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Inverter Drives 8400 StateLine C _ _ _ _ _

Reference manual

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Overview of technical documentation for Inverter Drives 8400

Project planning, selection & ordering

- ☐ 8400 hardware manual
- ☒ Catalogue

Mounting & wiring

- ☒ MA 8400 BaseLine/StateLine/HighLine/TopLine
- ☒ MA for the communication module
- ☒ MA for the extension module
- ☒ MA for the safety module
- ☒ MA for the accessories

Parameterisation

- ☒ BA keypad
- ☐ SW 8400 BaseLine
- ☐ SW 8400 StateLine
- ☐ SW 8400 HighLine
- ☐ SW 8400 TopLine
- ☐ KHB for the communication module

← This documentation

Drive commissioning

- ☐ SW 8400 BaseLine/StateLine/HighLine/TopLine
 - chapter "Commissioning"
 - chapter "Diagnostics & error management"
- ☐ Remote maintenance manual

Networking

- ☐ KHB for the communication medium used

Legend:

- ☒ Printed documentation
- ☐ Online documentation (PDF/Engineer online help)

Abbreviations used:

- BA Operating Instructions
- KHB Communication manual
- MA Mounting instructions
- SW Software/reference manual

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1 About this documentation

1.1 Document history

1 About this documentation



Danger!

The controller is a source of danger which may lead to death or severe injury of persons.

To protect yourself and others against these dangers, observe the safety instructions before switching on the controller.

Please read the safety instructions provided in the **8400 mounting instructions** and in the **8400 hardware manual**. Both documents are supplied with the controller.

Target group

This documentation addresses to all persons who would like to parameterise, configure and diagnose the 8400 StateLine with the Lenze engineering software »Engineer« and the X400 keypad.

Validity

The information in this documentation are valid for the following standard devices:

Product series	Type designation	from software version
8400 StateLine C	E84AVSCxxxxx	01.00

Screenshots/application examples

All screenshots provided in this documentation are application examples. Depending on the software version of the controller and the version of the installed »Engineer« software, the screenshots in this documentation may differ from the representation in the »Engineer«.



Tip!

Information and tools for Lenze products are provided in the download area at

<http://www.lenze.com> → Download

1.1 Document history

Version			Description
12.0	06/2014	TD05	Extended by new functions for 8400 StateLine C V15.00.00
11.0	11/2013	TD05	Extended by new functions for 8400 StateLine C V14.00.00
10.0	11/2012	TD05	Extended by new functions for 8400 StateLine C V13.00.00 and converted to new layout.
9.1	09/2012	TD05	Error corrections & supplements
9.0	08/2012	TD05	Extended by new functions for 8400 StateLine C V12.00.00
8.0	10/2011	TD05	Extended by new functions for 8400 StateLine C V11.00.00
7.1	02/2011	TD05	Error corrections & supplements
7.0	11/2010	TD05	Extended by new functions for 8400 StateLine C V06.00.00 and V10.00.00

1.2

Conventions used

This documentation uses the following conventions to distinguish between different types of information:

Type of information	Writing	Examples/notes
Spelling of numbers		
Decimal separator	Point	The decimal point is generally used. Example: 1234.56
Hexadecimal number	0x	For hexadecimal numbers, the "0x" prefix is used. Example: 0x60F4
Binary number	0b	For binary numbers, the "0b" prefix is used. Example: 0b00010111
Text		
Version info	Blue text colour	All information that only applies to a certain controller software version or higher is identified accordingly in this documentation. Example: This function extension is available from software version V3.0!
Program name	» «	The Lenze »Engineer« PC software ...
Window	<i>italics</i>	The <i>Message</i> window ... / The <i>Options</i> dialog box...
Variable identifier		By setting <i>bEnable</i> to TRUE...
Control element	bold	The OK button... / The Copy command... / The Properties tab... / The Name input field...
Sequence of menu commands		If the execution of a function requires several commands, the individual commands are separated by an arrow: Select File→Open to...
Shortcut	< bold >	Press <F1> to open the online help.
		If a command requires a combination of keys, a "+" is placed between the key symbols: Use <Shift>+<ESC> to...
Hyperlink	<u>Underlined</u>	Optically highlighted reference to another topic. In this documentation activated by mouse-click.
Icons		
Page reference	 16	Optically highlighted reference to another page. In this documentation activated by mouse-click.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

All information that only applies to a certain controller software version or higher is identified accordingly in this documentation.

1.3

Terminology used

Term	Meaning
Engineering Tools	Software solutions for simple engineering at all stages  »EASY Navigator« – Ensures easy operator guidance • All practical Lenze engineering tools at a glance • Tools can be selected quickly • Clearly arranged, simplifying the engineering process from the start  »EASY Starter« – Simple tool for service technicians • Especially developed for the commissioning and maintenance of Lenze devices • Graphical user interface with few buttons • Simple online diagnostics, parameterisation and commissioning • No risk of accidentally changing the application • Ready applications can be loaded to the device  »Engineer« – Multi-device engineering • For all products from our L-force portfolio • Practice-oriented user interface • Easy handling due to graphical user interfaces • Suitable for all project stages (configuration, commissioning, production) • Parameter setting and configuration
Application block	Block for a technology application (e.g. actuating drive speed) A technology application is a drive solution based on the experience and know-how of Lenze in which function blocks interconnected to a signal flow form the basis for implementing typical drive tasks.
ASM	Abbreviation for asynchronous motor
CAN	Abbreviation for Controller Area Network. CAN is an asynchronous, serial fieldbus system.
	CANopen® is a communication protocol based on CAN. The Lenze system bus (CAN on board) operates with a subset of this communication protocol. CANopen® is a registered community trademark of the CAN user organisation CiA® (CAN in Automation e. V.). ► System bus "CAN on board"
Code	Parameter used for controller parameterisation or monitoring. The term is usually called "index".
Display code	Parameter that displays the current status or value of an input/output of a system block.
Emergency brake	The emergency brake serves to shutdown rotary or translatory masses in motion in emergency situations. Emergency situations are exceptional situations that only occur sporadically.
	EtherCAT® is a real-time capable Ethernet system with maximum performanc. EtherCAT® is a registered trademark and patented technology, licensed by the Beckhoff Automation GmbH, Germany.
	Ethernet POWERLINK is a real-time capable fieldbus system based on Ethernet. For user data exchange, Ethernet POWERLINK specifies a communication protocol based on CANopen. Ethernet POWERLINK is a patented technology licensed by the Ethernet POWERLINK Standardization Group (EPG), Germany.
	EtherNet/IP™ (EtherNet Industrial Protocol) is a fieldbus system based on Ethernet which uses the Common Industrial Protocol™ (CIP™) for data exchange. EtherNet/IP™ and Common Industrial Protocol™ (CIP™) are trademarks and patented technologies licensed by the user organisation ODVA (Open DeviceNet Vendor Association), USA.
FB Editor	Abbreviation for function block editor. Graphic interconnection tool which is available in the »Engineer« for function block interconnections on the FB Editor. ► Working with the FB Editor

Term	Meaning
Function block	General designation of a function block for free interconnection in the FB Editor. A function block (short: FB) can be compared with an integrated circuit that contains a specific control logic and delivers one or several values when being executed. Example: "L_Arithmetik_1" (FB for arithmetic operations) Many function block are available several times (e.g. L_And_1, L_And_2 and L_And_3). ► Function blocks
Holding brake	The holding brake serves to statically hold e.g. a position during the downtimes of a robot/travelling/synchronous/hoist drive.
	INTERBUS was developed as sensor/actuator/bus system for transmitting process data. Today, maintenance activities for the INTERBUS technologies are carried out by the user organisation PROFIBUS & PROFINET International (PI).
Keypad	The keypad is an alternative to the PC for the local operation, parameterisation, and diagnostics in a simple manner.
LA	Abbreviation for Lenze Application block Example: "LA_NCtrl" (block for the "Actuating drive speed" application)
Lenze setting	This setting is the default factory setting of the device.
LP	Abbreviation for Lenze Port block Example: "LP_CanIn1" (CAN1 port block)
LS	Abbreviation for Lenze System block Example: "LS_DigitalInput" (system block for digital input signals)
MCI	Abbreviation for Motionbus Communication Interface (fieldbus interface) The Inverter Drives 8400 can accommodate plug-in communication modules and can therefore take part in the data transfer of an existing fieldbus system. ► Fieldbus interface (MCI)
Port block	Block for implementing the process data transfer via a fieldbus
	PROFIBUS® (Process Field Bus) is fieldbus system used worldwide for automating machines and production plants. PROFIBUS® is a registered trademark and patented technology licensed by the user organisation PROFIBUS & PROFINET International (PI).
	PROFINET® (Process Field Network) is a real-time capable fieldbus system based on Ethernet. PROFINET® is a registered trademark and patented technology licensed by the user organisation PROFIBUS & PROFINET International (PI).
PSM	Abbreviation for permanently excited synchronous motor
QSP	Abbreviation for quick stop
SC	Abbreviation for Servo Control
Service brake	The service brake serves to shutdown rotary or translatory masses in motion in a controlled manner. The energy to be dissipated in this process is produced in the form of friction energy. Unlike emergency braking, this process is a regular and recurring operating mode.
SLPSM	Abbreviation for sensorless control of synchronous motors
SLVC	Abbreviation for SensorLess Vector Control
Subcode	If a code contains several parameters, these are stored in "subcodes". This Manual uses a slash "/" as a separator between code and subcode (e.g. "C00118/3"). The term is usually called "subindex".
System block	System blocks provide interfaces to basic functions, to "free codes" and to the hardware of the controller in the FB editor of the »Engineer« (e.g. to the digital inputs). Each system block is only available once. ► System blocks
USB diagnostic adapter	The USB diagnostic adapter is used for the operation, parameterisation, and diagnostics of the controller. Data are exchanged between the PC (USB connection) and the controller (diagnostic interface on the front) via the diagnostic adapter. Order designation: E94AZCUS
VFCplus	Abbreviation for Voltage Frequency Control

1.4

Definition of the notes used

The following signal words and symbols are used in this documentation to indicate dangers and important information:

Safety instructions

Layout of the safety instructions:

**Pictograph and signal word!**

(characterise the type and severity of danger)

Note

(describes the danger and gives information about how to prevent dangerous situations)

Pictograph	Signal word	Meaning
	Danger!	Danger of personal injury through dangerous electrical voltage Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Danger!	Danger of personal injury through a general source of danger Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
	Stop!	Danger of property damage Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph	Signal word	Meaning
	Note!	Important note to ensure trouble-free operation
	Tip!	Useful tip for easy handling

2 Introduction: Parameterising the controller

Being a component of a machine which includes a speed-variable drive system, the controller needs to be adjusted to its drive task. The controller is adjusted by changing parameters which are saved in the memory module. The parameters can be accessed by keypad, by the »EASY Starter« or by the »Engineer«. Access is also possible by a master control via fieldbus communication. For this purpose, the "CAN on board" CAN interface and the MCI interface for using a communication module (e.g. PROFIBUS) are available.

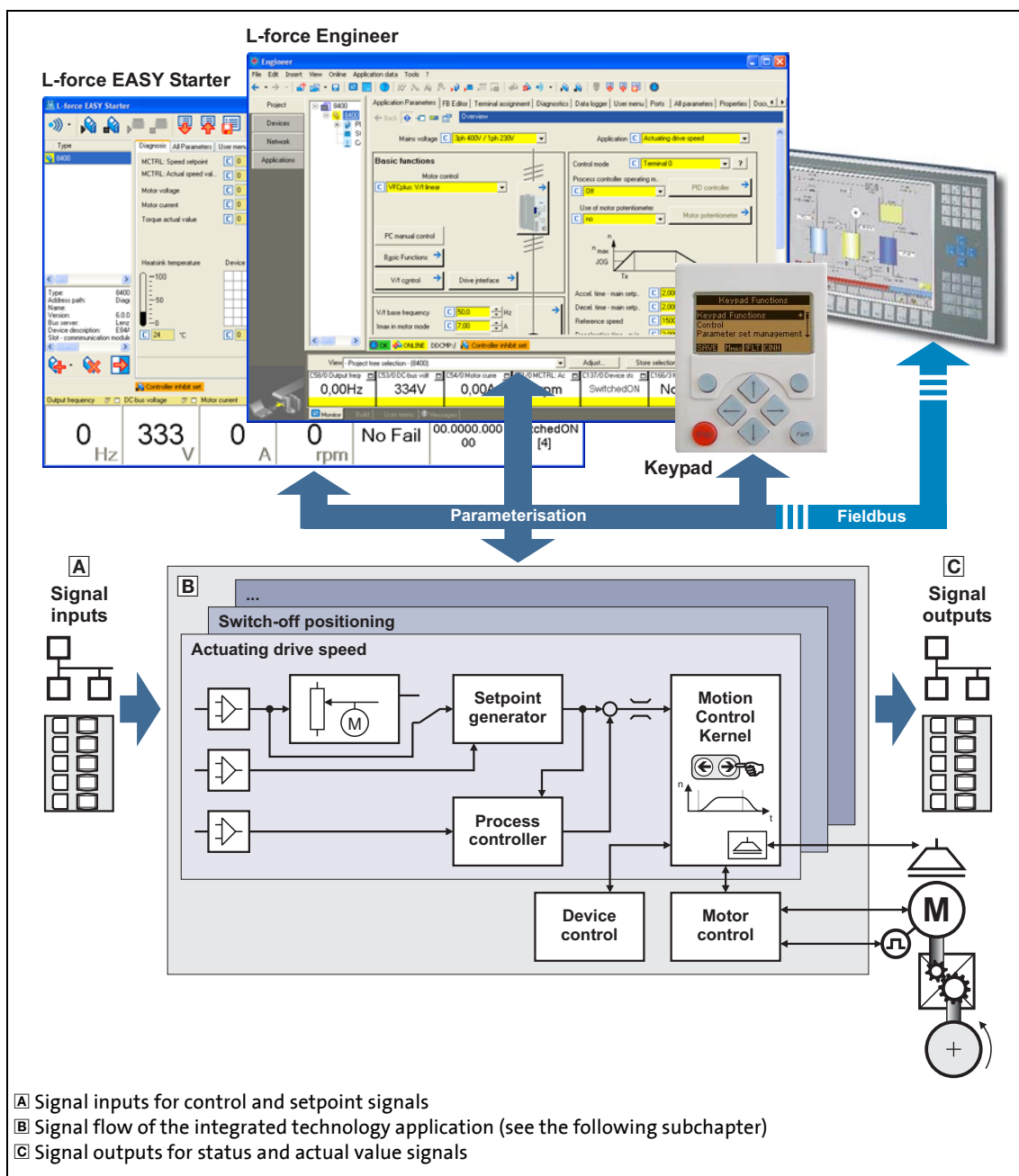


Danger!

In general, changing a parameter causes an immediate response in the controller!

An enabled controller can cause an unwanted behaviour at the motor shaft! For instance, setpoint sources can change over abruptly (e.g. when the signal source is configured for the main setpoint).

Certain device commands or settings which may cause critical states of drive behaviour constitute exceptions. Such parameter changes are only possible if the controller is inhibited. Otherwise, a corresponding error message will be issued.



[2-1] Adaptation of the drive solution via parameter setting

2.1 Integrated technology applications

The following technology applications integrated in the drive controller 8400 StateLine provide the main signal flow for the implementation of a general or a special drive solution:



Technology application "Actuating drive speed"

This preset technology application serves to solve speed-controlled drive tasks, e.g. conveyor drives (interconnected), extruders, test benches, vibrators, travelling drives, presses, machining systems, metering units.



technology application "Actuating drive speed (AC Drive Profile)"

This technology application available [from version 13.00.00](#) provides a speed and torque control by means of "AC Drive Profile". The fieldbuses EtherNet/IP™ and system bus (CANopen) are supported.



"Switch-off positioning" technology application

This technology application available [from version 04.00.00](#) is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. The pre-switch off is implemented by connecting switch-off sensors.



Note!

Please note that the "StateLine", "HighLine" and "TopLine" device types differ with regard to the number, functional range, and flexibility of the technology applications offered.



Detailed information on each technology application can be found in the main chapter "[Technology applications](#)". ([book icon](#) 296)

2.1.1 Purpose of the technology applications

The stepped Inverter Drives 8400 series provides solutions for simple to complex applications – depending on the user's experience and knowledge about the handling of drives and drive tasks.

On the one hand, a great scope of standard drive tasks for frequency inverters is covered by the technology applications offered by Lenze, and on the other hand, the user is relieved from time-consuming programming activities. In practice, some drive tasks are alike so that minor modifications of the corresponding technology applications lead to quick results.

Other important features of technology applications are:

- Direct implementation of drive tasks without recreating a function block interconnection inside the device
- Operation via keypad and/or operation via convenient operator dialogs in the «Engineer».
- Commissioning via few operating and diagnosing parameters (local keypad operation).
- Achieving a transparency as high as possible via the integrated functionality of the device by representing signal flow diagrams.
- Provision of a basic functionality suitable and often sufficient for many applications.

2.1.2 Application cases for a technology application

You should use a technology application if

- the task can be solved completely or to a great extent by the basic functionality of the technology application.
- the end customer does not want to create the comprehensive core functions of the corresponding technology on his own.
- the creation time for a project is to be reduced by using the ready-made technology application
- the end customer wants to build upon the know-how of Lenze.



Tip!

If the end customer of the machine does not want to use ready-made Lenze functions, it is also possible to implement individual drive solutions with the "Stateline C", "HighLine C" and "TopLine C" versions in the form of "free interconnections". (In case of "Stateline C2, free interconnection is only possible from version 12.00.00 and »Engineer« V2.17.)

Here, a technology application can be used as starting basis, which has to be adapted to the requirement by a change or extension via function block editor (see the following chapter).

2.1.3 Technology application = function block interconnection

In case of the 8400 device version, each technology application is connected to a "function block interconnection" ("FB interconnection"). This FB interconnections serve to implement signal interconnections. Various FBs are available for digital signal processing, signal conversion and logic modules.

For special drive tasks it has proved of value to use the integrated technology applications as a basis for modifications or extensions of the available FB interconnections.

I/O level & application level

The interconnection of the interfaces is shown in the I/O level of the function block editor according to the selected control mode. In the "deeper" application level, the main signal flow is realised in the form of an interconnection of various function and system blocks.

For the device versions "StateLine C", "HighLine C" and "TopLine C" the following applies:

- The preconfigured signal links can be reconfigured in the I/O level if required.
- Moreover, applications integrated in the controller can be reconfigured in the application level and extended by individual functions.
- Moreover, experienced users are offered the opportunity to implement their own drive solutions independent of the predefined technology applications by using so-called "free interconnections". (In case of "StateLine C", free interconnection is only possible from version 12.00.00 and »Engineer« V2.17.)

Motion Control Kernel

Important basic (drive) functions as well as further basic functionalities are implemented in the firmware of the drive controller in the so-called **Motion Control Kernel** (MCK) which can be accessed by the active technology application via defined internal interfaces. By this means the expensive creation of single function block interconnections is omitted so that the expenditure and the complexity for the realisation of standard functions is minimised.

The **Motion Control Kernel** is integrated in the main setpoint path and, depending on the set operating mode, it creates the required control and setpoint signals for the motor control and the drive interface.



More detailed information:

- A detailed description of the basic functions implemented in the **Motion Control Kernel** can be found in the main chapter "[Basic drive functions \(MCK\)](#)". (📖 390)
- Detailed information on the creation or change of interconnections by means of the function block editor can be found in the main chapter "[Working with the FB Editor](#)". (📖 857)
- All available function and system blocks are described in the main chapter "[Function library](#)". (📖 909)

2.2 Selection of the appropriate commissioning tool

There are several possibilities for commissioning the 8400 StateLine controller:



Commissioning via keypad X400 (or diagnosis terminal X400)

The keypad is an alternative to the PC for the local operation, parameterisation, and diagnostics in a simple manner. The keypad is especially suited for test and demonstration purposes and for the case that only few parameters have to be adapted.



Commissioning using PC and »EASY Starter«

The »EASY Starter« is a Lenze tool for simple online diagnostics, parameterisation and commissioning of the controller.



Commissioning using PC and »Engineer«

The »Engineer« is a Lenze engineering software for parameter setting across all devices, configuring and diagnosing individual components (as for instance controllers, industrial PCs, motors, I/O systems) and machine control systems.



Tip!

The engineering tools »EASY Starter« and »Engineer StateLevel« are provided free of charge in the internet:

<http://www.lenze.com> → Download → Software Downloads

For communication between PC and controller, the USB diagnostic adapter can be used for instance (see the following subchapter).

2.2.1 Overview: Accessories for commissioning

Version	Features	Product key
Keypad X400 	Quick access to parameters and operating data • Supports hot plugging • Graphic display with plain texts • Backlighting • Easy user guidance • 4 navigation keys, 2 context-sensitive keys • Adjustable RUN/STOP function • Can be used for L-force Inverter Drives 8400 and Servo Drives 9400	EZAEBK1001
Diagnosis terminal X400 	Keypad X400 in a robust housing, also suitable for installation into the control cabinet door. • Supports hot plugging • Graphic display with plain texts • Backlighting • Easy user guidance • 4 navigation keys, 2 context-sensitive keys • Adjustable RUN/STOP function • Incl. 2.5 m cable • Enclosure IP20; in case of front installation in control cabinet IP65 • Can be used for L-force Inverter Drives 8400 and Servo Drives 9400	EZAEBK2001
USB diagnostic adapter 	For electrical isolation of your PC and the controller. • Supports hot plugging • Diagnostic LED for data transfer display • plug and play • Input-side voltage supply via USB connection from PC • Output-side voltage supply via the diagnostic interface of the controller • Connecting cables can be selected in various lengths:	E94AZCUS
Connecting cable for USB diagnostic adapter	2.5 m length	EWL0070
	5 m length	EWL0071
	10 m length	EWL0072

2.3**General notes on parameters**

All parameters for controller parameterising or monitoring are saved as so-called "codes".

- The codes are numbered and indicated by the prefix "C" before the code, e.g. "C00002".
- Moreover, each code has a name and specific attributes, as for example access type (reading, writing), data type, limit values and default setting ("Lenze setting").
- For the sake of clarity, some codes contain "subcodes" for saving parameters. This Manual uses a slash "/" as a separator between code and subcode, e.g. C00118/3".
- According to their functionality, the parameters are divided into three groups:
 - Setting parameters: For specifying setpoints and for setting device / monitoring functions.
 - Configuration parameters: For configuring signal connections and terminal assignments.
 - Diagnostic/display parameters: For displaying device-internal process factors, current actual values and status messages. These are read-only parameters.

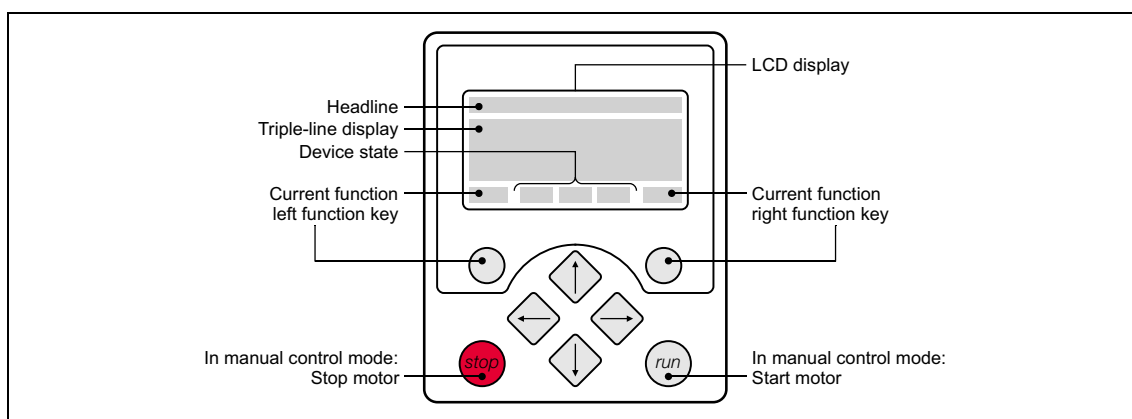
2.3.1 Changing the parameterisation with the keypad



The keypad is simply plugged on the diagnostic interface X6 ("DIAG") at the front of the standard device.

Plugging and unplugging the keypad is possible during operation.

Keypad display and control elements



LCD display

Headline

In the menu level: Menu name

In the parameter level: Parameter name

Three-part display

In the menu level: List of available menus

In the parameter level: Code/subcode and setting or actual value

Device status

RDY	Controller is switched on	IMP	Pulse inhibit active
RUN	Controller is enabled	ISFLT	System fault active
CINH	Controller is inhibited	IFLT	"Fault" device status is active
QSP	Quick stop active	ITRB	"Trouble" device status is active
Imax	Current limit exceeded	ITQSP	"TroubleQSP" device status is active
Mmax	Speed controller 1 in the limitation	WRN	A warning is indicated

LCD display			
Function - left function key		Function - right function key	
	Change parameter setting (change to editing mode)		Accept change in the controller (no saving with mains failure protection → SAVE)
	Back to main menu		Abort (discard change)
	Parameter can only be changed when the controller is inhibited		
	Save all parameter settings in the memory module safe against mains failure		

Control elements	
	Execute the function assigned to the function key (see LCD display)
	Execute the stop function set in C00469 (Lenze setting: Inhibit controller)
	Deactivate stop function again (Lenze setting: Enable controller again)
	In the menu level: Select menu/submenu In the parameter level: Select parameter
	In the editing mode: Change marked digits or select list entry
	In the menu level: Select submenu/change to parameter level In the editing mode: Cursor to the right
	In the menu level: One menu level higher (if available) In the parameter level: Back to the menu level In the editing mode: Cursor to the left

Menu structure

In the keypad, the parameters are classified into various menus and submenus.

- The **USER menu** includes a selection of frequently used parameters.
- The **Code list** contains all parameters.
- The **Go to param** function enables you to reach the corresponding parameter directly.
- The **Logbook** logs all errors and their chronological history.
- The **Diagnostics** menu contains diagnostic/display parameters for displaying device-internal process factors, current actual values and status messages.

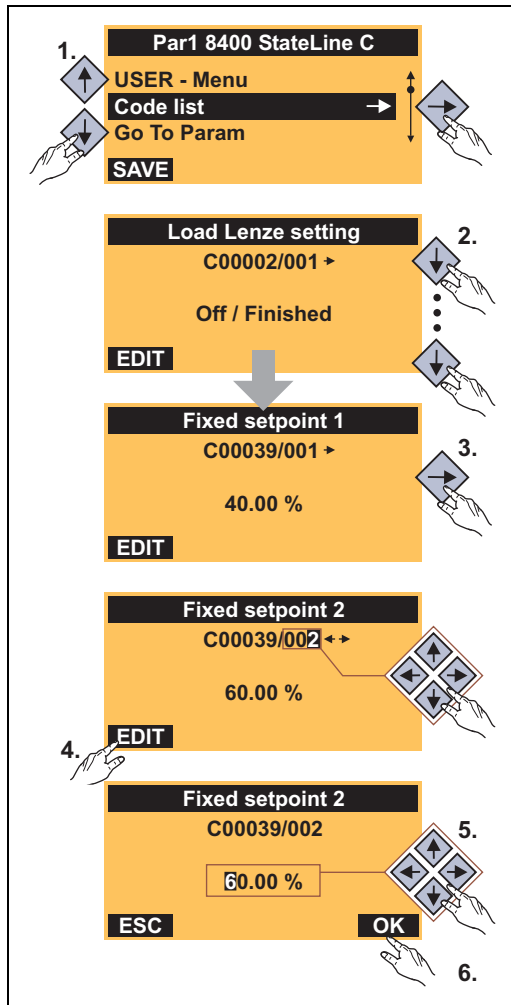
Userlevel

From version **12.00.00 onwards**, the extent of menus, submenus and codes shown in the keypad can be adapted by selecting the "Userlevel" in [C00001/1](#):

- Userlevel **Standard** (Lenze setting): Only the most important menus and codes are shown in the keypad.
- Userlevel **Expert**: All menus and codes are shown in the keypad.
- Userlevel **Service**: For service purposes only (Lenze service).

When the Userlevel has been changed, the menus are restructured in the keypad according to the selected Userlevel. The parameters of a plugged in communication module are always displayed completely independent of the set Userlevel.

General operation



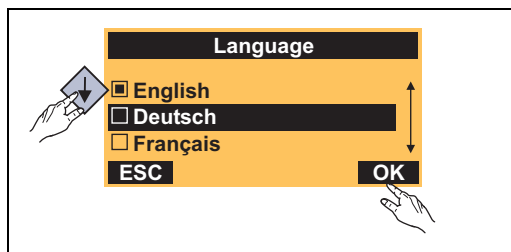
[2-2] Example: Changing parameters with the keypad

1. Use the $\uparrow/\downarrow$ navigation keys to select the desired menu.
 - Use the $\uparrow/\downarrow$ navigation keys to reach a higher/lower menu level.
 - Use the ESC function key to return to the main menu.
2. Use the $\uparrow/\downarrow$ navigation keys to select the parameter to be set within a submenu.
3. In order to select another subcode in case of a parameter with subcodes:
 - Press the navigation key $\leftarrow$ to change to the editing mode for the subcode.
 - Use the navigation keys to set the desired subcode.
4. Use the **EDIT** function key to switch over to the editing mode.
5. Use the navigation keys to set the desired value.
6. Use the **OK** function key to accept the change and to leave the editing mode.
 - Use the **ESC** function key to leave the editing mode without accepting the change.

Multilingualism

All texts displayed in the keypad are in English.

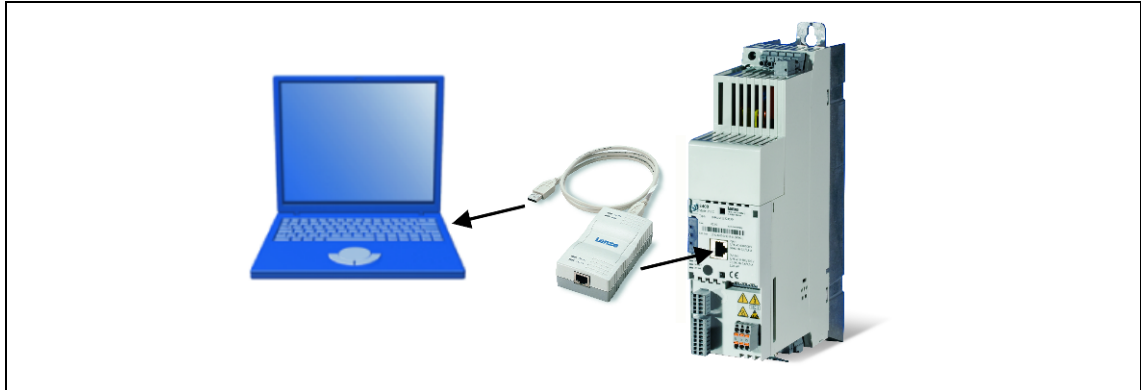
From version 11.00.00 onwards, the most important menus as well as diagnostic and configuration parameters can be also available in German and French. To set a different language, select the **Language selection** menu item in the main menu of the keypad.



- The multilingual texts are stored in the controller and do not have to be loaded into the device.
- For reasons of disc space, only the most important menus and parameters as well as the error messages are available in several languages.

2.3.2 Change parameter settings with PC and Lenze software

The USB diagnostic adapter, for instance, can be used for the communication between the PC (including the »Engineer« software) and the controller, see the following illustration. The USB diagnostic adapter is the connection between the PC (free USB port) and the controller (X6 diagnostic interface).



[2-3] Exemplary constellation for parameterising the controller

The **All parameters** tab in the »EASY Starter« and the »Engineer« provides a quick access to all parameters of the controller.

The given categories and subcategories correspond 1:1 to the menus and submenus of the keypad:

	C...	S...	Name	Value	Unit
	2	1	Load Lenze setting	Off / ready	
	2	6	Load all parameter sets	Off / ready	
	2	19	Reset error	Off / ready	
	5	0	Application	Actuating drive speed	
	7	0	Control mode	Terminal 0	
	10	1	AIN1: (+y0) = min	0.00	%
	10	3	AIN1: (-y0) = (-min)	0.00	%
	11	0	Appl.: Reference speed	1500	rpm
	12	0	Accel. time - main setpoint	2,000	s
	13	0	Decel. time - main setpoint	2,000	s
	15	0	VFC: V/f base frequency	50.0	Hz

[A] Category
 [B] Subcategories

[2-4] All parameters tab in the »Engineer«

Moreover, the »Engineer« provides a commissioning interface on the **Application parameters** tab where you can commission the application in a few steps.



Detailed information on how to handle the »Engineer« can be found in the integrated online help that you can call with the [F1] function key.

2.3.3 Save parameter settings in the memory module safe against mains failure

Controller parameter changes via the EASY Starter / »Engineer«, the keypad, or a master control via fieldbus communication will be lost after mains switching of the controller unless the settings have been explicitly saved to the integrated memory module.

General information

- In the delivery state, the Lenze setting of the parameters has been saved to the integrated memory module. These parameters are
 - the parameters of the controller
 - the parameters of the communication module plugged into the MCI interface
 - the parameters of the possibly existing safety module (device variant)
- When the device or the external 24 V voltage supply is switched on, all parameters are automatically loaded from the memory module into the main memory of the controller.
- Full functionality of the memory module is even provided if the power supply has been switched off and only the electronic components of the controller are externally supplied by a 24 V DC voltage, e.g. via the X4/24E terminal.
- The memory module can be preconfigured with customised data.
- The memory module is available as a spare part - without any data.

During operation

- Parameter sets can be saved and loaded manually.
- Using the keypad, you can press function key **SAVE** to save the parameter settings.
- The »EASY Starter«/»Engineer« serves to execute the saving via the icon  in the *toolbar* or via the device command "Save all parameter sets" ([C00002/11](#) = "1: On / start").
 - The storage process may take a couple of seconds. After the device command has been called in [C00002/11](#), dynamic status information ("Work in progress 20%" → "Work in progress 40%" → "Work in progress 60%", etc.) is returned.



Note!

In order to prevent data inconsistencies during the saving process:

- Do not switch off the supply voltage!
- Do not remove the memory module from the device!

Automatic saving of changed parameter settings is explicitly not supported because this significantly reduces the service life of the memory module.

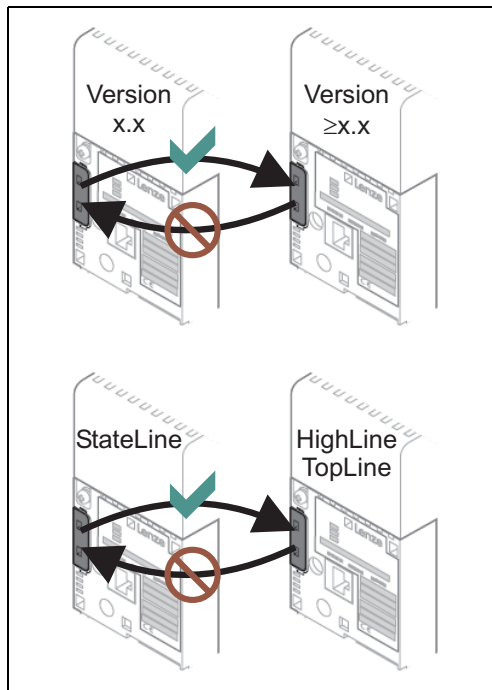
Unplugging the memory module

The memory module is hot-pluggable. A removal during operation causes a warning "[PS01: No memory module](#)" and should thus be avoided. The behaviour of the device, however, remains unchanged as all parameters are available in the RAM memory after the device has been started. The device can also be parameterised when the memory module has been unplugged. In this case, the parameter sets cannot be saved in the memory module.

Replacing the controller

In the event of a device replacement, the entire parameter data of an axis can be copied to the replacement device by "taking along" the memory module, so that additional PC or keypad operations are not required.

When replacing the controller, the versions of the old device and the new device are of importance. Before data are actually transferred, the versions are internally checked. Basically, the following applies:



- Parameter sets of old devices can only be processed on new devices with the same or higher device version (downward compatibility).
- Parameter sets of devices with versions that have less functions (e.g. 8400 StateLine) can be loaded into and executed on devices with versions that have more functions (e.g. 8400 HighLine). The reverse is not possible!
- If the parameter set saved in the memory module is not compatible with the standard device, the "[PS03: Par.set device invalid](#)" is output.

2.3.4 User menu for quick access to frequently used parameters

When a system is installed, parameters must be changed time and again until the system runs satisfactorily. The user menu of the controller contains a selection of frequently used parameters to be able to access and change these parameters quickly:

Parameter	Name	Lenze setting
C00051	MCTRL: Actual speed value	-
C00053	DC-bus voltage	-
C00054	Motor current	-
C00061	Heatsink temperature	-
C00137	Device status	-
C00166/3	Mess. - status det. error	-
C00011	Appl.: Reference speed	1500 rpm
C00039/1	Fixed setpoint 1	40.00 %
C00039/2	Fixed setpoint 2	60.00 %
C00012	Acceleration time - main setpoint	2.000 s
C00013	Deceleration time - main setpoint	2.000 s
C00015	VFC: V/f base frequency	50 Hz
C00016	VFC: Vmin boost	1.60 %
C00022	I _{max} in motor mode	depending on the device power
C00120	Setting of motor overload (I ² xt)	100.00 %
C00087	Rated motor speed	1460 rpm
C00099	Firmware version	-
C00200	Firmware product type	-
C00105	Decel. time - quick stop	2.000 s
C00173	Mains voltage	0: "3ph 400V / 1ph 230V"
Highlighted in grey = display parameter		



Tip!

The user menu can be freely configured in [C00517](#).

In the »Engineer«, you can configure the user menu comfortably via the **User menu** tab (see »Engineer« online help).

The [password protection](#) serves to restrict the access to parameters of the user menu. Then, all other parameters cannot be accessed without knowing the password and are thus protected against unwanted changes.

2.4 Device access protection

[This function extension is available from version 06.00.00!](#)

Various tasks can be executed via the functions of the device access protection:

- [Password protection](#)
 - Only authorised persons (with password knowledge) may read/change all parameters of the controller.
 - Non-authorised persons (without password knowledge) can only access the max. 32 parameters of the user menu.
- [Device personalisation](#)
 - Only controller personalised with a specific binding ID and memory modules can be used in the system.



Note!

If password protection/device personalisation is used:

- Inform the end customer that Lenze can only provide restricted service for the devices with access protection.
- It is not possible for Lenze to modify a replacement device via special accesses in such a way that it cooperates with a personalised memory module.
- The keypad does not support the alpha-numeric entry of a password, thus the keypad cannot be used for entry.

2.4.1 Password protection

When the password protection is active, only write/read access to the parameters of the user menu is possible.

- From version 15.00.00, the password protection can be configured individually for every single communication channel. ▶ [Individual password protection for single communication channels](#) (38)
- The following describes how to set/check/delete a password by means of the parameters relevant for these functions.
- From »Engineer« V2.14 onwards, these functions can also be executed via dialog (menu command **Online → Set/check/delete password**).



Note!

The password protection serves to only limit the access to parameters of the standard device. The access to parameters of a plugged-in communication module is not concerned.

Short overview of the relevant parameters for password protection:

Parameter	Info	Lenze setting						
C00505/3	Password • The password must have a length of 4 ... 16 characters. • The password may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9). Note: After the execution of one of the device commands listed below, this parameter returns the current password status: <table><tr><td>off</td><td>No password is set, password protection is not active (Lenze delivery status).</td></tr><tr><td>on</td><td>Password is set, password protection is active. • This status is also displayed if checking/deleting the password has not been successful due to an invalid entry. </td></tr><tr><td>ok</td><td>Password is set, password protection is not active. • The password protection is temporarily deactivated. </td></tr></table>	off	No password is set, password protection is not active (Lenze delivery status).	on	Password is set, password protection is active. • This status is also displayed if checking/deleting the password has not been successful due to an invalid entry.	ok	Password is set, password protection is not active. • The password protection is temporarily deactivated.	
off	No password is set, password protection is not active (Lenze delivery status).							
on	Password is set, password protection is active. • This status is also displayed if checking/deleting the password has not been successful due to an invalid entry.							
ok	Password is set, password protection is not active. • The password protection is temporarily deactivated.							
Device commands Before the following device commands are executed, enter the corresponding password in C00505/3 .								
C00002/31	Set password ▶ Activate the password protection	0: Off / ready						
C00002/32	Check password ▶ Temporarily deactivate the password protection	0: Off / ready						
C00002/33	Delete password ▶ Deactivate password protection/change password	0: Off / ready						
Highlighted in grey = display parameter								

Parameter	Info	Lenze setting
Status displays		
C00003	Status of the last device command	-
C00507/1	Password protection - all communication channels • Bit coded display of the active protective functions:	-
	Bit 0 Only access to user menu	
	Bit 1 Parameter write protection	
	Bit 2 Parameter read protection	
	Bit 3 ... 14 Reserved	
	Bit 15 Memory module binding on	
	Note: As the password protection can be configured individually for each single communication channel from version 15.00.00 bit 1 and bit 2 indicate the active protection always with regard to the communication channel <u>used</u> .	
Highlighted in grey = display parameter		

Activate the password protection

The password protection is activated by setting a password.



How to set a password:

- Enter the desired password in [C00505/3](#).
 - The password must have a length of 4 ... 16 characters.
 - The password may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9).
- Execute "Set password" device command: [C00002/31](#) = "1: On / start"
 - After successful execution, password status ON is displayed in [C00505/3](#) and password protection takes immediate effect.

Temporarily deactivate the password protection

The "Check password" device command serves to temporarily deactivate the password protection in order to execute password-protected functions.

- The password protection remains deactivated until
 - an invalid password will be entered and checked
 - or -
 - the external 24-V supply of the control electronics is switched off (< 19 V).



How to temporarily deactivate the active password protection:

- Enter the set password in [C00505/3](#).
- Execute "Check password" device command [C00002/32](#) = "1: On / start"
 - After a successful check, password status OK is displayed in [C00505/3](#).

Deactivate password protection/change password

The password protection is simply activated by deleting the set password. If you want to change the set password, first delete the set password as well. Then set the new password.



How to delete the set password:

1. Enter the set password in [C00505/3](#).
2. Execute "Delete password" device command [C00002/33](#) = "1: On / start"
 - After a successful deletion, password status OFF is displayed in [C00505/3](#).

2.4.2 Individual password protection for single communication channels

This function extension is available from version 15.00.00!

The 8400 StateLine can be parameterised via the following "communication channels":

- Internally via system blocks ([LS_ParReadWrite1-6](#) and [LS_WriteParamList](#))
- externally via
 - Diagnostics interface X6 ("DIAG")
 - CANopen interface X1 ("CAN on board")
 - Fieldbus interface (MCI)

As in some applications, only certain communication channels have to be protected, the parameters described in the following serve to configure individual access restrictions for each communication channel.

In the Lenze setting, all access restrictions are active for all communication channels when the password is set. This corresponds to the previous behaviour with a set password, i.e. only one write/read access to the parameters of the user menu is possible.



Note!

The configuration can only be changed if no password has been set!

- This means that even if the password has been deactivated temporarily by the "check password" device command, the configuration cannot be changed.
- As long as a password is set, the "Load Lenze setting" device command does not change the configuration either.

The password protection is activated by setting a password.

▶ [Activate the password protection](#) (📖 37)

▶ [Deactivate password protection/change password](#) (📖 38)

Short overview of the relevant parameters for configuring the password protection:

When the password is set, the respective restriction is active if the corresponding bit has been set:

Parameter	Info	Lenze setting
C00506/1	PW protection internal config	0x0007
	Bit 0 Only access to user menu • The menus in the keypad are reduced. • Only the user menu can be used to change parameters.	
	Bit 1 Parameter write protection • System blocks cannot be used to write into write/read parameters.	
	Bit 2 Parameter read protection • System blocks cannot be used to read write/read parameters.	
	Bit 3 ... 15 Reserved	
C00508/1	PW protection config. X6 (DIAG)	0x0006
	Bit 0 Reserved	
	Bit 1 Parameter write protection • The diagnostics interface X6 cannot be used to write into write/read parameters.	
	Bit 2 Parameter read protection • The diagnostics interface X6 cannot be used to read write/read parameters.	
	Bit 3 ... 15 Reserved	
C00509/1	PW protection config. X1 (CAN)	0x0006
	Bit 0 Reserved	
	Bit 1 Parameter write protection • The CANopen interface X1 cannot be used to write into write/read parameters.	
	Bit 2 Parameter read protection • The CANopen interface X1 cannot be used to read write/read parameters.	
	Bit 3 ... 15 Reserved	
C00510/1	PW protection config. MCI	0x0006
	Bit 0 Reserved	
	Bit 1 Parameter write protection • The fieldbus interface (MCI) cannot be used to write into write/read parameters.	
	Bit 2 Parameter read protection • The fieldbus interface (MCI) cannot be used to read write/read parameters.	
	Bit 3 ... 15 Reserved	

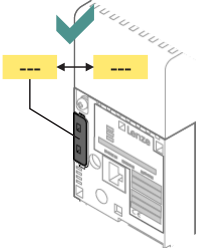
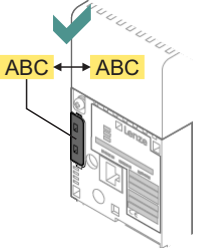
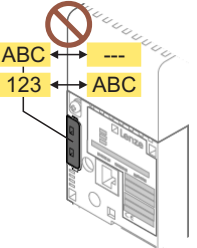
The parameter set must be saved to the device safe against mains failure to prevent password protection configured in the device from getting lost due to mains switching.



► [Save parameter settings in the memory module safe against mains failure](#) (32)

2.4.3 Device personalisation

The controller and the memory module are married via the device personalisation by means of a binding ID. When the device personalisation is active, all write/read actions between controller and memory module are only executed if both components have the same binding ID.

Lenze delivery status:	Procedure carried out by the customer:	Impermissible replacement by the end user:
		
No binding ID is set.	Customer sets binding ID for device personalisation.	When device personalisation is active: The replacement of the controller or memory module causes an error message if the binding ID is incorrect or not available.

If, for instance, a parameter set has been loaded from the memory module with an active device personalisation, saving of this parameter set on another memory module with a different or non-existent binding ID is not possible.

- Thus, copying the parameter set from a personalised memory module to a non-personalised memory module is not possible!

Two types of checks are distinguished:

- If a differing binding ID is detected when the controller is switched on (during device initialisation):
 - the "Fault" error response is returned.
 - The "[PS10: Invalid memory module binding](#)" error message is entered into the logbook.
- If a differing binding ID is detected while a device command for loading/saving the parameter set is executed:
 - Loading/saving is not executed.
 - A corresponding status for the device command is output in [C00003](#).

Short overview of the relevant parameters for device personalisation:

Parameter	Info	Lenze setting				
C00505/2	Binding ID • The binding ID must have a length of 4 ... 16 characters. • The binding ID may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9). Note: <u>After the execution</u> of one of the device commands listed below, this parameter returns the current binding ID status: <table><tr><td>off</td><td>No binding ID is set.</td></tr><tr><td>on</td><td>Binding ID is set.</td></tr></table>	off	No binding ID is set.	on	Binding ID is set.	
off	No binding ID is set.					
on	Binding ID is set.					
Highlighted in grey = display parameter						

Parameter	Info	Lenze setting
Device commands		
Before the following device commands are executed, enter the corresponding binding ID in C00505/2 .		
C00002/29	Set binding ID ▶ Activate device personalisation	0: Off / ready
C00002/30	Delete binding ID ▶ Deactivate device personalisation/change binding ID	0: Off / ready
Status displays		
C00003	Status of the last device command	-
C00507/1	Password protection - all communication channels • Bit coded display of the active protective functions:	-
	Bit 0 Only access to user menu	
	Bit 1 Parameter write protection	
	Bit 2 Parameter read protection	
	Bit 3 ... 14 Reserved	
	Bit 16 Memory module binding on	
Highlighted in grey = display parameter		

Activate device personalisation

The device personalisation is activated by setting a binding ID.



How to set the binding ID:

- Enter the desired binding ID in [C00505/2](#).
 - The binding ID must have a length of 4 ... 16 characters.
 - The binding ID may consist of any character. However, this is not sensible. Recommended characters are: lower case letters (a - z), upper case letters (A - Z) and digits (0 - 9).
- Execute "Set binding ID" device command [C00002/29](#) = "1: On / start"
 - After successful execution, status ON is displayed in [C00505/2](#).

Deactivate device personalisation/change binding ID

The device personalisation is simply deactivated by deleting the set binding ID. If you want to change the set binding ID, first delete the set binding ID as well. Then set the new binding ID.



How to delete the binding ID:

- Enter the set binding ID in [C00505/2](#).
 - If controller and memory module do not have the same binding ID, enter the binding ID of the memory module to delete the binding ID of both components.
- Execute "Delete binding ID" device command [C00002/30](#) = "1: On / start"
 - After a successful deletion, status OFF is displayed in [C00505/2](#).

2.4.4 Unlocking the controller with a MasterPin

Every controller has an individual master password called "MasterPin". By entering the MasterPin, a controller inhibited by the password mechanisms can be reset to the delivery status.



Stop!

When the MasterPin is used, the parameter set is reset to the Lenze setting both in the controller and in the memory module!

- This results in a permanent loss of the customised parameterisation that must be recreated!
- A reset to the Lenze setting can result in unforeseen level changes at the I/O terminals (e.g. brake control)!



How to restore the delivery status:

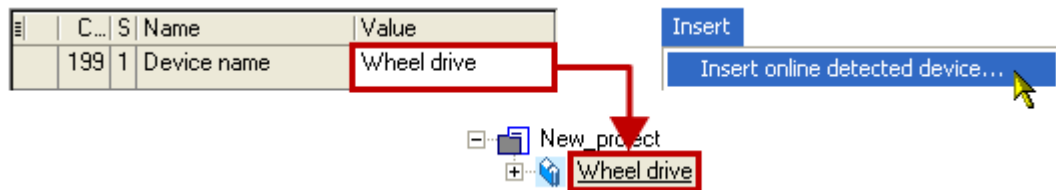
1. Inhibit the controller if it is enabled, e.g. via the [C00002/16](#) device command.
2. Enter the MasterPin in [C00505/1](#).
 - The MasterPin comprises the last 6 digits of the serial number of the memory module.
3. Execute "Check MasterPin" device command [C00002/28](#) = "1: On / start"

2.5 Device identification

For device identification, any device name (e.g. wheel drive) with max 32 characters can be set in [C00199/1](#) for the controller and saved in the memory module with mains failure protection.

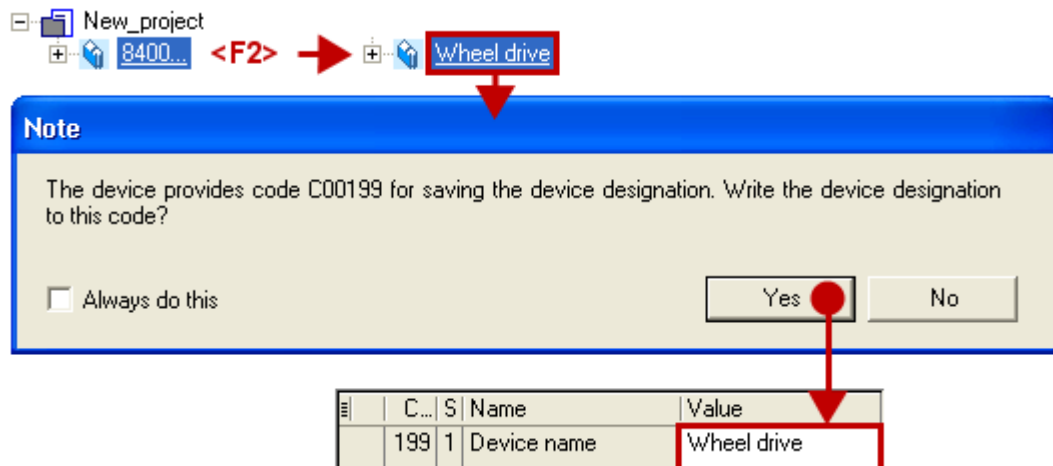
2.5.1 Automatic acceptance of the device name in the »Engineer«

If a device name is stored in [C00199/1](#) and the controller is added to the project in the »Engineer« via the **Einfügen → Insert device detected online...** function, the *device name* stored in ("8400 StateLine") [C00199/1](#) (here: wheel drive) is used as device name instead of the type:



This mechanism also functions in reverse direction:

If you rename the controller in the *project view* via **<F2>**, you will be asked afterwards if you want to take over the changed name in [C00199/1](#):



2.5.2 Extended item designation

This function extension is available from version 12.00.00!

In [C00199/2...5](#), four texts à max. 32 characters can be set for item designation and saved in the memory module safe against mains failure. These additional subcodes are not dependent on the previously described text acceptance mechanism in the »Engineer« for the device name ([C00199/1](#)).

3 Commissioning



Danger!

Unexpected motor movements can occur

Under certain conditions the motor may rotate after mains connection.

Possible consequences:

- Persons in the vicinity of the machine or plant risk getting hurt.
- Unexpected starting action may damage the machine or plant.

Protective measures:

- Commissioning with external 24 V supply and without mains voltage. In this case, the controller can only be parameterised and diagnosed during commissioning.
- Ensure that setpoints are not active.



Tip!

- Information on some of the operating statuses can quickly be obtained via the [LED status displays](#) on the front of the controller. (📖 421)
- **Check firmware:** Particularly with regard to the use of older controllers (e.g. if the customer is using one from stock) it makes sense to check the software (firmware) version. The software version of the controller can be seen on the nameplate in the "SW" line and can be determined by reading out code [C00099](#).
- **Restore delivery status:** Set code [C00002/1](#) to "1: On / start" to reset all parameter settings of the device to the Lenze setting. This leaves you with a defined device configuration. ▶ [Load Lenze setting](#) (📖 77)



The following chapters describe the commissioning of the available technology applications with the »Engineer«.

Information on how to commission using the keypad (or diagnosis terminal) can be found in the **8400 hardware manual**. The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 controller.

3.1 Safety instructions with regard to commissioning

General safety instructions

In order to prevent injury to persons or damage to material assets

- check before connecting the mains voltage
 - the wiring for completeness, short circuit, and earth fault
 - the "emergency stop" function of the entire system
 - that the motor circuit configuration (star/delta) is adapted to the output voltage of the controller
 - the in-phase connection of the motor
- check the setting of the most important drive parameters before enabling the controller:
 - the V/f rated frequency must be adapted to the motor circuit configuration!
 - the drive parameters relevant for your application must be set correctly!
 - the configuration of the I/O terminals must be adapted to the wiring!
- ensure that there are no active speed setpoints before enabling the controller.

Safety instructions with regard to motor operation



Danger!

- For thermal reasons, continuous operation of self-ventilated motors at a low field frequency and rated motor current is not permissible!
 - In the Lenze setting, the [Motor temperature monitoring \(PTC\)](#) is activated. (📖 242)
 - Activate the [Brake resistor monitoring \(I2xt\)](#) if necessary. (📖 243)
- [C00015](#) must be used to select 87 Hz operation if a delta-connected asynchronous motor (nameplate data: 400 V Δ / 230 V Δ) is to be operated in conjunction with a drive controller for a mains voltage of 400 V.

3.2 Notes on motor control

In the Lenze setting, the V/f characteristic control (VFCplus) as motor control is set in [C00006](#) with a linear characteristic.

- V/f characteristic control (VFCplus) is a motor control mode for classic frequency inverter applications on the basis of a simple and robust control procedure for the operation of machines with a linear or quadratic load torque characteristic (e.g. fans).
- The presettings of the parameters ensure that the controller is immediately ready for operation and the motor works adequately without further parameterisation if a controller and a 50 Hz asynchronous machine with matching performances are assigned to each other.



Note!

Check the nameplate data against the motor data set in the controller. Further information is provided in the chapter "[Motor selection/Motor data](#)". (105)

Recommendations for the following application cases:

- If the controller and motor differ greatly in terms of performance:
Set the I_{max} limit (in motor mode) in [C00022](#) to 2x rated motor current.
- If a high starting torque is required:
When the motor is idling, set a value for V_{min} boost in [C00016](#) which ensures that the rated motor current flows at a field frequency of $f = 3$ Hz (display in [C00058](#)).
- For noise optimisation:
In [C00018](#), set a switching frequency of "16 kHz var./drive-opt."
- If a high torque must be provided at small speeds without feedback:
Select "Sensorless vector control (SLVC) as motor control mode in [C00006](#).

Related topics:

- ▶ [Motor control \(MCTRL\)](#) (104)

3.3

Preconditions for commissioning with the »Engineer«

For commissioning, you need

- a PC that satisfies the following requirements:
 - processor with 1.4 GHz or higher
 - at least 512 MB RAM and 650 MB free hard disc space
 - Microsoft® Windows® 2000 operating system (from service pack 2 onwards) or Windows® XP
- the Lenze »Engineer« PC software
- a connection to the controller, e.g. via a USB diagnostic adapter:
 - connect the USB diagnostic adapter to the X6 diagnostic interface.
 - establish a connection between the USB diagnostic adapter and the PC via a free USB port.

**Tip!**

How to obtain/update the »Engineer« software:

- **Download from the internet:** The full version of the »Engineer StateLevel« is provided free of charge in the internet:
<http://www.Lenze.com> → Download → Software downloads
- **Requesting the CD** You can also request the »Engineer« separately on CD free of charge at your Lenze representative. See the "About Lenze" area on our homepage for e.g. the corresponding German address.

3.4 Trouble-shooting during commissioning

When the »Engineer« is used, trouble during commissioning can be detected and eliminated conveniently. Proceed as follows:

- Check whether error messages appear in the »Engineer«.
 - On the **Diagnostics** tab, relevant actual states of the controller and pending error messages are displayed in a well-arranged visualisation.
- Check the input terminals for their corresponding setpoints.
 - The **Terminal assignment** tab displays the current input/output signals.
- Check the signal flow of the application.
 - For this purpose, click the **Signal flow** button on the **Application parameter** tab. The displayed signal flow shows active setpoints and their further processing.

Related topics:

- ▶ [Diagnostics & error management](#) (📖 420)
- ▶ [LED status displays](#) (📖 421)
- ▶ [Error messages of the operating system](#) (📖 444)

3.5 Commissioning wizard 8400

This function extension is supported by the »Engineer« from version 2.15 onwards!

The **commissioning wizard 8400** serves to carry out a guided commissioning of the controller based on the Lenze setting of the parameters. The set parameters can then be saved in the controller with mains failure protection.



Note!

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

- ▶ [Safety instructions with regard to commissioning](#) (📖 45)



How to carry out a guided commissioning using the »Engineer«:

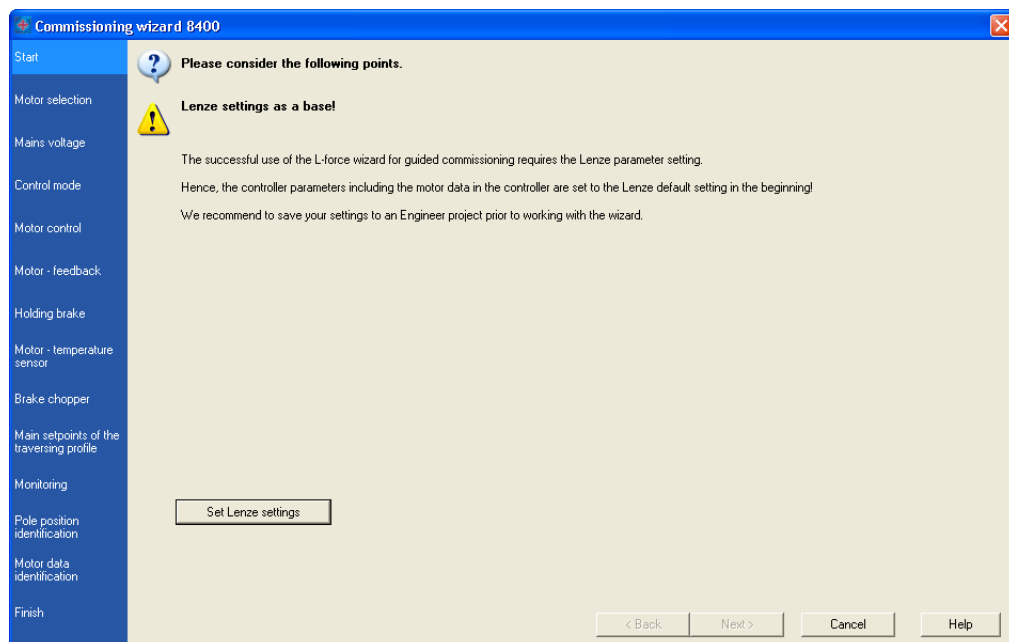
1. In the *Project view*, select the 8400 StateLine controller.

2.  Go online.

After a connection to the controller has been established, the following status is displayed in the *Status line*:



3. Click the  icon to open the *commissioning wizard 8400* dialog box.
 - Now the commissioning wizard guides you step by step through the setting of the important parameters for a quick commissioning.
 - The **Next** button can only be activated again after all parameter settings in the device have been reset via the **Load Lenze setting** button.



Related topics:

- ▶ [Commissioning of the "Actuating drive speed" technology application](#) (51)

3.6 Manual motor direction of rotation check (manual control)

The »Engineer« function "Manual control" easily allows for controlling the direction of rotation of the motor. The manual control serves to let the motor connected to the controller with an adjustable speed for an adjustable time.



Note!

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

► [Safety instructions with regard to commissioning](#) (45)



How to carry out a manual motor direction of rotation check using the »Engineer«:

1. In the *Project view*, select the 8400 StateLine controller.

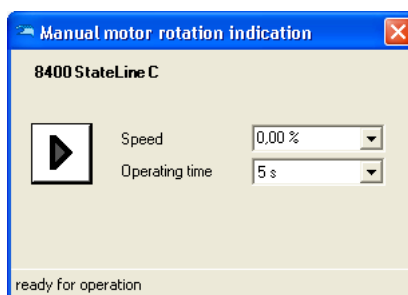
2. Go online.

After a connection to the controller has been established, the following status is displayed in the *Status line*:



3. Click the symbol to inhibit the controller via device command.
4. Ensure that the following conditions are met:
 - The mains voltage is switched on.
 - No trouble is active.
 - Safe torque off (STO) is not active.
5. Enable controller via terminal: Set terminal X5/RFR to HIGH level.
6. Click the icon to open the *Manual motor rotation indication* dialog box.

Note: If the "not ready for operation" status is displayed, check whether all conditions mentioned before (see steps 3 ... 5) have been met.



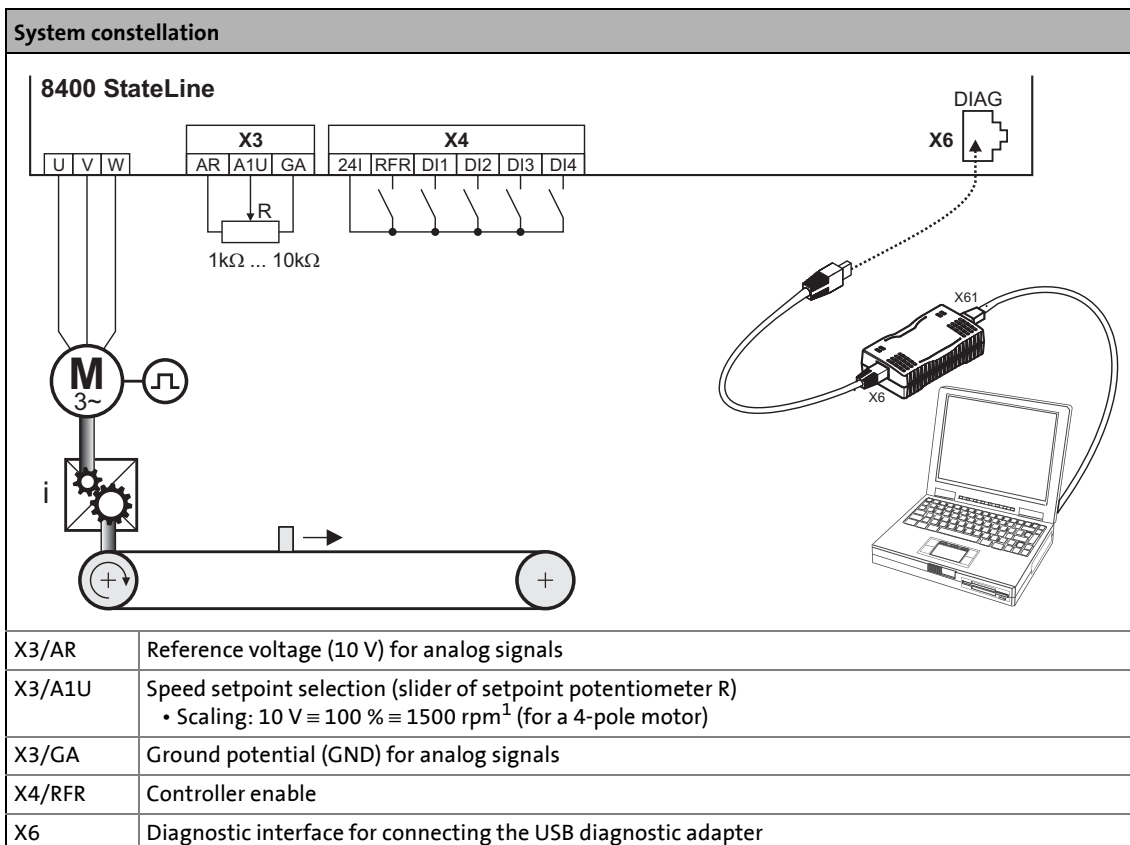
7. Set the desired speed and runtime.
(The speed refers to the reference speed set in [C00011](#).)
8. Click the button to let the motor rotate with the set speed for the set runtime.

By clicking the button, the function can be aborted.

**Note!**

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

► [Safety instructions with regard to commissioning](#) (45)



[3-1] Block diagram for wiring the commissioning example for the "Actuating drive speed" application

Commissioning steps

Find a description of the commissioning steps of the "Actuating drive speed" technology application below.

Please observe the sequence of the steps in the following chapters and follow them through carefully. This will help you to commission your controller quickly and as safely as possible:

- [Prepare controller for commissioning](#) (52)
- [Creating an »Engineer« project & going online](#) (53)
- [Parameterising the motor control](#) (54)
- [Parameterise application](#) (55)

► [Saving parameter settings safe against mains failure](#) (📖 57)

► [Enable controller and test application](#) (📖 57)

3.7.1 Prepare controller for commissioning

1. Power terminal wiring.

Refer to the mounting instructions supplied with the drive controller to find help on how to correctly design the power connections to match the requirements of your device.

2. Control terminal wiring.

The assignment for your digital inputs should correspond to one of the preconfigured control modes ([C00007](#)) for terminal control:

Control mode	Assignment of the digital terminals			
	DI1	DI2	DI3	DI4
Terminals 0	JOG 1/3	JOG 2/3	DCB	Cw/Ccw
Terminals 2	JOG 1/3	JOG 2/3	QSP	Cw/Ccw
Terminals 11	Cw/Ccw	DCB	MPotUp	MPotDown
Terminal 16	JOG 1/3	JOG 2/3	Cw/QSP	Ccw/QSP
Abbreviations used:				
JOG	Selection of fixed setpoints 1 ... 3 parameterised in C00039/1...3			
DCB	Manual DC-injection braking			
Cw/Ccw	CW/CCW rotation			
QSP	Quick stop			
MPotUp	Motor potentiometer: Increase speed			
MPotDown	Motor potentiometer: Reduce speed			
Cw/QSP	Fail-safe selection of the direction of rotation in connection with quick stop			
Ccw/QSP				

3. Inhibit controller: Set terminal X4/RFR to LOW level or open contact.

4. Connect USB diagnostic adapter.

5. Switch on voltage supply of the controller.

- Without motor operation: Connect external 24 V supply.
- With motor operation: Connect mains voltage.

If the green "DRV-RDY" LED is blinking and the red "DRV-ERR" LED is off, the controller is ready for operation and commissioning can proceed.

Related topics:

► [Automatic restart after mains connection/fault...](#) (📖 95)

► [LED status displays](#) (📖 421)

3.7.2 Creating an »Engineer« project & going online



You can find detailed information on the general use of the »Engineer« in the online help which you can call with **[F1]**.

- The chapter "Working with projects" describes, among other things, all options of the *Start-up wizard* which are available to create a new »Engineer« project.

The following steps serve to describe a general method for creating a project with the **Select component from catalogue** option. For this purpose, individual components (controller, motor, etc.) are selected from selection lists.

1. Start the »Engineer«.
2. Create a new project with the *Start-up wizard* and the **Select component from catalogue** option:
 - In the **Component** step, select the 8400 StateLine controller.
 - In the **Device modules** step, select the available communication module.
 - In the **Application** step, select the "Actuating drive speed" application. (The application can also be selected any time afterwards via the **Application parameter** tab or [C00005](#).)
 - Select the other components (motor/gearbox) to be added to the project in the **Other components** dialog step.
3. In the *Project view*, select the 8400 StateLine controller.
4.  Go online.

After a connection to the controller has been established, the following status is displayed in the *Status line*:

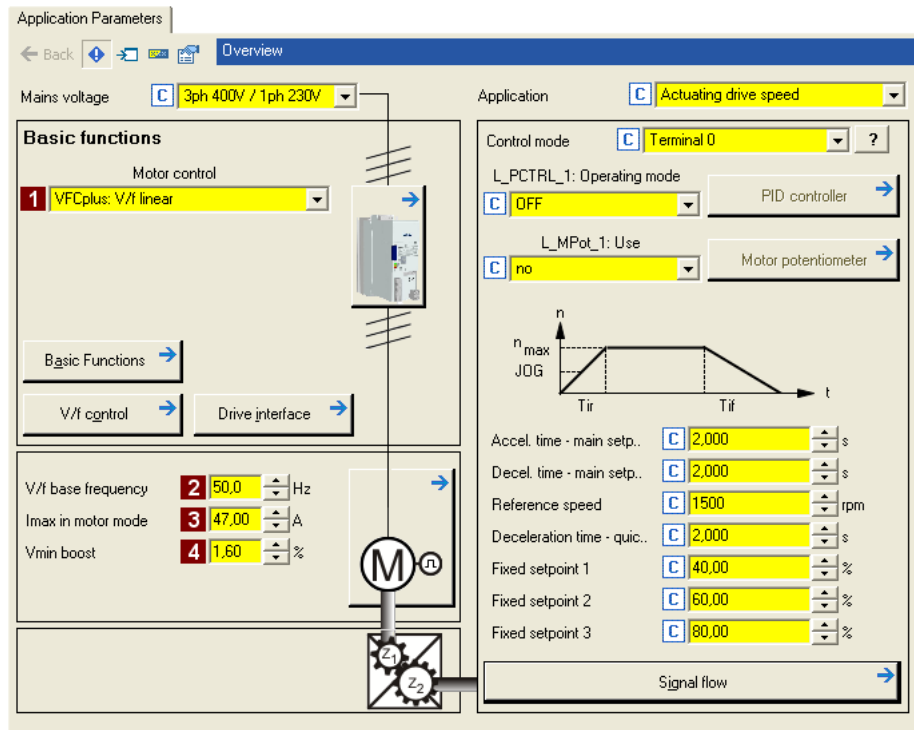


5.  Transfer parameter set to the device.
This command serves to overwrite the current parameter settings in the controller by parameter settings of the »Engineer« project.

3.7.3 Parameterising the motor control

1. Select the **Application parameters** tab from the *Workspace*.

The motor control parameters, among other things, can be found on the left:



2. In the **1 Motor control** list field ([C00006](#)), select the desired motor control.
3. Adapt the motor control parameters:

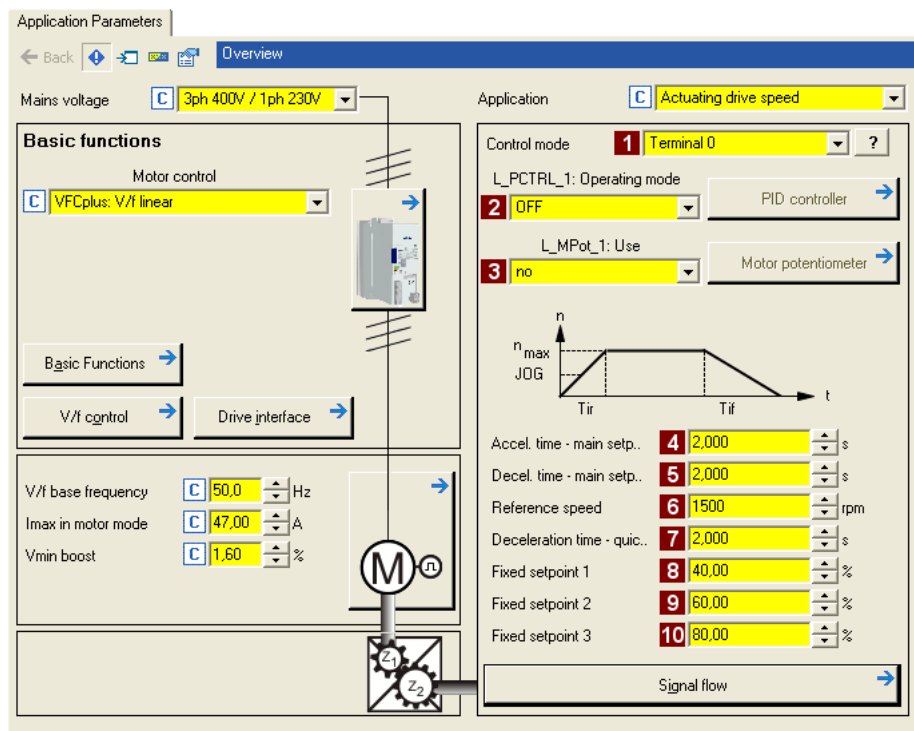
Parameter	Lenze setting		Info
	Value	Unit	
2 V/f base frequency (C00015)	50.0	Hz	► Adapting the V/f base frequency (133)
3 Imax in motor mode (C00022)	47.00	A	► Optimising the Imax controller (136)
4 Vmin boost (C00016)	1.60	%	► Adapting the Vmin boost (135)

Related topics:

- [Notes on motor control](#) (46)
- [Motor control \(MCTRL\)](#) (104)

3.7.4 Parameterise application

The application parameters can be found on the right side of the **Application parameter** tab:



1. In the **1 Control mode** list field ([C00007](#)), select the control mode suitable for the wiring of the terminals.
 - The corresponding wiring diagram is displayed in a pop-up window if you click the **?** button right to the list field.
 - For a detailed description, see the chapter "[Terminal assignment of the control modes](#)". ([309](#))
2. Optional: Use process controller.
 - For this purpose, select the desired operating mode in the **2 L_PCTRL_1: Operating mode** list field ([C00242](#)).
 - For a detailed description see the [L_PCTRL_1](#) function block. ([972](#))
 - Go to the parameterisation dialog of the process controller via the **Process controller** button.
3. Optional: Use motor potentiometer.
 - For this purpose, select "1: On" in the **3 L_MPot_1: Use** list field ([C00806](#)).
 - For a detailed description see the [L_MPot_1](#) function block. ([944](#))
 - Go to the parameterisation dialog of the motor potentiometer via the **Motor potentiometer** button.

4. Adapt the application parameters:

Parameter	Lenze setting		Info
	Value	Unit	
4 Accel. time - main setpoint (C00012)	2.000	s	The setpoint is led via a ramp function generator with linear characteristic. The ramp function generator converts setpoint step-changes at the input into a ramp. ▶ L_NSet_1 (📘 952)
5 Decel. time - main setpoint (C00013)	2.000	s	
6 Reference speed (C00011)	1500	rpm	All speed setpoint selections are provided in % and always refer to the reference speed set in C00011 . The motor reference speed is indicated on the motor nameplate.
7 Decel. time - quick stop (C00105)	2.000	s	If quick stop is requested, motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105 , the motor is brought to a standstill ($n_{act} = 0$). ▶ Activate/deactivate quick stop (📘 81)
8 Fixed setpoint 1 (C00039/1)	40.00	%	A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via the digital DI1 and DI2 inputs. • Fixed setpoints are selected in [%] based on the reference speed (C00011). ▶ L_NSet_1 (📘 952)
9 Fixed setpoint 2 (C00039/2)	60.00	%	
10 Fixed setpoint 3 (C00039/3)	80.00	%	

**Tip!**

- Click the **Signal flow** button to go down one dialog level to the signal flow of the application with further possible parameter settings. See chapter "[Basic signal flow](#)". (📘 299)
- The preconfigured I/O connection in the selected control mode can be changed via configuration parameters. See chapter "[User-defined terminal assignment](#)". (📘 289)

More detailed information on the technology application:

- ▶ [TA "Actuating drive speed"](#) (📘 298)
- ▶ [Internal interfaces | application block "LA_NCtrl"](#) (📘 301)
- ▶ [Process data assignment for fieldbus communication](#) (📘 318)
- ▶ [Terminal assignment of the control modes](#) (📘 309)
- ▶ [Setting parameters \(short overview\)](#) (📘 320)
- ▶ [Configuration parameters](#) (📘 322)

3.7.5 Saving parameter settings safe against mains failure

The parameter set must be saved to the device safe against mains failure to prevent parameter settings becoming lost due to mains switching.



Save parameter set.

3.7.6 Enable controller and test application



Stop!

Before stipulating a speed setpoint, check whether the brake in the form of a holding brake on the motor shaft has been released!



Note!

If the controller is enabled and the "Inhibit at power-on" auto-start option is activated in [C00142](#) (Lenze setting) when the mains is connected, the controller remains in the "ReadyToSwitchOn" state.

To be able to change to the "SwitchedOn" status, the controller enable must be deactivated first: set terminal X4/RFR to LOW level.

If the controller is in the "SwitchedOn" status:

1. Enable controller: Set terminal X4/RFR to HIGH level or close contact.
 - If there is no other active source for the controller inhibit, the controller changes from the "SwitchedOn" status to the "OperationEnabled" status.
 - The **Diagnostics** tab and [C00158](#) display all active sources for the controller inhibit.
2. Select the speed setpoint.

In the "Terminal 0" control mode by selecting a voltage at the analog input via the setpoint potentiometer or by selecting a fixed setpoint via the digital DI1/DI2 inputs:

DI1	DI2	Speed selection
LOW	LOW	The setpoint speed is selected via analog input 1 • Scaling: 10 V $\equiv$ 100 % $\equiv$ reference speed (C00011)
HIGH	LOW	Fixed setpoint 1 (C00039/1) is used as setpoint speed. • Lenze setting: 40 % of the reference speed (C00011)
LOW	HIGH	Fixed setpoint 2 (C00039/2) is used as setpoint speed. • Lenze setting: 60 % of the reference speed (C00011)
HIGH	HIGH	Fixed setpoint 3 (C00039/3) is used as setpoint speed. • Lenze setting: 80 % of the reference speed (C00011)



Note!

Observe the actual speed value (display in [C00051](#)) as well as the [LED status displays](#).
([421](#))

**Tip!**

Other control functions in the "Terminal 0" control mode:

- DI3: HIGH level $\equiv$ Request DC-injection braking
- DI4: HIGH level $\equiv$ Request a change of direction of rotation

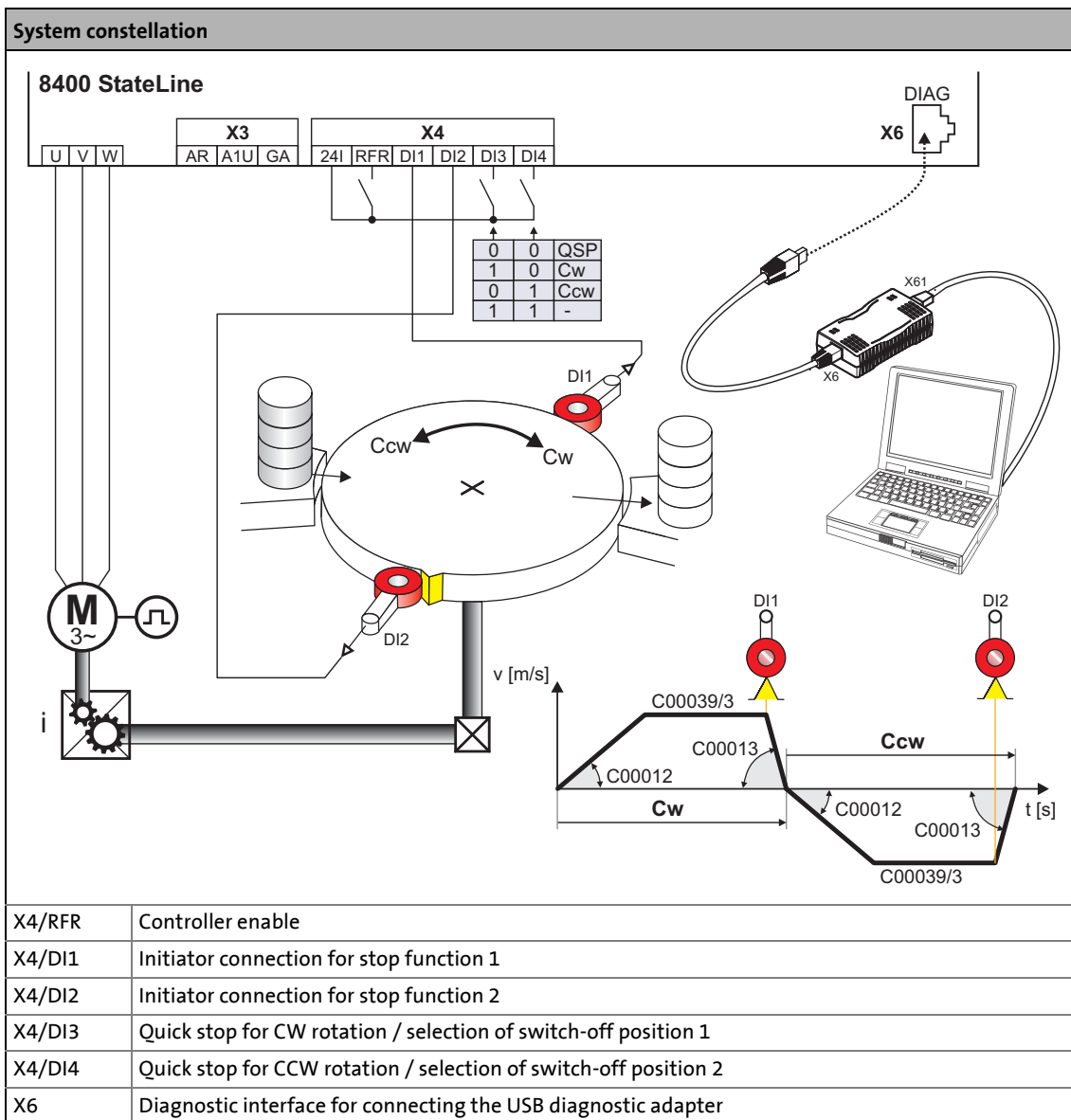
Related topics:

- ▶ ["Inhibit at power-on" auto-start option](#) (📖 95)
- ▶ [Trouble-shooting during commissioning](#) (📖 48)
- ▶ [Diagnostics & error management](#) (📖 420)

**Note!**

Take all the necessary safety precautions before you carry out the following commissioning steps and switch the device on!

► [Safety instructions with regard to commissioning](#) (45)



[3-2] Block diagram for wiring of the commissioning example for the "Switch-off positioning" application

Functional principle of a switch-off positioning without pre-switch off

In case of the switch-off positioning without pre-switch off shown above, it makes sense to use the "[Terminals 2](#)" control mode:

1. Set DI3 to HIGH level to activate CW rotation.
2. The drive accelerates along the acceleration ramp ([C00012](#)) up to the traversing speed set in [C00039/3](#).
3. After reaching the DI1 contact, the drive comes to a stop with quick stop (QSP) in the target position.
4. Reset DI3 to LOW level and set DI4 to HIGH level to activate CCW rotation now.
5. The drive is accelerated along the acceleration ramp ([C00012](#)) up to the traversing speed set in [C00039/3](#).
6. After the DI2 contact has been reached, the drive is braked to standstill with quick stop (QSP) in the initial position.



Tip!

- In order to avoid positioning inaccuracy due to signal propagation delays, the initiators can be directly evaluated by the drive controller. Limit switch evaluation can be configured in the drive controller. In code [C00488/x](#) you can change the method of detecting position signals from level evaluation to edge evaluation.
- In order to prevent unintended movements of the load in the target position, the use of a holding brake is recommended as an alternative to DC-injection braking (limited torque).
- The device terminals and their function assignment do not appear in the FB Editor. The assignment of (hardware) terminals to (software) functions is explained in the chapter "[Terminal assignment of the control modes](#)". ([369](#))

Commissioning steps

As shown in illustration [\[3-2\]](#), below find a description of the commissioning steps of the "Switch-off positioning" application without pre-switch off.

Please observe the sequence of the steps in the following chapters and follow them through carefully. This will help you to commission your controller quickly and as safely as possible:

- ▶ [Prepare controller for commissioning](#) ([61](#))
- ▶ [Creating an »Engineer« project & going online](#) ([62](#))
- ▶ [Parameterising the motor control](#) ([63](#))
- ▶ [Parameterise application](#) ([64](#))
- ▶ [Saving parameter settings safe against mains failure](#) ([66](#))
- ▶ [Enable controller and test application](#) ([66](#))

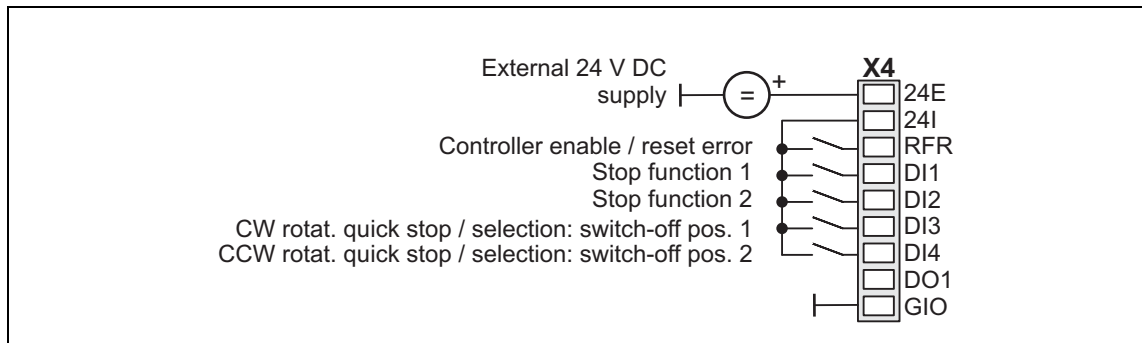
3.8.1 Prepare controller for commissioning

1. Power terminal wiring.

Refer to the mounting instructions supplied with the drive controller to find help on how to correctly design the power connections to match the requirements of your device.

2. Control terminal wiring.

In case of the application shown in illustration [3-2], switch-off positioning without pre-switch off, wiring according to the "[Terminals 2](#)" control mode makes sense:



3. Inhibit controller: Set terminal X4/RFR to LOW level or open contact.

4. Connect USB diagnostic adapter.

5. Switch on voltage supply of the controller.

- Without motor operation: Connect external 24 V supply.
- With motor operation: Connect mains voltage.

If the green "DRV-RDY" LED is blinking and the red "DRV-ERR" LED is off, the controller is ready for operation and commissioning can proceed.

Related topics:

- ▶ [Automatic restart after mains connection/fault...](#) (95)
- ▶ [LED status displays](#) (421)

3.8.2 Creating an »Engineer« project & going online



You can find detailed information on the general use of the »Engineer« in the online help which you can call with **[F1]**.

- The chapter "Working with projects" describes, among other things, all options of the *Start-up wizard* which are available to create a new »Engineer« project.

The following steps serve to describe a general method for creating a project with the **Select component from catalogue** option. For this purpose, individual components (controller, motor, etc.) are selected from selection lists.

1. Start the »Engineer«.
2. Create a new project with the *Start-up wizard* and the **Select component from catalogue** option:
 - In the **Component** step, select the 8400 StateLine controller.
 - In the **Device modules** step, select the available communication module.
 - In the **Application** step, select the "Switch-off positioning" application. (The application can also be selected any time afterwards via the **Application parameter** tab or [C00005](#).)
 - Select the other components (motor/gearbox) to be added to the project in the **Other components** dialog step.
3. In the *Project view*, select the 8400 StateLine controller.
4.  Go online.

After a connection to the controller has been established, the following status is displayed in the *Status line*:

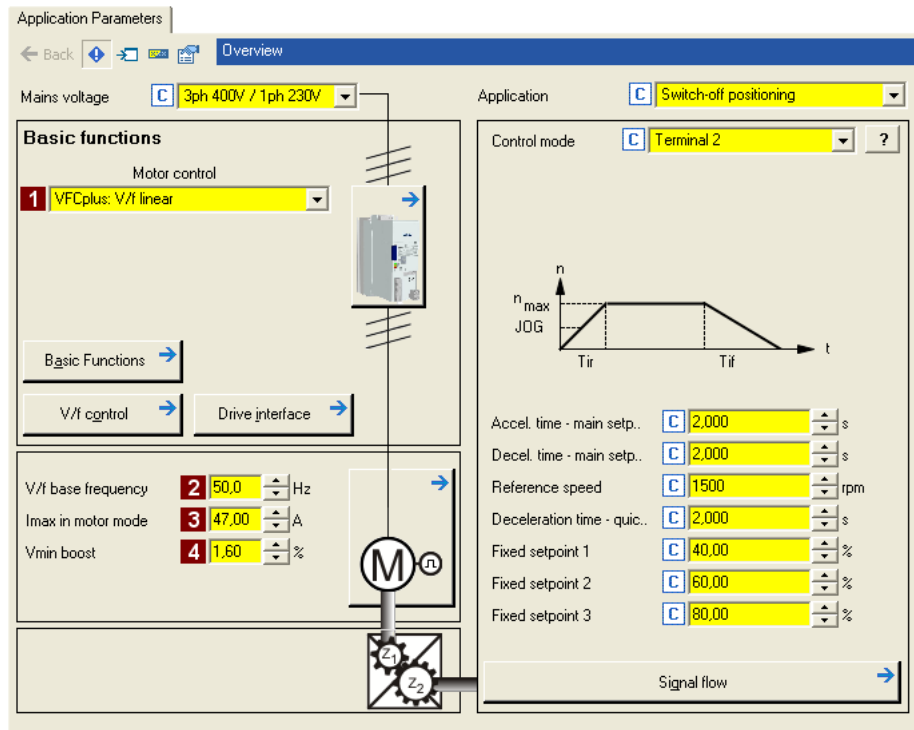


5.  Transfer parameter set to the device.
This command serves to overwrite the current parameter settings in the controller by parameter settings of the »Engineer« project.

3.8.3 Parameterising the motor control

1. Select the **Application parameters** tab from the *Workspace*.

The motor control parameters, among other things, can be found on the left:



2. In the **1 Motor control** list field ([C00006](#)), select the desired motor control.
3. Adapt the motor control parameters:

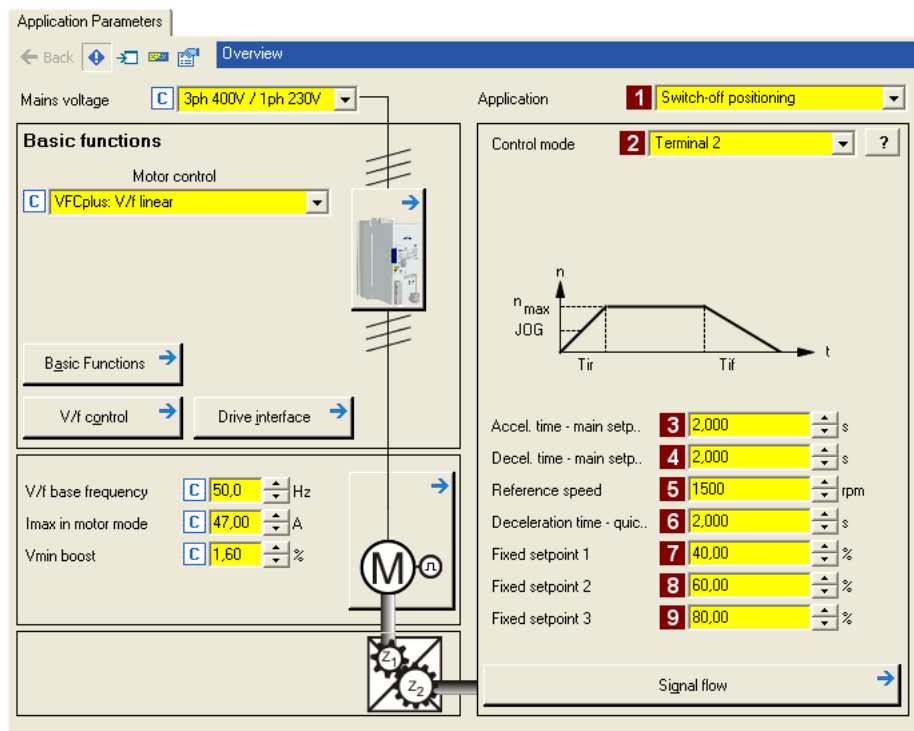
Parameter	Lenze setting		Info
	Value	Unit	
2 V/f base frequency (C00015)	50.0	Hz	► Adapting the V/f base frequency (📖 133)
3 Imax in motor mode (C00022)	47.00	A	► Optimising the Imax controller (📖 136)
4 Vmin boost (C00016)	1.60	%	► Adapting the Vmin boost (📖 135)

Related topics:

- [Notes on motor control](#) (📖 46)
- [Motor control \(MCTRL\)](#) (📖 104)

3.8.4 Parameterise application

The application parameters can be found on the right side of the **Application parameter** tab:



1. In the **1 Application** list field ([C00005](#)), select the "switch-off positioning".
After the "Switch-off positioning" application is selected, the contents of the tab change, e.g. the **Process controller** and **Motor potentiometer** buttons are not shown any more.
2. In the **2 Control mode** list field ([C00007](#)) and in case of illustration [\[3-2\]](#), for the shown switch-off positioning without pre-switch off the "[Terminals 2](#)" control mode must be selected.
 - The corresponding wiring diagram is displayed in a pop-up window if you click the **?** button right to the list field.
 - For a detailed description, see the chapter "[Terminal assignment of the control modes](#)".
([309](#))

3. Adapt the application parameters:

Parameter	Lenze setting		Info
	Value	Unit	
3 Accel. time - main setpoint (C00012)	2.000	s	The setpoint is led via a ramp function generator with linear characteristic. The ramp function generator converts setpoint step-changes at the input into a ramp. Note: These settings only apply if no other ramp times have been selected at the L_NSet FB!
4 Decel. time - main setpoint (C00013)	2.000	s	
5 Reference speed (C00011)	1500	rpm	All speed setpoint selections are provided in % and always refer to the reference speed set in C00011 . The motor reference speed is indicated on the motor nameplate.
6 Decel. time - quick stop (C00105)	2.000	s	If quick stop is requested, motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105 , the motor is brought to a standstill ($n_{act} = 0$). ► Activate/deactivate quick stop (81)
7 Fixed setpoint 1 (C00039/1)	40.00	%	Fixed setpoints are selected in [%] based on the reference speed (C00011). Fixed setpoint 2 must be smaller than fixed setpoint 3! Otherwise, the drive will be started with a low speed and accelerated after the pre-switch off.
8 Fixed setpoint 2 (C00039/2)	60.00	%	
9 Fixed setpoint 3 (C00039/3)	80.00	%	

**Tip!**

- Click the **Signal flow** button to go down one dialog level to the signal flow of the application with further possible parameter settings. See chapter "[Basic signal flow](#)". (360)
- The preconfigured I/O connection in the selected control mode can be changed via configuration parameters. See chapter "[User-defined terminal assignment](#)". (289)
- Low-jerk traversing profiles can be implemented by means of S-shaped ramps.
- In the case of high breakaway torques combined with horizontal motion sequences, "Sensorless vector control (SLVC)" can be used as motor control ([C00006](#)).
- For reversal of rotation direction (bidirectional motion), comprehensive configuration options are available in the drive controller (e.g. by means of the [L_DFlipFlop](#) function block).

More detailed information on the technology application:

- [TA "Switch-off positioning"](#) (358)
- [Internal interfaces | application block "LA_SwitchPos"](#) (361)
- [Process data assignment for fieldbus communication](#) (378)
- [Terminal assignment of the control modes](#) (369)
- [Setting parameters \(short overview\)](#) (380)
- [Configuration parameters](#) (382)

3.8.5 Saving parameter settings safe against mains failure

The parameter set must be saved to the device safe against mains failure to prevent parameter settings becoming lost due to mains switching.



Save parameter set.

3.8.6 Enable controller and test application



Stop!

Before stipulating a speed setpoint, check whether the brake in the form of a holding brake on the motor shaft has been released!



Note!

If the controller is enabled and the "Inhibit at power-on" auto-start option is activated in [C00142](#) (Lenze setting) when the mains is connected, the controller remains in the "[ReadyToSwitchOn](#)" state.

To be able to change to the "[SwitchedOn](#)" status, the controller enable must be deactivated first: set terminal X4/RFR to LOW level.

If the controller is in the "[SwitchedOn](#)" status:

1. Enable controller: Set terminal X4/RFR to HIGH level or close contact.
 - If there is no other active source for the controller inhibit, the controller changes from the "[SwitchedOn](#)" status to the "[OperationEnabled](#)" status.
 - The **Diagnostics** tab and [C00158](#) display all active sources for the controller inhibit.
2. Select the respective control signals via the digital inputs.



Note!

Observe the actual speed value (display in [C00051](#)) as well as the [LED status displays](#).
([421](#))

Related topics:

- ▶ ["Inhibit at power-on" auto-start option](#) ([495](#))
- ▶ [Trouble-shooting during commissioning](#) ([48](#))
- ▶ [Diagnostics & error management](#) ([420](#))

3.9 PC manual control

This function extension is available from version 06.00.00 onwards and is supported by the »Engineer« from version 2.13 onwards!

For the purpose of testing and demonstration and when an online connection has been established, the PC manual control enables the manual control of various drive functions from the »Engineer«.

Supported drive functions:

- Speed control (follow speed setpoint)
- Activate/deactivate quick stop

More control functions:

- Reset error message
- Set digital/analog outputs (in preparation)

Diagnostic functions:

- Display of the actual speed value and motor current (as time characteristic)
- Display of the current device status
- Display of the status determining error
- Display of the status of the digital/analog inputs (in preparation)

3.9.1 Activate PC manual control

**Stop!**

PC manual control must be explicitly activated by the user.

If PC manual control is activated, the controller is inhibited via device command ([C00002/16](#)) first.



Note!

With active PC manual control:

The online connection between PC and controller is monitored by the controller.

- If the online connection is interrupted longer than the timeout time set (Lenze setting: 2 s):
 - The error response "Fault" takes place, i.e. the motor becomes torqueless and coasts, if it has not yet been in standstill.
 - The "[Ck16: Time overflow manual control](#)" error message is entered into the logbook.

PC manual control provides the **Motion Control Kernel** and the motor interface with all required control signals and setpoint signals.

- The available application (function block interconnection) is now decoupled from these interfaces, but is continued to be processed and remains unchanged.
- It does not matter what type of motor control is set in [C00006](#).



How to activate the PC manual control:

1. If an online connection to the controller has not been established yet:
 - Go online.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the **PC manual control** button.
 - First, the following safety note is displayed:

Safety note:

When the drive controller is controlled using the PC, the drive controller must be able to be set to "controller inhibited" status via digital input terminal "RFR" at any time.

When the PC manual control is connected, connection monitoring takes place between the PC and the drive controller. If the connection is interrupted, the drive controller becomes inhibited.

monitoring timeout

C

2000

ms

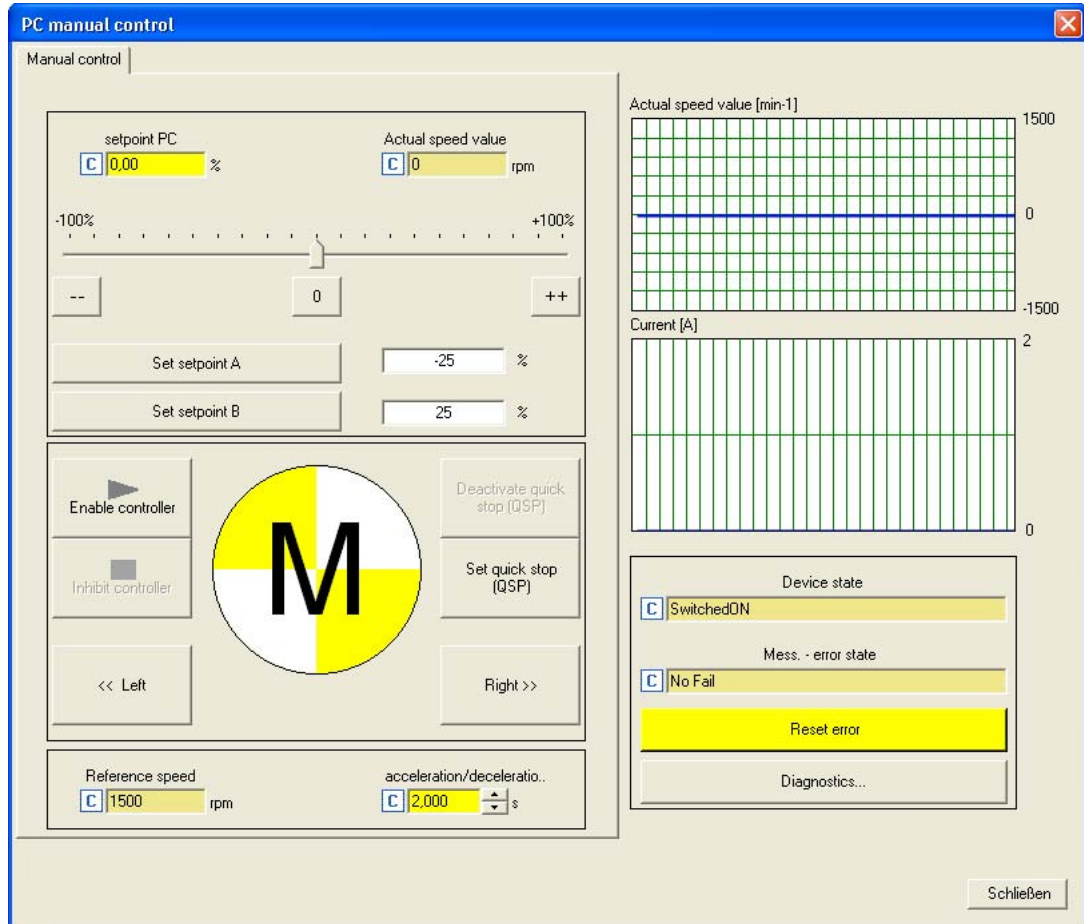
Connect PC manual control

Cancel

- Click the **Cancel** button to abort the action and close the dialog box.
 - The **Timeout monitoring** input field serves to adapt the timeout for monitoring the connection between the PC and the controller.
4. To acknowledge the note and activate PC manual control:
 - Click the **Connect PC manual control** button.
 - The controller is inhibited via device command ([C00002/16](#)).
 - The *PC manual control* operator dialog is displayed.

PC manual control - operator dialog

On the left-hand side, the *PC manual control* operator dialog includes control elements which serve to select various control functions. On the right-hand side, setpoint and status displays are provided for diagnostic purposes:



Note!

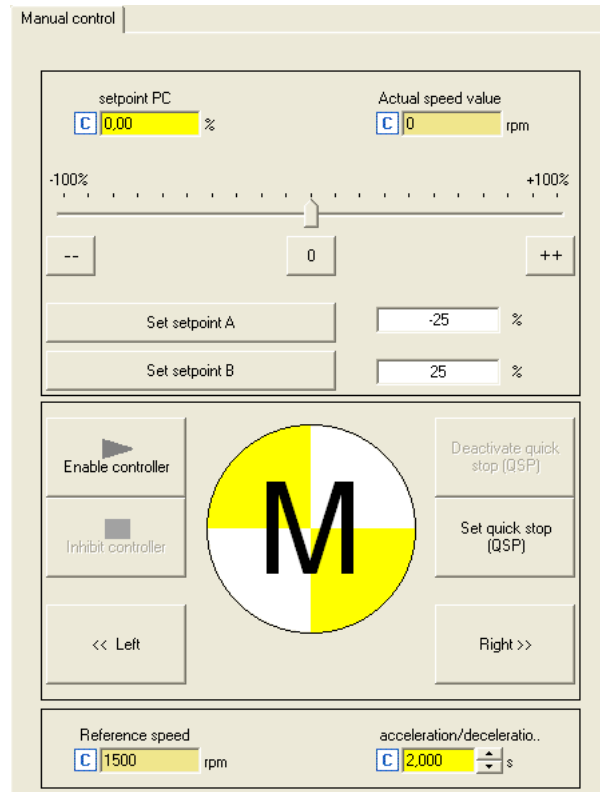
PC manual control can be exited any time by clicking the **Close** button.

If you exit PC manual control or change to another tab, the controller is inhibited via device command ([C00002/16](#)), i.e. the motor becomes torqueless and is coasting unless it already is at standstill.

The different versions are described in the following chapters.

3.9.2 Speed control

Via the **Speed control** tab, simply make the drive rotate in the "Speed follower" operating mode without the need to set control parameters or feedback systems:



How to easily rotate the motor:

1. Set the desired speed setpoint in [%] based on the reference speed, e.g. directly in the **Setpoint PC** input field or via the slider.
 - Via the -- / 0 / ++ buttons, the currently set speed setpoint can be reduced/increased in steps of 10 percent or set to zero.
 - Via the **Set setpoint A/B** buttons, the speed setpoint can be set to a previously set constant value A/B.
2. To start the speed follower:

Enable the controller via the **Enable controller** button.

 - Please observe that the controller will not be enabled if other sources of controller inhibit (e.g. terminal RFR) are active.
 - The enabled drive now follows the defined speed setpoint.
 - In order to prevent shocks or overload at higher setpoint changes, the speed setpoint is lead via a linear ramp generator with adjustable acceleration/deceleration time.
 - Via the **Inhibit controller** button, the controller can be inhibited again, i.e. the motor becomes torqueless and is coasting unless it already is at standstill.

Further functions:

- If the **Set quick stop (QSP)** button is clicked, the motor is braked to a standstill within the deceleration time parameterised in [C00105](#).
 - Via the **Deactivate quick stop (QSP)** button, the quick stop can be deactivated.
- Via the << **Left** and **Right** >> buttons, the direction of rotation can be changed.

4 Device control (DCTRL)

This chapter provides information on internal device control as well as the device commands which can be executed via the subcodes of [C00002](#).

- The device control causes the controller to take defined device statuses.
- The device control provides a multitude of status information in many ways:
 - Visually via the [LED status displays](#) on the front of the controller. ([📖 422](#))
 - As text messages in the [Logbook](#). ([📖 429](#))
 - As process signals via the outputs of the [LS_DriveInterface](#) system block. ([📖 98](#))
 - Via diagnostic / display parameters which are included in the »Engineer« parameter list as well as in the **Diagnostics** category in the keypad.



Note!

The device statuses of the controller are based on the operating statuses of the CiA402 standard. ▶ [Device state machine and device states](#) ([📖 84](#))

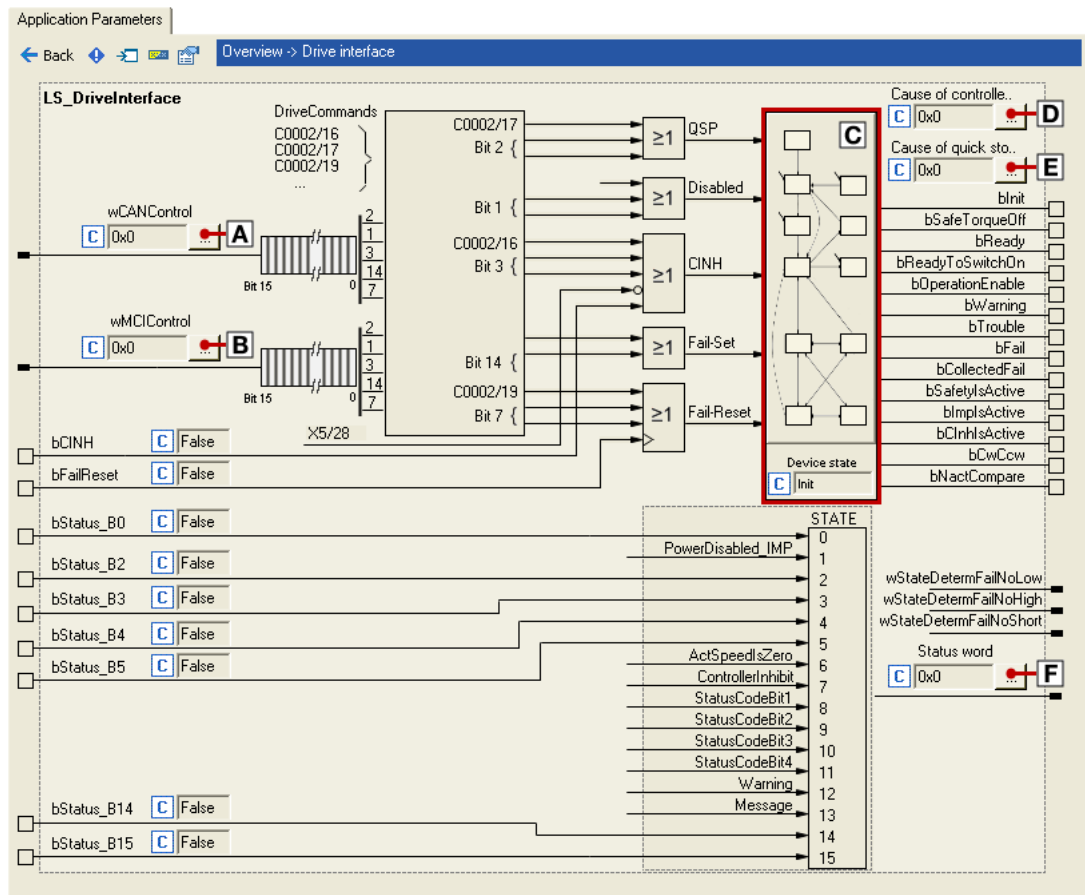


How to get to the parameterisation dialog of the device control:

1. »Engineer« Go to the *Project* view and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the **Drive interface** button.

Parameterisation dialog in the »Engineer«

The parameterisation dialog shows the input / output signals and the internal signal flow of the [LS_DriveInterface](#) system block which displays the device control in the function block editor:



Range / Meaning	Display parameter
A Display of the control word via system bus (CAN)	C00136/2
B Display of the control word via communication module (e.g. PROFIBUS)	C00136/1
C Display of the internal state machine and the current device status	C00137
D Display of all active sources of a controller inhibit	C00158
E Display of all active sources of a quick stop	C00159
F Display of the status word of the device control	C00150

4.1 Device commands (C00002/x)

This chapter describes the device commands which are provided in the subcodes of [C00002](#) and can be carried out using the keypad or, alternatively, the »Engineer« when an online connection has been established.

The device commands serve, among other things, to directly control the controller, to organise parameter sets, and to call diagnostic services.

Regarding the execution of the device commands, a distinction is drawn between:

- Device commands which have an immediate effect on control (e.g. "Activate quick stop")
 - After being called in [C00002/x](#), these device commands provide static status information ("On" or "Off").
- Device commands with longer execution duration (several seconds)
 - After being called in [C00002/x](#), these device commands provide dynamic status information ("Work in progress 20%" → "Work in progress 40%", etc.).
 - The execution of the device command has not finished successfully until the "Off / ready" status information is provided in [C00002/x](#).
 - In the event of an error, the "Action cancelled" status information is provided in [C00002/x](#). In this case, further details can be obtained from the status of the device command executed last which is displayed in [C00003](#).



Stop!

Before the supply voltage is switched off after a device command has been transmitted via [C00002/x](#), the device command must be checked for successful completion on the basis of the status information provided in [C00002/x](#)!

- This is of particular importance for device commands which save data to the memory module of the device. Incomplete storage processes may lead to data inconsistencies in the memory module.



Note!

- Before activating device commands by a master control, wait for the "Ready" signal of the controller.
- The device will reject a write process to [C00002/x](#) if the value is >1 and issue an error message.
- [C00003](#) displays the status of the device command that was executed last.

Activate device command

When an online connection has been established, simply use the »Engineer« to activate a device command by selecting the corresponding option from the **Parameters** tab in [C00002/x](#) ("0: off" or "1: On / start").

- Alternatively, the device command can also be activated via e.g. keypad or through a master control by writing to [C00002/x](#).
- Some of the frequently used device commands (such as "Save parameter set") can also be executed via the *Toolbar* icons of the »Engineer« when an online connection has been established:

Icon	Function
	Enable controller
	Inhibit controller
	Save parameter set (for 8400: Save all parameter sets)



Note!

Device commands that can be executed via the *Toolbar* of the »Engineer« always affect the element currently selected in the *Project view* including all subelements!

- If no controller but a system module is selected in the *Project view*, the corresponding device command will be activated in all lower-level controllers having an online connection with the »Engineer«.

Before the desired action is carried out, a confirmation prompt appears first, asking whether the action is really to be carried out.

Short overview of device commands

Device commands described in this chapter:

C00002 Subcode:	Device command	Controller inhibit required	Status information
1	Load Lenze setting	●	dynamic
6	Load all parameter sets	●	dynamic
11	Save all parameter sets		dynamic
16	Enable/Inhibit controller		static
17	Activate/deactivate quick stop		static
19	Reset error		static
21	Delete logbook		static
27	Device search function (from version 06.00.00)		static

Device commands described in other chapters:

C00002 Subcode:	Device command	Controller inhibit required	Status information
23	Motor parameter identification ‣ Automatic motor data identification	●	dynamic
26	CAN reset node ‣ Reinitialising the CANopen interface		static
28	Check MasterPin (from version 06.00.00) ‣ Unlocking the controller with a MasterPin	●	static
29	Set binding ID (from version 06.00.00) ‣ Device personalisation		static
30	Delete binding ID (from version 06.00.00) ‣ Device personalisation		static
31	Set password (from version 06.00.00) ‣ Password protection		static
32	Check password (from version 06.00.00) ‣ Password protection		static
33	Delete password (from version 06.00.00) ‣ Password protection		static

4.1.1 Load Lenze setting

The [C00002/1](#) = "1: On / start" device command resets the parameters to the Lenze setting which are saved in the controller firmware.

- Can only be executed if the controller is inhibited; otherwise, the feedback [C00002/1](#) = "6: No access - controller inhibit" will be returned.
- All parameter changes made since the last saving of the parameter set will get lost!
- This device command has an effect on the settings of the parameters of the operating system, application and module.



How to load the Lenze setting:

1. If the controller is enabled, it must be inhibited, e.g. by executing the "Enable/Inhibit controller" device command "[C00002/16](#) = "0: Off / ready".
2. Execute the "Load Lenze setting" device command:
[C00002/1](#) = "1: On / start"

The loading process may take a couple of seconds. After the device command has been called, [C00002/1](#) returns dynamic status information ("Work in progress 20 %" → "Work in progress 40 %" → "Work in progress 60 %", etc.).

Notes on execution time

The execution time of this device command usually is 2.5 s, independent of the communication module used.

If - in addition to the device-internal time monitoring - a monitoring of the execution time is to be implemented for this device command in a higher-level control, the monitoring time has to be 2 ... 3 times higher.

4.1.2 Load all parameter sets

The [C00002/6](#) = "1: On / start" device command reloads all parameter settings from the memory module to the controller.

- Can only be executed if the controller is inhibited; otherwise, the feedback [C00002/6](#) = "6: No access - controller inhibit" will be returned.
- All parameter changes made since the last saving of the parameter set will get lost!
- This device command has an effect on the settings of the parameters of the operating system, application and module.



Note!

The controller is currently provided with one data record for all parameters, i.e. every parameter has a value. Several data records per controller are in preparation.

From version 04.00.00 onwards, the basic function [Parameter change-over](#) provides a change-over between four sets with different parameter values for up to 32 freely selectable parameters. ([□ 577](#))



How to load the parameter settings from the memory module:

1. If the controller is enabled, it must be inhibited, e.g. by executing the "Enable/Inhibit controller" device command ("[C00002/16](#) = "0: Off / ready").
2. Execute the "Load all parameter sets" device command:
[C00002/6](#) = "1: On / start"

The loading process may take a couple of seconds. After the device command has been called, [C00002/6](#) returns dynamic status information ("Work in progress 20 %" → "Work in progress 40 %" → "Work in progress 60 %", etc.).

Notes on execution time

The execution time of this device command depends on the communication module used. If - in addition to the device-internal time monitoring - a monitoring of the execution time is to be implemented for this device command in a higher-level control, the monitoring time has to be 2 ... 3 times higher than the times specified in the following table:

Communication module used	Typical execution time		
	StateLine C	HighLine C	TopLine C
Without communication module	3.5 s	3.5 s	3.5 s
PROFIBUS® or INTERBUS	3.5 s	3.5 s	3.5 s
EtherCAT®, PROFINET® or EtherNet/IP™	4.0 s	3.5 s	4.0 s
Ethernet POWERLINK	15.0 s	15.0 s	15.0 s

4.1.3 Save all parameter sets

If parameter settings are changed in the controller, those changes will be lost after mains switching of the controller unless the settings have been saved explicitly.

The [C00002/11](#) = "1: On / start" device command saves the current parameter settings safe against mains failure to the memory module of the controller.



Note!

When the device is switched on, all parameters are automatically loaded from the memory module to the main memory of the controller.

Observe the following to avoid data inconsistencies which cause errors when the parameters are loaded from the memory module:

During the storage process:

- Do not switch off the supply voltage!
- Do not remove the memory module from the device!

The controller is currently provided with one data record for all parameters, i.e. every parameter has a value. Several data records per controller are in preparation.



How to save the parameter settings to the memory module:

Execute the "Save all parameter sets" device command:

[C00002/11](#) = "1: On / start"

The storage process may take a couple of seconds. After the device command has been called in [C00002/11](#), dynamic status information ("Work in progress 20%" → "Work in progress 40%" → "Work in progress 60%", etc.) is returned.



Tip!

- This device command can also be activated via the  icon in the *Toolbar*.
- The "[Load Lenze setting](#)" device command ([C00002/1](#) = "1: On / start") resets the parameter settings to the delivery status of the device.

Notes on execution time

The execution time of this device command depends on the communication module used. If - in addition to the device-internal time monitoring - a monitoring of the execution time is to be implemented for this device command in a higher-level control, the monitoring time has to be 2 ... 3 times higher than the times specified in the following table:

Communication module used	Typical execution time		
	StateLine C	HighLine C	TopLine C
Without communication module	2.0 s	2.5 s	2.5 s
PROFIBUS® or INTERBUS	3.5 s	3.5 s	4.0 s
EtherCAT®, PROFINET® or EtherNet/IP™	4.5 s	4.5 s	4.5 s
Ethernet POWERLINK	11.0 s	11.0 s	11.0 s

4.1.4 Enable/Inhibit controller

The [C00002/16](#) = "1: On / start" device command enables the controller, provided that no other source of a controller inhibit is active.

The [C00002/16](#) = "0: Off / ready" device command inhibits the controller again, i.e. the power output stages in the controller are inhibited and the speed/current controllers of the motor control are reset.

- The motor becomes torqueless and coasts, if it has not yet been in standstill.
- When the controller is inhibited, the status output *bClnhActive* of the [LS_DriveInterface](#) system block is set to TRUE.
- When the controller inhibit request is reset, the drive synchronises to the actual speed. For this purpose,
 - If the flying restart circuit is activated in [C00990](#), the flying restart function parameterised in [C00991](#) is used for the synchronisation to the rotary or standing drive. ▶ [Flying restart function](#) (□ 208)
 - In the case of an operation with feedback, the actual speed is read out by the encoder system.
 - In the case of a sensorless vector control (SLVC), the actual speed from the motor model of the motor control is used for the synchronisation.
- [C00158](#) provides a bit coded representation of all active sources/triggers of a controller inhibit:

Bit	Cause/Source of controller inhibit
Bit 0	Terminal controller enable
Bit 1	CAN control word
Bit 2	MCI control word
Bit 3	SwitchOn
Bit 4	Application (LS_DriveInterface system block: <i>bClnh</i> input)
Bit 5	Device command (C00002/16)
Bit 6	Error with a "Fault"/"Trouble" error response or system error, respectively
Bit 7	Internal signal
Bit 8	Reserved
Bit 9	Reserved
Bit 10	AutoStartLock
Bit 11	Motor parameter identification
Bit 12	Automatic brake operation
Bit 13	DCB-IMP
Bit 14	Reserved
Bit 15	Reserved



Tip!

The controller can also be enabled or inhibited via the  and  toolbar icons.

4.1.5 Activate/deactivate quick stop

The [C00002/17](#) = "1: On / start" device command activates the quick stop function, i.e. the motor control is separated from the setpoint selection, and within the deceleration time parameterised in [C00105](#) the motor is brought to a standstill ($n_{act} = 0$).

Parameter	Info	Lenze setting	
		Value	Unit
C00105	Decel. time - quick stop	2.000	s

- The motor is kept at a standstill during closed-loop operation.
- A pulse inhibit is set if the auto-DCB function has been activated via [C00019](#).
- [C00159](#) provides a bit coded representation of all active sources/triggers of a quick stop:

Bit	Cause/source for quick stop
Bit 0	Reserved
Bit 1	CAN control word (bit 2)
Bit 2	MCI control word (bit 2)
Bit 3	Reserved
Bit 4	Application (LS_MotorInterface system block: <i>bQspOn</i> input)
Bit 5	Device command (C00002/17)
Bit 6	Device error with "TroubleQSP" error response
Bit 7	Internal signal
Bit 8	Reserved
Bit 9	Reserved
Bit 10	Operating system
Bit 11	Reserved
Bit 12	MCK (System block LS_MotionControlKernel : Input <i>bQspOn</i>)
Bit 13	Reserved
Bit 14	Reserved
Bit 15	Reserved

Deactivate quick stop again

The [C00002/17](#) = "0: Off / ready" device command deactivates the quick stop again, provided that no other source of a quick stop is active.

4.1.6 Reset error

The [C00002/19](#) = "1: On / start" device command acknowledges an existing error message if the error cause has been eliminated and thus the error is no longer pending.

- After the reset (acknowledgement) of the current error, further errors may be pending which must also be reset.
- The status determining error is displayed in [C00168](#).
- The current error is displayed in [C00170](#).



Tip!

An error message can also be acknowledged by activating the **Reset error** button in the **Diagnostics** tab.

Detailed information on error messages can be found in the "[Diagnostics & error management](#)" chapter. ([420](#))

4.1.7 Delete logbook

The [C00002/21](#) = "1: On / start" device command deletes all logbook entries.



Tip!

To display the logbook in the »Engineer«, click the **Logbook** button on the **Diagnostics** tab.

In the *Logbook* dialog box, it is also possible to delete all logbook entries by clicking the **Delete** button.

Detailed information on the logbook can be found in the "[Diagnostics & error management](#)" chapter. ([420](#))

4.1.8 Device search function

This function extension is available from version 06.00.00!

In some applications where controllers are installed in control cabinets or are positioned in a spacious plant, it is often difficult to locate a device connected online for e.g. maintenance work. There is an established online connection with the device but you do not know where the controller is located physically.

The [C00002/27](#) = "1: On / start" device command serves to carry out an "optical location":

- For the time set in [C00181/1](#), all four status LEDs at the front of the controller flash. Afterwards, the function is turned off automatically.
- If the device command is executed again within the set time period, the duration is extended accordingly.
- The setting [C00002/27](#) = "0: Off / ready" serves to abort or switch off the function.
- Adjustable time period: 0 ... 6000 s (Lenze setting: 5 s)

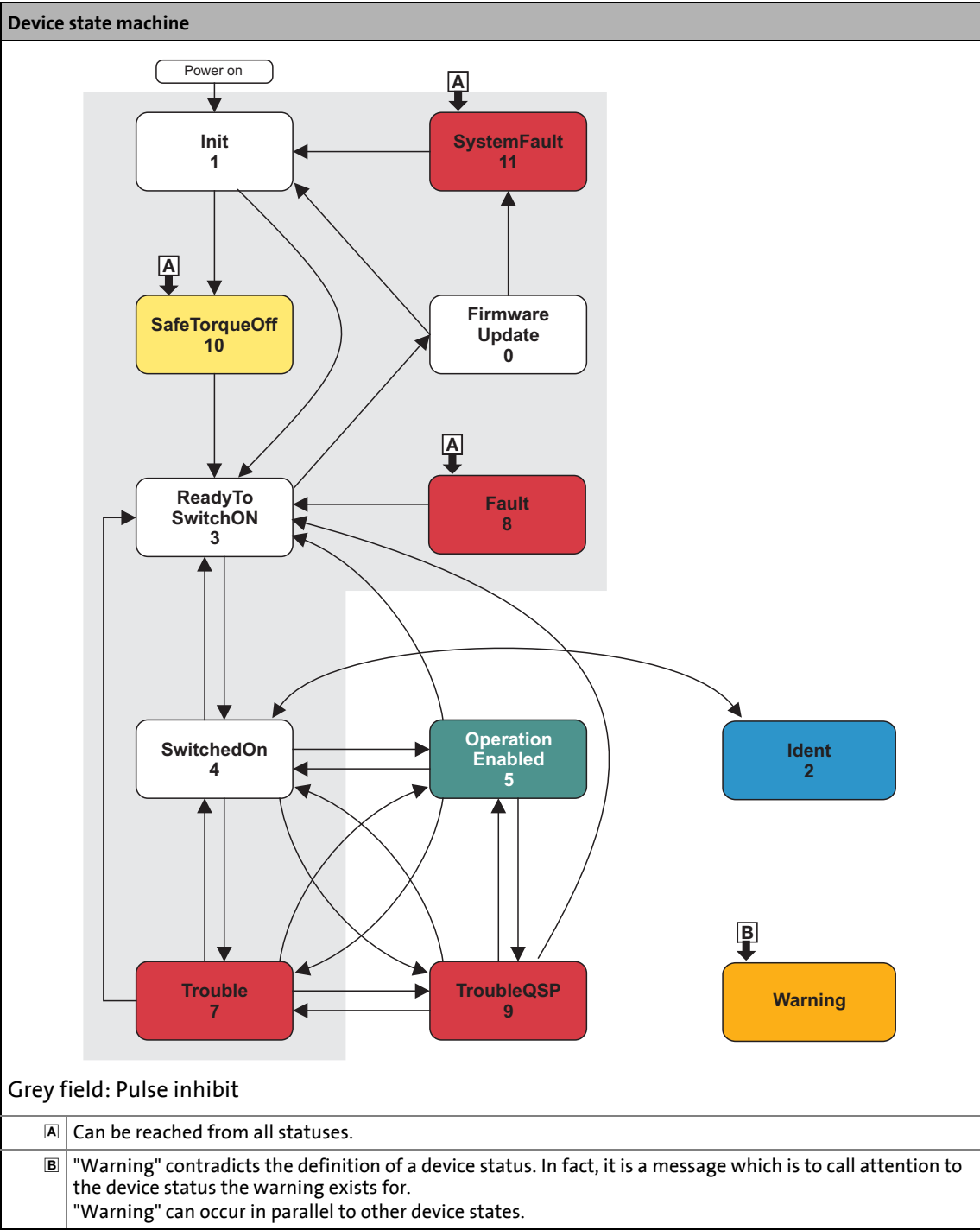


Tip!

The device search function can also be activated via the  *toolbar* icon.

4.2 Device state machine and device states

The behaviour of the controller is mainly determined by the current device status within the device state machine. Which device status is active and which device status is next depends on certain control signals (e.g. for controller inhibit and quick stop) and status parameters.



- The arrows between the device states mark possible state changes.
- The digits stand for the status ID (see table below).

- The change from one status to the other is carried out within a 1-ms cycle. If within this time there are several requests for status changes, the status with the higher priority is processed first (see table below).
- The [C00137](#) displays the current device status.
- [C00150](#) (status word) provides a bit coded representation of the current device status via bits 8 ... 11 (see table below).

ID	Device status (Display in C00137)	Priority	Status bits (Display in C00150)				Meaning
			Bit 11	Bit 10	Bit 9	Bit 8	
0	FirmwareUpdate	-	0	0	0	0	Firmware update function is active
1	Init	-	0	0	0	1	Initialisation active
2	Ident	-	0	0	1	0	Identification active
3	ReadyToSwitchOn	Prio 5	0	0	1	1	Device is ready to start
4	SwitchedOn	Prio 4	0	1	0	0	Device is switched on
5	OperationEnabled	Prio 1	0	1	0	1	Operation
6	-	-	0	1	1	0	-
7	Trouble	Prio 3	0	1	1	1	Fault active
8	Fault	Prio 7	1	0	0	0	Fault active
9	TroubleQSP	Prio 2	1	0	0	1	TroubleQSP is active
10	SafeTorqueOff	Prio 6	1	0	1	0	Safe torque off is active
11	SystemFault	Prio 8	1	0	1	1	System fault active

[4-1] Device statuses, priorities, and meaning of the status bits in the status word

4.2.1

FirmwareUpdate



Note!

This function may only be executed by qualified Lenze personnel!

4.2.2 Init

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF	OFF	Init	0	0	0	1

The controller is in this status immediately after switching on its 24 V supply voltage.

In the "Init" status, the operating system is initialised and all device components (communication module, memory module, power section, etc.) are identified. When identifying the power section, it is checked first if it is switched on or if the required voltage lies within the tolerance zone, respectively.

- The inverter is inhibited, i.e. the motor terminals (U, V, W) of the inverter are deenergised.
- The digital and analog inputs are not yet evaluated at this time.
- The bus systems (CAN, PROFIBUS etc.) do not work yet, i.e. communication is not possible.
- The application is not yet processed.
- The monitoring functions are not active yet.
- The controller cannot be parameterised yet and no device commands can be carried out yet.

**Note!**

If the 24V voltage supply is in the valid range (>19V) and the initialisation is finished, the device changes automatically to the "[ReadyToSwitchOn](#)" status.

If only the 24V voltage supply is available during the mains connection, the error message "[LU: Undervoltage in the DC bus](#)" is also entered into the logbook of the drive controller.

4.2.3 Ident

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	Ident	0	0	1	0

The controller has been provided with the "Motor parameter identification" function for automatic identification of the motor parameters. If the motor parameter identification is active, the controller is in the "Ident" device status.

The "Ident" device status can only be reached from the "[SwitchedOn](#)" device status, i.e. the controller must be inhibited first so that identification can be started afterwards via the corresponding device command:

Device command	Function	Detailed information
C00002/23	Motor parameter identification	► Automatic motor parameter identification



Stop!

During the identification of the motor parameters

- the controller does not respond to setpoint changes or control processes, (e.g. speed setpoints, quick stop, torque limitations),
- the application remains active,
- all system interfaces (IO, bus systems, etc.) remain active,
- error monitoring remains active,
- the inverter is controlled independently of the setpoint sources.

After the motor parameter identification is completed, the status changes back to "[SwitchedOn](#)".

4.2.4 SafeTorqueOff

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	SafeTorqueOff	1	0	1	0



Note!

[Up to and including version 13.xx.xx the following applies:](#)

This device status is only possible in connection with an integrated safety system and if a power section supply is available!

[From version 14.00.00 the following applies:](#)

This device status is only possible in connection with an integrated safety system!

Integrated safety systems with Inverter Drives 8400

Drive controller of the 8400 series can be equipped with the integrated "Safe torque off (STO)" safety system.

The integrated safety system is applicable on machines for the protection of persons.

The drive function is still carried out by the drive controller. The safety system provides safe inputs. If the safety system is activated, it executes control functions according to EN 60204-1 directly in the drive controller in case of errors.

Safety state

If the drive controller is switched off by the safety system, the device changes to the "SafeTorqueOff" status.

If the safety system deactivates the "Safe torque off (STO)" request, the device changes to the "[ReadyToSwitchOn](#)" status.



Detailed information on the integrated safety system can be found in the hardware manual!

The hardware manual contains important notes on the safety system which must be observed!

The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 drive controller.

4.2.5 ReadyToSwitchOn

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	ReadyToSwitchOn	0	0	1	1

The controller is in this device status directly after the initialisation has been completed!

- The bus systems are running and the terminals and encoders are evaluated.
- The monitoring functions are active.
- The controller can be parameterised.
- The application is basically executable.



Note!

- The "ReadyToSwitchOn" state is not only activated after the mains connection, but also after the deactivation of [Trouble](#), [Fault](#) or [SafeTorqueOff](#).
- If [C00142](#) activates the autostart option "Inhibit at power-on" (Lenze setting), explicit deactivation of the controller inhibit after mains connection is always required for the controller to change from the "ReadyToSwitchOn" status to the [SwitchedOn](#) status.
- If only the 24V voltage supply is available during the mains connection, the error message ["LU: Undervoltage in the DC bus"](#) is entered into the logbook of the drive controller and the drive controller remains in the "ReadyToSwitchOn" status.



Danger!

If the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#), the "ReadyToSwitchOn" status switches directly to the [SwitchedOn](#) status after mains connection.

► [Automatic restart after mains connection/fault...](#) (95)

4.2.6 SwitchedOn

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	SwitchedON	0	1	0	0

The drive is in this device status if the DC bus voltage is applied and the controller is still inhibited by the user (controller inhibit).

- The bus systems are running and the terminals and encoders are evaluated.
- The monitoring functions are active.
- The application is basically executable.

If the controller inhibit is deactivated, the device changes to the "[OperationEnabled](#)" status and the motor follows the setpoint defined by the active application.



Tip!

[C00158](#) provides a bit coded representation of all active sources/triggers of a controller inhibit.

Depending on certain conditions, a status change takes place based on the "SwitchedOn" device status:

Change condition	Changeover to the device status
Control bit "EnableOperation" of all control channels = "1" AND terminal RFR = HIGH level (controller enable)	OperationEnabled
Control bit "SwitchOn" of a control channel = "0".	ReadyToSwitchOn
Motor parameter identification requested.	Ident
Undervoltage in the DC bus.	Trouble/Fault (depending on C00600/1)
Error with error response "Trouble" occurs.	Trouble
Error with error response "TroubleQSP" occurs.	TroubleQSP

Related topics:

► [wCANControl/wMCIControl control words](#) (101)

4.2.7 OperationEnabled

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
	OFF	OperationEnabled	0	1	0	1

The drive controller is in this device status if the controller inhibit is deactivated and no error ("Trouble" or "TroubleQSP") has occurred.

If the operation is enabled and the magnetisation in case of sensorless vector control (SLVC) has been completed, the motor follows the setpoint determined by the active application.

Depending on certain conditions, a status change takes place based on the "OperationEnabled" device status.

Change condition	Changeover to the device status
Control bit "EnableOperation" of a control channel = "0" OR terminal RFR = LOW level (controller inhibit).	SwitchedOn
Control bit "SwitchOn" of a control channel = "0".	ReadyToSwitchOn
Undervoltage in the DC bus.	Trouble/Fault (depending on C00600/1)
Error with error response "Trouble" occurs.	Trouble
Error with error response "TroubleQSP" occurs.	TroubleQSP

Related topics:

► [wCANControl/wMCIControl control words](#) (101)

4.2.8

TroubleQSP

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
		TroubleQSP	1	0	0	1

This device status will be active as soon as a monitoring mode responds the error response "TroubleQSP" has been parameterised for.

- The drive is decelerated to standstill with torque within the deceleration time parameterised for quick stop independently of the defined setpoint and can be kept there.
- The device status can only be abandoned by acknowledging the error if the error cause is removed.
- When the controller is inhibited, it is possible to jump to the ["SwitchedOn"](#) status even during the error status since the controller inhibit function has a higher priority. As long as the error is pending and has not been acknowledged, the status is changed back to the "TroubleQSP" status when the controller is enabled afterwards.

Depending on certain conditions a status change takes place based on the "TroubleQSP" device status.

Change condition	Changeover to the device status
Control bit "SwitchOn" of a control channel = "0".	ReadyToSwitchOn
Control bit "EnableOperation" of all control channels = "1" AND terminal RFR = HIGH level (controller enable) AND error is reset by the control bit "ResetFault" AND no more errors are pending.	OperationEnabled
Control bit "EnableOperation" of a control channel = "0" OR terminal RFR = LOW level (controller inhibit) AND error is reset by the control bit "ResetFault" AND no more errors are pending.	SwitchedOn
A message is active in the system.	Trouble

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (📖 101)
- ▶ [Basics on error handling in the controller](#) (📖 420)
- ▶ [Error messages of the operating system](#) (📖 444)

4.2.9 Trouble

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF		Trouble	0	1	1	1

This device status becomes active as soon as a monitoring mode responds for which the error response "Trouble" has been parameterised.

- The motor has no torque (is coasting) due to the inhibit of the inverter.
- The "Trouble" device status is automatically abandoned if the error cause has been removed.



Note!

If in [C00142](#) the "Inhibit at trouble" is activated, explicit deactivation of the controller inhibit is required before this status can be abandoned.

Depending on certain conditions a status change takes place based on the "Trouble" device status.

Change condition	Changeover to the device status
The error cause is no longer active.	ReadyToSwitchOn
Control bit "EnableOperation" of all control channels = "1" AND terminal RFR = HIGH level (controller enable) AND the message has been cancelled.	OperationEnabled
Control bit "EnableOperation" of a control channel = "0" OR terminal RFR = LOW level (controller inhibit) AND the message has been cancelled.	SwitchedOn
In the system, there is an error configured on "TroubleQSP". AND the message has been cancelled.	TroubleQSP

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (📖 101)
- ▶ [Basics on error handling in the controller](#) (📖 420)
- ▶ [Error messages of the operating system](#) (📖 444)

4.2.10 Fault

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF		Fault	1	0	0	0

This device status will be active as soon as a monitoring mode responds the error response "Fault" has been parameterised for.

- The motor has no torque (is coasting) due to the inhibit of the inverter.
- The error must explicitly be reset ("acknowledged") in order to exit the device status, e.g. by the device command "[Reset error](#)" or via the control bit "ResetFault" in the control word *wCanControl* or *wMCIControl*.

**Note!**

If an undervoltage in the DC bus of the drive controller occurs (error message "LU"), the device changes to the "[Trouble](#)" status.

An additional error of higher priority leads the device into the "[Fault](#)" status.

According to the [Device state machine](#), the device changes to the "[ReadyToSwitchOn](#)" status after acknowledging the error although the undervoltage is still available!

If the "Inhibit at fault" auto-start option has been activated in [C00142](#), explicit deactivation of the controller inhibit is required before the status can be abandoned.

Related topics:

- ▶ [wCANControl/wMCIControl control words](#) (📖 101)
- ▶ [Basics on error handling in the controller](#) (📖 420)
- ▶ [Error messages of the operating system](#) (📖 444)

4.2.11 SystemFault

"DRV-RDY" LED	"DRV-ERR" LED	Display in C00137	Display in status word 1 (C00150)			
			Bit 11	Bit 10	Bit 9	Bit 8
OFF		SystemFault	1	0	1	1

This device status becomes active if a system fault occurs.

- The device status can only be abandoned by
 - mains switching or
 - a system restart (*in preparation*).

4.3 Automatic restart after mains connection/fault...

.../Error/undervoltage/loading of the Lenze setting

In [C00142](#), the starting performance of the controller after mains connection, undervoltage, loading of the Lenze setting as well as a "[Trouble](#)" or a "[Fault](#)" reset can be parameterised individually:

Auto-start option (C00142)		Lenze setting
Bit 0	"Inhibit at power-on" auto-start option	1 ≡ Inhibit is active
Bit 1	Inhibit at trouble	0 ≡ Inhibit is not active
Bit 2	Inhibit at fault	0 ≡ Inhibit is not active
Bit 3	Inhibit at undervoltage	1 ≡ Inhibit is active
Bit 4	Auto-start option "Inhibit at Lenze setting" (from version 06.00.00)	1 ≡ Inhibit is active
Bit 5	Reserved	0
Bit 6		
Bit 7		



Note!

In the Lenze setting, automatic restart after mains connection, undervoltage, and loading of the Lenze setting is inhibited.

4.3.1 "Inhibit at power-on" auto-start option

The auto-start option "Inhibit at power-on" prevents the change to the "[SwitchedOn](#)" status after mains connection if the controller is already enabled at mains connection.



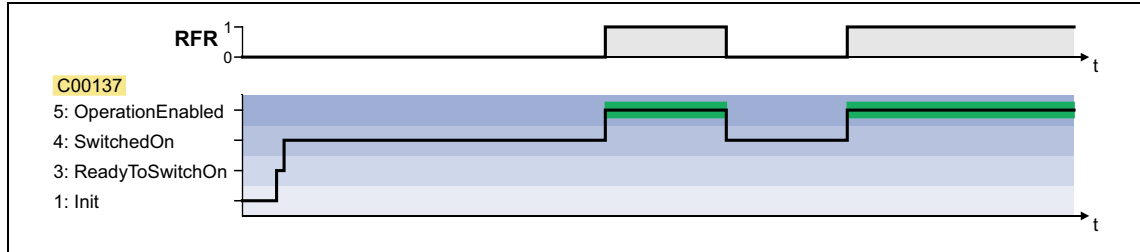
Danger!

If the "Inhibit at power-on" auto-start option has been deactivated in [C00142](#), (bit 0 = 0), the motor can directly start to run if the controller is enabled after mains connection!

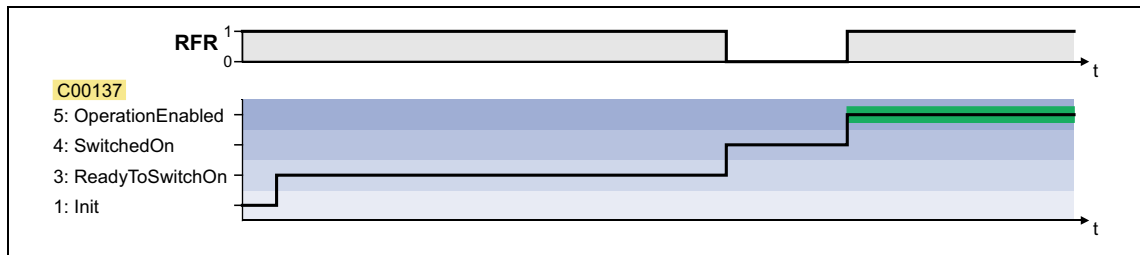
The following three cases describe the behaviour of the controller after mains connection depending on whether the controller is enabled and the set auto-start option. Here, it is assumed that after mains connection, no errors and trouble occur in the controller and the "EnableOperation" control bit in the *wDriveControl* is set to "1".

Case 1: No controller enable at mains connection

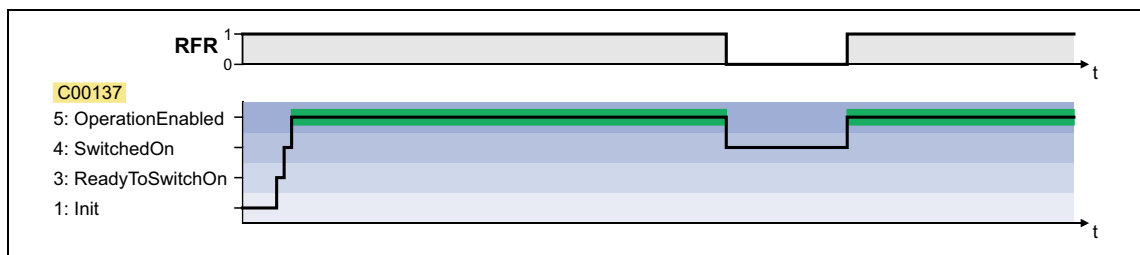
If the controller is not enabled at mains connection, the controller remains in the "[SwitchedOn](#)" status. Only with the controller enable, the device changes to the "[OperationEnabled](#)" status, independent of the set auto-start option:

**Case 2: Controller enable at mains connection and "Inhibit at power-on" activated**

If the controller is enabled at mains connection and the auto-start option "Inhibit at power-on" is activated, the controller remains in the "[ReadyToSwitchOn](#)" status. For changing to the "[SwitchedOn](#)" status, the controller enable must first be deactivated. Only when the controller is enabled again afterwards, the status changes to "[OperationEnabled](#)":

**Case 3: Controller enable at mains connection and "Inhibit at power-on" deactivated**

If in [C00142](#) the autostart option "Inhibit at power-on" is deactivated (bit 0 = 0), the status first changes from "[ReadyToSwitchOn](#)" to "[SwitchedOn](#)" and then to "[OperationEnabled](#)" after mains connection with an enabled controller:

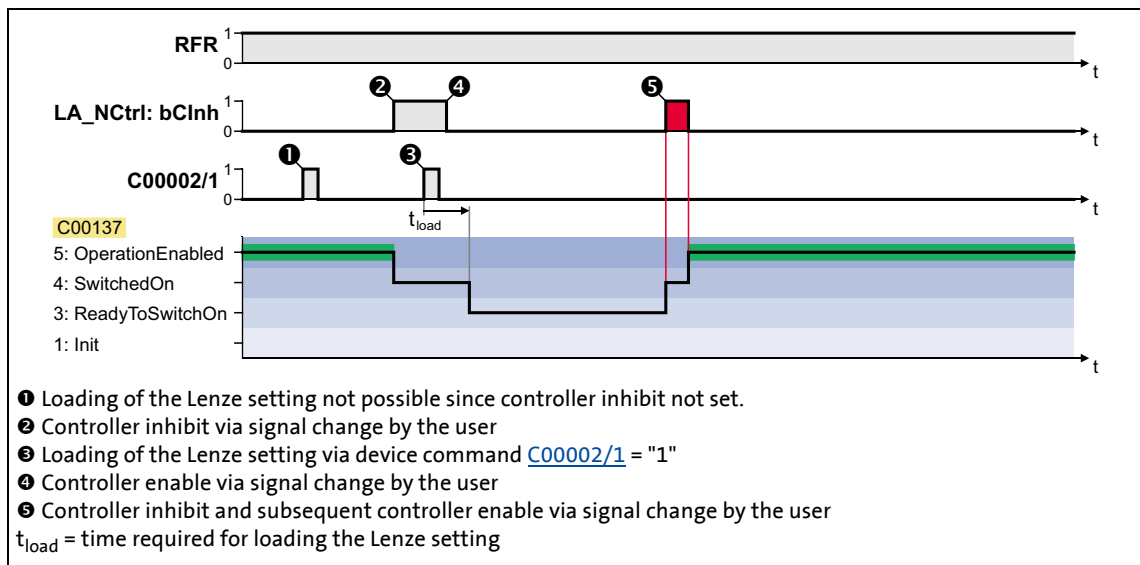


4.3.2 Auto-start option "Inhibit at Lenze setting"

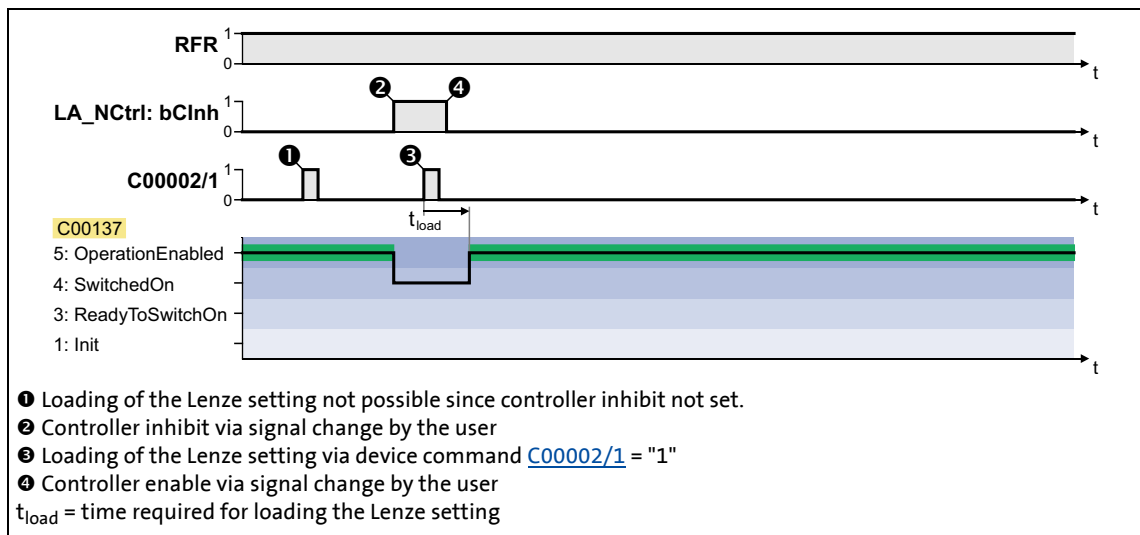
This function extension is available from version 06.00.00!

The "Inhibit at Lenze setting" auto-start option configurable via bit 4 of [C00142](#) prevents the change to the "[SwitchedOn](#)" status after the Lenze setting has been loaded and the controller is enabled.

For a change to the "[SwitchedOn](#)" status, the controller enable must first be deactivated after the Lenze setting has been loaded. Only if the controller is enabled again afterwards, the status changes to "[OperationEnabled](#)":



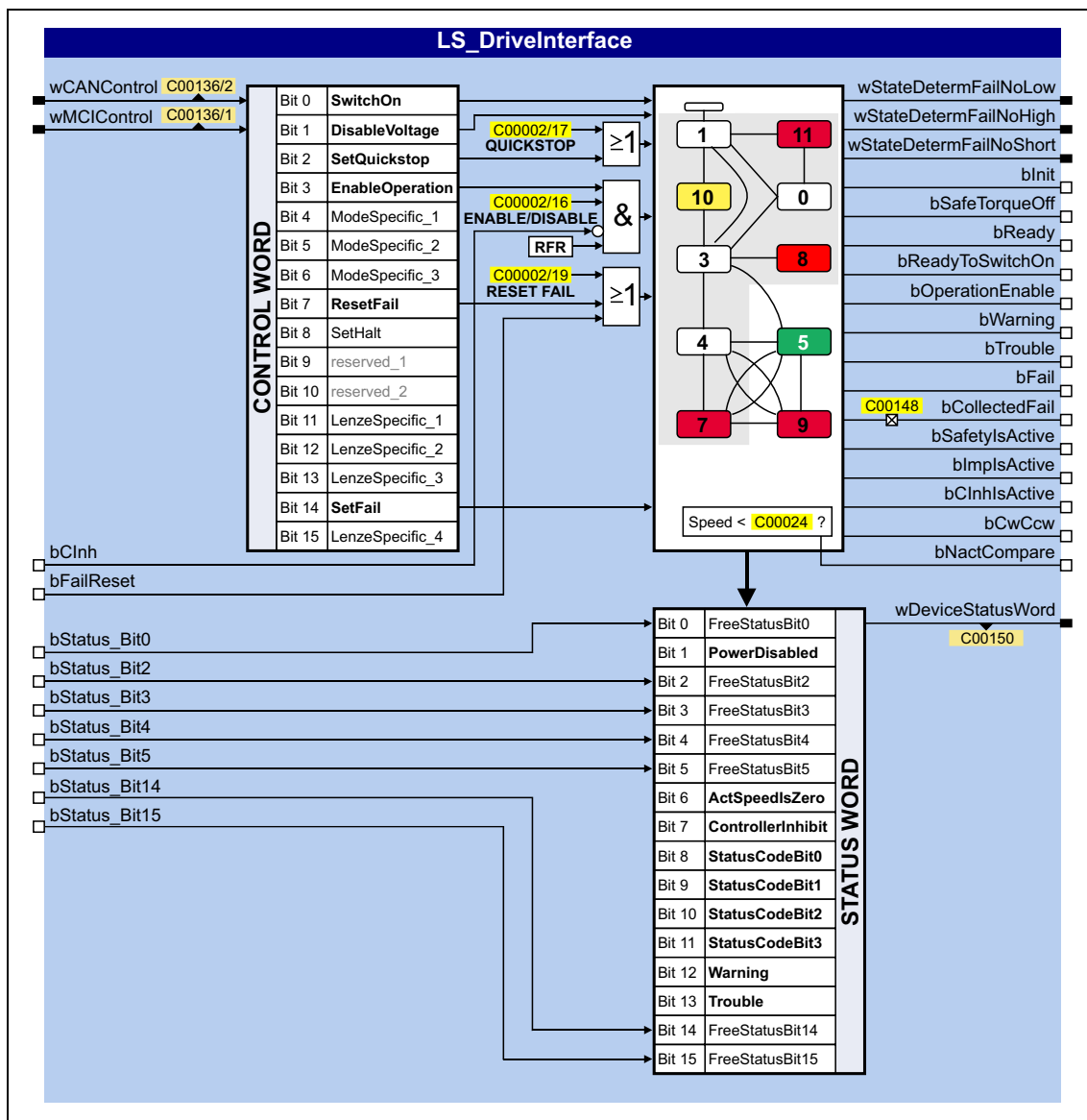
[4-1] Example 1: Behaviour with activated auto-start option "Inhibit at Lenze setting" ([C00142](#): Bit 4 = "1")



[4-2] Example 2: Behaviour with deactivated auto-start option "Inhibit at Lenze setting" ([C00142](#): Bit 4 = "0")

4.4 Internal interfaces | "LS_DriveInterface" system block

The LS_DriveInterface system block displays the device control in the FB Editor.



Inputs

Identifier DIS code data type	Information/possible settings				
wCANControl C00136/2 WORD	Control word via system bus (CAN) - The controller controlled by a master control (e.g. IPC) receives its control word by the CANopen system bus interface. The process data word is provided at this input by the upstream port block LP_CanIn1. - For a detailed description of the individual control bits, see chapter "wCANControl/wMCIControl control words". (101)				
wMCIControl C00136/1 WORD	Control word via communication module (e.g. PROFIBUS) - The controller controlled by a master control (e.g. IPC) receives its control word by a plugged-in communication module. The process data word is provided at this input by the upstream port block LP_McIn1. - For a detailed description of the individual control bits, see chapter "wCANControl/wMCIControl control words". (101)				
bCInh C00833/36 BOOL	► Enable/Inhibit controller (80) <table> <tr> <td>FALSE</td><td>Enable controller: The controller switches to the "OperationEnabled" device state, if no other source of a controller inhibit is active. C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. </td></tr> <tr> <td>TRUE</td><td>Inhibit controller (controller inhibit): The controller switches to the "SwitchedOn" device state.</td></tr> </table>	FALSE	Enable controller: The controller switches to the " OperationEnabled " device state, if no other source of a controller inhibit is active. C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit.	TRUE	Inhibit controller (controller inhibit): The controller switches to the " SwitchedOn " device state.
FALSE	Enable controller: The controller switches to the " OperationEnabled " device state, if no other source of a controller inhibit is active. C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit.				
TRUE	Inhibit controller (controller inhibit): The controller switches to the " SwitchedOn " device state.				
bFailReset C00833/37 BOOL	► Reset error message (448) <table> <tr> <td>FALSE → TRUE</td><td>The current error is reset.</td></tr> </table>	FALSE → TRUE	The current error is reset.		
FALSE → TRUE	The current error is reset.				
bStatus_Bit0 bStatus_Bit2 bStatus_Bit3 bStatus_Bit4 bStatus_Bit5 bStatus_Bit14 bStatus_Bit15 C00833/38 ... 44 BOOL	Freely assignable bits in the status word of the controller You can use these bits for returning information to the master control (e.g. IPC).				
bFree_1 bFree_2 bFree_3 bFree_4 C00833/45 ... 48 BOOL	Reserved inputs have no function				

Outputs

Identifier DIS code data type	Value/meaning	
wDeviceStatusWord C00150 WORD	Status word of the controller (based on DSP-402) - The status word contains all information relevant for controlling the controller. - The status word is sent as a process data word to the master control via a port block: - Port block LP_CanOut1 when the CANopen system bus interface is used or - Port block LP_MciOut when a plugged-in communication module is used (e.g. PROFIBUS). - For a detailed description of each status bit see chapter "wDeviceStatusWord status word". (103)	
wStateDetermFailNoLow WORD	Display of the status determining error (32-bit error number, Low-Word) From version 06.00.00 onwards: If the "Use 16BitFailNo." (Bit 15 = "1") option is activated in C00148, the short16-bit error number (<i>wStateDetermFailNoShort</i>) is provided via this output as well. - In this case, the <i>wStateDetermFailNoHigh</i> output is "0". - Advantage: The bus transfer of the error numbers is possible via a data word without changing the interconnection of the technology application.	
wStateDetermFailNoHigh WORD	Display of the status determining error (32-bit error number, High-Word)	
wStateDetermFailNoShort WORD (from version 06.00.00)	Display of the status determining error (16-bit error number)	
bInit BOOL	TRUE	" Init " device status is active
bSafeTorqueOff BOOL	TRUE	" SafeTorqueOff " device status is active
bReady BOOL	TRUE	" SwitchedOn " device status is active
bReadyToSwitchOn BOOL	TRUE	" ReadyToSwitchOn " device status is active
bOperationEnable BOOL	TRUE	" OperationEnabled " device status is active
bWarning BOOL	TRUE	A warning is indicated
bTrouble BOOL	TRUE	" Trouble " device state is active
bFail BOOL	TRUE	" Fault " device state is active
bCollectedFail BOOL (from version 04.00.00)	TRUE	Group error: A device status according to the group error configuration in C00148 has occurred, the drive is not able to follow the setpoint selection.
bSafetyIsActive BOOL	TRUE	In preparation
bImplsActive BOOL	TRUE	Pulse inhibit is active
bCInhIsActive BOOL	TRUE	Controller inhibit is active
bCwCcw BOOL	FALSE	Motor rotates in CW direction
	TRUE	Motor rotates in CCW direction
bNactCompare BOOL	TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
		During closed-loop operation: Actual speed value < Comparison value (C00024)

Option "Lock bFail at TroubleQSP"

The [TroubleQSP](#) device status gets active as soon as a monitoring function responds that has been parameterised for the "TroubleQSP" error response. Since the *bFail* status output is not set in this case, it is not recognisable after pulse inhibit due to e.g. automatic brake operation (as well for a higher-level control), why the drive is standing und does not start when the setpoint is selected. Only after an error reset, a setpoint is accepted again.

From version 11.00.00: If the "Lock bFail at TroubleQSP" option is activated (bit 14 = "1") in [C00148](#), the *bFail* status output is also set to TRUE if the device status is [TroubleQSP](#).

4.4.1 wCANControl/wMCIControl control words

The controller is controlled by a master control (e.g. IPC) via the *wCanControl* or *wMCIControl* control word, respectively.

- *wCANControl*: Control word via system bus (CAN)
 - The process data word is provided at the *wCanControl* input via the upstream [LP_CanIn1](#) port block.
 - Display parameter: [C00136/2](#)
- *wMCIControl*: Control word via a plugged-in communication module (e.g. PROFIBUS)
 - The process data word is provided at the *wMCIControl* input via the upstream [LP_MciIn1](#) port block.
 - Display parameter: [C00136/1](#)
- The bit assignment for the *wCanControl*/*wMCIControl* control words can be seen from the table below.

**Note!**

The assignment of bits 11 ... 13 and bit 15 depends on the technology application selected in [C00005](#)!

- See description of the corresponding technology application.

Bit	Name	Function
Bit 0	SwitchOn	1 ≡ Change to the "SwitchedOn" device status • From version 05.01.00 onwards, the following applies: This bit must be set in the CAN AND MCI control word in order that the drive changes to the "SwitchedOn" device state after mains connection. In order to reach the "ReadyToSwitchOn" state, it is sufficient to set the bit to 0 in one of the two control words. • Up to and including version 05.00.00 the following applies: This bit must be set in the CAN OR MCI control word in order that the drive changes to the "SwitchedOn" state after mains connection.
Bit 1	DisableVoltage	1 ≡ Inhibit inverter control (pulse inhibit)
Bit 2	SetQuickStop	Activate quick stop (QSP) ▶ Activate/deactivate quick stop (□ 81)
Bit 3	EnableOperation	1 ≡ Enable controller (RFR) • This bit must be set in CAN AND in the MCI control word, otherwise the controller will be inhibited.
Bit 4	ModeSpecific_1	Reserved (currently not assigned)
Bit 5	ModeSpecific_2	
Bit 6	ModeSpecific_3	
Bit 7	ResetFault	1 ≡ Reset fault (trip reset) • Acknowledge error message (if the error cause has been eliminated).
Bit 8	SetHalt	1 ≡ Activate stop function • Stop drive via stopping ramp (in preparation).
Bit 9	reserved_1	Reserved (currently not assigned)
Bit 10	reserved_2	
Bit 11	LenzeSpecific_1	Assignment depends on the selected technology application • See description of the corresponding technology application.
Bit 12	LenzeSpecific_2	
Bit 13	LenzeSpecific_3	
Bit 14	SetFail	1 ≡ Set error (trip set)
Bit 15	LenzeSpecific_4	Assignment depends on the selected technology application • See description of the corresponding technology application.

**Tip!**

If a bus control is not wanted (e.g. in case of control via terminals):

Connect both control word inputs with the *wDriveCtrl* output signal of the [LS ParFix](#) system block. This output signal has the fixed value "9", which corresponds to the following assignment:

- Bit 0, SwitchOn = 1
- Bit 3, EnableOperation = 1
- All others: 0

4.4.2 wDeviceStatusWord status word

The *wDeviceStatusWord* status word provided by the control system contains all information relevant for controlling the controller.

- The status word is sent as a process data word to the master control via a port block:
 - The **LP_CanOut1** port block if "CAN on board" is used or
 - the **LP_MciOut1** port block if a plugged-in communication module is used (e.g. PROFIBUS).
- Display parameter: [C00150](#)
- The bit assignment of the *wDeviceStatusWord* status word can be seen from the table below.

Bit	Name	Status
Bit 0	FreeStatusBit0	Free status bit 0
Bit 1	PowerDisabled	1 ≡ Inverter control inhibited (pulse inhibit is active)
Bit 2	FreeStatusBit2	Free status bit 2 (not assigned, freely assignable)
Bit 3	FreeStatusBit3	Free status bit 3 (not assigned, freely assignable)
Bit 4	FreeStatusBit4	Free status bit 4 (not assigned, freely assignable)
Bit 5	FreeStatusBit5	Free status bit 5 (not assigned, freely assignable)
Bit 6	ActSpeedIsZero	During open-loop operation: 1 ≡ Speed setpoint < Comparison value (C00024)
		During closed-loop operation: 1 ≡ Actual speed value < Comparison value (C00024)
Bit 7	ControllerInhibit	1 ≡ Controller inhibited (controller inhibit is active)
Bit 8	StatusCodeBit0	Bit coded display of the active device status ▶ Device state machine and device states (see table [4-1])
Bit 9	StatusCodeBit1	
Bit 10	StatusCodeBit2	
Bit 11	StatusCodeBit3	
Bit 12	Warning	1 ≡ A warning is indicated
Bit 13	Trouble	1 ≡ Controller is in the " Trouble " device status • E.g. if an overvoltage has occurred.
Bit 14	FreeStatusBit14	Free status bit 14 (not assigned, freely assignable)
Bit 15	FreeStatusBit15	Free status bit 15 (not assigned, freely assignable)

5 Motor control (MCTRL)

This chapter provides information on the parameter setting of the controller's internal motor control.

Topics:

Basic settings:

- ▶ [Motor selection/Motor data](#)
- ▶ [Selecting the control mode](#)
- ▶ [Defining current and speed limits](#)

Description of the motor control types:

- ▶ [V/f characteristic control \(VFCplus\)](#)
- ▶ [V/f characteristic control - energy-saving \(VFCplusEco\)](#)
- ▶ [V/f control \(VFCplus + encoder\)](#)
- ▶ [Sensorless vector control \(SLVC\)](#)
- ▶ [Sensorless control for synchronous motors \(SLPSM\)](#)

Parameterisable additional functions:

- ▶ [Selection of switching frequency](#)
- ▶ [Operation with increased rated power](#)
- ▶ [Flying restart function](#)
- ▶ [DC-injection braking](#)
- ▶ [Slip compensation](#)
- ▶ [Oscillation damping](#)
- ▶ [Phase sequence reversal for correcting misconnected UVW motor phases](#)

Further topics:

- ▶ [Encoder/feedback system](#)
- ▶ [Braking operation/brake energy management](#)
- ▶ [Monitoring](#)

Internal interfaces (process signals):

- ▶ [Internal interfaces | System block "LS_MotorInterface"](#)
- ▶ [Internal status signals | System block "LS_DeviceMonitor"](#)

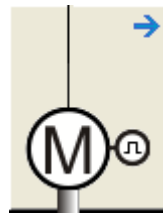
5.1 Motor selection/Motor data

The motor data term comprises all parameters that only depend on the motor and that only characterise the electrical behaviour of the machine. The motor data are independent of the application in which the controller and the motor are used.



Proceed as follows to open the dialog for parameterising the motor data:

1. »Engineer« Go to the *Project* view and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the following button:



Parameterisation dialog in the »Engineer«

Motor data		Actual values	
Rated motor power	[C] 0,08 kW	Actual speed value	[C] 0 rpm
Rated motor speed	[C] 2700 rpm	Motor voltage	[C] 0 V
Rated motor current	[C] 0,54 A	DC-bus voltage	[C] 0 V
Rated motor frequency	[C] 100 Hz	Motor current	[C] 0,00 A
Rated motor voltage	[C] 390 V	Thermal motor load (Fxt)	[C] 0,00 %
Motor cosine phi	[C] 0,50		

- Via the **From Motor Catalogue** button, the motor catalogue can be opened to select another motor. ▶ [Selecting a motor from the motor catalogue in the »Engineer«](#) (109)
- Via the **From drive...** button, the motor data set in the controller can be copied to the »Engineer« when an online connection has been established.
- When an online connection has been established to the controller, the **Identification in progress...** button serves to automatically identify different motor data. ▶ [Automatic motor data identification](#) (111)
- The **Encoder/feedback system...** button serves to get to the settings for the encoder/feedback system, if available. ▶ [Encoder/feedback system](#) (220)

**Stop!**

Motors with electronic nameplates (ETS) must not be operated on 8400 controllers!

**Note!**

Sensorless vector control (SLVC) and sensorless control for synchronous motors (SLPSM) in particular requires the motor data parameters to be set. The motor data comprise the data of the motor nameplate and the data of the motor equivalent circuit.

If the motor has been selected via the motor catalogue of the »Engineer« or the motor data have been adapted offline using the »Engineer«, all motor data must then be copied to the controller and saved power-failure-proof to the memory module (device command: [C00002/11](#)) when an online connection has been established.

**Note!****Setting a rated motor frequency with a decimal position**

If the motor has a rated motor frequency with a decimal position (e.g. motor nameplate data "23.7 Hz"):

- [Up to and including version 11.xx.xx](#), the following motor nameplate data must be increased by a factor of 10:
 - [C00089](#): Rated motor frequency
(a value of "23.7 Hz", for instance, must be increased to 237 Hz.)
 - [C00081](#): Rated motor power
 - [C00087](#): Rated motor speed
 - [C00090](#): Rated motor voltage
- [From version 12.00.00](#), the rated motor frequency must be entered without decimal position to clearly identify the right motor type. (a value of "23.7 Hz", for instance, must be set to 23 Hz in [C00089](#))
 - [C01000](#) displays the set motor type (ASM or PSM).
 - [C00969](#) displays the set number of motor pole pairs.
- [From version 14.00.00 onwards](#), the motor type (ASM or PSM) can also be set manually in [C01001/1](#) for a clear identification.

**Note!**

If a rated motor speed is set for an asynchronous motor (ASM) in [C00087](#) which corresponds to a very high slip speed, the number of pole pairs is identified incorrectly. Moreover, a synchronous motor (PSM) is detected instead of an asynchronous motor (ASM) at certain slip speeds. Detailed information and possible remedies can be found here:

► [Application notes for asynchronous motors with high slip speed](#) (📖 117)

Motor data

In the parameterisation dialog, the data of the motor nameplate for the selected motor are displayed under "Motor data".

Parameter	Info
C00081	Rated motor power
C00087	Rated motor speed
C00088	Rated motor current
C00089	Rated motor frequency
C00090	Rated motor voltage
C00091	Motor cos φ

Actual values

When an online connection to the controller has been established, the following actual values are displayed in the parameterisation dialog under "Actual values":

Parameter	Info
C00051	Actual speed value
C00052	Motor voltage
C00053	DC-bus voltage
C00054	Motor current
C00066	Thermal motor load (I2xt)
Highlighted in grey = display parameter	

Adapting motor data manually

If a third party manufacturer's motor is used, the displayed motor data can exactly be adapted to the real motor by clicking the **From project...** button and selecting the "Own motor settings" entry from the **Motor selection** dialog box afterwards. For this purpose, the data of the motor nameplate and the equivalent circuit diagram must be available.



Tip!

For a better concentricity factor, we recommend to perform motor parameter identification of the third party manufacturer's motor first. The motor parameters can be manually adapted afterwards.

Improving the concentricity factor includes

- the adjustment of the inverter error characteristic to the drive system and
- the knowledge of the motor cable resistance.

Both factors are determined in the course of motor parameter identification.

► [Automatic motor data identification](#) (111)

Other motor data

Click the **Other motor data...** button and go to the *Other motor data* dialog box including the motor equivalent circuit (in the following for an asynchronous motor):

The 'Other motor data' dialog box displays the following parameters and units:

- Motor stator resistance: 43000 mOhm
- Motor stator leakage inductance: 172.60 mH
- Motor rotor resistance: 86600 mOhm
- Motor magnetising current: 0.35 A
- Motor magnetising inductance: 879.0 mH
- VFC: V/f base frequency: 100.0 Hz
- Slip comp.: 10.00 %
- SLVC: Vp speed controller: 10.93
- SLVC: Ti speed controller: 100.0 ms
- Vp current controller: 345.20 V/A
- Ti current controller: 4.01 ms
- SC: Moment of inertia: 0.41 kg c

The dialog box also includes a 'Back' button and a 'C' icon next to each input field. An equivalent circuit diagram is shown in the background, representing the motor's electrical model.

Parameter	Info	ASM	PSM
C00084	Motor stator resistance	●	●
C00085	Motor stator leakage inductance	●	●
C00082	Motor rotor resistance	●	
C00095	Motor magnetising current	●	
C00092	Motor magnetising inductance	●	
C00015	VFC: V/f base frequency	●	●
C00021	Slip compensation	●	
C00070/1	SLVC: Vp speed controller	●	
C00071/1	SLVC: Ti speed controller	●	
C00075	Vp current controller	●	●
C00076	Ti current controller	●	●
C00273	Moment of inertia	●	●
C00016	VFC: Vmin boost	●	●
C00070/3	SLPSM: Vp speed controller	●	●
C00071/4	SLPSM: Ti speed controller	●	●
C00011	Appl.: Reference speed	●	●
C00022	Imax in motor mode	●	●
C00966	VFC: Time const. slip comp.	●	
C00982	VFC-ECO: Voltage reduction ramp	●	
C00073/1	VFC: Vp Imax controller	●	●

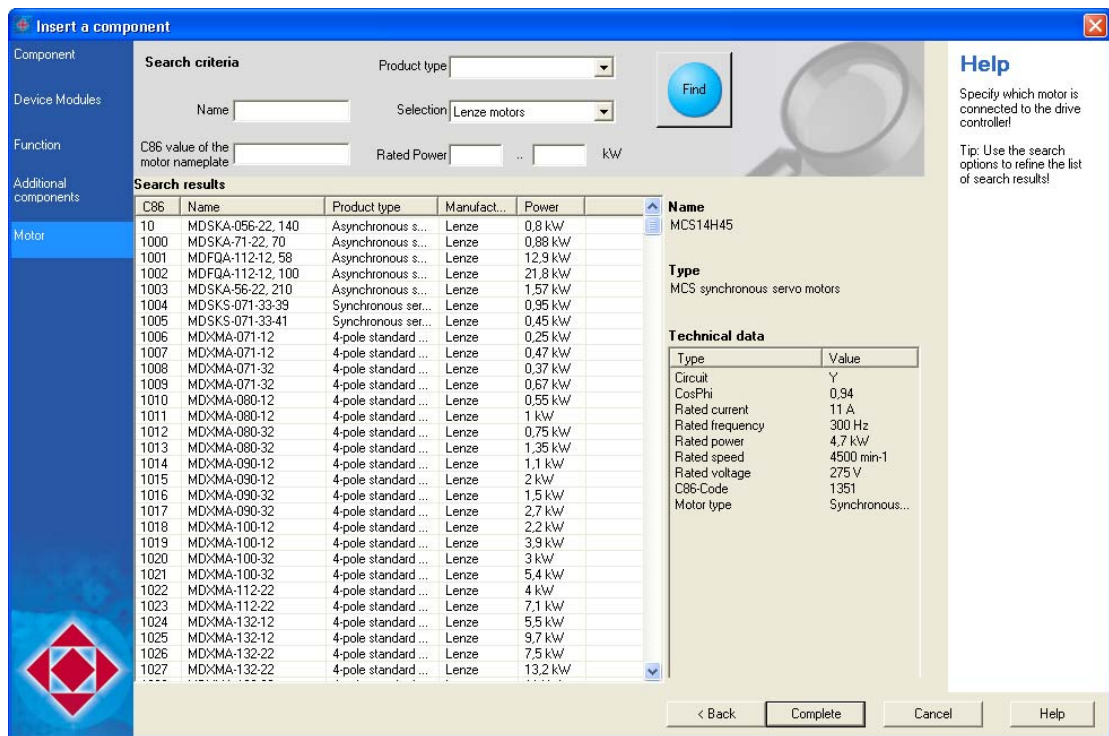
- From version 12.00.00 onwards, [C01000](#) displays the set motor type (ASM or PSM).
- Generally, a synchronous motor without speed feedback can also be operated with the [V/f characteristic control \(VFCplus\)](#) control mode. The parameters for this control mode (e.g. V/f base frequency) thus also have an according influence on synchronous motors.

5 Motor control (MCTRL)

5.1 Motor selection/Motor data

5.1.1 Selecting a motor from the motor catalogue in the »Engineer«

If you, when inserting the controller into the project in the dialog step "Other components", put a checkmark in the control field **Motor**, you can select as a further dialog step the motor for the controller from the motor catalogue:



- Alternatively, the motor can be inserted into the project at a later time via the **Insert a component** command.
- Go to the **Application parameters** tab in the **Overview → Motor data** dialog level and click the **From motor catalogue...** button to also reach the motor catalogue for the selection of another motor.

Accepting the default values of the motor

If a motor is selected from the motor catalogue at a later time, the *Use motor's default values* dialog box is displayed afterwards which includes all motor data of the selected motor. Please select here which of the default values are to be copied to the controller:

Use motor's default values

Controller: [8400 StateLine C V04.00.00 [8400 StateLine C V04.00.00]]

Motor: [SDSGA047-22, 100 (Y)]

Motor parameter

☐ Use selection of motor controller in C0006: [No default value available for this motor]

☒ Use following values in drive controller:

Code	Subcode	Description	Value	Unit
0015	000	VFC: V/f base frequency	100	Hz
0016	000	VFC: rpm boost	4.93	%
0021	000	Slip comp.	10	%
0073	001	VFC: Vp Imax controller	1.45	
0075	000	Vp current controller	345.2	V/A
0076	000	Ti current controller	4.01	ms
0081	000	Rated motor power	0.08	kW
0082	000	Motor rotor resistance	86600	mOhm
0084	000	Motor stator resistance	43000	mOhm
0085	000	Motor stator leakage inductance	172.6	mH

Path parameters for operation with zero load

☒ Use following values in drive controller:

Code	Subcode	Description	Value	Unit
0022	000	Imax in motor mode	0.95	A
0070	001	SLVC: Vp Drehzahlregler	10.93	
0071	001	SLVC: Ti speed controller	100	ms
0273	000	SC: Moment of inertia	0.41	kg cm ²

OK

- The listed motor parameters are already optimally preset for the selected Lenze motor. An adaptation is not required.
- The "plant parameter" term comprises all parameters that result from the combination of motor and load. These characterise the transfer behaviour of the entire controlled system.
 - The plant parameters depend on the application in which the controller and motor are used.
 - When a Lenze motor is selected in the »Engineer«, plant parameters are suggested for this motor for a load-free operation.



Tip!

If a third party manufacturer's motor is used, select a Lenze motor from the motor catalogue first which is similar in terms of current, voltage and speed rating. Adapt the preselected motor data exactly to the real motor afterwards.

5.1.2 Automatic motor data identification

The motor parameter identification serves to automatically identify the inverter characteristic, the influences of the motor cable and various motor parameters.



Note!

We strongly recommend motor parameter identification before the initial commissioning of the sensorless vector control (SLVC) and the sensorless control for synchronous motors (SLPSM).

Automatically identified motor parameters

Parameter	Info	ASM	PSM
C00015	V/f base frequency	●	●
C00016	V _{min} boost	●	●
C00021	Slip compensation	●	
C00082	Motor rotor resistance	●	
C00083	Motor rotor time constant	●	
C00084	Motor stator resistance	●	●
C00085	Motor stator leakage inductance	●	●
C00092	Motor magnetising inductance	●	
C00095	Motor magnetising current	●	

Automatic calculation of the current controller and field controller parameters

From version 12.00.00 onwards: Following successful motor parameter identification, the current controller and field controller parameters listed in the below table are calculated as well.

- If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".

Parameter	Info	ASM	PSM
C00073/1	VFC: Vp I _{max} controller	●	●
C00075	Vp current controller	●	●
C00076	Ti current controller	●	●

OPTIONAL: Automatic calculation of the speed controller parameters

From version 12.00.00 onwards: Following successful motor parameter identification, the speed controller parameters listed in the below table can also be calculated automatically.

- If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".

Parameter	Info	ASM	PSM
C00070/1	SLVC: Vp speed controller	●	
C00071/1	SLVC: Ti speed controller	●	
C00070/3	SLPSM: Vp speed controller	●	●
C00071/3	SLPSM: Ti speed controller	●	●

- Care must be taken that the constant mass inertia of the drive (mass inertia of motor, gearbox, shaft and constant load) is entered as exactly as possible in [C00273](#) to calculate the speed controller parameters as dynamically as possible.
 - Mass inertias that are not constant (e.g. changing loads of reels or different loads of hoists) must be entered in [C00919/1](#).
 - If the mass inertia set in [C00273](#) is too low, the speed controller parameters are calculated less dynamically.
 - If the mass inertia set in [C00273](#) is too high, speed controller operation is unstable.
- If the mass inertia in [C00273](#) is set to "0", the setting of bit 5 in [C02865](#) has no effect on the speed controller parameter calculation. In this case, the speed controller parameters will not be calculated automatically after motor parameter identification.

OPTIONAL: Automatic calculation of other controller parameters

From version 12.00.00 onwards: Following successful motor parameter identification, the controller parameters listed in the below table can also be calculated automatically.

- If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

Parameter	Info	ASM	PSM
C00011	Appl.: Reference speed	●	●
C00022	Imax in motor mode	●	●
C00497	Nact filter time constant	●	●
C00966	VFC: Time const. slip comp.	●	
C00982	VFC-ECO: Voltage reduction ramp	●	

Principal sequence of the motor parameter identification

1. The motor stator resistance ([C00084](#)) is measured.
2. The inverter error characteristic is measured.
3. The motor stator leakage inductance ([C00085](#)) is measured.
4. The V/f base frequency ([C00015](#)) is calculated.
5. The slip compensation ([C00021](#)) is calculated.
6. The $V_{\min}$ boost ([C00016](#)) is detected.
7. Only for asynchronous motors:
 The motor magnetising inductance ([C00092](#)) and the motor rotor resistance ([C00082](#)) are measured.
 The motor magnetising current ([C00095](#)) is measured.

From version 12.00.00:

8. If [C02865/1](#) - bit 4 = "0" (Lenze setting):
 The current controller and field controller parameters are calculated. (See [table](#).)
9. If [C02865/1](#) - bit 5 = "1":
 The speed controller parameters are calculated. (See [table](#).)
10. If [C02865/1](#) - bit 6 = "1":
 Other controller parameters are calculated. (See [table](#).)

Selection of the identification mode

From version 10.00.00 onwards, two identification modes are available in [C02867/1](#):

- "1: Basic identification" (previous mode)
 - Only for asynchronous motors
 - Duration approx. 30 s
- "2: extended identification"
 - Stands out due to increased accuracy of the determined motor parameters.
 - Also supports synchronous motors and asynchronous motors with a power of more than 11 kW.
 - Duration approx. 80 s



Tip!

In the Lenze setting, a setting of "0: automatic" is selected in [C02867/1](#). This setting ensures that the controller automatically selects the optimum procedure for motor parameter identification.

Preconditions for executing the motor parameter identification

- The motor parameter identification must be carried out when the motor is cold!
- The load machine may remain connected. Holding brakes, if present, may remain in the braking position.
- In case of a synchronous motor:
 - The shaft must be able to rotate freely (must not be locked).
 - An identification is only possible with the extended motor parameter identification.
- For an asynchronous motor from a power of 11 kW:
An identification is only possible with the extended motor parameter identification.
- The controller has to be ready for enable (has to be in the "[SwitchedOn](#)" state).
Inhibit the controller if it is enabled, e.g. via the [C00002/16](#) device command or a LOW signal at the X4/RFR terminal.
- The motor has to be at standstill.

Required parameter settings before the motor parameter identification is executed

- For an extended motor parameter identification, a motor control suitable for the motor has to be set in [C00006](#). When the identification starts, this setting determines whether an asynchronous motor or a synchronous motor has to be identified. ▶ [Selecting the control mode](#) (□ 118)
- The motor parameters listed in the table below are excluded from automatic identification and must therefore be adapted to the used motor before motor parameter identification is carried out (see motor nameplate).

Parameter	Info
C00081	Rated motor power
C00087	Rated motor speed
C00088	Rated motor current (according to the connection method Δ/Δ) Note The amplitude of the rated motor current (C00088) is injected to identify the stator resistance. If the rated motor current amounts to less than 60 % of the rated inverter current, at least 60 % of the rated inverter current will be injected to ensure sufficient motor parameter identification accuracy.
C00089	Rated motor frequency (according to the connection method Δ/Δ)
C00090	Rated motor voltage (according to the connection method Δ/Δ)
C00091	Motor $\cos \varphi$

- If the motor nameplate data are entered in the »Engineer« motor catalogue instead of selecting a motor, it is recommendable to use the extended motor parameter identification ([C02867/1](#) = "2: extended identification").
- Especially for third-party motors, it is also recommendable to carry out the slip calculation with the motor equivalent circuit diagram data ([C02879/1](#)). If the slip calculation is derived from the motor nameplate data, this can negatively affect the stability and accuracy of the drive behaviour because the rated speed specified on the motor nameplate often is rather inaccurate.

- The available motor cable must be specified in terms of length and cross-section:

Parameter	Info
C00915	Motor cable length
C00916	Motor cable cross-section

The motor cable resistance resulting from these settings is displayed in [C00917](#).

- For the measurement of the required variables, the motor is energised via the controller terminals U, V and W during the motor parameter identification. The corresponding current controller is preset in the Lenze setting so that an optimal controller behaviour is achieved with an asynchronous motor power-adapted to the controller.

Thanks to optimisation, the current controller can be set via the following parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00075	Vp current controller	7.00	V/A
C00076	Ti current controller	10.61	ms

- Switching frequency for the motor parameter identification:
 - [Up to and including version 13.xx.xx](#), the motor parameter identification is executed with a switching frequency of 4 kHz.
 - [From version 14.00.00](#), the motor parameter identification can also be executed with a switching frequency of 8 kHz instead of 4 kHz. For this purpose, the option "Motor ident.: Switching frequency 8 kHz" (Bit 4 = "1") has to be set in [C02864/1](#).
Example of how to use this option: Between the output of the inverter and the motor, a sinusoidal filter is connected which may only be operated with a minimum switching frequency of 8 kHz. (See also the section "[Preventing a decrease of the switching frequency](#)".)
[\(□ 203\)](#)

Generally, a switching frequency of 4 kHz is recommended for the motor parameter identification as it serves to obtain the most accurate results.

Premature abort of the motor parameter identification



Stop!

If motor parameter identification is aborted, unstable drive behaviour may be the result!

The motor parameter identification can be aborted in the following cases:

- If a special motor (e.g. mid-frequency motor) or a servo motor is used.
- If there is a large deviation between inverter and motor power.

In case of a simple motor parameter identification, we recommend the following:

- to reduce the P component Vp of the current controller ([C00075](#)) e.g. by halving.
- to increase the time constant Ti of the current controller ([C00076](#)) e.g. by doubling.

In case of the extended motor parameter identification, the current controller parameters are determined automatically. If the identification is aborted all the same, the current controller parameters set in [C00075](#) and [C00076](#) can be used by parameterising [C02866](#) to "1".

Another cause for the abort of the motor parameter identification could be the implausibility of the entered nameplate data, e.g. the entry P = 0 kW for the motor power.

Execute automatic motor parameter identification**Danger!**

During motor parameter identification, the motor is energised via the outputs U, V and W of the controller!

- Observe the corresponding safety instructions!
- With an idling motor, a small angular offset may occur at the motor shaft.
- During the motor parameter identification, rotations occur in case of a synchronous motor.

**How to carry out automatic motor parameter identification:**

1. Activate motor parameter identification via the [C00002/23](#) = "1: On / start" device command.
2. Enable controller.
 - The controller changes to the "[Ident](#)" device status.
 - Motor parameter identification starts.
 - The progress of the identification run can be seen in [C00002/23](#).
 - The identification is completed if the "0: Off / ready" message is displayed in [C00002/23](#).
 - After successful identification, it changes back to the "[SwitchedOn](#)" device status.
3. Inhibit controller again.

5.1.3 Application notes for asynchronous motors with high slip speed



Note!

If a rated motor speed is set for an asynchronous motor (ASM) in [C00087](#) which corresponds to a very high slip speed, the number of motor pole pairs is identified incorrectly.

Moreover, a synchronous motor is (PSM) is detected instead of an asynchronous motor (ASM). In this case, the "[Id7](#)" error message can occur since motor and motor control type do not match.

Examples, possible impacts and remedies are described in the following sections.

Examples:

Number of pole pairs	Mechanical synchronous speed	Rated motor frequency (C00089)	Incorrect number of pole pairs if the rated motor speed (C00087) is lower:
1	3000 rpm	50 Hz	1986 rpm
2	1500 rpm	50 Hz	1195 rpm
3	1000 rpm	50 Hz	854 rpm
4	750 rpm	50 Hz	665 rpm

Possible impacts depending on the motor control type:

Motor control type	Possible impacts on the drive
V/f control (VFCplus + encoder)	The motor can accelerate up to maximum speed of the motor.
Sensorless vector control (SLVC)	The output speed is considerably too high.
V/f characteristic control (VFCplus)	Example: $p=2$, $f_n=50$ Hz, $n_n=1195 \text{ min}^{-1}$ → Speed is 50 % too high

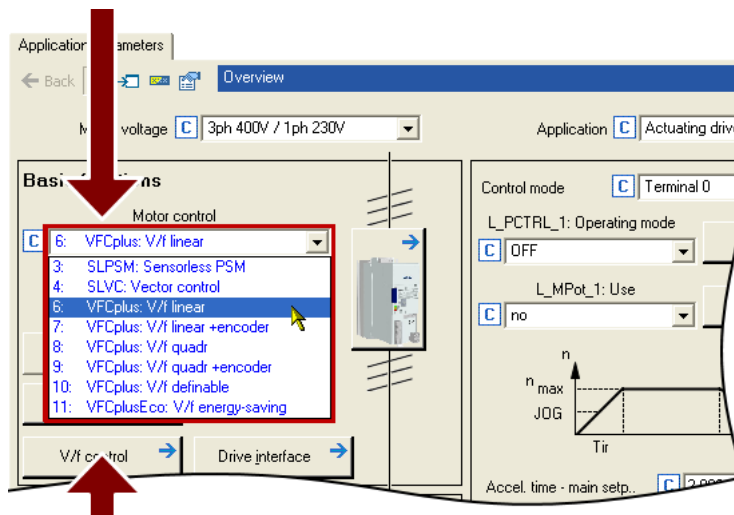
Remedies:

- For version 12.xx.xx and version 13.xx.xx the following applies:
Limit the rated motor speed: $C00087 = C00089 * 60 / (\text{number of pole pairs} + 0.5)$
- From version 14.00.00:
Set the motor type ("ASM" or "PSM") manually in [C01001/1](#). The rated motor speed does not need to be limited since the number of pole pairs can be detected safely when the motor type has been set manually.

5.2 Selecting the control mode

The 8400 StateLine controller supports various modes for motor control (open loop or closed loop).

- V/f characteristic control (VFCplus) with linear characteristic for asynchronous motors is preset.
- The control mode can be selected in the »Engineer« on the **Application parameter** tab via the **Motor control (C00006)** list field:



- A click on the **Motor control...** button leads you to the parameterisation dialog of the selected motor control. (The button is labelled according to the selected motor control.)



Tip!

In order to make the selection of the motor control easier, we provide a selection help with recommendations and alternatives for standard applications in the subchapter entitled "[Selection help](#)". (122)

The following section briefly describe the control modes. A reference to more details can be found at the end of each section.

V/f characteristic control (VFCplus)

The V/f characteristic control (VFCplus) is a motor control mode for standard frequency inverter applications based on a simple and robust control process which is suitable for the operation of asynchronous motors with linear or square-law load torque characteristic (e.g. fans). Furthermore, this motor control mode is also suitable for group drives and special motors. Due to the low parameterisation effort, commissioning of such applications is fast and easy.

The $V_{\min}$ boost ([C00016](#)) and slip compensation ([C00021](#)) required for optimising the drive behaviour are dimensioned for asynchronous motors with power adaptations to the inverter in the Lenze setting.

▶ [V/f characteristic control \(VFCplus\)](#) (📘 126)

Energy-saving V/f characteristic control (VFCplusEco)

From version 10.00.00

In contrast to the V/f characteristic control mode (VFCplus), this motor control mode uses a $\cos\phi$ control in partial load operational range to automatically reduce the power loss in the asynchronous motor (energy optimisation).

The motor data required for the $\cos\phi$ control and the $V_{\min}$ boost ([C00016](#)) and slip compensation ([C00021](#)) required for optimising the drive behaviour are dimensioned for asynchronous motors with power adaptations to the inverter in the Lenze setting.

The required motor data (motor rotor resistance, motor stator resistance, motor stator leakage inductance and mutual motor inductance) only affect the extent of energy optimisation but not the stability.

In case of applications with dynamically very high sudden load variations from the unloaded operation, this motor control mode should not be used since a motor stalling cannot be excluded.

Energy optimisation for dynamic applications is not possible with this motor control mode.

▶ [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (📘 144)

V/f control (VFCplus + encoder)

The V/f control can be selected for operating asynchronous motors with speed feedback. With this motor control, a slip regulator can be additionally parameterised which adjusts the actual speed value dynamically to the speed setpoint.

▶ [V/f control \(VFCplus + encoder\)](#) (📘 154)

Sensorless vector control (SLVC)

Sensorless (field-oriented) vector control for asynchronous motors is based on a decoupled, separate control for the torque-producing and the field-producing current component. In addition, the actual speed is reconstructed by means of a motor model so that a speed sensor is not required.

In comparison to the V/f characteristic control without feedback, the following can be achieved by means of sensorless vector control SLVC:

- A higher maximum torque throughout the entire speed range
- A higher speed accuracy
- A higher concentricity factor
- A higher level of efficiency
- The implementation of torque-actuated operation with speed limitation
- The limitation of the maximum torque in motor and generator mode for speed-actuated operation

**Tip!**

If a high torque without feedback is to be provided at small speeds, we recommend the "Sensorless vector control" motor control mode.

► [Sensorless vector control \(SLVC\)](#) (📖 161)

Sensorless control for synchronous motors (SLPSM)

From version 10.00.00

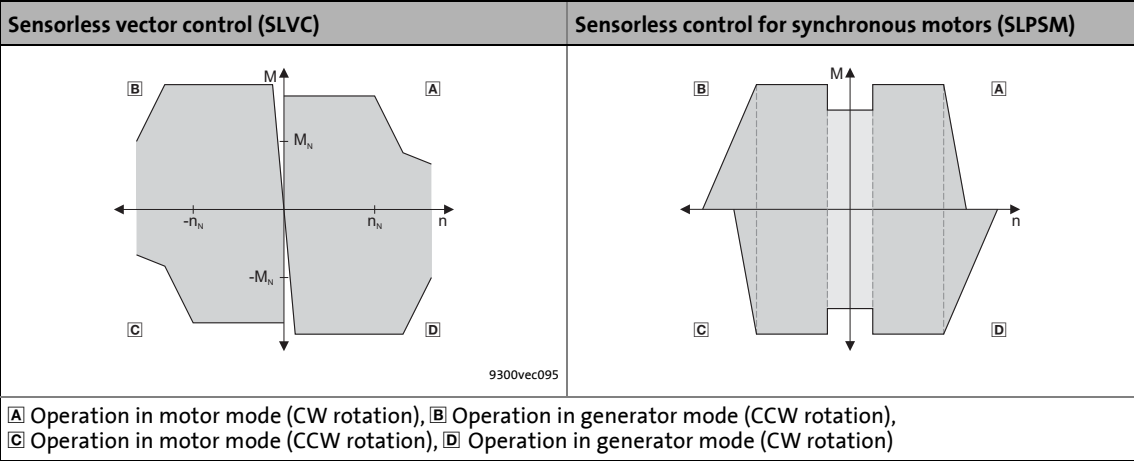
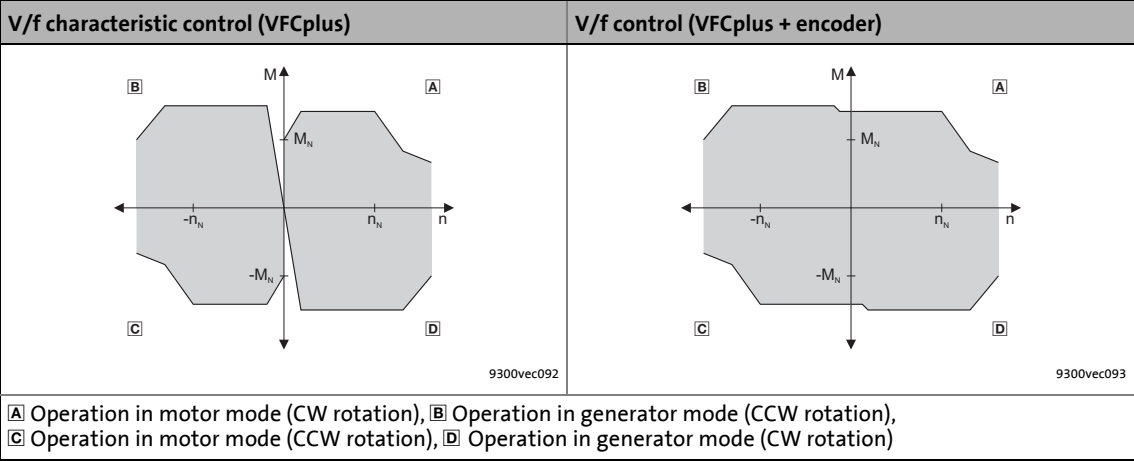
This sensorless control enables an encoderless control of synchronous motors. The process is based on field-oriented control within a higher speed range (e.g. > 10 % of the rated motor speed). The actual speed value and rotor position are reconstructed via a motor model.

Standard applications for this control type are pumps and fans, horizontal materials handling and simple positioning technology.

► [Sensorless control for synchronous motors \(SLPSM\)](#) (📖 177)

Speed feedback

As shown in the following graphics, the drive systems with feedback have, independently of the motor control, more advantages than systems without feedback.



5.2.1 Selection help

To ease the selection of the motor control mode, the two following tables contain recommendations and alternatives to standard applications.

Application	recommended	Alternatively
Single drives		
With constant load	VFCplus: V/f linear	SLVC or SLPSM
With extremely alternating loads	VFCplus: V/f linear	SLVC
With high starting duty	SLVC	VFCplus: V/f linear
Torque limitation	SLVC	SLPSM
With torque limitation (power control)	VFCplus: V/f linear	SLPSM
Three-phase reluctance motor	VFCplus: V/f linear	-
Three-phase sliding rotor motor	VFCplus: V/f linear	-
Three-phase AC motors with permanently assigned frequency/voltage characteristic	VFCplus: V/f linear	-
Pump and fan drives with quadratic load characteristic	VFCplus: U/f square-law From version 10.00.00 onwards: VFCplusEco	SLVC or SLPSM
Simple hoists	VFCplus: V/f linear	-
Group drives (<i>several motors connected to controller</i>)		
Identical motors and loads	VFCplus: V/f linear	-
Different motors and/or alternating loads	VFCplus: V/f linear	-

[5-1] Standard applications without speed feedback

Application	recommended	Alternatively
Single drives		
With constant load	VFCplus: V/f linear	SLVC
With extremely alternating loads	VFCplus: V/f linear	SLVC
With high starting duty	VFCplus: V/f linear	SLVC
With speed control (speed feedback)	VFCplus: V/f linear	-
With high dynamic performance e.g. for positioning and infeed drives	VFCplus: V/f linear	-
Torque limitation	VFCplus: V/f linear	SLVC
With torque limitation (power control)	-	-
Winder with dancer position control	VFCplus: V/f linear	-
Unwinder with dancer position control	VFCplus: V/f linear	-
Three-phase reluctance motor	-	-
Three-phase sliding rotor motor	-	-
Three-phase AC motors with permanently assigned frequency/voltage characteristic	-	-
Pump and fan drives with quadratic load characteristic	-	-
Simple hoists	VFCplus: V/f linear	-
Group drives (<i>several motors connected to controller</i>)		
Identical motors and loads	VFCplus	-
Different motors and/or alternating loads	VFCplus	-

[5-2] Standard applications with speed feedback

5.3 Defining current and speed limits

Limitation of the speed setpoint

Parameterising the reference speed in [C00011](#) means that the drive must rotate at the set speed if a speed setpoint of 100% is specified.

All speed setpoint selections are provided in % and always refer to the reference speed set in [C00011](#).



Tip!

For reasons of achievable resolution and the accuracy involved, the reference speed should be geared to the speed range required for the respective application.

Lenze recommendation: Reference speed ([C00011](#)) = 1500 ... 3000 rpm

Irrespective of the selected motor control, there are more limitation options:

Parameter	Info	Lenze setting	
		Value	Unit
C00909/1	Max. positive speed	120	%
C00909/2	Max. negative speed	120	%
C00910/1	Max. positive output frequency	1000	Hz
C00910/2	Max. negative output frequency	1000	Hz



Note!

In the torque-controlled operation (*bTorquemodeOn* = TRUE), the limitation of the speed setpoint set in [C00909/x](#) has no impact!

For the torque-controlled operation, a permissible speed range can be defined via the speed limitation (inputs *nSpeedHighLimit_a* and *nSpeedLowLimit_a* at the SB [LS MotorInterface](#)).

For a correct function of the speed limitation in both direction, the following applies:

The speed limitation operates with a internal hysteresis of 50 min⁻¹. The upper or lower speed limit resulting from the settings has to be higher than this hysteresis!

Current limitation in motor and generator mode

In the various motor control modes, the controller is provided with functions which determine the dynamic behaviour under load and counteract exceedance of the maximum current in motor or generator mode.

Parameter	Info	Lenze setting	
		Value	Unit
C00022	I _{max} in motor mode	47.00	A
C00023	I _{max} in generator mode • 100 % ≡ I _{max} in motor mode (C00022)	100	%

The current limits must be selected depending on

- the permissible maximum current of the motor → recommendation: $I(\text{Mot})_N < 1.5 \dots 2.0$
- the permissible maximum current of the inverter
- the torque in motor/generator mode required for the application



Note!

Highly dynamic applications

(that have e.g. too short acceleration/deceleration times or excessively changing loads)

The overcurrent disconnection may respond (fault message oC1 or oC11) if the setting of the maximum current in motor mode in [C00022](#) approximately corresponds to the maximum permissible value of the respective inverter.

Remedies:

- Increase of the acceleration and deceleration ramp times
- Reduction of the maximum current in motor mode ([C00022](#))
- Reduction of the maximum current in generator mode ([C00023](#))
- Adaptation of the indirect peak current limitation (procedure depends on the selected motor control mode, see below)
- Reduction of the reset time of the current limiting controller ([C00074/1](#))

Influencing the torque in motor/generator mode

The torque in motor and generator mode can be limited via the *nTorqueMotLim* and *nTorqueGenLim* process signal inputs.

- If V/f characteristic control (VFCplus) is selected, limitation is indirectly performed via a so-called I_{max} controller.
- If sensorless vector control (SLVC) and sensorless control for synchronous motors (SLPSM) is selected, limitation has a direct effect on the torque-producing current component.

If keypad control is selected, the *nTorqueMotLim* and *nTorqueGenLim* process signals can be parameterised via [C00728/1...2](#).

**How to adapt the peak current limitation:**

V/f characteristic control (VFCplus):

- Reduce the slip compensation with [C00021](#).

V/f control (VFCplus + encoder):

- Reduce the slip limitation to twice the rated motor slip with [C00971](#).
- Reduce the $V_{\min}$ boost in [C00016](#).

Sensorless vector control (SLVC):

- Reduce the slip compensation with [C00021](#).
- Reduce the limitation of the torque in motor mode via $nTorqueMotLimit\_a$ ([C00728/1](#)) and the limitation of the torque in generator mode via $nTorqueGenLimit\_a$ ([C00728/2](#)).

5.4 V/f characteristic control (VFCplus)

In case of the V/f characteristic control (VFCplus), the motor voltage of the inverter is determined by means of a linear or quadratic characteristic depending on the field frequency or motor speed to be generated. The voltage follows a preselected characteristic.



Stop!

- The V/f characteristic control is only suitable for asynchronous motors.
- The following must be observed when operating drives with quadratic V/f characteristic:
 - Please always check whether the corresponding drive is suitable for operation with a quadratic V/f characteristic!
 - If you pump or fan drive is not suitable for operation with a square-law V/f characteristic, we recommend using the energy-saving V/f characteristic control (VFCplusEco). Alternatively, you can use the V/f characteristic control with linear V/f characteristic or the sensorless vector control (SLVC).
- For adjustment, observe the thermal performance of the connected asynchronous motor at low output frequencies.
 - Usually, standard asynchronous motors with insulation class B can be operated for a short time with their rated current in the frequency range 0 Hz ... 25 Hz.
 - Contact the motor manufacturer to get the exact setting values for the max. permissible motor current of self-ventilated motors in the lower speed range.
 - If you select square-law V/f characteristics, we recommend setting a lower V_{min} or using the energy-saving V/f characteristic control (VFCplusEco).
- The nameplate data of the motor (at least rated speed and rated frequency) must be entered if, instead of a standard motor, an asynchronous motor is used with the following values:
 - rated frequency $\neq$ 50 Hz (star) or
 - rated frequency $\neq$ 87 Hz (delta) or
 - number of pole pairs $\neq$ 2



Note!

When the auto DCB threshold ([C00019](#)) is set > 0 rpm, there is no torque at the motor shaft in the lower speed range!

► [Automatic DC-injection braking \(Auto-DCB\)](#) (□ 212)

5.4.1 Parameterisation dialog/signal flow

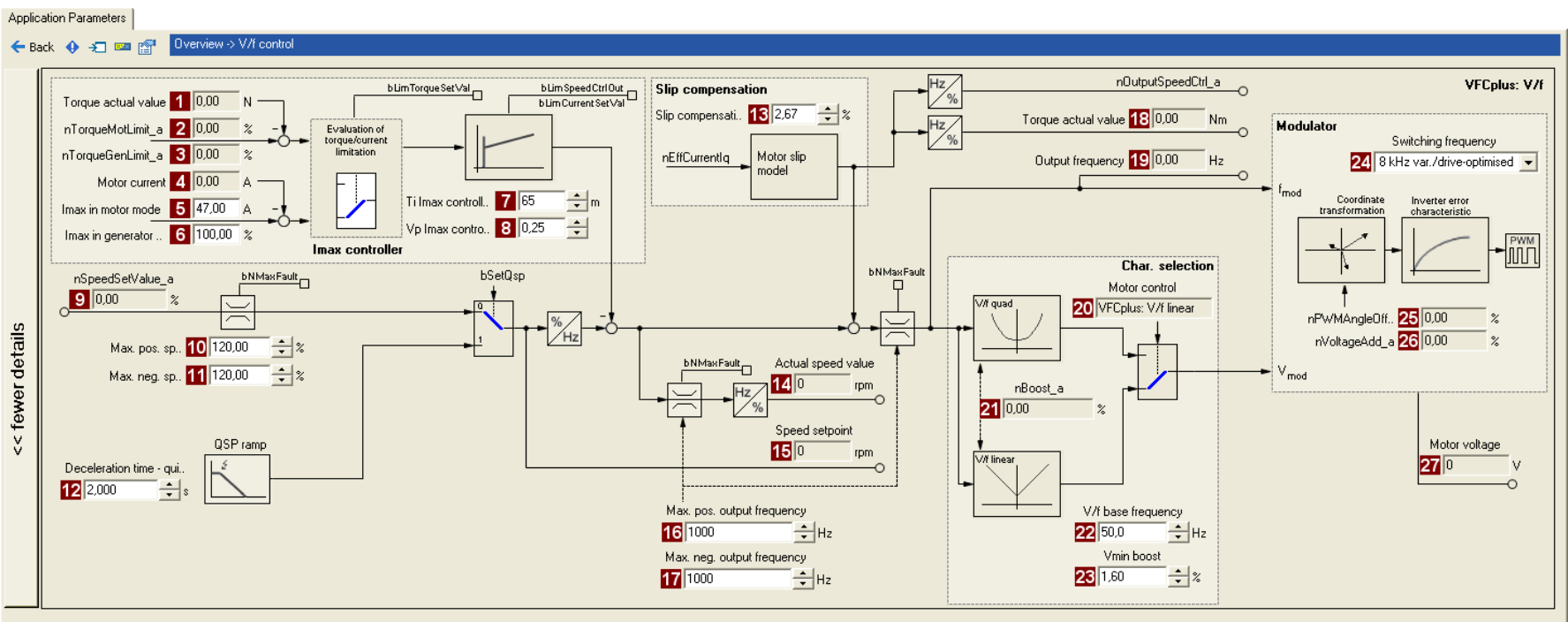


Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control from the *Overview* dialog level in the **Motor control** list field:
 - "6: VFCplus: V/f linear" for linear characteristic or
 - "8: VFCplus: V/f quadr" for square-law characteristic

More available V/f characteristic control modes:

- "10: VFCplus: U/f definable" (from version 04.00.00 onwards).
With this motor control, the V/f characteristic can be freely defined. ▶ [Defining a user-defined V/f characteristic](#) (□ 140)
 - "11: VFCplusEco: V/f energy-saving" (from version 10.00.00 onwards).
With this motor control, the motor is always operated in an optimal efficiency range via a $\cos\phi$ control and the resulting voltage reduction (reduced copper losses in the asynchronous motor). ▶ [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (□ 144)
4. Click the **Motor control V/f** button to change to the *Overview* → *Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the >>**More details** button in the left-most position, a signal flow with more details/parameters is displayed.



Parameter	Info	Parameter	Info	Parameter	Info
1	C00056/2 Actual torque value	13	C00021 Slip compensation	18	C00056/2 Actual torque value
2	C00830/29 Limitation of torque in motor mode	14	C00051 Actual speed value	19	C00058 Output frequency
3	C00830/28 Limitation of torque in generator mode	15	C00050 Speed setpoint	20	C00006 Motor control
4	C00054 Motor current	16	C00910/1 Max. pos. output frequency	21	C00830/26 MCTRL: nBoost_a
5	C00022 I _{max} in motor mode	17	C00910/2 Max. neg. output frequency	22	C00015 V/f base frequency
6	C00023 I _{max} in generator mode			23	C00016 V _{min} boost
7	C00074 T _i I _{max} controller			24	C00018 Switching frequency
8	C00073 V _p I _{max} controller			25	C00830/32 MCTRL: nPWMAngleOffset_a
9	C00830/22 Speed setpoint			26	C00830/31 MCTRL: nVoltageAdd_a
10	C00909/1 Max. pos. speed			27	C00052 Motor voltage
11	C00909/2 Max. neg. speed				
12	C00105 Decel. time - quick stop				

5.4.2 Basic settings

The "Initial commissioning steps" listed in the table below are sufficient for a simple characteristic control.

- Detailed information on the individual steps can be found in the following subchapters.

Initial commissioning steps	
1.	Defining the V/f characteristic shape. (📖 130)
2.	Defining current limits (I_{max} controller). (📖 131)



Tip!

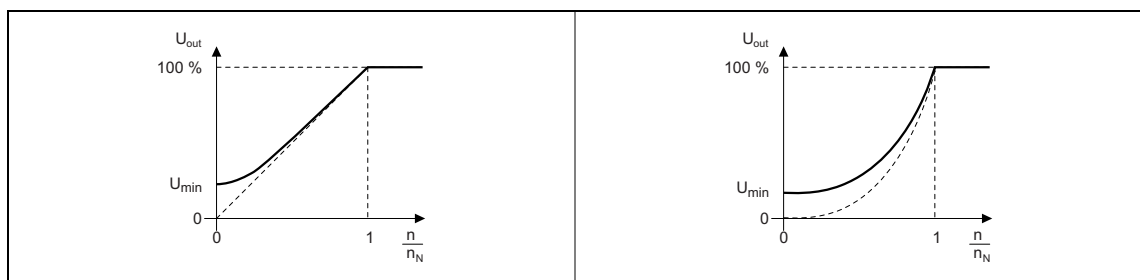
Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". (📖 132)

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". (📖 202)

5.4.2.1 Defining the V/f characteristic shape

In principle, four different characteristic shapes can be stipulated:

1. **Linear V/f characteristic:**
For drives for a constant, speed-independent load torque.
2. **Quadratic V/f characteristic:**
For drives with a load torque curve which is quadratic or in relation to speed. Quadratic V/f characteristics are preferred in the case of centrifugal pumps and fan drives.
3. **User-definable V/f characteristic (from version 04.00.00 onwards):**
For drives that require adaptation of the magnetising current by means of the output speed. The freely definable V/f characteristic can be used e.g. for operation in conjunction with special machines such as reluctance motors in order to suppress oscillations at the machine or to optimise energy consumption.



[5-3] Principle of a linear V/f characteristic (on the left) and a quadratic V/f characteristic (on the right)

4. **Linear V/f characteristic with voltage reduction (from version 10.00.00 onwards):**
For drives which often work in partial load operation, the energy-saving V/f characteristic control (VFCplusEco) offers the opportunity to reduce the voltage at low load in order to save energy. At higher loads, the voltage reduction is cancelled and a linear characteristic is caused.

The V/f characteristic shape is defined by selecting the corresponding motor control mode in [C00006](#):

V/f characteristic shape	Motor control to be selected (C00006)
Linear V/f characteristic	6: VFCplus: V/f linear
Square-law V/f characteristic	8: VFCplus: V/f quadr
User-definable V/f characteristic	10: VFCplus: V/f definable
Linear V/f characteristic with voltage reduction	11: VFCplusEco: V/f energy-saving

**Tip!**

- You can find detailed information on freely definable V/f characteristics in the subchapter entitled "[Defining a user-defined V/f characteristic](#)". (140)
- You can find detailed information on the linear V/f characteristic with voltage reduction in the chapter entitled "[V/f characteristic control - energy-saving \(VFCplusEco\)](#)". (144)

5.4.2.2 Defining current limits (I_{max} controller)

The V/f characteristic control (VFCplus) and the V/f control (VFCplus + encoder) operating modes are provided with a current limitation control which is decisive for the dynamic behaviour under load and counteracts exceedance of the maximum current in motor or generator mode. This current limitation control is called I_{max} control.

- The efficiency (motor current) measured by the I_{max} control is compared with the current limit value for motor load set in [C00022](#) and the current limit value for generator load set in [C00023](#).
- If the current limit values are exceeded, the controller changes its dynamic behaviour.

Motor overload during acceleration

The controller prolongs the acceleration ramp to keep the current on or below the current limit.

Generator overload during deceleration

The controller prolongs the deceleration ramp to keep the current on or below the current limit.

Increasing load with constant speed

- If the motor current limit value is reached:
 - The controller reduces the effective speed setpoint until a stable working point is set or an effective speed setpoint of 0 rpm is reached.
 - If the load is reduced, the controller increases the effective speed setpoint until the setpoint speed is reached or the load reaches the current limit value again.
- When the generator current limit value is reached:
 - The controller increases the effective speed setpoint until a stable working point is set or the maximally permissible speed ([C00909](#)) or output frequency is reached ([C000910](#)).
 - If the load is reduced, the controller reduces the effective speed setpoint until the setpoint speed is reached or the load reaches the current limit value again.
- If a sudden load is built up at the motor shaft (e.g. drive is blocked), the overcurrent disconnection may respond (fault message oC1 or oC11).

5.4.3 Optimising the control mode

The V/f characteristic control (VFCplus) is generally ready for operation. It can be adapted subsequently by adapting the characteristic and/or the drive behaviour.



Note!

Following successful motor parameter identification, the V/f base frequency ([C00015](#)) and the $V_{\min}$ boost ([C00016](#)) as well as the slip constant for slip compensation ([C00021](#)) are calculated automatically.

From version 12.00.00:

- Following successful motor parameter identification, the gain of the $I_{\max}$ controller ([C00073/1](#)) is calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#), [C00966](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

Adapting characteristic

For the linear and quadratic characteristic, it is also possible to match its curve to different load profiles or motors by adapting the V/f base frequency ([C00015](#)) and the $V_{\min}$ boost ([C00016](#)).

- ▶ [Adapting the V/f base frequency](#) (📖 133)
- ▶ [Adapting the \$V_{\min}\$ boost](#) (📖 135)

Freely defining the characteristic

From version 04.00.00 onwards, the V/f characteristic can also be defined freely if the linear and square-law characteristic are not suitable.

- ▶ [Defining a user-defined V/f characteristic](#) (📖 140)

Adapting drive behaviour

- Limitation of the maximum current by a current limitation controller (e.g. to prevent the motor from stalling or to limit to the maximally permissible motor current). ▶ [Optimising the \$I_{\max}\$ controller](#) (📖 136)
- Adaptation of the field frequency by a load-dependent slip compensation (improved speed accuracy for systems without feedback)
- Adaptation of the controller parameters of the slip regulator if V/f control (VFCplus + encoder) is selected. ▶ [Parameterising the slip regulator](#) (📖 158)

5.4.3.1 Adapting the V/f base frequency

The V/f base frequency ([C00015](#)) determines the slope of the V/f characteristic and has considerable influence on the current, torque, and power performance of the motor.

- The setting in [C00015](#) applies to all permitted mains voltages.
- Mains fluctuations or fluctuations of the DC-bus voltage (operation in generator mode) do not need to be considered when the V/f base frequency is set. They are automatically compensated for by the internal mains voltage compensation of the device.
- Depending on the setting in [C00015](#), it may be required to adapt the reference speed ([C00011](#)) to traverse the entire speed range of the motor.
- The V/f base frequency is automatically calculated from the stored motor nameplate data by the motor parameter identification:

$$C00015 \text{ [Hz]} = \frac{U_{FI} \text{ [V]}}{U_{Ratedmot} \text{ [V]}} \cdot f_{Rated} \text{ Hz}$$

U_{FI} : Mains voltage 400 V or 230 V

$U_{Ratedmot}$: Rated motor voltage depending on the connection method

f_{Rated} : Rated motor frequency

[5-4] Calculation of the V/f base frequency

Typical values of the V/f base frequency

Drive controller with 400 V mains connection			
Motor voltage [V]	Motor frequency [Hz]	Motor connection	V/f base frequency (C00015)
230 / 400	50	Y	50 Hz
220 / 380	50	Y	52.6 Hz
280 / 480	60	Y	50 Hz
400 / 690	50	Δ	50 Hz
400	50		
230 / 400	50	Δ	87 Hz
280 / 480	60		
400	87		
220 / 380	50	Δ	90.9 Hz

Drive controller with 230 V mains connection			
Motor voltage [V]	Motor frequency [Hz]	Motor connection	V/f base frequency (C00015)
230	50	Δ	50 Hz
220 / 380	50	Δ	52.3 Hz

**Note!****87-Hz operation**

4-pole asynchronous motors which are designed for a rated frequency of $f = 50$ Hz in star connection can be operated in delta connection when being constantly excited up to $f = 87$ Hz.

- Advantages:
 - Higher speed-setting range
 - 73% higher power output in case of standard motors
- Motor current and motor power increase by the factor $\sqrt{3}$.
- The field weakening range starts above 87 Hz.
- Generally, this process can also be used with motors which have different numbers of pole pairs. In case of 2-pole asynchronous motors, the mechanical limit speed must be maintained.

5.4.3.2 Adapting the V_{min} boost

The V_{min} boost ([C00016](#)) of the motor voltage serves to select a load independent magnetising current which is required for asynchronous motors. The torque behaviour of the motor can be optimised by adapting the setting in [C00016](#).

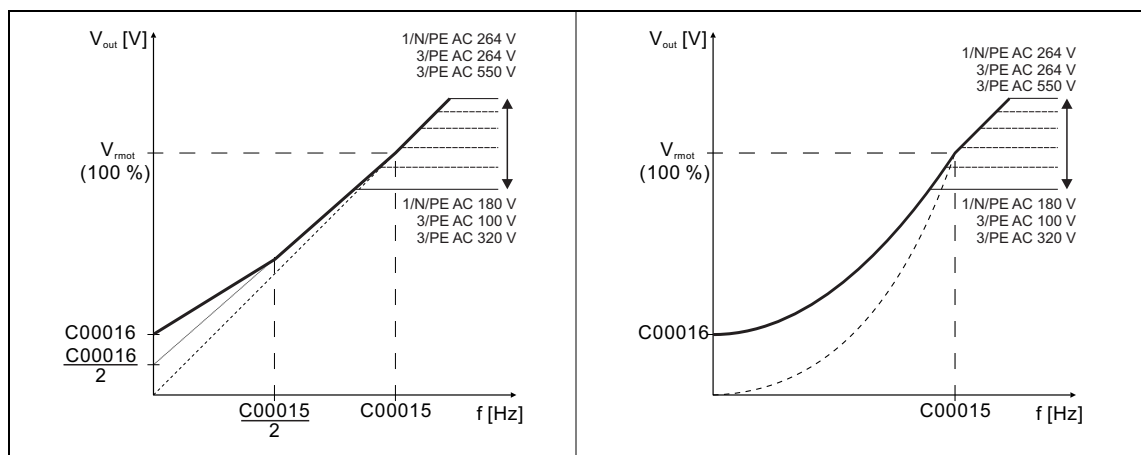
The *nBoost_a* process signal at the SB [LS MotorInterface](#) serves to carry out a V_{min} boost as well:

Identifier DIS code data type	Information/possible settings
nBoost_a C00830/26 INT	Process signal for the V_{min} boost - This signal is added to C00016 and has thus an increasing or decreasing effect. - This signal serves to implement a load-dependent Vmin boost to improve the torque behaviour in different load states, as for instance in case of operation in generator or motor mode. - Scaling: 16384 ≡ 100 % rated device voltage V_{FU} (400 V or 230 V) STOP Stop! Values selected too high may cause the motor to heat up due to the resulting current!

**Note!**

The V_{min} boost has an effect on output frequencies below the V/f base frequency ([C00015](#)).

The general linear and quadratic V/f characteristics are shown in the illustrations below. The illustrations show the impacts of the parameters used to adapt the characteristic shape.



[5-5] Representation of the linear V/f characteristic (on the left) and quadratic V/f characteristic (on the right)

**How to set the V_{min} boost:**

1. Operate motor in idle state at approx. 6 % of the rated motor speed.
2. Increase V_{min} boost ([C00016](#)) until the following motor current is reached:

Motor in short-time operation up to 0.5 n_{rated}

- for self-ventilated motors: $I_{\text{motor}} \approx I_{\text{rated motor}}$
- for forced ventilated motors: $I_{\text{motor}} \approx I_{\text{rated motor}}$

Motor in continuous operation up to $0.5 n_{rated}$

- for self-ventilated motors: $I_{motor} \approx 0.8 I_{rated\ motor}$
- for forced ventilated motors: $I_{motor} \approx I_{rated\ motor}$



Note!

V_{min} boost is automatically calculated by the motor parameter identification using the data specified on the motor nameplate so that a no-load current of approx. $0.8 I_{rated\ motor}$ results at the slip frequency of the machine.

V/f control (VFCplus + encoder)

If V/f control (VFCplus + encoder) is selected, we recommend a decidedly lower V_{min} boost:

- In this case, select a V_{min} boost which ensures that approx. 50 % of the rated motor current flows at slip frequency when the motor is idling.

5.4.3.3 Optimising the I_{max} controller

Using the Lenze setting of the current limitation controller, the drive is stable:

Parameter	Info	Lenze setting	
		Value	Unit
C00073/1	VFC: Vp I_{max} controller	0.25	
C00074/1	VFC: Ti I_{max} controller	65	ms

Most applications do not require optimisation.

The setting of the current limitation controller must be adapted if

- power control including great moments of inertia is performed.
 - Recommendation: Increase of the reset time Ti ([C00074/1](#)) of the I_{max} controller.
- vibrations occur in the V/f control (VFCplus + encoder) mode during the intervention of the current limitation controller.
 - Recommendation: Increase of the reset time Ti ([C00074/1](#)) of the I_{max} controller.
- overcurrent errors (e.g. OC3) occur due to load impulses or too high acceleration ramps.
 - Recommendation: Reduction of the gain Vp ([C00073/1](#)) and reset time Ti ([C00074/1](#)) of the I_{max} controller.

5.4.3.4 Optimising the stalling behaviour

Motor stalling due to a torque overload in the field weakening range is prevented in all characteristic-based motor control types (VFCplus) by means of an inverter-internal stalling current monitoring. In the field weakening range, hence at frequencies above the base frequency, it reduces the maximum current to prevent the motor from stalling. The reduction depends on the current field frequency, the base frequency, the DC-bus voltage and the maximum current ([C00022](#)). Generally it applies that a higher field frequency causes a stronger limitation of the maximum current.

The behaviour in the field weakening range can be adapted via the override point of field weakening ([C00080](#)). This parameter serves to shift the frequency-dependent maximum current characteristic:

- [C00080](#) > 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to higher field frequencies.
 - The maximally permissible current and the maximum torque increase in the field weakening range.
 - The risk of motor stalling increases.
- [C00080](#) < 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to lower field frequencies.
 - The maximally permissible current and the maximum torque are reduced in the field weakening range.
 - The risk of motor stalling is reduced.



Note!

We recommend to keep the Lenze setting (0 Hz).

5.4.3.5 Torque limitation

The previous chapter, "[Optimising the I_{max} controller](#)", describes how the drive can be protected from overload. During commissioning, these settings are carried out once and remain unchanged afterwards. However, it is often necessary to limit the torque to a lower value for plant or process reasons.

- To avoid overload in the drive train, the torque in motor mode can be limited via the *nTorqueMotLimit_a* process input signal, and the torque in generator mode can be limited via the *nTorqueGenLimit_a* process input signal:

Identifier DIS code data type	Information/possible settings
nTorqueMotLimit_a C00830/29 INT	Torque limitation in motor mode • Scaling: 16384 $\equiv$ 100 % M_{max} (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1.
nTorqueGenLimit_a C00830/28 INT	Torque limitation in generator mode • Scaling: 16384 $\equiv$ 100 % M_{max} (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2.

**Note!**

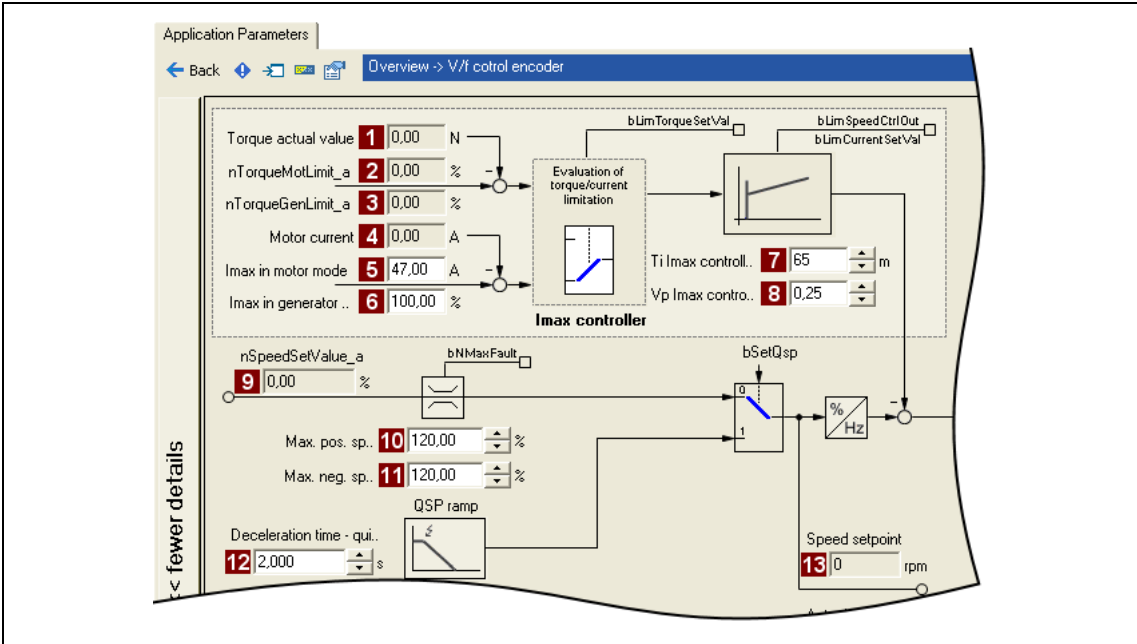
- The actual torque ([C00056/2](#)) is directly calculated from the current slip speed of the machine. This requires correct entry of the motor data. ▶ [Motor selection/Motor data](#) ([105](#))
- To avoid instabilities during operation with active slip compensation, the torque limit values are internally processed as absolute values.
- If slip compensation is deactivated ([C00021](#) = 0), indirect torque limitation (differential signal between apparent motor current and *nTorqueMotLimit_a* or *nTorqueGenLimit_a*) occurs. Above the no-load current of the motor, the accuracy of the indirect torque limitation is limited.

V/f characteristic control (VFC)

The accuracy of the torque limitation is limited because the actual torque ([C00056/2](#)) is only calculated from the slip speed measured indirectly via the motor current.

V/f control (VFC + encoder)

The slip speed of the motor is available at the slip controller output. This leads to a high accuracy for the actual torque ([C00056/2](#)) and the torque limitation.



[5-6] Extract from the signal flow of the V/f control (VFC + encoder)

Parameter	Info	Parameter	Info
1	C00056/2 Actual torque value	9	C00830/22 MCTRL: nSpeedSetValue_a
2	C00830/29 Limitation of torque in motor mode	10	C00909/1 Max. pos. speed
3	C00830/28 Limitation of torque in generator mode	11	C00909/2 Max. neg. speed
4	C00054 Motor current	12	C00105 Decel. time - quick stop
5	C00022 Imax in motor mode	13	C00050 Speed setpoint
6	C00023 Imax in generator mode		
7	C00074 Ti Imax controller		
8	C00073 Vp Imax controller		

5.4.3.6 Defining a user-defined V/f characteristic

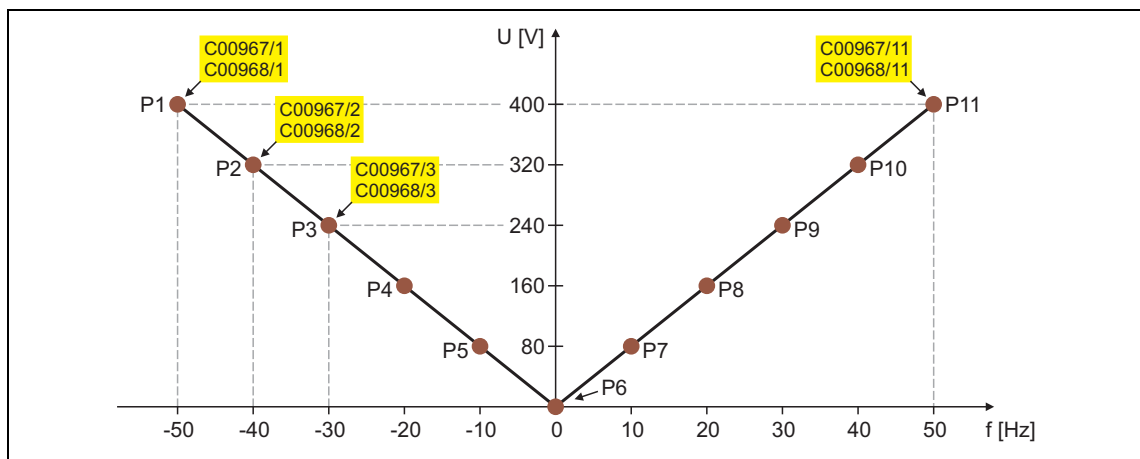
This function extension is only available from version 04.00.00!

For individual adaptation of the motor magnetisation to the actual application, the motor control "10: VFCplus: V/f definable" with a freely definable characteristic can be selected in [C00006](#) as an alternative if the linear and quadratic characteristics are not suitable.

**Note!**

The V/f base frequency ([C00015](#)) and the $V_{\min}$ boost ([C00016](#)) no longer exert an influence if this motor control is chosen.

- The 11 grid points (voltage/frequency values) of the characteristic are selected via the 11 subcodes of [C00967](#) and [C00968](#).
 - It is necessary to set all 11 grid points by means of corresponding subcodes.
 - If fewer grid points (voltage/frequency values) are needed, this can be achieved indirectly by ascribing the same voltage and frequency values to consecutive grid points.
Example: $C00967/3 = C00967/4$ and $C00968/3 = C00968/4$
 - The grid points can be specified in any sequence. Internally, they are automatically ordered from the minimum to the maximum frequency value.
 - Above the maximum and below the minimum frequency, the previous rise is continued until the maximum output voltage.
- In the Lenze setting, the 11 grid points represent a linear characteristic.
 - 3-phase devices: Output voltage 400 V at $f = 50$ Hz
 - 1-phase devices: Output voltage 230 V at $f = 50$ Hz



	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
V	400 V	320 V	240 V	160 V	80 V	0 V	80 V	160 V	240 V	320 V	400 V
f	-50 Hz	-40 Hz	-30 Hz	-20 Hz	-10 Hz	0 Hz	10 Hz	20 Hz	30 Hz	40 Hz	50 Hz

[5-7] Freely definable characteristic (Lenze setting for 3-phase devices)

**Tip!**

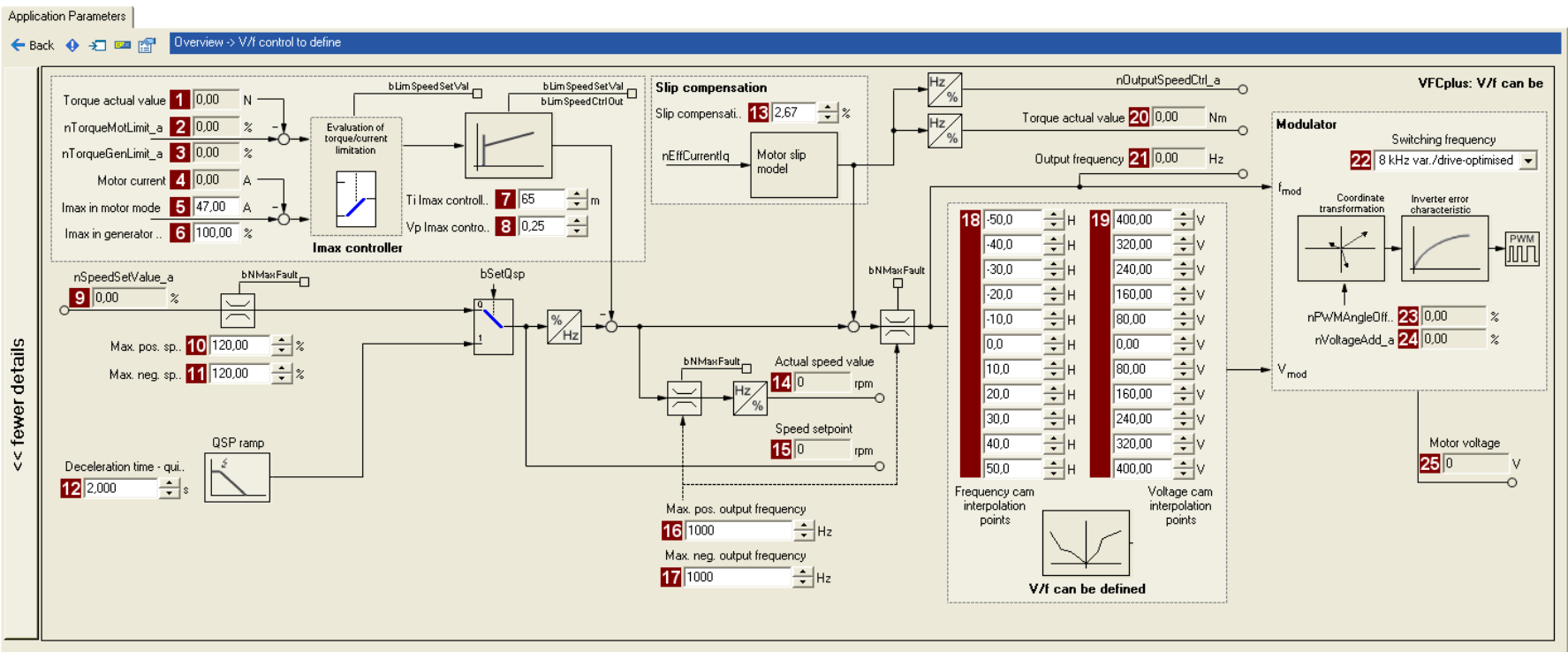
Cases of application for this function:

- Operation of reluctance motors or synchronous motors during controlled acceleration (reduction of natural frequencies caused by wrong excitation).
- Adaptation of the voltage requirement for the motor, depending on specific load conditions.



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "10: VFCplus: V/f definable" from the *Overview* dialog box in the **Motor control** list field:
4. Click the **Motor control V/f definable** button to change to the *Overview → Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed.



Parameter	Info	Parameter	Info	Parameter	Info
1	C00056/2 Actual torque value	13	C00021 Slip compensation	18	C00967/x Frequency interpol. points
2	C00830/29 Limitation of torque in motor mode	14	C00051 Actual speed value	19	C00968/x Voltage interpol. points
3	C00830/28 Limitation of torque in generator mode	15	C00050 Speed setpoint	20	C00056/2 Actual torque value
4	C00054 Motor current	16	C00910/1 Max. pos. output frequency	21	C00058 Output frequency
5	C00022 Imax in motor mode	17	C00910/2 Max. neg. output frequency	22	C00018 Switching frequency
6	C00023 Imax in generator mode			23	C00830/32 MCTRL: nPWMAngleOffset_a
7	C00074 Ti Imax controller			24	C00830/31 MCTRL: nVoltageAdd_a
8	C00073 Vp Imax controller			25	C00052 Motor voltage
9	C00830/22 Speed setpoint				
10	C00909/1 Max. pos. speed				
11	C00909/2 Max. neg. speed				
12	C00105 Decel. time - quick stop				

5.4.4 Remedies for undesired drive behaviour

Drive behaviour	Remedy
Inadequate smooth running at low speeds, especially in the case of operation with a long motor cable	▶ Automatic motor data identification (111)
Problems in case of high starting duty (great mass inertia)	▶ Adapting the Vmin boost (135)
Drive does not follow the speed setpoint.	The current controller intervenes in the set field frequency to limit the controller output current to the maximum current (C0022, C0023). Therefore: • Prolong acceleration/deceleration times: C00012: Accel. time - main setpoint C00013: Decel. time - main setpoint • Consider a sufficient magnetising time of the motor. Depending on the motor power, the magnetising time amounts to 0.1 ... 0.2 s. • Increase the maximally permissible current: C00022: I_{max} in motor mode C00023: I_{max} in generator mode)
For operation without speed feedback (C00006 = 6): Insufficient speed constancy at high load (setpoint and motor speed are not proportional anymore)	• Increase slip compensation (C00021). Important: Unstable drive due to overcompensation! • With cyclic load impulses (e. g. centrifugal pump), a smooth motor characteristic is achieved by smaller values in C00021 (possibly negative values). Note: The slip compensation is only active for operation without speed feedback.
"Clamp operation active" error message (oC11): Controller cannot follow dynamic processes, i.e. too short acceleration/deceleration times in terms of load ratios.	• Increase the gain of the I_{max} controller (C00073/1) • Reduce the reset time of the I_{max} controller (C00074/1) • Prolong the acceleration time (C00012) • Prolong the deceleration time (C00013)
Motor stalling in the field weakening range (adaptation especially required for small machines)	• Reduce the override point of field weakening (C00080) • If motor power < inverter power: Set C00022 to I_{max} = 2 I_{rated motor} • Reduce dynamic performance of setpoint generation

5.5

V/f characteristic control - energy-saving (VFCplusEco)

This function extension is available from version 10.00.00!

With the energy-saving V/f characteristic control mode (VFCplusEco), the motor voltage of the inverter is detected by means of a linear characteristic depending on the field frequency to be created or the motor speed. Moreover, a $\cos\phi$ control and the resulting voltage reduction causes the motor to be always operated in the optimum efficiency range (reduction of copper losses in the asynchronous motor).

- Hence, these are the advantages of this motor control mode:
 - Good robustness
 - Easy parameter setting
 - High energy efficiency (lower heating of the motor in partial load operational range)
 - Same speed accuracy and maximum torques as with VFCplus
 - Less noise generation of the motor with active voltage reduction
- Predestinated application areas of this motor control mode are materials handling technology and pump and fan systems.
- This motor control mode serves to improve efficiency of standard asynchronous motors with efficiency class IE1 (standard IEC 60034-30 2008) in the range 0 ... $M_{\text{efficiency\_max}}$ between 0 ... 20 % ($\emptyset$ 5 ... 10 %).
 - For asynchronous motors with energy efficiency class IE2 the potential for efficiency improvement is reduced to approx. 0 ... 15 %.
 - Description of $M_{\text{efficiency\_max}}$: Indicates the torque [%] of $M_{\text{rated\_motor}}$, where the motor has the max. efficiency.)
- In case of asynchronous motors with a higher energy efficiency class (IE2 and IE3), the absolute energy saving of the motor control mode is lower due to improved efficiency of the machine. However, energy saving is still achieved in a higher load range.
- $M_{\text{efficiency\_max}}$ is performance-related and listed in the following table for some power values of the energy efficiency class IE1 and IE2:

Power	$M_{\text{efficiency\_max}}$ (related to $M_{\text{rated\_motor}}$)	
	IE1	IE2
0.25 kW	75 %	
0.75 kW	65 %	75 %
2.2 kW	55 %	85 %
7.5 kW	30 %	45 %
22 kW	23 %	
45 kW	21 %	



Stop!

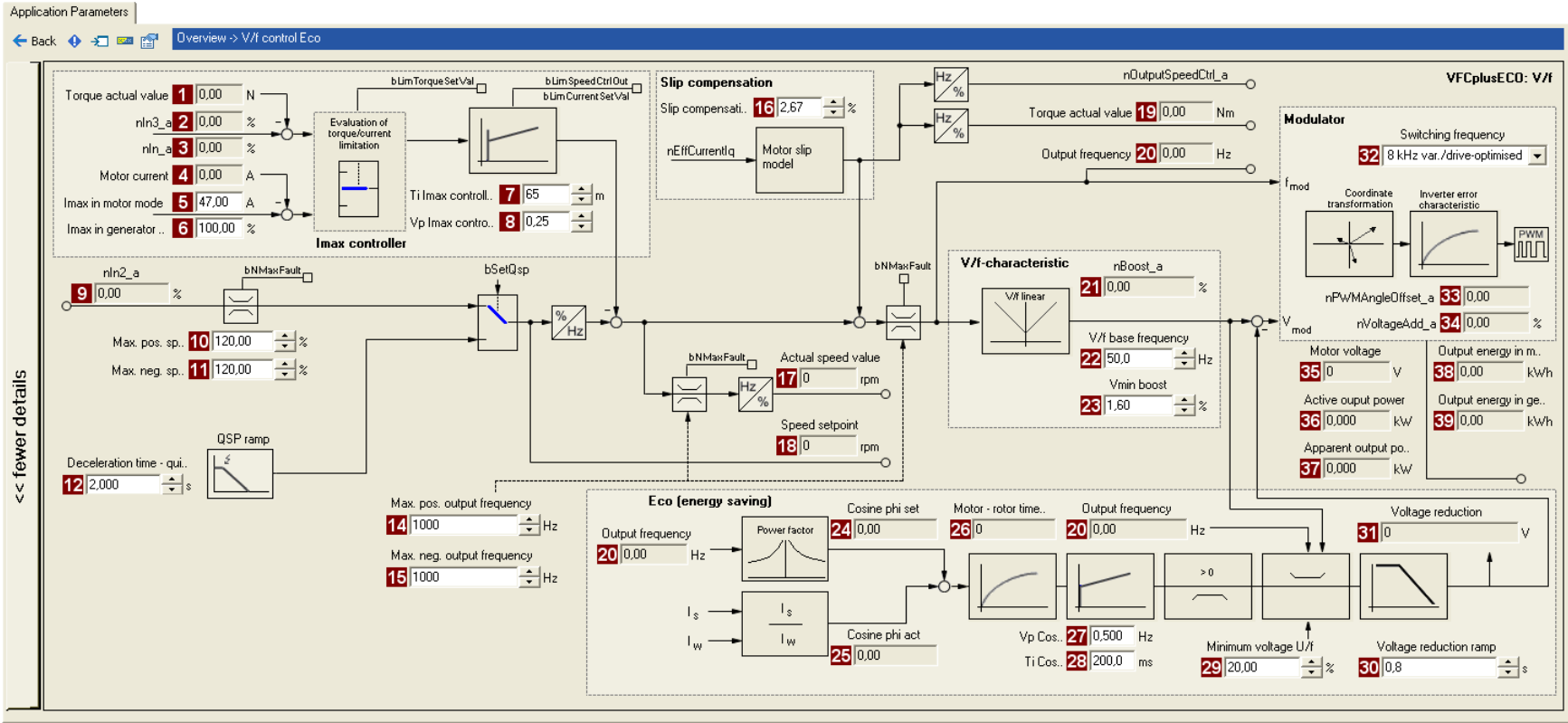
- For adjustment, observe the thermal performance of the connected asynchronous motor at low output frequencies.
 - Usually, standard asynchronous motors with insulation class B can be operated for a short time with their rated current in the frequency range 0 Hz ... 25 Hz.
 - Contact the motor manufacturer to get the exact setting values for the max. permissible motor current of self-ventilated motors in the lower speed range.
- The nameplate data of the motor (at least rated speed and rated frequency) must be entered if, instead of a standard motor, an asynchronous motor is used with the following values:
 - rated frequency $\neq$ 50 Hz (star) or
 - rated frequency $\neq$ 87 Hz (delta) or
 - number of pole pairs $\neq$ 2

5.5.1 Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "11: VFCplusEco: V/f energy-saving" from the *Overview* dialog box in the **Motor control** 11list field:
4. Click the **Motor control V/f Eco** button to change to the *Overview* → *Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the >>**More details** button in the left-most position, a signal flow with more details/parameters is displayed.

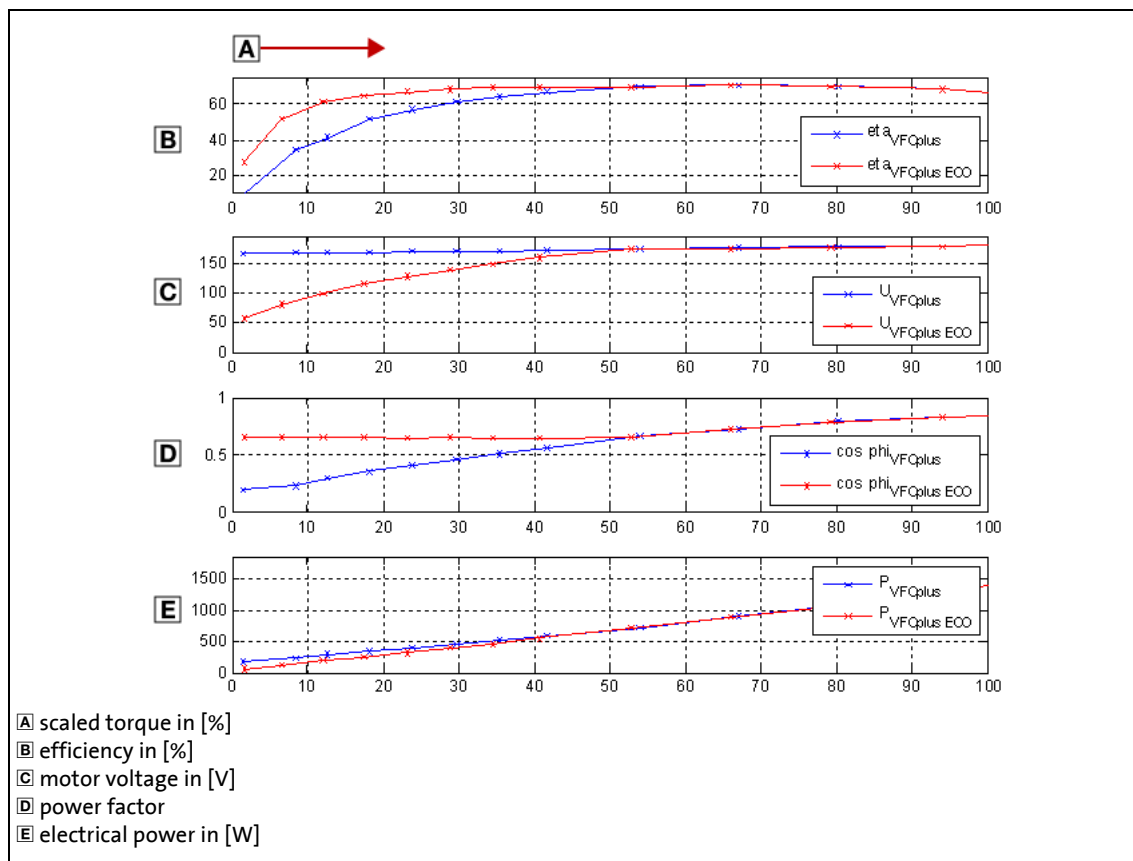


Parameter	Info	Parameter	Info	Parameter	Info
1	C00056/2 Actual torque value	14	C00910/1 Max. pos. output frequency	27	C00975 VFC-ECO: Vp
2	C00830/4 Limitation of torque in motor mode	15	C00910/2 Max. neg. output frequency	28	C00976 VFC-ECO: Ti
3	C00830/5 Limitation of torque in generator mode	16	C00021 Slip compensation	29	C00977 VFC-ECO: Minimum voltage V/f
4	C00054 Motor current	17	C00051 Actual speed value	30	C00982 VFC-ECO: Voltage reduction ramp
5	C00022 I _{max} in motor mode	18	C00050 Speed setpoint	31	C00978 VFC-ECO: Voltage reduction
6	C00023 I _{max} in generator mode	19	C00056/2 Actual torque value	32	C00018 Switching frequency
7	C00074 Ti I _{max} controller	20	C00058 Output frequency	33	C00830/32 MCTRL: nPWMAngleOffset_a
8	C00073 Vp I _{max} controller	21	C00830/26 MCTRL: nBoost_a	34	C00830/31 MCTRL: nVoltageAdd_a
9	C00830/3 Speed setpoint	22	C00015 V/f base frequency	35	C00052 Motor voltage
10	C00909/1 Max. pos. speed	23	C00016 Vmin boost	36	C00980/1 Active output power
11	C00909/2 Max. neg. speed	24	C00979/2 Cosine phi set	37	C00980/2 Apparent output power
12	C00105 Decel. time - quick stop	25	C00979/1 Cosine phi act	38	C00981/1 Output energy in motor mode
13	-	26	C00083 Motor rotor time constant	39	C00981/2 Output energy in generator mode

5.5.2 Comparison of VFCplusEco - VFCplus

The following characteristics show the impact of the energy-saving V/f characteristic control (VFCplusEco) compared to the standard V/f characteristic control (VFCplus).

- The characteristics were recorded with a standard asynchronous motor 2.2 kW with energy efficiency class IE1 at speed = 600 rpm.



[5-8] Comparison of VFCplusEco - VFCplus

5.5.3 Basic settings

The "Initial commissioning steps" listed in the table below are sufficient for the V/f characteristic control - energy-saving (VFCplusECo).

- Detailed information on the individual steps can be found in the following subchapters.

Initial commissioning steps			
1.	Determine the motor control: C00006 = "11: VFCplusEco: V/f energy-saving"		
2.	The required motor data are pre-initialised depending on the device and thus, they do not need to be entered directly. In order to achieve a high energy optimisation, these motor data can be entered (see the following section). Set the motor selection/motor data • When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (105) Depending on the motor manufacturer, proceed as follows: <table border="1"> <tr> <td> Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification </td><td> Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance </td></tr> </table>	Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance
Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance		
3.	Defining current limits (I_{max} controller) . (131)		



Tip!

Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". ([149](#))

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([202](#))

5.5.4 Optimising the control mode

The V/f characteristic control - energy-saving (VFCplus) is generally ready for operation. It can be adapted subsequently by adapting the characteristic and/or the drive behaviour.



Note!

Following successful motor parameter identification, the V/f base frequency ([C00015](#)) and the $V_{\min}$ boost ([C00016](#)) as well as the slip constant for slip compensation ([C00021](#)) are calculated automatically.

From version 12.00.00 onwards:

- Following successful motor parameter identification, the gain of the $I_{\max}$ controller ([C00073/1](#)) is calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#), [C00966](#), [C00982](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

Adapting characteristic

For the linear characteristic as part of the V/f characteristic control - energy-saving (VFCplusEco), it is also possible (like in case of the standard V/f characteristic control) to match its curve to different load profiles or motors by adapting the V/f base frequency ([C00015](#)) and the $V_{\min}$ boost ([C00016](#)).

► [Adapting the V/f base frequency](#) ([133](#))

► [Adapting the \$V_{\min}\$ boost](#) ([135](#))

Adapting drive behaviour

- Limitation of the maximum current by a current limitation controller (e.g. to prevent the motor from stalling or to limit to the maximally permissible motor current). ► [Optimising the \$I_{\max}\$ controller](#) ([136](#))
- Adaptation of the field frequency by a load-dependent slip compensation (improved speed accuracy for systems without feedback).
- [Improving the behaviour at high dynamic load changes](#). ([150](#))
- [Adapting the slope limitation for lowering the Eco function](#). ([151](#))
- [Optimising the cos/phi controller](#). ([151](#))

Torque limitation

Limit the torque to a lower value. ► [Torque limitation](#) ([138](#))

5.5.4.1 Improving the behaviour at high dynamic load changes

Due to the voltage reduction executed via the $\cos\phi$ control, the motor may stall in the Lenze setting at high dynamic load torque changes. This is caused by the flux reduction and the connected reduction of the stalling torque of the motor current:

$$M_{\text{Max}(t)} = M_{\text{Stalling}} \cdot \frac{U_{\text{Motor}(t)}^2}{(U_{\text{Motor}(t)} - U_{\text{Reduction}})^2} \quad \text{with } M_{\text{Stalling}} = 1.6 \dots 2.5 \cdot M_{\text{Rated\_motor}}$$

V_{Motor} = display in [C00052](#)
 $V_{\text{Reduction}}$ = display in [C00978](#)

It generally applies that when the output voltage is divided in halves, the maximum torque is approx. reduced by the factor 4. A reduction by the factor 5 reduces the torque to approx. 15 ... 50 % of the rated torque.

The minimum voltage and thus the maximum influence access of the Eco function on the output voltage can be defined in [C00977](#). With full influence of the Eco function, the following stalling torque can be ensured depending on the setting in [C00977](#):

Minimum voltage V/f (C00977)	Maximum torque
100 %	160 % ... 250 % M_{rated}
70 %	80 % ... 130 % M_{rated}
50 %	40 % ... 70 % M_{rated}
20 %	15 % ... 50 % M_{rated}

An adaptation of the minimum voltage V/f ([C00977](#)) improves the stability in case of load impulses.

- In the Lenze setting, the minimum voltage V/f is set to 20 % for the highest energy optimisation. This setting serves to respond to load torques if these amount to approx. 25 % of the rated torque or occur with low dynamics.
- An increase of the minimum voltage V/f to 70 % permits to apply a dynamic load impulse from 0 to 100 % rated motor torque without the motor stalling. This reduces the energy optimisation to be achieved by approx. 75 %.
- A further increase of the stability at still higher dynamic load impulses can be achieved by a further increase of the minimum voltage V/f, but means a further loss in energy optimisation.



Note!

In case of applications with very high dynamic sudden load variations from the unloaded operation, this motor control mode should not be used or the energy optimisation should be switched off, since a motor stalling cannot be excluded.

- The energy optimisation can be switched off by setting the minimum voltage V/f ([C00977](#)) to 100 %. Then, the behaviour corresponds to the V/f characteristic control (VFCplus) with linear characteristic.
- From version 13.00.00, the energy optimisation can be switched off via the *bVfcEcoDisable* process signal if a dynamic load change is known to take place.

5.5.4.2 Adapting the slope limitation for lowering the Eco function

The ramp set in [C00982](#) for voltage reduction serves as slope limitation in order to prevent that voltage is suddenly applied to the motor when the Eco function is deactivated. Otherwise, the overvoltage limitation (Imax, Clamp) would be activated.

- This ramp is, depending on the device, pre-initialised to approx. the triple rotor time constant. An adaptation of this parameter is not required.

When the Eco function is switched off, a quick reaction (high dynamic performance) is required, but with a low current overshoot and a small torque jump. Thus, the Lenze setting of [C00982](#) is a compromise regarding the switch-off of the Eco function (voltage reduction = 0).

- To increase the dynamics when switching off the Eco function:
Reduce → setting in [C00982](#).
(Current compensation actions increase when the Eco function is switched off.)
- In order to reduce current compensation actions when switching off the Eco function:
Increase → setting in [C00982](#).
(The dynamics when switching off the eco function is reduced)

5.5.4.3 Optimising the cos/phi controller

With the Lenze setting, the cosφ controller is set such that usually no adaptation is required for all power ratings and application cases.

Behaviour	Remedy/recommendation
The cosφ actual value (C00979/1) varies greatly.	Reduce gain Vp (C00975) and reset time Ti (C00976).
The cosφ actual value (C00979/1) is permanently lower than the cosφ setpoint (C00979/2).	Increase gain Vp (C00975) and reset time Ti (C00976).

5.5.5 Remedies for undesired drive behaviour

Drive behaviour	Remedy
Inadequate smooth running at low speeds, especially in the case of operation with a long motor cable	► Automatic motor data identification (□ 111) Reduce the influence of the Eco function by increasing the minimum voltage V/f (C00977) if necessary.
Problems in case of high starting duty (great mass inertia)	1. Set motor control VFCplus with linear characteristic (C00006 = 6). 2. Adapting the Vmin boost. (□ 135) 3. Again set motor control VFCplusEco (C00006 = 11).
Drive does not follow the speed setpoint	The current controller intervenes in the set field frequency to limit the controller output current to the maximum current (C0022, C0023). Therefore: • Prolong acceleration/deceleration times: C00012: Accel. time - main setpoint C00013: Decel. time - main setpoint • Consider a sufficient magnetising time of the motor. Depending on the motor power, the magnetising time amounts to 0.1 ... 0.2 s. • Increase the maximally permissible current: C00022: I_{max} in motor mode C00023: I_{max} in generator mode • Make adaptations for the Eco function: • Improving the behaviour at high dynamic load changes. (□ 150) • Adapting the slope limitation for lowering the Eco function. (□ 151) • Optimising the cos/phi controller. (□ 151)
Insufficient speed constancy at high load (setpoint and motor speed are not proportional anymore)	• Increase slip compensation (C00021). Important: Unstable drive due to overcompensation! • With cyclic load impulses (e. g. centrifugal pump), a smooth motor characteristic is achieved by smaller values in C00021 (possibly negative values). Note: The slip compensation is only active for operation without speed feedback.
"Clamp operation active" error message (oC11): Controller cannot follow dynamic processes, i.e. too short acceleration/deceleration times in terms of load ratios.	• Increase the gain of the I_{max} controller (C00073) • Reduce the reset time of the I_{max} controller (C00074) • Prolong the acceleration time (C00012) • Prolong the deceleration time (C00013) • Make adaptations for the Eco function: • Improving the behaviour at high dynamic load changes. (□ 150) • Adapting the slope limitation for lowering the Eco function. (□ 151)
Motor stalling in the field weakening range (adaptation especially required for small machines)	• If motor power < inverter power: Set C00022 to I_{max} = 2 I_{rated motor} • Reduce dynamic performance of setpoint generation • Make adaptations for the Eco function: • Improving the behaviour at high dynamic load changes. (□ 150) • Adapting the slope limitation for lowering the Eco function. (□ 151)
Speed variations in no-load operation for speeds > 1/3 rated speed.	Minimise speed oscillations with oscillation damping (C00234).

Drive behaviour	Remedy
Speed variations in no-load operation and with load for speeds > rated speed.	Minimise speed oscillations with increasing the oscillation damping field weakening (C00236). Caution: If C00236 is increased, the maximum output voltage of the device is reduced!
Output voltage is too low. There is a too low maximum torque in the high field weakening range.	Reduction of the oscillation damping field weakening (C00236). Caution: When C00236 = 0, oscillation damping field weakening is inactive. Thus, a maximum output voltage is available but the tendency to speed oscillations in the field weakening range at no-load operation and with load increases.

5.6 V/f control (VFCplus + encoder)

The V/f characteristic control (VFCplus) described above can be operated with a speed feedback. This has the following advantages:

- Steady-state accuracy of the speed
- Less parameterisation effort compared to the sensorless vector control (SLVC)
- Improved dynamics compared to V/f characteristic control without feedback or to sensorless vector control (SLVC).
- Suitability for group drives



Stop!

The V/f control requires a speed feedback!

- The speed sensor used has to be set in [C00495](#). This setting is not made automatically with the selection of the motor from the »Engineer« motor catalogue!
- If no speed sensor is set in [C00495](#) and the controller is enabled, an impermissibly high motor current occurs which may destroy the motor thermally!
- From version 14.00.00, the error response set in [C00571/2](#) (Lenze setting: "Fault") takes place if in case of controller enable it is detected that a motor control type with feedback is set in [C00006](#) but no speed encoder is set in [C00495](#).



Stop!

V/f emergency operation

From version 15.00.00, it is internally switched to the encoderless V/f characteristic control in case of an encoder open circuit in order to avoid impermissible motor movements.

- In order that this "V/f emergency operation" works properly, the parameters relevant for the V/f characteristic control (base frequency, Vmin boost, slip compensation, etc.) have to be set correctly. As an alternative, a motor parameter identification can be executed as well.
- The change-over to "V/f emergency operation" is reported via bit 4 in [C01000](#) and via the *bWirebreakUfLinearActive* status signal at the SB [LS DeviceMonitor](#).
- The change-over to "V/f emergency operation" can be suppressed by setting bit 8 to "1" in [C02864/1](#).



Note!

- Make sure that, when the motor control with speed feedback is in use, the maximum input frequency of 10 kHz is not exceeded. ▶ [Using DI1 and DI2 as frequency inputs](#) ([book 266](#))
- As the slip is calculated in the feedback V/f operation and injected through the slip regulator, the slip compensation ([C00021](#)) is deactivated with V/f control.



The descriptions in chapter "[V/f characteristic control \(VFCplus\)](#)" also apply to the V/f control. ([126](#))

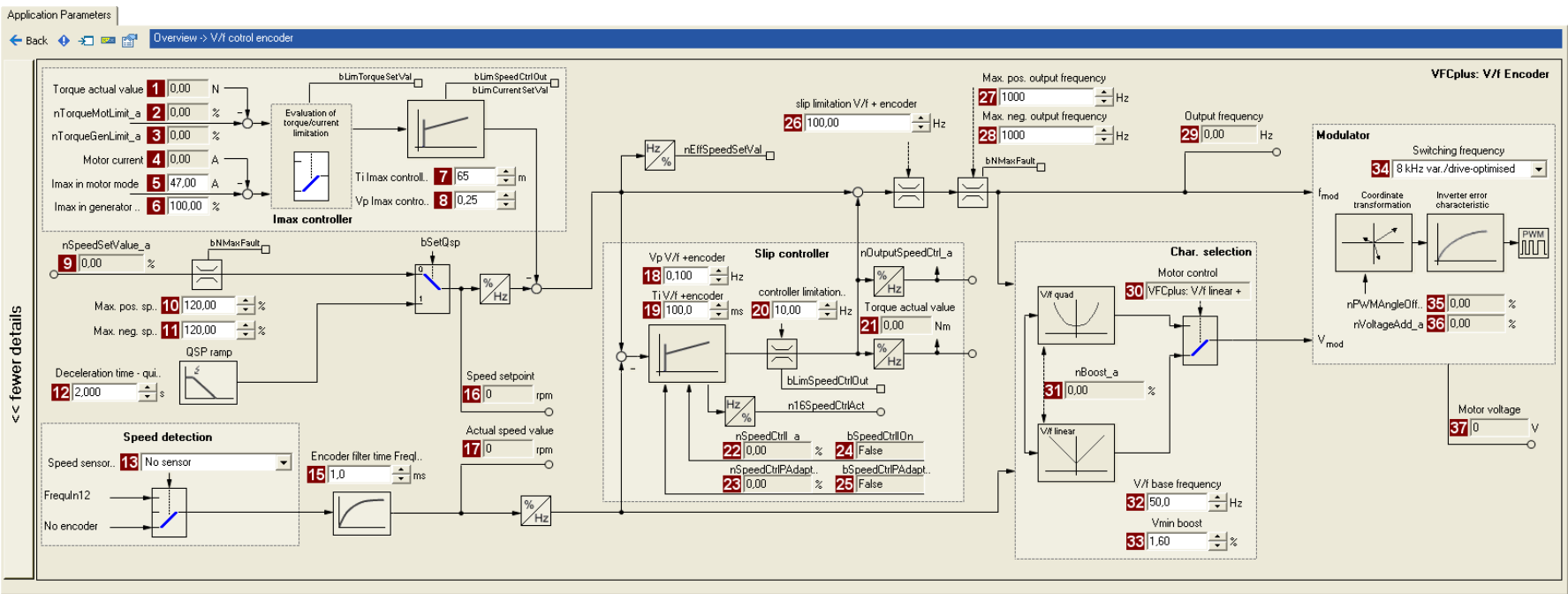
Detailed information on the speed feedback can be found in the chapter "[Encoder/feedback system](#)". ([220](#))

5.6.1 Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control from the *Overview* dialog level in the **Motor control** ([C00006](#)) list field:
 - "7: VFCplus: V/f linear +encoder" for linear characteristic or
 - "9: VFCplus: V/f quadr +encoder" for quadratic characteristic
4. Click the **Motor control V/f encoder** button to change to the *Overview → Motor control V/f* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed, as shown in the following subchapter.



Parameter	Info	Parameter	Info	Parameter	Info
1	C00056/2 Actual torque value	16	C00050 Speed setpoint	29	C00058 Output frequency
2	C00830/29 Limitation of torque in motor mode	17	C00051 Actual speed value	30	C00006 Motor control
3	C00830/28 Limitation of torque in generator mode	18	C00972 Vp Vf+encoder	31	C00830/26 MCTRL: nBoost_a
4	C00054 Motor current	19	C00973 Ti Vf+encoder	32	C00015 V/f base frequency
5	C00022 Imax in motor mode	20	C00971/1 Controller limitation Vf+encoder	33	C00016 Vmin boost
6	C00023 Imax in generator mode	21	C00056/2 Actual torque value	34	C00018 Switching frequency
7	C00074 Ti Imax controller	22	C00830/24 MCTRL: nSpeedCtrlI_a	35	C00830/32 MCTRL: nPWMAngleOffset_a
8	C00073 Vp Imax controller	23	C00830/25 MCTRL: nSpeedCtrlIPAdapt_a	36	C00830/31 MCTRL: nVoltageAdd_a
9	C00830/22 Speed setpoint	24	C00833/31 MCTRL: bSpeedCtrlIOn	37	C00052 Motor voltage
10	C00909/1 Max. pos. speed	25	C00833/69 MCTRL: bSpeedCtrlIPAdaptOn		
11	C00909/2 Max. neg. speed	26	C00971/2 Slip limitation Vf+encoder		More relevant parameters for Encoder/feedback system :
12	C00105 Decel. time - quick stop	27	C00910/1 Max. pos. output frequency		C00115 DI1/2 & DI6/7 function
13	C00495 Speed sensor selection	28	C00910/2 Max. neg. output frequency		C00420 Number of encoder increments
14	-				C00425 Encoder scanning time
15	C00497/1 Encoder filter time FreqIn12				C00496 Encoder evaluation method

5.6.2 Basic settings

In order to protect the drive system, carry out the commissioning of the V/f control and the slip regulator in several steps.

- Detailed information on the single steps can be found in the following subchapters or in the corresponding subchapters for V/f characteristic control.

Initial commissioning steps	
1.	Define the V/f characteristic: • C00006 = 7: Linear characteristic • C00006 = 9: Quadratic characteristic
2.	Defining current limits (I_{max} controller) . (📖 131)
3.	Parameterise encoder/feedback system. ▶ Encoder/feedback system (📖 220)
4.	If special motors with a rated frequency other than 50 Hz or with a number of pole pairs $\neq 2$ are used, set the motor parameters according to the motor nameplate. ▶ Motor selection/Motor data (📖 105)
5.	Define speed setpoint (e.g. 20 % of the rated speed) and enable controller.
6.	Check whether the actual speed value (C00051) $\approx$ speed setpoint (C00050) and then inhibit the controller again. • In case of a sign reversal between actual value and setpoint, check the connection of the encoder (e.g. change track A or B of the encoder or invert the actual speed value). • In case the actual value differs considerably from the setpoint (factor 2), set the motor parameters according to motor nameplate. Then repeat step 5.
7.	To protect the drive, reduce the slip regulator limitation in C00971/1 . • e.g. reduction to half the slip frequency (≈ 2 Hz)
8.	Define speed setpoint (e.g. 20 % of the rated speed) and enable controller.
9.	In case of a semi-stable operational performance, reduce the reset time (C00972) or the proportional gain (C00973) of the slip regulator until a stable operation has been achieved. ▶ Parameterising the slip regulator (📖 158)
10.	In a final step, increase the slip regulator limitation again in C00971/1 . • e.g. increase to twice the slip frequency



Tip!

Information on the further optimisation of the control mode and the adaptation to the real application is provided in the "[Optimising the control mode](#)" chapter for the V/f characteristic control (📖 132)

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". (📖 202)

5.6.2.1 Parameterising the slip regulator

The slip regulator is designed as a PI controller. In order to improve the response to setpoint changes, the setpoint speed or setpoint frequency is added to the output (correcting variable) of the slip regulator as feedforward control value.

- Unlike traditional speed controllers, the slip regulator only controls the slip.
- In the Lenze setting, the configuration of the slip regulator provides robustness and moderate dynamics.

Parameter	Info	Lenze setting	
		Value	Unit
C00971/1	VFC: Controller limitation V/f +encoder	10.00	Hz
C00971/2	VFC: Slip limitation V/f +encoder	100.00	Hz
C00972	VFC: Vp V/f +encoder	0.100	Hz/Hz
C00973	VFC: Ti V/f +encoder	100.0	ms

Slip regulator gain Vp

The setting range of the slip regulator gain Vp ([C00972](#)) which leads to a stable operational performance, mainly depends on the resolution of the speed sensor. There is a direct relationship between encoder resolution and gain:

- The higher the encoder resolution, the higher the gain can be set.

The following table provides maximum and recommended slip regulator gains for encoder with standard encoder increments:

Encoder increment [Increments/revolution]	Slip regulator gain Vp	
	maximum	recommended
8	0.09	0.06
64	0.52	0.31
100	0.79	0.47
120	0.94	0.57
128	1.00	0.60
256	1.29	0.77
386	1.63	0.98
512	1.97	1.18
640	2.31	1.38
768	2.65	1.59
896	2.99	1.79
1014	3.33	2.00
1536	4.69	2.81
2048	6.05	3.63
3072	8.77	5.26
4096	11.49	6.90

[5-1] Slip regulator gain Vp based on the encoder increment



How to adapt the slip regulator gain to the operating conditions:

1. Adapt the slip regulator gain ([C00972](#)) to the encoder increment according to table [\[5-1\]](#).
2. Set controller limitation ([C00971/1](#)) to half the slip frequency (≈ 2 Hz).
3. Select speed setpoint (e.g. 20 % of the rated speed).
4. Enable controller.
5. Increase the slip regulator gain ([C00972](#)) until the drive is semi-stable.
 - This can be recognised by motor noises or "humming" of the motor or by a noise on the actual speed signal.
6. Reduce slip regulator gain ([C00972](#)) until the drive runs stable again (no motor "humming").
7. Reduce slip regulator gain ([C00972](#)) to approx. half the value.
 - With low encoder resolutions, another reduction of the the slip regulator gain for low speeds may be necessary (speed setpoint ≈ 0).
 - We recommend to finally check the behaviour at setpoint speed = 0 and to further reduce the slip regulator gain if irregular running occurs.
8. Increase controller limitation ([C00971/1](#)) again (e.g. to twice the slip frequency).

Slip regulator time constant T_i



How to set the slip regulator time constant:

1. Set controller limitation ([C00971/1](#)) to half the slip frequency (≈ 2 Hz).
2. Select speed setpoint (e.g. 20 % of the rated speed).
3. Enable controller.
4. Reduce the slip regulator time constant ([C00973](#)) until the drive is semi-stable.
 - This can be recognised by motor noise, "motor vibrations" or resonance on the actual speed value signal.
5. Increase slip regulator time constant ([C00973](#)) until the drive runs stable again (no motor "oscillation").
6. Increase the slip regulator time constant ([C00973](#)) to approx. twice the value.
7. Increase controller limitation ([C00971/1](#)) again (e.g. to twice the slip frequency).

Controller limitation

Max. intervention of the controller is limited by the controller limitation ([C00971/1](#)).

- The controller can be limited depending on the application.
- We recommend to limit the max. intervention to twice the rated slip of the motor.
- The rated slip is calculated as follows:

$$f_{\text{Slip}_{\text{Rated}}} [\text{Hz}] = f_{\text{Rated}} [\text{Hz}] - \left(\frac{n_{\text{Motor}_{\text{Rated}}} [\text{rpm}]}{60} \cdot p_{\text{Number of pole pairs}} \right)$$

[5-9] Calculation of the rated slip



Note!

A setting of [C00971/1](#) = 0 Hz deactivates the slip regulator. In this case, the structure of the V/f control corresponds to the structure of a V/f characteristic control without feedback.

Slip limitation

In addition to limiting the slip regulator, the field frequency to be injected can also be limited by another limiting element, the slip limitation ([C00971/2](#)).

- If the slip is e.g. limited to twice the rated slip of the motor, a stalling of the motor during very dynamic processes can be avoided.
- Motor stalling is caused by:
 - a high overcurrent at very steep speed ramps
 - very fast speed changes due to load, e.g. abrupt stopping of the drive due to an encounter with a stop or a load that is not moving.

5.7

Sensorless vector control (SLVC)

Sensorless vector control (SLVC) is based on a better motor current control according to a field-oriented control mode by Lenze.

**Stop!**

- The sensorless vector control (SLVC) is only suitable for asynchronous motors.
- The connected motor may be maximally two power classes lower than the motor assigned to the controller.
- Operation of the sensorless vector control (SLVC) is only permissible for one single drive!
- Operation of the sensorless vector control (SLVC) is not permissible for hoists!
- The Lenze setting permits the operation of a power-adapted motor. Optimal operation is only possible if either:
 - the motor is selected via the »Engineer« motor catalogue,
 - the motor nameplate data are entered and motor parameter identification is carried out afterwards
 - or -
 - the nameplate data and equivalent circuit data of the motor (motor leakage inductance and mutual motor inductance, slip compensation and motor stator resistance) are entered manually.
- When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the selected connection type.
 - In this context, also observe the instructions in chapter "[Adapting the V/f base frequency](#)" relating to V/f characteristic control. ([book 133](#))

**Note!**

Optimal operation of the sensorless vector control (SLVC) can be achieved from a minimum speed of approx. 0.5-fold slip speed. At lower speed values below the 0.5-fold slip speed, the maximum torque is reduced.

The maximum field frequency with this motor control mode is 650 Hz.

In comparison to the V/f characteristic control without feedback, the following can be achieved by means of sensorless vector control SLVC:

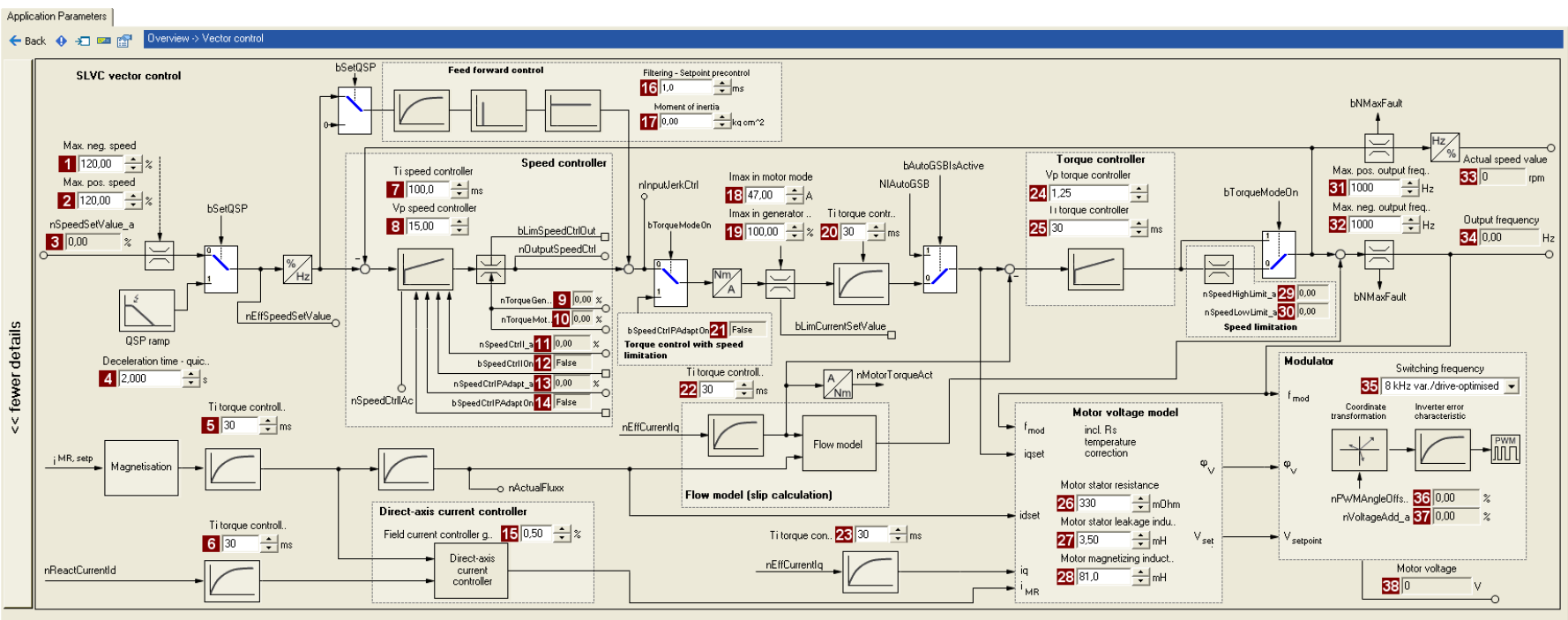
- A higher maximum torque throughout the entire speed range
- A higher speed accuracy
- A higher concentricity factor
- A higher level of efficiency
- The implementation of torque-controlled operation with speed limitation
- The limitation of the maximum torque in motor and generator mode for speed-controlled operation

5.7.1 Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "4: SLVC: Vector control" from the *Overview* dialog level in the **Motor control** list field ([C00006](#)):
4. Click the **Motor control vector** button to change to the *Overview → Motor control vector* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed, as shown in the following subchapter.



Parameter	Info	Parameter	Info	Parameter	Info
1	C00909/2 Max. neg. speed	16	C00275 Setpoint feedforward control filtering	24	C00073/2 SLVC: Vp torque controller
2	C00909/1 Max. pos. speed	17	C00273 Moment of inertia	25	C00074/2 SLVC: Ti torque controller
3	C00830/22 Speed setpoint	18	C00022 Imax in motor mode	26	C00084 Motor stator resistance
4	C00105 Decel. time - quick stop	19	C00023 Imax in generator mode	27	C00085 Motor stator leakage inductance
5	C00074/2 SLVC: Ti torque controller	20	C00074/2 SLVC: Ti torque controller	28	C00092 Motor magnetising inductance
6	C00074/2 SLVC: Ti torque controller	21	C00833/69 MCTRL: bSpeedCtrlIPAdaptOn	29	C00830/88 MCTRL: nSpeedHighLimit_a
7	C00071/1 SLVC: Ti speed controller	22	C00074/2 SLVC: Ti torque controller	30	C00830/23 MCTRL: nSpeedLowLimit_a
8	C00070/1 SLVC: Vp speed controller	23	C00074/2 SLVC: Ti torque controller	31	C00910/1 Max. pos. output frequency
9	C00830/28 Limitation of torque in generator mode			32	C00910/2 Max. neg. output frequency
10	C00830/29 Limitation of torque in motor mode			33	C00051 Actual speed value
11	C00830/24 MCTRL: nSpeedCtrlI_a			34	C00058 Output frequency
12	C00833/31 MCTRL: bSpeedCtrlIOn			35	C00018 Switching frequency
13	C00830/25 MCTRL: nSpeedCtrlIPAdapt_a			36	C00830/32 MCTRL: nPWMAngleOffset_a
14	C00833/69 MCTRL: bSpeedCtrlIPAdaptOn			37	C00830/31 MCTRL: nVoltageAdd_a
15	C00985 SLVC: Field current controller gain			38	C00052 Motor voltage

5.7.2 Types of control

The sensorless vector control can be operated in two different modes:

- [Speed control with torque limitation](#) (*bTorquemodeOn* = FALSE)
- [Torque control with speed limitation](#) (*bTorquemodeOn* = TRUE)

5.7.2.1 Speed control with torque limitation

When *bTorquemodeOn* = FALSE, the drive system is operated with a selected speed setpoint in a speed-controlled manner.



Note!

From version 13.00.00, the torque setpoint *nSpeedSetValue_a* is set to 0 by quick stop (QSP) device-internally and the torque limit values *nTorqueMotLimit_a* and *nTorqueGenLimit_a* are set to 100 % to stop the drive quickly and safely anytime. The previous behaviour can be set in [C2865/1](#) via bit 12 and bit 13.

The operational performance can be adapted in the following ways:

- Overload limitation in the drive train
- Motor current limitation
- Slip compensation

Overload limitation in the drive train

The torque is limited via the torque setpoint.

- The torque setpoint is identical to the value at the output of the speed controller, *nOutputSpeedCtrl*.
- To avoid overload in the drive train, the torque in motor mode can be limited via the *nTorqueMotLimit_a* process input signal, and the torque in generator mode can be limited via the *nTorqueGenLimit_a* process input signal:

Identifier DIS code data type	Information/possible settings
<i>nTorqueMotLimit_a</i> C00830/29 INT	Torque limitation in motor mode • Scaling: 16384 $\equiv$ 100 % $M_{\max}$ (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1.
<i>nTorqueGenLimit_a</i> C00830/28 INT	Torque limitation in generator mode • Scaling: 16384 $\equiv$ 100 % $M_{\max}$ (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2.



Note!

To avoid instabilities during operation, the torque limit values are internally processed as absolute values.

Motor current limitation

A cross current setpoint is calculated from the torque setpoint which is limited depending on the magnetising current, the max. current in motor mode ([C00022](#)) and the max. current in generator mode ([C00023](#)). The total current injected into the motor does not exceed the max. currents in motor mode and in generator mode.

Slip compensation

The slip of the machine is reconstructed using the slip model. An influencing parameter is the slip constant ([C00021](#)). ▶ [Slip compensation](#) (215)

5.7.2.2 Torque control with speed limitation

When *bTorquemodeOn* = TRUE, a torque-controlled operation is activated. The setpoint torque directly follows the default value *nTorqueSetValue_a*.

Due to its speed limitation, the torque-controlled drive can only rotate within a speed range whose positive speed is limited by *nSpeedHighLimit_a* and whose negative speed is limited by *nSpeedLowLimit_a*.

**Note!**

- Absolute speed limitation to speed 0 min⁻¹ (*nSpeedLowLimit_a* or *nSpeedHighLimit_a* = 0) is only possible [from version 12.00.00](#).
- Quick stop (QSP) is used to switch over to [Speed control with torque limitation](#).
 - [From version 13.00.00](#), the torque setpoint *nSpeedSetValue_a* is set to 0 by quick stop (QSP) device-internally and the two torque limit values *nTorqueMotLimit_a* and *nTorqueGenLimit_a* are set to 100 % to stop the drive quickly and safely anytime. The previous behaviour can be set in [C2865/1](#) via bit 12 and bit 13.
- [From version 13.00.00](#), the *bLimSpeedTorquemodeOn* status signal is used to show that the speed limitation is active.
- The speed is defined by the process.
- The torque setpoint is calculated directly from *nTorqueSetValue_a*.
 - [From version 12.00.00 onwards](#), the torque limitation is active via *nTorqueMotLimit_a* and *nTorqueGenLimit_a* in this control mode, too, for the torque setpoint to be limited. The torque limitation can be deactivated in [C2865/1](#) via bit 0 to obtain the previous function.

Identifier DIS code data type	Information/possible settings
<i>nTorqueSetValue_a</i> C00830/27 INT	Torque setpoint / additive torque • Scaling: 16384 ≡ 100 % M_{max} (C00057)
<i>nSpeedHighLimit_a</i> C00830/88 INT	Upper speed limit for the speed limitation • During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) • Scaling: 16384 ≡ 100 % rated speed (C00011)
<i>nSpeedLowLimit_a</i> C00830/23 INT	Lower speed limit for speed limitation • During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) • Scaling: 16384 ≡ 100 % rated speed (C00011)

Identifier DIS code data type	Information/possible settings
nTorqueMotLimit_a C00830/29 INT	Torque limitation in motor mode • Scaling: $16384 \equiv 100\% M_{\max}$ (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1.
nTorqueGenLimit_a C00830/28 INT	Torque limitation in generator mode • Scaling: $16384 \equiv 100\% M_{\max}$ (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2.

5.7.3

Basic settings

The following "Initial commissioning steps" must be performed to commission the sensorless vector control:

Initial commissioning steps			
1.	Determine the motor control: C00006 = "4: SLVC: Vector control"		
2.	Set the motor selection/motor data • When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (105) Depending on the motor manufacturer, proceed as follows: <table border="1"> <tr> <td> Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification </td><td> Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram data manually: C00082: Motor rotor resistance C00084: Motor stator resistance C00085: Motor stator leakage inductance C00092: Motor magnetising inductance C00095: Motor magnetising current </td></tr> </table>	Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram data manually: C00082 : Motor rotor resistance C00084 : Motor stator resistance C00085 : Motor stator leakage inductance C00092 : Motor magnetising inductance C00095 : Motor magnetising current
Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification	Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram data manually: C00082 : Motor rotor resistance C00084 : Motor stator resistance C00085 : Motor stator leakage inductance C00092 : Motor magnetising inductance C00095 : Motor magnetising current		
3.	Define the type of control: <i>bTorquemodeOn</i> = FALSE: Speed control with torque limitation <i>bTorquemodeOn</i> = TRUE: Torque control with speed limitation		
4.	Set the slip compensation (C00021). ▶ Slip compensation (215)		

**Tip!**

Information on the optimisation of the control mode and the adaptation to the real application is provided in chapter "[Optimising the control mode](#)". ([167](#))

We recommend to use the flying restart function for connecting/synchronising the inverter to an already rotating drive system. ▶ [Flying restart function](#) ([208](#))

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([202](#))

5.7.4 Optimising the control mode



Note!

From version 12.00.00:

- Following successful motor parameter identification, the current controller parameters ([C00075](#), [C00076](#)) are calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, the speed controller parameters ([C00070/1](#), [C00071/1](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

5.7.4.1 Optimising the starting performance after a controller enable

After the controller has been enabled, the starting action of the motor is delayed due to the magnetisation of the motor. Under consideration of the motor rotor time constant ([C00083](#)), the time delay is calculated as follows:

$$\text{Magnetisation} = 1.5 * \text{motor rotor time constant}$$

If this delay cannot be tolerated for specific applications, the motor must always be operated in an energised condition. For this, select one of the following options:

Procedure without setting a controller inhibit

1. Deactivate the auto DCB function with [C00019](#) = 0.
2. Do not activate the controller inhibit. Instead, stop the drive by selecting a setpoint of 0 or by activating the quick stop function.

Procedure with setting a controller inhibit due to application requirements

1. Deactivate the auto DCB function with [C00019](#) = 0.
2. Enter a greater value for the motor rotor resistance (max. factor 2!) to reduce the magnetisation time in [C00082](#).



Note!

During the starting action, a jerk may occur in the machine due to the temporarily increased motor current!

5.7.4.2 Optimise speed controller

The speed controller is designed as a PI controller.

- In the Lenze setting, the configuration of the speed controller provides robustness and moderate dynamics.

Parameter	Info	Lenze setting	
		Value	Unit
C00070/1	SLVC: Vp speed controller	15.00	
C00071/1	SLVC: Ti speed controller	100.0	ms

Speed controller gain Vp

The gain Vp ([C00070/1](#)) of the speed controller is defined in a scaled representation which enables a comparable parameterisation almost independent of the power of the motor or inverter. Here, the speed input difference of the controller is scaled to the rated motor speed whereas the output torque refers to the rated motor torque. A gain of 10 means that a speed difference of 1 % is gained through the P component with 10 % torque.

If the rated data of the motor and the mass inertia of the drive system are known, we recommend the following setting:

$$V_p \approx 1.5 \dots 3 \cdot \frac{T_M[s]}{0.01[s]}$$

$$T_M[s] = \frac{2 \cdot \pi \cdot n_N[\text{rpm}]}{M_N[\text{Nm}] \cdot 60} \cdot J_{\text{Drive, total}}[\text{kgm}^2]$$

$$M_N[\text{Nm}] = \frac{P_N[\text{W}] \cdot 60}{2 \cdot \pi \cdot n_N[\text{rpm}]}$$

V_p = Gain of the speed controller ([C00070/1](#))
 T_M = Time constant for the acceleration of the motor
 M_N = Rated motor torque
 n_N = Rated motor speed
 $J_{\text{drive, total}}$ = Total moment of inertia of the drive

[5-10] Recommendation for the setting of the gain of the speed controller

**Tip!**

Values recommended by Lenze for the setting of the (proportional) gain:

- For drive systems without feedback: $V_p = 6 \dots 25$
- For drive systems with a good disturbance behaviour: $V_p > 15$
In this case, we recommend the optimisation of the dynamic performance of the torque controller.

Speed controller reset time T_i

Apart from setting the P component, [C00071/1](#) provides the possibility to take influence on the I component of the PI controller.

**Tip!**

Value range recommended by Lenze for the setting of the reset time:

$T_i = 20 \text{ ms} \dots 150 \text{ ms}$

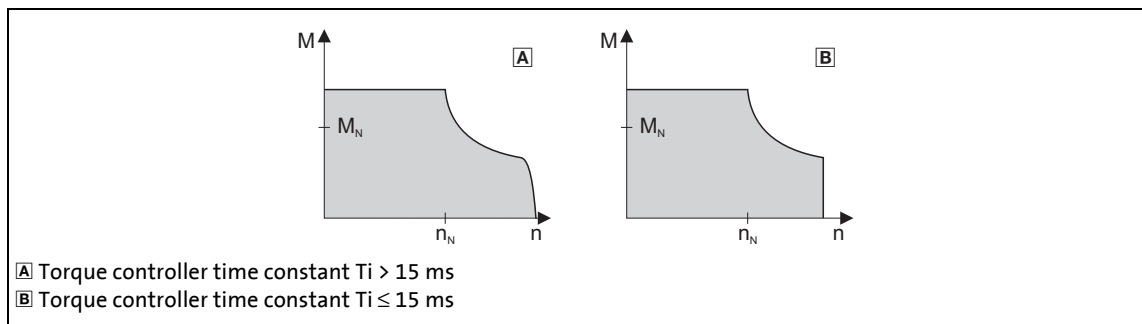
5.7.4.3 Optimising dynamic performance and field weakening behaviour

In the Lenze setting, the torque controller has been preset in such a way that robust and stable operation with a moderate dynamic response is enabled over the entire speed range. Retrospective optimisation of the controller parameters is not necessary.

Parameter	Info	Lenze setting	
		Value	Unit
C00073/2	SLVC: V_p torque controller	1.25	
C00074/2	SLVC: T_i torque controller	30	ms

A greater dynamic performance of the sensorless vector control can be achieved by reducing time constant T_i of the speed controller ([C00074/2](#)).

A greater dynamic performance of the field weakening function can be achieved by setting a time constant $\leq 15 \text{ ms}$. This means for actual speeds above rated speed a better torque-speed-characteristic in the field weakening range:



[5-11] Speed / torque characteristic diagram in the field weakening range

- For $T_i > 15 \text{ ms}$ (see **A**), the actual speed value slightly drops in the field weakening range if the load torque increases in the motor mode.
- For $T_i \leq 15 \text{ ms}$ (see **B**), the speed remains stable in the field weakening range if the torque is within the M/n characteristic field highlighted in grey.

**Tip!**

For applications with high dynamic performance and speed/torque accuracy requirements in the field weakening range, we recommend a time constant $T_i \leq 15 \text{ ms}$.

In this case, the maximum torque should be limited via the $nTorqueMotLimit\_a$ and $nTorqueGenLimit\_a$ process input signals to $1.5 \times M_N$ to ensure stable operation in the field weakening range.

5.7.4.4 Optimising the stalling behaviour

Motor stalling due to a torque overload in the field weakening range is prevented in sensorless vector control by means of an inverter-internal stalling current monitoring. In the field weakening range, hence at frequencies above the base frequency, it reduces the maximum current to prevent the motor from stalling. The reduction depends on the current field frequency, the base frequency, the DC-bus voltage and the maximum current ([C00022](#)). Generally it applies that a higher field frequency causes a stronger limitation of the maximum current.

The field weakening behaviour of the sensorless vector control depends on the setting of the reset time T_i of the torque controller ([C00074/2](#)).

The following applies to the reset time T_i ([C00074/2](#)) > 15 ms:

The behaviour in the field weakening range can be adapted via the override point of field weakening ([C00080](#)). This parameter serves to shift the frequency-dependent maximum current characteristic:

- [C00080](#) > 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to higher field frequencies.
 - The maximally permissible current and the maximum torque increase in the field weakening range.
 - The risk of motor stalling increases.
- [C00080](#) < 0 Hz:
 - The maximum current characteristic is shifted by the entered frequency to lower field frequencies.
 - The maximally permissible current and the maximum torque are reduced in the field weakening range.
 - The risk of motor stalling is reduced.



Note!

We recommend to keep the Lenze setting (0 Hz).

The following applies to the reset time T_i ([C00074/2](#)) ≤ 15 ms:

The reduction of the magnetising current in the field weakening range can be adapted via the override point of field weakening ([C00080](#)):

- [C00080](#) > 0 Hz: The reduction of the magnetising current is shifted to higher field frequencies. Here, there is a risk of the motor being magnetised too much and having too little voltage reserve for the torque-creating current.
- [C00080](#) < 0 Hz: The reduction of the magnetising current is shifted to lower field frequencies.



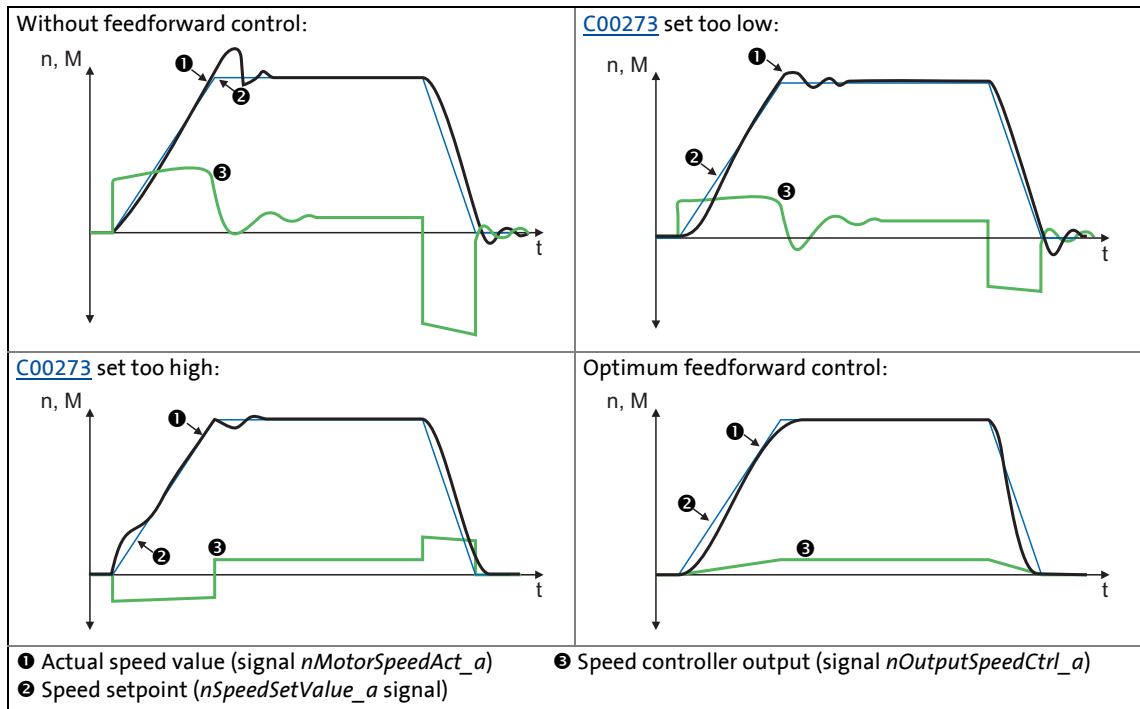
Note!

A function for enabling a stable operation can only be implemented to a limited extent with a reset time T_i ≤ 15 ms. For applications with speeds above the 2-fold rated speed, we recommend a reset time T_i ([C00074/2](#)) > 15 ms.

5.7.4.5 Optimise response to setpoint changes and determine mass inertia

Optimisation at constant mass inertia

Setting the total moment of inertia under [C00273](#) provides the optimum torque feedforward control. Depending on the application, an adjustment of the setting under [C00273](#) may be necessary to optimise the response to position/speed setpoint changes by means of the torque feedforward control.



[5-12] Typical signal characteristics for different settings of the load moment of inertia



How to optimise the torque feedforward control:

- Run a typical speed profile and record the inputs and outputs of the speed controller with the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
 - nOutputSpeedCtrl_a* (speed controller output)
- Estimate the moment of inertia and set it in [C00273](#) in relation to the motor end (i.e. with account being taken of the gearbox factors).
- Repeat the data logger recording (see step 1).

Now the data logger should show that part of the required torque is generated by the feedforward control and the speed controller output signal (*nOutputSpeedCtrl_a*) is correspondingly smaller. The resulting following error decreases.
- Change the setting in [C00273](#) and repeat the data logger recording until the intended response to setpoint changes is reached.
 - The optimisation could aim at the speed controller being completely relieved (see signal characteristics in Fig. [\[5-12\]](#)).
- Save the parameter set (device command: [C00002/11](#)).

Optimisation at variable mass inertia

From version V12.00.00, mass inertia that changes during the process (e.g. a reel) can be taken into account when optimising the response to setpoint changes.

How to proceed:

1. In [C00273](#) the known constant total moment of inertia (motor, gearbox, shaft, etc.) must be set or determined according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile without variable mass inertia (e.g. reels).
2. At the [LS_MotorInterface](#) SB, the *nInertiaAdapt_a* process signal must be interconnected in a way which ensures that a value of "100 %" is applied at this input.
3. In [C00919/1](#) set the known maximum value of the variable moment of inertia or determine the value according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile including variable mass inertia (e.g. maximum reels).
4. The *nInertiaAdapt_a* process signal can be used during the process to dynamically control the percentage of the variable moment of inertia set in [C00919/1](#) which is to be considered for setpoint feedforward control.

Example:

- If there is no variable moment of inertia (e.g. no reel), the *nInertiaAdapt_a* process signal must be set to "0 %".
- If the maximally variable moment of inertia is available (e.g. maximum reels), the *nInertiaAdapt_a* process signal must be set to "100 %".



Tip!

Via the *nTorqueSetValue_a* process signal at the [LS_MotorInterface](#) SB, any differential signal can be defined for torque feedforward control. First the speed controller, then this additive torque is connected which is hence not derived from the differential change in speed setpoint.

Other functions for differential setpoint feedforward control

From version V12.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00653/1](#), the sensitivity of setpoint feedforward control can be adapted.
- In [C00654/1](#), alternatively to the *nSpeedSetValue_a* process signal, the new *nSpeedSetValueInertia_a* process signal for the setpoint feedforward control can be selected at the [LS_MotorInterface](#) SB. Via the *nSpeedSetValueInertia_a* process signal, an optional input value (e.g. setpoint of the position or process controller) for the torque feedforward control can be specified.
- For *bTorqueModeOn* = TRUE, the setpoint feedforward control is added to the torque setpoint *nTorqueSetValue_a*. In this way, feedforward control of torque is also possible for torque-controlled operation (e.g. for winder applications).



Stop!

In the Lenze setting of [C00654/1](#), the speed setpoint of the speed controller (*nSpeedSetValue_a*) is used for the torque feedforward control which is why it is also called "differential setpoint feedforward control". A very sharp change of the speed setpoint at the speed controller thus causes a strong torque impulse at the machine!

A very sharp change of the speed setpoint of the speed controller occurs if a control creates the setpoint ramp itself and the speed setpoint is only written every 20 ms to the drive. (In this case, the speed setpoint is changed every 20 ms.)

Deactivate the speed feedforward control for the speed setpoint in [C00654/1](#) if the speed setpoint changes very sharply or the mass inertia is unknown (e.g. in case of hoists)!

5.7.4.6 Slip calculation from motor equivalent circuit diagram data

This function extension is available from version 11.00.00!

In order to achieve a better speed stability and torque accuracy, the slip calculation can be either derived from the motor nameplate data (e.g. rated motor speed) or the motor equivalent circuit diagram data (stator resistance, rotor resistance etc.).

The data to be used for sensorless vector control is selected via bit 0 in [C02879/1](#):

Setting		Info
Bit 0	SLVC	In case of sensorless vector control: • "0" ≡ Slip calculation from motor nameplate data (Lenze setting) • "1" ≡ Slip calculation from motor equivalent circuit diagram data
Bit 1 ... 7	Reserved	

**Note!**

In order that the slip can be calculated from the motor equivalent circuit diagram data, the equivalent circuit data (stator resistance, rotor resistance etc.) must be known as exactly as possible.

- Selecting a motor in the »Engineer« motor catalogue loads the exact motor equivalent circuit diagram data.
- When the motor nameplate data is entered manually and the motor equivalent circuit diagram data is then detected via the motor parameter identification, the "extended identification" ([C02867/1](#) = 2) must be used. ▶ [Automatic motor data identification](#) (111)

In the slip calculation from the motor equivalent circuit diagram data, the slip compensation ([C00021](#)) has no influence anymore.

5.7.4.7 Optimising field feedforward control and torque feedforward control

At the start of an acceleration process and at the end of a deceleration process, the field current (*nReaktCurrentId_a*) may oscillate.

- Especially when accelerating via small acceleration ramps, these oscillations become obvious by the speed being unable to follow the setpoint or speed drops during acceleration.
- Oscillating can be reduced by increasing the gain of the field current controller in [C00985](#). A small increase of the cross current controller gain in [C00986](#) can further improve the starting performance for small acceleration ramps.

In the field weakening range, the cross current (*nEffCurrentIq_a*) may oscillate when an acceleration process starts or a deceleration process ends.

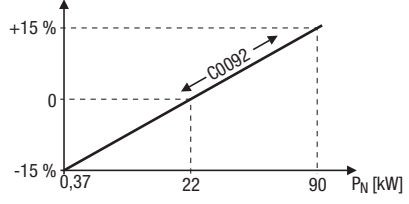
- In case of some motors, this cross current oscillation (*nEffCurrentIq_a*) can also occur in the motor setting range/field weakening range transitions which may also cause an overcurrent interruption.
- These oscillations can be reduced by again increasing the cross current controller gain slightly in [C00986](#).



Note!

The setting of [C00985](#) and [C00986](#) reduces the torque setting range.

5.7.5 Remedies for undesired drive behaviour

Drive behaviour	Remedy
Deviation between no-load current and magnetising current or bad speed or torque accuracy.	Adapt the motor magnetising inductance (C00092) for no-load operation. - If the no-load current is greater than the magnetising current (C00095) at 0.5-fold rated motor speed, the magnetising inductance must be reduced until the no-load current and the magnetising current have the same values. - Otherwise, the magnetising inductance must be increased. Tendency of the correction of C00092:  PN: Rated motor power
Insufficient speed constancy at high load: Setpoint and motor speed are not proportional anymore. Caution: Overcompensation of the settings mentioned under "Remedy" may result in unstable behaviour!	Via the slip compensation (C00021), the speed stability under high loads can be affected: - If $n_{act} > n_{slip}$, reduce the value in C00021 - If $n_{act} < n_{slip}$, increase the value in C00021
Unstable control with higher speeds.	- Check the setting of the magnetising inductance (C00092) by comparing the current consumption in no-load operation with the rated magnetising current (C00095). - Optimise oscillation damping (C00234).
"Short circuit" (oC1) or "Clamp operation active" (oC11) error messages at short acceleration time (C00012) in proportion to the load (controller cannot follow the dynamic processes).	- Increase the gain of the torque controller (C00073/2). - Reduce the reset time of the torque controller (C00074/2). - Increase the acceleration (C00012)/deceleration (C00013) time.
Mechanical resonance at certain speeds.	The L_NSet 1 function block masks out those speed ranges that include resonance.
Speed variations in no-load operation for speeds > 1/3 rated speed.	Minimise speed oscillations with oscillation damping (C00234).
Drive runs unstable.	Check set motor data (nameplate data and equivalent circuit diagram data). ► Motor selection/Motor data (105)
Setpoint speed and actual speed differ strongly.	
The torque required is not generated at standstill.	Increase motor magnetising current (C00095).
Current overshoots occur when heavy loads are accelerated from standstill (OC1 or OC11 error).	
The machine runs uneven.	

5.8

Sensorless control for synchronous motors (SLPSM)

This function extension is available from version 10.00.00!

The sensorless control for synchronous motors is based on a decoupled and separated control of the torque-creating and field-creating current share of synchronous motors. In contrast to the servo control, the actual speed value and the rotor position are reconstructed via a motor model.



Stop!

- The sensorless control for synchronous motors is only possible up to a maximum output frequency of 650 Hz (from version 14.00.00: 1000 Hz)!
 - Depending on the number of motor pole pairs, the reference speed ([C00011](#)) may only be selected that high that the output frequency displayed in [C00059](#) is less than or equal to 650 Hz (from version 14.00.00: 1000 Hz).
- We recommend to select a power-adapted combination of inverter and motor.
- The Lenze setting permits the operation of a power-adapted motor. Optimal operation is only possible if either:
 - the motor is selected via the »Engineer« motor catalogue,
 - the motor nameplate data are entered and motor parameter identification is carried out afterwards
 - or -
 - the nameplate data and equivalent circuit data of the motor (motor leakage inductance and motor stator resistance) are entered manually.
- When you enter the motor nameplate data, take into account the phase connection implemented for the motor (star or delta connection). Only enter the data applying to the selected connection type.
- In order to protect the motor (e.g. from demagnetisation), we recommend setting the ultimate motor current in [C00939](#). This ensures motor protection even with an unstable operation. ▶ [Maximum current monitoring](#) (📘 248)
- Controller enable is only possible if the motor is at standstill.
 - When the controller is enabled, a jerk may occur due to an angle jump since the rotor displacement angle is not known after controller enable. For some applications, this jerk in the machine is not acceptable.
 - From version 11.00.00, the rotor displacement angle is identified with every controller enable in the Lenze setting, and thus a jerk in the machine after controller enable can be avoided. ▶ [Pole position identification without motion](#) (📘 197)
 - A flying restart circuit for synchronising to rotating motors is in preparation.
- The injection of a constant current may cause an unwanted heating of the motor at controlled operation.
 - We recommend using a temperature feedback via PTC or thermal contact. ▶ [Motor temperature monitoring \(PTC\)](#) (📘 242)

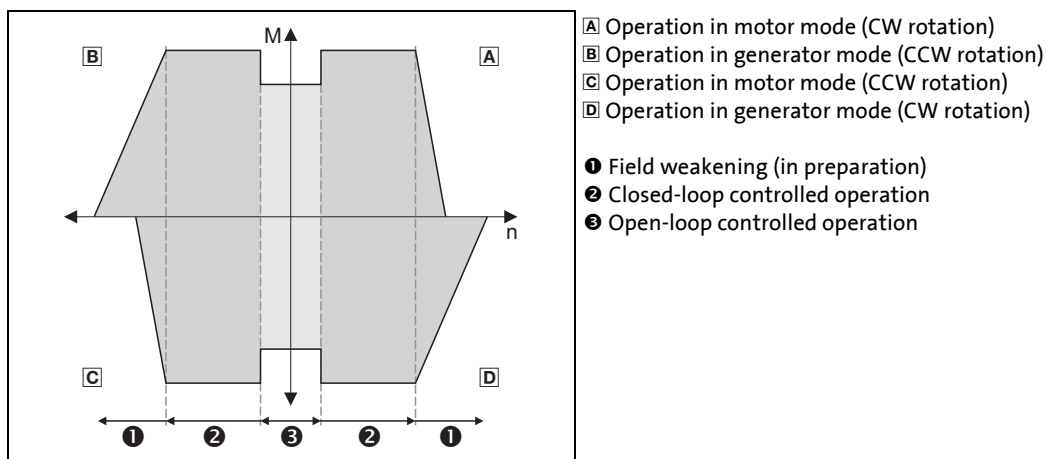
**Note!**

Currently, the sensorless control does not contain a flying restart function that enables a synchronisation of the controller to a rotating machine.

- Thus, we recommend taking measures for preventing overvoltages at operation in generator mode (e.g. brake resistor).
- By any means, the delay time for the "DC-bus overvoltage" error trigger in [C00601/1](#) must be set to 0 s.

The motor model-based speed monitoring requires a rotating machine. Thus, the operational performance of the sensorless control for synchronous motors is divided into two categories:

1. Open-loop controlled operation ($|n_{\text{setpoint}}| < n_{C00996}$)
 - In the range of low speeds, the speed of a synchronous motor is not possible. Thus, only an adjustable and constant current is injected that enables an acceleration.
2. Closed-loop controlled operation ($|n_{\text{setpoint}}| > n_{C00996}$)
 - In this range, the rotor flux position and the speed are reconstructed via an observer. The control is carried out field-oriented. Only the current is injected that is needed for the required torque.



[5-13] Operating ranges of the sensorless control for synchronous motors

The sensorless control for synchronous motors has similar advantages for the closed-loop controlled operating range and the servo control (SC) for synchronous motors. Compared to asynchronous motors, there are the following advantages:

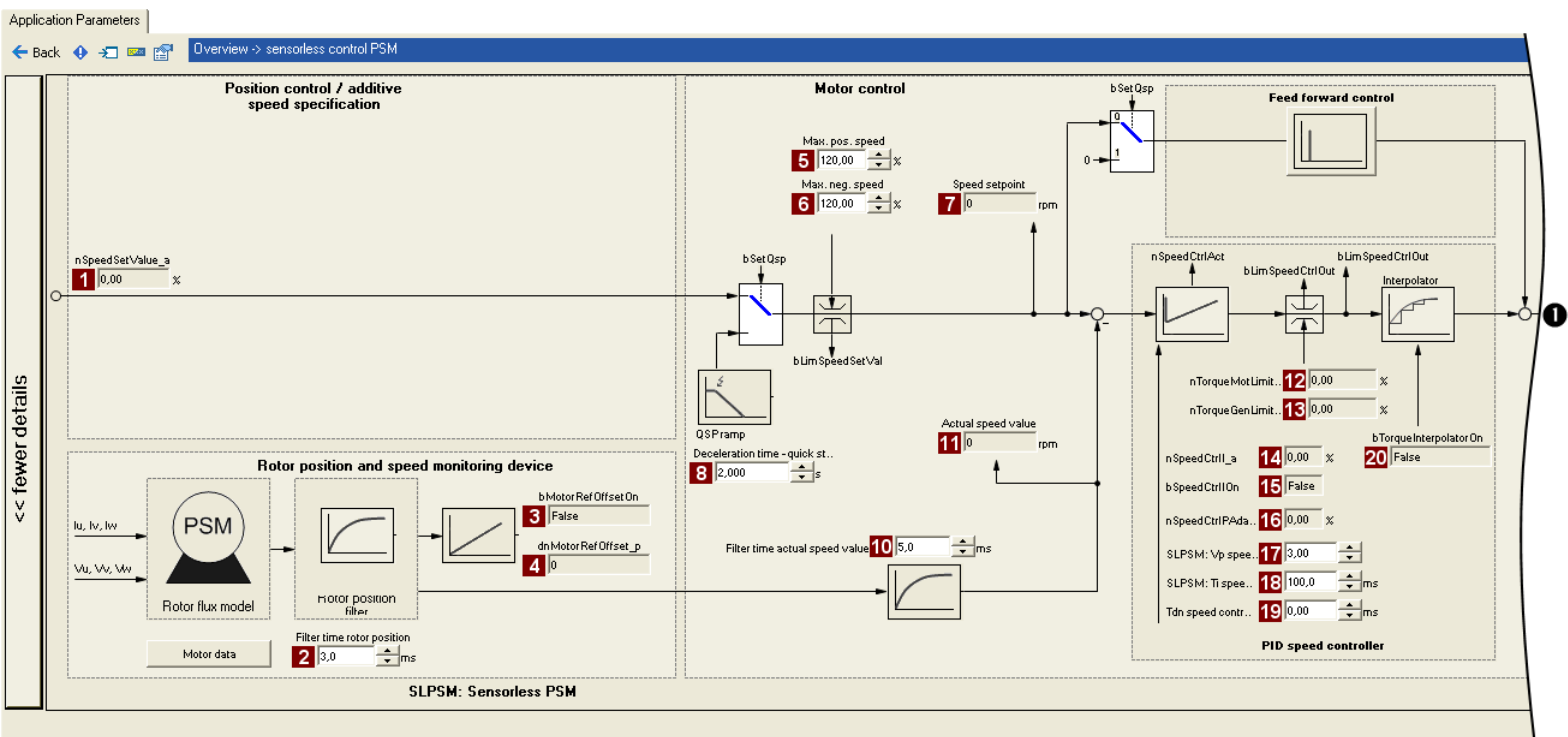
- Higher power density of the motor
- Higher efficiency
- Limitation of the maximum torque in motor mode and generator mode in closed-loop operating range
- Implementation of simple positioning

5.8.1 Parameterisation dialog/signal flow



Proceed as follows to open the dialog for parameterising the motor control:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Select the motor control "3: SLPSM: Sensorless PSM" from the *Overview* dialog level in the **Motor control** list field:
4. Click the **Motor control servo SLPSM** button to change to the *Overview → Motor control vector* dialog box.
 - This dialog level only shows a simplified signal flow with the most important parameters.
 - When you click the **>>More details** button in the left-most position, a signal flow with more details/parameters is displayed.

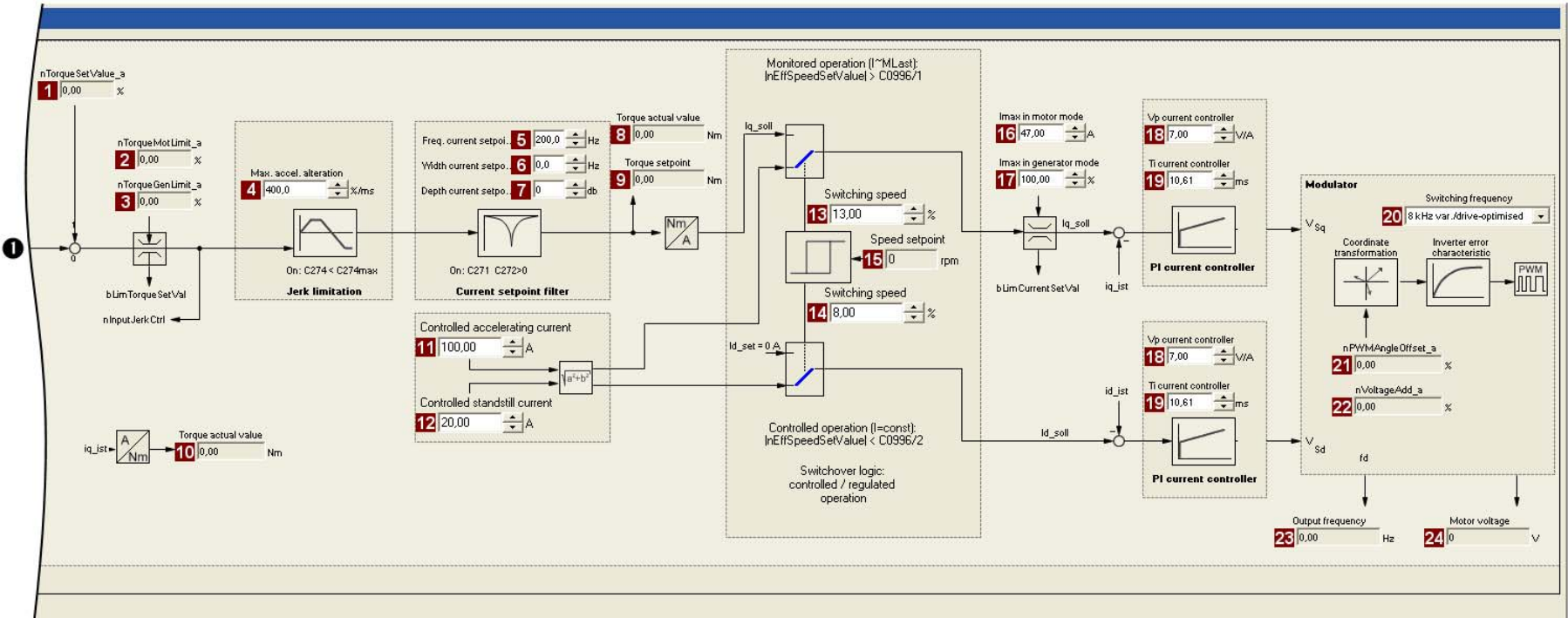


Parameter	Info	Parameter	Info	Parameter	Info
1	C00830/22 Speed setpoint	5	C00909/1 Max. pos. speed	12	C00830/29 Limitation of torque in motor mode
2	C00998/1 SLPSM: Filter time rotor position	6	C00909/2 Max. neg. speed	13	C00830/28 Limitation of torque in generator mode
3	C00833/68 MCTRL: bMotorRefOffsetOn	7	C00050 Speed setpoint	14	C00830/24 MCTRL: nSpeedCtrlI_a
4	C00834/6 MCTRL: dnMotorRefOffset_p	8	C00105 Decel. time - quick stop	15	C00833/31 MCTRL: bSpeedCtrlIOn
		9	-	16	C00830/25 MCTRL: nSpeedCtrlIPAdapt_a
		10	C00998/2 SLPSM: Filter time actual speed value	17	C00070/3 SLPSM: Vp speed controller
		11	C00051 Actual speed value	18	C00071/3 SLPSM: Ti speed controller
				19	C00072 SC: Tdn speed controller
				20	C00833/29 MCTRL: bTorqueInterpolatorOn

Motor control (MCTRL)

5.8

Sensorless control for synchronous motors (SLPSM)



Parameter	Info		Parameter	Info		Parameter	Info	
1	C00830/27	MCTRL: nTorqueSetValue_a	11	C00995/1	SLPSM: Open-loop controlled accelerating current	18	C00075	Vp current controller
2	C00830/29	Limitation of torque in motor mode	12	C00995/2	SLPSM: Open-loop controlled standstill current	19	C00076	Ti current controller
3	C00830/28	Limitation of torque in generator mode	13	C00996/1	SLPSM: Closed-loop controlled switching speed	20	C00018	Switching frequency
4	C00274	SC: Max. change in acceleration	14	C00996/2	SLPSM: Open-loop controlled switching speed	21	C00830/32	MCTRL: nPWMAngleOffset_a
5	C00270	SC: Freq. current setpoint filter	15	C00050	Speed setpoint	22	C00830/31	MCTRL: nVoltageAdd_a
6	C00271	SC: Current setpoint filter width	16	C00022	Imax in motor mode	23	C00058	Output frequency
7	C00272	SC: Current setpoint filter depth	17	C00023	Imax in generator mode	24	C00052	Motor voltage
8	C00056/2	Actual torque value						
9	C00056/1	Torque demand						
10	C00056/2	Actual torque value						

5.8.2 Types of control

Sensorless control for synchronous motors can only be executed in the "Speed control with torque limitation" (*bTorquemodeOn* = FALSE) mode.

Speed control with torque limitation

A speed setpoint is selected and the drive system is operated in a speed-controlled manner. For adapting the operational performance, the overload in the drive train can be limited:

- The torque is limited via the torque setpoint.
- The torque setpoint is identical to the value at the output of the speed controller, *nOutputSpeedCtrl*.
- To avoid overload in the drive train, the torque in motor mode can be limited via the *nTorqueMotLimit_a* process input signal, and the torque in generator mode can be limited via the *nTorqueGenLimit_a* process input signal:

Identifier DIS code data type	Information/possible settings
<i>nTorqueMotLimit_a</i> C00830/29 INT	Torque limitation in motor mode • Scaling: $16384 \equiv 100\% M_{\max}$ (C00057) • Setting range: 0 ... +199.99 % • If keypad control is performed: Parameterisable via C00728/1.
<i>nTorqueGenLimit_a</i> C00830/28 INT	Torque limitation in generator mode • Scaling: $16384 \equiv 100\% M_{\max}$ (C00057) • Setting range: -199.99 ... 0 % • If keypad control is performed: Parameterisable via C00728/2.



Stop!

Torque limitation is only active in the closed-loop controlled operation ($|n_{\text{Setpoint}}| > n_{C00996}$)!

- It must be prevented that the actual speed value is braked into the non-observable area due to the torque limitation!



Note!

To avoid instabilities during operation, the torque limit values are internally processed as absolute values.

5.8.3 Basic settings

The following "Initial commissioning steps" must be performed to commission the sensorless control for synchronous motors:

Initial commissioning steps	
1.	Select motor control: C00006 = "3: SLPSM: Sensorless PSM"
2.	Set the motor selection/motor data When selecting and parameterising the motor, the motor nameplate data and the equivalent circuit diagram data are relevant. Detailed information can be found in the "Motor selection/Motor data" chapter. (105) Depending on the motor manufacturer, proceed as follows: Lenze motor: Selecting a motor from the motor catalogue in the »Engineer« - or - 1. Set the motor nameplate data 2. Automatic motor data identification Third party manufacturer's motor: 1. Set the motor nameplate data 2. Automatic motor data identification or set known equivalent circuit diagram manually: C00084: Motor stator resistance C00085: Motor stator leakage inductance
3.	Set speed switching thresholds between open-loop and closed-loop controlled operation: - Set transition speed from closed-loop to open-loop operation in C00996/1 in [%] with regard to the rated motor speed (C00087). - Set transition speed from closed-loop to open-loop operation in C00996/2 in [%] with regard to the rated motor speed (C00087). Tip! - With voltage-adjusted motors, a speed switching threshold of 10 % is recommended. - As a rule of thumb, the speed switching threshold should be selected as follows: $C00996/1...2 [\%] = \frac{U_{Rated, motor}[V]}{U_{Rated, FI}[V]} \cdot 10$
4.	Set open-loop accelerating current in C00995/1 in [%] with regard to the rated motor current (C00088). - This value defines the height of the current that is injected during the acceleration process. - The accelerating current must be dimensioned so that the required torque in the lower speed range can always be reached (acceleration torque + load torque): $C00995/1 [\%] = \frac{M_{Meax}[Nm]}{M_{Rated}[Nm]} \cdot I_{Rated, motor}[A] \cdot 1.3$
5.	Set open-loop steady-state current in C00995/2 in [%] with regard to the rated motor current (C00088). This value defines the height of the current for processes without acceleration (e.g. standstill or constant setpoint speed).
6.	For improving the operating characteristics: If required, adapt the filter time for reconstructing the rotor position and the actual speed value through the motor model in C00998/1 and C00998/2 . - We recommend using the Lenze setting: - Filter time rotor position (C00998/1) = 3 ms - Filter time actual speed value (C00998/2) = 5 ms - Deviant from this, the following value range can be used: - Filter time rotor position (C00998/1) = 2 ... 5 ms - Filter time actual speed value (C00998/2) = 3 ... 8 ms
7.	For protecting the motor from demagnetisation: Set the ultimate current in C00939 .



Note!

The Lenze settings of the current controller are predefined for a power-adapted motor. For an optimal drive behaviour of a synchronous motor, we recommend to adapt the controller settings.

**Tip!**

Information on the optimisation of the control mode and the adaptation to the real application is provided in the "[Optimising the control mode](#)" chapter.

Parameterisable additional functions are described correspondingly in the chapter "[Parameterisable additional functions](#)". ([book icon](#) 202)

5.8.4 Optimising the control mode



Note!

From version 12.00.00:

- Following successful motor parameter identification, the current controller parameters ([C00075](#), [C00076](#)) are calculated automatically.
 - If these parameters are not to be calculated, bit 4 of [C02865/1](#) must be set to "1".
- Following successful motor parameter identification, the speed controller parameters ([C00070/3](#), [C00071/3](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "5".
- Following successful motor parameter identification, other controller parameters ([C00011](#), [C00022](#)) can be calculated automatically.
 - If these parameters are to be calculated, bit 6 of [C02865/1](#) must be set to "6".

The measures described in the following subchapters serve to further optimise the control behaviour of the sensorless control for synchronous motors and adjust it to the concrete application.

- [Optimise current controller.](#) (📖 186)
 - The current controller should always be optimised if a motor of a third-party manufacturer with unknown motor data is used!
- [Optimise speed controller.](#) (📖 187)
 - The setting of the speed controller must be adapted depending on the mechanical path.
- [Optimise response to setpoint changes and determine mass inertia.](#) (📖 190)
 - For an optimal reference behaviour, the total moment of inertia can be used to make a feedforward control of the speed setpoint.
- [Current-dependent stator leakage inductance Ppp\(l\).](#) (📖 193)
 - If the motor is operated with very low and very high currents during the process (e.g. in *Pick and place*-applications), the stator leakage inductance and current controller parameters can be tracked by means of an adjustable saturation characteristic.



Note!

Current setpoint filter (band-stop filter) / jerk limitation

The use of the functions is only recommended in exceptional cases.

- ▶ [Setting the current setpoint filter \(band-stop filter\)](#) (📖 195)
- ▶ [Adapting the max. acceleration change \(jerk limitation\)](#) (📖 196)

5.8.4.1 Optimise current controller

**Note!**

An optimisation of the current controller should generally be carried out unless a power-adapted standard motor is used or the motor has been selected from the motor catalogue of the »Engineer«!

An optimisation of the current controller is sensible since the two control parameters gain ([C00075](#)) and reset time ([C00076](#)) depend on the required maximum current and the set switching frequency.

Parameter	Info	Lenze setting	
		Value	Unit
C00075	Vp current controller	7.00	V/A
C00076	Ti current controller	10.61	ms

- Gain and reset time can be calculated as per the following formulae:

$$V_p = \frac{L_{ss}[H]}{T_E[s]}$$

$$T_i = \frac{L_{ss}[H]}{R_s[\Omega]}$$

V_p = Current controller gain ([C00075](#))

T_i = Current controller reset time ([C00076](#))

L_{ss} = Motor stator leakage inductance ([C00085](#))

R_s = Motor stator resistance ([C00084](#))

T_E = Equivalent time constant (= 500 µs)

5.8.4.2 Optimise speed controller

The speed controller is in the form of a PID controller with an additional differential speed-setpoint gain. For optimum behaviour, the PID speed controller has to be optimised and the overall mass inertia of the drive train has to be determined.

- In the Lenze setting, the configuration of the speed controller provides robustness and moderate dynamics.

Parameter	Info	Lenze setting	
		Value	Unit
C00070/3	SLPSM: Vp speed controller	3.00	
C00071/3	SLPSM: Ti speed controller	100.0	ms
C00072	SC: Tdn speed controller	0.00	ms

Speed controller gain Vp

The gain Vp ([C00070/3](#)) of the speed controller is defined in a scaled representation which enables a comparable parameterisation almost independent of the power of the motor or inverter. Here, the speed input difference of the controller is scaled to the rated motor speed whereas the output torque refers to the rated motor torque. A gain of 10 means that a speed difference of 1 % is gained through the P component with 10 % torque.

If the rated data of the motor and the mass inertia of the drive system are known, we recommend the following setting:

$$V_p \approx 0.2 \dots 0.5 \cdot \frac{T_M[s]}{0.01[s]}$$

$$T_M[s] = \frac{2 \cdot \pi \cdot n_N[\text{rpm}]}{M_N[\text{Nm}] \cdot 60} \cdot J_{\text{Drive, total}}[\text{kgm}^2]$$

$$M_N[\text{Nm}] = \frac{P_N[\text{W}] \cdot 60}{2 \cdot \pi \cdot n_N[\text{rpm}]}$$

V_p = Gain of the speed controller ([C00070/3](#))

T_M = Time constant for the acceleration of the motor

M_N = Rated motor torque

n_N = Rated motor speed

$J_{\text{drive, total}}$ = Total moment of inertia of the drive

[5-14] Recommendation for the setting of the gain of the speed controller

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

1. Specify speed setpoint.
 - A small speed just above the switching threshold is recommended in the closed-loop controlled operation.
2. Increase V_p ([C00070/3](#)) until the drive starts to oscillate (observe engine noise).
3. Reduce V_p ([C00070/3](#)) until the drive runs stable again.
4. Reduce V_p ([C00070/3](#)) to approx. half the value.
5. Afterwards check results of the optimisation in the entire speed range (one-time passing through of the speed range).



Tip!

Values recommended by Lenze for the setting of the (proportional) gain:

- For drive systems without feedback: $V_p = 2 \dots 8$
- For drive systems with a good disturbance behaviour: $V_p > 6$

Speed controller reset time T_i

Apart from setting the P component, [C00071/3](#) provides the possibility to take influence on the I component of the PI controller.

If the mass inertia of the drive is unknown, the optimisation can be achieved as follows:

1. Specify speed setpoint.
2. Reduce T_i ([C00071/3](#)) until the drive starts to oscillate (observe engine noise).
3. Increase T_i ([C00071/3](#)) until the drive runs stable again.
4. Increase T_i ([C00071/3](#)) to approx. twice the value.



Tip!

Value range recommended by Lenze for the setting of the reset time:

$T_i = 20 \text{ ms} \dots 150 \text{ ms}$

Using the ramp response for setting the speed controller

If the mechanical components cannot be operated at the stability limit, the ramp response can also be used for setting the speed controller.



Stop!

If the controller parameters are preset unfavourably, the control can tend to heavy overshoots up to instability!

- Following and speed errors can adopt very high values.
- If the mechanics are sensitive, the corresponding monitoring functions are to be activated.

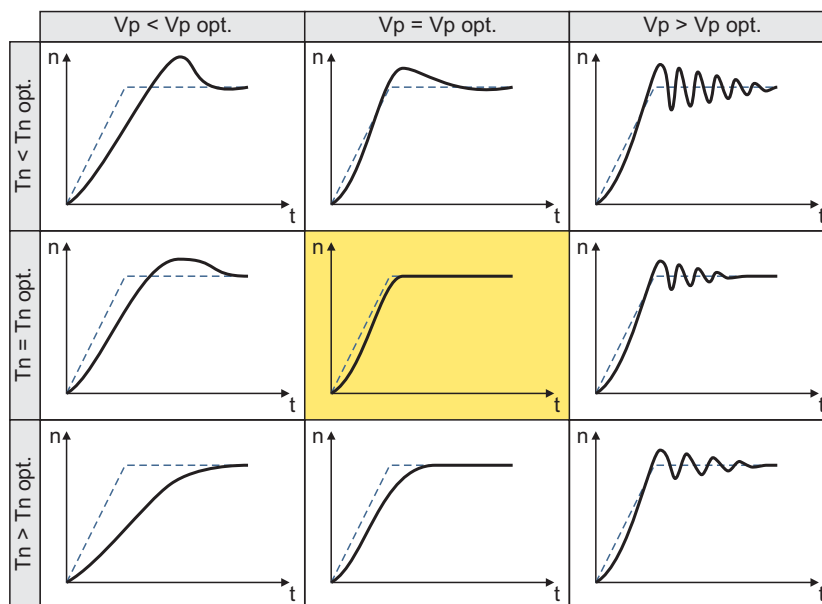
**Note!**

For an optimal setting, we recommend to determine the mass inertia (optimal response to setpoint changes) first.

► [Optimise response to setpoint changes and determine mass inertia](#) (190)

**How to optimise the speed controller setting by means of the ramp response:**

- Run a typical speed profile and record the ramp response of the speed using the data logger.
 - Motor control variables to be recorded:
nSpeedSetValue_a (speed setpoint)
nMotorSpeedAct_a (actual speed value)
- Evaluate the ramp response:



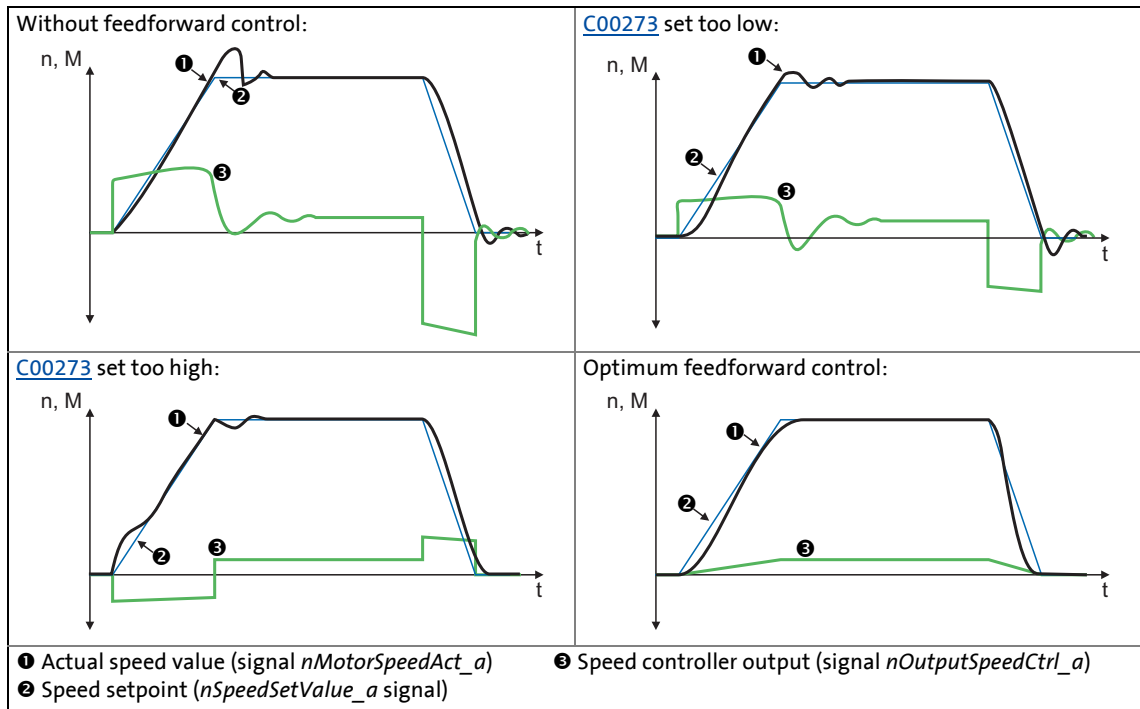
- Solid line = ramp response (actual speed value)
- Dash line = speed setpoint

- Change gain V_p in [C00070/3](#) and reset time T_n in [C00071/3](#).
- Repeat steps 1 ... 3 until the optimum ramp response is reached.

5.8.4.3 Optimise response to setpoint changes and determine mass inertia

Optimisation at constant mass inertia

Setting the total moment of inertia under [C00273](#) provides the optimum torque feedforward control. Depending on the application, an adjustment of the setting under [C00273](#) may be necessary to optimise the response to position/speed setpoint changes by means of the torque feedforward control.



[5-15] Typical signal characteristics for different settings of the load moment of inertia



How to optimise the torque feedforward control:

- Run a typical speed profile and record the inputs and outputs of the speed controller with the data logger.
 - Motor control variables to be recorded:
 - nSpeedSetValue_a* (speed setpoint)
 - nMotorSpeedAct_a* (actual speed value)
 - nOutputSpeedCtrl_a* (speed controller output)
 - Estimate the moment of inertia and set it in [C00273](#) in relation to the motor end (i.e. with account being taken of the gearbox factors).
 - Repeat the data logger recording (see step 1).
- Now the data logger should show that part of the required torque is generated by the feedforward control and the speed controller output signal (*nOutputSpeedCtrl_a*) is correspondingly smaller. The resulting following error decreases.
- Change the setting in [C00273](#) and repeat the data logger recording until the intended response to setpoint changes is reached.
 - The optimisation could aim at the speed controller being completely relieved (see signal characteristics in Fig. [5-15]).
 - Save the parameter set (device command: [C00002/11](#)).

Optimisation at variable mass inertia

From version V12.00.00, mass inertia that changes during the process (e.g. a reel) can be taken into account when optimising the response to setpoint changes.

How to proceed:

1. In [C00273](#) the known constant total moment of inertia (motor, gearbox, shaft, etc.) must be set or determined according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile without variable mass inertia (e.g. reels).
2. At the [LS_MotorInterface](#) SB, the *nInertiaAdapt_a* process signal must be interconnected in a way which ensures that a value of "100 %" is applied at this input.
3. In [C00919/1](#) set the known maximum value of the variable moment of inertia or determine the value according to previous instructions ("[How to optimise ...](#)").
 - The determination requires travelling the typical speed profile including variable mass inertia (e.g. maximum reels).
4. The *nInertiaAdapt_a* process signal can be used during the process to dynamically control the percentage of the variable moment of inertia set in [C00919/1](#) which is to be considered for setpoint feedforward control.

Example:

- If there is no variable moment of inertia (e.g. no reel), the *nInertiaAdapt_a* process signal must be set to "0 %".
- If the maximally variable moment of inertia is available (e.g. maximum reels), the *nInertiaAdapt_a* process signal must be set to "100 %".



Tip!

Via the *nTorqueSetValue_a* process signal at the [LS_MotorInterface](#) SB, any differential signal can be defined for torque feedforward control. First the speed controller, then this additive torque is connected which is hence not derived from the differential change in speed setpoint.

Other functions for differential setpoint feedforward control

From version V12.00.00 onwards, the following additional functions are available for differential setpoint feedforward control (torque feedforward control):

- In [C00653/1](#), the sensitivity of setpoint feedforward control can be adapted.
- In [C00654/1](#), alternatively to the *nSpeedSetValue_a* process signal, the new *nSpeedSetValueInertia_a* process signal for the setpoint feedforward control can be selected at the [LS_MotorInterface](#) SB. Via the *nSpeedSetValueInertia_a* process signal, an optional input value (e.g. setpoint of the position or process controller) for the torque feedforward control can be specified.
- For *bTorqueModeOn* = TRUE, the setpoint feedforward control is added to the torque setpoint *nTorqueSetValue_a*. In this way, feedforward control of torque is also possible for torque-controlled operation (e.g. for winder applications).



Stop!

In the Lenze setting of [C00654/1](#), the speed setpoint of the speed controller (*nSpeedSetValue_a*) is used for the torque feedforward control which is why it is also called "differential setpoint feedforward control". A very sharp change of the speed setpoint at the speed controller thus causes a strong torque impulse at the machine!

A very sharp change of the speed setpoint of the speed controller occurs if a control creates the setpoint ramp itself and the speed setpoint is only written every 20 ms to the drive. (In this case, the speed setpoint is changed every 20 ms.)

Deactivate the speed feedforward control for the speed setpoint in [C00654/1](#) if the speed setpoint changes very sharply or the mass inertia is unknown (e.g. in case of hoists)!

5.8.4.4 Current-dependent stator leakage inductance Ppp(I)

The current controller must be adjusted to the electrical characteristics of the motor stator resistance ([C00084](#)) and stator leakage inductance ([C00085](#)). In case of modern motors, the stator leakage inductance changes with the height of the current so that a new current controller setting is required for each current height.

When the motor is operated with very low and very high currents (e.g. in *Pick and place* applications), it is not always possible to achieve a satisfactory current controller setting for all operating points. For this purpose, the correction of the stator leakage inductance and current controller parameters is now possible via an adjustable saturation characteristic (17 interpolation points).

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C02853/1...17	PSM: Ppp saturation characteristic (17 interpolation points)	100	%
C02855	PSM: I _{max} L _{ss} saturation characteristic	3000.0	A
C02859	PSM: Activate Ppp saturation char.	0: Off	

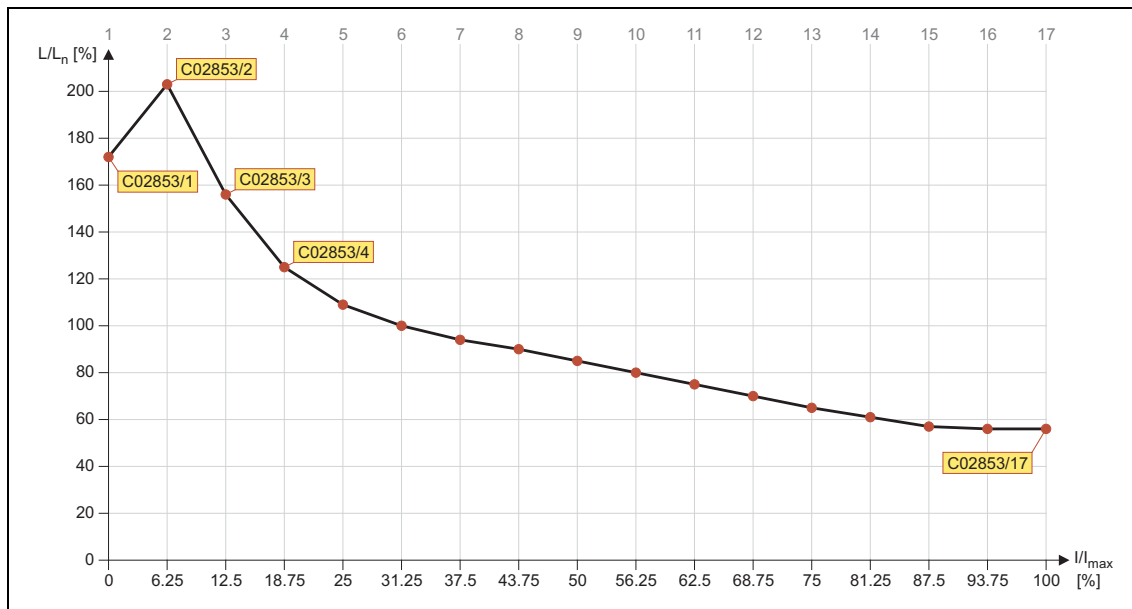


Note!

- The saturation characteristic is not only used for the correction of the current controller but also influences the current controller feedforward control ([C00079/1](#)).
- When a Lenze motor is selected from the »Engineer« motor catalogue, the corresponding saturation characteristic is set in [C02853/1...17](#) and – if required – the correction via this saturation characteristic is switched on in [C02859](#).
- For third-party motors: If the current controller becomes unstable with high currents, contact the motor manufacturer to find out whether the stator leakage inductance changes with the current level. If required, the saturation characteristic of this motor must be set in [C02853/1...17](#) and then activated in [C02859](#).

Distribution of the interpolation points

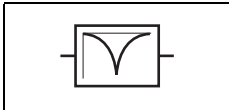
- The saturation characteristic is represented by 17 interpolation points linearly distributed on the X axis ([C02853/1...17](#)).
- Interpolation point 17 represents 100 % of the maximum motor current in the process ([C02855](#)).
- The following diagram shows the saturation characteristic stored in the »Engineer« motor catalogue for the Lenze motor "MCS12H15" as an example:



[5-16] Saturation characteristic: Inductance referring to the inductance for rated current

5.8.4.5 Setting the current setpoint filter (band-stop filter)

Due to the high dynamic performance/limit frequency of the closed current control loop, mechanical natural frequencies can be activated which may lead to an unstable speed control loop.



To mask out or at least damp these resonant frequencies, a so-called current setpoint filter is integrated into the speed control loop of the controller.

Parameter	Info	Lenze setting	
		Value	Unit
C00270	SC: Freq. current setpoint filter	200.0	Hz
C00271	SC: Current setpoint filter width	0.0	Hz
C00272	SC: Current setpoint filter depth	0	dB

- In the default setting of 0 db of the filter depth ([C00272](#)), the current setpoint filter is switched off.

Setting of the current setpoint filter

Since the frequency response of the speed controlled system is only rarely known to such an extent that the current setpoint filter can be adjusted to the controlled system in the run-up, the following example describes how to set the current setpoint filter.



How to set the current setpoint filter:

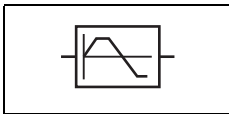
1. [Optimise current controller](#). (□ 186)
2. [Optimise speed controller](#). (□ 187)
3. Measure the oscillation frequency (observe current or speed).
4. Set the measured oscillation frequency in [C00270](#) as filter frequency.
5. Set "25%" of the filter frequency in [C00271](#) as filter width.
 - Example: Filter frequency = 200 Hz → filter width = 50 Hz.
6. Set "40 dB" in [C00272](#) as filter depth.
 - If the filter depth is set to "0 dB" (default setting), the filter is not active.



Note!

Readjust the speed controller after setting the current setpoint filter. ▶ [Optimise speed controller](#). (□ 187)

5.8.4.6 Adapting the max. acceleration change (jerk limitation)



Via the max. acceleration change that can be set in [C00274](#), the change of the setpoint torque can be limited for jerk limitation. Hence, sudden torque step changes can be avoided. The entire speed characteristic is smoothed.

Parameter	Info	Lenze setting	
		Value	Unit
C00274	SC: Max. change in acceleration	400.0	%/ms

In the default setting of 400 %/ms of the max. acceleration change ([C00274](#)), jerk limitation is switched off.

The setting defines the permissible maximum torque change per ms (based on the rated motor torque).



Note!

Only activate this jerk limitation for speed-controlled applications!

5.8.5 Pole position identification without motion

This function extension is available from version 11.00.00!

From version 11.00.00 onwards, when sensorless control is active for synchronous motors (SLPSM), the rotor displacement angle is identified with every controller enable in the Lenze setting and thus a jerk in the machine after controller enable can be avoided.

The "Pole position identification without motion" is able to identify the electrical rotor displacement angle with an accuracy of up to 10°. The identification takes 1 ... 15 ms depending on the motor. The function is preset in the Lenze setting so that no further settings need to be made in the majority of cases. In order to get the same behaviour as before, the function can be deactivated in [C02874](#).

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C02874	Pole position identification	1: On	
C02872	PLI: Adaptation of time period PLI in operation	0	
C02875	PLI: Adaptation of ident angle PLI in operation	0	°
C02870	PLI: Degree of optimisation	-	%
C02871	PLI: Identification time	-	ms
C02873	PLI: Identified rotor displacement angle	-	°
Highlighted in grey = display parameter			



Note!

In case of synchronous motors with a stator time constant < 1 ms, the pole position identification is not executed since the resulting test current pulse could exceed the permissible motor current.

- This, however, only affects very few synchronous motors with very low power (e.g. Lenze motor MDSKS-020-13-300 with rated power of 40 W).
- A non-executed pole position identification can be recognised by the display [C02870](#) = 0 % and [C02871](#) = 0 ms.

- The stator time constants can be calculated based on the following formula:

$$T_s[\text{ms}] = \frac{L_{ss}[\text{mH}]}{R_s[\Omega]}$$

T_s = stator time constant

L_{ss} = Motor stator leakage inductance ([C00085](#))

R_s = Motor stator resistance ([C00084](#))

Optimising the pole position identification



Stop!

In case of a too high setting in [C02872](#), an impermissible motor current may occur during pole position identification. In this case, the "Fault" error response occurs and the "Id5: Pole position identification error" error message entered in the logbook.

In case of a considerably too high setting in [C02872](#):

- The following current monitoring functions can be triggered:
 - OC7: Motor overcurrent
 - OC11: Active clamp operation
 - OC1: Power section - short circuit
- The optimisation degree "0 %" is displayed in [C02870](#).
- The time "0 ms" is displayed in [C02871](#).



How to optimise the pole position identification without motion:

1. For optimisation, enable the controller for various rotor displacement angles.
2. After every controller enable, check the optimisation degree displayed in [C02870](#).
The pole position identification is set optimally if an optimisation degree in the range 70 ... 130 % is displayed in [C02870](#) after every controller enable.
3. When the optimisation degree is > 130 %:
Reduce the setting in [C02872](#) step by step and execute controller enable for various rotor displacement angles until an optimisation degree < 130 % is displayed.
4. When the optimisation degree is < 70 %:
Increase setting in [C02872](#) step by step and execute controller enable for various rotor displacement angles until an optimisation degree > 70 % is displayed.
5. Optionally: [C02875](#) serves to increase or reduce the identified electrical rotor displacement angle. This can prevent e.g. a reversing of the motor due to the accuracy of identification if applications require it.

5.8.6 Field weakening for synchronous motors

This function extension is available from version 11.00.00!



Note!

In the Lenze setting, the field weakening for synchronous motors is activated in [C00079/4](#).

- If a high energy efficiency is required, keep the field weakening switched off or restrict the field weakening operation via [C00938](#).

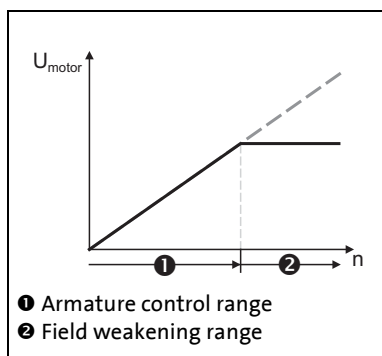


Stop!

In the field weakening operation, a current is injected into the synchronous motor even in idle state which can rise to maximum current ([C00022](#)).

Ensure that this no-load current does not cause the motor to be heated impermissibly!

- We recommend using a temperature feedback via PTC or thermal contact. ▶ [Motor temperature monitoring \(PTC\)](#) (📖 242)

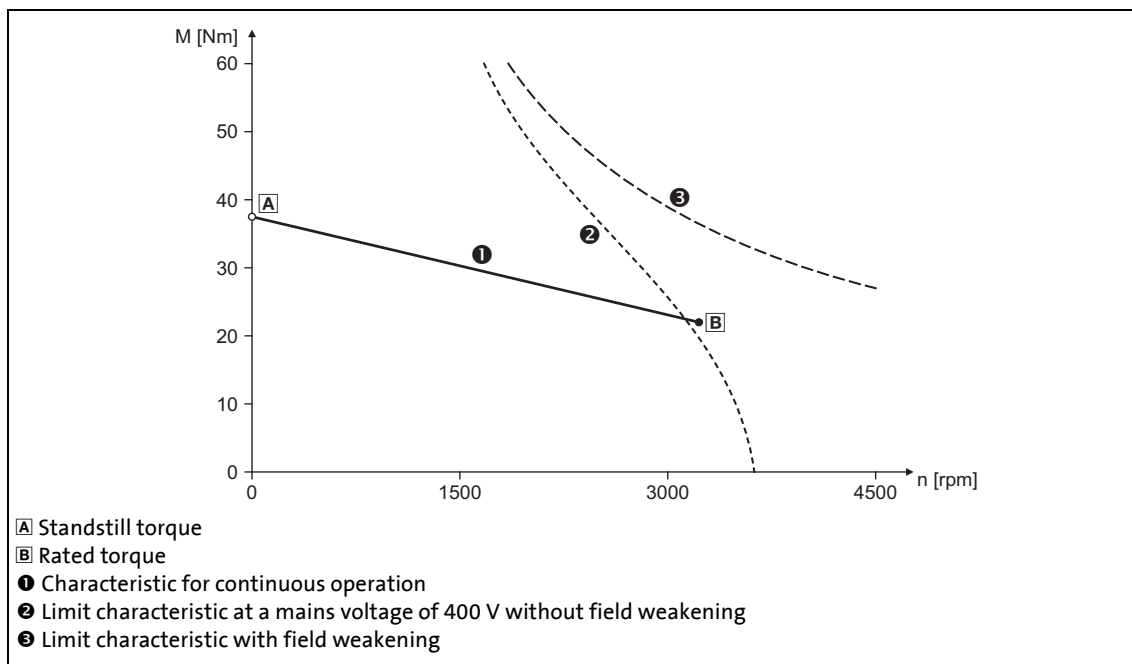


- When field weakening is switched on, the motor magnetising current is increased from 0 A to the maximally effective magnetising current via an internal control loop when the voltage limit is reached.
- As a result, a higher speed can be reached at the same motor voltage or DC-bus voltage.

[5-17] Voltage/speed characteristic with switched-on field weakening

$$n_{\max} = n_{\text{nenn\_mot}} \cdot \frac{800\text{V}}{\sqrt{2} \cdot U_{\text{nenn\_mot}}}$$

[5-18] Calculation of the maximally reachable speed with switched-on field weakening



[5-19] Speed/torque characteristics of a synchronous servo motor with field weakening

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00079/4	Field weakening	1: On	
C00938	Limitation of maximally effective field-producing motor current • With regard to rated motor current (C00088)	30	%
C00937/1	Maximally effective field-producing motor current	-	A
Highlighted in grey = display parameter			

- The maximally effective field-producing motor current is calculated based on the motor data set in [C00085](#), [C00089](#) and [C00098](#). Then, the value is internally limited to 98 % of the set maximum current ([C00022](#) or maximally permissible current for the permanent switching frequency set in [C00018](#)).
- [C00938](#) serves to limit the maximally effective field-producing motor current as well.
 - In the Lenze setting, the field weakening for synchronous motors is active ([C00079/4](#)). However, the field-producing motor current is limited via [C00938](#) to 30 % of the rated motor current ([C00088](#)). Hence, the maximum speed is limited during field weakening operation and, at the same time, the temperature rise of the motor during field weakening operation and no-load operation is also limited.
 - If a higher speed for the field weakening operation is required or the current in the field weakening operation is to be limited (e.g. since no motor temperature detection is available and/or heating in the field weakening operation is to be limited), the value must be increased or reduced accordingly in [C00938](#).

- In [C000937/1](#), the actually used maximally effective field-producing motor current is displayed.
 - With switched-on and active field weakening: 0.00 A ... -x.xx A
 - With sensorless control for synchronous motors (SLPSM), the injected current is displayed in open-loop controlled operation: 0.00 A ... +x.xx A
 - If neither field weakening nor open-loop controlled operation are active, "0.00 A" is displayed.



Note!

If a Lenze motor is used:

The controller is automatically parameterised so that field weakening operates optimally and the maximally permissible speed is monitored.



Stop!

If an OEM motor is used:

If pulse inhibit is set in the controller, the DC bus is loaded with the voltage that corresponds to the current speed of the machine.

Since with switched-on field weakening higher speeds can be achieved at a correspondingly higher rotor voltage of the motor, the DC bus can be loaded to a voltage higher than the set DC-bus voltage in case of pulse inhibit and a currently high motor speed and even exceed the maximally permissible voltage of 800 V!

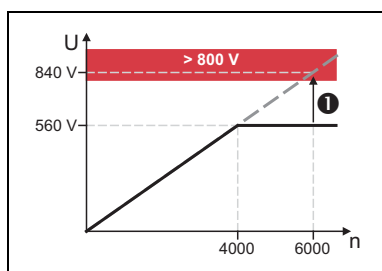
For device protection, either use a brake chopper or parameterise the motor speed monitoring via [C00965](#) in such a way that only a maximum speed is possible which would be also reachable without field weakening with a DC-bus voltage of = 800 V.

► [Motor speed monitoring](#) (📖 249)

Example: Voltage increase in the DC bus when field weakening is switched off

(For instance by an active setting of the controller inhibit or by tripping a fault or error at high motor speed.)

Field weakening	Speed n	Motor voltage peak value
Switched off	4000 rpm	560 V
	5700 rpm	800 V
	6000 rpm	840 V
Switched-on	6000 rpm	560 V



- If pulse inhibit occurs at 6000 rpm and switched-on field weakening, the DC bus is loaded to more than 800 V (❶).
- A speed limitation to 5700 rpm is required since this speed causes a DC-bus voltage of 800 V if field weakening is switched off.

[5-20] Example: Possible DC-bus voltage > 800 V if field weakening gets lost

5.9 Parameterisable additional functions

5.9.1 Selection of switching frequency

The switching frequency of the inverter that can be selected in [C00018](#) influences the smooth running performance and the noise generation in the connected motor as well as the power losses in the controller.

The lower the switching frequency the higher the concentricity factor, the smaller the losses, and the higher the noise generation.



Stop!

If operated at a switching frequency of 16 kHz, the output current of the controller must not exceed the current limit values specified in the technical data! (See chapter "Rated data" of the hardware manual.)



Note!

- Operate mid-frequency motors only at a switching frequency of 8 kHz or 16 kHz (var./drive-opt.).
- If operated at a switching frequency of 16 kHz, the Ixt evaluation ([C00064](#)) is considered including the required derating to 67 % of the rated device current at switching frequencies of 2.4 and 8 kHz.
- Ensure that the value does not fall below the permissible switching frequency,
 - if the motor is not approved for the setting switching frequency
 - or -
 - if a sinusoidal filter has been connected between the output of the inverter and the motor which is not approved for the setting switching frequency.
(see section "[Preventing a decrease of the switching frequency](#)")

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00018	Switching frequency	2: "8 kHz var./drive-opt."	
C00144	Switching frequency reduction (temp.)	1: On	
C00725	Current switching frequency	-	
C00910/1	Max. pos. output frequency	1000	Hz
C00910/2	Max. neg. output frequency	1000	Hz
C02864/1	MCTRL: Special settings 2 Option "Motor ident: Switching frequency 8 kHz" (from version 14.00.00)	0x0000 (Off)	
Highlighted in grey = display parameter			

Settable switching frequencies

Selection in C00018			
1	4 kHz var./drive-optimised	21	8 kHz var./drive-opt./4 kHz min
2	8 kHz var./drive-optimised	22	16 kHz var./drive-opt./4 kHz min
3	16 kHz var./drive-optimised	23	16 kHz var./drive-opt./8 kHz min
5	2 kHz constant/drive-optimised	31	8 kHz var./min. Pv/4 kHz min
6	4 kHz constant/drive-optimised	32	16 kHz var./min. Pv/4 kHz min
7	8 kHz constant/drive-optimised	33	16 kHz var./min. Pv/8 kHz min
8	16 kHz constant/drive-optimised	Abbreviations used: • "var.": Adaptation of the switching frequency depending on the current • "drive-opt.": drive-optimised modulation ("sine/delta modulation") • "fixed": fixed switching frequencies • "min. Pv": additional reduction of power loss	
11	4 kHz var./min. Pv		
12	8 kHz var./min. Pv		
13	16 kHz var./min. Pv		
15	2 kHz constant/min. Pv		
16	4 kHz constant/min. Pv		
17	8 kHz constant/min. Pv		
18	16 kHz constant/min. Pv		



Tip!

The Lenze setting [C00018](#) = "2: 8 kHz var.drive-opt." is the optimal value for standard applications.

Preventing a decrease of the switching frequency

The value must not fall below the permissible switching frequency if the motor is not approved for the setting switching frequency or if a sinusoidal filter is connected between the output of the inverter and the motor that is not approved for the setting switching frequency.

In order to prevent a decrease of the switching frequency, the following settings have to be made:

1. The temporary switching frequency reduction has to be activated by the setting [C00144](#) = "0: Off".
2. The switching frequency has to be set in [C00018](#) so that the value is not fallen below the permissible switching frequency.
3. If a sinusoidal filter is available, only a drive-optimised switching frequency ("drive-opt.") is permissible.

Example:

A sinusoidal filter is connected between the output of the inverter and the motor which only is to be operated with a minimum switching frequency of 8 kHz.

In this case, only the following settings in [C00018](#) are permissible:

Selection in C00018	
7	8 kHz constant/drive-optimised
8	16 kHz constant/drive-optimised
23	16 kHz var./drive-opt./8 kHz min



Note!

Switching frequency for the motor parameter identification

Up to and including version 13.xx.xx, the motor parameter identification is executed with a switching frequency of 4 kHz.

- Thus, a motor parameter identification is not permissible for the previously mentioned example as the sinusoidal filter may only be operated with a minimum switching frequency of 8 kHz!

From version 14.00.00, the motor parameter identification can also be executed with a switching frequency of 8 kHz instead of 4 kHz. For this purpose, the option "Motor ident.: Switching frequency 8 kHz" (Bit 4 = "1") has to be set in [C02864/1](#).

- With this setting, a motor parameter identification would be permissible for the previously mentioned example.

Generally, a switching frequency of 4 kHz is recommended for the motor parameter identification as it serves to obtain the most accurate results.

► [Automatic motor data identification](#) (📖 111)

Lowering the switching frequency due to high heatsink temperatures

Exceeding the maximally permissible heatsink temperature would lead to an inhibited drive due to the "Overtemperature" error and a torquelessly coasting motor. Therefore, if the Lenze setting is selected, the switching frequency is reduced to the next frequency below when the heatsink temperature has risen to 5 °C below the maximally permissible temperature. After the heatsink has cooled down, the controller automatically switches to the next frequency above until the set switching frequency is reached.

Switching frequency reduction due to high heatsink temperature can be deactivated via [C00144](#). If the switching frequency reduction is deactivated, the "oH1: Heatsink overtemperature" error message will be issued when the maximally permissible heatsink temperature is reached. An "Error" response is the result and the motor is coasting.

Parameter	Info	Lenze setting
C00144	Switching frequency reduction (temp.)	1: On

Lowering of the switching frequency depending on the output current

"Variable" switching frequencies can be selected for the controller in [C00018](#), where the controller automatically lowers the switching frequency depending on the controller output current. The modulation mode will not be changed.



The changeover thresholds are listed in the **8400 hardware manual** in the rated data. The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 controller.

When a "fixed" switching frequency is selected, no switching frequency changeover takes place. In case of fixed frequencies, the controller output current is limited to the permissible value of the corresponding switching frequency. In case of larger load impulses, the overcurrent interruption may be activated, to which the controller responds with "Error".

Limiting the maximum output frequency

The maximum output frequency ([C00910](#)) of the controller is not limited depending on the switching frequency. Therefore, adapt the maximum output frequency according to our recommendation:

$$\text{Maximum output frequency} \leq \frac{1}{8} \text{ Switching frequency}$$

- At a switching frequency of 4 kHz, for instance, 500 Hz for the maximum output frequency should not be exceeded.

Carry out further measures:

- If required, deactivate the switching frequency changeover by the heatsink temperature via [C00144](#).
- If required, ensure that the changeover threshold of the controller output current to the next switching frequency below will not be exceeded. If required, select a constant switching frequency in [C00018](#).

Operation at an ambient temperature of 45°C

The controller is designed so that operation at an ambient temperature of 45° C without derating is permissible at a switching frequency of 4 kHz.

5.9.2 Operation with increased rated power

Under the operating conditions described here and under continuous operation, the controller can be operated with a higher power motor (increased rated power). The remaining overload capacity of the drive system (for 60 s/3 s) is reduced accordingly to approx. 120 %/160 %.

Typical applications stand out due to low dynamic requirements, e.g. pumps and fans, general horizontal materials handling technology and line drives.



The controllers which can be operated at an increased rated power are listed in the **8400 hardware manual** in the rated data. The hardware manual is stored in electronic form on the data carrier which is supplied with the 8400 controller.



Stop!

Operation at increased rated power is only permitted ...

- with the controllers listed in the **8400 hardware manual** for this type of operation in the stated mains voltage range.
- at switching frequencies of 2 kHz and 4 kHz.
- at a max. ambient temperature of 40 °C.
- with the types of installation stated in the **8400 hardware manual**.
- with the fuses, cable cross-sections, mains chokes, and filters as required in the **8400 hardware manual** for this operation.
- after parameterisation according to the specifications below.

Required parameterisation

Operation at increased rated power requires the following settings to be made particularly for the V/f characteristic control (VFCplus), but also for all other types of control:

Parameter	Info	Required setting
C00016	VFC: Vmin boost	adapt to motor (reduce)
C00018	Switching frequency	1: 4 kHz var./drive-opt.
C00021	Slip compensation	adapt to motor
C00120	Setting of motor overload (I _{xt})	adapt to motor
C00123	Device utilisat. threshold (I _{xt})	120 %
C00173	Mains voltage	see hardware manual → Rated data

All other types of control require the following settings in addition:

Parameter	Info	Required setting
C00022	I _{max} in motor mode	higher than rated motor current (max. 160 % rated motor current)
C00081	Rated motor power	adapt motor data (see motor nameplate), then carry out identification run ▶ Automatic motor data identification (📖 111)
C00087	Rated motor speed	
C00088	Rated motor current	
C00089	Rated motor frequency	
C00090	Rated motor voltage	
C00091	Motor cos φ	

5.9.3 Flying restart function

The flying restart circuit for asynchronous motors uses a simple motor model which requires knowledge of the motor stator resistance R_S and the rated motor current.



Note!

- Currently, the flying restart circuit is only available for asynchronous motors. (A flying restart circuit for synchronous motors is in preparation.)
- For a correct functioning of the flying restart circuit, we recommend to perform a parameter identification first. ▶ [Automatic motor data identification](#) (📖 111)
- The flying restart function works safely and reliably for drives with great centrifugal masses.
- Do not use the flying restart function if several motors with different centrifugal masses are connected to a controller.
- After the controller is enabled, the motor can start for a short time or reverse when machines with low friction and low mass inertia are used.
- The flying restart function serves to identify max. field frequencies up to ± 200 Hz.
- When power-adapted standard asynchronous motors are used (rated motor power approximately corresponds to the rated inverter power), a motor parameter identification is not required.
- On drive systems with feedback, you do not need to use the flying restart function because the synchronisation to the speed detected by the feedback is always carried out in a jerk-free manner.
- Especially in case of very high power, very high mass inertia and a mains voltage higher than 440 V, an overvoltage in the DC bus may be caused temporarily. Using a brake resistor may avoid this behaviour.
 - From version 15.00.00, frequency can be set as a remedy in [C00989](#) which is added to the found flying restart frequency. Here, the setting in [C00989](#) has to be increased in small steps up to double the slip frequency until the behaviour does not occur anymore.



Tip!

In association with the flying restart function, we recommend information provided in this documentation on the following topic:

▶ [Automatic DC-injection braking \(Auto-DCB\)](#) (📖 212)

General information

This function serves to activate a mode which is used to "catch" a coasting motor during operation without speed feedback. This means that the synchronicity between controller and motor is to be adjusted in such a way that a jerk-free transition to the rotating machines is achieved in the instant of connection.

The drive controller determines the synchronicity by identifying the synchronous field frequency.

Duration

The "catching" process is completed after approx. 0.5 ... 1.5 seconds. The duration is influenced by the starting value. If the field frequency is not known, we recommend a fixed starting value of 10 Hz (or -10 Hz with systems rotating in negative direction).

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00989	Restart on the fly: Flying restart frequency f_{d_add} (from version 15.00.00)	0.00	Hz
C00990	Flying restart fct.: Activate	Off	
C00991	Flying restart fct.: Process	-n...+n Start: +10 Hz	
C00992	Flying restart fct.: Start frequency	5	Hz
C00993	Flying restart fct.: Int. time	300	ms
C00994	Flying restart fct.: Current	25.00	%



How to parameterise the flying restart function:

1. Activate the flying restart circuit by selecting "1: On" in [C00990](#).
 - Every time the controller is enabled, a synchronisation to the rotating or standing drive is carried out.

When the Lenze setting is used, most applications do not require additional controller settings.

If additional settings are necessary, proceed as follows:

2. Define the process and hence the speed range/rotational frequency range in [C00991](#) which is to be examined by the flying restart circuit:
 - positive speed range ($n \geq 0$ rpm)
 - negative speed range ($n \leq 0$ rpm)
 - total speed range
3. Define the starting frequency.

The starting frequency which defines the starting point of the flying restart function is 10 or -10 Hz for processes 0 ... 3 and has been pre-optimised for standard motors.

If process 4 is selected in [C00991](#), an arbitrary starting frequency can be defined via [C00992](#). This is especially recommended for motors with higher rated frequencies.

- We recommend to define a starting frequency of approximately 20 % of the rated motor frequency to enable a safe and fast connection to standing drive systems.
- For systems with a known search speed (e.g. torque-controlled drive systems which are to synchronise to a defined speed) the starting value can be adapted to reduce the flying restart time.

4. Set the flying restart current in [C00994](#).

We recommend setting a flying restart current of 10 % ... 25 % of the rated motor current.

- During a flying restart process, a current is injected into the motor to identify the speed.
- Reducing the current causes a reduction of the motor torque during the flying restart process. A short-time starting action or reversing of the motor is prevented with low flying restart currents.
- An increase of the current improves the robustness of the flying restart function.
- At too high mass inertias and high speeds at the same time, the flying restart circuit may cause an overvoltage in the DC bus ("oU") if no brake resistor is connected. In this case, reduce the flying restart current.



Tip!

Use of motors with higher rated frequencies

For trouble-free operation, we recommend to manually enter a starting frequency of 20 % of the rated motor frequency in [C00992](#) as well as to accelerate the flying restart process (see above) and to use a lower flying restart current (10 % of the rated motor current) if motors with higher rated frequencies are used.

Optimisation of the flying restart time

From version 05.00.00 onwards, the duration of the flying restart process can be influenced via the setting of the integration time ([C00993](#)). A reduction of the integration time causes the flying restart function to accelerate and thus a reduced flying restart time.

- We recommend not to change the Lenze setting of the integration time.
- When special motor are used (e.g. multi-pole motors or ASM servo motors), a reduced integration time may improve the flying restart behaviour.

Optimising the current controller if the behaviour is unstable

During the execution of flying restart function, peak currents/torques are avoided by controlling the current amplitude.

Gain ([C00075](#)) and reset time ([C00076](#)) of the current controller can be adapted to improve the jerk-free/torque-free connection of the inverter to the supply of the rotating motor.

- We recommend not to change the Lenze setting of the current controller.
- If the behaviour of the current controller is unstable, gain and reset time can be calculated as per the following formulae:

$$V_p = \frac{L_{ss}[H]}{T_E[s]}$$

$$T_i = \frac{L_{ss}[H]}{R_s[\Omega]}$$

V_p = Current controller gain ([C00075](#))

T_i = Current controller reset time ([C00076](#))

L_{ss} = Motor stator leakage inductance ([C00085](#))

R_s = Motor stator resistance ([C00084](#))

T_E = Equivalent time constant (= 500 μ s)

[5-21] Formulae for the calculation of the gain and reset time of the current controller

5.9.4 DC-injection braking



Note!

The DC-injection braking function (manually or automatically) is only possible for the following motor control modes:

- [V/f characteristic control \(VFCplus\)](#) (☐ 126)
- [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (☐ 144)
- [V/f control \(VFCplus + encoder\)](#) (☐ 154)
- [Sensorless vector control \(SLVC\)](#) (☐ 161)



Danger!

Holding braking is not possible when this braking mode is used!

For low-wear control of a holding brake, use the basic function "[Holding brake control](#)". (☐ 402)

DC-injection braking allows the drive to be quickly braked to a standstill without the need to use an external brake resistor.

- The braking current is set in [C00036](#).
- The maximum braking torque to be generated by the DC braking current is approx. 20 ... 30 % of the rated motor torque. It is lower than that for braking in generator mode with an external brake resistor.
- The DC-injection braking can be activated manually via a control input of the application or automatically ("Auto-DCB"). The two different modes are described in the following subchapters.



Tip!

DC-injection braking has the advantage that it is possible to influence the braking time by changing the motor current or the braking torque..

The automatic DC-injection braking (Auto-DCB) improves the starting performance of the motor in case of V/f operation without speed feedback.

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00019	Auto-DCB: Threshold • Operating threshold for activating DC-injection braking	3	rpm
C00036	DC braking: Current • Braking current in [%] based on rated device current (C00098)	50	%
C00106	Auto-DCB: Hold time	0.500	s
C00107	DC braking: Hold time • When "999.000 s" is set, the hold time is infinite.	999.000	s

5.9.4.1 Manual DC-injection braking (DCB)

DC-injection braking can be activated manually for the two technology applications "speed actuating drive" and "switch-off positioning" by connecting the *bSetDCBrake* input of the [LA_NCtrl](#) or [LA_SwitchPos](#) application block to a digital signal source (e.g. via a digital signal source *bCtrl1_B3* of the [LP_CanIn1](#) port block).

- For HIGH-active inputs, DC-injection braking is active as long as the signal is at HIGH level.
- After the hold time ([C00107](#)) has expired, the controller set the pulse inhibit.

Short overview of the relevant configuration parameters:

Parameter	Info	Lenze setting
C00701/4	LA_NCtrl : <i>bSetDCBrake</i> • "Speed actuating drive" application: Selection of the signal source for manually activating DC-injection braking.	Dependent on the selected control mode
C00761/4	LA_SwitchPos : <i>bSetDCBrake</i> • "Switch-off positioning" application: Selection of the signal source for manually activating DC-injection braking.	Dependent on the selected control mode

5.9.4.2 Automatic DC-injection braking (Auto-DCB)

"Automatic DC-injection braking" (referred to in the following as "auto DCB") can be used if there is a requirement that the drive be isolated from the supply at $n \approx 0$.

**Note!**

Deactivate automatic DC-injection braking when a holding brake is used!

- For this purpose, go to [C00019](#) and set the auto DCB threshold to "0".
- Background: Controller inhibit is already activated by the [Holding brake control](#).
([□ 402](#))

Function

For understanding the auto DCB function, it is necessary to distinguish between three different types of operation:

- The drive has been enabled and, in the course of operation, the speed setpoint falls below the auto DCB threshold.
 - In case of V/f operation without speed feedback, a braking current ([C00036](#)) is injected. After the auto DCB hold time ([C00106](#)) has expired, the motor is deenergised via the auto DCB function, i.e. pulse inhibit is set.
 - In case of V/f operation with speed feedback, the motor is deenergised via the auto DCB function after the auto DCB hold time ([C00106](#)) has expired, i.e. pulse inhibit is set. The braking current which can be parameterised in [C00036](#) does not have any effect during operation with speed feedback.
- When the controller is enabled, the drive is at standstill ($n = 0$).
 If the enabled drive is to start, the speed setpoint passed via the acceleration ramp must exceed the auto DCB threshold ([C00019](#)). Below this threshold, the motor will not be energised.

C. When the controller is enabled, the motor (still) rotates at a speed which is above the auto DCB threshold. If the speed setpoint reached via the acceleration ramp exceeds the auto DCB threshold ([C00019](#)), the motor will be energised and the following action will take place:

- During V/f operation without speed feedback, the drive is "caught". ▶ [Flying restart function](#) ([□ 208](#))
- During V/f operation with speed feedback, the drive synchronises to the current actual speed value.



Tip!

We recommend to deactivate the auto DCB function during V/f operation with speed feedback via a setting of [C00019](#) = 0.

Auto DCB function during V/f operation with speed feedback



Stop!

If the DC-injection braking operation is too long and the braking current or braking voltage is too high, the connected motor may overheat!

If you want to use the auto DCB function contrary to our recommendation (see above), the auto DCB threshold must not fall below the following values depending on the number of encoder increments:

Number of encoder increments (C00420)	Auto-DCB threshold (C00019)
8	16
16	8
32	4
64	2
> 128	No restrictions

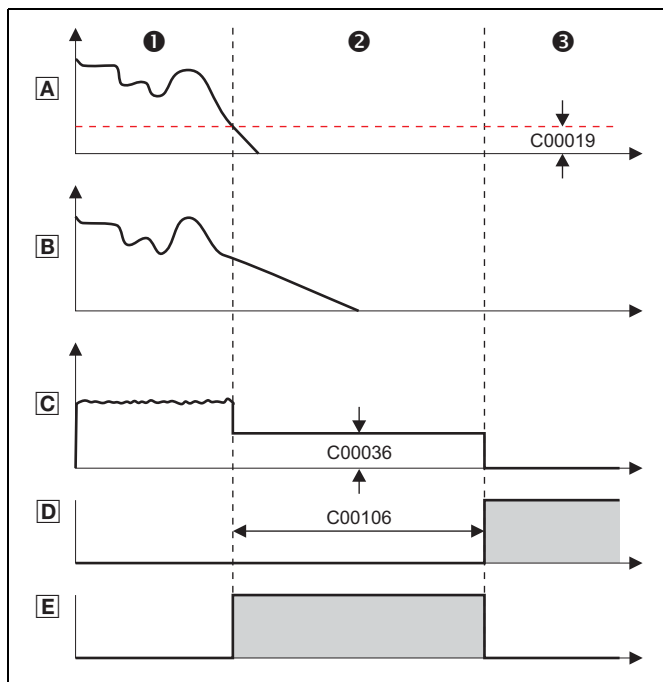
Setting the auto-DCB function



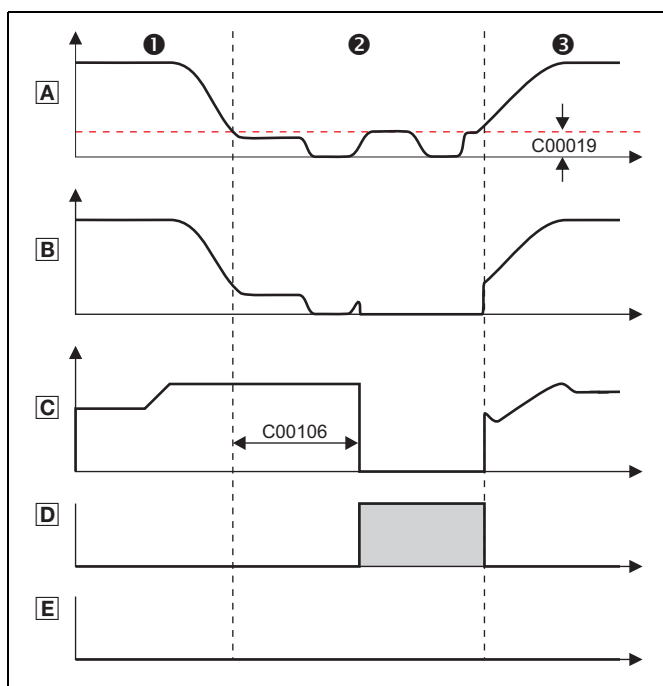
How to set the automatic DC-injection braking:

1. Set a hold time in [C00106](#) > 0 s.
 - Automatic DC-injection braking is active for the time set.
 - In case of V/f operation without speed feedback, the braking set in [C00036](#) is injected.
 - After the set hold time has expired, the controller sets pulse inhibit.
2. Set the operating threshold in [C00019](#).
 - The operating threshold can serve to set a dead band in the setpoint. If DC-injection braking is not to be active then, [C00106](#) must be set to a value of "0".

Explanation of the automatic DC-injection braking function by means of two examples



[5-22] Example 1: Auto-GSB signal characteristic during V/f operation without speed feedback



[5-23] Example 2: Auto-GSB signal characteristic during V/f operation with speed feedback

- ❶ The motor rotates at a specified speed. The current adjusts itself to the load, see [C](#).
- ❷ The DC braking current set in [C00036](#) is injected.
- ❸ After the hold time ([C00106](#)) has expired, a pulse inhibit is set.

- [A](#) Speed setpoint
- [B](#) Actual speed value of the motor
- [C](#) Controller output current
- [D](#) Disable voltage
- [E](#) DC-injection braking is active

- ❶ The motor rotates at a specified speed. The current adjusts itself to the load, see [C](#).
- ❷ The current sets itself load-dependent until the hold time ([C00106](#)) has expired.
- ❸ The actual speed value of the motor follows the speed setpoint. The resulting current depends on the load.

- [A](#) Speed setpoint
- [B](#) Actual speed value of the motor
- [C](#) Controller output current
- [D](#) Disable voltage
- [E](#) DC-injection braking is active

5.9.5 Slip compensation

**Note!**

Slip compensation is only active with the following motor control modes:

- [V/f characteristic control \(VFCplus\)](#) (□ 126)
- [Sensorless vector control \(SLVC\)](#) (□ 161)

Under load, the speed of an asynchronous motor decreases. This load-dependent speed drop is called slip. The slip can partly be compensated for by the setting in [C00021](#).

Parameter	Info	Lenze setting	
		Value	Unit
C00021	Slip compensation	2.11	%

- The setting of [C00021](#) can be done automatically in the course of motor parameter identification. ▶ [Automatic motor data identification](#) (□ 111)
- The setting must be made manually if the motor parameter identification cannot be called up.

**How to set the slip compensation manually:**

1. Set rated motor current ([C00088](#)) and rated motor frequency ([C00089](#)).
2. Calculate the slip compensation according to motor nameplate data:

$$s = \frac{n_{rsyn} - n_r}{n_{rsyn}} \cdot 100\%$$

$$n_{rsyn} = \frac{f_r \cdot 60}{p}$$

- s Slip constant ([C00021](#)) [%]
- n_{rsyn} Synchronous motor speed [rpm]
- n_r Rated motor speed according to the motor nameplate [rpm]
- f_r Rated motor frequency according to the motor nameplate [Hz]
- p Number of motor pole pairs (1, 2, 3 ...)

3. Transfer the calculated slip constant s to [C00021](#).
4. Correct the setting in [C00021](#) while the drive is running until the load-dependent speed drop does not occur anymore between idling and maximum load of the motor in the desired speed range.

**Tip!**

The following guide value applies to a correctly set slip compensation:

- Deviation from the rated motor speed $\leq 1\%$ for the speed range of 10 % ... 100 % of the rated motor speed and loads $\leq$ rated motor torque.
- Greater deviations are possible in the field weakening range.
- If [C00021](#) is set too high, the drive may get unstable.
- Negative slip ([C00021](#) < 0) with V/f characteristic control results in "smoother" drive behaviour at heavy load impulses or applications requiring a significant speed drop under load.

5.9.6 Oscillation damping

Mechanical oscillations are undesirable effects in every process and they may have an adverse effect on the single system components and/or the production output.

Mechanical oscillations in the form of speed oscillations are suppressed by the oscillation damping function.

Mechanical oscillations may occur:

- In the voltage range (output voltage is lower than max. voltage)
 - Here, the oscillations occur in no-load operation.
 - Here, speeds of 40 ... 80 % of the rated speed are typical.
 - See subchapter "[Oscillation damping voltage range](#)". (📖 217)
- In the field weakening range (output voltage has reached maximum voltage)
 - Here, the oscillations occur in no-load operation and with load.
 - Here, speeds higher than the rated speed are typical, especially when the output frequency is close to the mains frequency.
 - See subchapter "[Oscillation damping in the field weakening range](#)". (📖 218)

5.9.6.1 Oscillation damping voltage range

The oscillation damping voltage range is successfully used with

- unloaded motors (no-load oscillations)
- motors whose rated power deviates from the rated power of the controller.
 - e.g. during operation at high switching frequency including the power derating involved.
- operation with higher-pole motors
- operation with special motors
- compensation of resonance in the drive
 - At an output frequency of approx. 20 ... 40 Hz, some asynchronous motors can show resonance which causes current and speed variations and thus destabilise the running operation.

Parameter	Info	Lenze setting	
		Value	Unit
C00234	Oscillation damping influence	5.00	%
C00235	Oscillation damping filter time	32	ms



Note!

Compensate the resonance during operation with feedback (closed loop, feedback of n_{act}) via the parameters of the slip regulator.

► [Parameterising the slip regulator](#) (158)



How to eliminate speed oscillations in no-load operation at speeds with 40 ... 80 % of the rated speed:

1. Approach the area where the speed oscillations occur.
2. Reduce the speed oscillations by changing [C00234](#) step by step (increment 1 %).
 - The filter time oscillation damping ([C00235](#)) should not be changed.
3. These can be indicators for smooth running:
 - Constant motor current characteristic
 - Reduction of the mechanical oscillations in the bearing seat

5.9.6.2 Oscillation damping in the field weakening range

When the max. possible output voltage (full modulation) has been reached, a voltage dip in the DC bus causes a voltage fluctuation in the motor. With load and during no-load operation this voltage fluctuation can cause mechanical oscillations.

The "oscillation damping field weakening" adjustable in [C00236](#) serves to limit the maximum output voltage. This can be used to always compensate voltage dips in the DC bus to the output voltage (constant output voltage). This serves to prevent mechanical oscillations due to these voltage dips.

Parameter	Info	Lenze setting	
		Value	Unit
C00236	Oscillation damping field weakening • Setting "0" ≡ 100 % output voltage can be reached	14	

- With the Lenze setting of [C00236](#) the limitation of the output voltage is set so that voltage dips in the DC bus in the output voltage for the single-phase and three-phase devices can largely be compensated so that no speed oscillations may be expected. Thus, an adaptation of [C00236](#) is not required in the majority of cases.
- Maximum output voltage to be reached with Lenze setting of [C00236](#):
 - Single-phase devices: 98.2 %
 - Three-phase devices: 99.7 %



Note!

The limitation of the output voltage via [C00236](#) in the extreme field weakening range (high speeds) causes a reduction of the max. possible output torque (stalling torque).

- If the output torque to be reached in the extreme field weakening range is not sufficient (motor is stalling too early), reduce the setting in [C00236](#).



How to eliminate speed oscillations in the field weakening range:

1. Approach the area where the speed oscillations occur.
2. Reduce the speed oscillations by changing [C00236](#) step by step (increment 1).
3. These can be indicators for smooth running:
 - Constant motor current characteristic
 - Reduction of the mechanical oscillations in the bearing seat

5.9.7 Phase sequence reversal for correcting misconnected UVW motor phases

This function extension is only available from version 04.00.00!



Note!

Up to and including version 11.00.00, this function may only be activated for the following motor control types:

- [V/f characteristic control \(VFCplus\)](#) (□ 126)
- [V/f characteristic control - energy-saving \(VFCplusEco\)](#) (□ 144)

For all other motor control types, this function must not be activated because the set control mode would not work in that case!

From version 12.00.00, this function may be activated for all motor control types with the exception of the ones for synchronous motor.

The activation of this function does not affect the control types for synchronous motor since these control types require an in-phase connection of the synchronous motor.

If the motor phases are misconnected at the inverter output (e.g. phase u takes the place of phase v), the motor will rotate in the wrong direction.

To correct such misconnected motor phases, the rotating field of the controller's output can be reversed by selecting "1: Inverted" in [C00905](#). In this case, a phase will be reversed at the output of the inverter.

This function does not have any effect on setpoints and actual values, i.e. the polarity of the speed setpoint/actual speed value, actual torque, output frequency, and AngleOffset do not change.



Tip!

Cases of application for this function:

- Phase sequence reversal in case of misconnected motor phases.
- Setting of the correctly signed direction of rotation for inversely mounted motors.

5.10 Encoder/feedback system

For motor control with speed feedback, the feedback signal can be fed to the digital terminals (DI1/DI2) via an HTL encoder.



Danger!

- To avoid interference when using an encoder, only use shielded motor and encoder cables.
- If an HTL encoder is used at the digital input terminals:
Observe the maximum input frequencies of the digital inputs!
 - DI1/DI2: max. 10 kHz

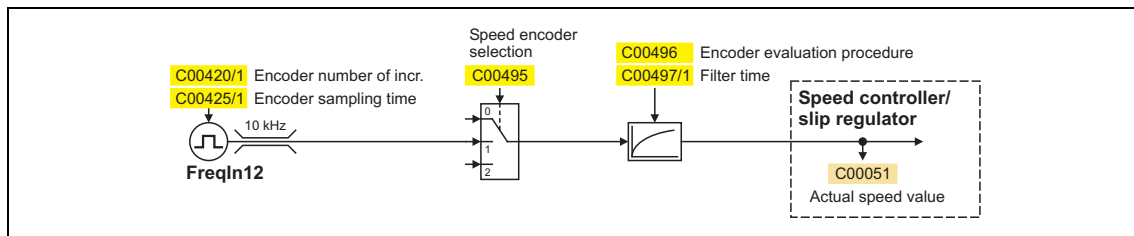


Note!

In the Lenze setting (e.g. when the device is delivered), the open-circuit monitoring of the encoder is activated. ▶ [Encoder open-circuit monitoring](#) (□ 250)



Wiring diagram, assignment and electrical data of the digital input terminals can be found in the **hardware manual 8400** in the chapter "technical data". The hardware manual is stored in electronic form on the data carrier supplied with the 8400 controller.

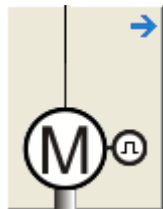


[5-24] Signal flow - encoder interface



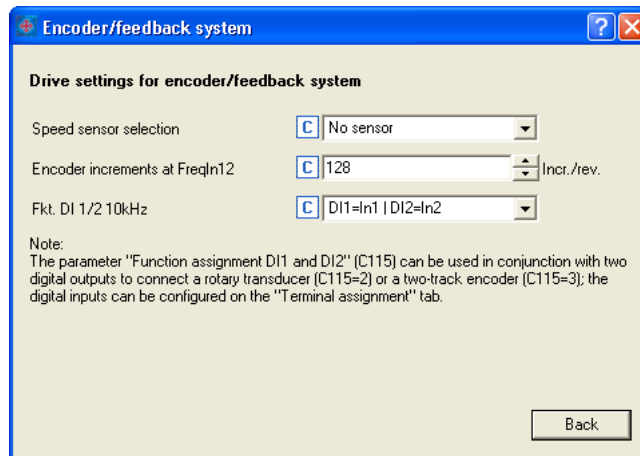
How to get to the parameterisation dialog of the encoder/feedback system:

1. »Engineer« Go to the *Project view* and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the following button:



4. Go to the *Overview* → *Motor data* dialog level and click the **Encoder/Feedback system...** button.

Parameterisation dialog in the »Engineer«



Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
Encoder selection / General settings			
C00495	Speed sensor selection Source of feedback signal for speed control.	0: No sensor	
C00490	Position encoder selection - From version 12.00.00 - Selection of the speed signal, the <i>dnMotorPosAct_p</i> position signal is derived from.	0: no sensor: nSpeedSetValue_a	
Settings for HTL encoder at DI1/DI2			
C00115/1	Fkt. DI 1/2 10kHz Function of the digital inputs DI1 and DI2	0: DI1=In1 DI2=In2	
C00420/1	FreqIn12: Encoder increment If the digital inputs DI1 and DI2 are used as encoder inputs.	128	Inc/rev.
C00425/1	FreqIn12: Encoder scanning time If the digital inputs DI1 and DI2 are used as encoder inputs.	10	ms
C00497/1	FreqIn12: Encoder filter time If the digital inputs DI1 and DI2 are used as encoder inputs.	1.0	ms
C00496	► Encoder evaluation method DigIn12 (📖 224)	1: Low-resolution encoder (StateLine)	
C00055/1	Actual value - HTL encoder FreqIn12	-	rpm
Monitoring			
C00586	Resp. to encoder open circuit HTL Encoder open-circuit monitoring (📖 250)	1: Fault	
Highlighted in grey = display parameter			

General procedure

(if the encoder is connected to the digital inputs DI1 and DI2)

1. Define the function of the digital inputs DI1 and DI2 in [C00115/1](#).
2. Set the encoder increments in [C00420/1](#).
3. Select "1: Encoder signal FreqIn12" in [C00495](#).
4. Adapt the filter time of the speed measurement in [C00497/1](#).

5.10.1 Parameterising digital inputs as encoder inputs

Define the function of the digital inputs DI1 and DI2 in [C00115/1](#).

To be able to use the digital inputs as encoder inputs, select 2, 3, or 4 (Lenze recommendation: 2) in [C00115/](#) depending on the input terminals used.

Selection in C00115/1	Function
2: (DI1/DI2)=FreqIn12 (2-track)	DI1 and DI2 = 2-track frequency input • Permits a two-track evaluation of the encoder including correct detection of the direction of rotation.
3: (DI1/DI2=+-)=FreqIn12	DI1 = 1-track frequency input DI2 = specification of direction
4: DI1=CountIn1 DI2=In2	DI1 = counter input DI2 = digital input



Danger!

For single-track evaluation, make sure that the sign is correctly specified. Otherwise, the motor may overspeed.



Note!

If the digital inputs are parameterised as encoder inputs, the corresponding output signals (*bIn1/bIn2*) at the [LS_DigitalInput](#) system block are automatically set to FALSE.



The wiring diagram and assignment of the input terminals are described in the **8400 hardware manual**. The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 controller.

Related topics:

- ▶ [Digital terminals](#) (📖 261)
- ▶ [Using DI1 and DI2 as frequency inputs](#) (📖 266)

5.10.2 Generation of the actual speed value

Up to and including version 11.xx.xx the following applies:

- For motor control types without speed feedback ([C00495](#) = "0: No encoder") a speed-proportional unit is taken for calculating the *nMotorSpeedAct_v* speed signal. This derivation, however, is very imprecise so that in case of applications with synchronous motors without speed feedback it is not possible to calculate the current position from the current *nMotorSpeedAct_v* speed signal.
- The *dnMotorPosAct_p* position signal is always derived from the *nSpeedSetValue_a* speed setpoint. This derivation, however, is very imprecise since in this case, speed limitations (e.g. by overcurrent limitations) are not considered.

From version 12.00.00 the following applies:

- For applications with synchronous motors without speed feedback, an *nMotorSpeedAct_v* error-free speed signal is available. This is calculated from the electrical output angle considering the number of pole pairs of the *nMotorSpeedAct_v* speed signal.
- When synchronous or reluctance motors without feedback are used in the motor control types [V/f characteristic control \(VFCplus\)](#) and [Sensorless control for synchronous motors \(SLPSM\)](#), the *nMotorSpeedAct_v* speed signal can be used to create an error-free position signal via a control if the *nMotorSpeedAct_v* signal is read out by the control in a 1 ms cycle.
- The speed signal for deriving the *dnMotorPosAct_p* position signal can now be selected in [C00490](#). In the Lenze setting, the position signal is continued to be derived from the *nSpeedSetValue_a* speed setpoint. If, however, "10: No encoder: C495 or nMotorSpeedSetAct_v" is selected, the position signal is either calculated from the set speed feedback (if [C00495](#) > 0) or from the *nMotorSpeedAct_v* speed signal (if [C00495](#) = 0).
 - For all motor control types without speed feedback, this selection serves to improve the creation of the *dnMotorPosAct_p* position signal.
 - When synchronous or reluctance motors without feedback are used, the *dnMotorPosAct_p* position signal can be created correctly.
 - In case of the motor control types with speed feedback, the *dnMotorPosAct_p* position signal is directly created from the speed feedback signal.

5.10.3 HTL encoder at DI1/DI2

**Note!**

At the digital terminals DI1 and DI2, only encoders with HTL level can be used.

In spite of the selected operating mode without encoder feedback, the actual speed value ([C00051](#)) is calculated if an encoder is connected and "1: Encoder signal FrqIn12" is selected in [C00495](#).

Encoder evaluation method DigIn12

Depending on the encoder used at the digital terminals DI1 and DI2, the following table specifies which evaluation method should be selected in [C00496](#):

Selection in C00496	Encoder evaluation method
1: Low-resolution encoder (Lenze setting)	High-precision procedure for low-resolution encoders (≤ 128 increments) • Exact method for speed measurement with automatic scanning time setting (0.5 ... 500 ms) for low-resolution encoders in the range of 4 ... 128 increments. • Evaluation with automatic scanning time minimisation for an optimum dynamic performance. • Method is also suited for encoders with poor signal quality, e.g. for encoders with high error rate in scanning ratio and phase offset. • This method requires an equidistant period length per encoder increment. • Wiring according to EMC (e.g. motor and encoder cable shielding) is required!
3: Edge-counting procedure	Simple edge counting procedure with adjustable scanning time (C00425) • Speed measurement by means of the edges of tracks A and B measured per scanning interval. • Integrated correction algorithm for EMC interference. • Limited suitability for systems with unshielded encoder and/or motor cable. • Limited suitability for encoders with poor signal quality, i.e. high error rate in scanning ratio and phase offset.

**Tip!**

We recommend the use of the preset procedure for low-resolution encoders ([C00496](#) = 1). This procedure can also be used for dynamic applications (e.g. V/f + encoder).

Low speeds (except for edge counting)

For the first method ([C00496](#) = 1), the minimum speed that can be measured depends on the encoder resolution.

The quantisation error

- is independent of the encoder resolution,
- exclusively depends on the encoder quality (encoder errors).
- at least amounts to 0.5 rpm.

Internal arithmetic operations automatically maintain the minimally required value of the scanning time in order to achieve maximum dynamics.

Encoder resolution (Number of increments)	Min. measurable speed in [rpm]
8	16
16	8
32	4
64	2
128	1
256	0.5

Low speeds with edge counting

The minimum speed that can be measured and the quantisation error of speed measurement in the edge-counting procedure ([C00496](#) = 3) depend on the scanning time that can be set in [C00425/1](#) and the encoder resolution.

Depending on accuracy and the requirements with regard to the dynamic performance, the respective scanning time must be selected and set in [C00425/1](#):

Encoder resolution (Number of increments)	Scanning time [ms]									
	1	2	5	10	20	50	100	200	500	1000
	Min. measurable speed in [rpm]									
8	1875	938	375	188	93.8	37.5	18.8	9.4	3.8	1.9
16	938	469	188	94	46.9	18.8	9.4	4.7	1.9	0.9
32	469	234	94	46.9	23.4	9.4	4.7	2.3	0.9	0.5
64	234	117	46.9	23.4	11.7	4.7	2.3	1.2	0.5	0.2
128	117	58.6	23.4	11.7	5.9	2.3	1.2	0.6	0.2	0.12
256	58.6	29.3	11.7	5.9	2.9	1.2	0.6	0.3	0.12	0.06

5.11 Braking operation/brake energy management

When braking electrical motors, the kinetic energy of the drive train is fed back regeneratively to the DC bus. This energy results in a boost of the DC-bus voltage.

- Several different strategies can serve to avoid DC-bus overvoltages:
 - Use of a brake resistor
 - Stopping of the ramp function generator if brake chopper threshold exceeded (RFG_Stop)
 - Use of the "inverter motor brake" function ([from version 04.00.00](#))
 - Combination of the above named options
- In the case of inverters with a 3-phase supply, the following is also possible:
 - Coupling of the inverters in a DC-bus connection
 - Recovery of regenerative energy with a regenerative module



Stop!

If the connected brake resistor is smaller than required, the brake chopper can be destroyed!

- Appropriate protective measures are described in subchapter "[Avoiding thermal overload of the brake resistor](#)". (📖 234)

If no brake resistor or regenerative module is used, the overvoltage switch-off ("oU") may respond, e.g. in case of short deceleration times during feedback operation. ▶ [Error messages of the operating system](#) (📖 444)

Using the integrated brake chopper

We recommend to use the brake chopper (brake transistor) which is integrated into the controller for the braking operation, regardless of the selected motor mode.

- Connect the required brake resistor to the R_{B1} and R_{B2} terminals of the controller.
- In [C00175](#), a ramp function generator stop (FB [L_NSet 1](#)) can be set for instances when the brake resistor is controlled. This prevents overvoltage deactivation in the case of short deceleration times. ▶ [Selecting the response to an increase of the DC-bus voltage](#) (📖 229)



Note!

The brake transistor will be switched off if it remains switched on for a period of 4 seconds.

- If the DC-bus voltage falls under the brake chopper threshold for a short time again, the brake transistor can switch on again for a maximum of 4 seconds, without interruption.
- This protective function is used to prevent the brake chopper from being switched on permanently due to e.g. too high voltages at all times or incorrect interconnection of the *bBrakeChopperOn* signal (from version V12.00.00).
- From version 14.00.00, the limitation of the operating time can be deactivated to max. 4 seconds. For this purpose, set bit 1 to "1" in [C02864/1](#).

The integrated brake chopper is always triggered via the DC-bus voltage with exceedance of the "voltage threshold for braking operation" independent of the device status.

From version 14.00.00, the brake chopper can also be switched off at pulse inhibit or when the "Fault" device status is activated.

- For a switch-off at pulse inhibit, set bit 7 to "1" in [C02865/1](#).
- For a switch-off in the "Fault" device status, set bit 2 to "1" in [C02864/1](#).

DC-bus system

For a DC-bus connection with other devices, we recommend to connect the regenerative power supply module to terminals +UG and –UG.



Note!

DC-bus system without the use of a regenerative module:

- Up to and including version V11.xx.xx, only one internal brake chopper can be used in the DC-bus system to dissipate regenerative energy.
- From version V12.00.00, all internal brake choppers can be used in the DC-bus system to dissipate regenerative energy ("Master-slave operation"). ▶ [Control of multiple internal brake choppers in the DC-bus system](#) (📖 234)

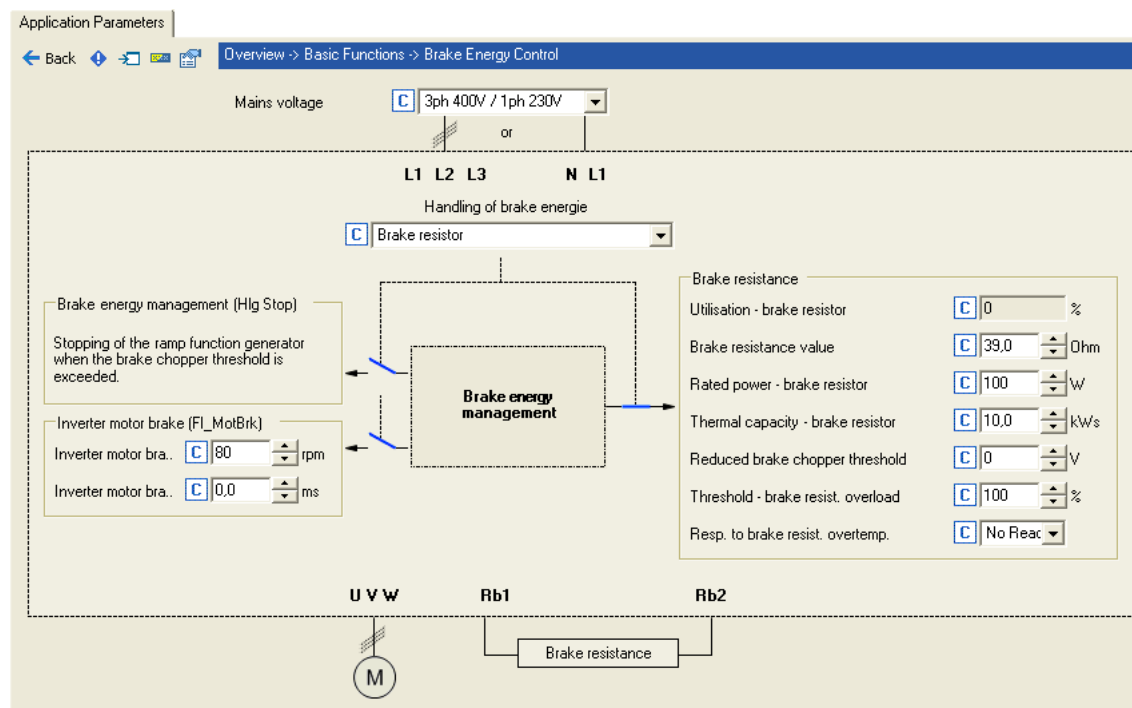


In order to install the regenerative module, follow the notes in the **8400 hardware manual**. The hardware manual has been stored in electronic form on the data carrier supplied with the 8400 controller.



Proceed as follows to open the dialog for parameterising the brake energy management:

1. »Engineer« Go to the *Project* view and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "basic functions" button.
4. Go to the *Overview* → *basic functions* dialog box and click the **Brake energy management** button.



Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00173	Mains voltage	3ph 400 V / 1ph 230 V	
C00175	Brake energy management	R_Brake (brake resistance)	
Brake resistor			
C00133	Brake resistor utilisation	-	%
C00129	Brake resistance value	39.0	Ohm
C00130	Rated brake resistor power	100	W
C00131	Thermal capacity - brake resistor	10.0	kWs
C00174	Reduced brake chopper threshold	0	V
C00572	Threshold - brake resist. overload	100	%
C00574	Resp. to brake resist. overtemp.	No response	
Inverter motor brake			
C00987	Inverter motor brake: nAdd	80	rpm
C00988	Inverter motor brake: PT1 filter time	0.0	ms
Highlighted in grey = display parameter			

5.11.1 Setting the voltage source for braking operation

The voltage threshold for braking operation is set via the mains voltage ([C00173](#)) and the reduced brake chopper threshold ([C00174](#)). When this "brake chopper threshold" is exceeded, the response selected in [C00175](#) takes place in the DC bus. The selected function (e.g. use of a brake resistor) serves to dissipate energy in the DC bus and reduce the DC-bus voltage.

- The "brake chopper threshold" is preset as follows so that it is higher than the specified mains voltage ([C00173](#)):

C00173	Mains voltage		Brake chopper threshold	
	1-phase	3-phase	1-phase	3-phase
0	1ph 230V	3ph 400V	DC380V	DC725V
1	1ph 230V	3ph 440V	DC380V	DC735V
2	1ph 230V	3ph 480V	DC380V	DC775V
3	1ph 230V	3ph 500V	DC380V	DC790V

- This brake chopper threshold can be reduced by 0 ... 150 V by means of [C00174](#).



Stop!

The brake chopper threshold resulting from [C00173](#) and [C00174](#) must not exceed the stabilised DC-bus voltage!

Example:

- A 400 V device has a maximum mains voltage of 420 V AC.
 - Maximum stationary DC-bus voltage: $420 \text{ V AC} \cdot 1.414 = 594 \text{ V DC}$
 - [C00173](#) has been set with the selection "0" for 400 V AC mains.
- This means that [C00174](#) can be set to a maximum of 131 V DC (725 V DC - 594 V DC).

5.11.2 Selecting the response to an increase of the DC-bus voltage

If the brake chopper threshold resulting from [C00173](#) and [C00174](#) is exceeded in the DC bus, the reaction selected in [C00175](#) takes place (use of the brake resistor and/or stop of the ramp function generator and/or inverter-motor brake).

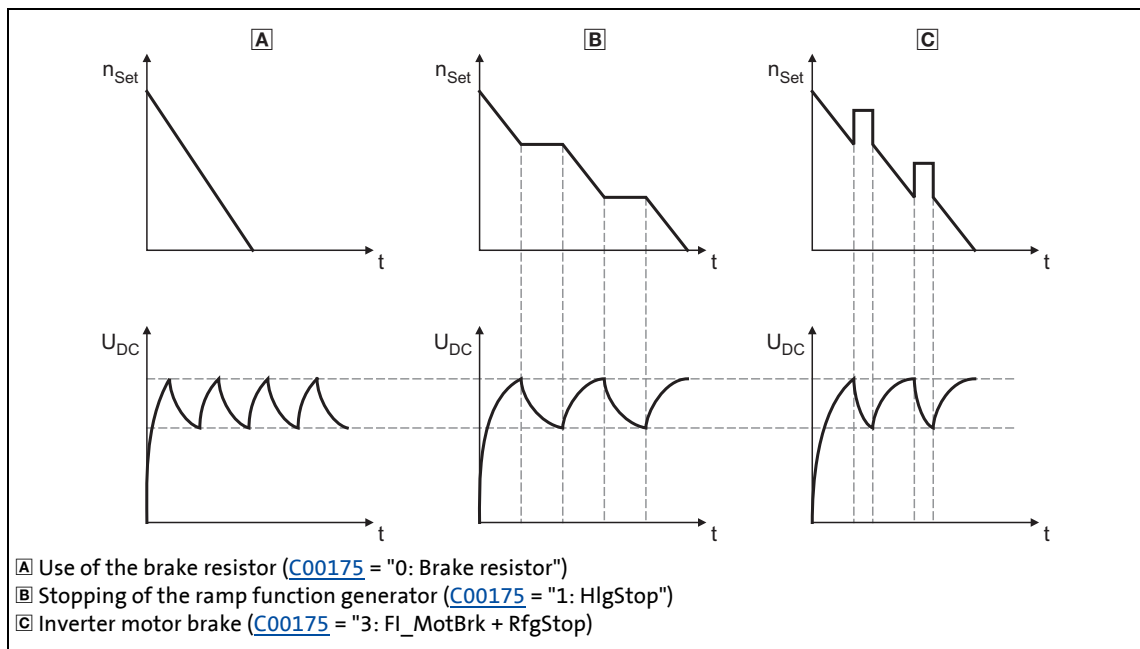
- Optimum following of the actual speed value until the speed setpoint is reached (e.g. the motor is stopped rapidly) is always achieved with the help of a brake resistor.
- Stopping the ramp function generator enables smoother deceleration with lower torque oscillation..
- The inverter motor brake is available in [C00175](#) from version 04.00.00 onwards. This function enables rapid braking without a brake resistor. Torque oscillations can occur due to the traversing dynamics. ▶ [Inverter motor brake](#) (□ 231)



Stop!

- The two braking procedures "Stopping of the ramp function generator" and "Inverter motor brake" can only be used for speed-controlled applications without the influence of a position controller!
- When the "inverter motor brake" function is used, the [Motor overload monitoring \(I2xt\)](#) is not adapted. If it is braked too frequently, there is a risk of the motor being thermally overloaded or the motor overload monitoring does not work properly!
- The "inverter motor brake" function must not be used with vertical conveyors (hoists) or with active loads!

The way in which the different braking procedures work is demonstrated schematically in the following illustration:



[5-25] Graph of the effective speed setpoint and the DC bus voltage during braking



Tip!

Independent of the selected motor control, all procedures given in [C00175](#) can be used. The actual speed value always follows the speed setpoint in an optimal way when a brake resistor is used.

If it is possible to dispense with exact adherence to the deceleration ramp in simple applications, selection of a braking method without an external brake resistor enables costs to be reduced due to the avoidance of having to use a brake resistor.

With the "inverter motor brake" function, an effective braking torque of 10 ... 20 % of the rated motor torque can be achieved.

A combination of all three braking procedures is also possible, e.g. for emergency braking if the brake resistor fails

([C00175](#) = "4: Brake resistor + FI_MotBrk + RfgStop").

5.11.2.1 Inverter motor brake

This function extension is only available from version 04.00.00!

With this braking method, which can be selected as an alternative in [C00175](#), the regenerative energy in the motor is converted as a result of dynamic acceleration/deceleration with down-ramping of the ramp function generator..



Stop!

- This braking method only works without intervention of a position controller in the case of speed-controlled applications!
- When the "inverter motor brake" function is used, the [Motor overload monitoring \(I2xt\)](#) is not adapted. If it is braked too frequently, there is a risk of the motor being thermally overloaded or the motor overload monitoring does not work properly!
- The "inverter motor brake" function must not be used with vertical conveyors (hoists) or with active loads!



Tip!

If no brake resistor is used, the DC injection brake can also be used for a braking process in addition to the "inverter motor brake" and "Stopping of the ramp function generator".

► [DC-injection braking](#) (📖 211)

In applications with high mass inertia and long braking times (> 2 s), we recommend the use of the DC injection brake.

- The DC injection brake provides for an oscillation-minimised braking. The braking process generally takes more time than the "inverter motor brake" function with an optimised setting. Moreover, the function is only recommended for braking to a standstill.

In the following cases we recommend the "inverter motor brake" function:

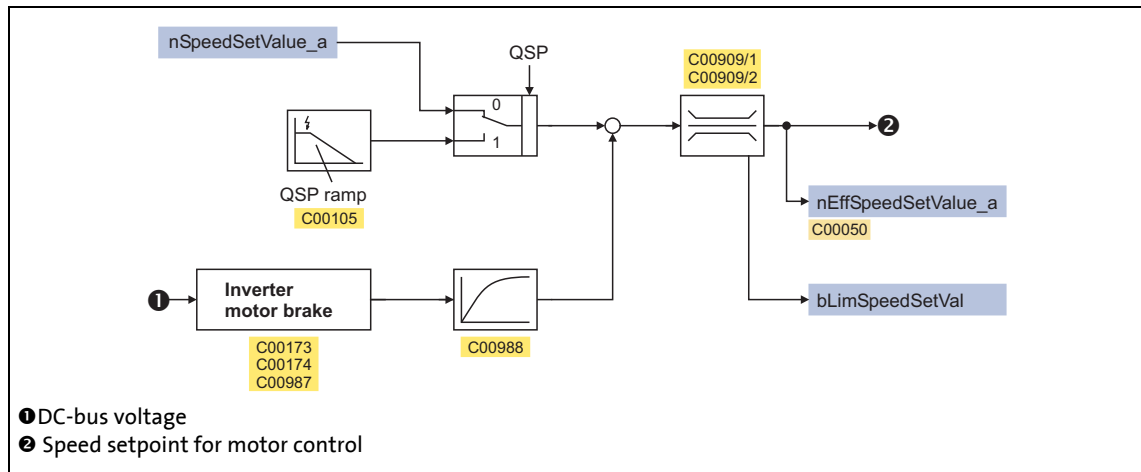
- For all applications that do not require braking to a standstill (e.g. braking to a lower speed setpoint) or the braking process can be interrupted by selecting a new speed setpoint.
- For applications with low mass inertias and a short braking time (< 1 s).
- For all applications where braking should be as quick as possible.

Operating mode of the inverter motor brake

The ramp function generator is stopped during acceleration. The speed set in [C00987](#) is added to the speed setpoint by means of a hysteresis-type 2-point DC bus voltage controller, whereby the sign of the current actual speed is taken into account. In addition, the ramp function generator is stopped during overvoltage.

If the DC bus voltage falls below a defined DC bus voltage potential of the hysteresis controller, the added speed is subtracted again and the ramp function generator is activated again.

The energy is converted into heat in the motor due to alternating instances of acceleration and deceleration as a result of this switching operation.



[5-26] Signal flow of the "Inverter motor brake" function

- In case of an asynchronous motor, the additive speed setpoint ([C00987](#)) should be 1 ... 4 times the slip of the machine:

$$C00987 \text{ [rpm]} = 1 \dots 4 \cdot (n_{\text{Sync}} \text{ [rpm]} - n_{\text{Rated}} \text{ [rpm]})$$

$$n_{\text{Sync}}[\text{rpm}] = \frac{f_{\text{Rated}} \text{Hz} \cdot 60}{p}$$

p = number of pole pairs

 n_{Rat} = Rated speed of the motor f_{Rat} = Rated frequency of the motor n_{Sync} = Synchronous speed of the motor

[5-27] Formula for calculating the additive speed setpoint for an asynchronous motor

- In case of a synchronous motor, the additive speed setpoint ([C00987](#)) should be 5 ... 20 % of the rated machine speed.

Short overview of the relevant parameters:

Parameter	Info	Lenze setting	
		Value	Unit
C00173	Mains voltage	3ph 400V / 1ph 230V	
C00174	Reduc. brake chopper threshold	0	V
C00175	Resp. to brake resistor control	Brake resistor	
C00987	Inverter motor brake: nAdd • Speed lift which is connected in pulses to the brake rampe when the motor is braked.	80	rpm
C00988	Inverter motor brake: PT1 filter time • PT1 filter time for smoothing the speed lift which is added in pulses.	0.0	ms

**Note!**

When the "inverter motor brake" function is used, torque oscillations occur which have may have a negative effect on the service life of the components of the mechanical drive train (e.g. gearbox).

- The extent of the occurring oscillations depends on the drive train (mass inertia, natural frequencies, etc.) and the function setting.
- We recommend optimising the "inverter motor brake" function for an oscillation-free operation as described in the following. Usually, this setting does not cause any torque oscillations which affect the service life of the gearbox.
- The settings of implementing a maximum acceleration ramp are only recommended if the inverter motor brake is used infrequently (e.g. in case of quick stop).

**How to set the "inverter motor brake" function for an oscillation-reduced operation:**

For V/f characteristic open-loop control/closed-loop control (VFCplus):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 70 V.
- Set additive speed ([C00987](#)) to rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

For sensorless vector control (SLVC):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 50 V.
- Set additive speed ([C00987](#)) to 1 ... 2-fold rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

**How to set the "inverter motor brake" function for a maximum acceleration ramp:**

For V/f characteristic open-loop control/closed-loop control (VFCplus):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 70 V.
- Set additive speed ([C00987](#)) to 1,5 ... 2,5-fold rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

For sensorless vector control (SLVC):

- Set reduced brake chopper threshold ([C00174](#)) to approx. 70 V.
- Set additive speed ([C00987](#)) to 2 ... 4-fold rated slip speed.
- Adapt the deceleration ramp so that the deceleration time is slightly below (10 ... 30 %) the deceleration time that can be realised with the inverter motor brake.

5.11.3 Avoiding thermal overload of the brake resistor

- Parameterisation of an error response in [C00574](#) and evaluation of the parameterised error message within the application or within the machine control system.
 - See chapter entitled "[Brake resistor monitoring \(l2xt\)](#)". ([□ 243](#))
- External interconnection using the thermal contact on the brake resistor (e.g. supply interruption via the mains contactor and activation of the mechanical brakes).

5.11.4 Control of multiple internal brake choppers in the DC-bus system

[This function extension is available from version 12.00.00!](#)

If an additional control signal is used, all internal brake choppers can be used in the DC-bus system to dissipate regenerative energy ("Master-slave operation").



Stop!

The integration of external brake choppers (e.g. brake chopper 9352) in the above-described "Master-slave operation" is not permissible since the voltage levels for the input and output of the external brake chopper are not suitable for the brake transistor control or, more precisely, for the output of the state of the brake transistor.

If the internal brake choppers of the DC-bus system are not sufficient, they should be replaced by an external brake chopper. It can be synchronised with other external brake choppers, if need be, so that simultaneous switch-on of all external brake choppers is ensured.



Note!

For trouble-free operation, the setting of the mains voltage in [C00173](#) must be identical for all controllers of the DC-bus system since this setting also influences the brake chopper threshold for switching on the brake chopper.

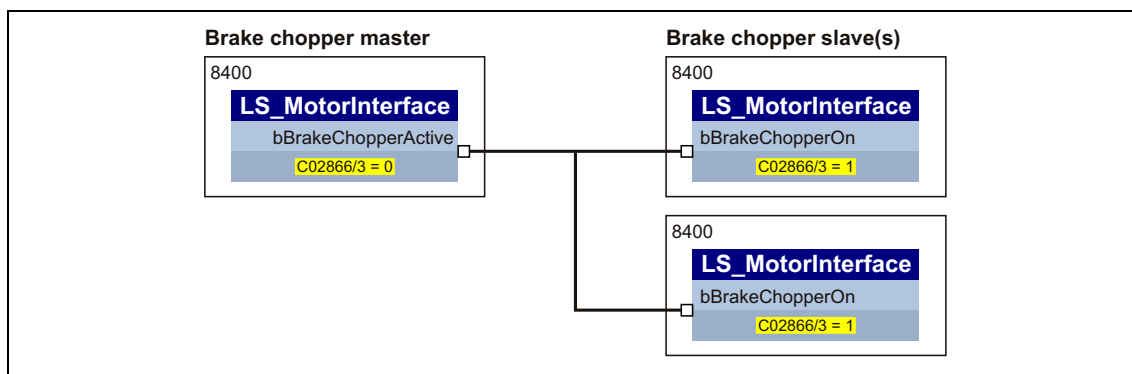
Functional principle

One of the controllers of the DC-bus system is assigned the role of the "brake chopper master".

- For logical reasons, the "brake chopper master" should be the most powerful controller.
- The "brake chopper master" controls its internal brake chopper via the DC-bus voltage as before. In addition, the "brake chopper master" transmits the *bBrakeChopperActive* status signal of its internal brake chopper control to the other controllers of the DC-bus system via fieldbus or digital output.

All other controllers of the DC-bus system are "brake chopper slaves".

- The "brake chopper slaves" have the *bBrakeChopperActive* status signal received from the "brake chopper master" connected to the *bBrakeChopperOn* control input.
- If the internal brake transistor of the "brake chopper master" is switched on, the internal brake transistors of the "brake chopper slaves" are switched on at the same time.



[5-28] Functional principle of the "Brake chopper master-slave operation" (simplified representation)

Procedure

1. Assign the role of the "brake chopper master" to one of the controllers of the DC-bus system.
2. Adapt the function block interconnection for the "brake chopper master" so that the *bBrakeChopperActive* status signal of the [LS_MotorInterface](#) SB is provided to the other controllers for controlling the internal brake chopper.
 - The *bBrakeChopperActive* signal can e.g. be output via port block to the fieldbus or via digital output.
 - A free output of the application block can be used to transfer the signal from application level to I/O level.
3. Configure all other controllers of the DC-bus system as "brake chopper slaves". Select "1: Yes" in [C2866/3](#) for these controllers.
 - With this setting, the brake chopper is not controlled via the DC-bus voltage anymore. Its control now depends on the *bBrakeChopperOn* control signal.
4. Adapt the function block interconnection for the "brake chopper slaves" so that the *bBrakeChopperActive* signal received from the "brake chopper master" is connected to the *bBrakeChopperOn* input of the [LS_MotorInterface](#) SB.
 - Depending on the output at the "brake chopper master", the signal must be read in e.g. via port block or digital input.
 - A free input of the application block can be used to transfer the signal from I/O level to application level.
 - If the digital inputs/outputs are used for transmitting the signal, they must be connected electrically accordingly.

**Note!**

If the brake chopper master-slave operation is activated, plausibility monitoring is carried out in the "brake chopper slaves":

- The brake transistor can only be switched on via the *bBrakeChopperOn* control signal if the DC-bus voltage is greater than the brake chopper threshold minus 40 V_{DC}.
- Exception: From a mains voltage of 513 V_{AC} (or 725 V_{DC}) and a mains voltage of 480 V or 500 V set in [C00173](#), the plausibility monitoring is not effective anymore.

Fast discharge of the DC bus

The *bBrakeChopperOn* control input of the "brake chopper master" can be optionally used for a fast discharge of the DC bus after the supply voltage has been switched off. The FB interconnection of the "brake chopper master" has to be adapted so that the *bBrakeChopperOn* control input of the SB [LS_MotorInterface](#) is connected to a digital bus or hardware signal (e.g. digital input on HIGH level).

**Note!**

Only the brake transistor of the "brake chopper master" is switched on with this function (max. 4 seconds, without interruption).

A complete discharge of the DC-bus cannot be achieved using this function!

From version 14.00.00, the limitation of the operating time can be deactivated to max. 4 seconds. For this purpose, set bit 1 to "1" in [C02864/1](#).

- We recommend this setting when this function is used in order to achieve a higher discharge of the DC bus - especially in case of high device power.

5.12 Monitoring

Many monitoring functions that are integrated into the controller can detect errors and thus protect the device/motor from damage or overload.

- Detailed information on the individual monitoring functions can be found in the following subchapters.

Monitoring	Response		Error message (with activated monitoring)
	Lenze setting	Configuration	
Device overload monitoring (Ixt)	Warning	C00604	oC5
Motor overload monitoring (I2xt)	Warning	C00606	oC6
Motor overcurrent monitoring	Fault	-	oC7
Motor temperature monitoring (PTC)	Fault	C00585	oH3
Brake resistor monitoring (I2xt)	No Reaction	C00574	oC12
Motor phase failure monitoring	No Reaction	C00597	LP1
Motor phase error monitoring before operation	No Reaction	C02866/2	
Mains phase failure monitoring	Warning	C00565	Su02
Maximum current monitoring	No Reaction	C00609	oC10
Maximum torque monitoring	No Reaction	C00608	oT1
Motor speed monitoring	Fault	-	oS2
Encoder open-circuit monitoring	Fault	C00586	Sd3

Parameterisable responses

If a monitoring function trips, the response set via the corresponding parameter is carried out. The following responses can be selected:

- "No response": Response/monitoring is deactivated.
- "Fault": Change of the operating status by a pulse inhibit of the power output stage.
- "Warning": Operating status of the controller remains unchanged. Only a message is entered into the Logbook of the controller.

Related topics:

- ▶ [Device state machine and device states](#) (📖 84)
- ▶ [Diagnostics & error management](#) (📖 420)
- ▶ [Basics on error handling in the controller](#) (📖 420)
- ▶ [Error messages of the operating system](#) (📖 444)

5.12.1 Device overload monitoring (Ixt)

[C00064/1...3](#) displays the device utilisation (ixt) in [%] in different time intervals:

Parameter	Info
C00064/1	Device utilisation (Ixt) Maximum value of pulse utilisation (C00064/2) and permanent utilisation (C00064/3).
C00064/2	Device utilisation (Ixt) 15s Pulse utilisation over the last 15 seconds (only for loads >160 %).
C00064/3	Device utilisation (Ixt) 3 min Permanent utilisation over the last 3 minutes.
Highlighted in grey = display parameter	

- If the device utilisation reaches the switch-off threshold set in [C00123](#):
 - The error response set in [C00604](#) will be carried out (Lenze setting: "Warning").
 - The "[oC5: Ixt overload](#)" error message will be entered into the Logbook.
 - The *bMctrlIxtOverload* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.
- A setting of [C00604](#) = "0: No Reaction" deactivates the monitoring.

5.12.2 Motor overload monitoring (I2xt)

The Inverter Drives 8400 are provided with a simple, sensorless, thermal I²xt motor monitoring of self-ventilated standard motors which is based on a mathematical model.

- [C00066](#) displays the calculated motor load in [%].
- If the calculated motor load reaches the motor load setting ([C00120](#)):
 - The error response set in [C00606](#) will be carried out (Lenze setting: "Warning").
 - The "[oC6: I2xt motor overload](#)" error message will be entered into the Logbook.
 - The *bMctrlI2xtOverload* status output of the [LS DeviceMonitor](#) system block will be set to TRUE.
- A setting of [C00606](#) = "0: No Reaction" deactivates the monitoring.



Stop!

I²xt motor monitoring does not provide full motor protection!

As the motor utilisation calculated in the thermal motor model is lost after mains switching, for instance the following operating states cannot be detected correctly:

- Restarting (after mains switching) of a motor that is already very hot.
- Change of the cooling conditions (e.g. cooling air flow interrupted or too warm).

A full motor protection requires additional measures as e.g. the evaluation of temperature sensors that are located directly in the winding or the use of thermal contacts.

For the installation according to UL or UR, the safety instructions provided in the hardware manual must be observed! Among other things, the activation of the motor overload monitoring (I2xt) is required here.



Note!

From version 12.00.00, the thermal motor load displayed in [C00066](#) can be pre-initialised when the device is connected to the mains, optionally using a fixed value or the value used last at the time when the device was switched off. The desired initialisation is selected in [C00122](#). In the Lenze setting of [C00122](#), the behaviour remains unchanged (no initialisation).

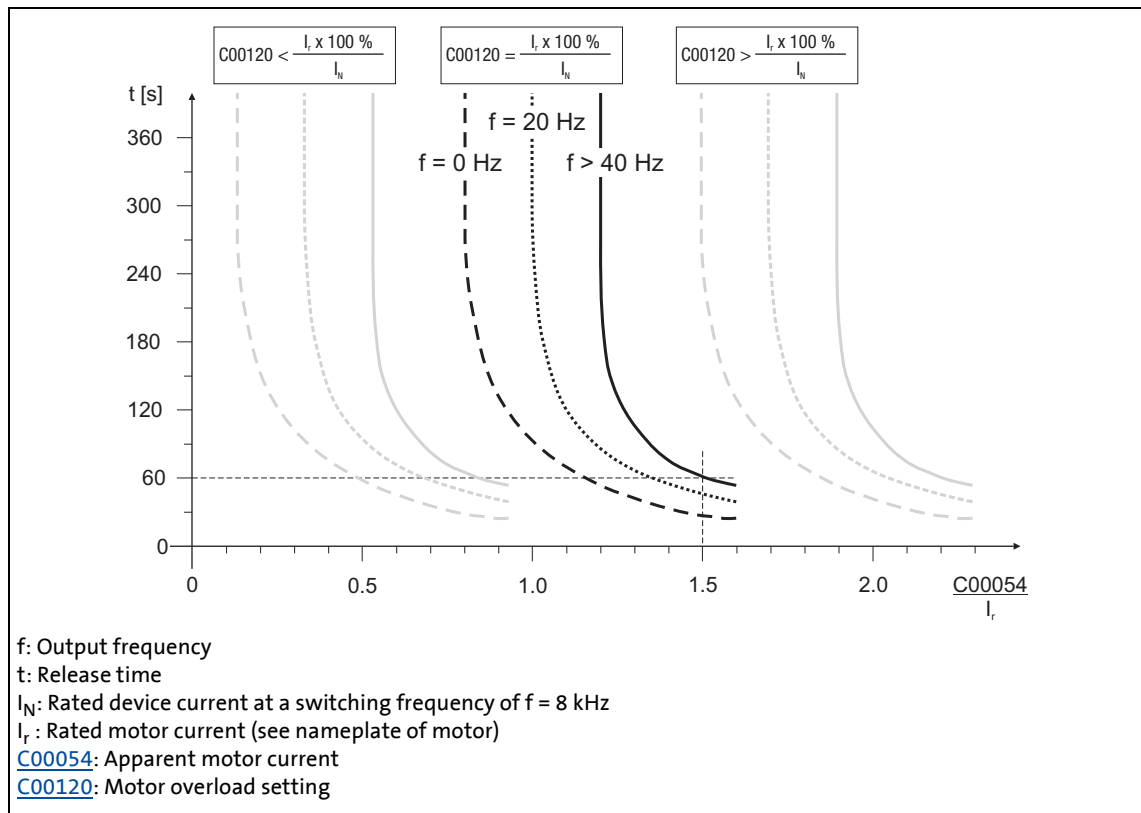
Adjustment of the motor utilisation meter

The motor utilisation meter for indicating the motor load in [C00066](#) begins to count when the apparent motor current ([C00054](#)) is greater than the motor overload setting ([C00120](#)).

The overload threshold ([C00120](#)) is to be set as follows:

$$C00120 = \frac{\text{Rated motor current (C00088)}}{\text{Rated device current (C00098)}} \cdot 100 \%$$

- If you reduce [C00120](#) starting from the calculated value, the motor utilisation meter will already be counted up before the rated overload threshold is reached.
- If you increase [C00120](#) starting from the calculated value, the motor utilisation meter will not be counted up until the rated overload threshold is reached.



[5-29] Tripping characteristic of the I^2xt monitoring

Example in Figure [5-29]:

$$C00120 = I_r / I_{\text{rated}} \times 100 \%$$

$$C00054 = 150 \% \text{ rated motor current}$$

- After approx. 60 seconds, [C00066](#) has reached the final value (100 %) at output frequencies $f > 40 \text{ Hz}$.
- The controller outputs the "[oC6: I2xt overload motor](#)" error message and triggers the response set in [C00606](#) (default setting: "Warning").

**Tip!**

- If forced ventilated motors are used, a premature response of the overload threshold can be avoided by deactivating this function if necessary ([C00606](#) = "0: No Reaction").
- The current limits set in [C00022](#) and [C00023](#) influence the I^2t calculation only in an indirect way. However, the operation of the motor at maximum possible load can be averted. ▶ [Defining current and speed limits](#) (□ 123)

5.12.3 Motor overcurrent monitoring

The ultimate motor current to be parameterised in [C00939](#) is a limit value to protect the motor from destruction, influence of the rated data and demagnetisation.

- This limit value must not be travelled cyclically in the drive process.
- If the instantaneous value of the motor current exceeds the limit value set in [C00939](#), the error response "Fault" occurs to protect the motor and the error message "[oC7: Motor overcurrent](#)" is entered into the logbook.
- The maximum currents to be parameterised in [C00022](#) and [C00023](#) should have a sufficient distance to this limit value.

**Note!**

If a Lenze motor is selected from the catalogue whose plant parameters are transferred into the controller, the setting of the maximum current in [C00022](#) and [C00023](#) will automatically be adapted to the selected motor.

Related topics:

- ▶ [Maximum current monitoring](#) (□ 248)

5.12.4 Motor temperature monitoring (PTC)

For detecting and monitoring of the motor temperature, a PTC thermistor (DIN 44081/DIN 44082) or a thermal contact (NC contact) can be connected to the terminals X106/T1 and X106/T2.



Stop!

- The controller can only evaluate one PTC thermistor!
Do not connect several PTC thermistors in series or parallel.
- If several motors are operated on one controller, use thermal contacts (NC contacts) connected in series.
- To achieve full motor protection, an additional temperature monitoring with separate evaluation must be installed.



Note!

- In the Lenze setting ([C00585](#) = "1: Fault"), motor temperature monitoring is activated!
- There is a wire jumper between the terminals X106/T1 and X106/T2 by default.
- Lenze three-phase AC motors are provided with a thermal contact on delivery.

- If $1.6\text{ k}\Omega < R < 4\text{ k}\Omega$ at the terminals X106/T1 and X106/T2, the monitoring will respond, see functional test below.
- If the monitoring responds:
 - The error response set in [C00585](#) is activated (Lenze setting: "Fault").
 - The "[oH3: Motor temperature \(X106\) triggered](#)" error message is entered into the Logbook.
 - The *bMctrlMotorPtc* status output of the [LS DeviceMonitor](#) system block is set to TRUE.
- A setting of [C00585](#) = "0: No Reaction" deactivates the monitoring.



Tip!

We recommend to always activate the PTC input when using motors which are equipped with PTC thermistors or thermostats. This prevents the motor from being destroyed by overheating.

Functional test

Connect a fixed resistor to the PTC input:

- $R > 4\text{ k}\Omega$: Fault message must be activated.
- $R < 1\text{ k}\Omega$: Fault message must not be activated.

5.12.5 Brake resistor monitoring (I2xt)

Due to the converted braking power, the brake resistor is thermally stressed and can even be thermally destroyed by excessive braking power.

The monitoring of the I^2xt utilisation of the controller serves to protect the brake resistor. It acts in proportion to the converted braking power.



Danger!

In the Lenze setting ([C00574](#) = "0: No Reaction"), the response of the monitoring function does not stop the braking process!

In particular for applications such as hoists or applications with a DC-bus connection, it must be checked if a stopping of the braking process due to a setting of [C00574](#) = "1: Fault" is permissible.



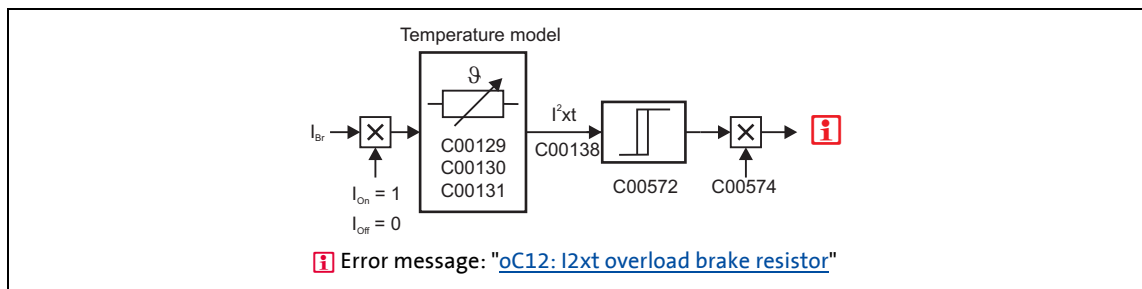
Stop!

Implement appropriate protective measures against thermal overload of the brake resistor!

Examples:

- Parameterisation of an error response in [C00574](#) and evaluation of the parameterised error message within the application or the machine control system.
 - Interruption of the mains supply by means of the temperature contact at the brake resistor and a simultaneous activation of the mechanical brake.
-
- If the I^2xt utilisation reaches the switch-off threshold set in [C00572](#):
 - The error response set in [C00574](#) will take place.
 - The "[oC12: I2xt brake resistor overload](#)" error message is entered into the Logbook.
 - The *bMctrlBrakeChopperFault* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.
 - If the system is dimensioned correctly, the monitoring should not be activated. If individual pieces of rated data of the actually connected brake resistor are not known, they have to be identified.
 - If the DC-bus voltage exceeds the overvoltage threshold due to a braking energy that is too high, the monitoring for overvoltage in the DC bus is activated ("OU: DC-bus overvoltage" error message).
 - Apart from the threshold of the I^2xt utilisation that can be set in [C00572](#), there is the switching threshold of the brake transistor which results from the mains voltage ([C00173](#)) and the reduced brake chopper threshold ([C00174](#)).

Temperature model



[5-30] Signal flow for monitoring the brake resistor

The monitoring function calculates the braking current I_{Br} from the current DC-bus voltage U_{DC_act} and the brake resistance parameterised in [C00129](#):

$$I_{Br} = \frac{U_{DC\_act}}{C00129}$$

**Note!**

The monitoring function can also be triggered due to a value entered in [C00129](#) although a brake resistor is not even connected.

- The calculation considers the thermal utilisation of the brake resistor based on the following parameters:
 - Resistance value ([C00129](#))
 - Continuous power ([C00130](#))
 - Thermal capacity ([C00131](#))
- In the Lenze setting these parameters are preset with the corresponding power-adapted Lenze brake resistor.
- [C00133](#) indicates the calculated utilisation of the brake resistor in [%].
 - A utilisation of 100 % corresponds to the continuous power of the brake resistor depending on the maximally permissible temperature limit.

Related topics:

► [Braking operation/brake energy management](#) (226)

5.12.6 Motor phase failure monitoring

**Note!**

In the Lenze setting ([C00597](#) = "0: No Reaction"), the motor phase failure monitoring is not activated!

In the case of a synchronous motor,

- the motor phase failure monitoring is basically deactivated. (Due to the low no-load current, the monitoring would be permanently activated.)
- only the [Motor phase error monitoring before operation](#) is active (for Lenze setting [C2866/2](#) = "1: Yes").

In order to safely detect the failure of a motor phase, a certain motor current must flow for the current sensor system. Thus, the response set in [C00597](#) (Lenze setting: "No Reaction") is caused after a delay time of maximally 2 s after controller enable if a current-carrying motor phase U, V, W fails or if motor connection is missing. If the current threshold value set in [C00599](#) is already exceeded within the delay time, the motor phase failure monitoring starts from this point in time.

The monitoring mode checks the current flow for each motor phase as a function of the commutation angle. Monitoring is activated if a commutation angle of approx. 140° is covered without the current set in [C00599](#) being exceeded. Monitoring is activated at an output frequency of 0 Hz if none of the three motor phases reaches the threshold value set in [C00599](#).

- If the motor phase failure detection is tripped:
 - The response set in [C00597](#) will take place.
 - The error message "[LP1: Motor phase failure](#)" is entered into the logbook.
 - The *bMctrlMotorPhaseFault* status output of the [LS DeviceMonitor](#) system block is set to TRUE.

**Note!**

If an error response of "1: Fault" is set in [C00597](#), the *bMctrlMotorPhaseFault* status output of the [LS DeviceMonitor](#) SB will be set to TRUE for only 1 second in the event of a motor phase failure because it is no longer possible to detect a motor phase fault via the error response with a pulse inhibit. However, the Logbook and [C00561/3...5](#) still display the cause of the motor phase failure.

- The motor phase failure detection is inactive if
 - a controller inhibit is set,
 - connection to a rotating machine is carried out (flying restart circuit or connection to actual speed value),
 - an error is pending due to a DC-bus overvoltage ("[OU](#)"),
 - motor parameter identification is carried out,
 - DC-injection braking is active.

5.12.7 Motor phase error monitoring before operation

This function extension is available from version 11.00.00!

This extended motor phase failure monitoring can both detect a phase failure on the basis of test signals and check for the existence of the motor.

- The "motor phase error monitoring before operation" is only directly active after controller enable if
 - an error response is set in [C00597](#) **AND**
 - the motor phase error monitoring is switched on ([C2866/2](#) = "1: Yes").
- The following parameters show the cause of the motor phase failure:
 - [C00561/3](#): Motor phase U
 - [C00561/4](#): Motor phase V
 - [C00561/5](#): Motor phase W



Note!

The motor phase error monitoring before operation must not be connected to a rotating or coasting machine (high compensation currents and effect of the DC injection braking).

- In case of motor control with feedback, no motor phase error monitoring is executed if the actual speed value is > 10 rpm.
- In case of motor control without feedback, the user must ensure that the motor phase error monitoring will only be executed if the speed is 0.

If the motor is at quick stop and the brake is applied, no motor phase error monitoring is executed when quick stop is deactivated (same with "0" speed and applied brake).

If the rated current of the connected motor is lower than 10 % of the rated device current, the motor phase error monitoring can be activated although no motor phase error has occurred. In this case, the motor phase error monitoring must be switched off before operation ([C2866/2](#) = "0: No").

**Note!****With automatic brake control:**

In case of automatic brake control, the brake will only be released if no motor phase failure exists and the magnetisation of the field-oriented control types is completed.

With manual brake control:

In case of manual brake control and forced release of the brake, the brake will be controlled directly as before.

The user himself must ensure that the brake will only be opened if all of the following conditions are met:

- Motor phase failure monitoring ([C00597](#)) and motor phase error monitoring before operation ([C2866/2](#)) are active.
- The controller is enabled (controller enable).
- The *bMctrlMotorPhaseFault* status output of the SB [LS DeviceMonitor](#) is set to FALSE.
- Bit 10 of the *MCTRL_Status3* status word must be set to 0 before the brake opening is triggered.
 - When the controller is enabled, this bit is set to 1 and will not be set to 0 again before the "Motor phase error monitoring before operation" is successfully completed.
- The *MCTRL_Status3* status word can be integrated in the application via configuration parameters (e.g. [C00620](#)) (*MCTRL_Status3* = selection 34906 in [Selection list - analog signals](#)).

5.12.8 Mains phase failure monitoring



Stop!

Under load, the mains input of a three-phase controller can be destroyed if the device is only supplied by two phases (e.g. if a mains phase fails).

The drive controller has a simple mains-phase failure detection function with which a mains phase failure can be detected under load.

- In the case of power-adapted machines, approx. 50 % of the rated motor power must be exceeded so that a main-phase failure can be detected.
- If the mains phase failure monitoring is tripped:
 - The error response set in [C00565](#) will be carried out (Lenze setting: "Warning").
 - The "[Su02: One mains phase is missing](#)" error message will be entered into the logbook.
 - The *bMctrlMainsFault* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.

5.12.9 Maximum current monitoring



Note!

In the Lenze setting ([C00609](#) = "0: No Reaction"), the maximum current monitoring is not activated!

If a Lenze motor is selected from the catalogue whose plant parameters are transferred into the controller, the setting of the maximum current in [C00022](#) and [C00023](#) will automatically be adapted to the selected motor.

If the parameterised maximum current is reached, the response set in [C00609](#) is triggered (Lenze setting: "0: No Reaction").

If the activated monitoring is tripped:

- The "[oC10: Maximum current reached](#)" error message is entered in the logbook.

Related topics:

▶ [Motor overcurrent monitoring](#) (📖 241)

5.12.10 Maximum torque monitoring

This function extension is only available from version 04.00.00!



Note!

In the Lenze setting ([C00608](#) = "0: No Reaction"), the maximum torque monitoring is not activated!

If the maximum possible torque [C00057](#) is reached at the motor shaft, the response set in [C00608](#) will be carried out (Lenze setting: "0: No Reaction").

If the activated monitoring is tripped:

- The "[oT1: Maximum torque reached](#)" error message is entered into the logbook.
- The *bMctrlTorqueMax* status output of the [LS_DeviceMonitor](#) system block will be set to TRUE.

5.12.11 Motor speed monitoring

This function extension is available from version 11.00.00!

If the drive reaches the maximally permissible motor speed ([C00965](#)):

- The error response "Fault" occurs, i.e. the inverter is inhibited and the motor changes to torque-free operation (coasts down).
- The error message "[oS2: Max. motor speed reached](#)" is entered into the logbook.

5.12.12 Encoder open-circuit monitoring



Note!

In the Lenze setting ([C00586](#) = "1: Fault"), open-circuit monitoring of the encoder is activated!

When does the open-circuit monitoring system respond?

The open-circuit monitoring will trigger if

- an open circuit occurs in the encoder cable.
- an extreme overload (e.g. blocked motor shaft) occurs during the start-up phase of the motor.
- highly dynamic reversion of the motor occurs.

Which measured values lead to an actuation of the open-circuit monitoring system?

The following measured values checked for plausibility lead to an actuation of the open-circuit monitoring system:

1. If the total deviation between actual speed and setpoint speed is higher than $f = 40 \text{ Hz}$ for a time $> 0.1 \text{ s}$.
2. If the sign of the injected frequency and the actual speed is not the same, the $I_{\max}$ controller is active and this status is active for 0.1 s . Usually this is the case when A/B tracks are reversed.

Response to open circuit

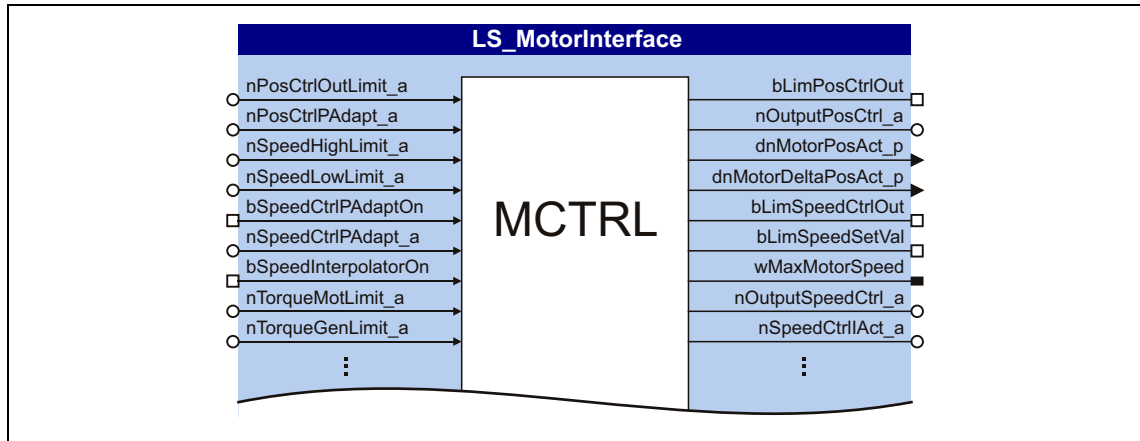
- If the open-circuit monitoring is tripped:
 - The error response set in [C00586](#) is activated (Lenze setting: "Fault").
 - The "[Sd3: Open circuit - feedback system](#)" is entered into the Logbook.
 - The `bMctrlEncoderComFault` status output of the [LS DeviceMonitor](#) SB is set to TRUE.
- A setting of [C00586](#) = "0: No Reaction" deactivates the monitoring.

Related topics:

- ▶ [Encoder/feedback system](#) (220)

5.13 Internal interfaces | System block "LS_MotorInterface"

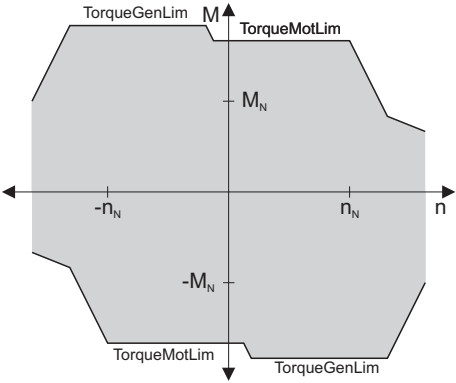
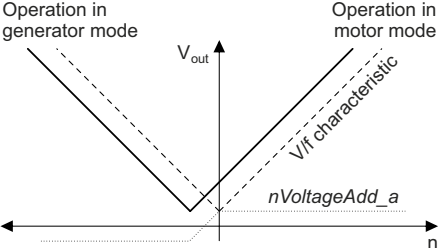
The **LS_MotorInterface** system block provides the internal interfaces to the driving machine in the function block editor.



[5-31] LS_MotorInterface system block (excerpt)

Inputs

Identifier DIS code data type	Information/possible settings				
nPosCtrlOutLimit_a C00830/21 INT	Limitation of the position controller output Scaling: 16384 $\equiv$ 100 % reference speed (C00011)				
nPosCtrlPAdapt_a C00830/20 INT	Adaptation of the position controller gain Scaling: 16384 $\equiv$ 100 % Vp position controller				
nSpeedHighLimit_a C00830/88 INT	Upper speed limit for the speed limitation - During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) - Scaling: 16384 $\equiv$ 100 % reference speed (C00011) Note: For a correct function of the speed limitation in both direction, the following applies: The speed limitation operates with a internal hysteresis of 50 rpm. The upper or lower speed limit resulting from the settings has to be higher than this hysteresis!				
nSpeedLowLimit_a C00830/23 INT	Lower speed limit for speed limitation - During torque-controlled operation only (<i>bTorquemodeOn</i> = TRUE) - Scaling: 16384 $\equiv$ 100 % reference speed (C00011) Note: For a correct function of the speed limitation in both direction, the following applies: The speed limitation operates with a internal hysteresis of 50 rpm. The upper or lower speed limit resulting from the settings has to be higher than this hysteresis!				
bSpeedCtrlPAdaptOn C00833/69 BOOL	Adaptation of the speed controller gain <table border="1"> <tr> <td>FALSE</td><td>Deactivate adaptive adaptation.</td></tr> <tr> <td>TRUE</td><td>Activate adaptive adaptation.</td></tr> </table>	FALSE	Deactivate adaptive adaptation.	TRUE	Activate adaptive adaptation.
FALSE	Deactivate adaptive adaptation.				
TRUE	Activate adaptive adaptation.				
nSpeedCtrlPAdapt_a C00830/25 INT	Adaptation of the speed controller gain Scaling: 16384 $\equiv$ 100 % Vp (C00070)				
bSpeedInterpolatorOn C00833/28 BOOL	Speed setpoint interpolation <table border="1"> <tr> <td>FALSE</td><td>Deactivate interpolation</td></tr> <tr> <td>TRUE</td><td>Activate interpolation</td></tr> </table>	FALSE	Deactivate interpolation	TRUE	Activate interpolation
FALSE	Deactivate interpolation				
TRUE	Activate interpolation				

Identifier	Information/possible settings				
DIS code data type nTorqueMotLimit_a C00830/29 INT nTorqueGenLimit_a C00830/28 INT	Torque limitation in motor mode and in generator mode - The drive cannot output a higher torque in motor/generator mode than set here. - The applied values (any polarity) are internally interpreted as absolute values. - If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called I_{max} controller. - If sensorless vector control (SLVC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. - Scaling: 16384 $\equiv$ 100 % M_{max} (C00057) Torque limits in motor and generator mode: 				
bTorqueInterpolatorOn C00833/29 BOOL	Torque setpoint interpolation <table border="1"> <tr> <td>FALSE</td><td>Deactivate interpolation</td></tr> <tr> <td>TRUE</td><td>Activate interpolation</td></tr> </table>	FALSE	Deactivate interpolation	TRUE	Activate interpolation
FALSE	Deactivate interpolation				
TRUE	Activate interpolation				
nVoltageAdd_a C00830/31 INT	Additive voltage impression - An additional setpoint for the motor voltage can be specified via this process input. - If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. - If the value is negative, the voltage is reduced. - Scaling: 16384 $\equiv$ 1000 V This process signal also serves to implement a load adaptation. Example of V/f characteristic control (VFCplus): Adaptation of the voltage characteristic as a function of the load in motor mode/in generator mode in case of CW/CCW rotation  - CW rotation in motor mode: Increase voltage - CCW rotation in generator mode: Reduce voltage STOP Stop! Values selected too high may cause the motor to heat up due to the resulting current!				
bAutoBoostOn C00833/32 BOOL (from version 04.00.00)	Reserved				

Identifier DIS code data type	Information/possible settings				
nBoost_a C00830/26 INT	Process signal for the V_{min} boost - This signal is added to C00016 and has thus an increasing or decreasing effect. - This signal serves to implement a load-dependent V_{min} boost to improve the torque behaviour in different load states, as for instance in case of operation in generator or motor mode. - Scaling: $16384 \equiv 100\%$ rated device voltage V_{FU} (400 V or 230 V) ▶ Adapting the V_{min} boost (□ 135)				
	 Stop! Values selected too high may cause the motor to heat up due to the resulting current!				
bPosCtrlOn bDeltaPosOn dnDeltaPos_p dnPosSetValue_p bPosDerivativeOn bMotorRefOffsetOn dnMotorRefOffset_p	Inputs of 8400 StateLine have no function!				
bQspOn C00833/33 BOOL	Quick stop <table border="1"> <tr> <td>FALSE</td><td>Deactivate quick stop</td></tr> <tr> <td>TRUE</td><td>Activate quick stop</td></tr> </table>	FALSE	Deactivate quick stop	TRUE	Activate quick stop
FALSE	Deactivate quick stop				
TRUE	Activate quick stop				
nPWMAngleOffset_a C00830/32 INT	Angle step change of output voltage phasor Scaling: $65535 \equiv 1$ revolution				
bSpeedCtrlOn C00833/31 BOOL	Directly set the I-component of speed controller In order to statically specify a minimum torque, e.g. when a load is being lifted. <table border="1"> <tr> <td>TRUE</td><td>Se the I-component of the speed controller to the value <i>nSpeedCtrlI_a</i>.</td></tr> </table>	TRUE	Se the I-component of the speed controller to the value <i>nSpeedCtrlI_a</i> .		
TRUE	Se the I-component of the speed controller to the value <i>nSpeedCtrlI_a</i> .				
nSpeedCtrlI_a C00830/24 INT	Value of the speed controller integrator - Scaling depends on the selected motor control: - V/f control (VFCplus + encoder): $16384 \equiv 100\%$ reference speed (C00011) - Vector control (SLVC): $16384 \equiv 100\%$ M_{max} (C00057)				
nSpeedSetValue_a C00830/22 INT	Speed setpoint Scaling: $16384 \equiv 100\%$ reference speed (C00011)				
bTorquemodeOn C00833/30 BOOL	Selection: Speed/Torque control <table border="1"> <tr> <td>FALSE</td><td>Speed control with torque limitation</td></tr> <tr> <td>TRUE</td><td>Torque control with speed limitation</td></tr> </table>	FALSE	Speed control with torque limitation	TRUE	Torque control with speed limitation
FALSE	Speed control with torque limitation				
TRUE	Torque control with speed limitation				
nTorqueSetValue_a C00830/27 INT	Torque setpoint / additive torque Scaling: $16384 \equiv 100\%$ M_{max} (C00057)				
bDcBrakeOn C00833/34 BOOL	Activate DC injection brake <table border="1"> <tr> <td>FALSE</td><td>Deactivate DC-injection braking</td></tr> <tr> <td>TRUE</td><td>Activate DC-injection braking</td></tr> </table>	FALSE	Deactivate DC-injection braking	TRUE	Activate DC-injection braking
FALSE	Deactivate DC-injection braking				
TRUE	Activate DC-injection braking				
bTorqueLimitAdaptOn C00833/98 BOOL	Adaptation of torque limitation <table border="1"> <tr> <td>TRUE</td><td>Activate adaptation of torque limitation.</td></tr> </table>	TRUE	Activate adaptation of torque limitation.		
TRUE	Activate adaptation of torque limitation.				
nTorqueLimitAdapt_a C00830/70 INT	Value for adaptation of torque limitation Scaling: $16384 \equiv 100\%$ <i>nTorqueMotLimit_a</i> and <i>nTorqueGenLimit_a</i>				

Identifier DIS code data type	Information/possible settings
nInertiaAdapt_a C00830/96 INT (from version 12.00.00)	Adaptation of the moment of inertia - This process signal can be used during the process to dynamically control the percentage of the variable moment of inertia (e.g. a reel) set in C00919/1 which is to be considered for setpoint feedforward control. - Scaling: 16384 $\equiv$ 100 % moment of inertia - process (C00919/1)
bBrakeChopperOn C00833/130 BOOL (from version 12.00.00)	Switch on the internal brake chopper as "brake chopper slave" (C02866/3 = "1: Yes") when the controller is configured ► Control of multiple internal brake choppers in the DC-bus system (□ 234)
	TRUE Switch on internal brake chopper.
nSpeedSetValueInertia_a C00830/97 INT (from version 12.00.00)	Input for differential setpoint feedforward control (torque feedforward control) - If the selection "1: nSpeedSetValueInertia_a" is set in C00654/1, this process signal can be used to preselect any input value (e.g. setpoint of the position or process controller) for torque feedforward control. - Scaling: 16384 $\equiv$ 100 % reference speed (C00011)
bVfcEcoDisable C00833/131 BOOL (from version 13.00.00)	Deactivate energy optimisation for VFCplusEco ► Improving the behaviour at high dynamic load changes
	FALSE Activate energy optimisation.
	TRUE Deactivate energy optimisation.

Outputs

Identifier DIS code data type	Value/meaning
bLimPosCtrlOut BOOL	"Position controller output inside the limitation" status signal
	TRUE The position controller output is internally limited
nOutputPosCtrl_a INT	Position controller output Scaling: 16384 $\equiv$ 100 % reference speed (C00011)
dnMotorPosAct_p DINT	Current position of the motor shaft in [increments]
dnMotorDeltaPosAct_p DINT	Current following error in [increments] Following error = Difference between set position and actual position
bLimSpeedCtrlOut BOOL	"Speed controller or manipulating variable of the slip regulator inside the limitation" status signal
	TRUE The speed controller output is internally limited
bLimSpeedSetVal BOOL	"Reduction or increase of the setpoint speed active" status signal
	TRUE Reduction or increase of the setpoint speed by the $I_{\max}$ controller is active
wMaxMotorSpeed C00011 BOOL	Reference speed (C00011)
nOutputSpeedCtrl_a INT	Speed controller output - Scaling: 16384 $\equiv$ 100 % $M_{\max}$ (C00057) - In case of the "VFC (+encoder)" motor control, this output is the output of the slip regulator. In this case, the scaling depends on the reference frequency (display in C00059): C00059 < 650 Hz: 16384 $\equiv$ 327.68 Hz (24000 $\equiv$ 480.00 Hz) C00059 > 650 Hz: 16384 $\equiv$ 655.36 Hz (12000 $\equiv$ 480.00 Hz)
nSpeedCtrlIntAct_a INT	Current value of speed controller integrator - Scaling depends on the selected motor control: - V/f control (VFCplus + encoder): 16384 $\equiv$ 100 % reference speed (C00011) - Vector control (SLVC): 16384 $\equiv$ 100 % $M_{\max}$ (C00057)
nEffSpeedSetValue_a INT	Effective speed setpoint Scaling: 16384 $\equiv$ 100 % reference speed (C00011)

Identifier DIS code data type	Value/meaning
nMotorSpeedAct_a C00051 INT	Actual speed value • Scaling: 16384 $\equiv$ 100 % reference speed (C00011)
nMotorSpeedAct_v INT	Actual speed value • Scaling: 65535 $\equiv$ 1 revolution
nMotorFreqAct_a C00058 INT	Current field frequency • Scaling depends on the reference frequency (display in C00059): • C00059 < 650 Hz: 16384 $\equiv$ 327.68 Hz (24000 $\equiv$ 480.00 Hz) • C00059 > 650 Hz: 16384 $\equiv$ 655.36 Hz (12000 $\equiv$ 480.00 Hz)
bLimTorqueSetVal BOOL	"Setpoint torque inside the limitation" status signal TRUE The setpoint torque is internally limited
wMaxMotorTorque C00057	Maximum motor torque • Scaling: 100 = 0.01 Nm • From version 06.00.00: $wMaxMotorTorque = 10 * M_{max}$ (C00057)
nInputTorqueCtrl_a INT	Input value of the torque control (torque setpoint) • Scaling: 16384 $\equiv$ 100 % M_{max} (C00057)
nMotorTorqueAct_a C00056/2 INT	Actual torque • In the "VFC (+encoder)" motor control mode, this value is determined from the current motor current and only approximately corresponds to the actual torque value.. • Scaling: 16384 $\equiv$ 100 % M_{max} (C00057)
nInputJerkCtrl_a INT	Input value of the jerk limitation • Scaling: 16384 $\equiv$ 100 % M_{max} (C00057)
bLimCurrentSetVal BOOL	"Current setpoint inside the limitation" status signal TRUE The current setpoint is internally limited
nStatorCurrentIS_a INT	Current stator current/effective motor current • Scaling: 16384 $\equiv$ 100 % I_{max_mot} (C00022)
nEffCurrentIq_a INT	Current torque-producing cross current • Scaling: 16384 $\equiv$ 100 % I_{max_mot} (C00022)
nReaktCurrentId_a INT	Current field-producing direct-axis current • Scaling: 16384 $\equiv$ 100 % I_{max_mot} (C00022)
nActualFluxx_a INT	Current magnetising current • Scaling: 16384 $\equiv$ 100 % I_{max_mot} (C00022)
nDCVoltage_a INT	Actual DC-bus voltage • Scaling: 16384 $\equiv$ 1000 V
nMotorVoltage_a INT	Current motor voltage/inverter output voltage • Scaling: 16384 $\equiv$ 1000 V
bQspActive BOOL	"Quick stop active" status signal TRUE Quick stop is active
bAutoDCBActive BOOL	"Automatic DC-injection braking active" status signal ► DC-injection braking (□ 211) TRUE Automatic DC-injection braking is active
bIdentificationActive BOOL	"Motor parameter identification active" status signal ► Automatic motor data identification (□ 111) TRUE Motor parameter identification is active
bFlyingSyncActive BOOL	"Flying restart function active" status signal ► Flying restart function (□ 208) TRUE Flying restart function is active

Identifier	DIS code data type	Value/meaning
bHlgLoad	BOOL	Control signal for an additional loading function of the ramp function generator • → L_NSet_1.bExternalCINH • To enable the ramp function generator to follow automatically when the controller is inhibited, for jerk-free setpoint connection.
		TRUE Set the ramp function generator to a setpoint of <i>nHlgSetValue_a</i>
nHlgSetValue_a	INT	Setpoint for an additional loading function of the ramp function generator • → L_NSet_1.nClnhVal_a • For speed-controlled drive tasks, the current actual speed value (e.g. in case of an active pulse inhibit, flying restart function, controller inhibit) is provided at this output. • Scaling: 16384 ≡ 100 % reference speed (C00011)
bHlgStop	BOOL	Control signal for stopping the ramp function generator (L_NSet_1)
		TRUE Stop the ramp function generator
bBrakeChopperActive	BOOL	Status signal of the internal brake chopper control
(from version 12.00.00)		► Control of multiple internal brake choppers in the DC-bus system (234)
		TRUE Internal brake chopper is switched-on.
nVoltageAngleAct_a	INT	Current electrical voltage output angle of the controller • Scaling: 16384 ≡ 360°
		(from version 13.00.00)
bLimSpeedTorquemodeOn	BOOL	Status signal of torque control with speed limitation
		(from version 13.00.00)
		TRUE Speed limitation for torque control is active.

5.14

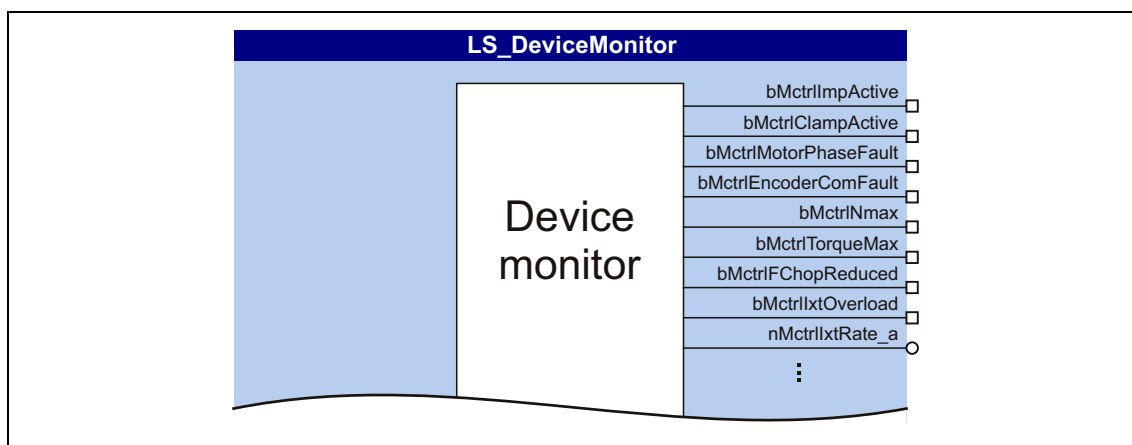
Internal status signals | System block "LS_DeviceMonitor"

The **LS_DeviceMonitor** system block provides the status signals of the motor control in the function block editor.

**Note!**

The **LS_DeviceMonitor** system block can only be inserted on the application level.

If status signals of the motor control function are to be output via digital outputs or example, you can use the free *bFreeOut1* ... *bFreeOut8* outputs of the application block to transfer the desired status signals from the application level to the I/O level. On the I/O level, you can then establish the logical link to the digital output terminals.



[5-32] LS_DeviceMonitor system block (excerpt)

Outputs

Identifier	Data type	Value/meaning	
bMctrlImpActive	BOOL	TRUE	Pulse inhibit is active
bMctrlClampActive	BOOL	TRUE	Clamp current limitation is active
bMctrlMotorPhaseFault	BOOL	Status of the Motor phase failure monitoring	
		TRUE	Motor phase fault has been detected
bMctrlEncoderComFault	BOOL	TRUE	Encoder error has been detected
bMctrlNmax	BOOL	TRUE	Max. speed limitation is active
bMctrlTorqueMax	BOOL	Status of the Maximum torque monitoring	
		TRUE	Max. torque limitation is active
bMctrlFChopReduced	BOOL	TRUE	PWM frequency reduction is active
bMctrlIxtOverload	BOOL	Status of the Device overload monitoring (Ixt)	
		TRUE	Device utilisation (Ixt) ≥ device utilisation threshold (C00123) • Lenze setting: C00123 = 100 %
nMctrlIxtRate_a	INT	Current device utilisation (Ixt) • Scaling: 16384 ≙ 100 %	

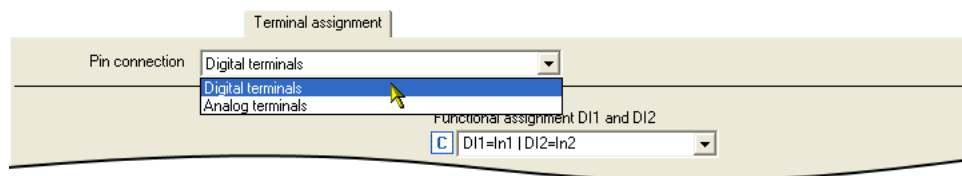
Identifier	Data type	Value/meaning
bMctrlI2xtOverload	BOOL	Status of the Motor overload monitoring (I2xt)
		TRUE Thermal motor overload (I^2_{xt}) $\geq$ motor overload setting (C00120) • Lenze setting: C00120 = 100 %.
nMctrlI2xtRate_a	INT	Current thermal motor load (I2xt) • Scaling: 16384 $\equiv$ 100 %
bMctrlMotorPTC	BOOL	Status of the Motor temperature monitoring (PTC)
		TRUE Temperature monitoring: An error has been detected
bMctrlMotorTemp	BOOL	TRUE Thermal motor overload
bMctrlHeatSinkTemp	BOOL	TRUE Thermal inverter overload • The heatsink temperature (display in C00061) has reached the maximally permissible temperature. The "oH1: Overtemperature heatsink" error message is pending and the "Fault" response is activated. • Furthermore, this output is set if the heatsink temperature has exceeded the maximally permissible temperature for the switching frequency set. A response with an "oH4: Heatsink temp. > switch-off temp. -5°C" error message can be set in C00582 . In the Lenze setting, no response will be effected.
bMctrlMainsFault	BOOL	Status of the Mains phase failure monitoring
		TRUE Mains phase failure/Mains failure
bMctrlFanFault	BOOL	TRUE Fan monitoring: An error has been detected
bMctrlNmaxForFChop	BOOL	TRUE The maximum field frequency for the respective switching frequency has been exceeded.
bMctrlShortCircuit	BOOL	TRUE Motor short circuit has been detected
bMctrlEarthFault	BOOL	TRUE Earth fault has been detected
bMctrlUVDetected	BOOL	TRUE An undervoltage has been detected
bMctrlOVDetected	BOOL	TRUE An overvoltage has been detected
bMctrlBrakeChopperFault	BOOL	Status of the Brake resistor monitoring (I2xt) • This output is set independent of the set error response of the monitoring function.
		TRUE The I^2_{xt} utilisation has reached the switch-off threshold set in C00572 . • Lenze setting: C00572 = 100 %.
wUB24V	WORD	Current 24 V supply voltage • Scaling: 1000 $\equiv$ 1.000 V
nMctrlActiveOutputPower_a	INT	Current active output power • Scaling: 16384 $\equiv$ double rated power of the controller (from version 14.00.00)
nMctrlApparentOutputPower_a	INT	Current apparent output power • Scaling: 16384 $\equiv$ double rated power of the controller (from version 14.00.00)
nMctrlCosinePhiAct_a	INT	Current cosine phi • Scaling: 16384 $\equiv$ cosine phi of 1.0 (from version 14.00.00)

Identifier	Data type	Value/meaning
bWirebreakUfLinearActive (from version 15.00.00)	BOOL	Status "V/f emergency operation due to encoder open circuit active" • The internal change-over to "V/f emergency operation" can be suppressed by setting bit 8 to "1" in C02864/1 .
		TRUE Due to an encoder open circuit, it is internally switched to the encoderless V/f characteristic control in order to avoid impermissible motor movements. This does not influence the setting in C00006 .

6 I/O terminals

This chapter provides information on the function, possible parameter settings, and technical data of the input/output terminals of the controller.

In the »Engineer«, the input and output terminals are parameterised on the **Terminal assignment** tab. To do this, go to the **Control terminals** list field and select the terminals that you wish to parameterise:



You can find further information in the respective subchapter:

- ▶ [Digital terminals](#) (📖 261)
- ▶ [Analog terminals](#) (📖 280)

**Note!**

The input and output terminals of the drive controller have already been functionally assigned in the default setting ("Lenze setting"). The preconfigured assignment depends on the technology application selected in [C00005](#) and the control mode selected in [C00007](#):

- TA "Actuating drive speed": [Terminal assignment of the control modes](#) (📖 309)
- TA "Switch-off positioning": [Terminal assignment of the control modes](#) (📖 369)



Wiring diagram, assignment and electrical data of the input and output terminals can be found in the **hardware manual 8400** in the chapter "technical data". The hardware manual is stored in electronic form on the data carrier supplied with the 8400 controller.

**Tip!**

How you can alter the preconfigured assignment of the input and output terminals is described in the chapter entitled "[User-defined terminal assignment](#)". (📖 289)

6.1 Digital terminals

The digital input terminals together with the digital output terminals are located on the X4 plug connector.

Digital input terminals

The drive controller has 4 parameterisable input terminals (DI1 ... DI4) for detecting digital signals. The RFR control input for enabling the controller is permanently connected to the device control unit.

Digital output terminals

The controller has

- a parameterisable output terminal (DO1) for outputting digital signals,
- a relay output (terminal strip X101),



Note!

Initialisation behaviour:

- After mains switching up to the start of the application, the digital output remains set to FALSE.

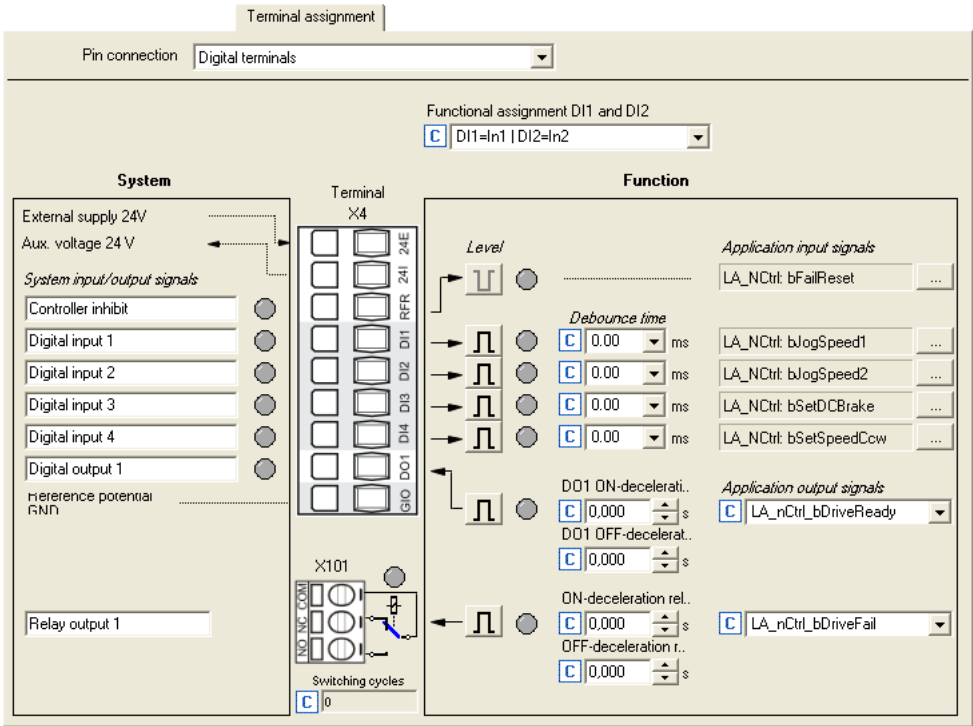
Exception handling:

- In case of a critical exception in the application (e.g. reset), the digital output is set to FALSE considering the terminal polarity parameterised in [C00118](#).

Switching cycle diagnostics of the relay:

- A reference for evaluating the wear limit can be obtained via the number of switching cycles of the relay displayed in [C00177/2](#).

Parameterisation dialog in the »Engineer«:



Button	Function
	Indicates the polarity of the input is HIGH active. The polarity can be changed from HIGH active to LOW active by clicking this button.
	Indicates that the polarity of the input is LOW active. The polarity can be changed from LOW active to HIGH active by clicking this button.
	Open the parameterising dialog for assigning application inputs to the digital input. ▶ Changing the terminal assignment with the »Engineer« (📘 293)

Short overview of the parameters for the digital terminals:

Parameter	Info	Lenze setting	
		Value	Unit
C00115/1	Fkt. DI 1/2 10kHz ▶ Change function assignment (📖 264)	0: DI1=In1 / DI2=In2	
Digital inputs DI1 ... DI4			
C00114	DigInX: Inversion	Bit coded	
C02830/1...4	DI1...DI4: Entprellzeit	1: 0.25	
C00443/1	Dlx: Terminal level	-	
C00443/2	Dlx: Output level	-	
Digital output DO1			
C00118	DigOutX: Inversion	Bit coded	
C00423/3	DO1 ON delay	0.000	s
C00423/4	DO1 OFF delay	0.000	s
C00444/1	DOx: Input level	-	
C00444/2	DOx: Terminal level	-	
Relay output			
C00423/1	Relay ON delay	0.000	s
C00423/2	Relay OFF delay	0.000	s
Digital outputs - terminal configuration			
C00621/1	LS_DigitalOutput:bRelay	1001: LA_nCtrl_bDriveFail	
C00621/2	LS_DigitalOutput:bOut1	1000: LA_nCtrl_bDriveReady	
Highlighted in grey = display parameter			

Related topics:

- [Configuring exception handling of the output terminals](#) (📖 288)
- [User-defined terminal assignment](#) (📖 289)

6.1.1 Change function assignment

The internal processing function of the digital input terminals DI1 and DI2 can be reconfigured in [C00115](#) if necessary. In this way, these input terminals can alternatively be used as frequency or counting inputs in order to implement the following functions:

- Detection of the input frequency
- Detection and processing of two unipolar input frequencies to one bipolar frequency
- Counting of input pulses
- Evaluation of the speed feedback (HTL encoder) for the motor control (speed-controlled operation)

C00115/1: Function assignment DI1 and DI2		Function assignment	
		DI1	DI2
0	DI1=In1 / DI2=In2	Digital input	Digital input
1	DI1=FreqIn12 / DI2=In2	Frequency input	Digital input
2	DI1&DI2=FreqIn (2-track)	Frequency input (2-track)	
3	(DI1/DI2=+-) = FreqIn12	Frequency input (speed)	Frequency input (direction)
4	DI1=CountIn1 / DI2=In2	Count input	Digital input



Note!

- In the Lenze setting of [C00115](#), the digital input terminals DI1 and DI2 have been configured as "normal" digital inputs.
- The digital input terminals DI3 ... DI4 are basically designed as "normal" digital inputs.
- Very high pulse frequencies can be measured at the DI1 and DI2 input terminals if the latter have been configured as frequency or counting inputs in [C00115](#). Scanning is then carried out within less than μs instead of the otherwise usual scanning rate of 1 kHz (1 ms).

You can find detailed information on the respective function assignment in the following subchapters:

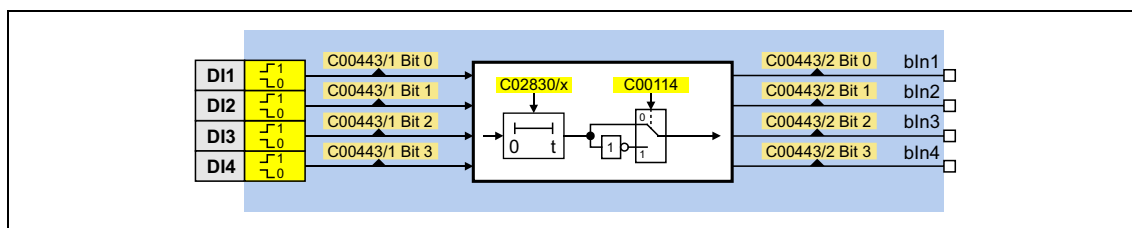
- ▶ [Using DI1 and DI2 as digital inputs](#) (265)
- ▶ [Using DI1 and DI2 as frequency inputs](#) (266)
- ▶ [Using DI1 as counting input](#) (270)

6.1.1.1 Using DI1 and DI2 as digital inputs

Function assignment 0: DI1=In1 / DI2=In2

With this setting in [C00115](#), the digital input terminals have been configured as "normal" digital inputs.

- For each digital input, the debounce time ([C02830/1...4](#)) and the terminal polarity ([C00114](#)) can be set individually.
- The current terminal level at the input of the internal processing function is shown in [C00443/1](#) in bit-coded form.
- The output level for the application is shown in [C00443/2](#) in bit-coded form.

**Internal interfaces to the application**

- Relevant outputs at the [LS_DigitalInput](#) system block:

Output	Value/meaning
DIS code data type	
bIn1 ... bIn4 C00443/2 BOOL	Digital input DI1 ... DI4

Related topics:

- ▶ [Using DI1 and DI2 as frequency inputs](#) (266)
- ▶ [Using DI1 as counting input](#) (270)
- ▶ [Internal interfaces | System block "LS_DigitalInput"](#) (273)

6.1.1.2 Using DI1 and DI2 as frequency inputs

General information on using the input terminals as frequency inputs

The frequency inputs serve to detect HTL encoders with any number of increments and single-track and two-track signals. Single-track signals can be evaluated with or without rotation signal.



Note!

- Make sure that, when motor control with speed feedback is in use, the maximum input frequency of the respective input terminal is not exceeded.
 - DI1/DI2: $f_{\max} = 10 \text{ kHz}$
- If the encoder signal is used as an actual speed value:
Number of encoder pulses / revolution $\leq 8192!$

Example of DI1/DI2 (in accordance with the preceding note):

- Encoder increment: 512 pulses / motor revolution
- Reference speed (C00011): 1500 rpm
- Speed setpoint: 100 %

$$\text{Input frequency} = \frac{1500 \text{ rpm}}{60 \text{ s}} \times 512 \text{ pulses} = 12800 \text{ pulses/s} = 12.8 \text{ kHz}$$

- Result: The speed or the number of increments is too high!

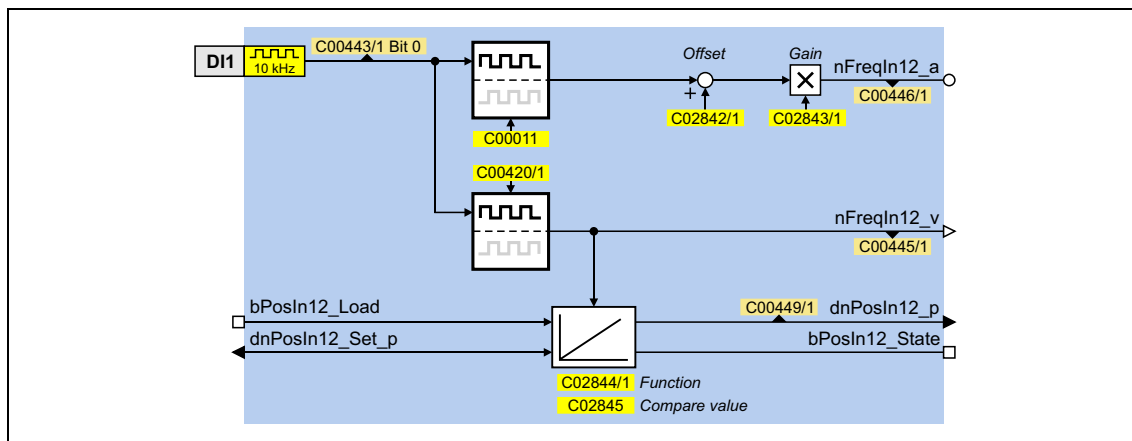


Tip!

From version 06.00.00 onwards, the [LS_DigitalInput](#) system block can also provide the encoder position. Detailed information on this topic is provided in chapter "[Output of the encoder position of the DI1/DI2 frequency input](#)". (📖 275)

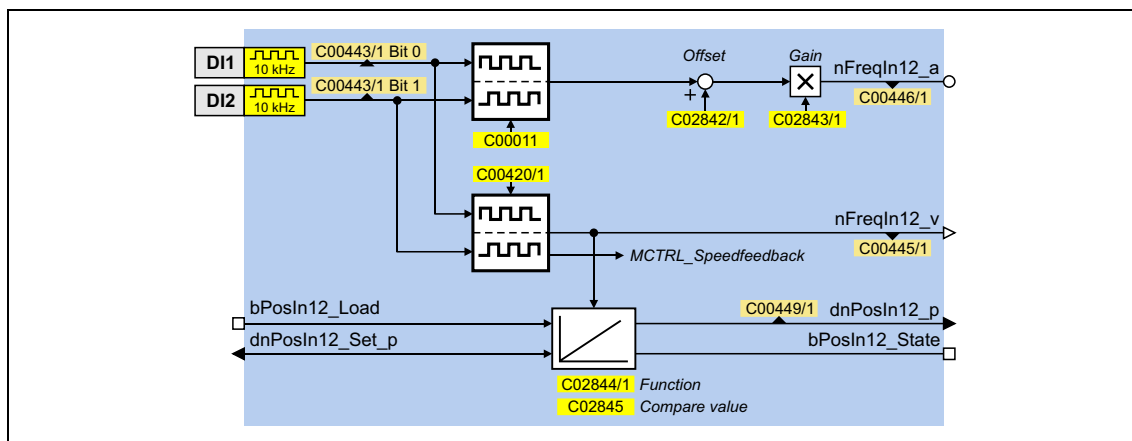
Function assignment 1: DI1=FreqIn / DI2=In

This setting in [C00115](#) configures the input terminal DI1 as frequency input. The input terminal DI2 remains configured as "normal" digital input..



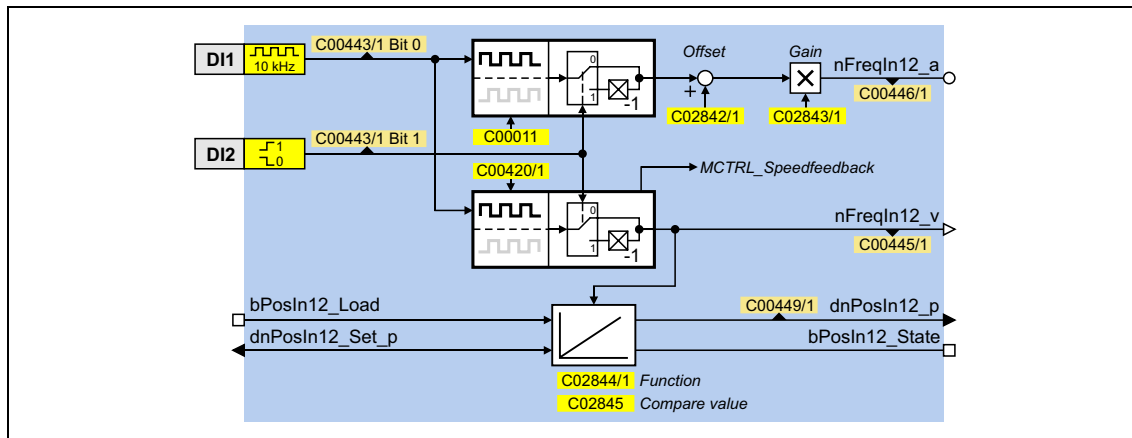
Function assignment 2: DI1&DI2=FreqIn (2-track)

This setting in [C00115](#) can be used to connect a two-track encoder to the DI1/DI2 terminals.



Function assignment 3: DI1=FreqIn / DI2=direction

This setting in [C00115](#) can be used to connect a single-track encoder to terminals DI1/DI2. For this purpose, the rotation speed is evaluated via terminal DI1 and the direction of rotation of the encoder (LOW level $\equiv$ CW direction of rotation) is evaluated via the DI2 terminal.



Short overview of the parameters for the frequency inputs:

Parameter	Info	Lenze setting	
		Value	Unit
C00011	Appl.: Reference speed	1500	rpm
Frequency input DI1/DI2			
C00115/1	Fkt. DI 1/2 10kHz	0: DI1=In1 / DI2=In2	
C00420/1	Encoder increments at FreqIn12	128	Incr./rev.
C02842/1	FreqIn12: Offset	0.00	%
C02843/1	FreqIn12: Gain	100.00	%
C02844/1	PosIn12: Function	Loading with level	
C02845	PosIn12: Comparison value	0	
C00443/1	Dlx: Terminal level	-	
C00445/1	FreqIn12_nOut_v	-	Incr/ms
C00446/1	FreqIn12_nOut_a	-	%
C00449/1	FreqIn12_dnOut_p	-	Incr
Highlighted in grey = display parameter			

Internal interfaces to the application

- Relevant inputs at the [LS_DigitalInput](#) system block:

Input	Data type	Information/possible settings
Frequency input DI1/DI2		
bPosIn12_Load (from version 06.00.00)	BOOL	Load angle integrator with starting value and reset status signal
		TRUE Angle integrator is loaded with the value at <i>dnPosIn12_Set_p</i> and <i>bPosIn12_State</i> is reset to FALSE.
dnPosIn12_Set_p (from version 06.00.00)	DINT	Starting value for angle integrator

- Relevant outputs at the [LS_DigitalInput](#) system block:

Output	Data type	Value/meaning
Frequency input DI1/DI2		
nFreqIn12_a C00446/1	INT	Output frequency as scaled analog signal in [%]
nFreqIn12_v C00445/1	INT	Output frequency as speed signal in [inc/ms]

Related topics:

- ▶ [Output of the encoder position of the DI1/DI2 frequency input](#) (📖 275)
- ▶ [Using DI1 and DI2 as digital inputs](#) (📖 265)
- ▶ [Using DI1 as counting input](#) (📖 270)
- ▶ [Internal interfaces | System block "LS_DigitalInput"](#) (📖 273)

6.1.1.3 Using DI1 as counting input

General information on use as a counting input

The counting input is used for counting fast edges. A 32-bit counter counts from a parameterisable starting value up to a parameterisable comparison value and then outputs a corresponding status signal.

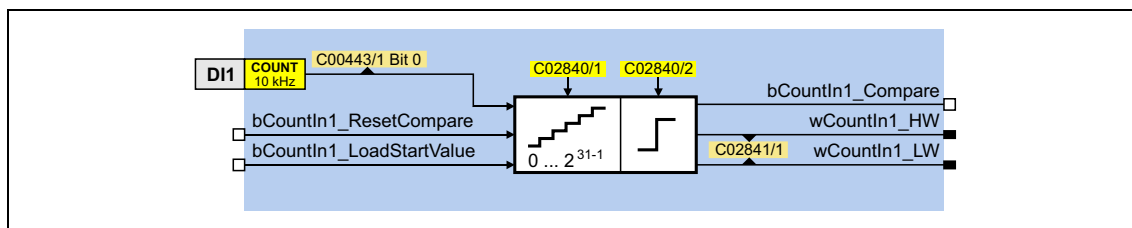
- Possible counting range: $0 \dots 2^{31} - 1$ (0 ... 2147483647)

**Note!**

- The starting value must have been set so that it is smaller than the comparison value. Otherwise, the counter will be kept at the starting value because the condition "Count value $\geq$ Comparison value" has been satisfied.
- Note the maximum input frequency of the input terminal:
 - DI1: $f_{\max} = 10 \text{ kHz}$

Function assignment 4: DI1=CountIn / DI2=In

This setting in [C00115](#) configures the input terminal DI1 as counting input. The input terminal DI2 remains configured as "normal" digital input..

**Short overview of parameters for the counting inputs:**

Parameter	Info	Lenze setting	
		Value	Unit
Counting input DI1			
C00115/1	Fkt. DI 1/2 10kHz	0: DI1=In1 / DI2=In2	
C00621/3	LS_DigitalInput: bCountIn1_Reset	0: Not connected	
C00621/4	LS_DigitalInput: bCountIn1_LoadStartValue	0: Not connected	
C02840/1	CountIn1: Starting value	0	incr
C02840/2	CountIn1: Comparison value	65535	incr
C02841/1	CountIn1: Counter content	-	incr
C00443/1	Dlx: Terminal level	-	
Highlighted in grey = display parameter			

Internal interfaces to the application

- Relevant inputs at the [LS_DigitalInput](#) system block:

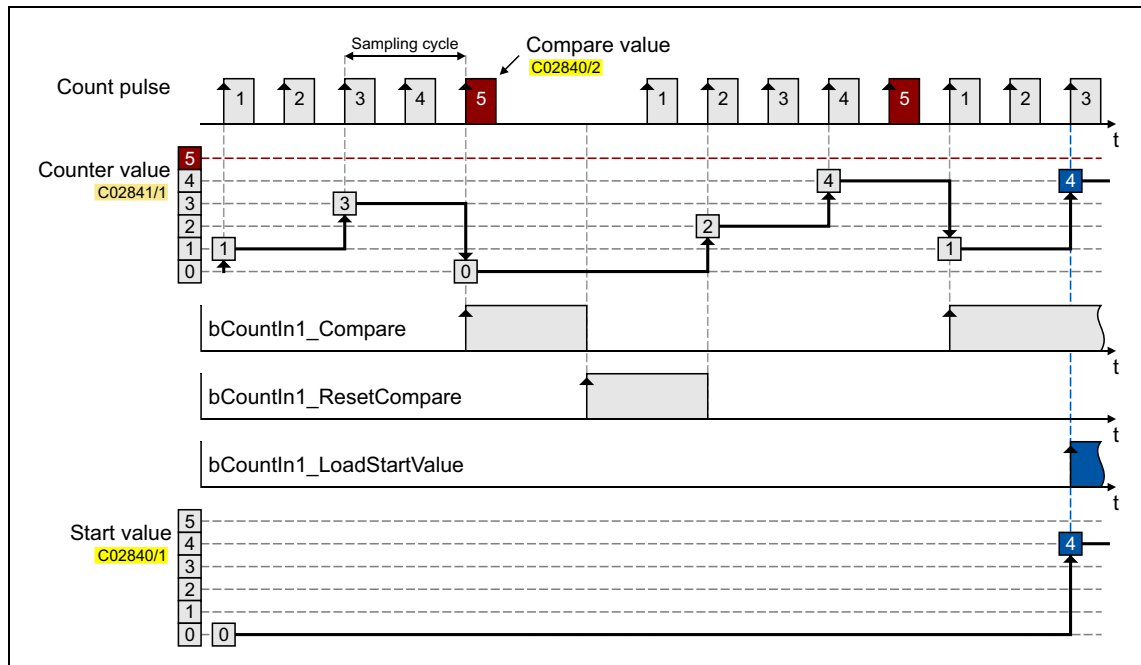
Identifier DIS code data type	Information/possible settings	
Counting input DI1		
bCountIn1_ResetCompare BOOL	Reset status signal "Comparison value reached"	
	FALSE↗TRUE	The output <i>bCountIn1_Compare</i> is reset to FALSE.
bCountIn1_LoadStartValue BOOL	Load starting value into counter	
	FALSE↗TRUE	The starting value set in C02840/1 is accepted as the current count value.

- Relevant outputs at the [LS_DigitalInput](#) system block:

Identifier	Value/meaning	
DIS code data type		
Counting input DI1		
bCountIn1_Compare BOOL	Status signal "Comparison value reached"	
	FALSE	Current count value < comparison value (C02840/2)
	TRUE	Current count value ≥ comparison value (C02840/2)
wCountIn1_HW wCountIn1_LW C02841/1 WORD	Current count value - Output as High and Low word (without sign) - Possible counting range: 0 ... 2³¹ - 1	

Counting behaviour

The following temporal characteristic shows the counting process depending on the signals of the interfaces described before:



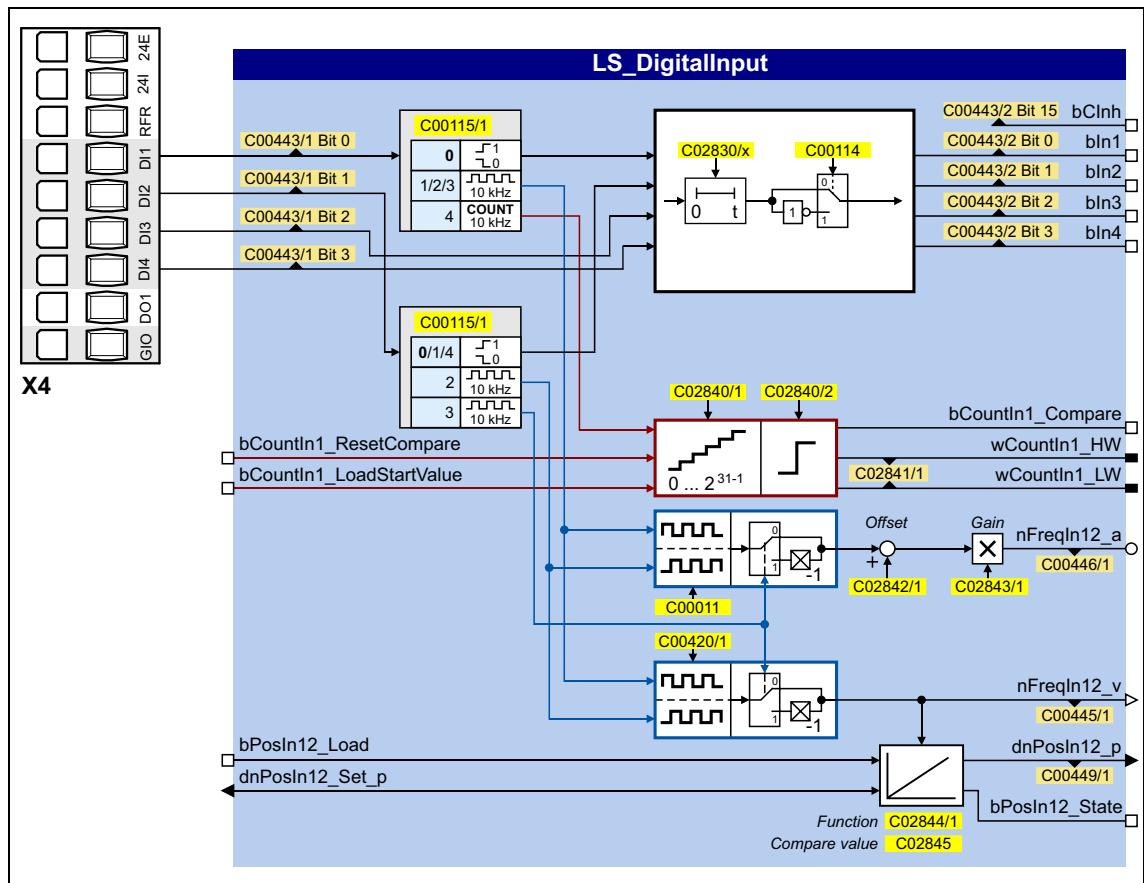
[6-1] Transient characteristic of a quick counter block, sampling cycle = 1 ms

- The counter starts with the parameterised starting value.
- If the comparison value is reached or exceeded:
 - The counter jumps back to its starting value.
 - The *bCount1_Compare* output is set to TRUE.
- If there is a FALSE/TRUE edge at the *bCountIn1_ResetCompare* input, the *bCountIn1_Compare* output can be reset to FALSE.
- If there is a FALSE-TRUE edge at the input *bCountIn1_LoadStartValue*, the current counter content can be reset to the parameterised starting value.

Related topics:

- ▶ [Using DI1 and DI2 as digital inputs](#) (265)
- ▶ [Using DI1 and DI2 as frequency inputs](#) (266)
- ▶ [Internal interfaces | System block "LS_DigitalInput"](#) (273)

- The internal processing function of the digital DI1/2 input terminals can be reconfigured in [C00115](#) if necessary. These input terminals can then be alternatively used as frequency inputs or counting inputs.
- The DI3 ... DI4 input terminals are basically designed as "normal" digital inputs.



Inputs

Identifier DIS code data type	Information/possible settings
Counting input DI1	► Using DI1 as counting input
bCountIn1_ResetCompare BOOL	Reset status signal "Comparison value reached" FALSE → TRUE The output <i>bCountIn1_Compare</i> is reset to FALSE.
bCountIn1_LoadStartValue BOOL	Load starting value into counter FALSE → TRUE The starting value set in C02840/1 is accepted as the current count value.
Frequency input DI1/DI2	► Output of the encoder position of the DI1/DI2 frequency input
bPosIn12_Load (from version 06.00.00) BOOL	Load angle integrator with starting value and reset status signal TRUE Angle integrator is loaded with the value at <i>dnPosIn12_Set_p</i> and <i>bPosIn12_State</i> is reset to FALSE.
dnPosIn12_Set_p (from version 06.00.00) DINT	Starting value for angle integrator

Outputs

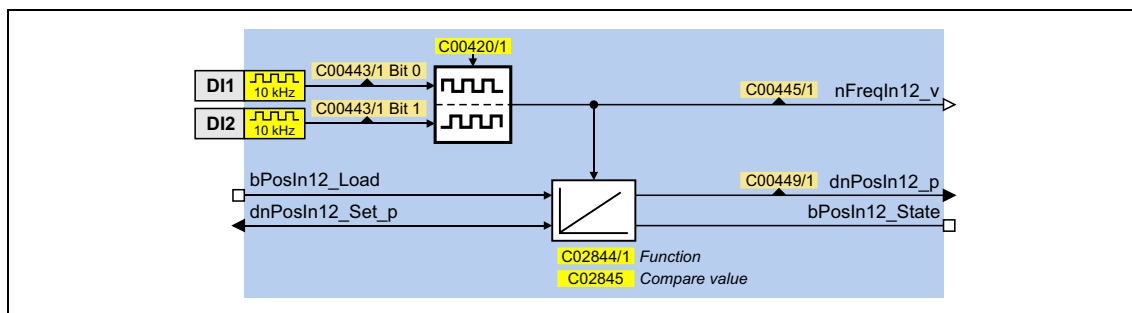
Identifier DIS code data type	Value/meaning
bCInh C00443/2 BOOL	RFR digital input (controller enable)
Digital inputs DI1 ... DI4	► Using DI1 and DI2 as digital inputs
bln1 ... bln4 C00443/2 BOOL	Digital input DI1 ... DI4
Counting input DI1	► Using DI1 as counting input
bCountIn1_Compare BOOL	Status signal "Comparison value reached" FALSE Current count value < comparison value (C02840/2) TRUE Current count value ≥ comparison value (C02840/2)
wCountIn1_HW wCountIn1_LW C02841/1 WORD	Current count value • Output as High and Low word (without sign) • Possible counting range: 0 ... $2^{31} - 1$
Frequency input DI1/DI2	► Using DI1 and DI2 as frequency inputs
nFreqIn12_a C00446/1 INT	Output frequency as scaled analog signal in [%]
nFreqIn12_v C00445/1 INT	Output frequency as speed signal in [inc/ms]
dnPosIn12_p (from version 06.00.00) DINT	Angle output signal • 65536 [incr.] ≡ 1 encoder revolution • Overflow is possible (display via <i>bPosIn12_State</i>)
bPosIn12_State (from version 06.00.00) BOOL	Status signal "Overflow occurred/distance processed" • Status signal can be reset via <i>bPosIn12_Load</i> . TRUE Overflow has occurred or distance is processed.

6.1.2.1 Output of the encoder position of the DI1/DI2 frequency input

This function extension is available from version 06.00.00!

The [LS DigitalInput](#) system block has been extended by the integrator function for providing the encoder position.

- The integrator can take max. ± 32000 encoder revolutions.
- The starting position can be loaded via inputs.
- The internal function can be set via parameters.
- In addition to the encoder position, the "Overflow occurred/distance processed" status signal is provided.



Inputs

Identifier DIS code data type	Information/possible settings
bPosIn12_Load BOOL	Load angle integrator with starting value and reset status signal TRUE Angle integrator is loaded with the value at <i>dnPosIn12_Set_p</i> and <i>bPosIn12_State</i> is reset to FALSE.
dnPosIn12_Set_p DINT	Starting value for angle integrator

Outputs

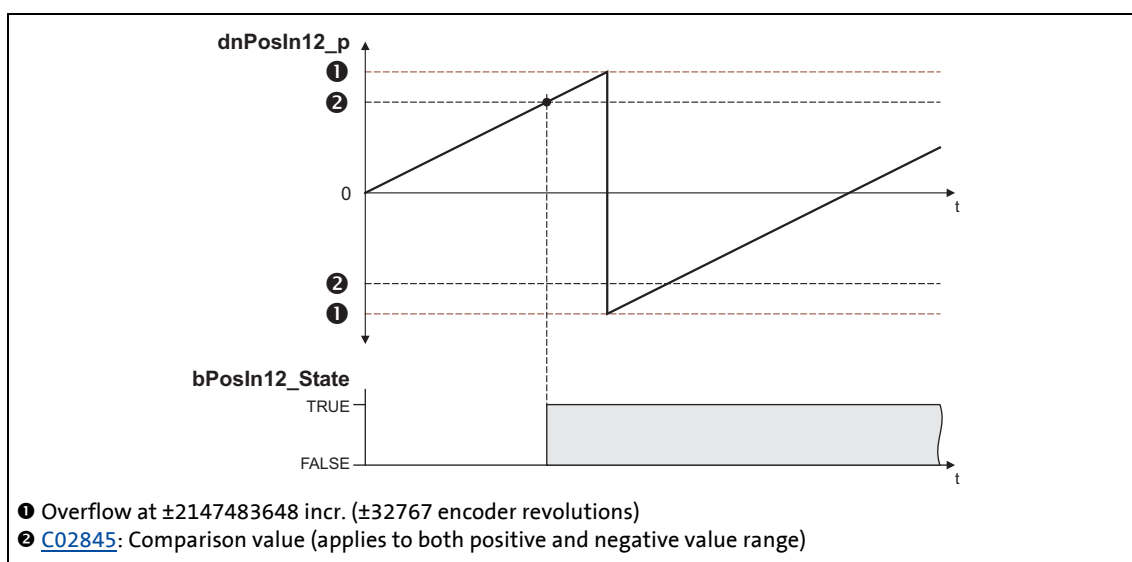
Identifier DIS code data type	Value/meaning
dnPosIn12_p DINT	Angle output signal • 65536 [incr.] $\equiv$ 1 encoder revolution • Overflow is possible (display via <i>bPosIn12_State</i>)
bPosIn12_State BOOL	Status signal "Overflow occurred/distance processed" • Status signal can be reset via <i>bPosIn12_Load</i> . TRUE Overflow has occurred or distance is processed.

Parameter

Parameter	Possible settings			Info
C02844/1				Function
	0	Loading with level		Load integrator with TRUE level at the <i>bPosIn12_Load</i> input (Lenze setting).
	1	Loading with edge		Load integrator with FALSE/TRUE edge at the <i>bPosIn12_Load</i> input.
	2	Loading with level + reset		Load integrator when reaching the comparison value or with TRUE level at the <i>bPosIn12_Load</i> input.
C02845	0		2000000000	Comparison value • Is valid for both the positive and the negative value range. • Lenze setting: 0

Function at constant input value

Selection: [C02844/1](#) = "0: Loading with level" or "1: Loading with edge"



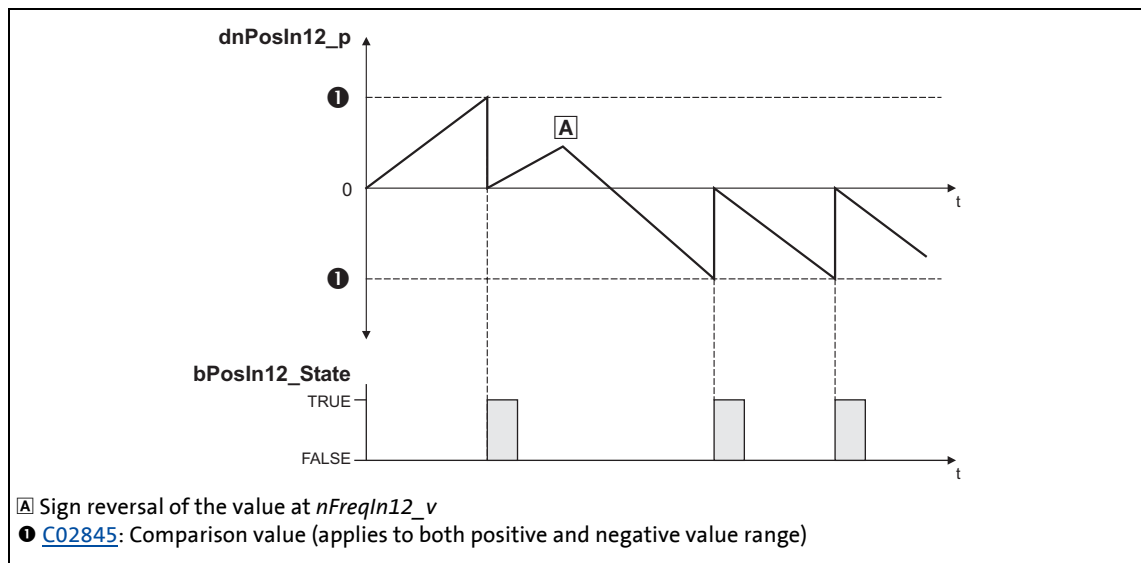
[6-2] Switching performance if the overflow is in the positive direction

- If "0: Loading with level" is selected in [C02844/1](#), the *bPosIn12_Load* input is status-controlled: In case of a TRUE signal, the integrator is loaded with the value at *dnPosIn12_Set_p* and the *bPosIn12_State* output is set to FALSE.
- If "1: Loading with edge" is selected in [C02844/1](#), the *bPosIn12_Load* input is edge-controlled: In case of a FALSE/TRUE edge, the integrator is loaded with the value at *dnPosIn12_Set_p* and then immediately continues to integrate, the *bPosIn12_State* output is set to FALSE.
- A positive *nFreqIn12_v* signal is incremented (the counter content is increased with every cycle).
- A negative *nFreqIn12_v* signal is decremented (the counter content is reduced with every cycle).

- *dnPosIn12_p* provides the counter content of the bipolar integrator.
 - If the counter content exceeds a value of +32767 encoder revolutions (corresponds to +2147483647 incr.), an overflow occurs and the counting process continues at a value of -32768 encoder revolutions.
 - If the counter content falls below a value of -32768 encoder revolutions (corresponds to -2147483648 incr.), an overflow occurs and the counting process starts at a value of +32767 encoder revolutions.
- *bPosIn12_State* is set to TRUE if the comparison value set in [C02845](#) has been reached.

Function at input value with sign reversal

Selection: [C02844/1](#) = "2: Loading with level + reset"



[6-3] Switching performance if the input signal changes signs

- If "2: Loading with level + reset" is selected in [C02844/1](#), the *bPosIn12_Load* input is status-controlled: In case of a TRUE signal, the integrator is loaded with the value at *dnPosIn12_Set_p* and the *bPosIn12_State* output is set to FALSE.
- A positive *nFreqIn12_v* signal is incremented (the counter content is increased with every cycle).
- A negative *nFreqIn12_v* signal is decremented (the counter content is reduced with every cycle).
- *dnPosIn12_p* provides the counter content of the bipolar integrator.
 - If the positive counter content is higher than the comparison value set in [C02845](#), the comparison value will be subtracted from the counter content, and *bPosIn12_State* will be set to TRUE for one task cycle.
 - If the negative counter content is lower than the comparison value set in [C02845](#), the comparison value will be added to the counter content, and *bPosIn12_State* will be set to TRUE for one task cycle.

Calculation of the output signal

The output value at *dnPosIn12_p* is calculated as per the formula below:

$$\text{dnPosIn12\_p [incr.]} = \text{nFreqIn12\_v [rpm]} \cdot t [\text{s}] \cdot 65535 [\text{incr./rev.}]$$

t = integration time

16384 $\approx$ 15000 rpm

1 $\approx$ 1 incr.

Example

You want to determine the counter content of the integrator at a certain speed at the input and a certain integration time *t*.

Given values:

- *nFreqIn12_v* = 1000 rpm $\approx$ integer value 1092
- Integration time *t* = 10 s
- Starting value of the integrator = 0

Solution:

- Conversion of the *nFreqIn12_v* input signal:

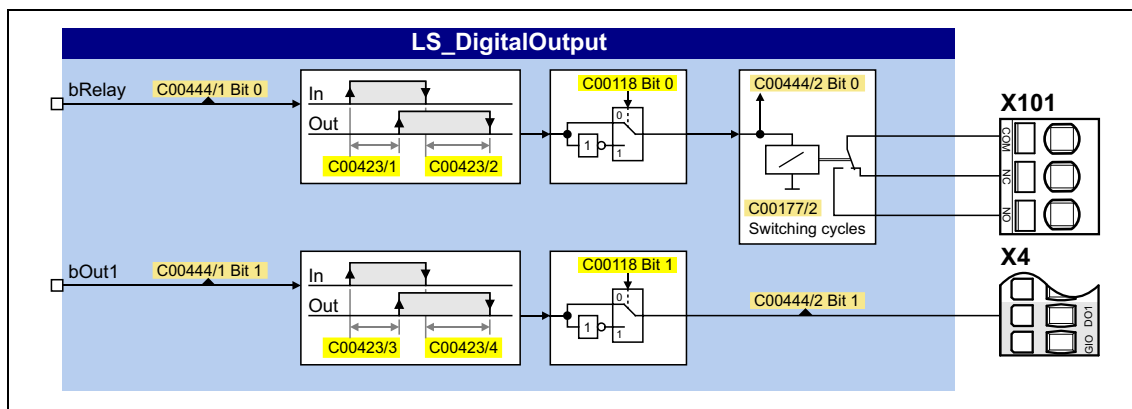
$$1000 \text{ rpm} = \frac{1000 \text{ rev.}}{60 \text{ s}}$$

- Calculation of the output value:

$$\text{dnPosIn12\_p} = \frac{1000 \text{ rev.}}{60 \text{ s}} \cdot 10 \text{ s} \cdot \frac{65535 \text{ incr.}}{\text{Rev.}} = 10922666 \text{ incr.}$$

6.1.3 Internal interfaces | System block "LS_DigitalOutput"

The **LS_DigitalOutput** system block maps the digital output terminals in the FB editor.



Input	Information/possible settings
bRelay C00444/1 BOOL	Relay output (potential-free two-way switch)
bOut1 C00444/1 BOOL	DO1 digital output

6.2 Analog terminals

The analog input terminals together with the analog output terminals are located on the X3 plug connector.

Analog input terminals

The drive controller has two analog input terminals for detecting one current signal and one voltage signal:

- Voltage signal in the ± 10 V range
The voltage signal can be e.g. an analog speed setpoint or the signal of an external sensor (temperature, pressure, etc.).
- Current signal in the $0/+ 4 \dots + 20$ mA range
For open-circuit monitoring, the current signal can be evaluated with regard to "Life Zero" or "Dead Zero":
 - $0 \dots 20$ mA, without open-circuit monitoring
 - $4 \dots 20$ mA, with open-circuit monitoring



Note!

To avoid undefined states, free input terminals of the controller must be assigned as well, e.g. by applying 0 V to the terminal.

Analog output terminal

The controller has an analog output terminal for outputting an analog voltage signal (O1U).



Note!

Initialisation behaviour:

- After mains switching up to the start of the application, the analog output remains set to 0 V.

Exception handling:

- In case of a critical exception in the application (e.g. reset), the analog output is set to 0 V.

Parameterisation dialog in the »Engineer«:

The screenshot shows the 'Terminal assignment' dialog with the 'Pin connection' set to 'Analog terminals'. The dialog is divided into two main sections: 'System' and 'Function'.

System Section:

Signal name	Value
10 V reference (max 10 mA)	← [C] 0,00 V
Analog input 1	[C] 0,00 mA
Ground analog signals	
Analog output 1	[C] 0,00 V

Terminal Section:

Terminal X3

Pin 1: 01U GA A1U AU AR

Function Section:

Setting	Value	Application signal name
→	[C] 0,00 %	LA_NCtrl: nMainSetValue_a ...
←	[C] 0,00 %	[C] LA_nCtrl_nMotorSpeedAct_a

Button	Function
	Parameterising analog input (📖 282)
	Parameterising analog output (📖 286)
	Open the parameterising dialog for assigning application inputs to the analog input. ▶ Changing the terminal assignment with the »Engineer« (📖 293)

Short overview of parameters for the analog terminals:

Parameter	Info	Lenze setting	
		Value	Unit
Analog input 1			
C00028/1	AIN1: Input voltage	-	V
C00029/1	AIN1: Input current	-	mA
C00033/1	AIN1: Output value (to application)	-	%
Analog output 1			
C00439/1	O1U: Input value (from application)	-	%
C00436/1	O1U: Voltage	-	V
Analog output 1 - terminal assignment			
C00620/1	LS_AnalogOutput: nOut1_a (V)	1003: LA_nCtrl_nMotorSpeedAct_a	
Highlighted in grey = display parameter			

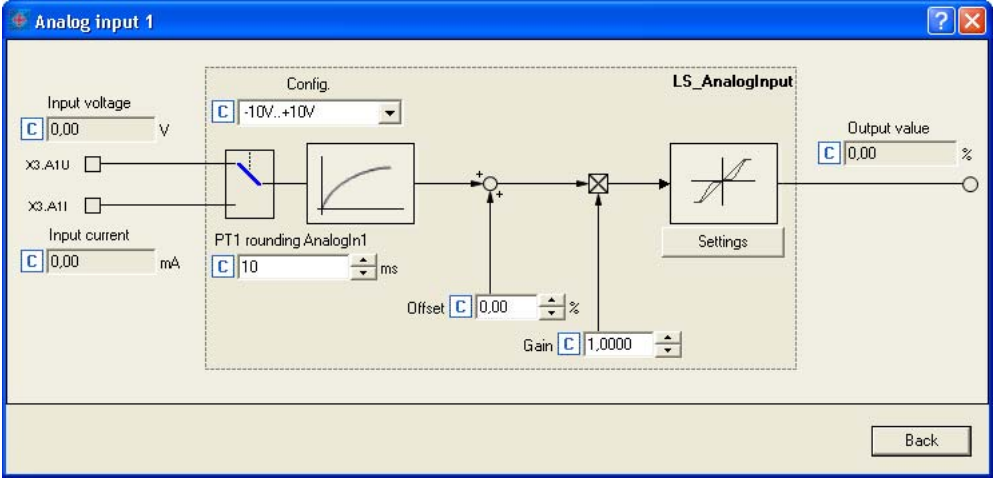
Related topics:

- ▶ [Configuring exception handling of the output terminals](#) (📖 288)
- ▶ [User-defined terminal assignment](#) (📖 289)

6.2.1

Parameterising analog input

By clicking on the  button on the **Terminal assignment** tab, you reach the parameterising dialog for the analog input:



Short overview of the parameters for the analog input:

Parameter	Info	Lenze setting	
		Value	Unit
Analog input 1			
C00034/1	AIN1: Config.	0: -10V..+10V	
C00026/1	AIN1: Offset	0.00	%
C00027/1	AIN1: Gain	1.0000	
C00028/1	AIN1: Input voltage	-	V
C00029/1	AIN1: Input current	-	mA
C00033/1	AIN1: Output value (to application)	-	%
C00440/1	PT1 rounding AnalogIn1	10	ms
C00598/1	Resp. to open circuit AIN1	3: TroubleQuickStop	
Highlighted in grey = display parameter			

Using current input A1I

In the Lenze setting, voltage signals in the range of ± 10 V are evaluated via the A1U input terminal. If current signals are detected via the A1I input terminal instead, the selection "1: 0...20mA" or "2: 4...20mA" is to be set in [C00034](#).

**Tip!**

By selecting "2: 4...20mA", you can implement a 4 ...20 mA current loop, e.g. for stipulation of the speed setpoint.

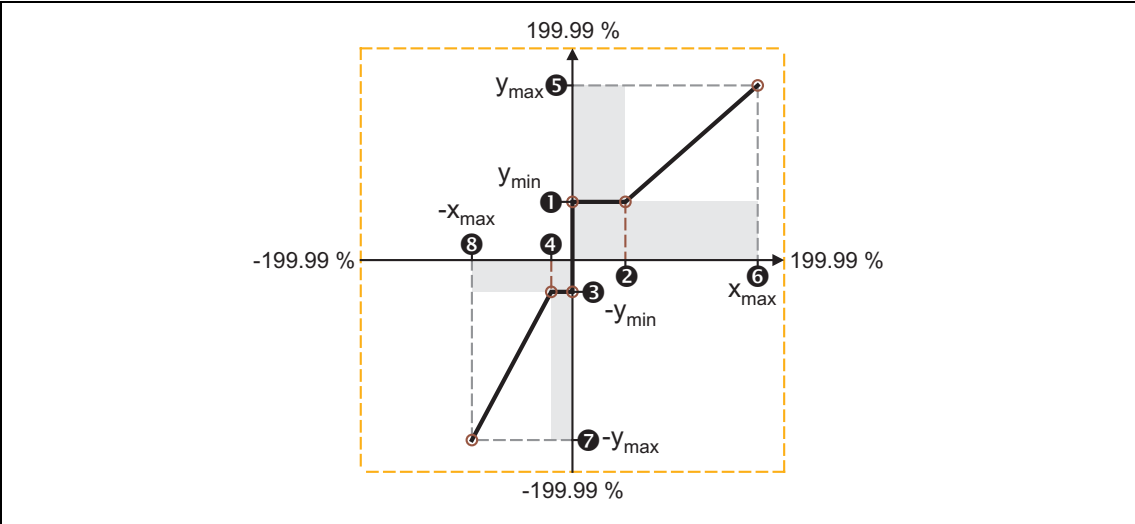
Open-circuit monitoring

In the case of configuration as a 4 ... 20 mA current loop, the fault response set in [C00598](#) takes place in the event of a wire breakage (Lenze setting: "TroubleQuickStop").

6.2.1.1 Signal adaptation by means of characteristic

This function extension is only available from version 04.00.00!

According to the illustration below, an individual characteristic can be parameterised for the analog input via the subcodes of [C00010](#) to provide different slopes and a dead band. Here, the input signal corresponds to the X axis and the output signal corresponds to the Y axis:



[6-4] Characteristic for analog inputs

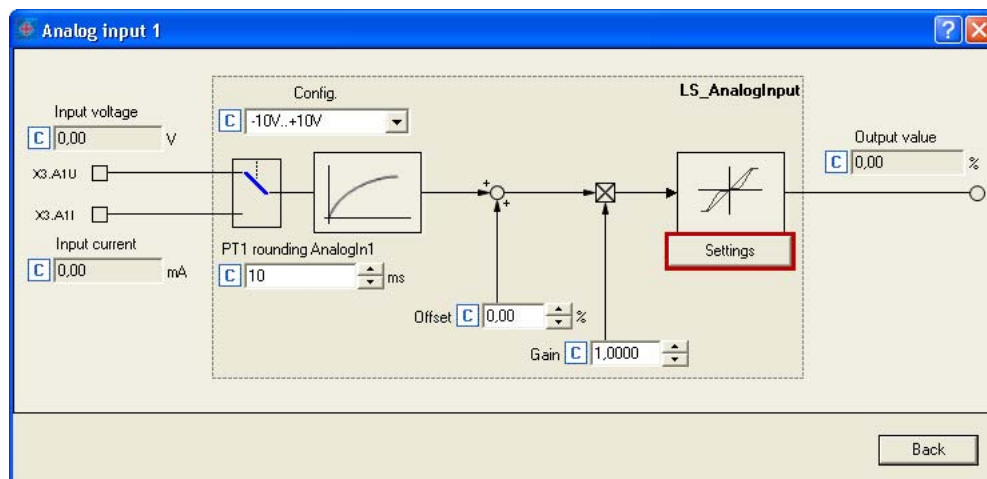
Parameter	Info	Lenze setting	
		Value	Unit
C00010/1	➊ AIN1: (+y0) = min	0.00	%
C00010/2	➋ AIN1: (+x0) = Dead band	0.00	%
C00010/3	➌ AIN1: (-y0) = (-min)	0.00	%
C00010/4	➍ AIN1: (-x0) = (-Dead band)	0.00	%
C00010/5	➎ AIN1: (+y_max)	199.99	%
C00010/6	➏ AIN1: (+x_max)	199.99	%
C00010/7	➐ AIN1: (-y_max)	199.99	%
C00010/8	➑ AIN1: (-x_max)	199.99	%

In the »Engineer«, there is a parameterising dialog for entering the characteristic. This dialog also displays the set characteristic graphically.

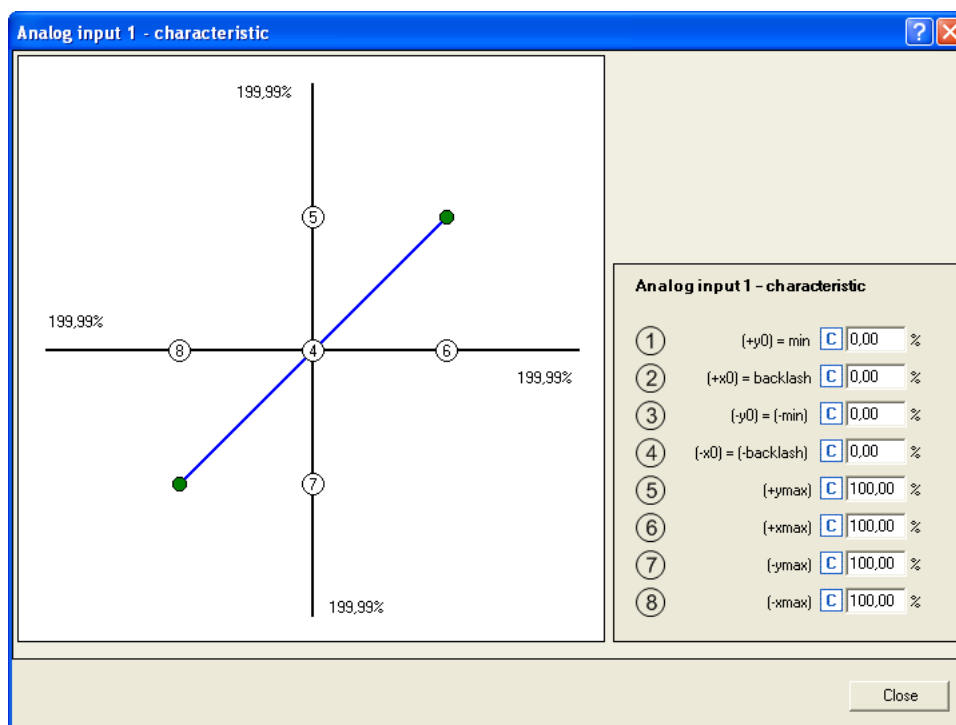


Proceed as follows to open the dialog for parameterising the characteristic:

1. Go to the **Terminal assignment** tab and select the "Analog terminals" entry in the **Control connections** list field.
2. Click on the  button for the analog input in order to open the *Analog input* dialog.



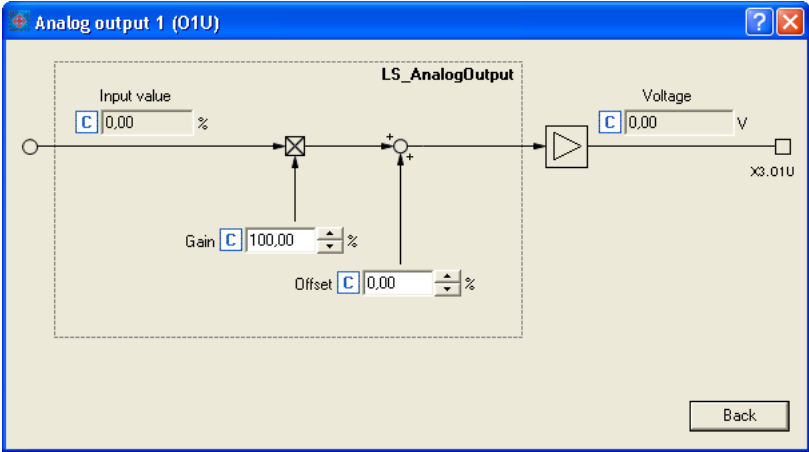
3. Click on the **Settings** button in order to open the *Analog input - Characteristic* dialog box:



6.2.2

Parameterising analog output

By clicking on the  button on the **Terminal assignment** tab, you reach the parameterising dialog for the analog output:

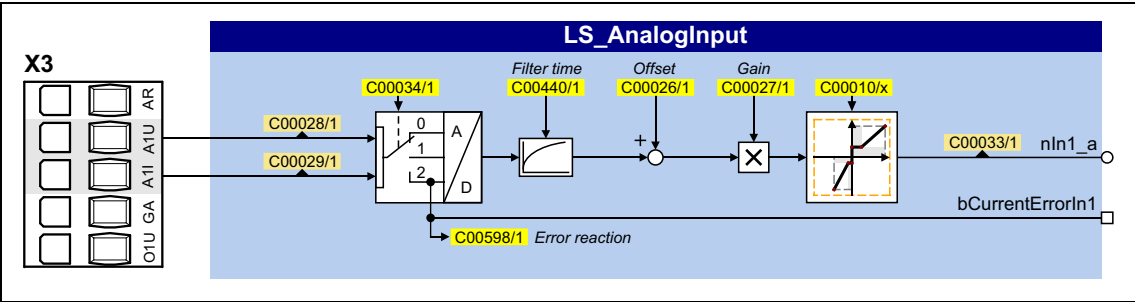


Short overview of parameters for the analog output:

Parameter	Info	Lenze setting	
		Value	Unit
Analog output 1			
C00434/1	O1U: Gain	100.00	%
C00435/1	O1U: Offset	0.00	%
C00439/1	O1U: Input value (from application)	-	%
Highlighted in grey = display parameter			

6.2.3 Internal interfaces | System block "LS_AnalogInput"

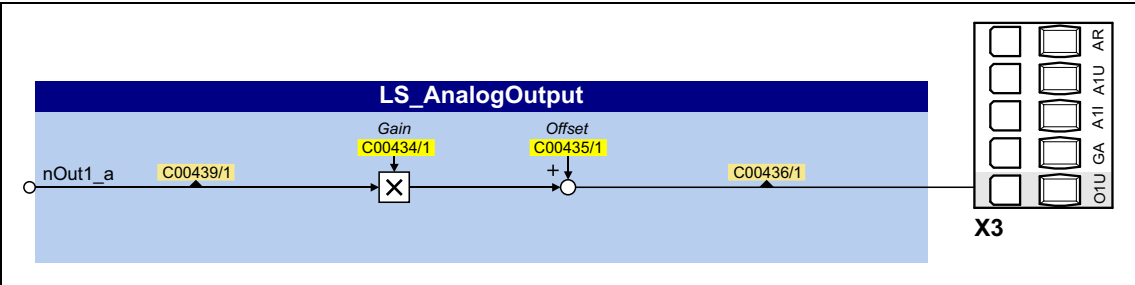
The LS_AnalogInput system block displays the analog input in the FB Editor.



Output	Data type	Value/meaning
nIn1_a	C00033/1 INT	Analog input 1 - Scaling: $\pm 2^{14} \equiv \pm 10$ V for use as voltage input $+2^{14} \equiv +20$ mA for use as current input
bCurrentErrorIn1	BOOL	Status signal "Current input error" - Only when analog input 1 is used as current input. - Application: Cable-breakage monitoring of the 4 ...20 mA circuit.
		TRUE $ I_{AIN1} < 4$ mA

6.2.4 Internal interfaces | System block "LS_AnalogOutput"

The LS_AnalogInput system block maps the analog output in the FB editor.



Input	Data type	Information/possible settings
nOut1U_a	INT	Analog output 1 Scaling: $2^{14} \equiv 16384 \equiv 10$ V

6.3

Configuring exception handling of the output terminals

This function extension is only available from version 04.00.00!

Exception handling for the analog and digital output terminals in the event of an error can be set via decoupling configuration and decoupling values.

- Bit coded selection is carried out in [C00441](#) for the analog output terminal, defining the events that will trigger decoupling.
- Bit coded selection is carried out in [C00447](#) for the digitale output terminal, defining the events that will trigger decoupling.

Bit	Event
Bit 0 ☐	SafeTorqueOff
Bit 1 ☐	ReadyToSwitchOn
Bit 2 ☐	SwitchedOn
Bit 3 ☐	Reserved
Bit 4 ☐	Trouble
Bit 5 ☐	Fault
Bit 6 ☐	Reserved
Bit 7 ☐	Reserved
Bit 8 ☐	Reserved
Bit 9 ☐	Fail CAN_Management
Bit 10 ☐	Reserved
Bit 11 ☐	Reserved
Bit 12 ☐	Reserved
Bit 13 ☐	Reserved
Bit 14 ☐	Reserved
Bit 15 ☐	Reserved

Finally, the following parameters define the value/status that the output terminals are to have when they are decoupled:

Parameter	Info	Lenze setting	
		Value	Unit
C00442/1	AOut1_U: Decoupling value	0.00	%
C00448	DigOut decoupling value	Bit coded	

Related topics:

► [Configuring exception handling of the CAN PDOs](#) (522)

6.4 User-defined terminal assignment

In order to individually adapt the preconfigured assignment of the input/output terminals to your application, you can choose one of the following procedures:

- A. In the »Engineer«:
 - Change the terminal assignment on the **Terminal assignment** tab.
 - Change the signal assignment on the **Application Parameters** tab, on the dialog level *Overview* → *Signal flow*.
 - Change the interconnections in the FB editor (on the I/O level).
- B. In the »Engineer« or with the keypad:
 - Change the parameters for signal configuration in the parameters list.



Note!

If you change the preconfigured assignment of the input/output terminals, the terminal assignment will be a user-defined one. In [C00007](#), control mode "0: Interconnection changed" will be shown.



Tip!

First of all, select a Lenze configuration useful for the purpose at hand by going to [C00005](#) and selecting a technology application that matches your drive task and then going to [C00007](#) and selecting an appropriate control mode. You will then have an application for which there is a signal flow, logical block links and terminal assignment.

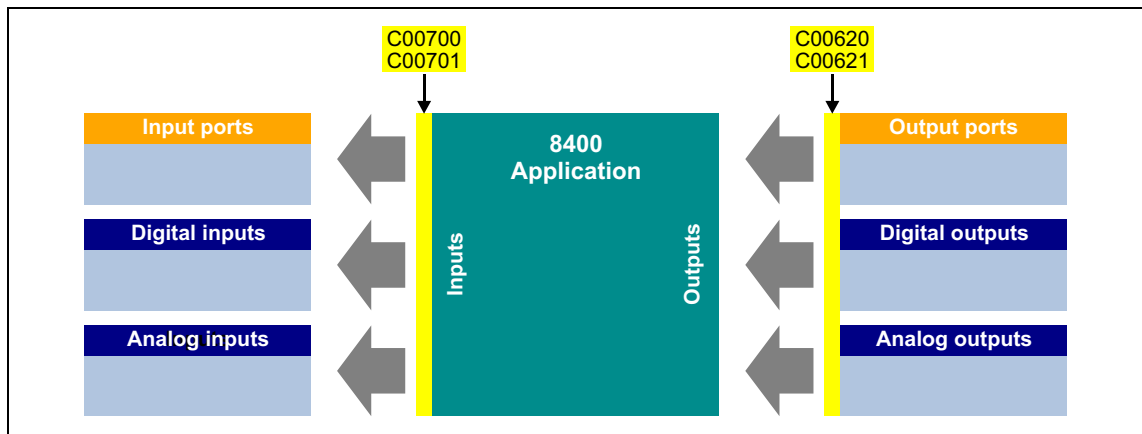
We recommend using the »Engineer« for the implementation of comprehensive user-defined drive solutions.

6.4.1 Source-destination principle

The I/O configuration of the input and output signals is carried out according to the source/destination principle:

- A connection always has a direction and therefore always has a source and a target.
- The inputs signals of the technology application are logically linked to the outputs of system blocks which represent the device input terminals.
- The inputs of system blocks that represent the device output terminals are logically linked to output signals of the technology application.

The following graphic illustrates the source/destination principle:



[6-5] Source-destination principle

Note the following:

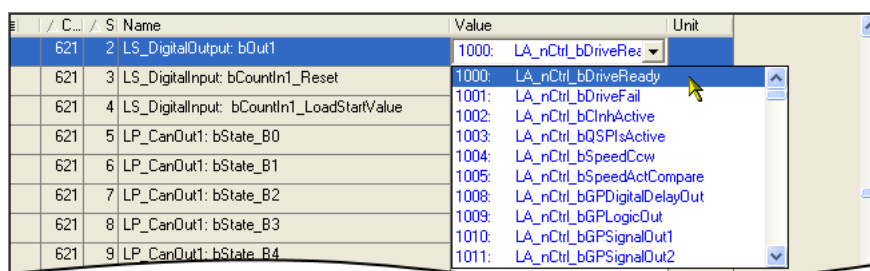
- An equipment input terminal can be logically linked to several inputs of the application block.
- Every input of the application block can only be logically linked to one input signal.
- An output of the application block can be logically linked to several device output terminals.

6.4.2 Changing the terminal assignment with the keypad

You can reconfigure the preconfigured terminal assignment with the keypad (and with the »Engineer«) by means of so-called configuration parameters.

- Each configuration parameter represents a signal input of a system block or application block.
- Each configuration parameter contains a selection list with output signals of the same type of data.
- Logical linking is thus carried out by selecting the output signal for the corresponding signal input.

In the following example, digital output 1 (**LS_DigitalOutput.bOut1** input) is logically linked to the status signal "Drive ready" (**LA_nCtrl_bDriveReady** output signal):



Configuration parameters for the analog and digital output terminals

The preconfigured assignment of the analog and digital output terminals can be altered by means of the subcodes of [C00620](#) and [C00621](#):

Parameter	Info	Lenze setting	
		Value	Unit
Analog outputs - terminal assignment			
C00620/1	LS_AnalogOutput: nOut1_a	1003: LA_nCtrl_nMotorSpeedAct_a	
Digital outputs - terminal assignment			
C00621/1	LS_DigitalOutput:bRelay	1001: LA_nCtrl_bDriveFail	
C00621/2	LS_DigitalOutput:bOut1	1000: LA_nCtrl_bDriveReady	

Other subcodes (not shown here) allow the configuration of input signals of different system blocks and port blocks.

Configuration parameters for the inputs of the technology application

The following parameters can be used to change the preconfigured assignment of the application inputs:

Parameter	Info
TA "Actuating drive speed": Configuration parameters (322)	
C00700/1...20	Analog connection list
C00701/1...48	Digital connection list
TA "Switch-off positioning": Configuration parameters (382)	
C00760/1...16	Analog connection list
C00761/1...47	Digital connection list

Example

Task: Starting from the preset technology application "Actuating drive speed" and the "Terminals 0" control mode, the DI2 digital input is to be used for choosing an alternative acceleration/deceleration time for the main setpoint instead of for choosing the fixed setpoint 2/3. To do this, the DI2 digital input is not to be linked to the *bJogSpeed2* input but to the *bJogRamp1* input of the application module.

Procedure:

1. Use the keypad to go to the menu level **Applications → Actuating drive speed (conf.)**. This menu level contains all the configuration parameters of the "Actuating drive speed" technology application". ▶ [Configuration parameters](#) (322)
2. Navigate to the configuration parameter LA_NCtrl: bJogSpeed2 ([C00701/10](#)) which represents the logical signal link of the application input *bJogSpeed2*.
3. Change the setting of [C00701/10](#):
Change selection "16001: DigIn_bln2" in selection "0: Not interconnected".
4. Navigate to the configuration parameter LA_NCtrl: bJogRamp1 ([C00701/13](#)) which represents the logical signal link of the application input *bJogRamp1*.
5. Change the setting of [C00701/13](#):
Change selection "0: Not interconnected" in selection "16001: DigIn_bln2".



Tip!

The example shows that, for each input of the application block, the associated configuration parameter ([C00700/x](#) or [C00701/x](#)) is only allowed to contain one source that you enter.

6.4.3 Changing the terminal assignment with the »Engineer«

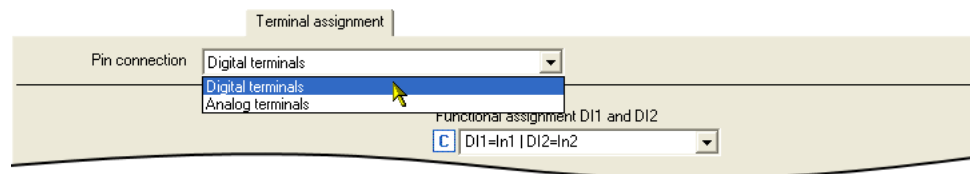
Whereas the configuration parameters referred to have to be parameterised with the keypad, implementation in the »Engineer« is much easier due to the availability of the corresponding dialogs. The following task illustrates the respective procedure.

Task: Starting from the preset technology application "Actuating drive speed" and the "Terminals 0" control mode, the DI2 digital input is to be used for choosing an alternative acceleration/deceleration time for the main setpoint instead of for choosing the fixed setpoint 2/3. To do this, the DI2 digital input is not to be linked to the *bJogSpeed2* input but to the *bJogRamp1* input of the application module.

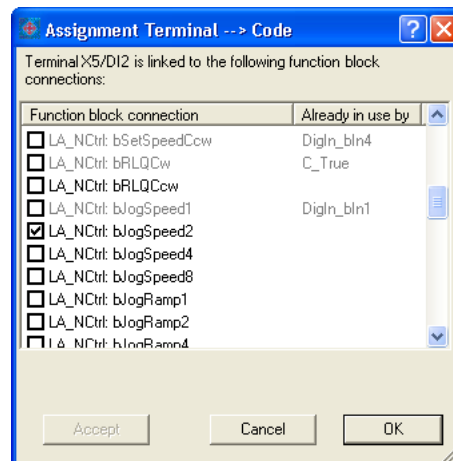
Possibility 1: Change terminal assignment by means of the Terminal Assignment tab

Procedure:

1. Go to the **Terminal Assignment** tab and select "Digital terminals" in the **Control connections** list field:



2. Click on the **...** button for the DI2 terminal in order to open the dialog box *Assignment Terminal --> Function block*.
 - In the list field, all block inputs that are currently logically linked to digital input DI2 are marked with a checkmark:



3. Remove checkmark for the connection **LA_NCtrl: bJogSpeed2** in order to cancel the existing logical link.
4. Set checkmark for connection **LA_NCtrl: bJogRamp1** in order to logically link this application input to digital input DI2.

Possibility 2: Change terminal assignment by means of the signal flow shown

Procedure:

1. Go to the **Application parameters** tab.
2. Go to the **Application Parameters** tab and click on the **Signal flow** button in order to change to the dialog level *Overview → Signal flow*.
3. On the dialog level *Overview → Signal flow*, click on the **Digital control signals** button in order to open the *Digital control signals* dialog box:

Section	Signal Name	Terminal Assignment
DCTRL	bClnh	Not interconnected
	bFailReset	DigIn_Clnh
MCTRL	bSetQuickstop	Not interconnected
	bSetDCBrake	DigIn_bln3
MCK	bMBRKRelease	Not interconnected
	bMANJogPos	Not interconnected
	bMANJogNeg	Not interconnected
Motor potentiometer	bMPOTUp	Not interconnected
	bMPOTDown	Not interconnected
	bMPOTInAct	Not interconnected
	bMPotEnable	Not interconnected
NSET	bSetSpeedCw	DigIn_bln4
	bJogSpeed1	DigIn_bln1
	bJogSpeed2	DigIn_bln2
	bJogSpeed4	Not interconnected
	bJogSpeed8	Not interconnected
	bJogRamp1	Not interconnected
	bJogRamp2	Not interconnected
	bJogRamp4	Not interconnected
PID/PCTRL	bPIDEnableInfluenceRamp	Not interconnected

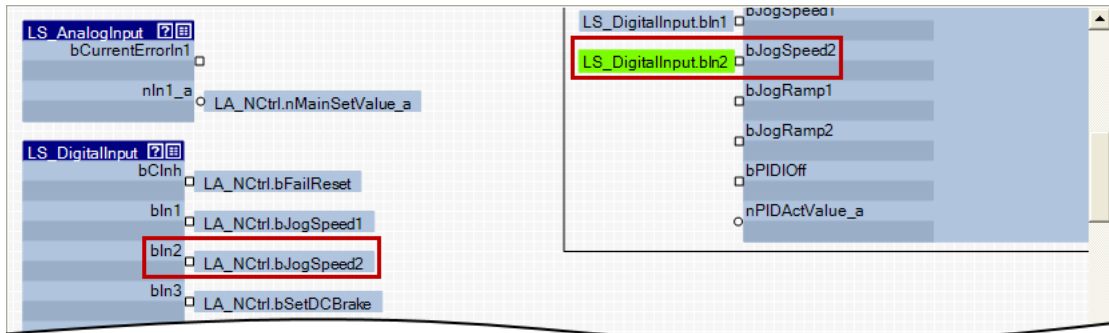
Back

4. In the **bJogSpeed2** list field, set the selection "0: Not interconnected".
5. In the **bJogRamp1** list field, set the selection "16001: DigIn_bln2".
6. Click on the **Back** button in order to close the dialog box again.

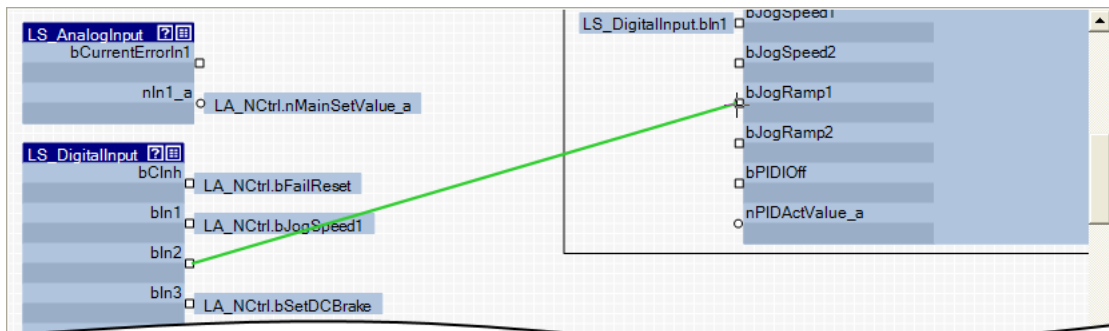
Possibility 3: Change terminal assignment with the FB editor

Procedure:

1. Go to the **FB Editor** tab.
2. Delete the existing interconnection from **LS_DigitalInput.bIn2** to **LA_NCtrl.bJogSpeed2**:



3. Establish a new interconnection from **LS_DigitalInput.bIn2** to **LA_NCtrl.bJogRamp1**:



Tip!

You can find detailed information on how to use the FB editor of the »Engineer« in the main chapter entitled "[Working with the FB Editor](#)". (857)

7 Technology applications

This chapter describes the handling and the functional range of the technology applications available for the 8400 StateLine controller.



Technology application "Actuating drive speed"

This technology application preset in [C00005](#) serves to solve speed-controlled drive tasks, e.g. conveyor drives (interconnected), extruders, test benches, vibrators, travelling drives, presses, machine tools, dosing systems.

▶ [TA "Actuating drive speed"](#) (📖 298)



technology application "Actuating drive speed (AC Drive Profile)"

This technology application available [from version 13.00.00](#) provides a speed and torque control by means of "AC Drive Profile". The fieldbuses EtherNet/IP™ and system bus (CANopen) are supported.

▶ [TA "actuating drive speed \(AC Drive Profile\)"](#) (📖 325)



"Switch-off positioning" technology application

This technology application available [from version 04.00.00](#) is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. The pre-switch off is implemented by connecting switch-off sensors.

▶ [TA "Switch-off positioning"](#) (📖 358)



Note!

Please note that the "StateLine", "HighLine" and "TopLine" device types differ with regard to the number, functional range, and flexibility of the technology applications offered.

Related topics:

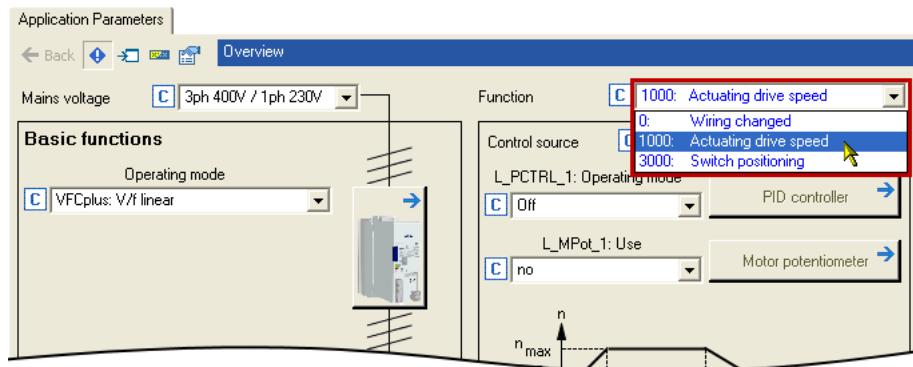
- ▶ [Integrated technology applications](#) (📖 22)
- ▶ [Commissioning of the "Actuating drive speed" technology application](#) (📖 51)
- ▶ [Commissioning of the "Switch-off positioning" technology application](#) (📖 59)

7.1

Selection of the technology application and the control mode

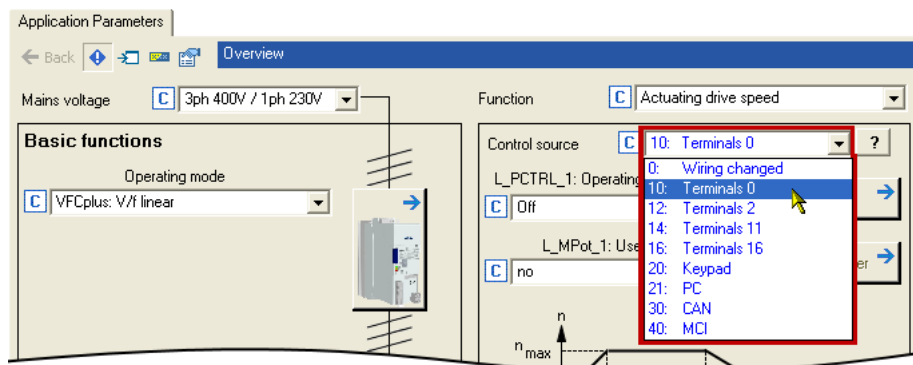
The technology application to be used is selected in [C00005](#).

- You can select the technology application in the »Engineer« on the **Application parameter** tab via the **Application** list field:



Different control modes can be selected for every application in [C00007](#). By selecting the control mode you set the way by which the technology application should be controlled, e.g. via terminals or via a fieldbus. The interconnection of the input/output terminals and ports shown in the FB editor in the I/O level changes accordingly.

- You can select the control mode in the »Engineer« on the **Application parameter** tab via the **Control mode** list field:

**Tip!**

You can infer the pre-configured assignment of the input/output terminals and ports for each control mode from the description of the corresponding technology application:

TA "Actuating drive speed": [Terminal assignment of the control modes](#) (□ 309)

TA "Switch-off positioning": [Terminal assignment of the control modes](#) (□ 369)

Detailed information on the individual configuration of the input/output terminals can be found in the description of the I/O terminals in the subchapter "[User-defined terminal assignment](#)". (□ 289)

7.2

TA "Actuating drive speed"

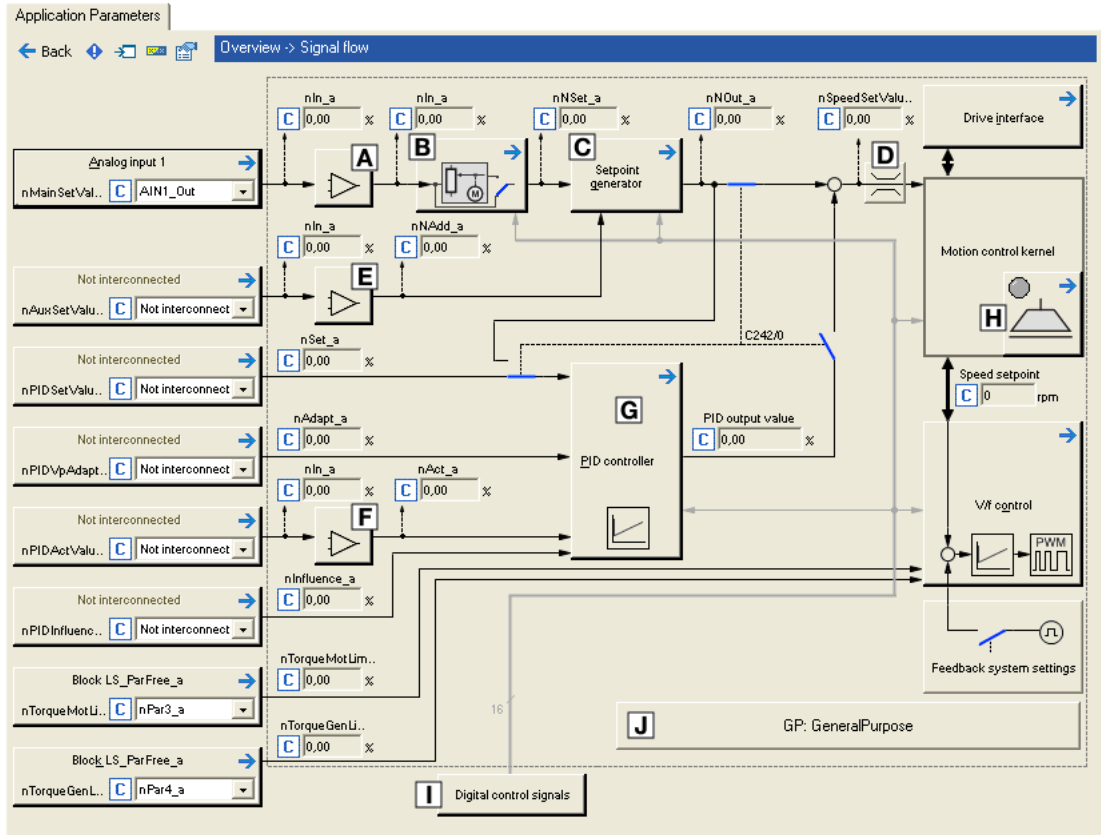
Features

- Pre-configured control modes for terminals and bus control (with predefined process data connection to the fieldbus)
- Free configuration of input and output signals
- Offset, gain, and negation of main setpoint, additional setpoint, actual process controller value
- Up to 15 fixed setpoints for speed and ramp time
- Adjustable setpoint ramp times
- Freely selectable, variable ramp shape
- Automatic holding brake control
- Quick stop (QSP) with adjustable ramp time
- Motor potentiometer function
- Process controller
- Load monitoring (*in preparation*)
- Integrated, freely available "GeneralPurpose" functions:
Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop
- Interface to the safety module (optional)
- Integration of encoder feedback

Related topics:

- ▶ [Commissioning of the "Actuating drive speed" technology application](#) (📖 51)

7.2.1



[7-1] Signal flow of the technology application "Actuating drive speed"

- A** Main speed setpoint offset and gain ([L_OffsetGainP_1](#))
- B** Motor potentiometer function ([L_MPot_1](#))
- C** Setpoint generator ([L_NSet_1](#))
- D** Speed setpoint input limitation
- E** Additional speed setpoint offset and gain ([L_OffsetGainP_2](#))
- F** Actual speed/sensor value offset and gain ([L_OffsetGainP_3](#))
- G** Process controller ([L_PCTRL_1](#))
- H** [Holding brake control](#)
- I** Terminal assignment & display of digital control signals
- J** Integrated disposable "[GeneralPurpose](#)" functions: Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop

Selection of the main speed setpoint

The main speed setpoint is selected in the Lenze setting via the analog input 1.

- Offset and gain of this input signal can be set in [C00696](#) and [C00670](#) for a simple signal adjustment of a setpoint encoder.
- Scaling: $16384 \equiv 100\%$ reference speed ([C00011](#))
- The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps.
- Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective.
- For a detailed functional description see the [L_NSet](#) FB.

Motor potentiometer function

Alternatively, the main speed setpoint can be generated via a motor potentiometer function.

- In the Lenze setting, the motor potentiometer function is deactivated.
- Activation is possible via [C00806](#) or via the *bMPotEnable* input.
- The behaviour of the motor potentiometer during switch-on of the drive system can be selected in [C00805](#).
- For a detailed functional description see the [L_MPot](#) FB.

Optional selection of an additional speed setpoint

You can optionally select an additional speed setpoint (e.g. as a correcting signal).

- The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator.
- You must set the setpoint arithmetic to "1: NOut = NSet + NAdd" in [C00190](#) in order to activate the additional speed setpoint.
- Offset and gain of this input signal can be set in [C00697](#) and [C00671](#) for a simple signal adjustment of a setpoint encoder.
- Scaling: $16384 \equiv 100\%$ reference speed ([C00011](#))
- The acceleration and deceleration time for the additional speed setpoint can be set in [C00220](#) and [C00221](#).
- For a detailed functional description see the [L_NSet](#) FB.



Tip!

In the case of a grinding machine, the additional speed setpoint can, for instance, be used to control a constant circumferential speed while the grinding disk diameter is reduced.

7.2.2 Internal interfaces | application block "LA_NCtrl"

**Note!**

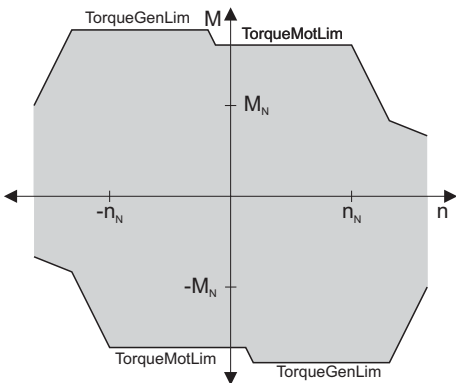
The connectors grayed out in the following table are hidden in the function block editor in the Lenze setting.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

Inputs

Identifier	Data type	Information/possible settings
wCANDriveControl	WORD	Control word via system bus (CAN) for device control • See the device control chapter, subchapter "wCANControl/wMCIControl control words" for a detailed description of the individual control bits.
wMCIControl	WORD	Control word via communication module (e.g. PROFIBUS) for device control • See the device control chapter, subchapter "wCANControl/wMCIControl control words" for a detailed description of the individual control bits.
wSMControl	WORD	Interface to the optional safety system. • Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). • For a detailed description of each control bit see the subchapter "Interface to safety system" in the basic drive functions chapter.
bCInh	BOOL	Enable/Inhibit controller
		FALSE Enable controller: The controller switches to the "OperationEnabled" device state, if no other source of a controller inhibit is active. • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. TRUE Inhibit controller (controller inhibit): The controller switches to the "SwitchedOn" device state.
bFailReset	BOOL	Reset error message In the Lenze setting this input is connected to the digital input controller enable so that a possibly existing error message is reset together with the controller enable (if the cause for the fault is eliminated).
		TRUE The current fault is reset, if the cause for the fault is eliminated. • If the fault still exists, the error status remains unchanged.
bSetQuickstop	BOOL	Enable quick stop (QSP) • Also see device command "Activate/deactivate quick stop".
		TRUE Activate quick stop • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019.
		FALSE Deactivate quick stop • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop.

Identifier	Data type	Information/possible settings
bSetDCBrake	BOOL	Manual DC-injection braking (DCB) Detailed information on DC-injection braking is provided in the motor control chapter, subchapter "DC-injection braking".
		 Note! Holding braking is not possible when this braking mode is used! Use the basic " Holding brake control " function for controlling the holding brake with a low rate of wear.
		FALSE Deactivate DC-injection braking.
		TRUE Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. - The braking effect stops when the rotor is at standstill. - After the hold time (C00107) has expired, the controller sets the pulse inhibit.
bRFG_Stop	BOOL	Ramp function generator: Maintain the current value of the main setpoint integrator - The speed, for instance, of a running ramp process is immediately kept constant when <i>bRFG_Stop</i> is activated. At the same time, the acceleration/deceleration jumps to the value "0". - For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is held.
bRFG_0	BOOL	Ramp function generator: Lead the main setpoint integrator to "0" within the current Ti times For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is led to "0" within the Ti time set.
nVoltageAdd_a	INT	Additive voltage impression - An additional setpoint for the motor voltage can be specified via this process input. - If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. - If the value is negative, the voltage is reduced. - Scaling: 16384 $\equiv$ 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nBoost_a	INT	Additional setpoint for the motor voltage at speed = 0 - The entire voltage-frequency characteristic is provided with an offset. - Scaling: 16384 $\equiv$ 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nPWMAngleOffset	INT	Additional offset for the electrical angle of rotation - If a torque is connected, e.g. dynamic acceleration processes can be generated. - Scaling: $\pm 32767 \equiv \pm 180^\circ$ angle of rotation

Identifier	Data type	Information/possible settings				
nTorqueMotLim_a nTorqueGenLim_a	INT	Torque limitation in motor mode and in generator mode • These input signals are directly transferred to the motor control to limit the controller's maximum torque in motor and generator mode. • The drive cannot output a higher torque in motor/generator mode than set here. • The applied values (any polarity) are internally interpreted as absolute values. • If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called $I_{\max}$ controller. • If sensorless vector control (SLVC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. • Scaling: $16384 \equiv 100 \% M_{\max}$ (C00057) Torque limits in motor and generator mode: 				
bSetSpeedCcw	BOOL	Change of direction of rotation • For instance if a motor or gearbox is fixed laterally reversed to a machine part, but the setpoint selection should still be executed for the positive direction of rotation. <table><tr><td>FALSE</td><td>Clockwise rotation (Cw)</td></tr><tr><td>TRUE</td><td>Direction of rotation to the left (Ccw)</td></tr></table>	FALSE	Clockwise rotation (Cw)	TRUE	Direction of rotation to the left (Ccw)
FALSE	Clockwise rotation (Cw)					
TRUE	Direction of rotation to the left (Ccw)					
bRLQCw	BOOL	Activate clockwise rotation (fail-safe) • For a detailed functional description see the L_RLO FB. <table><tr><td>FALSE</td><td>Quick stop</td></tr><tr><td>TRUE</td><td>CW rotation</td></tr></table>	FALSE	Quick stop	TRUE	CW rotation
FALSE	Quick stop					
TRUE	CW rotation					
bRLQCcw	BOOL	Activate counter-clockwise rotation (fail-safe) • For a detailed functional description see the L_RLO FB. <table><tr><td>FALSE</td><td>Quick stop</td></tr><tr><td>TRUE</td><td>Counter-clockwise rotation</td></tr></table>	FALSE	Quick stop	TRUE	Counter-clockwise rotation
FALSE	Quick stop					
TRUE	Counter-clockwise rotation					
nMainSetValue_a	INT	Main speed setpoint • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100 \% \text{ reference speed}$ (C00011) • The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB.				

Identifier	Data type	Information/possible settings
nAuxSetValue_a	INT	Additional speed setpoint • The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator. • You must set the setpoint arithmetic to "1: NOut = NSet + NAdd" in C00190 in order to activate the additional speed setpoint. • Offset and gain of this input signal can be set in C00697 and C00671 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100\%$ reference speed (C00011) • The acceleration and deceleration time for the additional speed setpoint can be set in C00220 and C00221. • For a detailed functional description see the L_NSet FB.
bJogSpeed1 bJogSpeed2	BOOL	Selection inputs for fixed changeover setpoints (JOG setpoints) for the main setpoint • A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via these selection inputs. • The four selection inputs are binary coded, therefore 15 fixed setpoints can be selected. • In the case of binary coded selection "0" (all inputs = FALSE or not assigned), main setpoint <i>nMainSetValue_a</i> is active. • The selection of the fixed setpoints is carried out in C00039/1...15 in [%] based on the reference speed (C00011). • For a detailed functional description see the L_NSet FB.
bJogSpeed4 bJogSpeed8	BOOL	
bJogRamp1 bJogRamp2	BOOL	Selection inputs for alternative acceleration/deceleration times for the main setpoint • The four selection inputs are binary coded, therefore 15 alternative acceleration/deceleration times can be selected. • For main setpoint <i>nMainSetValue_a</i>, the set acceleration time (C00012) and deceleration time (C00013) are active in the case of the binary coded selection "0" (all inputs = FALSE or not assigned). • Alternative acceleration times are selected in C00101/1...15. • The selection of the alternative deceleration times is carried out in C00103/1...15. • For a detailed functional description see the L_NSet FB.
bJogRamp4 bJogRamp8	BOOL	
Motor potentiometer Alternatively to the input signal <i>nMainSetValue_a</i> , the main setpoint can also be generated by a motor potentiometer function. • In the Lenze setting, the motor potentiometer function is deactivated. • Activation is possible via C00806 or via the <i>bMPotEnable</i> input. • The behaviour of the motor potentiometer during switch-on of the drive system can be selected in C00805. • For a detailed functional description see the L_MPot FB.		
bMPotEnable	BOOL	Activating the motor potentiometer function • This input and C00806 are OR'd.
	TRUE	The motor potentiometer function is active; the speed setpoint can be changed via the <i>bMPotUp</i> and <i>bMPotDown</i> control inputs.
bMPotUp	BOOL	Increasing the speed setpoint
	TRUE	Approach the upper speed limit value set in C00800 with the acceleration time set in C00802 .
bMPotInAct	BOOL	Activating the inactive function
	TRUE	The speed setpoint behaves according to the inactive function set in C00804 . • In the Lenze setting, the speed setpoint is maintained.
bMPotDown	BOOL	Decreasing the speed setpoint
	TRUE	Approach the lower speed limit value set In C00801 with the deceleration time set in C00803 .

Identifier	Data type	Information/possible settings	
Process controller • In the Lenze setting, the process controller is deactivated. • The activation is executed by selecting the operating mode in C00242. • For a detailed functional description see FB L_PCTRL.			
bPIDEnableInfluenceRamp	BOOL	Activate ramp for influencing factor	
		FALSE	Influencing factor of the PID controller is ramped down to "0".
		TRUE	Influencing factor of the PID controller is ramped up to the value <i>nPIDInfluence_a</i> .
bPIDIOff	BOOL	Switch off the I-component of the process controller • In conjunction with the operating mode set in C00242 (Lenze setting: "Off").	
		TRUE	I-component of the process controller is switched off.
nPIDVpAdapt_a	INT	Adaptation of gain Vp set in C00222 in percent • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 % • Changes can be done online.	
nPIDSetValue_a	INT	Sensor and process setpoint for operating modes 2, 4 and 5 • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 %	
nPIDActValue_a	INT	Speed or actual sensor value (actual process value) • Offset and gain for this input signal can be set in C00698 and C00672. • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 %	
nPIDInfluence_a	INT	Limitation of the influencing factor in percent • The influence factor of the PID controller can be limited to a certain value (- 199.99% ... + 199.99%) via <i>nPIDInfluence_a</i>. • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 %	
MCK basic functions			
bMBrakeRelease	BOOL	Holding brake control : Release/apply brake • In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off").	
		FALSE	Apply brake. • During automatic operation, the internal brake logic controls the brake.
		TRUE	Release brake manually (forced release). • Note! The brake can also be released if the controller is inhibited! • During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. • In semi-automatic operation, the brake is released including feedforward control.

Identifier	Data type	Information/possible settings
GP: GeneralPurpose The following inputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions		
bGPFree1 ... bGPFree2 (from version 11.00.00)	BOOL	Free inputs for digital signals Digital signals can be transferred from the I/O level to the application level via these inputs.
nGPAAnalogSwitchIn1_a nGPAAnalogSwitchIn2_a	INT	Analog switch : Input signals The input signal selected via the selection input <i>bGPAAnalogSwitchSet</i> is output at output <i>nGPAAnalogSwitchOut_a</i>.
bGPAAnalogSwitchSet	BOOL	Analog switch : Selection input
		FALSE <i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i>
		TRUE <i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i>
nGPArithmetikIn1_a nGPArithmetikIn2_a	INT	Arithmetic : Input signals - The arithmetic function is selected in C00338. - The result is output at output <i>nGPArithmetikOut_a</i>.
nGPMulDivIn_a	INT	Multiplication/Division : Input signal - The factor for the multiplication can be set in C00699/1 (numerator) and C00699/2 (denominator). - The result is output at output <i>nGPMulDivOut_a</i>.
bGPDigitalDelayIn	BOOL	Binary delay element : Input signal - The on-delay can be set in C00720/1. - The off-delay can be set in C00720/2. - The time-delayed input signal is output at output <i>bGPDigitalDelayOut</i>.
bGPLogicIn1 bGPLogicIn2 bGPLogicIn3	BOOL	Binary logic : Input signals - The logic operation is selected in C00820. - The result is output at output <i>bGPLogicOut</i>.
nGPCompareIn1_a nGPCompareIn2_a	INT	Analog comparison : Input signals - The comparison operation is selected in C00680. - Hysteresis and window size can be set in C00680 and C00682. - If the comparison statement is true, the output <i>bGPCompareOut</i> will be set to TRUE.
bGPDFlipFlop_InD bGPDFlipFlop_InClk bGPDFlipFlop_InClr	BOOL	D-FlipFlop : Input signals Data, clock and reset input
Free inputs The following inputs can freely be interconnected on the application level. The signals can be transferred from the I/O level to the application level via these inputs.		
bFreeIn1 ... bFreeIn8	BOOL	Free inputs for digital signals
wFreeIn1 ... wFreeIn4	WORD	Free inputs for 16-bit signals

Outputs

Identifier	Data type	Value/meaning	
wDriveControlStatus	WORD	Status word of the controller - The status word contains information on the current status of the drive controller. - For bit assignment, see subchapter "wDeviceStatusWord status word" in the chapter for device control.	
wStateDetermFailNoLow	WORD	Display of the status determining error (LOW word)	
wStateDetermFailNoHigh	WORD	Display of the status determining error (HIGH word)	
bDriveFail	BOOL	TRUE	Drive controller in error status. "Fault" device status is active.
bDriveReady	BOOL	TRUE	Controller is ready for operation. "SwitchedOn" device status is active. - The drive is in this device status if the DC bus voltage is applied and the controller is still inhibited by the user (controller inhibit).
bCInhActive	BOOL	TRUE	Controller inhibit is active.
bQSPisActive	BOOL	TRUE	Quick stop is active.
bSpeedCcw	BOOL	Current direction of rotation	
		FALSE	Clockwise rotation (Cw)
		TRUE	Direction of rotation to the left (Ccw)
bSpeedActCompare	BOOL	Result of the speed comparison (detection of speed=0)	
		TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
			During closed-loop operation: Actual speed value < Comparison value (C00024)
bOverLoadActive	BOOL	In preparation (output is not interconnected on the application level)	
bUnderLoadActive	BOOL	In preparation (output is not interconnected on the application level)	
bImaxActive	BOOL	"Current setpoint inside the limitation" status signal	
		TRUE	The current setpoint is internally limited (the drive controller operates at the maximum current limit).
bSpeedSetReached	BOOL	Status signal "setpoint = 0"	
		TRUE	Speed setpoint from the ramp function generator = 0
bSpeedActEqSet	BOOL	TRUE	Actual speed value = speed setpoint
nMotorCurrent_a	INT	Current stator current/effective motor current Scaling: $16384 \equiv 100\% I_{\max\_mot}$ (C00022)	
nMotorSpeedSet_a	INT	Speed setpoint Scaling: $16384 \equiv 100\%$ reference speed (C00011)	
nMotorSpeedAct_a	INT	Actual speed value Scaling: $16384 \equiv 100\%$ reference speed (C00011)	
nMotorTorqueAct_a	INT	Actual torque - In the "VFC (+encoder)" operating mode of the motor control, this value is determined from the current motor current and corresponds to the actual torque only by approximation. - Scaling: $16384 \equiv 100\% M_{\max}$ (C00057)	

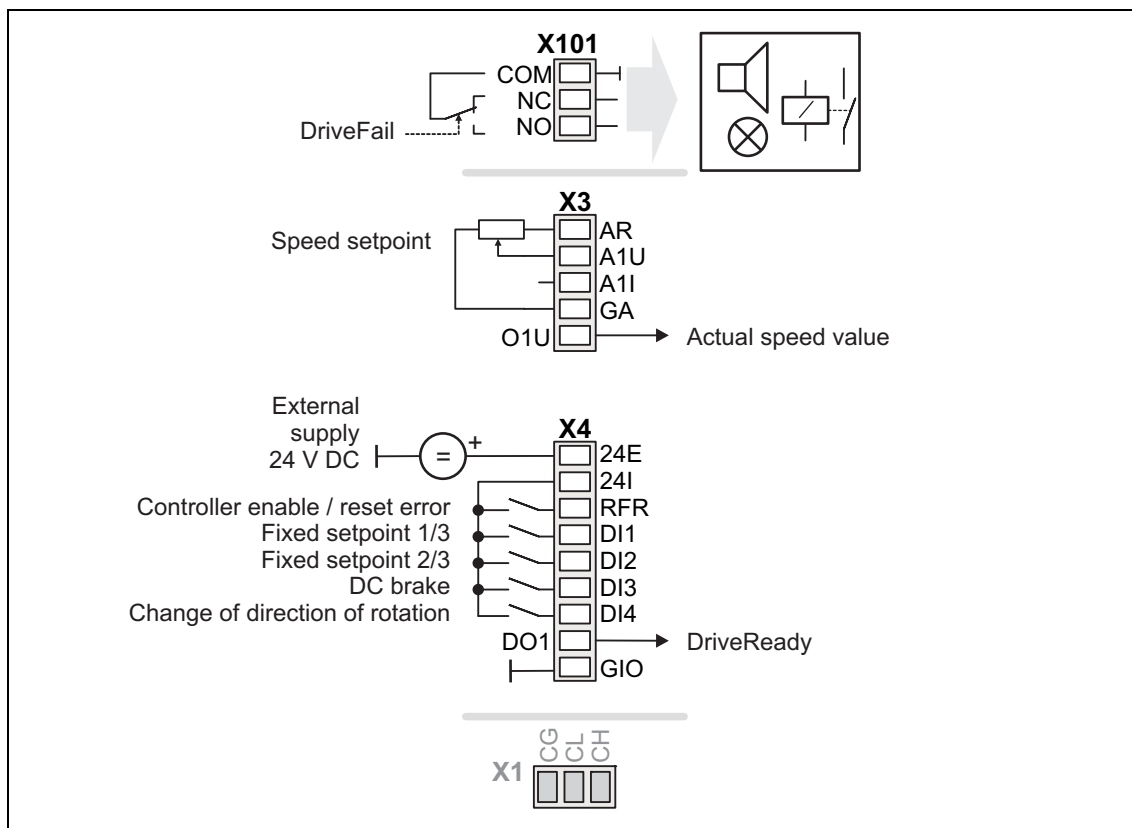
Identifier	Data type	Value/meaning	
nDCVoltage_a	INT	Actual DC-bus voltage • Scaling: 16384 ≙ 1000 V	
nMotorVoltage_a	INT	Current motor voltage/inverter output voltage • Scaling: 16384 ≙ 1000 V	
MCK basic functions			
bMBrakeReleaseOut	BOOL	Holding brake control : Trigger signal for the holding brake control switching element via a digital output • Use bit 0 in C02582 to activate inverted switching element triggering.	
		FALSE	Apply brake.
		TRUE	Release brake.
bMBrakeReleased	BOOL	Holding brake control : "Brake released" considering the brake release time • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed!	
		TRUE	Brake released (after the brake release time has expired).
GP: GeneralPurpose The following outputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions			
nGPAAnalogSwitchInOut_a	INT	Analog switch : Output signal	
nGPArithmetikOut_a	INT	Arithmetic : Output signal	
nGPMulDivOut_a	INT	Multiplication/Division : Output signal	
bGPDigitalDelayOut	BOOL	Binary delay element : Output signal	
bGPLogicOut	BOOL	Binary logic : Output signal	
bGPCompareOut	BOOL	Analog comparison : Output signal	
bGPSignalOut1 ... bGPSignalOut4	BOOL	Binary signal monitor : Output signals • The signal sources to be output are selected in C00411/1...4. • A bit coded inversion of the output signals can be parameterised in C00412.	
nGPSignalOut1_a ... nGPSignalOut4_a	BOOL	Analog signal monitor : Output signals • The signal sources to be output are selected in C00410/1...4. • Gain and offset for each output signal can be parameterised in C00413/1...8.	
bGPDFlipFlop_Out	BOOL	D-FlipFlop : Output signal	
bGPDFlipFlop_NegOut	BOOL	D-FlipFlop : Negated output signal	
Free outputs The following outputs can freely be interconnected on the application level. The signals from the application level can be transferred to the I/O level via these outputs.			
bFreeOut1 ... bFreeOut8	BOOL	Free outputs for digital signals	
wFreeOut1 ... wFreeOut4	WORD	Free outputs for 16-bit signals	

7.2.3 Terminal assignment of the control modes

The following comparison provides information about which inputs/outputs of the application block **LA_NCtrl** are interconnected to the digital and analog input/output terminals of the drive controller in the different control modes.

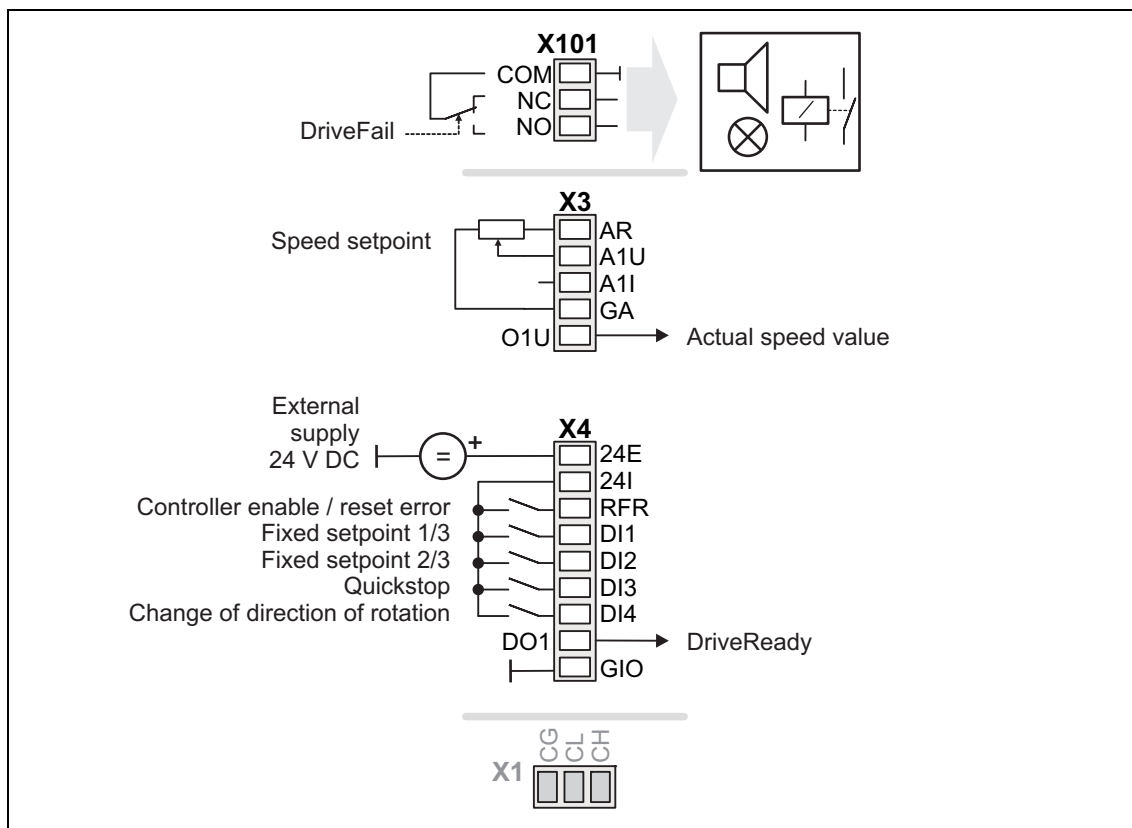
	Control mode (C00007)							
	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminal 16	20: Keypad	21: PC	30: CAN	40: MCI
Digital input terminals								
X4/RFR	Controller enable / Reset of error message bFailReset							
X4/DI1	Fixed setpoint 1/3 bJogSpeed1		Change of direction of rotation bSetSpeedCcw	Fixed setpoint 1/3 bJogSpeed1	-	-	Quick stop bSetQuickstop	
X4/DI2	Fixed setpoint 2/3 bJogSpeed2		Activate manual DC-injection braking (DCB) bSetDCBrake	Fixed setpoint 2/3 bJogSpeed2	-	-	-	-
X4/DI3	Activate manual DC-injection braking (DCB) bSetDCBrake	Quick stop bSetQuickstop	Motor potentiometer: Increase speed bMPotUp	CW rotation quick stop bRLQCw	-	-	-	-
X4/DI4	Change of direction of rotation bSetSpeedCcw		Motor potentiometer: Decrease speed bMPotDown	CCW rotation quick stop bRLQCcw	-	-	-	-
Analog input terminals								
X3/A1U, A1I	Main speed setpoint nMainSetValue_a 10 V ≡ 100 % reference speed (C00011)				-	-	Additional speed setpoint nAuxSetValue_a 10 V ≡ 100 % reference speed (C00011)	
Digital output terminals								
X4/DO1	Status "Drive is ready" bDriveReady							
X101/COM, NO	Status "Error is pending" bDriveFail							
Analog output terminal								
X3/O1U	Actual speed value nMotorSpeedAct_a 10 V ≡ 100 % reference speed (C00011)							

7.2.3.1 Terminals 0



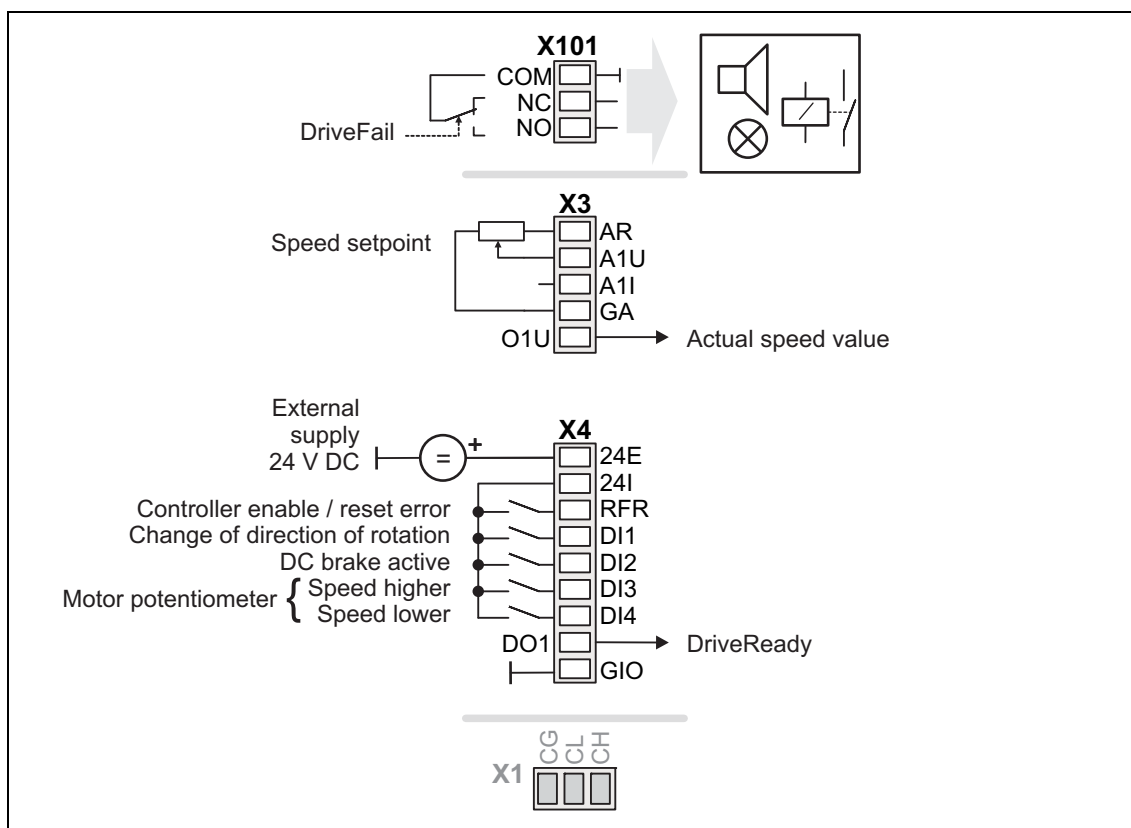
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nMainSetValue_a *
X4/DI1	LA_NCtrl.bJogSpeed1	X3/A1I	-
X4/DI2	LA_NCtrl.bJogSpeed2	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bSetDCBrake	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI4	LA_NCtrl.bSetSpeedCcw	X4/DO1	LA_NCtrl.bDriveReady

7.2.3.2 Terminals 2



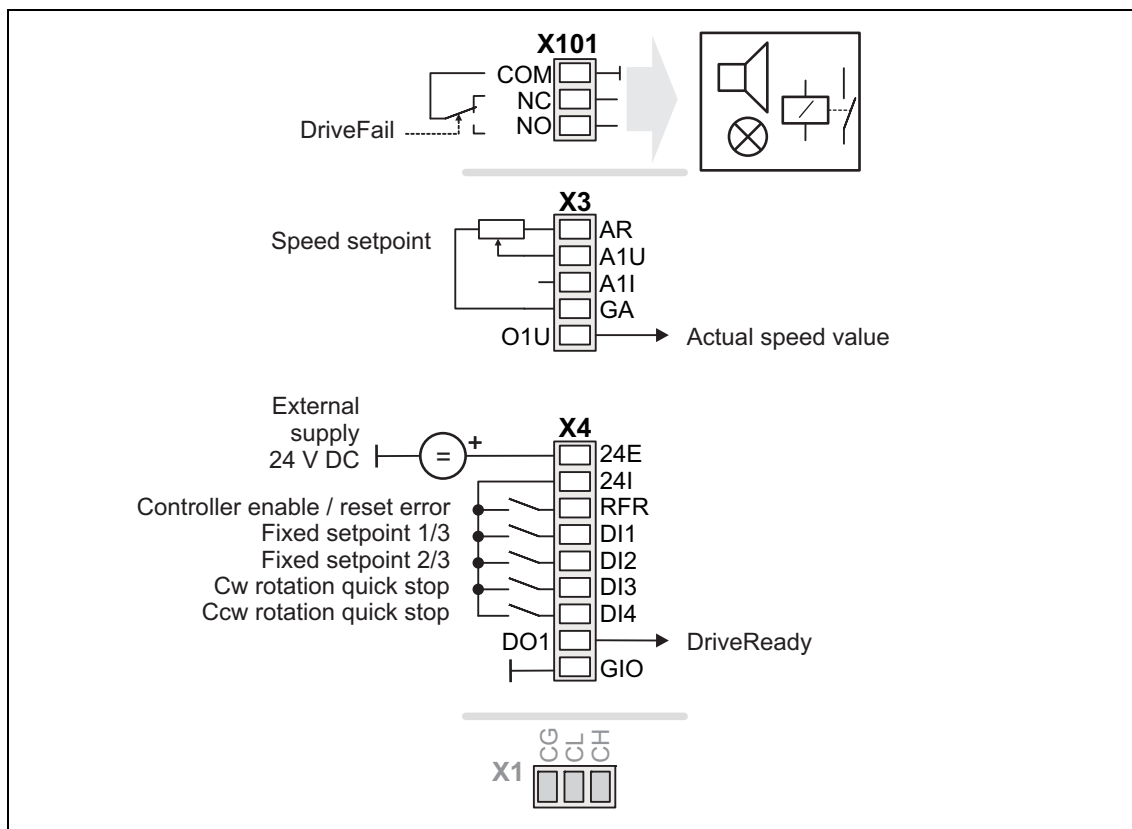
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail	X3/A1U	LA_NCtrl.nMainSetValue_a *
X4/RFR	LA_NCtrl.bFailReset	X3/A1I	-
X4/DI1	LA_NCtrl.bJogSpeed1	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI2	LA_NCtrl.bJogSpeed2	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI3	LA_NCtrl.bSetQuickstop	X4/DO1	LA_NCtrl.bDriveReady
X4/DI4	LA_NCtrl.bSetSpeedCcw		

7.2.3.3 Terminals 11



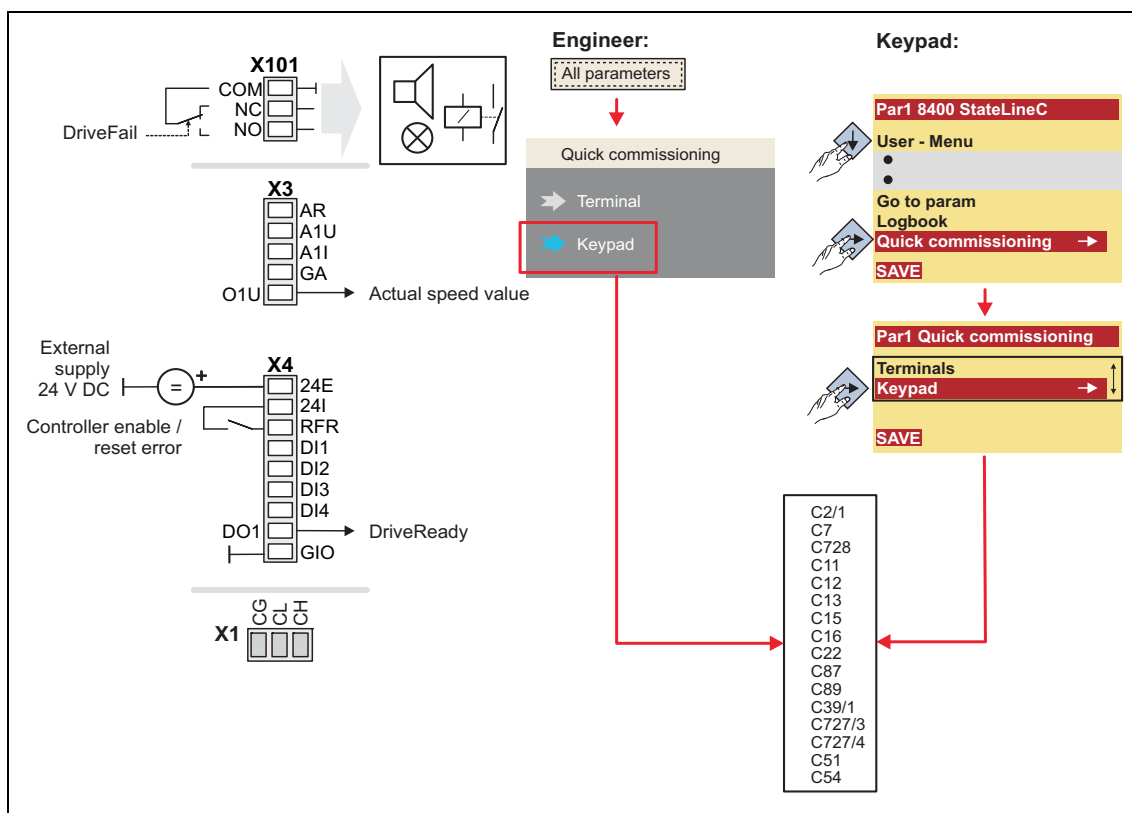
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail	X3/A1U	LA_NCtrl.nMainSetValue_a *
X4/RFR	LA_NCtrl.bFailReset	X3/A1I	-
X4/DI1	LA_NCtrl.bSetSpeedCcw	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI2	LA_NCtrl.bSetDCBrake	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI3	LA_NCtrl.bMPotUp	X4/DO1	LA_NCtrl.bDriveReady
X4/DI4	LA_NCtrl.bMPotDown		

7.2.3.4 Terminal 16



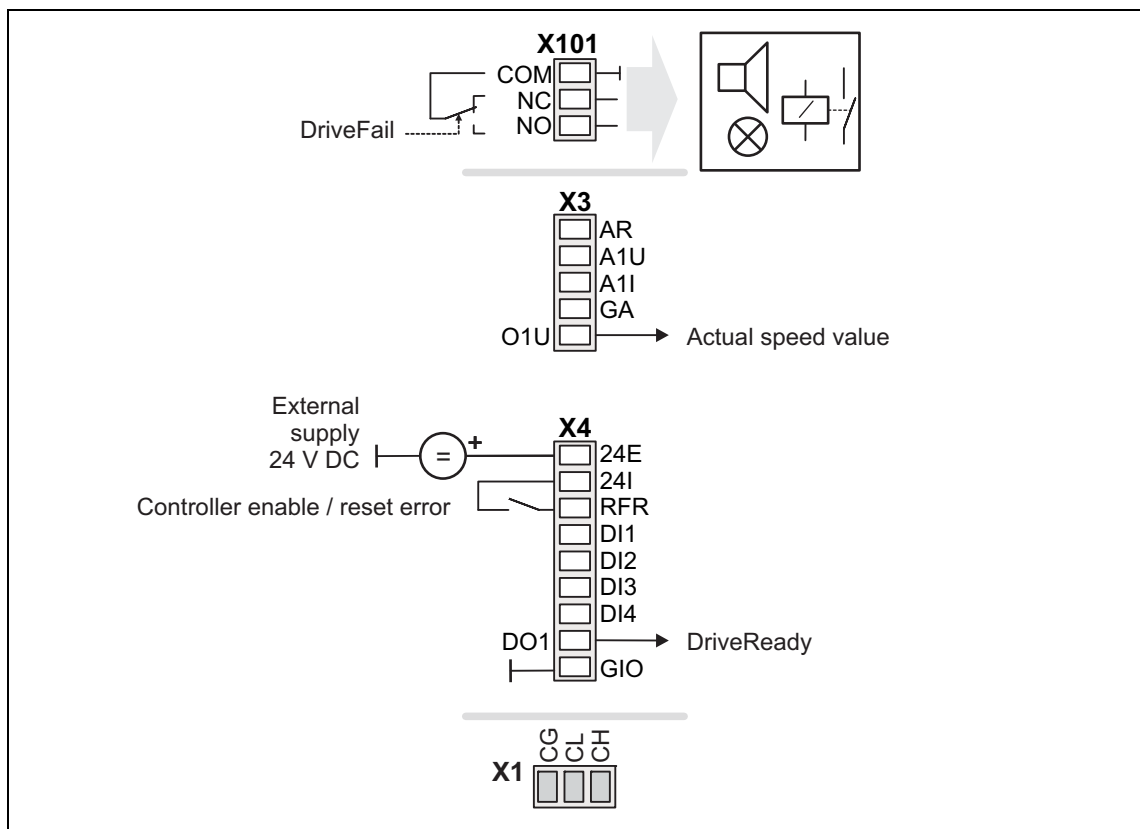
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail	X3/A1U	LA_NCtrl.nMainSetValue_a *
X4/RFR	LA_NCtrl.bFailReset	X3/A1I	-
X4/DI1	LA_NCtrl.bJogSpeed1	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI2	LA_NCtrl.bJogSpeed2	* 10 V $\equiv$ 100 % reference speed (C00011)	
X4/DI3	LA_NCtrl.bRLQCw	X4/DO1	LA_NCtrl.bDriveReady
X4/DI4	LA_NCtrl.bRLQCcw		

7.2.3.5 Keypad



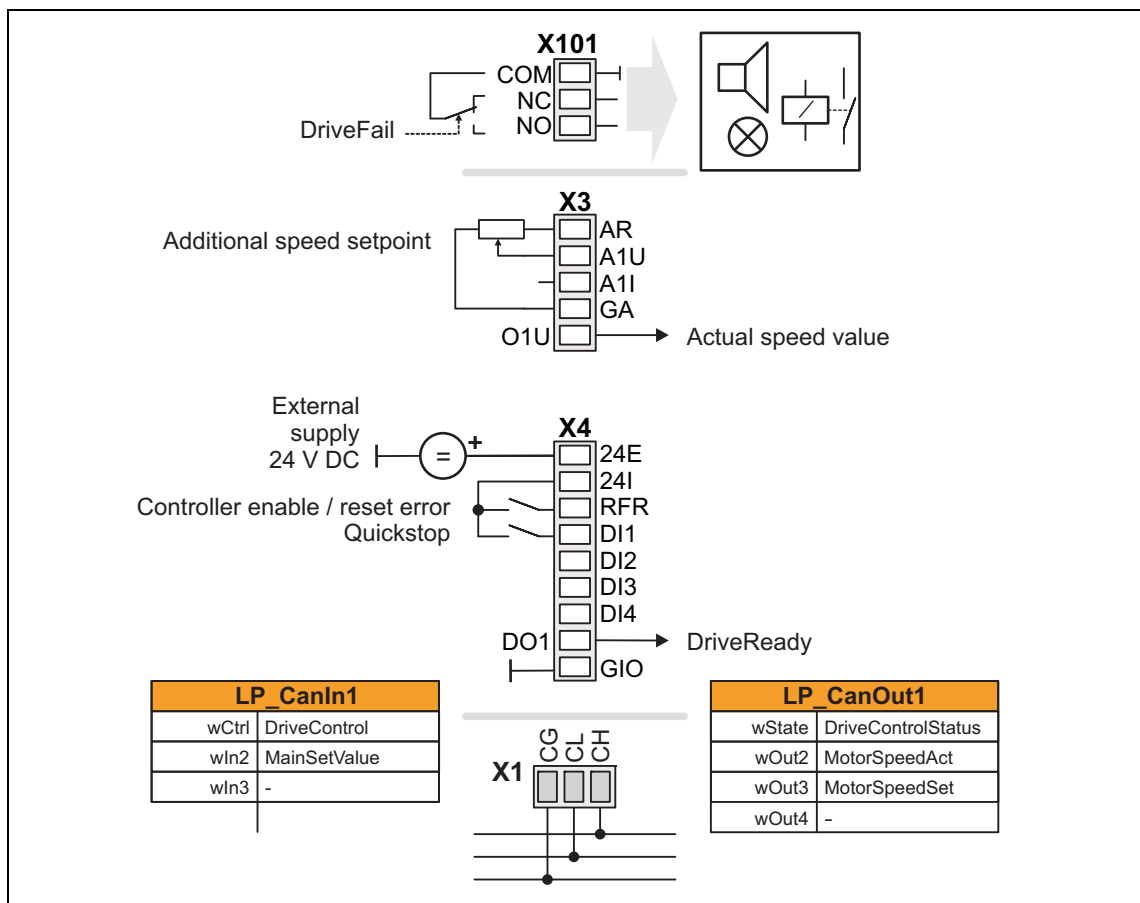
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	-
X4/DI1	-	X3/A1I	-
X4/DI2	-	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	-		* 10 V ≙ 100 % reference speed (C00011)
X4/DI4	-	X4/DO1	LA_NCtrl.bDriveReady

7.2.3.6 PC



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail	X3/A1U	-
		X3/A1I	-
X4/RFR	LA_NCtrl.bFailReset	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI1	-	* 10 V $\equiv$ 100 % reference speed (C00011)	
X4/DI2	-	X4/DO1	LA_NCtrl.bDriveReady
X4/DI3	-		
X4/DI4	-		

7.2.3.7 CAN



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/RFR	LA_NCtrl.bFailReset	X3/A1I	-
X4/DI1	LA_NCtrl.bSetQuickStop	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI2	-	* 10 V $\equiv$ 100 % reference speed (C00011)	
X4/DI3	-	X4/DO1	LA_NCtrl.bDriveReady
X4/DI4	-		

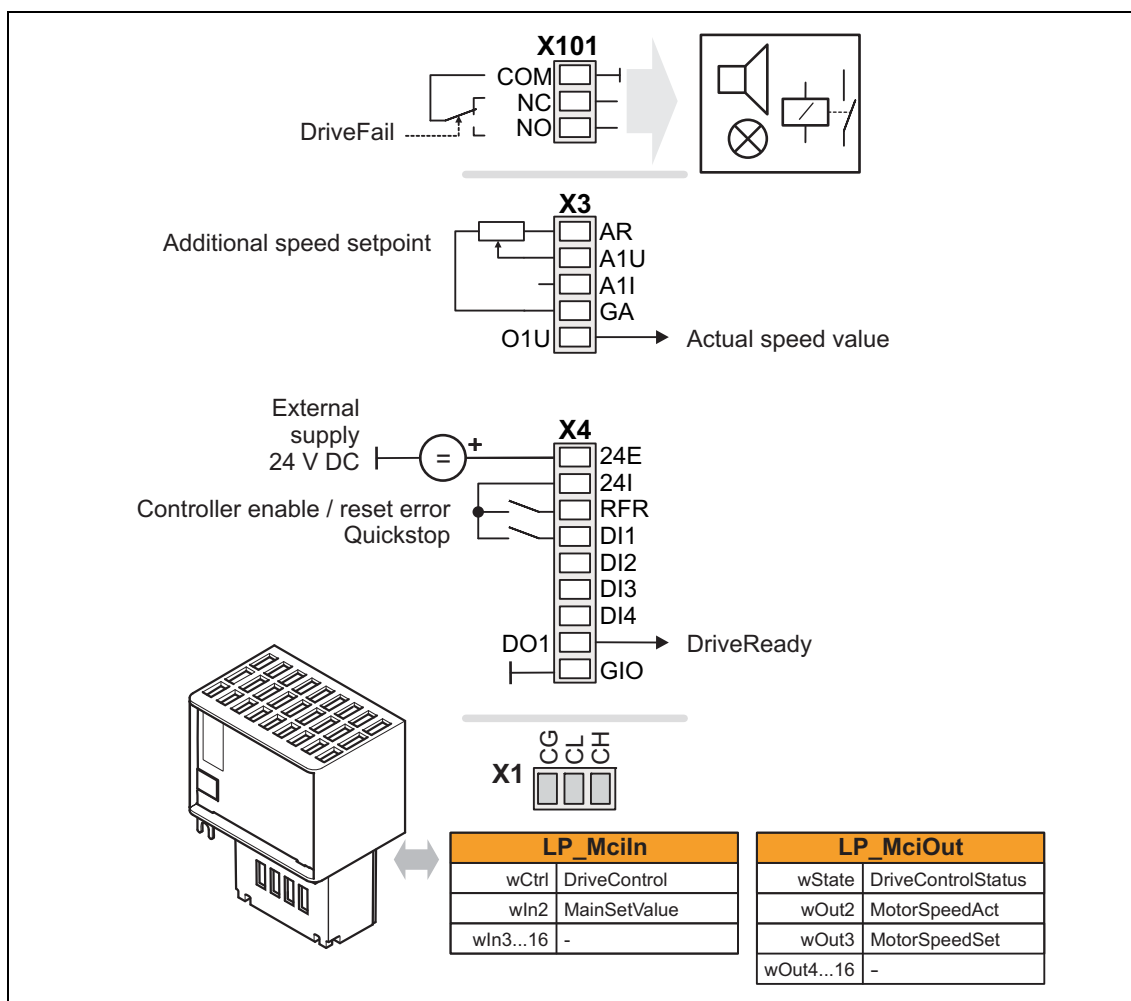
► [Process data assignment for fieldbus communication](#) (318)



Note!

- You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.
- The "manual jog" function via digital terminals is being prepared!

7.2.3.8 MCI



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bSetQuickStop	X3/A1I	-
X4/DI2	-	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	-	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI4	-	X4/DO1	LA_NCtrl.bDriveReady

► [Process data assignment for fieldbus communication](#) (318)

**Note!**

- You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.
- The "manual jog" function via digital terminals is being prepared!

7.2.4 Process data assignment for fieldbus communication

The fieldbus communication is connected (preconfigured) to the previously selected technology application by selecting the corresponding control mode in [C00007](#):

- "30: [CAN](#)" for the connection to the system bus (CAN)
- "40: [MCI](#)" for the connection to a plugged-on communication module (e.g. PROFIBUS)

The assignment of the process data words depends only on the application, not on the bus system used:

Input words	Name	Assignment
Word 1	DriveControl	Control word • For bit assignment see the table below.
Word 2	MainSetValue	Speed setpoint • Scaling: 16384 $\equiv$ 100 % reference speed (C00011)
Word 3	-	Not preconfigured
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Control word	Name	Function
Bit 0	SwitchOn	1 $\equiv$ Change to the " SwitchedOn " device status • This bit must be set in the CAN/MCI control word to ensure that the device changes to the SwitchedOn device status after mains connection without the need for a master control specifying this bit via fieldbus. • If control via a bus system is not wanted (e.g. in the case of control via terminals), the <i>wDriveCtrl</i> output signal of the LS_ParFix system block can be connected to the control word inputs.
Bit 1	DisableVoltage	1 $\equiv$ Inhibit inverter control (pulse inhibit)
Bit 2	SetQuickStop	1 $\equiv$ Activate quick stop (QSP). ▶ Activate/deactivate quick stop (81)
Bit 3	EnableOperation	1 $\equiv$ Enable controller (RFR) • If control via terminals is performed, this bit must be set both in the CAN control word and in the MCI control word. Otherwise, the controller is inhibited. ▶ Enable/Inhibit controller (80)
Bit 4	ModeSpecific_1	Reserved (currently not assigned)
Bit 5	ModeSpecific_2	
Bit 6	ModeSpecific_3	
Bit 7	ResetFault	1 $\equiv$ Reset fault (trip reset) • Acknowledge error message (if the error cause has been eliminated). ▶ Reset error (82)
Bit 8	SetHalt	1 $\equiv$ Activate stop function • Stop drive via stopping ramp (in preparation).
Bit 9	reserved_1	Reserved (currently not assigned)
Bit 10	reserved_2	
Bit 11	SetDCBrake	1 $\equiv$ Activate DC-injection braking ▶ Manual DC-injection braking (DCB) (212)
Bit 12	JogSpeed1	Activation of fixed speed 1 ... 3
Bit 13	JogSpeed2	

Control word	Name	Function
Bit 14	SetFail	1 ≡ Set error (trip set)
Bit 15	SetSpeedCcw	0 ≡ Direction of rotation to the right (Cw) 1 ≡ Direction of rotation to the left (Ccw)

Output words	Name	Assignment
Word 1	DriveControlStatus	Status word • For bit assignment see the table below.
Word 2	MotorSpeedAct	Actual speed value • Scaling: 16384 ≡ 100 % reference speed (C00011)
Word 3	MotorSpeedSet	Resulting overall setpoint • Scaling: 16384 ≡ 100 % reference speed (C00011)
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Status word	Name	Status
Bit 0	FreeStatusBit0	Free status bit 0 (not assigned, freely assignable)
Bit 1	PowerDisabled	1 ≡ Inverter control inhibited (pulse inhibit is active)
Bit 2	FreeStatusBit2	Free status bit 2 (not assigned, freely assignable)
Bit 3	FreeStatusBit3	Free status bit 3 (not assigned, freely assignable)
Bit 4	FreeStatusBit4	Free status bit 4 (not assigned, freely assignable)
Bit 5	FreeStatusBit5	Free status bit 5 (not assigned, freely assignable)
Bit 6	ActSpeedIsZero	During open-loop operation: 1 ≡ Speed setpoint < Comparison value (C00024) During closed-loop operation: 1 ≡ Actual speed value < Comparison value (C00024)
Bit 7	ControllerInhibit	1 ≡ Controller inhibited (controller inhibit is active)
Bit 8	StatusCodeBit0	Bit coded display of the active device status ► Device state machine and device states (see table [4-1])
Bit 9	StatusCodeBit1	
Bit 10	StatusCodeBit2	
Bit 11	StatusCodeBit3	
Bit 12	Warning	1 ≡ A warning is indicated
Bit 13	Trouble	1 ≡ Controller is in the " Trouble " device status • E.g. if an overvoltage has occurred.
Bit 14	FreeStatusBit14	Free status bit 14 (not assigned, freely assignable)
Bit 15	FreeStatusBit15	Free status bit 15 (not assigned, freely assignable)

7.2.5 Setting parameters (short overview)

Parameter	Info	Lenze setting	
		Value	Unit
C00012	Accel. time - main setpoint	2.000	s
C00013	Decel. time - main setpoint	2.000	s
C00019	Auto-DCB: Threshold	3	rpm
C00024	LS_DriveInterface: bNActCompare	0.00	%
C00036	DCB braking: Current	50.00	%
C00039/1	Fixed setpoint 1	40.00	%
C00039/2	Fixed setpoint 2	60.00	%
C00039/3	Fixed setpoint 3	80.00	%
C00039/4...15	Fixed setpoint 4 ... 15	0.00	%
C00101/1...15	Add. accel. time 1 ... 15	0.000	s
C00103/1...15	Add. decel. time 1 ... 15	0.000	s
C00105	Decel. time - quick stop	2.000	s
C00106	Auto-DCB: Hold time	0.500	s
C00107	DCB braking: Hold time	999.000	s
C00134	L_NSet_1: Ramp smoothing	0: Off	
C00182	L_NSet_1: S-ramp time PT1	20.00	s
C00190	L_NSet_1: Setpoint arithmetic	0: Out = Set	
C00220	L_NSet_1: Acceleration time - add. setpoint	0.000	s
C00221	L_NSet_1: Deceleration time - add. setpoint	0.000	s
C00222	L_PCTRL_1: Vp	1.0	
C00223	L_PCTRL_1: Tn	400	ms
C00224	L_PCTRL_1: Kd	0.0	
C00225	L_PCTRL_1: MaxLimit	199.99	%
C00226	L_PCTRL_1: MinLimit	-199.99	%
C00227	L_PCTRL_1: Acceleration time	0.010	s
C00228	L_PCTRL_1: Deceleration time	0.010	s
C00233	L_PCTRL_1: Root function	0: Off	
C00241	L_NSet_1: Hyst. NSet reached	0.50	%
C00242	Operating mode of process controller	0: Off	
C00243	L_PCTRL_1: Accel. time influence	5.000	s
C00244	L_PCTRL_1: Deceleration time influence	5.000	s
C00632/1	L_NSet_1: Blocking speed 1 max	0.00	%
C00632/2	L_NSet_1: Blocking speed 2 max	0.00	%
C00632/3	L_NSet_1: Blocking speed 3 max	0.00	%
C00633/1	L_NSet_1: Blocking speed 1 min	0.00	%
C00633/2	L_NSet_1: Blocking speed 2 min	0.00	%
C00633/3	L_NSet_1: Blocking speed 3 min	0.00	%
C00635	L_NSet_1: nMaxLimit	199.99	%
C00636	L_NSet_1: nMinLimit	-199.99	%
C00670	L_OffsetGainP_1: Gain	1.0000	
C00671	L_OffsetGainP_2: Gain	1.0000	
C00672	L_OffsetGainP_3: Gain	1.0000	

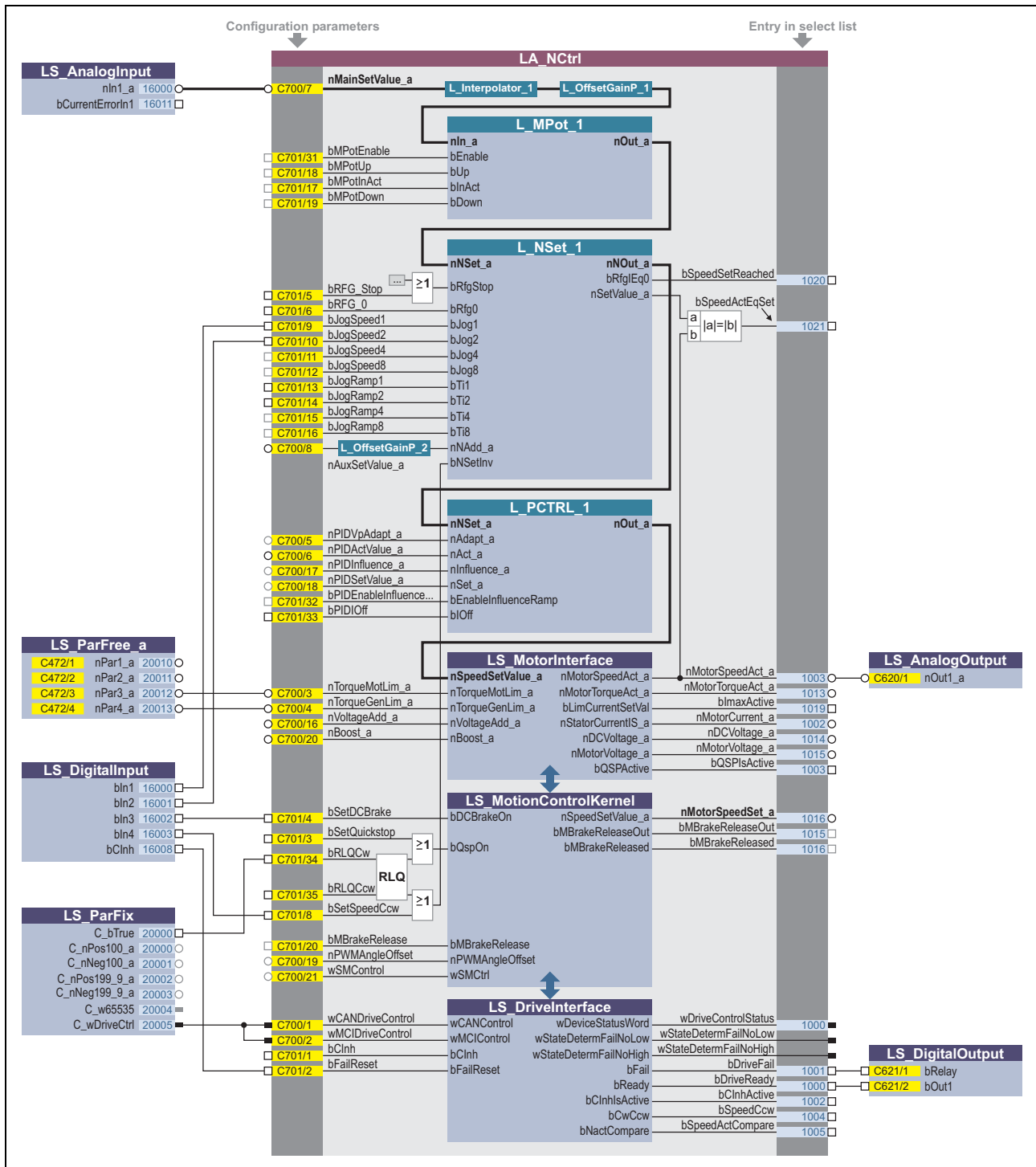
Parameter	Info	Lenze setting	
		Value	Unit
C00696	L_OffsetGainP_1: Offset	0.00	%
C00697	L_OffsetGainP_2: Offset	0.00	%
C00698	L_OffsetGainP_3: Offset	0.00	%
C00800	L_MPot_1: Upper limit	100.00	%
C00801	L_MPot_1: Lower limit	-100.00	%
C00802	L_MPot_1: Acceleration time	10.0	s
C00803	L_MPot_1: Deceleration time	10.0	s
C00804	L_MPot_1: Inactive fct.	0: Retain value	
C00805	L_MPot_1: Init fct.	0: Load last value	
C00806	Use of motor potentiometer	0: No	

Related topics:

► ["GeneralPurpose" functions](#) (📖 385)

7.2.6 Configuration parameters

If required, the subcodes of [C00700](#) and [C00701](#) serve to change the pre-configured assignment of the application inputs:



[7-2] Pre-assignment of the "Actuating drive speed" application in the "Terminals 0" control mode

Configuration parameters

Entry in select list

LA_NCtrl

GeneralPurpose (GP) functions

○ C700/9 nGPAAnalogSwitchIn1_a C00830/14

○ C700/10 nGPAAnalogSwitchIn2_a C00830/15

□ C701/23 bGPAAnalogSwitchSet C00833/13

○ C700/11 nGPArithmetikIn1_a C00830/12 In1

○ C700/12 nGPArithmetikIn2_a C00830/13 In2

○ C700/13 nGPMulDivIn_a C00830/82

□ C701/24 bGPDigitalDelayIn C00833/66

□ C701/25 bGPLogicIn1 C00833/63

□ C701/26 bGPLogicIn2 C00833/64

□ C701/27 bGPLogicIn3 C00833/65

○ C700/14 nGPCompareIn1_a C00830/16

○ C700/15 nGPCompareIn2_a C00830/17

○ C00411/1 C00412 - Bit 0

○ C00411/2 C00412 - Bit 1

○ C00411/3 C00412 - Bit 2

○ C00411/4 C00412 - Bit 3

○ C00838 Out =

0	In1
1	In1 + In2
2	In1 - In2
3	(In1 * In2) / 100%
4	(In1 * 1%) / In2
5	(In1 * 100%) / (100% - In2)

○ C00699/1 C00699/2

○ C00720/1 C00720/2

○ C00821/1 C00821/2 C00821/3 ... C00821/8

○ C00681 C00682

○ C00680

○ C00820

○ C00830/14 C00830/15 C00830/13 C00830/12 C00830/13 C00830/82 C00833/66 C00833/63 C00833/64 C00833/65 C00830/16 C00830/17 C00412 - Bit 0 C00412 - Bit 1 C00412 - Bit 2 C00412 - Bit 3

○ nGPAAnalogSwitchOut_a 1006

○ nGPArithmetikOut_a 1007

○ nGPMulDivOut_a 1008

○ bGPDigitalDelayOut 1008

○ bGPLogicOut 1009

○ bGPCompareOut 1017

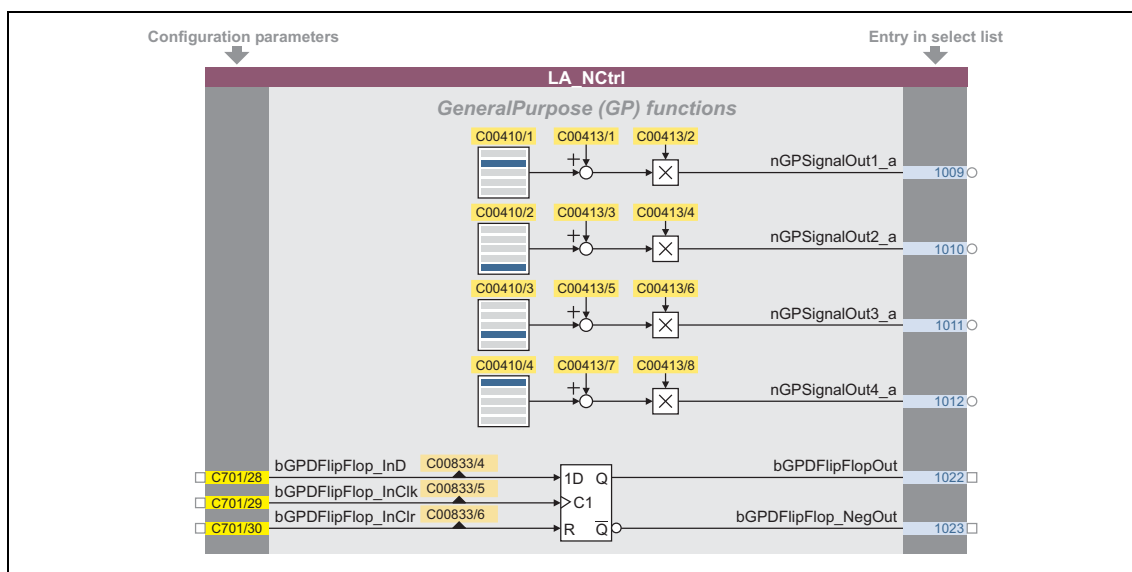
○ bGPSignalOut1 1010

○ bGPSignalOut2 1011

○ bGPSignalOut3 1012

○ bGPSignalOut4 1013

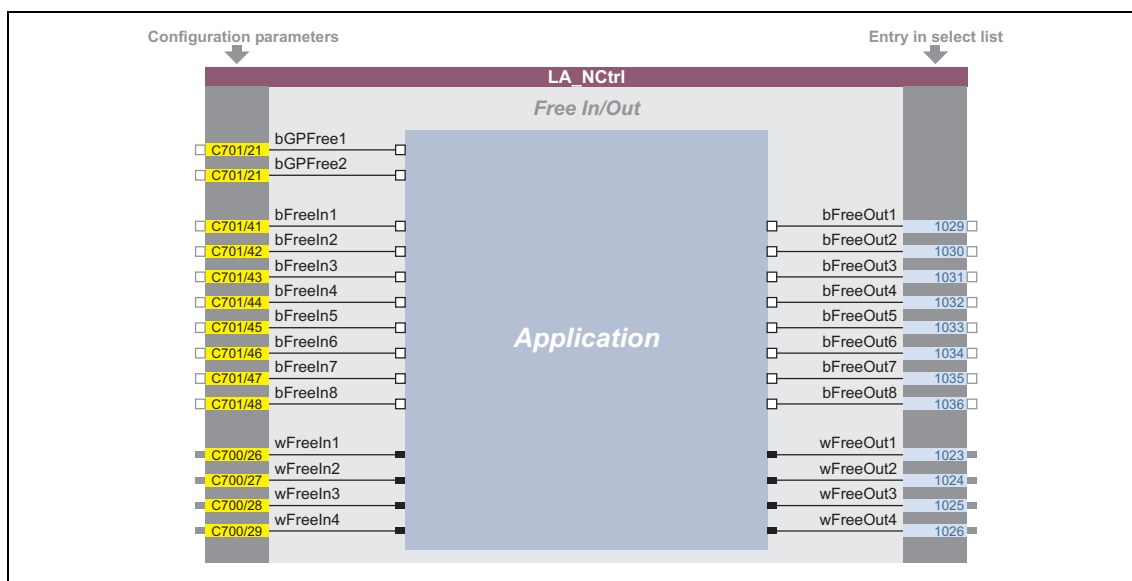
[7-3] "GeneralPurpose" functions



[7-4] "GeneralPurpose" functions (continuation)

Free inputs and outputs

These inputs can be freely interconnected in the application level. They can be used to transfer signals from the I/O level to the application level and vice versa.



[7-5] Free inputs/outputs

Related topics:

- ▶ [User-defined terminal assignment](#) (289)
- ▶ ["GeneralPurpose" functions](#) (385)

7.3 TA "actuating drive speed (AC Drive Profile)"

This technology application is available from version 13.00.00!

The EtherNet/IP™ communication module supports the "AC Drive Profile".

When the controller is provided with an EtherNet/IP™ communication module and the control is to be carried out by means of "AC Drive Profile" via EtherNet/IP™, make the following settings:

1. Set the application "1100: Actuating drive speed (AC Drive Profile)" in [C00005](#).
2. Set the "40: MCI" control mode in [C00007](#).
 - The process data word received by the master control is then interpreted by the application as "AC Drive Profile" control word.
 - When the control is carried out via the system bus (CANopen), set the "30: CAN" control mode instead in [C00007](#).

Features

- Pre-configured control modes for terminals and bus control (with predefined process data connection to the fieldbus)
- Free configuration of input and output signals
- adjustable offset, gain and negation of the speed setpoint
- Up to 15 fixed setpoints for speed and ramp time
- Adjustable setpoint ramp times
- Freely selectable, variable ramp shape
- Automatic holding brake control
- Quick stop (QSP) with adjustable ramp time
- Motor potentiometer function (optional)
- Process controller (optional)
- Integrated, freely available "GeneralPurpose" functions:
Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop
- Interface to the safety module (optional)
- Integration of encoder feedback



Note!

In contrast to the "actuating drive speed" standard application, this application makes use of the *nAuxSetValue_a* input to determine a local speed setpoint (when NetRef=0). For this reason, the *nNAdd_a* input at the [L NSet 1](#) setpoint generator for determining an additional speed setpoint is not connected in the Lenze setting.

7.3.1 I/O assemblies

For the data exchange, the technology application supports the assembly output object instance 23 (0x17) and assembly input object instance 73 (0x49) defined by the ODVA (Open DeviceNet Vendor Association).

Instance 23 (0x17): Extended Speed and Torque Control Output								
Bytes	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0		Net Ref	NetCtrl			Fault Reset	Run Rev	Run Fwd
1								
2	Speed Reference (Low Byte)							
3	Speed Reference (High Byte)							
4	Torque Reference (Low Byte)							
5	Torque Reference (High Byte)							

Instance 73 (0x49): Extended Speed and Torque Control Input								
Bytes	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	At Reference	RefFrom Net	CtrlFrom Net	Ready	Running2 (Rev)	Running1 (Fwd)	Warning	Faulted
1	Drive State							
2	Speed Actual (Low Byte)							
3	Speed Actual (High Byte)							
4	Torque Actual (Low Byte)							
5	Torque Actual (High Byte)							



Detailed information on the data transfer and "AC Drive Profile" can be found in the E84AYCEO communication manual (EtherNet/IP™).



Tip!

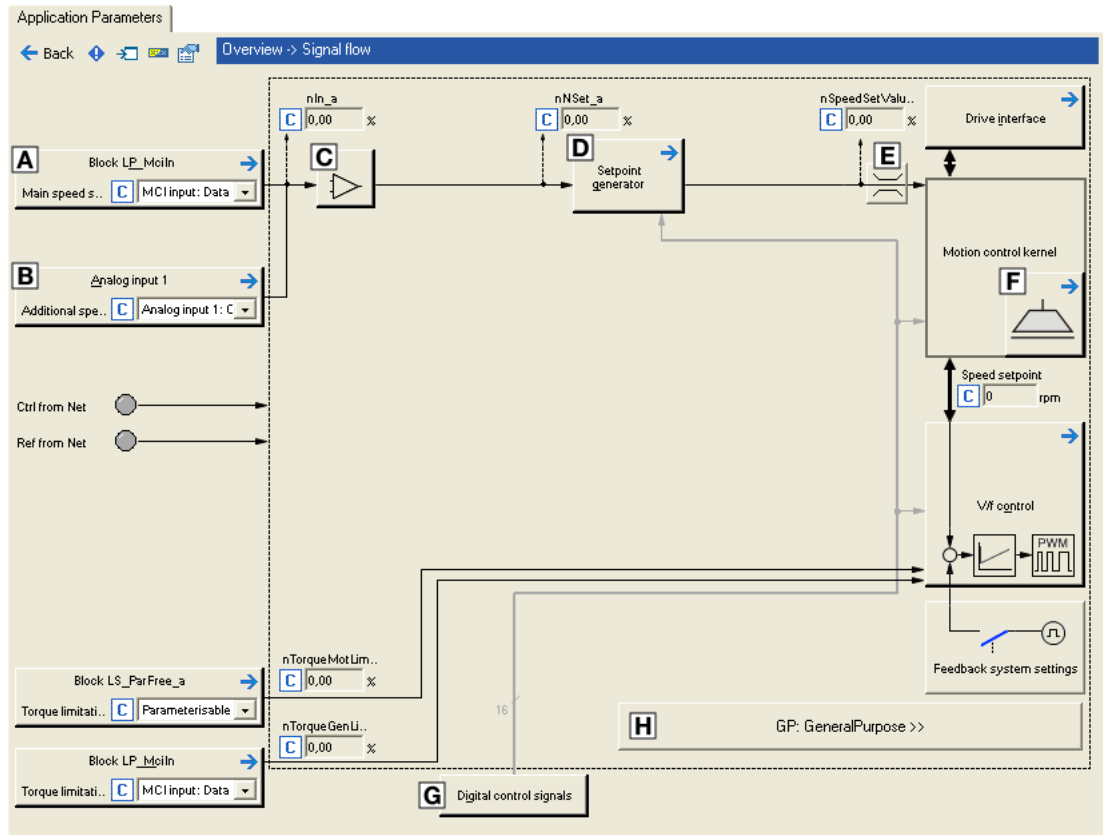
Detailed information on EtherNet/IP™ can be found at the web page of the ODVA (Open DeviceNet Vendor Association) user organisation:

<http://www.odva.org>

Related topics:

- [Process data assignment for fieldbus communication](#)
- [Run/Stop event](#)
- [Scaling of speed and torque values](#)

7.3.2 Basic signal flow



[7-6] Signal flow of the "actuating drive speed (AC Drive Profile)" technology application

- A Configuration of the signal source for setpoint selection via fieldbus (NetRef=1)
- B Configuration of the signal source for local setpoint selection (NetRef=0)
- C Offset and gain for speed setpoint ([L_OffsetGainP_1](#))
- D Setpoint generator ([L_NSet_1](#))
- E Speed setpoint input limitation
- F [Holding brake control](#)
- G Terminal assignment & display of digital control signals
- H Integrated disposable ["GeneralPurpose" functions](#): Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop

Definition of the speed setpoint

The speed setpoint is usually defined as process data via the fieldbus. If set accordingly, the speed setpoint can also be determined locally (e.g. via the analog input 1). Depending on the selection, either only the *nMainSetValue_a* application input or only the application input *nAuxSetValue_a* is effective. The following table shows the relationships:

Fieldbus used	Control mode (C00007)	Speed reference	AC Drive Profile control word (wMCIDriveControl)	effective input (at LA_NCtrl)
	40: MCI	via fieldbus (data word 2)	Bit 6 ("NetRef") = 1	<i>nMainSetValue_a</i>
		local*	Bit 6 ("NetRef") = 0	<i>nAuxSetValue_a</i>
	30: CAN	via fieldbus (data word 2)	Bit 6 ("NetRef") = 1	<i>nMainSetValue_a</i>
		local*	Bit 6 ("NetRef") = 0	<i>nAuxSetValue_a</i>
-	10: Terminals 0 12: Terminals 2 14: Terminals 11 16: Terminals 16	local*	9 ≡ 0x0009 • Bit 0, SwitchOn = TRUE • Bit 3, EnableOperation = TRUE • All others: FALSE	<i>nAuxSetValue_a</i>
	20: Keypad	C00728/3		
	21: PC	C00472/1		

* The local setpoint is selected in the Lenze setting via the analog input 1

Scaling of the speed setpoint

If the setpoint is determined via fieldbus (NetRef=1), the setpoint applied to the *nMainSetValue_a* application input is evaluated with the speed scaling set in [C01353/1](#) (AC Drive Attribute 22). ▶ [Scaling of speed and torque values](#).

If the setpoint is determined locally (e.g. via the analog input 1), the setpoint applied to the *nAuxSetValue_a* application input is scaled as follows:

$$16384 \equiv 100 \% \text{ reference speed (C00011).}$$

Offset & gain

Offset and gain of the speed signal can be set in [C00696](#) and [C00670](#) for a simple signal adjustment of a setpoint encoder.

Ramp function generator

The setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps.

- Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective.
- For a detailed functional description see the [L_NSet](#) FB.

Selection of the direction of rotation

- In case of control via fieldbus via bit 0 "Run Forward" and bit 1 "Run Backward" of the AC Drive Profile control word.
- In case of local control via the *bSetSpeedCcw* application input or by selecting negative fixed setpoints.

Selection of the torque setpoint in torque mode

In torque mode", the *nTorqueGenLim_a* application input has the function of the torque setpoint selection.

The torque setpoint is usually defined as process data via the fieldbus. If set accordingly, the torque setpoint can also be determined locally (e.g. via the analog input 1).

For the local selection of the torque setpoint, the same application input (*nAuxSetValue_a*) is used as for the local selection of the speed setpoint. In "torque mode" however, the *nAuxSetValue_a* input is internally connected to the *nTorqueGenLim_a* input. In this case, the speed setpoint is internally permanently set to "100 %".

The relationships are shown in the following table:

Fieldbus used	Control mode (C00007)	Torque reference	AC Drive Profile control word (wMCIDriveControl)	effective input (at LA_NCtrl)
	40: MCI	via fieldbus (data word 3)	Bit 6 ("NetRef") = 1	<i>nTorqueGenLim_a</i>
		local*	Bit 6 ("NetRef") = 0	<i>nAuxSetValue_a</i>
	30: CAN	via fieldbus (data word 3)	Bit 6 ("NetRef") = 1	<i>nTorqueGenLim_a</i>
		local*	Bit 6 ("NetRef") = 0	<i>nAuxSetValue_a</i>
-	10: Terminals 0 12: Terminals 2 14: Terminals 11 16: Terminals 16	local*	9 ≡ 0x0009 • Bit 0, SwitchOn = TRUE • Bit 3, EnableOperation = TRUE • All others: FALSE	<i>nAuxSetValue_a</i>
	20: Keypad	C00728/3		
	21: PC	C00472/1		

* The local setpoint is selected in the Lenze setting via the analog input 1

7.3.3 Internal interfaces | application block "LA_NCtrl"

**Note!**

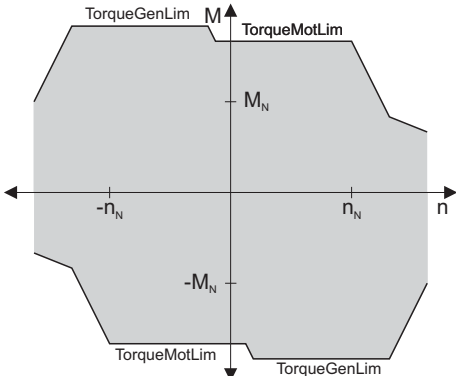
The connectors grayed out in the following table are hidden in the function block editor in the Lenze setting.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

Inputs

Identifier	Data type	Information/possible settings
wCANDriveControl	WORD	Input for CAN control word • Is not used in this configuration and is thus set to the permanent value "9" in the Lenze setting (SwitchOn = TRUE and EnableOperation = TRUE). • For the evaluation of the AC Drive Profile control word received via fieldbus, the <i>wMCIDriveControl</i> input is used in the control modes 30: CAN" and "40: MCI".
wMCIDriveControl	WORD	Input for the AC Drive Profile control word received via fieldbus • The AC Drive Profile control word operates the controller in compliance with the assembly output object instances 20 ... 23. For this purpose, the control bits are evaluated and lead to a corresponding modification of the control signals <i>bFailReset</i>, <i>bRFG_0</i> and <i>bSetSpeedCw</i> which results in the AC Drive-specific behaviour. • See the "Process data assignment for fieldbus communication" subchapter for a detailed description of the individual control bits. • Display parameter: C01351/1
wSMControl	WORD	Interface to the optional safety system. • Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). • See the subchapter "Interface to safety system" of the chapter on basic drive functions for a detailed description of the individual control bits.
bCIInh	BOOL	Enable/Inhibit controller
		FALSE Enable controller: The controller switches to the "OperationEnabled" device status if no other source for controller inhibit is active. • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. TRUE Inhibit controller (controller inhibit): The controller switches to the "SwitchedOn" device status.
bFailReset	BOOL	Reset error message • In the Lenze setting this input is connected to the digital input controller enable so that a possibly existing error message is reset together with the controller enable (if the cause for the fault is eliminated). • In case of control via fieldbus (NetCtrl=1): This input is OR'd with bit 2 ("fault reset") of the AC Drive Profile control word.
		TRUE The current fault is reset, if the cause for the fault is eliminated. • If the fault still exists, the error status remains unchanged.

Identifier	Data type	Information/possible settings
bSetQuickstop	BOOL	Enable quick stop (QSP) • Also see device command " Activate/deactivate quick stop ".
		TRUE Activate quick stop • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105 , the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019 .
		FALSE Deactivate quick stop • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop.
bSetDCBrake	BOOL	Manual DC-injection braking (DCB) • Detailed information on DC-injection braking is provided in the motor control chapter, subchapter " DC-injection braking ".
		 Note! Holding braking is not possible when this braking mode is used! Use the basic " Holding brake control " function for controlling the holding brake with a low rate of wear.
		FALSE Deactivate DC-injection braking.
		TRUE Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. • The braking effect stops when the rotor is at standstill. • After the hold time (C00107) has expired, the controller sets the pulse inhibit.
bRFG_Stop	BOOL	Ramp function generator: Maintain the current value of the main setpoint integrator • The speed, for instance, of a running ramp process is immediately kept constant when <i>bRFG_Stop</i> is activated. At the same time, the acceleration/deceleration jumps to the value "0". • For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is held.
bRFG_0	BOOL	Ramp function generator: Lead the main setpoint integrator to "0" within the current T_i times • In case of control via fieldbus (NetCtrl=1): If a stop is triggered via bit 0 ("Run Forward") and bit 1 ("Run Backward") of the AC Drive Profile control word, this signal is internally set to TRUE and thus the drive is braked to standstill. • For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is led to "0" within the T_i time set.
nVoltageAdd_a	INT	Additive voltage impression • An additional setpoint for the motor voltage can be specified via this process input. • If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. • If the value is negative, the voltage is reduced. • Scaling: $16384 \equiv 1000 \text{ V}$
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!

Identifier	Data type	Information/possible settings				
nBoost_a	INT	Additional setpoint for the motor voltage at speed = 0 - The entire voltage-frequency characteristic is provided with an offset. - Scaling: 16384 ≡ 1000 V STOP Stop! Values selected too high may cause the motor to heat up due to the resulting current!				
nPWMAngleOffset	INT	Additional offset for the electrical angle of rotation - If a torque is connected, e.g. dynamic acceleration processes can be generated. - Scaling: ±32767 ≡ ±180 ° angle of rotation				
nTorqueMotLim_a nTorqueGenLim_a	INT	Torque limitation in motor mode and in generator mode (speed mode) or torque setpoint selection (torque mode) When "speed mode" is set, the following applies: - The torque limitation in motor mode and generator mode are determined via <i>nTorqueMotLim_a</i>. - The <i>nTorqueGenLim_a</i> input is not effective. When "torque mode" is set, the following applies: - The torque setpoint is determined via <i>nTorqueGenLim_a</i>. - The <i>nTorqueMotLim_a</i> input is not effective. More notes for both inputs: - These input signals are directly transferred to the motor control to limit the controller's maximum torque in motor and generator mode. - The drive cannot output a higher torque in motor/generator mode than set here. - The applied values (any polarity) are internally interpreted as absolute values. - If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called <i>I_{max}</i> controller. - If sensorless vector control (SLVC) or servo control (SC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. - Scaling: 16384 ≡ 100 % <i>M_{max}</i> (C00057) Torque limits in motor and generator mode: 				
bSetSpeedCcw	BOOL	Change of direction of rotation - For instance if a motor or gearbox is fixed laterally reversed to a machine part, but the setpoint selection should still be executed for the positive direction of rotation. Input only effective in case of local control (NetCtrl=0) <table><tr><td>FALSE</td><td>Clockwise rotation (Cw)</td></tr><tr><td>TRUE</td><td>Direction of rotation to the left (Ccw)</td></tr></table>	FALSE	Clockwise rotation (Cw)	TRUE	Direction of rotation to the left (Ccw)
FALSE	Clockwise rotation (Cw)					
TRUE	Direction of rotation to the left (Ccw)					
bRLQCw	BOOL	Activate clockwise rotation (fail-safe) For a detailed functional description see the L_RLQ FB. <table><tr><td>FALSE</td><td>Quick stop</td></tr><tr><td>TRUE</td><td>CW rotation</td></tr></table>	FALSE	Quick stop	TRUE	CW rotation
FALSE	Quick stop					
TRUE	CW rotation					

Identifier	Data type	Information/possible settings
bRLQCcw	BOOL	Activate counter-clockwise rotation (fail-safe) • Input only effective in case of local control (NetCtrl=0) • For a detailed functional description see the L_RLO FB.
		FALSEQuick stop
		TRUECounter-clockwise rotation
nMainSetValue_a	INT	Speed setpoint via fieldbus in [rpm] • Input only effective in case of setpoint selection via fieldbus (NetRef=1) • This input is evaluated with the speed scaling set in C01353/1 (AC Drive Attribute 22). ▶ Scaling of speed and torque values • An absolute value is created internally (the sign has no meaning). • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • The setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB.
nAuxSetValue_a	INT	Local speed setpoint (speed mode) or torque setpoint (torque mode) • Input only effective in case of local setpoint selection (NetRef=0)
		When "speed mode" is set, the following applies: • The input value is interpreted as speed setpoint. • Scaling: 16384 ≡ 100 % reference speed (C00011) • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • The setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB.
		When "torque mode" is set, the following applies: • The input value is interpreted as torque setpoint. (Input <i>nAuxSetValue_a</i> is internally connected to input <i>nTorqueGenLim_a</i>). • Scaling: 16384 ≡ 100 % M_{max} (C00057) • The speed setpoint is internally permanently set to "100 %".
bJogSpeed1 bJogSpeed2	BOOL	Selection inputs for override fixed setpoints (JOG setpoints) • Inputs only effective in case of local setpoint selection (NetRef=0) • These selection inputs can be used to activate a fixed setpoint for the setpoint generator instead of the setpoint applied to the <i>nAuxSetValue_a</i> input. • The four selection inputs are binary coded, therefore 15 fixed setpoints can be selected. • In case of binary coded selection "0" (all inputs = FALSE or not assigned), the main setpoint applied to the <i>nAuxSetValue_a</i> input is active. • The selection of the fixed setpoints is carried out in C00039/1...15 in [%] based on the reference speed (C00011). • For a detailed functional description see the L_NSet FB.
bJogSpeed4 bJogSpeed8	BOOL	
bJogRamp1 bJogRamp2	BOOL	Selection inputs for alternative acceleration/deceleration times • The four selection inputs are binary coded, therefore 15 alternative acceleration/deceleration times can be selected. • In case of binary selection "0" (all inputs = FALSE or not assigned), the acceleration time (C00012) and deceleration time (C00013) set for the main setpoint are active. • Alternative acceleration times are selected in C00101/1...15. • The selection of the alternative deceleration times is carried out in C00103/1...15. • For a detailed functional description see the L_NSet FB.
bJogRamp4 bJogRamp8	BOOL	

Identifier	Data type	Information/possible settings	
Motor potentiometer Alternatively to the input signal <i>nMainSetValue_a</i> (or <i>nAuxSetValue_a</i> in case of local setpoint selection), the speed setpoint can also be generated via a motor potentiometer function. • In the Lenze setting, the motor potentiometer function is deactivated. • Activation is possible via C00806 or via the <i>bMPotEnable</i> input. • The behaviour of the motor potentiometer during switch-on of the drive system can be selected in C00805. • For a detailed functional description see the L_MPot FB.			
bMPotEnable	BOOL	Activating the motor potentiometer function • This input and C00806 are OR'd.	
		TRUE	The motor potentiometer function is active; the speed setpoint can be changed via the <i>bMPotUp</i> and <i>bMPotDown</i> control inputs.
bMPotUp	BOOL	Increasing the speed setpoint	
		TRUE	Approach the upper speed limit value set in C00800 with the acceleration time set in C00802 .
bMPotInAct	BOOL	Activating the inactive function	
		TRUE	The speed setpoint behaves according to the inactive function set in C00804 . • In the Lenze setting, the speed setpoint is maintained.
bMPotDown	BOOL	Decreasing the speed setpoint	
		TRUE	Approach the lower speed limit value set In C00801 with the deceleration time set in C00803 .
Process controller • In the Lenze setting, the process controller is deactivated. • The activation is executed by selecting the operating mode in C00242. • For a detailed functional description see FB L_PCTRL.			
bPIDEnableInfluenceRamp	BOOL	Activate ramp for influencing factor	
		FALSE	Influencing factor of the PID controller is ramped down to "0".
		TRUE	Influencing factor of the PID controller is ramped up to the value <i>nPIDInfluence_a</i> .
bPIDIOff	BOOL	Switch off the I-component of the process controller • In conjunction with the operating mode set in C00242 (Lenze setting: "Off").	
		TRUE	I-component of the process controller is switched off.
nPIDVpAdapt_a	INT	Adaptation of gain Vp set in C00222 in percent • Scaling: 16384 $\equiv$ 100 % • Internal limitation to ± 199.99 % • Changes can be done online.	
nPIDSetValue_a	INT	Sensor and process setpoint for operating modes 2, 4 and 5 • Scaling: 16384 $\equiv$ 100 % • Internal limitation to ± 199.99 %	
nPIDActValue_a	INT	Speed or actual sensor value (actual process value) • Offset and gain for this input signal can be set in C00698 and C00672. • Scaling: 16384 $\equiv$ 100 % • Internal limitation to ± 199.99 %	
nPIDInfluence_a	INT	Limitation of the influencing factor in percent • The influence factor of the PID controller can be limited to a certain value (-199.99% ... +199.99%) via <i>nPIDInfluence_a</i>. • Scaling: 16384 $\equiv$ 100 % • Internal limitation to ± 199.99 %	

Identifier	Data type	Information/possible settings	
MCK basic functions			
bMBrakeRelease	BOOL	Holding brake control : Release/apply brake In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off").	
		FALSE	Apply brake. During automatic operation, the internal brake logic controls the brake.
		TRUE	Release brake manually (forced release). Note! The brake can also be released if the controller is inhibited! - During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. - In semi-automatic operation, the brake is released including feedforward control.
GP: GeneralPurpose The following inputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions			
bGPFree1 ... bGPFree2	BOOL	Free inputs for digital signals Digital signals can be transferred from the I/O level to the application level via these inputs.	
nGPAAnalogSwitchIn1_a nGPAAnalogSwitchIn2_a	INT	Analog switch : Input signals The input signal selected via the selection input <i>bGPAAnalogSwitchSet</i> is output at output <i>nGPAAnalogSwitchOut_a</i>.	
bGPAAnalogSwitchSet	BOOL	Analog switch : Selection input	
		FALSE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i>
		TRUE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i>
nGPArithmetikIn1_a nGPArithmetikIn2_a	INT	Arithmetic : Input signals - The arithmetic function is selected in C00338. - The result is output at output <i>nGPArithmetikOut_a</i>.	
nGPMulDivIn_a	INT	Multiplication/Division : Input signal - The factor for the multiplication can be set in C00699/1 (numerator) and C00699/2 (denominator). - The result is output at output <i>nGPMulDivOut_a</i>.	
bGPDigitalDelayIn	BOOL	Binary delay element : Input signal - The on-delay can be set in C00720/1. - The off-delay can be set in C00720/2. - The time-delayed input signal is output at output <i>bGPDigitalDelayOut</i>.	
bGPLogicIn1 bGPLogicIn2 bGPLogicIn3	BOOL	Binary logic : Input signals - The logic operation is selected in C00820. - The result is output at output <i>bGPLogicOut</i>.	
nGPCompareIn1_a nGPCompareIn2_a	INT	Analog comparison : Input signals - The comparison operation is selected in C00680. - Hysteresis and window size can be set in C00680 and C00682. - If the comparison statement is true, the output <i>bGPCompareOut</i> will be set to TRUE.	
bGPDFlipFlop_InD bGPDFlipFlop_InClk bGPDFlipFlop_InClr	BOOL	D-FlipFlop : Input signals Data, clock and reset input	

Identifier	Data type	Information/possible settings
Free inputs The following inputs can freely be interconnected on the application level. The signals can be transferred from the I/O level to the application level via these inputs.		
bFreeIn1 ... bFreeIn8	BOOL	Free inputs for digital signals
wFreeIn1 ... wFreeIn4	WORD	Free inputs for 16-bit signals

Outputs

Identifier	Data type	Value/meaning
wDriveControlStatus	WORD	AC Drive Profile status word - The status word contains information on the currents status of the drive controller. - For a detailed description of the individual status bits, see subchapter entitled "Process data assignment for fieldbus communication". - Display parameter: C01352/1
wStateDetermFailNoLow	WORD	Display of the status determining error (LOW word)
wStateDetermFailNoHigh	WORD	Display of the status determining error (HIGH word)
bDriveFail	BOOL	TRUE Drive controller in error status. "Fault" device status is active.
bDriveReady	BOOL	TRUE Controller is ready for operation. "SwitchedOn" device status is active. - The drive is in this device status if the DC bus voltage is applied and the controller is still inhibited by the user (controller inhibit).
bClnhActive	BOOL	TRUE Controller inhibit is active.
bQSPLsActive	BOOL	TRUE Quick stop is active.
bSpeedCcw	BOOL	Current direction of rotation
		FALSE Clockwise rotation (Cw)
		TRUE Direction of rotation to the left (Ccw)
bSpeedActCompare	BOOL	Result of the speed comparison (detection of speed=0)
		TRUE During open-loop operation: Speed setpoint < Comparison value (C00024)
		During closed-loop operation: Actual speed value < Comparison value (C00024)
bOverLoadActive	BOOL	In preparation (output is not interconnected on the application level)
bUnderLoadActive	BOOL	In preparation (output is not interconnected on the application level)
blmaxActive	BOOL	"Current setpoint inside the limitation" status signal
		TRUE The current setpoint is internally limited (the drive controller operates at the maximum current limit).
bSpeedSetReached	BOOL	Status signal "setpoint = 0"
		TRUE Speed setpoint from the ramp function generator = 0
bSpeedActEqSet	BOOL	TRUE Actual speed value = speed setpoint
nMotorCurrent_a	INT	Current stator current/effective motor current Scaling: $16384 \equiv 100\% I_{\max\_mot}$ (C00022)

Identifier	Data type	Value/meaning
nMotorSpeedSet_a	INT	Speed setpoint Scaling: 16384 $\equiv$ 100 % reference speed (C00011)
nMotorSpeedAct_a	INT	Actual speed value - Scaling: 16384 $\equiv$ 100 % reference speed (C00011) - The absolute value is output (the sign has no meaning).
nMotorTorqueAct_a	INT	Actual torque - In the "VFC (+encoder)" operating mode of the motor control, this value is determined from the current motor current and corresponds to the actual torque only by approximation. - Scaling: 16384 $\equiv$ 100 % $M_{\max}$ (C00057) - The absolute value is output (the sign has no meaning).
nDCVoltage_a	INT	Actual DC-bus voltage Scaling: 16384 $\equiv$ 1000 V
nMotorVoltage_a	INT	Current motor voltage/inverter output voltage Scaling: 16384 $\equiv$ 1000 V
MCK basic functions		
bMBrakeReleaseOut	BOOL	Holding brake control : Trigger signal for the holding brake control switching element via a digital output Use bit 0 in C02582 to activate inverted switching element triggering.
		FALSE Apply brake.
		TRUE Release brake.
bMBrakeReleased	BOOL	Holding brake control : "Brake released" considering the brake release time When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed!
		TRUE Brake released (after the brake release time has expired).
GP: GeneralPurpose The following outputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions		
nGPAAnalogSwitchInOut_a	INT	Analog switch : Output signal
nGPArithmetikOut_a	INT	Arithmetic : Output signal
nGPMulDivOut_a	INT	Multiplication/Division : Output signal
bGPDigitalDelayOut	BOOL	Binary delay element : Output signal
bGPLogicOut	BOOL	Binary logic : Output signal
bGPCompareOut	BOOL	Analog comparison : Output signal
bGPSignalOut1 ... bGPSignalOut4	BOOL	Binary signal monitor : Output signals - The signal sources to be output are selected in C00411/1...4. - A bit coded inversion of the output signals can be parameterised in C00412.
nGPSignalOut1_a ... nGPSignalOut4_a	BOOL	Analog signal monitor : Output signals - The signal sources to be output are selected in C00410/1...4. - Gain and offset for each output signal can be parameterised in C00413/1...8.
bGPDFlipFlop_Out	BOOL	D-FlipFlop : Output signal
bGPDFlipFlop_NegOut	BOOL	D-FlipFlop : Negated output signal

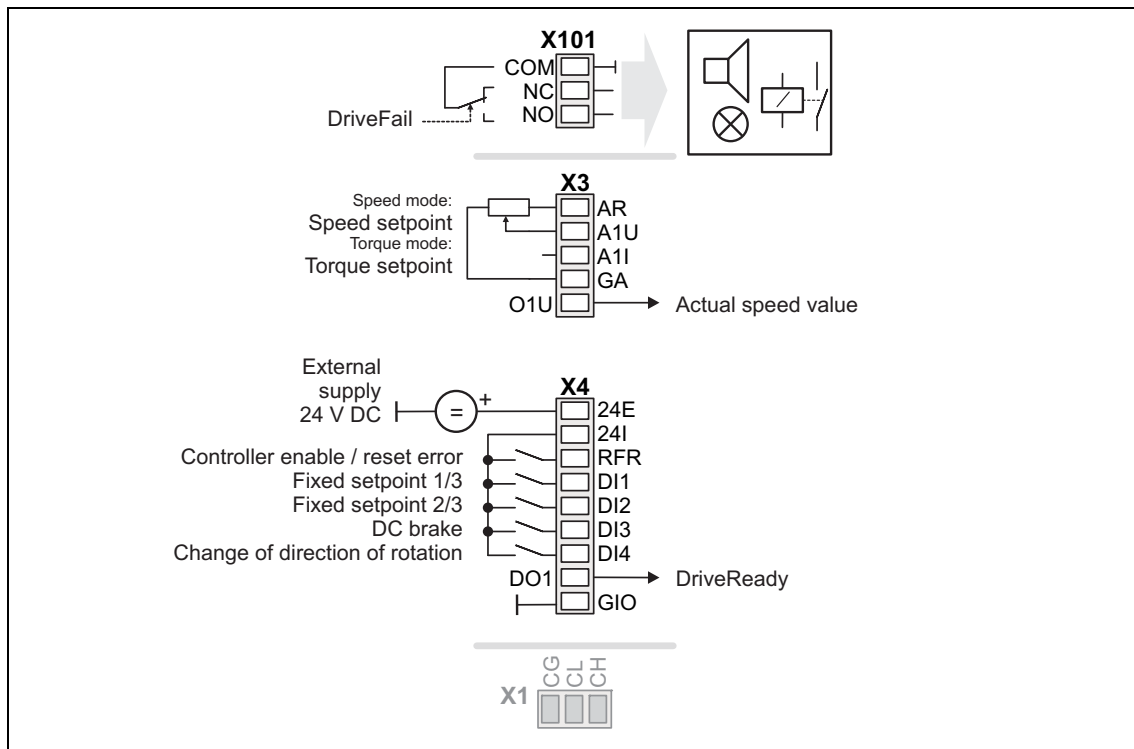
Identifier	Data type	Value/meaning
Free outputs The following outputs can freely be interconnected on the application level. The signals from the application level can be transferred to the I/O level via these outputs.		
bFreeOut1 ... bFreeOut8	BOOL	Free outputs for digital signals
wFreeOut1 ... wFreeOut4	WORD	Free outputs for 16-bit signals

7.3.4 Terminal assignment of the control modes

The following comparison provides information about which inputs/outputs of the application block **LA_NCtrl** are interconnected to the digital and analog input/output terminals of the drive controller in the different control modes.

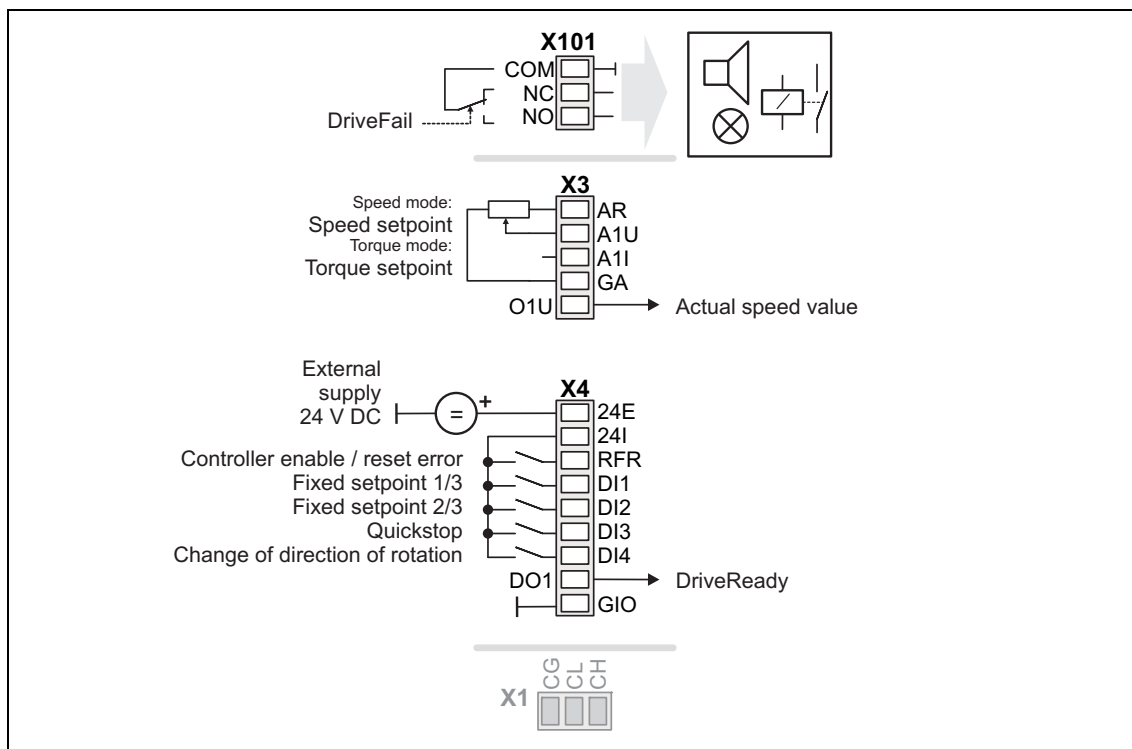
		Control mode (C00007)															
10: Terminals 0		12: Terminals 2		14: Terminals 11		16: Terminal 16		20: Keypad		21: PC		30: CAN		40: MCI			
Digital input terminals																	
X4/RFR		Controller enable / Reset of error message bFailReset															
X4/DI1		Fixed setpoint 1/3 bLogSpeed1			Change of direction of rotation bSetSpeedCcw		Fixed setpoint 1/3 bLogSpeed1		-		-		Only if NetCtrl=0: fixed setpoint 1/3 bLogSpeed1				
X4/DI2		Fixed setpoint 2/3 bLogSpeed2			Activate manual DC-injection braking (DCB) bSetDCBrake		Fixed setpoint 2/3 bLogSpeed2		-		-		Only if NetCtrl=0: fixed setpoint 2/3 bLogSpeed2				
X4/DI3		Activate manual DC-injection braking (DCB) bSetDCBrake		Quick stop bSetQuickstop		Motor potentiometer: Increase speed bMPotUp		CW rotation quick stop bRLQCw		-		-		Only if NetCtrl=0: Activate manual DC-injection braking (DCB) bSetDCBrake			
X4/DI4		Change of direction of rotation bSetSpeedCcw			Motor potentiometer: Decrease speed bMPotDown		CCW rotation quick stop bRLQCcw		-		-		Only if NetCtrl=0: change of direction of rotation bSetSpeedCcw				
Analog input terminals																	
X3/A1U, A1I		Local setpoint nAuxSetValue_a Speed mode: 10 V ≡ 100 % reference speed (C00011) Torque mode: 10 V ≡ 100 % M _{max} (C00057); speed setpoint = 100 % (fixed)						-		-		Only if NetRef=0: Local setpoint nAuxSetValue_a Speed mode: 10 V ≡ 100 % reference speed (C00011) Torque mode: 10 V ≡ 100 % M _{max} (C00057)					
Digital output terminals																	
X4/DO1		Status "Drive is ready" bDriveReady															
X101/COM, NO		Status "Error is pending" bDriveFail															
Analog output terminal																	
X3/O1U		Actual speed value nMotorSpeedAct_a 10 V ≡ 100 % reference speed (C00011)															

7.3.4.1 Terminals 0



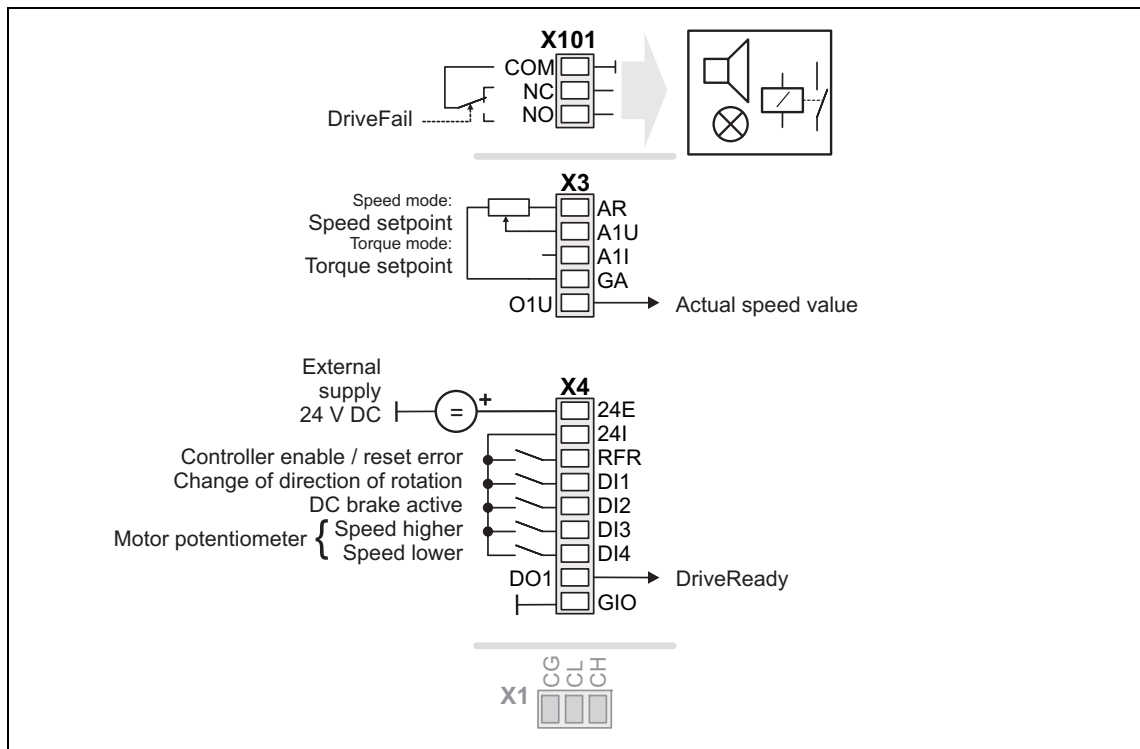
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bJogSpeed1	X3/A1I	-
X4/DI2	LA_NCtrl.bJogSpeed2	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bSetDCBrake	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI4	LA_NCtrl.bSetSpeedCcw	X4/DO1	LA_NCtrl.bDriveReady

7.3.4.2 Terminals 2



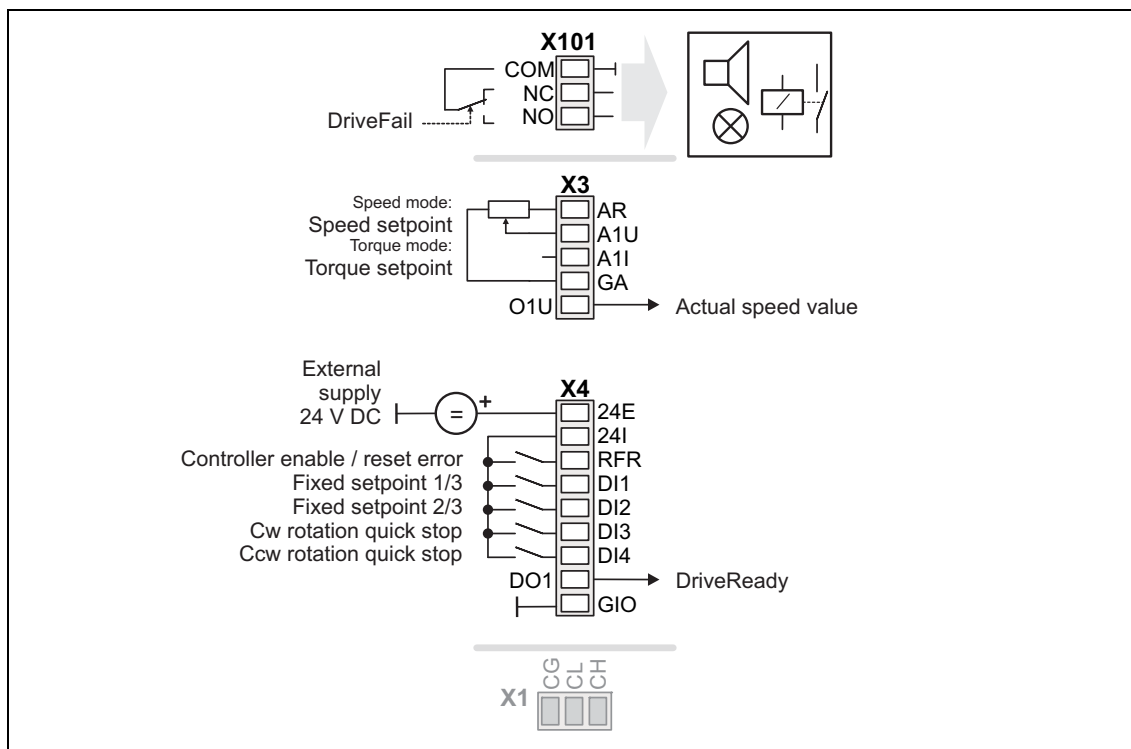
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bJogSpeed1	X3/A1I	-
X4/DI2	LA_NCtrl.bJogSpeed2	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bSetQuickstop		* 10 V ≙ 100 % reference speed (C00011)
X4/DI4	LA_NCtrl.bSetSpeedCcw	X4/DO1	LA_NCtrl.bDriveReady

7.3.4.3 Terminals 11



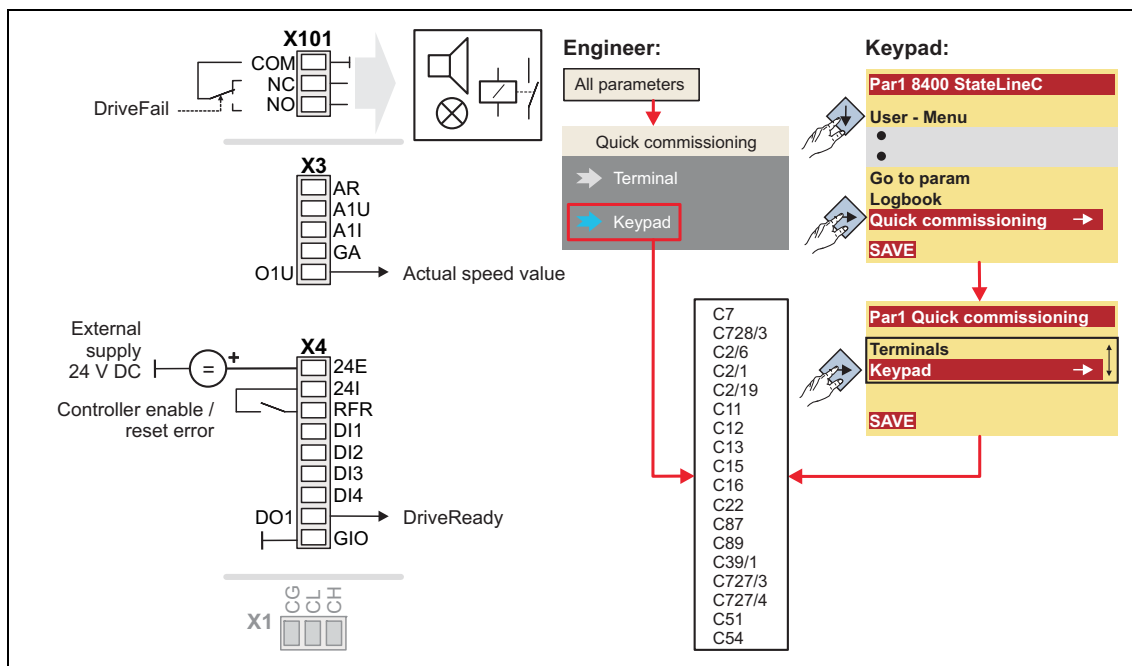
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bSetSpeedCcw	X3/A1I	-
X4/DI2	LA_NCtrl.bSetDCBrake	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bMPotUp	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI4	LA_NCtrl.bMPotDown	X4/DO1	LA_NCtrl.bDriveReady

7.3.4.4 Terminal 16



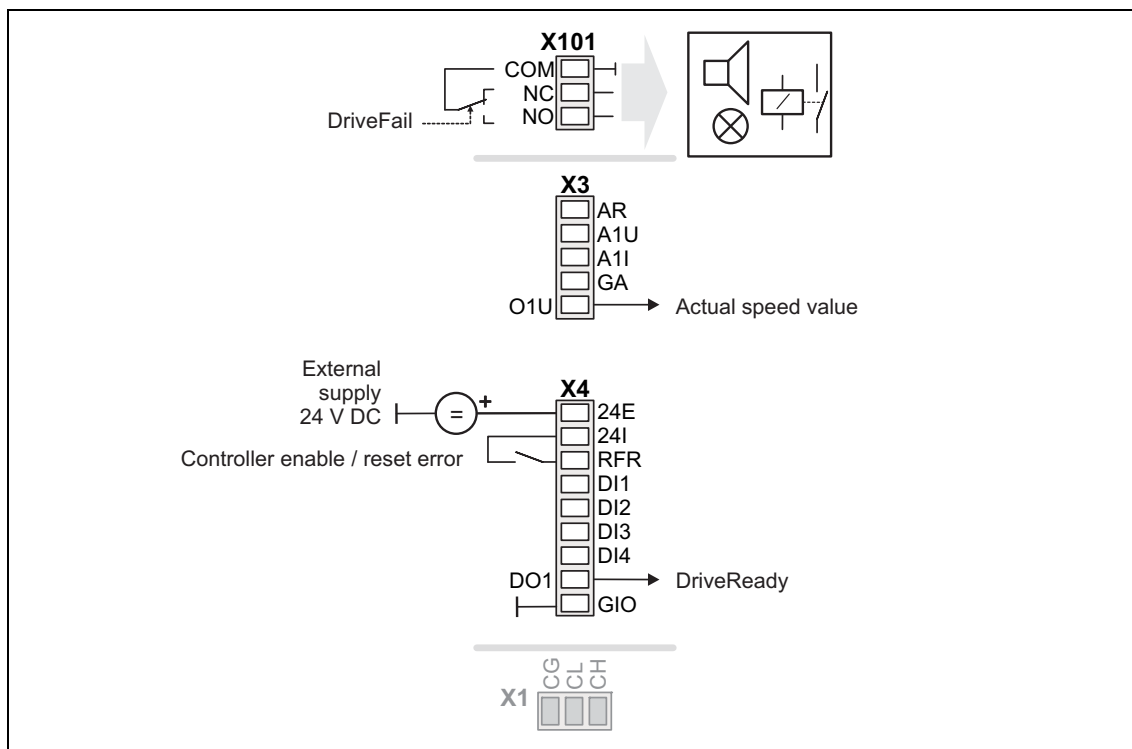
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bJogSpeed1	X3/A1I	-
X4/DI2	LA_NCtrl.bJogSpeed2	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bRLQCw		* 10 V $\equiv$ 100 % reference speed (C00011)
X4/DI4	LA_NCtrl.bRLQCcw	X4/DO1	LA_NCtrl.bDriveReady

7.3.4.5 Keypad



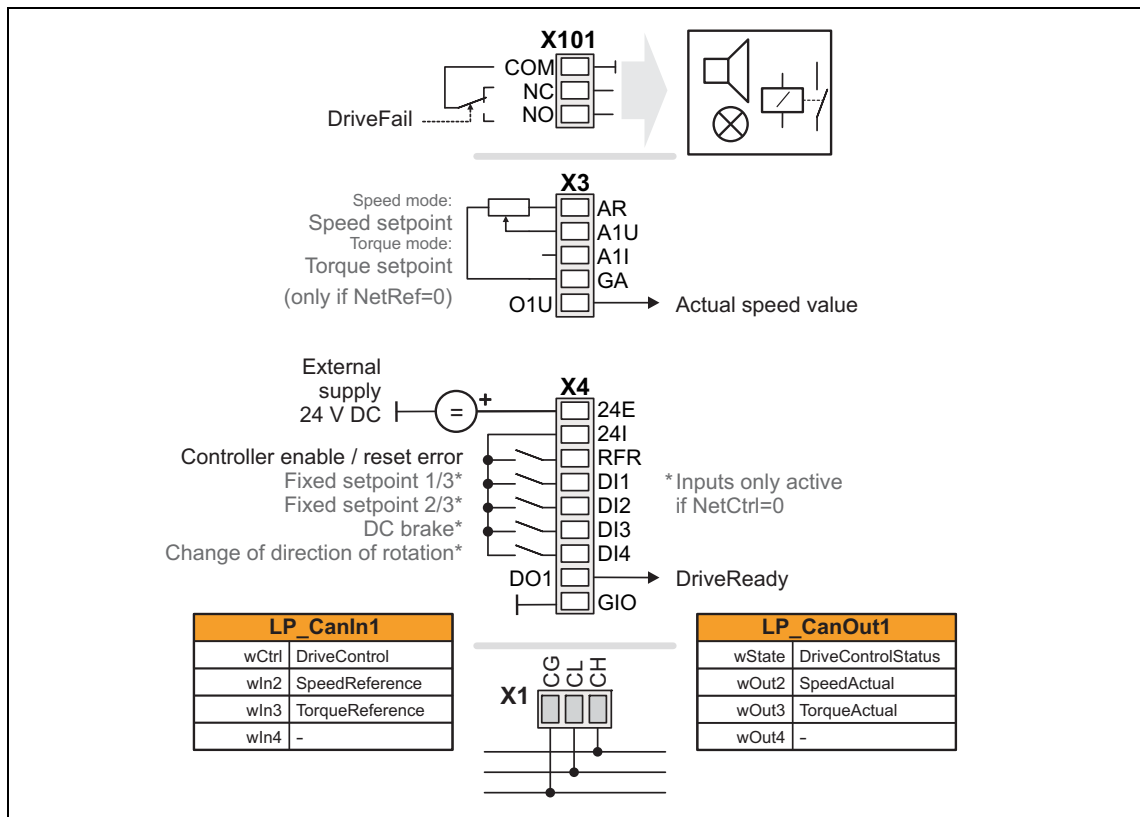
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	-
X4/DI1	-	X3/A1I	-
X4/DI2	-	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	-		* 10 V ≙ 100 % reference speed (C00011)
X4/DI4	-	X4/DO1	LA_NCtrl.bDriveReady

7.3.4.6 PC



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	-
X4/DI1	-	X3/A1I	-
X4/DI2	-	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	-		* 10V ≙ 100% of reference speed (C00011)
X4/DI4	-	X4/DO1	LA_NCtrl.bDriveReady

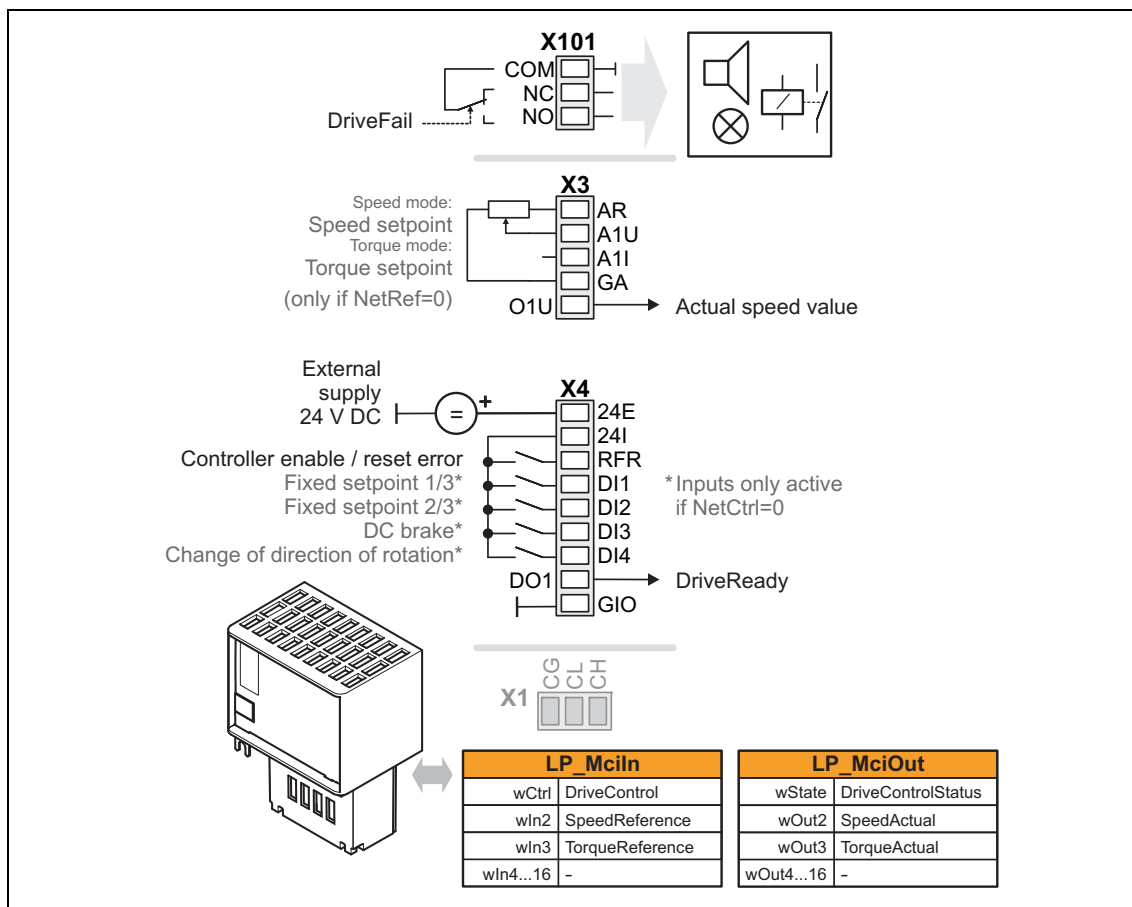
7.3.4.7 CAN



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bJogSpeed1	X3/A1I	-
X4/DI2	LA_NCtrl.bJogSpeed2	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bSetDCBrake	* 10V ≙ 100% of reference speed (C00011)	
X4/DI4	LA_NCtrl.bSetSpeedCcw	X4/DO1	LA_NCtrl.bDriveReady

► [Process data assignment for fieldbus communication \(318\)](#)

7.3.4.8 MCI



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_NCtrl.bDriveFail		
X4/RFR	LA_NCtrl.bFailReset	X3/A1U	LA_NCtrl.nAuxSetValue_a *
X4/DI1	LA_NCtrl.bJogSpeed1	X3/A1I	-
X4/DI2	LA_NCtrl.bJogSpeed2	X3/O1U	LA_NCtrl.nMotorSpeedAct_a *
X4/DI3	LA_NCtrl.bSetDCBrake		* 10V ≙ 100% of reference speed (C00011)
X4/DI4	LA_NCtrl.bSetSpeedCcw	X4/DO1	LA_NCtrl.bDriveReady

► [Process data assignment for fieldbus communication \(348\)](#)

7.3.5 Process data assignment for fieldbus communication

The fieldbus communication is connected (preconfigured) to the previously selected technology application by selecting the corresponding control mode in [C00007](#):

- "30: [CAN](#)" for the connection to the system bus (CAN)
- "40: [MCI](#)" for the connection to a plugged-in communication module (e.g. EtherNet/IP™)

The assignment of the process data words depends only on the application, not on the bus system used:

Input words	Name	Assignment
Word 1	DriveControl	Control word • For bit assignment see the table below. • Display parameter: C01351/1
Word 2	SpeedReference	Speed setpoint in [rpm] ▶ Scaling of speed and torque values
Word 3	TorqueReference	Torque setpoint in [Nm] ▶ Scaling of speed and torque values
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Control word	Name	Function
Bit 0	Run Forward	Relationships between Run1 and Run2 and trigger events can be found in the chapter " Run/Stop event ".
Bit 1	Run Backward	
Bit 2	Fault Reset	071 ≡ Reset error 0 ≡ No response
Bit 3	Reserved	-
Bit 4	Reserved	-
Bit 5	NetCtrl	Run/Stop control: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)
Bit 6	NetRef	Reference speed/reference torque: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)
Bit 7 ... 15	Reserved	-

Output words	Name	Assignment
Word 1	DriveControlStatus	Status word • For bit assignment see the table below. • Display parameter: C01352/1
Word 2	SpeedActual	Actual speed value in [rpm] ▶ Scaling of speed and torque values
Word 3	TorqueActual	Actual torque in [Nm] ▶ Scaling of speed and torque values
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Status word	Name	Status
Bit 0	Faulted	0 ≡ No errors 1 ≡ Errors have occurred
Bit 1	Warning	0 ≡ No warnings 1 ≡ Warnings have occurred
Bit 2	Running1 (Fwd)	Relationships between Run1 and Run2 and trigger events can be found in the chapter " Run/Stop event ".
Bit 3	Running2 (Rev)	
Bit 4	Ready	0 ≡ Different status than in case of "1" 1 ≡ Ready or Enabled or Stopping
Bit 5	Ctrl from Net	Run/Stop control: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)
Bit 6	Ref from Net	Reference speed/reference torque: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)
Bit 7	At Reference	1 ≡ The drive currently runs with reference speed (speed mode) or reference torque (Torque mode)
Bit 8	Drive State	The "Drive State" is coded as follows: 0: Manufacturer-specific (not used with 8400) 1: Start-up (drive initialisation) 2: Not_Ready (mains voltage switched off) 3: Ready (mains voltage switched-on) 4: Enabled (drive has received "Run" command) 5: Stopping (drive has received "Stop" command and is stopped) 6: Fault_Stop (drive is stopped due to an error) 7: Faulted (errors have occurred)
Bit 9	Drive State	
Bit 10	Drive State	
Bit 11	Drive State	
Bit 12	Drive State	
Bit 13	Drive State	
Bit 14	Drive State	
Bit 15	Drive State	

7.3.5.1 Run/Stop event

Relationships between Run1 and Run2:

	Contactor	Starter	Starter Reverser	Speed	Soft start	Drive
Run1	Close	Run	RunFwd	RunLow	RunRamp1	RunFwd
Run2	No Action	No Action	RunRev	RunHigh	RunRamp2	RunRev

Run1 and Run2 trigger:

Run1	Run2	Trigger event	Run type
0	0	Stop	No Action
0 → 1	0	Run	Run1
0	0 → 1	Run	Run2
0 → 1	0 → 1	No Action	No Action
1	1	No Action	No Action
1 → 0	1	Run	Run2
1	1 → 0	Run	Run1

7.3.5.2 Scaling of speed and torque values

Scaling of the speed values

The speed setpoint is defined by the bus in [rpm]. The conversion then takes place in the controller as all speed-related signals are processed to a reference variable in percent. An adjustable scaling factor serves to make an additional scaling.

Equation for scaling the speed setpoint		
$\text{Speed setpoint}_{\text{Application}} = \text{Speed setpoint}_{\text{Bus}}[\text{rpm}] \cdot \frac{16384}{\text{Reference speed}[\text{rpm}]} \cdot \frac{1}{2^{\text{Scaling factor}}}$		
Parameter	Name	Description
C00011	Appl.: Reference speed	Reference variable for speed-related signals
C01353/1	ACDrive: Speed scaling	In the Lenze setting "0", no scaling takes place ($2^0 = 1$)

For the output of the actual speed value to the bus, the following conversion is made:

Equation for scaling the actual speed value		
$\text{Actual speed value}_{\text{Bus}}[\text{rpm}] = \text{Actual speed value}_{\text{Application}} \cdot \frac{\text{Reference speed}[\text{rpm}]}{16384} \cdot 2^{\text{Scaling factor}}$		
Parameter	Name	Description
C00011	Appl.: Reference speed	Reference variable for speed-related signals
C01353/1	ACDrive: Speed scaling	In the Lenze setting "0", no scaling takes place ($2^0 = 1$)

Scaling of the torque values

The torque setpoint is defined by the bus in [Nm]. The conversion then takes place in the controller as all torque-related signals are processed to a reference variable in percent. An adjustable scaling factor serves to make an additional scaling.

Equation for scaling the torque setpoint		
$\text{Torque setpoint}_{\text{Application}} = \text{Torque setpoint}_{\text{Bus}}[\text{Nm}] \cdot \frac{16384 \cdot 100}{\text{Maximum torque}[0.01 \text{ Nm}]} \cdot \frac{1}{2^{\text{Scaling factor}}}$		
Parameter	Name	Description
C00057	Maximum torque	Reference variable for torque-related signals
C01353/2	ACDrive: Torque scaling	In the Lenze setting "0", no scaling takes place ($2^0 = 1$)

For the output of the actual torque value to the bus, the following conversion is made:

Equation for scaling the actual torque		
$\text{Actual torque}_{\text{Bus}}[\text{Nm}] = \text{Actual torque}_{\text{Application}} \cdot \frac{\text{Maximum torque}[0.01 \text{ Nm}]}{16384 \cdot 100} \cdot 2^{\text{Scaling factor}}$		
Parameter	Name	Description
C00057	Maximum torque	Reference variable for torque-related signals
C01353/2	ACDrive: Torque scaling	In the Lenze setting "0", no scaling takes place ($2^0 = 1$)

7.3.6 AC Drive Profile diagnostic parameters

In the **All parameters** tab, the parameters for diagnostic purposes listed in the following table are displayed in the **AC Drive Profile** category.



Note!

These parameter are set by the EtherNet/IP™ communication module and should not be written by the user.

Parameter	Info	Lenze setting
C01350/1	ACDrive: DriveMode	1: Speed mode
C01351/1	ACDrive: Control word	-
C01352/1	ACDrive: Status word	-
C01353/1	ACDrive: Speed scaling	0
C01353/2	ACDrive: Torque scaling	0
Highlighted in grey = display parameter		

7.3.7 Setting parameters (short overview)

Parameter	Info	Lenze setting	
		Value	Unit
C00012	Accel. time - main setpoint	2.000	s
C00013	Decel. time - main setpoint	2.000	s
C00019	Auto-DCB: Threshold	3	rpm
C00024	LS_DriveInterface: bNActCompare	0.00	%
C00036	DCB braking: Current	50.00	%
C00039/1	Fixed setpoint 1	40.00	%
C00039/2	Fixed setpoint 2	60.00	%
C00039/3	Fixed setpoint 3	80.00	%
C00039/4...15	Fixed setpoint 4 ... 15	0.00	%
C00101/1...15	Add. accel. time 1 ... 15	0.000	s
C00103/1...15	Add. decel. time 1 ... 15	0.000	s
C00105	Decel. time - quick stop	2.000	s
C00106	Auto-DCB: Hold time	0.500	s
C00107	DCB braking: Hold time	999.000	s
C00134	L_NSet_1: Ramp smoothing	0: Off	
C00182	L_NSet_1: S-ramp time PT1	20.00	s
C00190	L_NSet_1: Setpoint arithmetic	0: Out = Set	
C00220	L_NSet_1: Acceleration time - add. setpoint	0.000	s
C00221	L_NSet_1: Deceleration time - add. setpoint	0.000	s
C00222	L_PCTRL_1: Vp	1.0	
C00223	L_PCTRL_1: Tn	400	ms
C00224	L_PCTRL_1: Kd	0.0	

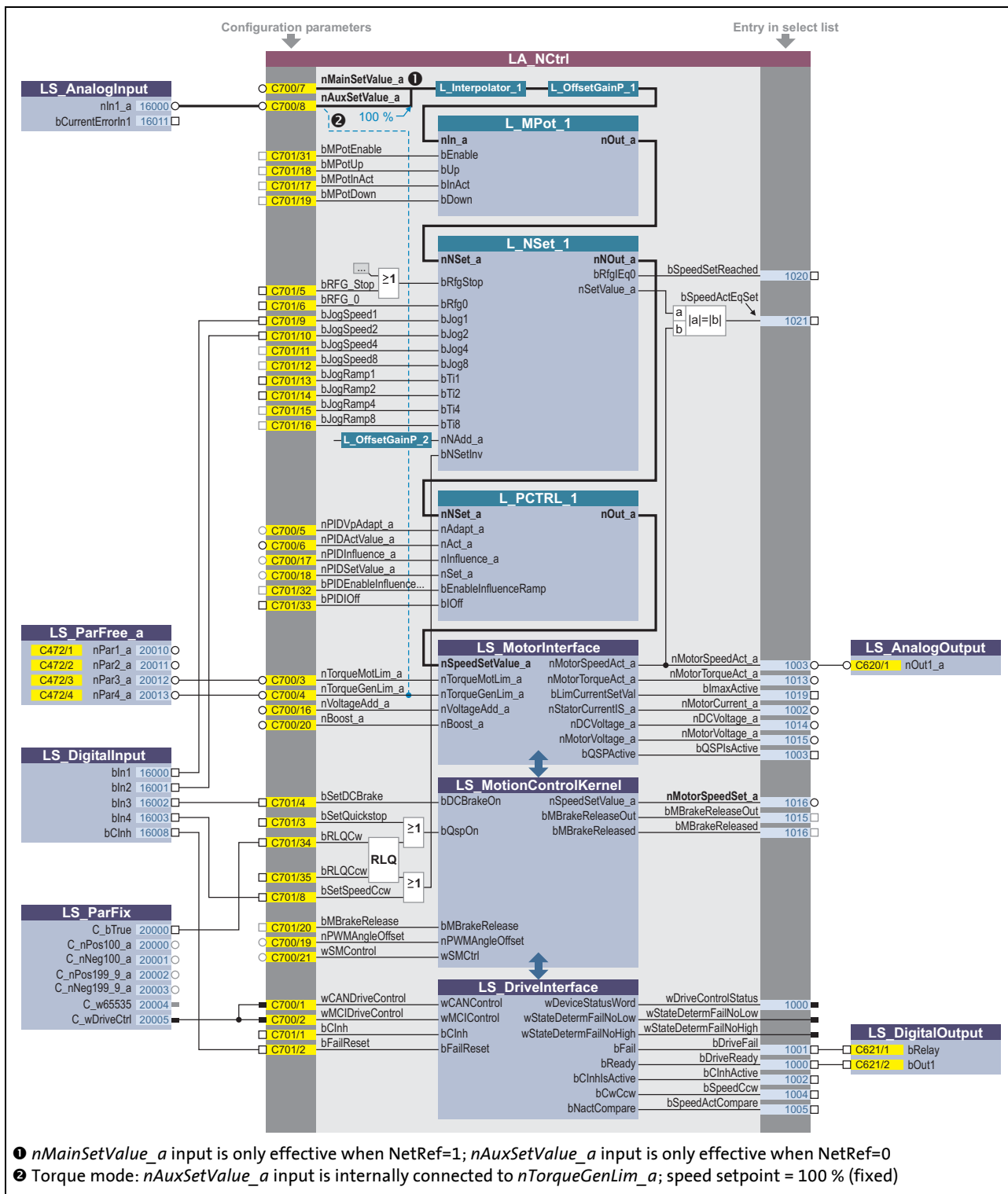
Parameter	Info	Lenze setting	
		Value	Unit
C00225	L_PCTRL_1: MaxLimit	199.99	%
C00226	L_PCTRL_1: MinLimit	-199.99	%
C00227	L_PCTRL_1: Acceleration time	0.010	s
C00228	L_PCTRL_1: Deceleration time	0.010	s
C00233	L_PCTRL_1: Root function	0: Off	
C00241	L_NSet_1: Hyst. NSet reached	0.50	%
C00242	Operating mode of process controller	0: Off	
C00243	L_PCTRL_1: Accel. time influence	5.000	s
C00244	L_PCTRL_1: Deceleration time influence	5.000	s
C00632/1	L_NSet_1: Blocking speed 1 max	0.00	%
C00632/2	L_NSet_1: Blocking speed 2 max	0.00	%
C00632/3	L_NSet_1: Blocking speed 3 max	0.00	%
C00633/1	L_NSet_1: Blocking speed 1 min	0.00	%
C00633/2	L_NSet_1: Blocking speed 2 min	0.00	%
C00633/3	L_NSet_1: Blocking speed 3 min	0.00	%
C00635	L_NSet_1: nMaxLimit	199.99	%
C00636	L_NSet_1: nMinLimit	-199.99	%
C00670	L_OffsetGainP_1: Gain	1.0000	
C00671	L_OffsetGainP_2: Gain	1.0000	
C00672	L_OffsetGainP_3: Gain	1.0000	
C00696	L_OffsetGainP_1: Offset	0.00	%
C00697	L_OffsetGainP_2: Offset	0.00	%
C00698	L_OffsetGainP_3: Offset	0.00	%
C00800	L_MPot_1: Upper limit	100.00	%
C00801	L_MPot_1: Lower limit	-100.00	%
C00802	L_MPot_1: Acceleration time	10.0	s
C00803	L_MPot_1: Deceleration time	10.0	s
C00804	L_MPot_1: Inactive fct.	0: Retain value	
C00805	L_MPot_1: Init fct.	0: Load last value	
C00806	Use of motor potentiometer	0: No	

Related topics:

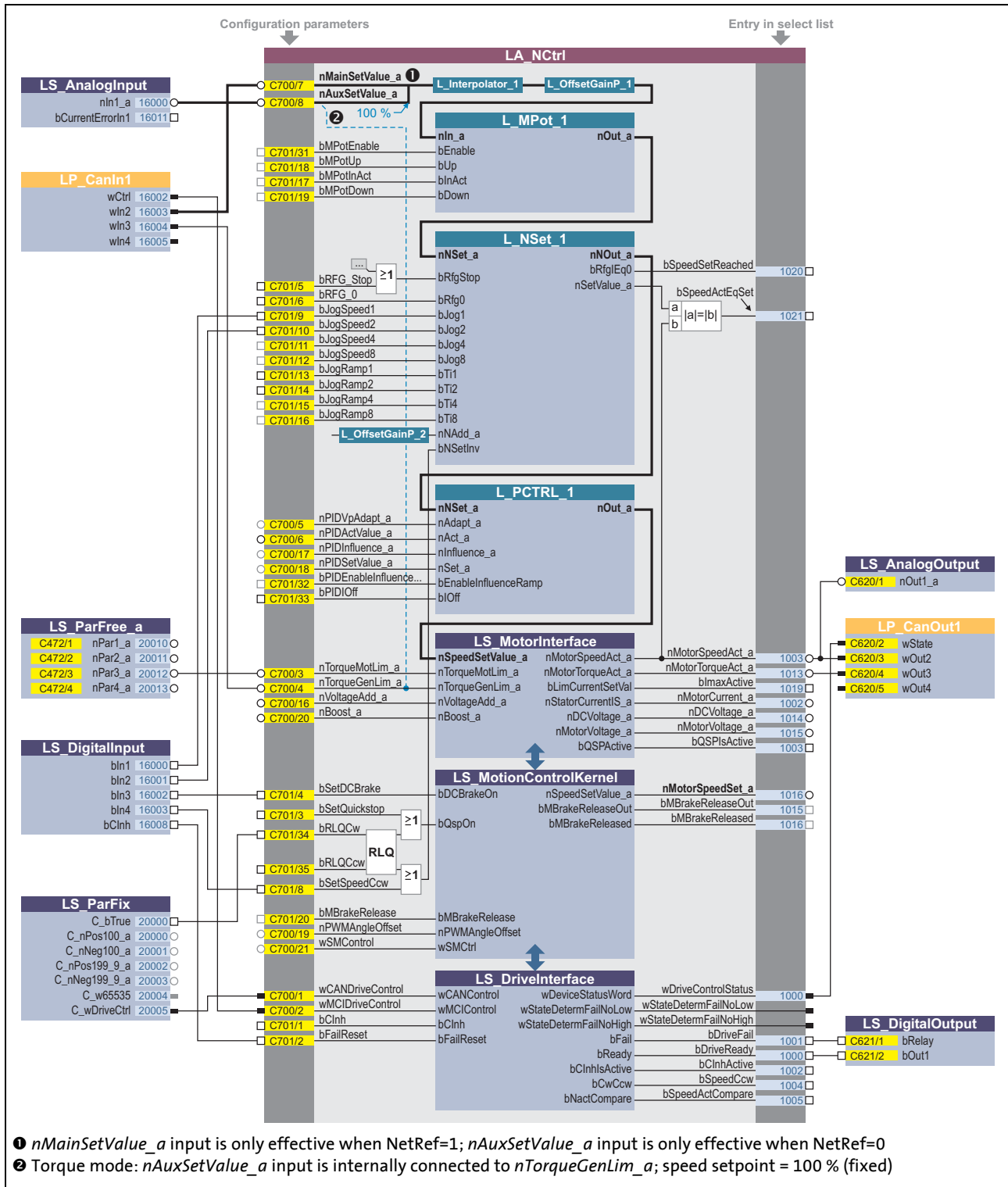
► ["GeneralPurpose" functions](#) (📖 385)

7.3.8 Configuration parameters

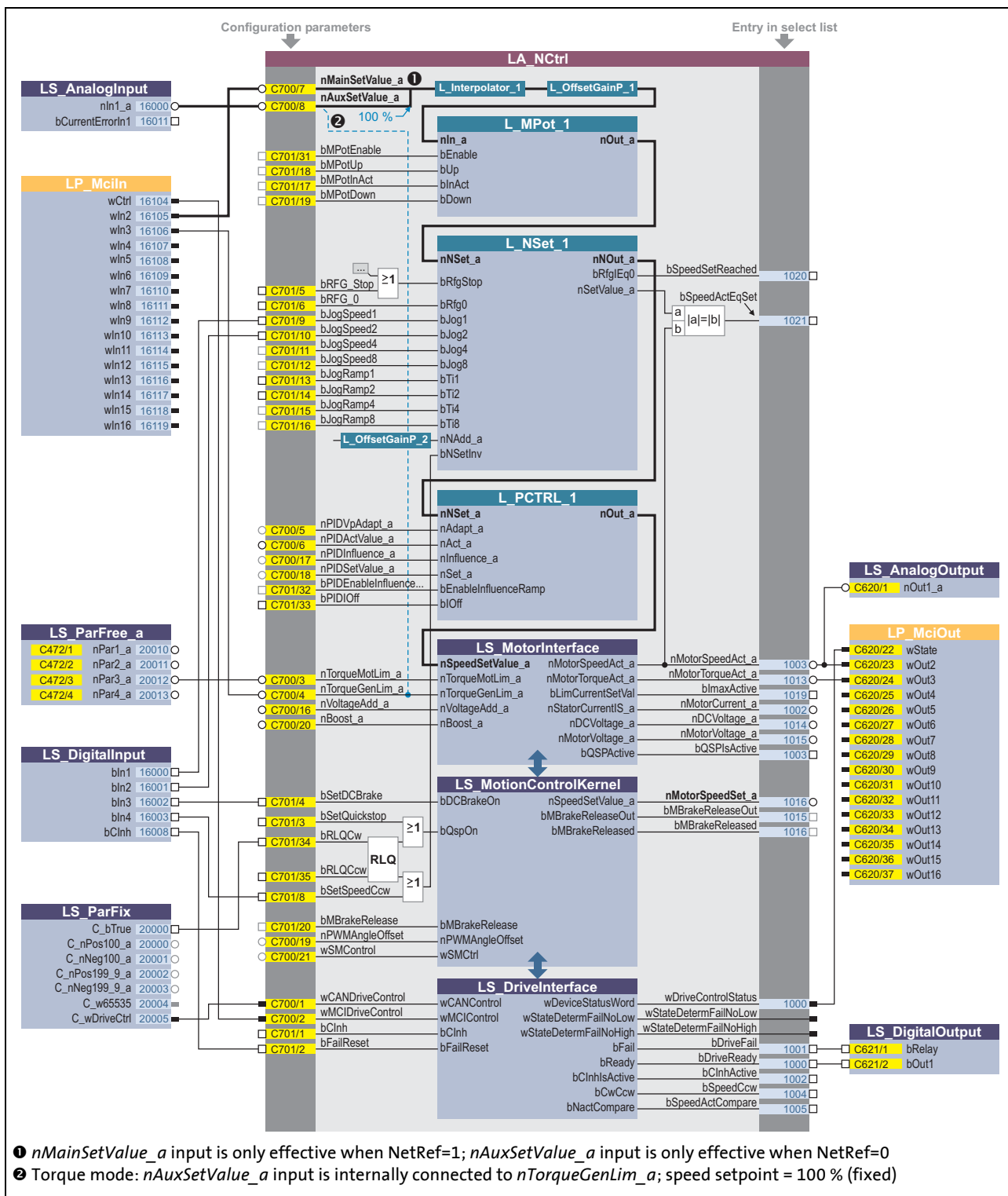
If required, the subcodes of [C00700](#) and [C00701](#) serve to change the pre-configured assignment of the application inputs:



[7-7] Pre-assignment of the "Actuating drive speed" (AC Drive Profile) application in the "Terminals 0" control mode

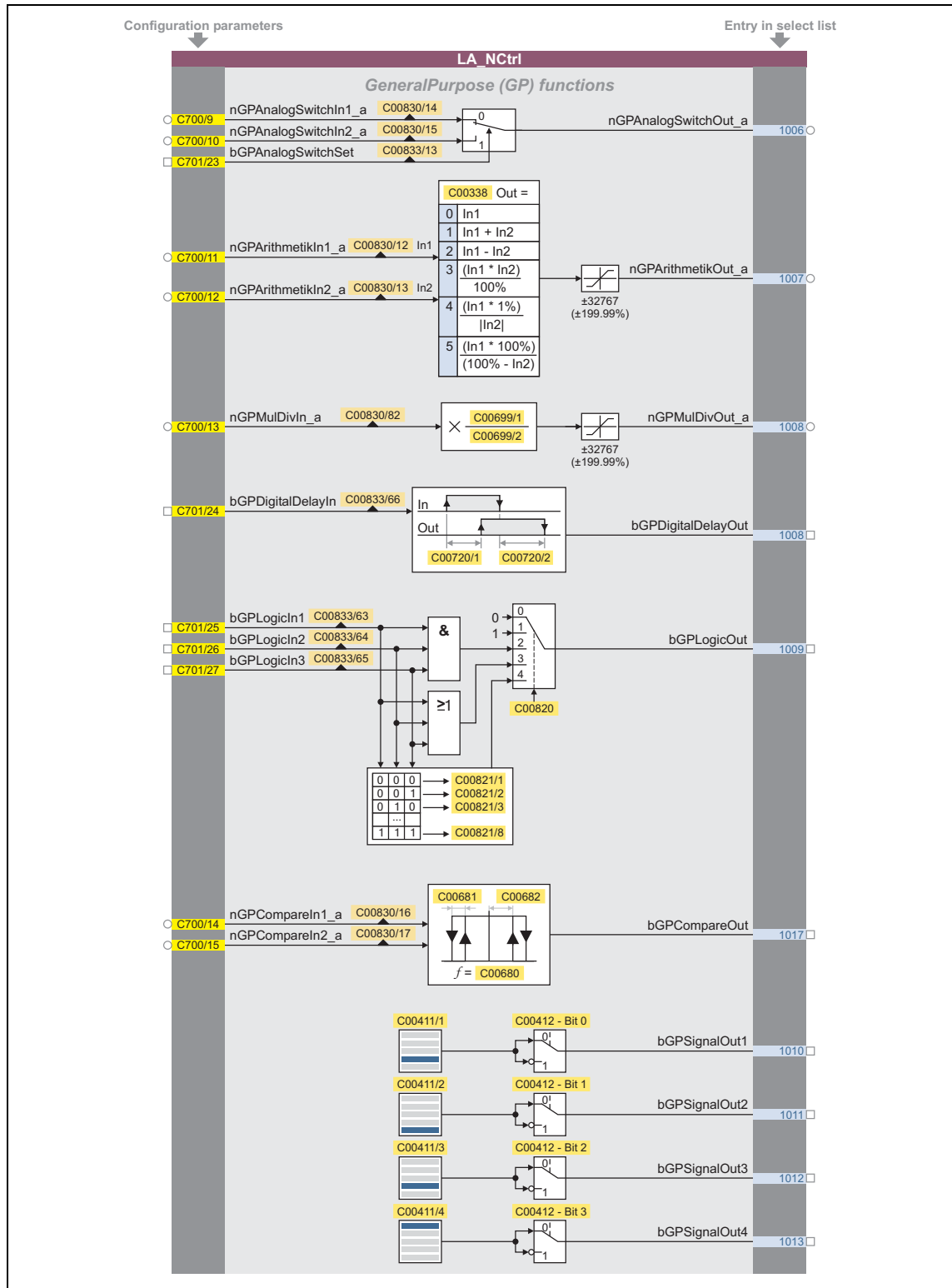


[7-8] Pre-assignment of the "Actuating drive speed" (AC Drive Profile) application in the "CAN" control mode

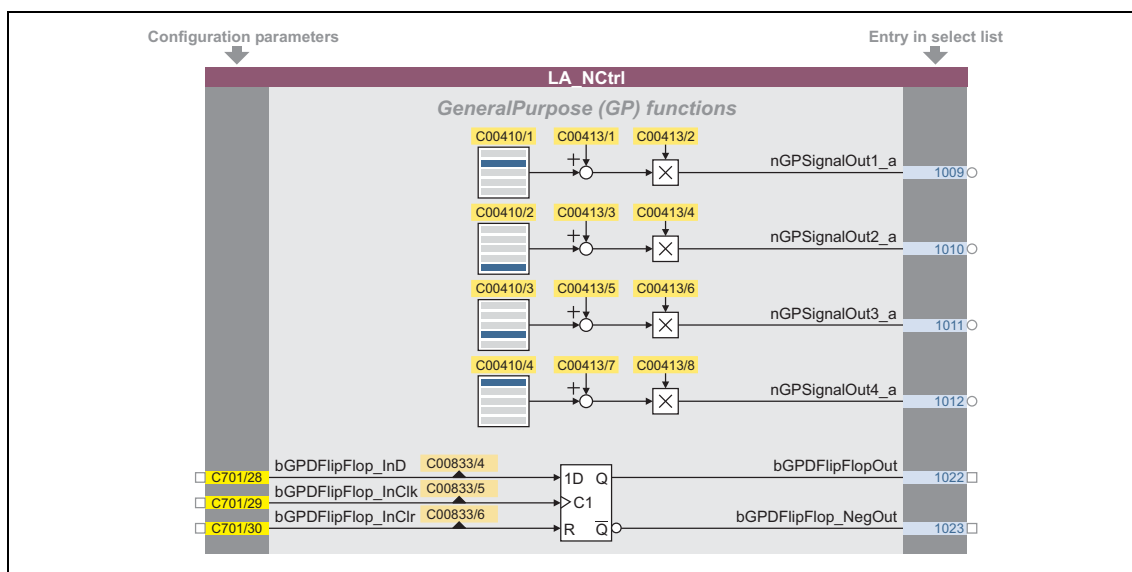


[7-9] Pre-assignment of the "Actuating drive speed" (AC Drive Profile) application in the "MCI" control mode

Configuration parameters for "GeneralPurpose" functions



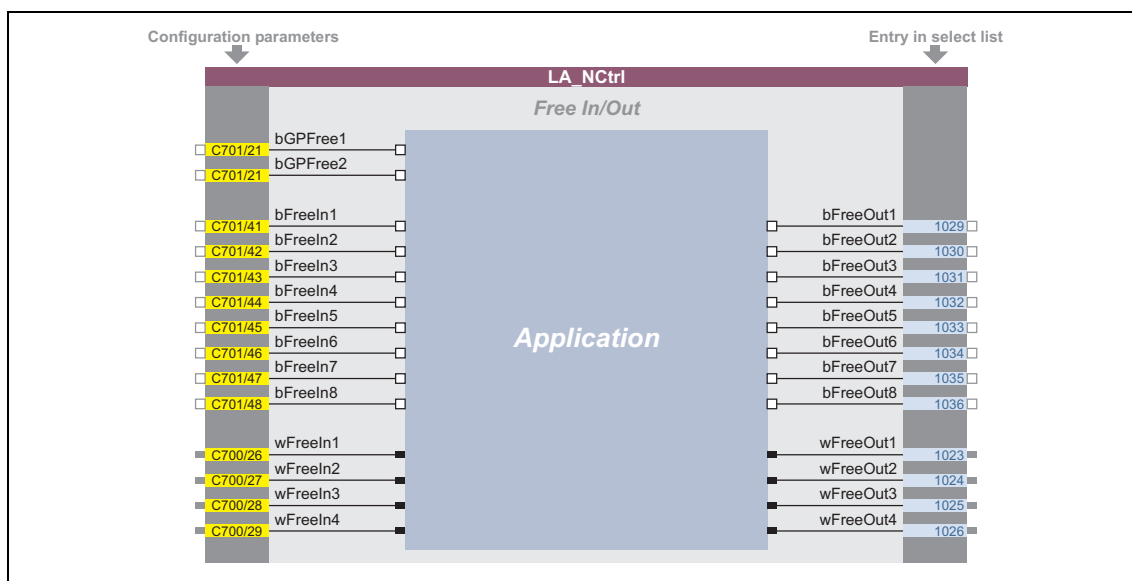
[7-10] "GeneralPurpose" functions



[7-11] "GeneralPurpose" functions (continuation)

Free inputs and outputs

These inputs can be freely interconnected in the application level. They can be used to transfer signals from the I/O level to the application level and vice versa.



[7-12] Free inputs/outputs

Related topics:

- ▶ [User-defined terminal assignment](#) (289)
- ▶ ["GeneralPurpose" functions](#) (385)

7.4 TA "Switch-off positioning"

This technology application is only available from version 04.00.00!

The basic principle of this technology application is to travel to a switch-off sensor (e.g. a limit switch) in a speed-controlled manner and to stop as close as possible at this position. Unlike other positioning controls, the switch-off positioning neither has a position feedback nor calculates the path in advance. Thus, the accuracy that can be achieved depends on various factors such as the speed at which the switch-off sensor is advanced.

In addition, a pre-switch off can be implemented which requires a sufficient number of unassigned digital inputs on the controller which can be used to connect other sensors for the additional stop positions. These sensors effect a reduction in speed before the last switch-off sensor is reached.

Features

- Pre-configured control modes for terminals and bus control (with predefined process data connection to the fieldbus)
- Free configuration of input and output signals
- Offset, gain, and negation of main setpoint & additional setpoint
- Up to 15 fixed setpoints for speed and ramp time
- Adjustable setpoint ramp times
- Freely selectable, variable ramp shape
- Automatic holding brake control
- Quick stop (QSP) with adjustable ramp time
- Integrated, freely available "GeneralPurpose" functions:
Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop
- Interface to the safety module (optional)
- Integration of encoder feedback
- Switch-off sensor management for the implementation of a pre-switch off

Decision criteria

Criteria	Switch-off positioning with constant load	Switch-off positioning with variable load
Operating mode	V/f characteristic without speed sensor. Alternatively for large breakaway torques: Use of a sensorless vector control (only applicable for horizontal movements).	
Limit switch evaluation	One limit switch is required per direction of movement. When the limit switch is reached, the drive is brought to a standstill led by the deceleration ramp or the QSP ramp.	One limit switch and an initiator are required for fast/slow changeover per direction of movement. When the initiator has been reached, the speed of the drive is reduced to a creeping speed (fixed setpoint 2) in a controlled way. When the limit switch is reached, the drive is brought to a standstill led by the deceleration ramp or the QSP ramp.

Criteria	Switch-off positioning with constant load	Switch-off positioning with variable load
Positioning accuracy at the motor shaft The positioning accuracy of the load depends, among other things, on the clearance and friction of the selected mechanics and has to be determined individually.	The ideal case is 5-10° at the motor shaft. Consider the influence of the motor temperature. In the case of a constant load, you can assume a good repeat accuracy during positioning. In the case of variable loads, you must take significant deviations into account.	5-10° at the motor shaft. As the positioning is executed in a creeping speed, a good repeat accuracy is reached even for variable loads.
Speed setting range	1 : 50, based on 50Hz and M_n	1 : 50, based on 50Hz and M_n
Typical applications	Switch-off positioning with constant load, e.g. travelling drive, roll-up door.	Switch-off positioning with variable load, e.g. travelling drive, conveying belt, hoists approaching a stop position.

System limits and exclusion criteria

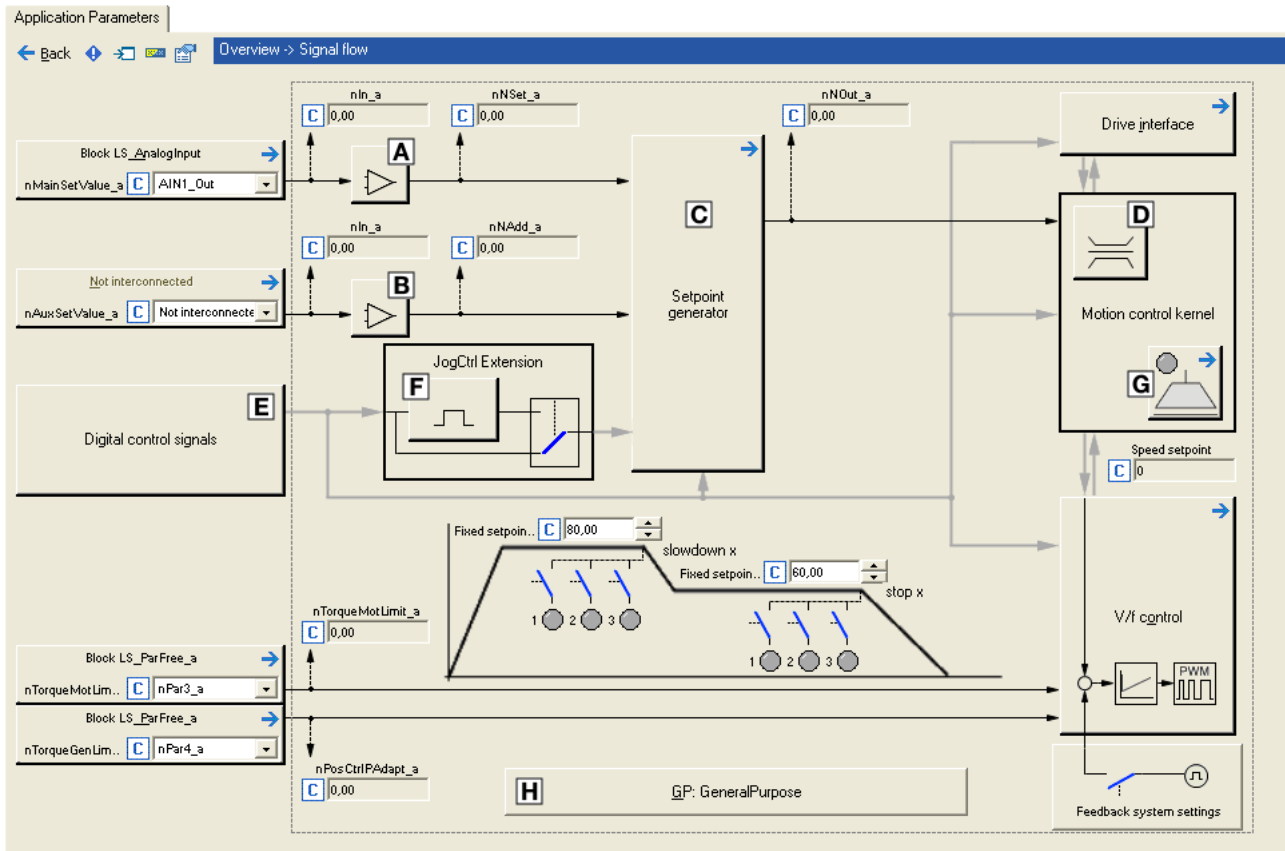
They result from the non-compliance with the decision criteria.

- Compared to systems with speed feedback, the positioning and repeat accuracy is reduced.
- Due to the mechanical hardware limit switches, this concept is only applicable for systems with only a few fixed positions. Changing the target position during the operation or the teaching is not possible.
- If necessary, additional functions like manual jog or homing must be realised externally, e.g. via a control.
- As the 8400 Stateline controller does not meet safety-related functions except STO (Safe Torque Off), you must observe that all safety-related aspects are realised by the plant instructor.
- Especially in the case of an outdoor use or in wet areas, you must consider the corresponding discharge currents when operated with a fault current circuit breaker.
- A table positioning or sequential positioning control is required for highly dynamic applications and jerk-free traversing profiles which is available with the "HighLine" device version.

Related topics:

- ▶ [Commissioning of the "Switch-off positioning" technology application](#) (59)

7.4.1 Basic signal flow



[7-13] Signal flow of the switch-off positioning

- [A] Main speed setpoint offset and gain ([L_OffsetGainP_1](#))
- [B] Additional speed setpoint offset and gain ([L_OffsetGainP_2](#))
- [C] Setpoint generator ([L_NSet_1](#))
- [D] Speed setpoint input limitation
- [E] Terminal assignment & display of digital control signals
- [F] Selection of edge/level for tripping the ramp down and stop functions ([L_JogCtrlExtension_1](#))
- [G] [Holding brake control](#)
- [H] Integrated disposable "[GeneralPurpose](#)" functions: Analog switch, arithmetic, multiplication/division, binary delay element, binary logic, analog comparison, D-flipflop

7.4.2 Internal interfaces | application block "LA_SwitchPos"

**Note!**

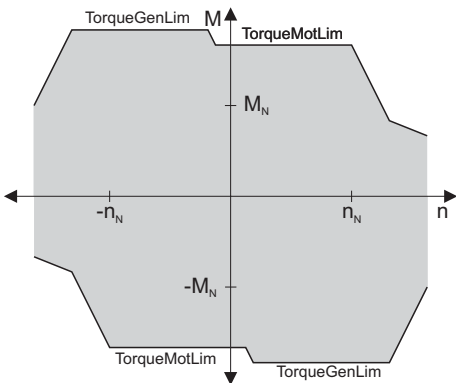
The connectors grayed out in the following table are hidden in the function block editor in the Lenze setting.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

Inputs

Identifier	Data type	Information/possible settings
wCANDriveControl	WORD	Control word via system bus (CAN) for device control • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits.
wMCIDriveControl	WORD	Control word via communication module (e.g. PROFIBUS) for device control • See the "wCANControl/wMCIControl control words" subchapter of the chapter on device control for a detailed description of the individual control bits.
wSMControl	WORD	Interface to the optional safety system. • Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). • See the subchapter "Interface to safety system" of the chapter on basic drive functions for a detailed description of the individual control bits.
bCInh	BOOL	Enable/Inhibit controller
		FALSE Enable controller: The controller switches to the "OperationEnabled" device status if no other source for controller inhibit is active. • C00158 provides a bit coded representation of all active sources/triggers of a controller inhibit. TRUE Inhibit controller (controller inhibit): The controller switches to the "SwitchedOn" device status.
bFailReset	BOOL	Reset error message In the Lenze setting this input is connected to the digital input controller enable so that a possibly existing error message is reset together with the controller enable (if the cause for the fault is eliminated).
		TRUE The current fault is reset, if the cause for the fault is eliminated. • If the fault still exists, the error status remains unchanged.
bSetQuickstop	BOOL	Enable quick stop (QSP) • Also see device command "Activate/deactivate quick stop".
		TRUE Activate quick stop • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105, the motor is brought to a standstill ($n_{act} = 0$). • The motor is kept at a standstill during closed-loop operation. • A pulse inhibit is set if the auto-DCB function has been activated via C00019.
		FALSE Deactivate quick stop • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop.

Identifier	Data type	Information/possible settings
bSetDCBrake	BOOL	Manual DC-injection braking (DCB) Detailed information on DC-injection braking is provided in the motor control chapter, subchapter "DC-injection braking".
		 Note! Holding braking is not possible when this braking mode is used! Use the basic " Holding brake control " function for controlling the holding brake with a low rate of wear.
		FALSE Deactivate DC-injection braking.
		TRUE Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. - The braking effect stops when the rotor is at standstill. - After the hold time (C00107) has expired, the controller sets the pulse inhibit.
bRFG_Stop	BOOL	Ramp function generator: Maintain the current value of the main setpoint integrator - The speed, for instance, of a running ramp process is immediately kept constant when <i>bRFG_Stop</i> is activated. At the same time, the acceleration/deceleration jumps to the value "0". - For a detailed functional description see the L_NSet FB.
		TRUE The current value of the main setpoint integrator is held.
nVoltageAdd_a	INT	Additive voltage impression - An additional setpoint for the motor voltage can be specified via this process input. - If there are, for instance, different loads at the motor output end, it is possible to apply a voltage boost at the starting time. - If the value is negative, the voltage is reduced. - Scaling: 16384 $\equiv$ 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nBoost_a	INT	Additional setpoint for the motor voltage at speed = 0 - The entire voltage-frequency characteristic is provided with an offset. - Scaling: 16384 $\equiv$ 1000 V
		 Stop! Values selected too high may cause the motor to heat up due to the resulting current!
nPWMAngleOffset	INT	Additional offset for the electrical angle of rotation - If a torque is connected, e.g. dynamic acceleration processes can be generated. - Scaling: $\pm 32767 \equiv \pm 180^\circ$ angle of rotation

Identifier	Data type	Information/possible settings				
nTorqueMotLim_a nTorqueGenLim_a	INT	Torque limitation in motor mode and in generator mode • These input signals are directly transferred to the motor control to limit the controller's maximum torque in motor and generator mode. • The drive cannot output a higher torque in motor/generator mode than set here. • The applied values (any polarity) are internally interpreted as absolute values. • If V/f characteristic control (VFCplus) is selected, limitation is <u>indirectly</u> performed via a so-called $I_{\max}$ controller. • If sensorless vector control (SLVC) is selected, limitation has a <u>direct</u> effect on the torque-producing current component. • Scaling: $16384 \equiv 100 \% M_{\max}$ (C00057) Torque limits in motor and generator mode: 				
bSetSpeedCcw	BOOL	Change of direction of rotation • For instance if a motor or gearbox is fixed laterally reversed to a machine part, but the setpoint selection should still be executed for the positive direction of rotation. <table><tr><td>FALSE</td><td>Clockwise rotation (Cw)</td></tr><tr><td>TRUE</td><td>Direction of rotation to the left (Ccw)</td></tr></table>	FALSE	Clockwise rotation (Cw)	TRUE	Direction of rotation to the left (Ccw)
FALSE	Clockwise rotation (Cw)					
TRUE	Direction of rotation to the left (Ccw)					
bRLQCw	BOOL	Activate clockwise rotation (fail-safe) • For a detailed functional description see the L_RLO FB. <table><tr><td>FALSE</td><td>Quick stop</td></tr><tr><td>TRUE</td><td>CW rotation</td></tr></table>	FALSE	Quick stop	TRUE	CW rotation
FALSE	Quick stop					
TRUE	CW rotation					
bRLQCcw	BOOL	Activate counter-clockwise rotation (fail-safe) • For a detailed functional description see the L_RLO FB. <table><tr><td>FALSE</td><td>Quick stop</td></tr><tr><td>TRUE</td><td>Counter-clockwise rotation</td></tr></table>	FALSE	Quick stop	TRUE	Counter-clockwise rotation
FALSE	Quick stop					
TRUE	Counter-clockwise rotation					
nMainSetValue_a	INT	Main speed setpoint • Offset and gain of this input signal can be set in C00696 and C00670 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100 \% \text{ reference speed}$ (C00011) • The main setpoint is transformed to a speed setpoint in the setpoint encoder via a ramp function generator with linear or S-shaped ramps. • Upstream to the ramp function generator, a blocking speed masking function and a setpoint MinMax limitation are effective. • For a detailed functional description see the L_NSet FB.				
nAuxSetValue_a	INT	Additional speed setpoint • Offset and gain of this input signal can be set in C00697 and C00671 for a simple signal adjustment of a setpoint encoder. • Scaling: $16384 \equiv 100 \% \text{ reference speed}$ (C00011) • The additional speed setpoint can be linked arithmetically with the main speed setpoint behind the ramp function generator. • The additional speed setpoint can be shown via ramp times of a second ramp function generator. • For a detailed functional description see the L_NSet FB.				

Identifier	Data type	Information/possible settings
Switch-off positioning		
bJogCtrlInputSel1 bJogCtrlInputSel2	BOOL	Selection inputs for a binary coded selection of the switch-off position 1 ... 3 Activation of the signal pairs <i>bJogCtrlSlowDown1/bJogCtrlStop1</i>, <i>bJogCtrlSlowDown2/bJogCtrlStop2</i> or <i>bJogCtrlSlowDown3/bJogCtrlStop3</i> according to the Truth table for activating the pre-switch off.
bJogCtrlRfgrIn	BOOL	Ramping down of the setpoint generator in the downstream L_NSet FB according to the Truth table for activating the pre-switch off
bJogCtrlJog1 bJogCtrlJog2	BOOL	Selection inputs for fixed changeover setpoints (JOG setpoints) for the main setpoint - If the pre-switch off is inactive (<i>bJogCtrlInputSel1</i> and <i>bJogCtrlInputSel2</i> are both set to FALSE), the two control signals are passed through 1:1 to the downstream FB L_NSet. - To achieve the desired behaviour (starting at high speed, pre-switch off at low speed), both inputs must be set to TRUE. - Fixed setpoint 2 must be less than fixed setpoint 3! Otherwise, the drive will start at a low speed and accelerate after the pre-switch off. - If in addition to the inputs <i>bJogCtrlJog1</i> and <i>bJogCtrlJog2</i> the selection inputs <i>bJogSpeed4</i> and <i>bJogSpeed8</i> are assigned, different fixed setpoints can result from this and the drive may travel with different speeds than selected via <i>bJogCtrlJog1</i> and <i>bJogCtrlJog2</i>.
bJogCtrlSlowDown1 bJogCtrlSlowDown2 bJogCtrlSlowDown3	BOOL	Activation of fixed setpoint 2 in the downstream L_NSet FB These inputs only have a function if they have been previously activated via <i>bJogCtrlInputSel1</i> and <i>bJogCtrlInputSel2</i> (see Truth table for activating the pre-switch off).
bJogCtrlStop1 bJogCtrlStop2 bJogCtrlStop3	BOOL	Ramping down of the ramp function generator in the downstream L_NSet FB These inputs only have a function if they have been previously activated via <i>bJogCtrlInputSel1</i> and <i>bJogCtrlInputSel2</i> (see Truth table for activating the pre-switch off).
bJogSpeed4 bJogSpeed8	BOOL	Selection inputs for fixed changeover setpoints (JOG setpoints) for the main setpoint - A fixed setpoint for the setpoint generator can be activated instead of the main setpoint via these selection inputs. - The selection inputs are binary coded. - For a detailed functional description see the L_NSet FB.
bJogRamp1 ... bJogRamp8	BOOL	Selection inputs for alternative acceleration/deceleration times for the main setpoint - The four selection inputs are binary coded, therefore 15 alternative acceleration/deceleration times can be selected. - For main setpoint <i>nMainSetValue_a</i>, the set acceleration time (C00012) and deceleration time (C00013) are active in the case of the binary coded selection "0" (all inputs = FALSE or not assigned). - Alternative acceleration times are selected in C00101/1...15. - The selection of the alternative deceleration times is carried out in C00103/1...15. - For a detailed functional description see the L_NSet FB.
MCK basic functions		
bMBrakeRelease	BOOL	Holding brake control : Release/apply brake In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off").
	FALSE	Apply brake. During automatic operation, the internal brake logic controls the brake.
	TRUE	Release brake manually (forced release). Note! The brake can also be released if the controller is inhibited! - During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. - In semi-automatic operation, the brake is released including feedforward control.

Identifier	Data type	Information/possible settings				
GP: GeneralPurpose The following inputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions						
nGPAAnalogSwitchIn1_a nGPAAnalogSwitchIn2_a	INT	Analog switch : Input signals The input signal selected via the selection input <i>bGPAAnalogSwitchSet</i> is output at output <i>nGPAAnalogSwitchOut_a</i>.				
bGPAAnalogSwitchSet	BOOL	Analog switch : Selection input <table><tr><td>FALSE</td><td><i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i></td></tr><tr><td>TRUE</td><td><i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i></td></tr></table>	FALSE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i>	TRUE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i>
FALSE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn1_a</i>					
TRUE	<i>nGPAAnalogSwitchOut_a</i> = <i>nGPAAnalogSwitchIn2_a</i>					
nGPArithmetikIn1_a nGPArithmetikIn2_a	INT	Arithmetic : Input signals - The arithmetic function is selected in C00338. - The result is output at output <i>nGPArithmetikOut_a</i>.				
nGPMulDivIn_a	INT	Multiplication/Division : Input signal - The factor for the multiplication can be set in C00699/1 (numerator) and C00699/2 (denominator). - The result is output at output <i>nGPMulDivOut_a</i>.				
bGPDigitalDelayIn	BOOL	Binary delay element : Input signal - The on-delay can be set in C00720/1. - The off-delay can be set in C00720/2. - The time-delayed input signal is output at output <i>bGPDigitalDelayOut</i>.				
bGPLogicIn1 bGPLogicIn2 bGPLogicIn3	BOOL	Binary logic : Input signals - The logic operation is selected in C00820. - The result is output at output <i>bGPLogicOut</i>.				
nGPCompareIn1_a nGPCompareIn2_a	INT	Analog comparison : Input signals - The comparison operation is selected in C00680. - Hysteresis and window size can be set in C00680 and C00682. - If the comparison statement is true, the output <i>bGPCompareOut</i> will be set to TRUE.				
bGPDFlipFlop_InD bGPDFlipFlop_InClk bGPDFlipFlop_InClr	BOOL	D-FlipFlop : Input signals Data, clock and reset input				
Free inputs The following inputs can freely be interconnected on the application level. The signals can be transferred from the I/O level to the application level via these inputs.						
bFreeIn1 ... bFreeIn8	BOOL	Free inputs for digital signals				
wFreeIn1 ... wFreeIn4	WORD	Free inputs for 16-bit signals				
dnFreeIn1_p ... dnFreeIn2_p	DINT	Free inputs for 32-bit signals				

Outputs

Identifier	Data type	Value/meaning
wDriveControlStatus	WORD	Status word of the controller - The status word contains information on the current status of the drive controller. - See the "wDeviceStatusWord status word" subchapter of the chapter on device control for a detailed description of the bit assignment.
wStateDetermFailNoLow	WORD	Display of the status determining error (LOW word)

Identifier	Data type	Value/meaning	
wStateDetermFailNoHigh	WORD	Display of the status determining error (HIGH word)	
bDriveFail	BOOL	TRUE	Drive controller in error status. • " Fault " device status is active.
bWarningActive	BOOL	TRUE	A monitoring in the drive controller, for which the error response "Warning" or "Warning locked" has been parameterised, responded.
bSafeTorqueOff	BOOL	TRUE	Safe torque off. • " SafeTorqueOff " device status is active.
bDriveReady	BOOL	TRUE	Controller is ready for operation. • " SwitchedOn " device status is active. • The drive is in this device status if the DC bus voltage is applied and the controller is still inhibited by the user (controller inhibit).
bCInhActive	BOOL	TRUE	Controller inhibit is active.
bImplsActive	BOOL	TRUE	Pulse inhibit is active.
bQSPlsActive	BOOL	TRUE	Quick stop is active.
bSpeedCcw	BOOL	Current direction of rotation	
		FALSE	Clockwise rotation (Cw)
		TRUE	Direction of rotation to the left (Ccw)
bSpeedActCompare	BOOL	Result of the speed comparison (detection of speed=0)	
		TRUE	During open-loop operation: Speed setpoint < Comparison value (C00024)
			During closed-loop operation: Actual speed value < Comparison value (C00024)
blmaxActive	BOOL	"Current setpoint inside the limitation" status signal	
		TRUE	The current setpoint is internally limited (the drive controller operates at the maximum current limit).
bSpeedSetReached	BOOL	Status signal "setpoint = 0"	
		TRUE	Speed setpoint from the ramp function generator = 0
bSpeedActEqSet	BOOL	TRUE	Actual speed value = speed setpoint
nMotorCurrent_a	INT	Current stator current/effective motor current • Scaling: 16384 $\equiv$ 100 % $I_{\max\_mot}$ (C00022)	
nMotorSpeedSet_a	INT	Speed setpoint • Scaling: 16384 $\equiv$ 100 % reference speed (C00011)	
nMotorSpeedAct_a	INT	Actual speed value • Scaling: 16384 $\equiv$ 100 % reference speed (C00011)	
nMotorTorqueAct_a	INT	Actual torque • In the "VFC (+encoder)" operating mode of the motor control, this value is determined from the current motor current and corresponds to the actual torque only by approximation. • Scaling: 16384 $\equiv$ 100 % $M_{\max}$ (C00057)	
nDCVoltage_a	INT	Actual DC-bus voltage • Scaling: 16384 $\equiv$ 1000 V	
nMotorVoltage_a	INT	Current motor voltage/inverter output voltage • Scaling: 16384 $\equiv$ 1000 V	

Identifier	Data type	Value/meaning
MCK basic functions		
bMBrakeReleaseOut	BOOL	Holding brake control : Trigger signal for the holding brake control switching element via a digital output Use bit 0 in C02582 to activate inverted switching element triggering.
		FALSE Apply brake.
		TRUE Release brake.
bMBrakeReleased	BOOL	Holding brake control : "Brake released" considering the brake release time When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed!
		TRUE Brake released (after the brake release time has expired).
GP: GeneralPurpose The following outputs are interconnected with logic/arithmetic functions on application level for free usage. ▶ "GeneralPurpose" functions		
nGPAAnalogSwitchInOut_a	INT	Analog switch : Output signal
nGPArithmetikOut_a	INT	Arithmetic : Output signal
nGPMulDivOut_a	INT	Multiplication/Division : Output signal
bGPDigitalDelayOut	BOOL	Binary delay element : Output signal
bGPLogicOut	BOOL	Binary logic : Output signal
bGPCompareOut	BOOL	Analog comparison : Output signal
bGPSignalOut1 ... bGPSignalOut4	BOOL	Binary signal monitor : Output signals - The signal sources to be output are selected in C00411/1...4. - A bit coded inversion of the output signals can be parameterised in C00412.
nGPSignalOut1_a ... nGPSignalOut4_a	BOOL	Analog signal monitor : Output signals - The signal sources to be output are selected in C00410/1...4. - Gain and offset for each output signal can be parameterised in C00413/1...8.
bGPDFlipFlop_Out	BOOL	D-FlipFlop : Output signal
bGPDFlipFlop_NegOut	BOOL	D-FlipFlop : Negated output signal
Free outputs The following outputs can freely be interconnected on the application level. The signals from the application level can be transferred to the I/O level via these outputs.		
bFreeOut1 ... bFreeOut8	BOOL	Free outputs for digital signals
wFreeOut1 ... wFreeOut4	WORD	Free outputs for 16-bit signals
dnFreeOut1_p dnFreeOut2_p	WORD	Free outputs for 32-bit signals

7.4.2.1 Truth table for activating the pre-switch off

Input		Function	Response in the setpoint generator (FB L_NSet)
bJogCtrl InputSel1	bJogCtrl InputSel2		
FALSE	FALSE	Pre-switch off inactive	No response - The input signal <i>bJogCtrlRfgIn</i> is output directly at output <i>bRfgOut</i>. - The input signals <i>bJogCtrlJog1</i> and <i>bJogCtrlJog2</i> are passed through 1:1 to the downstream FB L_NSet for the selection of fixed setpoints.
TRUE	FALSE	The <i>bJogCtrlSlowDown1</i> and <i>bJogCtrlStop1</i> inputs are evaluated.	Pre-switch off can be activated - If the slowdown function is activated via the selected <i>bJogCtrlSlowDown</i> input, fixed setpoint 2 is activated in the setpoint generator. - If the stop function is activated via the selected <i>bJogCtrlStop</i> input, the setpoint generator is deactivated.
FALSE	TRUE	The <i>bJogCtrlSlowDown2</i> and <i>bJogCtrlStop2</i> inputs are evaluated.	
TRUE	TRUE	The inputs <i>bJogCtrlSlowDown3</i> and <i>bJogCtrlStop3</i> are evaluated.	

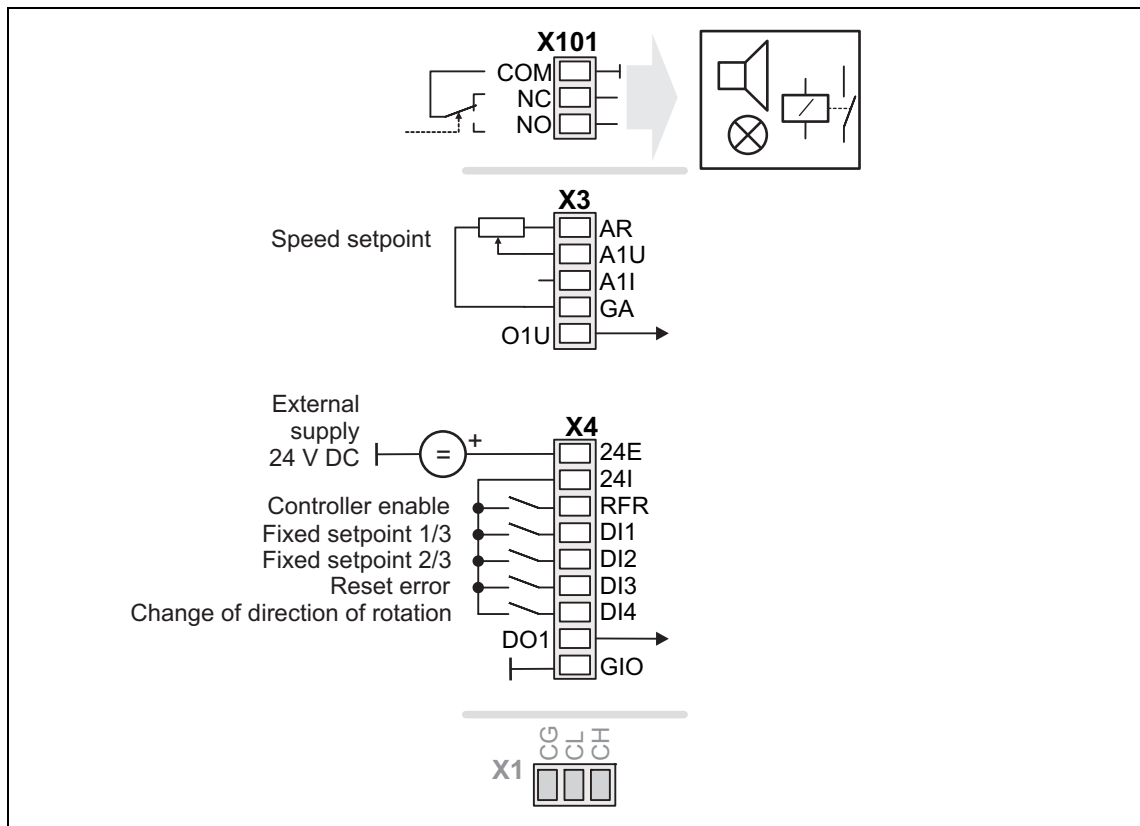
[7-1] Truth table for activating the pre-switch off

7.4.3 Terminal assignment of the control modes

The following comparison provides information about which inputs/outputs of the application block **LA_SwitchPos** are interconnected to the digital and analog input/output terminals of the drive controller in the different control modes.

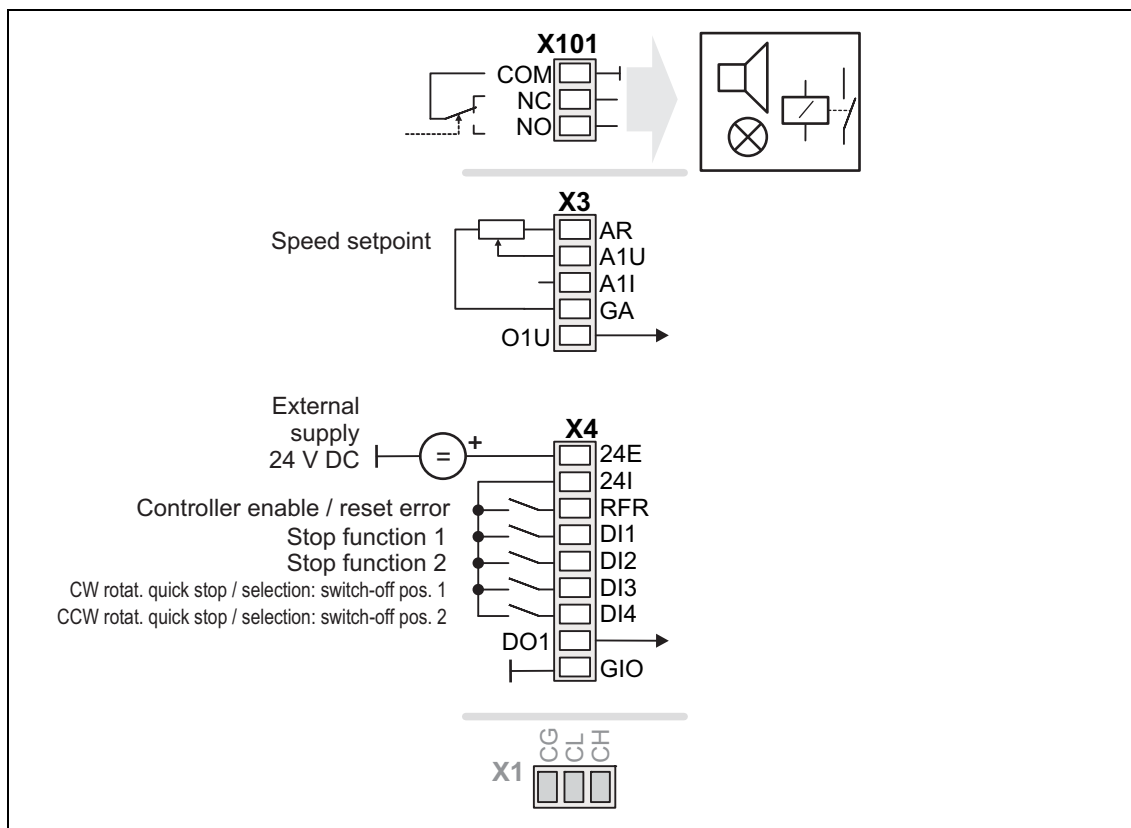
	Control mode (C00007)							
	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminal 16	20: Keypad	21: PC	30: CAN	40: MCI
Digital input terminals								
X4/RFR	Controller enable	Controller enable / Reset of error message bFailReset						
X4/DI1	Fixed setpoint 1/3 bJogCtrlJog1	Stop function 1 bJogCtrlStop1		Fixed setpoint 1/3 bJogCtrlJog1	-	-	Stop function 1 bJogCtrlStop1	
X4/DI2	Fixed setpoint 2/3 bJogCtrlJog2	Stop function 2 bJogCtrlStop2	Selection: Pre-switch off 1 bJogCtrlSlowDown 1	Fixed setpoint 2/3 bJogCtrlJog2	-	-	Selection: Pre-switch off 1 bJogCtrlSlowDown 1	
X4/DI3	Reset error message bFailReset	CW rotation quick stop bRLQCw Selection: Switch-off position 1 bJogCtrlInputSel1		CW rotation quick stop bRLQCw	-	-	Stop function 2 bJogCtrlStop2	
X4/DI4	Change of direction of rotation bSetSpeedCcw	CCW rotation quick stop bRLQCcw Selection: Switch-off position 2 bJogCtrlInputSel2		CCW rotation quick stop bRLQCcw	-	-	Selection: Pre-switch off 2 bJogCtrlSlowDown 2	
Analog input terminals								
X3/A1U, A1I	Main speed setpoint nMainSetValue_a 10 V ≡ 100 % reference speed (C00011)				-	-	Additional speed setpoint nAuxSetValue_a 10 V ≡ 100 % reference speed (C00011)	
Digital output terminals								
X4/DO1	-	-	-	-	-	-	-	-
X101/COM, NO	-	-	-	-	-	-	-	-
Analog output terminal								
X3/O1U	-	-	-	-	-	-	-	-

7.4.3.1 Terminals 0



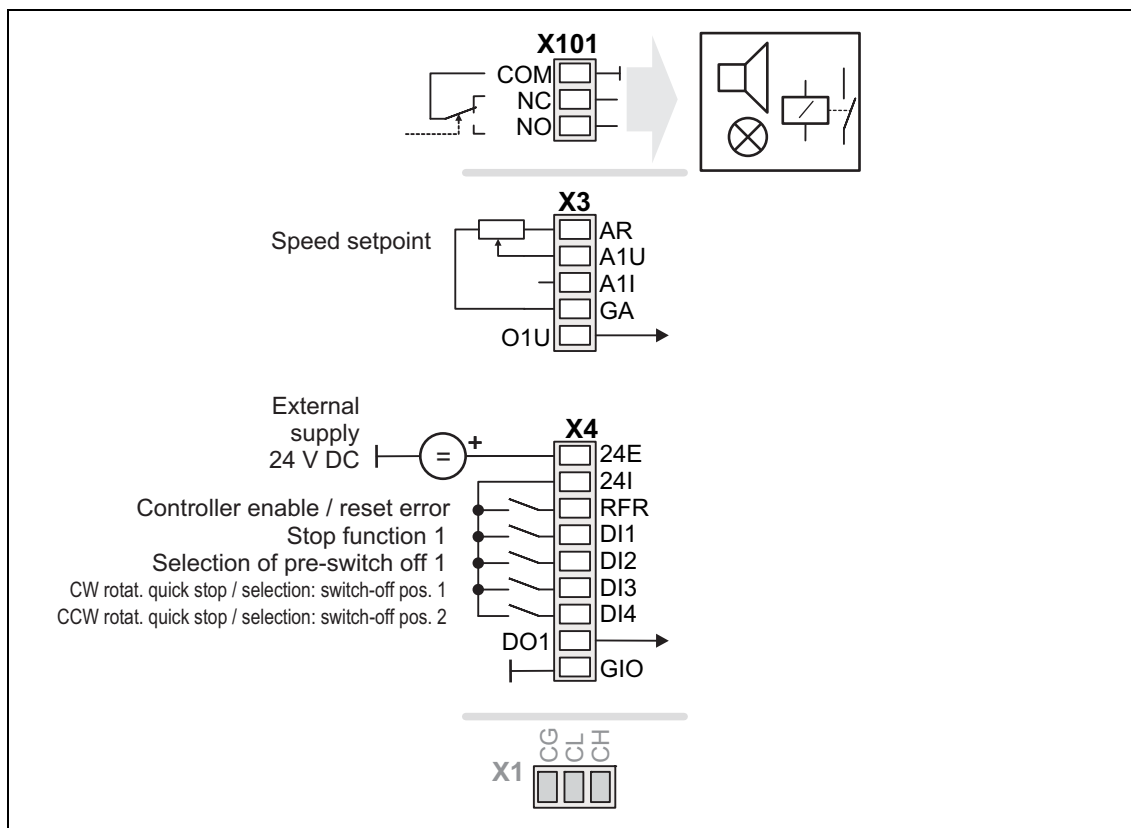
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail		
X4/RFR	-	X3/A1U	LA_SwitchPos.nMainSetValue_a *
X4/DI1	LA_SwitchPos.bJogCtrlJog1	X3/A1I	-
X4/DI2	LA_SwitchPos.bJogCtrlJog2	X3/O1U	-
X4/DI3	LA_SwitchPos.bFailReset	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI4	LA_SwitchPos.bSetSpeedCcw	X4/DO1	LA_SwitchPos.bDriveReady

7.4.3.2 Terminals 2



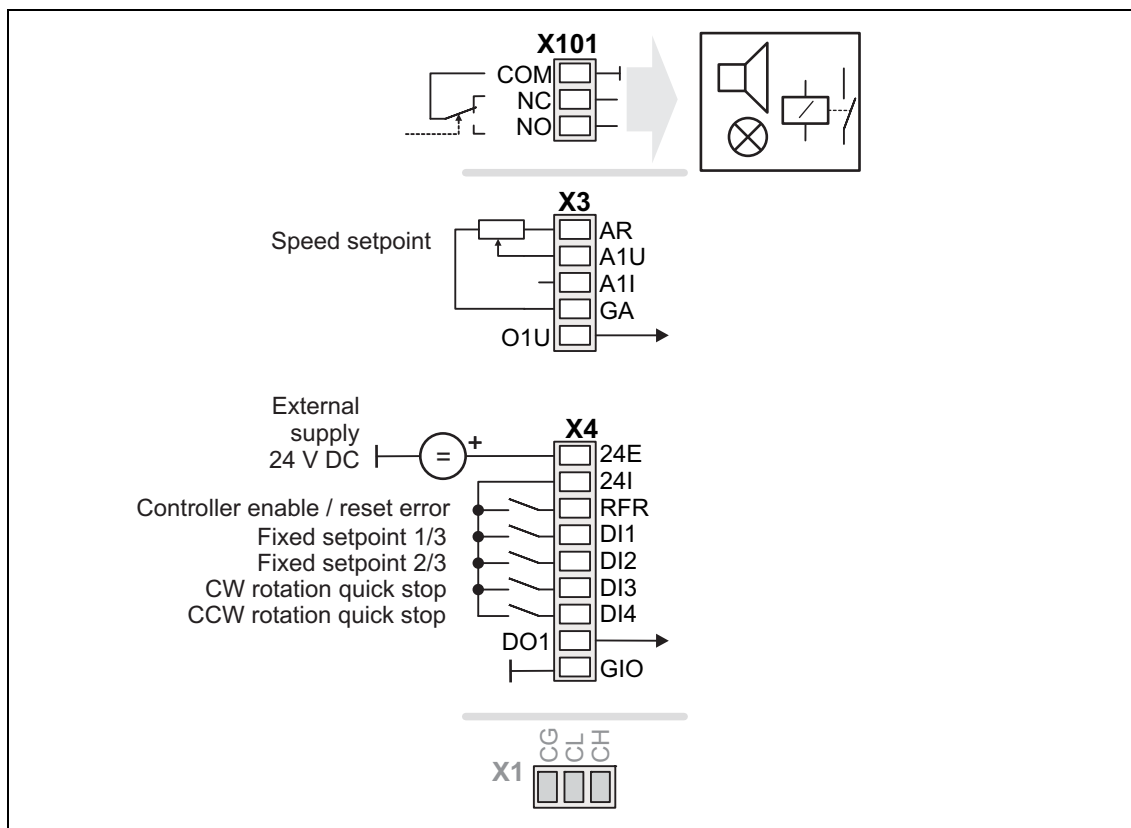
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail		
X4/RFR	LA_SwitchPos: bFailReset	X3/A1U	LA_SwitchPos.nMainSetValue_a *
X4/DI1	LA_SwitchPos: bLogCtrlStop1	X3/A1I	-
X4/DI2	LA_SwitchPos: bLogCtrlStop2	X3/O1U	-
X4/DI3	LA_SwitchPos: bRLQCw	* 10 V ≙ 100 % reference speed (C00011)	
	LA_SwitchPos: bLogCtrlInputSel1		
X4/DI4	LA_SwitchPos: bRLQCcw	X4/DO1	LA_SwitchPos.bDriveReady
	LA_SwitchPos: bLogCtrlInputSel2		

7.4.3.3 Terminals 11



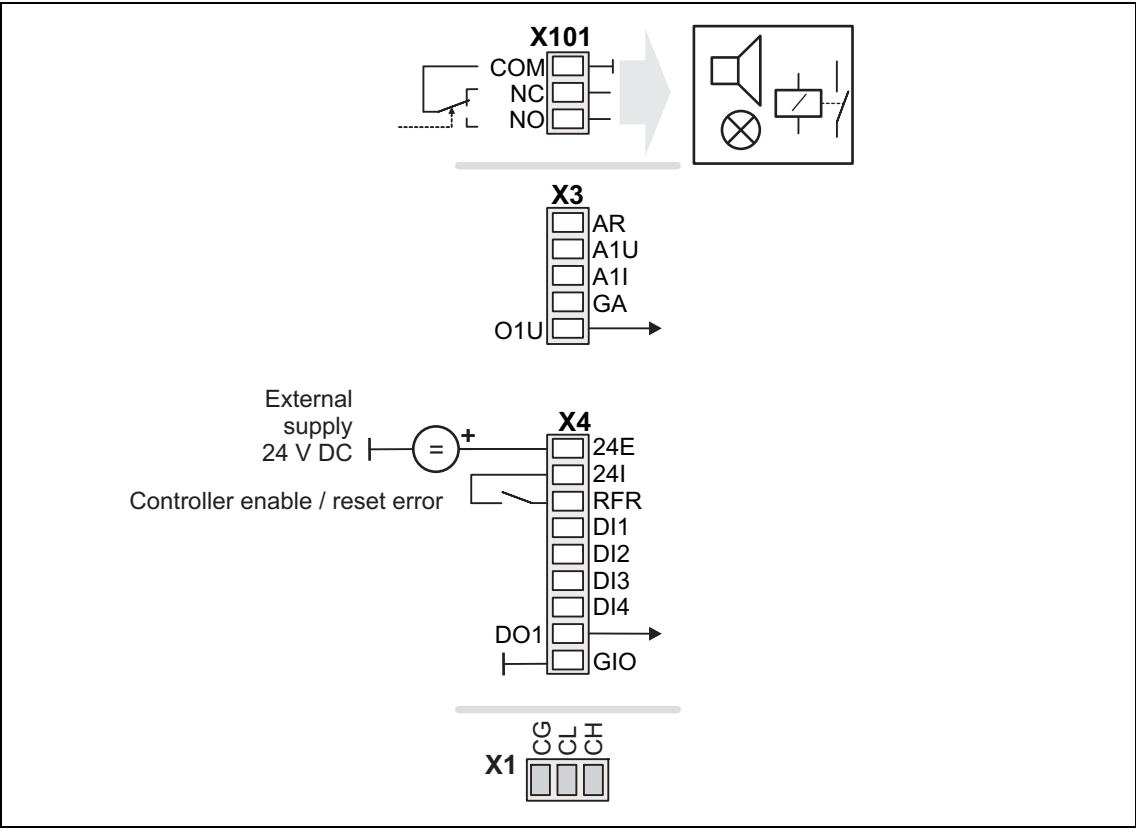
Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail		
X4/RFR	LA_SwitchPos: bFailReset	X3/A1U	LA_SwitchPos.nMainSetValue_a *
X4/DI1	LA_SwitchPos: bLogCtrlStop1	X3/A1I	-
X4/DI2	LA_SwitchPos: bLogCtrlSlowDown1	X3/O1U	-
X4/DI3	LA_SwitchPos: bRLQCw	* 10 V ≡ 100 % reference speed (C00011)	
	LA_SwitchPos: bLogCtrlInputSel1		
X4/DI4	LA_SwitchPos: bRLQCcw	X4/DO1	LA_SwitchPos.bDriveReady
	LA_SwitchPos: bLogCtrlInputSel2		

7.4.3.4 Terminal 16



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail		
X4/RFR	LA_SwitchPos: bFailReset	X3/A1U	LA_SwitchPos.nMainSetValue_a *
X4/DI1	LA_SwitchPos: bLogCtrlJog1	X3/A1I	-
X4/DI2	LA_SwitchPos: bLogCtrlJog2	X3/O1U	-
X4/DI3	LA_SwitchPos: bRLQCw	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI4	LA_SwitchPos: bRLQCcw	X4/DO1	LA_SwitchPos.bDriveReady

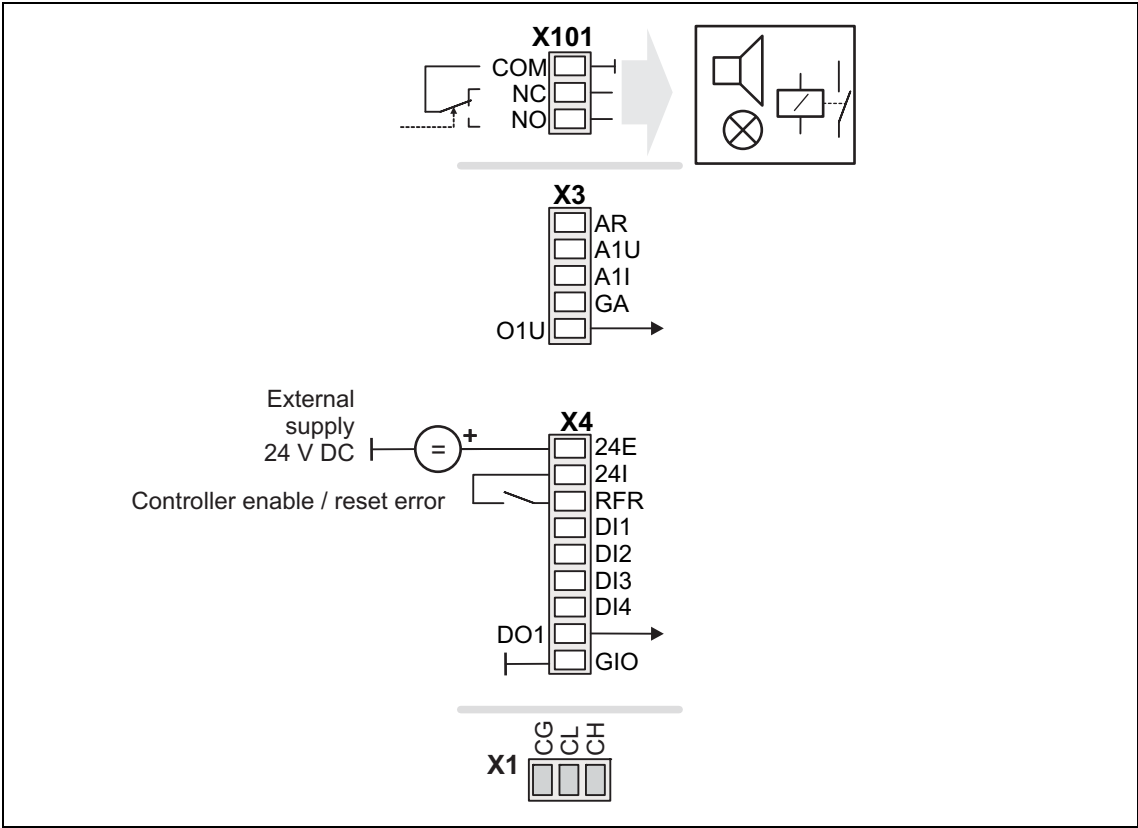
7.4.3.5 Keypad



Connection	Assignment		Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail			
X4/RFR	LA_SwitchPos.bFailReset		X3/A1U	-
X4/DI1	-		X3/A1I	-
X4/DI2	-		X3/O1U	-
X4/DI3	-			
X4/DI4	-		X4/DO1	LA_SwitchPos.bDriveReady

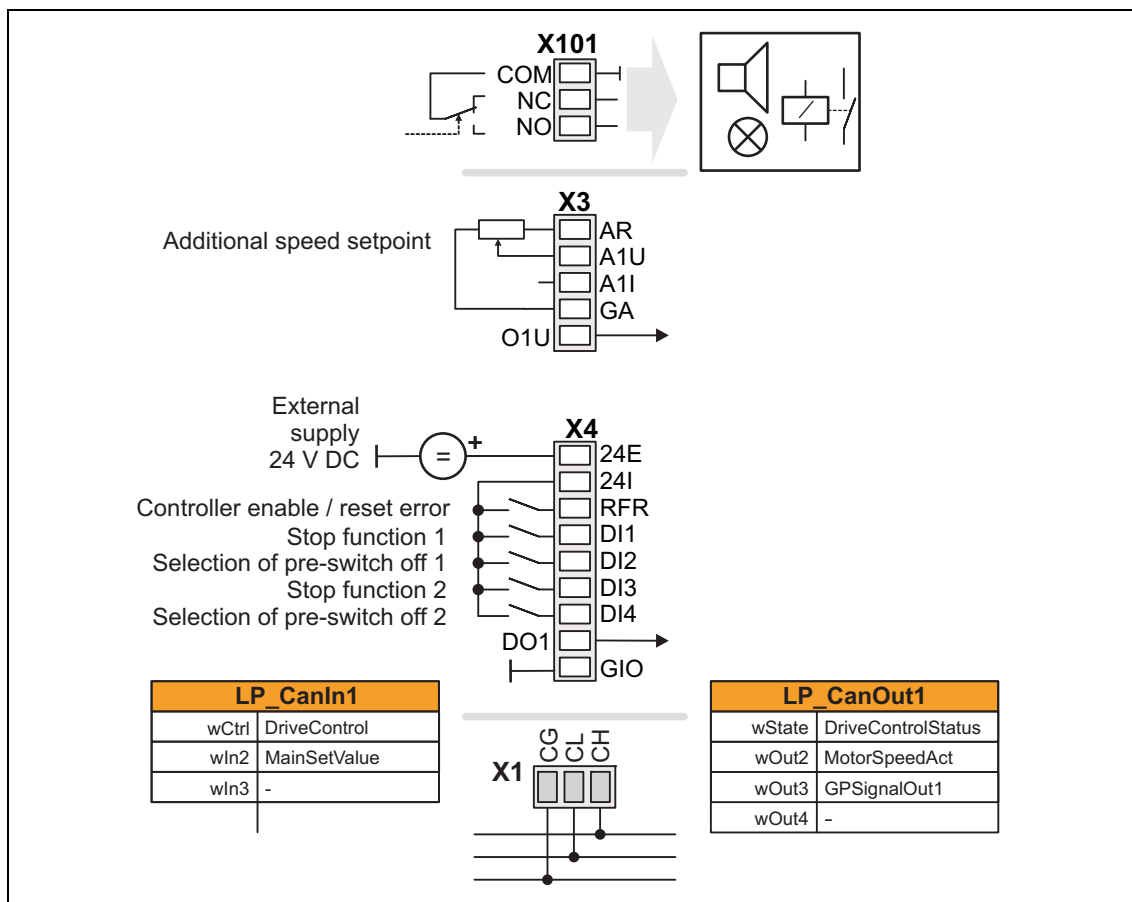
7.4.3.6

PC



Connection	Assignment		Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail			
X4/RFR	LA_SwitchPos.bFailReset		X3/A1U	-
X4/DI1	-		X3/A1I	-
X4/DI2	-		X3/O1U	-
X4/DI3	-			
X4/DI4	-		X4/DO1	LA_SwitchPos.bDriveReady

7.4.3.7 CAN



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail	X3/A1U	LA_SwitchPos.nAuxSetValue_a *
X4/RFR	LA_SwitchPos: bFailReset	X3/A1I	-
X4/DI1	LA_SwitchPos: bJogCtrlStop1	X3/O1U	-
X4/DI2	LA_SwitchPos: bJogCtrlSlowDown1	* 10 V ≙ 100 % reference speed (C00011)	
X4/DI3	LA_SwitchPos: bJogCtrlStop2	X4/DO1	LA_SwitchPos.bDriveReady
X4/DI4	LA_SwitchPos: bJogCtrlSlowDown2		

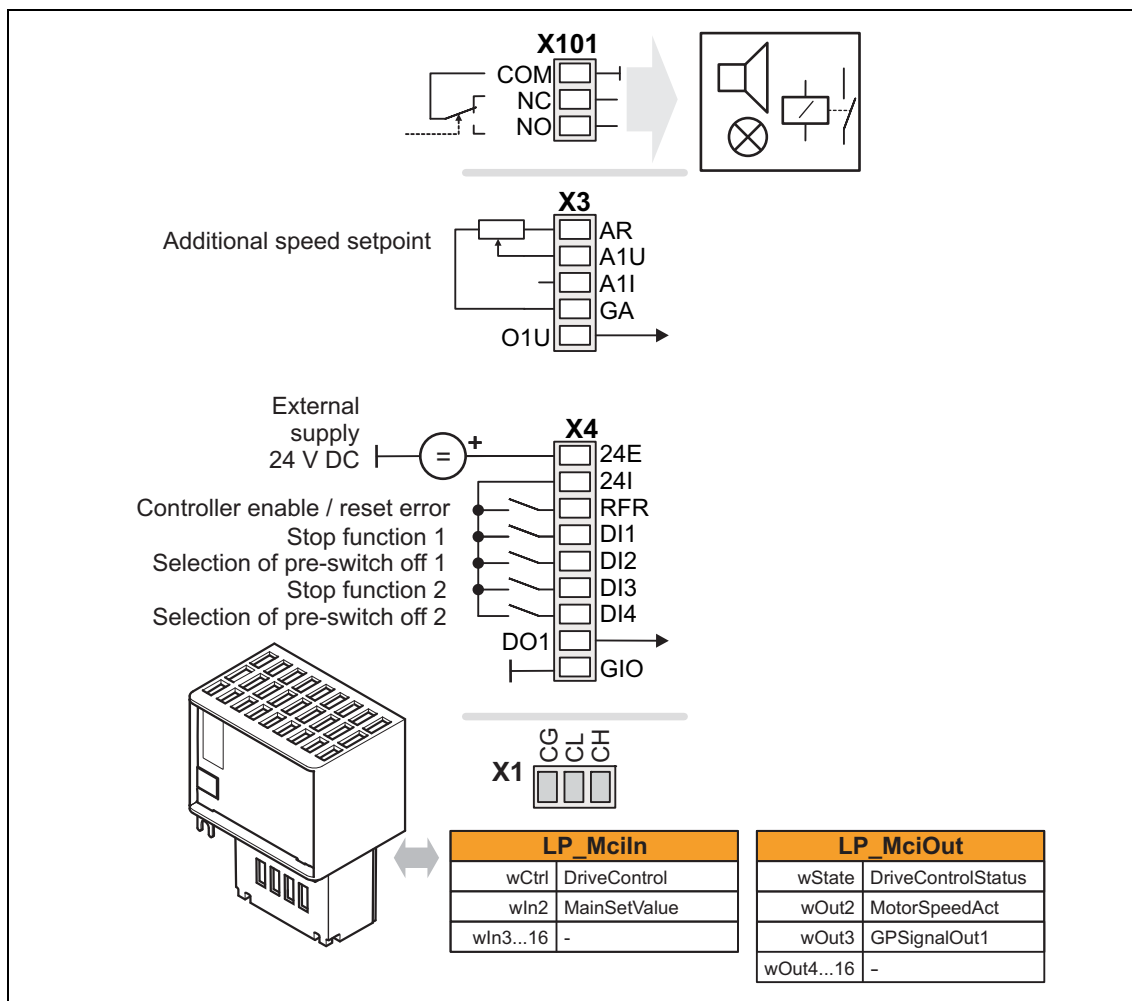
► [Process data assignment for fieldbus communication \(378\)](#)



Note!

You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.

7.4.3.8 MCI



Connection	Assignment	Connection	Assignment
X101/NC-NO	LA_SwitchPos.bDriveFail		
X4/RFR	LA_SwitchPos: bFailReset	X3/A1U	LA_SwitchPos.nAuxSetValue_a *
X4/DI1	LA_SwitchPos: bLogCtrlStop1	X3/A1I	-
X4/DI2	LA_SwitchPos: bLogCtrlSlowDown1	X3/O1U	-
X4/DI3	LA_SwitchPos: bLogCtrlStop2	* 10 V ≡ 100 % reference speed (C00011)	
X4/DI4	LA_SwitchPos: bLogCtrlSlowDown2	X4/DO1	LA_SwitchPos.bDriveReady

► [Process data assignment for fieldbus communication \(378\)](#)



Note!

You must set the setpoint arithmetic in [C00190](#) to "1: NOut = NSet + NAdd" so that the additional speed setpoint selected via the analog input A1U has an additive effect.

7.4.4 Process data assignment for fieldbus communication

The fieldbus communication is connected (preconfigured) to the previously selected technology application by selecting the corresponding control mode in [C00007](#):

- "30: [CAN](#)" for the connection to the system bus (CAN)
- "40: [MCI](#)" for the connection to a plugged-on communication module (e.g. PROFIBUS)

The assignment of the process data words depends only on the application, not on the bus system used:

Input words	Name	Assignment
Word 1	DriveControl	Control word • For bit assignment see the table below.
Word 2	MainSetValue	Speed setpoint • Scaling: $16384 \equiv 100\%$ reference speed (C00011)
Word 3	-	Not preconfigured
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Control word	Name	Function
Bit 0	SwitchOn	1 $\equiv$ Change to the " SwitchedOn " device status • This bit must be set in the CAN/MCI control word to ensure that the device changes to the " SwitchedOn " device status after mains connection without the need for a master control specifying this bit via fieldbus. • If control via a bus system is not wanted (e.g. in the case of control via terminals), the <i>wDriveCtrl</i> output signal of the LS_ParFix system block can be connected to the control word inputs.
Bit 1	DisableVoltage	1 $\equiv$ Inhibit inverter control (pulse inhibit)
Bit 2	SetQuickStop	1 $\equiv$ Activate quick stop (QSP). ▶ Activate/deactivate quick stop (81)
Bit 3	EnableOperation	1 $\equiv$ Enable controller (RFR) • If control via terminals is performed, this bit must be set both in the CAN control word and in the MCI control word. Otherwise, the controller is inhibited. ▶ Enable/Inhibit controller (80)
Bit 4	ModeSpecific_1	Reserved (currently not assigned)
Bit 5	JogCtrlInputSel1	Binary coded selection of the switch-off position 1 ... 3 • Activation of the signal pairs <i>bJogCtrlSlowDown1/bJogCtrlStop1</i> , <i>bJogCtrlSlowDown2/bJogCtrlStop2</i> or <i>bJogCtrlSlowDown3/bJogCtrlStop3</i> according to the Truth table for activating the pre-switch off .
Bit 6	JogCtrlInputSel2	
Bit 7	ResetFault	1 $\equiv$ Reset fault (trip reset) • Acknowledge error message (if the error cause has been eliminated). ▶ Reset error (82)
Bit 8	bJogCtrlRfglN	Ramping down of the setpoint generator in the downstream L_NSet FB according to the Truth table for activating the pre-switch off
Bit 9	reserved_1	Reserved (currently not assigned)
Bit 10	reserved_2	

Control word	Name	Function
Bit 11	MBrkRelease	Holding brake control : 0 ≡ Apply brake 1 ≡ Release brake • In conjunction with the operating mode selected in C02580 (Lenze setting: "Brake control off").
Bit 12	JogCtrlJog1	Binary coded selection of the fixed setpoints (JOG setpoints)
Bit 13	JogCtrlJog2	
Bit 14	SetFail	1 ≡ Set error (trip set)
Bit 15	SetSpeedCcw	0 ≡ Direction of rotation to the right (Cw) 1 ≡ Direction of rotation to the left (Ccw)

Output words	Name	Assignment
Word 1	DriveControlStatus	Status word • For bit assignment see the table below.
Word 2	MotorSpeedAct	Actual speed value • Scaling: 16384 ≡ 100 % reference speed (C00011)
Word 3	GPSignalOut1	Analog signal monitor: Output signal 1 • The selection of the signal source to output is executed in C00410/1 . • Gain and offset for the output signal can be parameterised in C00413/1 and C00413/2 . • For a detailed functional description see the L_SignalMonitor a FB.
Word 4	-	Not preconfigured
Words 5 ... 16	-	Not preconfigured • Only available in control mode "40: MCI".

Status word	Name	Status
Bit 0	DriveFail	1 ≡ Drive controller in error status • " Fault " device status is active.
Bit 1	PowerDisabled	1 ≡ Inverter control inhibited (pulse inhibit is active)
Bit 2	DriveReady	1 ≡ Drive controller is ready for operation • " SwitchedOn " device status is active. • The drive is in this device status if the DC bus voltage is applied and the controller is still inhibited by the user (controller inhibit).
Bit 3	SpeedCcw	0 ≡ Direction of rotation to the right (Cw) 1 ≡ Direction of rotation to the left (Ccw)
Bit 4	QSPIsActive	1 ≡ Quick stop is active
Bit 5	BrakeReleased	1 ≡ Brake released (after the brake opening time has elapsed)
Bit 6	ActSpeedIsZero	During open-loop operation: 1 ≡ Speed setpoint < Comparison value (C00024)
		During closed-loop operation: 1 ≡ Actual speed value < Comparison value (C00024)
Bit 7	ControllerInhibit	1 ≡ Controller inhibited (controller inhibit is active)
Bit 8	StatusCodeBit0	Bit coded display of the active device status ▶ Device state machine and device states (see table [4-1])
Bit 9	StatusCodeBit1	
Bit 10	StatusCodeBit2	
Bit 11	StatusCodeBit3	
Bit 12	Warning	
		1 ≡ A warning is indicated

Status word	Name	Status
Bit 13	Trouble	1 ≙ Controller is in the "Trouble" device status • E.g. if an overvoltage has occurred.
Bit 14	JogCtrlInputSel1	Binary coded selection of the switch-off position 1 ... 3 • Bit 5 and bit 6 of the control word.
Bit 15	JogCtrlInputSel2	

7.4.5 Setting parameters (short overview)

Parameter	Info	Lenze setting	
		Value	Unit
C00011	Appl.: Reference speed	1500	rpm
C00012	Accel. time - main setpoint	2.000	s
C00013	Decel. time - main setpoint	2.000	s
C00105	Decel. time - quick stop	2.000	s
C00039/1	Fixed setpoint 1	40.00	%
C00039/2	Fixed setpoint 2	60.00	%
C00039/3	Fixed setpoint 3	80.00	%
C00039/4...15	Fixed setpoint 4 ... 15	0.00	%
C00101/1...15	Add. accel. time 1 ... 15	0.000	s
C00103/1...15	Add. decel. time 1 ... 15	0.000	s
C00105	Decel. time - quick stop	2.000	s
C00106	Auto-DCB: Hold time	0.500	s
C00107	DCB braking: Hold time	999.000	s
C00134	L_NSet_1: Ramp smoothing	0: Off	
C00182	L_NSet_1: S-ramp time PT1	20.00	s
C00190	L_NSet_1: Setpoint arithmetic	0: Out = Set	
C00220	L_NSet_1: Acceleration time - add. setpoint	0.000	s
C00221	L_NSet_1: Deceleration time - add. setpoint	0.000	s
C00241	L_NSet_1: Hyst. NSet reached	0.50	%
C00488/1	InputSens.SlowDown1	0: Level	
C00488/2	InputSens.Stop1	0: Level	
C00488/3	InputSens.SlowDown2	0: Level	
C00488/4	InputSens.Stop2	0: Level	
C00488/5	InputSens.SlowDown3	0: Level	
C00488/6	InputSens.Stop3	0: Level	
C00632/1	L_NSet_1: Blocking speed 1 max	0.00	%
C00632/2	L_NSet_1: Blocking speed 2 max	0.00	%
C00632/3	L_NSet_1: Blocking speed 3 max	0.00	%
C00633/1	L_NSet_1: Blocking speed 1 min	0.00	%
C00633/2	L_NSet_1: Blocking speed 2 min	0.00	%
C00633/3	L_NSet_1: Blocking speed 3 min	0.00	%
C00635	L_NSet_1: nMaxLimit	199.99	%
C00636	L_NSet_1: nMinLimit	-199.99	%
C00670	L_OffsetGainP_1: Gain	1.0000	

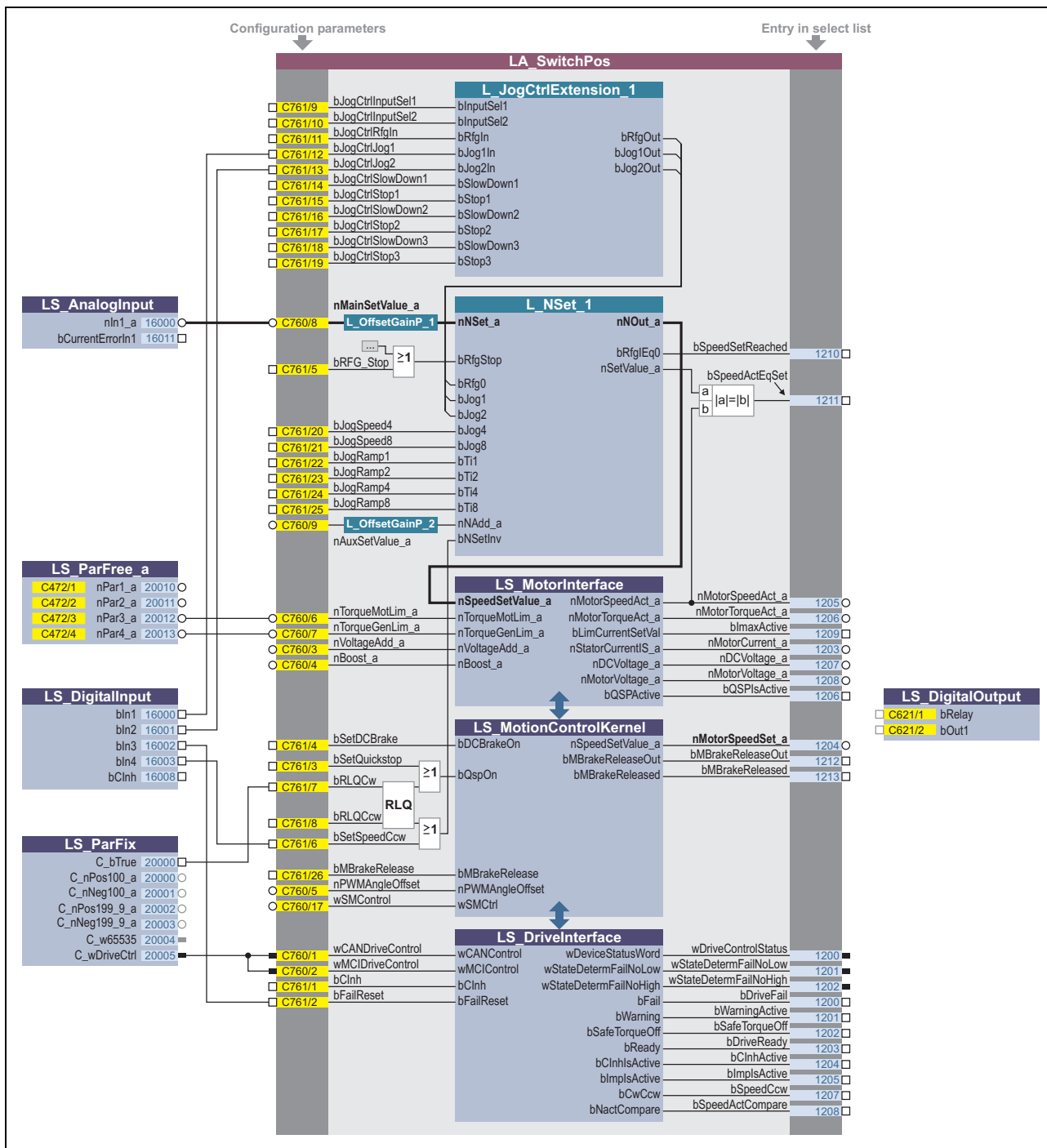
Parameter	Info	Lenze setting	
		Value	Unit
C00671	L_OffsetGainP_2: Gain	1.0000	
C00672	L_OffsetGainP_3: Gain	1.0000	
C00696	L_OffsetGainP_1: Offset	0.00	%
C00697	L_OffsetGainP_2: Offset	0.00	%
C00698	L_OffsetGainP_3: Offset	0.00	%
C00800	L_MPot_1: Upper limit	100.00	%
C00801	L_MPot_1: Lower limit	-100.00	%
C00802	L_MPot_1: Acceleration time	10.0	s
C00803	L_MPot_1: Deceleration time	10.0	s
C00804	L_MPot_1: Inactive fct.	0: Retain value	
C00805	L_MPot_1: Init fct.	0: Load last value	
C00806	Use of motor potentiometer	0: No	
C02610/2	MCK: Ramp time synchr. setpoint	2.000	s
C02611/1	MCK: Pos. max. speed	199.99	%
C02611/2	MCK: Pos. min. speed	0.00	%
C02611/3	MCK: Neg. min. speed	0.00	%
C02611/4	MCK: Neg. max. speed	199.99	%

Related topics:

► ["GeneralPurpose" functions](#) (📖 385)

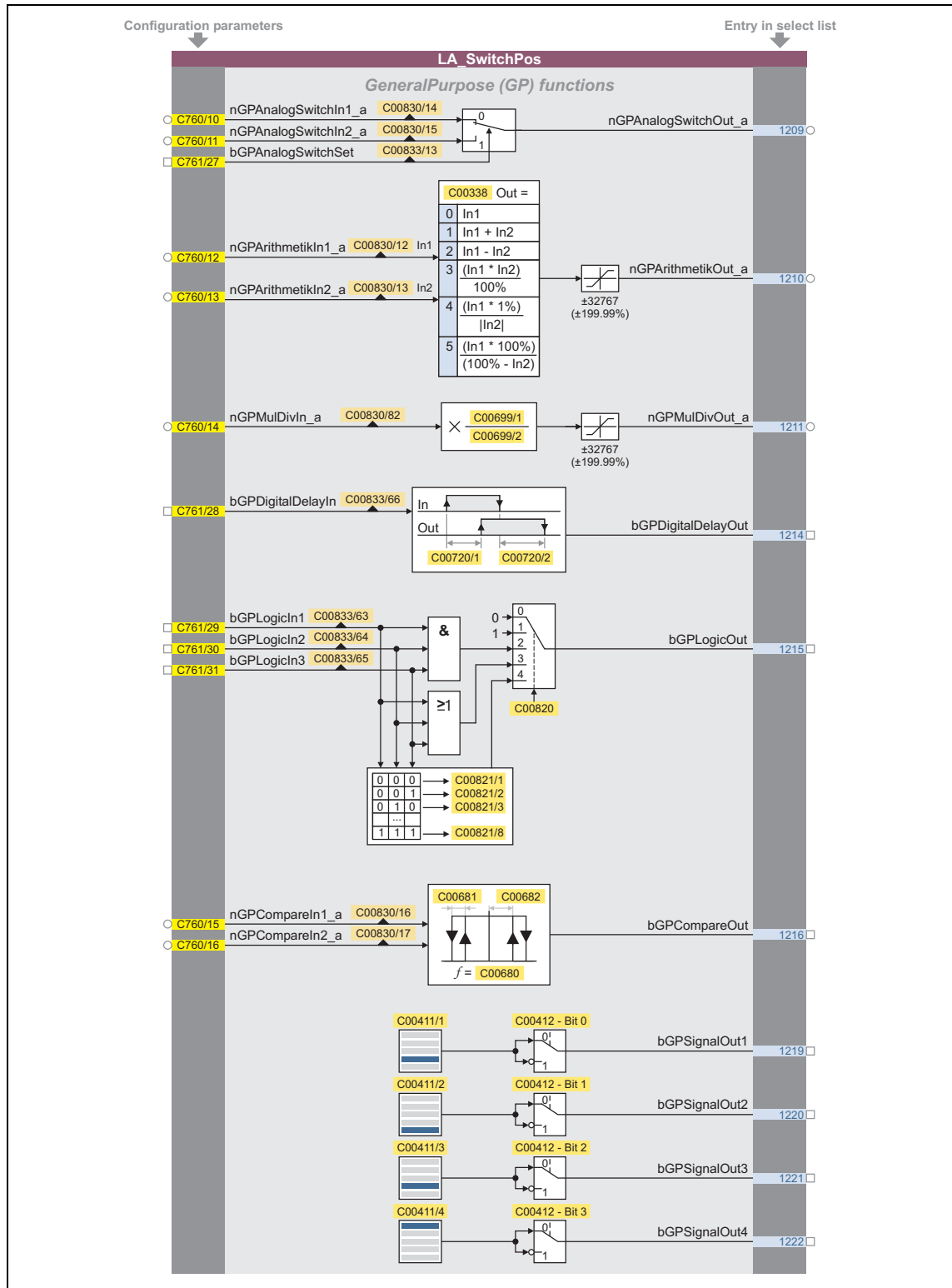
7.4.6 Configuration parameters

If required, the subcodes of [C00760](#) and [C00761](#) serve to change the pre-configured assignment of the application inputs:

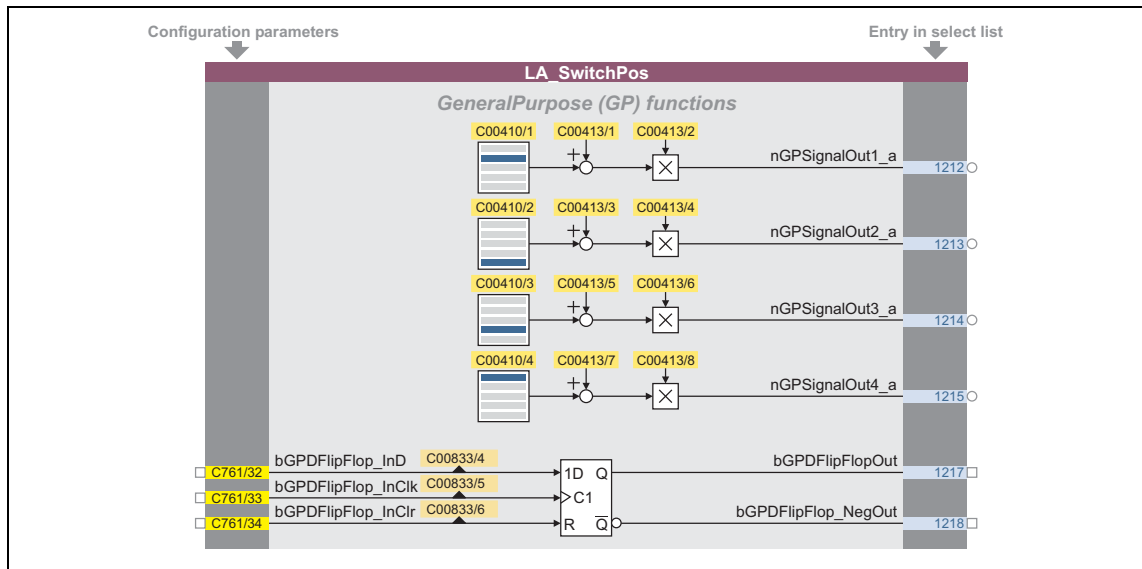


[7-14] Pre-assignment of the "Switch-off positioning" application in the "Terminals 0" control mode

Configuration parameters for "GeneralPurpose" functions



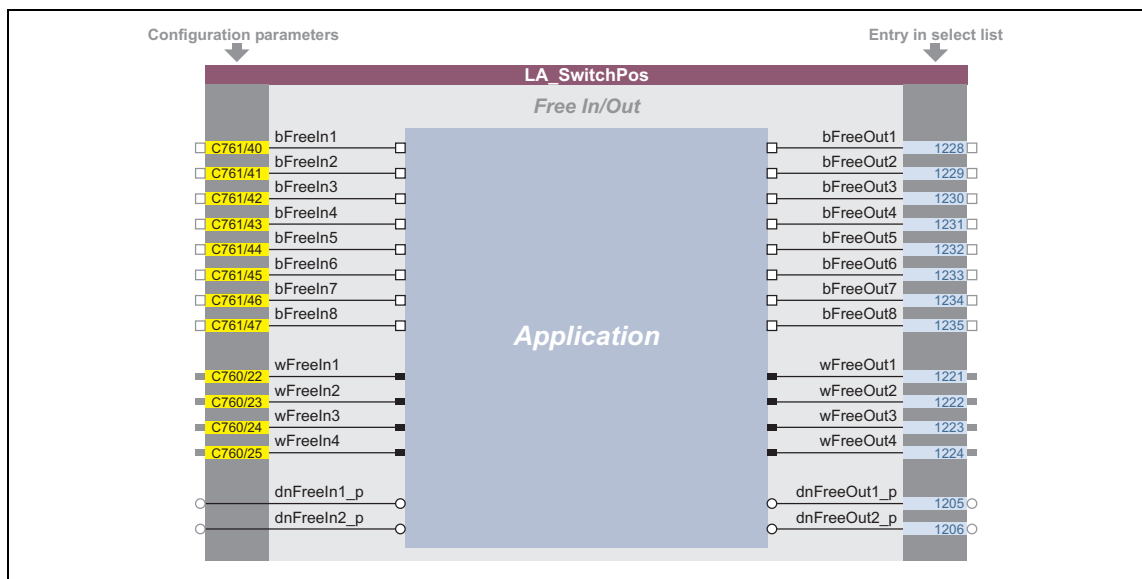
[7-15] "GeneralPurpose" functions



[7-16] "GeneralPurpose" functions (continuation)

Free inputs and outputs

These inputs can be freely interconnected in the application level. They can be used to transfer signals from the I/O level to the application level and vice versa.



[7-17] Free inputs/outputs

Related topics:

- ▶ [User-defined terminal assignment](#) (289)
- ▶ ["GeneralPurpose" functions](#) (385)

7.5 "GeneralPurpose" functions

Each technology application provides different free logic and arithmetic functions, so-called "GeneralPurpose" functions.

For the interconnection of these functions, the application block features inputs and outputs on the I/O level, which are linked to the logic/arithmetic function.



Note!

In the Lenze setting, the connectors for the "GeneralPurpose" functions are hidden in the function block editor.

- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.



Tip!

The inputs of the "GeneralPurpose" functions can also be linked to other output signals via the configuration parameters of the technology application.

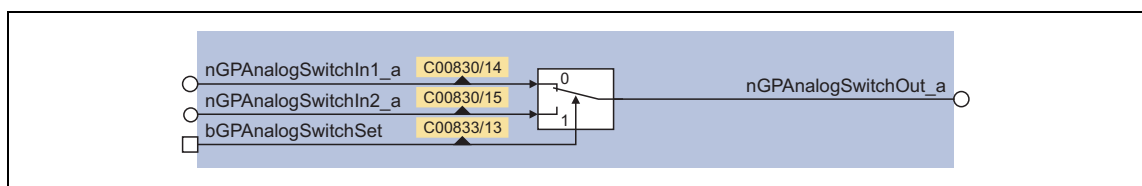
On the other hand, the outputs of the "GeneralPurpose" functions can be selected in the configuration parameters of other inputs.

Related topics:

- ▶ [User-defined terminal assignment](#) (📖 289)
- ▶ [TA "Actuating drive speed": Configuration parameters](#) (📖 322)
- ▶ [TA "Switch-off positioning": Configuration parameters](#) (📖 382)

7.5.1 Analog switch

This function switches between two analog input signals. The switch-over is controlled by a boolean input signal.

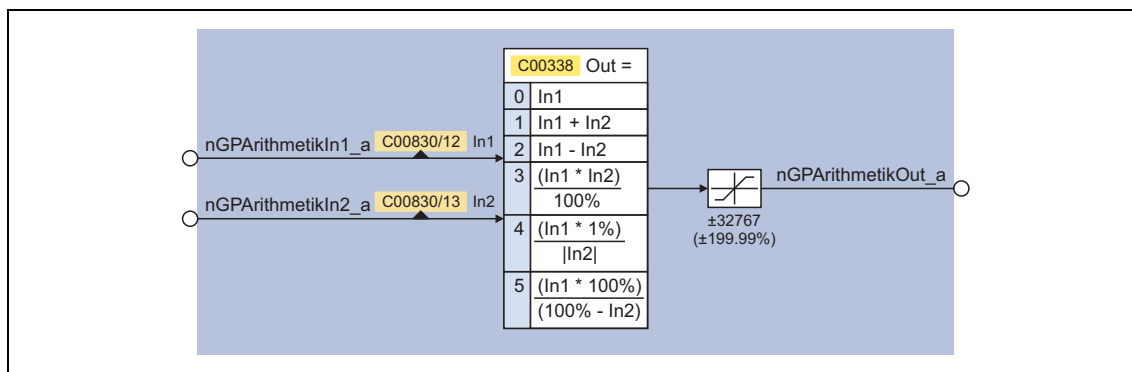


[7-18] GeneralPurpose function "Analog switch"

- For a detailed functional description see FB [L_AnalogSwitch](#).

7.5.2 Arithmetic

This function links two analog signals arithmetically. The arithmetic function can be parameterised.



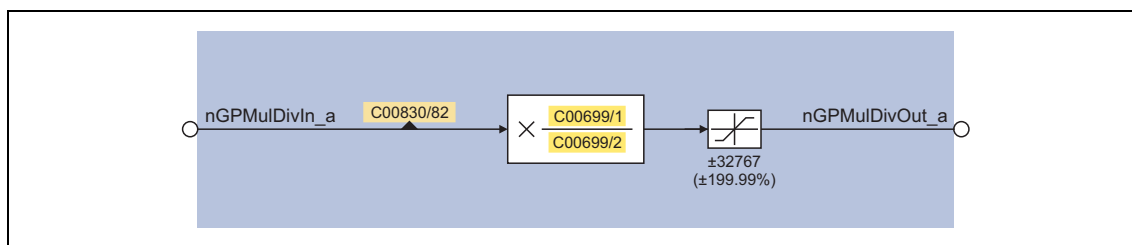
[7-19] GeneralPurpose function "Arithmetic"

Parameter	Info	Lenze setting	
		Value	Unit
C00338	L_Arithmetik_1: Function	0: nOut_a = nIn1_a	

- For a detailed functional description see the [L_Arithmetik](#) FB.

7.5.3 Multiplication/Division

This function multiplies an analog input signal with a parameterisable factor. The factor must be selected in the form of a quotient (numerator and denominator).



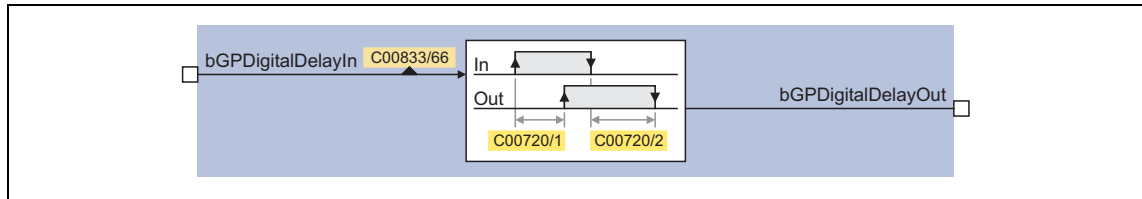
[7-20] GeneralPurpose function "Multiplication/division"

Parameter	Info	Lenze setting	
		Value	Unit
C00699/1	L_MulDiv_1: Numerator	0	
C00699/2	L_MulDiv_1: Denominator	10000	

- For a detailed functional description see FB [L_MulDiv](#).

7.5.4 Binary delay element

This function timely delays binary signals. On-delay and off-delay can be parameterised separately.



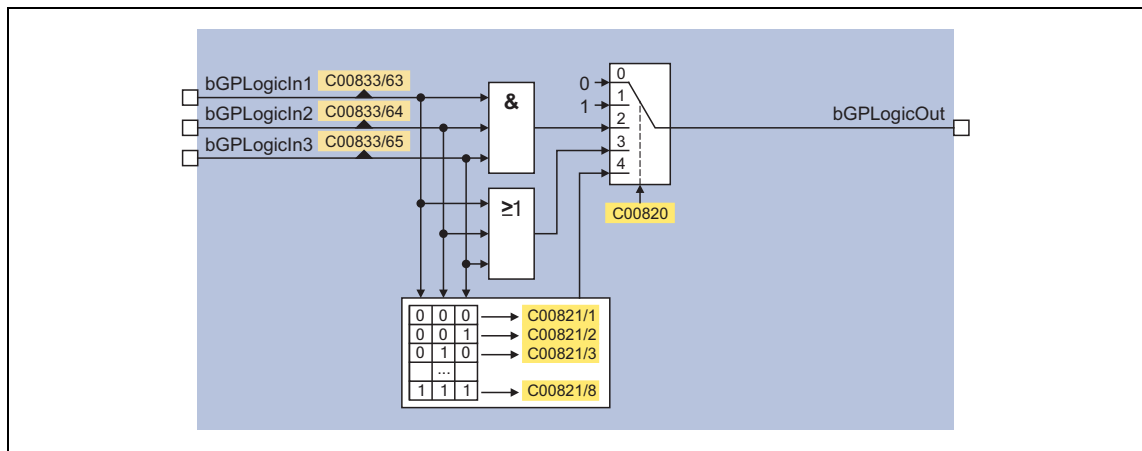
[7-21] GeneralPurpose function "Binary delay element"

Parameter	Info	Lenze setting	
		Value	Unit
C00720/1	L_DigitalDelay_1: On delay	0.000	s
C00720/2	L_DigitalDelay_1: Off delay	0.000	s

- For a detailed functional description see FB [L_DigitalDelay](#).

7.5.5 Binary logic

This function provides a binary output signal which is formed by a logic operation of the input signals. Alternatively, you can also select a fixed binary value which is independent of the input signals.



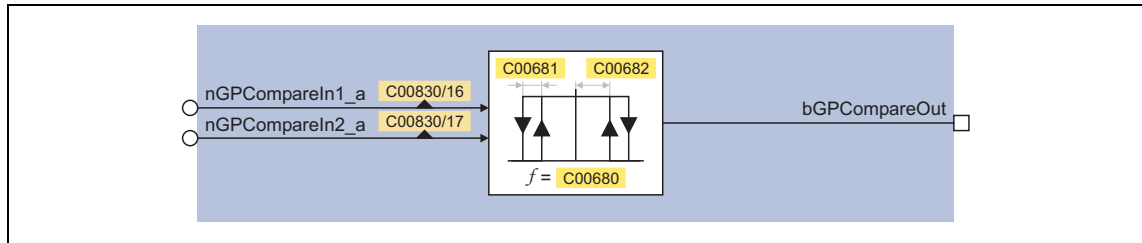
[7-22] GeneralPurpose function "Binary logic"

Parameter	Info	Lenze setting	
		Value	Unit
C00820	L_DigitalLogic_1: Function	0: bOut = 0	
C00821/1	bIn1=0/bIn2=0/bIn3=0	0: FALSE	
C00821/...	...	...	
C00821/8	bIn1=1/bIn2=1/bIn3=1	0: FALSE	

- For a detailed functional description see FB [L_DigitalLogic](#).

7.5.6 Analog comparison

This function compares two analog signals and can be used e.g. to realise a trigger. The comparison operation, hysteresis and window size can be parameterised.



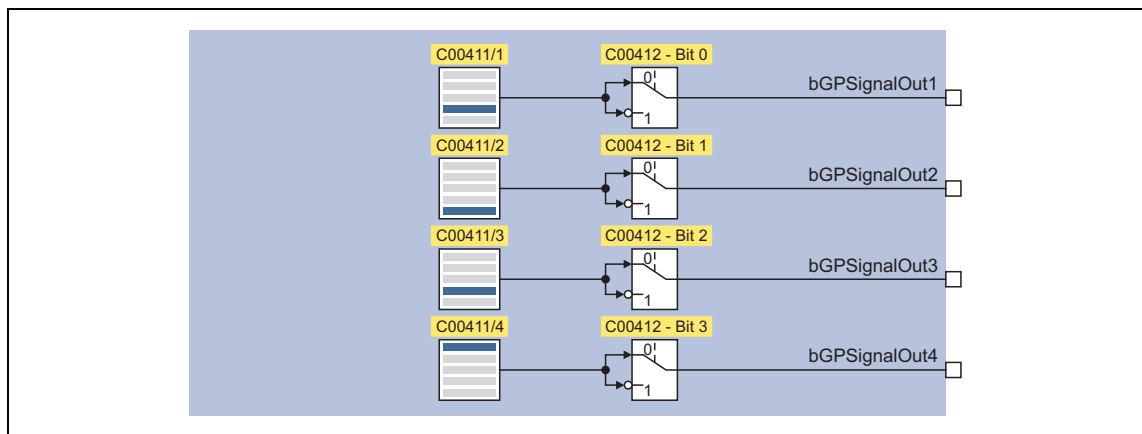
[7-23] GeneralPurpose function "Analog comparison"

Parameter	Info	Lenze setting	
		Value	Unit
C00680	L_Compare_1: Fct.	6: $ In1 < In2 $	
C00681	L_Compare_1: Hysteresis	0.50	%
C00682	L_Compare_1: Window	2.00	%

- For a detailed functional description see FB [L_Compare](#).

7.5.7 Binary signal monitor

This function serves to output four binary signals selected from a list of all binary output signals available in the drive controller. You can set an inversion of the output signals.



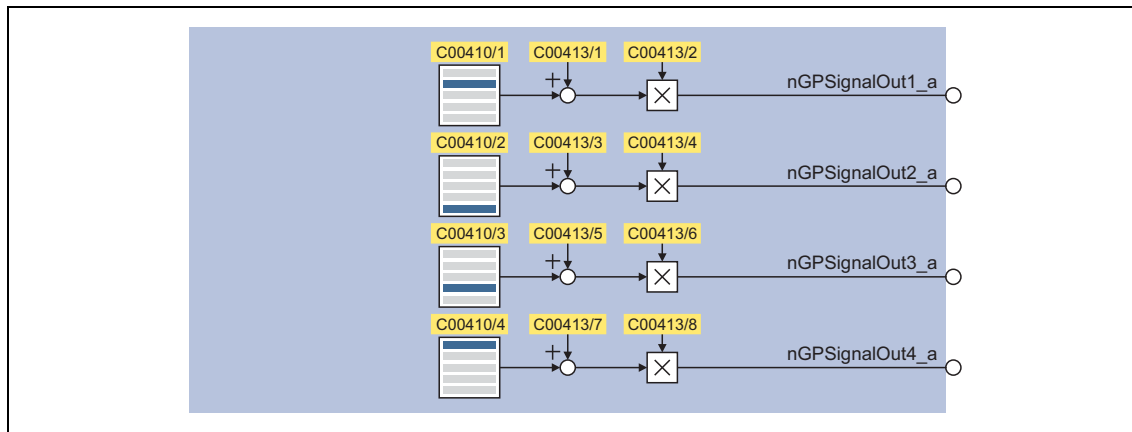
[7-24] GeneralPurpose function "Binary signal monitor"

Parameter	Info	Lenze setting	
		Value	Unit
C00411/1...4	L_SignalMonitor_b: Signal 1 ... 4	0: Not connected	
C00412	L_SignalMonitor_b: Inversion	Bit coded	

- For a detailed functional description see FB [L_SignalMonitor_b](#).

7.5.8 Analog signal monitor

This function serves to output four analog signals selected from a list of all analog output signals available in the drive controller. Offset and gain of the source signals can be adjusted.



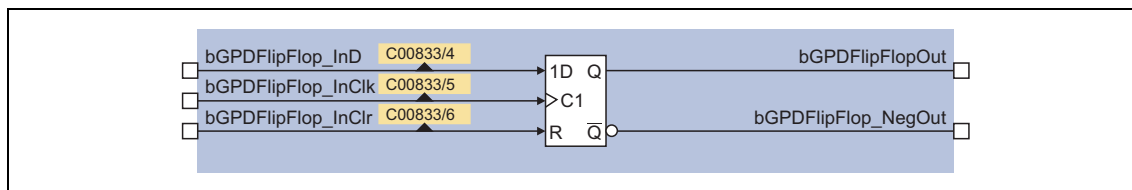
[7-25] GeneralPurpose function "Analog signal monitor"

Parameter	Info	Lenze setting	
		Value	Unit
C00410/1...4	L_SignalMonitor_a: Signal 1 ... 4	0: Not connected	
C00413/1	L_SignalMonitor_a: Signal 1 offset	0.00	%
C00413/2	L_SignalMonitor_a: Signal 1 gain	100.00	%
C00413/3	L_SignalMonitor_a: Signal 2 offset	0.00	%
C00413/4	L_SignalMonitor_a: Signal 2 gain	100.00	%
C00413/5	L_SignalMonitor_a: Signal 3 offset	0.00	%
C00413/6	L_SignalMonitor_a: Signal 3 gain	100.00	%
C00413/7	L_SignalMonitor_a: Signal 4 offset	0.00	%
C00413/8	L_SignalMonitor_a: Signal 4 gain	100.00	%

- For a detailed functional description see the [L_SignalMonitor_a](#) FB.

7.5.9 D-FlipFlop

This function saves the logic status of the data input (1D) in case of an active clock edge at the clock input (C1) and puts out its value in sequence at the output Q. If there is no active clock edge, the input value is not accepted.



[7-26] GeneralPurpose function "D-FlipFlop" (clock-edge controlled)

- For a detailed functional description see FB [L_DFlipFlop](#).

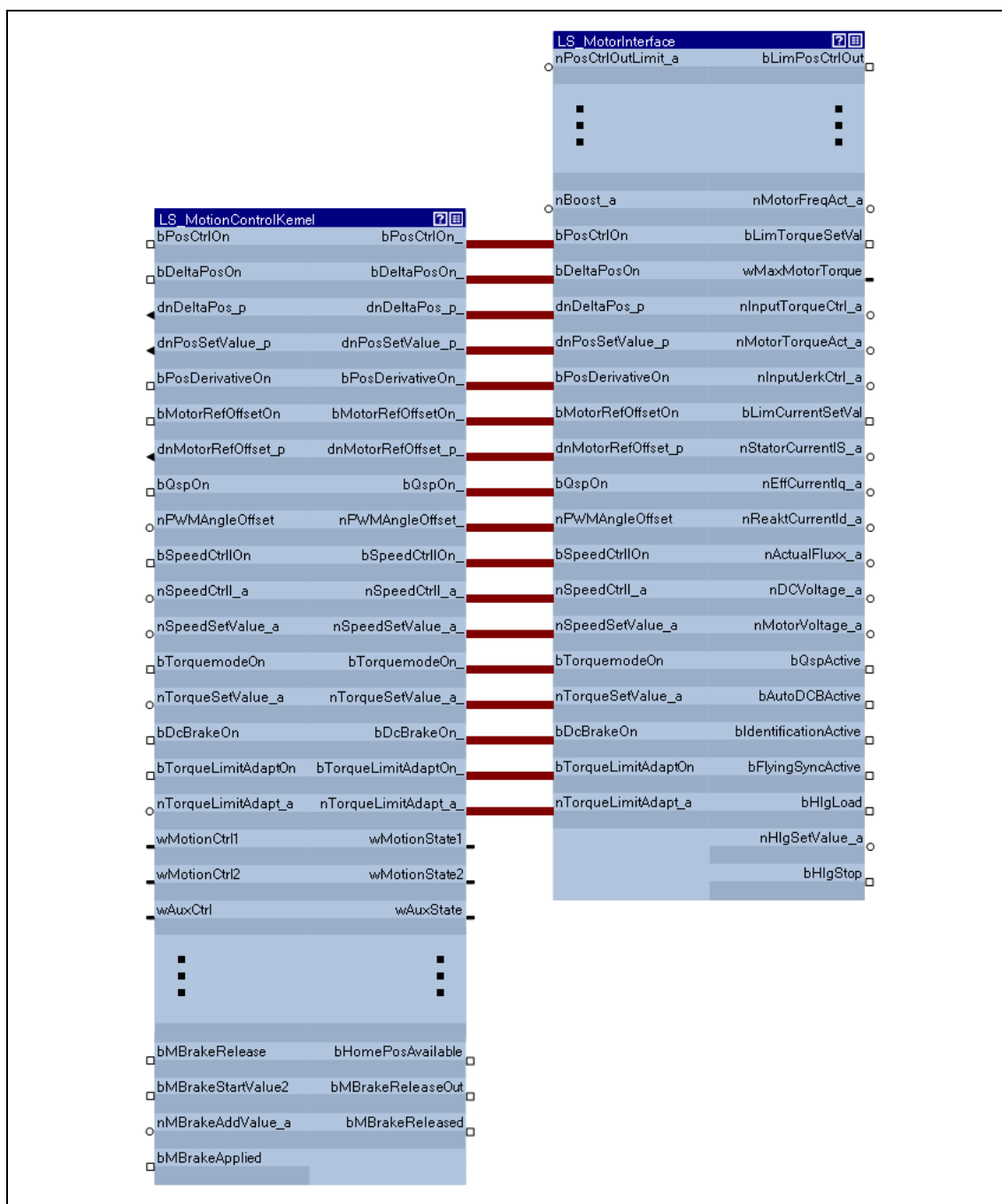
8 Basic drive functions (MCK)

In this chapter, the standard and basic drive functions integrated in the **Motion Control Kernel** (MCK) of the 8400 StateLine are described to which the active technology application can gain access via defined internal interfaces. As a result, the time-consuming creation of individual FB interconnections is avoided and the amount of work and complexity involved in the implementation of standard functions is minimised.

In the **Motion Control Kernel**, for example, an automatic holding brake control function is integrated which controls the holding brake in relation to the speed setpoint and various other internal control signals. Due to integrated automatic brake operation, the user is relieved of the task of managing these control signals.

8.1 Basic signal flow

The **Motion Control Kernel** is connected between setpoint generator (e.g. ramp generator, PID process controller, etc.) and the motor control function in the case of the available technology applications. For problem-free interaction of the **Motion Control Kernel** and motor control function, the two associated system blocks [LS_MotionControlKernel](#) and [LS_MotorInterface](#) have interfaces with corresponding inputs/outputs. These are visible in the FB Editor for monitoring purposes and must be connected to each other:



[8-1] Interconnection of Motion Control Kernel and motor control function

In the interconnection previously shown, the **Motion Control Kernel** monitors every interface. Some of the signals such as a quick stop request or a DC-injection braking request are directly passed through to the motor control. However, other signals are passed through or modified depending on the operating mode (e.g. synchronising a setpoint selection via ramp function).

8.2 Internal interfaces | System block "LS_MotionControlKernel"

In the Function Block editor, the system block **LS_MotionControlKernel** provides the interfaces to the **Motion Control Kernel**.

Inputs

Identifier	Data type	Information/possible settings
Control and setpoint signals for motor control The purpose of the following inputs is to transfer control signals and setpoints to the internal motor control function (LS_MotorInterface).		
bPosCtrlOn		Inputs of 8400 StateLine have no function!
bDeltaPosOn		
dnDeltaPos_p		
dnPosSetValue_p		
bPosDerivativeOn		
bMotorRefOffsetOn		
dnMotorRefOffset_p		
bQspOn	BOOL	Trigger quick stop (QSP) via the MCK • Also see device command " Activate/deactivate quick stop ".
		TRUE Activate quick stop • Motor control is decoupled from the setpoint selection and, within the deceleration time parameterised in C00105 , the motor is brought to a standstill ($n_{act} = 0$). • A pulse inhibit is set if the auto-DCB function has been activated via C00019 . • The motor is kept at a standstill during closed-loop operation (function in preparation).
		FALSE Deactivate quick stop • The quick stop is deactivated if no other source for the quick stop is active. • C00159 displays a bit code of active sources/causes for the quick stop.
nPWMAngleOffset	INT	Angular offset input • Scaling: $16384 \equiv 100\%$ • Setting range: 0 ... 199.99 %
bSpeedCtrlIOn	BOOL	Directly set the I-component of speed controller • In order to statically specify a minimum torque, e.g. when a load is being lifted.
		TRUE Set the I-component of the speed controller to the value <i>nSpeedCtrlI_a</i> .
nSpeedCtrlI_a	INT	I-component of the speed controller • Value is adopted in the case of a FALSE-TRUE edge at the input <i>bSpeedCtrlIOn</i> .
nSpeedSetValue_a	INT	Rotation speed/velocity setpoint
bTorquemodeOn	BOOL	TRUE Switch on torque-controlled operation
nTorqueSetValue_a	INT	Torque setpoint

Identifier	Data type	Information/possible settings				
bDcBrakeOn	BOOL	Manual DC-injection braking (DCB) - For this function, the <i>bDcBrakeOn_</i> output signal must be connected to the <i>bDcBrakeOn</i> input of the same name of the LS_MotorInterface system block. - Detailed information on DC-injection braking is provided in the motor control chapter, subchapter "DC-injection braking".  Note! Holding braking is not possible when this braking mode is used! Use the basic "Holding brake control" function for controlling the holding brake with a low rate of wear. <table><tr><td>FALSE</td><td>Deactivate DC-injection braking.</td></tr><tr><td>TRUE</td><td>Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. - The braking effect stops when the rotor is at standstill. - After the hold time (C00107) has expired, the controller sets the pulse inhibit. </td></tr></table>	FALSE	Deactivate DC-injection braking.	TRUE	Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. - The braking effect stops when the rotor is at standstill. - After the hold time (C00107) has expired, the controller sets the pulse inhibit.
FALSE	Deactivate DC-injection braking.					
TRUE	Activate DC-injection braking, i.e. the drive is brought to a standstill by means of DC-injection braking. - The braking effect stops when the rotor is at standstill. - After the hold time (C00107) has expired, the controller sets the pulse inhibit.					
bTorqueLimitAdaptOn		Inputs of 8400 Stateline have no function!				
nTorqueLimitAdapt_a						
Control words						
MCK: wMotionCtrl1		Inputs of 8400 Stateline have no function!				
wMotionCtrl2						
wAuxCtrl						
wSMCtrl	WORD	Interface to the optional safety system. - Setting control bit 0 ("SafeStop1") in this control word causes e.g. the automatic deceleration of the drive to standstill within this application (in the Motion Control Kernel). - See the "Interface to safety system" subchapter for a detailed description of the individual control bits.				
Control and setpoint signals for Motion Control Kernel function						
dnProfilePosition_p		Inputs of 8400 Stateline have no function!				
nSpeedAddValue_v						
nSpeedOverride_a						
nAccOverride_a						
nSRampOverride_a						
bLimitSwitchPos						
bLimitSwitchNeg						
bHomingMark						
bMBrakeRelease	BOOL		Holding brake control: Releasing/applying the brake in connection with the selected operating mode <table><tr><td>FALSE</td><td>Apply brake. - During automatic operation, the internal brake logic controls the brake. </td></tr><tr><td>TRUE</td><td>Release brake manually (forced release). Note! The brake can also be released if the controller is inhibited! - During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. - In semi-automatic operation, the brake is released including feedforward control. </td></tr></table>	FALSE	Apply brake. During automatic operation, the internal brake logic controls the brake.	TRUE
FALSE	Apply brake. During automatic operation, the internal brake logic controls the brake.					
TRUE	Release brake manually (forced release). Note! The brake can also be released if the controller is inhibited! - During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. - In semi-automatic operation, the brake is released including feedforward control.					

Outputs

Identifier	Data type	Value/meaning	
Control and setpoint signals for motor control			
The following outputs are used to transfer control signals and setpoints to the internal motor control function (LS_MotorInterface).			
bPosCtrlOn_		Outputs of 8400 StateLine have no function!	
bDeltaPosOn_			
dnDeltaPos_p_			
dnPosSetValue_p_			
bPosDerivativeOn_			
bMotorRefOffsetOn_			
dnMotorRefOffset_p_			
bQspOn_	BOOL	TRUE	Activate quick stop
nPWMAngleOffset_a_	INT	Angular offset input	
bSpeedCtrlIOn_	BOOL	TRUE	Set I-component of speed controller.
nSpeedCtrlI_a_	INT	I-component of the speed controller	
nSpeedSetValue_a_	INT	Main setpoint of speed	
bTorqueModeOn_	BOOL	TRUE	Switch on torque-guided operation.
nTorqueSetValue_a_	INT	Torque setpoint	
bDcBrakeOn_	BOOL	TRUE	Activate DC-injection braking.
bTorqueLimitAdaptOn_		Outputs of 8400 StateLine have no function!	
nTorqueLimitAdapt_a_			
Status words			
wMotionState1 wMotionState2	WORD	MCK status word 1 & 2 • For a detailed description of the individual status bits, see subchapter entitled " MCK status word ."	
wAuxState		Output of 8400 StateLine have no function!	
Status signal and actual-value signals from Motion Control Kernel functions			
nSpeedSet_v		Outputs of 8400 StateLine have no function!	
dnPosTarget_p			
dnPosSet_p			
dnPosSetRelative_p			
wActProfileNo			
wFollowProfileNo			
bBusy			
bDone			
bHomingDone			
bHomePosAvailable			

Identifier	Data type	Value/meaning
bMBrakeReleaseOut	BOOL	Trigger signal for switching element holding brake control via a digital output • Use bit 0 in C02582 to activate inverted switching element triggering. ▶ Holding brake control
		FALSE Apply brake.
		TRUE Release brake.
bMBrakeReleased	BOOL	"Brake released" status signal considering the brake release time • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed! ▶ Holding brake control
		TRUE Brake released (after the brake release time has expired).

8.2.1 MCK status word

MCK status word 1 (wMotionState1)

Bit	Designation	Description	Bit 3	Bit 2	Bit 1	Bit 0
0	ActOpModeBit00	Active operating mode Speed follower Safe stop 1 (SS1) StandBy (internal operating mode in the event of quick stop, pulse inhibit, and DC-injection braking)	0	0	0	0
...	...					
3	ActOpModeBit03					
4	Busy	For 8400 StateLine no function (always "0")!	1	1	1	1
5	Done					
6	AcceleratingActive					
7	ConstSpeedDuty					
8	DeceleratingActive					
9	S_ShapingActive					
10	Pos. HW-Limit Detected					
11	Neg. HW-Limit Detected					
12	HomPosDone					
13	HomPosAvailable					
14	Reserved	-				
15	Reserved	-				



Note!

The internal "StandBy" operating mode is assumed if pulse inhibit, quick stop and/or DC-injection braking are activated.

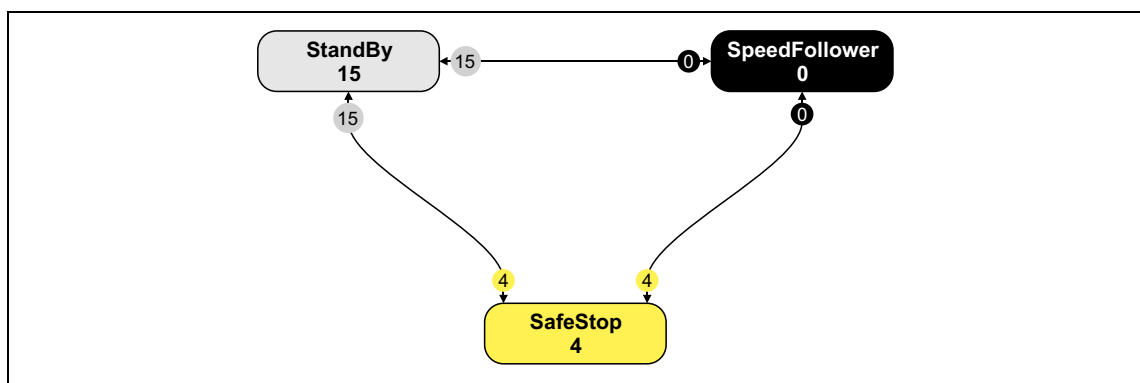
- No setpoint generation via the **Motion Control Kernel** in this operating mode.
- If the holding brake control sets a controller inhibit when the holding brake is closed, the internal "StandBy" operating mode is not assumed.

MCK status word 2 (wMotionState2)

Bit	Designation	Description
16	DwellTime	For 8400 StateLine no function (always "0")!
17	InTarget	
18	PosDone	
19	Reserved	
20	ActPosMode_Bit00	
...	...	
23	ActPosMode_Bit03	
24	ActProfileNo_Bit00	
...	...	
31	ActProfileNo_Bit07	

8.2.2 MCK state machine

Prio	Condition	
1	15 Setpoint generation through Motor control (MCTRL) : • DCB = DC-injection braking • QSP = quick stop • CINH = controller inhibit	DCB → ≥ 1 QSP → ≥ 1 CINH → ≥ 1 → 15
2	4 "Safe stop 1" (SS1) requested ▶ Interface to safety system	DCB → & QSP → & CINH → & SafeStop1 → & → 4
3	0 Speed follower requested	



[8-2] MCK state machine

8.2.2.1 "StandBy" operating mode

The internal "StandBy" operating mode is implicitly assumed if controller inhibit, pulse inhibit, quick stop and/or DC-injection braking are activated. Thus, there is no setpoint generation by the **Motion Control Kernel** in the "StandBy" operating mode.

- If the holding brake control sets a controller inhibit when the holding brake is closed, the internal "StandBy" operating mode is not assumed.
- The "StandBy" operating mode cannot be activated via the MCK control word.
- When the "StandBy" operating mode is active, bits 0 ... 3 are set in the MCK status word.

Speed acceptance when the "StandBy" operating mode is quit

If the operating mode is changed from "StandBy" to "SpeedFollower", not only controller inhibit, pulse inhibit, quick stop and/or DC-injection braking are cancelled but also the current speed is transferred to the speed setpoint if [Flying restart function](#) is activated.

From version V12.00.00 onwards, a sensitive threshold can be set in [C2611/5](#). If the absolute value of the current speed is below the sensitivity threshold, the value "0" is transferred to the speed setpoint instead of the current speed.

In the Lenze setting "0.5 %", the sensitivity threshold corresponds to approx. 7.5 rpm at a reference speed of 1500 rpm set in [C00011](#).

8.2.3 Interface to safety system

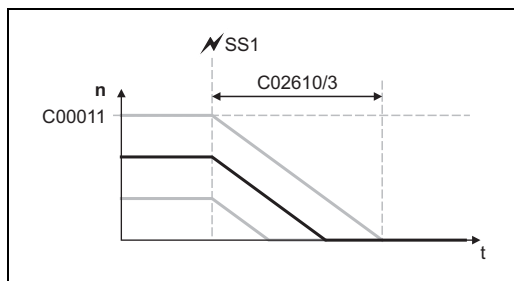
For operation with optional safety system, the [LS_MotionControlKernel](#) system block has the *wSMCtrl* input. This interface is used to transfer a control word by means of which the **Motion Control Kernel** can be supplied with information on requested or active safety functions. The **Motion Control Kernel** then initiates the necessary motion sequence (e.g. braking).

At the moment, only bit 0 in the *wSMCtrl* control word has a function. Additional functions are in preparation:

Bit	Designation	Description
0	SafeStop1	"1" ≡ Request for "Safe Stop 1" (SS1).
1	Reserved	In preparation - Still without function!
...		
15		

Behaviour in case of request for "Safe Stop 1" (SS1)

The drive is brought to a standstill with the stopping ramp set in [C02610/3](#).



- The time set in [C02610/3](#) refers to the down-ramping of the reference speed set in [C00011](#).
- If the current speed is lower, the time to standstill is accordingly lower as well.

[8-3] Ramping down to standstill

If the request is reset during the down-ramping process (bit 0 = "1↯0"), the behaviour depends on the active operating mode:

- In the "[Speed follower](#)" operating mode, direct synchronisation with the target speed takes place with the ramp time set in [C02610/2](#).

8 Basic drive functions (MCK)

8.3 Speed follower

8.3 Speed follower

The 8400 StateLine controller only supports the "speed follower" operating mode where the drive follows a speed setpoint.

8.3.1 Parameter setting

Short overview of parameters for the "speed follower" operating mode:

Parameter	Info	Lenze setting	
		Value	Unit
C02610/2	MCK: Ramp time synchr. setpoint	2.000	s
C02611/1	MCK: Pos. max. speed	199.99	%
C02611/2	MCK: Pos. min. speed	0.00	%
C02611/3	MCK: Neg. min. speed	0.00	%
C02611/4	MCK: Neg. max. speed	199.99	%

In the »Engineer«, you can set the initial limit by means of the dialog box *Min/Max speed*.

- Open the *Min/max speed* dialog box by opening the **Application Parameters** tab and clicking on the following button on the dialog level *Overview* → *Signal flow*:



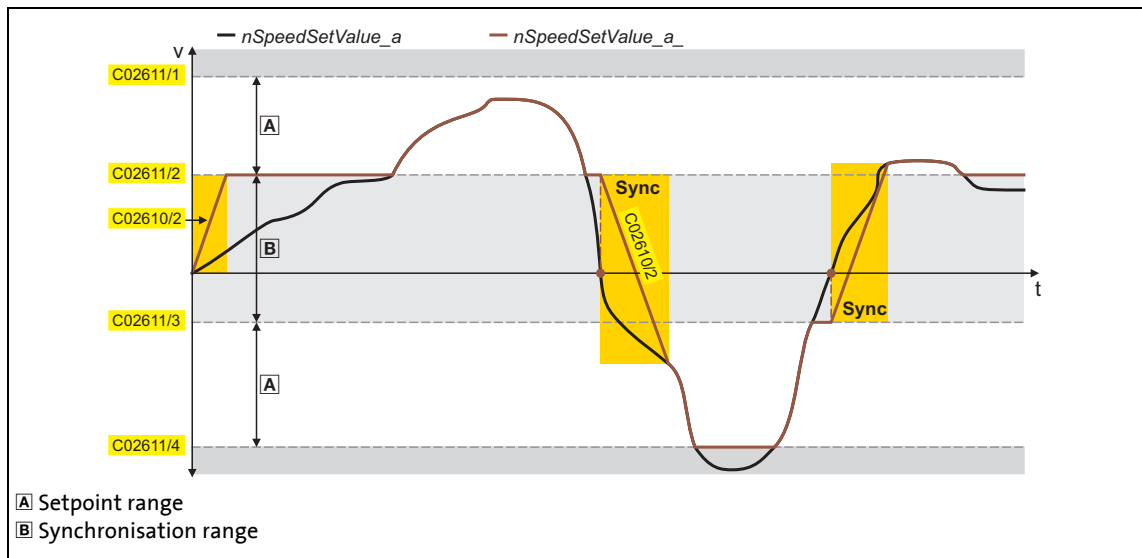
8.3.2 Setpoint selection

The speed setpoint is selected via the *nSpeedSetValue_a* process input and additively via the *nSpeedAddValue_v* process input.

- Usually, the ramp generator [L_NSet](#) and, optionally, the process controller [L_PCTRL](#) are upstream of the *nSpeedSetValue_a* process input.
- The speed setpoint is limited internally to the speed limits set in [C02611/1...4](#).

Speed setpoint generation

When the speed limit values are set, the **Motion Control Kernel** influences the setpoint generation with a synchronisation mode. The synchronisation mode serves to travel the synchronisation range dynamically with the synchronisation ramp set in [C02610/2](#):



[8-4] Example: Speed setpoint generation in the "Speed follower" operating mode (with $nSpeedAddValue_v = 0$)

8.4

Holding brake control

This basic function is used for low-wear control of a holding brake.

**Danger!**

Please note that the holding brake is an important element of the safety concept of the entire machine.

Thus, proceed very carefully when commissioning this system part!

**Stop!**

Holding brakes on Lenze motors are not intended for braking during operation. The increased wear caused by braking during operation can destroy the motor holding brake!

**Note!**

- **Deactivate automatic DC-injection braking when a holding brake is used!**
 - For this purpose, go to [C00019](#) and set the [Auto DCB](#) threshold to "0".
 - Background: Controller inhibit is already activated by the holding brake control.
- If an electrically holding (self-releasing) brake is to be controlled instead of an electrically released (self-holding) brake, the trigger signal must be inverted!
 - [Functional settings](#) (□ 408)
- Detailed information on mounting and electrical installation of the motor holding brake can be found in the documentation on the motor holding brake.

Intended use

Motor holding brakes are used to lock axes if the controller is inhibited or in case of "mains off" system status. This is not only important for vertical axes but also for e.g. horizontal axes which may cause various problems if the motion is not controlled.

Examples:

- Loss of the reference information after mains OFF and further spinning of the drive.
- Collision with other moving machine parts.

8.4.1 Internal interfaces

In the function block editor, the [LS MotionControlKernel](#) system block provides the following internal interfaces for the basic function "holding brake control":

Inputs

Identifier	Data type	Information/possible settings				
bMBrakeRelease	BOOL	Releasing/applying the brake in connection with the selected operating mode <table><tr><td>FALSE</td><td> Apply brake. • During automatic operation, the internal brake logic controls the brake. </td></tr><tr><td>TRUE</td><td> Release brake manually (forced release). • Note! The brake can also be released if the controller is inhibited! • During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. • In semi-automatic operation, the brake is released including feedforward control. </td></tr></table>	FALSE	Apply brake. • During automatic operation, the internal brake logic controls the brake.	TRUE	Release brake manually (forced release). • Note! The brake can also be released if the controller is inhibited! • During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. • In semi-automatic operation, the brake is released including feedforward control.
FALSE	Apply brake. • During automatic operation, the internal brake logic controls the brake.					
TRUE	Release brake manually (forced release). • Note! The brake can also be released if the controller is inhibited! • During automatic operation, the internal brake logic is deactivated and the brake is released (supervisor operation). If a controller inhibit has been set by the brake control, it will be deactivated. • In semi-automatic operation, the brake is released including feedforward control.					
bMBrakeStartValue2 (from version 11.00.00)	BOOL	Selection of the torque feedforward control value ► Feedforward control of the motor before release <table><tr><td>FALSE</td><td>Starting value 1 is active (see the following figure).</td></tr><tr><td>TRUE</td><td>Starting value 2 is active (see the following figure).</td></tr></table> Creation of the feedforward control value for the release process of the brake: A Signal path for motor control <u>with</u> feedback B Signal path for motor control <u>without</u> feedback C Feedforward control value 1 C02581/1: Switching threshold 2 C02581/2: Hysteresis for release 3 C02581/3: Hysteresis for application 4 C02581/4: Starting value 1 for manual feedforward control 5 C02581/5: Starting value 2 for manual feedforward control 6 C02582/Bit 4: Selection of the feedforward control value (automatic/manual selection)	FALSE	Starting value 1 is active (see the following figure).	TRUE	Starting value 2 is active (see the following figure).
FALSE	Starting value 1 is active (see the following figure).					
TRUE	Starting value 2 is active (see the following figure).					
nMBrakeAddValue_a (from version 11.00.00)	INT	Additive feedforward control value (speed or torque) in [%] for torque feedforward control when the respective control mode is started • For speed control: 100 % ≡ reference speed (C00011) • For torque control: 100 % ≡ maximum torque (C00057) ► Feedforward control of the motor before release				

Identifier	Data type	Information/possible settings
bMBrakeApplied (from version 11.00.00)	BOOL	Input for status detection via switching contacts at the brake • Only effective if bit 5 in C02582 is set to "1".
		FALSE Brake is released.
		TRUE Brake is applied.

Outputs

Identifier	Data type	Value/meaning
bMBrakeReleaseOut	BOOL	Trigger signal for switching element holding brake control via a digital output • Use bit 0 under C02582 to activate inverted switching element triggering. ▶ Functional settings
		FALSE Apply brake.
		TRUE Release brake.
bMBrakeReleased	BOOL	"Brake released" status signal considering the brake release time • When the holding brake is triggered to close, <i>bMBrakeReleased</i> is immediately set to FALSE even if the brake closing time has not yet elapsed!
		TRUE Brake released (after the brake release time has expired).



Stop!

The digital outputs are not suitable for the "direct" control of a holding brake!

- Connect the digital output connected to the trigger signal *bMBrakeReleaseOut* with a relay or power contactor which switches the brake supply.
- When a power contactor is used, the response and release time of the earth contact is added to the response and release time of the brake. Both times must also be considered for parameterising the closing and opening time of the holding brake

8.4.2 Parameter setting

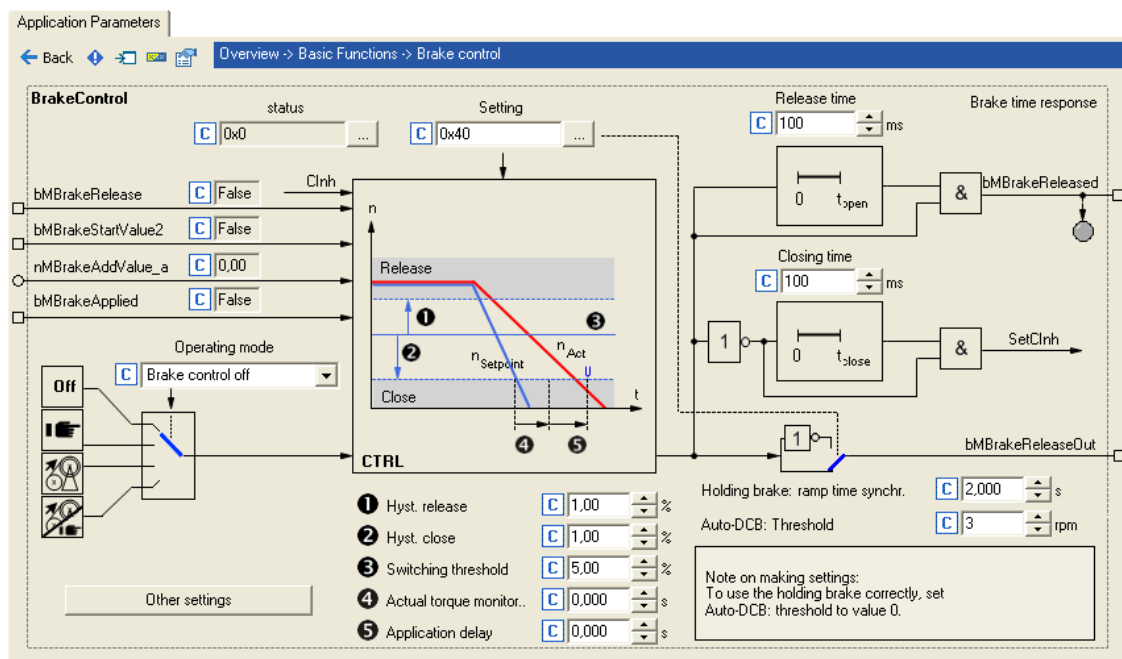
**Danger!**

A faultless brake control function requires a correct setting of the different deceleration times in the following parameters!

A wrong setting of the delay times can cause a faulty control of the brake!

**How to go to the parameterisation dialog of the holding brake control:**

1. »Engineer« Go to the *Project* view and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "**Basic functions**" button.
4. Go to the *Overview* → *Basic functions* dialog box and click the **Holding brake control** button.

**Short overview of parameters for holding brake control:**

Parameter	Info	Lenze setting	
		Value	Unit
C02580	Holding brake: Operating mode	0: Brake control off	
C02581/1	Holding brake: Switching threshold	5.00	%
C02581/2	Holding brake: Hyst. release	1.00	%
C02581/3	Holding brake: Hyst. close	1.00	%
C02581/4	Holding brake: FF control starting value 1	0	%
C02581/5	Holding brake: FF control starting value 2	0	%
C02582	Holding brake: Setting	0	

Highlighted in grey = display parameter

Parameter	Info	Lenze setting	
		Value	Unit
C02589/1	Holding brake: Closing time	100	ms
C02589/2	Holding brake: Release time	100	ms
C02589/3	Holding brake: Waiting time status	100	ms
C02589/4	Holding brake: Ramp FF control	0	ms
C02593/1	Holding brake: Actual value monitoring	0.000	ms
C02593/2	Holding brake: Application delay	0.000	ms
C02610/1	MCK: Holding brake ramp time synchr.	2.000	s
C02607	Holding brake: Status	-	
C00830/68	MCK: nMBrakeAddValue_a	-	%
C00833/80	MCK: bMBrakeRelease	-	
C00833/81	MCK: bMBrakeStartValue2	-	
C00833/82	MCK: bMBrakeApplied	-	
Highlighted in grey = display parameter			

8.4.2.1 Operating mode

For different applications and tasks, different operating modes are available in [C02580](#). The selected operating mode determines whether the holding brake control is used and how the holding brake will be switched.

Mode 0: Brake control off

In this mode, brake control is switched off (not active).

- The *bMBrakeReleaseOut* trigger signal for the holding brake control switching element is set to FALSE.
- The *bMBrakeReleased* status signal is set to FALSE.



Note!

In the Lenze setting, the mode 0 is preset to get into a safe state after the mains is switched on.

Mode 11: Manual control

In this mode, brake release and brake application can be directly controlled via the *bMBrakeRelease* input without special logic or automatic.

- Setting pulse inhibit or controller inhibit has no influence on the *bMBrakeReleaseOut* trigger signal for the holding brake control switching element.
- After the brake has been activated and the brake application time has expired, the controller is inhibited automatically by the basic "Holding brake control" function.



Tip!

You can use mode 11 to easily check if the brake switches correctly.

Mode 12: Automatic control

In this mode, the brake is controlled automatically.

**Danger!**

In this mode, the input *bMBrakeRelease* should be permanently set to FALSE unless manual release (supervisor operation) is required.

If the *bMBrakeRelease* input is set to TRUE, the brake is released immediately, even if the controller is inhibited!

- If the requested speed setpoint reaches a parameterisable upper speed threshold that allows traversing of the drive, the brake will be released and operation enabled.
- On the other hand, if speed setpoint and actual speed fall below a parameterisable lower speed threshold, the brake will be applied under consideration of different time parameters.
- The brake will also be activated automatically if quick stop is activated in the drive, e.g. by a device command or as response to an error, and in the event of controller inhibit or pulse inhibit.
- After automatic brake activation and expiration of the brake application time, the controller is inhibited automatically by the basic "Holding brake control" function.

**Tip!**

The 2/12 mode is the usual mode to control the brake.

Mode 13: Semi-automatic control

From version 11.00.00

In this mode, brake release and brake application can be directly controlled via the *bMBrakeRelease* input without special logic or automatic.

In contrast to the manual operation (mode 11)

- the feedforward control is active in this mode, preventing a sagging e.g. in case of a hoist.
- the brake in this mode also closes when the controller is inhibited in order to prevent the axis in a hoist from falling.

Related topics:

- ▶ [TroubleQSP](#) (📖 92)
- ▶ [Behaviour in case of pulse inhibit](#) (📖 417)

8.4.2.2 Functional settings

The following bit coded functional settings for the holding brake control can be made in [C02582](#):

Bit	Option	Info
Bit 0	bMBrakeReleaseOut invert.	Activation of inverted control "1" ≡ Inverted logic of the trigger signal for the holding brake control switching element
Bit 1	Horizontal brake protection	Brake response in case of pulse inhibit "1" ≡ In the case of a pulse inhibit, the actual speed value is monitored which must reach the "Close" threshold value to cause the holding brake to be applied. Note: - This function is only active if bit 3 (horizontal/winding technology) is set as well. The function is used in order that, when the controller is inhibited, the holding brake of a drive with horizontal traverse path does not wear out during rotation. - With vertical motion (bit 3 = 0), this function is not active. Especially with hoists and activated pulse inhibit of the controller, an immediate application of the brake is essential for safety-related reasons!
Bit 2	with hoist inv. feedfwd. control	Direction of feedforward control with vertical/hoist technology: "0" ≡ Positive direction "1" ≡ Negative direction Note: Reversal (Ccw) is then considered.
Bit 3	Horizontal application	Direction of movement of the axis "0" ≡ The axis performs vertical movements. Gravitational acceleration causes movements. "1" ≡ The direction of the axis is horizontal or rotary. The gravitational acceleration does not cause any movement.
Bit 4	Feedforward control C2581 (from version 11.00.00)	Selection of the feedforward control value "0" ≡ Automatic selection. - The torque saved at the last stop is used. "1" ≡ Manual selection. - bMBrakeStartValue2 = FALSE: The feedforward control value 1 set in C02581/4 is used. - bMBrakeStartValue2 = TRUE: The feedforward control value set in C02581/5 is used.
Bit 5	Feedback monitoring (from version 11.00.00)	Activation of status monitoring "1" ≡ The bMBrakeApplied input for status detection of the brake (via a switching contact at the brake) is monitored after the waiting time set in C02589/3 has expired.
Bit 6	Sync ramp L_NSet_1 (from version 11.00.00)	Selection of the ramp time for the synchronisation process to setpoint speed after the brake opening time has elapsed Revised behaviour from version 11.00.00: "1" ≡ The ramp time of the effective acceleration of the ramp function generator (L_NSet_1) is used (Lenze setting). "0" ≡ As before, the ramp time set in C02610/1 is used. Note: The changeover can be dynamically both via the ramp parameter and via bit 6.
Bit 7	Reserved	

Related topics:

- ▶ [Behaviour in case of pulse inhibit](#) (📖 417)
- ▶ [Feedforward control of the motor before release](#) (📖 418)

8.4.2.3 Switching thresholds**Stop!**

Do not set the lower speed threshold for closing the brake too high to prevent excessive wear of the brake!

**Note!**

When comparing speeds, only the absolute value of the motor speed and not the direction of rotation is considered.

Upper speed threshold for brake release:

Switching threshold ([C02581/1](#)) + hysteresis for release ([C02581/2](#))

Lower speed threshold for brake application:

Switching threshold ([C02581/1](#)) - hysteresis for application ([C02581/3](#))

**Tip!**

The lower speed threshold for brake application should be set to approximately 5 ... 20 % of the maximum speed to minimise the wear of the brake and provide for an optimum brake reaction by a low grinding of the brake.

Related topics:

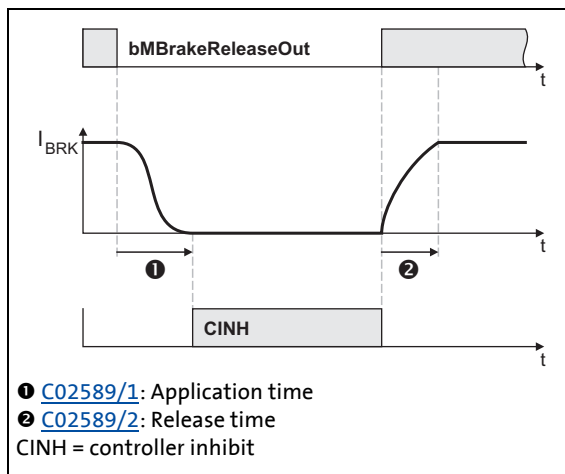
- ▶ [Process when brake is released](#) (📖 414)
- ▶ [Process when brake is closed](#) (📖 415)

8.4.2.4 Application and release time

**Danger!**

A wrong setting of the application and release time can cause a faulty control of the brake!

- If the application time is set too low, the controller is inhibited and the drive becomes torqueless before the brake is applied completely.



- Every mechanical holding brake comes with a construction-conditioned application and release time which must be considered by the holding brake control and is set in [C02589](#).
- The application and release time of the Lenze holding brake is indicated in the supplied operating instructions in the "Technical data" chapter.
- If the application and release times are too long, this is uncritical in respect of safety but leads to unnecessarily long delays during cyclical braking processes.

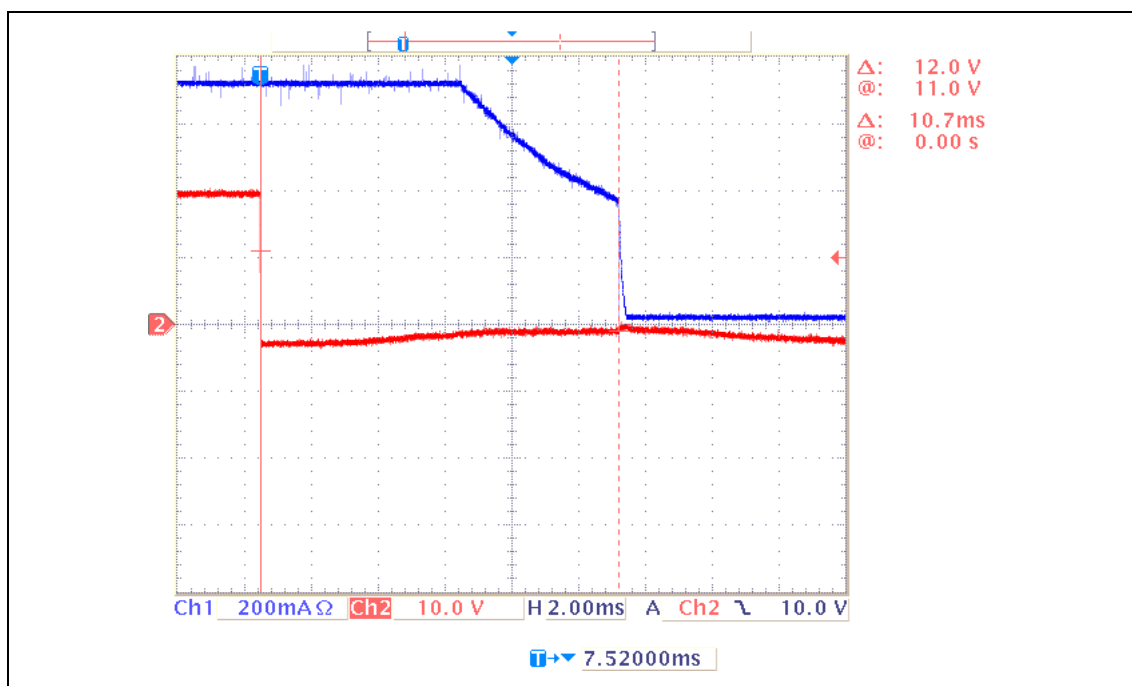
[8-5] Definition of the application and release time with the example of the PM brake

**Tip!**

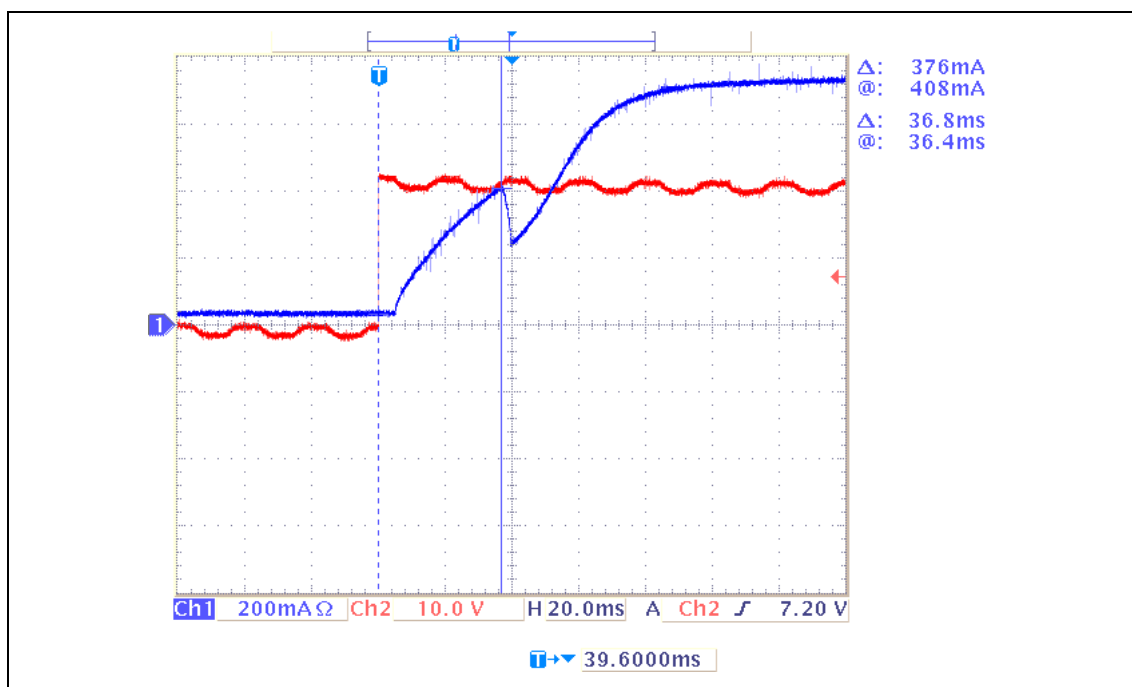
The application and release times do not only vary between the brake types but also depend on the basic conditions in the plant:

- Parameters of the hardware (cable length, temperature, level of supply voltage etc.)
- Contact elements used (brake module or contactor at the digital output)
- Type of overvoltage limitation/suppressor circuit

For optimisation purposes, detect in individual cases the response times by measurement.



[8-6] Oscillogram 1: Current characteristic for the application of a mechanical holding brake (application time: 10.7 ms)



[8-7] Oscillogram 2: Current characteristic for the release of a mechanical holding brake (release time: 36.8 ms)

Related topics:

- ▶ [Process when brake is released](#) (414)
- ▶ [Process when brake is closed](#) (415)

8.4.2.5 Ramp time for approaching the setpoint speed

For the "[Speed follower](#)" operating mode, a ramp time can be set in [C02610/1](#) if the setpoint is already out of reach while the holding brake is initiating the feedforward control process.

Example:

A setpoint of 90 % is selected via the ramp function generator while the brake is applied (controller is inhibited).

1. At the set ramp (in most cases [C00012](#)), the ramp function generator ramps up to 90 %.
2. The brake identifies the setpoint selection of 5 % (release switching threshold). The feedforward control of the brake provides 3 % of the setpoint and will not report the release of the brake after approx. 1 s has expired.

Conclusion: 90 % of the selected setpoint is already ramped up while the brake is only providing 3 % of the setpoint via the feedforward control.

Since at this point a step change from 3 % to 90 % may cause mechanical jerks, the setpoint is ramped up from 3 % to 90 %, using the ramp time set in [C02610/1](#) (Lenze setting: 2 s).

Our example is based on the V/f characteristic control mode (VFCplus). However, ramping up to a setpoint that is out of reach is carried out for all motor control modes because there is always a mechanical/electric delay when controlling a holding brake.

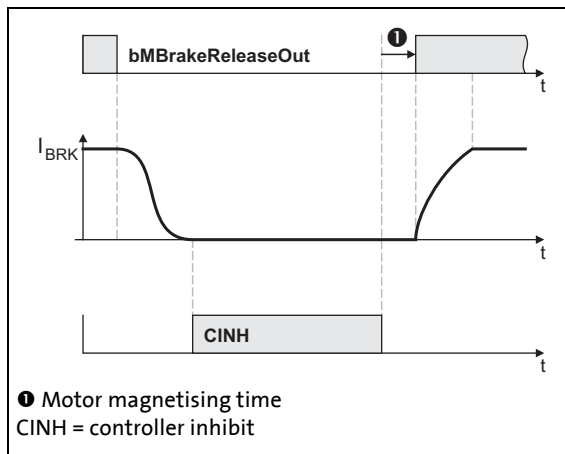
This delay is due to:

- Motor magnetisation (in the case of servo control only)
- Mechanical delay of all switching elements connected upstream to the holding brake
- Mechanical delay of the holding brake itself
- Generation of the holding torque by the motor

Related topics:

- [Process when brake is released](#) (📖 414)

8.4.2.6 Motor magnetising time (only with asynchronous motor)



- When an asynchronous motor is used, first the magnetic field required for the holding torque is created (which is already available when a synchronous motor is used) after the controller inhibit is deactivated.
- The motor is internally magnetised through internal feedforward control of the lower speed threshold. The release time set in [C02589/2](#) is considered here.

[8-8] Considering the motor magnetising time taking the PM brake as an example

Related topics:

► [Process when brake is released](#) (414)

8.4.2.7 Actual value monitoring

If an actual value monitoring time > 0 s is selected in [C02593/1](#), the actual speed time monitoring is active.

- The monitoring time starts when the speed setpoint has reached the lower switching threshold and the actual speed is still above this threshold. (see illustration [\[8-11\]](#) in chapter "[Process when brake is closed](#)".)
- If the actual speed is still above the threshold when the monitoring time has expired, the brake will be automatically applied in the automatic brake control mode (mode 12).



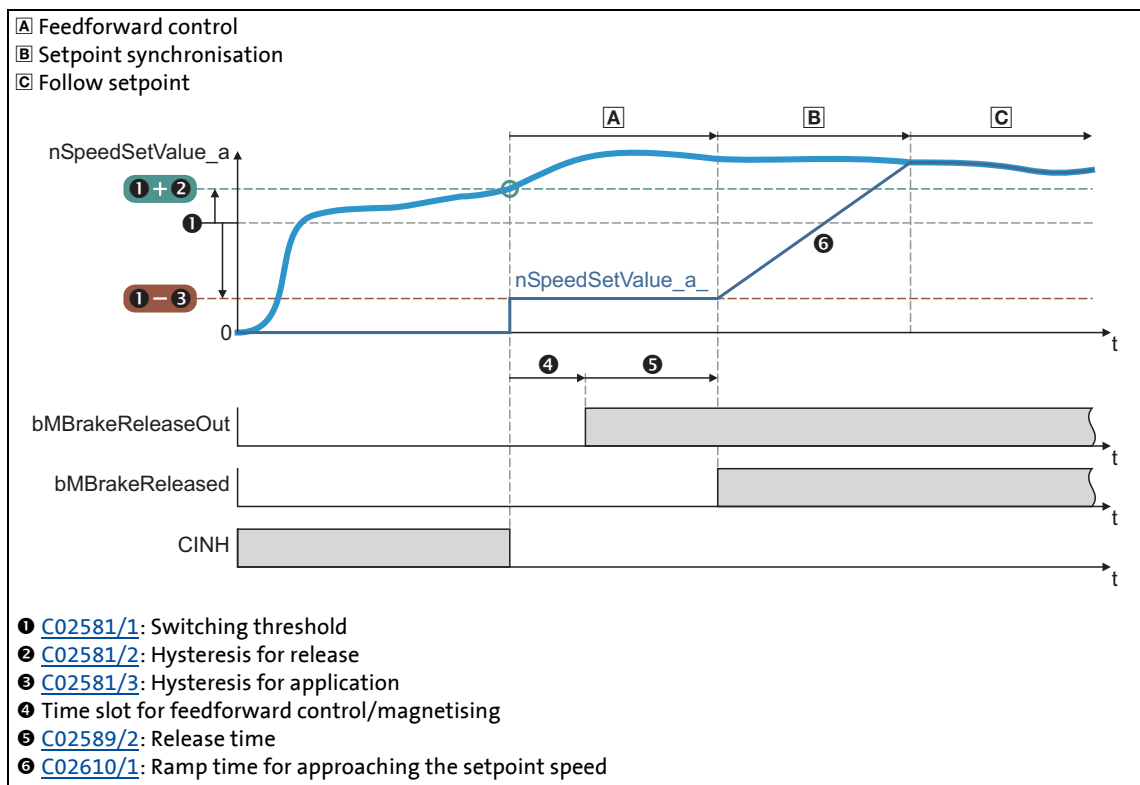
Note!

In the Lenze setting, the actual speed time monitoring is deactivated ([C02593/1](#) = "0 s"), i.e. the brake will only be applied when the actual speed has reached the lower switching threshold.

8.4.3 Process when brake is released

1. The controller inhibit is deactivated.
2. The magnetic field required for the holding torque is created in the motor (is already available when a synchronous machine is used).
3. The *bMBrakeReleaseOut* trigger signal for holding brake switching element is set to TRUE for releasing the brake.
4. After the brake opening time has elapsed:
 - The *bMBrakeReleased* status signal ("brake released") is set to TRUE.
 - In the "[Speed follower](#)" operating mode, the drive synchronises to the already accelerated speed setpoint.
5. After the waiting time set in [C02589/3](#) has additionally expired, the status monitoring starts again (if activated via bit 5 in [C02582](#)).

Time diagram



[8-9] Release holding brake in automatic mode via speed threshold

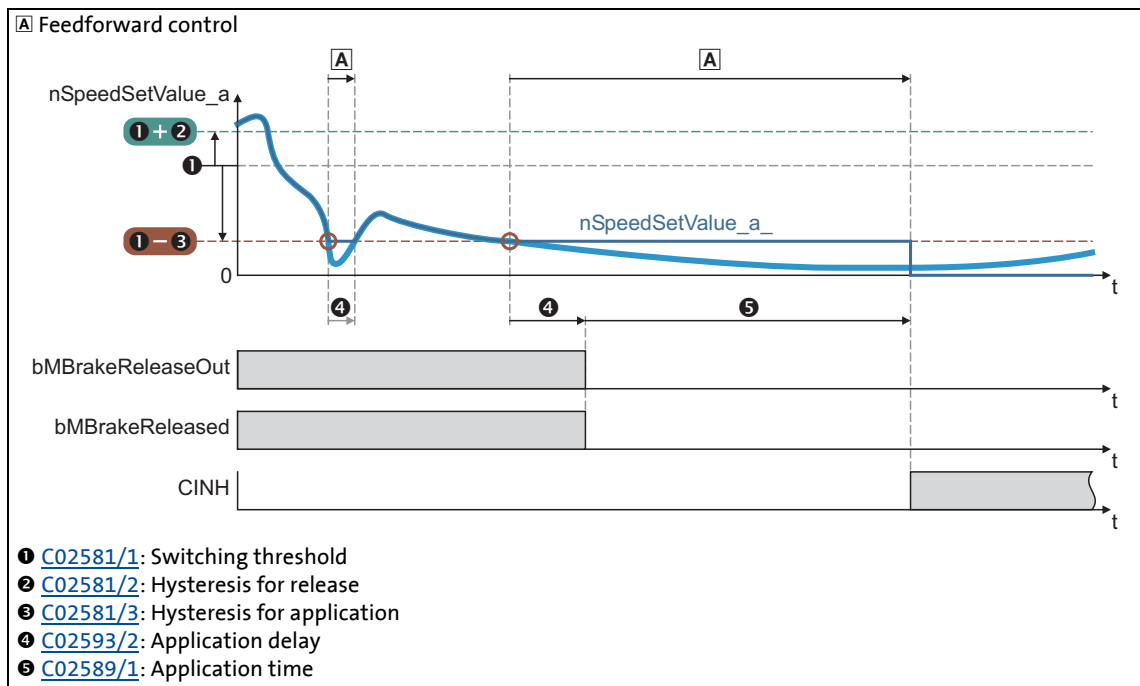
Related topics:

► [Feedforward control of the motor before release](#) (418)

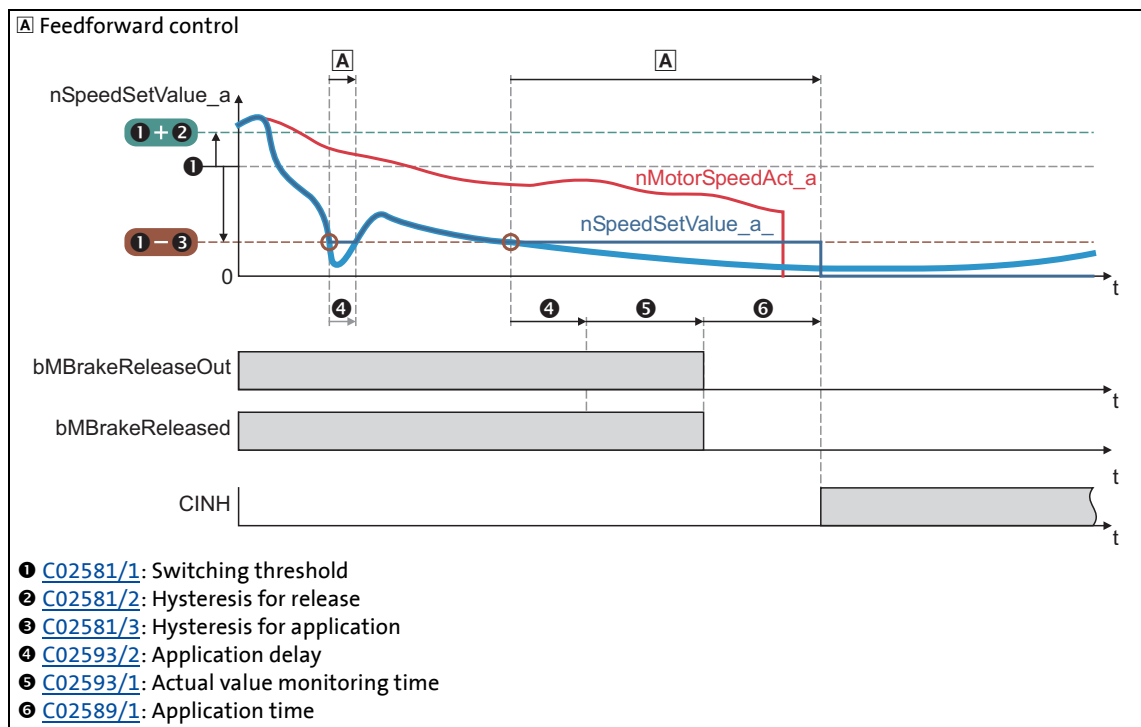
8.4.4 Process when brake is closed

1. The motor is decelerated when the setpoint is reduced by the user (e.g. turn down the potentiometer, setpoint selection via CAN).
 - The motor can also be decelerated by the "Quick stop" function or by "DC-injection braking", either directly requested by the user or as response to an error.
2. If the speed setpoint and the actual speed have fallen below the lower speed threshold or only the speed setpoint has fallen below the lower speed threshold and the actual value monitoring time has expired:
 - The *bMBrakeReleaseOut* trigger signal for the holding brake switching element is set to FALSE for closing the brake.
 - The *bMBrakeReleased* status signal is reset to FALSE.
 - The brake application time starts to expire.
3. After the brake application time has expired, the controller is inhibited.
4. After the waiting time set in [C02589/3](#) has additionally expired, the status monitoring starts again (if activated via bit 5 in [C02582](#)).
5. In order to prevent the drive from further rotating/accelerating in the event of an error of the feedback contact, controller inhibit is cancelled again and the drive is held at standstill in a speed-controlled manner.

Time diagrams



[8-10] Close holding brake in automatic mode via speed threshold (actual value = setpoint)



[8-11] Close holding brake in automatic mode with actual value monitoring time ([C02593/1](#) > 0 s)

8.4.5 Behaviour in case of pulse inhibit

Setting the pulse inhibit causes a load-controlled coasting of the motor until the pulse is enabled again. In the enabled controller, the pulse can be inhibited e.g. due to a DC overvoltage, DC undervoltage or the "Safe torque off" request.

The brake response to pulse inhibit can be parameterised under [C02582](#).



Stop!

For parameterising the response to pulse inhibit in [C02582](#), the energy conditions of the machine should be evaluated first.

The energy stored in the machine can be considerably higher than the permissible switching energy and thus lead to the destruction of the brake if applied directly!

Activate brake immediately when pulse is inhibited

If bit 1 is set to "0" in [C02582](#) (Lenze setting), the brake will be immediately applied when the pulse is inhibited to avoid damage to the mechanical components.

Especially in the case of hoist drives, immediate engagement of the brake is absolutely necessary for safety reasons if the pulse inhibit function of the drive controller has been activated!



Danger!

This behaviour is valid in (semi) automatic operation when the *bMBrakeRelease* input is set to FALSE.

When the *bMBrakeRelease* input is set to TRUE (supervisor operation) in automatic mode, the brake is not applied at pulse inhibit!

Only activate brake below threshold for brake activation

If bit 1 and bit 3 are set to "1" in [C02582](#), the brake remains released until the lower speed threshold is reached to avoid an excessive wear of the brake.

- The braking action only takes places due to the friction in the load mechanics.
- The brake will not be applied until the motor speed has reached the threshold for brake activation. Hence, the function depends on the signal of the speed encoder.

During uncritical operation (horizontal loading condition), delayed brake application may be required to protect the brake in case of high centrifugal masses.

In case of vertical motion (bit 3 = 0), this function is not active due to safety-related reasons.

Related topics:

- ▶ [Functional settings](#) (📖 408)
- ▶ [Switching thresholds](#) (📖 409)

8.4.6 Feedforward control of the motor before release

The motor is precontrolled by selecting the lower speed threshold for applying the brake. When the upper speed threshold for brake release is reached, the motor is precontrolled for 200 ms with the lower threshold value before the brake switches to the release mode.

Here, the direction of the feedforward control depends on two conditions:

1. On the settings selected under [C02582](#):
 - Bit 2 = feedforward control inverted
 - Bit 3 = direction of the axis
2. On the sign of the setpoint.

Truth table for the direction of the feedforward control

Setpoint	Direction	Feedforward control	Scheme	Direction	
				Feedforward control value	Start value
$n \geq 0$	vertical/hoist (C02582: Bit 3 = 0)	not inverted (C02582: Bit 2 = 0)		+	+
		inverted (C02582: Bit 2 = 1)		-	+
$n < 0$		not inverted (C02582: Bit 2 = 0)		+	-
		inverted (C02582: Bit 2 = 1)		-	-
$n \geq 0$	horizontal/winding drive (C02582: Bit 3 = 1)	Inversion via bit 2 with horizontal direction not effective		+	+
$n < 0$				-	-

Selection of the feedforward control value

From version 11.00.00 onwards, the feedforward control value can be selected via bit 4 in [C02582](#):

- Bit 4 = 0: Automatic selection
 - The torque saved at the last stop is used.
- Bit 4 = 1: Manual selection
 - *bMBrakeStartValue2* = FALSE: The feedforward control value 1 set in [C02581/4](#) is used.
 - *bMBrakeStartValue2* = TRUE: The feedforward control value set in [C02581/5](#) is used.

Related topics:

- ▶ [Functional settings](#) (📖 408)
- ▶ [Switching thresholds](#) (📖 409)

9 Diagnostics & error management

This chapter provides information on error handling, drive diagnostics, and fault analysis.

9.1 Basics on error handling in the controller

Many of the functions integrated into the controller can

- detect errors and thus protect the device from damage or overload, e.g. short-circuit detection, Ixt overload detection, overtemperature detection, etc.
- detect an operating error by the user, e.g. a missing memory module, a required or missing communication module, etc.
- output a warning signal if desired, e.g. if the speed is too high or too low, etc.

Depending on the importance, the error detection in the device responds very fast (e.g. short-circuit detection < 1 ms) or in a slower cycle (e.g. temperature monitoring approx. 100 ms).

All functions provided with an error detection (e.g. the motor control) supply information to a so-called error handler. The error handler is processed every 1 ms and evaluates all information.

In this evaluation, the so-called status determining error (display in [C00168](#)) and the current error (display in [C00170](#)) are generated, and the controller is caused to take the respective error status (e.g. TroubleQSP).

These two types of error information serve to diagnose errors systematically and contain the following information:

1. The error type (e.g. "Warning")
2. The error subject area (e.g. "CAN generally integrated")
3. The error ID within the error subject area

Together all types of information form the real error number which is unique in the whole device system. ▶ [Structure of the 32-bit error number \(bit coding\)](#) (📖 444)

In addition to the control of the device status by the error handler, a logbook function records the errors and their histories. ▶ [Logbook](#) (📖 429)



Tip!

For many device errors, the error type and hence the response of the controller to the error can be parameterised. ▶ [Setting the error response](#) (📖 438)

9.2 LED status displays

	CAN-RUN
	CAN-ERR
	DRV-RDY
	DRV-ERR

Information on some of the operating states can be quickly obtained via the LED display on the front of the controller.

Labelling	Colour	Description	
CAN-RUN	green	CAN bus ok	▶ LED status displays for the system bus (📖 494)
CAN-ERR	red	CAN bus error	
DRV-RDY	green	Standard device ready for operation	▶ LED status displays of the device status (📖 422)
DRV-ERR	red	Warning/trouble/fault	

Related topics:

- ▶ [Device control \(DCTRL\)](#) (📖 72)
- ▶ [Device state machine and device states](#) (📖 84)
- ▶ [System bus "CAN on board"](#) (📖 488)

9.2.1 LED status displays of the device status

	CAN-RUN
	CAN-ERR
	DRV-RDY
	DRV-ERR

The two LEDs "DRV-RDY" and "DRV-ERR" on the front of the controller are triggered depending on the device status.

The meaning can be seen from the table below.

DRV-RDY	DRV-ERR	Description	Device status (Display in C00137)
OFF	OFF	OFF or initialisation active	Init
	OFF	Safe torque off is active	SafeTorqueOff
	OFF	Device is ready to start	ReadyToSwitchOn
	OFF	Device is switched on	SwitchedOn
	OFF	Motor data identification/operation	OperationEnabled
  		The controller is ready to switch on, switched on or the operation is enabled and a warning is indicated.	
		Fault active, quick stop	TroubleQSP
OFF		Fault active	Trouble
OFF		Fault active	Fault
OFF		System fault active	SystemFault
Legend Meaning of the symbols used to describe the LED states:			
	LED is flashing once approx. every 3 seconds (<i>slow flash</i>)		
	LED is flashing twice approx. every 1.25 seconds (<i>flash</i>)		
	LED is flashing twice approx. every 1.25 seconds (<i>double flash</i>)		
	LED is blinking every second		
	LED is permanently on		

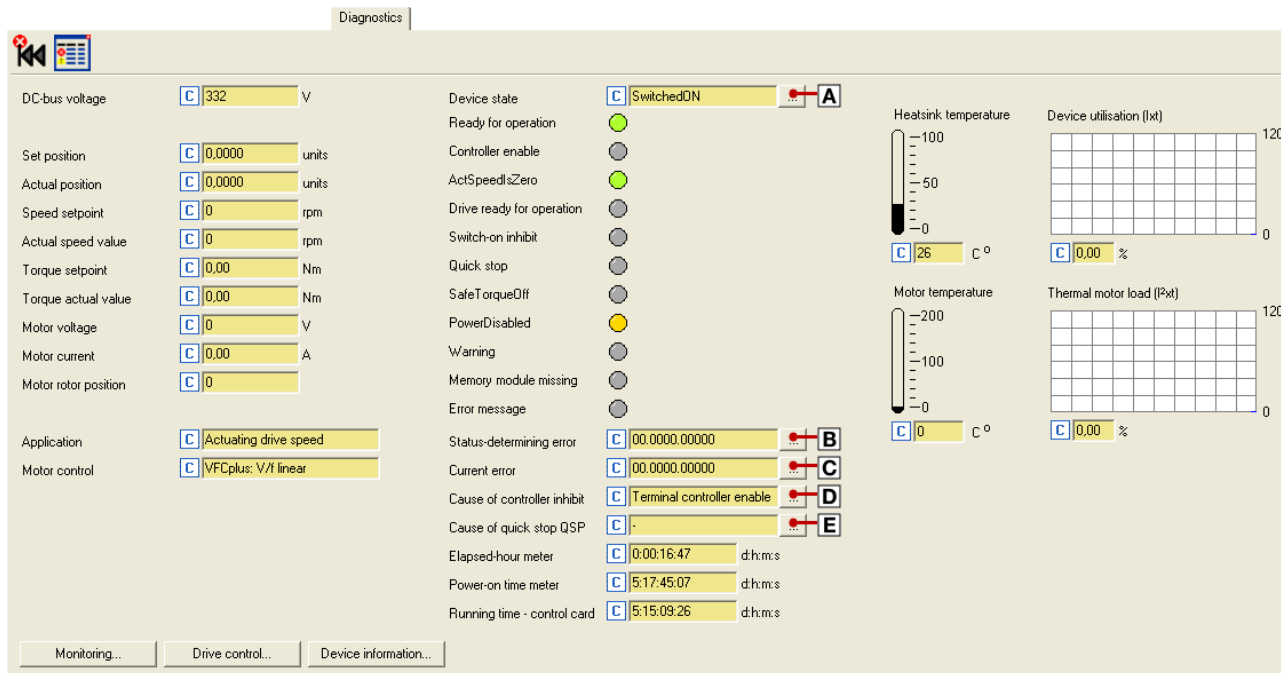
Related topics:

► [Device state machine and device states](#) (84)

9.3 Drive diagnostics with the »Engineer«

When an online connection to the controller has been established, the connected controller can be diagnosed and relevant actual controller states can be displayed in a clearly arranged visualisation using the »Engineer«.

Example: Representation of the diagnostic information in the »Engineer« V2.19



Button	Function
	Acknowledge error message (if the error cause has been eliminated).
	Display the Logbook of the controller. (429)
	[A] Display the internal state machine including the current device status.
	[B] Display details of the status determining error.
	[C] Display details of the current error.
	[D] Display all active sources of a controller inhibit.
	[E] Display all active sources of a quick stop.
Monitoring...	Configure the Monitoring. (436)
Drive control...	Display the bit assignment of the following control-related words: • MCI control word (C00136/1) • CAN control word (C00136/2) • Cause of controller inhibit (C00158) • Cause of quick stop (C00159) • Status word (C00150) • Status word 2 (C00155)
Device information...	Display identification data, e.g. firmware information or serial number of individual controller components.

**How to diagnose a drive with the »Engineer«:**

1. In the *Project view*, select the 8400 StateLine controller.
2. Click the  icon or select the **Online→Go online** command to build up an online connection with the controller.
3. Select the **Diagnostics** tab.
 - With an online connection, the **Diagnostics** tab displays current status information about the controller.

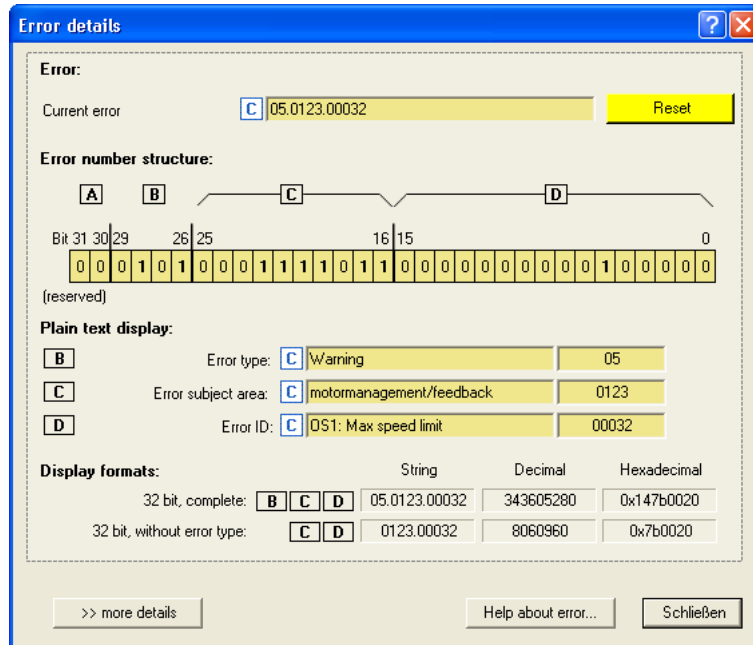
**Tip!**

The online connection to the controller can be established via the following device interfaces:

- CAN interface X1
Diagnostics via the [System bus "CAN on board"](#) ( 488)
- X6 diagnostic interface
We recommend this diagnostic connection when the X1 CAN interface is used for process communication.

9.3.1 Display details of the error

If you go to the **Diagnostics** tab and click the  button for the status determining or current error, the *Error details* dialog box displays further information on the error:



Error details

Error:

Current error: **C** 05.0123.00032 Reset

Error number structure:

Diagram showing bit positions 31 to 0. Bits 31-29 are reserved. Bits 28-16 are part of the error number. Bits 15-0 are part of the error number.

Bit 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

(reserved)

Plain text display:

B Error type: **C** Warning 05

C Error subject area: **C** motormanagement/feedback 0123

D Error ID: **C** OS1: Max speed limit 00032

Display formats:

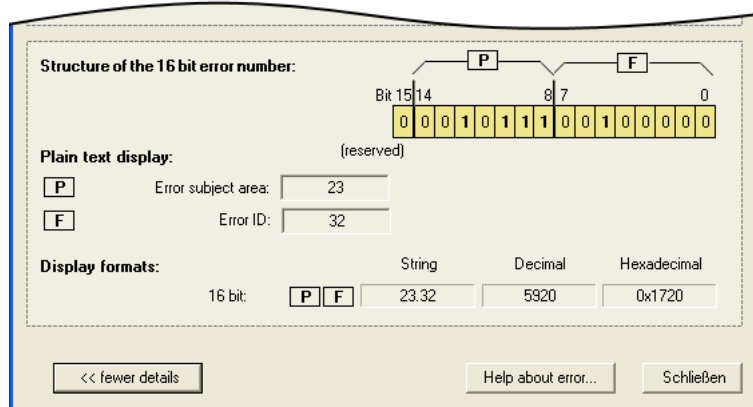
	String	Decimal	Hexadecimal
32 bit, complete: B C D	05.0123.00032	343605280	0x147b0020
32 bit, without error type: C D	0123.00032	8060960	0x7b0020

>> more details Help about error... Schließen

- Click the **Help about error...** button to open the online help with information on the error cause and possible remedies.

From version 06.00.00 / »Engineer V2.13« onwards:

- The **>> more details** button serves to provide more information about the structure of the 16-bit error number:



Structure of the 16 bit error number:

Diagram showing bit positions 15 to 0. Bits 15-14 are reserved. Bits 13-8 are part of the error number. Bits 7-0 are part of the error number.

Bit 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

(reserved)

Plain text display:

P Error subject area: 23

F Error ID: 32

Display formats:

	String	Decimal	Hexadecimal
16 bit: P F	23.32	5920	0x1720

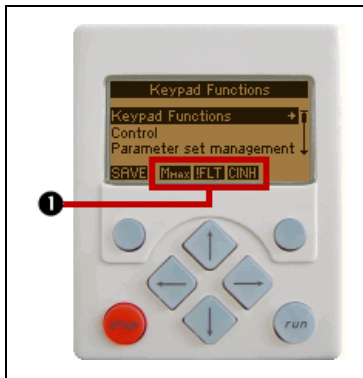
<< fewer details Help about error... Schließen

Related topics:

- ▶ [Structure of the 32-bit error number \(bit coding\)](#) (□ 444)
- ▶ [Structure of the 16 bit error number \(bit coding\)](#) (□ 447)

9.4 Drive diagnostics via keypad/bus system

Keypad display of the controller status



- If the keypad on the front of the controller is connected to the diagnostic interface X6, the status of the controller is shown via different icons on the LCD display in the area ❶.

Icon	Meaning	Note
RDY	Controller is switched on.	▶ SwitchedOn (📖 90)
RUN	Controller is enabled.	
STP	Application in the controller is stopped.	
QSP	Quick stop active	
CINH	Controller is inhibited.	The power outputs are inhibited.
OFF	Controller is ready to start.	▶ ReadyToSwitchOn (📖 89)
Mmax	Speed controller 1 at the limit.	The drive is torque-controlled.
Imax	Set current limit has been exceeded in motor or generator mode.	
IMP	Pulse inhibit active	The power outputs are inhibited.
ISFLT	System fault active	
IFLT	Fault	▶ Fault (📖 94)
ITRB	Trouble	▶ Trouble (📖 93)
ITQSP	TroubleQSP	▶ TroubleQSP (📖 92)
WRN	Warning is active	

Display parameters

The parameters listed in the following tables serve to query current states and actual values of the controller for diagnostic purposes, e.g. by using the keypad, a bus system or the »Engineer« (with an online connection to the controller).

- These parameters are listed in the »Engineer« parameter list and the keypad in the **Diagnostics** category.
- A detailed description of these parameters can be found in the chapter "[Parameter reference](#)" ([□ 590](#)).

Parameter	Display
C00051	MCTRL: Actual speed value
C00052	Motor voltage
C00053	DC-bus voltage
C00054	Motor current
C00056/1	Torque demand
C00056/2	Actual torque value
C00058	Output frequency
C00061	Heatsink temperature
C00064/1	Device utilisation (lxt)
C00064/2	Device utilisation (lxt) 15s
C00064/3	Device utilisation (lxt) 3 min
C00133	Brake resistor utilisation
C00136/1	MCI control word
C00136/2	CAN control word
C00137	Device status
C00138/1	SYS control signals
C00138/2	MCK control signals
C00138/3	FWM control signals
C00150	Status word
C00158	Cause of controller inhibit
C00159	Cause of quick stop QSP
C00165/1	Status determining error (displayed as a numeric text)
C00165/2	Current error (displayed as a numeric text)
C00168	Status determining error (display of 32-bit number)
C00170	Current error
C00166/1	Error type, status determining
C00166/2	Error subject area, status determining
C00166/3	Error ID, status determining
C00166/4	Error type, current
C00166/5	Error subject area, current
C00166/6	Error ID, current
C00177/1	Switching cycles mains switching
C00177/2	Switching cycles output relay
C00177/3	Stress counter - short circuit
C00177/4	Stress counter - earth fault
C00177/5	Stress meter clamp

Parameter	Display
C00177/6	STO counter after power-on
C00177/7	DigIn CINH counter after power-on
C00177/8	IMP counter after power-on
C00178	Time the controller was enabled (elapsed-hour meter)
C00179	Power-up time (power-on time meter)
C00180/1	Running time - control card
C00180/2	Running time - heatsink fan
C00180/3	Running time - internal fan

Identification data

The parameters listed in the following table belong to the **Identification** category of the »Engineer« parameter list and the keypad and serve to display the identification data of the controller:

Parameter	Display
C00099	Firmware version (as a string)
C00199/1	Device name ► Automatic acceptance of the device name in the »Engineer«
C00200	Firmware product type
C00201/1...6	Firmware of the control card and the power section
C00203/1...9	Product type code of the individual device components
C00204/1...9	Serial numbers of the individual device components

9.5

Logbook

The integrated logbook function of the controller chronologically logs important events within the system and plays an important role for troubleshooting and controller diagnostics.

Events that can be logged

The following events can be logged in the logbook:

- [Error messages of the operating system](#) (📖 444)
- Error messages generated by the application (via [LS_SetError](#))
- Loading/saving of parameter sets, loading of the Lenze setting (*in preparation*)
- Transmitting the firmware to the controller (*in preparation*)
- Switching the controller on/off

Information saved

For each event, the following information is saved in the logbook:

- Type of response to the event (e.g. fault, warning or information)
- Subject area that activated the event (e.g. CAN or USER).
- Event
- Value of power-on time meter
- Selected process values (analog % signals, binary signals)

Memory depth

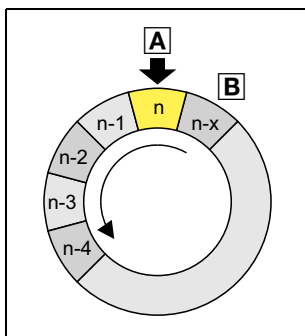
Maximum number of logbook entries:

- 8400 Stateline: 15 logbook entries
- 8400 HighLine/TopLine: 50 logbook entries

9.5.1

Functional description

The structure of the logbook corresponds to a ring buffer:



- As long as free logbook memory is available, the entry is placed in the next free position within the memory (A).
- If all memory units are assigned, the oldest entry (B) is deleted for a new entry.
- The newest entries will always remain available.



Note!

In the event of a supply voltage failure, the logbook is saved and reloaded automatically when the controller is switched on. This ensures that the error history of the device does not get lost. For this reason it is very important to act with caution when deleting the logbook entries.

9.5.2 Filtering logbook entries

The logbook adds new entries to the ring buffer after they have been passed through a parameterisable filter. This filter helps you to exclude certain events from being entered into the logbook which would trigger a certain error response (fault, trouble, warning, information, etc.).

[C00169](#) (bit 1 ... bit 6) includes a bit coded specification of the events which are to be entered into the logbook. In the Lenze setting, all events are entered into the logbook.



Note!

Events with the "No response" setting are not entered into the logbook.

Counter for multiple entries

In order to prevent the ring buffer from overflowing with identical errors with frequent occurrence e.g. during commissioning, identical errors will not lead to new line entries in the configuration of the logbook in the Lenze setting. Instead, one counter will be counted up for this error.

- The time of the error is always the time of its first occurrence. Hence, a new logbook line will only be generated if a new error occurs.
- The error counter can be deactivated by resetting bit 9 in [C00169](#).

9.5.3 Automatic recording of device-internal signals at the time the error occurs

For purposes of error analysis, two optional device-internal digital signals and an analog signal (16 bit) can be recorded at the time the error occurs.

- The digital signals to be recorded are selected in [C00163/1](#) and [C00163/2](#).
 - Scaling of the value recorded: 0 $\equiv$ FALSE; 1 $\equiv$ TRUE
- The analog signal to be recorded is selected in [C00164/1](#).
 - Scaling of the value recorded: 16384 $\equiv$ 100 %

9.5.4 Reading out logbook entries

With an online connection, the existing logbook entries can easily be displayed in the »Engineer«. Alternatively, the logbook entries can also be read out via the corresponding parameters (e.g. using the keypad).



Note!

Reading out the logbook entries is only permissible by one engineering tool at a time!

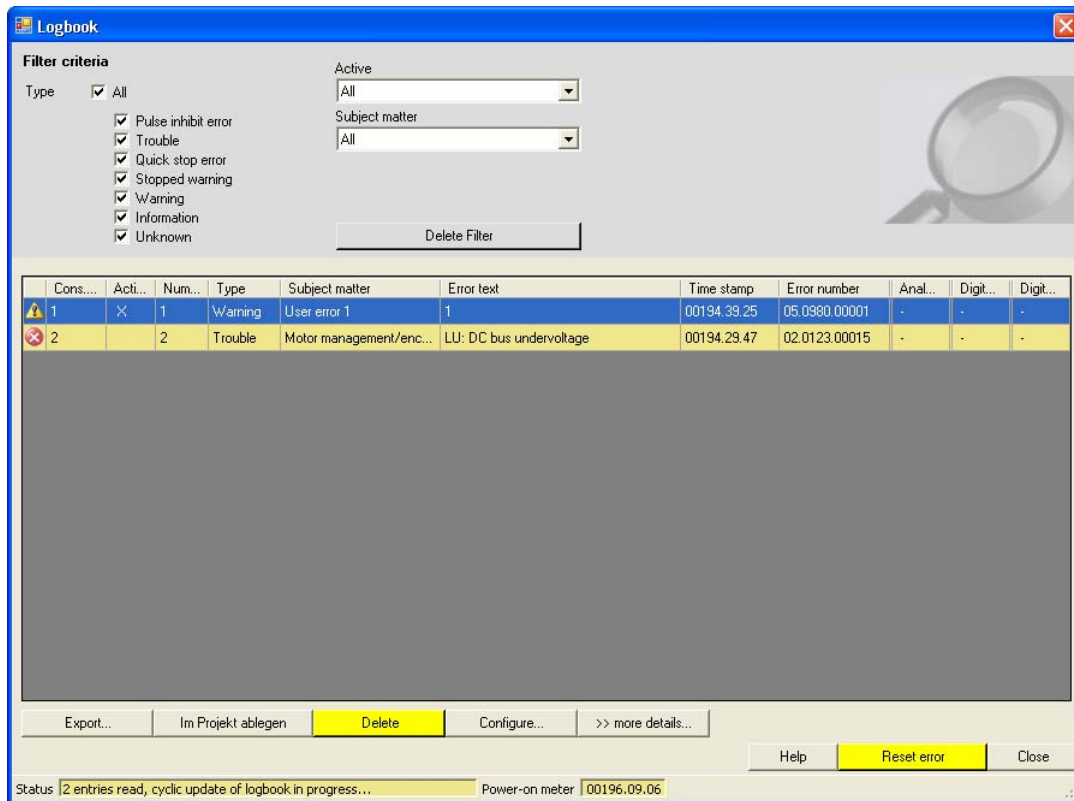
- If the logbook entries are tried to be read out via two engineering tools at the same time, missing lines or a permanent refresh may be caused.
- The parameter interface for reading out the logbook by an external control/visualisation, is available as well. ▶ [Reading out the logbook from an external control/visualisation](#) (434)



How to display logbook entries in the »Engineer«:

1. In the *Project view*, select the 8400 StateLine controller.
2. Click the icon or select the **Online→Go online** command to build up an online connection with the controller.
3. Select the **Diagnostics** tab from the *Workspace*.
4. Click **Logbook**.

Example: Representation of the logbook in the »Engineer« V2.13



Button	Function
Reset filters	Reset set filter criteria to display all available logbook entries.
Export...	Export the entries available in the logbook into a *.log file. ▶ Exporting logbook entries to a file (□ 432)
File in project	File the current logbook in the Engineer project to be able to access it offline, too. ▶ Storing the logbook in the project (□ 433)
Delete	Delete all entries available in the logbook.
Configure...	Open parameterisation dialog for configuring the logbook.
>> more details	Show more details: • Analog value 1, digital values 1 & 2 • More output types of the error numbers (32-bit, internal 32-bit and internal 16-bit). • Instead of the >> more details button, the << less details is now displayed via which the details can be hidden again.
Help	Open online help for the logbook.
Reset error	Acknowledge existing error message if the error cause has been eliminated and thus the error is not pending anymore. • After the reset (acknowledgement) of the current error, further errors may be pending which must also be reset.
Close	Close the <i>Logbook</i> dialog box again.

9.5.5 Exporting logbook entries to a file



How to export the logbook entries to a file:

1. Click **Export...** in the *Logbook* dialog box.
 - The *Export logbook* dialog box is displayed.
2. Specify the folder, file name, and file type for the file.
3. Click the **Save** button to export the logbook entries into the given file.
 - Hidden logbook entries are not exported, i.e. the filter criteria specified are accounted for during the export.
 - The logbook entries are written to the file in the form of a semicolon separated list.

Structure of the semicolon separated list

The list includes the following information:

1. Cons. no.	9. Error number
2. Active	10. Source - analog value 1
3. Counter	11. Analog value 1
4. Type	12. Source - digital value 1
5. Subject area	13. Digital value 1
6. Error text	14. Source - digital value 2
7. Time stamp	15. Digital value 2
8. Relative time	

9.5.6 Storing the logbook in the project

If you want to display the currently available logbook entries at a later date in offline mode, i.e. without a connection to the controller, you can store the current logbook in the project.



How to store the logbook in the project:

Go to the *Logbook* dialog box and click the **File in project** button.

- The logbook with all the entries uploaded up to now is stored in the Engineer project independent of the set filter criteria.
- A logbook of the same device already stored before will be overwritten without querying the user.
- The filter settings are not stored in the project.
- When a logbook is filed in the project, the logbook can also be opened in offline mode via the **Logbook** button on the **Diagnostics** tab.



Note!

Storing the logbook changes the project.

- When the project is closed, you are asked to save the changed project.
- Only if the changed project is saved, the new logbook entries stored in the project remain stored.

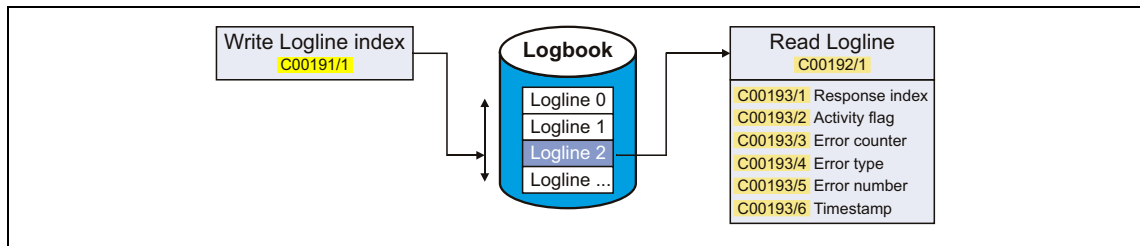
9.5.7

Reading out the logbook from an external control/visualisation

This function extension is available from version 12.00.00!

The parameters described in the following provide a second interface via which an external control or visualisation can exclusively access the logbook and read out logbook contents. Logbook contents can even be read out via this additional interface if the logbook is read out by the »Engineer« or »EASY Starter« at the same time.

Structure of the interface



- The line index of the logbook entry to be read out has to be set in [C00191/1](#).
- Then the logbook entry addressed is stored as "OCTET STRING" in [C00192/1](#).
 - Via this display parameter, the logbook entry can be read out by the control.
 - The "OCTET STRING" has a length of 8 double words of 4 successive bytes (= 32 bytes), starting with byte 0 in each case:

OCTET STRING	Byte 0	Byte 1	Byte 2	Byte 3
DWORD 0	Reserved	Reserved	Response index	Reserved
DWORD 1	Error activity flag	Error counter	Reserved	Reserved
DWORD 2	32-bit error number A Reserved B Error type C Error subject area D Error ID			
DWORD 3	Time in [s] during which the power was switched on (power-on time meter).			
DWORD 4	Reserved	Reserved	Reserved	Reserved
DWORD 5	Source - analog value 1	Reserved	Analog value 1 (scaling: 16384 ≙ 100 %)	
DWORD 6	Source - digital value 1	Reserved	Digital value 1	Reserved
DWORD 7	Source - digital value 2	Reserved	Digital value 2	Reserved

- Additionally, a read access to different individual elements of the logbook entry addressed can be executed via the subcodes of [C00193](#). These parameters have a uniform data format (32 bits) and represent the most important part of the logbook data:

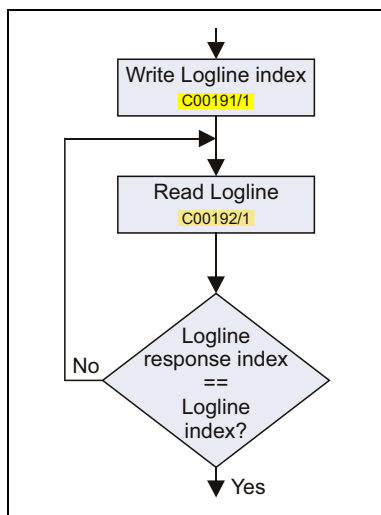
Parameter	Display
C00193/1	Response index, reference to the index requested (C00191/1)
C00193/2	Error activity flag (0 = error not active; 1 = error active)
C00193/3	Error counter (0 ... 255) • This information depends on the logbook configuration. In the Lenze setting the logbook configured so that identical errors do not produce a new line entry, but a counter is incremented for this error.
C00193/4	Error type (bits 26 ... 29 of the 32-bit error number)
C00193/5	Error subject area + error ID (bits 0 ... 25 of the 32-bit error number)
C00193/6	Time in [s] during which the power was switched on (power-on time meter).



Note!

- In the case of a simultaneous read access to the logbook entry ([C00192/1](#)) and its individual elements ([C00193/x](#)), the line index in [C00191/1](#) must only be reset by the control after the read process is fully completed. Otherwise the data read are inconsistent.
- Depending on the device version, the maximum number of logbook entries can vary:
 - 8400 StateLine: 15 logbook entries
 - 8400 HighLine/TopLine: 50 logbook entries

Basic workflow



- The logbook can be read out by an external control or visualisation via the procedure shown on the left.
- The "Response index" query ensures that the logbook entry read really corresponds to the logbook entry requested.

Related topics:

- ▶ [Structure of the 32-bit error number \(bit coding\)](#)

9.6 Monitoring

The controller is provided with various monitoring functions which protect the drive against impermissible operating conditions.

- If a monitoring function responds,
 - an entry will be made into the [Logbook](#) of the controller,
 - the response (TroubleQSP, Warning, Fault, etc.) set for this monitoring function will be triggered,
 - the status of the internal device control changes according to the selected response, controller inhibit is set, and the "DRV- ERR" LED on the front of the controller goes on:

Response	Entry in the logbook	Display in C00168	Disable voltage	Controller inhibit	Acknowledgement required	"DRV-ERR" LED
None						OFF
Fault	☑	☑	☑	☑	☑	
Trouble	☑	☑	☑	☑		
TroubleQSP	☑	☑			☑	
WarningLocked	☑	☑			☑	
Warning	☑	☑				
Information	☑	☑				OFF
System fault	☑	☑	☑	☑	Mains switching is required!	

Related topics:

- ▶ [LED status displays of the device status](#) (📘 422)
- ▶ [Device state machine and device states](#) (📘 84)
- ▶ [Device overload monitoring \(lxt\)](#) (📘 238)
- ▶ [Motor overload monitoring \(l2xt\)](#) (📘 239)
- ▶ [Motor temperature monitoring \(PTC\)](#) (📘 242)
- ▶ [Brake resistor monitoring \(l2xt\)](#) (📘 243)
- ▶ [Motor phase failure monitoring](#) (📘 245)
- ▶ [Mains phase failure monitoring](#) (📘 248)
- ▶ [Maximum current monitoring](#) (📘 248)
- ▶ [Maximum torque monitoring](#) (📘 249)
- ▶ [Encoder open-circuit monitoring](#) (📘 250)

9.6.1 Monitoring configuration



How to configure the monitoring functions using the »Engineer«:

1. In the *Project view*, select the 8400 StateLine controller.
2. Select the **Diagnostics** tab from the *Workspace*.
3. Click the **Monitoring...** button.
 - The *8400 monitoring configuration* dialog box is displayed via which the desired settings can be made:

		Name	Value	Unit
120	0	Motor overload threshold (I _{Pxt})	100,00	%
123	0	Device utilisat. threshold (I _{xt})	100,00	%
184	0	AutoFailReset repetition time	3	s
185	0	AutoFailReset residual runtime	0	s
186	0	Max. no. of AutoFailReset procedures	4	
187	0	Current AutoFailReset procedures	0	
188	0	AutoFailReset configuration	OFF	
189	0	Resp. too frequent AutoFailReset	Fault	

Motor overload threshold (I_{Pxt})
 PC value: 100,00
 Value range: 0,00 ... 250,00
 Default setting: 100,00

Schließen

Related topics:

► [Setting the error response](#) (438)

9.6.2 Setting the error response

When a monitoring function responds, the response set for this monitoring function (TroubleQSP, Warning, Fault, etc.) will be triggered.

- For many monitoring functions the response can be individually parameterised via parameters.

C...	S	Name	Value	Unit
581	1	Resp. L9_SetError_1 bSetError1	0: No Reaction	
			0: No Reaction	
			1: Fault	
			2: Trouble	
			3: TroubleQuickStop	
			4: WarningLocked	
			5: Warning	
			6: Information	



Tip!

The table in the chapter "[Short overview \(A-Z\)](#)" contains the error messages for which the response can be set. ([450](#))

Warning thresholds

Some of the monitoring functions are activated if a defined warning threshold (e.g. temperature) has been exceeded.

- The corresponding preset threshold values can be changed via the following parameters:

Parameter	Info
C00120	Setting of motor overload (I ² xt)
C00123	Device utilisat. threshold (Ixt)
C00572	Brake resistor overload threshold
C00599	Motor phase failure threshold

9.6.3 AutoFailReset function

The AutoFailReset function serves to automatically reset the latching "Fault" and "TroubleQSP" errors as well as the latching "WarningLocked" warning.

The "latching" term means that the effect on the controller remains active even after the error cause has been removed.

To reset latching errors and warnings, the following options are available:

- Manual reset
 - with device command [C00002/19](#) (activated by Low-High edge)
 - by a Low-High edge at the *bResetFail* input of the [LS DriveInterface](#) (the "FailReset" control bit in the control word must be parameterised with a value of "1").
- Automatic reset
 - using the AutoFailReset function.

Overview of the relevant parameters

Parameter	Info
C00184	Repetition time of the error reset processes
C00185	Time left until the next error reset process
C00186	Max. number of permissible <u>unsuccessful</u> error reset processes • When the number set is reached, the response parameterised in C00189 is executed.
C00187	Current number of <u>unsuccessful</u> error reset processes carried out
C00188	Configuration of the AutoFailReset function • 0: Off • 1: Fault + TroubleQSP • 2: WarningLocked • 3: All locking
C00189	Response after max. number of <u>unsuccessful</u> error reset processes has been reached
Highlighted in grey = display parameter	

9.7

Maloperation of the drive

Maloperation	Cause	Remedy
Motor does not rotate	DC-bus voltage is too low - Red LED is blinking every 1 s - Display in the keypad: LU	Check mains voltage
	Controller is inhibited - Green LED is blinking - Display in the keypad: CINH	Deactivate controller inhibit - Note: Controller inhibit can be set via several sources ! C00158 displays all active sources for controller inhibit.
	Automatic start is inhibited (Bit 0 in C00142 = 1)	LOW/HIGH edge at RFR If required, correct starting condition with C00142
	DC-injection braking (DCB) is active	Deactivate DC injection brake
	Mechanical motor brake is not released	Release mechanical motor brake manually or electrically
	Quick stop (QSP) is active Display in the keypad: IMP	Deactivate quick stop - Note: Quick stop can be set via several sources! C00159 displays all active sources for quick stop.
	Setpoint = 0	Select setpoint
	JOG frequency = 0 at activated JOG setpoint	Set JOG setpoint in C00039/1...15
	Fault active	Clear fault
	With C00006 = 4, "SLVC: Vector control" has been set, but no motor parameter identification has been carried out.	Execute automatic motor parameter identification with the C00002/23 device command
Motor rotates irregularly	Assignment of several mutually exclusive functions with a signal source in C00701	Correct configuration in C00701
	Motor cable is defective	Check motor cable
	Maximum motor current in motor or generator mode is set too low	Adjust settings to the application: C00022 : I _{max} in motor mode C00023 : I _{max} in generator mode
	Motor is underexcited or overexcited	Check parameterisation: C00006 : Motor control C00015 : VFC: V/f base frequency C00016 : VFC: V _{min} boost
	Rated motor data (stator resistance, speed, current, frequency, voltage) and cos φ and/or magnetising inductance is not adapted to the motor data	Execute automatic motor parameter identification with the C00002/23 device command - or - Adjust motor parameters manually: C00084 : Motor stator resistance C00087 : Rated motor speed C00088 : Rated motor current C00089 : Rated motor frequency C00090 : Rated motor voltage C00091 : Motor cosine phi C00092 : Motor magnetising inductance
	Motor windings are wired incorrectly	Reverse from star connection to delta connection

Maloperation	Cause	Remedy
Motor rotates regardless of setpoint "0"	The setpoint is selected via the analog input (blank where necessary). The analog input has a tolerance of $\pm 1\%$ and is designed as bipolar input unlike in the case of the 8200 vector. For this reason, no dead band has been set in the Lenze setting. When a setpoint of 0.3 % has been selected, e.g. a speed of 4.5 rpm (with reference speed = 1500 rpm) is the result. As the auto-DCB threshold in C00019 is set to 3 rpm, the speed oscillates between 0 and 4 rpm.	Set dead band for the analog input in C00010/2 and C00010/4 (see chapter "Signal adaptation by means of characteristic") - or - Increase auto-DCB threshold in C00019
Motor consumes too much current	$V_{\min}$ boost has been selected too high	Correct setting with C00016
	V/f base frequency has been selected too low	Correct setting with C00015
	Rated motor data (stator resistance, speed, current, frequency, voltage) and $\cos \varphi$ and/or magnetising inductance is not adapted to the motor data	Execute automatic motor parameter identification with the C00002/23 device command - or - Adjust motor parameters manually: C00084 : Motor stator resistance C00087 : Rated motor speed C00088 : Rated motor current C00089 : Rated motor frequency C00090 : Rated motor voltage C00091 : Motor cosine phi C00092 : Motor magnetising inductance
Motor parameter identification is aborted with error LP1	Motor is too small compared to the rated device power ($>1 : 3$)	Use device with lower rated power
	DC injection brake (DCB) is active via terminal	Deactivate DC injection brake
Drive behaviour with vector control is not satisfactory	different	Optimise or manually adapt vector control
		Execute automatic motor parameter identification with the C00002/23 device command
Torque dip in field weakening range or motor stalling when being operated in the field weakening range	Motor is overloaded	Check motor load
	Motor windings are wired incorrectly	Reverse from star connection to delta connection
	V/f reference point is set too high	Correct setting with C00015
	Override point of field weakening is set too low	Correct setting with C00080

Maloperation	Cause	Remedy
An asynchronous motor with feedback rotates without control and with too low speed	Motor phases have been interchanged • Thus the rotating field of the motor is not identical anymore with the rotating field of the feedback system. • Therefore, the drive shows the following behaviour if V/f characteristic control (C00006 = 7) is performed: • The motor rotates faster than the speed setpoint by the value set in C00074. • After the controller has been enabled, the controller will not stop if the speed setpoint = 0 or a quick stop (QSP) occurs. • Among other things, the final motor current depends on the value set for the $V_{\min}$ boost and may rise up to $I_{\max}$ which can trigger the "oC5: lxt overload" fault message.	Check the phase position of the motor cable If possible: Actuate the motor with deactivated feedback (C00006 = 6) and check direction of rotation of the motor
Motor phase (LP1) monitoring does not respond if the motor phases are interrupted	Monitoring is not active (C00597 = 0)	Activate monitoring (C00597 = 1)



Note!

Observe the following restrictions for operation without mains supply:

Safety state

Controllers of the 8400 series can be optionally equipped with the integrated "Safe torque off (STO)" safety system.

- **Up to and including version 13.xx.xx, the following applies:**
If merely the external 24-V supply of the controller is switched on, the "Safe torque off" status in [C00137](#) (bit 10) will not be updated.
- **From version 14.00.00 the following applies:**
If merely the external 24-V supply of the controller is switched on, the "Safe torque off" status in [C00137](#) (bit 10) will be updated.

Fan monitoring functions

The fan monitoring functions are only active if the mains supply is switched on.

The following display parameters have a value of "0" if the mains supply is switched off and the external 24 V supply of the controller is switched on:

Parameter	Info
C00050	MCTRL: Speed setpoint
C00051	MCTRL: Actual speed value
C00052	Motor voltage
C00053	DC-bus voltage
C00054	Motor current
C00058	Output frequency
C00061	Heatsink temperature
C00064/1...3	Device utilisation (Ixt)
C00066	Thermal motor load (I²xt)
C00177	Switching cycles
C00725	Current switching frequency

9.9 Error messages of the operating system

This chapter describes all error messages of the controller operating system and possible causes & remedies.

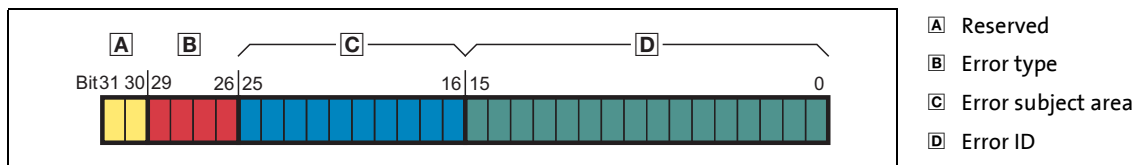


Tip!

Each error message is also saved to the logbook in chronological order. ▶ [Logbook](#) (📖 429)

9.9.1 Structure of the 32-bit error number (bit coding)

If an error occurs in the controller, the internal fault memory saves a 32-bit value which contains the following information:



[9-1] Structure of the error number

- Display parameter: [C00168](#)
 - From version 13.00.00: [C00162/1](#) additionally displays the 32-bit error number without error type, i.e. this error number only contains the error subject area and the error ID (bit 0 ... bit 25).
- The [LS DriveInterface](#) system block shows the 32-bit error number at the outputs *wStateDetermFailNoLow* (Low Word) and *wStateDetermFailNoHigh* (High Word).
 - From version 06.00.00 onwards: If the "Use 16BitFailNo." (Bit 15 = "1") option is activated in [C00148](#), the short 16-bit error number is provided by the SB [LS DriveInterface](#) at the *wStateDetermFailNoLow* output and the value "0" is provided at the *wStateDetermFailNoHigh* output (see the following chapter).
- For the sake of legibility, the error number in the logbook and in [C00165](#) is displayed with the following syntax:
[Error type].[Error subject area no.].[Error ID]

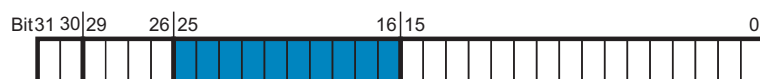
Error type



The error type gives information about the behaviour/response of the controller to the error. The error type for some device errors can also be parameterised.

Bit 29	Bit 28	Bit 27	Bit 26	Meaning
0	0	0	0	0: No response
0	0	0	1	1: Fault
0	0	1	0	2: Trouble
0	0	1	1	3: TroubleQSP
0	1	0	0	4: WarningLocked
0	1	0	1	5: Warning
0	1	1	0	6: Information

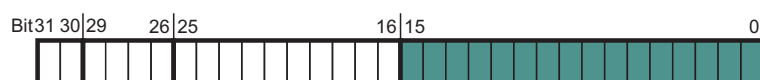
Error subject area



The error subject area indicates the internal "function unit" of the controller in which the error has occurred:

Error subject area		Assigned errors	Remedy possible by user?
No.	Name		
111	Supply voltage	Errors that occur in connection with the supply voltage of the device.	Yes
119	Temperature	Errors that occur for temperature reasons.	Yes
123	Motor management / encoder	Errors that occur within the motor control or encoder evaluation.	Yes
125	Analog I/O integrated	Errors that occur in connection with the analog inputs and outputs.	Yes
127	Extension module slot 1	Errors that are reported by the extension module, and communication errors to the plugged-in extension module.	Yes if it is a fieldbus error.
131	CAN integrated (general)	Errors related to general CAN functions.	Yes
135	CAN process data object (PDO)	Errors that are explicitly only related to the CAN-PDO (process data objects).	Yes
140	Device configuration	Errors that occur due to incompatibilities of the plugged-in individual components (fieldbus module, safety module, et al.).	Yes if the error relates to a module plugged-in by the user.
144	Parameter set	Errors that occur in connection with the parameter set or the parameter set memory (memory module).	Yes if the error relates to a missing or incompatible memory module.
145	Device firmware (internal error)	Internal error of the device firmware.	No
184	MotionControlKernel	Errors that occur within the MotionControl basic functions (e.g. profile generation, brake control, positioning).	Yes
400	Defective device hardware	Errors that occur due to defective device hardware.	No
444	Fieldbus	Errors that occur in connection with fieldbus communication.	Yes
980	User error 1	Errors generated by the user (by the application) via the LS_SetError_1 system block.	Yes
...	...		
983	User error 4		

Error ID

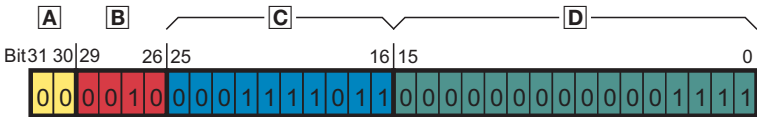


16-bit value (0 ... 65535) for error identification within the error subject area.

Example for bit coding of the error number

C00168 displays the internal error number "142278671".

- This decimal value corresponds to the following bit sequence:



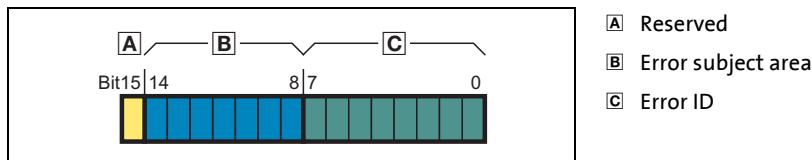
Assignment	Information	Meaning in the example
00	Reserved	-
0010	Error type	2: Trouble
0001111011	Error subject area	123: Motor management / encoder
0000000000001111	Error ID	15: "LU: DC bus undervoltage"

- Thus, error number "142278671" means:
A DC bus undervoltage has been detected in the "Motor management / encoder" subject area.
The error response is a "Fault".

9.9.2 Structure of the 16 bit error number (bit coding)

This function extension is available from version 06.00.00!

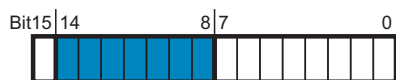
In addition to the 32-bit error number, a 16-bit error number is generated if an error occurs. It consists of the following information:



[9-2] Structure of the error number

- Display parameter: [C00160](#)
- The [LS_DriveInterface](#) system block shows the 16-bit error number at the output *wStateDetermFailNoShort*.
- If the "Use 16BitFailNo." option is activated in [C00148](#) (bit 15 = "1"), the [LS_DriveInterface](#) system block also shows the short 16-bit error number at the output *wStateDetermFailNoLow* (Low Word of the 32-bit error number).
 - The output *wStateDetermFailNoHigh* (High Word of the 32-bit error number) in this case is "0".
 - Advantage: The bus transfer of the error numbers is possible via a data word without changing the interconnection of the technology application.
- For the sake of legibility, the 16-bit error number in the logbook is displayed with the following syntax::
[Error subject area no.].[Error ID]

Error subject area



The error subject area indicates the internal "function unit" of the controller in which the error has occurred.



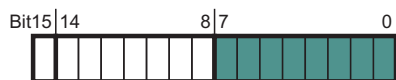
Note!

Due to the smaller value range (0 ...127), the number assignment to the error subject area differs from the 32-bit error number.

Error subject area		Assigned errors	Remedy possible by user?
No.	Name		
11	Supply voltage	Errors that occur in connection with the supply voltage of the device.	Yes
19	Temperature	Errors that occur for temperature reasons.	Yes
23	Motor management / encoder	Errors that occur within the motor control or encoder evaluation.	Yes
25	Analog I/O integrated	Errors that occur in connection with the analog inputs and outputs.	Yes
26	Defective device hardware	Errors that occur due to defective device hardware.	No
27	Extension module slot 1	Errors that are reported by the extension module, and communication errors to the plugged-in extension module.	Yes if it is a fieldbus error.
31	CAN integrated (general)	Errors related to general CAN functions.	Yes

Error subject area		Assigned errors	Remedy possible by user?
No.	Name		
35	CAN process data object (PDO)	Errors that are explicitly only related to the CAN-PDO (process data objects).	Yes
40	Device configuration	Errors that occur due to incompatibilities of the plugged-in individual components (fieldbus module, safety module, et al.).	Yes if the error relates to a module plugged-in by the user.
44	Parameter set	Errors that occur in connection with the parameter set or the parameter set memory (memory module).	Yes if the error relates to a missing or incompatible memory module.
45	Device firmware (internal error)	Internal error of the device firmware.	No
54	Fieldbus	Errors that occur in connection with fieldbus communication.	Yes
84	MotionControlKernel	Errors that occur within the MotionControl basic functions (e.g. profile generation, brake control, positioning).	Yes
100 ... 103	User error 1 ... User error 4	Errors generated by the user (by the application) via the LS_SetError_1 system block.	Yes

Error ID



8-bit value (0 ... 255) for error identification within the error subject area.



Tip!

All possible 16-bit error numbers are listed in the table "[Short overview \(A-Z\)](#)" in the second column. ([book 450](#))

9.9.3

Reset error message

An error message with the response "Fault", "Trouble", "TroubleQSP" or "Warning locked" must be explicitly reset (acknowledged) after the cause of the error has been eliminated.



To reset (acknowledge) a pending error message, execute device command [C00002/19](#) = "1".



Tip!

When an online connection to the controller has been established, use the **Diagnostics** tab of »Engineer« and click **Reset error** to reset a pending error message.

9.9.4 Export error texts

All error texts of the controller can be exported into a text file (*.txt) for further processing.

- The error text is preceded with the corresponding 32-bit error number (no error type) and the 16-bit error number, both as decimal number.
- If there is no corresponding 16-bit error number for a 32-bit error number, the field remains empty.

Example

Output of the German and English error texts:

32-BitError	16-BitError	DE-de	EN-en
0	0	No error	No error
111	11	Versorgungsspannung	Supply voltage
119 / 19			
12323 : Motor management / encoder			
125	25	E/A integriert	I/O integrated
...			
26214416	6672	dH10: Lüfterausfall	dH10: Fan failure
26214505	6761	dH69: Abgleichdatenfehler	dH69: Adjustment fault



How to export the error texts into a text file:

1. Go to the *Project view* in the *Context menu* of the 8400 StateLine controller and execute the **Export error texts...** command.
2. Define the following options in the *Export error texts* dialog box:
 - Output file and memory location
 - Languages to be exported (German/English/French)
 - Device/module to be exported
 - Separator (tabulator or semicolon)
 - Font (UTF8, standard font or ASCII)
3. Click **OK** to start the export.
 - After the export, a message appears indicating whether the export was successful.



Tip!

From version 13.00.00, the 32-bit number of the state-determining error is displayed in C00162/1 without error type.

If, for instance, the error texts are stored in a master control or on an operator panel, the error text to be displayed can be detected by reading the C00162/1 code.

9.9.5 Short overview (A-Z)

The table below contains all error messages of the controller operating system in alphabetical order.

**Note!**

For the sake of legibility, the [Logbook](#) and [C00165](#) display the error number with the following syntax:

[Error type].[Error subject area no.].[Error ID]

In this documentation, "xx", a wildcard, stands for the error type since it is configurable for many error messages.

**Tip!**

If you click the cross-reference in the first column, "Error number", you will reach the detailed description of the respective error message in the following chapter "[Cause & possible remedies](#)". (453)

Error number	32 bits	16 bits _{hex}	16 bits _{dec}	Display in C00162/1	Error message	Response (Lenze setting)	can be set in	CAN Emergency Error Code
▶ xx.0125.00001	0x1901	6401	8192001		An01: AIN1_I < 4 mA	TroubleQuickStop	C00598/1	0xF000
▶ xx.0131.00006	0x1f06	7942	8585222		CA06: CAN CRC error	No Reaction	C00592/1	0x8000
▶ xx.0131.00007	0x1f07	7943	8585223		CA07: CAN bus warn	No Reaction	C00592/3	0x8000
▶ xx.0131.00008	0x1f08	7944	8585224		CA08: CAN Bus Stopped	No Reaction	C00592/4	0x8000
▶ xx.0131.00011	0x1f0b	7947	8585227		CA0b: CAN HeartBeatEvent	No Reaction	C00592/5	0x8130
▶ xx.0131.00015	0x1f0f	7951	8585231		CA0F: CAN control word	Fault	C00594/1	0xF000
▶ xx.0127.00002	0x1b02	6914	8323074		CE04: MCI communication error	No Reaction	C01501/1	0x7000
▶ xx.0127.00015	0x1b0f	6927	8323087		CE0F: MCI control word	Fault	C00594/2	0xF000
▶ xx.0135.00001	0x2301	8961	8847361		CE1: CAN RPDO1	No Reaction	C00593/1	0x8100
▶ xx.0135.00002	0x2302	8962	8847362		CE2: CAN RPDO2	No Reaction	C00593/2	0x8100
▶ xx.0135.00003	0x2303	8963	8847363		CE3: CAN RPDO3	No Reaction	C00593/3	0x8100
▶ xx.0131.00000	0x1f00	7936	8585216		CE4: CAN Bus Off	No Reaction	C00592/2	0x8000
▶ xx.0140.00013	0x280d	10253	9175053		CI01: Module missing/incompatible	No Reaction	C01501/2	0x7000
▶ xx.0184.00005	0x5405	21509	12058629		Ck15: Error status sign. brake	TroubleQuickStop	-	0x8600
▶ xx.0184.00064	0x5440	21568	12058688		Ck16: Time overflow manual control	Fault	-	
▶ xx.0135.00004	0x2304	8964	8847364		CP04: CAN RPDO4	No Reaction	C00593/4	0x8100
▶ xx.0145.00035	0x2d23	11555	9502755		dF10: AutoTrip Reset	Fault	C00189	0xF000
▶ xx.0145.00014	0x2d0e	11534	9502734		dF14: SW/HW invalid	Fault	-	
▶ xx.0145.00024	0x2d18	11544	9502744		dF18: BU RCOM error	Fault	-	0x6100
▶ xx.0145.00033	0x2d21	11553	9502753		dF21: BU Watchdog	Fault	-	0x6100
▶ xx.0145.00034	0x2d22	11554	9502754		dF22: CU watchdog	Fault	-	0x6100
▶ xx.0145.00025	0x2d19	11545	9502745		dF25: CU RCOM error	Fault	-	0x6100
▶ xx.0145.00026	0x2d1a	11546	9502746		dF26: Appl. watchdog	No Reaction	C00580/1	0x6200
▶ xx.0145.00050	0x2d32	11570	9502770		dF50: Retain error	Fault	-	0x6100
▶ xx.0145.00051	0x2d33	11571	9502771		dF51: CuCcr error	Fault	-	0x6100
▶ xx.0145.00052	0x2d34	11572	9502772		dF52: BuCcr error	Fault	-	0x6100
▶ xx.0400.00009	0x1a09	6665	26214409		dH09: EEPROM power section	Fault	-	0x5500
▶ xx.0400.00016	0x1a10	6672	26214416		dH10: Fan failure	Warning	C00566	0x5000
▶ xx.0400.00104	0x1a68	6760	26214504		dH68: Adjustment data error CU	Fault	-	0x5500
▶ xx.0400.00105	0x1a69	6761	26214505		dH69: Adjustment data error BU	Fault	-	0x5500
▶ xx.0400.00106	0x1a6a	6762	26214506		dH70: ControlUnit is unequal to BaseUnit	Fault	-	0x5500

9 Diagnostics & error management

9.9 Error messages of the operating system

Error number			Display in C00162/1	Error message	Response (Lenze setting)	can be set in	CAN Emergency Error Code
	32 bits	16 bits _{hex}	16 bits _{dec}				
▶ xx.0123.00094	0x175e	5982	8061022	FC01: Switching frequency reduction	No Reaction	C00590	0x2000
▶ xx.0123.00095	0x175f	5983	8061023	FC02: Maximum speed for Fchop	No Reaction	C00588	0xF000
▶ xx.0123.00099	0x1763	5987	8061027	FC03: Field controller limitation	No Reaction	C00570/4	0xF000
▶ xx.0123.00057	0x1739	5945	8060985	Id1: Motor data identification error	Fault	-	0xF000
▶ xx.0123.00058	0x173a	5946	8060986	Id3: CINH identification	WarningLocked	-	0xF000
▶ xx.0123.00059	0x173b	5947	8060987	Id4: Resistance identification error	Warning	-	0xF000
▶ xx.0123.00074	0x174a	5962	8061002	Id5: Pole position identification error	Fault	C00643/1	
▶ xx.0123.00060	0x173c	5948	8060988	Id7: Motor control does not match motor data	Information	C00571/1	0xF000
▶ xx.0123.00061	0x173d	5949	8060989	Id8: Speed sensor has not been set	Fault	C00571/2	0x7120
▶ xx.0123.00145	0x1791	6033	8061073	LP1: Motor phase failure	No Reaction	C00597	0x3000
▶ xx.0123.00015	0x170f	5903	8060943	LU: DC bus undervoltage	Trouble	C00600/1	0x3100
▶ xx.0123.00016	0x1710	5904	8060944	oC1: Power section - short circuit	Fault	-	0x2000
▶ xx.0123.00017	0x1711	5905	8060945	oC2: Power section - earth fault	Fault	-	0x2000
▶ xx.0119.00050	0x1332	4914	7798834	oC5: Ixt overload	Warning	C00604	0x2000
▶ xx.0123.00105	0x1769	5993	8061033	oC6: I2xt motor overload	Warning	C00606	0x2000
▶ xx.0123.00007	0x1707	5895	8060935	oC7: Motor overcurrent	Fault	-	0x2000
▶ xx.0123.00030	0x171e	5918	8060958	oC10: Maximum current reached	No Reaction	C00609	0x2000
▶ xx.0123.00071	0x1747	5959	8060999	oC11: Clamp operation active	Fault	-	0xF000
▶ xx.0123.00065	0x1741	5953	8060993	oC12: I2xt brake resistor overload	Fault	-	0xF000
▶ xx.0123.00090	0x175a	5978	8061018	oC13: Maximum current for Fch exceeded	Fault	-	0xF000
▶ xx.0123.00096	0x1760	5984	8061024	oC14: Direct-axis current controller limitation	No Reaction	C00570/1	0xF000
▶ xx.0123.00097	0x1761	5985	8061025	oC15: Cross current controller limitation	No Reaction	C00570/2	0xF000
▶ xx.0123.00098	0x1762	5986	8061026	oC16: Torque controller limitation	No Reaction	C00570/3	0xF000
▶ xx.0123.00031	0x171f	5919	8060959	oC17: Clamp sets pulse inhibit	No Reaction	C00569/1	0xF000
▶ xx.0119.00001	0x1301	4865	7798785	oH1: Heatsink overtemperature	Fault	-	0x4000
▶ xx.0119.00015	0x130f	4879	7798799	oH3: Motor temperature (X106) triggered	Fault	C00585	0x4000
▶ xx.0119.00000	0x1300	4864	7798784	oH4: Heatsink temp. > shutdown temp. -5°C	No Reaction	C00582	0x4000
▶ xx.0123.00032	0x1720	5920	8060960	oS1: Maximum speed limit reached	No Reaction	C00579	0x8400
▶ xx.0123.00033	0x1721	5921	8060961	oS2: Max. motor speed	Fault	-	0x8400
▶ xx.0123.00001	0x1701	5889	8060929	ot1: Max. torque reached	No Reaction	C00608	0x8300
▶ xx.0123.00093	0x175d	5981	8061021	ot2: Speed controller output limited	No Reaction	C00567	0xF000
▶ xx.0123.00014	0x170e	5902	8060942	OU: DC bus overvoltage	Trouble	-	0x3100
▶ xx.0144.00001	0x2c01	11265	9437185	PS01: No memory module	Warning	-	0x6300
▶ xx.0144.00002	0x2c02	11266	9437186	PS02: Invalid par. set	Fault	-	0x6300
▶ xx.0144.00003	0x2c03	11267	9437187	PS03: Invalid device par. set	Fault	-	0x6300
▶ xx.0144.00004	0x2c04	11268	9437188	PS04: Invalid MCI par. set	Fault	-	0x6300
▶ xx.0144.00007	0x2c07	11271	9437191	PS07: Invalid memory module par. set	Fault	-	0x6300
▶ xx.0144.00008	0x2c08	11272	9437192	PS08: Invalid device par.	Fault	-	0x6300
▶ xx.0144.00009	0x2c09	11273	9437193	PS09: Invalid par. format	Fault	-	0x6300
▶ xx.0144.00010	0x2c0a	11274	9437194	PS10: Memory module binding invalid	Fault	-	
▶ xx.0123.00205	0x17cd	6093	8061133	Sd3: Feedback system open circuit	Fault	C00586	0x7300
▶ xx.0123.00200	0x17c8	6088	8061128	Sd10: Speed limit for feedback system 12	Fault	C00607	0x7300
▶ xx.0111.00002	0x0b02	2818	7274498	Su02: One mains phase is missing	Warning	C00565	0x3000
▶ xx.0111.00003	0x0b03	2819	7274499	Su03: Too frequent mains switching	Fault	-	0x3000
▶ xx.0111.00004	0x0b04	2820	7274500	Su04: CU Insufficiently Supplied	Warning	-	0x3000
▶ xx.0111.00006	0x0b06	2822	7274502	Su06: Mains input overload	Fault	-	0x3000

9 Diagnostics & error management

9.9 Error messages of the operating system

Error number			Display in	Error message	Response (Lenze setting)	can be set in	CAN Emergency Error Code
32 bits	16 bits _{hex}	16 bits _{dec}	C00162/1				
Freely configurable user error messages (see LS_SetError_1)							
▶ xx.0980.00001	25600 _{dec} + C161/1 *			User error 1	No Reaction	C00581/1	0x6200
▶ xx.0981.00002	25856 _{dec} + C161/2 *			User error 2	No Reaction	C00581/2	0x6200
▶ xx.0982.00003	26112 _{dec} + C161/3 *			User error 3	No Reaction	C00581/3	0x6200
▶ xx.0983.00004	26368 _{dec} + C161/4 *			User error 4	No Reaction	C00581/4	0x6200
* Only the lower 8 bits of the adjustable error ID (C161/x) can be used.							

9.9.6 Cause & possible remedies

This chapter contains all error messages of the controller operating system in numerical order of the error numbers. The list provides detailed information on the response to the error message as well as information on the cause & possible remedies.



Note!

For the sake of legibility, the [Logbook](#) and [C00165](#) display the error number with the following syntax:

[Error type].[Error subject area no.].[Error ID]

In this documentation, "xx", a wildcard, stands for the error type since it is configurable for many error messages.



Tip!

A list of all error messages of the controller operating system in alphabetical order can be found in the previous chapter "[Short overview \(A-Z\)](#)" ([□ 450](#)).

Su02: One mains phase is missing [xx.0111.00002]

Response (Lenze setting printed in bold)	Setting: C00565 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
One mains phase of a three-phase supply has failed.	Check mains connection (terminal X100).

Su03: Too frequent mains switching [xx.0111.00003]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Too frequent mains switching of the power section. - The device recognises if the power section is switched on and off too frequently. - To protect internal charging connections from destruction, the device reports this error and prevents the controller inhibit. All other functions are active. Use of a power supply module in the DC-bus connection, the DC terminals of which are connected downstream to the charging connection for the voltage DC bus (e.g. 9400 from 45 kW).	The error must be acknowledged by mains switching. The charging circuit can only cool down when the mains is switched off. - After switching the mains 3 times in one minute, there must be a switching pause of 9 minutes. - Cyclic mains switching every 3 minutes is permissible. From version 12.00.00 onwards, this power supply module can be used in the DC-bus connection by enabling it via C02865 (bit 8). Note: For further configuration of devices in the DC-bus connection with 8400, the DC terminals of which are connected downstream to the charging connection for the voltage DC bus (e.g. 9400 from 45 kW with 8400) contact Lenze.

Su04: CU insufficiently supplied [xx.0111.00004]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
After switching on the device, the 24V supply voltage for the control electronics is too low (100 ms after switch-on U is < 19V). The current supply voltage is displayed in C00065.	With internal supply voltage via the power electronics, the controller must be replaced. With external supply voltage, check the correct connection and/or the stability of the supply voltage.

Su06: Mains input overload [xx.0111.00006]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
In order to protect the device from overload, the following device outputs have a hardware detection in the mains input: 7.5 kW, 11 kW, 15 kW, 30 kW, 37 kW, 45 kW. In case of the error message "Su06", this hardware detection has responded.	- Check whether all mains phases are connected (a 2-phase supply may be existent). - Provide for sufficient cooling of the device.

oH4: Heatsink temp. > shutdown temp. -5°C [xx.0119.00000]

Response (Lenze setting printed in bold)	
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
The heatsink temperature now only differs by 5 °C from the shutdown temperature of the motor.	Prevent further heating, i.e. reduce motor load or set controller inhibit so that the heatsink can cool down again.

oH1: Heatsink overtemperature [xx.0119.00001]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The heatsink temperature is higher than the fixed limit temperature (90 °C). Maybe the ambient temperature of the controller is too high or the fan or its ventilation slots are dirty.	- Check control cabinet temperature. - Clean filter. - Clean controller. - If required, clean or replace the fan. - Provide for sufficient cooling of the device.

oH3: Motor temperature (X106) triggered [xx.0119.00015]

Response (Lenze setting printed in bold)	
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
The motor temperature monitoring function at the plug connector X106, terminal T1 /T2, has tripped. Possible causes: - The motor is overheated so that the thermal contact integrated into the motor has been switched. - An open circuit or a loose contact at the connections mentioned above has occurred.	- Check motor temperature monitoring. - Provide for sufficient cooling of the motor. - Check terminals for open circuit or loose contact.

oC5: lxt overload [xx.0119.00050]

Response (Lenze setting printed in bold)		Setting: C00604 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
The lxt overload check has tripped. - Operating threshold = 100 % lxt (adjustable in C00123) Possible causes: - Wrong dimensioning of the device with regard to its motor load. - Load cycles are not complied with.	- Check and, if required, correct dimensioning of the device and the motor load with regard to technical data. - Reduce motor load cycles (observe load cycles according to documentation).	

ot1: Maximum torque reached [xx.0123.00001]

Response (Lenze setting printed in bold)		Setting: C00608 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device indicates that the maximally possible torque at the motor shaft has been reached. C00057 displays the current torque.	Reduce motor load.	

oC7: Motor overcurrent [xx.0123.00007]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
Maximum current monitoring has tripped. The instantaneous value of the motor current has exceeded the limit value set in C00939.	Check and, if required, correct dimensioning of the load with regard to the installed device power.	

oU: DC bus overvoltage [xx.0123.00014]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has detected an overvoltage in the DC bus. To protect the device hardware, the inverter control is switched off. - Depending on the configuration of the auto-start lock function, set C00142 so that, when this error is tripped, the controller only restarts after the controller inhibit has been switched. - If this error message remains active longer than the time set in C00601, a "Fault" is tripped. Otherwise, the deactivation of the error message causes the inverter control to be enabled again - In case of the control types VFCplus and SLVC, the motor voltage is approached to the voltage setpoint alongside a ramp. - From version 15.00.00, this voltage ramp can be set in C00983/2. If the described remedies are not possible or do not have any effect, it may be required to increase this voltage ramp as otherwise an overcurrent interruption may be caused. This only happens in case of high motor power and mass inertia so that the Lenze setting of 1 s should be sufficient in the majority of cases.	- Reduce load in generator mode. - Use a brake resistor. - Use a regenerative power supply unit. - Establish a DC-bus connection. - Select a braking method in C00175 which stops the ramp function generator when reaching the brake chopper threshold ("HlgStop").	

LU: DC bus undervoltage [xx.0123.00015]

Response (Lenze setting printed in bold)		Setting: C00600/1 (☑ Adjustable response)
☐ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has detected a DC bus undervoltage. The inverter control is switched off because the drive properties of the motor control cannot be provided anymore due to the DC bus undervoltage. Depending on the configuration of the auto-start lock function, set C00142 so that, when this error is tripped, the controller only restarts after the controller inhibit has been switched.	- Switch on mains supply or ensure sufficient supply via DC bus. - Adjust setting in C00142 if required.	

oC1: Power section - short circuit [xx.0123.00016]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has recognised a short circuit of the motor phases. To protect the device electronics, the inverter control is switched off. - Mostly, incorrectly executed motor connections are the cause. - If the device is inappropriately dimensioned with regard to the motor load and the current limitation in the controller (I_{max} controller) is set incorrectly, this error message may also occur. ► Motor control: Defining current limits	- Check motor connections and the corresponding plug connector on the device. - Only use permissible combinations of device power and motor power. - Do not set the dynamics of the current limitation controller too high.	

oC2: Power section - earth fault [xx.0123.00017]

Response (Lenze setting printed in bold)		
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has recognised an earth fault at one of the motor phases. To protect the device electronics, the inverter control is switched off. - Mostly, incorrectly executed motor connections are the cause. - If motor filter, motor cable length, and cable type (shielding capacity) are dimensioned incorrectly, this error message may occur due to leakage currents to PE. - If motor filters with additional terminals for +UG and –UG and devices greater or equal 3 kW are used, the earth fault detection may be triggered due to leakage currents to +UG and –UG. - A cause can also be the use of shielded motor cables longer than 50 m.	- Check motor connections and the corresponding plug connector on the device. - Use motor filters, cable lengths, and cable types recommended by Lenze. - If motor filters with additional terminals for +UG and –UG and devices greater or equal 3 kW are used: - up to version V05.00.00: Set resp. to earth fault (C00602) to "0: No Reaction". - From version V05.01.00 onwards: Deactivate earth-fault detection during operation by setting the filter time (C01770) to 250 ms. - If motor cables longer than 50 m are used: - From version V05.01.00 onwards: Increase filter time for earth-fault detection during operation (C01770).	

oC10: Maximum current reached [xx.0123.00030]

Response (Lenze setting printed in bold)		Setting: C00609 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device displays that the maximum current has been reached.	• Check and, if required, correct dimensioning of the load with regard to the installed device power. • Check the maximum current settings in C00022 (Imax in motor mode) and C00023 (Imax in generator mode).	

oC17: Clamp sets pulse inhibit [xx.0123.00031]

Response (Lenze setting printed in bold)		Setting: C00569/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
Due to a short overcurrent, the inverter was switched off for a short time (clamp disconnection).	• Check and, if required, correct dimensioning of the load with regard to the installed device power. • Reduce the dynamics of the setpoint change or speed control.	

oS1: Maximum speed limit reached [xx.0123.00032]

Response (Lenze setting printed in bold)		Setting: C00579 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information		
Cause	Remedy	
The device has recognised that the maximum speed has been reached.	• Limit setpoint selection to maximum values. • Adjust set speed limitation (C00909) and frequency limitation (C00910).	

oS2: Max. motor speed [xx.0123.00033]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The device has recognised that the maximally permissible motor speed has been reached.	• Limit setpoint selection to the maximally permissible motor speed. • If required, adapt set maximum motor speed (C00965).

Id1: Motor data identification error [xx.0123.00057]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
During the identification of motor parameters, an error has occurred. Possible causes: • Interrupted motor cable. • Switched-off power section during the identification. • Implausible start parameter settings.	• Check the motor connections and the corresponding plug connector on the device and, if necessary, the motor terminal box. • Correct start parameters for the motor parameter identification (motor nameplate data). • Stable power supply of the device.

Id3: CINH identification [xx.0123.00058]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☒ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The device has detected controller inhibit during the motor data identification. This cancels the identification process. The Lenze setting of the motor data is used.	- Do not set controller inhibit during the motor data identification. - Do not execute any device function which may activate controller inhibit.

Id4: Resistor identification error [xx.0123.00059]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
The device has recognised that an error has occurred in the calculation of the motor cable resistance. The parameters for cable cross-section and cable length are implausible.	Enter sensible values for cable cross-section and motor cable length.

Id7: Motor control does not match motor data [xx.0123.00060]

Response (Lenze setting printed in bold)		Setting: C00571/1 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
At controller enable, the device has detected that the motor control type set in C00006 cannot control the motor type set. Example: Motor nameplate data for an asynchronous motor have been entered; however, a motor control type for a synchronous motor is set in C00006. Note: Since the "VFCplus" control types are able to control every motor to a certain extent, this error message will never occur here.	Enter correct motor nameplate data and set a matching motor control type in C00006 : - Motor nameplate data asynchronous motor → motor control type must be ASM, SLVC or VFCplus servo control. - Motor nameplate data synchronous motor → motor control type must be PSM, SLPSM or VFCplus servo control.	

Id8: Speed encoder has not been set [xx.0123.00061]

Response (Lenze setting printed in bold)		Setting: C00571/2 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
When being In controller enable status, the device has detected that a motor control type with feedback has been set in C00006 , but no speed sensor has been set in C00495 .	Set the speed sensor in C00495 . Note: The error can only be reset if the settings in C00006 and C00495 match.	

oC12: I2xt overload - brake resistor [xx.0123.00065]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Too frequent and too long braking processes.	Check drive dimensioning.

oC11: Clamp operation active [xx.0123.00071]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The device indicates that the "CLAMP" overcurrent limitation has been activated. A permanent clamp operation causes an overload disconnection.	Reduce setpoint generation dynamics or motor load.

Id5: Pole position identification error [xx.0123.00074]

Response (Lenze setting printed in bold)		Setting: C00643/1 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
Pole position identification has not been completed successfully.	Check parameter setting of the pole position identification.	

oC13: Maximum current for Fch exceeded [xx.0123.00090]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The device has detected a motor current which exceeds the maximum current limit at permanent switching frequency of the inverter. If a permanent switching frequency inverter is set, a certain limit arises for the maximum current, depending on the setting. If this current limit is exceeded due to a load impulse or overload, an error message is displayed.	- Observe the maximum current setting depending on the set switching frequency of the inverter. - Reduce the required load or setting of the dynamic switching frequency if necessary.

ot2: Speed controller output limited [xx.0123.00093]

Response (Lenze setting printed in bold)		Setting: C00567 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information		
Cause	Remedy	
The output of the speed controller has reached the internal limit value. In this status, the speed controller is not able anymore to correct the system deviation. Only during "Closed loop" operation or with vector control (SLVC).	- Observe load requirements. - Correct dimensioning or reduce setpoint generation dynamics if necessary. ► Motor control	

FC01: Switching frequency reduction [xx.0123.00094]

Response (Lenze setting printed in bold)		Setting: C00590 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information		
Cause	Remedy	
Load-dependent switching frequency reduction	- Observe load requirements. - Correct dimensioning or reduce setpoint generation dynamics if necessary. ► Motor control	

FC02: Maximum speed for Fchop [xx.0123.00095]

Response (Lenze setting printed in bold)	Setting: C00588 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Maximum speed for chopper frequency has been reached. • The maximum speed has been exceeded depending on the switching frequency.	Select the correct maximum speed as a function of the switching frequency. ► Motor control: Determine speed limits

oC14: Direct-axis current controller limitation [xx.0123.00096]

Response (Lenze setting printed in bold)	Setting: C00570/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Direct-axis current controller limitation is active.	• Observe load requirements. • Correct dimensioning or reduce setpoint generation dynamics if necessary. ► Motor control

oC15: Cross current controller limitation [xx.0123.00097]

Response (Lenze setting printed in bold)	Setting: C00570/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Cross current controller limitation is active.	• Observe load requirements. • Correct dimensioning or reduce setpoint generation dynamics if necessary. • Check parameter setting of the current controller with regard to the motor controllers (e.g. reduce Vp). ► Motor control

oC16: Torque controller limitation [xx.0123.00098]

Response (Lenze setting printed in bold)	Setting: C00570/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Actuator limitation according to speed controller.	• Observe load requirements. • Correct dimensioning or reduce setpoint generation dynamics if necessary. ► Motor control

FC03: Field controller limitation [xx.0123.00099]

Response (Lenze setting printed in bold)	Setting: C00570/4 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
The output of the field controller has reached its maximum limit value. The drive is at the torque limit in the field weakening range.	• Observe load requirements. • Correct dimensioning or reduce setpoint from the field weakening range if necessary. ► Motor control

oC6: I2xt overload - motor [xx.0123.00105]

Response (Lenze setting printed in bold)	Setting: C00606 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Thermal overload of the motor.	Only self-ventilated motors can be monitored using the I2xt function. • Check whether is it a self-ventilated motor. If not, set C00606 to "0: No Reaction". • Observe load requirements. • Correct dimensioning if necessary. • For VFCplus control type: Check Vmin boost (C00016). ▶ Set Vmin boost

LP1: Motor phase failure [xx.0123.00145]

Response (Lenze setting printed in bold)	Setting: C00597 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Motor phase failure - power section • This error message is displayed if a motor phase carries less current of one half-wave than set in C00599.	• Check the motor connections and the corresponding plug connector on the device and, if necessary, the motor terminal box. • Check the trigger threshold (C00599).

Sd10: Speed limit - feedback system 12 [xx.0123.00200]

Response (Lenze setting printed in bold)	Setting: C00607 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Maximally permissible speed of the feedback system connected to DI1/DI2 reached.	Reduce speed of the rotation shaft/feedback system. $n_{\text{encoder}} \leq (f_{\text{max}} \times 60) / \text{encoder increments}$ (for $f_{\text{max}} = 10 \text{ kHz}$)

Sd3: Open circuit - feedback system [xx.0123.00205]

Response (Lenze setting printed in bold)	Setting: C00586 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
• HTL encoder cable interrupted. • HTL encoder is defective. Note: May also be caused by a very dynamic acceleration or starting up against a blocked motor shaft (e.g. with a closed holding brake).	• Check HTL encoder cable. • Check HTL encoder. • Check related terminals. • Switch off monitoring (C00586 = "0: No reaction") when the HTL encoder is not used.

An01: AIN1_I < 4 mA [xx.0125.00001]

Response (Lenze setting printed in bold)	Setting: C00598/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Open-circuit monitoring for analog input 1 has tripped. • Only if the analog input has been configured as a current loop of 4 ... 20 mA (C00034/1 = 2).	• Check wiring of the analog X3/A1I input terminal for open circuit. • Check minimum current values of the signal sources.

CE04: MCI communication error [xx.0127.00002]

Response (Lenze setting printed in bold)	Setting: C01501/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
Communication error with extension module in slot 1.	• Eliminate EMC interference. • Switch off controller, correctly plug in the module, switch on the controller again. • Mains switching or restart of the controller, respectively. • Replace module/controller. • Please contact Lenze if the problem occurs again.

CE0F: MCI control word [xx.0127.00015]

Response (Lenze setting printed in bold)	Setting: C00594/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Bit 14 ("SetFail") of the wMciCtrl control word of the LS_DriveInterface system block has been set.	Trace back signal source on the bus (e.g. PROFIBUS) that sets bit 14 ("SetFail").

CE4: CAN bus off [xx.0131.00000]

Response (Lenze setting printed in bold)	Setting: C00592/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : "Bus off" status • Received too many faulty telegrams. • Damaged cable (e.g. loose contact). • Two nodes with the same ID.	• Check wiring and bus terminating resistor. • Set identical baud rate for each bus node. • Assign different IDs to nodes. • Eliminate electrical interference (e.g. EMC).

CA06: CAN CRC error [xx.0131.00006]

Response (Lenze setting printed in bold)	Setting: C00592/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : A faulty CAN telegram has been detected.	• Check wiring and bus terminating resistor. • Eliminate electrical interference (e.g. EMC).

CA07: CAN bus warning [xx.0131.00007]

Response (Lenze setting printed in bold)	Setting: C00592/3 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : Incorrect transmission or reception of more than 96 CAN telegrams. • The current number of incorrectly transmitted CAN telegrams is displayed in C00372/1. • The current number of incorrectly received CAN telegrams is displayed in C00372/2. • The current CAN error status is displayed in C00345.	• Check wiring and bus terminating resistor. • Set identical baud rate for each bus node. • Assign different IDs to nodes. • Eliminate electrical interference (e.g. EMC).

CA08: CAN bus stopped [xx.0131.00008]

Response (Lenze setting printed in bold)	Setting: C00592/4 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : The device has received the "Stop Remote Node" NMT telegram.	Check CAN master (NMT master).

CA0b: CAN HeartBeatEvent [xx.0131.00011]

Response (Lenze setting printed in bold)	Setting: C00592/5 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : Cyclic node monitoring - Being a Heartbeat consumer, the device has not received a Heartbeat telegram from Heartbeat producer 1 ... 7 within the defined time. - The current states of the Heartbeat producers are displayed in C00347/1...7.	- Reactivate Heartbeat producers by mains switching, restarting the controller, or a CAN Reset Node. - Reparameterise CAN Heartbeat producer time or switch off consumer monitoring and reset error status if latched. ► Heartbeat protocol

CA0F: CAN control word [xx.0131.00015]

Response (Lenze setting printed in bold)	Setting: C00594/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☐ 4: WarningLocked ☑ 5: Warning ☐ 6: Information	
Cause	Remedy
Bit 14 ("SetFail") in the wCANControl control word of the LS DriveInterface system block has been set.	Trace back signal source on the CAN bus that sets bit 14 ("SetFail").

CE1: CAN RPDO1 [xx.0135.00001]

Response (Lenze setting printed in bold)	Setting: C00593/1 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : Time monitoring for RPDO1 has been triggered. RPDO1 has not been received within the monitoring time set in C00357/1 or was faulty.	- Set correct telegram length for CAN master (transmitter). - Eliminate electrical interference (e.g. EMC). - Adjust monitoring time C00357/1 or switch off time monitoring.

CE2: CAN RPDO2 [xx.0135.00002]

Response (Lenze setting printed in bold)	Setting: C00593/2 (☑ Adjustable response)
☑ 0: No Reaction ☑ 1: Fault ☑ 2: Trouble ☑ 3: TroubleQuickStop ☑ 4: WarningLocked ☑ 5: Warning ☑ 6: Information	
Cause	Remedy
CAN on board : Time monitoring for RPDO2 has been triggered. RPDO2 has not been received within the monitoring time set in C00357/2 or was faulty.	- Set correct telegram length for CAN master (transmitter). - Eliminate electrical interference (e.g. EMC). - Adjust monitoring time C00357/2 or switch off time monitoring.

CE3: CAN RPDO3 [xx.0135.00003]

Response (Lenze setting printed in bold)		Setting: C00593/3 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
CAN on board: Time monitoring for RPDO3 has been triggered. RPDO3 has not been received within the monitoring time set in C00357/3 or was faulty.	- Set correct telegram length for CAN master (transmitter). - Eliminate electrical interference (e.g. EMC). - Adjust monitoring time C00357/3 or switch off time monitoring.	

CE5: CAN RPDO4 [xx.0135.00004]

Response (Lenze setting printed in bold)		Setting: C00593/4 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
CAN on board: Time monitoring for RPDO4 has been triggered. RPDO4 has not been received within the monitoring time set in C00357/4 or was faulty.	- Set correct telegram length for CAN master (transmitter). - Eliminate electrical interference (e.g. EMC). - Adjust monitoring time C00357/4 or switch off time monitoring.	

CI01: Module missing/incompatible [xx.0140.00013]

Response (Lenze setting printed in bold)		Setting: C01501/2 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
The optional communication module has been removed or there is a connection problem or incompatibility with the standard device.	- Check connection between the communication module and standard device. - Check if the module is plugged in correctly. - In case of an incompatibility, either the module or the software of the standard device is out of date. In this case, please contact Lenze.	

PS01: No memory module [xx.0144.00001]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
Memory module is either not available or not snapped into place correctly.	- If a memory module has been provided: Plug the memory module into the slot of the standard device intended for this purpose. - If a memory module has been provided: Check if the memory module has been plugged-in correctly.

PS02: Par. set invalid [xx.0144.00002]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The parameter set saved to the memory module is invalid because it has not been saved completely. - This can be due to voltage failure or caused by removing the memory module while saving the parameter set. The parameter set stored in the memory module is invalid. The reason for this can be as follows: - Incomplete storage of the parameter set due to voltage failure. - The plugged-in module stems from a device with new firmware (compare C00099) or from a different device type (e.g. 8400 BaseLine).	Ensure voltage supply during the storage process and that the module remains plugged into the slot. Acknowledge errors via C00002/19 or control word via communication interface and then re-parameterise the controller. The error can only be removed by loading the Lenze setting with the C00002/1 = "1: On / start" device command. - In order to prevent the error, do not switch off the voltage during the saving process. - If the parameter set is to be transferred from one device with a higher version to a device with a lower version, use the "copy parameter set" function of the keypad. Make sure that you do not use functions that are not available in the older device.

PS03: Par. set device invalid [xx.0144.00003]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The parameter set saved to the memory module is incompatible to the standard device. An incompatibility of the parameter set is caused e.g. when the memory module of an 8400 HighLine is plugged into an 8400 StateLine or the parameter set in the memory module has a higher version than expected by the standard device.	When the memory modules are exchanged, observe the downward compatibility: - OK: StateLine V2.0 to StateLine V3.0 - OK: StateLine V2.0 to HighLine V2.0 - Not OK: HighLine Vx.x to StateLine Vx.x - Not OK: StateLine V3.0 to StateLine < V3.0

PS04: Par. set Mci invalid [xx.0144.00004]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The parameter set saved to the communication module is incompatible to the standard device. An incompatibility of the parameter set is caused e.g. when the MCI module parameters in the memory module do not match the plugged communication module.	When the memory modules are exchanged, observe the downward compatibility: - OK: StateLine V2.0 to StateLine V3.0 - OK: StateLine V2.0 to HighLine V2.0 - Not OK: HighLine Vx.x to StateLine Vx.x - Not OK: StateLine V3.0 to StateLine < V3.0

PS07: Par. memory module invalid [xx.0144.00007]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The parameter set saved to the memory module is invalid. - The error occurs while loading the parameter set. - The memory module plugged in the device lacks a code or a code is incorrect.	Consultation with Lenze required.

PS08: Par. device invalid [xx.0144.00008]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The parameter set in the device is invalid. • The error occurs while loading the parameter set. • One code in the device is incorrect.	Consultation with Lenze required.

PS09: Par. format invalid [xx.0144.00009]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
The code format is invalid. • The error occurs while loading the parameter set.	Consultation with Lenze required.

PS10: Memory module binding invalid [xx.0144.00010]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device personalisation is active: The binding ID of the memory module does not comply with the binding ID of the controller.	• Use memory module/controller with matching binding IDs. • Contact machine manufacturer. Note: It is not possible for Lenze to modify a replacement device via special accesses in such a way that it cooperates with a personalised memory module.

dF14: SW-HW invalid [xx.0145.00014]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dF18: BU RCOM error [xx.0145.00024]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dF25: CU RCOM error [xx.0145.00025]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dF26: Appl. watchdog [xx.0145.00026]

Response (Lenze setting printed in bold)		Setting: C00580/1 (☒ Adjustable response)
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information		
Cause	Remedy	
Time-out of the application. The required computing time of the application exceeds the available computing time.	Reduction of the function block interconnection or the complexity of the application.	

dF21: BU watchdog [xx.0145.00033]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dF22: CU watchdog [xx.0145.00034]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dF10: AutoTrip reset [xx.0145.00035]

Response (Lenze setting printed in bold)		Setting: C00189 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information		
Cause	Remedy	
Too frequent auto-trip reset.	• Check the error cause that activates the auto-trip reset. • Eliminate error cause and reset (acknowledge) error manually afterwards.	

dF50: Retain error [xx.0145.00050]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
An error has occurred when accessing retain data. • Either caused by an internal hardware error or by lack of mains switching after a firmware download.	Mains switching • Please contact Lenze if the problem occurs again.

dF51: CuCcr error [xx.0145.00051]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Mains switching • Please contact Lenze if the problem occurs again.

dF52: BuCcr error [xx.0145.00052]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Mains switching • Please contact Lenze if the problem occurs again.

Ck15: Error status sign. brake [xx.0184.00005]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☐ 1: Fault ☐ 2: Trouble ☒ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
MCK: The status monitoring of the holding brake control has tripped.	• Check configuration of the <i>bMBrakeApplied</i> input for status detection of the brake (via a switching contact at the brake). • Check wiring/function of the switching contact. • Adapt waiting time (C02589/3). • Deactivate status monitoring (via bit 5 in C02582).

Ck16: Time overflow manual operation [xx.0184.00064]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
PC manual control: The connection monitoring has tripped. • The online connection between the PC and the controller has been interrupted for a longer period of time than the timeout set in C00464/1 .	• Check communication link between PC and controller. • Check voltage supply/function of the controller. • Adjust the timeout (C00464/1).

dH09: EEPROM power section [xx.0400.00009]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dH10: Fan failure [xx.0400.00016]

Response (Lenze setting printed in bold)	
☒ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☒ 5: Warning ☐ 6: Information	
Cause	Remedy
The device fan has failed. Possible causes: • The short-circuit check of the fan connection has tripped. • The speed monitoring of the fan has tripped.	• Check the fan for short-circuit. • Clean the fan.

dH68: Adjustment data error CU [xx.0400.00104]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dH69: Adjustment data error BU [xx.0400.00105]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

dH70: ControlUnit is unequal to BaseUnit [xx.0400.00106]

Response (Lenze setting printed in bold)	
☐ 0: No Reaction ☒ 1: Fault ☐ 2: Trouble ☐ 3: TroubleQuickStop ☐ 4: WarningLocked ☐ 5: Warning ☐ 6: Information	
Cause	Remedy
Device error	Consultation with Lenze required.

User error 1 [xx.0980.00000 ... xx.0980.65535]

Response (Lenze setting printed in bold)	
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information	
Cause	Remedy
User error 1 has been tripped via the <i>bSetError1</i> input of the LS_SetError_1 system block.	User-defined.

User error 2 [xx.0981.00000 ... xx.0981.65535]

Response (Lenze setting printed in bold)	
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information	
Cause	Remedy
User error 2 has been tripped via the <i>bSetError2</i> input of the LS_SetError_1 system block.	User-defined.

User error 3 [xx.0982.00000 ... xx.0982.65535]

Response (Lenze setting printed in bold)	
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information	
Cause	Remedy
User error 3 has been tripped via the <i>bSetError3</i> input of the LS_SetError_1 system block.	User-defined.

9 Diagnostics & error management

9.9 Error messages of the operating system

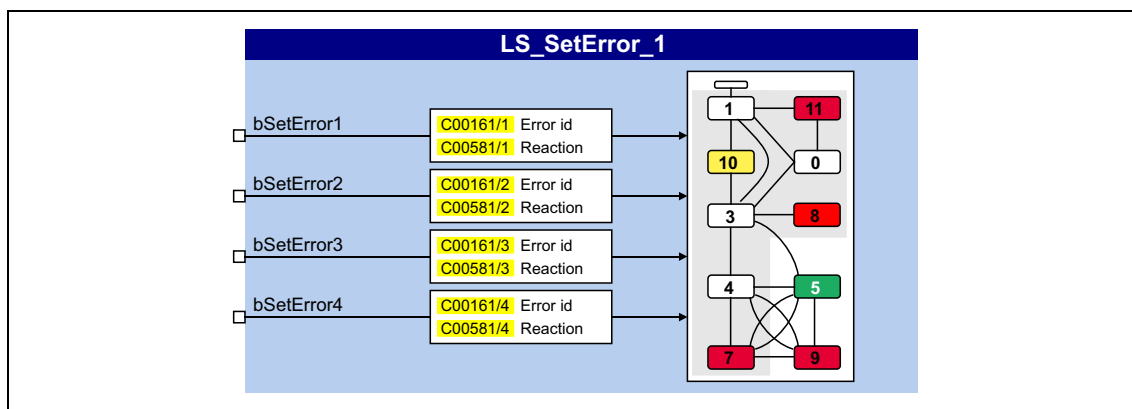
User error 4 [xx.0983.00000 ... xx.0983.65535]

Response (Lenze setting printed in bold)	Setting: C00581/4 (☒ Adjustable response)
☒ 0: No Reaction ☒ 1: Fault ☒ 2: Trouble ☒ 3: TroubleQuickStop ☒ 4: WarningLocked ☒ 5: Warning ☒ 6: Information	
Cause	Remedy
User error 4 has been tripped via the <i>bSetError4</i> input of the LS_SetError_1 system block.	User-defined.

9.10 "LS_SetError_1" system block

This system block is used for error handling within the application.

- The application can trip up to four different user error messages with parameterisable error IDs and error responses via the four boolean inputs.
- If several inputs are set to TRUE at the same time, the input with the lowest number will trip the error message.



Inputs

Identifier	Data type	Information/possible settings
bSetError1	BOOL	Input for tripping " User error 1 " • Error subject number: 980 • Error number: $(C00581/1 \times 0x0400000) + (980 \times 0x10000) + (C00161/1)$
bSetError2	BOOL	Input for tripping " User error 2 " • Error subject number: 981 • Error number: $(C00581/2 \times 0x0400000) + (981 \times 0x10000) + (C00161/2)$
bSetError3	BOOL	Input for tripping " User error 3 " • Error subject number: 982 • Error number: $(C00581/3 \times 0x0400000) + (982 \times 0x10000) + (C00161/3)$
bSetError4	BOOL	Input for tripping " User error 4 " • Error subject number: 983 • Error number: $(C00581/4 \times 0x0400000) + (983 \times 0x10000) + (C00161/4)$

Parameter

Parameter	Possible settings			Info
C00161/1...4	0	...	65535	Error ID for user errors 1 ... 4
C00581/1...4				Response to user errors 1 ... 4
	0	No Reaction		
	1	Fault		
	2	Trouble		
	3	TroubleQuickStop		
	4	WarningLocked		
	5	Warning		
	6	Information		

10 Oscilloscope function

[This function extension is available from version 12.00.00!](#)

The oscilloscope function integrated in the 8400 StateLine can be used as support for commissioning, maintenance, and troubleshooting. It is operated via a user interface in the »Engineer«.

Typical applications

- Graphical representation of measured values (e.g. speed setpoint, actual speed and torque)
- Detection of process values without additional measuring instruments (e.g. oscilloscope, voltmeter and ammeter)
- Convenient documentation for fine tuning of control circuits or parameter changes of the controller

Special features

- Recording and saving of measured values in the 8400 StateLine
- Simultaneous measuring on four independent channels
- Measuring of fast and slow signals by means of adjustable sample rate
- Triggering on a channel
- Detecting of measured values before and after a trigger event (pre-/post-trigger)
- Transfer of the measured values to the Engineering PC for the graphical representation and evaluation in the »Engineer«
- The measured data represented in the form of interpolated curves can be optionally shown and hidden, represented in any colour or overlaid with the signal characteristics of other variables recorded.
- Cursor and zoom function for the measurement analysis
- Saving & loading of oscilloscope configurations on the Engineering PC
- Export of measured values via the clipboard for further processing

Functional description

In the »Engineer«, you set the trigger condition and sample rate and select the variables to be recorded via the oscilloscope user interface when an online connection to the 8400 StateLine has been established. In this case, "variables" are the internal output signals of the function, system, application and port blocks.

Every configuration change is transferred to the 8400 StateLine and checked. If invalid settings are found, the oscilloscope triggers an error.

With an online connection, the measured 8400 StateLine data are transferred to the »Engineer« and graphically represented on the oscilloscope user interface as soon as the measurement has been completed.

10.1

Technical data

Oscilloscope function of 8400 StateLine	
Number of channels	1 ... 4
Memory depth	Max. 8192 measured values, depending on the number of channels and the size of the variables to be recorded
Data width of a channel	Max. 32 bits, corresponding to the data type of the variable to be recorded
Sample rate	1 ms or a multiple thereof
Time base	5, 10, 20, 50, 100, 200, 500 ms or 1 s
Trigger level	Corresponding to the value range of the variable to be triggered
Trigger selection	The trigger is activated if the trigger value set for the respective channel is fallen short of or exceeded. The trigger value "must actually pass" the threshold.
Trigger delay	-100 % ... +400 %
Trigger source	Channel 1 ... 4

10.2 User interface

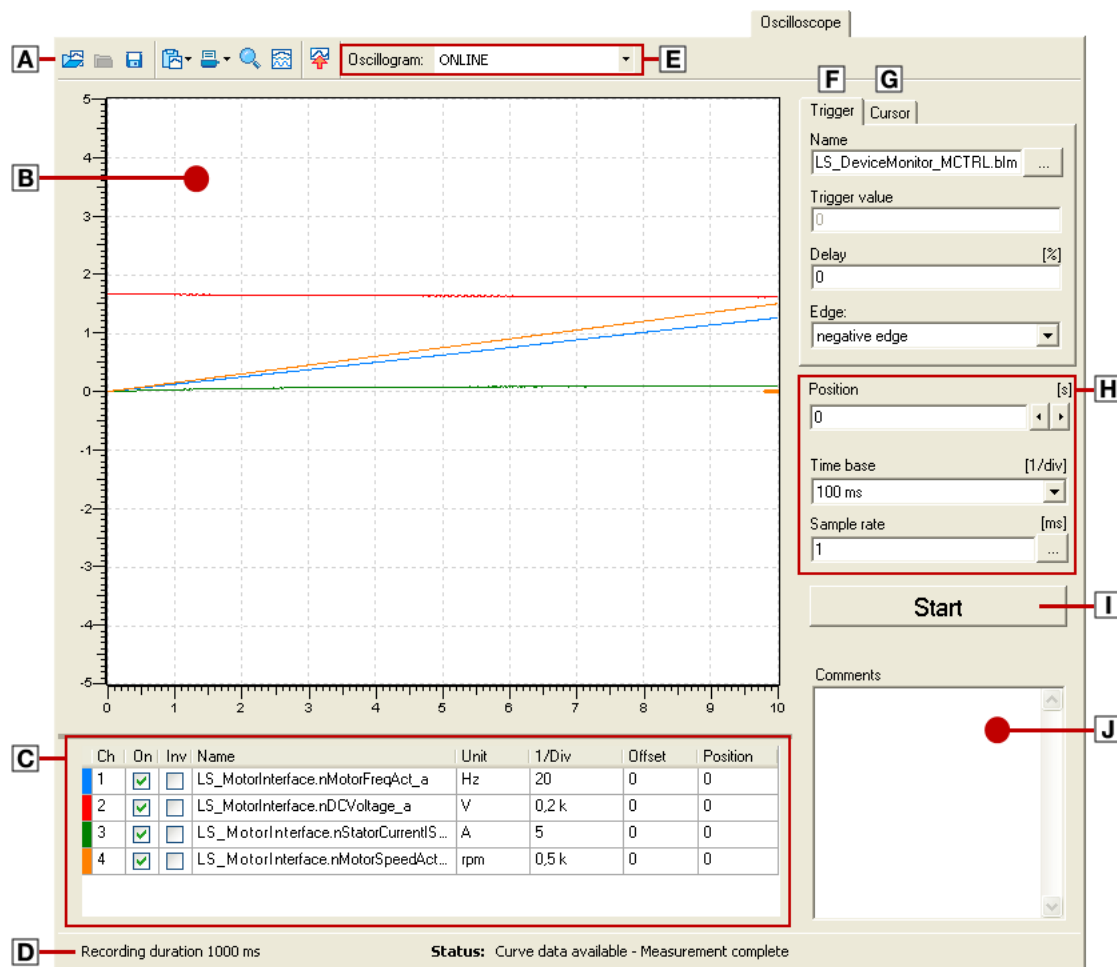
The oscilloscope user interface is available in the »Engineer« from version 2.16 onwards!



How to go to the oscilloscope user interface:

1. Go to the *Project* view and select the controller.
2. Select the **Oscilloscope** tab from the *Workspace*.

The oscilloscope user interface contains the following control and function elements:



A [Oscilloscope toolbar](#)

B Oscillogram

C Vertical channel settings
 ▶ [Selecting the variables to be recorded](#)

D Status bar

E [Oscillogram selection](#)

F [Trigger settings](#)

G [Cursor function: Reading individual measured values](#)

H Horizontal settings
 ▶ [Selecting the recording time/sample rate](#)

I [Starting recording](#)

J Input field for [comments](#)

Oscilloscope toolbar

Icon	Function
	Loading the oscillogram (📖 485)
	Closing the oscillogram (📖 486)
	Saving the oscillogram (📖 484)
	Copy to clipboard: Copy as text Copy as image • For documentation purposes, it is possible to copy the measured data of a data set as a table or, alternatively, the oscilloscope user interface as a picture, to the clipboard for use in other programs.
	Printer settings Print view Print
	Activate zoom function ▶ Adjusting the representation (📖 479)
	Activate automatic scaling function ▶ Adjusting the representation (📖 479)
	Load recorded oscillogram from device • Transfer data from the measured data memory of the 8400 StateLine to the Engineering PC as data set. • Only possible when an online connection has been established to the 8400 StateLine.

10.3 Operation

This chapter describes step-by-step how to record the signal characteristics of 8400 StateLine variables and represent, analyse, document and process them in the oscilloscope.



Note!

The oscilloscope can only be configured and recording can only be started when an online connection has been established to the 8400 StateLine.

10.3.1 Selecting the variables to be recorded

The oscilloscope supports up to four channels, i.e. max. four variables can be recorded in a data set.

The variables to be recorded can be configured by means of the **Vertical channel settings** list field. Four variables have already been selected in the default setting. In case of the 8400 StateLine, all available channels are already assigned:

Ch	On	Inv	Name	Unit	1/Div	Offset	Position
1	☒	☐	LS_MotorInterface.nMotorFreqAct_a	Hz	20	0	0
2	☒	☐	LS_MotorInterface.nDCVoltage_a	V	0,2 k	0	0
3	☒	☐	LS_MotorInterface.nStatorCurrentIS...	A	5	0	0
4	☒	☐	LS_MotorInterface.nMotorSpeedAct...	rpm	0,5 k	0	0

Column	Name	Meaning
1	-	Curve colour for representation in the oscillogram
2	Ch	Channel number
3	On	On/off
4	Inv	On/off inversion
5	Name	Selection of the variable to be recorded
6	Unit	Scaling
7	1/Div	Vertical scaling factor
8	Offset	Offset value The offset value depends on the scaling factor. It is indicated by a dashed line in the colour of the curve on the left-hand edge of the oscillogram.
9	Position	Position value The position value is independent of the scaling factor. It is indicated by a line on the left-hand edge of the oscillogram.

**How to change a selection:**

1. Go to the **Vertical channel settings** list field and double-click the variable to be changed in the **Name** column.
2. Select a new variable in the *Select variable* dialog box.
3. Click **Ok**.
 - The dialog box is closed and the selection is accepted.

**How to delete a selection:**

1. Go to the **Vertical channel settings** list field and right-click the variable to be removed to open the *context menu*.
2. Select the **Delete** command from the *context menu*.

If not all available channels are assigned, you can add more variables for recording.

**How to add another variable for recording:**

1. Double-click the bottom line highlighted in grey in the **Vertical channel settings** list field.
2. Select the desired variable in the *Select variable* dialog box.
3. Click **Ok**.
 - The dialog box is closed and the selection is accepted.

10.3.2 Selecting the recording time/sample rate

**How to select the recording time and the sample rate:**

1. Select the desired time base from the **Time base** list field.
 - The current time base setting multiplied by ten results in the recording time.
 - Since the measured data memory of the 8400 StateLine has a limited capacity, usually a compromise is made between sample rate and recording time.
2. Enter the desired sample rate in [ms] in the **Sample rate** input field.

10.3.3 Defining the trigger condition

The trigger condition serves to define the starting time of recording in the 8400 StateLine. The oscilloscope provides various trigger conditions by means of which recording of the measured values can be controlled.



If the **Cursor** tab is selected, click the **Trigger** tab to show the input fields for configuring the trigger condition.

Setting	Function
Source	Selection of trigger source:
Channel	The oscilloscope triggers on a channel configured in the Vertical channel settings list field.
Force trigger	No trigger condition, recording starts immediately after the start.
Trigger value	Value from which on triggering is activated.
Delay	Delay between recording and trigger event.
Pre-trigger	Select a negative delay time to detect signals prior to the trigger event. • In the oscillogram, the trigger time is marked by a dashed line. • When triggering on occurrence of an event, it is thus possible to detect the values that have caused the event.
Post-trigger	Select a positive delay time to detect signals occurring a certain time after the trigger event.
Edge	Three trigger modes are available:
Positive edge	For trigger activation, the selected trigger value must first be fallen short of and then be exceeded.
Negative edge	For trigger activation, the selected trigger value must first be exceeded and then be fallen short of.
Change	For triggering on a BOOL variable: • Trigger activation requires a state change. For triggering on a different variable: • For trigger activation, the current value must be different than the last value.

10.3.4 Starting recording

**Note!**

Recording can only be started when an online connection has been established to the 8400 StateLine.



Click **Start** to start recording.

To obtain a maximum sample rate when recording the variable values, the data are first stored in the measured data memory of the 8400 StateLine and then transferred as a data set to the Engineering PC. The current recording status is displayed in the status bar.

10.3.5 Adjusting the representation

After the variable values have been recorded and the online data set has been transferred to the Engineering PC, the data set is visualised in the oscillogram. If required, the representation can now be adjusted by using the zoom or the automatic scaling function.

**Tip!**

When the oscillogram does not show the complete measurement, a scrollbar appears below the time axis. You can use this scrollbar for horizontal scrolling of the visible area. The labelling of the time axis and the position display are automatically adapted.

Selection of the horizontal display position

The **Position** input field can be used to change the horizontal display position.

- The position value can be directly entered into the input field or selected using the arrow buttons.
- When the arrow buttons are used and the <Ctrl> key is pressed, you can increase the step size to accelerate the shift.

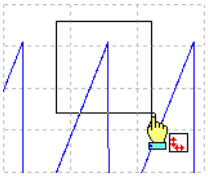
Subsequently changing the time base

Change the time base to stretch or compress measurements that have already been completed.

Zoom function



Go to the *oscilloscope toolbar* and click the  icon to activate the zoom function.

Zoom function	Procedure	
Zoom selection		Hold down the left mouse button and draw the oscillogram section to be zoomed:  • While being drawn, the selection is shown with a frame. • When the left mouse button is released, the selection is zoomed in the oscillogram.
Horizontal/vertical shift of selection		Hold down the left and right mouse button and move the mouse pointer on the scale to shift the selection accordingly. With a three-button mouse, you can use the mouse button in the middle.
Horizontal stretching	On the horizontal scale:	
		Hold down the left mouse button and move the mouse pointer to the left to stretch the shown selection from the right edge.
		Hold down the right mouse button and move the mouse pointer to the right to stretch the shown selection from the left edge.
	Moving the mouse pointer in opposite direction continuously reduces the stretching.	
Vertical stretching	On the vertical scale:	
		Hold down the left mouse button and move the mouse pointer to the bottom to stretch the shown selection from the top.
		Hold down the right mouse button and move the mouse pointer to the top to stretch the shown selection from the bottom.
	Moving the mouse pointer in opposite direction continuously reduces the stretching.	
Return to original representation		Click the right mouse button in the oscillogram to return step by step to the original representation.

Automatic scaling function

Use the automatic scaling function to automatically scale and reposition the representation of selectable signal characteristics in the oscillogram and reset the offset to "0".

**How to carry out automatic scaling:**

1. Go to the *oscilloscope toolbar* and click the  icon to activate the automatic scaling function.
2. Select the channels/variables for automatic scaling in the *Select variable* dialog box.
3. Click **Ok**.
 - The dialog box is closed and the selected channels/variables are scaled automatically.

10.3.6 Cursor function: Reading individual measured values

In addition to the zoom and scaling function, the oscilloscope offers a "cursor function" that can be used to display individual measured values of a selectable channel or the difference between two measured values.



How to use the cursor function:

1. Click the **Cursor** tab to display it in the foreground and activate the cursor function.
 - Now two movable vertical measuring lines are shown in the oscillogram.
2. Select the channel for which individual measured values are to be indicated from **Channel** list field.
3. Hold down the left mouse button and drag the red vertical measuring line to the desired position.
 - The active measuring line is represented by a continuous line, the inactive measuring line is represented by a dashed line.
 - If you position the mouse pointer over the inactive measuring line, the measuring line automatically becomes active.
 - The value measured at the position of the active measuring line is indicated in the **Value** group box.
 - The difference between the values measured at the two measuring lines is indicated in the **Difference** group box.
 - Comparing peak values: Several values displayed in the oscillogram can be compared by means of a horizontal measurement line. This measurement line is automatically generated based on the current cursor position and thus cannot be moved separately.

10.4 Managing oscillograms (measured data sets)

If several measured data sets are loaded in the oscilloscope at the same time, the data set to be displayed is selected via the **Oscillogram** list field. There are three types of data sets:

Online data record

The ONLINE data set is the only data set which can be used to establish a connection to the target system to carry out an oscilloscope measurement.

Offline data record

The OFFLINE data set is a data set already stored in the project or a data set imported from a file.

- The configuration of the OFFLINE data set can be reused for future recordings.
- The OFFLINE data set is displayed in the **Oscillogram** list field with the name assigned to it upon saving.

Merge data record

The MERGE data set is automatically available in the **Oscillogram** list field if two or more data sets are loaded in the oscilloscope at the same time.

- In the merge data record, several characteristics from the currently loaded data records can overlaid, e.g. to compare signal characteristics from different recordings. ▶ [Overlay function](#) (486)

10.4.1 Commenting the oscillogram

In the **Comments** text field, you can enter a comment on the oscillogram selected.

- When the  [Saving the oscillogram](#) command is executed, the comment is saved in the file together with the data set.
- If you execute the  [Loading the oscillogram](#) command and then select a data set in the *Load data set* dialog box, the corresponding comment is shown in the dialog box.

10.4.2 Saving the oscillogram

After the variables to be recorded have been selected and the required settings have been entered, you can save the configuration and recording, if already executed, for future use in the project or export them to a file.



Note!

The reuse of a saved configuration is only reasonable for controllers of the same type, as otherwise due to a scaling of the oscilloscope channels that is not adapted, incorrect values are displayed!



How to save the data set in the project:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Save data set* dialog box appears.
2. Enter a name in the **Name of the data set to be stored** input field.
3. Click **Filing in the project**.
 - The dialog box is closed and the current data set is filed in the project.



Note!

The data set is only saved if the entire project is saved!



How to export the data set to a file:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Save data set* dialog box appears.
2. Enter a name in the **Name of the data set to be stored** input field.
3. Click the **Export to file** button.
4. Specify the filing folder and the file name of the data set to be stored in the *Save as* dialog box.
5. Click **Save**.
 - The dialog box is closed and the current data set is saved.

10.4.3 Loading the oscillogram

Configurations/data sets already stored can be reloaded into the oscilloscope any time, e.g. for the overlay function.



Note!

The reuse of a saved configuration is only reasonable for controllers of the same type, as otherwise due to a scaling of the oscilloscope channels that is not adapted, incorrect values are displayed!



How to load a data set from the project:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Load data set* dialog box appears.
2. Select the data set to be loaded from the upper list field.
3. If the data set is to be used as a configuration, select the option **as configuration...**
4. Click **Open**.
 - The dialog box is closed and the selected data set/configuration is loaded.
 - If the configuration to be loaded contains variables that are no longer available in the controller, these variables are automatically removed from the configuration.



How to import a data set from a file:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Load data set* dialog box appears.
2. Click the **Search...** button.
3. Select the file to be imported within the desktop environment from the *Open* dialog box.
4. If the data set is to be used as a configuration, select the option **as configuration...**
5. Click **Open**.
 - The dialog box is closed and the selected data set/configuration is imported.
 - If the configuration to be loaded contains variables that are no longer available in the controller, these variables are automatically removed from the configuration.

10.4.4 Closing the oscillogram

You can close an open offline data record at any time.

- After a data set is closed, it is no longer available in the **Oscillogram** list field. The oscilloscope automatically displays the ONLINE data set.
- If the closed data set was included in the MERGE data set, its channels will be removed from the MERGE data set.



Go to the *Oscilloscope toolbar* and click the  symbol to close the currently displayed offline data record.

10.4.5 Overlay function

The overlay function serves to lay several characteristics from the currently loaded data sets on top of each other, e.g. to compare signal characteristics from different recordings.

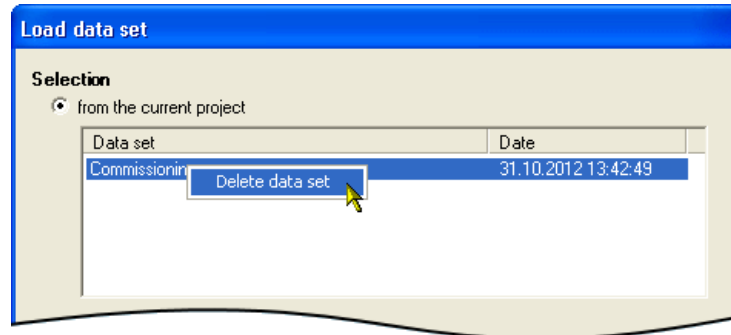
- If two or more data sets are loaded in the oscilloscope, e.g. the ONLINE data set and a data set saved before in the project, a "MERGE" data set is automatically provided in the **Oscillogram** list field.
- If the merge data record is selected, the desired characteristics to be overlaid or compared can be selected from the loaded data records in the **Vertical channel settings** group field.
- If an online data record is used in the merge data record, an update is carried out in the merge data record in case of a renewed recording.
- Removing variables from an offline or online data record causes the characteristics in the merge data record to be deleted.

10.4.6 Deleting a data set saved in the project



How to delete a data set saved in the project:

1. Click the  icon in the *oscilloscope toolbar*.
 - The *Load data set* dialog box appears.



2. In the upper list field, click the data set to be deleted using the right mouse button to open the *Context menu*.
3. In the *Context menu*, select the **Delete data set** command to delete the data set in the project.
4. Click **Cancel** to close the *Load data set* dialog box again.

11 System bus "CAN on board"

The controller has an integrated CANopen interface ("CAN on board") which is used to exchange i.a. process data and parameter values between the nodes. Furthermore, other modules can be connected via this interface such as decentralised terminals, operator and input devices (HMIs), as well as external controls and host systems.

The interface transfers CAN objects following the CANopen communication profile (CiA DS301, version 4.02) developed by the umbrella organisation of CiA (CAN in Automation) in conformity with the CAL (CAN Application Layer).



Tip!

- In the »Engineer« parameter list, category **CAN**, you can find the parameters relevant for the CANopen interface classified in different subcategories.
- Information on CAN communication modules and CANopen interfaces of other Lenze devices is provided in the "CAN" communication manual in the Lenze library.

11.1 General information

For many years, the system bus (CAN) based on the CANopen communication profile has been integrated in Lenze controllers. Due to the lower number of data objects available, the functionality and compatibility of the previous system bus are lower as compared to CANopen. For parameter setting, two parameter data channels are always available to the user while CANopen provides only one active parameter channel.

The system bus (CANopen) of the Inverter Drives 8400 is a further development of the system bus (CAN) including the following properties:

- Full compatibility with CANopen DS301 V4.02.
- Support of the "Heartbeat" NMT slave function (DS301 V4.02)
- 1 or 2 parameterisable parameter data channels for transmitting SDOs (*Service Data Objects*)
- Up to four parameterisable process data channels (dependent on the device version) for transmitting PDOs (*Process Data Objects*)
 - All process data channels are functionally equivalent
 - Monitoring of the receive PDOs for data reception
- Adjustable error response to ...
 - physical CAN errors (frame, bit, ACK error)
 - bus-stop, bus working
 - absent PDOs
- Telegram counters for SDOs and PDOs
- Bus status diagnostics
- Boot-up telegram generation
- Emergency telegram generation
- Reset node telegram generation (for master configuration)
- Sync telegram generation and response to sync telegrams:
 - Data transmission/reception
 - Device-internal time base synchronisation
- Abort codes
- All CAN on board functions can be parameterised via codes
- Object directory (all mandatory functions, optional functions, indexes)

11.1.1 General data and application conditions

Range	Values
Communication profile	CANopen, DS301 V4.02
Communication medium	DIN ISO 11898
Network topology	Line terminated at both ends
Adjustable node addresses (max. number of nodes)	Depending on the number of SDO channels set in C00366 : • 1 SDO: Node address 1 ... 127 (max. 127 nodes) • 2 SDO: Node address 1 ... 63 (max. 63 nodes) • adjustable via DIP switches or via code C00350.
Adjustable baud rates	20, 50, 125, 250, 500, 1000 kbps • adjustable via DIP switches or via code C00351. • 1000 kbps are supported from version 11.00.00.

Range	Values
Process data	For "BaseLine C" version: • Max. 2 transmit PDOs (TPDOs) with 1 ... 8 bytes (adjustable) • Max. 2 receive PDOs (RPDOs) with 1 ... 8 bytes (adjustable)
	For "StateLine C" version: • Max. 4 transmit PDOs (TPDOs) with 1 ... 8 bytes (adjustable) • Max. 4 receive PDOs (RPDOs) with 1 ... 8 bytes (adjustable) (Process data channel 4 is available from version 15.00.00!)
Parameter data	Max. 2 server SDO channels with 1 ... 8 bytes • Because of the 2 server SDO channels, the address range from 1 ... 63 is available
Transfer mode for TPDOs	• in case of data change (including adjustable blocking time) • Time-controlled, 1 to x ms • After the reception of 1 to 240 sync telegrams

11.1.2 Supported protocols

Protocols	
Standard PDO protocols	PDO write PDO read
SDO protocols	SDO download SDO download initiate SDO download segment
	SDO upload SDO upload initiate SDO upload segment
	SDO abort transfer
	SDO block download SDO block download initiate SDO block download end
	SDO block upload SDO block upload initiate SDO block upload end
NMT protocols	Start remote node (master and slave)
	Stop remote node (slave)
	Enter pre-operational (slave)
	Reset node (slave and local device)
	Reset communication protocol (slave)
Monitoring protocols	Heartbeat (heartbeat producer and heartbeat consumer) • Up to 7 Heartbeat Producers can be monitored.
	Emergency telegram (to master)
More protocols	Transmitting and receiving a sync telegram • Synchronisation of the internal time base to the reception of the CAN sync telegram is possible. ▶ Synchronisation of the internal time base

11.1.3 Communication time

The communication time is the time between the start of a request and the arrival of the corresponding response.

**Tip!**

The communication times in the CAN network depend on:

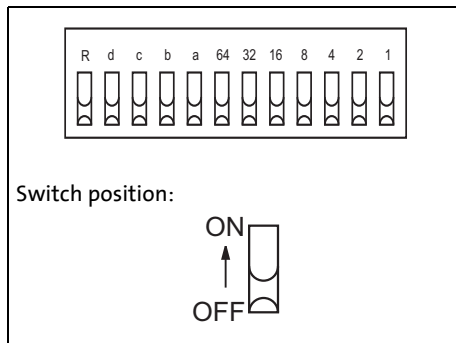
- the processing time in the device
- the telegram runtime (baud rate/telegram length)
- the bus load (especially if the bus is charged with PDOs and SDOs at a low baud rate)

Processing time in the 8400 controller

No dependencies exist between parameter data and process data.

- Parameter data: approx. 5 ms (typical value)
 - For parameters concerning the motor control (e.g. C00011), the processing time may be longer (up to 30 ms).
- Process data: 1 ms

11.2 Possible settings via DIP switch



[11-1] DIP switch

The following can be set via the front panel DIP switches:

- Bus terminating resistor
Switch: "R"
- Baud rate
Switch: "a" ... "d"
- Node address
Switch: "1" ... "64"

Lenze setting: All DIP switches are in the "OFF" position



Note!

- The DIP switch settings are accepted if a node address is unequal zero when the device or the 24-V supply is switched on by the DIP address.
- If all DIP switches are OFF when the device or the 24 V supply is switched on, the setting of the baud rate and node address are read out of the parameter set/parameter.



Tip!

The current DIP switch settings are displayed in code [C00349](#).

Bit 15 indicates that the setting of the DIP switches has been accepted when the device or the 24V supply has been switched on.

11.2.1 Activating the bus terminating resistor

The system bus must be terminated between CAN low and CAN high at the first and last physical node each by a resistor (120 Ω). The 8400 controller is provided with an integrated bus terminating resistor, which can be activated via the unlabelled DIP switch.

DIP switch position ("R"):

- OFF = bus terminating resistor is inactive
- ON = bus terminating resistor is active

11.2.2 Setting the baud rate

The baud rate can be set via code [C00351](#) or with the DIP switches a to d.



Note!

- All DIP switches (a ... d, 1 ... 64) = OFF (Lenze setting):
 - At switching on, the settings under code [C00350](#) (node address) and [C00351](#) (baud rate) will become active.
- Preset baud rate: 500 kbps

DIP switch position				Baud rate
d	c	b	a	
OFF	ON	OFF	ON	20 kbps
OFF	OFF	ON	ON	50 kbps
OFF	OFF	ON	OFF	125 kbps
OFF	OFF	OFF	ON	250 kbps
OFF	OFF	OFF	OFF	500 kbps
OFF	ON	OFF	OFF	1000 kbps*

* From version 11.00.00

11.2.3 Setting the node address

The node address can be set via code [C00350](#) or with the DIP switches 1 to 64.

- The labelling on the housing corresponds to the values of the individual DIP switches for determining the node address.
- The valid address range depends on the number of SDO channels set in [C00366](#):
 - 1 SDO (Lenze setting): 1 ... 127
 - 2 SDO: 1 ... 63



Note!

- The addresses of the nodes must differ from each other.
- All DIP switches (a ... d, 1 ... 64) = OFF (Lenze setting):
 - At switching on, the settings under code [C00350](#) (node address) and [C00351](#) (baud rate) will become active.

Example: Setting of the node address 23

DIP switch	64	32	16	8	4	2	1
Switch position	OFF	OFF	ON	OFF	ON	ON	ON
Value	0	0	16	0	4	2	1
Node address	= Sum of the values = 16 + 4 + 2 + 1 = 23						

11.3**LED status displays for the system bus**

	CAN-RUN
	CAN-ERR
	DRV-RDY
	DRV-ERR

Information about the status of the system bus can be obtained quickly via LED displays "CAN-RUN" and "CAN-ERR" on the front of the controller.

The meaning can be seen from the tables below.

Controller is not (yet) active on the system bus

LED display	Meaning
 (CAN-ERR is permanently lit)	Controller is not active on the system bus / Bus Off
 (CAN-RUN and CAN-ERR flicker)	Automatic detection of baud rate is active

Controller is active on the system bus

- LED "CAN-RUN" signals the CANopen state:

LED display	CANopen state
 (CAN-RUN is blinking every 0.2 seconds)	Pre-Operational
 (CAN-RUN is permanently lit)	Operational
 (CAN-RUN is blinking every second)	Stopped

- LED "CAN-ERR" signals a CANopen error:

LED display	CANopen error
 (CAN-ERR is blinking once, then off for 1 second)	Warning Limit reached
 (CAN-ERR is blinking twice, then off for 1 second)	Node Guard Event
 (CAN-ERR is blinking three times, then off for 1 second)	Sync Message Error (only possible in the "Operational" state)

11.4 Going online via the system bus

The integrated system bus interface (CAN on board, X1 terminal) can also be used for the communication between the »Engineer« and the controller, alternatively to the USB diagnostic adapter.

- Lenze offers the following communication accessories for connection to the PC:

Communication accessories	PC interface
PC system bus adapter 2173 incl. connection cable and voltage supply adapter • for DIN keyboard connection (EMF2173IB) • for PS/2 keyboard connection (EMF2173IBV002) • for PS/2 keyboard connection with electrical isolation (EMF2173IBV003)	Parallel interface (LPT port)
PC system bus adapter 2177 incl. connection cable (EMF2177IB)	USB (Universal Serial Bus)



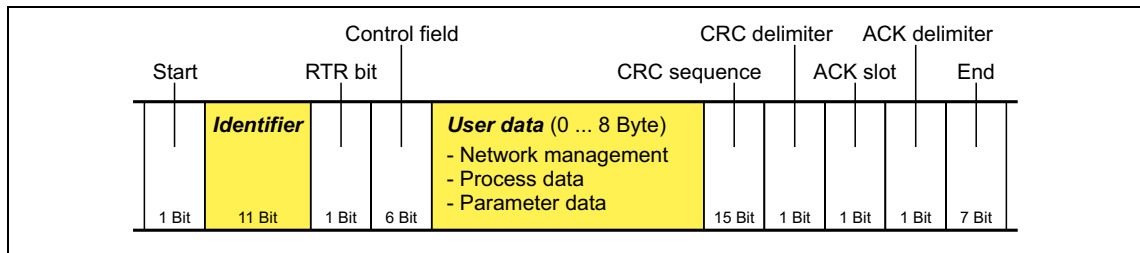
Note!

- For detailed information about the PC system bus adapter, please see the "CAN Communication Manual".
- Please observe the documentation for the PC system bus adapter!
- In the »Engineer«, go to the *Device assignment offline devices* dialog box and select the "System bus CAN" entry from the **Bus connection** list field to establish an online connection.

11.5 Reinitialising the CANopen interface

The [C00002/26](#) = "1: EOn / start" device command reinitialises the CANopen interface of the controller ("Reset node"), which is required after e.g. changing the data transfer rate, the node address or the identifiers, respectively.

11.6 Structure of the CAN data telegram



[11-2] Basic structure of the CAN telegram

The following subchapters provide a detailed description of the identifier and the user data. The other signals refer to the transfer characteristics of the CAN telegram whose description is not included in the scope of this documentation.



Tip!

Please visit the homepage of the CAN user organisation CiA (CAN in automation) for further information:

<http://www.can-cia.org>

11.6.1 Identifier

The principle of the CAN communication is based on a message-oriented data exchange between a transmitter and many receivers. All nodes can transmit and receive quasi-simultaneously.

The identifier, also called COB-ID (abbr. for communication object identifier), is used to control which node is to receive a transmitted message. In addition to the addressing, the identifier contains information on the priority of the message and the type of user data.

The identifier consists of a basic identifier and the node address of the node to be addressed:

Identifier (COB-ID) = basic identifier + node address (node ID)

Exception: The identifier for process data/heartbeat/emergency objects as well as network management and sync telegrams is freely assigned by the user (either manually or automatically by the network configurator), or is permanently assigned.

Node address (node ID)

Every node of the system bus network must be assigned to a node address (also called node ID) within the valid address range (1 ... 127) for unambiguous identification.

- Assigning a node address more than once within a network is impermissible.
- The own node address can be configured via the DIP switches or via code [C00350](#). ▶ [Setting the node address](#) (□ 493)

Identifier assignment

The system bus is message-oriented instead of node-oriented. Every message has an unambiguous identification, the identifier. For CANopen, node-oriented transfer is achieved by the fact that every message has only one transmitter.

- The basic identifiers for network management (NMT) and the basic SDO channel (SDO1) are defined in the CANopen protocol and cannot be changed.
- The basic identifiers of the PDOs are preset in the Lenze setting according to the "Predefined Connection Set" of DS301 V4.02.

Communication object		Basis identifier (CANBaseID)		Direction
Network management (NMT)		0	0x0000	
Sync ¹⁾		128	0x0080	
Emergency ¹⁾		128	0x0080	Device → system bus
PDO1 (Process data channel 1)	TPDO1	384	0x0180	Device → system bus
	RPDO1	512	0x0200	System bus → device
PDO2 (Process data channel 2)	TPDO2	640	0x0280	Device → system bus
	RPDO2	768	0x0300	System bus → device
PDO3 (Process data channel 3)	TPDO3	896	0x0380	Device → system bus
	RPDO3	1024	0x0400	System bus → device
PDO4 ²⁾ (Process data channel 4)	TPDO4	1152	0x0480	Device → system bus
	RPDO4	1280	0x0500	System bus → device
SDO1 (Parameter data channel 1)	TSDO1	1408	0x0580	Device → system bus
	RSDO1	1536	0x0600	System bus → device
SDO2 (Parameter data channel 2)	TSDO2	1472	0x05C0	Device → system bus
	RSDO2	1600	0x0640	System bus → device
Heartbeat		1792	0x0700	Device → system bus
Boot-up		1792	0x0700	Device → system bus
¹⁾ If you set the sync identifiers manually, observe the use of the emergency telegram, since it has the same COB-ID. ²⁾ From version 15.00.00				



Tip!

If required, the identifiers of the PDOs and the identifiers for the sync telegram can be changed via parameters/indices.

▶ [Identifiers of the process data objects](#) (□ 517)

▶ [PDO synchronisation via sync telegram](#) (□ 521)

The active identifiers for the PDOs are displayed in [C00355/x](#).

11.6.2 User data

All nodes communicate by exchanging data telegrams via the system bus. The user data area of the CAN telegram either contains network management data or parameter data or process data:

Network management data

(NMT data)

- Control information on start, stop, reset, etc. of communication to specific nodes or to all nodes of the CAN network.

Process data

(PDOs – process data objects)

- Process data are transferred via the process data channel.
- Process data can be used to control the controller.
- Process data are not saved to the controller.
- Process data are transmitted between host system and nodes to ensure continuous exchange of current input and output data.
- Process data usually are unscaled/scalable raw data.
- Process data are, for instance, setpoints and actual values.
- The exact meaning of the PDO file contents is determined via the function block editor (FB Editor) in the I/O level or via the PDO mapping.

Parameter data

(SDOs – service data objects)

- Parameter data are the CANopen indexes or, in case of Lenze devices, the codes.
- Parameters are, for instance, used for one-off plant setting during commissioning or when the material is changed on a production machine.
- Parameter data are transmitted as SDOs via the parameter data channel. They are acknowledged by the receiver, i.e. the transmitter gets a feedback about the transmission being successful or not.
- The parameter data channel enables access to all Lenze codes and CANopen indexes.
- Parameter changes are automatically saved to the controller until mains switching.
- In general, the parameter transfer is not time-critical.
- Parameter data are, for instance, operating parameters, diagnostic information and motor data as well as control information on the interconnection of function blocks in the I/O level of the FB Editor.

11.7 Communication phases/network management

Regarding communication via the system bus, the controller distinguishes between the following statuses:

Status	Explanation
"Initialisation" (Initialisation)	After switch-on, an initialisation run is carried out. • During this phase, the controller is not involved in the data exchange via the bus. • The standard values are re-written to all CAN-relevant parameters. • After initialisation is completed, the controller is automatically set to the "Pre-Operational" status.
"Pre-Operational" (before being ready for operation)	Parameter data can be received, process data are ignored.
"Operational" (ready for operation)	Parameter data and process data can be received!
"Stopped" (stopped)	Only network management telegrams can be received.

Communication object	Initialisation	Pre-Operational	Operational	Stopped
PDO			•	
SDO		•	•	
Sync		•	•	
Emergency		•	•	
Boot-up	•			
Network management (NMT)		•	•	•

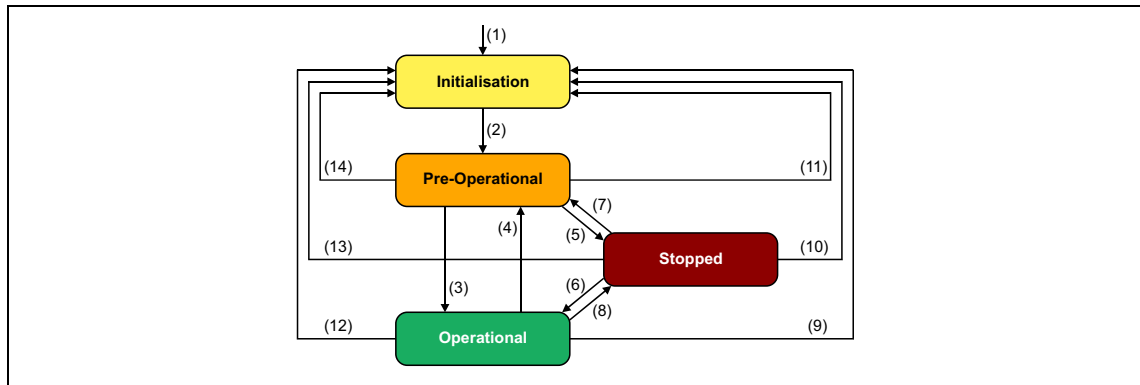


Tip!

Part of the initialisation or the entire initialisation can be carried out anew in every status by transferring the corresponding network management telegrams.

The current CAN status is displayed in [C00359](#) for diagnostic purposes.

11.7.1 Status transitions

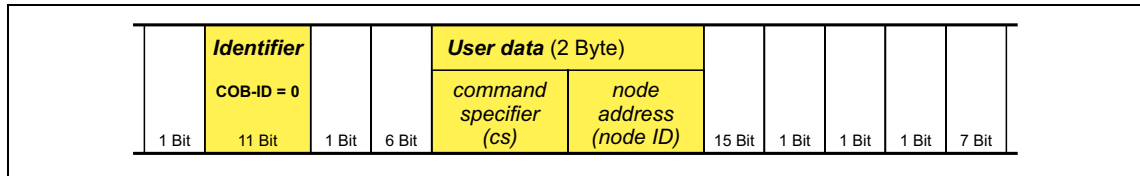


[11-3] NMT status transitions in the CAN network

Transition	NMT command	Status after change	Effects on process/parameter data after status change
(1)	-	Initialisation	Initialisation starts automatically when the mains is switched on. - During initialisation, the controller is not involved in the data exchange. - After the initialisation is completed, the node sends a boot-up message with an individual identifier and automatically changes to the "pre-operational" status.
(2)	-	Pre-Operational	In this phase, the master determines the way in which the node(s) takes/take part in communication.
	From here, the master changes the statuses for the entire network. - A target address included in the NMT command defines the receiver(s). - If the 8400 controller is configured as CAN master, the status is automatically changed to "Operational" after a waiting time has expired (C00356/1), and the 0x0100 ("Start remote node") NMT command is transmitted to all nodes. - Data can only be exchanged via process data objects if the status is "Operational"!		
(3), (6)	0x01 xx Start remote node	Operational	Network management/sync/emergency telegrams as well as process data (PDO) and parameter data (SDO) are active. Optional: When the status is changed, event and time-controlled process data (PDOs) are transmitted once.
(4), (7)	0x80 xx Enter Pre-Operational	Pre-Operational	Network management/sync/emergency telegrams and parameter data (SDO) are active.
(5), (8)	0x02 xx Stop remote node	Stopped	Only network management telegrams can be received.
(9), (10), (11)	0x81 xx Reset node	Initialisation	All CAN-relevant parameters (CiA DS 301) are initialised with the saved values.
(12), (13), (14)	0x82 xx Reset communication		All CAN-relevant parameters (CiA DS 301) are initialised with the saved values.
	Meaning of the node address in the NMT command: - xx = 0x00: If this assignment is selected, the telegram addresses all nodes (broadcast telegram). The status of all nodes can be changed at the same time. - xx = Node ID: If a node address is specified, only the status of the node with the corresponding address changes.		

11.7.2 Network management telegram (NMT)

The telegram for the network management contains identifier "0" and the command included in the user data which consists of the command byte and the node address:



[11-4] Network management telegram for changing over the communication phases

Command specifier (cs)		NMT command
dec	hex	
1	0x01	Start remote node
2	0x02	Stop remote node
128	0x80	Enter Pre-Operational
129	0x81	Reset node
130	0x82	Reset communication

The change-over of the communication phases for the entire network is carried out by one node, the CAN master. The function of the CAN master can also be carried out by the controller.

► [Parameterising the controller as CAN master](#) (📖 502)

Meaning of the node address in the user data:

- node ID = "0": The telegram addresses all nodes (broadcast telegram). The status of all nodes can be changed at the same time.
- node ID = "1" ... "127": If a node address is specified, only the status of the node with the corresponding address changes.

Example:

Data can only be exchanged via process data objects if the status is "Operational". If the CAN master is supposed to switch all nodes connected to the bus from the "Pre-Operational" communication status to the "Operational" communication status, the identifier and user data in the transmission telegram must be set as follows:

- Identifier: 0x00 (network management)
- User data: 0x0100 ("Start remote node" NMT command to all nodes)

11.7.3 Parameterising the controller as CAN master

If the initialisation of the system bus and the associated status change from "Pre-Operational" to "Operational" is not effected by a superimposed host system, the controller can instead be defined to be a "quasi" master to execute this task.

The controller is configured as CAN master in [C00352](#).

- Being the CAN master, the controller sets all nodes connected to the bus (broadcast telegram) to the "Operational" communication status with the "Start remote node" NMT telegram. Only in this communication status, data can be exchanged via process data objects.
- A delay time can be set in [C00356/1](#) which must expire after mains switching before the controller transmits the "Start remote node" NMT telegram.

Parameter	Info	Lenze setting	
		Value	Unit
C00352	CAN slave/master	Slave	
C00356/1	CAN delay boot-up - Operational	3000	ms



Note!

The changes of the master/slave operation in [C00352](#) will not be activated until

- another mains switching of the controller

or

- the "Reset node" or "Reset communication" NMT telegram has been transmitted to the controller.

The "CAN reset node" device command ([C00002/26](#)) is provided as an alternative to the "Reset node" NMT telegram for the reinitialisation of the CAN-specific device parameters.

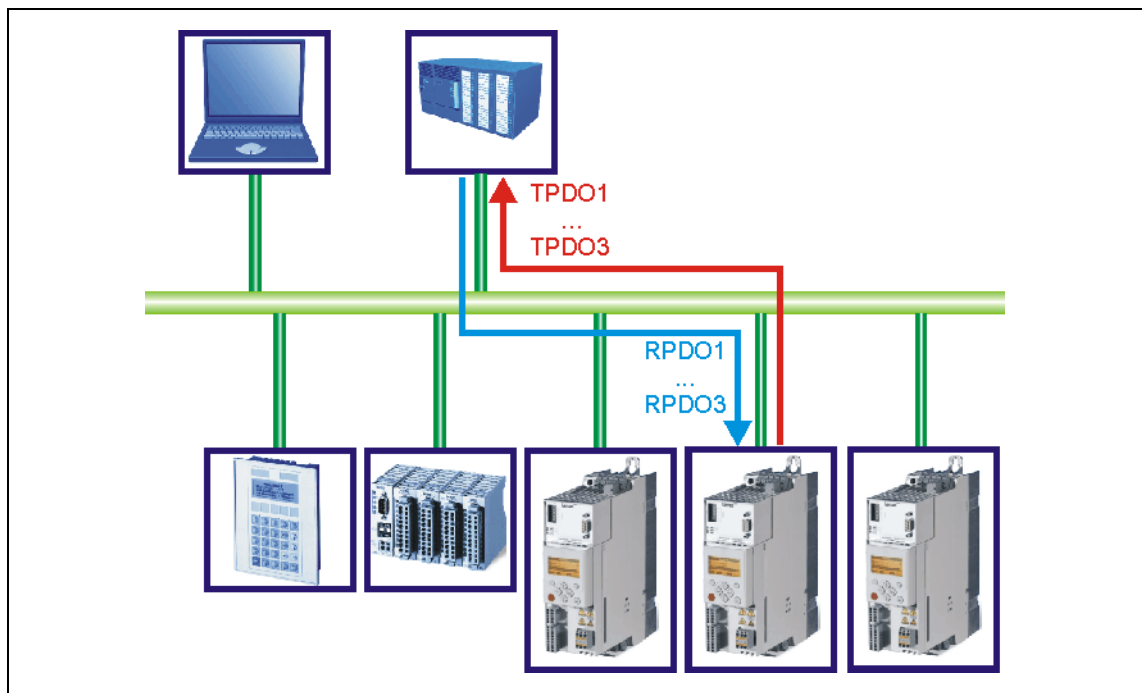


Tip!

Master functionality is only required during the initialisation phase of the drive system.

11.8

Process data transfer



[11-5] PDO data transfer from / to the higher-level host system

For transmitting process data, up to four separated process data channels (PDO1 ... PDO4) are available depending on the device version and software version.

Definitions

- Process data telegrams between the host system and the devices are distinguished in terms of direction as follows:
 - Process data telegrams to the device (RPDO)
 - Process data telegrams from the device (TPDO)
- The CANopen process data objects are designated as seen from the node's view:
 - Receive PDOs (RPDOx): Process data object received by a node
 - Transmit PDOs (TPDOx): Process data object sent by a node



Note!

Data can only be exchanged via process data objects if the status is "Operational"!

► [Communication phases/network management](#) (499)

11.8.1 Available process data objects

The number of available process data objects for controllers of the 8400 series depends on the device version:

Process data object	Version "BaseLine C"	from version "StateLine"
RPDO1 Port block "LP_CanIn1"	●	●
RPDO2 "LP_CanIn2" port block	●	●
RPDO3 "LP_CanIn3" port block		●
RPDO4 "LP_CanIn4" port block		● (from version 15.00.00)
TPDO1 "LP_CanOut1" port block	●	●
TPDO2 "LP_CanOut2" port block	●	●
TPDO3 "LP_CanOut3" port block		●
TPDO4 "LP_CanOut4" port block		● (from version 15.00.00)

Receive PDOs (RPDOs)

The process data objects transmitted from the system bus to the drive are processed via the [LP_CanIn1](#) ... [LP_CanIn4](#) port blocks.

- Every port block provides 4 words (2 bytes/word). The data of every first word are provided in a bit decoded manner (bit 0 ... 15).
- The first word of the [LP_CanIn1](#) port block is defined as control word *wCtrl*. The *wCtrl* control word does not have a permanent connection to the device control and can be used as required. The predefined assignment of the *wCtrl* control word in the [C00007](#) = "30: CAN" control mode depends on the technology application selected in [C00005](#):
 - TA "Actuating drive speed":
[Process data assignment for fieldbus communication](#) (□ 318)
 - TA "Abschaltpositionierung":
[Process data assignment for fieldbus communication](#) (□ 378)

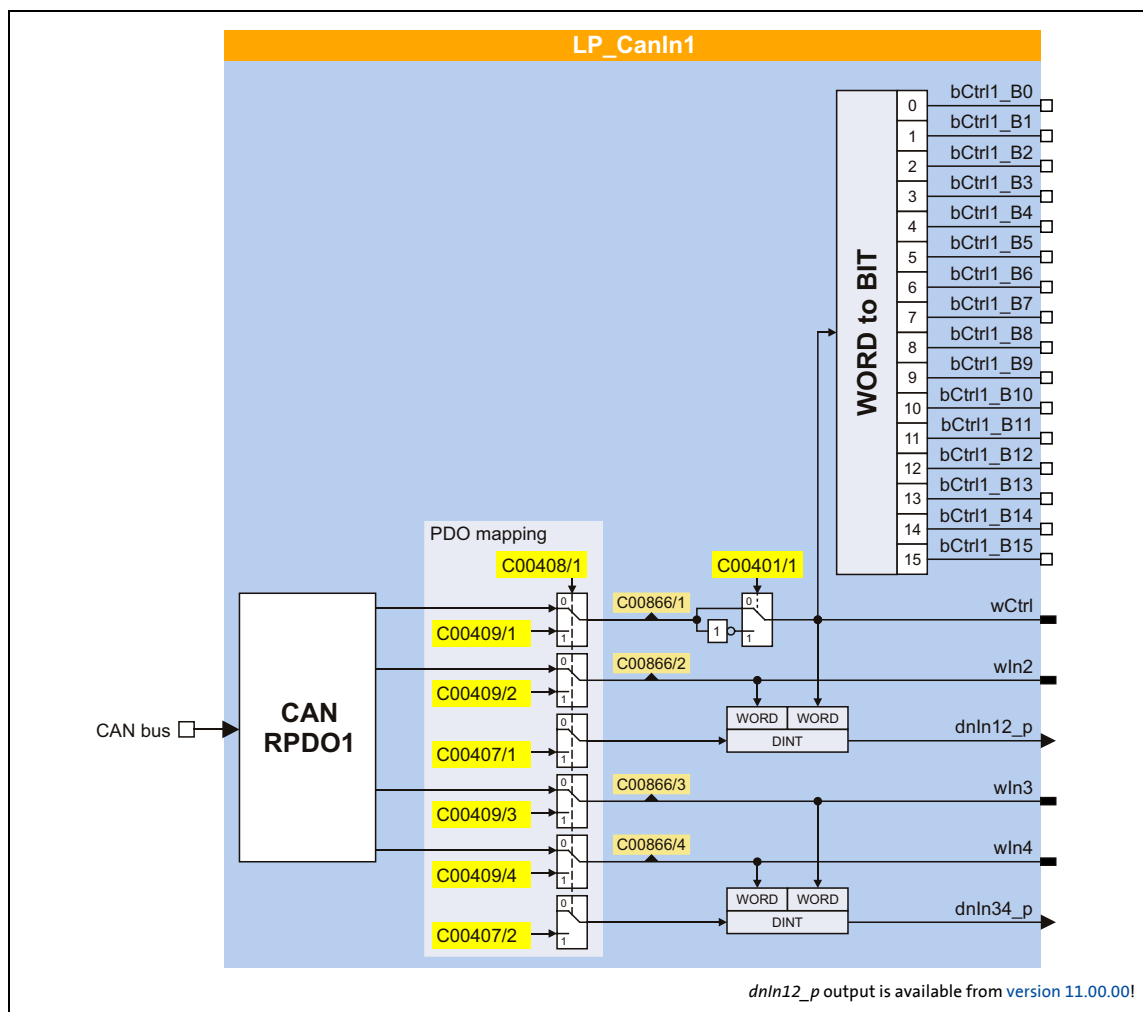
Transmit PDOs (TPDOs)

The process data transmitted from the drive to the system bus are processed via the [LP_CanOut1](#) ... [LP_CanOut4](#) port blocks.

- Every port block receives 4 words (2 bytes/word). The data of every first word are transmitted bit by bit (bit 0 ... 15).
- The first word of the [LP_CanOut1](#) port block is defined as the *wState* status word. The *wState* status word does not have a permanent connection to the device control and can be used as required.
 - Vordefinierte Belegung siehe [wDeviceStatusWord status word](#) der Antriebsschnittstelle.

11.8.1.1 RPDO1 | Port block "LP_CanIn1"

The LP_CanIn1 port block maps process data object RPDO1 in the FB Editor.



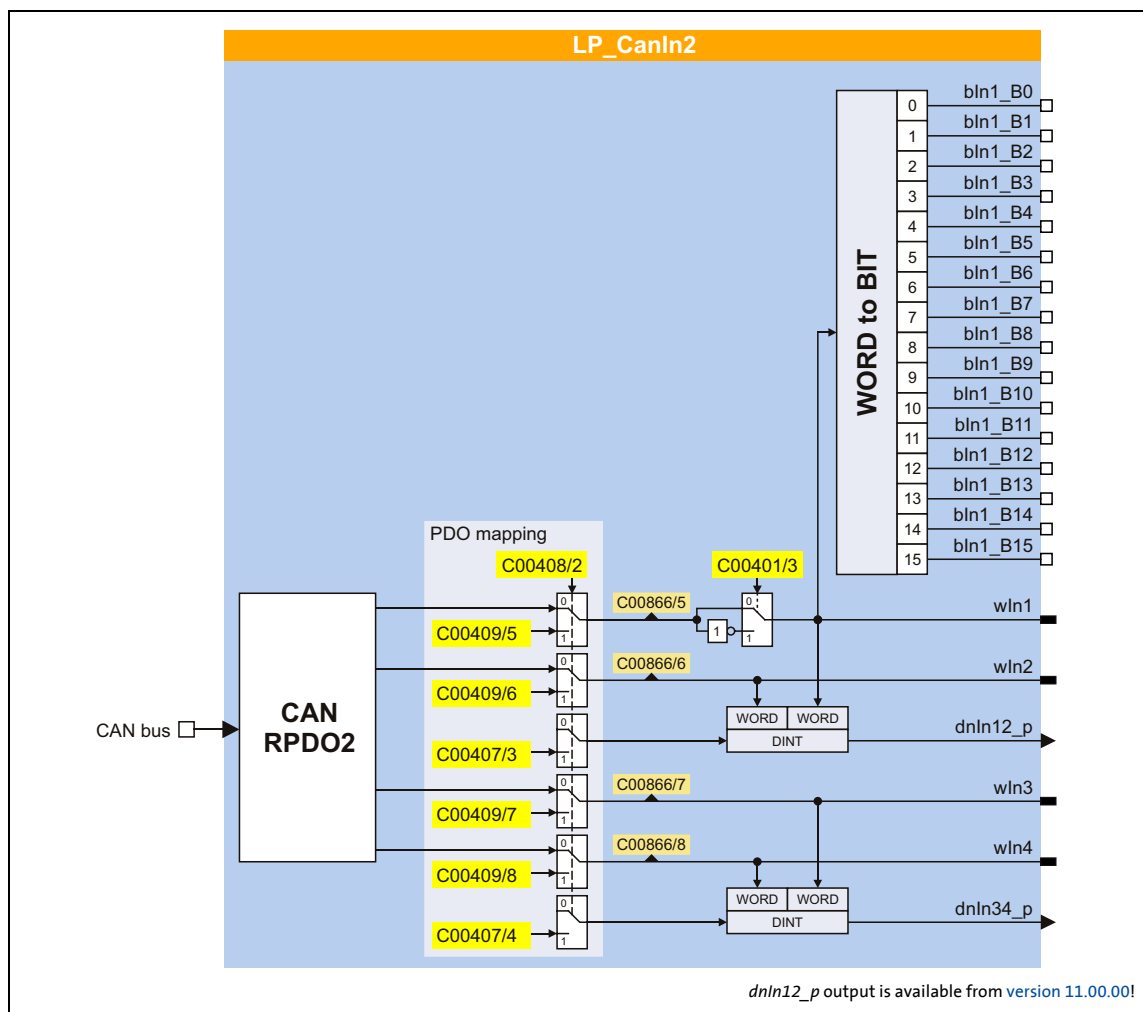
Short overview of the parameters for LP_CanIn1:

Parameter	Info	Lenze setting	
C00401/1	LP_CanIn1: Inversion bCtrl1_B0..15	0x0000	
C00866/1	LP_CanIn1: wCtrl	-	
C00866/2	LP_CanIn1: wIn2	-	
C00866/3	LP_CanIn1: wIn3	-	
C00866/4	LP_CanIn1: wIn4	-	
PDO mapping			
C00408/1	LP_CanIn1: Mapping selection	CanIn	
C00409/1	LP_CanIn1: wCtrl MapVal	0	
C00409/2	LP_CanIn1: wIn2 MapVal	0	
C00409/3	LP_CanIn1: wIn3 MapVal	0	
C00409/4	LP_CanIn1: wIn4 MapVal	0	
Highlighted in grey = display parameter			

Parameter	Info	Lenze setting
C00407/1	LP_CanIn1: dwIn12 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/1 and C00409/2 .	0
C00407/2	LP_CanIn1: dwIn34 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/3 and C00409/4 .	0
Highlighted in grey = display parameter		

11.8.1.2 RPDO2 | "LP_CanIn2" port block

The LP_CanIn2 port block maps process data object RPDO2 in the FB Editor.



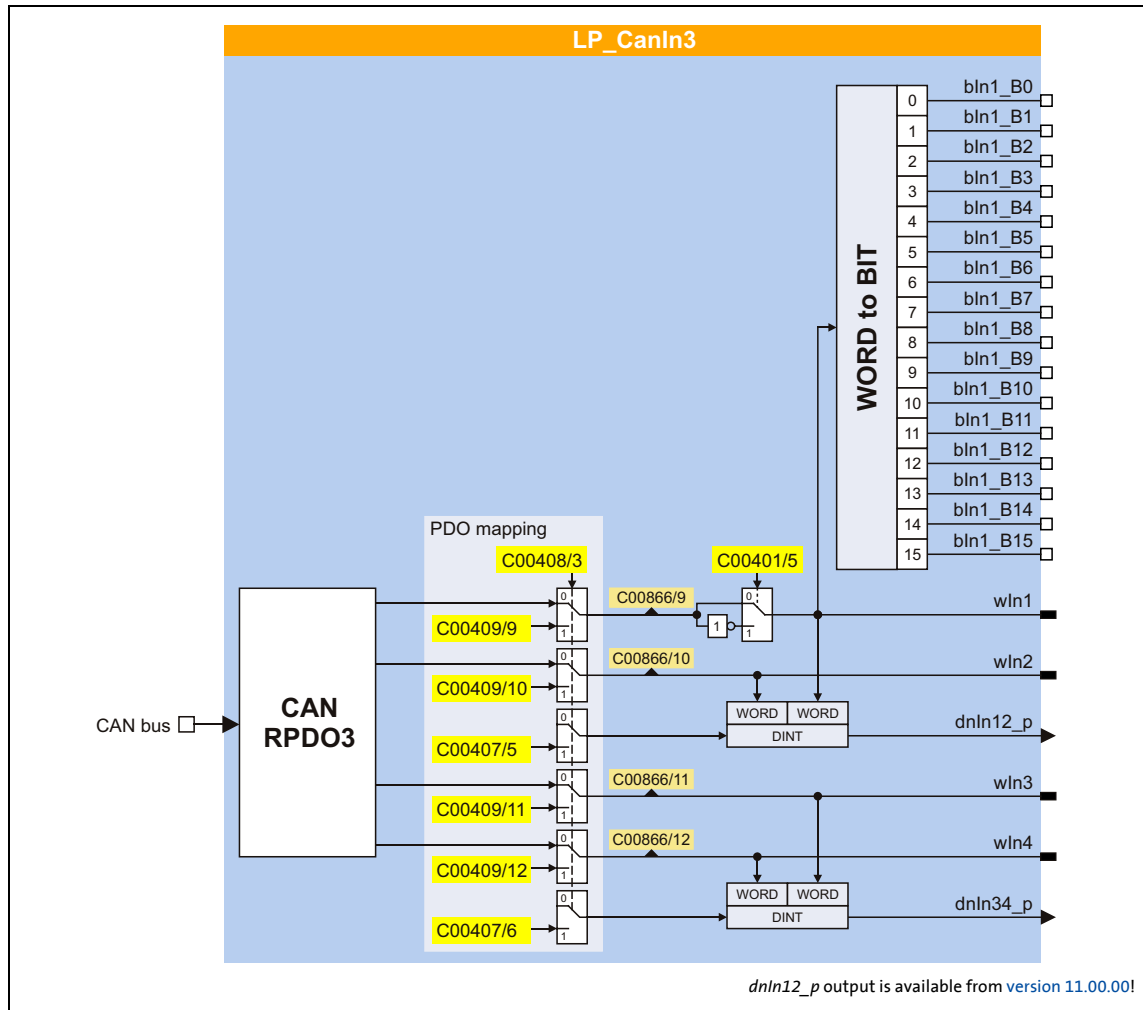
Short overview of the parameters for LP_CanIn2:

Parameter	Info	Lenze setting
C00401/3	LP_CanIn2: Inversion bln1_B0..15	0x0000
C00866/5	LP_CanIn2: wln1	-
C00866/6	LP_CanIn2: wln2	-
C00866/7	LP_CanIn2: wln3	-
C00866/8	LP_CanIn2: wln4	-
PDO mapping		
C00408/2	LP_CanIn2: Mapping selection	CanIn
C00409/5	LP_CanIn2: wln1 MapVal	0
C00409/6	LP_CanIn2: wln2 MapVal	0
C00409/7	LP_CanIn2: wln3 MapVal	0
C00409/8	LP_CanIn2: wln4 MapVal	0
Highlighted in grey = display parameter		

Parameter	Info	Lenze setting
C00407/3	LP_CanIn2: dwIn12 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/5 and C00409/6 .	0
C00407/4	LP_CanIn2: dwIn34 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/7 and C00409/8 .	0
Highlighted in grey = display parameter		

11.8.1.3 RPDO3 | "LP_CanIn3" port block

The LP_CanIn3 port block maps process data object RPDO3 in the FB Editor.



Short overview of the parameters for LP_CanIn3:

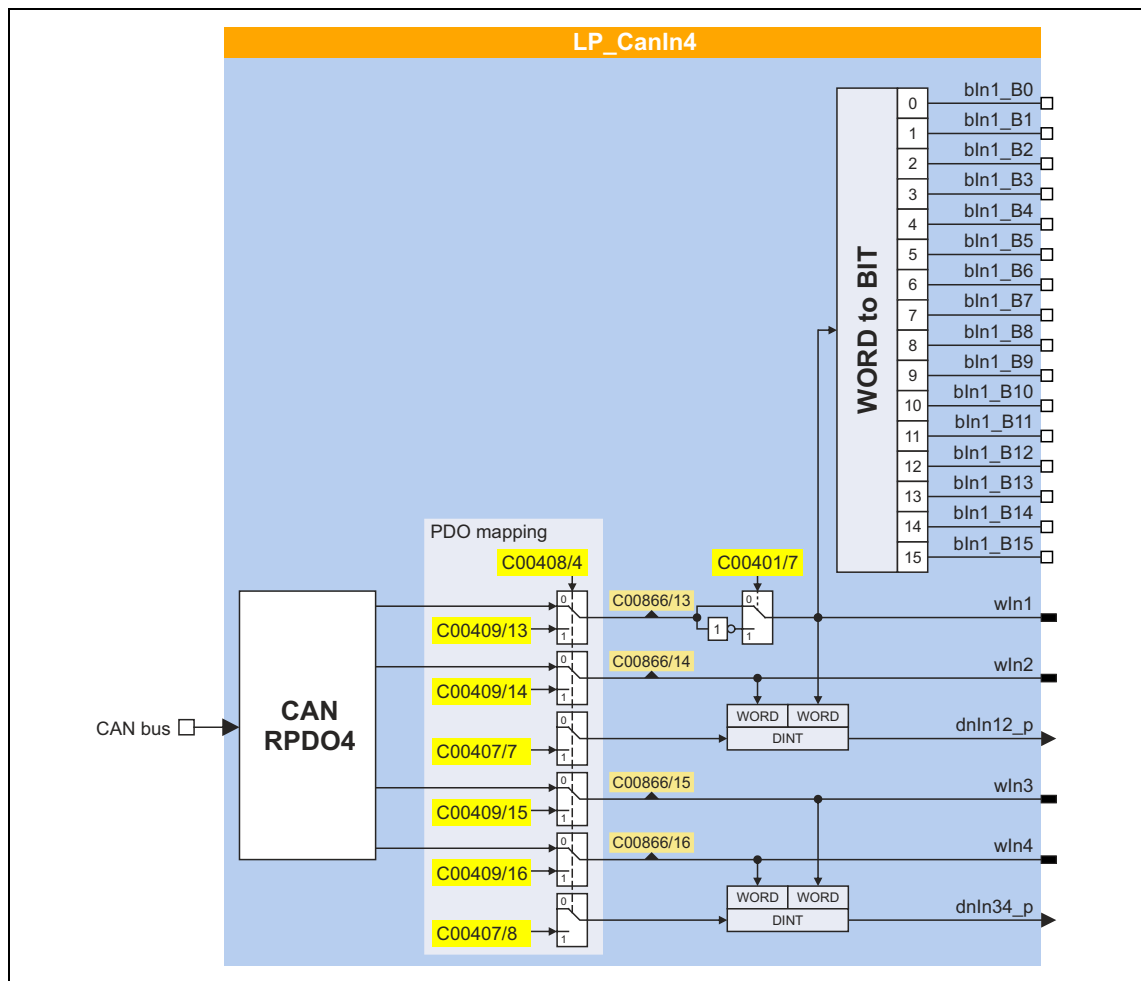
Parameter	Info	Lenze setting
C00401/5	LP_CanIn3: Inversion bln1_B0..15	0x0000
C00866/9	LP_CanIn3: wln1	-
C00866/10	LP_CanIn3: wln2	-
C00866/11	LP_CanIn3: wln3	-
C00866/12	LP_CanIn3: wln4	-
PDO mapping		
C00408/3	LP_CanIn3: Mapping selection	CanIn
C00409/9	LP_CanIn3: wln1 MapVal	0
C00409/10	LP_CanIn3: wln2 MapVal	0
C00409/11	LP_CanIn3: wln3 MapVal	0
C00409/12	LP_CanIn3: wln4 MapVal	0
Highlighted in grey = display parameter		

Parameter	Info	Lenze setting
C00407/5	LP_CanIn3: dwIn12 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/9 and C00409/10 .	0
C00407/6	LP_CanIn3: dwIn34 MapVal • From version 12.00.00 • The mapping for the double word is ORed with the mapping setting in C00409/11 and C00409/12 .	0
Highlighted in grey = display parameter		

11.8.1.4 RPDO4 | "LP_CanIn4" port block

This function extension is available from version 15.00.00!

The **LP_CanIn4** port block maps process data object RPDO4 in the FB Editor.



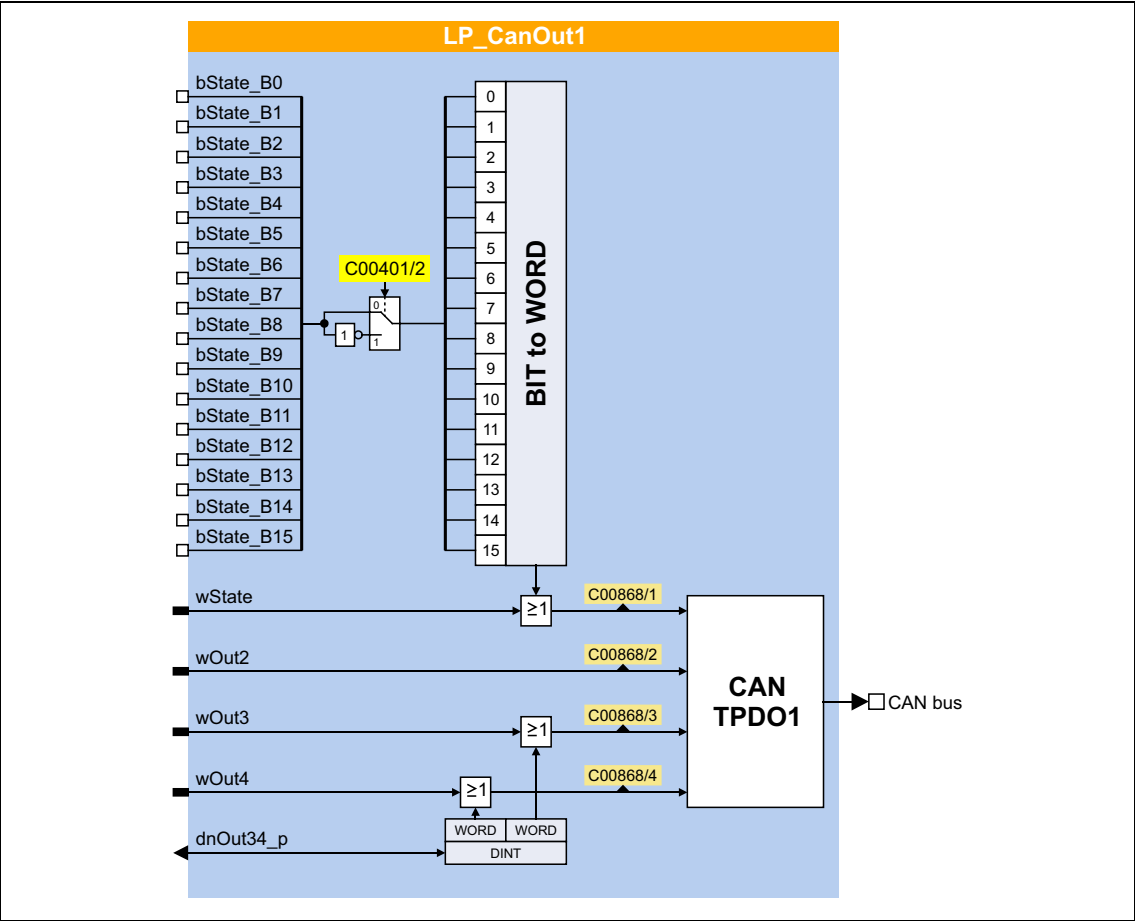
Short overview of the parameters for **LP_CanIn4**:

Parameter	Info	Lenze setting
C00401/7	LP_CanIn4: Inversion bln1_B0..15	0x0000
C00866/13	LP_CanIn4: wln1	-
C00866/14	LP_CanIn4: wln2	-
C00866/15	LP_CanIn4: wln3	-
C00866/16	LP_CanIn4: wln4	-
PDO mapping		
C00408/4	LP_CanIn4: Mapping Selection	CanIn
C00409/13	LP_CanIn4: wln1 MapVal	0
C00409/14	LP_CanIn4: wln2 MapVal	0
C00409/15	LP_CanIn4: wln3 MapVal	0
C00409/16	LP_CanIn4: wln4 MapVal	0
Highlighted in grey = display parameter		

Parameter	Info	Lenze setting
C00407/7	LP_CanIn4: dwIn12 MapVal The mapping for the double word is ORed with the mapping setting in C00409/13 and C00409/14.	0
C00407/8	LP_CanIn4: dwIn34 MapVal The mapping for the double word is ORed with the mapping setting in C00409/15 and C00409/16.	0
Highlighted in grey = display parameter		

11.8.1.5 TPDO1 | "LP_CanOut1" port block

The LP_CanOut1 port block maps process data object TPDO1 in the FB Editor.

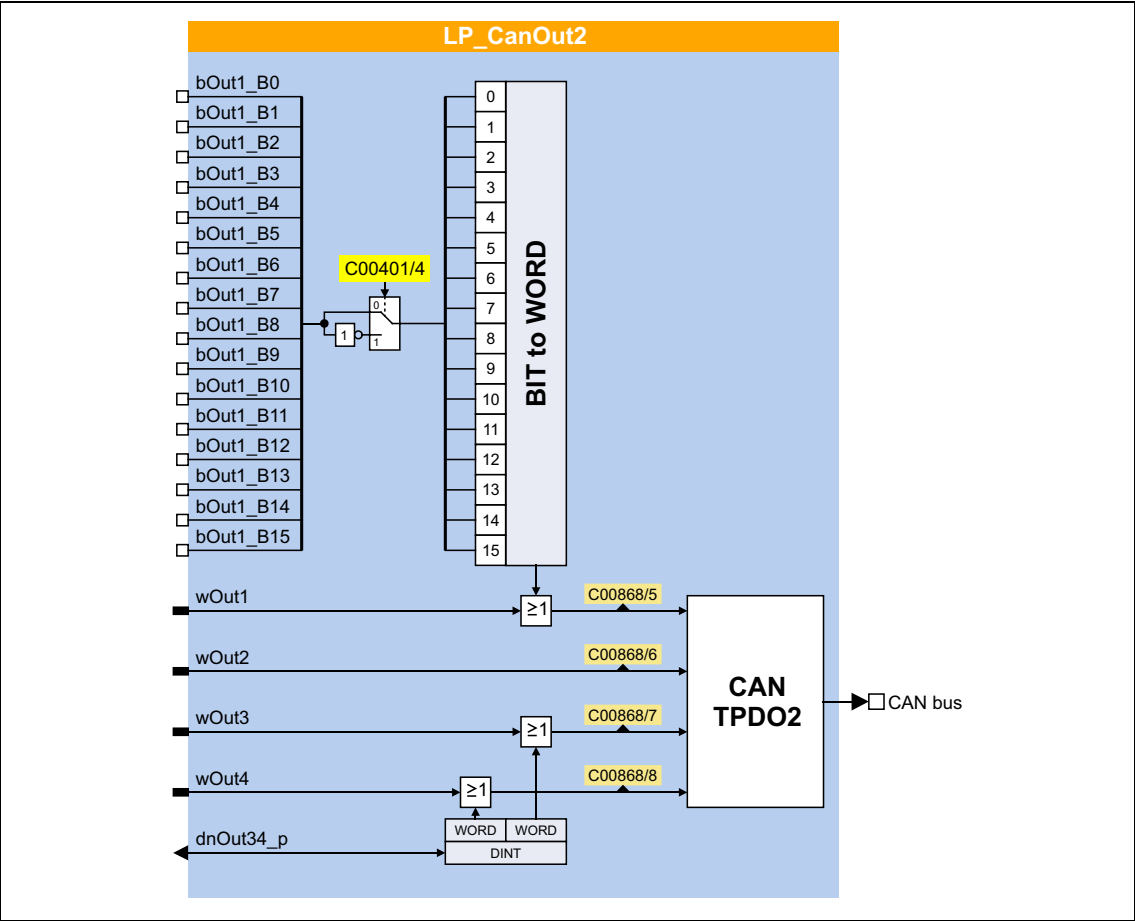


Short overview of the parameters for LP_CanOut1:

Parameter	Info	Lenze setting
C00401/2	LP_CanOut1: Inversion bState_B0..15	0x0000
C00868/1	LP_CanOut1:wState	-
C00868/2	LP_CanOut1:wOut2	-
C00868/3	LP_CanOut1:wOut3	-
C00868/4	LP_CanOut1: wOut4	-
Highlighted in grey = display parameter		

11.8.1.6 TPDO2 | "LP_CanOut2" port block

The LP_CanOut2 port block maps process data object TPDO2 in the FB Editor.

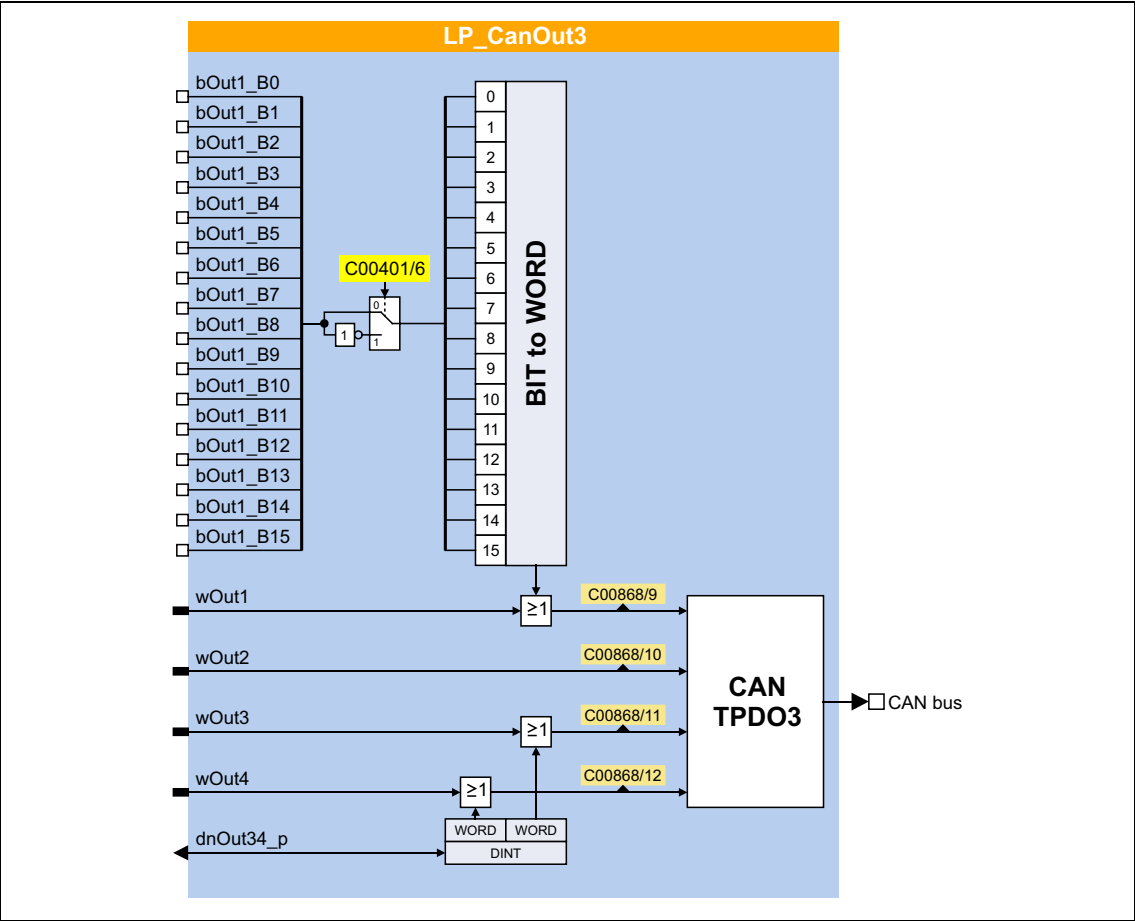


Short overview of the parameters for LP_CanOut2:

Parameter	Info	Lenze setting
C00401/4	LP_CanOut2: Inversion bOut1_B0..15	0x0000
C00868/5	LP_CanOut2: wOut1	-
C00868/6	LP_CanOut2: wOut2	-
C00868/7	LP_CanOut2: wOut3	-
C00868/8	LP_CanOut2: wOut4	-
Highlighted in grey = display parameter		

11.8.1.7 TPDO3 | "LP_CanOut3" port block

The LP_CanOut3 port block maps process data object TPDO3 in the FB Editor.



Short overview of the parameters for LP_CanOut3:

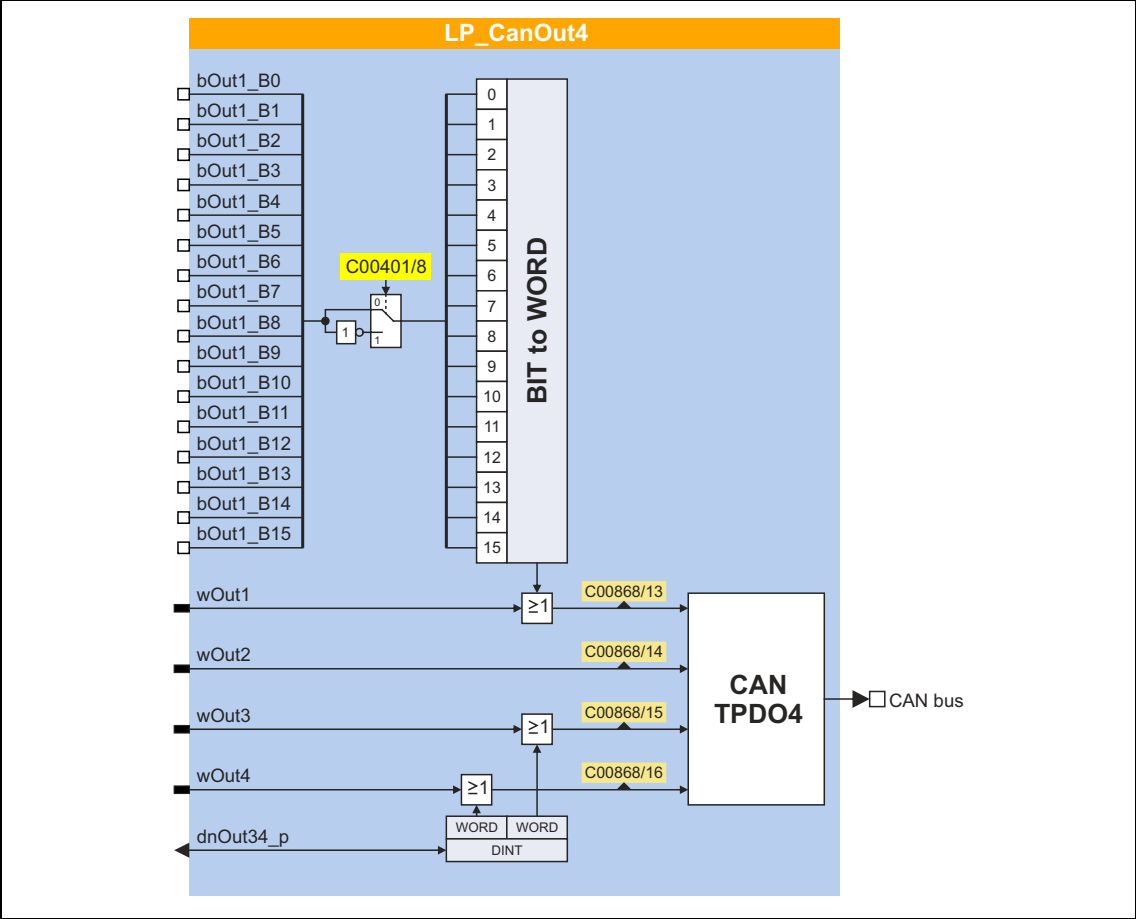
Parameter	Info	Lenze setting
C00401/6	LP_CanOut3: Inversion bOut1_B0..15	0x0000
C00868/9	LP_CanOut3: wOut1	-
C00868/10	LP_CanOut3: wOut2	-
C00868/11	LP_CanOut3: wOut3	-
C00868/12	LP_CanOut3: wOut4	-

Highlighted in grey = display parameter

11.8.1.8 TPDO4 | "LP_CanOut4" port block

This function extension is available from version 15.00.00!

The LP_CanOut4 port block maps process data object TPDO4 in the FB Editor.



Short overview of the parameters for LP_CanOut4:

Parameter	Info	Lenze setting
C00401/8	LP_CanOut4: Inversion bOut1_B0..15	0x0000
C00868/13	LP_CanOut4: wOut1	-
C00868/14	LP_CanOut4: wOut2	-
C00868/15	LP_CanOut4: wOut3	-
C00868/16	LP_CanOut4: wOut4	-

Highlighted in grey = display parameter

11.8.2 Identifiers of the process data objects

For the process data objects PDO1 ... PDO4, three identifier assignment procedures are available in [C00353/1...4](#):

- Identifier (COB-ID) = node address (C00350) + CANBaseID (Lenze setting)
- Identifier (COB-ID) = node address (C00350) + LenzeBaseID
- Identifier (COB-ID) = C0354/x

Lenze setting: Basic identifiers according to the "Predefined Connection Set" of DS301 V4.02

In the Lenze setting, the identifiers for the process data objects PDO1 ... PDO4 consist of the node address set in [C00350](#) and a basic identifier (CANBaseID) which corresponds to the "Predefined Connection Set" of DS301 V4.02:

Object			Basis identifier (CANBaseID)	
PDO1	TPDO1	COB-ID = node address (C00350) +	384	0x180
	RPDO1		512	0x200
PDO2	TPDO2		640	0x280
	RPDO2		768	0x300
PDO3	TPDO3		896	0x380
	RPDO3		1024	0x400
PDO4	TPDO4		1152	0x480
	RPDO4		1280	0x500



Tip!

The active identifiers (COB-ID) are displayed in [C00355/x](#).

OPTIONAL: Use the basic identifier according to Lenze definition (LenzeBaseID)

If the basic identifiers shall be used instead according to the Lenze definition, go to [C00353/x](#) and select "0: COBID = C0350 + LenzeBaseID" for the corresponding PDO.

The basic Lenze identifiers which differ from the "Predefined Connection Set" are highlighted in colour in the following table:

Object			Basic identifier (LenzeBaseID)	
PDO1	TPDO1	COB-ID = node address (C00350) +	384	0x180
	RPDO1		512	0x200
PDO2	TPDO2		640	0x280
	RPDO2		641	0x281
PDO3	TPDO3		768	0x300
	RPDO3		769	0x301
PDO4	TPDO4		896	0x380
	RPDO4		897	0x381

OPTIONAL: Set identifier individually

When "2: COBID = C0354/x" in [C00353/x](#), the identifiers for the PDOs can be individually set via the Lenze codes and CANopen indexes listed in the table below. That way, identifiers independent of the node address can be set for specific PDOs.

- If identifiers are assigned individually, all PDOs must have basic identifier values in the range of 385 ... 1407.

Object			Lenze code	CANopen index	Default setting
PDO1	TPDO1	COB-ID =	C00354/1	I-1400/1	0x201
	RPDO1		C00354/2	I-1800/1	0x181
PDO2	TPDO2		C00354/3	I-1401/1	0x301
	RPDO2		C00354/4	I-1801/1	0x281
PDO3	TPDO3		C00354/5	I-1402/1	0x401
	RPDO3		C00354/6	I-1802/1	0x381
PDO4	TPDO4		C00354/7	I-1403/1	0x501
	RPDO4		C00354/8	I-1803/1	0x481

**Note!**

After a node address change ([C00350](#)) and a CAN reset node afterwards, the subcodes of [C00354](#) automatically resume the values which result from the respective basic identifier and the set node address.

11.8.3 Transmission type

Process data objects can be transmitted in an event-controlled or time-controlled manner. The below table shows that it is possible to combine the different methods by means of logic operations (AND, OR):

- Event-controlled
The PDO is sent when a special device-internal event has occurred, e.g. when the data contents of the TPDO have changed or when a transmission cycle time has elapsed
- Synchronous transmission
A TPDO (or RPDO) is transmitted (or received) after the device has received a sync telegram (COB-ID 0x80).
- Cyclic transmission
The cyclic transmission of PDOs takes place when the transmission cycle time has elapsed.
- Polled via RTR
A TPDO is transmitted when another device requests it by means of a data request telegram (RTR remote transmit request). For this purpose, the data requester (e.g. the master) sends the data request telegram with the COB-ID of the TPDO requested to be sent. The receiver recognises the RTR and transmits the corresponding PDO.

Transmission type	PDO transmission			Logic combination of different transmission types
	cyclic	synchronous	event-controlled	
0		•	•	AND
1 ... 240		•		-
254, 255	•		•	OR

Transmission type	Description
0	Synchronous and acyclic: The PDO is transmitted on an event-controlled basis with every sync (e.g. when a bit change occurs in the PDO).
1 ... 240	Synchronous and cyclic (sync-controlled with response): • Selection $n = 1$: The PDO is transmitted with <u>every</u> sync. • Selection $1 < n \leq 240$: The PDO is transmitted with <u>every n-th</u> sync.
241 ... 251	Reserved
252	Synchronous - RTR only
253	Asynchronous - RTR only
254, 255	Asynchronous - manufacturer-specific / device profile-specific: If this value is entered, the PDO transmission is event-controlled <u>or</u> cyclic. (Note: The values "254" and "255" have the same meaning). For a cyclic transmission, a cycle time must be entered for the respective PDO. In this case, cyclic transmission takes place in addition to event-controlled transmission.

The communication parameters such as the transmission mode and cycle time can be set freely for every PDO and independently of the settings of other PDOs:

Parameter	Info	Lenze setting	
		Value	Unit
CAN1_OUT			
C00322/1	Transmission mode	254	
C00324/2	Blocking time	0	ms
C00356/5	Cycle time	0	ms
C00358/1	Data length	8	Bytes
CAN2_OUT			
C00322/2	Transmission mode	254	
C00324/3	Blocking time	0	ms
C00356/2	Cycle time	0	ms
C00358/2	Data length	8	Bytes
CAN3_OUT			
C00322/3	Transmission mode	254	
C00324/4	Blocking time	0	ms
C00356/3	Cycle time	0	ms
C00358/3	Data length	8	Bytes
CAN4_OUT (from version 15.00.00			
C00322/4	Transmission mode	254	
C00324/5	Blocking time	0	ms
C00356/6	Cycle time	0	ms
C00358/4	Data length	8	Bytes
CAN1_IN ... CAN4_IN			
C00323/1...4	Transmission mode CAN1_IN ... CAN4_IN • In the case of the RPDO serves as monitoring setting in the case of sync-controlled PDOs.	254	

Blocking time

In [C00324/x](#) a "blocking time" can be set which defines the shortest transmission cycle with the transmission type "asynchronous - manufacturer-specific/device profile-specific".

Example: Cycle time = 500 ms, blocking time = 100 ms, sporadic data change:

- With a sporadic data change < 500 ms, quickest transmission takes place every 100 ms due to the set blocking time (event-controlled transmission). The transmission cycle timer is reset to 0 if the transmission has been activated in an event-controlled way.
- In the case of a sporadic data change > 500 ms, due to the cycle time set, transmission takes place every 500 ms (cyclic transmission).



Tip!

The communication parameters can also be set via the following CANopen objects:

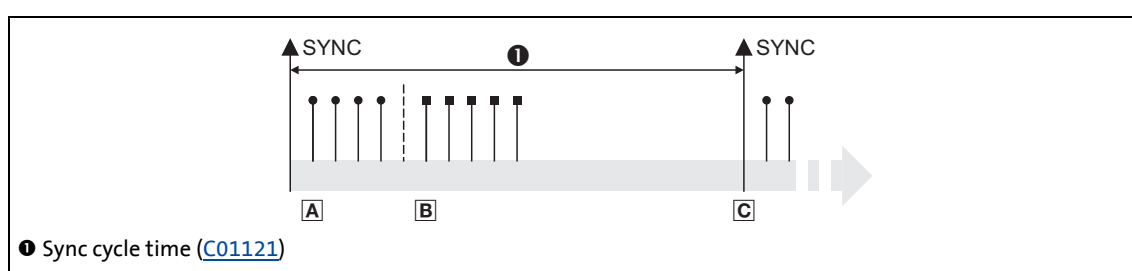
- [I-1400](#) ... [I-1403](#): Communication parameters for RPDO1 ... RPDO4
- [I-1800](#) ... [I-1803](#): Communication parameters for TPDO1 ... TPDO4

11.8.4 PDO synchronisation via sync telegram

During cyclic transmission, one or more PDOs are transmitted/received in fixed time intervals. An additional specific telegram, the so-called sync telegram, is used for synchronising cyclic process data.

- The sync telegram is the trigger point for the transmission of process data from the slaves to the master and for the acceptance of process data from the master in the slaves.
- For sync-controlled process data processing, the sync telegram must be generated accordingly.
- The response to a sync telegram is determined by the selected transmission type. ▶ [Transmission type](#) (□ 519)

Basic workflow



[11-6] Sync telegram

- After the sync telegram has been received, the slaves transmit the synchronous process data to the master (TPDOs). The master reads them as process input data.
- When the transmission process is completed, the slaves receive (RPDOs) the process output data (of the master).
 - All other telegrams (e.g. parameters or event-controlled process data) are accepted acyclically by the slaves after the transmission is completed.
 - Illustration [11-6] does not include acyclic data. However, they need to be considered when dimensioning the cycle time.
- The data are accepted in the slave with the next sync telegram if the Rx mode is set to 1 ... 240. If the Rx mode is 254 or 255, the data are accepted in the next device cycle, irrespective of the sync telegram.

Short overview: Parameters for the synchronisation via sync telegram

Parameter	Info	Lenze setting		Assignment	
		Value	Unit	Sync master	Sync slave
C00367	CAN SYNC Rx identifier	0x0080			●
C00368	CAN SYNC Tx identifier	0x0080		●	
C00369	CAN sync transmission cycle time	0	ms	●	

Related topics:

- ▶ [Synchronisation of the internal time base](#) (□ 575)

11.8.5 Monitoring of the RPDOs for data reception

For RPDO1 ... RPDO4 each, a monitoring time can be parameterised within which the RPDO must arrive. If the RPDO is not received within the monitoring time or not with the configured sync, the response parameterised for each RPDO takes place.

Short overview: Parameters for RPDO monitoring

Parameter	Info	Lenze setting	
		Value	Unit
C00357/1...4	CAN1...4_IN monitoring time	3000	ms
C00593/1...4	Resp. to CAN1...4_IN monitoring	No response	

11.8.6 Configuring exception handling of the CAN PDOs

[This function extension is only available from version 04.00.00!](#)

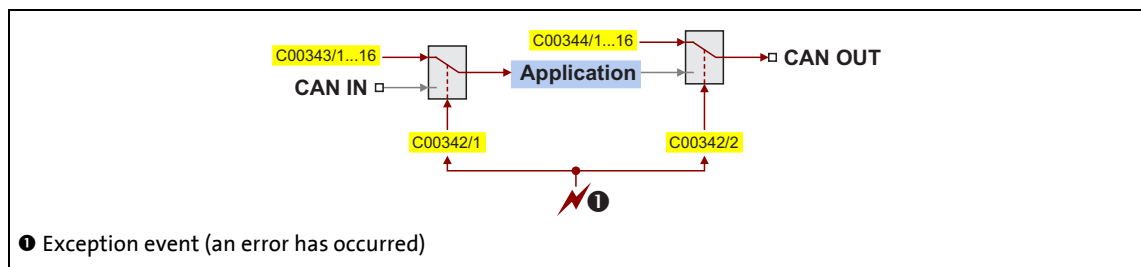
Exception handling for the CAN PDOs in the event of an error can be set via decoupling configuration and decoupling values.

- Bit coded selection is carried out in [C00342/1](#) for the process data words read by the bus, defining the events that will trigger decoupling.
- Bit coded selection is carried out in [C00342/2](#) for the process data words output by the application, defining the events that will trigger decoupling.

Bit	Event
Bit 0 ☐	BusOff_MsgErr
Bit 1 ☐	Warning
Bit 2 ☐	NodeStopped
Bit 3 ☐	HeartBeatEvent
Bit 4 ☐	CAN1_In_Überw.
Bit 5 ☐	CAN2_In_Überw.
Bit 6 ☐	CAN3_In_Überw.
Bit 7 ☐	CAN4_In_Überw.
Bit 8 ☐	Reserved
Bit 9 ☐	Reserved
Bit 10 ☐	Reserved
Bit 11 ☐	Reserved
Bit 12 ☐	Reserved
Bit 13 ☐	Reserved
Bit 14 ☐	Trouble
Bit 15 ☐	Fault

Finally, the following parameters define the value that the process data words are to have when they are decoupled:

Parameter	Info	Lenze setting	
		Value	Unit
C00343/1	LP_CanIn1:wCtrl DiscVal	0	
C00343/2...4	LP_CanIn1:wIn2...wIn4 DiscVal	0	
C00343/5...8	LP_CanIn2:wIn1...wIn4 DiscVal	0	
C00343/9...12	LP_CanIn3:wIn1...wIn4 DiscVal	0	
C00343/13...16	LP_CanIn4:wIn1...wIn4 DiscVal	0	
C00344/1	LP_CanOut1:wState DiscVal	0	
C00344/2...4	LP_CanOut1:wOut2...wOut4 DiscVal	0	
C00344/5...8	LP_CanOut2:wOut1...wOut4 DiscVal	0	
C00344/9...12	LP_CanOut3:wOut1...wOut4 DiscVal	0	
C00344/13...16	LP_CanOut4:wOut1...wOut4 DiscVal	0	



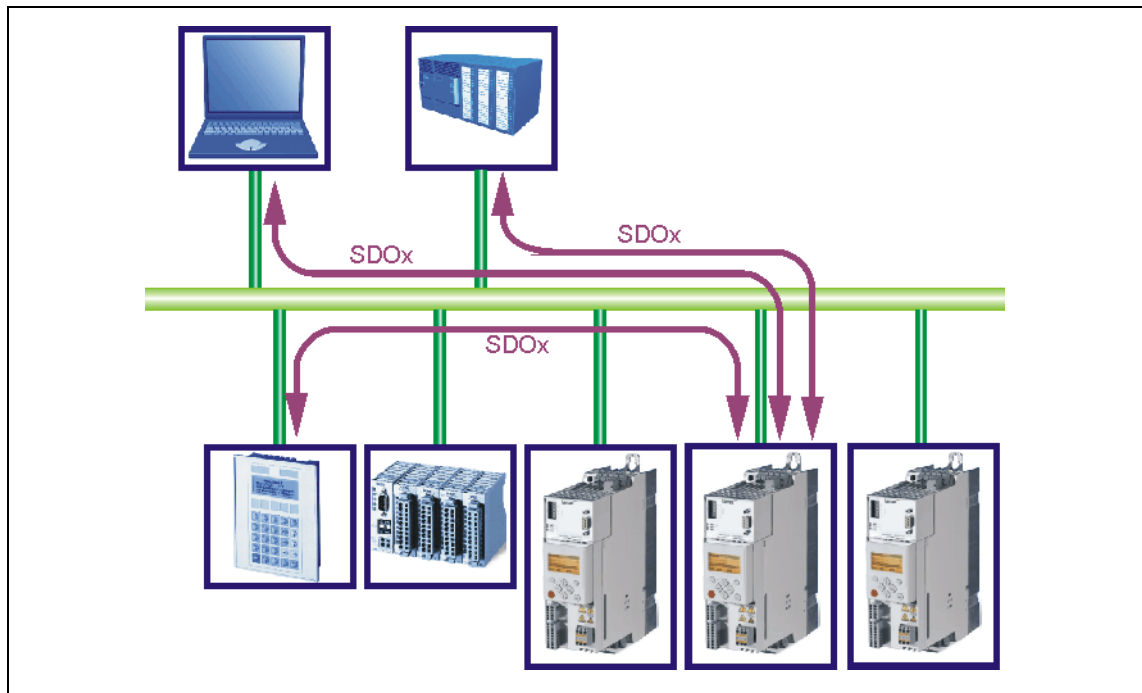
[11-7] General signal flow in the event of a configured exception

Related topics:

► [Configuring exception handling of the output terminals](#) (📖 288)

11.9

Parameter data transfer



[11-8] Parameter data transfer via the available parameter data channels

Parameters are values stored in codes on Lenze controllers.

Two parameter data channels are available for parameter setting, enabling the simultaneous connection of different devices for configuration purposes.

Parameter data are transmitted via the system bus as SDOs (*Service Data Objects*) and acknowledged by the receiver. The SDO enables read and write access to all device parameters and to the CANopen object directory integrated in the device. Indices (e.g. 0x1000) ensure access to device parameters and functions included in the object directory. To transfer SDOs, the information contained in the user data must comply with the CAN SDO protocol.



Note!

Up to and including version 05.00.00, the parameter channels 1 and 2 are activated in the Lenze setting.

From version 05.01.00 onwards, only the parameter data channel 1 is activated in the Lenze setting according to CANopen.

- In order to activate both parameter data channels according to the previous behaviour, set "2 SDO Lenze" in [C00366](#).

11.9.1 Identifiers of the parameter data objects

In the Lenze setting, the basic identifiers of the SDOs are preset according to the "Predefined Connection Set".

The identifiers of the parameter data objects SDO1 and SDO2 result from the basic identifier and the node address set under code [C00350](#):

Identifier = basic identifier + node address

Object		Direction		Lenze-Base-ID		CANopen-Base-ID	
		from device	to device	dec	hex	dec	hex
SDO1 (Parameter data channel 1)	TSDO1	●		1408	580	1408	580
	RSDO1		●	1536	600	1536	600
SDO2 (Parameter data channel 2)	TSDO2	●		1472	5C0	1472	5C0
	RSDO2		●	1600	640	1600	640
Heartbeat		●		1792	700	1792	700
Boot-up		●		1792	700	1792	700

11.9.2 User data

Structure of the user data of the parameter data telegram

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte



Note!

For the user data, the Motorola format is used.

► [Parameter data telegram examples](#) (📖 531)

The following subchapters provide detailed information on user data.

11.9.2.1 Command

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

The following commands can be transmitted or received for writing and reading the parameters:

Command	1st byte		Data length	Info
	hex	dec		
Write request	0x23	35	4 bytes	Writing of a parameter to the controller.
	0x2B	43	2 bytes	
	0x2F	47	1 byte	
	0x21	33	Block	
Write response	0x60	96	4 bytes	Controller acknowledges a write request.
Read request	0x40	64	4 bytes	Reading of a parameter from the controller.
Read response	0x43	67	4 bytes	Controller's response to a read request with the current parameter value.
	0x4B	75	2 bytes	
	0x4F	79	1 byte	
	0x41	65	Block	
Error response	0x80	128	4 bytes	Controller's response if the write/read request could not be executed correctly. ▶ Error messages (529)

More precisely, the command byte comprises the following information:

Command	1st byte							
	Command specifier (cs)			Toggle (t)	Length*		e	s
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Write request	0	0	1	0	0/1	0/1	1	1
Write response	0	1	1	0	0	0	0	0
Read request	0	1	0	0	0	0	0	0
Read response	0	1	0	0	0/1	0/1	1	1
Error response	1	0	0	0	0	0	0	0

*Bit coding of the length: 00 = 4 bytes, 01 = 3 bytes, 10 = 2 bytes, 11 = 1 byte
e: expedited (shortened block service)
s: segmented (normal block service)

**Tip!**

More commands are defined in CANopen specification DS301, V4.02 (e.g. segmented transfer).

11.9.2.2 Addressing by means of index and subindex

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

A parameter (a Lenze code) is addressed as per the following formula:

Index = 24575 - (Lenze code number)

Example

The [C00011](#) parameter (motor reference speed) is to be addressed.

Calculation:

- Index:
 - Decimal: $24575 - 11 = 24564$
 - Hexadecimal: $0x5FFF - 0xB = 0x5FF4$
- Subindex: 0x00 (subindex 0 since the parameter does not have any subcodes)

Entries:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	0xF4	0x5F	0x00				

11.9.2.3 Data 1 ... Data 4

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

Maximally 4 bytes are available for parameter value entries. Depending on the data format, they are assigned as follows:

5th byte	6th byte	7th byte	8th byte
Parameter value (1 byte)	0x00	0x00	0x00
Parameter value (2 bytes)		0x00	0x00
LOW byte	HIGH byte		
Parameter value (4 bytes)			
LOW word		HIGH word	
LOW byte	HIGH byte	LOW byte	HIGH byte

**Note!**

The "Factor" column of the [Table of attributes](#) contains a so-called scaling factor for all Lenze parameters. The scaling factor is relevant to the transfer of parameter values which have one or more decimal positions in the parameter list.

If the scaling factor is > 1, the value must be multiplied by the indicated scaling factor prior to transmission to be able to transfer the value as an integer. At the SDO client end, the integer must be divided by the scaling factor to obtain the original value including decimal positions again.

Example

A value of "123.45" is to be transmitted for a code, unit: "%" (e.g. C00039/1: "Fixed setpoint-JOG1").

In controllers of the 8400 series, parameters with the "%" unit have two decimal positions and hence a scaling factor of "100".

Calculation:

- Value to be transmitted = scaling factor x value
- Data (1 ... 4) = 100 x 123.45 = 12345 (0x00 00 30 39)

Entries:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
				0x39	0x30	0x00	0x00

11.9.2.4 Error messages

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Error code			
0x80 (128)	LOW byte	HIGH byte		LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte

In the event of an error, the addressed node generates a telegram with the "Error response" (0x80) command.

- The telegram includes the index and subindex of the code where the error occurred.
- The error code is entered in bytes 5 ... 8.
 - The error codes are standardised according to DS301, V4.02.
 - The representation of the error codes is provided in reverse read direction (see example below).

Example

Representation of error code "0x06 04 00 41" in bytes 5 ... 8:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Error code			
				0x41	0x00	0x04	0x06

Meaning of the error codes

The error codes are standardised acc. to DS301, V4.02.

Error code	Explanation
0x0503 0000	Toggle bit not changed
0x0504 0000	SDO protocol expired
0x0504 0001	Invalid or unknown client/server command specifier
0x0504 0002	Invalid block size (only block mode)
0x0504 0003	Invalid sequence number (only block mode)
0x0504 0004	CRC error (only block mode)
0x0504 0005	Not sufficient memory
0x0601 0000	Object access not supported
0x0601 0001	Attempt to read a write-only object
0x0601 0002	Attempt to write to a read-only object
0x0602 0000	Object not listed in object directory
0x0604 0041	Object not mapped to PDO
0x0604 0042	Number and length of objects to be transferred longer than PDO length.
0x0604 0043	General parameter incompatibility
0x0604 0047	General internal device incompatibility
0x0606 0000	Access denied because of hardware error
0x0607 0010	Unsuitable data type, unsuitable service parameter length
0x0607 0012	Unsuitable data type, service parameter length exceeded
0x0607 0013	Unsuitable data type, service parameter length not long enough
0x0609 0011	Subindex does not exist
0x0609 0030	Parameter value range exceeded
0x0609 0031	Parameter values too high
0x0609 0032	Parameter values too low
0x0609 0036	Maximum value falls below minimum value
0x0800 0000	General error
0x0800 0020	Data cannot be transferred/saved for application.
0x0800 0021	Data cannot be transferred/saved for application due to local control.
0x0800 0022	Data cannot be transferred/saved for application due to current device status.
0x0800 0023	Dynamic generation of object directory failed or no object directory available (e.g. object directory generated from file, generation not possible because of a file error).

11.9.3 Parameter data telegram examples

11.9.3.1 Read parameters

Task: The heatsink temperature of 43 °C (code [C00061](#), data format INTEGER16, scaling factor 1) of the controller with node address "5" is to be read.

Telegram to drive

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x0605	0x40	0xC2	0x5F	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram to the drive	
Identifier	= 1536 + node address = 1536 + 5 = 1541 = 0x0605 (1536 = SDO1 basic identifier to the controller)
Command	= 0x40 = "Read request" (read request of a parameter from the controller)
Index	= 24575 - code number = 24575 - 61 = 24514 = 0x5FC2
Subindex	= 0 (code C00061 does not have any subcodes)

Response telegram from drive (if data have been correctly transmitted)

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	-	-
0x0585	0x4B	0xC2	0x5F	0x00	0x2B	0x00	-	-

Explanations on the telegram from the drive	
Identifier	= 1408 + node address = 1408 + 5 = 1413 = 0x0585 (1408 = SDO1 basic identifier from the controller)
Command	= 0x4B = "Read Response" (response to the read request with current value)
Index	as in telegram to the drive
Subindex	
Data 1 ... 2	= 0x002B = 43 [°C]

11.9.3.2 Write parameters

Task: The rated current of the connected motor is to be entered with $I_N = 10.20\text{ A}$ (code [C00088](#)) into the controller with node address "2".

Data 1 ... 4	Calculation
Value for motor current, (data type U16; display factor 1/100)	$10.20 \times 100 = 1020\text{ (0x03 FC)}$

Telegram to drive

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x0602	0x23	0xA7	0x5F	0x00	0xFC	0x03	0x00	0x00

Explanations on the telegram to the drive	
Identifier	= $1536 + \text{node address} = 1536 + 2 = 1538 = 0x0602$ (1536 = SDO1 basic identifier to the controller)
Command	= $0x23$ = "Write request" (write request of a parameter to the controller)
Index	= $24575 - \text{code number} = 24575 - 88 = 24487 = 0x5FA7$
Subindex	= 0 (code C00088 does not have any subcodes)
Data 1 ... 4	= $10.20 \times 100 = 1020 = 0x000003FC$ (motor current value; data type U32; display factor 1/100)

Response telegram from drive (if data have been correctly transmitted)

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x0582	0x60	0xA7	0x5F	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram from the drive	
Identifier	= $1408 + \text{node address} = 1408 + 2 = 1410 = 0x0582$ (1408 = SDO1 basic identifier from the controller)
Command	= $0x60$ = "Write response" (Acknowledgement of the write access from the controller)
Index	as in telegram to the drive
Subindex	

11.9.3.3 Read block parameters

Task: The firmware version (code [C00099](#)) is to be read from the parameter set of the controller with node address "12". The firmware version has a length of 11 ASCII characters which are transmitted as a block parameter. Depending on the block, the data width from the 2nd to 8th byte is assigned within the user data.

Telegram 1 to the drive: Read request

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x060C	0x40	0x9C	0x5F	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram to the drive	
Identifier	= 1536 + node address = 1536 + 12 = 1548 = 0x060C (1536 = SDO1 basic identifier to the controller)
Command	= 0x40 = "Read request" (read request of a parameter from the controller)
Index	= 24575 - code number = 24575 - 99 = 24476 = 0x5F9C
Subindex	= 0 (code C00099 does not have any subcodes)

Response telegram 1 from the drive: Indication of the block length (11 characters)

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x058C	0x41	0x9C	0x5F	0x00	0x0B	0x00	0x00	0x00

Explanations on the telegram from the drive	
Identifier	= 1408 + node address = 1408 + 12 = 1420 = 0x058C (1408 = SDO1 basic identifier from the controller)
Command	= 0x41 = "Read response" (response is block telegram)
Index	as in telegram to the drive
Subindex	
Data 1 ... 4	= 0x0000000B = data length of 11 characters in the ASCII format

Telegram 2 to the drive: Request of the 1st data block

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x060C	0x60	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Explanations on the telegram to the drive	
Command	= 0x60 = "Read segment request" (request: read data block) • Bit 4 = 0 (toggle bit) Influence of the toggle bit on the request command The single blocks are toggled one after another, i.e. first the request is made with the "0x60" command (= 0b0110*0000), then with the "0x70" command (= 0b0111*0000), and then again with the "0x60" command, etc. * Toggle bit

Response telegram 2 from the drive: Transmission of the 1st data block

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x058C	0x00	0x30	0x31	0x2E	0x30	0x30	0x2E	0x30
		0 _{asc}	1 _{asc}	·asc	0 _{asc}	0 _{asc}	·asc	0 _{asc}

Explanations on the telegram to the drive	
Command	= 0x00 = 0b00000000 • Bit 4 = 0 (toggle bit) Influence of the toggle bit on the transmission command • The 1st response of the controller in the command byte is "0b0000*0000" if bytes 2 ... 8 are completely filled with data and other telegrams are following. • The 2nd response of the controller in the command byte is "0b0001*0000" if bytes 2 ... 8 are completely filled with data and other telegrams are following, etc. * Toggle bit
Data 1 ... 7	= "01.00.0" (ASCII representation)

Telegram 3 to the drive: Request of the 2nd data block

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x060C	0x70	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Explanations on telegram 3 to the drive

Command	= 0x70 = "Read segment request" (request: read data block) • Bit 4 = 1 (toggle bit)

Response telegram 3 from the drive: Transmission of the 2nd data block including end identifier

Identifier	User data							
	1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
	Command	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
0x058C	0x17	0x30	0x2E	0x30	0x30	0x00	0x00	0x00
		0 _{asc}	·asc	0 _{asc}	0 _{asc}	-	-	-

Explanations on telegram 3 from the drive

Command	= 0x17 = 0b00010111: • Bit 0 = 1 (end of transmission) • Bit 1 ... bit 3 = 0b011 (3 bytes do not contain any data) • Bit 4 = 1 (toggle bit)
	Influence of the final bit and the residual data length on the transmission command • The end of transmission is signalled via the set final bit 0. • Bits 1 ... 3 reveal the number of bytes that do not contain any data anymore. * Toggle bit
Data 1 ... 7	= "0.00" (ASCII representation) The result of the data block transmission is: "01.00.00.00"

11.10 Monitoring

11.10.1 Integrated error detection

If a node detects an error, it rejects the CAN telegram bits received so far and transmits an error flag. The error flag consists of 6 consecutive bits with the same logic value.

The following errors are detected:

Fault	Description
Bit error	The sending node follows the transmission on the bus and interrupts the transmission if it receives a different logic value than the value transmitted. With the next bit, the sending node starts the transmission of an error flag. In the arbitration phase, the transmitter only detects a bit error if a dominantly sent bit is received as recessive bit. In the ACK slot as well, the dominant overwriting of a recessive bit is not indicated as a bit error.
Stuff-bit error	If more than 5 consecutive bits have the same logic value before the ACK delimiter in the telegram, the previously transmitted telegram will be rejected and an error flag will be sent with the next bit.
CRC error	If the received CRC checksum does not correspond to the checksum calculated in the bus controller, the bus controller will send an error flag after the ACK delimiter and the previously transmitted telegram will be annulled.
Acknowledgement error	If the sent ACK slot recessively sent by the transmitting node is not dominantly overwritten by a receiver, the transmitting node will cancel the transmission. The transmitting node will annul the transmitted telegram and will send an error flags with the next bit.
Format error	If a dominant bit is detected in the CRC delimiter, in the ACK delimiter or in the first 6 bits of the EOF field, the received telegram will be rejected and an error flag will be sent with the next bit.



Tip!

The errors mentioned before indicate that a physical error has occurred in the bus system.

Possible causes are:

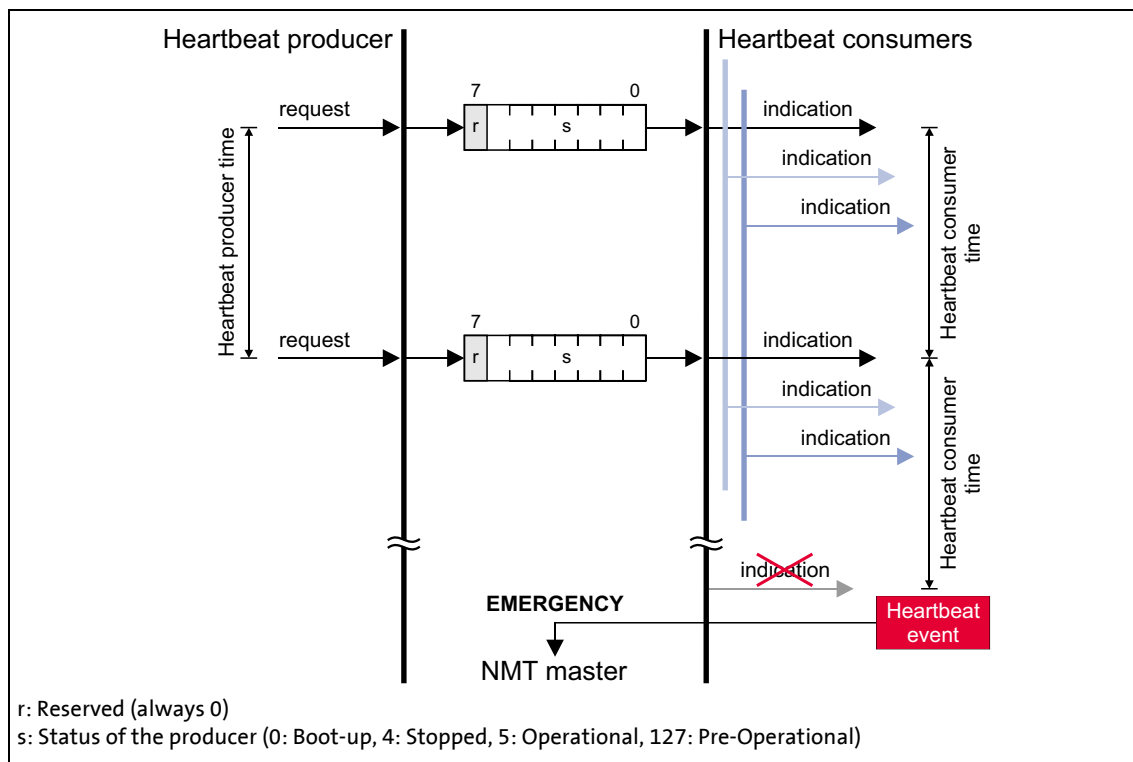
- Several nodes with identical node address
- Wrong baud rate of one or several nodes
- Too high cable length
- Too many or no terminating resistors
- Too high bus load/too many data telegrams
(e.g. since a node permanently transmits event-controlled due to data changes of an analog signal/actual value.)
- EMC interferences on the system bus
(e.g. since the CAN bus cable next to the motor cable is unshielded.)

[C00364](#) displays whether such an error is active.

11.10.2 Heartbeat protocol

The heartbeat protocol can be used for node monitoring purposes within a CAN network.

Basic workflow



[11-9] Heartbeat protocol

1. A heartbeat producer cyclically transmits a so-called heartbeat telegram to one or more consumers.
2. The consumer(s) monitor the heartbeat telegram for arrival on a regular basis.

11.10.2.1 Telegram structure

- The heartbeat telegram of the producer has the following identifier:
Identifier (COB-ID) = 1792 + producer's node address
- The user data (1 byte) contain the status (s) of the producer:

Heartbeat producer status		Data							
Communication status	Decimal value (s)	(r)	Producer status (s)						
		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Boot-up	0	0	0	0	0	0	0	0	0
Stopped	4	0	0	0	0	0	1	0	0
Operational	5	0	0	0	0	0	1	0	1
Pre-Operational	127	0	1	1	1	1	1	1	1

11.10.2.2 Parameter setting

Short overview of the parameters for the "Heartbeat" monitoring function:

Parameter	Info	Lenze setting		Assignment	
		Value	Unit	Consumer	Producer
C00347/1...n	CAN status of the heartbeat producer 1 ... n	-		●	
C00381	Heartbeat producer time	0	ms		●
C00385/1...n	CAN node address of the heartbeat producer 1 ... n	0		●	
C00386/1...n	Heartbeat consumer time for the heartbeat producer 1 ... n	0	ms	●	
C00592/5	Resp. to heartbeat event	No response		●	
Highlighted in grey = display parameter					

Heartbeat producer time

Time interval for the transmission of the heartbeat telegram to the consumer(s).

- Parameterisable in [C00381](#) or via object [I-1017](#). The parameterised time is rounded down to an integer multiple of 5 ms.
- The heartbeat telegram is sent automatically as soon as a time > 0 ms is set.

Heartbeat consumer time

Monitoring time for the nodes (producers) to be monitored.

- Parameterisable in [C00386/1...n](#) or via object [I-1016](#).
- The parameterised time is rounded down to an integer multiple of 5 ms and must have a greater value than the heartbeat producer time of the node to be monitored.
- The maximum number of the nodes to be monitored depends on the device version:
 - "BaseLine C": 1 Heartbeat Producer can be monitored.
 - "StateLine C": Up to 7 Heartbeat Producers can be monitored.
 - "HighLine C": Up to 15 Heartbeat Producers can be monitored.
 - "TopLine C": Up to 15 Heartbeat Producers can be monitored.
- The node address(es) of the nodes to be monitored is/are set in [C00385/1...n](#) or via object [I-1016](#), too.

Heartbeat event

The "Heartbeat event" is activated in the consumer if it does not receive any heartbeat telegram from the producer within the heartbeat consumer time:

- The consumer changes from the "Operational" communication status to the "Pre-Operational" communication status.
- The NMT master receives an emergency telegram containing emergency error code 0x8130.
- The response parameterised in [C00592/5](#) is activated (Lenze setting: "No response").

**Note!**

The heartbeat monitoring will not start until the first heartbeat telegram of a monitored producer has been received successfully and the "Pre-Operational" NMT status has been assumed.

The boot-up telegram counts as the first heartbeat telegram.

11.10.2.3 Commissioning example**Task**

An 8400 controller (node 2) which is configured as heartbeat consumer is to monitor another 8400 controller (heartbeat producer, node 1).

- The heartbeat producer is to transmit a heartbeat telegram to the heartbeat consumer every 10 ms.
- The heartbeat consumer monitors the heartbeat telegram for arrival. A response is to be activated in the event of an error.

Parameterising the heartbeat producer (node 1)

1. Set the heartbeat producer time ([C00381](#)) to 10 ms.

Parameterising the heartbeat consumer (node 2)

1. Set the CAN node address of the producer in [C00385/1](#).
2. Set the heartbeat consumer time in [C00386/1](#).
 - Note: The heartbeat consumer time must be greater than the heartbeat producer time of the node to be monitored set in [C00381](#).
3. Set the desired response in [C00592/5](#) which is to be activated should a heartbeat event in the consumer occur.

**Tip!**

[C00347/1...n](#) displays the heartbeat status of the monitored nodes.

Heartbeat telegram

- The heartbeat telegram of the producer has the following identifier:
Identifier (COB-ID) = 1792 + producer's node address = 1792 + 1 = 1793 = 0x701

11.10.3 Emergency telegram

If the error status changes because an internal device error occurs or has been eliminated, the NMT master receives an emergency telegram once with the following structure:

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Emergency error codes		Error register	Manufacturer-specific error message				
LOW byte	HIGH byte	I-1001	0x00 (Reserved)	LOW word		HIGH word	
				LOW byte	HIGH byte	LOW byte	HIGH byte
See table below			- For emergency error code 0xF000: Lenze error number (value displayed in C00168) - All other emergency error codes have a value of "0" here.				

Emergency error codes	Error register	Cause
0x0000	0xFF	One of several errors eliminated
	0x00	One error has been eliminated (error-free status afterwards)
0x3100	0x01	Supply voltage of standard device faulty or failed
0x8100	0x11	Communication error (warning)
0x8130	0x11	Life guarding error or heartbeat error
0x8150	0x11	Collision of identifiers (COB-IDs): An identifier parameterised for reception is also used for transmission.
0x8210	0x11	PDO length shorter than expected
0x8220	0x11	PDO length greater than expected
0x8700	0x11	Monitoring of the sync telegram
0xF000	0x01	Generic error - An error with a "Fault", "Trouble", "TroubleQSP", "Warning", or "SystemFault" error response occurred in the standard device. - Error message is the Lenze error number (C00168).

The [Short overview \(A-Z\)](#) of error messages of the operating system includes a list of more emergency error codes. [\(p 450\)](#)

Example

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Emergency error codes		Error register	Manufacturer-specific error message				
0x00	0xF0	0x01	0x00 (Reserved)	Lenze error number			
Generic error			▶ Error messages of the operating system Corresponding error-free message: Value "0x00000000"				



Tip!

A detailed description can be found in CAN specification DS301, V4.02.

11.11 Implemented CANopen objects

Lenze devices can both be parameterised with Lenze codes and manufacturer-independent "CANopen objects". A completely CANopen-compliant communication can only be achieved by using CANopen objects for parameter setting. The CANopen objects described in this chapter are defined in the CAN specification DS301 V4.02.

Many CANopen objects can be mapped on Lenze codes. In the following table, the corresponding Lenze codes are listed in the column "Relationship to Lenze codes".



Note!

Some of the terms used here derive from the CANopen protocol.

Overview of CANopen indices and their relationship to Lenze codes

CANopen object			Relationship to Lenze code
Index	Subindex	Name	
I-1000	0	Device type	-
I-1001	0	Error register	-
I-1003	Predefined error field		
	0	Number of errors	-
	1 ... 10	Standard error field	-
I-1005	0	COB-ID SYNC message	C00367 C00368
I-1006	0	Communication cycle period	C00369
I-1014	0	COB-ID EMCY	-
I-1016	Consumer heartbeat time		
	0	Highest subindex supported	-
	1 ... n	Consumer heartbeat time • "BaseLine C" version: n = 1 • "StateLine C" version: n = 7 • "HighLine C" version: n = 15 • "TopLine C" version: n = 15	C00385/1...n C00386/1...n
I-1017	0	Producer heartbeat time	C00381
I-1018	Identity object		
	0	Highest subindex supported	-
	1	Vendor ID	-
	2	Product code	-
	3	Revision number	-
	4	Serial number	-
I-1200	SDO1 server parameter		
	0	Highest subindex supported	-
	1	COB-ID client → server (rx)	-
	2	COB-ID server → client (tx)	-
I-1201	SDO2 server parameter		
	0	Highest subindex supported	-
	1	COB-ID client → server (rx)	-
	2	COB-ID server → client (tx)	-

CANopen object			Relationship to Lenze code
Index	Subindex	Name	
I-1400	RPDO1 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/1
	2	Transmission type	C00323/1
I-1401	RPDO2 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/3
	2	Transmission type	C00323/2
I-1402	RPDO3 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/5
	2	Transmission type	C00323/3
I-1403	RPDO4 communication parameter (from version 15.00.00)		
	0	Highest subindex supported	-
	1	COB-ID used by RPDO	C00355/7
	2	Transmission type	C00323/4
I-1600	RPDO1 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/1...4 C00866/1...4
I-1601	RPDO2 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/5...8 C00866/5...8
I-1602	RPDO3 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/9...12 C00866/9...12
I-1603	RPDO4 mapping parameter (from version 15.00.00)		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00409/13...16 C00866/13...16
I-1800	TPDO1 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/2
	2	Transmission type	C00322/1
	3	Inhibit time	C00324/2
	5	Event timer	C00356/5 C00369

CANopen object			Relationship to Lenze code
Index	Subindex	Name	
I-1801	TPDO2 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/4
	2	Transmission type	C00322/2
	3	Inhibit time	C00324/3
	5	Event timer	C00356/2 C00369
I-1802	TPDO3 communication parameter		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/6
	2	Transmission type	C00322/3
	3	Inhibit time	C00324/4
	5	Event timer	C00356/3 C00369
I-1803	TPDO4 communication parameter (from version 15.00.00)		
	0	Highest subindex supported	-
	1	COB-ID used by TPDO	C00355/8
	2	Transmission type	C00322/4
	3	Inhibit time	C00324/5
	5	Event timer	C00356/4 C00369
I-1A00	TPDO1 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/1...4
I-1A01	TPDO2 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/5...8
I-1A02	TPDO3 mapping parameter		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/9...12
I-1A03	TPDO4 mapping parameter (from version 15.00.00)		
	0	Number of mapped application objects in PDO	-
	1 ... 4	Application object 1 ... 4	C00868/13...16

I-1000

Index I-1000	Name: Device type					
Subindex	Default setting	Display range (min. value unit max. value)			Access	Data type
0: Device type	0	0		4294967295	ro	U32

The CANopen index I-1000 specifies the profile for this device. Furthermore, additional information defined in the device profile itself can be stored here.

8th byte	7th byte	6th byte	5th byte
Data 4	Data 3	Data 2	Data 1
HIGH word		LOW word	
HIGH byte	LOW byte	HIGH byte	LOW byte
Additional information		Device profile number	

[11-1] Data telegram assignment

In case of 8400 series controllers, the four bytes contain the following values:

- 5th and 6th byte: The data content is 0x0000, i.e. no profile definition.
- 7th byte: The data content specifies the device type: Here the value is 0x00 for controllers.
- 8th byte: The data content is 0x00.

The data content for the 8400 controller thus is: 00 00 00 00

I-1001

Index: I-1001	Name: Error register					
Subindex	Default setting	Display range (min. value unit max. value)			Access	Data type
0: Error register	-	0		255	ro	U8

Error register

The error status in the data byte (U8) is bit coded. The following error states are coded in the data byte (U8):

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Error status
0	0	0	0	0	0	0	0	No error
0	0	0	0	0	0	0	1	Device error message
0	0	0	1	0	0	0	1	Communication error

I-1003

Index: I-1003	Name: Predefined error field					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of errors	0	0		255	rw	U8
1 ... 10: Standard error field	-	0		4294967295	ro	U32

Error history

This object indicates that an error has occurred in the module and in the standard device.

Subindex	Meaning
0	Number of saved error messages
1 ... 10	Display of the error list The error messages (U32) consist of a 16-bit error code and a manufacturer-specific information field comprising 16 bits.

**Note!**

The values in the "standard error field" under subindex 1 ... 10 will be deleted if the subindex "number of recorded errors" is overwritten with the value "0".

Emergency error codes	Cause	Entry in the error register (I-1001)
0x0000	One of several errors eliminated	0xXX
	Elimination of one single error (afterwards no more errors)	0x00
0x1000	Standard device is in error status (error response "fault", "message", "warning", "error", "quick stop by trouble", or "system error")	0x01
0x3100	Supply voltage of standard device faulty or failed	0x01
0x8100	Communication error (warning)	0x11
0x8130	Life guard error or heartbeat error	0x11
0x8150	Collision of COB-IDs: An ID parameterised for reception is also used for transmission.	0x11
0x8210	PDO length shorter than expected	0x11
0x8220	PDO length greater than expected	0x11
0x8700	Monitoring of the sync telegram	0x11

I-1005

Index: I-1005	Name: COB-ID SYNC message					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: COB-ID SYNC message	0x0000 0080 or 0x8000 0080	0		4294967295	rw	U32

This object can be used to activate the generation of sync telegrams and to write the identifier value.

- This object relates to codes [C00367](#) and [C00368](#).

Creating sync telegrams

Sync telegrams are created by setting bit 30 (see below) to "1". The time between the sync telegrams can be set using the object [I-1006](#).

Writing identifiers

To receive PDOs, the value 0x80 must be entered in the 11-bit identifier in the Lenze setting (and according to CANopen specification). This means that all modules are by default set to the same sync telegram.

- If sync telegrams are only to be received by certain communication modules, their identifiers can be entered with values up to and including 0x07FF.
- The identifier can only be changed if the communication module does not send any sync telegrams (bit 30 = "0").
- How to change the identifier:
 - Deactivate identifier (set bit 30 to "0").
 - Change identifier.
 - Activate identifier (set bit 30 to "1").

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
X	0/1	Extended identifier*				11-bit identifier	

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-2] Data telegram assignment

I-1006

Index: I-1006	Name: Communication cycle period					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Communication cycle period	0 µs	0	µs	65535000	rw	U32

Setting the sync telegram cycle time.

- The cycle time can be selected as "1000" or as an integer multiple of it.
- If "0 µs" is set (Lenze setting), no sync telegrams are created.
- This object relates to code [C00369](#).

I-1014

Index: I-1014	Name: COB-ID EMCY					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: COB-ID EMCY	0x80 + node ID	0		4294967295	rw	U32

When communication errors occur and are acknowledged or when internal errors occur in the communication module or controller (e.g. "fault"), the system bus sends an error message. The telegram is sent once for every error. This function can be activated or deactivated with bit 31.

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0	Extended identifier*				11-bit identifier	
* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".							

[11-3] Data telegram assignment

Bit	Setting	
Bit 31	0	Emergency object is valid.
	1	Emergency object is invalid.

**Note!**

The identifier can only be changed in the "emergency object invalid" status (bit 31 = 1).

I-1016

Index: I-1016	Name: Consumer heartbeat time					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	BaseLine C: 1 StateLine C: 7 HighLine C: 15 TopLine C: 15	- (read access only)			ro	U16
1 ... n: Consumer heartbeat time	0	0		65535	rw	U16

Monitoring time for the nodes to be monitored via heartbeat. ► [Heartbeat protocol](#) (537)

- The parameterised time is rounded down to an integer multiple of 5 ms and must have a greater value than the heartbeat producer time of the node to be monitored.

Subindex	Meaning	Lenze code
0	Number of nodes to be monitored	
1 ... n	Node ID and heartbeat time of the node to be monitored	Node ID: C00385/x Heartbeat time: C00386/x

8th byte	7th byte	6th byte	5th byte
Data 4	Data 3	Data 2	Data 1
Bit 31 ... bit 24	Bit 23 ... Bit 16	Bit 15 ... Bit 0	
0 (Reserved)	Node ID	Heartbeat time in [ms]	

[11-4] Data telegram assignment

I-1017

Index: I-1017	Name: Producer heartbeat time					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Producer heartbeat time	0	0	ms	65535	rw	U16

Time interval for sending the heartbeat telegram to the consumer(s). ▶ [Heartbeat protocol](#) (📖 537)

- The parameterised time is rounded down to an integer multiple of 5 ms.
- The heartbeat telegram is automatically sent as soon as a time > 0 ms is entered. In this case, the "node guarding" monitoring function is deactivated.
- This object relates to code [C00381](#).

I-1018

Index: I-1018	Name: Identity object					
Subindex	Default setting	Display range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	see below	0		4294967295	ro	U32
1: Vendor ID						
2: Product code						
3: Revision number						
4: Serial number						

Subindex	Meaning	
1	Manufacturer's identification number • The identification number allocated to Lenze by the organisation "CAN in Automation e. V." is "0x0000003B".	
2	Product code	
	0x84001	8400 BaseLine C
	0x84002	8400 StateLine C
	0x84003	8400 HighLine C
	0x84004	8400 TopLine C
3	Main and subversion of firmware	
4	Serial number	

I-1200

Index: I-1200	Name: SDO1 server parameter					
Subindex	Default setting	Display range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	2	2		2	ro	U8
1: COB-ID client -> server (rx)	node ID + 0x600	0		4294967295	ro	U32
2: COB-ID server -> client (tx)	node ID + 0x580	0		4294967295	ro	U32

Identifiers for SDO server channel 1 (basic SDO channel).

- According to DS301 V4.02, the basic SDO channel can neither be changed nor deactivated.

Subindex	Meaning
1	Specification of receive identifier • For SDO server channel 1: node address (C00350) + 0x600
2	Specification of send identifier • For SDO server channel 1: node address (C00350) + 0x580

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0	0	Extended identifier*				11-bit identifier	

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-5] Data telegram assignment

I-1201

Index: I-1201	Name: SDO2 server parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	3	- (read access only)			ro	U8
1: COB-ID client -> server (rx)	0x80000000	0		4294967295	rw	U32
2: COB-ID server -> client (tx)	0x80000000	0		4294967295	rw	U32

Identifiers for SDO server channel 2.

- The SDO server parameter is only valid, if bit 31 is set to "0" for both transmission directions (subindex 1 and 2).
- In the Lenze setting, the SDO server channels 2 are deactivated (bit 31 = "1").
- The identifier can only be changed if the SDO is invalid (bit 31 = "1").

Subindex	Meaning
1	Specification of receive identifier
2	Specification of send identifier

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0	Extended identifier*				11-bit identifier	
* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".							

* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".

[11-6] Data telegram assignment

Bit	Setting	
Bit 31	0	SDO is valid.
	1	SDO is invalid.

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

Example

Parameter data channel 2 of the controller with node address 4 shall be activated.

- For this, bit 31 must be set to "0" ($\equiv$ "SDO is valid") in subindices 1 and 2 of the object [I-1201](#).
- The master must send the two "write request" commands to the nodes via the basic SDO channel.

Identifier calculation

- Identifier (COB-ID) = basic identifier + node address (node ID)
- Basic identifier SDO2 from master to drive: 1600 (0x640)
→ Identifier = 0x640 + 0x4 = 0x644
- Basic identifier SDO2 from drive to master: 1472 (0x5C0)
→ Identifier = 0x5C0 + 0x4 = 0x5C4

Resulting data (data 1 ... data 4)

8th byte			7th byte			6th byte			5th byte		
Data 4			Data 3			Data 2			Data 1		
Bit 31	Bit 30	Bit 29 ... bit 11						Bit 10 ... bit 0			
0	0	Extended identifier = 0						11-bit identifier = 0x644			
0x00			0x00			0x06			0x44		

[11-7] Data telegram assignment for subindex 1

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0	0	Extended identifier = 0				11-bit identifier = 0x5C4	
0x00		0x00		0x05		0xC4	

[11-8] Data telegram assignment for subindex 2

User data assignment

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x23	0x01	0x12	0x01	0x44	0x06	0x00	0x00

[11-9] User data assignment for writing to subindex 1

1st byte	2nd byte	3rd byte	4th byte	5th byte	6th byte	7th byte	8th byte
Command	Index		Subindex	Data 1	Data 2	Data 3	Data 4
0x23	0x01	0x12	0x02	0xC4	0x05	0x00	0x00

[11-10] User data assignment for writing to subindex 2

I-1400

Index: I-1400	Name: RPDO1 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by RPDO	0x200 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)			rw	U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	-	- (not used for RPDOs)			rw	U16

Communication parameter for receiving process data via RPDO1

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	RPDO1 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x200 + node ID	C00354/1
2	RPDO transmission type according to DS301 V4.02 ▶ Transmission type (☞ 519)	C00323/1

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0/1	Extended identifier*				11-bit identifier	
* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".							

[11-11] Data telegram assignment

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

Description of subindex 1

Bit no.	Value	Explanation
0 ... 10	0/1	11-bit identifier
(11 ... 28)*	0	*) The extended identifier (29 bits) is not supported. Any of these bits must be "0".
29*	0	
30	0	RTR to this PDO possible (cannot be set)
	1	RTR to this PDO not possible (Lenze)
31	0	PDO active
	1	PDO not active

[11-12] I-1400 ... I-1402, subindex 1

Description of subindex 2

cyclic	PDO transmission		Transmission type	Explanation
	synchronous	event-controlled		
X	X		n = 1 ... 240	When a value n is entered, this PDO will be accepted with every nth SYNC.
		X	n = 254	PDO will be accepted immediately.

[11-13] I-1400 ... I-1402, subindex 2

I-1401

Index: I-1401	Name: RPDO2 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Highest subindex supported	5	- (read access only)			ro U8
1: COB-ID used by RPDO	0x300 + node ID	0		4294967295	rw U32
2: Transmission type	254	0		255	rw U8
3: Inhibit time	-	- (not used for RPDOs)			rw U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)			rw U8
5: Event timer	-	- (not used for RPDOs)			rw U16

Communication parameter for receiving process data via RPDO2

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	RPDO2 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x300 + node ID	C00354/3
2	RPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 519)	C00323/2

- For data telegram assignment and description of subindices 1 and 2, see object [I-1400](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1402

Index: I-1402	Name: RPDO3 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by RPDO	0x400 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)			rw	U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	-	- (not used for RPDOs)			rw	U16

Communication parameter for receiving process data via RPDO3

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	RPDO3 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x400 + node ID	C00354/5
2	RPDO transmission type according to DS301 V4.02 ▶ Transmission type (☞ 519)	C00323/3

- For data telegram assignment and description of subindices 1 and 2, see object [I-1400](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1403

From version 15.00.00

Index: I-1403	Name: RPDO4 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by RPDO	0x500 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	-	- (not used for RPDOs)			rw	U16
4: Compatibility entry	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	-	- (not used for RPDOs)			rw	U16

Communication parameter for receiving process data via RPDO4

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	Identifier RPDO4 • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x500 + node ID	C00354/7
2	RPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 519)	C00323/4

- For data telegram assignment and description of subindices 1 and 2, see object [I-1400](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1600

Index: I-1600	Name: RPDO1 mapping parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Number of mapped application objects in PDO	0	0		8	rw U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw U32

The object I-1600 serves to receive parameter data as RPDO1.

- This object relates to codes [C00409/1...4](#) and [C00866/1...4](#).
- **From version 12.00.00 onwards:** For 32-bit values, this object relates to codes [C00407/1...2](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO1 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

8th byte	7th byte	6th byte	5th byte
Data 4	Data 3	Data 2	Data 1
Bit 31 ... bit 16		Bit 15 ... bit 8	Bit 7 ... bit 0
Index		Subindex	Length

[11-14] Data telegram assignment

IEC 61131 process data words are mapped. Only whole bytes can be mapped (1-byte/mapping entry).

Related topics:

- ▶ [RPDO1 | Port block "LP_CanIn1"](#) (📖 505)

I-1601

Index: I-1601	Name: RPDO2 mapping parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Number of mapped application objects in PDO	0	0		8	rw U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw U32

The object I-1601 serves to receive parameter data as RPDO2.

- This object relates to codes [C00409/5...8](#) and [C00866/5...8](#).
- **From version 12.00.00 onwards:** For 32-bit values, this object relates to codes [C00407/3...4](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO2 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1600](#).

Related topics:

► [RPDO2 | "LP_CanIn2" port block](#) (📖 507)

I-1602

Index: I-1602	Name: RPDO3 mapping parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Number of mapped application objects in PDO	0	0		8	rw U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw U32

The object I-1602 serves to receive parameter data as RPDO3.

- This object relates to codes [C00409/9...12](#) and [C00866/9...12](#).
- **From version 12.00.00 onwards:** For 32-bit values, this object relates to codes [C00407/5...6](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO3 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1600](#).

Related topics:

► [RPDO3 | "LP_CanIn3" port block](#) (📖 509)

I-1603

From version 15.00.00

Index: I-1603	Name: RPDO4 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1603 serves to receive parameter data as RPDO4.

- This object relates to codes [C00409/13...16](#) and [C00866/13...16](#).
- For 32-bit values, this object relates to the codes [C00407/7...8](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for RPDO4 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1600](#).

Related topics:

► [RPDO4 | "LP_CanIn4" port block](#) (📖 511)

I-1800

Index: I-1800	Name: TPDO1 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by TPDO	0x180 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw	U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	0 ms	0	ms	65535	rw	U16

Communication parameter for sending process data via TPDO1

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	TPDO1 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x180 + node ID	C00354/2
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 519)	C00322/1
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/2
5	Cycle time for PDO transmission with transmission type "254".	C00356/5 C00369

8th byte		7th byte		6th byte		5th byte	
Data 4		Data 3		Data 2		Data 1	
Bit 31	Bit 30	Bit 29 ... bit 11				Bit 10 ... bit 0	
0/1	0/1	Extended identifier*				11-bit identifier	
* The extended identifier is not supported. Bit 11 ... bit 29 must be set to "0".							

[11-15] Data telegram assignment

Bit	Setting
Bit 30	0 RTR to this PDO possible (Lenze).
	1 RTR to this PDO not possible (not adjustable)
Bit 31	0 PDO active
	1 PDO inactive

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

Subindex 2 - transmission type

PDO transmission			Transmission type	Explanation
cyclic	synchronous	event-controlled		
•	•		n = 1 ... 240	When a value n is entered, this PDO will be accepted with every nth SYNC.
	•		n = 252	On sync, the PDO is filled with new data, but only sent on RTR.
		•	n = 254, 255	Event-controlled or cyclic

Subindex 3 - inhibit time

**Note!**

The delay time can only be changed when the PDO is not active (see subindex 1, bit 31 = 1).

The entered value multiplied by 0.1 gives the delay time in [ms]. Only integers will be considered, i.e. fractional numbers will be **rounded down** to integers.

Example:

- Entered value: 26
- Calculated time = $26 \times 0.1 \text{ [ms]} = 2.6 \text{ [ms]} \rightarrow \text{delay time} = 2 \text{ [ms]}$

Subindex 5 - event timer

For cyclic operation (transmission type 254), the cycle time for sending the process data object on the system bus can be set under subindex 5:

The entered value corresponds to the time in [ms].

I-1801

Index: I-1801	Name: TPDO2 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Highest subindex supported	5	- (read access only)			ro U8
1: COB-ID used by TPDO	0x280 + node ID	0		4294967295	rw U32
2: Transmission type	254	0		255	rw U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw U8
5: Event timer	0 ms	0	ms	65535	rw U16

Communication parameter for sending process data via TPDO2

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	TPDO2 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x280 + node ID	C00354/4
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 519)	C00322/2
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/3
5	Cycle time for PDO transmission with transmission type "254".	C00356/2 C00369

- For data telegram assignment and description of subindices, see object [I-1800](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1802

Index: I-1802	Name: TPDO3 communication parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Highest subindex supported	5	- (read access only)			ro U8
1: COB-ID used by TPDO	0x380 + node ID	0		4294967295	rw U32
2: Transmission type	254	0		255	rw U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw U8
5: Event timer	0 ms	0	ms	65535	rw U16

Communication parameter for sending process data via TPDO3

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	TPDO3 identifier • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x380 + node ID	C00354/6
2	TPDO transmission type according to DS301 V4.02 ▶ Transmission type (□ 519)	C00322/3
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/4
5	Cycle time for PDO transmission with transmission type "254".	C00356/3 C00369

- For data telegram assignment and description of subindices, see object [I-1800](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1803

From version 15.00.00

Index: I-1803	Name: TPDO4 communication parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Highest subindex supported	5	- (read access only)			ro	U8
1: COB-ID used by TPDO	0x480 + node ID	0		4294967295	rw	U32
2: Transmission type	254	0		255	rw	U8
3: Inhibit time	0 ms	0	0.1 ms	65535	rw	U16
4: Reserved	-	- (reserved, read or write access leads to error message 0x06090011)			rw	U8
5: Event timer	0 ms	0	ms	65535	rw	U16

Communication parameter for sending process data via TPDO4

Subindex	Meaning	Code
0	"5" is permanently set. • Max. 5 subindices are supported.	-
1	Identifier TPDO4 • According to the "Predefined Connection Set", the basic setting is: Identifier = 0x480 + node ID	C00354/8
2	TPDO transmission type according to DS301 V4.02 ► Transmission type (□ 519)	C00322/4
3	Minimum time between sending two identical TPDOs (see DS301 V4.02).	C00324/5
5	Cycle time for PDO transmission with transmission type "254".	C00356/4 C00369

- For data telegram assignment and description of subindices, see object [I-1800](#).

How to change the identifier:

1. Deactivate identifier (set bit 31 to "1").
2. Change identifier.
3. Activate identifier (set bit 31 to "0").

I-1A00

Index: I-1A00	Name: TPDO1 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1A00 serves to send parameter data as TPDO1.

- This object relates to code [C00868/1...4](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO1 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

8th byte	7th byte	6th byte	5th byte
Data 4	Data 3	Data 2	Data 1
Bit 31 ... bit 16		Bit 15 ... bit 8	Bit 7 ... bit 0
Index		Subindex	Length

[11-16] Data telegram assignment

IEC 61131 process data words are mapped. Only whole bytes can be mapped (1-byte/mapping entry).

Related topics:

- ▶ [TPDO1 | "LP_CanOut1" port block](#) (513)

I-1A01

Index: I-1A01	Name: TPDO2 mapping parameter					
Subindex	Default setting	Setting range (min. value unit max. value)			Access	Data type
0: Number of mapped application objects in PDO	0	0		8	rw	U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw	U32

The object I-1A01 serves to send parameter data as TPDO2.

- This object relates to code [C00868/5...8](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO2 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1A00](#).

Related topics:

- ▶ [TPDO2 | "LP_CanOut2" port block](#) (514)

I-1A02

Index: I-1A02	Name: TPDO3 mapping parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Number of mapped application objects in PDO	0	0		8	rw U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw U32

The object I-1A02 serves to send parameter data as TPDO3.

- This object relates to code [C00868/9...12](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO3 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1A00](#).

Related topics:

► [TPDO3 | "LP_CanOut3" port block](#) (515)

I-1A03

Index: I-1A03	Name: TPDO4 mapping parameter				
Subindex	Default setting	Setting range (min. value unit max. value)			Access Data type
0: Number of mapped application objects in PDO	0	0		8	rw U8
1 ... 4: Application object 1 ... 4	0	0		4294967295	rw U32

The object I-1A03 serves to send parameter data as TPDO4.

- This object relates to code [C00868/13...16](#).

Subindex	Meaning
0	Number of mapped objects
1 ... 4	Mapping entries 1 ... 4 for TPDO4 • The 4th mapping entry is used for the statistic mapping. For this, there is no value available.

- For data telegram assignment, see object [I-1A00](#).

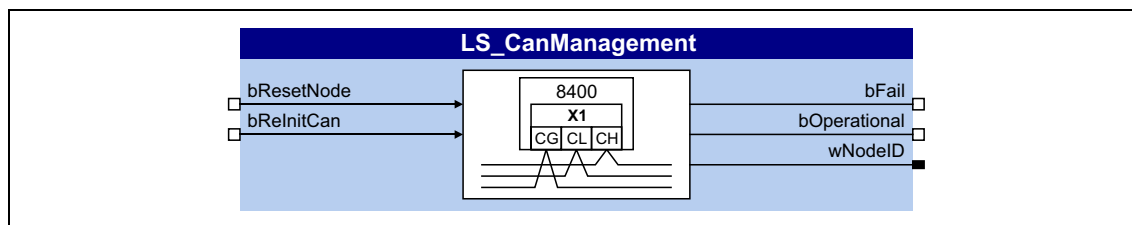
Related topics:

► [TPDO4 | "LP_CanOut4" port block](#) (516)

11.12 Internal interfaces | System block "LS_CANManagement"

This function extension is only available from version 04.00.00!

The **LS_CANManagement** system block serves to control internal functions of the CAN driver (reset node and re-initialisation) and to display the "Operational" status as well as the node address (analogous to the 9300 ServoPLC and ECS devices).



Inputs

Identifier	Data type	Information/possible settings	
bResetNode	BOOL	Reset node	
		TRUE	Carry out reset node • If the controller is configured as CAN master in C00352 , the NMT command "Start Remote Node" is sent to all nodes at the bus (broadcast telegram). ▶ Network management telegram (NMT)
bReInitCAN	BOOL	Reinitialisation	
		TRUE	Reinitialise "CAN on board" interface.

Outputs

Identifier	Data type	Value/meaning	
bFail	BOOL	Fault	
		TRUE	An event according to the error configuration in C00341 has occurred
bOperational	BOOL	"Operational" status signal	
		TRUE	The system bus is in the "Operational" status
wNodeID	WORD	Output of the node address	



Note!

If a "Bus off" error is detected, the "CAN on board" interface will automatically be reinitialised after 1 second.

Hence, 1 second after the "Bus off" has occurred, the controller will automatically be active again on the system bus ("Auto bus off recovery").

12 Fieldbus interface (MCI)

The Inverter Drives 8400 can accommodate plug-in communication modules and can therefore take part in the data transfer of an existing fieldbus system.

When using a communication module, the major advantage for the user is the possibility of parameterising, controlling, and diagnosing the drive system via the available fieldbus.

The following fieldbuses are supported by the 8400 StateLine:

Fieldbus	Communication module (type designation)
	System bus "CAN on board" (permanently integrated in the standard device)
	EtherCAT® (E84AYCET)
	Ethernet POWERLINK (E84AYCEC)
	EtherNet/IP™ (E84AYCEO)
	INTERBUS (E84AYCIB)
	PROFIBUS® (E84AYCPM)
	PROFINET® (E84AYCER)

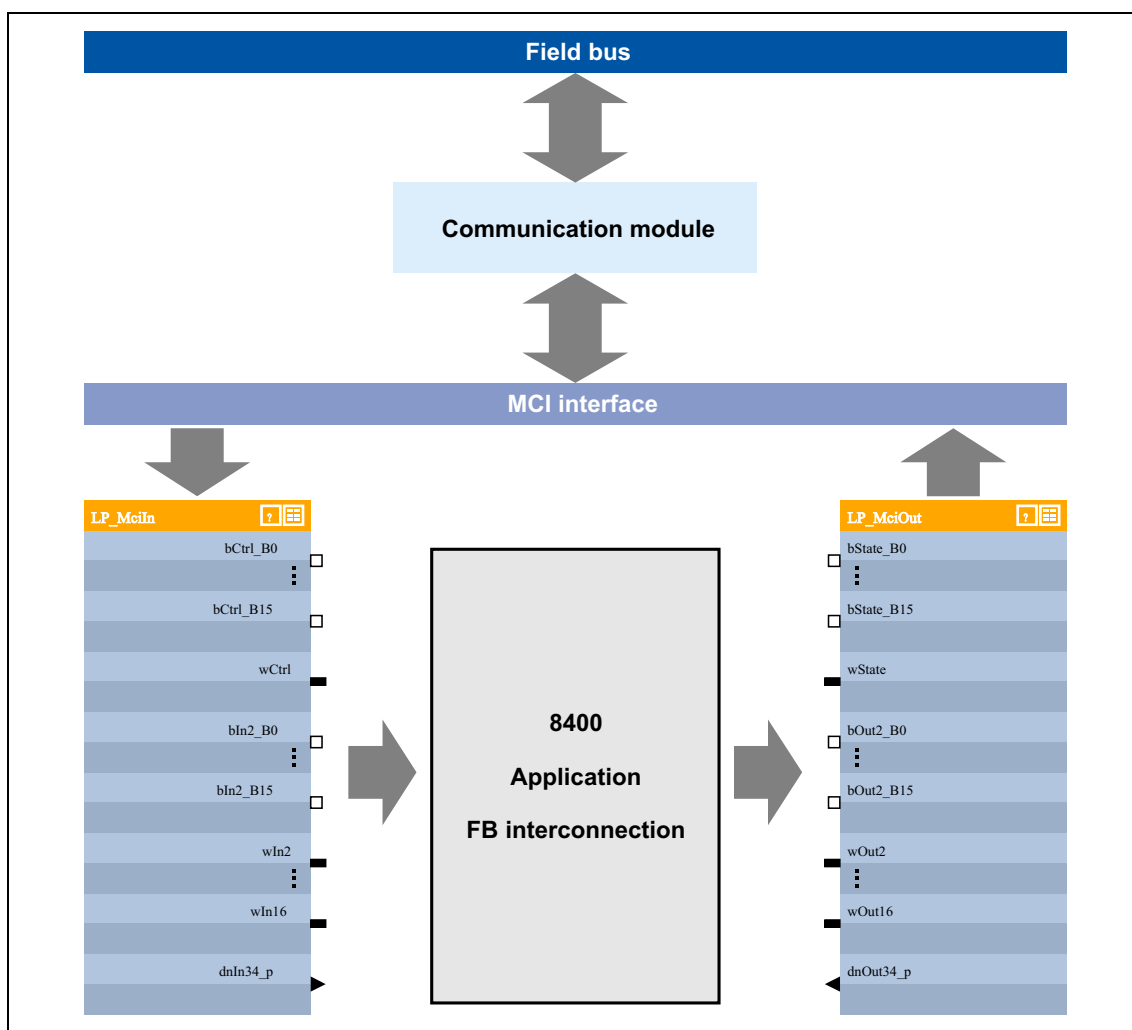


Detailed information is provided in the communication manual (KHB) for the respective fieldbus and in the »Engineer« online help.

12.1 Process data transfer

The process data serve to control the controller. Thus the transfer of the process data is time-critical.

- The process cycle is 1 ms, irrespective of the respectively plugged-in bus system and the type of drive controller.
- Process data transfer takes place cyclically between the master system and the drive controllers.
 - This concerns the continuous exchange of current input and output data.
 - In the case of the 8400 drive controller, 16 words per direction are exchanged.
- The master computer can directly access the process data.
Access to the process data takes place via the port blocks **LP_MciIn** and **LP_MciOut** (see FB interconnection of the »Engineer«).
These port blocks are also called process data channels.
- The process data are not saved in the controller.



[12-1] External and internal data transfer between bus system, drive controller and function block interconnection

Voltage supply

Depending on the complexity and functional range of the fieldbus, the communication modules are supplied by the standard device or an external 24 V supply at the module.

The external 24 V voltage supply of the communication module is required if the supply of the standard device fails but the communication via the bus is to continue.

Parameter setting of the communication modules

All codes which must be parameterised for establishing the fieldbus communication are saved in the memory module of the controller.

The archived data can be addressed by all bus systems supported by the controller.

Hotplug

The communication module (MCI module) can be plugged in/out while the controller is switched on. When the module is plugged in, it is automatically detected and checked for plausibility regarding the function and version.

Fieldbus-specific device profiles and PDO mapping

When specific bus systems are used, the controller is to behave according to a defined, manufacturer-spanning standard. The following definitions have been made for this:

- Definitions of the device state machine (e.g. DSP402, DriveCOM, ProfiDrive etc.)
- Definition of the bit assignment of control and status words
- Definition of signal scaling (on a limited scale)
- Definition of parameter scaling (on a limited scale)
- Definition of the process data mapping

These device profiles are not mapped in the communication module since some definitions have a strong effect on the device-internal behaviour and the device profiles are not uniform regarding this matter.

- The task of the communication modules is
 - to address parameters (SDOs),
 - to transfer PDOs and
 - the signal mapping of the PDOs.
- The process data objects (e.g. the meaning of the control word bits or the speed setpoint stipulated) are interpreted in the drive controller.

12.2 Control mode "MCI"

"40: MCI" can be selected as a control mode in [C00007](#) in order to quickly and easily set-up drive controller control by means of MCI-PDOs via the fieldbus interface.

Given that the technology applications are fundamentally different and have different requirements regarding the signals sent to them, predefined assignment of the MCI-PDOs depends on the technology application selected in [C00005](#):

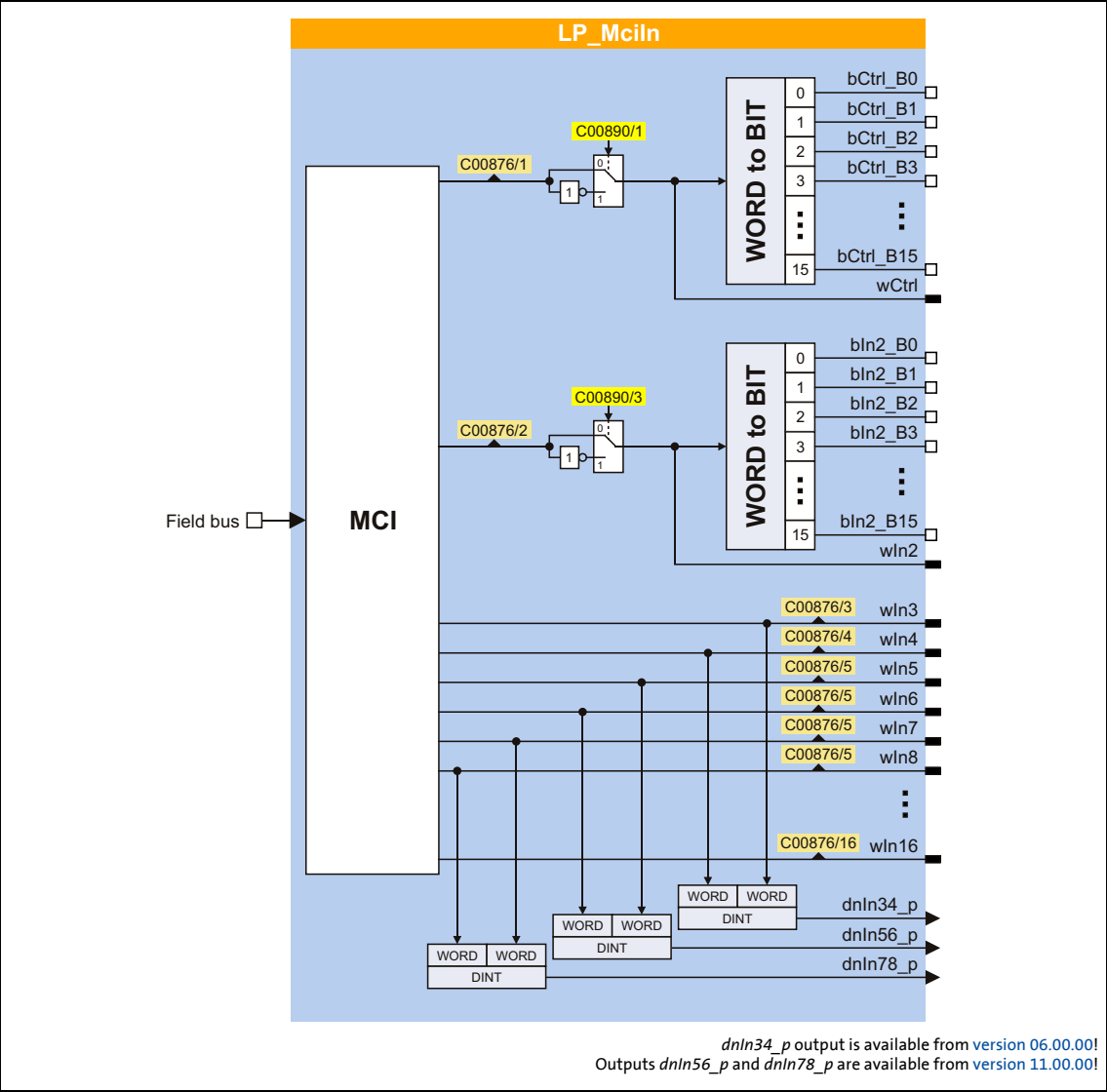
- **TA "Actuating drive speed":**
[Process data assignment for fieldbus communication](#) (📖 318)
- **TA "Abschaltpositionierung":**
[Process data assignment for fieldbus communication](#) (📖 378)

**Tip!**

The predefined assignment of the MCI-PDOs can be parameterised by means of PDO mapping and can be freely configured on the I/O level in the function block editor (FB editor).

12.2.1 Port block "LP_MciIn"

The LP_MciIn port block maps the received MCI-PDOs in the FB Editor.

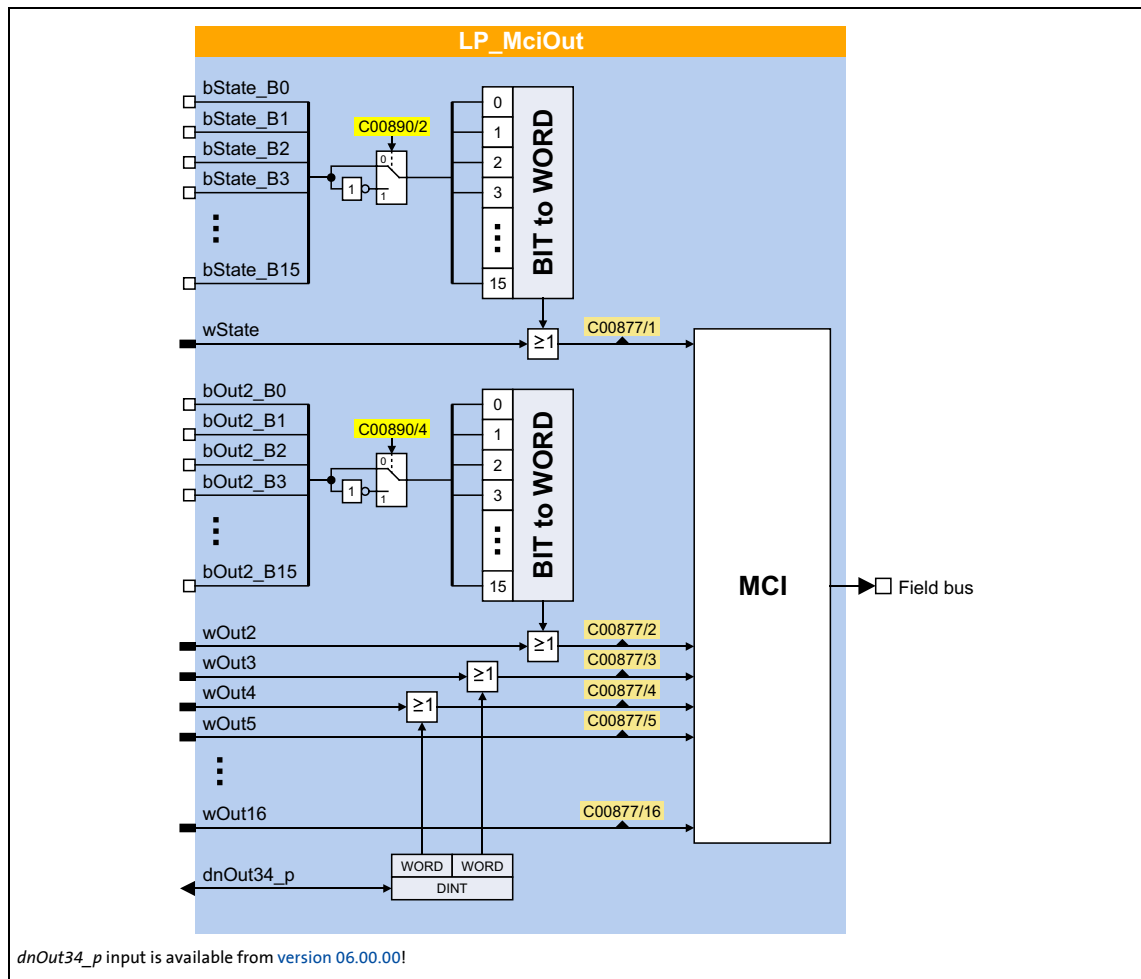


Short overview of the parameters for LP_MciIn:

Parameter	Info	Lenze setting
C00876/1	LP_MciIn:wCtrl	-
C00876/2...16	LP_MciIn: wln2 ... wln16	-
C00890/1	LP_MciIn: Inversion bCtrl_B0..15	0x0000
C00890/3	LP_MciIn: Inversion bln2_B0..15	0x0000
Highlighted in grey = display parameter		

12.2.2 Port block "LP_MciOut"

The **LP_MciOut** port block maps the MCI-PDOs to be transmitted in the FB Editor.



Short overview of the parameters for LP_MciOut:

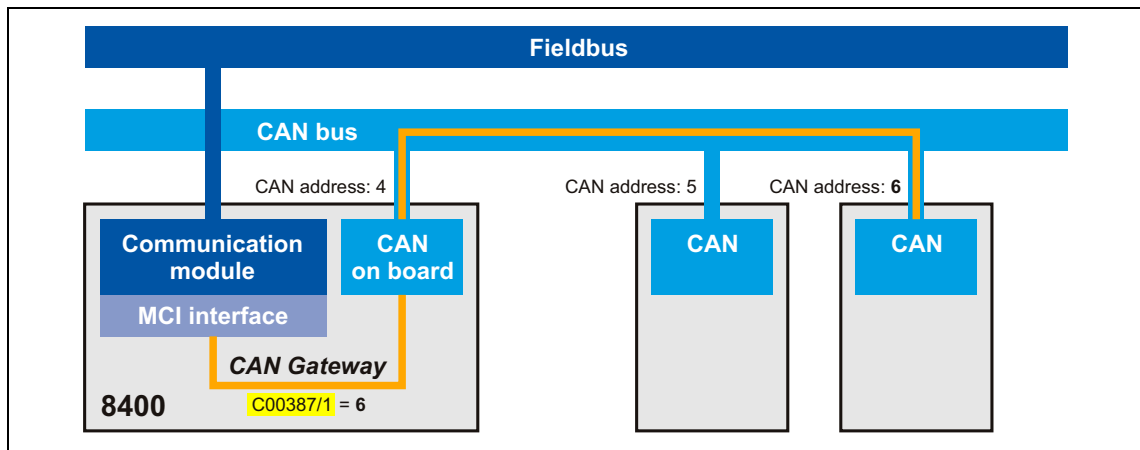
Parameter	Info	Lenze setting
C00877/1	LP_MciOut:wState	-
C00877/2...16	LP_MciOut: wOut2 ... wOut16	-
C00890/2	LP_MciOut: Inversion bState_B0..15	0x0000
C00890/4	LP_MciOut: Inversion bOut2_B0..15	0x0000
Highlighted in grey = display parameter		

12.3 CAN gateway

This function extension is available from version 12.00.00!

The CAN gateway functionality forwards the read/write requests of the attached communication module to a connected *remote* device via the "CAN on board" system bus. It also receives the responses via this way.

- From the point of view of the attached communication module, the read/write requests are identical to accesses to its own standard device.
- Block services (reading/writing parameters of the "String" data type) can also be executed via the CAN gateway.



[12-2] Functional principle of "CAN gateway"

Activating the CAN gateway

To activate the CAN gateway, the CAN address (1 ... 127) of the connected *remote* device must be set in [C00387/1](#).

- In the Lenze setting [C00387/1](#) = "0", the function is switched off.
- If the CAN gateway is activated, the own controller is the client and the *remote* device is the server.
- If the own CAN address is set, the read/write requests are forwarded to the own controller.
- The parameters of the communication module (C13000 ... C13999) are always processed in the own controller.
- The parameters [C00387/1](#) (CAN gateway address) and [C00350](#) (CAN node address) are not transferred to the *remote* device.

13 Synchronisation of the internal time base

In a drive system, synchronising the internal time bases of all controllers involved makes sense because cyclic process data should be processed synchronously in all drives.

- One of the following signal sources can be used for automatic synchronisation of the internal time base of the controller:
 - CAN bus ("CAN on board") → [sync telegram](#)
 - MCI → sync signal of a plugged-in communication module (EtherCAT, PROFINET or Powerlink)

Short overview of the parameters for the synchronisation of the internal time base:

Parameter	Info	Lenze setting	
		Value	Unit
C00370/1	CAN Sync instant of transmission	-	µs
C00370/2	Sync instant of reception	-	µs
C01120	Sync signal source	Off	
C01121	Sync cycle time setpoint	1000	µs
C01122	Sync phase position	0	µs
C01123	Sync window	100	µs
C01124	Sync correction width	300	ns

Highlighted in grey = display parameter

Sync signal source

The synchronisation signal source can be selected in [C01120](#). As a general rule, only one source can be used to synchronise the internal time base.

Sync cycle time setpoint

Time after which the internal phase-locking loop (PLL) anticipates the synchronisation signals. The time must be set in [C01121](#) according to the cycle of the synchronisation source selected in [C01120](#).



Note!

- Only integer multiples of 1000 µs can be set in [C01121](#).
- Intelligent communication modules usually define the cycle time setpoint derived from the bus cycle. In this case, a manual change is not possible.

Example: For the CAN bus, 2 ms has been selected as interval between two synchronisation signals. If the CAN bus is to be used as synchronisation source, a cycle time setpoint of 2000 µs must be selected in [C01121](#).

Sync phase position

The phase position determines the zero-time of the internal system cycle with regard to the synchronisation signal (bus cycle). Since PDO processing is an inherent part of the system part of the application, the instant of acceptance of the PDOs is postponed as well by a changed phase position.

- If "0" is set, the internal system cycle starts at the same time as the synchronisation signal.
- If a value > 0 is set, the internal system cycle starts by the set time earlier (the phase position has a negative effect) than the synchronisation signal.
- Intelligent communication modules define the optimal time with activated synchronisation by themselves. In this case, a manual change is not possible.
- For determining [C01122](#), the point in time where all bus nodes have valid PDOs is decisive.

Example: If the phase position is set to $550\ \mu\text{s}$, the system part of the application starts $550\ \mu\text{s}$ before the arrival of the synchronisation signal.

Sync correction width

If the cycle times of the synchronisation signal and the phase-locking loop (PLL) are different, the setting in [C01124](#) defines the correction increments for the phase-locking loop.

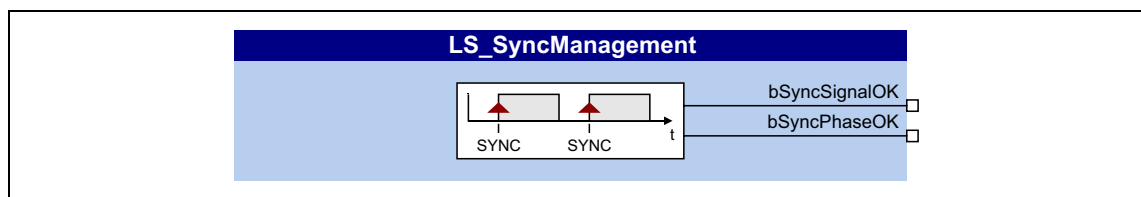
- The recommended reset time for the CAN bus as synchronisation source in case of occurring deviations is $300\ \text{ns}$ (Lenze setting).
- If synchronisation is not reached, select a higher correction width.
- The optimum setting depends on quartz precision and must be determined empirically if required.

13.1

Internal interfaces | System block "LS_SyncManagement"

This function extension is available from version 11.00.00!

The SB **LS_SyncManagement** provides status information for synchronising the internal time base:



Outputs

Identifier	Data type	Value/meaning
bSyncSignalOK	BOOL	TRUE Sync signal OK
bSyncPhaseOK	BOOL	TRUE Sync phase position OK

14 Parameter change-over

This function extension is only available from version 04.00.00!

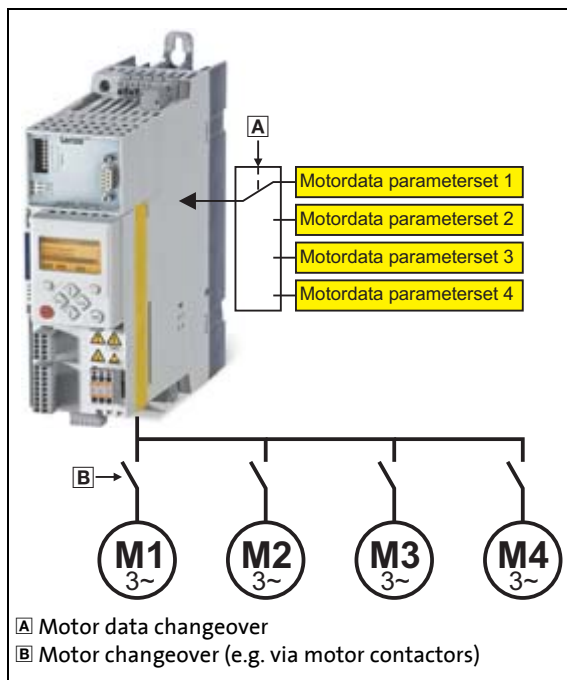
For up to 32 freely selectable parameters, this basic function provides a change-over between four sets with different parameter values.

The parameter list is created in the same way as the user menu is composed, namely by means of parameterisation. In the »Engineer«, a user-friendly parameterisation dialog with import and export functions is available for this purpose.

Motor data changeover

From version 12.00.00, an optional changeover between four parameter sets with different motor and control settings is supported in addition.

The optional motor data changeover is provided for applications/machines which have multiple axes controlled successively but which do not require the simultaneous operation of multiple motors. In this case, the very same controller can control the motors successively. Advantages of this solution: Fewer components (controllers) and hence less energy consumption.



Principle:

- The motor which is being controlled at the moment is connected to the controller via motor contactors. (The contactor system can e.g. be controlled via the digital outputs of the controller.)
- At the same time, the motor data changeover serves to activate the motor and control settings suitable for the motor in the controller.

Note:

The motor data changeover is carried out within 2 ms and hence within the opening and closing times of most motor contactors.

[14-1] Principle of the selective control of multiple motors using one controller

14.1 Configuring parameter change-over via the »Engineer« parameterisation dialog



Proceed as follows to open the dialog for parameterising the parameter change-over:

1. »Engineer« Go to the *Project* view and select the 8400 StateLine controller.
2. Select the **Application parameters** tab from the *Workspace*.
3. Go to the *Overview* dialog level and click the "Basic functions" button.
4. Go to the *Overview* → *Basic functions* dialog box and click the **Parameter change-over** button.

Application Parameters

Overview -> Basic Functions -> WriteParamList

Writing to parameter list: Activate
 Not connected

Writing to parameter list: Select value set - 1
 Not connected

Writing to parameter list: Select value set - 2
 Not connected

Selected value

Execute Mode
 0: By Execute

Definable parameter list
 ON

Motor data parameter list
 OFF

Error status
 0

Error line
 0

Copy values

Line	Code	Name	Unit	Active value	Value 1	Value 2	Value 3	Value 4
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								

Configure... Import... Export...



Note!

The "parameter change-over" basic function is always processed, even if the corresponding [LS WriteParamList](#) system block has been removed from the interconnection by the function block editor.

If you do not require this basic function anymore, delete the composed parameter list in order that no unwanted parameter write operations take place.

14.1.1 Configuring the parameter list(s)

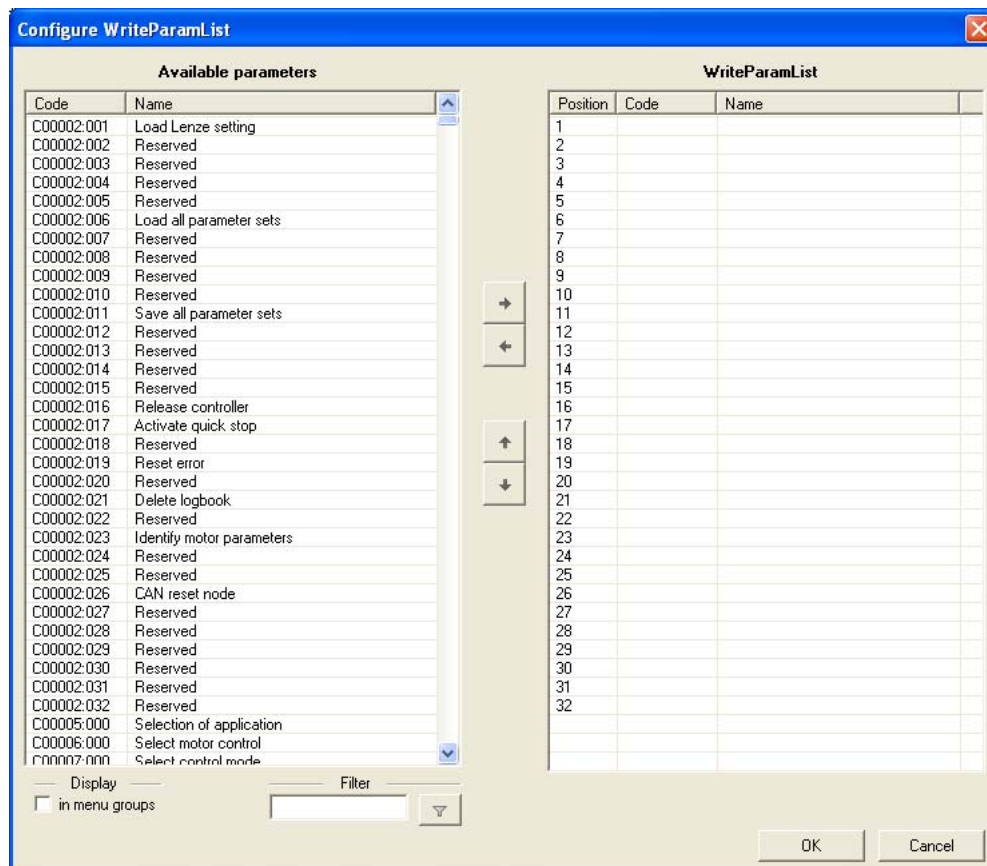
Configuring the definable parameter list

In the Lenze setting, the definable parameter list does not yet contain any parameters.



How to configure the definable parameter list:

1. Click the **Adapt...** button.
 - The dialog box entitled *Configure WriteParamList* is shown:



- On the left-hand side, all the parameters of the drive controller with write and read access are shown in the list entitled **Available parameters**.
 - If the option **In menu groups** is activated, all parameters are shown assigned to their functions.
 - By clicking on the  button in the **Filter** area, you can shorten the list of available parameters. If, for example, you enter the text "ain1" and then click on the button, only those parameters whose designation contains this text are shown for selection.
2. Highlight the parameter/parameters in the **Available parameters** list that is/are to be added to the *WriteParamList*.
 - Here, you can use the <Ctrl> key and the <Shift> key for multiple selection, as in the case of general Windows functions.

3. Click on the  button in order to add the highlighted parameters to the *WriteParamList* on the right-hand side.
 - With the  and  buttons, you can alter the sequence of parameters in the *WriteParamList*.

To remove parameters from the *WriteParamList*, proceed as follows:

 - Highlight the parameter/parameters in the **WriteParamList** that is/are to be removed from the *WriteParamList*.
 - Click on the  button to remove the highlighted parameters from the *WriteParamList*.
4. Click on the **OK** button to accept the configuration and close the dialog box.
 - You can call the configuration dialog again at any time in order to change or expand the *WriteParamList* retrospectively.

Changing the values of the definable parameter list

After the compilation of the definable parameter list, the values in the columns **1st value ... 4th value** first correspond to the Lenze setting of the respective parameter.

- Just click one of the input fields in these columns to change the displayed value.
- If you place the cursor in an input field, the permitted value range for the corresponding parameter is shown under the table.

Changing the values of the motor data parameter list

Click the **Motor data parameter list** register to put it in the foreground:

Definable parameter list		Motor data parameter list						Copy values	
Line	Code	Name	Unit	Active value	Value 1	Value 2	Value 3	Value 4	
01	C0006:000	Motor control		6	6	6	6	6	
02	C0015:000	VFC: V/f base frequency	Hz	50	50	50	50	50	
03	C0016:000	VFC: V/min boost	%	1,6	1,6	1,6	1,6	1,6	
04	C0018:000	Switching frequency		2	2	2	2	2	
05	C0019:000	Auto-DCB: Threshold	rpm	3	3	3	3	3	
06	C0021:000	Slip compensation	%	2,67	2,67	2,67	2,67	2,67	
07	C0022:000	I _{max} in motor mode	A	47	47	47	47	47	
08	C0023:000	I _{max} in generator mode	%	100	100	100	100	100	



- Unlike the "definable" parameter list, the motor data parameter list has a fixed assignment to the motor and control parameters.
 - A list of the switchable motor and control parameters is provided in chapter "[Configuring the motor data parameter list by means of parameterisation](#)". (📖 585)
- The preset values are changed in the same way as the definable parameter list.

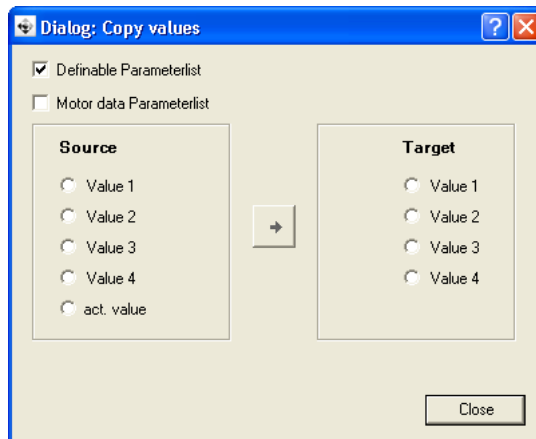
Copying values

All the settings of a value set can be copied to another value set.



To copy values, proceed as follows:

1. Click on the **Copy values** button.
 - The *Copy values* dialog box is displayed:



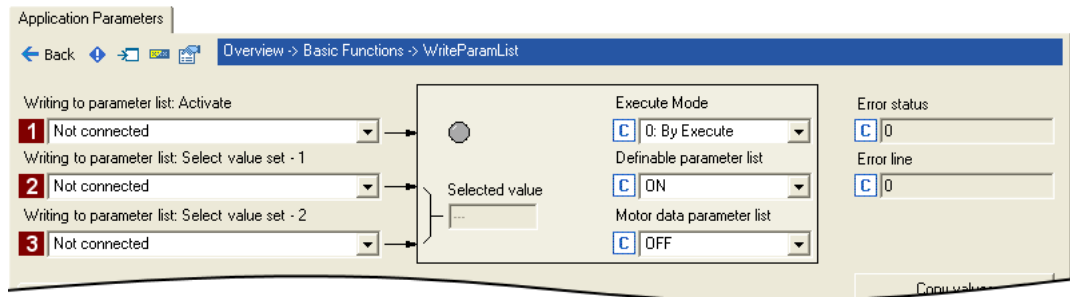
2. Define the parameter list to be copied via the two upper checkboxes.
3. Select **Source** and **Target**.
4. Click on  button in order to copy the values from **Source** to **target**.

Importing/exporting the list

For cross-device reuse of the configured *WriteParamList*, you can click on the **Export** and **Import** buttons to save the parameter selection as an *.epc file and then to re-import the saved *.epc file into another drive controller 8400.

14.1.2 Configuring control inputs

The three control inputs for parameter change-over can be configured via the following parameters:

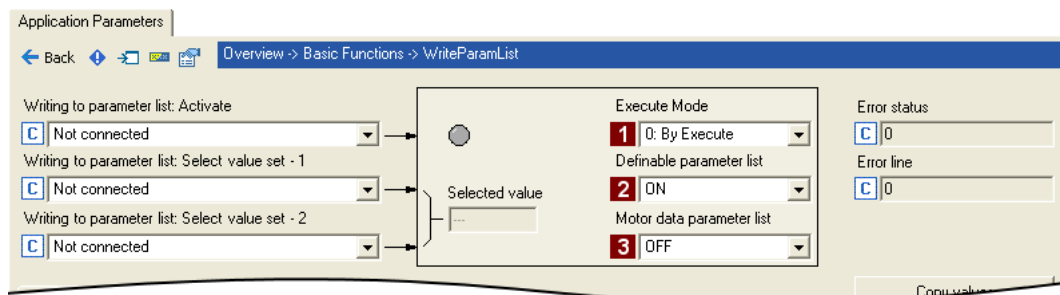


Parameter	Lenze setting	Info
1 Activate writing (C00621/123)	0: Not connected	Selection of the signal source that activates writing to the parameter list (for Execute Mode = "0: by Execute").
2 Selection value set - 1 (C00621/124)	0: Not connected	Selection of the two signal sources for the binary-coded selection of the value set 1 ... 4 to be used (see following truth table).
3 Selection value set - 2 (C00621/125)	0: Not connected	

Truth table for the selection of the value set to be used:

Selection value set - 1	Selection value set - 2	Value set used
FALSE	FALSE	Value set 1
TRUE	FALSE	Value set 2
FALSE	TRUE	Value set 3
TRUE	TRUE	Value set 4

14.1.3 Functional settings



Parameter	Lenze setting	Info
1 Execute Mode (C01082)	0: by Execute	For writing the parameter list, two modes are available: • 0: by Execute (Lenze setting) The writing of the parameter list is activated by a FALSE/TRUE edge at the <i>bExecute</i> control input. • 1: by Input Select The parameter list is written when the selection inputs <i>bSelectWriteValue_1</i> and <i>bSelectWriteValue_2</i> are changed and once during the initialisation of the controller. Note: If the execute mode changes from "0: by Execute" to "1: by Input Select", the parameter list selected by the selection inputs is written once. In the execute mode "1: by Input Select", the parameter list then is only written again when a change occurs on the selection inputs .
2 Definable parameter list (C02200/1)	1: On	Switch on/off parameter changeover for the definable parameter list.
3 Motor data parameter list (C02200/2)	0: Off	Switch on/off parameter changeover for the motor data parameter list.

14.1.4 Error indication

With every run through the main program, one parameter of the definable parameter list is written until the parameter list has been executed completely. If an error occurs, [C01083](#) displays an error status and [C01084](#) displays the number of the list entry causing the error (in connection with the selected value set).

- If several errors occur at the same time, only the first incorrect list entry will be displayed. Hence, after elimination of the displayed error and another activation, more errors may be displayed.
- The parameter list will always be processed from beginning to end, even if errors occur in the meantime.

14.2 Configuring the definable parameter list by means of parameterisation

The following application example shows the necessary procedure for configuring the list without using the »Engineer« parameterisation dialog.

Task:

The LS_WriteParamList SB is to be used to write to parameters [C00012](#), [C00026/1](#) and [C00027/1](#).

Compiling the parameter list

In [C01085/1 ... n](#), specify the above-named parameters in the <Code>,<Subcode> format:

- [C01085/1](#) = 12.000
- [C01085/2](#) = 26.001
- [C01085/3](#) = 27.001
- [C01085/4 ... n](#) = 0.000 (no parameter)



Note!

Gaps in the parameter list (setting = 0.000) are permissible and are skipped in the process.

Invalid parameter entries are not accepted when being entered.

Entering values for the parameters (value set 1)

In [C01086/1 ... n](#), specify the values to be used to describe the selected parameters. The values are entered according to the scaling format/scaling factor of the respective parameter.

- [C01086/1](#) = <value> for list entry 1 (in our example: for parameter [C00012](#))
- [C01086/2](#) = <value> for list entry 2 (in our example: for parameter [C00026/1](#))
- [C01086/3](#) = <value> for list entry 3 (in our example: for parameter [C00027/1](#))

These values are used in the writing process if the two *bSelectWriteValue_1* and *bSelectWriteValue_2* inputs are not assigned or both set to FALSE.

Entering other values for the parameters (value sets 2 ... 4)

If required, up to three other sets can be set in the same way in [C01087/1 ... n](#) to [C01089/1 ... n](#) which can optionally be written to the parameters. The decision as to which value set is finally used is dependent upon the assignment of the two *bSelectWriteValue_1* and *bSelectWriteValue_2* inputs:

14.3 Configuring the motor data parameter list by means of parameterisation

The setting of the values for value sets 1 ... 4 of the motor data parameter list can also be carried out directly via the codes from code [C02210](#) (see following table; columns 1st value ... 4th value).

- Unlike the "definable" parameter list, the motor data parameter list has a fixed assignment to the motor and control parameters.
- The preset values for value sets 1 ... 4 correspond to the Lenze setting of the respective motor or control parameter.
- The values are entered according to the scaling format / scaling factor of the respective motor or control parameter.

Code	Name	Lenze setting	1st value	2nd value	3rd value	4th value
C00006	Motor control	6	C02210/1	C02210/2	C02210/3	C02210/4
C00015	VFC: V/f base frequency	50.0 Hz	C02212/1	C02212/2	C02212/3	C02212/4
C00016	VFC: Vmin boost	1.60 %	C02213/1	C02213/2	C02213/3	C02213/4
C00018	Switching frequency	2	C02214/1	C02214/2	C02214/3	C02214/4
C00019	Auto-DCB: Threshold	3 rpm	C02215/1	C02215/2	C02215/3	C02215/4
C00021	Slip comp.	2.67 %	C02216/1	C02216/2	C02216/3	C02216/4
C00022	Imax in motor mode	47.00 A	C02217/1	C02217/2	C02217/3	C02217/4
C00023	Imax in generator mode	100.00 %	C02218/1	C02218/2	C02218/3	C02218/4
C00036	DC braking: Current	50.00 %	C02219/1	C02219/2	C02219/3	C02219/4
C00070/1	SLVC: Vp speed controller	15.00	C02220/1	C02220/2	C02220/3	C02220/4
C00070/2	Reserved	6.00	C02220/5	C02220/6	C02220/7	C02220/8
C00070/3	SLPSM: Vp speed controller	3.00	C02220/9	C02220/10	C02220/11	C02220/12
C00071/1	SLVC: Ti speed controller	100.0 ms	C02221/1	C02221/2	C02221/3	C02221/4
C00071/2	Reserved	50.0 ms	C02221/5	C02221/6	C02221/7	C02221/8
C00071/3	SLPSM: Ti speed controller	100.0 ms	C02221/9	C02221/10	C02221/11	C02221/12
C00072	SC: Tdn speed controller	0.00 ms	C02222/1	C02222/2	C02222/3	C02222/4
C00073/1	VFC: Vp Imax controller	0.25	C02223/1	C02223/2	C02223/3	C02223/4
C00073/2	SLVC: Vp torque controller	1.25	C02223/5	C02223/6	C02223/7	C02223/8
C00074/1	VFC: Ti Imax controller	65 ms	C02224/1	C02224/2	C02224/3	C02224/4
C00074/2	SLVC: Ti torque controller	30 ms	C02224/5	C02224/6	C02224/7	C02224/8
C00075	Vp current controller	7.00 V/A	C02225/1	C02225/2	C02225/3	C02225/4
C00076	Ti current controller	10.61 ms	C02226/1	C02226/2	C02226/3	C02226/4
C00079/1	SC: Current controller - feedforward control	0	C02229/1	C02229/2	C02229/3	C02229/4
C00079/2	SC: adapt. field weak. controller	1	C02229/5	C02229/6	C02229/7	C02229/8
C00079/3	SC: n-Ctrl Anti-Wind-Up	0	C02229/9	C02229/10	C02229/11	C02229/12
C00080	Override point of field weakening	0 Hz	C02230/1	C02230/2	C02230/3	C02230/4
C00081	Rated motor power	11.00 kW	C02231/1	C02231/2	C02231/3	C02231/4
C00082	Motor rotor resistance	276 mOhm	C02232/1	C02232/2	C02232/3	C02232/4
C00084	Motor stator resistance	330 mOhm	C02233/1	C02233/2	C02233/3	C02233/4
C00085	Motor stator leakage inductance	3.50 mH	C02234/1	C02234/2	C02234/3	C02234/4
C00087	Rated motor speed	1460 rpm	C02236/1	C02236/2	C02236/3	C02236/4
C00088	Rated motor current	21.00 A	C02237/1	C02237/2	C02237/3	C02237/4
C00089	Rated motor frequency	50 Hz	C02238/1	C02238/2	C02238/3	C02238/4
C00090	Rated motor voltage	400 V	C02239/1	C02239/2	C02239/3	C02239/4
C00091	Motor cosine phi	0.85	C02240/1	C02240/2	C02240/3	C02240/4
C00092	Motor magnetising inductance	81.0 mH	C02241/1	C02241/2	C02241/3	C02241/4
C00095	Motor magnetising current	8.50 A	C02242/1	C02242/2	C02242/3	C02242/4
C00106	Auto-DCB: Hold time	0.500 s	C02244/1	C02244/2	C02244/3	C02244/4
C00107	DC braking: Hold time	999.000 s	C02245/1	C02245/2	C02245/3	C02245/4
C00120	Setting of motor overload (I ^{xt})	100.00 %	C02246/1	C02246/2	C02246/3	C02246/4
C00234	Oscillation damping influence	5.00 %	C02249/1	C02249/2	C02249/3	C02249/4

Code	Name	Lenze setting	1st value	2nd value	3rd value	4th value
C00235	Oscillation damping filter time	32 ms	C02250/1	C02250/2	C02250/3	C02250/4
C00236	Oscillation damping field weakening	14	C02251/1	C02251/2	C02251/3	C02251/4
C00273	Motor moment of inertia	0.00 kg cm ²	C02256/1	C02256/2	C02256/3	C02256/4
C00653/1	Sensibility - Setpoint feedforward control	0	C02264/1	C02264/2	C02264/3	C02264/4
C00905	Motor phase direction of rotation	0	C02272/1	C02272/2	C02272/3	C02272/4
C00909/1	Max. pos. speed	120.00 %	C02273/1	C02273/2	C02273/3	C02273/4
C00909/2	Max. neg. speed	120.00 %	C02273/5	C02273/6	C02273/7	C02273/8
C00910/1	Max. pos. output frequency	1000 Hz	C02274/1	C02274/2	C02274/3	C02274/4
C00910/2	Max. neg. output frequency	1000 Hz	C02274/5	C02274/6	C02274/7	C02274/8
C00915	Motor cable length	5.0 m	C02275/1	C02275/2	C02275/3	C02275/4
C00916	Motor cable cross-section	6.00 mm ²	C02276/1	C02276/2	C02276/3	C02276/4
C00938	PSM: Maximum motor current field weakening	30.00 %	C02278/1	C02278/2	C02278/3	C02278/4
C00939	Ultimate motor current	3000.0 A	C02279/1	C02279/2	C02279/3	C02279/4
C00965	Max. motor speed	60000 rpm	C02280/1	C02280/2	C02280/3	C02280/4
C00966	VFC: Time const. slip comp.	100 ms	C02281/1	C02281/2	C02281/3	C02281/4
C00971/1	VFC: Controller limitation V/f +encoder	10.00 Hz	C02284/1	C02284/2	C02284/3	C02284/4
C00971/2	VFC: Slip limitation V/f +encoder	100.00 Hz	C02284/5	C02284/6	C02284/7	C02284/8
C00972	VFC: Vp V/f +encoder	0.100 Hz/Hz	C02285/1	C02285/2	C02285/3	C02285/4
C00973	VFC: Ti V/f +encoder	100.0 ms	C02286/1	C02286/2	C02286/3	C02286/4
C00975	VFC-ECO: Vp CosPhi controller	0.500 Hz/Hz	C02287/1	C02287/2	C02287/3	C02287/4
C00976	VFC-ECO: Ti CosPhi controller	200.0 ms	C02288/1	C02288/2	C02288/3	C02288/4
C00977	VFC-ECO: Minimum voltage V/f	20.00 %	C02289/1	C02289/2	C02289/3	C02289/4
C00982	VFC-ECO: Voltage reduction ramp	0.8 s	C02290/1	C02290/2	C02290/3	C02290/4
C00985	SLVC: Field current controller gain	0.50 %	C02291/1	C02291/2	C02291/3	C02291/4
C00986	SLVC: Cross current controller gain	0.00 %	C02292/1	C02292/2	C02292/3	C02292/4
C00987	Inverter motor brake: nAdd	80 rpm	C02293/1	C02293/2	C02293/3	C02293/4
C00988	Inverter motor brake: PT1 filter time	0.0 ms	C02294/1	C02294/2	C02294/3	C02294/4
C00990	Flying restart fct.: Activate	0	C02295/1	C02295/2	C02295/3	C02295/4
C00991	Flying restart fct.: Process	2	C02296/1	C02296/2	C02296/3	C02296/4
C00992	Flying restart fct.: Start frequency	10 Hz	C02297/1	C02297/2	C02297/3	C02297/4
C00993	Flying restart fct.: Int. time	300.0 ms	C02298/1	C02298/2	C02298/3	C02298/4
C00994	Flying restart fct.: Current	25.00 %	C02299/1	C02299/2	C02299/3	C02299/4
C00995/1	SLPSM: Controlled accelerating current	100.00 %	C02300/1	C02300/2	C02300/3	C02300/4
C00995/2	SLPSM: Controlled standstill current	20.00 %	C02300/5	C02300/6	C02300/7	C02300/8
C00996/1	SLPSM: Switching speed, closed-loop control	13.00 %	C02301/1	C02301/2	C02301/3	C02301/4
C00996/2	SLPSM: Switching speed, open-loop control	8.00 %	C02301/5	C02301/6	C02301/7	C02301/8
C00997	SLPSM: Filter cutoff frequency	5.00 %	C02302/1	C02302/2	C02302/3	C02302/4
C00998/1	SLPSM: Filter time rotor position	3.0 ms	C02303/1	C02303/2	C02303/3	C02303/4
C00998/2	SLPSM: Filter time actual speed value	5.0 ms	C02303/5	C02303/6	C02303/7	C02303/8
C00999	SLPSM: PLL gain	400 %	C02304/1	C02304/2	C02304/3	C02304/4
C01001/1	Manual entry of motor type	0	C02315/1	C02315/2	C02315/3	C02315/4
C02853/1	PSM: Lss saturation characteristic	100 %	C02305/1	C02305/2	C02305/3	C02305/4
C02853/2	PSM: Lss saturation characteristic	100 %	C02305/5	C02305/6	C02305/7	C02305/8
C02853/3	PSM: Lss saturation characteristic	100 %	C02305/9	C02305/10	C02305/11	C02305/12
C02853/4	PSM: Lss saturation characteristic	100 %	C02305/13	C02305/14	C02305/15	C02305/16
C02853/5	PSM: Lss saturation characteristic	100 %	C02305/17	C02305/18	C02305/19	C02305/20
C02853/6	PSM: Lss saturation characteristic	100 %	C02305/21	C02305/22	C02305/23	C02305/24
C02853/7	PSM: Lss saturation characteristic	100 %	C02305/25	C02305/26	C02305/27	C02305/28
C02853/8	PSM: Lss saturation characteristic	100 %	C02305/29	C02305/30	C02305/31	C02305/32
C02853/9	PSM: Lss saturation characteristic	100 %	C02305/33	C02305/34	C02305/35	C02305/36
C02853/10	PSM: Lss saturation characteristic	100 %	C02305/37	C02305/38	C02305/39	C02305/40
C02853/11	PSM: Lss saturation characteristic	100 %	C02305/41	C02305/42	C02305/43	C02305/44

Code	Name	Lenze setting		1st value	2nd value	3rd value	4th value
C02853/12	PSM: Lss saturation characteristic	100	%	C02305/45	C02305/46	C02305/47	C02305/48
C02853/13	PSM: Lss saturation characteristic	100	%	C02305/49	C02305/50	C02305/51	C02305/52
C02853/14	PSM: Lss saturation characteristic	100	%	C02305/53	C02305/54	C02305/55	C02305/56
C02853/15	PSM: Lss saturation characteristic	100	%	C02305/57	C02305/58	C02305/59	C02305/60
C02853/16	PSM: Lss saturation characteristic	100	%	C02305/61	C02305/62	C02305/63	C02305/64
C02853/17	PSM: Lss saturation characteristic	100	%	C02305/65	C02305/66	C02305/67	C02305/68
C02855	PSM: I _{max} Lss saturation characteristic	3000.0	A	C02306/1	C02306/2	C02306/3	C02306/4
C02859	PSM: Activate Ppp saturation char.	0		C02307/1	C02307/2	C02307/3	C02307/4
C02872/1	PLI without motion: Adaptation of time duration	0		C02311/1	C02311/2	C02311/3	C02311/4
C02874/1	PLI without motion	0x0001		C02312/1	C02312/2	C02312/3	C02312/4
C02875/1	PLI without motion: Adaptation of ident angle	0	°	C02313/1	C02313/2	C02313/3	C02313/4

14.4 Internal interfaces | System block "LS_WriteParamList"

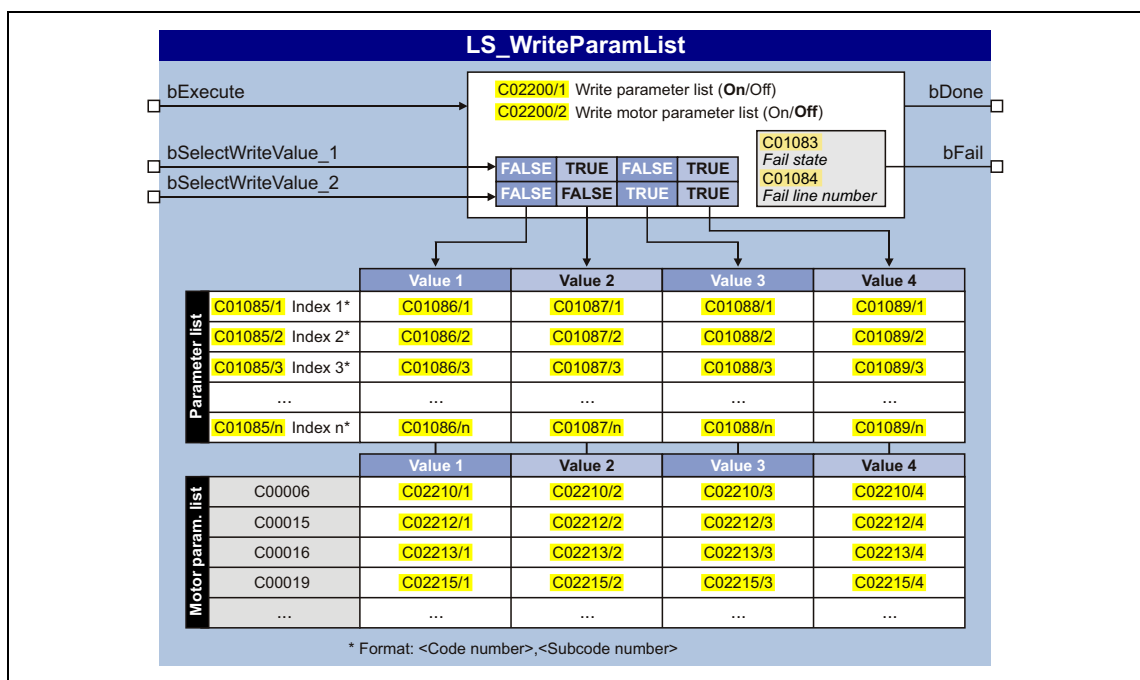
The **LS_WriteParamList** system block provides the internal interfaces for the basic "Parameter change-over" function.



Note!

The "parameter change-over" basic function is always processed, even if the **LS_WriteParamList** system block has been removed from the interconnection by the FB Editor.

If you do not require this basic function anymore, delete the composed parameter list in order that no unwanted parameter write operations take place.



Inputs

Identifier	Data type	Information/possible settings		
bExecute	BOOL	FALSE↗TRUE	For Execute Mode (C01082) = "0: by Execute": Activate writing of the parameter list	
bSelectWriteValue_1 bSelectWriteValue_2	BOOL	Binary coded selection of the value set 1 ... 4 to be used.		
		<i>bSelectWriteValue_1</i>	<i>bSelectWriteValue_2</i>	
		FALSE	FALSE	Value set 1
		TRUE	FALSE	Value set 2
		FALSE	TRUE	Value set 3
		TRUE	TRUE	Value set 4

Outputs

Identifier	Data type	Value/meaning
bDone	BOOL	"Writing of the parameter list completed" status signal The output is automatically reset to FALSE if writing via <i>bExecute</i> is activated again.
		TRUE Writing of the parameter list successfully completed.
		FALSE The FALSE status can have the following meanings: - There is no active writing of the parameter list. - Writing of the parameter list has not been completed yet. - An error has occurred (if <i>bFail</i> = TRUE).
bFail	BOOL	"Error" status
		TRUE An error has occurred (group signal). See display parameter (C01083) for details.

15 Parameter reference

This chapter describes all parameters which can be used for parameterising and monitoring the controller.

Parameters which are only available in the controller from a certain software version onwards are marked with a corresponding note in the parameter description ("from version xx.xx.xx").

The parameter descriptions are based on software version V15.00.00



Tip!

For quick reference of a parameter with a certain name simply use the **index** of the online documentation. The index always contains the corresponding code in parentheses behind the name.

General information on parameter setting can be found in the chapter "[Introduction: Parameterising the controller](#)". (📖 20)

For general information on how to read and change parameters, please see the online documentation for the »Engineer«.

15.1 Structure of the parameter descriptions

Each parameter is described in the [Parameter list](#) in the form of a table which consists of the following three areas:

Table header

The table header contains the following general information:

- Parameter number (Cxxxxx)
- Parameter name (display text in the »Engineer« and keypad)
- [Data type](#)
- Parameter index in decimal and hexadecimal notation for access via a fieldbus (e.g. CAN system bus).



Tip!

The parameter index is calculated as follows:

- Index [dec] = 24575 - code
- Index [hex] = 0x5FFF - code

Example for code C00005:

- Index [dec] = 24575 - 5 = 24570
- Index [hex] = 0x5FFF - 0x{5} = 0x5FFA

Table contents

The table contains further general explanations & notes on the parameter and the possible settings, which are represented in different ways depending on the parameter type:

- [Parameters with read-only access](#)
- [Parameters with write access](#)

Table footer

The table footer contains the [Parameter attributes](#).

15.1.1 Data type

The following data types are available for parameters:

Data type	Meaning
INTEGER_16	16-bit value with sign
INTEGER_32	32-bit value with sign
UNSIGNED_8	8-bit value without sign
UNSIGNED_16	16-bit value without sign
UNSIGNED_32	32-bit value without sign
VISIBLE_STRING	String of characters of printable characters

15.1.2 Parameters with read-only access

Parameters for which the "write access" attribute has not been set can only be read and not be changed by the user.

Description structure

Parameter Name: Cxxxxx _____		Data type: _____ Index: _____
Description		
Display range (min. value unit max. value)		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

Representation in the »Engineer«

The »Engineer« displays these parameters with a grey background or, with an online connection, with a pale-yellow background:

	C...	S	Name	Value	Unit
	3	0	Status of last device command	Successful	

15.1.3 Parameters with write access

Only parameters with a check mark (☑) in front of the "write access" attribute can be changed by the user. The Lenze setting for these parameters is **printed in bold**.

- The settings can either be selected from a selection list or the values can be entered directly.
- Values outside the valid setting range are represented in red in the »Engineer«.

15.1.3.1 Parameters with setting range

Description structure

Parameter Name: Cxxxxx _____			Data type: _____ Index: _____	
Description				
Setting range (min. value unit max. value)			Lenze setting	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1				

Parameter setting in the »Engineer«

In the »Engineer«, parameters are set by entering the desired value into the input field:

	C...	S	Name	Value	Unit
11	0		Appl.: Reference speed	1500	rpm

15.1.3.2 Parameters with selection list

Description structure

Parameter Name: Cxxxxx _____			Data type: _____ Index: _____	
Description				
Selection list (Lenze setting printed in bold)				
1				
2				
3				
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1				

Parameter setting in the »Engineer«

In the »Engineer«, a list field is used for parameter setting:

	C...	S	Name	Value	Unit
	173	0	Mains voltage	0: 3ph 400V / 1ph 230V	
				0: 3ph 400V / 1ph 230V	
				1: 3ph 440V / 1ph 230V	
				2: 3ph 480V / 1ph 230V	
				3: 3ph 500V / 1ph 230V	
				4: 3ph 400V / 1ph 115V	

15.1.3.3 Parameters with bit-coded setting

Description structure

Parameter Name: Cxxxxx _____		Data type: _____ Index: _____
Description		
Value is bit-coded:		
Bit 0		
...		
Bit 31		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

Parameter setting in the »Engineer«

The »Engineer« uses a dialog box for parameter setting in which the individual bits can be set or reset. Alternatively, the value can be entered as a decimal or hexadecimal value:

Bit	Comment
0	bOut1 inverted
1	bOut2 inverted
2	bOut3 inverted
3	bOut4 inverted
4	Reserved
5	Reserved
6	Reserved
7	Reserved

15.1.3.4 Parameters with subcodes

Description structure

Parameter Name: Cxxxxx _____		Data type: _____ Index: _____
Description		
Setting range (min. value unit max. value)		
Subcodes	Lenze setting	
Cxxxxx/1		
Cxxxxx/2		
Cxxxxx/3		
Cxxxxx/4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

Parameter setting in the »Engineer«

The »Engineer« parameter list displays each subcode individually. The parameters are set as described in the previous chapters.

	C...	S	Name	Value	Unit
	39	1	Fixed setpoint 1	40.00	%
	39	2	Fixed setpoint 2	60.00	%
	39	3	Fixed setpoint 3	80.00	%
	39	4	Fixed setpoint 4	0.00	%

15.1.4 Parameter attributes

The table footers contain the parameter attributes:

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1

Attribute	Meaning
☒ Read access	Read access to parameter possible.
☒ Write access	Write access to parameter possible. • Please also observe the following attributes:
☒ CINH	Parameter value can only be changed when the controller is inhibited.
☒ PLC STOP	Parameter value can only be changed when the application is stopped.
☒ No transfer	Parameter is not transferred to controller when the command <u>Download parameter set</u> is executed.
☒ COM	Communication-relevant parameter • This parameter is relevant for parameter data transfer via the (CAN) system bus.
☒ MOT	Motor control parameters

Scaling factor

The "scaling factor" is important for parameter access via a bus system.

Signal type	Scaling factor	Resolution	Value range
Analog (scaled)	100	16 bits signed	± 199.99 %
Angular velocity	1	16 bits signed	± 32767 incr./ms
Position in [units]	10000	32 bits signed	± 214748.3647 [units]
Digital (BOOL)	1	8 bits unsigned	0 ≡ FALSE; 1 ≡ TRUE
Time	1000	16 bits unsigned	0 ... 999.000 s
Selection value	1	16 bits unsigned	0 ... 65535

Example 1: The value "654" of the parameter [C00028/1](#) (AIN1: input voltage) read via a bus system must be divided by the corresponding scaling factor "100" to obtain the actual display value "6.54 V".

$$\frac{\text{Read value (via bus system)}}{\text{Scaling factor}} = \text{Indicated value (Engineer)}$$

[15-1] Conversion formula for read access via bus system

Example 2: In order to set the parameter [C00012](#) (acceleration time main setpoint) to the value "123.45 %" via a bus system, the integer value "12345" must be transferred, i.e. the value to be set must be multiplied by the corresponding scaling factor "100".

$$\text{Value to be written (via bus system)} = \text{Value to be set} \cdot \text{Scaling factor}$$

[15-2] Conversion formula for write access via bus system

Character length

In case of parameters of "VISIBLE_STRING" data type, the character length is given in addition. This is also important for the parameter access via a bus system.

15.2 Parameter list

This chapter lists all parameters of the operating system in numerically ascending order.

**Note!**

The parameter descriptions are based on the software version V15.00.00.

C00001

Parameter Name: C00001 Keypad Userlevel		Data type: UNSIGNED_8 Index: 24574 _d = 5FFE _h
From version 12.00.00 onwards, the extent of menus, submenus and codes shown in the keypad can be adapted by selecting the "userlevel". - When the userlevel has been changed, the menus of the keypad will be reconfigured according to the selected user level. - Independently of the set userlevel, the parameters of the attached communication module will always be displayed completely.		
Selection list		Info
10	Standard	Only the most important menus and codes are displayed on the keypad.
20	Expert	All menus and codes are displayed on the keypad.
30	Service	Only for servicing purposes (Lenze service).
Subcodes	Lenze setting	Info
C00001/1	10: Standard	Keypad UserLevel
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00002

Parameter Name: C00002 Device command		Data type: UNSIGNED_8 Index: 24573 _d = 5FFD _h
Note: - Before switching off the supply voltage after a device command has been executed, check the successful execution of the device command via the status display in C00003! - Before activating device commands by a master control, wait for the "Ready" signal of the controller. - The device will reject a write process to C00002/x if the value is >1 and issue an error message. ► Drive control (DCTRL): Device commands		
Selection list		
0	Off / ready	
1	On / start	
4	Action cancelled	
5	No access	
6	No access controller inhibit	
20	20% working	
40	40% working	
60	60% working	
80	80% working	

Parameter Name: C00002 Device command		Data type: UNSIGNED 8 Index: 24573 _d = 5FFD _h
Subcodes	Lenze setting	Info
C00002/1	0: Off / ready	Load Lenze setting • All parameters are reset to the Lenze setting. • Only possible when the controller is inhibited. ▶ Load Lenze setting
C00002/2	0: Off / ready	Reserved
C00002/3	0: Off / ready	Reserved
C00002/4	0: Off / ready	Reserved
C00002/5	0: Off / ready	Reserved
C00002/6	0: Off / ready	Load all parameter sets • All parameter sets are loaded by the memory module. • Only possible when the controller is inhibited. ▶ Load all parameter sets
C00002/7	0: Off / ready	Reserved
C00002/8	0: Off / ready	Reserved
C00002/9	0: Off / ready	Reserved
C00002/10	0: Off / ready	Reserved
C00002/11	0: Off / ready	Save all parameter sets • All parameter sets are saved to the memory module safe against mains failure. ▶ Save all parameter sets
C00002/12	0: Off / ready	Reserved
C00002/13	0: Off / ready	Reserved
C00002/14	0: Off / ready	Reserved
C00002/15	0: Off / ready	Reserved
C00002/16	1: On / start	Enable controller 1 ≡ Enable controller 0 ≡ Inhibit controller ▶ Enable/inhibit controller
C00002/17	0: Off / ready	Activate quick stop 1 ≡ Activate quick stop 0 ≡ Deactivate quick stop ▶ Activate/deactivate quick stop
C00002/18	0: Off / ready	Reserved
C00002/19	0: Off / ready	Reset error • After the reset (acknowledgement) of the current error, further errors may be pending which must also be reset. • The status determining error is displayed in C00168. • The current error is displayed in C00170. ▶ Error messages of the operating system
C00002/20	0: Off / ready	Reserved
C00002/21	0: Off / ready	Delete logbook • All entries in the logbook of the controller are deleted. • In the logbook, information on the error history is saved. ▶ Logbook
C00002/22	0: Off / ready	Reserved

Parameter Name: C00002 Device command		Data type: UNSIGNED 8 Index: 24573 _d = 5FFD _h
C00002/23	0: Off / ready	Motor parameter identification • This device command serves to carry out automatic motor parameter identification. • The device command is only executed when the drive controller is in the "SwitchedOn" status. • In order to identify the motor parameters, the controller must be enabled after this device command. • From version 10.00.00 onwards, the identification mode can be selected in C02867. ► Automatic motor parameter identification
C00002/24	0: Off / ready	Reserved
C00002/25	0: Off / ready	Reserved
C00002/26	0: Off / ready	CAN reset node • Reinitialise "CAN on board" interface. • Required when changing the baud rate, node address, or identifiers. ► "CAN on board" system bus
C00002/27	0: Off / ready	Device search function • From version 06.00.00 • This device command serves to optically locate a controller connected online (e.g. for maintenance work). ► Device search function
C00002/28	0: Off / ready	Check MasterPin • From version 06.00.00 ► Unlocking the controller with a MasterPin
C00002/29	0: Off / ready	Set binding ID • From version 06.00.00 ► Device personalisation
C00002/30	0: Off / ready	Delete binding ID • From version 06.00.00 ► Device personalisation
C00002/31	0: Off / ready	Set password • From version 06.00.00 ► Password protection
C00002/32	0: Off / ready	Check password • From version 06.00.00 ► Password protection
C00002/33	0: Off / ready	Delete password • From version 06.00.00 ► Password protection
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00003

Parameter | Name: **C00003 | Status of last device command**

Data type: UNSIGNED_8
Index: 24572_d = 5FFC_h

Status of the device command executed last ([C00002](#)).

Note:
Before switching off the supply voltage after carrying out a device command, check whether the device command has been carried out successfully via the status display!

▶ [Drive control \(DCTRL\): Device commands](#)

Selection list (read only)		Info
0	Successful	Device command has been executed successfully.
1	Command unknown	Device command implausible or unknown to the system.
2	Password protection	Unauthorised access for requested device command. ▶ Password protection
3	Time-out	Device command could not be processed in the defined time (timeout).
4	System fault	
5	Command server assigned	
6	Controller inhibit required	
10	Memory module binding error	▶ Device personalisation
11	Password too short	▶ Password protection
12	Wrong password	
13	Password already set	
14	Password not assigned	
20	Setting the hipurface position failed	

☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00005

Parameter Name: C00005 Application		Data type: UNSIGNED_16 Index: 24570 _d = 5FFA _h
Selection of the technology application		
Selection list (Lenze setting printed in bold)		Info
0	Wiring has changed	This display appears if the FB interconnection has been changed in the application level using the FB Editor.
1000	Actuating drive speed	This technology application is used to solve speed-controlled drive tasks, e.g. conveying belts. ▶ TA "Actuating drive speed"
1100	Actuating drive speed (AC Drive Profile)	From version 13.00.00 This technology application is used to solve speed-controlled drive tasks, e.g. conveying belts. The process data word received by the master control is interpreted as "AC Drive Profile" control word. ▶ TA "Actuating drive speed (AC Drive Profile)"
3000	Switch-off positioning	From version 04.00.00 This technology application is used to solve speed-controlled drive tasks which require a pre-switch off or stopping at certain positions, e.g. roller conveyors and conveying belts. This is implemented by connecting switch-off sensors. ▶ TA "Switch-off positioning"
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00006

Parameter Name: C00006 Motor control		Data type: UNSIGNED_8 Index: 24569 _d = 5FF9 _h
Selection of the motor control mode		
► Motor control (MCTRL): Select control mode		
Selection list (Lenze setting printed in bold)	Info	
3 SLPSM: Sensorless PSM	From version 10.00.00 This control type is used for the sensorless control of a synchronous motor. ► Sensorless control for synchronous motors	
4 SLVC: Vector control	This control type is used for sensorless vector control of an asynchronous motor. • The control type requires motor parameters to be set as exactly as possible! ► Sensorless vector control	
6 VFCplus: V/f linear	This control type is used for the speed control of an asynchronous motor via a linear V/f characteristic and is the simplest control type. • For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ► V/f characteristic control	
7 VFCplus: V/f linear + encoder	This control type is used for speed control of an asynchronous motor via a linear V/f characteristic. • The control type requires a speed feedback via an encoder mounted to the motor! • For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ► V/f control	
8 VFCplus: V/f quadr	This control type is used for speed control of an asynchronous motor via a square-law V/f characteristic. • For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ► V/f characteristic control	
9 VFCplus: V/f quadr + encoder	This control type is used for speed control of an asynchronous motor via a square-law V/f characteristic. • The control type requires a speed feedback via an encoder mounted to the motor! • For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ► V/f control	
10 VFCplus: V/f definable	From version 04.00.00 This type of control is used for the speed control of an asynchronous motor via a user-definable characteristic with several interpolation points. • For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. ► V/f characteristic control	

Parameter Name: C00006 Motor control		Data type: UNSIGNED_8 Index: 24569 _d = 5FF9 _h
11	VFCplusEco: V/f energy-saving	From version 10.00.00 This control type is used for energy-saving speed control of an asynchronous motor via a linear V/f characteristic. - For setting the V/f characteristic, only the rated frequency (C00089) and the rated voltage (C00090) of the motor have to be entered. - Predestinated application areas of this control type are materials handling technology and pump and fan systems. ► V/f characteristic control, energy-saving
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00007

Parameter Name: C00007 Control mode		Data type: UNSIGNED_16 Index: 24568 _d = 5FF8 _h
With this parameter the control mode for the technology application selected under C00005 is defined, i.e. how the inputs and outputs of the technology application are connected to the I/Os of the controller. - How the inputs and outputs are connected in the individual control modes is described in the corresponding technology application: "Actuating drive speed" TA TA "actuating drive speed (AC Drive Profile)" "Switch-off positioning" TA		
Selection list (Lenze setting printed in bold)		Info
0	Wiring has changed	This is displayed when the FB interconnection has been changed in the I/O level via the FB Editor.
10	Terminals 0	The technology application is controlled via the digital and analog input terminals of the controller. For a short overview of the preconfigured terminal assignment see the following section "Terminal assignment of the control modes 10 ... 16".
12	Terminals 2	
14	Terminals 11	
16	Terminal 16	
20	Keypad	The technology application is controlled via the keypad.
21	PC	The technology application is controlled via the "Free parameters" of the controller (PC control).
30	CAN	The technology application is controlled by means of CAN-PDOs via the system bus "CAN on board". ► "CAN on board" system bus
40	MCI	The technology application is controlled by means of MCI-PDOs via the MCI-interface of an attached communication module (e.g. PROFIBUS).
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

Terminal assignment of the control modes 10 ... 16

"Actuating drive speed" TA				
Input/output	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminals 16
RFR	Controller enable / Reset of error message			
DI1	Fixed setpoint 1/3		Change of direction of rotation	Fixed setpoint 1/3
DI2	Fixed setpoint 2/3		Activate manual DC-injection braking (DCB)	Fixed setpoint 2/3
DI3	Activate manual DC-injection braking (DCB)	Quick stop	Motor potentiometer: Increase speed	CW rotation quick stop
DI4	Change of direction of rotation		Motor potentiometer: Decrease speed	CCW rotation quick stop
A1U	Main speed setpoint (10 V $\equiv$ 100 % reference speed)			
O1U	Actual speed value (10 V $\equiv$ 100 % reference speed)			
DO1	Status "Drive is ready"			
Relay output	Status "Error is pending"			

TA "actuating drive speed (AC Drive Profile)"				
Input/output	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminals 16
RFR	Controller enable / Reset of error message			
DI1	Fixed setpoint 1/3		Change of direction of rotation	Fixed setpoint 1/3
DI2	Fixed setpoint 2/3		Activate manual DC-injection braking (DCB)	Fixed setpoint 2/3
DI3	Activate manual DC-injection braking (DCB)	Quick stop	Motor potentiometer: Increase speed	CW rotation quick stop
DI4	Change of direction of rotation		Motor potentiometer: Decrease speed	CCW rotation quick stop
A1U	Local speed/torque setpoint (speed mode: 10 V $\equiv$ 100 % reference speed; torque mode: 10 V $\equiv$ 100 % M_{max})			
O1U	Actual speed value (10 V $\equiv$ 100 % reference speed)			
DO1	Status "Drive is ready"			
Relay output	Status "Error is pending"			

"Switch-off positioning" TA				
Input/output	10: Terminals 0	12: Terminals 2	14: Terminals 11	16: Terminals 16
RFR	Controller enable	Controller enable / Reset of error message		
DI1	Fixed setpoint 1/3	Stop function 1		Fixed setpoint 1/3
DI2	Fixed setpoint 2/3	Stop function 2	Selection: Pre-switch off 1	Fixed setpoint 2/3
DI3	Reset error message	CW rotation quick stop Selection: Switch-off position 1		CW rotation quick stop
DI4	Change of direction of rotation	CCW rotation quick stop Selection: Switch-off position 2		CCW rotation quick stop
A1U	Main speed setpoint (10 V ≡ 100 % reference speed)			
O1U	-			
DO1	-			
Relay output	-			

C00008

Parameter Name: C00008 Original application control source		Data type: UNSIGNED_16 Index: 24567 _d = 5FF7 _h
Display of the originally selected technology application and the originally selected control mode. • This parameter shows the selection that was set with C00005 and C00007 before a change in the I/O level or the application level was carried out. • For diagnostic purposes, this display serves to determine whether there is a standard interconnection in the controller or a change carried out by the user.		
Selection list (read only)		Info
0	Free Free	Application: Interconnection has been changed. I/O level: Interconnection has been changed.
10	Free Terminal0	Application: Interconnection has been changed. I/O level: "Terminals 0" control mode
12	Free Terminal2	Application: Interconnection has been changed. I/O level: "Terminal 2" control mode
14	Free Terminal11	Application: Interconnection has been changed. I/O level: "Terminal 11" control mode
16	Free Terminal 16	Application: Interconnection has been changed. I/O level: "Terminal 16" control mode
20	Free Keypad	Application: Interconnection has been changed. I/O level: "Keypad" control mode
21	Free PC	Application: Interconnection has been changed. I/O level: "PC" control mode
30	Free CAN	Application: Interconnection has been changed. I/O level: "CAN" control mode
40	Free MCI	Application: Interconnection has been changed. I/O level: "MCI" control mode
1000	Speed Free	Application: Actuating drive speed I/O level: Interconnection has been changed.
1010	Speed Terminal0	Application: Actuating drive speed I/O level: "Terminals 0" control mode
1012	Speed Terminal2	Application: Actuating drive speed I/O level: "Terminal 2" control mode
1014	Speed Terminal11	Application: Actuating drive speed I/O level: "Terminal 11" control mode
1016	Speed Terminal16	Application: Actuating drive speed I/O level: "Terminal 16" control mode
1020	Speed Keypad	Application: Actuating drive speed I/O level: "Keypad" control mode
1021	Speed PC	Application: Actuating drive speed I/O level: "PC" control mode
1030	Speed CAN	Application: Actuating drive speed I/O level: "CAN" control mode
1040	Speed MCI	Application: Actuating drive speed I/O level: "MCI" control mode
1100	SpeedACdrive Free	Application: Actuating drive speed (AC Drive Profile) I/O level: Interconnection has been changed.
1110	SpeedACdrive Terminal0	Application: Actuating drive speed (AC Drive Profile) I/O level: "Terminals 0" control mode
1112	SpeedACdrive Klemme2	Application: Actuating drive speed (AC Drive Profile) I/O level: "Terminal 2" control mode
1114	SpeedACdrive Klemme11	Application: Actuating drive speed (AC Drive Profile) I/O level: "Terminal 11" control mode

Parameter Name: C00008 Original application control source		Data type: UNSIGNED_16 Index: 24567 _d = 5FF7 _h
1116	SpeedACdrive Klemme16	Application: Actuating drive speed (AC Drive Profile) I/O level: "Terminal 16" control mode
1120	SpeedACdrive Keypad	Application: Actuating drive speed (AC Drive Profile) I/O level: "Keypad" control mode
1121	SpeedACdrive PC	Application: Actuating drive speed (AC Drive Profile) I/O level: "PC" control mode
1130	SpeedACdrive CAN	Application: Actuating drive speed (AC Drive Profile) I/O level: "CAN" control mode
1140	SpeedACdrive MCI	Application: Actuating drive speed (AC Drive Profile) I/O level: "MCI" control mode
3000	SwitchPos Free	Application: Switch-off positioning I/O level: Interconnection has been changed.
3010	SwitchPos Terminal0	Application: Switch-off positioning I/O level: "Terminals 0" control mode
3012	SwitchPos Terminal 2	Application: Switch-off positioning I/O level: "Terminal 2" control mode
3014	SwitchPos Terminal 11	Application: Switch-off positioning I/O level: "Terminal 11" control mode
3016	SwitchPos Terminal 16	Application: Switch-off positioning I/O level: "Terminal 16" control mode
3020	SwitchPos Keypad	Application: Switch-off positioning I/O level: "Keypad" control mode
3021	SwitchPos PC	Application: Switch-off positioning I/O level: "PC" control mode
3030	SwitchPos CAN	Application: Switch-off positioning I/O level: "CAN" control mode
3040	SwitchPos MCI	Application: Switch-off positioning I/O level: "MCI" control mode
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00010

Parameter Name: C00010 AIN1: Characteristic			Data type: INTEGER_16 Index: 24565 _d = 5FF5 _h
From version 04.00.00			
			► Analog terminals: Signal adaptation via characteristic
Setting range (min. value unit max. value)			
0.00	%	199.99	
Subcodes	Lenze setting	Info	
C00010/1	0.00 %	AIN1: (+y0) = min	
C00010/2	0.00 %	AIN1: (+x0) = Dead band	
C00010/3	0.00 %	AIN1: (-y0) = (-min)	
C00010/4	0.00 %	AIN1: (-x0) = (-Dead band)	
C00010/5	100.00 %	AIN1: (+ymax)	
C00010/6	100.00 %	AIN1: (+xmax)	
C00010/7	100.00 %	AIN1: (-ymax)	
C00010/8	100.00 %	AIN1: (-xmax)	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00011

Parameter Name: C00011 Appl.: Reference speed			Data type: UNSIGNED_16 Index: 24564 _d = 5FF4 _h
Setting the reference speed • In the controller, all speed-related signals are processed to one reference variable in percent. • Set a reference speed here that corresponds to 100 %. • The frequency that corresponds to the set reference speed is displayed in C00059. Note: This is not a maximum limitation! All values in percent in the controller may be in a range of 0 ... 199.99 %.			
Setting range (min. value unit max. value)			Lenze setting
50	rpm	60000	1500 rpm
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00012

Parameter Name: C00012 Accel. time - main setpoint			Data type: UNSIGNED_32 Index: 24563 _d = 5FF3 _h
The L_NSet_1 FB: Acceleration time of the ramp generator for the main speed setpoint • Generally, this ramp generator is used for all speed-controlled technology applications.			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	2.000 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00013

Parameter Name: C00013 Decel. time - main setpoint			Data type: UNSIGNED_32 Index: 24562 _d = 5FF2 _h
The L_NSet_1 FB: Deceleration time of the ramp generator for the main speed setpoint • Generally, this ramp generator is used for all speed-controlled technology applications.			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	2.000 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00015

Parameter Name: C00015 VFC: V/f base frequency			Data type: UNSIGNED_16 Index: 24560 _d = 5FF0 _h
V/f base frequency for V/f characteristic control (VFCplus) and V/f control (VFCplus+encoder) • The motor voltage increases linearly with the frequency until the base frequency is reached. From this value on, the motor voltage remains constant, the speed increases and the maximum torque decreases. • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)			Lenze setting
7.5	Hz	2600.0	50.0 Hz
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10			

C00016

Parameter Name: C00016 VFC: Vmin boost			Data type: UNSIGNED_16 Index: 24559 _d = 5FEF _h
Boost of the V/f voltage characteristic in the range of small speeds or frequencies with V/f characteristic control (VFCplus) and V/f control (VFCplus+encoder) • This may increase the starting torque. • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well. ► Motor control (MCTRL): Setting the Vmin boost			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	1.60 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00018

Parameter Name: C00018 Switching frequency		Data type: UNSIGNED_8 Index: 24557 _d = 5FED _h																																										
Selection of the pulse width modulated switching frequency transferred from the inverter to the motor • Select between an ideal setting for the drive which provides smooth running, and an optimal setting with regard to the inverter which keeps its losses to a minimum (min. Pv). • Both possibilities offer fixed and variable switching frequencies. • When a variable switching frequency is selected, the switching frequency may change as a function of the load and rotational frequency. ► Selection of switching frequency																																												
<table><tr><th colspan="2">Selection list (Lenze setting printed in bold)</th></tr><tr><td>1</td><td>4 kHz var./drive-optimised</td></tr><tr><td>2</td><td>8 kHz var./drive-optimised</td></tr><tr><td>3</td><td>16 kHz var./drive-optimised</td></tr><tr><td>5</td><td>2 kHz constant/drive-optimised</td></tr><tr><td>6</td><td>4 kHz constant/drive-optimised</td></tr><tr><td>7</td><td>8 kHz constant/drive-optimised</td></tr><tr><td>8</td><td>16 kHz constant/drive-optimised</td></tr><tr><td>11</td><td>4 kHz var./min. Pv</td></tr><tr><td>12</td><td>8 kHz var./min. Pv</td></tr><tr><td>13</td><td>16 kHz var./min. Pv</td></tr><tr><td>15</td><td>2 kHz constant/min. Pv</td></tr><tr><td>16</td><td>4 kHz constant/min. Pv</td></tr><tr><td>17</td><td>8 kHz constant/min. Pv</td></tr><tr><td>18</td><td>16 kHz constant/min. Pv</td></tr><tr><td>21</td><td>8 kHz var./drive-opt./4 kHz min</td></tr><tr><td>22</td><td>16 kHz var./drive-opt./4 kHz min</td></tr><tr><td>23</td><td>16 kHz var./drive-opt./8 kHz min</td></tr><tr><td>31</td><td>8 kHz var./min. Pv/4 kHz min</td></tr><tr><td>32</td><td>16 kHz var./min. Pv/4 kHz min</td></tr><tr><td>33</td><td>16 kHz var./min. Pv/8 kHz min</td></tr></table>			Selection list (Lenze setting printed in bold)		1	4 kHz var./drive-optimised	2	8 kHz var./drive-optimised	3	16 kHz var./drive-optimised	5	2 kHz constant/drive-optimised	6	4 kHz constant/drive-optimised	7	8 kHz constant/drive-optimised	8	16 kHz constant/drive-optimised	11	4 kHz var./min. Pv	12	8 kHz var./min. Pv	13	16 kHz var./min. Pv	15	2 kHz constant/min. Pv	16	4 kHz constant/min. Pv	17	8 kHz constant/min. Pv	18	16 kHz constant/min. Pv	21	8 kHz var./drive-opt./4 kHz min	22	16 kHz var./drive-opt./4 kHz min	23	16 kHz var./drive-opt./8 kHz min	31	8 kHz var./min. Pv/4 kHz min	32	16 kHz var./min. Pv/4 kHz min	33	16 kHz var./min. Pv/8 kHz min
Selection list (Lenze setting printed in bold)																																												
1	4 kHz var./drive-optimised																																											
2	8 kHz var./drive-optimised																																											
3	16 kHz var./drive-optimised																																											
5	2 kHz constant/drive-optimised																																											
6	4 kHz constant/drive-optimised																																											
7	8 kHz constant/drive-optimised																																											
8	16 kHz constant/drive-optimised																																											
11	4 kHz var./min. Pv																																											
12	8 kHz var./min. Pv																																											
13	16 kHz var./min. Pv																																											
15	2 kHz constant/min. Pv																																											
16	4 kHz constant/min. Pv																																											
17	8 kHz constant/min. Pv																																											
18	16 kHz constant/min. Pv																																											
21	8 kHz var./drive-opt./4 kHz min																																											
22	16 kHz var./drive-opt./4 kHz min																																											
23	16 kHz var./drive-opt./8 kHz min																																											
31	8 kHz var./min. Pv/4 kHz min																																											
32	16 kHz var./min. Pv/4 kHz min																																											
33	16 kHz var./min. Pv/8 kHz min																																											
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1																																												

C00019

Parameter Name: C00019 Auto DCB: Threshold			Data type: UNSIGNED_16 Index: 24556 _d = 5FEC _h
Setpoint speed threshold for automatic DC injection braking For speed setpoints with values below the thresholds a DC current is injected or the motor is not supplied with current, depending on the setting. ▶ DC-injection braking			
Setting range (min. value unit max. value)			Lenze setting
0	rpm	60000	3 rpm
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00021

Parameter Name: C00021 Slip comp.			Data type: INTEGER_16 Index: 24554 _d = 5FEA _h
Slip compensation for V/f characteristic control (VFCplus) and sensorless vector control (SLVC) - A higher slip compensation results in a higher increase in frequency and voltage when the machine is under load. - After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well. ▶ Motor control (MCTRL): Optimising the operational performance by slip compensation			
Setting range (min. value unit max. value)			Lenze setting
-100.00	%	100.00	2.67 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00022

Parameter Name: C00022 I_{max} in motor mode			Data type: UNSIGNED_16 Index: 24553 _d = 5FE9 _h
Maximum current in motor mode for all motor control modes			
Setting range (min. value unit max. value)			Lenze setting
0.00	A	655.35	47.00 A
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00023

Parameter Name: C00023 I_{max} in generator mode			Data type: INTEGER_16 Index: 24552 _d = 5FE8 _h
Maximum current in generator mode for all motor control modes 100 % ≡ I_{max} in motor mode (C00022)			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	100.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00024

Parameter Name: C00024 LS_DriveInterface: bNActCompare			Data type: INTEGER_16 Index: 24551 _d = 5FE7 _h		
Threshold for the actual speed comparison					
• This parameter serves to set a threshold that is compared with the actual speed value. • If the value falls below this threshold, the <i>bNActCompare</i> output sets the LS_DriveInterface system block to TRUE. • Switching hysteresis = +1 %					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	199.99	0.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00026

Parameter Name: C00026 AINx: Offset			Data type: INTEGER_16 Index: 24549 _d = 5FE5 _h		
Offset for analog input					
▶ Analog terminals					
Setting range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes	Lenze setting		Info		
C00026/1	0.00 %		AIN1: Offset		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00027

Parameter Name: C00027 AINx: Gain			Data type: INTEGER_32 Index: 24548 _d = 5FE4 _h		
Gain for analog input					
▶ Analog terminals					
Setting range (min. value unit max. value)					
-100.0000		100.0000			
Subcodes	Lenze setting		Info		
C00027/1	1.0000		AIN1: Gain		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000					

C00028

Parameter Name: C00028 AINx: Input voltage			Data type: INTEGER_16 Index: 24547 _d = 5FE3 _h		
Display of the input voltage at the analog input					
▶ Analog terminals					
Display range (min. value unit max. value)					
-10.00	V	10.00			
Subcodes			Info		
C00028/1			AIN1: Input voltage		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00029

Parameter Name: C00029 AINx: Input current			Data type: INTEGER_16 Index: 24546 _d = 5FE2 _h		
Display of the Input current at the analog input					
• When the analog input is configured for current measurement (C00034/1 = 1 or 2). • When C00034/1 is set = 2 (4 ... 20 mA), 0 ... 16 mA is displayed.					
▶ Analog terminals					
Display range (min. value unit max. value)					
0.00	mA	20.00			
Subcodes			Info		
C00029/1			AIN1: Input current		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00033

Parameter Name:			Data type: INTEGER_16		
C00033 AINx: Output value			Index: 24542 _d = 5FDE _h		
Display of the output value in percent of the analog input amplifier					
• 100 % ≡ 16384 ≡ +10 V / +20 mA					
▶ Analog terminals					
Display range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes			Info		
C00033/1			AIN1: Output value		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00034

Parameter Name: C00034 AINx: Configuration		Data type: UNSIGNED_8 Index: 24541 _d = 5FDD _h
Configuration of the analog input for current or voltage measurement		
▶ Analog terminals		
Selection list		Info
0	-10...+10 V	Input signal is the voltage signal -10 V ... +10 V • -10 V ... +10 V ≡ -100 % ... +100 %
1	0...20 mA	Input signal is the current signal 0 mA ... 20 mA • 0 mA ... 20 mA ≡ 0 % ... +100 %
2	4...20 mA	Input signal is the current signal 4 mA ... 20 mA • 4 mA ... 20 mA ≡ 0 % ... +100 % • The current loop is monitored for open circuit (I < 4 mA) by the device.
Subcodes	Lenze setting	Info
C00034/1	0: -10...+10 V	AIN1: Config.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00036

Parameter Name: C00036 DC braking: Current			Data type: INTEGER_16 Index: 24539 _d = 5FDB _h
Braking current in [%] based on rated device current (C00098)			► DC-injection braking
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	200.00	50.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00039

Parameter Name: C00039 Fixed setpoint x (L_NSet_1 n-Fix)			Data type: INTEGER_16 Index: 24536 _d = 5FD8 _h
The L_NSet_1 FB: Fixed speed setpoints (JOG values) for the setpoint generator			
Setting range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes	Lenze setting	Info	
C00039/1	40.00 %	Fixed setpoint 1	
C00039/2	60.00 %	Fixed setpoint 2	
C00039/3	80.00 %	Fixed setpoint 3	
C00039/4	0.00 %	Fixed setpoint 4	
C00039/5	0.00 %	Fixed setpoint 5	
C00039/6	0.00 %	Fixed setpoint 6	
C00039/7	0.00 %	Fixed setpoint 7	
C00039/8	0.00 %	Fixed setpoint 8	
C00039/9	0.00 %	Fixed setpoint 9	
C00039/10	0.00 %	Fixed setpoint 10	
C00039/11	0.00 %	Fixed setpoint 11	
C00039/12	0.00 %	Fixed setpoint 12	
C00039/13	0.00 %	Fixed setpoint 13	
C00039/14	0.00 %	Fixed setpoint 14	
C00039/15	0.00 %	Fixed setpoint 15	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00050

Parameter Name: C00050 MCTRL: Speed setpoint			Data type: INTEGER_32 Index: 24525 _d = 5FCD _h
Display of the speed setpoint at the speed setpoint input of the motor control			
Display range (min. value unit max. value)			
-120000	rpm	120000	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00051

Parameter Name: C00051 MCTRL: Actual speed value			Data type: INTEGER_32 Index: 24524 _d = 5FCC _h		
Display of the actual speed value of the motor shaft					
Note: The displayed value only corresponds to the real actual speed value of the motor shaft if an encoder is connected to the motor and the evaluation of the feedback signal has been set correctly ("Closed loop" operation). In case of operation without speed feedback, the signal is calculated from the motor control and thus may not correspond to the real actual speed.					
Display range (min. value unit max. value)					
-120000	rpm	120000			
☒ Read access			☐ Write access		
☐ CINH			☐ PLC STOP		
☒ No transfer			☐ COM		
☐ MOT			Scaling factor: 1		

C00052

Parameter Name: C00052 Motor voltage			Data type: UNSIGNED_16 Index: 24523 _d = 5FCB _h		
Display of the current motor voltage/output voltage of the inverter					
Display range (min. value unit max. value)					
0	V	1000			
☒ Read access			☐ Write access		
☐ CINH			☐ PLC STOP		
☒ No transfer			☐ COM		
☐ MOT			Scaling factor: 1		

C00053

Parameter Name: C00053 DC-bus voltage			Data type: UNSIGNED_16 Index: 24522 _d = 5FCA _h		
Display of the current DC-bus voltage					
Display range (min. value unit max. value)					
0	V	1000			
☒ Read access			☐ Write access		
☐ CINH			☐ PLC STOP		
☒ No transfer			☐ COM		
☐ MOT			Scaling factor: 1		

C00054

Parameter Name: C00054 Motor current			Data type: UNSIGNED_16 Index: 24521 _d = 5FC9 _h		
Display of the current motor current/output current of the inverter					
Display range (min. value unit max. value)					
0.00	A	300.00			
☒ Read access			☐ Write access		
☐ CINH			☐ PLC STOP		
☒ No transfer			☐ COM		
☐ MOT			Scaling factor: 100		

C00055

Parameter Name: C00055 Actual values			Data type: INTEGER_16 Index: 24520 _d = 5FC8 _h
Note: When a single-track feedback has been selected for the HTL encoder (C00115 = 1 or 3), the sign of the actual speed value is created from the sign of the speed setpoint. In C00055/1, a positive speed is always displayed.			
Display range (min. value unit max. value)			
-32767	rpm	32767	
Subcodes			Info
C00055/1			Actual value - HTL encoder FreqIn12
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00056

Parameter Name: C00056 Torque			Data type: INTEGER_32 Index: 24519 _d = 5FC7 _h
Display of the current torque			
Display range (min. value unit max. value)			
-65000.00	Nm	65000.00	
Subcodes			Info
C00056/1			Torque demand • Only in case of sensorless vector control (SLVC).
C00056/2			Actual torque value • Estimated actual torque for all motor control modes.
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00057

Parameter Name: C00057 Maximum torque			Data type: UNSIGNED_32 Index: 24518 _d = 5FC6 _h
Display of the maximum torque to be generated by the motor • The maximum torque to be generated by the motor depends on various factors, e.g. on I _{max} in motor mode (C00022) and the motor type used.			
Display range (min. value unit max. value)			
0.00	Nm	65000.00	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00058

Parameter Name: C00058 Output frequency			Data type: INTEGER_32 Index: 24517 _d = 5FC5 _h
Display of the current output frequency			
Display range (min. value unit max. value)			
-1300.00	Hz	1300.00	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00059

Parameter Name: C00059 Appl.: Reference frequency C11			Data type: UNSIGNED_32 Index: 24516 _d = 5FC4 _h		
Display of the field frequency which corresponds to the reference speed set in C00011 .					
Display range (min. value unit max. value)					
0.00	Hz	1300.00			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00061

Parameter Name: C00061 Heatsink temperature			Data type: INTEGER_16 Index: 24514 _d = 5FC2 _h		
Display of the current heatsink temperature					
Display range (min. value unit max. value)					
-50	°C	150			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00062

Parameter Name: C00062 Temperature inside the controller			Data type: INTEGER_16 Index: 24513 _d = 5FC1 _h		
From version 11.00.00					
Display of the current temperature inside the controller					
Display range (min. value unit max. value)					
-200	°C	200			
Subcodes			Info		
C00062/1			Interior temperature of CU		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00064

Parameter Name:			Data type: INTEGER_16 Index: 24511 _d = 5FBF _h		
C00064 Device utilisation (lxt)					
Display of the device utilisation lxt in different time resolutions					
• If the value displayed here exceeds the threshold set in C00123, the fault message "OC5: Device overload (lxt)" is output and the fault response set in C00604 is executed (default setting: "Warning").					
Display range (min. value unit max. value)					
0.00	%	250.00			
Subcodes			Info		
C00064/1			Device utilisation (lxt) • Maximum value of the pulse utilisation (C00064/2) and permanent utilisation (C00064/3).		
C00064/2			Device utilisation (lxt) 15s • Pulse utilisation over the last 15 seconds (only for loads >160 %).		
C00064/3			Device utilisation (lxt) 3 min • Permanent utilisation over the last 3 minutes.		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00065

Parameter Name: C00065 Supply voltage 24V			Data type: INTEGER_16 Index: 24510 _d = 5FB _{Eh}		
Display of the 24V supply voltage for the supply of the control electronics					
Note: The 24 V supply for the control electronics is either provided by an external supply or by the controller itself if it is connected to the mains voltage.					
Display range (min. value unit max. value)					
0.0	V	3276.7			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 10					

C00066

Parameter Name: C00066 Thermal motor load (I²xt)			Data type: INTEGER_16 Index: 24509 _d = 5FBD _h		
Display of the thermal motor load, sensorlessly determined using a motor model • If the value displayed here exceeds "100.00 %", the error message "OC6: Thermal motor overload (I2xt)" is output and the fault response set in C00606 is executed (default setting: "Warning"). ▶ Motor overload monitoring (I2xt)					
Display range (min. value unit max. value)					
0.00	%	199.99			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00070

Parameter Name: C00070 Vp speed controller			Data type: UNSIGNED_16 Index: 24505 _d = 5FB9 _h		
Amplification factor Vp of the speed controller for different motor control modes					
Setting range (min. value unit max. value)					
0.00		600.00			
Subcodes	Lenze setting	Info			
C00070/1	15.00	SLVC : Vp speed controller			
C00070/2	6.00	Reserved			
C00070/3	3.00	SLPSM : Vp speed controller			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00071

Parameter Name: C00071 Ti speed controller			Data type: UNSIGNED_16 Index: 24504 _d = 5FB8 _h		
Reset time Ti of the speed controller for different motor control modes					
Setting range (min. value unit max. value)					
0.0	ms	6000.0			
Subcodes	Lenze setting		Info		
C00071/1	100.0 ms		SLVC : Ti speed controller		
C00071/2	50.0 ms		Reserved		
C00071/3	100.0 ms		SLPSM : Ti speed controller		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00072

Parameter Name: C00072 SC: Tdn speed controller			Data type: UNSIGNED_16 Index: 24503 _d = 5FB7 _h
Differential time constant Tdn of the speed controller for sensorless control for synchronous motors (SLPSM)			
Setting range (min. value unit max. value)			Lenze setting
0.00	ms	3.00	0.00 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00073

Parameter Name: C00073 I_{max}/M controller gain			Data type: UNSIGNED_16 Index: 24502 _d = 5FB6 _h
Amplification factor V _p of certain controllers for different motor control modes			
Setting range (min. value unit max. value)			
0.00		100.00	
Subcodes	Lenze setting	Info	
C00073/1	0.25	VFC : V _p I _{max} controller • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.	
C00073/2	1.25	SLVC : V _p torque controller	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00074

Parameter Name: C00074 Reset time I_{max}/M controller			Data type: UNSIGNED_16 Index: 24501 _d = 5FB5 _h
Reset time T _i of certain controllers for different motor control modes			
Setting range (min. value unit max. value)			
0	ms	9990	
Subcodes	Lenze setting	Info	
C00074/1	65 ms	VFC : T _i I _{max} controller	
C00074/2	30 ms	SLVC : T _i torque controller	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00075

Parameter Name: C00075 V_p current controller			Data type: UNSIGNED_16 Index: 24500 _d = 5FB4 _h
Gain factor V _p of the current controller for certain inverter functions (parameter identification, flying restart circuit) • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0.00	V/A	500.00	7.00 V/A
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00076

Parameter Name: C00076 Ti current controller			Data type: UNSIGNED_16 Index: 24499 _d = 5FB3 _h
Reset time Ti of the current controller for certain inverter functions (parameter identification, flying restart circuit) • After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0.00	ms	500.00	10.61 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00079

Parameter Name: C00079 SC: Settings		Data type: UNSIGNED_8 Index: 24496 _d = 5FB0 _h
Configuration of different options for sensorless control for synchronous motors (SLPSM)		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C00079/1	0: Off	SC: Current controller - feedforward control
C00079/2	1: On	SC: Adapt. VP in the field weakening range
C00079/3	0: Off	SC: n-Ctrl Anti-Wind-Up
C00079/4	1: On	Field weakening for synchronous motors • From version 11.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00080

Parameter Name: C00080 Override point of field weakening			Data type: INTEGER_16 Index: 24495 _d = 5FAF _h
Offset of the override point of field weakening • In the V/f characteristic control mode (VFCplus), the stall protection function or the max. permissible current in the field weakening range can be adapted.			
Setting range (min. value unit max. value)			Lenze setting
-500	Hz	500	0 Hz
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00081

Parameter Name: C00081 Rated motor power			Data type: UNSIGNED_16 Index: 24494 _d = 5FAE _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Note: It is mandatory to give the rated motor power for the sensorless vector control (SLVC).			
Setting range (min. value unit max. value)			Lenze setting
0.00	kW	500.00	11.00 kW
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00082

Parameter Name: C00082 Motor rotor resistance			Data type: UNSIGNED_32 Index: 24493 _d = 5FAD _h
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)			Lenze setting
0	mOhm	200000	276 mOhm
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00083

Parameter Name: C00083 Motor rotor time constant			Data type: UNSIGNED_16 Index: 24492 _d = 5FAC _h
From version 02.00.00 Display of the rotor time constant of the motor This value is calculated from the rotor resistance and the rotor inductance (leakage and magnetising inductance).			
Display range (min. value unit max. value)			
0	ms	32767	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00084

Parameter Name: C00084 Motor stator resistance			Data type: UNSIGNED_32 Index: 24491 _d = 5FAB _h
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)			Lenze setting
0	mOhm	200000	330 mOhm
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00085

Parameter Name: C00085 Motor stator leakage inductance			Data type: UNSIGNED_16 Index: 24490 _d = 5FAA _h
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)			Lenze setting
0.00	mH	650.00	3.50 mH
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00087

Parameter Name: C00087 Rated motor speed			Data type: UNSIGNED_16 Index: 24488 _d = 5FA8 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Note: It is mandatory to give the rated motor speed for the sensorless vector control (SLVC).			
Setting range (min. value unit max. value)			Lenze setting
50	rpm	60000	1460 rpm
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00088

Parameter Name: C00088 Rated motor current			Data type: UNSIGNED_16 Index: 24487 _d = 5FA7 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0.20	A	320.00	21.00 A
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00089

Parameter Name: C00089 Rated motor frequency			Data type: UNSIGNED_16 Index: 24486 _d = 5FA6 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Note: It is mandatory to give the rated motor frequency for the sensorless vector control (SLVC).			
Setting range (min. value unit max. value)			Lenze setting
1	Hz	1000	50 Hz
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00090

Parameter Name: C00090 Rated motor voltage			Data type: UNSIGNED_16 Index: 24485 _d = 5FA5 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0	V	5000	400 V
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00091

Parameter Name: C00091 Motor cosine phi			Data type: UNSIGNED_8 Index: 24484 _d = 5FA4 _h
This value can be obtained from the motor nameplate. After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically.			
Setting range (min. value unit max. value)			Lenze setting
0.40		1.00	0.85
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00092

Parameter Name: C00092 Motor magnetising inductance			Data type: UNSIGNED_16 Index: 24483 _d = 5FA3 _h
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.			
Setting range (min. value unit max. value)			Lenze setting
0.0	mH	6500.0	81.0 mH
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10			

C00093

Parameter Name: C00093 Power section identification			Data type: UNSIGNED_16 Index: 24482 _d = 5FA2 _h		
Display of the identification of the detected power section of the controller					
Display range (min. value unit max. value)					
0		65535			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00095

Parameter Name: C00095 Motor magnetising current			Data type: UNSIGNED_16 Index: 24480 _d = 5FA0 _h		
After the motor to be used has been selected from the motor catalogue, the suitable value can be entered automatically. An automatic detection via the motor parameter identification is possible as well.					
Setting range (min. value unit max. value)			Lenze setting		
0.00	A	320.00	8.50 A		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00097

Parameter Name: C00097 Rated motor torque			Data type: UNSIGNED_32 Index: 24478 _d = 5F9E _h		
Display of the rated motor torque • The value displayed here is calculated from different parameters, e.g. the maximum current set in C00022 .					
Display range (min. value unit max. value)					
0.00	Nm	100000.00			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00098

Parameter Name: C00098 Device rated current			Data type: UNSIGNED_16 Index: 24477 _d = 5F9D _h		
Display of the rated inverter current which is defined by the integrated power section.					
Display range (min. value unit max. value)					
0.0	A	6000.0			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00099

Parameter Name: C00099 Firmware version		Data type: VISIBLE_STRING Index: 24476 _d = 5F9C _h	
Display of the firmware version of the device as string			
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 12			

C00100

Parameter Name: C00100 Firmware version			Data type: UNSIGNED_8 Index: 24475 _d = 5F9B _h		
Display of the firmware version of the device, divided into subsections.					
Display range (min. value unit max. value)					
0		99			
Subcodes			Info		
C00100/1			Firmware version - main version		
C00100/2			Firmware version - subversion		
C00100/3			Firmware version - release		
C00100/4			Firmware version - build		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00101

Parameter Name: C00101 Add. accel. time x			Data type: UNSIGNED_32 Index: 24474 _d = 5F9A _h		
The L_NSet 1 : FB: Additional acceleration times for the main setpoint					
• The additional acceleration times set here can be selected via the binary inputs <i>bT11</i> ... <i>bT18</i> of the L_NSet 1 FB.					
Setting range (min. value unit max. value)					
0.000	s	999.999			
Subcodes	Lenze setting		Info		
C00101/1	0.000 s		Add. accel. time 1 ... 15		
C00101/...					
C00101/15					
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00103

Parameter Name: C00103 Add. decel. time x			Data type: UNSIGNED_32 Index: 24472 _d = 5F98 _h		
The L_NSet 1 FB: Additional deceleration times for the main setpoint					
• The additional deceleration times set here can be selected via the binary inputs <i>bT11</i> ... <i>bT18</i> of the L_NSet 1 FB.					
Setting range (min. value unit max. value)					
0.000	s	999.999			
Subcodes	Lenze setting		Info		
C00103/1	0.000 s		Add. decel. time 1 ... 15		
C00103/...					
C00103/15					
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00105

Parameter Name: C00105 Decel. time - quick stop			Data type: UNSIGNED_32 Index: 24470 _d = 5F96 _h		
The set deceleration time determines the ramp slope at quick stop					
▶ Activate/deactivate quick stop					
Setting range (min. value unit max. value)			Lenze setting		
0.000	s	999.900	2.000 s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00106

Parameter Name: C00106 Auto DCB: Hold time			Data type: UNSIGNED_32 Index: 24469 _d = 5F95 _h		
Hold time of the automatic DC injection brake					
• The DC injection brake is applied for the time set here if the value falls below the speed setpoint set in C00019. ▶ DC-injection braking					
Setting range (min. value unit max. value)			Lenze setting		
0.000	s	999.000	0.500 s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00107

Parameter Name: C00107 DC braking: Hold time			Data type: UNSIGNED_32 Index: 24468 _d = 5F94 _h		
Maximum hold time of the manual DC injection brake					
• A time can be set here after which the DC injection brake is switched off automatically to prevent the motor from thermal overload. • When "999.000 s" is set, the hold time is infinite.					
▶ DC-injection braking					
Setting range (min. value unit max. value)			Lenze setting		
0.000	s	999.000	999.000 s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00114

Parameter | Name:
C00114 | DigInX: Inversion

Data type: UNSIGNED_16
Index: 24461_d = 5F8D_h

The polarity of each digital input of the device can be inverted via this bit field.

▶ [Digital terminals](#)

Setting range (min. hex value max. hex value)			Lenze setting
0x0000		0xFFFF	0x0000 (decimal: 0)
Value is bit-coded: (☒ = bit set)			Info
Bit 0 ☐	DI1 inverted		Inversion of digital input 1
Bit 1 ☐	DI2 inverted		Inversion of digital input 2
Bit 2 ☐	DI3 inverted		Inversion of digital input 3
Bit 3 ☐	DI4 inverted		Inversion of digital input 4
Bit 4 ☐	Reserved		
Bit 5 ☐	Reserved		
Bit 6 ☐	Reserved		
Bit 7 ☐	Reserved		
Bit 8 ☐	Reserved		
Bit 9 ☐	Reserved		
Bit 10 ☐	Reserved		
Bit 11 ☐	Reserved		
Bit 12 ☐	Reserved		
Bit 13 ☐	Reserved		
Bit 14 ☐	Reserved		
Bit 15 ☐	Clnh inverted		Inversion of digital input RFR (controller enable)

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00115

Parameter Name: C00115 DI1 DI2: Function		Data type: UNSIGNED_8 Index: 24460 _d = 5F8C _h
Function assignment of the digital terminals DI1 and DI2		
▶ Digital terminals: Function assignment		
Selection list		Info
0	DI1=In1 DI2=In2	DI1 = digital input DI2 = digital input
1	DI1=FreqIn12 DI2=In2	DI1 = 1-track frequency input DI2 = digital input
2	(DI1/DI2)=FreqIn12 (2-track)	DI1 and DI2 = 2-track frequency input
3	(DI1/DI2=+-)=FreqIn12	DI1 = 1-track frequency input DI2 = specification of direction
4	DI1=CountIn1 DI2=In2	DI1 = counter input DI2 = digital input
Subcodes	Lenze setting	Info
C00115/1	0: DI1=In1 DI2=In2	Function assignment of DI1 and DI2
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00118

Parameter Name: C00118 DigOutX: Inversion		Data type: UNSIGNED_8 Index: 24457 _d = 5F89 _h
The polarity of each digital output of the device can be inverted via this bit field.		
▶ Digital terminals		
Setting range (min. hex value max. hex value)	Lenze setting	
0x00	0xFF 0x00 (decimal: 0)	
Value is bit-coded: (☒ = bit set)	Info	
Bit 0 ☐	Relay inverted	Relay inversion
Bit 1 ☐	DO1 inverted	Inversion of digital output 1
Bit 2 ☐	Reserved	
Bit 3 ☐	Reserved	
Bit 4 ☐	Reserved	
Bit 5 ☐	Reserved	
Bit 6 ☐	Reserved	
Bit 7 ☐	Reserved	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00120

Parameter Name: C00120 Setting of motor overload (I²xt)		Data type: INTEGER_16 Index: 24455 _d = 5F87 _h
Operating threshold for the "OC6: Motor overload (I ² xt)" error message - The response for reaching the threshold can be selected in C00606. - The current thermal motor load is displayed in C00606.		
▶ Motor overload monitoring (I²xt)		
Setting range (min. value unit max. value)	Lenze setting	
0.00	%	250.00 100.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100		

C00122

Parameter Name: C00122 Initial value motor overload (I²xt)			Data type: UNSIGNED_16 Index: 24453 _d = 5F85 _h		
From version 12.00.00 The thermal motor load displayed in C00066 is pre-initialised with the value set here when the device is connected to the mains. • If "100.00 %" is set, the last value at switching off the device is used for the initialisation. • Recommended setting for operation according to UL: 50.00 % ► Motor overload monitoring (I2xt)					
Setting range (min. value unit max. value)					
0.00	%	100.00			
Subcodes	Lenze setting	Info			
C00122/1	0.00 %	Initial value motor overload (I²xt)			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00123

Parameter Name: C00123 Device utilisation threshold (Ixt)			Data type: INTEGER_16 Index: 24452 _d = 5F84 _h		
Operating threshold for the "OC5: Device overload (Ixt)" error message • The response for reaching the threshold can be selected in C00604. • The current device utilisation is displayed in C00064.					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	200.00	100.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00129

Parameter Name: C00129 Brake resistance value			Data type: UNSIGNED_16 Index: 24446 _d = 5F7E _h		
From version 03.00.00 Resistance value of the connected brake resistor • The value to be entered can be obtained from the nameplate of the brake resistor.					
Setting range (min. value unit max. value)			Lenze setting		
0.0	Ohm	500.0	39.0 Ohm		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00130

Parameter Name: C00130 Rated power - brake resistor			Data type: UNSIGNED_16 Index: 24445 _d = 5F7D _h		
From version 03.00.00 Rated power of the connected brake resistor • The value to be entered can be obtained from the nameplate of the brake resistor.					
Setting range (min. value unit max. value)			Lenze setting		
0	W	65535	100 W		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C00131

Parameter Name: C00131 Rated heat amount of brake resist.			Data type: UNSIGNED_16 Index: 24444 _d = 5F7C _h		
From version 03.00.00					
Thermal capacity of the connected brake resistor					
• The value to be entered can be obtained from the nameplate of the brake resistor.					
Setting range (min. value unit max. value)			Lenze setting		
0.0	kWs	6553.5	10.0 kW _s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00133

Parameter Name: C00133 Brake resistor utilisation			Data type: UNSIGNED_16 Index: 24442 _d = 5F7A _h		
From version 03.00.00					
Display of the utilisation of the connected brake resistor					
Display range (min. value unit max. value)					
0	%	65535			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C00134

Parameter Name:		Data type: UNSIGNED_8 Index: 24441 _d = 5F79 _h	
C00134 L_NSet_1: Ramp smoothing			
The L_NSet_1 FB: Configuration of the ramp rounding for the main setpoint			
Selection list (Lenze setting printed in bold)		Info	
0	Off	Ramp rounding deactivated	
1	PT1 behaviour	Ramp rounding with PT1 behaviour • The corresponding S-ramp time must be set in C00182.	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00136

Parameter Name: C00136 Communication control words			Data type: UNSIGNED_16 Index: 24439 _d = 5F77 _h		
Control words of the communication interfaces					
Display area (min. hex value max. hex value)					
0x0000		0xFFFF			
Value is bit-coded:					
Bit 0	SwitchOn				
Bit 1	DisableVoltage				
Bit 2	SetQuickStop				
Bit 3	EnableOperation				
Bit 4	ModeSpecific_1				
Bit 5	ModeSpecific_2				
Bit 6	ModeSpecific_3				
Bit 7	ResetFault				
Bit 8	SetHalt				
Bit 9	Reserved_1				
Bit 10	Reserved_2				
Bit 11	LenzeSpecific_1				
Bit 12	LenzeSpecific_2				
Bit 13	LenzeSpecific_3				
Bit 14	SetFail				
Bit 15	LenzeSpecific_4				
Subcodes			Info		
C00136/1			MCI control word Control word of the MCI communication interface (communication module)		
C00136/2			CAN control word Control word of the CAN communication interface (CAN on board)		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00137

Parameter | Name: C00137 | Device status

Data type: UNSIGNED_16
Index: 24438_d = 5F76_h

Display of the current device status

Selection list (read only)	
0	FirmwareUpdate
1	Init
2	Ident
3	ReadyToSwitchON
4	SwitchedON
5	OperationEnable
6	Warning
7	Trouble
8	Fault
9	TroubleQSP
10	SafeTorqueOff
11	SystemFail
12	Reserved_1
13	Reserved_2
14	Reserved_3
15	Reserved_4

☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00138

Parameter Name:			Data type: UNSIGNED_16 Index: 24437 _d = 5F75 _h		
C00138 Internal control signals					
Bit coded display of internal control signals of different sources					
Display area (min. hex value max. hex value)					
0x0000		0xFFFF			
Value is bit-coded:					
Bit 0	Reserved				
Bit 1	DisableVoltage				
Bit 2	SetQuickStop				
Bit 3	EnableOperation				
Bit 4	InitFinishedOK				
Bit 5	ModeSpecific_2				
Bit 6	ModeSpecific_3				
Bit 7	ResetFault				
Bit 8	SetHalt				
Bit 9	FirmwareUpdate				
Bit 10	MotorIdent				
Bit 11	SetMessage				
Bit 12	SetIMP				
Bit 13	SetSystemFail				
Bit 14	SetFail				
Bit 15	SetFailQSP				
Subcodes			Info		
C00138/1			SYS control signals		
C00138/2			MCK control signals		
C00138/3			FWM control signals		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00142

Parameter | Name: C00142 | Auto-start option

Data type: UNSIGNED_8
Index: 24433_d = 5F71_h

Starting performance of the controller after mains connection, undervoltage, loading of the Lenze setting as well as a reset of "Trouble" or "Fault" can be parameterised individually.

▶ [Automatic restart after mains connection/fault...](#)

Setting range (min. hex value max. hex value)		Lenze setting
0x00		0xFF 0x19 (decimal: 25)
Value is bit-coded: (☑ = bit set)		Info
Bit 0 ☑	Inhibit at power-on	
Bit 1 ☐	Inhibit at trouble	
Bit 2 ☐	Inhibit at fault	
Bit 3 ☑	Inhibit at undervoltage	
Bit 4 ☑	Inhibit at Lenze setting	From version 06.00.00
Bit 5 ☐	Reserved	
Bit 6 ☐	Reserved	
Bit 7 ☐	Reserved	

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00144

Parameter Name: C00144 Switching freq. reduct. (Temp.)		Data type: UNSIGNED_8 Index: 24431 _d = 5F6F _h	
Activation of the automatic switching frequency reduction if the temperature is too high			
Selection list (Lenze setting printed in bold)		Info	
0	Off	Automatic switching frequency reduction deactivated	
1	On	Automatic switching frequency reduction activated	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00148

Parameter Name: C00148 LS_DriveInterface: Error message config.			Data type: UNSIGNED_16 Index: 24427 _d = 5F6B _h
From version 04.00.00 Selection of the device statuses for which the <i>bCollectedFail</i> group error output of SB LS_DriveInterface is to be set to TRUE.			
Setting range (min. hex value max. hex value)			Lenze setting
0x0000		0xFFFF	0x0030 (decimal: 48)
Value is bit-coded: (☒ = bit set)			Info
Bit 0 ☐	SafeTorqueOff		
Bit 1 ☐	ReadyToSwitchOn		
Bit 2 ☐	SwitchedOn		
Bit 3 ☐	TroubleQSP		From version 06.00.00
Bit 4 ☒	Trouble		
Bit 5 ☒	Fault		
Bit 6 ☐	Warning		
Bit 7 ☐	ImplsActive		
Bit 8 ☐	ClnhlsActive		
Bit 9 ☐	Fail CAN_Management		
Bit 10 ☐	Reserved		
Bit 11 ☐	Reserved		
Bit 12 ☐	Reserved		
Bit 13 ☐	Reserved		
Bit 14 ☐	Lock bFail at TroubleQSP		From version 11.00.00 1 ≙ The <i>bFail</i> output of the SB LS_DriveInterface is also set in the "TroubleQSP" status. • Advantage: Even in the "TroubleQSP" status, an error occurred before can still be recognised.
Bit 15 ☐	Use 16BitFailNo.		From version 06.00.00 1 ≙ The short 16-bit error number <i>wStateDetermFailNoShort</i> is provided at the <i>wStateDetermFailNoLow</i> output of the SB LS_DriveInterface . • In this case, the <i>wStateDetermFailNoHigh</i> output is "0". • Advantage: The bus transfer of the error numbers is possible via a data word without changing the interconnection of the technology application.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00150

Parameter Name: C00150 Status word			Data type: UNSIGNED_16 Index: 24425 _d = 5F69 _h
Bit coded device status word			
Display area (min. hex value max. hex value)			
0x0000		0xFFFF	
Value is bit-coded:			Info
Bit 0	FreeStatus	Free status bit 0	
Bit 1	PowerDisabled	Power switched off	
Bit 2	FreeStatus	Free status bit 2	
Bit 3	FreeStatus	Free status bit 3	
Bit 4	FreeStatus	Free status bit 4	
Bit 5	FreeStatus	Free status bit 5	
Bit 6	ActSpeedIsZero	Current speed is 0	
Bit 7	ControllerInhibit	Controller is inhibited	
Bit 8	StatusCodeBit0	Status code bit 0	
Bit 9	StatusCodeBit1	Status code bit 1	
Bit 10	StatusCodeBit2	Status code bit 2	
Bit 11	StatusCodeBit3	Status code bit 3	
Bit 12	Warning	Warning	
Bit 13	Trouble	Trouble	
Bit 14	FreeStatus	Free status bit 14	
Bit 15	FreeStatus	Free status bit 15	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00155

Parameter Name: C00155 Extended status word		Data type: UNSIGNED_16 Index: 24420 _d = 5F64 _h	
Bit coded device status word 2			
Display area (min. hex value max. hex value)			
0x0000			
Value is bit-coded:		Info	
Bit 0	Fail	Fault	
Bit 1	M_max	Maximum torque	
Bit 2	I_max	Maximum current	
Bit 3	PowerDisabled	Power switched off	
Bit 4	Ready	Controller is ready for operation	
Bit 5	ControllerInhibit	Controller is inhibited	
Bit 6	Trouble	Trouble	
Bit 7	InitState	Initialisation	
Bit 8	CwCcw	CW/CCW rotation	
Bit 9	TroubleQSP	Quick stop due to fault is active	
Bit 10	SafeTorqueOff	Safe torque off	
Bit 11	AplicationRunning	Application is running	
Bit 12	AplParSetBit0	Application parameter set - bit 0	
Bit 13	AplParSetBit1	Application parameter set - bit 1	
Bit 14	Quick stop	Quick stop active	
Bit 15	Motor parameter identification	Motor parameter identification is active	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00158

Parameter | Name:

C00158 | Cause of controller inhibit

Data type: UNSIGNED_16

Index: 24417_d = 5F61_h

Bit coded display of the cause/source of the controller inhibit

Display area (min. hex value max. hex value)	
0x0000	0xFFFF
Value is bit-coded:	
Bit 0	Terminal controller enable
Bit 1	CAN control word
Bit 2	MCI control word
Bit 3	SwitchOn
Bit 4	Application
Bit 5	Device command
Bit 6	Error response
Bit 7	Internal signal
Bit 8	Reserved
Bit 9	Reserved
Bit 10	AutoStartLock
Bit 11	Motor parameter identification
Bit 12	Automatic brake operation
Bit 13	DCB-IMP
Bit 14	Reserved
Bit 15	Reserved

☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT

C00159

Parameter Name: C00159 Cause of quick stop QSP			Data type: UNSIGNED_16 Index: 24416 _d = 5F60 _h
Bit coded display of the cause/source of the quick stop			
Display area (min. hex value max. hex value)			
0x0000		0xFFFF	
Value is bit-coded:			
Bit 0	Reserved		
Bit 1	CAN control word		
Bit 2	MCI control word		
Bit 3	Reserved		
Bit 4	Application		
Bit 5	Device command		
Bit 6	Error response		
Bit 7	Internal signal		
Bit 8	Reserved		
Bit 9	Reserved		
Bit 10	Operating system		
Bit 11	Reserved		
Bit 12	MCK		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	Reserved		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00160

Parameter Name: C00160 Status determining error (16bit)			Data type: UNSIGNED_16 Index: 24415 _d = 5F5F _h
From version 06.00.00 Display of the short 16-bit error number of the status determining error ▶ Structure of the 16-bit error number (bit coding)			
Display range (min. value unit max. value)			
0		65535	
Subcodes			Info
C00160/1			Status determining error (16-bit)
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00161

Parameter Name: C00161 LS_SetError_x: Error number			Data type: UNSIGNED_16 Index: 24414 _d = 5F5E _h
Setting of the error number for user error messages			
Setting range (min. value unit max. value)			
0		65535	
Subcodes	Lenze setting	Info	
C00161/1	1	LS_SetError_1 : Error no.1	
C00161/2	2	LS_SetError_1 : Error no.2	
C00161/3	3	LS_SetError_1 : Error no.3	
C00161/4	4	LS_SetError_1 : Error no.4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00162

Parameter Name: C00162 Error number masked			Data type: UNSIGNED_32 Index: 24413 _d = 5F5D _h		
From version 13.00.00					
Display of the 32-bit error number of the status determining error without error type					
• The error number displayed here only contains the error subject area and error ID (lower 26 bits of the 32-bit error number)					
► Structure of the 32-bit error number (bit coding)					
Display range (min. value unit max. value)					
0		4294967295			
Subcodes			Info		
C00162/1			Subject area + Id statuserror		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00163

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
Selection of two binary signals to be logged in the logbook		
Selection list		Info
0	No signal	
1	DI1: Input signal	
2	DI2: Input signal	
3	DI3: Input signal	
4	DI4: Input signal	
5	Controller inhibit signal	
6	Digital counter: Comparison bit	
7	CAN1 input bit 0	
8	CAN1 input bit 1	
9	CAN1 input bit 2	
10	CAN1 input bit 3	
11	CAN1 input bit 4	
12	CAN1 input bit 5	
13	CAN1 input bit 6	
14	CAN1 input bit 7	

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
15	CAN1 input bit 8	
16	CAN1 input bit 9	
17	CAN1 input bit 10	
18	CAN1 input bit 11	
19	CAN1 input bit 12	
20	CAN1 input bit 13	
21	CAN1 input bit 14	
22	CAN1 input bit 15	
23	CAN2 input bit 0	
24	CAN2 input bit 1	
25	CAN2 input bit 2	
26	CAN2 input bit 3	
27	CAN2 input bit 4	
28	CAN2 input bit 5	
29	CAN2 input bit 6	
30	CAN2 input bit 7	
31	CAN2 input bit 8	
32	CAN2 input bit 9	
33	CAN2 input bit 10	
34	CAN2 input bit 11	
35	CAN2 input bit 12	
36	CAN2 input bit 13	
37	CAN2 input bit 14	
38	CAN2 input bit 15	
39	CAN3 input bit 0	
40	CAN3 input bit 1	
41	CAN3 input bit 2	
42	CAN3 input bit 3	
43	CAN3 input bit 4	
44	CAN3 input bit 5	
45	CAN3 input bit 6	
46	CAN3 input bit 7	
47	CAN3 input bit 8	
48	CAN3 input bit 9	
49	CAN3 input bit 10	
50	CAN3 input bit 11	
51	CAN3 input bit 12	
52	CAN3 input bit 13	
53	CAN3 input bit 14	
54	CAN3 input bit 15	
55	MCI word1 input bit0	
56	MCI word1 input bit1	
57	MCI word1 input bit2	
58	MCI word1 input bit3	

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
59	MCI Word 1 Input bit 4	
60	MCI word1 input bit5	
61	MCI word1 input bit6	
62	MCI word1 input bit7	
63	MCI word1 input bit8	
64	MCI word1 input bit9	
65	MCI word1 input bit10	
66	MCI word1 input bit11	
67	MCI word1 input bit12	
68	MCI word1 input bit13	
69	MCI word1 input bit14	
70	MCI word1 input bit15	
71	MCI word2 input bit0	
72	MCI word2 input bit1	
73	MCI Word 2 Input bit 2	
74	MCI word2 input bit3	
75	MCI word2 input bit4	
76	MCI word2 input bit5	
77	MCI word2 input bit6	
78	MCI word 2 input bit 7	
79	MCI word2 input bit8	
80	MCI word2 input bit9	
81	MCI word2 input bit10	
82	MCI word2 input bit11	
83	MCI Word 2 Input bit 12	
84	MCI word2 input bit13	
85	MCI word2 input bit14	
86	MCI word2 input bit15	
87	Position controller: Limit	
88	Speed controller: Limit	
89	Speed setpoint: Limit	
90	Torque setpoint: Limit	
91	Current setpoint: Limit	
92	DC injection brake active	
93	Quick stop active	
94	Pulse inhibit active	
95	Controller inhibit active	
96	Safe status active	
97	Direction of rotation ccw	
98	Actual speed = 0	
99	L_Or_1: Out	
100	L_DFlipFlop_1: Out	
101	L_DigitalDelay_1: Out	
102	L_Compare_1: Out	

Parameter Name: C00163 Logbook - binary elements		Data type: UNSIGNED_16 Index: 24412 _d = 5F5C _h
103	L_Compare_2: Out	
104	L_NSet_1: Setpoint reached	
105	L_DigitalLogic_1: Out	
106	L_SignalMonitor_b: Out1	
107	L_SignalMonitor_b: Out2	
108	L_SignalMonitor_b: Out3	
109	L_SignalMonitor_b: Out4	
110	L_PCTRL_1: act=set	
Subcodes	Lenze setting	Info
C00163/1	0: No signal	Logbook - binary element 1
C00163/2	0: No signal	Logbook - binary element 2
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00164

Parameter Name: C00164 Logbook - analog elements		Data type: UNSIGNED_16 Index: 24411 _d = 5F5B _h
Selection of an analog signal to be logged in the logbook		
Selection list	Info	
0	No signal	
1	AIN1	
2	CAN1 control word	
3	CAN1 input word 2	
4	CAN1 input word 3	
5	CAN1 input word 4	
6	CAN2 input word 1	
7	CAN2 input word 2	
8	CAN2 input word 3	
9	CAN2 input word 4	
10	CAN3 input word 1	
11	CAN3 input word 2	
12	CAN3 input word 3	
13	CAN3 input word 4	
14	Digital counter LowWord	
15	Digital counter HighWord	
16	MCI word 1	
17	MCI word 2	
18	MCI word 3	
19	MCI word 4	
20	MCI word 5	
21	MCI word 6	
22	MCI word 7	
23	MCI word 8	
24	MCI word 9	
25	MCI word 10	

Parameter Name: C00164 Logbook - analog elements		Data type: UNSIGNED_16 Index: 24411 _d = 5F5B _h
26	MCI word 11	
27	MCI word 12	
28	MCI word 13	
29	MCI word 14	
30	MCI word 15	
31	MCI word 16	
32	Current motor speed	
33	Current motor torque	
34	DC-bus voltage	
35	Current motor current	
36	Current motor voltage	
37	Current motor frequency	
38	Effective speed setpoint	
39	Device utilisation	
40	Motor utilisation	
41	L_OffsetGainPar_1: Out	
42	L_OffsetGainPar_2: Out	
43	L_OffsetGainPar_3: Out	
44	L_Aritmethik_1: Out	
45	L_AnalogSwitch_1: Out	
46	L_NSet_1: Out	
47	L_MotorPoti_1: Out	
48	L_PCTRL_1: Out	
49	L_SignalMonitor_a: Out1	
50	L_SignalMonitor_a: Out2	
51	L_SignalMonitor_a: Out3	
52	L_SignalMonitor_a: Out4	
53	L_MulDiv_1: Out	
54	L_NSet_1: Target setpoint	
Subcodes	Lenze setting	Info
C00164/1	0: No signal	Logbook - analog element 1
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00165

Parameter Name: C00165 Error information		Data type: VISIBLE_STRING Index: 24410 _d = 5F5A _h
Display of the error number divided into sectors in the event of an error		
Subcodes	Info	
C00165/1	Status determining error	
C00165/2	Current error	
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 14		

C00166

Parameter Name: C00166 Error information text		Data type: VISIBLE_STRING Index: 24409 _d = 5F59 _h
Display of details on the status determining error and on the currently pending error		
Subcodes	Info	
C00166/1	Resp. to status det. error • Response to the status determining error	
C00166/2	Subj. - status det. error • Subject area of the status determining error	
C00166/3	Mess. - status det. error • Textual message of the status determining error	
C00166/4	Resp. to curr. error • Response of the currently pending error	
C00166/5	Subj. - curr. error • Subject area of the currently pending error	
C00166/6	Mess. - curr. error • Textual message of the currently pending error	
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 31		

C00167

Parameter Name: C00167 Logbook data	Data type: OCTET_STRING Index: 24408 _d = 5F58 _h
This code is for device-internal use only and must not be written to by the user!	

C00168

Parameter Name: C00168 Status determining error		Data type: UNSIGNED_32 Index: 24407 _d = 5F57 _h
Display of the 32-bit error number of the status determining error		
► Structure of the 32-bit error number (bit coding)		
Display range (min. value unit max. value)		
0		4294967295
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00169

Parameter Name: C00169 Logbook setting		Data type: UNSIGNED_16 Index: 24406 _d = 5F56 _h	
Configuration which message types are to be logged in the logbook.			
Setting range (min. hex value max. hex value)		Lenze setting	
0x0000		0xFFFF	0x067E (decimal: 1662)
Value is bit-coded: (☒ = bit set)			
Bit 0 ☐	Reserved		
Bit 1 ☒	Log entry: Fault		
Bit 2 ☒	Log entry: Trouble		
Bit 3 ☒	Log entry: TroubleQuickstop		
Bit 4 ☒	Log entry: WarningLocked		
Bit 5 ☒	Log entry: Warning		
Bit 6 ☒	Log entry: Information		
Bit 7 ☐	Reserved		
Bit 8 ☐	Reserved		
Bit 9 ☒	Activation: Error counter		
Bit 10 ☒	Activation: Log line refresh		
Bit 11 ☐	Reserved		
Bit 12 ☐	Reserved		
Bit 13 ☐	Reserved		
Bit 14 ☐	Reserved		
Bit 15 ☐	Reserved		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00170

Parameter Name: C00170 Current error		Data type: UNSIGNED_32 Index: 24405 _d = 5F55 _h	
Display of the internal error number of the currently pending error			
Display range (min. value unit max. value)			
0		4294967295	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00171

Parameter Name: C00171 Logbook access index		Data type: UNSIGNED_8 Index: 24404 _d = 5F54 _h	
This code is for device-internal use only and must not be written to by the user!			

C00173

Parameter Name: C00173 Mains voltage		Data type: UNSIGNED_8 Index: 24402 _d = 5F52 _h
If the rated mains voltage differs from 230 V or 400 V, set the mains voltage the drive is operated with. The set mains voltage influences the brake chopper threshold, the monitoring of the device utilisation (Ixt) and the switch-off threshold in case of undervoltage in the DC bus.		
Selection list (Lenze setting printed in bold)		Info
0	3ph 400V / 1ph 230V	3-phase 400 V or 1-phase 230 V
1	3ph 440V / 1ph 230V	3-phase 440 V or 1-phase 230 V
2	3ph 480V / 1ph 230V	3-phase 480 V or 1-phase 230 V
3	3ph 500V / 1ph 230V	3-phase 500 V or 1-phase 230 V
4	Reserved / reserved	
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00174

Parameter Name: C00174 Reduc. brake chopper threshold			Data type: UNSIGNED_8 Index: 24401 _d = 5F51 _h		
The threshold from which on the brake chopper is controlled is reduced by the voltage value set here.					
Setting range (min. value unit max. value)			Lenze setting		
0	V	150	0 V		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00175

Parameter | Name: **C00175 | Brake energy management**

Data type: UNSIGNED_8
Index: 24400_d = 5F50_h

From version 03.00.00

Selection of the braking procedure

► [Select response if the brake resistor is controlled](#)

Selection list (Lenze setting printed in bold)		Info
0	R_Brems	The brake resistor is used. When the threshold voltage (C00174) is exceeded, the brake resistor is energised.
1	RfgStop	The "Ramp function generator stop" signal (<i>MCTRL_brfgStop</i>) is used. When the threshold voltage is exceeded (C00174), the ramp function generator is stopped.
2	R_Brems + HlgStop	The brake resistor and the "Ramp function generator stop" signal are used. When the threshold voltage is exceeded (C00174), the brake resistor is energised and the ramp function generator is stopped.
3	FI_MotBrk + RfgStop	From version 04.00.00 Braking is performed by a superimposed speed setpoint vibration in conjunction with "Ramp function generator stop".
4	R_Brems + FU_MotBrk + HlgStop	From version 04.00.00 Braking is performed by combining all three braking procedures.

☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00176

Parameter Name:	Data type: UNSIGNED_16 Index: 24399 _d = 5F4F _h
C00176 Undervoltage threshold for mains OFF	
This code is for device-internal use only and must not be written to by the user!	

C00177

Parameter Name:	Data type: UNSIGNED_32 Index: 24398 _d = 5F4E _h
C00177 Switching cycles	
Counter of different switching cycles and stressful situations	
Display range (min. value unit max. value)	
0	2147483647
Subcodes	Info
C00177/1	Number of mains switching cycles
C00177/2	Number of switching cycles of the output relay
C00177/3	Short circuit counter
C00177/4	Earth fault counter
C00177/5	"Clamp" counter
C00177/6	Counter for "safe torque off" (STO) after power-on • From version 12.00.00
C00177/7	Counter for controller inhibit via terminal after power-on • From version 12.00.00
C00177/8	Counter for pulse inhibit (IMP) after power-on • From version 12.00.00
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1	

C00178

Parameter Name:	Data type: UNSIGNED_32 Index: 24397 _d = 5F4D _h
C00178 Elapsed-hour meter	
Display of operating hours in seconds	
Display range (min. value unit max. value)	
0	s 2147483647
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1	

C00179

Parameter Name:	Data type: UNSIGNED_32 Index: 24396 _d = 5F4C _h
C00179 Power-on time meter	
Display of the power-on time in seconds	
Display range (min. value unit max. value)	
0	s 2147483647
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1	

C00180

Parameter Name: C00180 Running time			Data type: UNSIGNED_32 Index: 24395 _d = 5F4B _h		
Display of various running times in seconds					
Display range (min. value unit max. value)					
0	s	2147483647			
Subcodes				Info	
C00180/1				Running time - control card	
C00180/2				Running time - heatsink fan	
C00180/3				Running time - internal fan	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00181

Parameter Name: C00181 Time settings			Data type: UNSIGNED_16 Index: 24394 _d = 5F4A _h		
From version 06.00.00 Time for device search function (optical location)					
► Device search function					
Setting range (min. value unit max. value)					
0	s	6000			
Subcodes	Lenze setting	Info			
C00181/1	5 s	Time - device search function			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00182

Parameter Name: C00182 L_NSet_1: S-ramp time PT1			Data type: INTEGER_16 Index: 24393 _d = 5F49 _h		
FB L_NSet_1 : PT1 S-ramp time for the main setpoint ramp function generator • Only effective with activated ramp rounding (C00134 = "1").					
Setting range (min. value unit max. value)			Lenze setting		
0.01	s	50.00	20.00 s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00184

Parameter Name: C00184 AutoFailReset repetition time			Data type: UNSIGNED_16 Index: 24391 _d = 5F47 _h		
After the time set here has expired, an error message of an error that has occurred will be reset automatically if "AutoFailReset" had been configured correspondingly in C00188 .					
► AutoFailReset function					
Setting range (min. value unit max. value)			Lenze setting		
1	s	600	3 s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00185

Parameter Name: C00185 AutoFailReset remaining time			Data type: UNSIGNED_16 Index: 24390 _d = 5F46 _h		
Display of the residual runtime of the "AutoFailReset" function					
▸ AutoFailReset function					
Display range (min. value unit max. value)					
0	s	600			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00186

Parameter Name: C00186 Max. number of AutoFailReset processes			Data type: UNSIGNED_8 Index: 24389 _d = 5F45 _h		
Maximum number of "AutoFailReset" procedures					
▸ AutoFailReset function					
Setting range (min. value unit max. value)			Lenze setting		
1		16	4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00187

Parameter Name: C00187 Current AutoFailReset processes			Data type: UNSIGNED_8 Index: 24388 _d = 5F44 _h		
Data of the current number of "AutoFailReset" procedures					
▸ AutoFailReset function					
Display range (min. value unit max. value)					
0		16			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00188

Parameter Name: C00188 AutoFailReset configuration		Data type: UNSIGNED_8 Index: 24387 _d = 5F43 _h	
Setting which error messages are to be reset automatically.			
▸ AutoFailReset function			
Selection list (Lenze setting printed in bold)		Info	
0	Off	No automatic error message reset	
1	Fault + TroubleQSP	Error messages with the response "Fault" and "TroubleQSP" are reset automatically	
2	WarningLocked	Error messages with the response "WarningLocked" are reset automatically	
3	All locking	All "locking" error messages are reset automatically	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00189

Parameter | Name: C00189 | Resp. to too frequent AutoFailReset

Data type: UNSIGNED_8
Index: 24386_d = 5F42_h

Response to exceeding the maximum number of "AutoFailReset" processes set in [C00186](#).

[AutoFailReset function](#)

Selection list (Lenze setting printed in bold)	
0	No Reaction
1	Fault
2	Trouble
3	TroubleQuickStop
4	WarningLocked
5	Warning
6	Information

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00190

Parameter Name:		Data type: UNSIGNED_8
C00190 L_NSet_1: Setpoint arithmetic		Index: 24385 _d = 5F41 _h
The L_NSet_1 FB: Selection of arithmetics		
• To be able to influence the main setpoint (NSet) by an additional setpoint (NAdd).		
Selection list (Lenze setting printed in bold)		
0	Out = Set	
1	Out = Set + Add	
2	NOut = NSet - NAdd	
3	NOut = (NSet * NAdd) / 100%	
4	NOut = (NSet * 1%) / NAdd	
5	Out = (Set*100%)/(100%-Add)	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00191

Parameter Name: C00191 Logbook access index User		Data type: UNSIGNED_8 Index: 24384 _d = 5F40 _h
From version 12.00.00 ► Logbook read interface		
Setting range (min. value unit max. value)		
0		255
Subcodes	Lenze setting	Info
C00191/1	255	Logbook access index User
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00192

Parameter Name: C00192 Logbook data User			Data type: OCTET_STRING Index: 24383 _d = 5F3F _h		
From version 12.00.00					
► Logbook read interface					
Display range (min. value unit max. value)					
Subcodes			Info		
C00192/1					
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00193

Parameter Name: C00193 Logbook element User			Data type: UNSIGNED_32 Index: 24382 _d = 5F3E _h		
From version 12.00.00					
► Logbook read interface					
Display range (min. value unit max. value)					
0		2147483647			
Subcodes			Info		
C00193/1			Response index		
C00193/2			Activity		
C00193/3			Counter		
C00193/4			Error type		
C00193/5			Error number		
C00193/6			Time stamp		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00199

Parameter Name:		Data type: VISIBLE_STRING
C00199 Description data		Index: 24376 _d = 5F38 _h
From version 06.00.00		
Parameters for storing decription data for the controller		
▸ Device identification		
Subcodes	Lenze setting	Info
C00199/1		Device name
C00199/2		User text • From version 12.00.00
C00199/3		User text • From version 12.00.00
C00199/4		User text • From version 12.00.00
C00199/5		User text • From version 12.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC-STOP ☐ No transfer ☐ COM ☐ MOT Character length: 32		

C00200

Parameter Name: C00200 Firmware product type	Data type: VISIBLE_STRING Index: 24375 _d = 5F37 _h
Display of the firmware product type	
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 19	

C00201

Parameter Name: C00201 Firmware	Data type: VISIBLE_STRING Index: 24374 _d = 5F36 _h
Display of the firmware data of the control card and the power section	
Subcodes	Info
C00201/1	Firmware type - ctrl card
C00201/2	Firmware version - ctrl card
C00201/3	Firmware comp. file - ctrl card
C00201/4	Firmware type - power section
C00201/5	Firmware version - power sect.
C00201/6	Firmw. comp. file - power sect.
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 22	

C00203

Parameter Name: C00203 Product type code	Data type: VISIBLE_STRING Index: 24372 _d = 5F34 _h
Display of the types of the individual device components	
Subcodes	Info
C00203/1	Type: Control card
C00203/2	Type: Power section
C00203/3	Type: MCI module
C00203/4	Reserved
C00203/5	Type: Memory module
C00203/6	Type: Safety card
C00203/7	Type: Standard device
C00203/8	Type: Complete device
C00203/9	Reserved
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 24	

C00204

Parameter Name: C00204 Serial number		Data type: VISIBLE_STRING Index: 24371 _d = 5F33 _h
Display of the serial numbers of the individual device components		
Subcodes	Info	
C00204/1	Serial no.: Control card	
C00204/2	Serial no.: Power section	
C00204/3	Serial no.: MCI module	
C00204/4	Reserved	
C00204/5	Serial no.: Memory module	
C00204/6	Serial no.: Safety card	
C00204/7	Serial no.: Standard device	
C00204/8	Serial no.: Complete device	
C00204/9	Reserved	
☒ Read access ☐ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 24		

C00205

Parameter Name: C00205 Info	Data type: VISIBLE_STRING Index: 24370 _d = 5F32 _h
This code is for device-internal use only and must not be written to by the user!	

C00206

Parameter Name: C00206 Production date	Data type: VISIBLE_STRING Index: 24369 _d = 5F31 _h
This code is for device-internal use only and must not be written to by the user!	

C00210

Parameter Name: C00210 HW version	Data type: VISIBLE_STRING Index: 24365 _d = 5F2D _h
This code is for device-internal use only and must not be written to by the user!	

C00219

Parameter Name: C00219 Identity			Data type: UNSIGNED_32 Index: 24356 _d = 5F24 _h	
From version 12.00.00				
Display range (min. value unit max. value)				
0		4294967295		
Subcodes			Info	
C00219/1			CAN manufacturer no.	
C00219/2			CAN device type	
C00219/3			CAN version	
C00219/4			CAN count no.	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1				

C00220

Parameter Name: C00220 L_NSet_1: Acceleration time - add. setpoint			Data type: UNSIGNED_32 Index: 24355 _d = 5F23 _h
The L_NSet_1 FB: Acceleration time for the additional setpoint <i>nNAdd_a</i>			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.000 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00221

Parameter Name: C00221 L_NSet_1: Deceleration time - add. setpoint			Data type: UNSIGNED_32 Index: 24354 _d = 5F22 _h
The L_NSet_1 FB: Deceleration time for the additional setpoint <i>nNAdd_a</i>			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.000 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00222

Parameter Name: C00222 L_PCTRL_1: Vp			Data type: INTEGER_16 Index: 24353 _d = 5F21 _h
The L_PCTRL_1 FB: Gain factor Vp for the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.1		500.0	1.0
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00223

Parameter Name: C00223 L_PCTRL_1: Tn			Data type: UNSIGNED_16 Index: 24352 _d = 5F20 _h
The L_PCTRL_1 FB: Reset time Tn for the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
20	ms	6000	400 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00224

Parameter Name: C00224 L_PCTRL_1: Kd			Data type: UNSIGNED_16 Index: 24351 _d = 5F1F _h
The L_PCTRL_1 FB: Derivative-action coefficient Kd for the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.0		5.0	0.0
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00225

Parameter Name: C00225 L_PCTRL_1: MaxLimit			Data type: INTEGER_16 Index: 24350 _d = 5F1E _h
The L_PCTRL_1 FB: Maximum output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	199.99 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00226

Parameter Name: C00226 L_PCTRL_1: MinLimit			Data type: INTEGER_16 Index: 24349 _d = 5F1D _h
The L_PCTRL_1 FB: Minimum output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	-199.99 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00227

Parameter Name: C00227 L_PCTRL_1: Acceleration time			Data type: UNSIGNED_32 Index: 24348 _d = 5F1C _h
The L_PCTRL_1 FB: Acceleration time for the output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.010 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00228

Parameter Name: C00228 L_PCTRL_1: Deceleration time			Data type: UNSIGNED_32 Index: 24347 _d = 5F1B _h
The L_PCTRL_1 FB: Deceleration time for the output value of the PID process controller			
Setting range (min. value unit max. value)			Lenze setting
0.000	s	999.999	0.010 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00231

Parameter Name: C00231 L_PCTRL_1: Operating range			Data type: INTEGER_16 Index: 24344 _d = 5F18 _h
From version 02.00.00 The L_PCTRL_1 FB: Operating range for the PID process controller			
Setting range (min. value unit max. value)			
0.00	%	199.99	
Subcodes	Lenze setting	Info	
C00231/1	199.99 %	L_PCTRL_1 : Pos. maximum	
C00231/2	0.00 %	L_PCTRL_1 : Pos. minimum	
C00231/3	0.00 %	L_PCTRL_1 : Neg. minimum	
C00231/4	199.99 %	L_PCTRL_1 : Neg. maximum	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT ☐ Scaling factor: 100			

C00233

Parameter Name: C00233 L_PCTRL_1: Root function		Data type: UNSIGNED_8 Index: 24342 _d = 5F16 _h	
The L_PCTRL_1 FB: Use of the root function at the actual value input			
Selection list (Lenze setting printed in bold)		Info	
0	Off	Root function inactive • The actual value <i>nAct_a</i> remains unchanged for further processing	
1	On	Root function active • The root is extracted of the actual value <i>nAct_a</i> for further processing	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00234

Parameter Name: C00234 Oscillation damping influence			Data type: UNSIGNED_16 Index: 24341 _d = 5F15 _h	
▸ Oscillation damping				
Setting range (min. value unit max. value)			Lenze setting	
0.00	%	250.00	5.00 %	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100				

C00235

Parameter Name: C00235 Oscillation damping filter time			Data type: UNSIGNED_8 Index: 24340 _d = 5F14 _h		
► Oscillation damping					
Setting range (min. value unit max. value)			Lenze setting		
2	ms	250	32 ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C00236

Parameter Name: C00236 Field weakening oscillation damping			Data type: UNSIGNED_8 Index: 24339 _d = 5F13 _h		
Oscillation damping for idling machines					
▸ Oscillation damping					
Setting range (min. value unit max. value)			Lenze setting		
0			40		14
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C00241

Parameter Name: C00241 L_NSet_1: Hyst. NSet reached			Data type: INTEGER_16 Index: 24334 _d = 5F0E _h
The L_NSet_1 FB: Hysteresis window for the zero detection of the speed output setpoint • The speed threshold for the zero detection is 1 %			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	0.50 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00242

Parameter Name: C00242 L_PCTRL_1: Operating mode		Data type: UNSIGNED_8 Index: 24333 _d = 5F0D _h
The L_PCTRL_1 FB: Selection of the operating mode		
Depending on the selection, the blue switches in the displayed signal flow are set accordingly in the Engineer on the Application parameters tab for the L_PCTRL_1 FB.		
Selection list (Lenze setting printed in bold)		Info
0	Off	The input setpoint <i>nSet_a</i> is output without any changes at the output <i>nOut_a</i> .
1	nNSet + nNSet_PID	<i>nNSet_a</i> and <i>nAct_a</i> are used as PID input values. The arriving <i>nNSet_a</i> is additively linked to the value output by the PID element.
2	nSet_PID	<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The input <i>nNSet_a</i> is not considered.
3	nNSet_PID	<i>nNSet_a</i> and <i>nAct_a</i> are used as PID input values. The input <i>nSet_a</i> is not considered.
4	nNSet + nSet_PID	<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The arriving <i>nNSet_a</i> setpoint is additively linked to the value output by the PID element.
5	nNSet nSet_PID	<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The setpoint <i>nNSet_a</i> is output at the output <i>nOut_a</i> . The PID output value is output at the output <i>nPIDOut_a</i> .
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00243

Parameter Name: C00243 L_PCTRL_1: Acceleration time influence		Data type: UNSIGNED_32 Index: 24332 _d = 5F0C _h
The L_PCTRL_1 FB: Acceleration time for showing the PID output value		
Setting range (min. value unit max. value)		Lenze setting
0.000	s	999.999
		5.000 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000		

C00244

Parameter Name: C00244 L_PCTRL_1: Deceleration time influence		Data type: UNSIGNED_32 Index: 24331 _d = 5F0B _h
The L_PCTRL_1 FB: Deceleration time for masking out the PID output value		
Setting range (min. value unit max. value)		Lenze setting
0.000	s	999.999
		5.000 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000		

C00245

Parameter Name: C00245 L_PCTRL_1: PID output value		Data type: INTEGER_16 Index: 24330 _d = 5F0A _h
The L_PCTRL_1 FB: Display of the output value of the PID process controller		
Display range (min. value unit max. value)		
-199.99	%	199.99
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100		

C00246

Parameter Name: C00246 L_PCTRL_1: nAct_a internal			Data type: INTEGER_16 Index: 24329 _d = 5F09 _h		
From version 04.00.00					
FB <u>L_PCTRL_1</u> : Display of the internal actual value					
Display range (min. value unit max. value)					
-199.99	%	199.99			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00247

Parameter Name: C00247 L_PCTRL_1: Window setpoint reached			Data type: INTEGER_16 Index: 24328 _d = 5F08 _h		
From version 06.00.00					
FB <u>L_PCTRL_1</u> : Window for comparison operation "actual value = setpoint"					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	100.00	2.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00249

Parameter Name: C00249 L_PT1_1: Time constant			Data type: UNSIGNED_16 Index: 24326 _d = 5F06 _h		
FB L_PT1_1 : Time constant Tn					
Setting range (min. value unit max. value)			Lenze setting		
0	ms	5000	2000 ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00254

Parameter Name:		Data type: UNSIGNED_16
C00254	Service parameter	Index: 24321 _d = 5F01 _h
This code is for device-internal use only and must not be written to by the user!		

C00265

Parameter Name:	Data type: UNSIGNED_8
C00265 SLVC: Tn torque controller	Index: 24310 _d = 5EF6 _h
This code is for device-internal use only and must not be written to by the user!	

C00270

Parameter Name: C00270 SC: Freq. current setpoint filter			Data type: UNSIGNED_16 Index: 24305 _d = 5EF1 _h		
Frequency to be inhibited by the current setpoint filter at sensorless control for synchronous motors (SLPSM).					
Setting range (min. value unit max. value)			Lenze setting		
40.0	Hz	1000.0	200.0 Hz		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00271

Parameter Name: C00271 SC: Width of current setpoint filter			Data type: UNSIGNED_16 Index: 24304 _d = 5EF0 _h		
Frequency width of the current setpoint filter with sensorless control for synchronous motors (SLPSM) • Width around the frequency to be inhibited (C00270).					
Setting range (min. value unit max. value)			Lenze setting		
0.0	Hz	500.0	0.0 Hz		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00272

Parameter Name: C00272 SC: Depth of current setpoint filter			Data type: UNSIGNED_16 Index: 24303 _d = 5EEF _h		
Damping of the current setpoint filter with sensorless control for synchronous motors (SLPSM)					
Setting range (min. value unit max. value)			Lenze setting		
0	dB	100	0 db		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C00273

Parameter Name: C00273 Moment of inertia motor			Data type: UNSIGNED_32 Index: 24302 _d = 5EEE _h		
From version 03.00.00 Moment of inertia for setpoint feedforward control with sensorless vector control (SLVC)					
Setting range (min. value unit max. value)			Lenze setting		
0.00	kg cm^2	6000000.00	0.00 kg cm^2		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			Scaling factor: 100		

C00274

Parameter Name: C00274 SC: Max. change in acceleration			Data type: UNSIGNED_16 Index: 24301 _d = 5EED _h		
Limitation of the acceleration change with sensorless control for synchronous motors (SLPSM) • Setting in % of M_Nenn per ms.					
Setting range (min. value unit max. value)			Lenze setting		
0.0	%/ms	400.0	400.0 %/ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00275

Parameter Name: C00275 Filter setpoint feedforward control			Data type: UNSIGNED_16 Index: 24300 _d = 5EEC _h		
From version 03.00.00 Filter time of the setpoint feedforward control with sensorless vector control (SLVC) • The setpoint feedforward control requires the entry of the moment of inertia in C00273 .					
Setting range (min. value unit max. value)			Lenze setting		
0.0	ms	1000.0	1.0 ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00276

Parameter Name: C00276 SC: Max. output voltage			Data type: UNSIGNED_8 Index: 24299 _d = 5EEB _h
From version 11.00.00			
Setting range (min. value unit max. value)			Lenze setting
80	%	99	95 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00280

Parameter Name: C00280 SC: Filter time const. DC detection			Data type: UNSIGNED_16 Index: 24299 _d = 5EEB _h
From version 11.00.00			
Setting range (min. value unit max. value)			Lenze setting
1	ms	1000	25 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00290

Parameter Name: C00290 RCOM error counter			Data type: UNSIGNED_16 Index: 24285 _d = 5EDD _h
This code is for device-internal use only and must not be written to by the user!			

C00291

Parameter Name: C00291 Error type RCOM			Data type: UNSIGNED_8 Index: 24284 _d = 5EDC _h
This code is for device-internal use only and must not be written to by the user!			

C00295

Parameter Name: C00295 savecycle memory modul			Data type: INTEGER_32 Index: 24280 _d = 5ED8 _h
This code is for device-internal use only and must not be written to by the user!			

C00296

Parameter Name: C00296 ICOM error number			Data type: UNSIGNED_16 Index: 24279 _d = 5ED7 _h
This code is for device-internal use only and must not be written to by the user!			

C00297

Parameter Name: C00297 Counter Receive Error Isr			Data type: UNSIGNED_8 Index: 24278 _d = 5ED6 _h
This code is for device-internal use only and must not be written to by the user!			

C00301

Parameter Name: C00301 DebugAccess			Data type: UNSIGNED_16 Index: 24274 _d = 5ED2 _h
This code is for device-internal use only and must not be written to by the user!			

C00302

Parameter Name:	Data type: UNSIGNED_8 Index: 24273 _d = 5ED1 _h
C00302 Internal Commands	
This code is for device-internal use only and must not be written to by the user!	

C00304

Parameter Name:	Data type: UNSIGNED_32 Index: 24271 _d = 5ECF _h
C00304 Password1	
This code is for device-internal use only and must not be written to by the user!	

C00305

Parameter Name:	Data type: UNSIGNED_32 Index: 24270 _d = 5ECF _h
C00305 Password2	
This code is for device-internal use only and must not be written to by the user!	

C00306

Parameter Name:	Data type: UNSIGNED_32 Index: 24269 _d = 5ECD _h
C00306 Debug address	
This code is for device-internal use only and must not be written to by the user!	

C00307

Parameter Name:	Data type: UNSIGNED_16 Index: 24268 _d = 5ECB _h
C00307 Debug value	
This code is for device-internal use only and must not be written to by the user!	

C00308

Parameter Name:	Data type: UNSIGNED_16 Index: 24267 _d = 5ECB _h
C00308 PartitionOffset	
This code is for device-internal use only and must not be written to by the user!	

C00309

Parameter Name:	Data type: UNSIGNED_8 Index: 24266 _d = 5ECA _h
C00309 PartitionSel	
This code is for device-internal use only and must not be written to by the user!	

C00310

Parameter Name:	Data type: UNSIGNED_16 Index: 24265 _d = 5EC9 _h
C00310 PartitionValue	
This code is for device-internal use only and must not be written to by the user!	

C00311

Parameter Name:	Data type: UNSIGNED_32 Index: 24264 _d = 5EC8 _h
C00311 Runtime measurement	
This code is for device-internal use only and must not be written to by the user!	

C00312

Parameter Name: C00312 System runtimes			Data type: UNSIGNED_32 Index: 24263 _d = 5EC7 _h		
From version 11.00.00					
Setting range (min. value unit max. value)					
0.000	μs	1638.375			
Subcodes	Lenze setting		Info		
C00312/1	0.000 μs		System runtime reserve		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00313

Parameter Name:	Data type: UNSIGNED_8
C00313 LS_DataAccess: Activation	Index: 24262 _d = 5EC6 _h
This code is for device-internal use only and must not be written to by the user!	

C00314

Parameter Name:	Data type: UNSIGNED_32
C00314 LS_DataAccess: Address access	Index: 24261 _d = 5EC5 _h
This code is for device-internal use only and must not be written to by the user!	

C00315

Parameter Name:	Data type: UNSIGNED_32
C00315 SystemFail-Adr	Index: 24260 _d = 5EC4 _h
This code is for device-internal use only and must not be written to by the user!	

C00316

Parameter Name:	Data type: UNSIGNED_16
C00316 SystemFail-Info	Index: 24259 _d = 5EC3 _h
This code is for device-internal use only and must not be written to by the user!	

C00317

Parameter Name:	Data type: UNSIGNED_16
C00317 WatchdogTimeMax	Index: 24258 _d = 5EC2 _h
This code is for device-internal use only and must not be written to by the user!	

C00320

Parameter Name:	Data type: UNSIGNED_32
C00320 Debug information	Index: 24255 _d = 5EBF _h
This code is for device-internal use only and must not be written to by the user!	

C00321

Parameter Name: C00321 Main program runtime			Data type: UNSIGNED_16 Index: 24254 _d = 5EBE _h
Display of the current and the maximum runtime of the main program in the controller			
Setting range (min. value unit max. value)			
0	ms	65535	
Subcodes	Lenze setting	Info	
C00321/1	0 ms	Curr. runtime of main program	
C00321/2	0 ms	Max. runtime of main program	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00322

Parameter | Name:

C00322 | Transmission mode CAN TxPDOs

Data type: UNSIGNED_8

Index: 24253_d = 5EBD_h

TPDO transmission type according to DS301 V4.02

• The following transmission modes are supported:

• 0: Synchronous and acyclic

• 1 ... 240: Synchronous and cyclic

• 252: Synchronous - RTR only

• 253: Asynchronous - RTR only

• 254: Asynchronous - manufacturer-specific

• 255: Asynchronous - device-profile specific

• The basic setting for all PDOs is "Asynchronous - manufacturer-specific" (254).

• Illustration of the CANopen objects [I-1800/2](#) ... [I-1803/2](#) (see DS301 V4.02).

▶ [System bus "CAN on board"](#)

Setting range (min. value | unit | max. value)

0

255

Subcodes

Lenze setting

Info

C00322/1

254

Transmission mode CAN1 OUT

C00322/2

254

Transmission mode CAN2 OUT

C00322/3

254

Transmission mode CAN3 OUT

C00322/4

254

Transmission mode CAN4 OUT

• [From version 15.00.00](#)

☒ Read access

☒ Write access

☐ CINH

☐ PLC STOP

☐ No transfer

☒ COM

☐ MOT

Scaling factor: 1

C00323

Parameter | Name:

C00323 | Transmission mode CAN Rx PDOs

Data type: UNSIGNED_8

Index: 24252_d = 5EBC_h

RPDO transmission type according to DS301 V4.02

- In the case of the RPDO serves as monitoring setting in the case of sync-controlled PDOs.
- The following transmission modes are supported:
 - 0: Synchronous and acyclic
 - 1 ... 240: Synchronous and cyclic
 - 252: Synchronous - RTR only
 - 253: Asynchronous - RTR only
 - 254: Asynchronous - manufacturer-specific
 - 255: Asynchronous - device-profile specific
- The basic setting for all PDOs is "Asynchronous - manufacturer-specific" (254).
- Illustration of the CANopen objects [I-1400/2](#) ... [I-1403/2](#) (see DS301 V4.02).

[System bus "CAN on board"](#)

Setting range (min. value | unit | max. value)

0

255

Subcodes

Lenze setting

Info

C00323/1

254

Transmission mode CAN1 IN

C00323/2

254

Transmission mode CAN2 IN

C00323/3

254

Transmission mode CAN3 IN

C00323/4

254

Transmission mode CAN4 IN

- From version 15.00.00

☒ Read access
☒ Write access
☐ CINH
☐ PLC STOP
☐ No transfer
☒ COM
☐ MOT
Scaling factor: 1

C00324

Parameter | Name: **C00324 | CAN transmission blocking time**

Data type: UNSIGNED_16
Index: 24251_d = 5EBB_h

From version 06.00.00

Blocking time for the transmission of the emergency telegram and the process data

Note:

If the "Asynchronous - manufacturer-specific/device profile-specific" transmission type is set, the transmission cycle timer is reset to 0 if event-controlled transmission has been triggered.

Example: Cycle time (C00356/x) = 500 ms, blocking time = 100 ms, data change sporadically:

- In the case of a sporadic data change < 500 ms, due to the blocking time set, transmission takes place every 100 ms (event-controlled transmission) as quickly as possible.
- In the case of a sporadic data change > 500 ms, due to the cycle time set, transmission takes place every 500 ms (cyclic transmission).

► [System bus "CAN on board"](#)

Setting range (min. value unit max. value)		
0	ms	6500

Subcodes	Lenze setting	Info
C00324/1	0 ms	CAN emergency blocking time
C00324/2	0 ms	CAN1_OUT blocking time
C00324/3	0 ms	CAN2_OUT blocking time
C00324/4	0 ms	CAN3_OUT blocking time
C00324/5	0 ms	CAN4_OUT blocking time • From version 15.00.00

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1

C00338

Parameter Name: C00338 L_Arithmetik_1: Function		Data type: UNSIGNED_8 Index: 24237 _d = 5EAD _h
The L_Arithmetik_1 FB: Selection of internal arithmetics		
Selection list (Lenze setting printed in bold)		
0	Out = In1	
1	Out = In1 + In2	
2	nOut_a = nIn1_a - nIn2_a	
3	Out = (In1 * In2) / 100%	
4	nOut_a = (nIn1_a * 1%) / nIn2_a	
5	nOut_a = (nIn1_a * 100%) / (100% - nIn2_a)	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00339

Parameter Name: C00339 L_Arithmetik_2: Function		Data type: UNSIGNED_8 Index: 24236 _d = 5EAC _h
From version 11.00.00		
The L_Arithmetik_2 FB: Selection of internal arithmetics		
Selection list (Lenze setting printed in bold)		
0	nOut_a = nIn1_a	
1	nOut_a = nIn1_a + nIn2_a	
2	nOut_a = nIn1_a - nIn2_a	
3	nOut_a = (nIn1_a * nIn2_a) / 100%	
4	nOut_a = (nIn1_a * 1%) / nIn2_a	
5	nOut_a = (nIn1_a * 100%) / (100% - nIn2_a)	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00341

Parameter | Name: **C00341 | CAN management - error configuration**

Data type: UNSIGNED_16
Index: 24234_d = 5EAA_h

From version 04.00.00

Selection of the events for which the *bFail* error output of the [LS CANManagement](#) SB must be set to TRUE.

Setting range (min. hex value max. hex value)		Lenze setting
0x0000	0xFFFF	0x0000 (decimal: 0)
Value is bit-coded: (☑ = bit set)		Info
Bit 0 ☐	BusOff_MsgErr	
Bit 1 ☐	Warning	
Bit 2 ☐	NodeStopped	
Bit 3 ☐	HeartBeatEvent	
Bit 4 ☐	CAN1_In_Überw.	
Bit 5 ☐	CAN2_In_Überw.	
Bit 6 ☐	CAN3_In_Überw.	
Bit 7 ☐	CAN4_In_Überw.	From version 15.00.00
Bit 8 ☐	Reserved	
Bit 9 ☐	Reserved	
Bit 10 ☐	Reserved	
Bit 11 ☐	Reserved	
Bit 12 ☐	Reserved	
Bit 13 ☐	Reserved	
Bit 14 ☐	Reserved	
Bit 15 ☐	Reserved	

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00342

Parameter Name: C00342 CAN decoupling PDOInOut		Data type: UNSIGNED_16 Index: 24233 _d = 5EA9 _h
From version 04.00.00 Configuration defining the events that lead to a decoupling of the process data words. ▶ Configuring exception handling of the CAN PDOs		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	BusOff_MsgErr	
Bit 1	Warning	
Bit 2	NodeStopped	
Bit 3	HeartBeatEvent	
Bit 4	CAN1_In_Überw.	
Bit 5	CAN2_In_Überw.	
Bit 6	CAN3_In_Überw.	
Bit 7	CAN4_In_Überw.	From version 15.00.00
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Trouble	
Bit 15	Fault	
Subcodes	Lenze setting	Info
C00342/1	0x0000	CAN decoupling PDO_In from the bus
C00342/2	0x0000	CAN decoupling PDO_Out from the appl.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00343

Parameter | Name:
C00343 | LP_CanIn decoupling value

Data type: UNSIGNED_16
Index: 24232_d = 5EA8_h

From version 04.00.00

Definition of the value the process data words are to have in the decoupled state.

▶ [Configuring exception handling of the CAN PDOs](#)

Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00343/1	0	LP_CanIn1 :wCtrl DiscVal
C00343/2	0	LP_CanIn1 :wIn2 DiscVal
C00343/3	0	LP_CanIn1 :wIn3 DiscVal
C00343/4	0	LP_CanIn1 :wIn4 DiscVal
C00343/5	0	LP_CanIn2 :wIn1 DiscVal
C00343/6	0	LP_CanIn2 :wIn2 DiscVal
C00343/7	0	LP_CanIn2 :wIn3 DiscVal
C00343/8	0	LP_CanIn2 :wIn4 DiscVal
C00343/9	0	LP_CanIn3 :wIn1 DiscVal
C00343/10	0	LP_CanIn3 :wIn2 DiscVal
C00343/11	0	LP_CanIn3 :wIn3 DiscVal
C00343/12	0	LP_CanIn3 :wIn4 DiscVal
C00343/13	0	LP_CanIn4 :wIn1 DiscVal • From version 15.00.00
C00343/14	0	LP_CanIn4 :wIn2 DiscVal • From version 15.00.00
C00343/15	0	LP_CanIn4 :wIn3 DiscVal • From version 15.00.00
C00343/16	0	LP_CanIn4 :wIn4 DiscVal • From version 15.00.00

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00344

Parameter Name: C00344 LP_CanOut decoupling value		Data type: UNSIGNED_16 Index: 24231 _d = 5EA7 _h	
From version 04.00.00 Definition of the value the process data words are to have in the decoupled state. ▶ Configuring exception handling of the CAN-PDOs			
Setting range (min. value unit max. value)			
0		65535	
Subcodes	Lenze setting	Info	
C00344/1	0	LP_CanOut1:wState DiscVal	
C00344/2	0	LP_CanOut1:wOut2 DiscVal	
C00344/3	0	LP_CanOut1:wOut3 DiscVal	
C00344/4	0	LP_CanOut1:wOut4 DiscVal	
C00344/5	0	LP_CanOut2:wOut1 DiscVal	
C00344/6	0	LP_CanOut2:wOut2 DiscVal	
C00344/7	0	LP_CanOut2:wOut3 DiscVal	
C00344/8	0	LP_CanOut2:wOut4 DiscVal	
C00344/9	0	LP_CanOut3:wOut1 DiscVal	
C00344/10	0	LP_CanOut3:wOut2 DiscVal	
C00344/11	0	LP_CanOut3:wOut3 DiscVal	
C00344/12	0	LP_CanOut3:wOut4 DiscVal	
C00344/13	0	LP_CanOut4:wOut1 DiscVal • From version 15.00.00	
C00344/14	0	LP_CanOut4:wOut2 DiscVal • From version 15.00.00	
C00344/15	0	LP_CanOut4:wOut3 DiscVal • From version 15.00.00	
C00344/16	0	LP_CanOut4:wOut4 DiscVal • From version 15.00.00	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00345

Parameter Name: C00345 CAN error status		Data type: UNSIGNED_8 Index: 24230 _d = 5EA6 _h	
From version 02.00.00			
▸ System bus "CAN on board"			
Selection list (read only)			
0	No Error		
1	Warning ErrActive		
2	Warning ErrPassive		
3	Bus off		
4	Reserved		
5	Reserved		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00347

Parameter Name:		Data type: UNSIGNED_8 Index: 24228 _d = 5EA4 _h	
C00347 CAN status HeartBeat producer			
From version 03.00.00			
		▶ Heartbeat protocol	
Selection list			
0	Boot-up		
4	Stopped		
5	Operational		
127	Pre-Operat.		
250	Failed		
255	NoResponse		
Subcodes		Info	
C00347/1		Status node 1 ... 7	
C00347/...			
C00347/7			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00349

Parameter Name: C00349 CAN setting - DIP switch		Data type: UNSIGNED_16 Index: 24226 _d = 5EA2 _h	
DIP switch setting during last mains power-on			
▸ System bus "CAN on board"			
Display area (min. hex value max. hex value)			
0x0000		0xFFFF	
Value is bit-coded:			
Bit 0	Node address 1		
Bit 1	Node address 2		
Bit 2	Node address 4		
Bit 3	Node address 8		
Bit 4	Node address 16		
Bit 5	Node address 32		
Bit 6	Node address 64		
Bit 7	Baud rate 1		
Bit 8	Baud rate 2		
Bit 9	Baud rate 4		
Bit 10	Reserved		
Bit 11	Reserved		
Bit 12	Reserved		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	DIP switch at 24V-ON accepted		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00350

Parameter Name: C00350 CAN node address			Data type: UNSIGNED_8 Index: 24225 _d = 5EA1 _h		
Setting of the node address via parameters • The node address can only be parameterised if the node address "0" is set via the DIP switches. • A change in the node address will not be effective until a CAN Reset Node is performed. ▶ System bus "CAN on board"					
Setting range (min. value unit max. value)			Lenze setting		
1		127	1		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00351

Parameter Name: C00351 CAN baud rate		Data type: UNSIGNED_8 Index: 24224 _d = 5EA0 _h	
Setting of the baud rate via parameters			
• The baud rate can only be parameterised if the baud rate "0" is set via the DIP switches. • A change in the baud rate will not be effective until a CAN Reset Node is performed.			
▶ System bus "CAN on board"			
Selection list (Lenze setting printed in bold)			
0	500 kbps		
1	250 kbps		
2	125 kbps		
3	50 kbps		
4	1000 kbps		
5	20 kbps		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1			

C00352

Parameter Name:		Data type: UNSIGNED_8 Index: 24223 _d = 5E9F _h	
C00352 CAN slave/master			
The drive starts as CAN master after mains switching if a value of "1" has been entered and saved here. ▶ System bus "CAN on board"			
Selection list (Lenze setting printed in bold)			
0	Slave		
1	Master		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1			

C00353

Parameter Name: C00353 CAN IN/OUT COBID source		Data type: UNSIGNED_8 Index: 24222 _d = 5E9E _h
Identifier assignment procedure for the CANx In/Out process data ► System bus "CAN on board": Identifier of the process data objects		
Selection list		Info
0	COBID = C0350 + LenzeBaseID	COBID = node address + LenzeBaseID
1	COBID = C0350 + CANBaseID	COBID = node address + CANBaseID (C00354/x)
2	COBID = C0354/x	COBID = direct setting from C00354/x
Subcodes	Lenze setting	Info
C00353/1	1: COBID = C0350 + CANBaseID	COBID source CAN1_IN/OUT
C00353/2	1: COBID = C0350 + CANBaseID	COBID source CAN2_IN/OUT
C00353/3	1: COBID = C0350 + CANBaseID	COBID source CAN3_IN/OUT
C00353/4	1: COBID = C0350 + CANBaseID	COBID source CAN4_IN/OUT • From version 15.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1		

C00354

Parameter Name: C00354 COBID		Data type: UNSIGNED_32 Index: 24221 _d = 5E9D _h
Setting of the default COBID according to CANopen • A change in the COBID will not be effective until a CAN reset node is performed. ► System bus "CAN on board": Identifier of the process data objects		
Setting range (min. hex value max. hex value)		
0x00000000	0xFFFFFFF	
Value is bit-coded:		Info
Bit 0	COBID Bit0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: PDO invalid (is not transmitted)
...	...	
Bit 31	PDO invalid	
Subcodes	Lenze setting	Info
C00354/1	0x00000201	COBID CAN1_IN
C00354/2	0x00000181	COBID CAN1_OUT
C00354/3	0x00000301	COBID CAN2_IN
C00354/4	0x00000281	COBID CAN2_OUT
C00354/5	0x00000401	COBID CAN3_IN
C00354/6	0x00000381	COBID CAN3_OUT
C00354/7	0x00000501	COBID CAN4_IN • From version 15.00.00
C00354/8	0x00000481	COBID CAN4_OUT • From version 15.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT		

C00355

Parameter Name: C00355 Active COBID			Data type: UNSIGNED_16 Index: 24220 _d = 5E9C _h		
Display of the COBID of the PDOs that is active in the CAN stack					
▶ System bus "CAN on board": Identifier of the process data objects					
Display range (min. value unit max. value)					
0		2047			
Subcodes			Info		
C00355/1			Active COBID CAN1_IN		
C00355/2			Active COBID CAN1_OUT		
C00355/3			Active COBID CAN2_IN		
C00355/4			Active COBID CAN2_OUT		
C00355/5			Active COBID CAN3_IN		
C00355/6			Active COBID CAN3_OUT		
C00355/7			Active COBID CAN4_IN • From version 15.00.00		
C00355/8			Active COBID CAN4_OUT • From version 15.00.00		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00356

Parameter | Name:

C00356 | CAN time settings

Data type: UNSIGNED_16

Index: 24219_d = 5E9B_h

Different time settings for the CAN interface

► [System bus "CAN on board"](#)

Setting range (min. value unit max. value)		
0	ms	65000
Subcodes	Lenze setting	Info
C00356/1	3000 ms	CAN delay boot-up - operat. • Delay time for NMT state change from "Boot-up" to "Operational".
C00356/2	0 ms	CAN2_OUT cycle time
C00356/3	0 ms	CAN3_OUT cycle time
C00356/4	0 ms	CANx_OUT operat. - 1.transmit • When the "Operational" NMT status is reached, the delay time set here is started. After the delay time has been elapsed, the PDOs CAN2_OUT and CAN3_OUT are sent for the first time.
C00356/5	0 ms	CAN1_OUT cycle time
C00356/6	0 ms	CAN4_OUT cycle time • From version 15.00.00

☒ Read access

☒ Write access

☐ CINH

☐ PLC STOP

☐ No transfer

☒ COM

☐ MOT

Scaling factor: 1

C00357

Parameter Name: C00357 CAN monitoring times			Data type: UNSIGNED_16 Index: 24218 _d = 5E9A _h		
Mapping of the RPDO event time (see DS301 V4.02) • If a value unequal to "0" is entered, the RPDO is not expected before the set time has expired. • If the RPDO is not received within the expected time, the response set in C00593/1...4 will be triggered. ▶ System bus "CAN on board"					
Setting range (min. value unit max. value)					
0	ms	65000			
Subcodes	Lenze setting		Info		
C00357/1	3000 ms		CAN1_IN monitoring time		
C00357/2	3000 ms		CAN2_IN monitoring time		
C00357/3	3000 ms		CAN3_IN monitoring time		
C00357/4	3000 ms		CAN4_IN monitoring time • From version 15.00.00		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00358

Parameter Name: C00358 CANx_OUT data length		Data type: UNSIGNED_8 Index: 24217 _d = 5E99 _h	
From version 03.00.00 Setting of the data length for TX PDOs			
▸ System bus "CAN on board"			
Setting range (min. value unit max. value)			
1			
Subcodes	Lenze setting	Info	
C00358/1	8	CAN1_OUT data length	
C00358/2	8	CAN2_OUT data length	
C00358/3	8	CAN3_OUT data length	
C00358/4	8	CAN4_OUT data length • From version 15.00.00	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1			

C00359

Parameter Name: C00359 CAN status		Data type: UNSIGNED_8 Index: 24216 _d = 5E98 _h	
▶ System bus "CAN on board"			
Selection list (read only)			
0	Operational		
1	Pre-Operat.		
2	Reserved		
3	Reserved		
4	BootUp		
5	Stopped		
6	Reserved		
7	Reset		
☒ Read access		☐ Write access	
☐ CINH		☐ PLC STOP	
☒ No transfer		☒ COM	
☐ MOT		Scaling factor: 1	

C00360

Parameter Name: C00360 CAN telegram counter			Data type: UNSIGNED_16 Index: 24215 _d = 5E97 _h		
▸ System bus "CAN on board"					
Display range (min. value unit max. value)					
0		65535			
Subcodes			Info		
C00360/1			All PDO/SDO sent		
C00360/2			All PDO/SDO received		
C00360/3			Telegram counter CAN1_OUT		
C00360/4			Telegram counter CAN2_OUT		
C00360/5			Telegram counter CAN3_OUT		
C00360/6			Telegram counter SDO1 OUT		
C00360/7			Telegram counter SDO2 OUT		
C00360/8			Telegram counter CAN1_IN		
C00360/9			Telegram counter CAN2_IN		
C00360/10			Telegram counter CAN3_IN		
C00360/11			Telegram counter SDO1 IN		
C00360/12			Telegram counter SDO2 IN		
C00360/13			Telegram counter CAN4_OUT • From version 15.00.00		
C00360/14			Telegram counter CAN4_IN • From version 15.00.00		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00364

Parameter Name:		Data type: UNSIGNED_8 Index: 24211 _d = 5E93 _h	
C00364 CAN MessageError		▶ System bus "CAN on board"	
Selection list (read only)			
0	No Error		
1	StuffError		
2	FormError		
3	AckError		
4	Bit1Error		
5	Bit0Error		
6	CRCError		
7	Reserved		
☒ Read access		☐ Write access	
☐ CINH		☐ PLC STOP	
☒ No transfer		☒ COM	
☐ MOT		Scaling factor: 1	

C00366

Parameter Name: C00366 Number of CAN SDO channels		Data type: UNSIGNED_8 Index: 24209 _d = 5E91 _h
Functional change from version 05.01.00 onwards Selection of the number of active parameter data channels • Up to and including version 05.00.00, the parameter channels 1 and 2 are activated in the Lenze setting. • From version 05.01.00 onwards, only the parameter data channel 1 is activated in the Lenze setting according to CANopen. In order to activate both parameter data channels according to the previous behaviour, set "2 SDO Lenze". ▶ System bus "CAN on board"		
Selection list (Lenze setting printed in bold)		
0	1 SDO CANOpen	
1	2 SDO Lenze	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1		

C00367

Parameter | Name: **C00367 | CAN SYNC Rx identifier** Data type: UNSIGNED_16
Index: 24208_d = 5E90_h

Identifier by means of which the sync slave is to receive sync telegrams.

- Mapping of the CANopen object [I-1005](#) (see DS301 V4.02).

▶ ["CAN on board" system bus](#)

Setting range (min. hex value max. hex value)		Lenze setting
0x0000	0xFFFF	0x0080 (decimal: 128)
Value is bit-coded: (☒ = bit set)		
Bit 0 ☐	COBID Bit0	
Bit 1 ☐	COBID Bit1	
Bit 2 ☐	COBID Bit2	
Bit 3 ☐	COBID Bit3	
Bit 4 ☐	COBID Bit4	
Bit 5 ☐	COBID Bit5	
Bit 6 ☐	COBID Bit6	
Bit 7 ☒	COBID Bit7	
Bit 8 ☐	COBID Bit8	
Bit 9 ☐	COBID Bit9	
Bit 10 ☐	COBID Bit10	
Bit 11 ☐	Reserved	
Bit 12 ☐	Reserved	
Bit 13 ☐	Reserved	
Bit 14 ☐	Reserved	
Bit 15 ☐	Reserved	

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT

C00368

Parameter | Name: C00368 | CAN SYNC Tx identifier

Data type: UNSIGNED_16
Index: 24207_d = 5E8F_h

Identifier by means of which the sync master is to transmit sync telegrams.

• Mapping of the CANopen object [I-1005](#) (see DS301 V4.02).

► [System bus "CAN on board"](#)

Setting range (min. hex value max. hex value)		Lenze setting
0x0000	0xFFFF	0x0080 (decimal: 128)
Value is bit-coded: (☒ = bit set)		
Bit 0 ☐	COBID Bit0	
Bit 1 ☐	COBID Bit1	
Bit 2 ☐	COBID Bit2	
Bit 3 ☐	COBID Bit3	
Bit 4 ☐	COBID Bit4	
Bit 5 ☐	COBID Bit5	
Bit 6 ☐	COBID Bit6	
Bit 7 ☒	COBID Bit7	
Bit 8 ☐	COBID Bit8	
Bit 9 ☐	COBID Bit9	
Bit 10 ☐	COBID Bit10	
Bit 11 ☐	Reserved	
Bit 12 ☐	Reserved	
Bit 13 ☐	Reserved	
Bit 14 ☐	Reserved	
Bit 15 ☐	Sync-transmit off	

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT

C00369

Parameter Name: C00369 CAN sync transmission cycle time			Data type: UNSIGNED_16 Index: 24206 _d = 5E8E _h
Cycle during which the sync master is to transmit sync telegrams. - If "0 ms" is set (Lenze setting), no sync telegrams are generated. - Mapping of the CANopen object I-1006 (see DS301 V4.02). ► System bus "CAN on board"			
Setting range (min. value unit max. value)			Lenze setting
0	ms	65000	0 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1			

C00370

Parameter Name: C00370 SyncTxRxTimes			Data type: INTEGER_16 Index: 24205 _d = 5E8D _h		
From version 04.00.00					
▶ "CAN on board" system bus					
Display range (min. value unit max. value)					
-1638	μs	1638			
Subcodes			Info		
C00370/1			CAN Sync instant of transmission		
C00370/2			Sync instant of reception		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00371

Parameter Name: C00371 CAN ErrorCode			Data type: UNSIGNED_16 Index: 24204 _d = 5E8C _h		
From version 13.00.00					
▶ "CAN on board" system bus					
Display range (min. value unit max. value)					
0		65535			
Subcodes			Info		
C00371/1			CAN ErrorCode		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00372

Parameter Name: C00372 CAN_Tx_Rx_Error			Data type: UNSIGNED_8 Index: 24203 _d = 5E8B _h		
▶ System bus "CAN on board"					
Display range (min. value unit max. value)					
0		255			
Subcodes			Info		
C00372/1			CAN Tx_Error		
C00372/2			CAN Rx_Error		
C00372/3			CAN Tx_Overflow		
C00372/4			CAN Rx_Overflow		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00381

Parameter Name:			Data type: UNSIGNED_16 Index: 24194 _d = 5E82 _h		
C00381 CAN Heartbeat producer time					
Time interval for the transmission of the heartbeat telegram to the consumer(s). • The heartbeat telegram is sent automatically as soon as a time > 0 ms is set. • Mapping of the CANopen object I-1017 (see DS301 V4.02).					
▶ Heartbeat protocol					
Setting range (min. value unit max. value)			Lenze setting		
0	ms	65535	0 ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C00385

Parameter Name: C00385 CAN node addr. HeartBeat producer			Data type: UNSIGNED_8 Index: 24190 _d = 5E7E _h
From version 03.00.00 The subcodes represent the nodes to be monitored by heartbeat. ▶ Heartbeat protocol			
Setting range (min. value unit max. value)			
0		127	
Subcodes	Lenze setting	Info	
C00385/1	0	CAN node address HeartBeat Producer 1 ... 7	
C00385/...			
C00385/7			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00386

Parameter Name: C00386 ConsumerTime HeartBeat Producer			Data type: UNSIGNED_16 Index: 24189 _d = 5E7D _h
From version 03.00.00 The subcodes represent the nodes to be monitored by heartbeat.			
► Heartbeat protocol			
Setting range (min. value unit max. value)			
0	ms	60000	
Subcodes	Lenze setting	Info	
C00386/1	0 ms	ConsumerTime HeartBeat Producer 1 ... 7	
C00386/...			
C00386/7			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00387

Parameter Name: C00387 CAN-GatewayAddr			Data type: UNSIGNED_8 Index: 24188 _d = 5E7C _h
From version 12.00.00			
▸ CAN gateway			
Setting range (min. value unit max. value)			
0			
Subcodes	Lenze setting	Info	
C00387/1	0	CAN_Gateway: Addr.	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00400

Parameter | Name: C00400 | LS_PulseGenerator

Data type: UNSIGNED_16
Index: 24175_d = 5E6F_h

Time setting of the pulse to be output by the SB [LS_PulseGenerator](#)

Note:

The real length of the low or high level at the *bSquareWave* output is always 1 ms higher than set here in subcode 1 or 2. If "0 ms" is set, a level with a length of 1 ms is created length, for instance, and if "1000 ms" is set, a level with a length of 1001 ms is created.

Setting range (min. value unit max. value)			
0	ms	60000	
Subcodes	Lenze setting	Info	
C00400/1	1000 ms	Length of the low level (break) + 1 ms	
C00400/2	1000 ms	Length of the high level + 1 ms	
C00400/3	100 ms	From version 06.00.00 Delay time for status signal <i>bFirstCycleDone</i> The <i>bFirstCycleDone</i> status signal is set to TRUE when the first task cycle is complete and the time set here has expired.	

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00401

Parameter | Name:

C00401 | CANxInOut: Inversion

Data type: UNSIGNED_16

Index: 24174_d = 5E6E_h

From version 03.00.00

This parameter serves to invert the control/status bits of the CAN port blocks.

▶ [CAN port block](#)

Setting range (min. hex value max. hex value)		
0x0000	0xFFFF	
Value is bit-coded:		Info
Bit 0	Active	Bit set = bit is inverted
...	...	
Bit 15	Active	
Subcodes	Lenze setting	Info
C00401/1	0x0000	Inversion of LP_CanIn1.bCtrl1_B0...15
C00401/2	0x0000	Inversion of LP_CanOut1.bState1_B0...15
C00401/3	0x0000	Inversion of LP_CanIn2.bIn1_B0...15
C00401/4	0x0000	Inversion of LP_CanOut2.bOut1_B0...15
C00401/5	0x0000	Inversion of LP_CanIn3.bIn1_B0...15
C00401/6	0x0000	Inversion of LP_CanOut3.bOut1_B0...15
C00401/7	0x0000	Inversion of LP_CanIn4.bIn1_B0...15 • From version 15.00.00
C00401/8	0x0000	Inversion of LP_CanOut4.bOut1_B0...15 • From version 15.00.00

☒ Read access
 ☒ Write access
 ☐ CINH
 ☐ PLC STOP
 ☐ No transfer
 ☐ COM
 ☐ MOT

C00407

Parameter | Name: C00407 | LP_CanIn Mapping

Data type: UNSIGNED_32
Index: 24168_d = 5E68_h

From version 12.00.00

Mapping for port blocks LP_CanIn1...4

• These settings are Ored with the mapping settings for the single words in C00409/x.

▶ CAN port block

Setting range (min. value unit max. value)		
0		4294967295
Subcodes	Lenze setting	Info
C00407/1	0	LP_CanIn1:dwIn12 MapVal
C00407/2	0	LP_CanIn1:dwIn34 MapVal
C00407/3	0	LP_CanIn2:dwIn12 MapVal
C00407/4	0	LP_CanIn2:dwIn34 MapVal
C00407/5	0	LP_CanIn3:dwIn12 MapVal
C00407/6	0	LP_CanIn3:dwIn34 MapVal
C00407/7	0	LP_CanIn4:dwIn12 MapVal • From version 15.00.00
C00407/8	0	LP_CanIn4:dwIn34 MapVal • From version 15.00.00

☒ Read access

☒ Write access

☐ CINH

☐ PLC STOP

☐ No transfer

☐ COM

☐ MOT

Scaling factor: 1

C00408

Parameter Name: C00408 LP_CanIn mapping selection		Data type: UNSIGNED_8 Index: 24167 _d = 5E67 _h
From version 03.00.00 Selection of the mapping source for port blocks LP_CanIn1...4		
► CAN port block		
Selection list		Info
0	CanIn	CanIn
1	Par.C409 C407	Mapping configured in C00409
Subcodes	Lenze setting	Info
C00408/1	0: CanIn	Mapping selection LP_CanIn1
C00408/2	0: CanIn	Mapping selection LP_CanIn2
C00408/3	0: CanIn	Mapping selection LP_CanIn3
C00408/4	0: CanIn	Mapping selection LP_CanIn4 • From version 15.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00409

Parameter | Name: C00409 | LP_CanIn Mapping

Data type: UNSIGNED_16
Index: 24166_d = 5E66_h

From version 03.00.00

Mapping for port blocks LP_CanIn1...4

• These settings are ORed with the mapping settings for the double words in C00407/x.

▶ CAN port block

Setting range (min. value unit max. value)		
0		65535
Subcodes	Lenze setting	Info
C00409/1	0	LP_CanIn1:wCtrl MapVal
C00409/2	0	LP_CanIn1:wIn2 MapVal
C00409/3	0	LP_CanIn1:wIn3 MapVal
C00409/4	0	LP_CanIn1:wIn4 MapVal
C00409/5	0	LP_CanIn2:wIn1 MapVal
C00409/6	0	LP_CanIn2:wIn2 MapVal
C00409/7	0	LP_CanIn2:wIn3 MapVal
C00409/8	0	LP_CanIn2:wIn4 MapVal
C00409/9	0	LP_CanIn3:wIn1MapVal
C00409/10	0	LP_CanIn3:wIn2 MapVal
C00409/11	0	LP_CanIn3:wIn3 MapVal
C00409/12	0	LP_CanIn3:wIn4 MapVal
C00409/13	0	LP_CanIn4:wIn1 MapVal • From version 15.00.00
C00409/14	0	LP_CanIn4:wIn2 MapVal • From version 15.00.00
C00409/15	0	LP_CanIn4:wIn3 MapVal • From version 15.00.00
C00409/16	0	LP_CanIn4:wIn4 MapVal • From version 15.00.00

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1

C00410

Parameter Name: C00410 L_SignalMonitor_a: Signal sources		Data type: UNSIGNED_16 Index: 24165 _d = 5E65 _h
The L_SignalMonitor_a FB: Selection of the signal sources		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00410/1	0: Not connected	Signal source for output <i>nOut1_a</i>
C00410/2	0: Not connected	Signal source for output <i>nOut2_a</i>
C00410/3	0: Not connected	Signal source for output <i>nOut3_a</i>
C00410/4	0: Not connected	Signal source for output <i>nOut4_a</i>
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00411

Parameter Name: C00411 L_SignalMonitor_b: Signal sources		Data type: UNSIGNED_16 Index: 24164 _d = 5E64 _h
The L_SignalMonitor_b FB: Selection of the signal sources		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00411/1	0: Not connected	Signal source for output <i>bOut1</i>
C00411/2	0: Not connected	Signal source for output <i>bOut2</i>
C00411/3	0: Not connected	Signal source for output <i>bOut3</i>
C00411/4	0: Not connected	Signal source for output <i>bOut4</i>
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00412

Parameter Name: C00412 L_SignalMonitor_b: Inversion			Data type: UNSIGNED_8 Index: 24163 _d = 5E63 _h
The L_SignalMonitor_b FB: Inversion of the binary outputs			
Setting range (min. hex value max. hex value)			Lenze setting
0x00		0xFF	0x00 (decimal: 0)
Value is bit-coded: (☒ = bit set)			Info
Bit 0 ☐	bOut1 inverted		Bit set = inversion active
Bit 1 ☐	bOut2 inverted		
Bit 2 ☐	bOut3 inverted		
Bit 3 ☐	bOut4 inverted		
Bit 4 ☐	Reserved		
Bit 5 ☐	Reserved		
Bit 6 ☐	Reserved		
Bit 7 ☐	Reserved		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00413

Parameter Name: C00413 L_SignalMonitor_a: Offs./gain		Data type: INTEGER_16 Index: 24162 _d = 5E62 _h
The L_SignalMonitor_a FB: Gain and offset of the analog signals		
Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C00413/1	0.00 %	Offset for output <i>nOut1_a</i>
C00413/2	100.00 %	Gain for output <i>nOut1_a</i>
C00413/3	0.00 %	Offset for output <i>nOut2_a</i>
C00413/4	100.00 %	Gain for output <i>nOut2_a</i>
C00413/5	0.00 %	Offset for output <i>nOut3_a</i>
C00413/6	100.00 %	Gain for output <i>nOut3_a</i>
C00413/7	0.00 %	Offset for output <i>nOut4_a</i>
C00413/8	100.00 %	Gain for output <i>nOut4_a</i>
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100		

C00420

Parameter Name: C00420 Number of encoder increments			Data type: UNSIGNED_16 Index: 24155 _d = 5E5B _h		
Indication of the encoder constant					
▸ Encoder/feedback system					
Setting range (min. value unit max. value)					
1	Incr./rev.	32767			
Subcodes	Lenze setting	Info			
C00420/1	128 incr./rev.	FreqIn12: Encoder increment			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C00423

Parameter Name: C00423 DOx: Delay times			Data type: UNSIGNED_16 Index: 24152 _d = 5E58 _h		
Delay times for the digital output terminals					
▸ Digital terminals					
Setting range (min. value unit max. value)					
0.000	s	65.000			
Subcodes	Lenze setting		Info		
C00423/1	0.000 s		Relay ON delay		
C00423/2	0.000 s		Relay OFF delay		
C00423/3	0.000 s		DO1 ON delay		
C00423/4	0.000 s		DO1 OFF delay		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00425

Parameter | Name: C00425 | Encoder scanning time

Data type: UNSIGNED_8
Index: 24150_d = 5E56_h

From version 03.00.00

Encoder sample time for the digital input terminals when configured as frequency inputs

► [Using DI1 and DI2 as frequency inputs](#)

Selection list	
0	1 ms
1	2 ms
2	5 ms
3	10 ms
4	20 ms
5	50 ms
6	100 ms
7	200 ms
8	500 ms
9	1000 ms

Subcodes	Lenze setting	Info
C00425/1	3: 10 ms	FreqIn12: Encoder scanning time

☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1

C00434

Parameter Name: C00434 O1U: Gain			Data type: INTEGER_16 Index: 24141 _d = 5E4D _h		
Gain of the analog output					
▶ Analog terminals					
Setting range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes	Lenze setting		Info		
C00434/1	100.00 %		O1U: Gain		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00435

Parameter Name: C00435 O1U: Offset			Data type: INTEGER_16 Index: 24140 _d = 5E4C _h		
Offset of the analog output					
▶ Analog terminals					
Setting range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes	Lenze setting		Info		
C00435/1	0.00 %		O1U: Offset		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00436

Parameter Name: C00436 O1U: Voltage			Data type: INTEGER_16 Index: 24139 _d = 5E4B _h		
Display of the analog output voltage					
▶ Analog terminals					
Display range (min. value unit max. value)					
0.00	V	10.00			
Subcodes			Info		
C00436/1			O1U: Output voltage		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00439

Parameter Name: C00439 O1U: Input value			Data type: INTEGER_16 Index: 24136 _d = 5E48 _h		
Display of the input value for the analog output					
▶ Analog terminals					
Display range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes			Info		
C00439/1			O1U: Input value		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00440

Parameter Name: C00440 LS_AnalogIn1: PT1 time constant			Data type: UNSIGNED_16 Index: 24135 _d = 5E47 _h
PT1 time constant (S-ramp time) for the analog input			
▶ Analog terminals			
Setting range (min. value unit max. value)			
0	ms	1000	
Subcodes	Lenze setting	Info	
C00440/1	10 ms	PT1 rounding AnalogIn1	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00441

Parameter Name: C00441 Decoupling AnalogOut			Data type: UNSIGNED_16 Index: 24134 _d = 5E46 _h
From version 04.00.00			
Configuration defining the events that lead to a decoupling of the analog output terminals. 			

C00442

Parameter Name: C00442 AOut1: Decoupling value			Data type: INTEGER_16 Index: 24133 _d = 5E45 _h		
From version 04.00.00					
Definition of the value the analog output terminals are to have in the decoupled state.					
▶ Configuring exception handling of the output terminals					
Setting range (min. value unit max. value)					
0.00	%	100.00			
Subcodes	Lenze setting		Info		
C00442/1	0.00 %		AOut1_U: Decoupling value		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00443

Parameter Name: C00443 DIx: Level			Data type: UNSIGNED_16 Index: 24132 _d = 5E44 _h		
Bit coded display of the level of the digital inputs					
▶ Digital terminals					
Display area (min. hex value max. hex value)					
0x0000			0xFFFF		
Value is bit-coded:			Info		
Bit 0	DI1	Bit set = HIGH level			
Bit 1	DI2				
Bit 2	DI3				
Bit 3	DI4				
Bit 4	Reserved				
Bit 5	Reserved				
Bit 6	Reserved				
Bit 7	Reserved				
Bit 8	Reserved				
Bit 9	Reserved				
Bit 10	Reserved				
Bit 11	Reserved				
Bit 12	Reserved				
Bit 13	Reserved				
Bit 14	Reserved				
Bit 15	CINH				
Subcodes			Info		
C00443/1			DIx: Terminal level		
C00443/2			DIx: Output level		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00444

Parameter Name: C00444 DOx: Level			Data type: UNSIGNED_16 Index: 24131 _d = 5E43 _h		
Bit coded display of the level of the digital outputs					
► Digital terminals					
Display area (min. hex value max. hex value)			Info Bit set = HIGH level		
0x0000		0xFFFF			
Value is bit-coded:					
Bit 0	Relay				
Bit 1	DO1				
Bit 2	Reserved				
Bit 3	Reserved				
Bit 4	Reserved				
Bit 5	Reserved				
Bit 6	Reserved				
Bit 7	Reserved				
Bit 8	Reserved				
Bit 9	Reserved				
Bit 10	Reserved				
Bit 11	Reserved				
Bit 12	Reserved				
Bit 13	Reserved				
Bit 14	Reserved				
Bit 15	Reserved				
Subcodes			Info		
C00444/1			DOx: Input level		
C00444/2			DOx: Terminal level		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00445

Parameter Name: C00445 FreqInxx_nOut_v			Data type: INTEGER_16 Index: 24130 _d = 5E42 _h		
From version 03.00.00					
Display of the frequency input signals which are fed into the application.					
▶ Using DI1 and DI2 as frequency inputs					
Display range (min. value unit max. value)					
-32767	Incr/ms	32767			
Subcodes			Info		
C00445/1			FreqIn12_nOut_v		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00446

Parameter Name: C00446 FreqInxx_nOut_a			Data type: INTEGER_16 Index: 24129 _d = 5E41 _h		
From version 03.00.00 Display of the frequency input signals which are fed into the application. ▶ Using DI1 and DI2 as frequency inputs					
Display range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes			Info		
C00446/1			FreqIn12_nOut_a		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00447

Parameter Name: C00447 DigOut decoupling			Data type: UNSIGNED_16 Index: 24128 _d = 5E40 _h		
From version 04.00.00 Configuration defining the events that lead to a decoupling of the digital output terminals. ‣ Configuring exception handling of the output terminals					
Setting range (min. hex value max. hex value)			Lenze setting		
0x0000		0xFFFF	0x0000 (decimal: 0)		
Value is bit-coded: (☒ = bit set)					
Bit 0 ☐	SafeTorqueOff				
Bit 1 ☐	ReadyToSwitchOn				
Bit 2 ☐	SwitchedOn				
Bit 3 ☐	Reserved				
Bit 4 ☐	Trouble				
Bit 5 ☐	Fault				
Bit 6 ☐	Reserved				
Bit 7 ☐	Reserved				
Bit 8 ☐	Reserved				
Bit 9 ☐	Fail CAN_Management				
Bit 10 ☐	Reserved				
Bit 11 ☐	Reserved				
Bit 12 ☐	Reserved				
Bit 13 ☐	Reserved				
Bit 14 ☐	Reserved				
Bit 15 ☐	Reserved				
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT					

C00448

Parameter | Name: C00448 | DigOut decoupling value

Data type: UNSIGNED_16
Index: 24127_d = 5E3F_h

From version 04.00.00

Definition of the value the digital output terminals are to have in the decoupled state.

• Bit set = HIGH level

► [Configuring exception handling of the output terminals](#)

Setting range (min. hex value max. hex value)			Lenze setting
0x0000		0xFFFF	0x0000 (decimal: 0)
Value is bit-coded: (☒ = bit set)			
Bit 0	☐	Relay_ON	
Bit 1	☐	DigOut1_ON	
Bit 2	☐	Reserved	
Bit 3	☐	Reserved	
Bit 4	☐	Reserved	
Bit 5	☐	Reserved	
Bit 6	☐	Reserved	
Bit 7	☐	Reserved	
Bit 8	☐	Reserved	
Bit 9	☐	Reserved	
Bit 10	☐	Reserved	
Bit 11	☐	Reserved	
Bit 12	☐	Reserved	
Bit 13	☐	Reserved	
Bit 14	☐	Reserved	
Bit 15	☐	Reserved	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00449

Parameter Name: C00449 FreqInxx_dnOut_p			Data type: INTEGER_32 Index: 24126 _d = 5E3E _h	
From version 06.00.00				
▶ Output of the encoder position of the DI1/DI2 frequency input				
Display range (min. value unit max. value)				
-2147483647	Incr.	2147483647		
Subcodes			Info	
C00449/1			FreqIn12_dnOut_p	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1				

C00453

Parameter Name: C00453 Keypad: Default manual jog			Data type: UNSIGNED_32 Index: 24122 _d = 5E3A _h		
From version 14.00.00					
Setting range (min. value unit max. value)					
0.000		16000.000			
Subcodes	Lenze setting		Info		
C00453/1	729.001		Keypad: Speed setpoint		
C00453/2	56.002		Keypad: Display bar		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00455

Parameter Name: C00455 FB_call table	Data type: UNSIGNED_16 Index: 24120 _d = 5E38 _h
This code is for device-internal use only and must not be written to by the user!	

C00456

Parameter Name:	Data type: UNSIGNED_8
C00456 Editor level	Index: 24119 _d = 5E37 _h
This code is for device-internal use only and must not be written to by the user!	

C00458

Parameter Name:	Data type: UNSIGNED_16
C00458 SYS_call table	Index: 24117 _d = 5E35 _h
This code is for device-internal use only and must not be written to by the user!	

C00459

Parameter Name:	Data type: UNSIGNED_16
C00459 SYS_Output table	Index: 24116 _d = 5E34 _h
This code is for device-internal use only and must not be written to by the user!	

C00460

Parameter Name:		Data type: UNSIGNED_8
C00460 Remote: Local keyswitch		Index: 24115 _d = 5E33 _h
This code is for device-internal use only and must not be written to by the user!		

C00461

Parameter Name:			Data type: UNSIGNED_32		
C00461 Remote: Acceleration/deceleration time			Index: 24114 _d = 5E32 _h		
From version 06.00.00					
PC manual control					
Setting range (min. value unit max. value)					
0.000	s	999.999			
Subcodes	Lenze setting		Info		
C00461/1	2.000 s		Remote: Acceleration/deceleration time		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00462

Parameter Name: C00462 Remote: Control			Data type: UNSIGNED_16 Index: 24113 _d = 5E31 _h		
From version 06.00.00					
PC manual control					
Setting range (min. value unit max. value)					
0		65535			
Subcodes	Lenze setting		Info		
C00462/1	0		Remote: Control mode		
C00462/2	0		Remote: Monitoring counter		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00463

Parameter Name: C00463 Remote: MCK control		Data type: UNSIGNED_32 Index: 24112 _d = 5E30 _h
From version 06.00.00		
This parameter serves to control the functions of the Motion Control Kernel for PC manual control .		
Setting range (min. hex value max. hex value)		
0x00000000		0xFFFFFFFF
Value is bit-coded:		
Bit 0	OpMode_Bit0	
Bit 1	OpMode_Bit1	
Bit 2	OpMode_Bit2	
Bit 3	OpMode_Bit3	
Bit 4	ManJogPos	
Bit 5	ManJogNeg	
Bit 6	ManExecute2ndSpeed	
Bit 7	ReleaseLimitSwitch	
Bit 8	HomStartStop	
Bit 9	HomSetPos	
Bit 10	HomResetPos	
Bit 11	EnableSpeedOverride	
Bit 12	EnableAccOverride	
Bit 13	EnableSRampOverride	
Bit 14	PosTeachSetPos	
Bit 15	PosTeachActPos	
Bit 16	PosExecute	
Bit 17	PosFinishTarget	
Bit 18	PosDisableFollowProfile	
Bit 19	PosStop	
Bit 20	PosModeBit0	
Bit 21	PosModeBit1	
Bit 22	PosModeBit2	
Bit 23	PosModeBit3	
Bit 24	ProfileNo_Bit0	
Bit 25	ProfileNo_Bit1	
Bit 26	ProfileNo_Bit2	
Bit 27	ProfileNo_Bit3	
Bit 28	ProfileNo_Bit4	
Bit 29	ProfileNo_Bit5	
Bit 30	ProfileNo_Bit6	
Bit 31	ProfileNo_Bit7	
Subcodes	Lenze setting	Info
C00463/1	0x00000000	Remote: MCK control
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT		

C00464

Parameter Name: C00464 Remote: Monitoring timeout			Data type: UNSIGNED_16 Index: 24111 _d = 5E2F _h		
From version 06.00.00					
► PC manual control					
Setting range (min. value unit max. value)					
200	ms	5000			
Subcodes	Lenze setting		Info		
C00464/1	2000 ms		Remote: Monitoring timeout		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00465

Parameter Name:		Data type: INTEGER_32 Index: 24110 _d = 5E2E _h	
C00465 Keypad: Timeout welcome screen			
Time setting for the automatic change of the keypad display to the welcome screen			
Selection list (Lenze setting printed in bold)			
0	Never show welcome screen		
5	5 min		
15	15 min		
30	30 min		
60	60 min		
☒ Read access		☒ Write access	
☐ CINH		☐ PLC STOP	
☐ No transfer		☐ COM	
☐ MOT		Scaling factor: 1	

C00466

Parameter Name: C00466 Keypad: Default parameter				Data type: INTEGER_32 Index: 24109 _d = 5E2D _h	
Setting of the default parameter for the keypad					
Setting range (min. value unit max. value)			Lenze setting		
0			65535		51
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00467

Parameter Name: C00467 Keypad: Default welcome screen		Data type: INTEGER_32 Index: 24108 _d = 5E2C _h	
Selection of the welcome screen for the keypad			
Selection list (Lenze setting printed in bold)			
0	Main menu		
1	Parameter list		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00468

Parameter Name: C00468 Service code	Data type: INTEGER_32 Index: 24107 _d = 5E2B _h
This code is for device-internal use only and must not be written to by the user!	

C00469

Parameter Name: C00469 Keypad: Fct. STOP key		Data type: INTEGER_32 Index: 24106 _d = 5E2A _h
Selection of the function for the STOP key on the keypad		
Selection list (Lenze setting printed in bold)		Info
0	No response	STOP key does not have any function
1	Inhibit controller	STOP key sets controller inhibit in the drive
2	Activate quick stop	STOP key sets quick stop in the drive
4	Inhibit controller and reset error	From version 14.00.00 STOP key sets controller inhibit in the drive. An error reset is carried out at the same time.
5	Activate quick stop and reset error	From version 14.00.00 STOP key sets quick stop in the drive. An error reset is carried out at the same time.
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00470

Parameter Name:		Data type: UNSIGNED_8
C00470 LS_ParFree_b		Index: 24105 _d = 5E29 _h
The LS_ParFree_b SB: Setting of the signal level to be output		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C00470/1	0: FALSE	Signal level for output <i>bPar1</i> ... <i>bPar16</i>
C00470/...		
C00470/16		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00471

Parameter Name: C00471 LS_ParFree			Data type: UNSIGNED_16 Index: 24104 _d = 5E28 _h		
The LS_ParFree SB: Setting of the words to be output					
Setting range (min. hex value max. hex value)					
0x0000		0xFFFF			
Value is bit-coded:					
Bit 0	Bit0				
...	...				
Bit 15	Bit15				
Subcodes		Lenze setting		Info	
C00471/1	0x0000		Value for output <i>wPar1</i> ... <i>wPar4</i>		
C00471/...					
C00471/4					
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT					

C00472

Parameter Name: C00472 LS_ParFree_a			Data type: INTEGER_16 Index: 24103 _d = 5E27 _h
The LS_ParFree_a SB: Setting of the analog signals to be output			
Setting range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes	Lenze setting	Info	
C00472/1	0.00 %	Value for output <i>nPar1_a</i>	
C00472/2	0.00 %	Value for output <i>nPar2_a</i>	
C00472/3	100.00 %	Value for output <i>nPar3_a</i>	
C00472/4	100.00 %	Value for output <i>nPar4_a</i>	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00473

Parameter Name: C00473 LS_ParFree_v			Data type: INTEGER_16 Index: 24102 _d = 5E26 _h
The LS_ParFree_v SB: Setting of the speed signals to be output			
Setting range (min. value unit max. value)			
-32767	Incr./ms	32767	
Subcodes	Lenze setting	Info	
C00473/1	0 incr./ms	Values for output <i>nPar1_v</i> ... <i>nPar4_v</i>	
C00473/...			
C00473/4			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00474

Parameter Name: C00474 LS_ParFree_p			Data type: INTEGER_32 Index: 24101 _d = 5E25 _h
Setting range (min. value unit max. value)			
-2147483647	Incr.	2147483647	
Subcodes	Lenze setting	Info	
C00474/1	0 incr.	LS_ParFree : dnPar1_p	
C00474/2	0 incr.	LS_ParFree : dnPar2_p	
C00474/3	0 incr.	LS_ParFree : dnPar3_p	
C00474/4	0 incr.	LS_ParFree : dnPar4_p	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00480

Parameter Name: C00480 LS_DisFree_b			Data type: UNSIGNED_8 Index: 24095 _d = 5E1F _h		
The LS_DisFree_b SB: Display of the input values					
Display area (min. hex value max. hex value)					
0x00		0xFF			
Value is bit-coded:			Info		
Bit 0	bDis1		Signal level input <i>bDis1</i> ... <i>bDis8</i>		
...	...				
Bit 7	bDis8				
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00481

Parameter Name: C00481 LS_DisFree			Data type: UNSIGNED_16 Index: 24094 _d = 5E1E _h		
The LS_DisFree SB: Display of the input values					
Display area (min. hex value max. hex value)					
0x0000		0xFFFF			
Value is bit-coded:					
Bit 0	Active				
...	...				
Bit 15	Active				
Subcodes			Info		
C00481/1			Input values <i>wDis1</i> ... <i>wDis4</i>		
C00481/...					
C00481/4					
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00482

Parameter Name: C00482 LS_DisFree_a			Data type: INTEGER_16 Index: 24093 _d = 5E1D _h		
The LS_DisFree_a SB: Display of the input values					
Display range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes			Info		
C00482/1			Input values <i>nDis1_a</i> ... <i>nDis4_a</i>		
C00482/...					
C00482/4					
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00484

Parameter Name: C00484 Application units: Offset			Data type: INTEGER_16 Index: 24091 _d = 5E1B _h		
From version 06.00.00					
The LS_DisFree_a SB: Offset for display of the input variables in application unit					
▶ Display of internal process factors in application units					
Setting range (min. value unit max. value)					
-199.99	%	199.99			
Subcodes	Lenze setting	Info			
C00484/1	0.00 %	Application unit 1: Offset			
C00484/2	0.00 %	Application unit 2: Offset			
C00484/3	0.00 %	Application unit 3: Offset			
C00484/4	0.00 %	Application unit 4: Offset			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00485

Parameter Name: C00485 Application units: Display factor			Data type: INTEGER_32 Index: 24090 _d = 5E1A _h		
From version 06.00.00					
The LS_DisFree_a SB: Display factor for display of the input variables in application unit					
▶ Display of internal process factors in application units					
Setting range (min. value unit max. value)					
-65536.0000		65536.0000			
Subcodes	Lenze setting		Info		
C00485/1	1.0000		Application unit 1: Display factor		
C00485/2	1.0000		Application unit 2: Display factor		
C00485/3	1.0000		Application unit 3: Display factor		
C00485/4	1.0000		Application unit 4: Display factor		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000					

C00486

Parameter | Name: **C00486 | Application units: Text** Data type: VISIBLE_STRING
Index: 24089_d = 5E19_h

From version 06.00.00

The [LS_DisFree_a](#) SB: Text for the display of the input variables in application unit

► [Display of internal process factors in application units](#)

Subcodes	Lenze setting	Info
C00486/1		Application unit 1: Text
C00486/2		Application unit 2: Text
C00486/3		Application unit 3: Text
C00486/4		Application unit 4: Text

☒ Read access ☒ Write access ☐ CINH ☐ PLC-STOP ☐ No transfer ☐ COM ☐ MOT Character length: 7

C00487

Parameter Name:			Data type: INTEGER_32 Index: 24088 _d = 5E18 _h		
C00487 - Application units					
From version 06.00.00					
SB LS_DisFree_a : Display of the input values in a configurable application unit					
▶ Display of internal process factors in application units					
Display range (min. value unit max. value)					
-21474836.47	units		21474836.47		
Subcodes				Info	
C00487/1				Application units 1	
C00487/2				Application units 2	
C00487/3				Application units 3	
C00487/4				Application units 4	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00488

Parameter | Name:

C00488 | L_JogCtrlEdgeDetect

Data type: UNSIGNED_8

Index: 24087_d = 5E17_h

From version 03.00.00

The [L_JogCtrlExtension_1](#) FB: Signal methodology

• Selection whether the corresponding function is to be activated by edge or level.

Selection list		Info
0	Level	
1	Edge	
Subcodes	Lenze setting	Info
C00488/1	0: Level	InputSens.SlowDown1 • Selection of edge or level for starting slow-down function 1
C00488/2	0: Level	InputSens.Stop1 • Selection of edge or level for stop function 1
C00488/3	0: Level	InputSens.SlowDown2 • Selection of edge or level for starting slow-down function 2
C00488/4	0: Level	InputSens.Stop2 • Selection of edge or level for stop function 2
C00488/5	0: Level	InputSens.SlowDown3 • Selection of edge or level for starting slow-down function 3
C00488/6	0: Level	InputSens.Stop3 • Selection of edge or level for stop function 3

☒ Read access

☒ Write access

☐ CINH

☐ PLC STOP

☐ No transfer

☐ COM

☐ MOT

Scaling factor: 1

C00490

Parameter Name: C00490 Position encoder selection		Data type: UNSIGNED_8 Index: 24085 _d = 5E15 _h
From version 12.00.00 Selection of the procedure of generating the actual position ► Encoder/feedback system		
Selection list (Lenze setting printed in bold)		Info
0	No sensor: nSpeedSetValue_a	The position signal <i>dnMotorPosAct_p</i> is derived from the speed setpoint <i>nSpeedSetValue_a</i> .
10	Encoder selection C495 or nVoltageAngleAct_a	The position signal <i>dnMotorPosAct_p</i> is either calculated from the set speed feedback (for C00495 > 0) or from the speed signal <i>nMotorSpeedAct_v</i> (for C00495 = 0).
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00495

Parameter Name: C00495 Speed sensor selection		Data type: UNSIGNED_8 Index: 24080 _d = 5E10 _h
Selection of the feedback system for the actual speed for motor control and display ► Encoder/feedback system		
Selection list (Lenze setting printed in bold)		Info
0	No sensor	No sensor available for the actual speed detection
1	Sensor signal FreqIn12	Speed sensor signal is fed via the digital DI1 and DI2 inputs
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00496

Parameter Name: C00496 Encoder evaluation method DigiIn12		Data type: UNSIGNED_8 Index: 24079 _d = 5E0F _h
From version 03.00.00 ► Encoder/feedback system		
Selection list (Lenze setting printed in bold)		Info
1	Low-resolution encoder (StateLine)	High-precision procedure for low-resolution encoders (<=128 increments)
3	Edge-counting procedure	Simple edge counting procedure with adjustable scanning time (C00425)
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00497

Parameter Name: C00497 Filter time constant		Data type: UNSIGNED_16 Index: 24078 _d = 5E0E _h
From version 03.00.00 ► Encoder/feedback system		
Setting range (min. value unit max. value)		
0.0	ms	500.0
Subcodes	Lenze setting	Info
C00497/1	1.0 ms	FreqIn12: Encoder filter time
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10		

C00505

Parameter Name: C00505 Password data		Data type: VISIBLE_STRING Index: 24070 _d = 5E06 _h
From version 06.00.00		
▶ Device access protection		
Subcodes	Lenze setting	Info
C00505/1		MasterPin
C00505/2		Binding ID
C00505/3		Password
☒ Read access ☒ Write access ☐ CINH ☐ PLC-STOP ☒ No transfer ☐ COM ☐ MOT Character length: 16		

C00506

Parameter Name: C00506 PW protection internal config		Data type: UNSIGNED_16 Index: 24069 _d = 5E05 _h
From version 15.00.00		
Configuration of the password protection for device-internal parameter access		
▶ Individual password protection for single access channels		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Only access to user menu	The menus in the keypad are reduced. Only the user menu can be used to change parameters.
Bit 1	Parameter write protection	Via system blocks (LS_ParReadWrite1-6 and LS_WriteParamList), write/read parameters cannot be written.
Bit 2	Parameter read protection	Via system blocks (LS_ParReadWrite1-6 and LS_WriteParamList), write/read parameters cannot be read.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00506/1	0x0007	PW protection internal config
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00507

Parameter Name: C00507 Current password protection		Data type: UNSIGNED_16 Index: 24068 _d = 5E04 _h	
From version 06.00.00 Display of the currently active device access protection (password protection and device personalisation) Note: As the password protection can be configured individually for each single communication channel from version 15.00.00 bit 1 and bit 2 indicate the active protection always with regard to the communication channel used. ▶ Device access protection			
Display area (min. hex value max. hex value)			
0x0000		0xFFFF	
Value is bit-coded:		Info	
Bit 0	Only access to user menu	1 ≡ The menus in the keypad are reduced. Only the user menu can be used to change parameters. ▶ Password protection	
Bit 1	Parameter write protection	1 ≡ The currently used communication channel cannot be used to write into write/read parameters. ▶ Password protection	
Bit 2	Parameter read protection	1 ≡ The currently used communication channel cannot be used to read write/read parameters. ▶ Password protection	
Bit 3	Reserved		
Bit 4	Reserved		
Bit 5	Reserved		
Bit 6	Reserved		
Bit 7	Reserved		
Bit 8	Reserved		
Bit 9	Reserved		
Bit 10	Reserved		
Bit 11	Reserved		
Bit 12	Reserved		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	Memory module binding on	1 ≡ Device personalisation is active. All write/read actions between controller and memory module are only executed if both components have the same binding ID. ▶ Device personalisation	
Subcodes		Info	
C00507/1		Password protection - all communication channels	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00508

Parameter Name: C00508 PW protection config X6(DIAG)		Data type: UNSIGNED_16 Index: 24067 _d = 5E03 _h
From version 15.00.00 Configuration of the password protection for parameter access via diagnostic interface X6 ("DIAG") ▶ Individual password protection for single communication channels		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Parameter write protection	The diagnostics interface X6 cannot be used to write into write/read parameters.
Bit 2	Parameter read protection	The diagnostics interface X6 cannot be used to read write/read parameters.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00508/1	0x0006	PW protection config X6(DIAG)
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00509

Parameter Name: C00509 PW protection config X1(CAN)		Data type: UNSIGNED_16 Index: 24066 _d = 5E02 _h	
From version 15.00.00 Configuration of the password protection for parameter access via CANopen interface X1 ("CAN on board") ▶ Individual password protection for single communication channels			
Setting range (min. hex value max. hex value)			
0x0000	0xFFFF		
Value is bit-coded:		Info	
Bit 0	Reserved		
Bit 1	Parameter write protection	The CANopen interface X1 cannot be used to write into write/read parameters.	
Bit 2	Parameter read protection	The CANopen interface X1 cannot be used to read write/read parameters.	
Bit 3	Reserved		
Bit 4	Reserved		
Bit 5	Reserved		
Bit 6	Reserved		
Bit 7	Reserved		
Bit 8	Reserved		
Bit 9	Reserved		
Bit 10	Reserved		
Bit 11	Reserved		
Bit 12	Reserved		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	Reserved		
Subcodes	Lenze setting	Info	
C00509/1	0x0006	PW protection config X1 (CAN)	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00510

Parameter Name: C00510 PW protection config MCI		Data type: UNSIGNED_16 Index: 24065 _d = 5E01 _h
From version 15.00.00 Configuration of the password protection for parameter access via fieldbus interface ("MCI") ▶ Individual password protection for single communication channels		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Reserved	
Bit 1	Parameter write protection	The fieldbus interface (MCI) cannot be used to write into write/read parameters.
Bit 2	Parameter read protection	The fieldbus interface (MCI) cannot be used to read write/read parameters.
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C00510/1	0x0006	PW protection config. MCI
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00516

Parameter Name: C00516 Checksums		Data type: UNSIGNED_32 Index: 24059 _d = 5DFB _h
This code is for device-internal use only and must not be written to by the user!		

C00517

Parameter Name: C00517 User menu		Data type: INTEGER_32 Index: 24058 _d = 5DFA _h	
When a system is installed, parameters must be changed time and again until the system runs satisfactorily. The user menu of a device serves to create a selection of frequently used parameters to be able to access and change these parameters quickly.			
• Format: <code number>,<subcode number>			
• If "0.000" is set, no entry will be displayed in the user menu.			
Setting range (min. value unit max. value)			
0.000		16000.000	
Subcodes	Lenze setting	Info	
C00517/1	51.000	C00051 : Display of actual speed value	
C00517/2	53.000	C00053 : Display of DC-bus voltage	
C00517/3	54.000	C00054 : Display of motor current	
C00517/4	61.000	C00061 : Display of heatsink temperature	
C00517/5	137.000	C00137 : Display of device status	
C00517/6	166.003	C00166/3 : Display of current error message	
C00517/7	0.000	User menu: Entry 7	
C00517/8	11.000	C00011 : Reference speed	
C00517/9	39.001	C00039/1 : Fixed setpoint 1	
C00517/10	39.002	C00039/2 : Fixed setpoint 2	
C00517/11	12.000	C00012 : Accel. time - main setpoint	
C00517/12	13.000	C00013 : Decel. time - main setpoint	
C00517/13	15.000	C00015 : V/f base frequency	
C00517/14	16.000	C00016 : Vmin boost	
C00517/15	22.000	C00022 : I _{max} in motor mode	
C00517/16	120.000	C00120 : Setting of motor overload (I ² _{xt})	
C00517/17	87.000	C00087 : Rated motor speed	
C00517/18	99.000	C00099 : Display of firmware version	
C00517/19	200.000	C00200 : Display of firmware product type	
C00517/20	0.000	User menu: Entry 20	
C00517/21	0.000	User menu: Entry 21	
C00517/22	0.000	User menu: Entry 22	
C00517/23	0.000	User menu: Entry 23	
C00517/24	105.000	C00105 : Decel. time - quick stop	
C00517/25	173.000	C00173 : Mains voltage	
C00517/26	0.000	User menu: Entry 26	
C00517/27	0.000	User menu: Entry 27	
C00517/28	0.000	User menu: Entry 28	
C00517/29	0.000	User menu: Entry 29	
C00517/30	0.000	User menu: Entry 30	
C00517/31	0.000	User menu: Entry 31	
C00517/32	0.000	User menu: Entry 32	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00560

Parameter Name: C00560 Fan switching status		Data type: UNSIGNED_8 Index: 24015 _d = 5DCF _h	
From version 02.00.00 Display of the function status of the device fans			
Selection list			
0	Off		
1	On		
2	No fan		
Subcodes		Info	
C00560/1		Switching status - internal fan	
C00560/2		Switching status - heatsink fan	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00561

Parameter Name:		Data type: UNSIGNED_8 Index: 24014 _d = 5DCE _h	
C00561 Failure indication			
From version 02.00.00 Failure display of device fans and motor phases			
Selection list			
0	No error		
1	Fault		
Subcodes		Info	
C00561/1		Internal fan	
C00561/2		Heatsink fan	
C00561/3		Motor phase U • From version 11.00.00	
C00561/4		Motor phase V • From version 11.00.00	
C00561/5		Motor phase W • From version 11.00.00	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00565

Parameter Name:		Data type: UNSIGNED_8	
C00565 Resp. to mains phase failure		Index: 24010 _d = 5DCAh	
Response to the failure of mains phases			
Selection list (Lenze setting printed in bold)			
0	No Reaction		
1	Fault		
5	Warning		
☒ Read access		☒ Write access	
☐ CINH		☐ PLC STOP	
☐ No transfer		☐ COM	
☒ MOT		Scaling factor: 1	

C00566

Parameter Name: C00566 Resp. to fan failure		Data type: UNSIGNED_8 Index: 24009 _d = 5DC9 _h
Response to the detection of a fan failure		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00567

Parameter Name:		Data type: UNSIGNED_8
C00567 Resp. to speed controller limited		Index: 24008 _d = 5DC8 _h
Response if speed controller output is limited (<i>bLimSpeedCtrlOut</i> = TRUE)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00569

Parameter Name: C00569 Resp. to peak current		Data type: UNSIGNED_8 Index: 24006 _d = 5DC6 _h
Configuration of monitoring of the motor control (group 1)		
Selection list		
0	No Reaction	
1	Fault	
5	Warning	
Subcodes	Lenze setting	Info
C00569/1	0: No Reaction	Response for overcurrent detection and clamp operation
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00570

Parameter Name: C00570 Resp. to controller limitations			Data type: UNSIGNED_8 Index: 24005 _d = 5DC5 _h
Configuration of monitoring of the motor control (group 2)			
Selection list			
0	No Reaction		
1	Fault		
5	Warning		
Subcodes	Lenze setting	Info	
C00570/1	0: No Reaction	Response if direct-axis current controller is limited	
C00570/2	0: No Reaction	Response if cross current controller is limited	
C00570/3	0: No Reaction	Response if torque setpoint is limited • Limitation of the speed controller output, the differential setpoint control and the additive torque with sensorless vector control (SLVC).	
C00570/4	0: No Reaction	Response if field controller is limited	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00571

Parameter Name: C00571 Resp. to wrong controller setting			Data type: UNSIGNED_8 Index: 24004 _d = 5DC4 _h
From version 14.00.00			
Selection list			
0	No Reaction		
1	Fault		
2	Trouble		
3	TroubleQuickStop		
4	WarningLocked		
5	Warning		
6	Information		
Subcodes	Lenze setting	Info	
C00571/1	6: Information	Resp. to: Motor control does not match motor data	
C00571/2	1: Fault	Resp. to a non-set speed controller	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1			

C00572

Parameter Name: C00572 Brake resistor overload threshold			Data type: UNSIGNED_8 Index: 24003 _d = 5DC3 _h
From version 03.00.00			
Adjustable threshold for monitoring the brake resistor utilisation • The response for reaching the threshold can be selected in C00574 .			
Setting range (min. value unit max. value)			Lenze setting
0	%	100	100 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00574

Parameter Name: C00574 Resp. to brake resist. overtemp.		Data type: UNSIGNED_8 Index: 24001 _d = 5DC1 _h
Response which is triggered if the threshold set in C00572 for monitoring brake resistor utilisation is reached.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00579

Parameter Name: C00579 Resp. to max. speed/output freq. reached		Data type: UNSIGNED_8 Index: 23996 _d = 5DBC _h
Response when the max. speed limit (C00909) or output frequency limit (C00910) has been reached.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00580

Parameter Name: C00580 Resp. to operating system error		Data type: UNSIGNED_8 Index: 23995 _d = 5DBB _h
From version 11.00.00 Response if the required computing time of the application exceeds the available computing time.		
Selection list		
0	No Reaction	
1	Fault	
5	Warning	
Subcodes	Lenze setting	Info
C00580/1	0: No Reaction	Resp. to runtime exceedance
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00581

Parameter Name: C00581 Resp. to LS_SetError_x		Data type: UNSIGNED_8 Index: 23994 _d = 5DBA _h
Selection of the error responses for application error messages • An application error message is tripped by a FALSE/TRUE edge at the binary inputs <i>bSetError1...4</i> .		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00581/1	0: No Reaction	LS_SetError 1 : Resp. to bSetError1
C00581/2	0: No Reaction	LS_SetError 1 : Resp. to bSetError2
C00581/3	0: No Reaction	LS_SetError 1 : Resp. to bSetError3
C00581/4	0: No Reaction	LS_SetError 1 : Resp. to bSetError4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00582

Parameter Name: C00582 Resp. to heatsink temp. > shutdown temp. -5°C		Data type: UNSIGNED_8 Index: 23993 _d = 5DB9 _h
Response if the heatsink temperature has reached the switch-off temperature threshold.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00585

Parameter Name: C00585 Resp. to motor overtemp. PTC		Data type: UNSIGNED_8 Index: 23990 _d = 5DB6 _h
Response to motor overtemperature The motor temperature is measured by means of a PTC thermistor at terminal X106.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00586

Parameter Name: C00586 Resp. to open circuit HTL encoder		Data type: UNSIGNED_8 Index: 23989 _d = 5DB5 _h
Response to encoder feedback system failure or encoder feedback system track failure due to open circuit		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00588

Parameter Name: C00588 Resp. to max. speed at switching freq.		Data type: UNSIGNED_8 Index: 23987 _d = 5DB3 _h
Response if the maximum speed for the set inverter switching frequency is reached (C00018)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00590

Parameter Name: C00590 Resp. to switching frequency red.		Data type: UNSIGNED_8 Index: 23985 _d = 5DB1 _h
Response to reduction of the inverter switching frequency (C00018)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00592

Parameter Name: C00592 Resp. to CAN bus connection		Data type: UNSIGNED_8 Index: 23983 _d = 5DAF _h
Configuration of monitoring of the CAN interface (group 1)		
▶ "CAN on board" system bus		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00592/1	0: No Reaction	Response to incorrect telegram for CAN communication
C00592/2	0: No Reaction	Response to "BusOff" (bus system switched off)
C00592/3	0: No Reaction	Response to warnings of the CAN controller
C00592/4	0: No Reaction	Response to communication stop of a CAN bus node
C00592/5	0: No Reaction	Response to an event in the case of monitoring via heartbeat protocol
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1		

C00593

Parameter Name: C00593 Resp. to CANx_IN monitoring		Data type: UNSIGNED_8 Index: 23982 _d = 5DAE _h
Configuration of monitoring of the CAN interface (group 2)		
▶ "CAN on board" system bus		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00593/1	0: No Reaction	Response if the monitoring time set in C00357/1 for the reception of the PDO CAN1_IN is exceeded.
C00593/2	0: No Reaction	Response if the monitoring time set in C00357/2 for the reception of the PDO CAN2_IN is exceeded.
C00593/3	0: No Reaction	Response if the monitoring time set in C00357/3 for the reception of the PDO CAN3_IN is exceeded.
C00593/4	0: No Reaction	Response if the monitoring time set in C00357/4 for the reception of the PDO CAN4_IN is exceeded. • From version 15.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1		

C00594

Parameter Name: C00594 Resp. to control word error		Data type: UNSIGNED_8 Index: 23981 _d = 5DAD _h
Configuration of device control monitoring		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
5	Warning	
Subcodes	Lenze setting	Info
C00594/1	1: Fault	Response if error bit 14 in the CAN control word is set.
C00594/2	1: Fault	Response if error bit 14 in the MCI control word is set.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00595

Parameter Name: C00595 MCK: Resp. to MCK error		Data type: UNSIGNED_8 Index: 23980 _d = 5DAC _h
Configuration of monitoring of the Motion Control Kernel		
		► Basic drive functions
Selection list		
0	No Reaction	
1	Fault	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C00595/1	0: No Reaction	Reserved
C00595/2	0: No Reaction	Reserved
C00595/3	0: No Reaction	Reserved
C00595/4	0: No Reaction	Reserved
C00595/5	0: No Reaction	Reserved
C00595/6	0: No Reaction	Reserved
C00595/7	0: No Reaction	Reserved
C00595/8	0: No Reaction	Reserved
C00595/9	0: No Reaction	Reserved
C00595/10	0: No Reaction	Reserved
C00595/11	0: No Reaction	Reserved
C00595/12	0: No Reaction	Reserved
C00595/13	0: No Reaction	Reserved
C00595/14	0: No Reaction	Reserved
C00595/15	1: Fault	Response to activated connection monitoring in case of PC manual control • From version 11.00.00
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00597

Parameter Name: C00597 Resp. to motor phase failure		Data type: UNSIGNED_8 Index: 23978 _d = 5DAA _h
Response to motor phase failure If a phase current does not exceed the threshold set in C00599 for more than one period, the response set here will be triggered.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00598

Parameter Name: C00598 Resp. to open circuit AINx		Data type: UNSIGNED_8 Index: 23977 _d = 5DA9 _h
Configuration of monitoring the analog input ▶ Analog terminals		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
5	Warning	
Subcodes	Lenze setting	Info
C00598/1	3: TroubleQuickStop	Response to open circuit at AIN1 if configured as 4 ... 20 mA current loop
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00599

Parameter Name: C00599 Motor phase failure threshold		Data type: INTEGER_16 Index: 23976 _d = 5DA8 _h
Threshold for motor phase failure monitoring 100 % ≡ rated inverter current (C00098) - If a phase current does not exceed the threshold set here for more than one period, the response to motor phase failure set in C00597 will be triggered.		
Setting range (min. value unit max. value)		Lenze setting
0.00	%	100.00 5.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100		

C00600

Parameter Name: C00600 Resp. to DC bus voltage			Data type: UNSIGNED_8 Index: 23975 _d = 5DA7 _h
Configuration of monitoring of the motor control (group 3)			
Selection list			
1	Fault		
2	Trouble		
Subcodes	Lenze setting	Info	
C00600/1	2: Trouble	Response to DC bus undervoltage	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00601

Parameter Name: C00601 Del. resp. to fault: DC bus overvoltage			Data type: UNSIGNED_16 Index: 23974 _d = 5DA6 _h		
Error response delay times					
Setting range (min. value unit max. value)					
0.000	s	65.000			
Subcodes	Lenze setting		Info		
C00601/1	2.000 s		Delay time for triggering the "DC-bus overvoltage" error • If a DC-bus overvoltage occurs, an error will not be triggered until the set delay time has elapsed.		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1000					

C00602

Parameter Name: C00602 Resp. to earth fault		Data type: UNSIGNED_8 Index: 23973 _d = 5DA5 _h	
Response to earth fault in the motor phase(s)			
Selection list (Lenze setting printed in bold)			
0	No Reaction		
1	Fault		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00604

Parameter Name: C00604 Resp. to device overload (lxt)		Data type: UNSIGNED_8 Index: 23971 _d = 5DA3 _h	
Response if the adjustable device utilisation threshold (C00123) is reached. • The current device utilisation is displayed in C00064 .			
Selection list (Lenze setting printed in bold)			
0	No Reaction		
1	Fault		
5	Warning		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00606

Parameter Name: C00606 Resp. to motor overload (I²xt)		Data type: UNSIGNED_8 Index: 23969 _d = 5DA1 _h
Response when the motor load displayed in C00066 reaches the value "100.00 %". ▶ Motor overload monitoring (I2xt)		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00607

Parameter Name: C00607 Resp. to max freq. feedb. DIG12/67		Data type: UNSIGNED_8 Index: 23968 _d = 5DA0 _h
Response when the maximum input frequency has been reached via the digital inputs.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00608

Parameter Name: C00608 Resp. to maximum torque		Data type: UNSIGNED_8 Index: 23967 _d = 5D9F _h
Response if the maximum torque (C00057) is reached.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00609

Parameter Name: C00609 Resp. to maximum current		Data type: UNSIGNED_8 Index: 23966 _d = 5D9E _h
Response if the maximum current (C00022 , C00023) is reached.		
Selection list (Lenze setting printed in bold)		
0	No Reaction	
1	Fault	
5	Warning	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00610

Parameter Name: C00610 16-bit connection table		Data type: UNSIGNED_16 Index: 23965 _d = 5D9D _h
This code is for device-internal use only and must not be written to by the user!		

C00611

Parameter Name: C00611 Bool connection table	Data type: UNSIGNED_16 Index: 23964 _d = 5D9C _h
This code is for device-internal use only and must not be written to by the user!	

C00612

Parameter Name: C00612 32-bit connection table	Data type: UNSIGNED_16 Index: 23964 _d = 5D9B _h
This code is for device-internal use only and must not be written to by the user!	

C00620

Parameter Name: C00620 System connection list: 16-bit		Data type: UNSIGNED_16 Index: 23955 _d = 5D93 _h
Connection parameters: 16-bit inputs • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes. • Non-listed subcodes are "reserved".		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00620/1	1003: LA_NCtrl: nMotorSpeedAct_a	LS AnalogOutput : nOut1_a Analog output 1: Voltage
C00620/2	0: Not connected	LP CanOut1 : wState CAN1 output: Status word
C00620/3	0: Not connected	LP CanOut1 : wOut2 CAN1 output: Data word 2
C00620/4	0: Not connected	LP CanOut1 : wOut3 CAN1 output: Data word 3
C00620/5	0: Not connected	LP CanOut1 : wOut4 CAN1 output: Data word 4
C00620/6	0: Not connected	LP CanOut2 : wOut1 CAN2 output: Data word 1
C00620/7	0: Not connected	LP CanOut2 : wOut2 CAN2 output: Data word 2
C00620/8	0: Not connected	LP CanOut2 : wOut3 CAN2 output: Data word 3
C00620/9	0: Not connected	LP CanOut2 : wOut4 CAN2 output: Data word 4
C00620/10	0: Not connected	LP CanOut3 : wOut1 CAN3 output: Data word 1
C00620/11	0: Not connected	LP CanOut3 : wOut2 CAN3 output: Data word 2
C00620/12	0: Not connected	LP CanOut3 : wOut3 CAN3 output: Data word 3
C00620/13	0: Not connected	LP CanOut3 : wOut4 CAN3 output: Data word 4
C00620/14	0: Not connected	LS DisFree_a : nDis1_a Display of analog signal 1
C00620/15	0: Not connected	LS DisFree_a : nDis2_a Display of analog signal 2

Parameter Name: C00620 System connection list: 16-bit		Data type: UNSIGNED_16 Index: 23955 _d = 5D93 _h
C00620/16	0: Not connected	LS_DisFree_a : nDis3_a Display of analog signal 3
C00620/17	0: Not connected	LS_DisFree_a : nDis4_a Display of analog signal 4
C00620/18	0: Not connected	LS_DisFree : wDis1 Display of 16-bit signal 1
C00620/19	0: Not connected	LS_DisFree : wDis2 Display of 16-bit signal 2
C00620/20	0: Not connected	LS_DisFree : wDis3 Display of 16-bit signal 3
C00620/21	0: Not connected	LS_DisFree : wDis4 Display of 16-bit signal 4
C00620/22	0: Not connected	LP_MciOut : wState MCI output: Status word
C00620/23	0: Not connected	LP_MciOut : wOut2 MCI output: Data word 2
C00620/24	0: Not connected	LP_MciOut : wOut3 MCI output: Data word 3
C00620/25	0: Not connected	LP_MciOut : wOut4 MCI output: Data word 4
C00620/26	0: Not connected	LP_MciOut : wOut5 MCI output: Data word 5
C00620/27	0: Not connected	LP_MciOut : wOut6 MCI output: Data word 6
C00620/28	0: Not connected	LP_MciOut : wOut7 MCI output: Data word 7
C00620/29	0: Not connected	LP_MciOut : wOut8 MCI output: Data word 8
C00620/30	0: Not connected	LP_MciOut : wOut9 MCI output: Data word 9
C00620/31	0: Not connected	LP_MciOut : wOut10 MCI output: Data word 10
C00620/32	0: Not connected	LP_MciOut : wOut11 MCI output: Data word 11
C00620/33	0: Not connected	LP_MciOut : wOut12 MCI output: Data word 12
C00620/34	0: Not connected	LP_MciOut : wOut13 MCI output: Data word 13
C00620/35	0: Not connected	LP_MciOut : wOut14 MCI output: Data word 14
C00620/36	0: Not connected	LP_MciOut : wOut15 MCI output: Data word 15
C00620/37	0: Not connected	LP_MciOut : wOut16 MCI output: Data word 16
C00620/49	0: Not connected	LS_ParReadWrite_1 : wParIndex Read/write request 1: Code
C00620/50	0: Not connected	LS_ParReadWrite_1 : wParSubindex Read/write request 1: Subcode
C00620/51	0: Not connected	LS_ParReadWrite_1 : wInHWord Read/write request 1: Value (high word)

Parameter Name: C00620 System connection list: 16-bit		Data type: UNSIGNED_16 Index: 23955 _d = 5D93 _h
C00620/52	0: Not connected	LS_ParReadWrite_1 : wInLWord Read/write request 1: Value (low word)
C00620/53	0: Not connected	LS_ParReadWrite_2 : wParIndex Read/write request 2: Code
C00620/54	0: Not connected	LS_ParReadWrite_2 : wParSubindex Read/write request 2: Subcode
C00620/55	0: Not connected	LS_ParReadWrite_2 : wInHWord Read/write request 2: Value (high word)
C00620/56	0: Not connected	LS_ParReadWrite_2 : wInLWord Read/write request 2: Value (low word)
C00620/57	0: Not connected	LS_ParReadWrite_3 : wParIndex Read/write request 3: Code
C00620/58	0: Not connected	LS_ParReadWrite_3 : wParSubindex Read/write request 3: Subcode
C00620/59	0: Not connected	LS_ParReadWrite_3 : wInHWord Read/write request 3: Value (high word)
C00620/60	0: Not connected	LS_ParReadWrite_3 : wInLWord Read/write request 3: Value (low word)
C00620/108	0: Not connected	LP_CanOut4 : wOut1 CAN4 output: Data word 1
C00620/109	0: Not connected	LP_CanOut4 : wOut2 CAN3 output: Data word 2
C00620/110	0: Not connected	LP_CanOut4 : wOut3 CAN3 output: Data word 3
C00620/111	0: Not connected	LP_CanOut4 : wOut4 CAN3 output: Data word 4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00621

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
Connection parameters: Binary inputs • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes. • Non-listed subcodes are "reserved".		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00621/1	1001: LA_NCtrl: bDriveFail	LS_DigitalOutput : bRelay Digital relay output: Input signal
C00621/2	1000: LA_NCtrl: bDriveReady	LS_DigitalOutput : bOut1 Digital output 1: Input signal
C00621/3	0: Not connected	LS_DigitalInput : bCountIn1_Reset Digital input 1: Reset counter
C00621/4	0: Not connected	LS_DigitalInput : bCountIn1_LoadStartValue Digital input 1: Load counter starting value
C00621/5	0: Not connected	LP_CanOut1 : bState_B0 CAN1 output: Status word - bit 0

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/6	0: Not connected	LP_CanOut1 : bState_B1 CAN1 output: Status word - bit 1
C00621/7	0: Not connected	LP_CanOut1 : bState_B2 CAN1 output: Status word - bit 2
C00621/8	0: Not connected	LP_CanOut1 : bState_B3 CAN1 output: Status word - bit 3
C00621/9	0: Not connected	LP_CanOut1 : bState_B4 CAN1 output: Status word - bit 4
C00621/10	0: Not connected	LP_CanOut1 : bState_B5 CAN1 output: Status word - bit 5
C00621/11	0: Not connected	LP_CanOut1 : bState_B6 CAN1 output: Status word - bit 6
C00621/12	0: Not connected	LP_CanOut1 : bState_B7 CAN1 output: Status word - bit 7
C00621/13	0: Not connected	LP_CanOut1 : bState_B8 CAN1 output: Status word - bit 8
C00621/14	0: Not connected	LP_CanOut1 : bState_B9 CAN1 output: Status word - bit 9
C00621/15	0: Not connected	LP_CanOut1 : bState_B10 CAN1 output: Status word - bit 10
C00621/16	0: Not connected	LP_CanOut1 : bState_B11 CAN1 output: Status word - bit 11
C00621/17	0: Not connected	LP_CanOut1 : bState_B12 CAN1 output: Status word - bit 12
C00621/18	0: Not connected	LP_CanOut1 : bState_B13 CAN1 output: Status word - bit 13
C00621/19	0: Not connected	LP_CanOut1 : bState_B14 CAN1 output: Status word - bit 14
C00621/20	0: Not connected	LP_CanOut1 : bState_B15 CAN1 output: Status word - bit 15
C00621/21	0: Not connected	LS_DisFree_b : bDis1 Display of digital signal 1
C00621/22	0: Not connected	LS_DisFree_b : bDis2 Display of digital signal 2
C00621/23	0: Not connected	LS_DisFree_b : bDis3 Display of digital signal 3
C00621/24	0: Not connected	LS_DisFree_b : bDis4 Display of digital signal 4
C00621/25	0: Not connected	LS_DisFree_b : bDis5 Display of digital signal 5
C00621/26	0: Not connected	LS_DisFree_b : bDis6 Display of digital signal 6
C00621/27	0: Not connected	LS_DisFree_b : bDis7 Display of digital signal 7
C00621/28	0: Not connected	LS_DisFree_b : bDis8 Display of digital signal 8
C00621/29	0: Not connected	LP_CanOut2 : bOut1_B0 CAN2 output: Data word 1- bit 0
C00621/30	0: Not connected	LP_CanOut2 : bOut1_B1 CAN2 output: Data word 1- bit 1

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/31	0: Not connected	LP_CanOut2 : bOut1_B2 CAN2 output: Data word 1- bit 2
C00621/32	0: Not connected	LP_CanOut2 : bOut1_B3 CAN2 output: Data word 1- bit 3
C00621/33	0: Not connected	LP_CanOut2 : bOut1_B4 CAN2 output: Data word 1- bit 4
C00621/34	0: Not connected	LP_CanOut2 : bOut1_B5 CAN2 output: Data word 1- bit 5
C00621/35	0: Not connected	LP_CanOut2 : bOut1_B6 CAN2 output: Data word 1- bit 6
C00621/36	0: Not connected	LP_CanOut2 : bOut1_B7 CAN2 output: Data word 1- bit 7
C00621/37	0: Not connected	LP_CanOut2 : bOut1_B8 CAN2 output: Data word 1- bit 8
C00621/38	0: Not connected	LP_CanOut2 : bOut1_B9 CAN2 output: Data word 1- bit 9
C00621/39	0: Not connected	LP_CanOut2 : bOut1_B10 CAN2 output: Data word 1- bit 10
C00621/40	0: Not connected	LP_CanOut2 : bOut1_B11 CAN2 output: Data word 1- bit 11
C00621/41	0: Not connected	LP_CanOut2 : bOut1_B12 CAN2 output: Data word 1- bit 12
C00621/42	0: Not connected	LP_CanOut2 : bOut1_B13 CAN2 output: Data word 1- bit 13
C00621/43	0: Not connected	LP_CanOut2 : bOut1_B14 CAN2 output: Data word 1- bit 14
C00621/44	0: Not connected	LP_CanOut2 : bOut1_B15 CAN2 output: Data word 1- bit 15
C00621/45	0: Not connected	LP_CanOut3 : bOut1_B0 CAN3 output: Data word 1- bit 0
C00621/46	0: Not connected	LP_CanOut3 : bOut1_B1 CAN3 output: Data word 1- bit 1
C00621/47	0: Not connected	LP_CanOut3 : bOut1_B2 CAN3 output: Data word 1- bit 2
C00621/48	0: Not connected	LP_CanOut3 : bOut1_B3 CAN3 output: Data word 1- bit 3
C00621/49	0: Not connected	LP_CanOut3 : bOut1_B4 CAN3 output: Data word 1- bit 4
C00621/50	0: Not connected	LP_CanOut3 : bOut1_B5 CAN3 output: Data word 1- bit 5
C00621/51	0: Not connected	LP_CanOut3 : bOut1_B6 CAN3 output: Data word 1- bit 6
C00621/52	0: Not connected	LP_CanOut3 : bOut1_B7 CAN3 output: Data word 1- bit 7
C00621/53	0: Not connected	LP_CanOut3 : bOut1_B8 CAN3 output: Data word 1- bit 8
C00621/54	0: Not connected	LP_CanOut3 : bOut1_B9 CAN3 output: Data word 1- bit 9
C00621/55	0: Not connected	LP_CanOut3 : bOut1_B10 CAN3 output: Data word 1- bit 10

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/56	0: Not connected	LP_CanOut3 : bOut1_B11 CAN3 output: Data word 1- bit 11
C00621/57	0: Not connected	LP_CanOut3 : bOut1_B12 CAN3 output: Data word 1- bit 12
C00621/58	0: Not connected	LP_CanOut3 : bOut1_B13 CAN3 output: Data word 1- bit 13
C00621/59	0: Not connected	LP_CanOut3 : bOut1_B14 CAN3 output: Data word 1- bit 14
C00621/60	0: Not connected	LP_CanOut3 : bOut1_B15 CAN3 output: Data word 1- bit 15
C00621/61	0: Not connected	LP_MciOut : bState_B0 MCI output: Status word - bit 0
C00621/62	0: Not connected	LP_MciOut : bState_B1 MCI output: Status word - bit 1
C00621/63	0: Not connected	LP_MciOut : bState_B2 MCI output: Status word - bit 2
C00621/64	0: Not connected	LP_MciOut : bState_B3 MCI output: Status word - bit 3
C00621/65	0: Not connected	LP_MciOut : bState_B4 MCI output: Status word - bit 4
C00621/66	0: Not connected	LP_MciOut : bState_B5 MCI output: Status word - bit 5
C00621/67	0: Not connected	LP_MciOut : bState_B6 MCI output: Status word - bit 6
C00621/68	0: Not connected	LP_MciOut : bState_B7 MCI output: Status word - bit 7
C00621/69	0: Not connected	LP_MciOut : bState_B8 MCI output: Status word - bit 8
C00621/70	0: Not connected	LP_MciOut : bState_B9 MCI output: Status word - bit 9
C00621/71	0: Not connected	LP_MciOut : bState_B10 MCI output: Status word - bit 10
C00621/72	0: Not connected	LP_MciOut : bState_B11 MCI output: Status word - bit 11
C00621/73	0: Not connected	LP_MciOut : bState_B12 MCI output: Status word - bit 12
C00621/74	0: Not connected	LP_MciOut : bState_B13 MCI output: Status word - bit 13
C00621/75	0: Not connected	LP_MciOut : bState_B14 MCI output: Status word - bit 14
C00621/76	0: Not connected	LP_MciOut : bState_B15 MCI output: Status word - bit 15
C00621/77	0: Not connected	LP_MciOut : bOut2_B0 MCI output: Data word 2 - bit 0
C00621/78	0: Not connected	LP_MciOut : bOut2_B1 MCI output: Data word 2 - bit 1
C00621/79	0: Not connected	LP_MciOut : bOut2_B2 MCI output: Data word 2 - bit 2
C00621/80	0: Not connected	LP_MciOut : bOut2_B3 MCI output: Data word 2 - bit 3

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/81	0: Not connected	LP_MciOut : bOut2_B4 MCI output: Data word 2 - bit 4
C00621/82	0: Not connected	LP_MciOut : bOut2_B5 MCI output: Data word 2 - bit 5
C00621/83	0: Not connected	LP_MciOut : bOut2_B6 MCI output: Data word 2 - bit 6
C00621/84	0: Not connected	LP_MciOut : bOut2_B7 MCI output: Data word 2 - bit 7
C00621/85	0: Not connected	LP_MciOut : bOut2_B8 MCI output: Data word 2 - bit 8
C00621/86	0: Not connected	LP_MciOut : bOut2_B9 MCI output: Data word 2 - bit 9
C00621/87	0: Not connected	LP_MciOut : bOut2_B10 MCI output: Data word 2 - bit 10
C00621/88	0: Not connected	LP_MciOut : bOut2_B11 MCI output: Data word 2 - bit 11
C00621/89	0: Not connected	LP_MciOut : bOut2_B12 MCI output: Data word 2 - bit 12
C00621/90	0: Not connected	LP_MciOut : bOut2_B13 MCI output: Data word 2 - bit 13
C00621/91	0: Not connected	LP_MciOut : bOut2_B14 MCI output: Data word 2 - bit 14
C00621/92	0: Not connected	LP_MciOut : bOut2_B15 MCI output: Data word 2 - bit 15
C00621/93	0: Not connected	LS_SetError_1 : bSetError1 Input for tripping "US01: User error 1"
C00621/94	0: Not connected	LS_SetError_1 : bSetError2 Input for tripping "US02: User error 2"
C00621/95	0: Not connected	LS_SetError_1 : bSetError3 Input for tripping "US03: User error 3"
C00621/96	0: Not connected	LS_SetError_1 : bSetError4 Input for tripping "US04: User error 4"
C00621/111	0: Not connected	LS_ParReadWrite_1 : bExecute Read/write request 1: Trigger
C00621/112	0: Not connected	LS_ParReadWrite_1 : bReadWrite Read/write request 1: Selection of reading/writing
C00621/113	0: Not connected	LS_ParReadWrite_2 : bExecute Read/write request 2: Trigger
C00621/114	0: Not connected	LS_ParReadWrite_2 : bReadWrite Read/write request 2: Selection of reading/writing
C00621/115	0: Not connected	LS_ParReadWrite_3 : bExecute Read/write request 3: Trigger
C00621/116	0: Not connected	LS_ParReadWrite_3 : bReadWrite Read/write request 3: Selection of reading/writing
C00621/123	0: Not connected	LS_WriteParamList : bExecute Writing the parameter list: Activate
C00621/124	0: Not connected	LS_WriteParamList : bSelectWriteValue_1 Writing to parameter list: Selection of value set - 1
C00621/125	0: Not connected	LS_WriteParamList : bSelectWriteValue_2 Writing to parameter list: Selection of value set - 2

Parameter Name: C00621 System connection list: Bool		Data type: UNSIGNED_16 Index: 23954 _d = 5D92 _h
C00621/126	0: Not connected	LS_CANManagement : bResetNode Reset CAN node
C00621/127	0: Not connected	LS_CANManagement : bReInitCAN Reinitialise CAN interface
C00621/128	0: Not connected	LS_DigitalInput : bPosIn12_Load Frequency input DI1/DI2: Load angle integrator with starting value and reset status signal
C00621/184	0: Not connected	LP_CanOut4 : bOut1_B0 CAN4 output: Data word 1- bit 0
C00621/185	0: Not connected	LP_CanOut4 : bOut1_B1 CAN4 output: Data word 1- bit 1
C00621/186	0: Not connected	LP_CanOut4 : bOut1_B2 CAN4 output: Data word 1- bit 2
C00621/187	0: Not connected	LP_CanOut4 : bOut1_B3 CAN4 output: Data word 1- bit 3
C00621/188	0: Not connected	LP_CanOut4 : bOut1_B4 CAN4 output: Data word 1- bit 4
C00621/189	0: Not connected	LP_CanOut4 : bOut1_B5 CAN4 output: Data word 1- bit 5
C00621/190	0: Not connected	LP_CanOut4 : bOut1_B6 CAN4 output: Data word 1- bit 6
C00621/191	0: Not connected	LP_CanOut4 : bOut1_B7 CAN4 output: Data word 1- bit 7
C00621/192	0: Not connected	LP_CanOut4 : bOut1_B8 CAN4 output: Data word 1- bit 8
C00621/193	0: Not connected	LP_CanOut4 : bOut1_B9 CAN4 output: Data word 1- bit 9
C00621/194	0: Not connected	LP_CanOut4 : bOut1_B10 CAN4 output: Data word 1- bit 10
C00621/195	0: Not connected	LP_CanOut4 : bOut1_B11 CAN4 output: Data word 1- bit 11
C00621/196	0: Not connected	LP_CanOut4 : bOut1_B12 CAN4 output: Data word 1- bit 12
C00621/197	0: Not connected	LP_CanOut4 : bOut1_B13 CAN4 output: Data word 1- bit 13
C00621/198	0: Not connected	LP_CanOut4 : bOut1_B14 CAN4 output: Data word 1- bit 14
C00621/199	0: Not connected	LP_CanOut4 : bOut1_B15 CAN4 output: Data word 1- bit 15
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00622

Parameter Name: C00622 System connection list: Angle		Data type: UNSIGNED_16 Index: 23953 _d = 5D91 _h
Connection parameters: 32-bit inputs • Selection of the 32-bit output signals for connection with the 32-bit input signals. • The selection list contains all 32-bit output signals which can be assigned to the 32-bit inputs mapped by the subcodes. • Non-listed subcodes are "reserved".		
Selection list		
See selection list - angle signals		
Subcodes	Lenze setting	Info
C00622/9	0: Not connected	LP_CanOut1 : dnOut34_p CAN1 output: Data words 3 + 4
C00622/10	0: Not connected	LP_CanOut2 : dnOut34_p CAN2 output: Data words 3 + 4
C00622/11	0: Not connected	LP_CanOut3 : dnOut34_p CAN3 output: Data words 3 + 4
C00622/12	0: Not connected	LP_MciOut : dnOut34_p MCI output: Data words 3 + 4
C00622/13	0: Not connected	LS_DigitalInput : dnPosIn12_Set_p Frequency input DI1/DI2: Starting value for angle integrator
C00622/25	0: Not connected	LP_CanOut4 : dnOut34_p CAN4 output: Data words 3 + 4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00632

Parameter Name: C00632 L_NSet_1: Max.SkipFrq.		Data type: INTEGER_16 Index: 23943 _d = 5D87 _h
Maximum limit values for the speed blocking zones • Selection of the maximum limit values for the blocking zones in which the speed must not be constant.		
Setting range (min. value unit max. value)		
0.00	%	199.99
Subcodes	Lenze setting	Info
C00632/1	0.00 %	L_NSet_1 : Blocking speed1 max
C00632/2	0.00 %	L_NSet_1 : Blocking speed2 max
C00632/3	0.00 %	L_NSet_1 : Blocking speed3 max
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100		

C00633

Parameter Name: C00633 L_NSet_1: Min.SkipFrq.			Data type: INTEGER_16 Index: 23942 _d = 5D86 _h		
Minimum limit values for the speed blocking zones					
• Selection of the minimum limit values for the blocking zones in which the speed must not be constant.					
Setting range (min. value unit max. value)					
0.00	%	199.99			
Subcodes	Lenze setting		Info		
C00633/1	0.00 %		L_NSet_1 : Blocking speed1 min		
C00633/2	0.00 %		L_NSet_1 : Blocking speed2 min		
C00633/3	0.00 %		L_NSet_1 : Blocking speed3 min		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00634

Parameter Name: C00634 L_NSet_1: wState			Data type: UNSIGNED_16 Index: 23941 _d = 5D85 _h		
The L_NSet_1 FB: Bit coded status display					
Display area (min. hex value max. hex value)					
0x0000		0xFFFF			
Value is bit-coded:			Info		
Bit 0	No blocking zone active		1 ≡ No blocking zone set for constant speeds		
Bit 1	Blocking zone 1 active		1 ≡ Suppression of constant speed characteristics within the limits of blocking zone 1		
Bit 2	Blocking zone 2 active		1 ≡ Suppression of constant speed characteristics within the limits of blocking zone 2		
Bit 3	Blocking zone 3 active		1 ≡ Suppression of constant speed characteristics within the limits of blocking zone 3		
Bit 4	Jog in blocking zone		1 ≡ A ramp is used to keep the speed setpoint within a speed blocking zone		
Bit 5	MaxLimit active		1 ≡ Speed setpoint is at the maximum speed limit		
Bit 6	MinLimit active		1 ≡ Speed setpoint is at the minimum speed limit		
Bit 7	Reserved				
Bit 8	Reserved				
Bit 9	Reserved				
Bit 10	Reserved				
Bit 11	Reserved				
Bit 12	Reserved				
Bit 13	Reserved				
Bit 14	Reserved				
Bit 15	Reserved				
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT					

C00635

Parameter Name: C00635 L_NSet_1: nMaxLimit			Data type: INTEGER_16 Index: 23940 _d = 5D84 _h
The L_NSet_1 FB: Maximum speed setpoint for speed setpoint limitation			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	199.99 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00636

Parameter Name: C00636 L_NSet_1: nMinLimit			Data type: INTEGER_16 Index: 23939 _d = 5D83 _h
The L_NSet_1 FB: Minimum speed setpoint for speed setpoint limitation			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	-199.99 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00637

Parameter Name: C00637 L_NSet_1: Output blocking zones			Data type: INTEGER_16 Index: 23938 _d = 5D82 _h
The L_NSet_1 FB: Speed setpoint is displayed after being processed by blocking zone function			
Display range (min. value unit max. value)			
-199.99	%	199.99	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00638

Parameter Name: C00638 L_NSet_1: Output ramp rounding			Data type: INTEGER_16 Index: 23937 _d = 5D81 _h
The L_NSet_1 FB: Speed setpoint is displayed after being processed by PT1 filter function			
Display range (min. value unit max. value)			
-199.99	%	199.99	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00639

Parameter Name: C00639 L_NSet_1: Output additional value			Data type: INTEGER_16 Index: 23936 _d = 5D80 _h
The L_NSet_1 FB: Additional speed setpoint is displayed after being processed by the ramp generator			
Display range (min. value unit max. value)			
-199.99	%	199.99	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00640

Parameter Name: C00640 L_NSet_1: nNOut_a			Data type: INTEGER_16 Index: 23935 _d = 5D7F _h		
The L_NSet_1 FB: Display of the generated main speed setpoint at the output <i>nNOut_a</i>					
Display range (min. value unit max. value)					
-199.99	%	199.99			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00643

Parameter Name: C00643 Resp. to PLI monitoring		Data type: UNSIGNED_8 Index: 23932 _d = 5D7C _h	
From version 11.00.00			
		► Pole position identification without motion	
Selection list			
0	No Reaction		
1	Fault		
3	TroubleQuickStop		
4	WarningLocked		
5	Warning		
6	Information		
Subcodes	Lenze setting	Info	
C00643/1	1: Fault	Response to PLI monitoring	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00653

Parameter | Name:

C00653 | Sensibility - Setpoint feedforward control

Data type: UNSIGNED_8

Index: 23922_d = 5D72_h

From version 12.00.00

Selection of the sensitivity of the differential setpoint feedforward control

Depending on the selection, the number of indicated higher-order bits is evaluated.

Note:

The most significant bit determines the sign of the value, the remaining bits determine the numerical value.

Selection list		Info
0	Inactive	
1	15 bits	Bit 0 ... bit 14 are evaluated
2	14 bits	Bit 0 ... bit 13 are evaluated
3	13 bits	Bit 0 ... bit 12 are evaluated
4	12 bits	Bit 0 ... bit 11 are evaluated
5	11 Bit	Bit 0 ... bit 10 are evaluated
6	10 Bit	Bit 0 ... bit 9 are evaluated
7	9 Bit	Bit 0 ... bit 8 are evaluated
Subcodes	Lenze setting	Info
C00653/1	0: Inactive	Sensibility - Setpoint feedforward control

☒ Read access
 ☒ Write access
 ☐ CINH
 ☐ PLC STOP
 ☐ No transfer
 ☐ COM
 ☒ MOT
 Scaling factor: 1

C00654

Parameter Name: C00654 Source of diff. setpoint feedforward control		Data type: UNSIGNED_8 Index: 23921 _d = 5D71 _h	
Selection list		Info	
0	nSpeedSetValue_a		
1	nSpeedSetValueInertia_a		
Subcodes	Lenze setting	Info	
C00654/1	0: nSpeedSetValue_a	Source of diff. setpoint feedforward control	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00670

Parameter Name: C00670 L_OffsetGainP_1: Gain			Data type: INTEGER_32 Index: 23905 _d = 5D61 _h		
The L_OffsetGainP_1 FB: Gain as multiplier of the input signal + offset					
Setting range (min. value unit max. value)			Lenze setting		
-100.0000			100.0000		1.0000
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000					

C00671

Parameter Name: C00671 L_OffsetGainP_2: Gain			Data type: INTEGER_32 Index: 23904 _d = 5D60 _h		
The L_OffsetGainP_2 FB: Gain as multiplier of the input signal + offset					
Setting range (min. value unit max. value)			Lenze setting		
-100.0000			100.0000		1.0000
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000					

C00672

Parameter Name: C00672 L_OffsetGainP_3: Gain			Data type: INTEGER_32 Index: 23903 _d = 5D5F _h
The L_OffsetGainP_3 FB: Gain as multiplier of the input signal + offset			
Setting range (min. value unit max. value)			Lenze setting
-100.0000		100.0000	1.0000
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C00680

Parameter Name: C00680 L_Compare_1: Fct.		Data type: UNSIGNED_8 Index: 23895 _d = 5D57 _h	
The L_Compare_1 FB: Comparison operation			
• If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE.			
Selection list (Lenze setting printed in bold)			
1	In1 = In2		
2	In1 > In2		
3	In1 < In2		
4	In1 = In2		
5	In1 > In2		
6	In1 < In2		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00681

Parameter Name: C00681 L_Compare_1: Hysteresis			Data type: INTEGER_16 Index: 23894 _d = 5D56 _h
The L_Compare_1 FB: Hysteresis for the comparison function selected in C00680			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	0.50 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00682

Parameter Name: C00682 L_Compare_1: Window			Data type: INTEGER_16 Index: 23893 _d = 5D55 _h
The L_Compare_1 FB: Window for the comparison function selected in C00680			
Setting range (min. value unit max. value)		Lenze setting	
0.00	%	100.00	2.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00685

Parameter Name: C00685 L_Compare_2: Fct.		Data type: UNSIGNED_8 Index: 23890 _d = 5D52 _h	
The L_Compare_2 FB: Comparison operation			
• If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE.			
Selection list (Lenze setting printed in bold)			
1	In1 = In2		
2	In1 > In2		
3	In1 < In2		
4	 In1 = In2 		
5	 In1 > In2 		
6	 In1 < In2 		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00686

Parameter Name: C00686 L_Compare_2: Hysteresis			Data type: INTEGER_16 Index: 23889 _d = 5D51 _h
The L_Compare_2 FB: Hysteresis for the comparison function selected in C00685			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	0.50 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00687

Parameter Name: C00687 L_Compare_2: Window			Data type: INTEGER_16 Index: 23889 _d = 5D50 _h
The L_Compare_2 FB: Window for the comparison function selected in C00685			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	2.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00690

Parameter Name: C00690 L_Compare_3: Function		Data type: UNSIGNED_8 Index: 23885 _d = 5D4D _h
From version 11.00.00		
The L_Compare_3 FB: Comparison operation		
• If the statement of the selected comparison operation is true, the binary <i>bOut</i> output will be set to TRUE.		
Selection list (Lenze setting printed in bold)		
1	In1 = In2	
2	In1 > In2	
3	In1 < In2	
4	In1 = In2	
5	In1 > In2	
6	In1 < In2	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00691

Parameter Name: C00691 L_Compare_3: Hysteresis			Data type: INTEGER_16 Index: 23884 _d = 5D4C _h
From version 11.00.00 FB L_Compare_3 : Hysteresis for the comparison operation selected in C00690			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	0.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00692

Parameter Name: C00692 L_Compare_3: Window			Data type: INTEGER_16 Index: 23883 _d = 5D4B _h
From version 11.00.00 FB L_Compare_3 : window for the comparison operation selected in C00690			
Setting range (min. value unit max. value)			Lenze setting
0.00	%	100.00	0.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00696

Parameter Name: C00696 L_OffsetGainP_1: Offset			Data type: INTEGER_16 Index: 23879 _d = 5D47 _h
The L_OffsetGainP_1 FB: Offset (additive to the input signal)			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	0.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00697

Parameter Name: C00697 L_OffsetGainP_2: Offset			Data type: INTEGER_16 Index: 23878 _d = 5D46 _h
The L_OffsetGainP_2 FB: Offset (additive to the input signal)			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	0.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00698

Parameter Name: C00698 L_OffsetGainP_3: Offset			Data type: INTEGER_16 Index: 23877 _d = 5D45 _h
The L_OffsetGainP_3 FB: Offset (additive to the input signal)			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	0.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00699

Parameter Name: C00699 L_MulDiv_1: Parameter			Data type: INTEGER_16 Index: 23876 _d = 5D44 _h
The L_MulDiv_1 FB: Numerator and denominator			
Setting range (min. value unit max. value)			
-32767			
Subcodes	Lenze setting	Info	
C00699/1	0	L_MulDiv_1 : Numerator	
C00699/2	10000	L_MulDiv_1 : Denominator	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00700

Parameter Name: C00700 LA_NCtrl: Analog connection list		Data type: UNSIGNED_16 Index: 23875 _d = 5D43 _h
Connection parameters for "Actuating drive speed" application: 16-bit inputs • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes.		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00700/1	20005: LS_ParFix: wDriveCtrl	LA_NCtrl : wCANDriveControl Input for control word from CAN to device control
C00700/2	20005: LS_ParFix: wDriveCtrl	LA_NCtrl : wMCIDriveControl Input for control word from communication interface to device control
C00700/3	20012: LS_ParFree_a: nC472_3_a	LA_NCtrl : nTorqueMotLim_a Input for maximum torque in motor mode
C00700/4	20013: LS_ParFree_a: nC472_4_a	LA_NCtrl : nTorqueGenLim_a Input for maximum torque in generator mode
C00700/5	0: Not connected	LA_NCtrl : nPIDVpAdapt_a Input for adapting the PID controller gain
C00700/6	0: Not connected	LA_NCtrl : nPIDActValue_a Input for actual PID controller value
C00700/7	16000: LS_AnalogInput: nIn1_a	LA_NCtrl : nMainSetValue_a Input for main speed setpoint
C00700/8	0: Not connected	LA_NCtrl : nAuxSetValue_a Input for additional speed setpoint
C00700/9	0: Not connected	LA_NCtrl : nGPAnalogSwitchIn1_a Input for analog switch - analog signal 1
C00700/10	0: Not connected	LA_NCtrl : nGPAnalogSwitchIn2_a Input for analog switch - analog signal 2
C00700/11	0: Not connected	LA_NCtrl : nGPArithmetikIn1_a Input for arithmetic function - analog signal 1
C00700/12	0: Not connected	LA_NCtrl : nGPArithmetikIn2_a Input for arithmetic function - analog signal 2
C00700/13	0: Not connected	LA_NCtrl : nGPMulDivIn_a Input for analog signal for multiplication/division
C00700/14	0: Not connected	LA_NCtrl : nGPCompareIn1_a Input for comparison operation - analog signal 1
C00700/15	0: Not connected	LA_NCtrl : nGPCompareIn2_a Input for comparison operation - analog signal 2
C00700/16	0: Not connected	LA_NCtrl : nVoltageAdd_a Input for additive voltage boost
C00700/17	0: Not connected	LA_NCtrl : nPIDInfluence_a Input for influence signal of PID controller correcting variable
C00700/18	0: Not connected	LA_NCtrl : nPIDSetValue_a Input for PID controller setpoint
C00700/19	0: Not connected	LA_NCtrl : nPWMAngleOffset Input for pulse width modulation phase offset
C00700/20	0: Not connected	LA_NCtrl : nBoost_a Input for additional setpoint for motor voltage at speed = 0

Parameter Name: C00700 LA_NCtrl: Analog connection list		Data type: UNSIGNED_16 Index: 23875 _d = 5D43 _h
C00700/21	0: Not connected	LA_NCtrl : wSMCtrl Interface to the optional safety system
C00700/22	0: Not connected	Reserved
C00700/23	0: Not connected	Reserved
C00700/24	0: Not connected	Reserved
C00700/25	0: Not connected	Reserved
C00700/26	0: Not connected	LA_NCtrl : wFreeIn1 Input for user signal 1
C00700/27	0: Not connected	LA_NCtrl : wFreeIn2 Input for user signal 2
C00700/28	0: Not connected	LA_NCtrl : wFreeIn3 Input for user signal 3
C00700/29	0: Not connected	LA_NCtrl : wFreeIn4 Input for user signal 4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00701

Parameter Name: C00701 LA_NCtrl: Digital connection list		Data type: UNSIGNED_16 Index: 23874 _d = 5D42 _h
Connection parameters for "Actuating drive speed" application: Binary inputs • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes.		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00701/1	0: Not connected	LA_NCtrl : bCInh Control input for setting controller inhibit
C00701/2	16008: LS_DigitalInput: bCInh	LA_NCtrl : bFailReset Control input for error acknowledgement
C00701/3	0: Not connected	LA_NCtrl : bSetQuickstop Control input for quick stop request
C00701/4	16002: LS_DigitalInput: bIn3	LA_NCtrl : bSetDCBrake Control input for DC-injection braking request
C00701/5	0: Not connected	LA_NCtrl : bRFG_Stop Control input for stopping the speed ramp function generator
C00701/6	0: Not connected	LA_NCtrl : bRFG_0 Control input for setting the speed ramp function generator to 0
C00701/7	0: Not connected	Reserved
C00701/8	16003: LS_DigitalInput: bIn4	LA_NCtrl : bSetSpeedCcw Control input for change of direction of rotation
C00701/9	16000: LS_DigitalInput: bIn1	LA_NCtrl : bJogSpeed1 Selection input for fixed setpoints
C00701/10	16001: LS_DigitalInput: bIn2	LA_NCtrl : bJogSpeed2 Selection input for fixed setpoints
C00701/11	0: Not connected	LA_NCtrl : bJogSpeed4 Selection input for fixed setpoints

Parameter Name: C00701 LA_NCtrl: Digital connection list		Data type: UNSIGNED_16 Index: 23874 _d = 5D42 _h
C00701/12	0: Not connected	LA_NCtrl: bJogSpeed8 Selection input for fixed setpoints
C00701/13	0: Not connected	LA_NCtrl: bJogRamp1 Selection input for additional acceleration/deceleration times
C00701/14	0: Not connected	LA_NCtrl: bJogRamp2 Selection input for additional acceleration/deceleration times
C00701/15	0: Not connected	LA_NCtrl: bJogRamp4 Selection input for additional acceleration/deceleration times
C00701/16	0: Not connected	LA_NCtrl: bJogRamp8 Selection input for additional acceleration/deceleration times
C00701/17	0: Not connected	LA_NCtrl: bMPOTInAct Control input for deactivation of motor potentiometer
C00701/18	0: Not connected	LA_NCtrl: bMPOTUp Control input for motor potentiometer ramp-up
C00701/19	0: Not connected	LA_NCtrl: bMPOTDown Control input for motor potentiometer ramp-down
C00701/20	0: Not connected	LA_NCtrl: bMBRKRelease Control input for manual holding brake release request
C00701/21	0: Not connected	LA_NCtrl: bGPFree1 Input for binary user signal
C00701/22	0: Not connected	LA_NCtrl: bGPFree2 Input for binary user signal
C00701/23	0: Not connected	LA_NCtrl: bGPAnalogSwitchSet Control input for analog-value selector change-over
C00701/24	0: Not connected	LA_NCtrl: bGPDigitalDelayIn Input for digital signal with time delay
C00701/25	0: Not connected	LA_NCtrl: bGPLogicIn1 Input signal 1 for digital logic
C00701/26	0: Not connected	LA_NCtrl: bGPLogicIn2 Input signal 2 for digital logic
C00701/27	0: Not connected	LA_NCtrl: bGPLogicIn3 Input signal 3 for digital logic
C00701/28	0: Not connected	LA_NCtrl: bGPDFlipFlopInD Control input for DFlipFlop setting signal
C00701/29	0: Not connected	LA_NCtrl: bGPDFlipFlopInClk Control input for DFlipFlop clock signal
C00701/30	0: Not connected	LA_NCtrl: bGPDFlipFlopInClr Control input for DFlipFlop reset signal
C00701/31	0: Not connected	LA_NCtrl: bMPotEnable Control input for activation of motor potentiometer
C00701/32	0: Not connected	LA_NCtrl: bPIDEnableInfluenceRamp Control input for activation of influence of output correcting variable of PID controller
C00701/33	0: Not connected	LA_NCtrl: bPIDIOff Control input for deactivation of PID controller I component
C00701/34	20000: LS_ParFix: bTrue	LA_NCtrl: bRLQCw Control input for activation of CW direction of rotation of speed setpoint

Parameter Name: C00701 LA_NCtrl: Digital connection list		Data type: UNSIGNED_16 Index: 23874 _d = 5D42 _h
C00701/35	0: Not connected	LA_NCtrl : bRLQCcw Control input for activation of CCW direction of rotation of speed setpoint
C00701/36	0: Not connected	Reserved
C00701/37	0: Not connected	Reserved
C00701/38	0: Not connected	Reserved
C00701/39	0: Not connected	Reserved
C00701/40	0: Not connected	Reserved
C00701/41	0: Not connected	LA_NCtrl : bFreeIn1 Input for binary user signal 1
C00701/42	0: Not connected	LA_NCtrl : bFreeIn2 Input for binary user signal 2
C00701/43	0: Not connected	LA_NCtrl : bFreeIn3 Input for binary user signal 3
C00701/44	0: Not connected	LA_NCtrl : bFreeIn4 Input for binary user signal 4
C00701/45	0: Not connected	LA_NCtrl : bFreeIn5 Input for binary user signal 5
C00701/46	0: Not connected	LA_NCtrl : bFreeIn6 Input for binary user signal 6
C00701/47	0: Not connected	LA_NCtrl : bFreeIn7 Input for binary user signal 7
C00701/48	0: Not connected	LA_NCtrl : bFreeIn8 Input for binary user signal 8
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00705

Parameter Name: C00705 LA_NCtrl_Out: Analog signal list	Data type: UNSIGNED_16 Index: 23870 _d = 5D3E _h
This code is for device-internal use only and must not be written to by the user!	

C00706

Parameter Name: C00706 LA_NCtrl_Out digital signal list	Data type: UNSIGNED_16 Index: 23869 _d = 5D3D _h
This code is for device-internal use only and must not be written to by the user!	

C00720

Parameter Name: C00720 L_DigitalDelay_1: Delay		Data type: UNSIGNED_32 Index: 23855 _d = 5D2F _h
Switch-on/off delay time		
Setting range (min. value unit max. value)		
0.000	s	3600.000
Subcodes	Lenze setting	Info
C00720/1	0.000 s	L_DigitalDelay_1 : ON delay
C00720/2	0.000 s	L_DigitalDelay_1 : OFF delay
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000		

C00725

Parameter Name:		Data type: UNSIGNED_8 Index: 23850 _d = 5D2A _h	
C00725 Current switching frequency			
Display of the current switching frequency			
• In C00018 you can choose between a drive-optimised setting for good smooth-running characteristics and an inverter loss-optimised setting (min. Pv). • Both possibilities offer fixed and variable switching frequencies. • When a variable switching frequency is selected in C00018, the switching frequency may change as a function of the load and rotational frequency.			
Selection list (read only)			
1	4 kHz var./drive-optimised		
2	8 kHz var./drive-optimised		
3	16 kHz var./drive-optimised		
5	2 kHz constant/drive-optimised		
6	4 kHz constant/drive-optimised		
7	8 kHz constant/drive-optimised		
8	16 kHz constant/drive-optimised		
11	4 kHz var./min. Pv		
12	8 kHz var./min. Pv		
13	16 kHz var./min. Pv		
14	Reserved		
15	2 kHz constant/min. Pv		
16	4 kHz constant/min. Pv		
17	8 kHz constant/min. Pv		
18	16 kHz constant/min. Pv		
21	8 kHz var./drive-opt./4 kHz min		
22	16 kHz var./drive-opt./4 kHz min		
23	16 kHz var./drive-opt./8 kHz min		
31	8 kHz var./min. Pv/4 kHz min		
32	16 kHz var./min. Pv/4 kHz min		
33	16 kHz var./min. Pv/8 kHz min		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00726

Parameter Name:	Data type: UNSIGNED_8
C00726 Current limit values	Index: 23849 _d = 5D29 _h
This code is for device-internal use only and must not be written to by the user!	

C00727

Parameter Name: C00727 LS_Keypad digital values			Data type: UNSIGNED_8 Index: 23848 _d = 5D28 _h
Execution of control commands for keypad operation			
Setting range (min. value unit max. value)			
0		1	
Subcodes	Lenze setting	Info	
C00727/1	0	1 ≡ request quick stop	
C00727/2	0	1 ≡ request DC-injection braking	
C00727/3	0	1 ≡ request change of direction of rotation	
C00727/4	0	1 ≡ request fixed speed setpoint 1	
C00727/5	0	1 ≡ request fixed speed setpoint 2	
C00727/6	0	1 ≡ motor potentiometer: request activation	
C00727/7	0	1 ≡ motor potentiometer: request pos. acceleration	
C00727/8	0	1 ≡ motor potentiometer: request neg. acceleration	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00728

Parameter Name: C00728 Keypad analog values			Data type: INTEGER_16 Index: 23847 _d = 5D27 _h
Selection of different setpoints when operating via keypad			
Setting range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes	Lenze setting	Info	
C00728/1	100.00 %	Torque limit in motor mode	
C00728/2	100.00 %	Torque limit in generator mode	
C00728/3	0.00 %	Setpoint speed	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00729

Parameter Name: C00729 Remote: Setpoint selection			Data type: INTEGER_16 Index: 23846 _d = 5D26 _h
Setting range (min. value unit max. value)			
-199.99		199.99	
Subcodes	Lenze setting	Info	
C00729/1	0.00	Remote: Setpoint keypad	
C00729/2	0.00	Remote: Setpoint PC	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00730

Parameter Name: C00730 Oscilloscope scanning interval			Data type: UNSIGNED_32 Index: 23845 _d = 5D25 _h
This code is for device-internal use only and must not be written to by the user!			

C00731

Parameter Name:	Data type: UNSIGNED_32 Index: 23844 _d = 5D24 _h
C00731 Oscilloscope recording length	
This code is for device-internal use only and must not be written to by the user!	

C00732

Parameter Name:	Data type: UNSIGNED_8 Index: 23843 _d = 5D23 _h
C00732 Oscilloscope command	
This code is for device-internal use only and must not be written to by the user!	

C00734

Parameter Name:	Data type: UNSIGNED_16 Index: 23841 _d = 5D21 _h
C00734 Oscilloscope trigger channel selection	
This code is for device-internal use only and must not be written to by the user!	

C00735

Parameter Name:	Data type: UNSIGNED_8 Index: 23840 _d = 5D20 _h
C00735 Oscilloscope channel source type	
This code is for device-internal use only and must not be written to by the user!	

C00736

Parameter Name:	Data type: UNSIGNED_16 Index: 23839 _d = 5D1F _h
C00736 Oscilloscope data type/data width	
This code is for device-internal use only and must not be written to by the user!	

C00740

Parameter Name:	Data type: UNSIGNED_32 Index: 23835 _d = 5D1B _h
C00740 Oscilloscope offset variables	
This code is for device-internal use only and must not be written to by the user!	

C00741

Parameter Name:	Data type: UNSIGNED_8 Index: 23834 _d = 5D1A _h
C00741 Oscilloscope trigger mode	
This code is for device-internal use only and must not be written to by the user!	

C00742

Parameter Name:	Data type: INTEGER_16 Index: 23833 _d = 5D19 _h
C00742 Oscilloscope trigger delay	
This code is for device-internal use only and must not be written to by the user!	

C00743

Parameter Name:	Data type: UNSIGNED_32 Index: 23832 _d = 5D18 _h
C00743 Oscilloscope trigger level	
This code is for device-internal use only and must not be written to by the user!	

C00744

Parameter Name:	Data type: UNSIGNED_32 Index: 23831 _d = 5D17 _h
C00744 Oscilloscope trigger mask	
This code is for device-internal use only and must not be written to by the user!	

C00746

Parameter Name:	Data type: UNSIGNED_32 Index: 23829 _d = 5D15 _h
C00746 Oscilloscope trigger counter	
This code is for device-internal use only and must not be written to by the user!	

C00747

Parameter Name:	Data type: UNSIGNED_16 Index: 23828 _d = 5D14 _h
C00747 Oscilloscope status word	
This code is for device-internal use only and must not be written to by the user!	

C00748

Parameter Name:	Data type: UNSIGNED_32 Index: 23827 _d = 5D13 _h
C00748 Oscilloscope no. of measured values	
This code is for device-internal use only and must not be written to by the user!	

C00749

Parameter Name:	Data type: UNSIGNED_32 Index: 23826 _d = 5D12 _h
C00749 Oscilloscope recording	
This code is for device-internal use only and must not be written to by the user!	

C00750

Parameter Name:	Data type: UNSIGNED_8 Index: 23825 _d = 5D11 _h
C00750 Select. of MCTRL oscillos. channels	
This code is for device-internal use only and must not be written to by the user!	

C00751

Parameter Name:	Data type: UNSIGNED_32 Index: 23824 _d = 5D10 _h
C00751 Oscilloscope data memory	
This code is for device-internal use only and must not be written to by the user!	

C00753

Parameter Name:	Data type: OCTET_STRING Index: 23822 _d = 5D0E _h
C00753 Oscilloscope data memory octet string	
This code is for device-internal use only and must not be written to by the user!	

C00760

Parameter Name:		Data type: UNSIGNED_16 Index: 23815 _d = 5D07 _h
C00760 LA_SwitchPos: Analog connection list		
Connection parameters for "Switch-off positioning" application: 16-bit inputs • Selection of the 16 bit output signals to be connected to the 16 bit input signals • The selection list contains all 16 bit output signals which can be assigned to the 16 bit inputs displayed by the subcodes.		
Selection list		
See selection list - analog signals		
Subcodes	Lenze setting	Info
C00760/1	0: Not connected	LA_SwitchPos : wCANDriveControl Input for control word from CAN to device control
C00760/2	0: Not connected	LA_SwitchPos : wMCIDriveControl Input for control word from communication interface to device control
C00760/3	0: Not connected	LA_SwitchPos : nVoltageAdd_a Input for additive voltage impression
C00760/4	0: Not connected	LA_SwitchPos : nBoost_a Input for additional setpoint for motor voltage at speed = 0
C00760/5	0: Not connected	LA_SwitchPos : nPWMAngleOffset Input for additional offset for the electrical angle of rotation
C00760/6	0: Not connected	LA_SwitchPos : nTorqueMotLim_a Input for maximum torque in motor mode
C00760/7	0: Not connected	LA_SwitchPos : nTorqueGenLim_a Input for maximum torque in generator mode
C00760/8	0: Not connected	LA_SwitchPos : nMainSetValue_a Input for main speed setpoint
C00760/9	0: Not connected	LA_SwitchPos : nAuxSetValue_a Input for additional speed setpoint
C00760/10	0: Not connected	LA_SwitchPos : nGPAnalogSwitchIn1_a Input for analog switch - analog signal 1
C00760/11	0: Not connected	LA_SwitchPos : nGPAnalogSwitchIn2_a Input for analog switch - analog signal 2
C00760/12	0: Not connected	LA_SwitchPos : nGPArithmetikIn1_a Input for arithmetic function - analog signal 1
C00760/13	0: Not connected	LA_SwitchPos : nGPArithmetikIn2_a Input for arithmetic function - analog signal 2
C00760/14	0: Not connected	LA_SwitchPos : nGPMulDivIn_a Input for analog signal for multiplication/division
C00760/15	0: Not connected	LA_SwitchPos : nGPCompareIn1_a Input for comparison operation - analog signal 1
C00760/16	0: Not connected	LA_SwitchPos : nGPCompareIn2_a Input for comparison operation - analog signal 2
C00760/17	0: Not connected	LA_SwitchPos : wSMCtrl Interface to the optional safety system
C00760/18	0: Not connected	Reserved
C00760/19	0: Not connected	Reserved
C00760/20	0: Not connected	Reserved
C00760/21	0: Not connected	Reserved

Parameter Name: C00760 LA_SwitchPos: Analog connection list		Data type: UNSIGNED_16 Index: 23815 _d = 5D07 _h
C00760/22	0: Not connected	LA_SwitchPos : wFreeIn1 Input for user signal 1
C00760/23	0: Not connected	LA_SwitchPos : wFreeIn2 Input for user signal 2
C00760/24	0: Not connected	LA_SwitchPos : wFreeIn3 Input for user signal 3
C00760/25	0: Not connected	LA_SwitchPos : wFreeIn4 Input for user signal 4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00761

Parameter Name: C00761 LA_SwitchPos: Digital connection list		Data type: UNSIGNED_16 Index: 23814 _d = 5D06 _h
Connection parameters for "Switch-off positioning" application: Binary inputs • Selection of the binary output signals to be connected to the binary input signals • The selection list contains all binary output signals which can be assigned to the binary inputs mapped by the subcodes.		
Selection list		
See selection list - digital signals		
Subcodes	Lenze setting	Info
C00761/1	0: Not connected	LA_SwitchPos : bCInh Control input for setting controller inhibit
C00761/2	0: Not connected	LA_SwitchPos : bFailReset Control input for error acknowledgement
C00761/3	0: Not connected	LA_SwitchPos : bSetQuickstop Control input for quick stop request
C00761/4	0: Not connected	LA_SwitchPos : bSetDCBrake Control input for DC-injection braking request
C00761/5	0: Not connected	LA_SwitchPos : bRFG_Stop Control input for stopping the speed ramp function generator
C00761/6	0: Not connected	LA_SwitchPos : bSetSpeedCcw Control input for change of direction of rotation
C00761/7	0: Not connected	LA_SwitchPos : bRLQCw Control input for activation of CW rotation (fail-safe)
C00761/8	0: Not connected	LA_SwitchPos : bRLQCcw Control input for activation of CCW rotation (fail-safe)
C00761/9	0: Not connected	LA_SwitchPos : bJogCtrlInputSel1 Selection input 1 for binary coded selection of the switch-off position 1 ... 3
C00761/10	0: Not connected	LA_SwitchPos : bJogCtrlInputSel2 Selection input 2 for binary coded selection of the switch-off position 1 ... 3
C00761/11	0: Not connected	LA_SwitchPos : bJogCtrlRfgIn Control input for setpoint generator ramp-down
C00761/12	0: Not connected	LA_SwitchPos : bJogCtrlJog1 Selection input 1 for overriding fixed setpoints (JOG setpoints) for the main setpoint
C00761/13	0: Not connected	LA_SwitchPos : bJogCtrlJog2 Selection input 2 for overriding fixed setpoints (JOG setpoints) for the main setpoint

Parameter Name: C00761 LA_SwitchPos: Digital connection list		Data type: UNSIGNED_16 Index: 23814 _d = 5D06 _h
C00761/14	0: Not connected	LA_SwitchPos : bJogCtrlSlowDown1 Control input for selection of pre-switch off 1
C00761/15	0: Not connected	LA_SwitchPos : bJogCtrlStop1 Control input for stop function 1
C00761/16	0: Not connected	LA_SwitchPos : bJogCtrlSlowDown2 Control input for selection of pre-switch off 2
C00761/17	0: Not connected	LA_SwitchPos : bJogCtrlStop2 Control input for stop function 2
C00761/18	0: Not connected	LA_SwitchPos : bJogCtrlSlowDown3 Control input for selection of pre-switch off 3
C00761/19	0: Not connected	LA_SwitchPos : bJogCtrlStop3 Control input for stop function 3
C00761/20	0: Not connected	LA_SwitchPos : bJogSpeed4 Selection input for fixed setpoints
C00761/21	0: Not connected	LA_SwitchPos : bJogSpeed8 Selection input for fixed setpoints
C00761/22	0: Not connected	LA_SwitchPos : bJogRamp1 Selection input for additional acceleration/deceleration times
C00761/23	0: Not connected	LA_SwitchPos : bJogRamp2 Selection input for additional acceleration/deceleration times
C00761/24	0: Not connected	LA_SwitchPos : bJogRamp4 Selection input for additional acceleration/deceleration times
C00761/25	0: Not connected	LA_SwitchPos : bJogRamp8 Selection input for additional acceleration/deceleration times
C00761/26	0: Not connected	LA_SwitchPos : bMBrkRelease Control input for manual holding brake release request
C00761/27	0: Not connected	LA_SwitchPos : bGPAnalogSwitchSet Control input for analog-value selector change-over
C00761/28	0: Not connected	LA_SwitchPos : bGPDigitalDelayIn Input for digital signal with time delay
C00761/29	0: Not connected	LA_SwitchPos : bGPLogicIn1 Input signal 1 for digital logic
C00761/30	0: Not connected	LA_SwitchPos : bGPLogicIn2 Input signal 2 for digital logic
C00761/31	0: Not connected	LA_SwitchPos : bGPLogicIn3 Input signal 3 for digital logic
C00761/32	0: Not connected	LA_SwitchPos : bGPDFlipFlop_InD Control input for DFlipFlop setting signal
C00761/33	0: Not connected	LA_SwitchPos : bGPDFlipFlop_InClk Control input for DFlipFlop clock signal
C00761/34	0: Not connected	LA_SwitchPos : bGPDFlipFlop_InClr Control input for DFlipFlop reset signal
C00761/35	0: Not connected	Reserved
C00761/36	0: Not connected	Reserved
C00761/37	0: Not connected	Reserved
C00761/38	0: Not connected	Reserved
C00761/39	0: Not connected	Reserved

Parameter Name:		Data type: UNSIGNED_16 Index: 23814 _d = 5D06 _h
C00761 LA_SwitchPos: Digital connection list		
C00761/40	0: Not connected	LA_SwitchPos : bFreeIn1 Input for binary user signal 1
C00761/41	0: Not connected	LA_SwitchPos : bFreeIn2 Input for binary user signal 2
C00761/42	0: Not connected	LA_SwitchPos : bFreeIn3 Input for binary user signal 3
C00761/43	0: Not connected	LA_SwitchPos : bFreeIn4 Input for binary user signal 4
C00761/44	0: Not connected	LA_SwitchPos : bFreeIn5 Input for binary user signal 5
C00761/45	0: Not connected	LA_SwitchPos : bFreeIn6 Input for binary user signal 6
C00761/46	0: Not connected	LA_SwitchPos : bFreeIn7 Input for binary user signal 7
C00761/47	0: Not connected	LA_SwitchPos : bFreeIn8 Input for binary user signal 8
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00762

Parameter Name:	Data type: UNSIGNED_16 Index: 23813 _d = 5D05 _h
C00762 LA_SwitchPos: phi connection list	
This code is for device-internal use only and must not be written to by the user!	

C00765

Parameter Name:	Data type: UNSIGNED_16 Index: 23810 _d = 5D02 _h
C00765 LA_SwitchPos_Out: Analog signal list	
This code is for device-internal use only and must not be written to by the user!	

C00766

Parameter Name:	Data type: UNSIGNED_16 Index: 23809 _d = 5D01 _h
C00766 LA_SwitchPos_Out: Digital signal list	
This code is for device-internal use only and must not be written to by the user!	

C00767

Parameter Name:	Data type: UNSIGNED_16 Index: 23808 _d = 5D00 _h
C00767 LA_SwitchPos_Out: phi signal list	
This code is for device-internal use only and must not be written to by the user!	

C00800

Parameter Name:		Data type: INTEGER_16 Index: 23775 _d = 5CDF _h
C00800 L_MPot_1: Upper limit		
The L_MPot_1 FB: Upper limit of the motor potentiometer function		
Setting range (min. value unit max. value)		Lenze setting
-199.99	%	199.99
		100.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100		

C00801

Parameter Name: C00801 L_MPot_1: Lower limit			Data type: INTEGER_16 Index: 23774 _d = 5CDE _h
The L_MPot_1 FB: Lower limit of the motor potentiometer function			
Setting range (min. value unit max. value)			Lenze setting
-199.99	%	199.99	-100.00 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00802

Parameter Name: C00802 L_MPot_1: Acceleration time			Data type: UNSIGNED_16 Index: 23773 _d = 5CDD _h
The L_MPot_1 FB: Acceleration time of the motor potentiometer function			
Setting range (min. value unit max. value)			Lenze setting
0.1	s	6000.0	10.0 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00803

Parameter Name: C00803 L_MPot_1: Deceleration time			Data type: UNSIGNED_16 Index: 23772 _d = 5CDC _h
The L_MPot_1 FB: Deceleration time of the motor potentiometer function			
Setting range (min. value unit max. value)			Lenze setting
0.1	s	6000.0	10.0 s
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00804

Parameter Name: C00804 L_MPot_1: Inactive fct.		Data type: UNSIGNED_8 Index: 23771 _d = 5CDB _h
The L_MPot_1 FB: Selection of the response if the motor potentiometer is deactivated via input <i>bInAct</i>		
Selection list (Lenze setting printed in bold)		Info
0	Retain value	Keep output value
1	Deceleration to 0	Deceleration via ramp to 0
2	Deceleration to lower limit	Deceleration via ramp to the lower limit (C00801)
3	Without ramp to 0	Step change to 0
4	Without ramp to lower limit	Jump to lower limit (C00800)
5	Acceleration to upper limit	Acceleration via ramp to upper limit (C00800)
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00805

Parameter Name: C00805 L_MPot_1: Init fct.		Data type: UNSIGNED_8 Index: 23770 _d = 5CDA _h
The L_MPot_1 FB: Selection of the response at device switch-on		
Selection list (Lenze setting printed in bold)		
0	Load last value	
1	Load lower limit	
2	Load 0	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00806

Parameter Name: C00806 L_MPot_1: Use		Data type: UNSIGNED_8 Index: 23769 _d = 5CD9 _h
The L_MPot_1 FB: Use of the motor potentiometer		
Selection list (Lenze setting printed in bold)		Info
0	No	The motor potentiometer is not used. • The analog value applied to the <i>nIn_a</i> input is looped through without any changes to the <i>nOut_a</i> output.
1	Yes	The motor potentiometer is used. • The analog value applied at the <i>nIn_a</i> input is led via the motor potentiometer and provided at the <i>nOut_a</i> output.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00820

Parameter Name: C00820 L_DigitalLogic_1: Function		Data type: UNSIGNED_8 Index: 23755 _d = 5CCB _h
The L_DigitalLogic_1 FB: Selection of the internal logic function		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	Constant value "FALSE"
1	bOut = 1	Constant value "TRUE"
2	bOut = bIn1 AND bIn2 AND bIn3	AND operation
3	bOut = bIn1 OR bIn2 OR bIn3	OR operation
4	bOut = f (truth table)	The truth table parameterised in C00821 is used.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00821

Parameter Name: C00821 L_DigitalLogic_1: Truth table		Data type: UNSIGNED_8 Index: 23754 _d = 5CCA _h
The L_DigitalLogic_1 FB: Parameterisation of the truth table		
Selection list		
0	False	
1	True	
Subcodes	Lenze setting	Info
C00821/1	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=0 0 0
C00821/2	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=0 0 1
C00821/3	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=0 1 0
C00821/4	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=0 1 1
C00821/5	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=1 0 0
C00821/6	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=1 0 1
C00821/7	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=1 1 0
C00821/8	0: FALSE	L_DigitalLogic_1 : bIn3...bIn1=1 1 1
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00828

Parameter Name: C00828 L_DigitalLogic_3: Function		Data type: UNSIGNED_8 Index: 23747 _d = 5CC3 _h
From version 11.00.00 The L_DigitalLogic_3 FB: Selection of the internal logic function		
Selection list (Lenze setting printed in bold)		Info
0	bOut = 0	Constant value "FALSE"
1	bOut = 1	Constant value "TRUE"
2	bOut = bIn1 AND bIn2 AND bIn3	AND operation
3	bOut = bIn1 OR bIn2 OR bIn3	OR operation
4	bOut = f (truth table)	The truth table parameterised in C00829 is used.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00829

Parameter Name: C00829 L_DigitalLogic_3: Truth table		Data type: UNSIGNED_8 Index: 23746 _d = 5CC2 _h
From version 11.00.00 The L_DigitalLogic_3 FB: Parameterisation of the truth table		
Selection list		Info
0	False	
1	True	
Subcodes	Lenze setting	Info
C00829/1	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=0 0 0
C00829/2	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=0 0 1
C00829/3	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=0 1 0
C00829/4	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=0 1 1
C00829/5	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=1 0 0
C00829/6	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=1 0 1
C00829/7	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=1 1 0
C00829/8	0: FALSE	L_DigitalLogic_3 : bIn3...bIn1=1 1 1
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00830

Parameter Name: C00830 16-bit inputs [%]		Data type: INTEGER_16 Index: 23745 _d = 5CC1 _h
Display in percent of 16-bit input values of different blocks • Non-listed subcodes are "reserved".		
Display range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Info	
C00830/1	L_Absolut_1 : nIn_a	
C00830/2	L_AddSub_1 : nIn1_a	
C00830/3	L_AddSub_1 : nIn2_a	
C00830/4	L_AddSub_1 : nIn3_a	
C00830/5	L_OffsetGain_1 : nIn_a	
C00830/6	L_OffsetGain_1 : nOffset_a	

Parameter Name: C00830 16-bit inputs [%]		Data type: INTEGER_16 Index: 23745 _d = 5CC1 _h
C00830/7	L_OffsetGain_1 : nGain_a	
C00830/8	L_Negation_1 : nIn_a	
C00830/9	L_GainOffset_1 : nIn_a	
C00830/10	L_GainOffset_1 : nGain_a	
C00830/11	L_GainOffset_1 : nOffset_a	
C00830/12	L_Arithmetik_1 : nIn1_a	
C00830/13	L_Arithmetik_1 : nIn2_a	
C00830/14	L_AnalogSwitch_1 : nIn1_a	
C00830/15	L_AnalogSwitch_1 : nIn2_a	
C00830/16	L_Compare_1 : nIn1_a	
C00830/17	L_Compare_1 : nIn2_a	
C00830/18	MCTRL : nTorqueLimitAdapt_a	
C00830/20	MCTRL : nPosCtrlPAdapt_a	
C00830/21	MCTRL : nPosCtrlOutLimit_a	
C00830/22	MCTRL : nSpeedSetValue_a	
C00830/23	MCTRL : nSpeedLowLimit_a	
C00830/24	MCTRL : nSpeedCtrlI_a	
C00830/25	MCTRL : nSpeedCtrlPAdapt_a	
C00830/26	MCTRL : nBoost_a	
C00830/27	MCTRL : nTorqueSetValue_a	
C00830/28	MCTRL : nTorqueGenLimit_a	
C00830/29	MCTRL : nTorqueMotLimit_a	
C00830/31	MCTRL : nVoltageAdd_a	
C00830/32	MCTRL : nPWMAngleOffset_a	
C00830/33	L_NSet_1 : nCInhVal_a	
C00830/34	L_NSet_1 : nNSet_a	
C00830/35	L_NSet_1 : nSet_a	
C00830/36	L_NSet_1 : nNAdd_a	
C00830/37	DCTRL : wCANControl	
C00830/38	DCTRL : wCCMControl	
C00830/41	L_Compare_2 : nIn1_a	
C00830/42	L_Compare_2 : nIn2_a	
C00830/45	L_AnalogSwitch_2 : nIn1_a	
C00830/46	L_AnalogSwitch_2 : nIn2_a	
C00830/47	L_AnalogSwitch_3 : nIn1_a	
C00830/48	L_AnalogSwitch_3 : nIn2_a	
C00830/53	L_GainOffset_2 : nIn_a	
C00830/54	L_GainOffset_2 : nGain_a	
C00830/55	L_GainOffset_2 : nOffset_a	
C00830/56	L_OffsetGainP_1 : nIn_a	
C00830/57	L_OffsetGainP_2 : nIn_a	
C00830/58	L_OffsetGain_2 : nIn_a	
C00830/59	L_OffsetGain_2 : nOffset_a	
C00830/60	L_OffsetGain_2 : nGain_a	

Parameter Name: C00830 16-bit inputs [%]		Data type: INTEGER_16 Index: 23745 _d = 5CC1 _h
C00830/61	L_PCTRL_1 : nAct_a	
C00830/62	L_PCTRL_1 : nAdapt_a	
C00830/63	L_PCTRL_1 : nSet_a	
C00830/64	L_PCTRL_1 : nInfluence_a	
C00830/65	MCK: nSpeedCtrlI_a	
C00830/66	MCK: nPWMAngleOffset_a	
C00830/68	MCK: nMBrakeAddValue_a	
C00830/69	MCK: nTorqueSetValue_a	
C00830/70	MCK: nTorqueLimitAdapt_a	
C00830/71	MCK: nSRampOverride_a	
C00830/72	MCK: nSpeedSetValue_a	
C00830/73	MCK: wMotionCtrl2	
C00830/74	MCK: wMotionCtrl1	
C00830/75	MCK: nSpeedOverride_a	
C00830/76	MCK: nAccOverride_a	
C00830/77	MCK: nSpeedAdd_v	
C00830/78	MCK: wAuxCtrl	
C00830/79	MCK: wSMCtrl	
C00830/80	L_OffsetGainP_3 : nIn_a	
C00830/81	L_MPot_1 : nIn_a	
C00830/82	L_MulDiv_1 : nIn_a	
C00830/83	LS_DataAccess: wIn1 (Lenze-internal)	
C00830/84	LS_DataAccess: wIn2 (Lenze-internal)	
C00830/85	LS_DataAccess: wIn3 (Lenze-internal)	
C00830/86	LS_DataAccess: wIn4 (Lenze-internal)	
C00830/87	L_PT1_1 : nIn_a	
C00830/88	MCTRL : nSpeedHighLimit_a	
C00830/89	L_PCTRL_1 : nNSet_a	
C00830/90	L_PCTRL_1 : nISet_a	
C00830/91	L_Interpolator_1 : nPhdIn_v	
C00830/92	L_Interpolator_1 : nNIn_a	
C00830/96	MCTRL : nInertiaAdapt_a	
C00830/97	MCTRL : nSpeedSetValueInertiaAdapt_a	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100		

C00831

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5CC0 _h
Decimal/hexadecimal/bit coded display of 16 bit input values of various blocks • Non-listed subcodes are "reserved".		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes	Info	
C00831/1	L Absolut 1 : nIn_a	
C00831/2	L AddSub 1 : nIn1_a	
C00831/3	L AddSub 1 : nIn2_a	
C00831/4	L AddSub 1 : nIn3_a	
C00831/5	L OffsetGain 1 : nIn_a	
C00831/6	L OffsetGain 1 : nOffset_a	
C00831/7	L OffsetGain 1 : nGain_a	
C00831/8	L Negation 1 : nIn_a	
C00831/9	L GainOffset 1 : nIn_a	
C00831/10	L GainOffset 1 : nGain_a	
C00831/11	L GainOffset 1 : nOffset_a	
C00831/12	L Arithmetik 1 : nIn1_a	
C00831/13	L Arithmetik 1 : nIn2_a	
C00831/14	L AnalogSwitch 1 : nIn1_a	
C00831/15	L AnalogSwitch 1 : nIn2_a	
C00831/16	L Compare 1 : nIn1_a	
C00831/17	L Compare 1 : nIn2_a	
C00831/18	MCTRL : nTorqueLimitAdapt_a	
C00831/20	MCTRL : nPosCtrlPAdapt_a	
C00831/21	MCTRL : nPosCtrlOutLimit_a	
C00831/22	MCTRL : nSpeedSetValue_a	
C00831/23	MCTRL : nSpeedLowLimit_a	
C00831/24	MCTRL : nSpeedCtrlI_a	
C00831/25	MCTRL : nSpeedCtrlPAdapt_a	
C00831/26	MCTRL : nBoost_a	
C00831/27	MCTRL : nTorqueSetValue_a	
C00831/28	MCTRL : nTorqueGenLimit_a	
C00831/29	MCTRL : nTorqueMotLimit_a	
C00831/31	MCTRL : nVoltageAdd_a	
C00831/32	MCTRL : nPWMAngleOffset_a	
C00831/33	L NSet 1 : nCInhVal_a	
C00831/34	L NSet 1 : nNSet_a	
C00831/35	L NSet 1 : nSet_a	
C00831/36	L NSet 1 : nNAdd_a	

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5C0 _h
C00831/37	DCTRL : wCANControl	
C00831/38	DCTRL : wMCIControl	
C00831/41	L Compare 2 : nIn1_a	
C00831/42	L Compare 2 : nIn2_a	
C00831/45	L AnalogSwitch 2 : nIn1_a	
C00831/46	L AnalogSwitch 2 : nIn2_a	
C00831/47	L AnalogSwitch 3 : nIn1_a	
C00831/48	L AnalogSwitch 3 : nIn2_a	
C00831/53	L GainOffset 2 : nIn_a	
C00831/54	L GainOffset 2 : nGain_a	
C00831/55	L GainOffset 2 : nOffset_a	
C00831/56	L OffsetGainP 1 : nIn_a	
C00831/57	L OffsetGainP 2 : nIn_a	
C00831/58	L OffsetGain 2 : nIn_a	
C00831/59	L OffsetGain 2 : nOffset_a	
C00831/60	L OffsetGain 2 : nGain_a	
C00831/61	L PCTRL 1 : nAct_a	
C00831/62	L PCTRL 1 : nAdapt_a	
C00831/63	L PCTRL 1 : nSet_a	
C00831/64	L PCTRL 1 : nInfluence_a	
C00831/65	MCK: nSpeedCtrlI_a	
C00831/66	MCK: nPWMAngleOffset_a	
C00831/68	MCK: nMBrakeAddValue_a	
C00831/69	MCK: nTorqueSetValue_a	
C00831/70	MCK: nTorqueLimitAdapt_a	
C00831/71	MCK: nSRampOverride_a	
C00831/72	MCK: nSpeedSetValue_a	
C00831/73	MCK: wMotionCtrl2	
C00831/74	MCK: wMotionCtrl1	
C00831/75	MCK: nSpeedOverride_a	
C00831/76	MCK: nAccOverride_a	
C00831/77	MCK: nSpeedAdd_v	
C00831/78	MCK: wAuxCtrl	
C00831/79	MCK: wSMCtrl	
C00831/80	L OffsetGainP 3 : nIn_a	
C00831/81	L MPot 1 : nIn_a	
C00831/82	L MulDiv 1 : nIn_a	
C00831/83	LS_DataAccess: wIn1 (Lenze-internal)	
C00831/84	LS_DataAccess: wIn2 (Lenze-internal)	
C00831/85	LS_DataAccess: wIn3 (Lenze-internal)	
C00831/86	LS_DataAccess: wIn4 (Lenze-internal)	

Parameter Name: C00831 16-bit inputs		Data type: UNSIGNED_16 Index: 23744 _d = 5C0 _h
C00831/87	L_PT1_1 : nIn_a	
C00831/88	MCTRL : nSpeedHighLimit_a	
C00831/89	L_PCTRL_1 : nNSet_a	
C00831/90	L_PCTRL_1 : nISet_a	
C00831/91	L_Interpolator_1 : nPhdIn_v	
C00831/92	L_Interpolator_1 : nNIn_a	
C00831/96	MCTRL : nInertiaAdapt_a	
C00831/97	MCTRL : nSpeedSetValueInertia_a	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT		

C00833

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
Display of the signal status of the binary inputs of different blocks • Non-listed subcodes are "reserved".		
Selection list		
0	False	
1	True	
Subcodes	Info	
C00833/1	L_And_1 : bIn1	
C00833/2	L_And_1 : bIn2	
C00833/3	L_And_1 : bIn3	
C00833/4	L_DFlipFlop_1 : bD	
C00833/5	L_DFlipFlop_1 : bClk	
C00833/6	L_DFlipFlop_1 : bClr	
C00833/7	L_Not_1 : bIn	
C00833/8	L_Or_1 : bIn1	
C00833/9	L_Or_1 : bIn2	
C00833/10	L_Or_1 : bIn3	
C00833/11	L_RLO_1 : bCw	
C00833/12	L_RLO_1 : bCcw	
C00833/13	L_AnalogSwitch_1 : bSet	
C00833/14	L_NSet_1 : bRfgStop	
C00833/15	L_NSet_1 : bRfg0	
C00833/16	L_NSet_1 : bNSetInv	
C00833/17	L_NSet_1 : bJog1	
C00833/18	L_NSet_1 : bJog2	
C00833/19	L_NSet_1 : bJog4	
C00833/20	L_NSet_1 : bJog8	
C00833/21	L_NSet_1 : bTi1	
C00833/22	L_NSet_1 : bTi2	
C00833/23	L_NSet_1 : bTi4	
C00833/24	L_NSet_1 : bTi8	
C00833/25	L_NSet_1 : bLoad	

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
C00833/26	L_NSet_1 : bExternalCINH	
C00833/27	MCTRL : bPosCtrlOn	
C00833/28	MCTRL : bSpeedInterpolatorOn	
C00833/29	MCTRL : bTorqueInterpolatorOn	
C00833/30	MCTRL : bTorquemodeOn	
C00833/31	MCTRL : bSpeedCtrlOn	
C00833/32	MCTRL : bAutoBoostOn	
C00833/33	MCTRL : bQSPOn	
C00833/34	MCTRL : bDcBrakeOn	
C00833/35	MCTRL : bDeltaPosOn	
C00833/36	DCTRL : bCINH	
C00833/37	DCTRL : bFailReset	
C00833/38	DCTRL : bStatus_B0	
C00833/39	DCTRL : bStatus_B2	
C00833/40	DCTRL : bStatus_B3	
C00833/41	DCTRL : bStatus_B4	
C00833/42	DCTRL : bStatus_B5	
C00833/43	DCTRL : bStatus_B14	
C00833/44	DCTRL : bStatus_B15	
C00833/45	DCTRL : bFree_1	
C00833/46	DCTRL : bFree_2	
C00833/47	DCTRL : bFree_3	
C00833/48	DCTRL : bFree_4	
C00833/49	L_And_2 : bIn1	
C00833/50	L_And_2 : bIn2	
C00833/51	L_And_2 : bIn3	
C00833/52	L_And_3 : bIn1	
C00833/53	L_And_3 : bIn2	
C00833/54	L_And_3 : bIn3	
C00833/55	L_Or_2 : bIn1	
C00833/56	L_Or_2 : bIn2	
C00833/57	L_Or_2 : bIn3	
C00833/58	L_Or_3 : bIn1	
C00833/59	L_Or_3 : bIn2	
C00833/60	L_Or_3 : bIn3	
C00833/61	L_Not_2 : bIn	
C00833/62	L_Not_3 : bIn	
C00833/63	L_DigitalLogic_1 : bIn1	
C00833/64	L_DigitalLogic_1 : bIn2	
C00833/65	L_DigitalLogic_1 : bIn3	
C00833/66	L_DigitalDelay_1 : bIn	
C00833/67	MCTRL : bPosDerivativeOn	
C00833/68	MCTRL : bMotorRefOffsetOn	
C00833/69	MCTRL : bSpeedCtrlAdaptOn	

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
C00833/70	L_AnalogSwitch_2 : bSet	
C00833/71	L_AnalogSwitch_3 : bSet	
C00833/72	L_MPot_1 : bUp	
C00833/73	L_MPot_1 : bInAct	
C00833/74	L_MPot_1 : bDown	
C00833/75	L_PCTRL_1 : bPIDOff	
C00833/76	L_PCTRL_1 : bInAct	
C00833/77	L_PCTRL_1 : bIOff	
C00833/78	MCK: bSpeedCtrlOn	
C00833/79	MCK: bDcBrakeOn	
C00833/80	MCK: bMBrakeRelease	
C00833/81	MCK: bMBrakeStartValue2	
C00833/82	MCK: bMBrakeApplied	
C00833/83	MCK: bLimitSwitchPos	
C00833/84	MCK: bLimitSwitchNeg	
C00833/85	MCK: bPosCtrlOn	
C00833/86	MCK: bDeltaPosOn	
C00833/87	MCK: bPosDerivativeOn	
C00833/88	MCK: bMotorRefOffsetOn	
C00833/89	MCK: bQspOn	
C00833/90	MCK: bTorquemodeOn	
C00833/91	MCK: bTorqueLimitAdaptOn	
C00833/92	MCK: bHomMark	
C00833/93	L_Transient_1 : bIn	
C00833/94	L_Transient_2 : bIn	
C00833/95	L_Transient_3 : bIn	
C00833/96	L_Transient_4 : bIn	
C00833/98	MCTRL : bTorqueLimitAdaptOn	
C00833/99	L_NSet_1 : bNAddInv	
C00833/100	L_MPot_1 : bEnable	
C00833/102	LS_DataAccess: bEnableIn1 (Lenze-internal)	
C00833/103	LS_DataAccess: bEnableIn2 (Lenze-internal)	
C00833/104	LS_DataAccess: bEnableIn3 (Lenze-internal)	
C00833/105	LS_DataAccess: bEnableIn4 (Lenze-internal)	
C00833/106	L_PCTRL_1 : bEnableInfluenceRamp	
C00833/111	L_JogCtrlExtension : bInputSel1	
C00833/112	L_JogCtrlExtension : bInputSel2	
C00833/113	L_JogCtrlExtension : bRfgIn	
C00833/114	L_JogCtrlExtension : bJog1In	
C00833/115	L_JogCtrlExtension : bJog2In	
C00833/116	L_JogCtrlExtension : bSlowDown1	

Parameter Name: C00833 Binary inputs		Data type: UNSIGNED_8 Index: 23742 _d = 5CBE _h
C00833/117	L JogCtrlExtension : bStop1	
C00833/118	L JogCtrlExtension : bbSlowDown2	
C00833/119	L JogCtrlExtension : bStop2	
C00833/120	L JogCtrlExtension : bSlowDown3	
C00833/121	L JogCtrlExtension : bStop3	
C00833/122	L PCTRL 1 : bISet	
C00833/123	L Interpolator 1 : bSpeedAct0	
C00833/124	L Or 4 : bIn1	
C00833/125	L Or 4 : bIn2	
C00833/126	L Or 4 : bIn3	
C00833/127	L DigitalLogic 3 : bIn1	
C00833/128	L DigitalLogic 3 : bIn2	
C00833/129	L DigitalLogic 3 : bIn3	
C00833/130	MCTRL : bBrakeChopperOn	
C00833/131	MCTRL : bVfcEcoDisable	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00834

Parameter Name: C00834 32-bit inputs [incr]			Data type: INTEGER_32 Index: 23741 _d = 5CBD _h
From version 03.00.00			
Display in [increments] of 32 bit input values of various blocks			
• Non-listed subcodes are "reserved".			
Display range (min. value unit max. value)			
-2147483647	Incr.	2147483647	
Subcodes			Info
C00834/1			MCK: dnPosSetValue_p
C00834/2			MCK: dnMotorRefOffset_p
C00834/3			MCK: dnDeltaPos_p
C00834/4			MCTRL : dnDeltaPos_p
C00834/5			MCTRL : dnPosSetValue_p
C00834/6			MCTRL : dnMotorRefOffset_p
C00834/7			MCK: dnProfilePosition_p
C00834/8			L Interpolator 1 : dnPhiIn_p
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00840

Parameter Name: C00840 16-bit inputs I/O level [%]			Data type: INTEGER_16 Index: 23735 _d = 5CB7 _h
Display in percent of 16 bit input values of various blocks of the I/O level • Non-listed subcodes are "reserved".			
Display range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes		Info	
C00840/1		LS_AnalogOutput : nOut1_a	
C00840/2		LP_CanOut1 : wState	
C00840/3		LP_CanOut1 : wOut2	
C00840/4		LP_CanOut1 : wOut3	
C00840/5		LP_CanOut1 : wOut4	
C00840/6		LP_CanOut2 : wOut1	
C00840/7		LP_CanOut2 : wOut2	
C00840/8		LP_CanOut2 : wOut3	
C00840/9		LP_CanOut2 : wOut4	
C00840/10		LP_CanOut3 : wOut1	
C00840/11		LP_CanOut3 : wOut2	
C00840/12		LP_CanOut3 : wOut3	
C00840/13		LP_CanOut3 : wOut4	
C00840/14		LS_DisFree_a : nDis1_a	
C00840/15		LS_DisFree_a : nDis2_a	
C00840/16		LS_DisFree_a : nDis3_a	
C00840/17		LS_DisFree_a : nDis4_a	
C00840/18		LS_DisFree : wDis1	
C00840/19		LS_DisFree : wDis2	
C00840/20		LS_DisFree : wDis3	
C00840/21		LS_DisFree : wDis4	
C00840/22		LP_MciOut : wState	
C00840/23		LP_MciOut : wOut2	
C00840/24		LP_MciOut : wOut3	
C00840/25		LP_MciOut : wOut4	
C00840/26		LP_MciOut : wOut5	
C00840/27		LP_MciOut : wOut6	
C00840/28		LP_MciOut : wOut7	
C00840/29		LP_MciOut : wOut8	
C00840/30		LP_MciOut : wOut9	
C00840/31		LP_MciOut : wOut10	
C00840/32		LP_MciOut : wOut11	
C00840/33		LP_MciOut : wOut12	
C00840/34		LP_MciOut : wOut13	
C00840/35		LP_MciOut : wOut14	
C00840/36		LP_MciOut : wOut15	
C00840/37		LP_MciOut : wOut16	
C00840/49		LS_ParReadWrite_1 : wParIndex	

Parameter Name: C00840 16-bit inputs I/O level [%]		Data type: INTEGER_16 Index: 23735 _d = 5CB7 _h
C00840/50	LS_ParReadWrite_1 : wParSubindex	
C00840/51	LS_ParReadWrite_1 : wInHWord	
C00840/52	LS_ParReadWrite_1 : wInLWord	
C00840/53	LS_ParReadWrite_2 : wParIndex	
C00840/54	LS_ParReadWrite_2 : wParSubindex	
C00840/55	LS_ParReadWrite_2 : wInHWord	
C00840/56	LS_ParReadWrite_2 : wInLWord	
C00840/57	LS_ParReadWrite_3 : wParIndex	
C00840/58	LS_ParReadWrite_3 : wParSubindex	
C00840/59	LS_ParReadWrite_3 : wInHWord	
C00840/60	LS_ParReadWrite_3 : wInLWord	
C00840/108	LP_CanOut4 : wOut1	
C00840/109	LP_CanOut4 : wOut2	
C00840/110	LP_CanOut4 : wOut3	
C00840/111	LP_CanOut4 : wOut4	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 100		

C00841

Parameter Name: C00841 16-bit inputs I/O level		Data type: UNSIGNED_16 Index: 23734 _d = 5CB6 _h
Decimal/hexadecimal/bit coded display of 16 bit input values of various blocks of the I/O level • Non-listed subcodes are "reserved".		
Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes	Info	
C00841/1	LS_AnalogOutput : nOut1_a	
C00841/2	LP_CanOut1 : wState	
C00841/3	LP_CanOut1 : wOut2	
C00841/4	LP_CanOut1 : wOut3	
C00841/5	LP_CanOut1 : wOut4	
C00841/6	LP_CanOut2 : wOut1	
C00841/7	LP_CanOut2 : wOut2	
C00841/8	LP_CanOut2 : wOut3	
C00841/9	LP_CanOut2 : wOut4	
C00841/10	LP_CanOut3 : wOut1	
C00841/11	LP_CanOut3 : wOut2	
C00841/12	LP_CanOut3 : wOut3	
C00841/13	LP_CanOut3 : wOut4	
C00841/14	LS_DisFree_a : nDis1_a	
C00841/15	LS_DisFree_a : nDis2_a	

Parameter Name: C00841 16-bit inputs I/O level		Data type: UNSIGNED_16 Index: 23734 _d = 5CB6 _h
C00841/16	LS_DisFree_a : nDis3_a	
C00841/17	LS_DisFree_a : nDis4_a	
C00841/18	LS_DisFree : wDis1	
C00841/19	LS_DisFree : wDis2	
C00841/20	LS_DisFree : wDis3	
C00841/21	LS_DisFree : wDis4	
C00841/22	LP_MciOut : wState	
C00841/23	LP_MciOut : wOut2	
C00841/24	LP_MciOut : wOut3	
C00841/25	LP_MciOut : wOut4	
C00841/26	LP_MciOut : wOut5	
C00841/27	LP_MciOut : wOut6	
C00841/28	LP_MciOut : wOut7	
C00841/29	LP_MciOut : wOut8	
C00841/30	LP_MciOut : wOut9	
C00841/31	LP_MciOut : wOut10	
C00841/32	LP_MciOut : wOut11	
C00841/33	LP_MciOut : wOut12	
C00841/34	LP_MciOut : wOut13	
C00841/35	LP_MciOut : wOut14	
C00841/36	LP_MciOut : wOut15	
C00841/37	LP_MciOut : wOut16	
C00841/49	LS_ParReadWrite_1 : wParIndex	
C00841/50	LS_ParReadWrite_1 : wParSubindex	
C00841/51	LS_ParReadWrite_1 : wInHWord	
C00841/52	LS_ParReadWrite_1 : wInLWord	
C00841/53	LS_ParReadWrite_2 : wParIndex	
C00841/54	LS_ParReadWrite_2 : wParSubindex	
C00841/55	LS_ParReadWrite_2 : wInHWord	
C00841/56	LS_ParReadWrite_2 : wInLWord	
C00841/57	LS_ParReadWrite_3 : wParIndex	
C00841/58	LS_ParReadWrite_3 : wParSubindex	
C00841/59	LS_ParReadWrite_3 : wInHWord	
C00841/60	LS_ParReadWrite_3 : wInLWord	
C00841/108	LP_CanOut4 : wOut1	
C00841/109	LP_CanOut4 : wOut2	
C00841/110	LP_CanOut4 : wOut3	
C00841/111	LP_CanOut4 : wOut4	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT		

C00843

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
Display of the signal status of the binary inputs of different I/O level blocks • Non-listed subcodes are "reserved".		
Selection list		
0	False	
1	True	
Subcodes	Info	
C00843/1	LS_DigitalOutput : bRelay	
C00843/2	LS_DigitalOutput : bOut1	
C00843/3	LS_DigitalInput : bCountIn1_Reset	
C00843/4	LS_DigitalInput : bCountIn1_LoadStartValue	
C00843/5	LP_CanOut1 : bState_B0	
C00843/6	LP_CanOut1 : bState_B1	
C00843/7	LP_CanOut1 : bState_B2	
C00843/8	LP_CanOut1 : bState_B3	
C00843/9	LP_CanOut1 : bState_B4	
C00843/10	LP_CanOut1 : bState_B5	
C00843/11	LP_CanOut1 : bState_B6	
C00843/12	LP_CanOut1 : bState_B7	
C00843/13	LP_CanOut1 : bState_B8	
C00843/14	LP_CanOut1 : bState_B9	
C00843/15	LP_CanOut1 : bState_B10	
C00843/16	LP_CanOut1 : bState_B11	
C00843/17	LP_CanOut1 : bState_B12	
C00843/18	LP_CanOut1 : bState_B13	
C00843/19	LP_CanOut1 : bState_B14	
C00843/20	LP_CanOut1 : bState_B15	
C00843/21	LS_DisFree_b : bDis1	
C00843/22	LS_DisFree_b : bDis2	
C00843/23	LS_DisFree_b : bDis3	
C00843/24	LS_DisFree_b : bDis4	
C00843/25	LS_DisFree_b : bDis5	
C00843/26	LS_DisFree_b : bDis6	
C00843/27	LS_DisFree_b : bDis7	
C00843/28	LS_DisFree_b : bDis8	
C00843/29	LP_CanOut2 : bOut1_B0	
C00843/30	LP_CanOut2 : bOut1_B1	
C00843/31	LP_CanOut2 : bOut1_B2	
C00843/32	LP_CanOut2 : bOut1_B3	
C00843/33	LP_CanOut2 : bOut1_B4	
C00843/34	LP_CanOut2 : bOut1_B5	
C00843/35	LP_CanOut2 : bOut1_B6	
C00843/36	LP_CanOut2 : bOut1_B7	
C00843/37	LP_CanOut2 : bOut1_B8	

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
C00843/38	LP_CanOut2 : bOut1_B9	
C00843/39	LP_CanOut2 : bOut1_B10	
C00843/40	LP_CanOut2 : bOut1_B11	
C00843/41	LP_CanOut2 : bOut1_B12	
C00843/42	LP_CanOut2 : bOut1_B13	
C00843/43	LP_CanOut2 : bOut1_B14	
C00843/44	LP_CanOut2 : bOut1_B15	
C00843/45	LP_CanOut3 : bOut1_B0	
C00843/46	LP_CanOut3 : bOut1_B1	
C00843/47	LP_CanOut3 : bOut1_B2	
C00843/48	LP_CanOut3 : bOut1_B3	
C00843/49	LP_CanOut3 : bOut1_B4	
C00843/50	LP_CanOut3 : bOut1_B5	
C00843/51	LP_CanOut3 : bOut1_B6	
C00843/52	LP_CanOut3 : bOut1_B7	
C00843/53	LP_CanOut3 : bOut1_B8	
C00843/54	LP_CanOut3 : bOut1_B9	
C00843/55	LP_CanOut3 : bOut1_B10	
C00843/56	LP_CanOut3 : bOut1_B11	
C00843/57	LP_CanOut3 : bOut1_B12	
C00843/58	LP_CanOut3 : bOut1_B13	
C00843/59	LP_CanOut3 : bOut1_B14	
C00843/60	LP_CanOut3 : bOut1_B15	
C00843/61	LP_MciOut : bState_B0	
C00843/62	LP_MciOut : bState_B1	
C00843/63	LP_MciOut : bState_B2	
C00843/64	LP_MciOut : bState_B3	
C00843/65	LP_MciOut : bState_B4	
C00843/66	LP_MciOut : bState_B5	
C00843/67	LP_MciOut : bState_B6	
C00843/68	LP_MciOut : bState_B7	
C00843/69	LP_MciOut : bState_B8	
C00843/70	LP_MciOut : bState_B9	
C00843/71	LP_MciOut : bState_B10	
C00843/72	LP_MciOut : bState_B11	
C00843/73	LP_MciOut : bState_B12	
C00843/74	LP_MciOut : bState_B13	
C00843/75	LP_MciOut : bState_B14	
C00843/76	LP_MciOut : bState_B15	
C00843/77	LP_MciOut : bOut2_B0	
C00843/78	LP_MciOut : bOut2_B1	
C00843/79	LP_MciOut : bOut2_B2	
C00843/80	LP_MciOut : bOut2_B3	
C00843/81	LP_MciOut : bOut2_B4	

Parameter Name: C00843 Binary inputs I/O level		Data type: UNSIGNED_8 Index: 23732 _d = 5CB4 _h
C00843/82	LP_MciOut : bOut2_B5	
C00843/83	LP_MciOut : bOut2_B6	
C00843/84	LP_MciOut : bOut2_B7	
C00843/85	LP_MciOut : bOut2_B8	
C00843/86	LP_MciOut : bOut2_B9	
C00843/87	LP_MciOut : bOut2_B10	
C00843/88	LP_MciOut : bOut2_B11	
C00843/89	LP_MciOut : bOut2_B12	
C00843/90	LP_MciOut : bOut2_B13	
C00843/91	LP_MciOut : bOut2_B14	
C00843/92	LP_MciOut : bOut2_B15	
C00843/93	LS_SetError_1 : bSetError1	
C00843/94	LS_SetError_1 : bSetError2	
C00843/95	LS_SetError_1 : bSetError3	
C00843/96	LS_SetError_1 : bSetError4	
C00843/111	LS_ParReadWrite_1 : bExecute	
C00843/112	LS_ParReadWrite_1 : bReadWrite	
C00843/113	LS_ParReadWrite_2 : bExecute	
C00843/114	LS_ParReadWrite_2 : bReadWrite	
C00843/115	LS_ParReadWrite_3 : bExecute	
C00843/116	LS_ParReadWrite_3 : bReadWrite	
C00843/123	LS_WriteParamList : bExecute	
C00843/124	LS_WriteParamList : bSelectWriteValue_1	
C00843/125	LS_WriteParamList : bSelectWriteValue_2	
C00843/126	LS_CANManagement : bResetNode	
C00843/127	LS_CANManagement : bReInitCAN	
C00843/128	LS_DigitalInput : bPosIn12_Load	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C00844

Parameter Name: C00844 32-bit inputs I/O level [incr]			Data type: INTEGER_32 Index: 23731 _d = 5CB3 _h	
Display of 32-bit input values of different I/O level blocks in [increments] • Non-listed subcodes are "reserved".				
Display range (min. value unit max. value)				
-2147483647	Incr.	2147483647		
Subcodes			Info	
C00844/9			LP_CanOut1 : dnOut34_p	
C00844/10			LP_CanOut2 : dnOut34_p	
C00844/11			LP_CanOut3 : dnOut34_p	
C00844/12			LP_MciOut : dnOut34_p	
C00844/13			LS_DigitalInput : dnPosIn12_Set_p	
C00844/25			LP_CanOut4 : dnOut34_p	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1				

C00866

Parameter | Name:

C00866 | CAN input words

Data type: UNSIGNED_16

Index: 23709_d = 5C9D_h

Display of the 16 bit input values of the CAN interface

▶ "CAN on board" system bus

Display area (min. hex value | max. hex value)

0x0000

0xFFFF

Value is bit-coded:

Bit 0Active

... ...

Bit 15Active

Subcodes

Info

C00866/1LP CanIn1: wCtrl

C00866/2LP CanIn1: wIn2

C00866/3LP CanIn1: wIn3

C00866/4LP CanIn1: wIn4

C00866/5LP CanIn2: wIn1

C00866/6LP CanIn2: wIn2

C00866/7LP CanIn2: wIn3

C00866/8LP CanIn2: wIn4

C00866/9LP CanIn3: wIn1

C00866/10LP CanIn3: wIn2

C00866/11LP CanIn3: wIn3

C00866/12LP CanIn3: wIn4

C00866/13LP CanIn4: wIn1

• From version 15.00.00

C00866/14LP CanIn4: wIn2

• From version 15.00.00

C00866/15LP CanIn4: wIn3

• From version 15.00.00

C00866/16LP CanIn4: wIn4

• From version 15.00.00

☒ Read access

☐ Write access

☐ CINH

☐ PLC STOP

☒ No transfer

☐ COM

☐ MOT

C00868

Parameter Name: C00868 CAN output words		Data type: UNSIGNED_16 Index: 23707 _d = 5C9B _h	
Display of the 16 bit output values of the CAN interface			
▶ "CAN on board" system bus			
Display area (min. hex value max. hex value)			
0x0000			0xFFFF
Value is bit-coded:			
Bit 0	Active		
Bit 1	Active		
Bit 2	Active		
Bit 3	Active		
Bit 4	Active		
Bit 5	Active		
Bit 6	Active		
Bit 7	Active		
Bit 8	Active		
Bit 9	Active		
Bit 10	Active		
Bit 11	Active		
Bit 12	Active		
Bit 13	Active		
Bit 14	Active		
Bit 15	Active		
Subcodes		Info	
C00868/1		LP_CanOut1 : wState	
C00868/2		LP_CanOut1 : wOut2	
C00868/3		LP_CanOut1 : wOut3	
C00868/4		LP_CanOut1 : wOut4	
C00868/5		LP_CanOut2 : wOut1	
C00868/6		LP_CanOut2 : wOut2	
C00868/7		LP_CanOut2 : wOut3	
C00868/8		LP_CanOut2 : wOut4	
C00868/9		LP_CanOut3 : wOut1	
C00868/10		LP_CanOut3 : wOut2	
C00868/11		LP_CanOut3 : wOut3	
C00868/12		LP_CanOut3 : wOut4	
C00868/13		LP_CanOut4 : wOut1 • From version 15.00.00	
C00868/14		LP_CanOut4 : wOut2 • From version 15.00.00	
C00868/15		LP_CanOut4 : wOut3 • From version 15.00.00	
C00868/16		LP_CanOut4 : wOut4 • From version 15.00.00	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00876

Parameter Name: C00876 MCI input words			Data type: UNSIGNED_16 Index: 23699 _d = 5C93 _h
Display of the 16 bit input values of the communication module			
Display area (min. hex value max. hex value)			
0x0000		0xFFFF	
Value is bit-coded:			
Bit 0	Active		
...	...		
Bit 15	Active		
Subcodes			Info
C00876/1			LP_McIln : wCtrl
C00876/2			LP_McIln : wIn2
C00876/3			LP_McIln : wIn3
C00876/4			LP_McIln : wIn4
C00876/5			LP_McIln : wIn5
C00876/6			LP_McIln : wIn6
C00876/7			LP_McIln : wIn7
C00876/8			LP_McIln : wIn8
C00876/9			LP_McIln : wIn9
C00876/10			LP_McIln : wIn10
C00876/11			LP_McIln : wIn11
C00876/12			LP_McIln : wIn12
C00876/13			LP_McIln : wIn13
C00876/14			LP_McIln : wIn14
C00876/15			LP_McIln : wIn15
C00876/16			LP_McIln : wIn16
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C00877

Parameter | Name: C00877 | MCI output words

Data type: UNSIGNED_16
Index: 23698_d = 5C92_h

Display of the 16 bit output values of the communication module

Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	Active	
...	...	
Bit 15	Active	
Subcodes		Info
C00877/1		LP_MciOut : wState
C00877/2		LP_MciOut : wOut2
C00877/3		LP_MciOut : wOut3
C00877/4		LP_MciOut : wOut4
C00877/5		LP_MciOut : wOut5
C00877/6		LP_MciOut : wOut6
C00877/7		LP_MciOut : wOut7
C00877/8		LP_MciOut : wOut8
C00877/9		LP_MciOut : wOut9
C00877/10		LP_MciOut : wOut10
C00877/11		LP_MciOut : wOut11
C00877/12		LP_MciOut : wOut12
C00877/13		LP_MciOut : wOut13
C00877/14		LP_MciOut : wOut14
C00877/15		LP_MciOut : wOut15
C00877/16		LP_MciOut : wOut16

☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT

C00890

Parameter Name: C00890 MCI_InOut: Inversion		Data type: UNSIGNED_16 Index: 23685 _d = 5C85 _h
From version 03.00.00		
This parameter serves to invert the control/status bits of the MCI port blocks.		
Setting range (min. hex value max. hex value)		
0x0000	0xFFFF	
Value is bit-coded:		Info
Bit 0	Active	Bit set = inversion active
...	...	
Bit 15	Active	
Subcodes	Lenze setting	Info
C00890/1	0x0000	LP_MciIn : Invert.Ctrl_B0..15
C00890/2	0x0000	LP_MciOut : Invert.State_B0..15
C00890/3	0x0000	LP_MciIn : Invert.In2_B0..15
C00890/4	0x0000	LP_MciOut : Invert.Out2_B0..15
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00905

Parameter | Name:

C00905 | Motor phase direction of rotation

Data type: UNSIGNED_8

Index: 23670_d = 5C76_h

From version 04.00.00

To correct such misconnected motor phases, the rotating field of the controller's output can be reversed by selecting "1: Inverted". In this case, a phase will be reversed at the output of the inverter.

Note:

Up to and including version 11.00.00, this function may only be activated for the following motor control types:

- V/f characteristic control (VFCplus)
- Energy-saving V/f characteristic control (VFCplusEco)

For all other motor control types, this function must not be activated because the set control mode would not work in that case!

From version 12.00.00, this function may be activated for all motor control types with the exception of the ones for synchronous motor.

The activation of this function does not affect the control types for synchronous motor since these control types require an in-phase connection of the synchronous motor.

Selection list (Lenze setting printed in bold)

0	not inverted
1	inverted

☒ Read access
 ☒ Write access
 ☒ CINH
 ☐ PLC STOP
 ☐ No transfer
 ☐ COM
 ☐ MOT
 Scaling factor: 1

C00909

Parameter Name: C00909 Speed limitation			Data type: INTEGER_16 Index: 23666 _d = 5C72 _h
Max. positive/negative speed for all motor control modes			
Setting range (min. value unit max. value)			
0.00	%	175.00	
Subcodes	Lenze setting	Info	
C00909/1	120.00 %	Max. pos. speed	
C00909/2	120.00 %	Max. neg. speed	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C00910

Parameter Name: C00910 Frequency limitation			Data type: UNSIGNED_16 Index: 23665 _d = 5C71 _h
Max. positive/negative output frequency for all motor control modes			
Setting range (min. value unit max. value)			
0	Hz	1300	
Subcodes	Lenze setting	Info	
C00910/1	1000 Hz	Max. pos. output frequency	
C00910/2	1000 Hz	Max. neg. output frequency	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00915

Parameter Name: C00915 Motor cable length			Data type: UNSIGNED_16 Index: 23660 _d = 5C6C _h		
From version 02.00.00					
Single motor cable length for calculating the motor cable resistance					
• The calculated motor cable resistance is displayed in C00917 .					
Setting range (min. value unit max. value)			Lenze setting		
0.0	m	1000.0	5.0 m		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00916

Parameter Name: C00916 Motor cable cross-section			Data type: UNSIGNED_16 Index: 23659 _d = 5C6B _h		
From version 02.00.00 Motor cable cross-section of a phase/cable for calculating the motor cable resistance The calculated motor cable resistance is displayed in C00917.					
Setting range (min. value unit max. value)			Lenze setting		
0.50	mm^2	100.00	6.00 mm^2		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			Scaling factor: 100		

C00917

Parameter Name: C00917 Motor cable resistance			Data type: UNSIGNED_16 Index: 23658 _d = 5C6A _h		
From version 02.00.00 Display of the motor cable resistance of a motor cable phase The motor cable resistance is calculated from the motor cable length set in C00915 and the motor cable cross-section set in C00916.					
Display range (min. value unit max. value)					
0	mOhm	64000			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00919

Parameter Name: C00919 Moment of inertia from load			Data type: UNSIGNED_32 Index: 23656 _d = 5C68 _h		
From version 12.00.00 In order to take account of mass inertias changing during the process (e.g. reels) when optimising the response to setpoint changes, the maximum value of the changing moment of inertia must be set here. The process signal <i>nInertiaAdapt_a</i> of the LS_MotorInterface SB can then be used in the process to dynamically control what percentage of it is to be taken into account for the setpoint feedforward control.					
Setting range (min. value unit max. value)					
0.00	kg cm^2	6000000.00			
Subcodes	Lenze setting		Info		
C00919/1	0.00 kg cm^2		Load moment of inertia		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00922

Parameter Name: C00922 ICM_DiagnosticCounter		Data type: UNSIGNED_16 Index: 23653 _d = 5C65 _h
This code is for device-internal use only and must not be written to by the user!		

C00937

Parameter Name: C00937 Field-oriented motor currents			Data type: INTEGER_16 Index: 23638 _d = 5C56 _h		
From version 11.00.00					
► Field weakening for synchronous motors					
Display range (min. value unit max. value)					
-320.00	A	320.00			
Subcodes			Info		
C00937/1			Field-producing current		
C00937/2			Torque-producing current		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00938

Parameter Name: C00938 PSM: Maximum motor current field weakening			Data type: UNSIGNED_16 Index: 23637 _d = 5C55 _h		
From version 11.00.00					
▶ Field weakening for synchronous motors					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	500.00	30.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00939

Parameter Name: C00939 Ultimate motor current			Data type: UNSIGNED_16 Index: 23636 _d = 5C54 _h		
From version 10.00.00					
Setting range (min. value unit max. value)			Lenze setting		
0.0	A	3000.0	3000.0 A		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00950

Parameter Name:		Data type: UNSIGNED_8 Index: 23625 _d = 5C49 _h	
C00950 <u>L_Interpolator_1</u> : Activation FB functions			
From version 04.00.00			
The <u>L_Interpolator_1</u> FB: Activation of signal interpolation and signal monitoring			
Selection list			
0	Off		
1	On		
Subcodes	Lenze setting	Info	
C00950/1	0: Off	<u>L_Interpolator_1</u> : Signal interpolation	
C00950/2	0: Off	<u>L_Interpolator_1</u> : Signal monitoring	
C00950/3	0: Off	<u>L_Interpolator_1</u> : Master value monitoring	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00951

Parameter Name: C00951 L_Interpolator_1: No. of interpolation steps			Data type: UNSIGNED_16 Index: 23624 _d = 5C48 _h
From version 04.00.00 The L_Interpolator_1 FB: No. of interpolation steps			
Setting range (min. value unit max. value)			Lenze setting
0		65535	1
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00952

Parameter Name: C00952 L_Interpolator_1: Limit value - error cycles			Data type: UNSIGNED_16 Index: 23623 _d = 5C47 _h
From version 04.00.00 The L_Interpolator_1 FB: Limit value for missing data telegrams			
Setting range (min. value unit max. value)			Lenze setting
0		65535	5
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00953

Parameter Name: C00953 L_Interpolator_1: Speed-up			Data type: UNSIGNED_8 Index: 23624 _d = 5C46 _h
From version 04.00.00 FB L_Interpolator_1 : Limitation of the number of correction increments per cycle (speed-up)			
Setting range (min. value unit max. value)			Lenze setting
0		100	0
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C00965

Parameter Name: C00965 Max. motor speed			Data type: UNSIGNED_16 Index: 23610 _d = 5C3A _h
From version 10.00.00 When the drive reaches the motor speed set here: • The "Fault" error response takes place, i.e. the motor is shut down immediately. • The error message "oS2: Max. motor speed reached" is entered into the logbook.			
Setting range (min. value unit max. value)			Lenze setting
50	rpm	65000	60000 rpm
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00966

Parameter Name: C00966 VFC: Time const. slip comp.			Data type: UNSIGNED_16 Index: 23609 _d = 5C39 _h
From version 02.00.00 Filter time constant of the slip compensation for V/f characteristic control (VFCplus) • The time constant of slip compensation serves to specify the dynamics of slip compensation for V/f characteristic control without feedback. • The lower the selected time constant, the higher the dynamic performance of the slip compensation.			
Setting range (min. value unit max. value)			Lenze setting
1	ms	6000	100 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C00967

Parameter | Name: **C00967 | VFC: Frequency interpol. point n**

Data type: INTEGER_16
Index: 23608_d = 5C38_h

From version 04.00.00

Selection of the interpolation points (frequency values) for the V/f characteristic control (**VFCplus**) with user-definable V/f characteristic (**C00006** = "10")

Setting range (min. value unit max. value)			
-2600.0	Hz	2600.0	
Subcodes	Lenze setting	Info	
C00967/1	-50.0 Hz	VFC : Frequency interpol. point 1	
C00967/2	-40.0 Hz	VFC : Frequency interpol. point 2	
C00967/3	-30.0 Hz	VFC : Frequency interpol. point 3	
C00967/4	-20.0 Hz	VFC : Frequency interpol. point 4	
C00967/5	-10.0 Hz	VFC : Frequency interpol. point 5	
C00967/6	0.0 Hz	VFC : Frequency interpol. point 6	
C00967/7	10.0 Hz	VFC : Frequency interpol. point 7	
C00967/8	20.0 Hz	VFC : Frequency interpol. point 8	
C00967/9	30.0 Hz	VFC : Frequency interpol. point 9	
C00967/10	40.0 Hz	VFC : Frequency interpol. point 10	
C00967/11	50.0 Hz	VFC : Frequency interpol. point 11	

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10

C00968

Parameter | Name: C00968 | VFC: Voltage interpol. point n

Data type: UNSIGNED_16
Index: 23607_d = 5C37_h

From version 04.00.00

Selection of the interpolation points (voltage values) for the V/f characteristic control (VFCplus) with user-definable V/f characteristic (C00006 = "10")

Setting range (min. value unit max. value)		
0.00	V	600.00

Subcodes	Lenze setting	Info
C00968/1	400.00 V	VFC: Voltage interpol. point 1
C00968/2	320.00 V	VFC: Voltage interpol. point 2
C00968/3	240.00 V	VFC: Voltage interpol. point 3
C00968/4	160.00 V	VFC: Voltage interpol. point 4
C00968/5	80.00 V	VFC: Voltage interpol. point 5
C00968/6	0.00 V	VFC: Voltage interpol. point 6
C00968/7	80.00 V	VFC: Voltage interpol. point 7
C00968/8	160.00 V	VFC: Voltage interpol. point 8
C00968/9	240.00 V	VFC: Voltage interpol. point 9
C00968/10	320.00 V	VFC: Voltage interpol. point 10
C00968/11	400.00 V	VFC: Voltage interpol. point 11

☒ Read access

☒ Write access

☐ CINH

☐ PLC STOP

☐ No transfer

☐ COM

☒ MOT

Scaling factor: 100

C00969

Parameter Name: C00969 Motorparameter			Data type: UNSIGNED_8 Index: 23606 _d = 5C36 _h		
From version 12.00.00					
Display range (min. value unit max. value)					
1		255			
Subcodes			Info		
C00969/1			Motor - number of pole pairs		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00971

Parameter Name:			Data type: UNSIGNED_16		
C00971 VFC: Limitation V/f +encoder			Index: 23604 _d = 5C34 _h		
Limitation of the output frequency of the slip regulator and limitation of the injected stator frequency for the V/f control (VFCplus+encoder)					
Setting range (min. value unit max. value)					
0.00	Hz	100.00			
Subcodes	Lenze setting		Info		
C00971/1	10.00 Hz		Maximum output / correcting variable of the slip regulator - The slip regulator output is limited to the value set here in motor/generator mode. - It is recommended to select 1 to 3 times the slip frequency of the motor as limit value.		
C00971/2	100.00 Hz		Maximum frequency deviation between the rotational frequency (speed) measured mechanically by the encoder and the injected stator frequency. A limitation may e.g. avoid overcurrent interruption when traversing to a fixed limit stop.		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00972

Parameter Name: C00972 VFC: Vp V/f +encoder			Data type: UNSIGNED_16 Index: 23603 _d = 5C33 _h		
Proportional gain of the slip regulator for V/f control (VFCplus+encoder) • The gain must be selected depending on the drive system and the sensor resolution (range: 0.005 ... 5). • A high gain requires a high number of increments.					
Setting range (min. value unit max. value)			Lenze setting		
0.000	Hz/Hz	64.000	0.100 Hz/Hz		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			Scaling factor: 1000		

C00973

Parameter Name: C00973 VFC: Ti V/f +encoder			Data type: UNSIGNED_16 Index: 23602 _d = 5C32 _h		
Integral time constant of the slip regulator for V/f control (VFCplus+encoder) In general, the time constant should be selected in a range of 20 ms (high dynamics) to 200 (low dynamics).					
Setting range (min. value unit max. value)			Lenze setting		
0.0	ms	6000.0	100.0 ms		
☒ Read access			☒ Write access		
☐ CINH			☐ PLC STOP		
☐ No transfer			☐ COM		
☒ MOT			Scaling factor: 10		

C00975

Parameter Name: C00975 VFC-ECO: Vp CosPhi controller			Data type: UNSIGNED_16 Index: 23600 _d = 5C30 _h		
From version 10.00.00 Proportional gain of the Cos-Phi controller for energy-saving V/f characteristic control (VFCplusEco)					
Setting range (min. value unit max. value)			Lenze setting		
0.000	Hz/Hz	64.000	0.500 Hz/Hz		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			Scaling factor: 1000		

C00976

Parameter Name: C00976 VFC-ECO: Ti CosPhi controller			Data type: UNSIGNED_16 Index: 23599 _d = 5C2F _h		
From version 10.00.00 Reset time of the Cos-Phi controller for energy-saving V/f characteristic control (VFCplusEco)					
Setting range (min. value unit max. value)			Lenze setting		
0.0	ms	6000.0	200.0 ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00977

Parameter Name: C00977 VFC-ECO: Minimum voltage V/f			Data type: INTEGER_16 Index: 23598 _d = 5C2E _h		
From version 10.00.00 Minimum voltage V/f of the Cos-Phi controller for energy-saving V/f characteristic control (VFCplusEco)					
Setting range (min. value unit max. value)			Lenze setting		
20.00	%	100.00	20.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00978

Parameter Name: C00978 VFC-ECO: Voltage reduction			Data type: INTEGER_16 Index: 23597 _d = 5C2D _h		
From version 10.00.00 Display of the voltage reduction with energy-saving V/f characteristic control (VFCplusEco)					
Display range (min. value unit max. value)					
-1000	V	1000			
☒ Read access			☐ Write access		
☐ CINH			☐ PLC STOP		
☐ No transfer			☐ COM		
☐ MOT			Scaling factor: 1		

C00979

Parameter Name: C00979 Cosine phi			Data type: INTEGER_16 Index: 23596 _d = 5C2C _h		
From version 10.00.00 Display of the cosφ setpoint and actual value with energy-saving V/f characteristic control (VFCplusEco)					
Display range (min. value unit max. value)					
-1.00		1.00			
Subcodes			Info		
C00979/1			Cosine phi act		
C00979/2			Cosine phi set		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00980

Parameter Name: C00980 Output power			Data type: INTEGER_32 Index: 23595 _d = 5C2B _h		
From version 10.00.00					
Display parameter for an energy analysis in the prevailing application. From this, decisions can be deduced whether a measure for energy optimisation is economic.					
Display range (min. value unit max. value)					
-32.000	kW	32.000			
Subcodes			Info		
C00980/1			Active output power		
C00980/2			Apparent output power		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C00981

Parameter Name: C00981 Energy display			Data type: INTEGER_32 Index: 23594 _d = 5C2A _h		
From version 10.00.00 Display parameter for an energy analysis in the prevailing application. From this, decisions can be deduced whether a measure for energy optimisation is economic. The values are saved to the device by switching off the mains and cannot be reset.					
Display range (min. value unit max. value)					
0.00	kWh	21474836.47			
Subcodes			Info		
C00981/1			Output energy in motor mode		
C00981/2			Output energy in generator mode		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00982

Parameter Name: C00982 VFC-ECO: Voltage reduction ramp			Data type: UNSIGNED_8 Index: 23593 _d = 5C29 _h		
From version 10.00.00 Voltage ramp for cancelling V-Sub with energy-saving V/f characteristic control (VFCplusEco)					
Setting range (min. value unit max. value)			Lenze setting		
0.0	s	5.0	0.8 s		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C00983

Parameter Name: C00983 Delay			Data type: UNSIGNED_16 Index: 23592 _d = 5C28 _h		
Setting range (min. value unit max. value)					
0	ms	4000			
Subcodes	Lenze setting	Info			
C00983/1	50 ms	Delay I _{max}			
C00983/2	1000 ms	<u>VFC</u> : Voltage ramp after overvoltage oU • From version 15.00.00			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C00985

Parameter Name:			Data type: INTEGER_16		
C00985 SLVC: Field current controller gain			Index: 23590 _d = 5C26 _h		
Gain of the direct-axis current difference (Id) between setpoint and actual current for the voltage model of the sensorless vector control (SLVC)					
• The gain should be selected in a range of 0 ...1 %.					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	20.00	0.50 %		
☒ Read access			☒ Write access		
☐ CINH			☐ PLC STOP		
☐ No transfer			☐ COM		
☒ MOT			Scaling factor: 100		

C00986

Parameter Name: C00986 SLVC: Cross current controller gain				Data type: INTEGER_16 Index: 23589 _d = 5C25 _h	
Gain of the cross current difference for the voltage model of the sensorless vector control (SLVC)					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	20.00	0.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00987

Parameter Name: C00987 Inverter motor brake: nAdd			Data type: INTEGER_16 Index: 23588 _d = 5C24 _h		
From version 04.00.00					
Speed lift which is connected in pulses to the brake rampe when the motor is braked.					
▸ Inverter motor brake					
Setting range (min. value unit max. value)			Lenze setting		
0	rpm	1000	80 rpm		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			Scaling factor: 1		

C00988

Parameter Name: C00988 Inverter motor brake: PT1 filter time			Data type: INTEGER_16 Index: 23587 _d = 5C23 _h		
From version 04.00.00					
PT1 filter time for smoothing the speed lift which is added in pulses (C00987)					
▸ Inverter motor brake					
Setting range (min. value unit max. value)			Lenze setting		
0.0	ms	100.0	0.0 ms		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10					

C00989

Parameter Name: C00989 Restart on the fly: Flying restart frequency fd_add			Data type: INTEGER_16 Index: 23586 _d = 5C22 _h		
From version 15.00.00					
Flying restart fct.					
Setting range (min. value unit max. value)					
0.00	Hz	5.00			
Subcodes	Lenze setting		Info		
C00989/1	0.00 Hz		Restart on the fly: Flying restart frequency fd_add		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00990

Parameter Name: C00990 Flying restart fct.: Activation		Data type: UNSIGNED_8 Index: 23585 _d = 5C21 _h
Switch on/activate flying restart circuit for non-feedback drive systems		
▶ Flying restart fct.		
Selection list (Lenze setting printed in bold)		
0	Off	
1	On	
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00991

Parameter Name: C00991 Flying restart fct.: Process		Data type: UNSIGNED_16 Index: 23584 _d = 5C20 _h
Selection of the starting value and the speed search range for the flying restart function		
▶ Flying restart fct.		
Selection list (Lenze setting printed in bold)		Info
0	0...+n Start: +10 Hz	Search positive speed range (0 ... +n) with a start frequency of +10 Hz
1	-n...0 Start: -10 Hz	Search negative speed range (-n ... 0) with a start frequency of -10 Hz
2	-n...+n Start: +10 Hz	Search negative and positive speed range (-n ... n) with a start frequency of +10 Hz
3	-n...+n Start: -10 Hz	Search negative and positive speed range (-n ... n) with a start frequency of -10 Hz
4	-n...+n Start: Cx992	Search the negative and positive speed range (-n ... n) with the start frequency set in C00992
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00992

Parameter Name: C00992 Flying restart fct.: Start frequency		Data type: INTEGER_16 Index: 23583 _d = 5C1F _h
Manual selection of the starting value for the flying restart function		
• Only active if C00991 = 4		
▶ Flying restart fct.		
Setting range (min. value unit max. value)		Lenze setting
-200	Hz	200
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C00993

Parameter Name: C00993 Flying restart fct: Int. time		Data type: UNSIGNED_16 Index: 23582 _d = 5C1E _h
Time constant of the angular difference controller of the flying restart function		
• The time constant is to amount between 60 ... 300 ms.		
▶ Flying restart fct.		
Setting range (min. value unit max. value)		Lenze setting
0.0	ms	6000.0
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10		

C00994

Parameter Name: C00994 Flying restart fct.: Current			Data type: INTEGER_16 Index: 23581 _d = 5C1D _h		
Current to be injected during the flying restart process • 100 % ≡ rated motor current (C00088). • The flying restart current should amount to 10 ... 25 % of the rated motor current. ▶ Flying restart fct.					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	100.00	25.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00995

Parameter Name: C00995 SLPSM: Controlled current setpoint			Data type: UNSIGNED_16 Index: 23580 _d = 5C1C _h		
From version 10.00.00					
▶ Sensorless control for synchronous motors (SLPSM)					
Setting range (min. value unit max. value)					
5.00	%	400.00			
Subcodes	Lenze setting		Info		
C00995/1	100.00 %		SLPSM : Controlled accelerating current		
C00995/2	20.00 %		SLPSM : Controlled standstill current		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C00996

Parameter Name: C00996 SLPSM: Switching speed			Data type: INTEGER_16 Index: 23579 _d = 5C1B _h		
From version 10.00.00					
▶ Sensorless control for synchronous motors (SLPSM)					
Setting range (min. value unit max. value)					
0.00	%	100.00			
Subcodes	Lenze setting		Info		
C00996/1	13.00 %		SLPSM : Switching speed, closed-loop control		
C00996/2	8.00 %		SLPSM : Switching speed, open-loop control		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00997

Parameter Name: C00997 SLPSM: Filter cutoff frequency			Data type: INTEGER_16 Index: 23578 _d = 5C1A _h		
From version 10.00.00					
► Sensorless control for synchronous motors (SLPSM)					
Setting range (min. value unit max. value)			Lenze setting		
0.00	%	100.00	5.00 %		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C00998

Parameter Name: C00998 SLPSM: Filter time rotor position			Data type: INTEGER_16 Index: 23577 _d = 5C19 _h
From version 10.00.00			
► Sensorless control for synchronous motors (SLPSM)			
Setting range (min. value unit max. value)			
0.5	ms	20.0	
Subcodes	Lenze setting	Info	
C00998/1	3.0 ms	SLPSM : Filter time rotor position	
C00998/2	5.0 ms	SLPSM : Filter time actual speed value	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10			

C00999

Parameter Name: C00999 SLPSM: PLL gain			Data type: INTEGER_16 Index: 23576 _d = 5C18 _h
From version 10.00.00			► Sensorless control for synchronous motors (SLPSM)
Setting range (min. value unit max. value)			Lenze setting
0	%	1000	400 %
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C01000

Parameter Name: C01000 MCTRL: Status		Data type: UNSIGNED_16 Index: 23575 _d = 5C17 _h	
From version 10.00.00			
Display area (min. hex value max. hex value)			
0x0000			
Value is bit-coded:		Info	
Bit 0	SLPSM: Speed closed-loop control	1 ≡ The sensorless control for synchronous motors is in the closed-loop controlled operation ($ n_{\text{Setpoint}} > n_{\text{C00996}}$). ▶ Sensorless control for synchronous motors (SLPSM)	
Bit 1	SLPSM: Speed open-loop control	From version 12.00.00 1 ≡ The sensorless control for synchronous motors is in the open-loop controlled operation ($ n_{\text{Setpoint}} > n_{\text{C00996}}$). ▶ Sensorless control for synchronous motors (SLPSM)	
Bit 2	Motor ASM	From version 12.00.00 1 ≡ Set motor type is "Asynchronous motor"	
Bit 3	Motor PSM	From version 12.00.00 1 ≡ Set motor type is "Synchronous motor"	
Bit 4	Encoder open circuit: V/f linear active	From version 15.00.00 1 ≡ Due to an encoder open circuit, it has been internally switched to the encoderless V/f characteristic control to avoid impermissible motor movements.	
Bit 5	Reserved		
Bit 6	Reserved		
Bit 7	Reserved		
Bit 8	Reserved		
Bit 9	Reserved		
Bit 10	Reserved		
Bit 11	Reserved		
Bit 12	Reserved		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	Reserved		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			

C01001

Parameter Name: C01001 Manual entry of motor type		Data type: UNSIGNED_8 Index: 23574 _d = 5C16 _h	
From version 14.00.00			
Selection list			
0	Automatic		
1	ASM		
2	PSM		
Subcodes	Lenze setting	Info	
C01001/1	0: Automatic	Manual entry of motor type	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C01082

Parameter Name: C01082 LS_WriteParamList: Execute Mode		Data type: UNSIGNED_8 Index: 23493 _d = 5BC5 _h
From version 04.00.00 Parameter change-over : Selection of the activation method		
Selection list (Lenze setting printed in bold)		Info
0	by Execute	The writing of the parameter list is activated by a FALSE/TRUE edge at the <i>bExecute</i> input.
1	by Input Select	The writing of the parameter list is carried out if a change is made at the select inputs and if the controller is initialised.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01083

Parameter Name: C01083 LS_WriteParamList: Error status		Data type: UNSIGNED_16 Index: 23492 _d = 5BC4 _h
From version 04.00.00 Parameter change-over : Error status:		
• 0 = no error • 33803 0x840B = invalid data type (e.g. STRING) • 33804 0x840C = limit violation • 33806 0x840E = invalid code • 33813 0x8415 = no element of the selection list • 33815 0x8417 = writing of the parameter not permitted • 33816 0x8418 = writing of the parameter only permitted if controller is inhibited • 33829 0x8425 = invalid subcode • 33865 0x8449 = no parameter with subcodes		
Display range (min. value unit max. value)		
0		34000
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01084

Parameter Name: C01084 LS_WriteParamList: Error line		Data type: UNSIGNED_8 Index: 23491 _d = 5BC3 _h
From version 04.00.00 Parameter change-over : Display of the number of list entry where the error occurred (in connection with the value set selected via <i>bSelectWriteValue_1</i> and <i>bSelectWriteValue_2</i>).		
Display range (min. value unit max. value)		
0		32
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01085

Parameter Name: C01085 LS_WriteParamList: Index			Data type: INTEGER_32 Index: 23490 _d = 5BC2 _h
From version 04.00.00 Parameter change-over : Parameter for entry 1 ... 32			
Setting range (min. value unit max. value)			
0.000		16000.000	
Subcodes	Lenze setting	Info	
C01085/1	0.000	Parameter for entries 1 ... 32 • Format: <code number>.<subcode number> • Examples: "12.000" = C00012; "26.001" = C00026/1	
C01085/...			
C01085/32			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C01086

Parameter Name: C01086 LS_WriteParamList: WriteValue_1			Data type: INTEGER_32 Index: 23489 _d = 5BC1 _h
From version 04.00.00 Parameter change-over : Parameter values - value set 1			
Setting range (min. value unit max. value)			
-2147483647			
Subcodes	Lenze setting	Info	
C01086/1	0	Parameter values - value set 1	
C01086/...		• Parameter values for the parameters defined in	
C01086/32		C01085 /1 ... 32.	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01087

Parameter Name: C01087 LS_WriteParamList: WriteValue_2			Data type: INTEGER_32 Index: 23488 _d = 5BC0 _h
From version 04.00.00 Parameter change-over : Parameter values - value set 2			
Setting range (min. value unit max. value)			
-2147483647		2147483647	
Subcodes	Lenze setting	Info	
C01087/1	0	Parameter values - value set 2	
C01087/...		• Parameter values for the parameters defined in C01085 /1 ... 32.	
C01087/32			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01088

Parameter Name: C01088 LS_WriteParamList: WriteValue_3			Data type: INTEGER_32 Index: 23487 _d = 5BBF _h
From version 04.00.00 Parameter change-over : Parameter values - value set 3			
Setting range (min. value unit max. value)			
-2147483647		2147483647	
Subcodes	Lenze setting	Info	
C01088/1	0	Parameter values - value set 3	
C01088/...		• Parameter values for the parameters defined in C01085 /1 ... 32.	
C01088/32			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01089

Parameter Name: C01089 LS_WriteParamList: WriteValue_4			Data type: INTEGER_32 Index: 23486 _d = 5BBE _h
From version 04.00.00 Parameter change-over : Parameter values - value set 4			
Setting range (min. value unit max. value)			
-2147483647		2147483647	
Subcodes	Lenze setting	Info	
C01089/1	0	Parameter values - value set 4	
C01089/...		• Parameter values for the parameters defined in C01085 /1 ... 32.	
C01089/32			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01090

Parameter Name: C01090 LS_ParReadWrite 1-3: Index			Data type: INTEGER_32 Index: 23485 _d = 5BBD _h
From version 06.00.00 Parameter to be read or written. • Format: <code number>,<subcode number> • For a setting of "0,000", inputs <i>wParIndex</i> and <i>wParSubindex</i> are effective for addressing purposes instead.			
Setting range (min. value unit max. value)			
0.000		16000.000	
Subcodes	Lenze setting	Info	
C01090/1	0.000	LS_ParReadWrite_1 : Index	
C01090/2	0.000	LS_ParReadWrite_2 : Index	
C01090/3	0.000	LS_ParReadWrite_3 : Index	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C01091

Parameter Name: C01091 LS_ParReadWrite 1-3: Cycle time		Data type: UNSIGNED_16 Index: 23484 _d = 5BBC _h
From version 04.00.00 Time interval for cyclic reading/writing		
Selection list		
0	0 (by Execute)	
20	20 ms	
50	50 ms	
100	100 ms	
200	200 ms	
500	500 ms	
1000	1000 ms	
2000	2000 ms	
5000	5000 ms	
10000	10000 ms	
Subcodes	Lenze setting	Info
C01091/1	0: 0 (by Execute)	LS_ParReadWrite 1 : Cycle time
C01091/2	0: 0 (by Execute)	LS_ParReadWrite 2 : Cycle time
C01091/3	0: 0 (by Execute)	LS_ParReadWrite 3 : Cycle time
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01092

Parameter Name: C01092 LS_ParReadWrite 1-3: FailState		Data type: UNSIGNED_16 Index: 23483 _d = 5BBB _h
From version 04.00.00 Error status:		
• 0 = no error • 33803 0x840B = invalid data type (e.g. STRING) • 33804 0x840C = limit violation • 33806 0x840E = invalid code • 33813 0x8415 = no element of the selection list • 33815 0x8417 = writing of the parameter not permitted • 33816 0x8418 = writing of the parameter only permitted if controller is inhibited • 33829 0x8425 = invalid subcode • 33865 0x8449 = no parameter with subcodes		
Display range (min. value unit max. value)		
0		
Subcodes		Info
C01092/1		LS_ParReadWrite 1 : Error status
C01092/2		LS_ParReadWrite 2 : Error status
C01092/3		LS_ParReadWrite 3 : Error status
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01093

Parameter Name: C01093 LS_ParReadWrite 1-3: Arithmetic mode		Data type: UNSIGNED_8 Index: 23482 _d = 5BBA _h
From version 06.00.00 The integrated arithmetic function allows for easy arithmetic conversion of the process value to be written or which was read into the format of the target parameter via parameterisable factors and without the need for an additional arithmetic FB.		
Selection list		
0	No arithmetic	
1	In16Bit: LW=+/-32767	
2	In16Bit: HW=+/-; LW=0..65535	
3	In32Bit: HW_LW=+/-2147483647	
Subcodes	Lenze setting	Info
C01093/1	0: no arithmetic	LS_ParReadWrite 1 : Arithmetic mode
C01093/2	0: no arithmetic	LS_ParReadWrite 2 : Arithmetic mode
C01093/3	0: no arithmetic	LS_ParReadWrite 3 : Arithmetic mode
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01094

Parameter Name: C01094 LS_ParReadWrite 1-3: Numerator		Data type: INTEGER_16 Index: 23481 _d = 5BB9 _h
From version 06.00.00 Arithmetic function : Factor (numerator) for internal conversion in arithmetic modes 1 ... 3.		
Setting range (min. value unit max. value)		
-32767		32767
Subcodes	Lenze setting	Info
C01094/1	1	LS_ParReadWrite 1 : Numerator
C01094/2	1	LS_ParReadWrite 2 : Numerator
C01094/3	1	LS_ParReadWrite 3 : Numerator
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01095

Parameter Name: C01095 LS_ParReadWrite 1-3: Denominator		Data type: INTEGER_16 Index: 23480 _d = 5BB8 _h
From version 06.00.00 Arithmetic function : Factor (denominator) for internal conversion in arithmetic modes 1 ... 3.		
Setting range (min. value unit max. value)		
1		32767
Subcodes	Lenze setting	Info
C01095/1	1	LS_ParReadWrite 1 : Denominator
C01095/2	1	LS_ParReadWrite 2 : Denominator
C01095/3	1	LS_ParReadWrite 3 : Denominator
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01120

Parameter Name: C01120 Sync signal source		Data type: UNSIGNED_8 Index: 23455 _d = 5B9F _h	
From version 03.00.00 Selection of the signal source for device synchronisation The drive can only be synchronised by one source. ▸ Synchronisation of the internal time base			
Selection list (Lenze setting printed in bold)		Info	
0	Off	Synchronisation off	
1	CAN on board	Synchronisation via CAN bus ▸ Sync telegram	
4	MCI	Synchronisation via MCI (communication module)	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01121

Parameter Name: C01121 Sync cycle time setpoint			Data type: UNSIGNED_16 Index: 23454 _d = 5B9E _h		
From version 03.00.00 Cycle time setpoint for device synchronisation - Time interval at which the phase control loop (PLL) in the controller expects the synchronisation signals. - The cycle time setpoint must be set according to the cycle of the respective synchronisation source. Note: - Only integer multiples of 1000 µs can be set. - Intelligent communication modules usually define the cycle time setpoint derived from the bus cycle. In this case, a manual change is not possible. Example: For the CAN bus, a distance of 2 ms has been set between two synchronisation signals. If the CAN bus is to be used as synchronisation source, a synchronisation cycle of 2000 µs must be set in C01121. ► Synchronisation of the internal time base					
Setting range (min. value unit max. value)			Lenze setting		
1000	µs	20000	1000 µs		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C01122

Parameter Name:		Data type: UNSIGNED_16 Index: 23453 _d = 5B9D _h	
C01122 Sync phase position			
From version 03.00.00			
Phase position for device synchronisation			
• The phase position determines the zero-time of the internal system cycle with regard to the synchronisation signal (bus cycle). Since PDO processing is an inherent part of the system part of the application, the instant of acceptance of the PDOs is postponed as well by a changed phase position. • With a setting = 0, the system cycle starts simultaneously with the synchronisation signal. • With a setting > 0, the internal system cycle starts earlier by the set time with regard to the synchronisation signal (the phase position acts negatively). • Intelligent communication modules define the optimal time with activated synchronisation by themselves. In this case, a manual change is not possible. • The decisive factor for defining C01122 is the time where all nodes are provided with valid PDOs.			
Example: If the phase position is set to 550 µs, the system part of the application starts 550 µs before the arrival of the synchronisation signal.			
► Synchronisation of the internal time base			
Setting range (min. value unit max. value)			Lenze setting
0	µs	1000	0 µs
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01123

Parameter Name: C01123 Sync window			Data type: UNSIGNED_16 Index: 23452 _d = 5B9C _h
From version 03.00.00 Time slot for monitoring the synchronisation signal or the phase position - The synchronisation signal or the current phase position must be within this time slot around the corresponding expected value (C01122). - With the setting "1000 µs" there will be no monitoring. Synchronisation of the internal time base			
Setting range (min. value unit max. value)			Lenze setting
0	µs	10000	100 µs
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01124

Parameter Name: C01124 Sync correction width			Data type: UNSIGNED_8 Index: 23451 _d = 5B9B _h
From version 03.00.00 Correction increment for device synchronisation - If the cycle times of the synchronisation signal differs and phase-locked loop (PLL) differ from each other, this setting defines the measure the phase-locking loop is reset with. - If synchronisation is not reached, select a higher correction constant. - The optimum setting depends on quartz precision and must be determined empirically if required. Synchronisation of the internal time base			
Selection list (Lenze setting printed in bold)			
1	100ns		
2	200ns		
3	300ns		
4	400ns		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01138

Parameter Name: C01138 L_Transient 1-4: Function		Data type: UNSIGNED_8 Index: 23437 _d = 5B8D _h
From version 04.00.00		
Selection of edge evaluation		
Selection list		
0	High edge	
1	Low edge	
2	High and low edge	
Subcodes	Lenze setting	Info
C01138/1	0: High edge	L_Transient 1 : Function
C01138/2	0: High edge	L_Transient 2 : Function
C01138/3	0: High edge	L_Transient 3 : Function
C01138/4	0: High edge	L_Transient 4 : Function
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01139

Parameter Name: C01139 L_Transient 1-4: Pulse duration			Data type: UNSIGNED_16 Index: 23436 _d = 5B8C _h		
From version 04.00.00					
Setting range (min. value unit max. value)					
0.000	s	60.000			
Subcodes	Lenze setting		Info		
C01139/1	0.000 s		L_Transient_1 : Pulse duration		
C01139/2	0.000 s		L_Transient_2 : Pulse duration		
C01139/3	0.000 s		L_Transient_3 : Pulse duration		
C01139/4	0.000 s		L_Transient_4 : Pulse duration		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C01350

Parameter Name:		Data type: UNSIGNED_8	
C01350 ACDrive: Drive mode		Index: 23225 _d = 5AB9 _h	
Selection list			
1	Speed mode		
3	Torque mode		
Subcodes	Lenze setting	Info	
C01350/1	1: Speed mode	ACDrive: Drive mode	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01351

Parameter Name: C01351 ACDrive: Control word		Data type: UNSIGNED_16 Index: 23224 _d = 5AB8 _h	
From version 13.00.00			
Display of the "AC Drive Profile" control word for the controller			
• Detailed information on the "AC Drive Profile" can be found in the EtherNet/IP™ communication manual.			
▶ Actuating drive speed (AC Drive Profile)			
Display area (min. hex value max. hex value)			
0x0000	0xFFFF		
Value is bit-coded:		Info	
Bit 0	Run Forward	Relationships between Run1 and Run2 and trigger events can be found in the chapter " Run/Stop Event ".	
Bit 1	Run Backward		
Bit 2	Fault Reset	0->1 ≡ Reset error 0 ≡ No response	
Bit 3	Reserved		
Bit 4	Reserved		
Bit 5	NetCtrl	Run/Stop control: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)	
Bit 6	NetRef	Reference speed/reference torque: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)	
Bit 7	Reserved		
Bit 8	Reserved		
Bit 9	Reserved		
Bit 10	Reserved		
Bit 11	Reserved		
Bit 12	Reserved		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	Reserved		
Subcodes		Info	
C01351/1		ACDrive: Control word	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C01352

Parameter Name: C01352 ACDrive: Status word		Data type: UNSIGNED_16 Index: 23223 _d = 5AB7 _h	
From version 13.00.00 Display of the "AC Drive Profile" status word of the controller • Detailed information on the "AC Drive Profile" can be found in the EtherNet/IP™ communication manual. ► Actuating drive speed (AC Drive Profile)			
Display area (min. hex value max. hex value)			
0x0000	0xFFFF		
Value is bit-coded:		Info	
Bit 0	Faulted	0 ≡ No errors 1 ≡ Errors have occurred	
Bit 1	Warning	0 ≡ No warnings 1 ≡ Warnings have occurred	
Bit 2	Running1 (Fwd)	Relationships between Run1 and Run2 and trigger events can be found in the chapter " Run/Stop Event ".	
Bit 3	Running2 (Rev)		
Bit 4	Ready	0 ≡ Different status than in case of "1" 1 ≡ Ready or Enabled or Stopping	
Bit 5	Ctrl from Net	Run/Stop control: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)	
Bit 6	Ref from Net	Reference speed/reference torque: 0 ≡ via local setting in the device or terminal 1 ≡ via fieldbus (e.g. by the scanner)	
Bit 7	At Reference	1 ≡ Currently, the controller runs with the reference speed or reference torque (depending on the "drive mode" set in C01350/1).	
Bit 8	DriveState_0	The "Drive State" is coded as follows: 0: Manufacturer-specific (not used with 8400) 1: Start-up (drive initialisation) 2: Not_Ready (mains voltage switched off) 3: Ready (mains voltage switched-on) 4: Enabled (drive has received "Run" command) 5: Stopping (drive has received "Stop" command and is stopped) 6: Fault_Stop (drive is stopped due to an error) 7: Faulted (errors have occurred)	
Bit 9	DriveState_1		
Bit 10	DriveState_2		
Bit 11	DriveState_3		
Bit 12	DriveState_4		
Bit 13	DriveState_5		
Bit 14	DriveState_6		
Bit 15	DriveState_7		
Subcodes		Info	
C01352/1		ACDrive: Status word	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT			

C01353

Parameter Name: C01353 ACDrive: Setpoint scaling			Data type: INTEGER_8 Index: 23222 _d = 5AB6 _h
From version 13.00.00			
▸ Actuating drive speed (AC Drive Profil): Scaling of the speed and torque values			
Setting range (min. value unit max. value)			
-128		127	
Subcodes	Lenze setting	Info	
C01353/1	0	ACDrive: Speed scaling	
C01353/2	0	ACDrive: Torque scaling	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C01501

Parameter Name:		Data type: UNSIGNED_8 Index: 23074 _d = 5A22 _h
C01501 Resp. to communication error with MCI		
Configuration of monitoring functions for the communication module		
Selection list		
0	No Reaction	
1	Fault	
2	Trouble	
3	TroubleQuickStop	
4	WarningLocked	
5	Warning	
6	Information	
Subcodes	Lenze setting	Info
C01501/1	0: No Reaction	Resp. to MCI connection error • Response to a communication error of the attached communication module.
C01501/2	0: No Reaction	Resp. to MCI invalid module • Response to an unplugged or incompatible communication module
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C01751

Parameter Name:	Data type: UNSIGNED_8
C01751 Service code inverter characteristic	Index: 22824 _d = 5928 _h
This code is for device-internal use only and must not be written to by the user!	

C01752

Parameter Name:	Data type: UNSIGNED_8
C01752 Service par. inverter charact. function	Index: 22823 _d = 5927 _h
This code is for device-internal use only and must not be written to by the user!	

C01755

Parameter Name:	Data type: INTEGER_16
C01755 Service par. inverter charact. factor	Index: 22820 _d = 5924 _h
This code is for device-internal use only and must not be written to by the user!	

C01763

Parameter Name:	Data type: INTEGER_16 Index: 22812 _d = 591C _h
C01763 Service code -clamp threshold	
This code is for device-internal use only and must not be written to by the user!	

C01764

Parameter Name:	Data type: UNSIGNED_8 Index: 22812 _d = 591B _h
C01764 Service par. clamp time	
This code is for device-internal use only and must not be written to by the user!	

C01765

Parameter Name:	Data type: UNSIGNED_16 Index: 22810 _d = 591A _h
C01765 Service code - difference threshold UG	
This code is for device-internal use only and must not be written to by the user!	

C01770

Parameter Name:	Data type: UNSIGNED_8 Index: 22805 _d = 5915 _h
C01770 Filter time - earth-fault detect. is running	
From version 05.00.00	
Setting range (min. value unit max. value)	Lenze setting
0 ms 250	2 ms
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1	

C01771

Parameter Name:	Data type: UNSIGNED_8 Index: 22804 _d = 5914 _h
C01771 BU-Osc: Cycle time selection	
This code is for device-internal use only and must not be written to by the user!	

C01772

Parameter Name:	Data type: UNSIGNED_8 Index: 22803 _d = 5913 _h
C01772 BU-Osc: Trigger channel selection	
This code is for device-internal use only and must not be written to by the user!	

C01773

Parameter Name:	Data type: UNSIGNED_8 Index: 22802 _d = 5912 _h
C01773 BU-Osc: Trigger command	
This code is for device-internal use only and must not be written to by the user!	

C01774

Parameter Name:	Data type: UNSIGNED_8 Index: 22801 _d = 5911 _h
C01774 BU-Osc: Trigger mode	
This code is for device-internal use only and must not be written to by the user!	

C01775

Parameter Name:	Data type: INTEGER_16 Index: 22800 _d = 5910 _h
C01775 BU-Osc: Trigger	
This code is for device-internal use only and must not be written to by the user!	

C01902

Parameter Name:	Data type: UNSIGNED_16 Index: 22673 _d = 5891 _h																				
C01902 Diagnostics X6: Max. baud rate																					
Maximally permissible baud rate in the standard device after determination of the baud rate at the diagnostic interface X6																					
<table border="1"> <thead> <tr> <th colspan="2">Selection list (Lenze setting printed in bold)</th></tr> </thead> <tbody> <tr><td>192</td><td>19.200 Bd</td></tr> <tr><td>384</td><td>38.400 Bd</td></tr> <tr><td>576</td><td>57.600 Bd</td></tr> <tr><td>750</td><td>75.000 Bd</td></tr> <tr><td>1152</td><td>115.200 Bd</td></tr> <tr><td>1500</td><td>150.000 Bd</td></tr> <tr><td>2500</td><td>250.000 Bd</td></tr> <tr><td>3750</td><td>375.000 Bd</td></tr> <tr><td>7500</td><td>750.000 Bd</td></tr> </tbody> </table>		Selection list (Lenze setting printed in bold)		192	19.200 Bd	384	38.400 Bd	576	57.600 Bd	750	75.000 Bd	1152	115.200 Bd	1500	150.000 Bd	2500	250.000 Bd	3750	375.000 Bd	7500	750.000 Bd
Selection list (Lenze setting printed in bold)																					
192	19.200 Bd																				
384	38.400 Bd																				
576	57.600 Bd																				
750	75.000 Bd																				
1152	115.200 Bd																				
1500	150.000 Bd																				
2500	250.000 Bd																				
3750	375.000 Bd																				
7500	750.000 Bd																				
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☒ COM ☐ MOT Scaling factor: 1																					

C01903

Parameter Name:	Data type: UNSIGNED_8 Index: 22672 _d = 5890 _h						
C01903 Diagnostics X6: Change baud rate							
New baud rate determination at the diagnostic interface X6							
<table border="1"> <thead> <tr> <th colspan="2">Selection list (Lenze setting printed in bold)</th></tr> </thead> <tbody> <tr><td>0</td><td>Ignore changes</td></tr> <tr><td>1</td><td>Negotiate baud rate</td></tr> </tbody> </table>		Selection list (Lenze setting printed in bold)		0	Ignore changes	1	Negotiate baud rate
Selection list (Lenze setting printed in bold)							
0	Ignore changes						
1	Negotiate baud rate						
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☒ COM ☐ MOT Scaling factor: 1							

C01905

Parameter Name:			Data type: UNSIGNED_32 Index: 22670 _d = 588E _h		
C01905 Diagnostics X6: Current baud rate					
Current baud rate at the diagnostic interface X6					
Display range (min. value unit max. value)					
0	Bd	3000000			
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☒ COM ☐ MOT Scaling factor: 1					

C02200

Parameter Name: C02200 LS_WriteParamList: Function		Data type: UNSIGNED_8 Index: 22375 _d = 5767 _h
From version 12.00.00 Configuration of which parameter lists are to be subject to the " Parameter change-over " function.		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02200/1	1: On	Definable parameter list
C02200/2	0: Off	Motor data parameter list
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C02210

Parameter Name: C02210 LS_WriteParamList: Motor control		Data type: UNSIGNED_8 Index: 22365 _d = 575D _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
3	SLPSM: Sensorless PSM	
4	SLVC: Vector control	
6	VFCplus: V/f linear	
7	VFCplus: V/f linear + encoder	
8	VFCplus: V/f quadr	
9	VFCplus: V/f quadr + encoder	
10	VFCplus: V/f definable	
11	VFCplusEco: V/f energy-saving	
Subcodes	Lenze setting	Info
C02210/1	6: VFCplus: V/f linear	LS_WriteParamList : c6_val1
C02210/2	6: VFCplus: V/f linear	LS_WriteParamList : c6_val2
C02210/3	6: VFCplus: V/f linear	LS_WriteParamList : c6_val3
C02210/4	6: VFCplus: V/f linear	LS_WriteParamList : c6_val3
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02212

Parameter Name: C02212 LS_WriteParamList: VFC: V/f base frequency		Data type: UNSIGNED_16 Index: 22363 _d = 575B _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
7.5	Hz	2600.0
Subcodes	Lenze setting	Info
C02212/1	50.0 Hz	LS_WriteParamList : c15_val1
C02212/2	50.0 Hz	LS_WriteParamList : c15_val2
C02212/3	50.0 Hz	LS_WriteParamList : c15_val3
C02212/4	50.0 Hz	LS_WriteParamList : c15_val4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10		

C02213

Parameter Name: C02213 LS_WriteParamList: VFC: Vmin boost			Data type: UNSIGNED_16 Index: 22362 _d = 575A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	%	100.00	
Subcodes	Lenze setting	Info	
C02213/1	1.60 %	LS_WriteParamList : c16_val1	
C02213/2	1.60 %	LS_WriteParamList : c16_val2	
C02213/3	1.60 %	LS_WriteParamList : c16_val3	
C02213/4	1.60 %	LS_WriteParamList : c16_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02214

Parameter Name: C02214 LS_WriteParamList: Switching frequency		Data type: UNSIGNED_8 Index: 22361 _d = 5759 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
1	4 kHz var./drive-optimised	
2	8 kHz var./drive-optimised	
3	16 kHz var./drive-optimised	
5	2 kHz constant/drive-optimised	
6	4 kHz constant/drive-optimised	
7	8 kHz constant/drive-optimised	
8	16 kHz constant/drive-optimised	
11	4 kHz var./min. Pv	
12	8 kHz var./min. Pv	
13	16 kHz var./min. Pv	
15	2 kHz constant/min. Pv	
16	4 kHz constant/min. Pv	
17	8 kHz constant/min. Pv	
18	16 kHz constant/min. Pv	
21	8 kHz var./drive-opt./4 kHz min	
22	16 kHz var./drive-opt./4 kHz min	
23	16 kHz var./drive-opt./8 kHz min	
31	8 kHz var./min. Pv/4 kHz min	
32	16 kHz var./min. Pv/4 kHz min	
33	16 kHz var./min. Pv/8 kHz min	
Subcodes	Lenze setting	
C02214/1	2: 8 kHz var./drive-opt.	LS_WriteParamList : c18_val1
C02214/2	2: 8 kHz var./drive-opt.	LS_WriteParamList : c18_val2
C02214/3	2: 8 kHz var./drive-opt.	LS_WriteParamList : c18_val3
C02214/4	2: 8 kHz var./drive-opt.	LS_WriteParamList : c18_val4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02215

Parameter Name: C02215 LS_WriteParamList: Auto-DCB: Threshold			Data type: UNSIGNED_16 Index: 22360 _d = 5758 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0	rpm	60000			
Subcodes	Lenze setting		Info		
C02215/1	3 rpm		LS_WriteParamList: c19_val1		
C02215/2	3 rpm		LS_WriteParamList: c19_val2		
C02215/3	3 rpm		LS_WriteParamList: c19_val3		
C02215/4	3 rpm		LS_WriteParamList: c19_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C02216

Parameter Name: C02216 LS_WriteParamList: Slip compensation			Data type: INTEGER_16 Index: 22359 _d = 5757 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
-100.00	%	100.00			
Subcodes	Lenze setting		Info		
C02216/1	2.67 %		LS_WriteParamList : c21_val1		
C02216/2	2.67 %		LS_WriteParamList : c21_val2		
C02216/3	2.67 %		LS_WriteParamList : c21_val3		
C02216/4	2.67 %		LS_WriteParamList : c21_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02217

Parameter Name: C02217 LS_WriteParamList: I_{max} in motor mode			Data type: UNSIGNED_16 Index: 22358 _d = 5756 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	A	655.35			
Subcodes	Lenze setting		Info		
C02217/1	47.00 A		LS_WriteParamList: c22_val1		
C02217/2	47.00 A		LS_WriteParamList: c22_val2		
C02217/3	47.00 A		LS_WriteParamList: c22_val3		
C02217/4	47.00 A		LS_WriteParamList: c22_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02218

Parameter Name: C02218 LS_WriteParamList: I_{max} in generator mode			Data type: INTEGER_16 Index: 22357 _d = 5755 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	%	100.00	
Subcodes	Lenze setting	Info	
C02218/1	100.00 %	LS_WriteParamList : c23_val1	
C02218/2	100.00 %	LS_WriteParamList : c23_val2	
C02218/3	100.00 %	LS_WriteParamList : c23_val3	
C02218/4	100.00 %	LS_WriteParamList : c23_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02219

Parameter Name: C02219 LS_WriteParamList: DC braking: Current			Data type: INTEGER_16 Index: 22356 _d = 5754 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	%	200.00	
Subcodes	Lenze setting	Info	
C02219/1	50.00 %	LS_WriteParamList : c36_val1	
C02219/2	50.00 %	LS_WriteParamList : c36_val2	
C02219/3	50.00 %	LS_WriteParamList : c36_val3	
C02219/4	50.00 %	LS_WriteParamList : c36_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02220

Parameter Name: C02220 LS_WriteParamList: Vp speed controller			Data type: UNSIGNED_16 Index: 22355 _d = 5753 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00		600.00	
Subcodes	Lenze setting	Info	
C02220/1	15.00	LS_WriteParamList : c70_s1_val1	
C02220/2	15.00	LS_WriteParamList : c70_s1_val2	
C02220/3	15.00	LS_WriteParamList : c70_s1_val3	
C02220/4	15.00	LS_WriteParamList : c70_s1_val4	
C02220/5	6.00	Reserved	
C02220/6	6.00	Reserved	
C02220/7	6.00	Reserved	
C02220/8	6.00	Reserved	
C02220/9	3.00	LS_WriteParamList : c70_s3_val1	
C02220/10	3.00	LS_WriteParamList : c70_s3_val2	
C02220/11	3.00	LS_WriteParamList : c70_s3_val3	
C02220/12	3.00	LS_WriteParamList : c70_s3_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02221

Parameter Name: C02221 LS_WriteParamList: Ti speed controller			Data type: UNSIGNED_16 Index: 22354 _d = 5752 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.0	ms	6000.0	
Subcodes	Lenze setting	Info	
C02221/1	100.0 ms	LS_WriteParamList : c71_s1_val1	
C02221/2	100.0 ms	LS_WriteParamList : c71_s1_val2	
C02221/3	100.0 ms	LS_WriteParamList : c71_s1_val3	
C02221/4	100.0 ms	LS_WriteParamList : c71_s1_val4	
C02221/5	50.0 ms	Reserved	
C02221/6	50.0 ms	Reserved	
C02221/7	50.0 ms	Reserved	
C02221/8	50.0 ms	Reserved	
C02221/9	100.0 ms	LS_WriteParamList : c71_s3_val1	
C02221/10	100.0 ms	LS_WriteParamList : c71_s3_val2	
C02221/11	100.0 ms	LS_WriteParamList : c71_s3_val3	
C02221/12	100.0 ms	LS_WriteParamList : c71_s3_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10			

C02222

Parameter Name: C02222 LS_WriteParamList: SC: Tdn speed controller			Data type: UNSIGNED_16 Index: 22353 _d = 5751 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	ms	3.00			
Subcodes	Lenze setting		Info		
C02222/1	0.00 ms		LS_WriteParamList : c72_val1		
C02222/2	0.00 ms		LS_WriteParamList : c72_val2		
C02222/3	0.00 ms		LS_WriteParamList : c72_val3		
C02222/4	0.00 ms		LS_WriteParamList : c72_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02223

Parameter Name: C02223 LS_WriteParamList: Imax/M controller gain			Data type: UNSIGNED_16 Index: 22352 _d = 5750 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00		100.00	
Subcodes	Lenze setting	Info	
C02223/1	0.25	LS_WriteParamList : c73_s1_val1	
C02223/2	0.25	LS_WriteParamList : c73_s1_val2	
C02223/3	0.25	LS_WriteParamList : c73_s1_val3	
C02223/4	0.25	LS_WriteParamList : c73_s1_val4	
C02223/5	1.25	LS_WriteParamList : c73_s2_val1	
C02223/6	1.25	LS_WriteParamList : c73_s2_val2	
C02223/7	1.25	LS_WriteParamList : c73_s2_val3	
C02223/8	1.25	LS_WriteParamList : c73_s2_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02224

Parameter Name: C02224 LS_WriteParamList: Imax/M controller reset time			Data type: UNSIGNED_16 Index: 22351 _d = 574F _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0	ms	9990	
Subcodes	Lenze setting	Info	
C02224/1	65 ms	LS_WriteParamList : c74_s1_val1	
C02224/2	65 ms	LS_WriteParamList : c74_s1_val2	
C02224/3	65 ms	LS_WriteParamList : c74_s1_val3	
C02224/4	65 ms	LS_WriteParamList : c74_s1_val4	
C02224/5	30 ms	LS_WriteParamList : c74_s2_val1	
C02224/6	30 ms	LS_WriteParamList : c74_s2_val2	
C02224/7	30 ms	LS_WriteParamList : c74_s2_val3	
C02224/8	30 ms	LS_WriteParamList : c74_s2_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02225

Parameter Name: C02225 LS_WriteParamList: Vp current controller			Data type: UNSIGNED_16 Index: 22350 _d = 574E _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	V/A	500.00	
Subcodes	Lenze setting	Info	
C02225/1	7.00 V/A	LS_WriteParamList : c75_val1	
C02225/2	7.00 V/A	LS_WriteParamList : c75_val2	
C02225/3	7.00 V/A	LS_WriteParamList : c75_val3	
C02225/4	7.00 V/A	LS_WriteParamList : c75_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02226

Parameter Name: C02226 LS_WriteParamList: Ti current controller			Data type: UNSIGNED_16 Index: 22349 _d = 574D _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	ms	500.00			
Subcodes	Lenze setting	Info			
C02226/1	10.61 ms	LS_WriteParamList : c76_val1			
C02226/2	10.61 ms	LS_WriteParamList : c76_val2			
C02226/3	10.61 ms	LS_WriteParamList : c76_val3			
C02226/4	10.61 ms	LS_WriteParamList : c76_val4			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02229

Parameter Name: C02229 LS_WriteParamList: SC: Settings		Data type: UNSIGNED_8 Index: 22346 _d = 574A _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02229/1	0: Off	LS_WriteParamList: c79_s1_val1
C02229/2	0: Off	LS_WriteParamList: c79_s1_val2
C02229/3	0: Off	LS_WriteParamList: c79_s1_val3
C02229/4	0: Off	LS_WriteParamList: c79_s1_val4
C02229/5	1: On	LS_WriteParamList: c79_s2_val1
C02229/6	1: On	LS_WriteParamList: c79_s2_val2
C02229/7	1: On	LS_WriteParamList: c79_s2_val3
C02229/8	1: On	LS_WriteParamList: c79_s2_val4
C02229/9	0: Off	LS_WriteParamList: c79_s3_val1
C02229/10	0: Off	LS_WriteParamList: c79_s3_val2
C02229/11	0: Off	LS_WriteParamList: c79_s3_val3
C02229/12	0: Off	LS_WriteParamList: c79_s3_val4
C02229/13	1: On	LS_WriteParamList: c79_s4_val1
C02229/14	1: On	LS_WriteParamList: c79_s4_val2
C02229/15	1: On	LS_WriteParamList: c79_s4_val3
C02229/16	1: On	LS_WriteParamList: c79_s4_val4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02230

Parameter Name: C02230 LS_WriteParamList: Override point of field weakening			Data type: INTEGER_16 Index: 22345 _d = 5749 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
-500	Hz	500			
Subcodes	Lenze setting		Info		
C02230/1	0 Hz		LS_WriteParamList : c80_val1		
C02230/2	0 Hz		LS_WriteParamList : c80_val2		
C02230/3	0 Hz		LS_WriteParamList : c80_val3		
C02230/4	0 Hz		LS_WriteParamList : c80_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02231

Parameter Name: C02231 LS_WriteParamList: Rated motor power			Data type: UNSIGNED_16 Index: 22344 _d = 5748 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	kW	500.00			
Subcodes	Lenze setting		Info		
C02231/1	11.00 kW		LS_WriteParamList : c81_val1		
C02231/2	11.00 kW		LS_WriteParamList : c81_val2		
C02231/3	11.00 kW		LS_WriteParamList : c81_val3		
C02231/4	11.00 kW		LS_WriteParamList : c81_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02232

Parameter Name: C02232 LS_WriteParamList: Motor rotor resistance			Data type: UNSIGNED_32 Index: 22343 _d = 5747 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0	mOhm	200000			
Subcodes	Lenze setting		Info		
C02232/1	276 mOhm		LS_WriteParamList : c82_val1		
C02232/2	276 mOhm		LS_WriteParamList : c82_val2		
C02232/3	276 mOhm		LS_WriteParamList : c82_val3		
C02232/4	276 mOhm		LS_WriteParamList : c82_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02233

Parameter Name: C02233 LS_WriteParamList: Motor stator resistance			Data type: UNSIGNED_32 Index: 22342 _d = 5746 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0	mOhm	200000			
Subcodes	Lenze setting	Info			
C02233/1	330 mOhm	LS_WriteParamList : c84_val1			
C02233/2	330 mOhm	LS_WriteParamList : c84_val2			
C02233/3	330 mOhm	LS_WriteParamList : c84_val3			
C02233/4	330 mOhm	LS_WriteParamList : c84_val4			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02234

Parameter Name:			Data type: UNSIGNED_16 Index: 22341 _d = 5745 _h		
C02234 LS_WriteParamList: Motor stator leakage inductance					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	mH	650.00			
Subcodes	Lenze setting		Info		
C02234/1	3.50 mH		LS_WriteParamList : c85_val1		
C02234/2	3.50 mH		LS_WriteParamList : c85_val2		
C02234/3	3.50 mH		LS_WriteParamList : c85_val3		
C02234/4	3.50 mH		LS_WriteParamList : c85_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02236

Parameter Name: C02236 LS_WriteParamList: Rated motor speed			Data type: UNSIGNED_16 Index: 22339 _d = 5743 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
50	rpm	60000			
Subcodes	Lenze setting		Info		
C02236/1	1460 rpm		LS_WriteParamList : c87_val1		
C02236/2	1460 rpm		LS_WriteParamList : c87_val2		
C02236/3	1460 rpm		LS_WriteParamList : c87_val3		
C02236/4	1460 rpm		LS_WriteParamList : c87_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02237

Parameter Name: C02237 LS_WriteParamList: Rated motor current			Data type: UNSIGNED_16 Index: 22338 _d = 5742 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.20	A	320.00			
Subcodes	Lenze setting		Info		
C02237/1	21.00 A		LS_WriteParamList: c88_val1		
C02237/2	21.00 A		LS_WriteParamList: c88_val2		
C02237/3	21.00 A		LS_WriteParamList: c88_val3		
C02237/4	21.00 A		LS_WriteParamList: c88_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02238

Parameter Name:			Data type: UNSIGNED_16 Index: 22337 _d = 5741 _h		
C02238 LS_WriteParamList: Rated motor frequency					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
1	Hz	1000			
Subcodes	Lenze setting		Info		
C02238/1	50 Hz		LS_WriteParamList : c89_val1		
C02238/2	50 Hz		LS_WriteParamList : c89_val2		
C02238/3	50 Hz		LS_WriteParamList : c89_val3		
C02238/4	50 Hz		LS_WriteParamList : c89_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02239

Parameter Name: C02239 LS_WriteParamList: Rated motor voltage			Data type: UNSIGNED_16 Index: 22336 _d = 5740 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0	V	5000			
Subcodes	Lenze setting		Info		
C02239/1	400 V		LS_WriteParamList : c90_val1		
C02239/2	400 V		LS_WriteParamList : c90_val2		
C02239/3	400 V		LS_WriteParamList : c90_val3		
C02239/4	400 V		LS_WriteParamList : c90_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02240

Parameter Name: C02240 LS_WriteParamList: Motor cosine phi			Data type: UNSIGNED_8 Index: 22335 _d = 573F _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.40		1.00			
Subcodes	Lenze setting		Info		
C02240/1	0.85		LS_WriteParamList : c91_val1		
C02240/2	0.85		LS_WriteParamList : c91_val2		
C02240/3	0.85		LS_WriteParamList : c91_val3		
C02240/4	0.85		LS_WriteParamList : c91_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02241

Parameter Name:			Data type: UNSIGNED_16 Index: 22334 _d = 573E _h		
C02241 LS_WriteParamList: Motor magnetizing inductance					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	mH	6500.0			
Subcodes	Lenze setting		Info		
C02241/1	81.0 mH		LS_WriteParamList : c92_val1		
C02241/2	81.0 mH		LS_WriteParamList : c92_val2		
C02241/3	81.0 mH		LS_WriteParamList : c92_val3		
C02241/4	81.0 mH		LS_WriteParamList : c92_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02242

Parameter Name: C02242 LS_WriteParamList: Motor magnetising current			Data type: UNSIGNED_16 Index: 22333 _d = 573D _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	A	320.00			
Subcodes	Lenze setting		Info		
C02242/1	8.50 A		LS_WriteParamList : c95_val1		
C02242/2	8.50 A		LS_WriteParamList : c95_val2		
C02242/3	8.50 A		LS_WriteParamList : c95_val3		
C02242/4	8.50 A		LS_WriteParamList : c95_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02244

Parameter Name: C02244 LS_WriteParamList: Auto-DCB: Hold time			Data type: UNSIGNED_32 Index: 22331 _d = 573B _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.000	s	999.000			
Subcodes	Lenze setting		Info		
C02244/1	0.500 s		LS_WriteParamList : c106_val1		
C02244/2	0.500 s		LS_WriteParamList : c106_val2		
C02244/3	0.500 s		LS_WriteParamList : c106_val3		
C02244/4	0.500 s		LS_WriteParamList : c106_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C02245

Parameter Name:			Data type: UNSIGNED_32 Index: 22330 _d = 573A _h		
C02245 LS_WriteParamList: DC braking: Hold time					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.000	s	999.000			
Subcodes	Lenze setting		Info		
C02245/1	998.999 s		LS_WriteParamList : c107_val1		
C02245/2	998.999 s		LS_WriteParamList : c107_val2		
C02245/3	998.999 s		LS_WriteParamList : c107_val3		
C02245/4	998.999 s		LS_WriteParamList : c107_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000					

C02246

Parameter Name: C02246 LS_WriteParamList: Setting of motor overload (I³xt)			Data type: INTEGER_16 Index: 22329 _d = 5739 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	%	250.00			
Subcodes	Lenze setting		Info		
C02246/1	100.00 %		LS_WriteParamList : c120_val1		
C02246/2	100.00 %		LS_WriteParamList : c120_val2		
C02246/3	100.00 %		LS_WriteParamList : c120_val3		
C02246/4	100.00 %		LS_WriteParamList : c120_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02249

Parameter Name:			Data type: UNSIGNED_16		
C02249 LS_WriteParamList: Oscillation damping influence			Index: 22326 _d = 5736 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	%	250.00			
Subcodes	Lenze setting		Info		
C02249/1	5.00 %		LS_WriteParamList : c234_val1		
C02249/2	5.00 %		LS_WriteParamList : c234_val2		
C02249/3	5.00 %		LS_WriteParamList : c234_val3		
C02249/4	5.00 %		LS_WriteParamList : c234_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02250

Parameter Name: C02250 LS_WriteParamList: Filter time - oscill. damping			Data type: UNSIGNED_8 Index: 22325 _d = 5735 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
2	ms	250			
Subcodes	Lenze setting		Info		
C02250/1	32 ms		LS_WriteParamList : c235_val1		
C02250/2	32 ms		LS_WriteParamList : c235_val2		
C02250/3	32 ms		LS_WriteParamList : c235_val3		
C02250/4	32 ms		LS_WriteParamList : c235_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02251

Parameter Name: C02251 LS_WriteParamList: Oscillation damping field weakening			Data type: UNSIGNED_8 Index: 22324 _d = 5734 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0		40			
Subcodes	Lenze setting		Info		
C02251/1	14		LS_WriteParamList : c236_val1		
C02251/2	14		LS_WriteParamList : c236_val2		
C02251/3	14		LS_WriteParamList : c236_val3		
C02251/4	14		LS_WriteParamList : c236_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02256

Parameter Name: C02256 LS_WriteParamList: Moment of inertia			Data type: UNSIGNED_32 Index: 22319 _d = 572F _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	kg cm^2	6000000.00			
Subcodes	Lenze setting		Info		
C02256/1	0.00 kg cm^2		LS_WriteParamList : c273_val1		
C02256/2	0.00 kg cm^2		LS_WriteParamList : c273_val2		
C02256/3	0.00 kg cm^2		LS_WriteParamList : c273_val3		
C02256/4	0.00 kg cm^2		LS_WriteParamList : c273_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02260

Parameter Name:		Data type: UNSIGNED_8 Index: 22315 _d = 572B _h	
C02260 LS_WriteParamList: Speed sensor selection			
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Selection list			
0	No sensor		
1	Sensor signal FreqIn12		
Subcodes	Lenze setting	Info	
C02260/1	0: No sensor	LS_WriteParamList : c495_val1	
C02260/2	0: No sensor	LS_WriteParamList : c495_val2	
C02260/3	0: No sensor	LS_WriteParamList : c495_val3	
C02260/4	0: No sensor	LS_WriteParamList : c495_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02264

Parameter Name: C02264 LS_WriteParamList: Empfindlichkeit Sollwertvorsteuerung		Data type: UNSIGNED_8 Index: 22311 _d = 5727 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Inactive	
1	15 bits	
2	14 bits	
3	13 bits	
4	12 bits	
5	11 Bit	
6	10 Bit	
7	9 Bit	
Subcodes	Lenze setting	Info
C02264/1	0: Inactive	LS_WriteParamList : C653_s1_val1
C02264/2	0: Inactive	LS_WriteParamList : C653_s1_val2
C02264/3	0: Inactive	LS_WriteParamList : C653_s1_val3
C02264/4	0: Inactive	LS_WriteParamList : C653_s1_val4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02272

Parameter Name:		Data type: UNSIGNED_8	
C02272 LS_WriteParamList: Motor phase direction of rotation		Index: 22303 _d = 571F _h	
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Selection list			
0	not inverted		
1	inverted		
Subcodes	Lenze setting	Info	
C02272/1	0: Not inverted	LS_WriteParamList : c905_val1	
C02272/2	0: Not inverted	LS_WriteParamList : c905_val2	
C02272/3	0: Not inverted	LS_WriteParamList : c905_val3	
C02272/4	0: Not inverted	LS_WriteParamList : c905_val4	
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C02273

Parameter Name:		Data type: INTEGER_16 Index: 22302 _d = 571E _h	
C02273 LS_WriteParamList: Speed limitation			
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	%	175.00	
Subcodes	Lenze setting	Info	
C02273/1	120.00 %	LS_WriteParamList : c909_s1_val1	
C02273/2	120.00 %	LS_WriteParamList : c909_s1_val2	
C02273/3	120.00 %	LS_WriteParamList : c909_s1_val3	
C02273/4	120.00 %	LS_WriteParamList : c909_s1_val4	
C02273/5	120.00 %	LS_WriteParamList : c909_s2_val1	
C02273/6	120.00 %	LS_WriteParamList : c909_s2_val2	
C02273/7	120.00 %	LS_WriteParamList : c909_s2_val3	
C02273/8	120.00 %	LS_WriteParamList : c909_s2_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02274

Parameter Name: C02274 LS_WriteParamList: Frequency limitation			Data type: UNSIGNED_16 Index: 22301 _d = 571D _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0	Hz	1300			
Subcodes	Lenze setting	Info			
C02274/1	1000 Hz	LS_WriteParamList : c910_s1_val1			
C02274/2	1000 Hz	LS_WriteParamList : c910_s1_val2			
C02274/3	1000 Hz	LS_WriteParamList : c910_s1_val3			
C02274/4	1000 Hz	LS_WriteParamList : c910_s1_val4			
C02274/5	1000 Hz	LS_WriteParamList : c910_s2_val1			
C02274/6	1000 Hz	LS_WriteParamList : c910_s2_val2			
C02274/7	1000 Hz	LS_WriteParamList : c910_s2_val3			
C02274/8	1000 Hz	LS_WriteParamList : c910_s2_val4			
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02275

Parameter Name: C02275 LS_WriteParamList: Motor cable length			Data type: UNSIGNED_16 Index: 22300 _d = 571C _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	m	1000.0			
Subcodes	Lenze setting		Info		
C02275/1	5.0 m		LS_WriteParamList : c915_val1		
C02275/2	5.0 m		LS_WriteParamList : c915_val2		
C02275/3	5.0 m		LS_WriteParamList : c915_val3		
C02275/4	5.0 m		LS_WriteParamList : c915_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02276

Parameter Name: C02276 LS_WriteParamList: Motor cable cross-section			Data type: UNSIGNED_16 Index: 22299 _d = 571B _h	
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over				
Setting range (min. value unit max. value)				
0.50	mm^2	100.00		
Subcodes	Lenze setting	Info		
C02276/1	6.00 mm^2	LS_WriteParamList : c916_val1		
C02276/2	6.00 mm^2	LS_WriteParamList : c916_val2		
C02276/3	6.00 mm^2	LS_WriteParamList : c916_val3		
C02276/4	6.00 mm^2	LS_WriteParamList : c916_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100				

C02278

Parameter Name: C02278 LS_WriteParamList: PSM: Maximum motor current field weakening			Data type: UNSIGNED_16 Index: 22297 _d = 5719 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	%	500.00			
Subcodes	Lenze setting		Info		
C02278/1	30.00 %		LS_WriteParamList : c938_val1		
C02278/2	30.00 %		LS_WriteParamList : c938_val2		
C02278/3	30.00 %		LS_WriteParamList : c938_val3		
C02278/4	30.00 %		LS_WriteParamList : c938_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02279

Parameter Name: C02279 LS_WriteParamList: Ultimate motor current			Data type: UNSIGNED_16 Index: 22296 _d = 5718 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	A	3000.0			
Subcodes	Lenze setting		Info		
C02279/1	3000.0 A		LS_WriteParamList : c939_val1		
C02279/2	3000.0 A		LS_WriteParamList : c939_val2		
C02279/3	3000.0 A		LS_WriteParamList : c939_val3		
C02279/4	3000.0 A		LS_WriteParamList : c939_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02280

Parameter Name: C02280 LS_WriteParamList: Max. motor speed			Data type: UNSIGNED_16 Index: 22295 _d = 5717 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
50	rpm	65000			
Subcodes	Lenze setting		Info		
C02280/1	60000 rpm		LS_WriteParamList : c965_val1		
C02280/2	60000 rpm		LS_WriteParamList : c965_val2		
C02280/3	60000 rpm		LS_WriteParamList : c965_val3		
C02280/4	60000 rpm		LS_WriteParamList : c965_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02281

Parameter Name: C02281 LS_WriteParamList: VFC: Time const. slip comp.			Data type: UNSIGNED_16 Index: 22294 _d = 5716 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
1	ms	6000	
Subcodes	Lenze setting	Info	
C02281/1	100 ms	LS_WriteParamList : c966_val1	
C02281/2	100 ms	LS_WriteParamList : c966_val2	
C02281/3	100 ms	LS_WriteParamList : c966_val3	
C02281/4	100 ms	LS_WriteParamList : c966_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02284

Parameter Name:		Data type: UNSIGNED_16	
C02284 LS_WriteParamList: VFC: limitation V/f +encoder		Index: 22291 _d = 5713 _h	
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	Hz		
Subcodes	Lenze setting	Info	
C02284/1	10.00 Hz	LS_WriteParamList : c971_s1_val1	
C02284/2	10.00 Hz	LS_WriteParamList : c971_s1_val2	
C02284/3	10.00 Hz	LS_WriteParamList : c971_s1_val3	
C02284/4	10.00 Hz	LS_WriteParamList : c971_s1_val4	
C02284/5	100.00 Hz	LS_WriteParamList : c971_s2_val1	
C02284/6	100.00 Hz	LS_WriteParamList : c971_s2_val2	
C02284/7	100.00 Hz	LS_WriteParamList : c971_s2_val3	
C02284/8	100.00 Hz	LS_WriteParamList : c971_s2_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100			

C02285

Parameter Name: C02285 LS_WriteParamList: VFC: Vp V/f +encoder			Data type: UNSIGNED_16 Index: 22290 _d = 5712 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.000	Hz/Hz	64.000	
Subcodes	Lenze setting	Info	
C02285/1	0.100 Hz/Hz	LS_WriteParamList : c972_val1	
C02285/2	0.100 Hz/Hz	LS_WriteParamList : c972_val2	
C02285/3	0.100 Hz/Hz	LS_WriteParamList : c972_val3	
C02285/4	0.100 Hz/Hz	LS_WriteParamList : c972_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1000			

C02286

Parameter Name: C02286 LS_WriteParamList: VFC: Ti V/f +encoder			Data type: UNSIGNED_16 Index: 22289 _d = 5711 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	ms	6000.0			
Subcodes	Lenze setting		Info		
C02286/1	100.0 ms		LS_WriteParamList: c973_val1		
C02286/2	100.0 ms		LS_WriteParamList: c973_val2		
C02286/3	100.0 ms		LS_WriteParamList: c973_val3		
C02286/4	100.0 ms		LS_WriteParamList: c973_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02287

Parameter Name:			Data type: UNSIGNED_16 Index: 22288 _d = 5710 _h		
C02287 LS_WriteParamList: VFC-ECO: Vp CosPhi controller					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.000	Hz/Hz	64.000			
Subcodes	Lenze setting		Info		
C02287/1	0.500 Hz/Hz		LS_WriteParamList : c975_val1		
C02287/2	0.500 Hz/Hz		LS_WriteParamList : c975_val2		
C02287/3	0.500 Hz/Hz		LS_WriteParamList : c975_val3		
C02287/4	0.500 Hz/Hz		LS_WriteParamList : c975_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1000					

C02288

Parameter Name: C02288 LS_WriteParamList: VFC-ECO: Ti CosPhi controller			Data type: UNSIGNED_16 Index: 22287 _d = 570F _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	ms	6000.0			
Subcodes	Lenze setting		Info		
C02288/1	200.0 ms		LS_WriteParamList: c976_val1		
C02288/2	200.0 ms		LS_WriteParamList: c976_val2		
C02288/3	200.0 ms		LS_WriteParamList: c976_val3		
C02288/4	200.0 ms		LS_WriteParamList: c976_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02289

Parameter Name: C02289 LS_WriteParamList: VFC-ECO: Minimum voltage U/f			Data type: INTEGER_16 Index: 22286 _d = 570E _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
20.00	%	100.00			
Subcodes	Lenze setting		Info		
C02289/1	20.00 %		LS_WriteParamList : c977_val1		
C02289/2	20.00 %		LS_WriteParamList : c977_val2		
C02289/3	20.00 %		LS_WriteParamList : c977_val3		
C02289/4	20.00 %		LS_WriteParamList : c977_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02290

Parameter Name: C02290 LS_WriteParamList: VFC-ECO: Voltage reduction ramp			Data type: UNSIGNED_8 Index: 22285 _d = 570D _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	s	5.0			
Subcodes	Lenze setting		Info		
C02290/1	0.8 s		LS_WriteParamList : c982_val1		
C02290/2	0.8 s		LS_WriteParamList : c982_val2		
C02290/3	0.8 s		LS_WriteParamList : c982_val3		
C02290/4	0.8 s		LS_WriteParamList : c982_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02291

Parameter Name: C02291 LS_WriteParamList: SLVC: Field current controller gain			Data type: INTEGER_16 Index: 22284 _d = 570C _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	%	20.00			
Subcodes	Lenze setting		Info		
C02291/1	0.50 %		LS_WriteParamList : c985_val1		
C02291/2	0.50 %		LS_WriteParamList : c985_val2		
C02291/3	0.50 %		LS_WriteParamList : c985_val3		
C02291/4	0.50 %		LS_WriteParamList : c985_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02292

Parameter Name: C02292 LS_WriteParamList: SLVC: Cross current controller gain			Data type: INTEGER_16 Index: 22283 _d = 570B _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	%	20.00			
Subcodes	Lenze setting		Info		
C02292/1	0.00 %		LS_WriteParamList : c986_val1		
C02292/2	0.00 %		LS_WriteParamList : c986_val2		
C02292/3	0.00 %		LS_WriteParamList : c986_val3		
C02292/4	0.00 %		LS_WriteParamList : c986_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02293

Parameter Name:			Data type: INTEGER_16 Index: 22282 _d = 570A _h		
C02293 LS_WriteParamList: Inverter motor brake: nAdd					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0	rpm	1000			
Subcodes	Lenze setting		Info		
C02293/1	80 rpm		LS_WriteParamList : c987_val1		
C02293/2	80 rpm		LS_WriteParamList : c987_val2		
C02293/3	80 rpm		LS_WriteParamList : c987_val3		
C02293/4	80 rpm		LS_WriteParamList : c987_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02294

Parameter Name: C02294 LS_WriteParamList: Inverter motor brake: PT1 filter time			Data type: INTEGER_16 Index: 22281 _d = 5709 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	ms	100.0			
Subcodes	Lenze setting		Info		
C02294/1	0.0 ms		LS_WriteParamList : c988_val1		
C02294/2	0.0 ms		LS_WriteParamList : c988_val2		
C02294/3	0.0 ms		LS_WriteParamList : c988_val3		
C02294/4	0.0 ms		LS_WriteParamList : c988_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10					

C02295

Parameter Name:		Data type: UNSIGNED_8 Index: 22280 _d = 5708 _h	
C02295 LS_WriteParamList: Flying restart fct.: Activation			
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Selection list			
0	Off		
1	On		
Subcodes	Lenze setting	Info	
C02295/1	0: Off	LS_WriteParamList : c990_val1	
C02295/2	0: Off	LS_WriteParamList : c990_val2	
C02295/3	0: Off	LS_WriteParamList : c990_val3	
C02295/4	0: Off	LS_WriteParamList : c990_val4	
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02296

Parameter Name:		Data type: UNSIGNED_16 Index: 22279 _d = 5707 _h	
C02296 LS_WriteParamList: Flying restart fct.: process			
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Selection list			
0	0...+n Start: +10 Hz		
1	-n...0 Start: -10 Hz		
2	-n...+n Start: +10 Hz		
3	-n...+n Start: -10 Hz		
4	-n...+n Start: Cx992		
Subcodes	Lenze setting	Info	
C02296/1	2: -n...+n Start: +10 Hz	LS_WriteParamList : c991_val1	
C02296/2	2: -n...+n Start: +10 Hz	LS_WriteParamList : c991_val2	
C02296/3	2: -n...+n Start: +10 Hz	LS_WriteParamList : c991_val3	
C02296/4	2: -n...+n Start: +10 Hz	LS_WriteParamList : c991_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02297

Parameter Name:			Data type: INTEGER_16 Index: 22278 _d = 5706 _h		
C02297 LS_WriteParamList: Flying restart: Start frequency					
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
-200	Hz	200			
Subcodes	Lenze setting		Info		
C02297/1	10 Hz		LS_WriteParamList : c992_val1		
C02297/2	10 Hz		LS_WriteParamList : c992_val2		
C02297/3	10 Hz		LS_WriteParamList : c992_val3		
C02297/4	10 Hz		LS_WriteParamList : c992_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02298

Parameter Name: C02298 LS_WriteParamList: Flying restart fct: Int. time			Data type: UNSIGNED_16 Index: 22277 _d = 5705 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.0	ms	6000.0			
Subcodes	Lenze setting		Info		
C02298/1	300.0 ms		LS_WriteParamList : c993_val1		
C02298/2	300.0 ms		LS_WriteParamList : c993_val2		
C02298/3	300.0 ms		LS_WriteParamList : c993_val3		
C02298/4	300.0 ms		LS_WriteParamList : c993_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02299

Parameter Name: C02299 LS_WriteParamList: Flying restart fct.: Current			Data type: INTEGER_16 Index: 22276 _d = 5704 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
0.00	%	100.00			
Subcodes	Lenze setting		Info		
C02299/1	25.00 %		LS_WriteParamList : c994_val1		
C02299/2	25.00 %		LS_WriteParamList : c994_val2		
C02299/3	25.00 %		LS_WriteParamList : c994_val3		
C02299/4	25.00 %		LS_WriteParamList : c994_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02300

Parameter Name: C02300 LS_WriteParamList: SLPSM: Controlled current setpoint			Data type: UNSIGNED_16 Index: 22275 _d = 5703 _h		
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over					
Setting range (min. value unit max. value)					
5.00	%	400.00			
Subcodes	Lenze setting		Info		
C02300/1	100.00 %		LS_WriteParamList : c995_s1_val1		
C02300/2	100.00 %		LS_WriteParamList : c995_s1_val2		
C02300/3	100.00 %		LS_WriteParamList : c995_s1_val3		
C02300/4	100.00 %		LS_WriteParamList : c995_s1_val4		
C02300/5	20.00 %		LS_WriteParamList : c995_s2_val1		
C02300/6	20.00 %		LS_WriteParamList : c995_s2_val2		
C02300/7	20.00 %		LS_WriteParamList : c995_s2_val3		
C02300/8	20.00 %		LS_WriteParamList : c995_s2_val4		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 100					

C02301

Parameter Name: C02301 LS_WriteParamList: SLPSM: Switching speed			Data type: INTEGER_16 Index: 22274 _d = 5702 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	%	100.00	
Subcodes	Lenze setting	Info	
C02301/1	13.00 %	LS_WriteParamList : c996_s1_val1	
C02301/2	13.00 %	LS_WriteParamList : c996_s1_val2	
C02301/3	13.00 %	LS_WriteParamList : c996_s1_val3	
C02301/4	13.00 %	LS_WriteParamList : c996_s1_val4	
C02301/5	8.00 %	LS_WriteParamList : c996_s2_val1	
C02301/6	8.00 %	LS_WriteParamList : c996_s2_val2	
C02301/7	8.00 %	LS_WriteParamList : c996_s2_val3	
C02301/8	8.00 %	LS_WriteParamList : c996_s2_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02302

Parameter Name: C02302 LS_WriteParamList: SLPSM: Filter time - rotor position			Data type: INTEGER_16 Index: 22273 _d = 5701 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.00	%	100.00	
Subcodes	Lenze setting	Info	
C02302/1	5.00 %	LS_WriteParamList : c997_val1	
C02302/2	5.00 %	LS_WriteParamList : c997_val2	
C02302/3	5.00 %	LS_WriteParamList : c997_val3	
C02302/4	5.00 %	LS_WriteParamList : c997_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02303

Parameter Name:			Data type: INTEGER_16
C02303 LS_WriteParamList: SLPSM: Filter time rotor position			Index: 22272 _d = 5700 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.5	ms	20.0	
Subcodes	Lenze setting	Info	
C02303/1	3.0 ms	LS_WriteParamList : c998_s1_val1	
C02303/2	3.0 ms	LS_WriteParamList : c998_s1_val2	
C02303/3	3.0 ms	LS_WriteParamList : c998_s1_val3	
C02303/4	3.0 ms	LS_WriteParamList : c998_s1_val4	
C02303/5	5.0 ms	LS_WriteParamList : c998_s2_val1	
C02303/6	5.0 ms	LS_WriteParamList : c998_s2_val2	
C02303/7	5.0 ms	LS_WriteParamList : c998_s2_val3	
C02303/8	5.0 ms	LS_WriteParamList : c998_s2_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10			

C02304

Parameter Name: C02304 LS_WriteParamList: SLP5M: PLL gain			Data type: INTEGER_16 Index: 22271 _d = 56FF _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0	%	1000	
Subcodes	Lenze setting	Info	
C02304/1	400 %	LS_WriteParamList : c999_val1	
C02304/2	400 %	LS_WriteParamList : c999_val2	
C02304/3	400 %	LS_WriteParamList : c999_val3	
C02304/4	400 %	LS_WriteParamList : c999_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02305

Parameter Name: C02305 LS_WriteParamList: PSM: Ppp saturation characteristic		Data type: UNSIGNED_8 Index: 22270 _d = 56FE _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Setting range (min. value unit max. value)		
0	% 255	
Subcodes	Lenze setting	Info
C02305/1	100 %	LS_WriteParamList : c2853_s1_val1
C02305/2	100 %	LS_WriteParamList : c2853_s1_val2
C02305/3	100 %	LS_WriteParamList : c2853_s1_val3
C02305/4	100 %	LS_WriteParamList : c2853_s1_val4
C02305/5	100 %	LS_WriteParamList : c2853_s2_val1
C02305/6	100 %	LS_WriteParamList : c2853_s2_val2
C02305/7	100 %	LS_WriteParamList : c2853_s2_val3
C02305/8	100 %	LS_WriteParamList : c2853_s2_val4
C02305/9	100 %	LS_WriteParamList : c2853_s3_val1
C02305/10	100 %	LS_WriteParamList : c2853_s3_val2
C02305/11	100 %	LS_WriteParamList : c2853_s3_val3
C02305/12	100 %	LS_WriteParamList : c2853_s3_val4
C02305/13	100 %	LS_WriteParamList : c2853_s4_val1
C02305/14	100 %	LS_WriteParamList : c2853_s4_val2
C02305/15	100 %	LS_WriteParamList : c2853_s4_val3
C02305/16	100 %	LS_WriteParamList : c2853_s4_val4
C02305/17	100 %	LS_WriteParamList : c2853_s5_val1
C02305/18	100 %	LS_WriteParamList : c2853_s5_val2
C02305/19	100 %	LS_WriteParamList : c2853_s5_val3
C02305/20	100 %	LS_WriteParamList : c2853_s5_val4
C02305/21	100 %	LS_WriteParamList : c2853_s6_val1
C02305/22	100 %	LS_WriteParamList : c2853_s6_val2
C02305/23	100 %	LS_WriteParamList : c2853_s6_val3
C02305/24	100 %	LS_WriteParamList : c2853_s6_val4
C02305/25	100 %	LS_WriteParamList : c2853_s7_val1
C02305/26	100 %	LS_WriteParamList : c2853_s7_val2

Parameter Name:		Data type: UNSIGNED 8 Index: 22270 _d = 56FE _h
C02305 LS_WriteParamList: PSM: Ppp saturation characteristic		
C02305/27	100 %	LS_WriteParamList: c2853_s7_val3
C02305/28	100 %	LS_WriteParamList: c2853_s7_val4
C02305/29	100 %	LS_WriteParamList: c2853_s8_val1
C02305/30	100 %	LS_WriteParamList: c2853_s8_val2
C02305/31	100 %	LS_WriteParamList: c2853_s8_val3
C02305/32	100 %	LS_WriteParamList: c2853_s8_val4
C02305/33	100 %	LS_WriteParamList: c2853_s9_val1
C02305/34	100 %	LS_WriteParamList: c2853_s9_val2
C02305/35	100 %	LS_WriteParamList: c2853_s9_val3
C02305/36	100 %	LS_WriteParamList: c2853_s9_val4
C02305/37	100 %	LS_WriteParamList: c2853_s10_val1
C02305/38	100 %	LS_WriteParamList: c2853_s10_val2
C02305/39	100 %	LS_WriteParamList: c2853_s10_val3
C02305/40	100 %	LS_WriteParamList: c2853_s10_val4
C02305/41	100 %	LS_WriteParamList: c2853_s11_val1
C02305/42	100 %	LS_WriteParamList: c2853_s11_val2
C02305/43	100 %	LS_WriteParamList: c2853_s11_val3
C02305/44	100 %	LS_WriteParamList: c2853_s11_val4
C02305/45	100 %	LS_WriteParamList: c2853_s12_val1
C02305/46	100 %	LS_WriteParamList: c2853_s12_val2
C02305/47	100 %	LS_WriteParamList: c2853_s12_val3
C02305/48	100 %	LS_WriteParamList: c2853_s12_val4
C02305/49	100 %	LS_WriteParamList: c2853_s13_val1
C02305/50	100 %	LS_WriteParamList: c2853_s13_val2
C02305/51	100 %	LS_WriteParamList: c2853_s13_val3
C02305/52	100 %	LS_WriteParamList: c2853_s13_val4
C02305/53	100 %	LS_WriteParamList: c2853_s14_val1
C02305/54	100 %	LS_WriteParamList: c2853_s14_val2
C02305/55	100 %	LS_WriteParamList: c2853_s14_val3
C02305/56	100 %	LS_WriteParamList: c2853_s14_val4
C02305/57	100 %	LS_WriteParamList: c2853_s15_val1
C02305/58	100 %	LS_WriteParamList: c2853_s15_val2
C02305/59	100 %	LS_WriteParamList: c2853_s15_val3
C02305/60	100 %	LS_WriteParamList: c2853_s15_val4
C02305/61	100 %	LS_WriteParamList: c2853_s16_val1
C02305/62	100 %	LS_WriteParamList: c2853_s16_val2
C02305/63	100 %	LS_WriteParamList: c2853_s16_val3
C02305/64	100 %	LS_WriteParamList: c2853_s16_val4
C02305/65	100 %	LS_WriteParamList: c2853_s17_val1
C02305/66	100 %	LS_WriteParamList: c2853_s17_val2
C02305/67	100 %	LS_WriteParamList: c2853_s17_val3
C02305/68	100 %	LS_WriteParamList: c2853_s17_val4
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02306

Parameter Name: C02306 LS_WriteParamList: PSM: Imax Ppp saturation characteristic			Data type: UNSIGNED_16 Index: 22269 _d = 56FD _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
0.0	A	3000.0	
Subcodes	Lenze setting	Info	
C02306/1	3000.0 A	LS_WriteParamList : c2855_val1	
C02306/2	3000.0 A	LS_WriteParamList : c2855_val2	
C02306/3	3000.0 A	LS_WriteParamList : c2855_val3	
C02306/4	3000.0 A	LS_WriteParamList : c2855_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10			

C02307

Parameter Name: C02307 LS_WriteParamList: PSM: Activate Ppp saturation char.		Data type: UNSIGNED_8 Index: 22268 _d = 56FC _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over		
Selection list		
0	Off	
1	On	
Subcodes	Lenze setting	Info
C02307/1	0: Off	LS_WriteParamList : c2859_val1
C02307/2	0: Off	LS_WriteParamList : c2859_val
C02307/3	0: Off	LS_WriteParamList : c2859_val
C02307/4	0: Off	LS_WriteParamList : c2859_val
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02311

Parameter Name: C02311 LS_WriteParamList: PLI without motion: Adaptation of time duration			Data type: INTEGER_8 Index: 22264 _d = 56F8 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
-10		10	
Subcodes	Lenze setting	Info	
C02311/1	0	LS_WriteParamList : c2872_s1_val1	
C02311/2	0	LS_WriteParamList : c2872_s1_val2	
C02311/3	0	LS_WriteParamList : c2872_s1_val3	
C02311/4	0	LS_WriteParamList : c2872_s1_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02312

Parameter | Name:

C02312 | LS_WriteParamList: PLI without motion

Data type: UNSIGNED_16

Index: 22263_d = 56F7_h

From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional [motor data change-over](#)

Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	for SLPSM with controller enable	
Bit 1	for SC PSM with mains on	
Bit 2	for SC PSM with controller enable	
Bit 3	for SC PSM once after fault reset	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C02312/1	0x0001	LS_WriteParamList : c2874_s1_val1
C02312/2	0x0001	LS_WriteParamList : c2874_s1_val2
C02312/3	0x0001	LS_WriteParamList : c2874_s1_val3
C02312/4	0x0001	LS_WriteParamList : c2874_s1_val4

☒ Read access
 ☒ Write access
 ☐ CINH
 ☐ PLC STOP
 ☐ No transfer
 ☐ COM
 ☒ MOT

C02313

Parameter Name: C02313 LS_WriteParamList: PLI without motion: Adaptation of ident angle			Data type: INTEGER_8 Index: 22262 _d = 56F6 _h
From version 12.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over			
Setting range (min. value unit max. value)			
-100	°	100	
Subcodes	Lenze setting	Info	
C02313/1	0 °	LS_WriteParamList : c2875_s1_val1	
C02313/2	0 °	LS_WriteParamList : c2875_s1_val2	
C02313/3	0 °	LS_WriteParamList : c2875_s1_val3	
C02313/4	0 °	LS_WriteParamList : c2875_s1_val4	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02314

Parameter Name: C02314 Reserved	Data type: UNSIGNED_8 Index: 22261 _d = 56F5 _h
This code is for device-internal use only and must not be written to by the user!	

C02315

Parameter Name: C02315 LS_WriteParamList: Manual entry of motor type	Data type: UNSIGNED_8 Index: 22260 _d = 56F4 _h										
From version 14.00.00 onwards: Parameter values (1st value ... 4th value) for optional motor data change-over											
<table border="1"> <thead> <tr> <th colspan="2">Selection list</th></tr> </thead> <tbody> <tr> <td>0</td><td>Automatic</td></tr> <tr> <td>1</td><td>ASM</td></tr> <tr> <td>2</td><td>PSM</td></tr> </tbody> </table>		Selection list		0	Automatic	1	ASM	2	PSM		
Selection list											
0	Automatic										
1	ASM										
2	PSM										
Subcodes	Lenze setting										
C02315/1	0: Automatic										
C02315/2	0: Automatic										
C02315/3	0: Automatic										
C02315/4	0: Automatic										
<table border="1"> <thead> <tr> <th colspan="2">Info</th></tr> </thead> <tbody> <tr> <td>LS_WriteParamList: c1001_s1_val1</td><td></td></tr> <tr> <td>LS_WriteParamList: c1001_s1_val2</td><td></td></tr> <tr> <td>LS_WriteParamList: c1001_s1_val3</td><td></td></tr> <tr> <td>LS_WriteParamList: c1001_s1_val4</td><td></td></tr> </tbody> </table>		Info		LS_WriteParamList: c1001_s1_val1		LS_WriteParamList: c1001_s1_val2		LS_WriteParamList: c1001_s1_val3		LS_WriteParamList: c1001_s1_val4	
Info											
LS_WriteParamList: c1001_s1_val1											
LS_WriteParamList: c1001_s1_val2											
LS_WriteParamList: c1001_s1_val3											
LS_WriteParamList: c1001_s1_val4											
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1											

C02580

Parameter Name: C02580 Holding brake: Operating mode	Data type: UNSIGNED_8 Index: 21995 _d = 55EB _h
Selection of the operating mode for holding brake control ▶ Holding brake control	
Selection list (Lenze setting printed in bold)	Info
0 Brake control off	No holding brake is used. Internal control is switched off.
11 Manually controlled	The holding brake is released and closed via a control bit in the MCK control word.
12 Autom. controlled	The holding brake is automatically released and closed via speed setpoint comparisons.
13 Semi-automat. controlled	From version 11.00.00 The holding brake is released and closed via a control bit in the MCK control word. • In contrast to the manual operation (mode 11) • the feedforward control is active in this mode, preventing a sagging e.g. in case of a hoist. • the brake in this mode also closes when the controller is inhibited in order to prevent the axis in a hoist from falling.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1	

C02581

Parameter | Name: **C02581 | Holding brake: Speed thresholds**

Data type: INTEGER_16
Index: 21994_d = 55EA_h

Speed setpoint threshold and hysteresis for automatic holding brake control

[Holding brake control](#)

Setting range (min. value unit max. value)		
-199.99	%	199.99
Subcodes	Lenze setting	Info
C02581/1	5.00 %	Holding brake: Switching threshold Switching threshold of the speed setpoint from which on the holding brake is released/applied automatically.
C02581/2	1.00 %	Holding brake: Hyst.release - Hysteresis for holding brake release. - Release threshold = switching threshold + release hysteresis
C02581/3	1.00 %	Holding brake: Hyst. close - Hysteresis for holding brake application. - Application threshold = switching threshold - application hysteresis
C02581/4	0.00 %	Holding brake: FF control starting value 1 From version 11.00.00
C02581/5	0.00 %	Holding brake: FF control starting value 2 From version 11.00.00

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100

C02582

Parameter Name: C02582 Holding brake: Setting			Data type: UNSIGNED_8 Index: 21993 _d = 55E9 _h
Activation of functional holding brake control options			
Holding brake control			
Setting range (min. hex value max. hex value)			Lenze setting
0x00		0xFF	0x40 (decimal: 64)
Value is bit-coded: (☒ = bit set)			Info
Bit 0 ☐	bMBrakeReleaseOut invert.	Activation of inverted control • 1 ≡ Inverted logic of the control signal for the holding brake control switching element.	
Bit 1 ☐	Horizontal brake protection	Brake response in case of pulse inhibit • 1 ≡ In the case of a pulse inhibit, the actual speed value is monitored which must reach the "Close" threshold value to cause the holding brake to be applied. Note: • This function is only active if bit 3 (horizontal/winding technology) is set as well. The function is used in order that, when the controller is inhibited, the holding brake of a drive with horizontal traverse path does not wear out during rotation. • With vertical motion (bit 3 = 0), this function is not active. Especially with hoists and activated pulse inhibit of the controller, an immediate application of the brake is essential for safety-related reasons!	

Parameter Name: C02582 Holding brake: Setting		Data type: UNSIGNED_8 Index: 21993 _d = 55E9 _h
Bit 2 ☐	with hoist inv. feedfwd. control	Direction of feedforward control with vertical/hoist technology: • 0 ≡ Positive direction • 1 ≡ Negative direction Note: Reversal (Ccw) is then considered.
Bit 3 ☐	Horizontal application	Direction of movement of the axis • 0 ≡ The axis performs vertical movements. Gravitational acceleration causes movements. • 1 ≡ The direction of the axis is horizontal or rotary. The gravitational acceleration does not cause any movement.
Bit 4 ☐	Feedforward control C2581	From version 11.00.00 Selection of the feedforward control value • 0 ≡ Automatic selection. The torque saved at the last stop is used. • 1 ≡ Manual selection. • <i>bMBrakeStartValue2</i> = FALSE: The feedforward control value 1 set in C02581/4 is used. • <i>bMBrakeStartValue2</i> = TRUE: The feedforward control value set in C02581/5 is used.
Bit 5 ☐	Feedback monitoring	From version 11.00.00 Activation of status monitoring • 1 ≡ The <i>bMBrakeApplied</i> input for status detection of the brake (via a switching contact at the brake) is monitored after the waiting time set in C02589/3 has expired.
Bit 6 ☒	SyncRampe L_NSet_1	From version 11.00.00 Selection of the ramp time for the synchronisation process to setpoint speed after the brake opening time has elapsed Revised behaviour from version 11.00.00: • 1 ≡ The ramp time of the effective acceleration of the ramp function generator (L_NSet_1) is used (Lenze setting). • 0 ≡ As before, the ramp time set in C02610/1 is used. Note: The changeover can be dynamically both via the ramp parameter and via bit 6.
Bit 7 ☐	Reserved	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02589

Parameter | Name:

C02589 | Holding brake: Time system

Data type: UNSIGNED_16

Index: 21986_d = 55E2_h

Operating times of the holding brake

• The electromechanical delay times of the holding brake are specified in the data sheets or on the holding brake nameplate.

▶ [Holding brake control](#)

Setting range (min. value unit max. value)			
0	ms	60000	
Subcodes	Lenze setting	Info	
C02589/1	100 ms	Holding brake: Application time Time in which the holding brake is completely applied from the beginning of control and in which the controller is inhibited.	
C02589/2	100 ms	Holding brake: Release time Time in which the holding brake is completely released from the beginning of control.	
C02589/3	100 ms	Holding brake: Waiting time status Time after which all transient reactions are completed and the switching status of the holding brake is stable. Beginning of monitoring the feedback signal for the switching status of the holding brake.	
C02589/4	0 ms	Holding brake: Ramp time FF ctrl From version 11.00.00	

☒ Read access
 ☒ Write access
 ☐ CINH
 ☐ PLC STOP
 ☐ No transfer
 ☐ COM
 ☐ MOT
 Scaling factor: 1

C02593

Parameter Name: C02593 Holding brake: Activation time			Data type: UNSIGNED_32 Index: 21982 _d = 55DE _h
Time parameter for the delay of trigger signals of the holding brake control			
Setting range (min. value unit max. value)			▶ Holding brake control
0.000	s	3600.000	
Subcodes	Lenze setting	Info	
C02593/1	0.000 s	Holding brake: Actual value monitoring • Time in which the actual value is supposed to reach the threshold for closing the brake if the setpoint has already reached the threshold. • Time > 0 s: If the actual speed value has not reached the threshold within the time for brake application, the holding brake is applied by control. • Time = 0 s: The brake is only applied by control when the actual speed has reached the application threshold.	
C02593/2	0.000 s	Holding brake: Application delay	
C02593/3	0.000 s	Holding brake: Reserved	
C02593/4	0.000 s	Holding brake: Reserved	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02607

Parameter | Name: **C02607 | Holding brake: Status**

Data type: UNSIGNED_16
Index: 21968_d = 55D0_h

Switching status of the holding brake control

▶ [Holding brake control](#)

Display area (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Brake applied	1 ≡ Holding brake is completely closed
Bit 1	Brake released	1 ≡ Holding brake is completely released
Bit 2	Feedforward control active	1 ≡ Feedforward control for holding of the load via the motor is active before the holding brake releases.
Bit 3	Closing active	1 ≡ The brake closing time (C02589/1) expires
Bit 4	Forced release active	1 ≡ In case of automatic operation of the holding brake control, the brake is directly released via the MCK input <i>bMBrakeRelease</i> = TRUE
Bit 5	Release active	1 ≡ The brake release time (C02589/2) expires
Bit 6	Setpoint synchronisation active	1 ≡ A speed setpoint at the MCK is approached along a defined ramp after brake release
Bit 7	Signalling contact error	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	

☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT

C02610

Parameter | Name: **C02610 | MCK: Accel./decel. times**

Data type: UNSIGNED_32
Index: 21965_d = 55CD_h

Ramp times for speed setpoint synchronisation

Setting range (min. value unit max. value)		
0.000	s	999.999
Subcodes	Lenze setting	Info
C02610/1	2.000 s	Holding brake: ramp time synchr. • Ramp time for the synchronisation process to setpoint speed after the brake opening time has elapsed Revised behaviour from version 11.00.00: • The setting made here is only effective if bit 6 "SyncRampe L_NSet_1" in C02582 is set to "0". • In the Lenze setting of C02582 (Bit 6 = "1"), the ramp time of the effective acceleration of the ramp function generator (L_NSet_1) is used. ► Holding brake control
C02610/2	2.000 s	MCK: Ramp time synchr. setpoint • Time for synchronisation ramps between setpoint jumps occurring through the exceedance of minimum and maximum speed setpoint limit ranges.
C02610/3	2.000 s	MCK: SM stopping ramp

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000

C02611

Parameter | Name: **C02611 | MCK: Limitations**

Data type: INTEGER_16
Index: 21964_d = 55CC_h

From version 02.00.00

Speed setpoint limits for the determination of limited validity ranges

Note:

Traversing with setpoints through resulting blocking zones is executed with the ramp set in [C02610/2](#).

▶ [Speed Min/Max](#)

Setting range (min. value unit max. value)			
0.00	%	199.99	
Subcodes	Lenze setting	Info	
C02611/1	199.99 %	MCK: Pos. max. speed Upper limit of the speed setpoint limitation in positive direction of rotation.	
C02611/2	0.00 %	MCK: Pos. min. speed Lower limit of the speed setpoint limitation in positive direction of rotation.	
C02611/3	0.00 %	MCK: Neg. min. speed Lower limit of the speed setpoint limitation in negative direction of rotation.	
C02611/4	199.99 %	MCK: Neg. max. speed Upper limit of the speed setpoint limitation in negative direction of rotation.	
C02611/5	0.50 %	MCK: Max. speed - From version 12.00.00 - Maximum value for transferring the current speed to the speed setpoint when the internal operating mode "StandBy" is exited.	

☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100

C02830

Parameter Name: C02830 DigInX: Debounce time		Data type: UNSIGNED_8 Index: 21745 _d = 54F1 _h
Debounce times for the digital inputs		Digital terminals
Selection list		
0	0.00 ms	
4	1.00 ms	
8	2.00 ms	
12	3.00 ms	
16	4.00 ms	
20	5.00 ms	
24	6.00 ms	
28	7.00 ms	
32	8.00 ms	
36	9.00 ms	
40	10.0 ms	
44	11.0 ms	
48	12.0 ms	
52	13.0 ms	
56	14.0 ms	
64	16.0 ms	
72	18.0 ms	
80	20.0 ms	
88	22.0 ms	
96	24.0 ms	
104	26.0 ms	
112	28.0 ms	
120	30.0 ms	
128	32.0 ms	
Subcodes	Lenze setting	Info
C02830/1	0: 0.00 ms	DigIn1: Debounce time
C02830/2	0: 0.00 ms	DigIn2: Debounce time
C02830/3	0: 0.00 ms	DigIn3: Debounce time
C02830/4	0: 0.00 ms	DigIn4: Debounce time
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C02840

Parameter Name: C02840 CountIn1: Parameter			Data type: UNSIGNED_32 Index: 21735 _d = 54E7 _h
From version 03.00.00 Starting and comparison value for digital counting input ▶ Using DI1 as counting input			
Setting range (min. value unit max. value)			
0	Incr.	2147483647	
Subcodes	Lenze setting	Info	
C02840/1	0 incr.	CountIn1: Starting value	
C02840/2	65535 incr.	CountIn1: Comparison value	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C02841

Parameter Name:			Data type: UNSIGNED_32 Index: 21734 _d = 54E6 _h		
C02841 CountIn1: Counter content					
From version 03.00.00					
Display of the current counter content of the digital counting input					
▶ Using DI1 as counting input					
Display range (min. value unit max. value)					
0		Incr.		2147483647	
Subcodes				Info	
C02841/1				CountIn1: Counter content	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☒ No transfer ☐ COM ☐ MOT Scaling factor: 1					

C02842

Parameter Name: C02842 FreqInxx: Offset			Data type: INTEGER_16 Index: 21733 _d = 54E5 _h	
From version 03.00.00 Offset for digital frequency input				
▶ Using DI1 and DI2 as frequency inputs				
Setting range (min. value unit max. value)				
-199.99	%	199.99		
Subcodes	Lenze setting		Info	
C02842/1	0.00 %		FreqIn12: Offset	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100				

C02843

Parameter Name: C02843 FreqInxx: Gain			Data type: INTEGER_16 Index: 21732 _d = 54E4 _h
From version 03.00.00 Gain for digital frequency input			
► Using DI1 and DI2 as frequency inputs			
Setting range (min. value unit max. value)			
-199.99	%	199.99	
Subcodes	Lenze setting	Info	
C02843/1	100.00 %	FreqIn12: Gain	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02844

Parameter Name: C02844 FreqIn12: Function		Data type: UNSIGNED_8 Index: 21731 _d = 54E3 _h
From version 06.00.00		► Output of the encoder position of the DI1/DI2 frequency input
Selection list		
0	Loading with level	
1	Loading with edge	
2	Loading with level + reset	
Subcodes	Lenze setting	Info
C02844/1	0: Loading with level	FreqIn12: PosIn function
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C02845

Parameter Name: C02845 FreqIn12: PosIn comparison value		Data type: INTEGER_32 Index: 21730 _d = 54E2 _h
From version 06.00.00		► Output of the encoder position of the DI1/DI2 frequency input
Setting range (min. value unit max. value)		Lenze setting
0	Incr.	2147418112
		0 incr.
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1		

C02853

Parameter Name: C02853 PSM: Lss saturation characteristic			Data type: UNSIGNED_8 Index: 21722 _d = 54DA _h		
From version 10.00.00					
► Current-dependent stator leakage inductance Lss(l)					
Setting range (min. value unit max. value)					
0	%	255			
Subcodes	Lenze setting		Info		
C02853/1	100 %		PSM: Lss saturation characteristic		
C02853/2	100 %		PSM: Lss saturation characteristic		
C02853/3	100 %		PSM: Lss saturation characteristic		
C02853/4	100 %		PSM: Lss saturation characteristic		
C02853/5	100 %		PSM: Lss saturation characteristic		
C02853/6	100 %		PSM: Lss saturation characteristic		
C02853/7	100 %		PSM: Lss saturation characteristic		
C02853/8	100 %		PSM: Lss saturation characteristic		
C02853/9	100 %		PSM: Lss saturation characteristic		
C02853/10	100 %		PSM: Lss saturation characteristic		
C02853/11	100 %		PSM: Lss saturation characteristic		
C02853/12	100 %		PSM: Lss saturation characteristic		
C02853/13	100 %		PSM: Lss saturation characteristic		
C02853/14	100 %		PSM: Lss saturation characteristic		
C02853/15	100 %		PSM: Lss saturation characteristic		
C02853/16	100 %		PSM: Lss saturation characteristic		
C02853/17	100 %		PSM: Lss saturation characteristic		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02855

Parameter Name: C02855 PSM: I_{max} Lss saturation characteristic			Data type: UNSIGNED_16 Index: 21720 _d = 54D8 _h		
From version 10.00.00					
► Current-dependent stator leakage inductance Lss(l)					
Setting range (min. value unit max. value)			Lenze setting		
0.0	A	3000.0	3000.0 A		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 10					

C02859

Parameter Name: C02859 PSM: Activate Lss saturation char.		Data type: UNSIGNED_8 Index: 21716 _d = 54D4 _h	
From version 10.00.00			
► Current-dependent stator leakage inductance Lss(l)			
Selection list (Lenze setting printed in bold)			
0	Off		
1	On		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02864

Parameter Name: C02864 MCTRL: Optimisations		Data type: UNSIGNED_16 Index: 21711 _d = 54CF _h
From version 14.00.00 Activation of special functions of the internal motor control		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	Motor temp. 90° for operation without KTY	1 ≡ Warm machine. In case the temperature tracking is not active, a motor temperature of 90 °C is assumed.
Bit 1	No switch-off of the brake chopper after 4s	1 ≡ Limitation of the operating time of the brake chopper (brake transistor) is deactivated. ► Braking operation/brake energy management
Bit 2	Brake chopper off in case of trip	0 ≡ No response of the brake chopper in the "Fault" device status. 1 ≡ In the "Fault" device status, the brake chopper is permanently switched off without any delay. ► Braking operation/brake energy management
Bit 3	Reserved (do not change!)	
Bit 4	Motor ident: Switching frequency 8kHz	Switching frequency for motor parameter identification: 0 ≡ 4 kHz 1 ≡ 8 kHz ► Preventing a decrease of the switching frequency
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Suppress V/f emergency operation	From version 15.00.00, it is internally switched to the encoderless V/f characteristic control in case of a motor control type with feedback and an encoder open circuit in order to avoid impermissible motor movements. • In order that this "V/f emergency operation" works properly, the parameters relevant for the V/f characteristic control (base frequency, Vmin boost, slip compensation, etc.) have to be set correctly. As an alternative, a motor parameter identification can be executed as well. • The change-over to "V/f emergency operation" is reported via bit 4 in C01000 and via the <i>bWirebreakUfLinearActive</i> status signal at the SB LS_DeviceMonitor. • The setting in C00006 is not affected by the change-over. The "V/f emergency operation" can be suppressed by setting bit 8 to "1". 0 ≡ V/f emergency operation in case of encoder open circuit 1 ≡ No V/f emergency operation in case of encoder open circuit
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	

Parameter Name: C02864 MCTRL: Optimisations		Data type: UNSIGNED_16 Index: 21711 _d = 54CF _h
Subcodes	Lenze setting	Info
C02864/1	0x0000	MCTRL: Optimisations
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT		

C02865

Parameter Name: C02865 MCTRL: Special settings		Data type: UNSIGNED_16 Index: 21710 _d = 54CE _h
From version 12.00.00 Activation of special functions of the internal motor control		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		Info
Bit 0	No TorqueLimit if TorquemodeOn	From version 12.00.00 onwards: If sensorless vector control (SLVC) is used, in the "torque control with speed limitation", mode the torque limitation via <i>nTorqueMotLimit_a</i> and <i>nTorqueGenLimit_a</i> is also active to limit the torque setpoint. If you want to deactivate the torque limitation to retain the former function, set bit 0 to "1". 0 ≡ Torque limitation is active 1 ≡ Torque limitation is not active
Bit 1	250ms IMP before DCB	
Bit 2	1000ms IMP before DCB	
Bit 3	DCB: Current controller and C036 app. to C088	
Bit 4	Motorident.: No calculation C73 C75 C76 C77 C78	From version 12.00.00 onwards: Following successful motor parameter identification, the current controller and field controller parameters are calculated as well. If these parameters are not to be calculated, bit 4 must be set to "1". 0 ≡ Calculate parameter 1 ≡ Do not calculate parameter ▶ Automatic motor data identification
Bit 5	Motorident.: Calculation C70 C71 C72	From version 12.00.00 onwards: Following successful motor parameter identification, the speed controller parameters can automatically be calculated as well. If these parameters are to be calculated, bit 5 must be set to "1". 0 ≡ Do not calculate parameter 1 ≡ Calculate parameter ▶ Automatic motor data identification
Bit 6	Motorident.: Calculation C11 C22 C497 C966 C982	From version 12.00.00 onwards: Following successful motor parameter identification, further controller parameters can be calculated automatically. If these parameters are to be calculated, bit 6 must be set to "1". 0 ≡ Do not calculate parameter 1 ≡ Calculate parameter ▶ Automatic motor data identification
Bit 7	Brake chopper off in case of pulse inhibit	From version 14.00.00 0 ≡ No response of the brake chopper in case of pulse inhibit. 1 ≡ In case of pulse inhibit, the brake chopper is permanently switched off without any delay. ▶ Braking operation/brake energy management

Parameter Name: C02865 MCTRL: Special settings		Data type: UNSIGNED_16 Index: 21710 _d = 54CE _h
Bit 8	DC-bus supply with DC charging connection	
Bit 9	Inverter characteristics inactive	From version 12.00.00 In case of very low-inductance motors (e.g. synchronous motor with a rated frequency of 1000 Hz) the inverter error characteristic needs to be switched off as otherwise the current of the device might be switched off. 0 ≡ Inverter error characteristic is active 1 ≡ Inverter error characteristic is not active
Bit 10	SCPSM: Extrapolation - actual speed value inactive	
Bit 11	TopLine: Speed encoder signal cycle 500us	
Bit 12	In case of QSP - nTorqueSetValue_a active	From version 13.00.00
Bit 13	In case of QSP - nTorquexxxLimit_a active	From version 13.00.00
Bit 14	Sensitivity of setpoint feedf. ctrl. 16 bits	From version 14.00.00
Bit 15	SC: Dead time of speed setpoint 500us	From version 14.00.00
Subcodes	Lenze setting	Info
C02865/1	0x0000	MCTRL: Special settings
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT		

C02866

Parameter Name: C02866 MCTRL: Special settings		Data type: UNSIGNED_8 Index: 21709 _d = 54CD _h
Activation of special functions of the internal motor control		
Selection list		
0	No	
1	Yes	
Subcodes	Lenze setting	Info
C02866/1	1: Yes	Motor ident.: Current controller par. from C075 C076 • From version 06.00.00 ▶ Automatic motor data identification
C02866/2	0: No	Motor phase error monitoring before operation • From version 11.00.00 ▶ Motor phase error monitoring before operation
C02866/3	0: No	Brake chopper DC-bus slave • From version 12.00.00 ▶ Control of multiple internal brake choppers in the DC-bus system
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02867

Parameter Name: C02867 - Identification procedure		Data type: UNSIGNED_8 Index: 21708 _d = 54C _h
From version 10.00.00		
Selection of the identification procedure for motor parameter identification ► Automatic motor parameter identification		
Selection list		Info
0	automatic	Automatic selection of the optimum identification procedure: - For synchronous motors, the extended identification procedure is always used. - For asynchronous motors with a rated motor power of up to 11 kW, the basic identification procedure is used. - For asynchronous motors with a rated motor power of more than 11 kW, the extended identification procedure is used.
1	standard identification	- Only for asynchronous motors. - Duration approx. 30 s
2	extended identification	- Stands out due to increased accuracy of the determined motor parameters. - Also supports synchronous motors and asynchronous motors with a power of more than 11 kW. - Duration approx. 80 s
Subcodes	Lenze setting	Info
C02867/1	0: automatic	Motor parameter identification: Process
☒ Read access ☒ Write access ☒ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1		

C02870

Parameter Name: C02870 PLI without motion: Optimisation factor			Data type: INTEGER_16 Index: 21705 _d = 54C9 _h	
From version 11.00.00				
► Pole position identification without motion				
Display range (min. value unit max. value)				
0.00	%	300.00		
Subcodes			Info	
C02870/1			PLI without motion: Optimisation factor	
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100				

C02871

Parameter Name: C02871 PLI without motion: Running time			Data type: INTEGER_16 Index: 21704 _d = 54C8 _h		
From version 11.00.00					
▶ Pole position identification without motion					
Display range (min. value unit max. value)					
0.00	ms	300.00			
Subcodes			Info		
C02871/1			PLI without motion: Running time		
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100					

C02872

Parameter Name: C02872 PLI without motion: Adaptation of time duration			Data type: INTEGER_8 Index: 21703 _d = 54C7 _h
From version 11.00.00			
▶ Pole position identification without motion			
Setting range (min. value unit max. value)			
-10			
Subcodes	Lenze setting	Info	
C02872/1	0	PLI without motion: Adaptation of time duration	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1			

C02873

Parameter Name: C02873 PLI without motion: Ident. el. rotor displ. angle			Data type: INTEGER_16 Index: 21702 _d = 54C6 _h
From version 11.00.00			
			▶ Pole position identification without motion
Display range (min. value unit max. value)			
0	°	360	
Subcodes			Info
C02873/1			PLI without motion: Ident. el. rotor displ. angle
☒ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1			

C02874

Parameter Name: C02874 PLI without motion		Data type: UNSIGNED_16 Index: 21701 _d = 54C5 _h	
From version 11.00.00			
		▶ Pole position identification without motion	
Setting range (min. hex value max. hex value)			
0x0000		0xFFFF	
Value is bit-coded:			
Bit 0	for SLPSM with controller enable		
Bit 1	for SC PSM with mains on		
Bit 2	for SC PSM with controller enable		
Bit 3	for SC PSM once after fault reset		
Bit 4	Reserved		
Bit 5	Reserved		
Bit 6	Reserved		
Bit 7	Reserved		
Bit 8	Reserved		
Bit 9	Reserved		
Bit 10	Reserved		
Bit 11	Reserved		
Bit 12	Reserved		
Bit 13	Reserved		
Bit 14	Reserved		
Bit 15	Reserved		
Subcodes	Lenze setting	Info	
C02874/1	0x0001	PLI without motion	
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT			

C02875

Parameter Name: C02875 PLI without motion: Adaptation of ident angle			Data type: INTEGER_8 Index: 21700 _d = 54C4 _h		
From version 11.00.00					
▶ Pole position identification without motion					
Setting range (min. value unit max. value)					
-100	°	100			
Subcodes	Lenze setting		Info		
C02875/1	0 °		PLI without motion: Adaptation of ident angle		
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT Scaling factor: 1					

C02879

Parameter Name: C02879 Slip calculation from equivalent circuit diagram		Data type: UNSIGNED_16 Index: 21696 _d = 54C0 _h
From version 11.00.00 In order to achieve a better speed stability and torque accuracy, the slip calculation can be either derived from the motor nameplate data (e.g. rated motor speed) or the motor equivalent circuit diagram data (stator resistance, rotor resistance etc.). ► Slip calculation		
Setting range (min. hex value max. hex value)		
0x0000		0xFFFF
Value is bit-coded:		
Bit 0	SLVC	
Bit 1	Reserved	
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Subcodes	Lenze setting	Info
C02879/1	0x0000	Slip calculation from equivalent circuit diagram
☒ Read access ☒ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☒ MOT		

C02993

Parameter Name: C02993 FB xy position	Data type: UNSIGNED_32 Index: 21582 _d = 544E _h
This code is for device-internal use only and must not be written to by the user!	

C02994

Parameter Name: C02994 FB xy position	Data type: UNSIGNED_32 Index: 21581 _d = 544D _h
This code is for device-internal use only and must not be written to by the user!	

C02995

Parameter Name: C02995 FB display InputOutput	Data type: UNSIGNED_32 Index: 21580 _d = 544C _h
This code is for device-internal use only and must not be written to by the user!	

15 Parameter reference

15.2 Parameter list | C02998

C02998

Parameter Name:	Data type: UNSIGNED_32
C02998 FB displayinputoutput3	Index: 21577 _d = 5449 _h
This code is for device-internal use only and must not be written to by the user!	

15.3

Selection list - analog signals

This selection list is relevant for the following configuration parameters:

Parameter	
C00410	L_SignalMonitor_a: Signal sources
C00620	System connection list: 16-bit
C00700	LA_NCtrl: Analog connection list
C00760	LA_SwitchPos: Analog connection list

Selection list - analog signals	
0	Not connected
1000	LA_NCtrl: wDriveControlStatus
1001	LA_NCtrl: wFailNumber
1002	LA_NCtrl: nMotorCurrent_a
1003	LA_NCtrl: nMotorSpeedAct_a
1006	LA_NCtrl: nGPAnalogSwitchOut_a
1007	LA_NCtrl: nGPArithmetikOut_a
1008	LA_NCtrl: nGPMulDivOut_a
1009	LA_NCtrl: nGPSignalOut1_a
1010	LA_NCtrl: nGPSignalOut2_a
1011	LA_NCtrl: nGPSignalOut3_a
1012	LA_NCtrl: nGPSignalOut4_a
1013	LA_NCtrl: nMotorTorqueAct_a
1014	LA_NCtrl: nDCVoltage_a
1015	LA_NCtrl: nMotorVoltage_a
1016	LA_NCtrl: nMotorSpeedSet_a
1017	LA_NCtrl: wFailTypeDomain
1023	LA_NCtrl: wFreeOut1
1024	LA_NCtrl: wFreeOut2
1025	LA_NCtrl: wFreeOut3
1026	LA_NCtrl: wFreeOut4
1200	LA_SwitchPos: wDriveControlStatus
1201	LA_SwitchPos: wFailNoLow
1202	LA_SwitchPos: wFailNoHigh
1203	LA_SwitchPos: nMotorCurrent_a
1204	LA_SwitchPos: nMotorSpeedSet_a
1205	LA_SwitchPos: nMotorSpeedAct_a
1206	LA_SwitchPos: nMotorTorqueAct_a
1207	LA_SwitchPos: nDCVoltage_a
1208	LA_SwitchPos: nMotorVoltage_a
1209	LA_SwitchPos: nGPAnalogSwitchOut_a
1210	LA_SwitchPos: nGPArithmetikOut_a
1211	LA_SwitchPos: nGPMulDivOut_a
1212	LA_SwitchPos: nGPSignalOut1_a
1213	LA_SwitchPos: nGPSignalOut2_a
1214	LA_SwitchPos: nGPSignalOut3_a
1215	LA_SwitchPos: nGPSignalOut4_a
1221	LA_SwitchPos: wFreeOut1
1222	LA_SwitchPos: wFreeOut2
1223	LA_SwitchPos: wFreeOut3
1224	LA_SwitchPos: wFreeOut4

Selection list - analog signals	
16000	LS_AnalogInput: nIn1_a
16002	LP_CanIn1: wCtrl
16003	LP_CanIn1: wIn2
16004	LP_CanIn1: wIn3
16005	LP_CanIn1: wIn4
16006	LP_CanIn2: wIn1
16007	LP_CanIn2: wIn2
16008	LP_CanIn2: wIn3
16009	LP_CanIn2: wIn4
16010	LP_CanIn3: wIn1
16011	LP_CanIn3: wIn2
16012	LP_CanIn3: wIn3
16013	LP_CanIn3: wIn4
16014	LS_DigitalInput: wCountIn1_LW
16015	LS_DigitalInput: wCountIn1_HW
16016	LS_DigitalInput: nFreqIn12_a
16017	LS_DigitalInput: nFreqIn12_v
16100	LS_DataAccess: wOut1
16101	LS_DataAccess: wOut2
16102	LS_DataAccess: wOut3
16103	LS_DataAccess: wOut4
16104	LP_McIn: wCtrl
16105	LP_McIn: wIn2
16106	LP_McIn: wIn3
16107	LP_McIn: wIn4
16108	LP_McIn: wIn5
16109	LP_McIn: wIn6
16110	LP_McIn: wIn7
16111	LP_McIn: wIn8
16112	LP_McIn: wIn9
16113	LP_McIn: wIn10
16114	LP_McIn: wIn11
16115	LP_McIn: wIn12
16116	LP_McIn: wIn13
16117	LP_McIn: wIn14
16118	LP_McIn: wIn15
16119	LP_McIn: wIn16
16120	LS_Keypad: nTorqueMotLim_a
16121	LS_Keypad: nTorqueGenLim_a
16122	LS_Keypad: nMainSetValue_a
16123	LS_CANManagement: wNodeID
16130	LS_ParReadWrite_1: wOutHWord
16131	LS_ParReadWrite_1: wOutLWord
16132	LS_ParReadWrite_2: wOutHWord
16133	LS_ParReadWrite_2: wOutLWord
16134	LS_ParReadWrite_3: wOutHWord
16135	LS_ParReadWrite_3: wOutLWord
16360	LP_CanIn4: wIn1
16361	LP_CanIn4: wIn2
16362	LP_CanIn4: wIn3

Selection list - analog signals	
16363	LP_CanIn4: wIn4
20000	LS_ParFix: nPos100_a
20001	LS_ParFix: nNeg100_a
20002	LS_ParFix: nPos199_99_a
20003	LS_ParFix: nNeg199_99_a
20004	LS_ParFix: w65535
20005	LS_ParFix: wDriveCtrl
20010	LS_ParFree_a: nC472_1_a
20011	LS_ParFree_a: nC472_2_a
20012	LS_ParFree_a: nC472_3_a
20013	LS_ParFree_a: nC472_4_a
20018	LS_ParFree_v: nC473_1_v
20019	LS_ParFree_v: nC473_2_v
20020	LS_ParFree_v: nC473_3_v
20021	LS_ParFree_v: nC473_4_v
20026	LS_ParFree: wC471_1
20027	LS_ParFree: wC471_2
20028	LS_ParFree: wC471_3
20029	LS_ParFree: wC471_4
32000	LS_MotorInterface: nMotorSpeedAct_a
32001	LS_MotorInterface: nOutputSpeedCtrl_a
32002	LS_MotorInterface: nInputJerkCtrl_a
32003	LS_MotorInterface: nInputTorqueCtrl_a
32004	LS_MotorInterface: nMotorTorqueAct_a
32005	LS_MotorInterface: nActualFluxx_a
32006	LS_MotorInterface: nDCVoltage_a
32007	LS_MotorInterface: nStatorCurrentIS_a
32008	LS_MotorInterface: nEffCurrentIq_a
32009	LS_MotorInterface: nReaktCurrentId_a
32010	LS_MotorInterface: wMaxMotorSpeed
32011	LS_MotorInterface: wMaxMotorTorque
32012	LS_MotorInterface: nMotorVoltage_a
32013	LS_MotorInterface: nMotorFreqAct_a
32014	LS_MotorInterface: nEffSpeedSetValue_a
32015	LS_DeviceMonitor_MCTRL: nIxRate_a
32016	LS_DeviceMonitor_MCTRL: nI2xTRate_a
32017	LS_MotorInterface: nOutputPosCtrl_a
32018	LS_MotorInterface: nHlgSetValue_a
32019	LS_MotorInterface: nMotorSpeedAct_v
32020	LS_MotorInterface: nSpeedCtrlAct_a
32021	LS_MotorInterface: nVoltageAngleAct_a
32022	LS_DeviceMonitor_MCTRL: nActiveOuputPower_a
32023	LS_DeviceMonitor_MCTRL: nApparentOuputPower_a
32024	LS_DeviceMonitor_MCTRL: nMctrlCosinePhiAct_a
32100	LS_DriveInterface: wDeviceStateWord
32101	LS_DriveInterface: wDeviceAuxStateWord
32102	LS_DriveInterface: wDetermFailNoLow
32103	LS_DriveInterface: wDetermFailNoHigh
32104	LS_DriveInterface: wDetermFailNoShort
32200	LS_MotionControlKernel: nSpeedSet_v
32201	LS_MotionControlKernel: nSpeedCtrlI_a
32202	LS_MotionControlKernel: nSpeedSetValue_a

Selection list - analog signals	
32203	LS_MotionControlKernel: nTorqueSetValue_a
32204	LS_MotionControlKernel: wActProfileNo
32205	LS_MotionControlKernel: wFollowProfileNo
32206	LS_MotionControlKernel: wMotionState1
32207	LS_MotionControlKernel: wMotionState2
32208	LS_MotionControlKernel: wAuxState
32209	LS_MotionControlKernel: nPWMAngleOffset
32210	LS_MotionControlKernel: nTorqueLimitAdapt_a
32211	Reserved: a32211
34900	MCTRL: OszCh1
34901	MCTRL: OszCh2
34902	MCTRL: OszCh3
34903	MCTRL: OszCh4
34904	MCTRL: Status1
34905	MCTRL: Status2
34906	MCTRL: Status3
34907	LS_DeviceMonitor: wUB_24V
36000	L_Absolut_1: nOut_a
36001	L_AddSub_1: nOut_a
36002	L_OffsetGain_1: nOut_a
36003	L_OffsetGain_2: nOut_a
36004	L_OffsetGainP_1: nOut_a
36005	L_OffsetGainP_2: nOut_a
36006	L_GainOffset_1: nOut_a
36007	L_GainOffset_2: nOut_a
36010	L_Negation_1: nOut_a
36011	L_Arithmetik_1: nOut_a
36012	L_Arithmetik_2: nOut_a
36013	L_AnalogSwitch_1: nOut_a
36014	L_AnalogSwitch_2: nOut_a
36015	L_AnalogSwitch_3: nOut_a
36018	L_NSet_1: nOut
36019	L_MPot_1: nOut_a
36020	L_PCTRL_1: nOut_a
36021	L_SignalMonitor_a: nOut1_a
36022	L_SignalMonitor_a: nOut2_a
36023	L_NLim_1: nOut_a
36025	L_OffsetGainP_3: nOut_a
36027	L_SignalMonitor_a: nOut3_a
36028	L_SignalMonitor_a: nOut4_a
36029	L_MulDiv_1: nOut_a
36030	L_NLim_1: wState
36031	L_NSet_1: wState
36032	L_NSet_1: nSetValue
36033	L_PT1_1: nOut_a
36091	L_PCTRL_1: nPIDOut1_a
36092	L_PCTRL_1: nPIDOut2_a
36093	L_PCTRL_1: nInfluenceOut_a
36095	L_Interpolator_1: nPhdOut_v
36096	L_Interpolator_1: nNOut_a
42000	LA_NCtrl_In: wCANDriveControl
42001	LA_NCtrl_In: wCCMDriveControl

Selection list - analog signals	
42002	LA_NCtrl_In: nTorqueMotLim
42003	LA_NCtrl_In: nTorqueGenLim
42004	LA_NCtrl_In: nPIDVpAdapt_a
42005	LA_NCtrl_In: nPIDActValue_a
42006	LA_NCtrl_In: nMainSetValue
42007	LA_NCtrl_In: nAuxSetValue
42008	LA_NCtrl_In: nGPAnalogSwitchIn1_a
42009	LA_NCtrl_In: nGPAnalogSwitchIn2_a
42010	LA_NCtrl_In: nGPArithmetikIn1_a
42011	LA_NCtrl_In: nGPArithmetikIn2_a
42012	LA_NCtrl_In: nGPMulDivIn_a
42013	LA_NCtrl_In: nGPCCompareIn1_a
42014	LA_NCtrl_In: nGPCCompareIn2_a
42015	LA_NCtrl_In: nVoltageAdd_a
42016	LA_NCtrl_In: nPIDInfluence_a
42017	LA_NCtrl_In: nPIDSetValue_a
42018	LA_NCtrl_In: nPWMAngleOffset
42019	LA_NCtrl_In: nBoost_a
42020	LA_NCtrl_In: wSMControl
42025	LA_NCtrl_In: wFreeln1
42026	LA_NCtrl_In: wFreeln2
42027	LA_NCtrl_In: wFreeln3
42028	LA_NCtrl_In: wFreeln4
42200	LA_SwitchPos_In: wCANDriveControl
42201	LA_SwitchPos_In: wMCIDriveControl
42202	LA_SwitchPos_In: nVoltageAdd_a
42203	LA_SwitchPos_In: nBoost_a
42204	LA_SwitchPos_In: nPWMAngleOffset
42205	LA_SwitchPos_In: nTorqueMotLim_a
42206	LA_SwitchPos_In: nTorqueGenLim_a
42207	LA_SwitchPos_In: nMainSetValue_a
42208	LA_SwitchPos_In: nAuxSetValue_a
42209	LA_SwitchPos_In: nGPAnalogSwitchIn1_a
42210	LA_SwitchPos_In: nGPAnalogSwitchIn2_a
42211	LA_SwitchPos_In: nGPArithmetikIn1_a
42212	LA_SwitchPos_In: nGPArithmetikIn2_a
42213	LA_SwitchPos_In: nGPMulDivIn_a
42214	LA_SwitchPos_In: nGPCCompareIn1_a
42215	LA_SwitchPos_In: nGPCCompareIn2_a
42216	LA_SwitchPos_In: wSMControl
42221	LA_SwitchPos_In: wFreeln1
42222	LA_SwitchPos_In: wFreeln2
42223	LA_SwitchPos_In: wFreeln3
42224	LA_SwitchPos_In: wFreeln4

15.4

Selection list - digital signals

This selection list is relevant for the following configuration parameters:

Parameter	
C00411	L_SignalMonitor_b: Signal sources
C00621	System connection list: Bool
C00701	LA_NCtrl: Digital connection list
C00761	LA_SwitchPos: Digital connection list

Selection list - digital signals	
0	Not connected
1000	LA_NCtrl: bDriveReady
1001	LA_NCtrl: bDriveFail
1002	LA_NCtrl: bClnhActive
1003	LA_NCtrl: bQSPisActive
1004	LA_NCtrl: bSpeedCcw
1005	LA_NCtrl: bSpeedActCompare
1008	LA_NCtrl: bGPDigitalDelayOut
1009	LA_NCtrl: bGPLogicOut
1010	LA_NCtrl: bGPSignalOut1
1011	LA_NCtrl: bGPSignalOut2
1012	LA_NCtrl: bGPSignalOut3
1013	LA_NCtrl: bGPSignalOut4
1014	LA_NCtrl: bOverLoadActive
1015	LA_NCtrl: bMBrakeReleaseOut
1016	LA_NCtrl: bMBrakeReleased
1017	LA_NCtrl: bGPCompareOut
1018	LA_NCtrl: bUnderLoadActive
1019	LA_NCtrl: blmaxActive
1020	LA_NCtrl: bSpeedSetReached
1021	LA_NCtrl: bSpeedActEqSet
1022	LA_NCtrl: bGPDFlipFlopOut
1023	LA_NCtrl: bGPDFlipFlopNegOut
1029	LA_NCtrl: bFreeOut1
1030	LA_NCtrl: bFreeOut2
1031	LA_NCtrl: bFreeOut3
1032	LA_NCtrl: bFreeOut4
1033	LA_NCtrl: bFreeOut5
1034	LA_NCtrl: bFreeOut6
1035	LA_NCtrl: bFreeOut7
1036	LA_NCtrl: bFreeOut8
1200	LA_SwitchPos: bDriveFail
1201	LA_SwitchPos: bWarningActive
1202	LA_SwitchPos: bSafeTorqueOff
1203	LA_SwitchPos: bDriveReady
1204	LA_SwitchPos: bClnhActive
1205	LA_SwitchPos: blmplsActive
1206	LA_SwitchPos: bQSPisActive
1207	LA_SwitchPos: bSpeedCcw
1208	LA_SwitchPos: bSpeedActCompare
1209	LA_SwitchPos: blmaxActive

Selection list - digital signals	
1210	LA_SwitchPos: bSpeedSetReached
1211	LA_SwitchPos: bSpeedActEqSet
1212	LA_SwitchPos: bBrakeReleaseOut
1213	LA_SwitchPos: bBrakeReleased
1214	LA_SwitchPos: bGPDigitalDelayOut
1215	LA_SwitchPos: bGPLogicOut
1216	LA_SwitchPos: bGPCompareOut
1217	LA_SwitchPos: bGPDFlipFlop_Out
1218	LA_SwitchPos: bGPDFlipFlop_NegOut
1219	LA_SwitchPos: bGPSignalOut1
1220	LA_SwitchPos: bGPSignalOut2
1221	LA_SwitchPos: bGPSignalOut3
1222	LA_SwitchPos: bGPSignalOut4
1228	LA_SwitchPos: bFreeOut1
1229	LA_SwitchPos: bFreeOut2
1230	LA_SwitchPos: bFreeOut3
1231	LA_SwitchPos: bFreeOut4
1232	LA_SwitchPos: bFreeOut5
1233	LA_SwitchPos: bFreeOut6
1234	LA_SwitchPos: bFreeOut7
1235	LA_SwitchPos: bFreeOut8
16000	LS_DigitalInput: bln1
16001	LS_DigitalInput: bln2
16002	LS_DigitalInput: bln3
16003	LS_DigitalInput: bln4
16008	LS_DigitalInput: bClnh
16009	LS_DigitalInput: bCountIn1_Compare
16011	LS_AnalogInput: bCurrentErrorIn1
16013	LP_CanIn1: bCtrl1_B0
16014	LP_CanIn1: bCtrl1_B1
16015	LP_CanIn1: bCtrl1_B2
16016	LP_CanIn1: bCtrl1_B3
16017	LP_CanIn1: bCtrl1_B4
16018	LP_CanIn1: bCtrl1_B5
16019	LP_CanIn1: bCtrl1_B6
16020	LP_CanIn1: bCtrl1_B7
16021	LP_CanIn1: bCtrl1_B8
16022	LP_CanIn1: bCtrl1_B9
16023	LP_CanIn1: bCtrl1_B10
16024	LP_CanIn1: bCtrl1_B11
16025	LP_CanIn1: bCtrl1_B12
16026	LP_CanIn1: bCtrl1_B13
16027	LP_CanIn1: bCtrl1_B14
16028	LP_CanIn1: bCtrl1_B15
16029	LP_CanIn2: bln1_B0
16030	LP_CanIn2: bln1_B1
16031	LP_CanIn2: bln1_B2
16032	LP_CanIn2: bln1_B3
16033	LP_CanIn2: bln1_B4
16034	LP_CanIn2: bln1_B5

Selection list - digital signals	
16035	LP_CanIn2: bln1_B6
16036	LP_CanIn2: bln1_B7
16037	LP_CanIn2: bln1_B8
16038	LP_CanIn2: bln1_B9
16039	LP_CanIn2: bln1_B10
16040	LP_CanIn2: bln1_B11
16041	LP_CanIn2: bln1_B12
16042	LP_CanIn2: bln1_B13
16043	LP_CanIn2: bln1_B14
16044	LP_CanIn2: bln1_B15
16045	LP_CanIn3: bln1_B0
16046	LP_CanIn3: bln1_B1
16047	LP_CanIn3: bln1_B2
16048	LP_CanIn3: bln1_B3
16049	LP_CanIn3: bln1_B4
16050	LP_CanIn3: bln1_B5
16051	LP_CanIn3: bln1_B6
16052	LP_CanIn3: bln1_B7
16053	LP_CanIn3: bln1_B8
16054	LP_CanIn3: bln1_B9
16055	LP_CanIn3: bln1_B10
16056	LP_CanIn3: bln1_B11
16057	LP_CanIn3: bln1_B12
16058	LP_CanIn3: bln1_B13
16059	LP_CanIn3: bln1_B14
16060	LP_CanIn3: bln1_B15
16061	LP_Mciln: bCtrl_B0
16062	LP_Mciln: bCtrl_B1
16063	LP_Mciln: bCtrl_B2
16064	LP_Mciln: bCtrl_B3
16065	LP_Mciln: bCtrl_B4
16066	LP_Mciln: bCtrl_B5
16067	LP_Mciln: bCtrl_B6
16068	LP_Mciln: bCtrl_B7
16069	LP_Mciln: bCtrl_B8
16070	LP_Mciln: bCtrl_B9
16071	LP_Mciln: bCtrl_B10
16072	LP_Mciln: bCtrl_B11
16073	LP_Mciln: bCtrl_B12
16074	LP_Mciln: bCtrl_B13
16075	LP_Mciln: bCtrl_B14
16076	LP_Mciln: bCtrl_B15
16077	LP_Mciln: bln2_B0
16078	LP_Mciln: bln2_B1
16079	LP_Mciln: bln2_B2
16080	LP_Mciln: bln2_B3
16081	LP_Mciln: bln2_B4
16082	LP_Mciln: bln2_B5
16083	LP_Mciln: bln2_B6
16084	LP_Mciln: bln2_B7
16085	LP_Mciln: bln2_B8
16086	LP_Mciln: bln2_B9

Selection list - digital signals	
16087	LP_Mciln: bln2_B10
16088	LP_Mciln: bln2_B11
16089	LP_Mciln: bln2_B12
16090	LP_Mciln: bln2_B13
16091	LP_Mciln: bln2_B14
16092	LP_Mciln: bln2_B15
16093	LS_Keypad: bSetQuickstop
16094	LS_Keypad: bSetDCBrake
16095	LS_Keypad: bSetSpeedCcw
16096	LS_Keypad: bJogSpeed1
16097	LS_Keypad: bJogSpeed2
16098	LS_Keypad: bMPotEnable
16099	LS_Keypad: bMPotUp
16100	LS_Keypad: bMPotDown
16101	LS_DigitalInput: bPosIn12_State
16110	LS_ParReadWrite_1: bDone
16111	LS_ParReadWrite_1: bFail
16112	LS_ParReadWrite_2: bDone
16113	LS_ParReadWrite_2: bFail
16114	LS_ParReadWrite_3: bDone
16115	LS_ParReadWrite_3: bFail
16122	LS_WriteParamList: bDone
16123	LS_WriteParamList: bFail
16161	LS_CANManagement: bFail
16162	LS_CANManagement: bOperational
16200	LS_SyncManagement: bSyncSignalOK
16201	LS_SyncManagement: bSyncPhaseOK
16400	LP_CanIn4: bln1_B0
16401	LP_CanIn4: bln1_B1
16402	LP_CanIn4: bln1_B2
16403	LP_CanIn4: bln1_B3
16404	LP_CanIn4: bln1_B4
16405	LP_CanIn4: bln1_B5
16406	LP_CanIn4: bln1_B6
16407	LP_CanIn4: bln1_B7
16408	LP_CanIn4: bln1_B8
16409	LP_CanIn4: bln1_B9
16410	LP_CanIn4: bln1_B10
16411	LP_CanIn4: bln1_B11
16412	LP_CanIn4: bln1_B12
16413	LP_CanIn4: bln1_B13
16414	LP_CanIn4: bln1_B14
16415	LP_CanIn4: bln1_B15
20000	LS_ParFix: bTrue
20001	LS_ParFree_b: bC470_1
20002	LS_ParFree_b: bC470_2
20003	LS_ParFree_b: bC470_3
20004	LS_ParFree_b: bC470_4
20005	LS_ParFree_b: bC470_5
20006	LS_ParFree_b: bC470_6
20007	LS_ParFree_b: bC470_7
20008	LS_ParFree_b: bC470_8

Selection list - digital signals	
20009	LS_ParFree_b: bC470_9
20010	LS_ParFree_b: bC470_10
20011	LS_ParFree_b: bC470_11
20012	LS_ParFree_b: bC470_12
20013	LS_ParFree_b: bC470_13
20014	LS_ParFree_b: bC470_14
20015	LS_ParFree_b: bC470_15
20016	LS_ParFree_b: bC470_16
20033	LS_PulseGenerator: b100Hz
20034	LS_PulseGenerator: b10Hz
20035	LS_PulseGenerator: b2Hz
20036	LS_PulseGenerator: b1Hz
20037	LS_PulseGenerator: b1HzFlash
20038	LS_PulseGenerator: b2HzFlash
20039	LS_PulseGenerator: bSingleFlash1
20040	LS_PulseGenerator: bSingleFlash2
20041	LS_PulseGenerator: bDoubleFlash
20042	LS_PulseGenerator: bSquareWave
20043	LS_PulseGenerator: bFirstCycle
32000	LS_DeviceMonitor_MCTRL: bFanFault
32001	LS_DeviceMonitor_MCTRL: bHeatSinkTemp
32002	LS_MotorInterface: bLimPosCtrlOut
32003	LS_MotorInterface: bLimSpeedCtrlOut
32004	LS_MotorInterface: bLimSpeedSetVal
32005	LS_MotorInterface: bLimTorqueSetVal
32006	LS_MotorInterface: bLimCurrentSetVal
32007	LS_DeviceMonitor_MCTRL: bUVDetected
32008	LS_DeviceMonitor_MCTRL: bOVDetected
32009	LS_DeviceMonitor_MCTRL: bMotorPhaseFault
32010	LS_DeviceMonitor_MCTRL: bEncoderComFault
32011	LS_DeviceMonitor_MCTRL: b1xtOverload
32012	LS_DeviceMonitor_MCTRL: b12xtOverload
32013	LS_MotorInterface: bIdentificationActive
32014	LS_MotorInterface: bFlyingSyncActive
32015	LS_DeviceMonitor_MCTRL: bTorqueMax
32016	LS_DeviceMonitor_MCTRL: bNMax
32017	LS_DeviceMonitor_MCTRL: bFChopReduced
32018	LS_DeviceMonitor_MCTRL: bMotorPTC
32019	LS_DeviceMonitor_MCTRL: bMotorTemp
32020	LS_MotorInterface: bDcbActive
32021	LS_DeviceMonitor_MCTRL: bBrakeChopperFault
32022	LS_MotorInterface: bQsplsActive
32023	LS_MotorInterface: bHlgLoad
32024	LS_MotorInterface: bHlgStop
32025	LS_DeviceMonitor_MCTRL: bImpActive
32026	LS_DeviceMonitor_MCTRL: bClampActive
32027	LS_DeviceMonitor_MCTRL: bMainsFault
32028	LS_DeviceMonitor_MCTRL: bNmaxForFChop
32029	LS_DeviceMonitor_MCTRL: bShortCircuit
32030	LS_DeviceMonitor_MCTRL: bEarthFault
32031	LS_DeviceMonitor_MCTRL: bWirebreakUfLinearActive

Selection list - digital signals	
32100	LS_DriveInterface: bInit
32101	LS_DriveInterface: bReady
32102	LS_DriveInterface: bReadyToSwitchOn
32103	LS_DriveInterface: bOperationEnable
32104	LS_DriveInterface: bWarning
32105	LS_DriveInterface: bTrouble
32106	LS_DriveInterface: bFail
32107	LS_DriveInterface: bCollectedFail
32108	LS_DriveInterface: bSafeTorqueOff
32109	LS_DriveInterface: bIMPIsActive
32110	LS_DriveInterface: bCINHIsActive
32111	LS_DriveInterface: bSafetyIsActive
32112	LS_DriveInterface: bCwCcw
32113	LS_DriveInterface: bNactCompare
32200	LS_MotionControlKernel: bPosCtrlOn
32201	LS_MotionControlKernel: bSpeedCtrlOn
32202	LS_MotionControlKernel: bTorquemodeOn
32203	LS_MotionControlKernel: bDcBrakeOn
32204	LS_MotionControlKernel: bBrkReleaseOut
32205	LS_MotionControlKernel: bBrkReleased
32206	LS_MotionControlKernel: bDeltaPosOn
32207	LS_MotionControlKernel: bPosDerivativeOn
32208	LS_MotionControlKernel: bMotorRefOffsetOn
32209	LS_MotionControlKernel: bQspOn
32210	LS_MotionControlKernel: bPosBusy
32211	LS_MotionControlKernel: bPosDone
32212	LS_MotionControlKernel: bHomDone
32213	LS_MotionControlKernel: bHomAvailable
32214	LS_MotionControlKernel: bTorqueLimitAdaptOn
32215	Reserved: b32215
32216	Reserved: b32216
32217	Reserved: b32217
32218	Reserved: b32218
32219	LS_MotionControlKernel: bFollowErrLim1
32220	LS_MotionControlKernel: bFollowErrLim2
36000	L_And_1: bOut
36001	L_And_2: bOut
36002	L_And_3: bOut
36003	L_Or_1: bOut
36004	L_Or_2: bOut
36005	L_Or_3: bOut
36006	L_Not_1: bOut
36007	L_Not_2: bOut
36008	L_Not_3: bOut
36009	L_DFlipFlop_1: bOut
36010	L_RLQ_1: bQsp
36011	L_RLQ_1: CwCcw
36012	L_DigitalDelay_1: bOut
36013	L_Compare_1: bOut
36014	L_Compare_2: bOut
36015	L_Compare_3: bOut
36016	L_NSet_1: bRfgEq0

Selection list - digital signals	
36017	L_DigitalLogic_1: bOut
36019	L_SignalMonitor_b: bOut1
36020	L_SignalMonitor_b: bOut2
36021	L_SignalMonitor_b: bOut3
36022	L_SignalMonitor_b: bOut4
36023	L_PCTRL_1: bActEqSet
36024	L_NLim_1: bLimitActive
36025	L_DFlipFlop_1: bNegOut
36039	L_Or_4: bOut
36040	L_DigitalLogic_3: bOut
36131	L_JogCtrlExtension_1: bRfgOut
36132	L_JogCtrlExtension_1: bJog1Out
36133	L_JogCtrlExtension_1: bJog2Out
36135	L_Interpolator_1: bIPulse
36136	L_Interpolator_1: bSignalError
36138	L_Transient_1: bOut
36139	L_Transient_2: bOut
36140	L_Transient_3: bOut
36141	L_Transient_4: bOut
42000	LA_NCtrl_In: bClnh
42001	LA_NCtrl_In: bFailReset
42002	LA_NCtrl_In: bSetQuickstop
42003	LA_NCtrl_In: bSetDCBrake
42004	LA_NCtrl_In: bRFG_Stop
42005	LA_NCtrl_In: bRFG_0
42007	LA_NCtrl_In: bSetSpeedCcw
42008	LA_NCtrl_In: bJogSpeed1
42009	LA_NCtrl_In: bJogSpeed2
42010	LA_NCtrl_In: bJogSpeed4
42011	LA_NCtrl_In: bJogSpeed8
42012	LA_NCtrl_In: bJogRamp1
42013	LA_NCtrl_In: bJogRamp2
42014	LA_NCtrl_In: bJogRamp4
42015	LA_NCtrl_In: bJogRamp8
42017	LA_NCtrl_In: bMPOTInAct
42018	LA_NCtrl_In: bMPOTUp
42019	LA_NCtrl_In: bMPOTDown
42020	LA_NCtrl_In: bMBRKRelease
42021	LA_NCtrl_In: bGPFree1
42022	LA_NCtrl_In: bGPFree2
42023	LA_NCtrl_In: bGPAnalogSwitchSet
42024	LA_NCtrl_In: bGPDigitalDelayIn
42025	LA_NCtrl_In: bGPLogicIn1
42026	LA_NCtrl_In: bGPLogicIn2
42027	LA_NCtrl_In: bGPLogicIn3
42028	LA_NCtrl_In: bGPDFlipFlopInD
42029	LA_NCtrl_In: bGPDFlipFlopInClk
42030	LA_NCtrl_In: bGPDFlipFlopInClr
42031	LA_NCtrl_In: bMPotEnable
42032	LA_NCtrl_In: bPIDEnableInfluenceRamp
42033	LA_NCtrl_In: bPIDIOff
42034	LA_NCtrl_In: bRLQCcw

Selection list - digital signals	
42035	LA_NCtrl_In: bRLQCcw
42041	LA_NCtrl_In: bFreeln1
42042	LA_NCtrl_In: bFreeln2
42043	LA_NCtrl_In: bFreeln3
42044	LA_NCtrl_In: bFreeln4
42045	LA_NCtrl_In: bFreeln5
42046	LA_NCtrl_In: bFreeln6
42047	LA_NCtrl_In: bFreeln7
42048	LA_NCtrl_In: bFreeln8
42200	LA_SwitchPos_In: bClnh
42201	LA_SwitchPos_In: bFailReset
42202	LA_SwitchPos_In: bSetQuickstop
42203	LA_SwitchPos_In: bSetDCBrake
42204	LA_SwitchPos_In: bRFG_Stop
42205	LA_SwitchPos_In: bSetSpeedCcw
42206	LA_SwitchPos_In: bRLQCw
42207	LA_SwitchPos_In: bRLQCcw
42208	LA_SwitchPos_In: bJogCtrlInputSel1
42209	LA_SwitchPos_In: bJogCtrlInputSel2
42210	LA_SwitchPos_In: bJogCtrlRfgIn
42211	LA_SwitchPos_In: bJogCtrlJog1
42212	LA_SwitchPos_In: bJogCtrlJog2
42213	LA_SwitchPos_In: bJogCtrlSlowDown1
42214	LA_SwitchPos_In: bJogCtrlStop1
42215	LA_SwitchPos_In: bJogCtrlSlowDown2
42216	LA_SwitchPos_In: bJogCtrlStop2
42217	LA_SwitchPos_In: bJogCtrlSlowDown3
42218	LA_SwitchPos_In: bJogCtrlStop3
42219	LA_SwitchPos_In: bJogSpeed4
42220	LA_SwitchPos_In: bJogSpeed8
42221	LA_SwitchPos_In: bJogRamp1
42222	LA_SwitchPos_In: bJogRamp2
42223	LA_SwitchPos_In: bJogRamp4
42224	LA_SwitchPos_In: bJogRamp8
42225	LA_SwitchPos_In: bMBrakeRelease
42226	LA_SwitchPos_In: bGPAnalogSwitchSet
42227	LA_SwitchPos_In: bGPDigitalDelayIn
42228	LA_SwitchPos_In: bGPLogicIn1
42229	LA_SwitchPos_In: bGPLogicIn2
42230	LA_SwitchPos_In: bGPLogicIn3
42231	LA_SwitchPos_In: bGPDFlipFlop_InD
42232	LA_SwitchPos_In: bGPDFlipFlop_InClk
42233	LA_SwitchPos_In: bGPDFlipFlop_InClr
42239	LA_SwitchPos_In: bFreeln1
42240	LA_SwitchPos_In: bFreeln2
42241	LA_SwitchPos_In: bFreeln3
42242	LA_SwitchPos_In: bFreeln4
42243	LA_SwitchPos_In: bFreeln5
42244	LA_SwitchPos_In: bFreeln6
42245	LA_SwitchPos_In: bFreeln7
42246	LA_SwitchPos_In: bFreeln8

Selection list - digital signals	
42247	LS_MotorInterface: bBrakeChopperActive
42248	LS_MotorInterface: bLimSpeedTorquemodeOn

15.5 Selection list - angle signals

This selection list is relevant for the following configuration parameters:

Parameter	
C00622	System connection list: Angle

Selection list - angle signals	
0	Not connected
1005	LA_NCtrl: dnFreeOut1_p
1006	LA_NCtrl: dnFreeOut2_p
1205	LA_SwitchPos: dnFreeOut1_p
1206	LA_SwitchPos: dnFreeOut2_p
16000	LP_CanIn1: dnIn34_p
16001	LP_CanIn2: dnIn34_p
16002	LP_CanIn3: dnIn34_p
16003	LP_MciIn: dnIn34_p
16006	LP_CanIn1: dnIn12_p
16007	LP_CanIn2: dnIn12_p
16008	LP_CanIn3: dnIn12_p
16009	LP_MciIn: dnIn56_p
16010	LP_MciIn: dnIn78_p
16011	LP_CanIn4: dnIn12_p
16012	LP_CanIn4: dnIn34_p
17020	LS_DigitalInput: dnPosIn12_p
20000	LS_ParFree_p: dnC474_1_p
20001	LS_ParFree_p: dnC474_2_p
20002	LS_ParFree_p: dnC474_3_p
20003	LS_ParFree_p: dnC474_4_p
32000	LS_MotorInterface: dnMotorPosAct_p
32001	LS_MotorInterface: dnMotorDeltaPosAct_p
32200	LS_MotionControlKernel: dnPosTarget_p
32201	LS_MotionControlKernel: dnPosSetValue_p
32202	LS_MotionControlKernel: dnDeltaPos_p
32203	LS_MotionControlKernel: dnMotorRefOffset_p
32204	LS_MotionControlKernel: dnPosSet_p
32205	LS_MotionControlKernel: dnPosSetRelative_p
36080	L_Interpolator_1: dnPhiOut_p
42005	LA_NCtrl_In: dnFreeIn1_p
42006	LA_NCtrl_In: dnFreeIn2_p
42205	LA_SwitchPos_In: dnFreeIn1_p
42206	LA_SwitchPos_In: dnFreeIn2_p

15.6 Table of attributes

The table of attributes contains information required for a communication with the controller via parameters.

How to read the table of attributes:

Column		Meaning	Entry	
Code		Parameter name	Cxxxxx	
Name		Parameter short text (display text)	Text	
Type		Parameter type	Selection list	Value from selection list
			Bit coded	Bit-coded value
			Linear value	Value with setting range
			String	String of digits
Index	dec	Index under which the parameter is addressed. The subindex for array variables corresponds to the Lenze subcode number.	24575 - Lenze code number	Is only required for access via a bus system.
	hex		5FFF _h - Lenze code number	
Data	DS	Data structure	E	Single variable (only one parameter element)
			A	Array variable (several parameter elements)
	DA	Number of array elements (subcodes)	Number	
	DT	Data type	INTEGER_16	2 bytes with sign
			INTEGER_32	4 bytes with sign
			UNSIGNED_8	1 byte without sign
			UNSIGNED_16	2 bytes without sign
			UNSIGNED_32	4 bytes without sign
			VISIBLE_STRING [xx]	ASCII string (with character length xx)
	Factor	Factor for data transmission via a bus system, depending on the number of decimal positions	Factor	1 = no decimal positions 10 = 1 decimal position 100 = 2 decimal positions 1000 = 3 decimal positions 10000 = 4 decimal positions
	CINH	Writing is only possible if the controller is inhibited	CINH	

Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C00001	Keypad UserLevel	Selection list	24574	5FFE	A	1	UNSIGNED_8	1	
C00002	Device commands	Selection list	24573	5FFD	A	33	UNSIGNED_8	1	
C00003	Status of the last device command	Selection list	24572	5FFC	E	1	UNSIGNED_8	1	
C00005	Application	Selection list	24570	5FFA	E	1	UNSIGNED_16	1	
C00006	Motor control	Selection list	24569	5FF9	E	1	UNSIGNED_8	1	
C00007	Control mode	Selection list	24568	5FF8	E	1	UNSIGNED_16	1	
C00008	Original application control source	Selection list	24567	5FF7	E	1	UNSIGNED_16	1	
C00010	AIN1: Characteristic	Linear value	24565	5FF5	A	8	INTEGER_16	100	
C00011	Appl.: Reference speed	Linear value	24564	5FF4	E	1	UNSIGNED_16	1	
C00012	Accel. time - main setpoint	Linear value	24563	5FF3	E	1	UNSIGNED_32	1000	
C00013	Decel. time - main setpoint	Linear value	24562	5FF2	E	1	UNSIGNED_32	1000	
C00015	VFC: V/f base frequency	Linear value	24560	5FF0	E	1	UNSIGNED_16	10	
C00016	VFC: Vmin boost	Linear value	24559	5FEF	E	1	UNSIGNED_16	100	
C00018	Switching frequency	Selection list	24557	5FED	E	1	UNSIGNED_8	1	
C00019	Auto-DCB: Threshold	Linear value	24556	5FEC	E	1	UNSIGNED_16	1	
C00021	Slip comp.	Linear value	24554	5FEA	E	1	INTEGER_16	100	
C00022	Imax in motor mode	Linear value	24553	5FE9	E	1	UNSIGNED_16	100	
C00023	Imax in generator mode	Linear value	24552	5FE8	E	1	INTEGER_16	100	
Grayed out = display parameter (read access only)									

Code	Name	Type	Index		Data					
			dec	hex	DS	DA	DT	Factor	CINH	
C00024	LS_DriveInterface: bNActCompare	Linear value	24551	5FE7	E	1	INTEGER_16		100	
C00026	AINx: Offset	Linear value	24549	5FE5	A	1	INTEGER_16		100	
C00027	AINx: Gain	Linear value	24548	5FE4	A	1	INTEGER_32		10000	
C00028	AINx: Input voltage	Linear value	24547	5FE3	A	1	INTEGER_16		100	
C00029	AINx: Input current	Linear value	24546	5FE2	A	1	INTEGER_16		100	
C00033	AINx: Output value	Linear value	24542	5FDE	A	1	INTEGER_16		100	
C00034	AINx: Configuration	Selection list	24541	5FDD	A	1	UNSIGNED_8		1	
C00036	DC braking: Current	Linear value	24539	5FDB	E	1	INTEGER_16		100	
C00039	Fixed setpoint x (L_NSet_1 n-Fix)	Linear value	24536	5FD8	A	15	INTEGER_16		100	
C00050	MCTRL: Speed setpoint	Linear value	24525	5FCD	E	1	INTEGER_32		1	
C00051	MCTRL: Actual speed value	Linear value	24524	5FCC	E	1	INTEGER_32		1	
C00052	Motor voltage	Linear value	24523	5FCB	E	1	UNSIGNED_16		1	
C00053	DC-bus voltage	Linear value	24522	5FCA	E	1	UNSIGNED_16		1	
C00054	Motor current	Linear value	24521	5FC9	E	1	UNSIGNED_16		100	
C00055	Actual values	Linear value	24520	5FC8	A	1	INTEGER_16		1	
C00056	Torque	Linear value	24519	5FC7	A	2	INTEGER_32		100	
C00057	Maximum torque	Linear value	24518	5FC6	E	1	UNSIGNED_32		100	
C00058	Output frequency	Linear value	24517	5FC5	E	1	INTEGER_32		100	
C00059	Appl.: Reference frequency C11	Linear value	24516	5FC4	E	1	UNSIGNED_32		100	
C00061	Heatsink temperature	Linear value	24514	5FC2	E	1	INTEGER_16		1	
C00062	Interior temperature	Linear value	24513	5FC1	A	1	INTEGER_16		1	
C00064	Device utilisation (Ixt)	Linear value	24511	5FBF	A	3	INTEGER_16		100	
C00065	Supply voltage 24V	Linear value	24510	5FBE	E	1	INTEGER_16		10	
C00066	Thermal motor load (I _{xt})	Linear value	24509	5FBD	E	1	INTEGER_16		100	
C00070	Vp speed controller	Linear value	24505	5FB9	A	3	UNSIGNED_16		100	
C00071	Ti speed controller	Linear value	24504	5FB8	A	3	UNSIGNED_16		10	
C00072	SC: Tdn speed controller	Linear value	24503	5FB7	E	1	UNSIGNED_16		100	
C00073	I _{max} /M controller gain	Linear value	24502	5FB6	A	2	UNSIGNED_16		100	
C00074	Reset time I _{max} /M controller	Linear value	24501	5FB5	A	2	UNSIGNED_16		1	
C00075	Vp current controller	Linear value	24500	5FB4	E	1	UNSIGNED_16		100	
C00076	Ti current controller	Linear value	24499	5FB3	E	1	UNSIGNED_16		100	
C00079	SC: Settings	Selection list	24496	5FB0	A	4	UNSIGNED_8		1	
C00080	Override point of field weakening	Linear value	24495	5FAF	E	1	INTEGER_16		1	
C00081	Rated motor power	Linear value	24494	5FAE	E	1	UNSIGNED_16		100	
C00082	Motor rotor resistance	Linear value	24493	5FAD	E	1	UNSIGNED_32		1	
C00083	Motor rotor time constant	Linear value	24492	5FAC	E	1	UNSIGNED_16		1	
C00084	Motor stator resistance	Linear value	24491	5FAB	E	1	UNSIGNED_32		1	
C00085	Motor stator leakage inductance	Linear value	24490	5FAA	E	1	UNSIGNED_16		100	
C00087	Rated motor speed	Linear value	24488	5FA8	E	1	UNSIGNED_16		1	
C00088	Rated motor current	Linear value	24487	5FA7	E	1	UNSIGNED_16		100	
C00089	Rated motor frequency	Linear value	24486	5FA6	E	1	UNSIGNED_16		1	
C00090	Rated motor voltage	Linear value	24485	5FA5	E	1	UNSIGNED_16		1	
C00091	Motor cosine phi	Linear value	24484	5FA4	E	1	UNSIGNED_8		100	
C00092	Motor magnetising inductance	Linear value	24483	5FA3	E	1	UNSIGNED_16		10	
C00093	Power section ID	Linear value	24482	5FA2	E	1	UNSIGNED_16		1	
C00095	Motor magnetising current	Linear value	24480	5FA0	E	1	UNSIGNED_16		100	
C00097	Rated motor torque	Linear value	24478	5F9E	E	1	UNSIGNED_32		100	
C00098	Rated device current	Linear value	24477	5F9D	E	1	UNSIGNED_16		10	
C00099	Firmware version	String	24476	5F9C	E	1	VISIBLE_STRING [12]			
C00100	Firmware version	Linear value	24475	5F9B	A	4	UNSIGNED_8		1	
Grayed out = display parameter (read access only)										

Code	Name	Type	Index		Data					
			dec	hex	DS	DA	DT	Factor	CINH	
C00101	Add. acceleration time x	Linear value	24474	5F9A	A	15	UNSIGNED_32	1000		
C00103	Add. deceleration time x	Linear value	24472	5F98	A	15	UNSIGNED_32	1000		
C00105	Decel. time - quick stop	Linear value	24470	5F96	E	1	UNSIGNED_32	1000		
C00106	Auto-DCB: Hold time	Linear value	24469	5F95	E	1	UNSIGNED_32	1000		
C00107	DC braking: Hold time	Linear value	24468	5F94	E	1	UNSIGNED_32	1000		
C00114	DigInX: Inversion	Bit coded	24461	5F8D	E	1	UNSIGNED_16	1		
C00115	DI1 DI2: Function	Selection list	24460	5F8C	A	1	UNSIGNED_8	1		
C00118	DigOutX: Inversion	Bit coded	24457	5F89	E	1	UNSIGNED_8	1		
C00120	Setting of motor overload (I*xt)	Linear value	24455	5F87	E	1	INTEGER_16	100		
C00122	Initial value motor overload (I*xt)	Linear value	24453	5F85	A	1	UNSIGNED_16	100		
C00123	Device utilisat. threshold (Ixt)	Linear value	24452	5F84	E	1	INTEGER_16	100		
C00129	Brake resistance value	Linear value	24446	5F7E	E	1	UNSIGNED_16	10		
C00130	Rated brake resistor power	Linear value	24445	5F7D	E	1	UNSIGNED_16	1		
C00131	Rated heat amount of brake resist.	Linear value	24444	5F7C	E	1	UNSIGNED_16	10		
C00133	Brake resistor utilisation	Linear value	24442	5F7A	E	1	UNSIGNED_16	1		
C00134	L_NSet_1: Ramp smoothing	Selection list	24441	5F79	E	1	UNSIGNED_8	1		
C00136	Communication control words	Bit coded	24439	5F77	A	2	UNSIGNED_16	1		
C00137	Device status	Selection list	24438	5F76	E	1	UNSIGNED_16	1		
C00138	Internal control signals	Bit coded	24437	5F75	A	3	UNSIGNED_16	1		
C00142	Auto-start option	Bit coded	24433	5F71	E	1	UNSIGNED_8	1		
C00144	Thermal switching frequency reduction	Selection list	24431	5F6F	E	1	UNSIGNED_8	1		
C00148	LS_DriveInterface: Error message config.	Bit coded	24427	5F6B	E	1	UNSIGNED_16	1		
C00150	Status word	Bit coded	24425	5F69	E	1	UNSIGNED_16	1		
C00155	Extended status word	Bit coded	24420	5F64	E	1	UNSIGNED_16	1		
C00158	Cause of controller inhibit	Bit coded	24417	5F61	E	1	UNSIGNED_16	1		
C00159	Cause of quick stop QSP	Bit coded	24416	5F60	E	1	UNSIGNED_16	1		
C00160	Status determining error (16-bit)	Linear value	24415	5F5F	A	1	UNSIGNED_16	1		
C00161	LS_SetError_x: Error number	Linear value	24414	5F5E	A	4	UNSIGNED_16	1		
C00162	Error number masked	Linear value	24413	5F5D	A	1	UNSIGNED_32	1		
C00163	Logbook - binary elements	Selection list	24412	5F5C	A	2	UNSIGNED_16	1		
C00164	Logbook - analog elements	Selection list	24411	5F5B	A	1	UNSIGNED_16	1		
C00165	Error information	String	24410	5F5A	A	2	VISIBLE_STRING [14]			
C00166	Error information text	String	24409	5F59	A	6	VISIBLE_STRING [31]			
C00168	Status determining error	Linear value	24407	5F57	E	1	UNSIGNED_32	1		
C00169	Logbook setting	Bit coded	24406	5F56	E	1	UNSIGNED_16	1		
C00170	Current error	Linear value	24405	5F55	E	1	UNSIGNED_32	1		
C00173	Mains voltage	Selection list	24402	5F52	E	1	UNSIGNED_8	1	CINH	
C00174	Reduc. brake chopper threshold	Linear value	24401	5F51	E	1	UNSIGNED_8	1		
C00175	Brake energy management	Selection list	24400	5F50	E	1	UNSIGNED_8	1	CINH	
C00177	Switching cycles	Linear value	24398	5F4E	A	8	UNSIGNED_32	1		
C00178	Elapsed-hour meter	Linear value	24397	5F4D	E	1	UNSIGNED_32	1		
C00179	Power-on time meter	Linear value	24396	5F4C	E	1	UNSIGNED_32	1		
C00180	Running time	Linear value	24395	5F4B	A	3	UNSIGNED_32	1		
C00181	Time settings	Linear value	24394	5F4A	A	1	UNSIGNED_16	1		
C00182	L_NSet_1: S-ramp time PT1	Linear value	24393	5F49	E	1	INTEGER_16	100		
C00184	AutoFailReset repetition time	Linear value	24391	5F47	E	1	UNSIGNED_16	1		
C00185	AutoFailReset residual runtime	Linear value	24390	5F46	E	1	UNSIGNED_16	1		
C00186	Max. number of AutoFailReset processes	Linear value	24389	5F45	E	1	UNSIGNED_8	1		
C00187	Current AutoFailReset processes	Linear value	24388	5F44	E	1	UNSIGNED_8	1		
C00188	AutoFailReset configuration	Selection list	24387	5F43	E	1	UNSIGNED_8	1		
Grayed out = display parameter (read access only)										

Code	Name	Type	Index		DS	DA	Data		
			dec	hex			DT	Factor	CINH
C00189	Resp. to too frequent AutoFailReset	Selection list	24386	5F42	E	1	UNSIGNED_8	1	
C00190	L_NSet_1: Setpoint arithmetic	Selection list	24385	5F41	E	1	UNSIGNED_8	1	
C00191	Logbook access index User	Linear value	24384	5F40	A	1	UNSIGNED_8	1	
C00192	Logbook data User	String	24383	5F3F	A	1	OCTET_STRING [32]		
C00193	Logbook element User	Linear value	24382	5F3E	A	6	UNSIGNED_32	1	
C00199	Description data	String	24376	5F38	A	5	VISIBLE_STRING [32]		
C00200	Firmware product type	String	24375	5F37	E	1	VISIBLE_STRING [19]		
C00201	Firmware	String	24374	5F36	A	6	VISIBLE_STRING [22]		
C00203	Product type code	String	24372	5F34	A	9	VISIBLE_STRING [24]		
C00204	Serial number	String	24371	5F33	A	9	VISIBLE_STRING [24]		
C00219	Identity	Linear value	24356	5F24	A	4	UNSIGNED_32	1	
C00220	L_NSet_1: Acceleration time - add. setpoint	Linear value	24355	5F23	E	1	UNSIGNED_32	1000	
C00221	L_NSet_1: Deceleration time - add. setpoint	Linear value	24354	5F22	E	1	UNSIGNED_32	1000	
C00222	L_PCTRL_1: Vp	Linear value	24353	5F21	E	1	INTEGER_16	10	
C00223	L_PCTRL_1: Tn	Linear value	24352	5F20	E	1	UNSIGNED_16	1	
C00224	L_PCTRL_1: Kd	Linear value	24351	5F1F	E	1	UNSIGNED_16	10	
C00225	L_PCTRL_1: MaxLimit	Linear value	24350	5F1E	E	1	INTEGER_16	100	
C00226	L_PCTRL_1: MinLimit	Linear value	24349	5F1D	E	1	INTEGER_16	100	
C00227	L_PCTRL_1: Acceleration time	Linear value	24348	5F1C	E	1	UNSIGNED_32	1000	
C00228	L_PCTRL_1: Deceleration time	Linear value	24347	5F1B	E	1	UNSIGNED_32	1000	
C00231	L_PCTRL_1: Operating range	Linear value	24344	5F18	A	4	INTEGER_16	100	
C00233	L_PCTRL_1: Root function	Selection list	24342	5F16	E	1	UNSIGNED_8	1	
C00234	Oscillation damping influence	Linear value	24341	5F15	E	1	UNSIGNED_16	100	
C00235	Oscillation damping filter time	Linear value	24340	5F14	E	1	UNSIGNED_8	1	
C00236	Oscillation damping field weakening	Linear value	24339	5F13	E	1	UNSIGNED_8	1	
C00241	L_NSet_1: Hyst. NSet reached	Linear value	24334	5F0E	E	1	INTEGER_16	100	
C00242	L_PCTRL_1: Operating mode	Selection list	24333	5F0D	E	1	UNSIGNED_8	1	
C00243	L_PCTRL_1: Accel. time influence	Linear value	24332	5F0C	E	1	UNSIGNED_32	1000	
C00244	L_PCTRL_1: Deceleration time influence	Linear value	24331	5F0B	E	1	UNSIGNED_32	1000	
C00245	L_PCTRL_1: PID output value	Linear value	24330	5F0A	E	1	INTEGER_16	100	
C00246	L_PCTRL_1: nAct_a internal	Linear value	24329	5F09	E	1	INTEGER_16	100	
C00247	L_PCTRL_1: Window setpoint reached	Linear value	24328	5F08	E	1	INTEGER_16	100	
C00249	L_PT1_1: Time constant	Linear value	24326	5F06	E	1	UNSIGNED_16	1	
C00270	SC: Freq. current setpoint filter	Linear value	24305	5EF1	E	1	UNSIGNED_16	10	
C00271	SC: Current setpoint filter width	Linear value	24304	5EF0	E	1	UNSIGNED_16	10	
C00272	SC: Current setpoint filter depth	Linear value	24303	5EEF	E	1	UNSIGNED_16	1	
C00273	Motor moment of inertia	Linear value	24302	5EEE	E	1	UNSIGNED_32	100	
C00274	SC: Max. change in acceleration	Linear value	24301	5EED	E	1	UNSIGNED_16	10	
C00275	Setpoint feedforward control filtering	Linear value	24300	5EEC	E	1	UNSIGNED_16	10	
C00276	SC: max. output voltage	Linear value	24299	5EEB	E	1	UNSIGNED_8	1	
C00280	SC: Filter time const. DC detection	Linear value	24295	5EE7	E	1	UNSIGNED_16	1	
C00312	System runtimes	Linear value	24263	5EC7	A	1	UNSIGNED_32	1000	
C00321	Main program runtime	Linear value	24254	5EBE	A	2	UNSIGNED_16	1	
C00322	Transmission mode CAN TxPDOs	Linear value	24253	5EBD	A	4	UNSIGNED_8	1	
C00323	Transmission mode CAN Rx PDOs	Linear value	24252	5EBC	A	4	UNSIGNED_8	1	
C00324	CAN transmit blocking time	Linear value	24251	5EBB	A	5	UNSIGNED_16	1	
C00338	L_Arithmetik_1: Function	Selection list	24237	5EAD	E	1	UNSIGNED_8	1	
C00339	L_Arithmetik_2: Function	Selection list	24236	5EAC	E	1	UNSIGNED_8	1	
C00341	CAN management - error configuration	Bit coded	24234	5EAA	E	1	UNSIGNED_16	1	
Grayed out = display parameter (read access only)									

Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C00342	CAN decoupling PDOInOut	Bit coded	24233	5EA9	A	2	UNSIGNED_16	1	
C00343	LP_CanIn decoupling value	Linear value	24232	5EA8	A	16	UNSIGNED_16	1	
C00344	LP_CanOut decoupling value	Linear value	24231	5EA7	A	16	UNSIGNED_16	1	
C00345	CAN error status	Selection list	24230	5EA6	E	1	UNSIGNED_8	1	
C00347	CAN status HeartBeat producer	Selection list	24228	5EA4	A	7	UNSIGNED_8	1	
C00349	CAN setting - DIP switch	Bit coded	24226	5EA2	E	1	UNSIGNED_16	1	
C00350	CAN node address	Linear value	24225	5EA1	E	1	UNSIGNED_8	1	
C00351	CAN baud rate	Selection list	24224	5EA0	E	1	UNSIGNED_8	1	
C00352	CAN slave/master	Selection list	24223	5E9F	E	1	UNSIGNED_8	1	
C00353	CAN IN/OUT COBID source	Selection list	24222	5E9E	A	4	UNSIGNED_8	1	
C00354	COBID	Bit coded	24221	5E9D	A	8	UNSIGNED_32	1	
C00355	Active COBID	Linear value	24220	5E9C	A	8	UNSIGNED_16	1	
C00356	CAN time settings	Linear value	24219	5E9B	A	6	UNSIGNED_16	1	
C00357	CAN monitoring times	Linear value	24218	5E9A	A	4	UNSIGNED_16	1	
C00358	CANx_OUT data length	Linear value	24217	5E99	A	4	UNSIGNED_8	1	
C00359	CAN status	Selection list	24216	5E98	E	1	UNSIGNED_8	1	
C00360	CAN telegram counter	Linear value	24215	5E97	A	14	UNSIGNED_16	1	
C00364	CAN MessageError	Selection list	24211	5E93	E	1	UNSIGNED_8	1	
C00366	Number of CAN SDO channels	Selection list	24209	5E91	E	1	UNSIGNED_8	1	
C00367	CAN SYNC Rx identifier	Bit coded	24208	5E90	E	1	UNSIGNED_16	1	
C00368	CAN SYNC Tx identifier	Bit coded	24207	5E8F	E	1	UNSIGNED_16	1	
C00369	CAN sync transmission cycle time	Linear value	24206	5E8E	E	1	UNSIGNED_16	1	
C00370	SyncTxRxTimes	Linear value	24205	5E8D	A	2	INTEGER_16	1	
C00371	CAN ErrorCode	Linear value	24204	5E8C	A	1	UNSIGNED_16	1	
C00372	CAN_Tx_Rx_Error	Linear value	24203	5E8B	A	4	UNSIGNED_8	1	
C00381	CAN Heartbeat producer time	Linear value	24194	5E82	E	1	UNSIGNED_16	1	
C00385	CAN node addr. HeartBeat producer	Linear value	24190	5E7E	A	7	UNSIGNED_8	1	
C00386	ConsumerTime HeartBeat Producer	Linear value	24189	5E7D	A	7	UNSIGNED_16	1	
C00387	CAN-GatewayAddr	Linear value	24188	5E7C	A	1	UNSIGNED_8	1	
C00400	LS_PulseGenerator	Linear value	24175	5E6F	A	3	UNSIGNED_16	1	
C00401	CANxInOut: Inversion	Bit coded	24174	5E6E	A	8	UNSIGNED_16	1	
C00407	LP_CanIn mapping	Linear value	24168	5E68	A	8	UNSIGNED_32	1	
C00408	LP_CanIn mapping selection	Selection list	24167	5E67	A	4	UNSIGNED_8	1	
C00409	LP_CanIn mapping	Linear value	24166	5E66	A	16	UNSIGNED_16	1	
C00410	L_SignalMonitor_a: Signal sources	Selection list	24165	5E65	A	4	UNSIGNED_16	1	
C00411	L_SignalMonitor_b: Signal sources	Selection list	24164	5E64	A	4	UNSIGNED_16	1	
C00412	L_SignalMonitor_b: Inversion	Bit coded	24163	5E63	E	1	UNSIGNED_8	1	
C00413	L_SignalMonitor_a: Offs./gain	Linear value	24162	5E62	A	8	INTEGER_16	100	
C00420	Number of encoder increments	Linear value	24155	5E5B	A	1	UNSIGNED_16	1	
C00423	DOx: Delay times	Linear value	24152	5E58	A	4	UNSIGNED_16	1000	
C00425	Encoder scanning time	Selection list	24150	5E56	A	1	UNSIGNED_8	1	CINH
C00434	O1U: Gain	Linear value	24141	5E4D	A	1	INTEGER_16	100	
C00435	O1U: Offset	Linear value	24140	5E4C	A	1	INTEGER_16	100	
C00436	O1U: Voltage	Linear value	24139	5E4B	A	1	INTEGER_16	100	
C00439	O1U: Input value	Linear value	24136	5E48	A	1	INTEGER_16	100	
C00440	LS_AnalogIn1: PT1 time constant	Linear value	24135	5E47	A	1	UNSIGNED_16	1	
C00441	Decoupling AnalogOut	Bit coded	24134	5E46	E	1	UNSIGNED_16	1	
C00442	AOut1: Decoupling value	Linear value	24133	5E45	A	1	INTEGER_16	100	
C00443	Dlx: Level	Bit coded	24132	5E44	A	2	UNSIGNED_16	1	
C00444	DOx: Level	Bit coded	24131	5E43	A	2	UNSIGNED_16	1	
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Code	Name	Type	Index		Data					CINH
			dec	hex	DS	DA	DT	Factor		
C00445	FreqInxx_nOut_v	Linear value	24130	5E42	A	1	INTEGER_16	1		
C00446	FreqInxx_nOut_a	Linear value	24129	5E41	A	1	INTEGER_16	100		
C00447	DigOut decoupling	Bit coded	24128	5E40	E	1	UNSIGNED_16	1		
C00448	DigOut decoupling value	Bit coded	24127	5E3F	E	1	UNSIGNED_16	1		
C00449	FreqInxx_dnOut_p	Linear value	24126	5E3E	A	1	INTEGER_32	1		
C00453	Keypad: Default manual jog	Linear value	24122	5E3A	A	2	UNSIGNED_32	1000		
C00461	Remote: Acceleration/deceleration time	Linear value	24114	5E32	A	1	UNSIGNED_32	1000		
C00462	Remote: Control	Linear value	24113	5E31	A	2	UNSIGNED_16	1		
C00463	Remote: MCK control	Bit coded	24112	5E30	A	1	UNSIGNED_32	1		
C00464	Remote: Monitoring timeout	Linear value	24111	5E2F	A	1	UNSIGNED_16	1		
C00465	Keypad: Time-out welcome screen	Selection list	24110	5E2E	E	1	INTEGER_32	1		
C00466	Keypad: Default parameter	Linear value	24109	5E2D	E	1	INTEGER_32	1		
C00467	Keypad: Default welcome screen	Selection list	24108	5E2C	E	1	INTEGER_32	1		
C00469	Keypad: Fct. STOP key	Selection list	24106	5E2A	E	1	INTEGER_32	1	CINH	
C00470	LS_ParFree_b	Selection list	24105	5E29	A	16	UNSIGNED_8	1		
C00471	LS_ParFree	Bit coded	24104	5E28	A	4	UNSIGNED_16	1		
C00472	LS_ParFree_a	Linear value	24103	5E27	A	4	INTEGER_16	100		
C00473	LS_ParFree_v	Linear value	24102	5E26	A	4	INTEGER_16	1		
C00474	LS_ParFree_p	Linear value	24101	5E25	A	4	INTEGER_32	1		
C00480	LS_DisFree_b	Bit coded	24095	5E1F	E	1	UNSIGNED_8	1		
C00481	LS_DisFree	Bit coded	24094	5E1E	A	4	UNSIGNED_16	1		
C00482	LS_DisFree_a	Linear value	24093	5E1D	A	4	INTEGER_16	100		
C00484	Application units: Offset	Linear value	24091	5E1B	A	4	INTEGER_16	100		
C00485	Application units: Display factor	Linear value	24090	5E1A	A	4	INTEGER_32	10000		
C00486	Application units: Text	String	24089	5E19	A	4	VISIBLE_STRING [7]			
C00487	Application units	Linear value	24088	5E18	A	4	INTEGER_32	100		
C00488	L_JogCtrlEdgeDetect_1	Selection list	24087	5E17	A	6	UNSIGNED_8	1		
C00490	Position encoder selection	Selection list	24085	5E15	E	1	UNSIGNED_8	1		
C00495	Speed sensor selection	Selection list	24080	5E10	E	1	UNSIGNED_8	1		
C00496	Encoder evaluation method DigIn12	Selection list	24079	5E0F	E	1	UNSIGNED_8	1	CINH	
C00497	Filter time constant	Linear value	24078	5E0E	A	1	UNSIGNED_16	10		
C00505	Password data	String	24070	5E06	A	3	VISIBLE_STRING [16]			
C00506	PW protection internal config	Bit coded	24069	5E05	A	1	UNSIGNED_16	1		
C00507	Current password protection	Bit coded	24068	5E04	A	1	UNSIGNED_16	1		
C00508	PW protection config X6(DIAG)	Bit coded	24067	5E03	A	1	UNSIGNED_16	1		
C00509	PW protection config X1 (CAN)	Bit coded	24066	5E02	A	1	UNSIGNED_16	1		
C00510	PW protection config. MCI	Bit coded	24065	5E01	A	1	UNSIGNED_16	1		
C00517	User menu	Linear value	24058	5DFA	A	32	INTEGER_32	1000		
C00560	Fan switching status	Selection list	24015	5DCF	A	2	UNSIGNED_8	1		
C00561	Failure indication	Selection list	24014	5DCE	A	5	UNSIGNED_8	1		
C00565	Resp. to mains phase failure	Selection list	24010	5DCA	E	1	UNSIGNED_8	1		
C00566	Resp. to fan failure	Selection list	24009	5DC9	E	1	UNSIGNED_8	1		
C00567	Resp. to speed controller limited	Selection list	24008	5DC8	E	1	UNSIGNED_8	1		
C00569	Resp. to peak current	Selection list	24006	5DC6	A	1	UNSIGNED_8	1		
C00570	Resp. to controller limitations	Selection list	24005	5DC5	A	4	UNSIGNED_8	1		
C00571	Resp. to wrong controller setting	Selection list	24004	5DC4	A	2	UNSIGNED_8	1		
C00572	Brake resistor overload threshold	Linear value	24003	5DC3	E	1	UNSIGNED_8	1		
C00574	Resp. to brake resist. overtemp.	Selection list	24001	5DC1	E	1	UNSIGNED_8	1		
C00579	Resp. to max. speed/output freq. reached	Selection list	23996	5DBC	E	1	UNSIGNED_8	1		
C00580	Resp. to operating system error	Selection list	23995	5DBB	A	1	UNSIGNED_8	1		
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Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C00581	Resp. to LS_SetError_x	Selection list	23994	5DBA	A	4	UNSIGNED_8	1	
C00582	Resp. to heatsink temp.> shutdown temp. -5°C	Selection list	23993	5DB9	E	1	UNSIGNED_8	1	
C00585	Resp. to motor overtemp. PTC	Selection list	23990	5DB6	E	1	UNSIGNED_8	1	
C00586	Resp. open circuit HTL encoder	Selection list	23989	5DB5	E	1	UNSIGNED_8	1	
C00588	Resp. to max. speed at switching freq.	Selection list	23987	5DB3	E	1	UNSIGNED_8	1	
C00590	Resp. to switch. frequency red.	Selection list	23985	5DB1	E	1	UNSIGNED_8	1	
C00592	Resp. to CAN bus connection	Selection list	23983	5DAF	A	5	UNSIGNED_8	1	
C00593	Resp. to CANx_IN monitoring	Selection list	23982	5DAE	A	4	UNSIGNED_8	1	
C00594	Resp. to control word error	Selection list	23981	5DAD	A	2	UNSIGNED_8	1	
C00595	MCK: Resp. to MCK error	Selection list	23980	5DAC	A	15	UNSIGNED_8	1	
C00597	Resp. to motor phase failure	Selection list	23978	5DAA	E	1	UNSIGNED_8	1	
C00598	Resp. to open circuit AINx	Selection list	23977	5DA9	A	1	UNSIGNED_8	1	
C00599	Motor phase failure threshold	Linear value	23976	5DA8	E	1	INTEGER_16	100	
C00600	Resp. to DC bus voltage	Selection list	23975	5DA7	A	1	UNSIGNED_8	1	
C00601	Delayed resp. to fault: DC bus overvoltage	Linear value	23974	5DA6	A	1	UNSIGNED_16	1000	
C00602	Resp. to earth fault	Selection list	23973	5DA5	E	1	UNSIGNED_8	1	
C00604	Resp. to device overload (lxt)	Selection list	23971	5DA3	E	1	UNSIGNED_8	1	
C00606	Resp. to motor overload (l*xt)	Selection list	23969	5DA1	E	1	UNSIGNED_8	1	
C00607	Resp. to max. freq. feedb. DIG12/67	Selection list	23968	5DA0	E	1	UNSIGNED_8	1	
C00608	Resp. to maximum torque	Selection list	23967	5D9F	E	1	UNSIGNED_8	1	
C00609	Resp. to maximum current	Selection list	23966	5D9E	E	1	UNSIGNED_8	1	
C00620	System connection list: 16-bit	Selection list	23955	5D93	A	111	UNSIGNED_16	1	
C00621	System connection list: Bool	Selection list	23954	5D92	A	199	UNSIGNED_16	1	
C00622	System connection list: Angle	Selection list	23953	5D91	A	25	UNSIGNED_16	1	
C00632	L_NSet_1: Max. skip freq.	Linear value	23943	5D87	A	3	INTEGER_16	100	
C00633	L_NSet_1: Min. skip freq.	Linear value	23942	5D86	A	3	INTEGER_16	100	
C00634	L_NSet_1: wState	Bit coded	23941	5D85	E	1	UNSIGNED_16	1	
C00635	L_NSet_1: nMaxLimit	Linear value	23940	5D84	E	1	INTEGER_16	100	
C00636	L_NSet_1: nMinLimit	Linear value	23939	5D83	E	1	INTEGER_16	100	
C00637	L_NSet_1: Output blocking zones	Linear value	23938	5D82	E	1	INTEGER_16	100	
C00638	L_NSet_1: Output ramp rounding	Linear value	23937	5D81	E	1	INTEGER_16	100	
C00639	L_NSet_1: Output add.value	Linear value	23936	5D80	E	1	INTEGER_16	100	
C00640	L_NSet_1: nNOut_a	Linear value	23935	5D7F	E	1	INTEGER_16	100	
C00643	Resp. to PLI monitoring	Selection list	23932	5D7C	A	1	UNSIGNED_8	1	
C00653	Sensibility - Setpoint feedforward control	Selection list	23922	5D72	A	1	UNSIGNED_8	1	
C00654	Source of diff. setpoint feedforward control	Selection list	23921	5D71	A	1	UNSIGNED_8	1	
C00670	L_OffsetGainP_1: Gain	Linear value	23905	5D61	E	1	INTEGER_32	10000	
C00671	L_OffsetGainP_2: Gain	Linear value	23904	5D60	E	1	INTEGER_32	10000	
C00672	L_OffsetGainP_3: Gain	Linear value	23903	5D5F	E	1	INTEGER_32	10000	
C00680	L_Compare_1: Fct.	Selection list	23895	5D57	E	1	UNSIGNED_8	1	
C00681	L_Compare_1: Hysteresis	Linear value	23894	5D56	E	1	INTEGER_16	100	
C00682	L_Compare_1: Window	Linear value	23893	5D55	E	1	INTEGER_16	100	
C00685	L_Compare_2: Fct.	Selection list	23890	5D52	E	1	UNSIGNED_8	1	
C00686	L_Compare_2: Hysteresis	Linear value	23889	5D51	E	1	INTEGER_16	100	
C00687	L_Compare_2: Window	Linear value	23888	5D50	E	1	INTEGER_16	100	
C00690	L_Compare_3: Fct.	Selection list	23885	5D4D	E	1	UNSIGNED_8	1	
C00691	L_Compare_3: Hysteresis	Linear value	23884	5D4C	E	1	INTEGER_16	100	
C00692	L_Compare_3: Window	Linear value	23883	5D4B	E	1	INTEGER_16	100	
C00696	L_OffsetGainP_1: Offset	Linear value	23879	5D47	E	1	INTEGER_16	100	
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Code	Name	Type	Index		Data					
			dec	hex	DS	DA	DT	Factor	CINH	
C00697	L_OffsetGainP_2: Offset	Linear value	23878	5D46	E	1	INTEGER_16	100		
C00698	L_OffsetGainP_3: Offset	Linear value	23877	5D45	E	1	INTEGER_16	100		
C00699	L_MulDiv_1: Parameter	Linear value	23876	5D44	A	2	INTEGER_16	1		
C00700	LA_NCtrl: Analog connection list	Selection list	23875	5D43	A	29	UNSIGNED_16	1		
C00701	LA_NCtrl: Digital connection list	Selection list	23874	5D42	A	48	UNSIGNED_16	1		
C00720	L_DigitalDelay_1: Delay	Linear value	23855	5D2F	A	2	UNSIGNED_32	1000		
C00725	Current switching frequency	Selection list	23850	5D2A	E	1	UNSIGNED_8	1		
C00727	LS_Keypad digital values	Linear value	23848	5D28	A	8	UNSIGNED_8	1		
C00728	Analog values - keypad	Linear value	23847	5D27	A	3	INTEGER_16	100		
C00729	Remote: Setpoint selection	Linear value	23846	5D26	A	2	INTEGER_16	100		
C00760	LA_SwitchPos: Analog connection list	Selection list	23815	5D07	A	25	UNSIGNED_16	1		
C00761	LA_SwitchPos: Digital connection list	Selection list	23814	5D06	A	47	UNSIGNED_16	1		
C00800	L_MPot_1: Upper limit	Linear value	23775	5CDF	E	1	INTEGER_16	100		
C00801	L_MPot_1: Lower limit	Linear value	23774	5CDE	E	1	INTEGER_16	100		
C00802	L_MPot_1: Acceleration time	Linear value	23773	5CDD	E	1	UNSIGNED_16	10		
C00803	L_MPot_1: Deceleration time	Linear value	23772	5CDC	E	1	UNSIGNED_16	10		
C00804	L_MPot_1: Inactive fct.	Selection list	23771	5CDB	E	1	UNSIGNED_8	1		
C00805	L_MPot_1: Init fct.	Selection list	23770	5CDA	E	1	UNSIGNED_8	1		
C00806	L_MPot_1: Use	Selection list	23769	5CD9	E	1	UNSIGNED_8	1		
C00820	L_DigitalLogic_1: Function	Selection list	23755	5CCB	E	1	UNSIGNED_8	1		
C00821	L_DigitalLogic_1: Truth table	Selection list	23754	5CCA	A	8	UNSIGNED_8	1		
C00828	L_DigitalLogic_3: Function	Selection list	23747	5CC3	E	1	UNSIGNED_8	1		
C00829	L_DigitalLogic_3: truth table	Selection list	23746	5CC2	A	8	UNSIGNED_8	1		
C00830	16-bit inputs [%]	Linear value	23745	5CC1	A	97	INTEGER_16	100		
C00831	16-bit inputs	Bit coded	23744	5CC0	A	97	UNSIGNED_16	1		
C00833	Binary inputs	Selection list	23742	5CBE	A	131	UNSIGNED_8	1		
C00834	32-bit inputs [incr]	Linear value	23741	5CBD	A	8	INTEGER_32	1		
C00840	16-bit inputs I/O level [%]	Linear value	23735	5CB7	A	111	INTEGER_16	100		
C00841	16-bit inputs I/O level	Bit coded	23734	5CB6	A	111	UNSIGNED_16	1		
C00843	Binary inputs I/O level	Selection list	23732	5CB4	A	183	UNSIGNED_8	1		
C00844	32-bit inputs I/O level [incr]	Linear value	23731	5CB3	A	25	INTEGER_32	1		
C00866	CAN input words	Bit coded	23709	5C9D	A	16	UNSIGNED_16	1		
C00868	CAN output words	Bit coded	23707	5C9B	A	16	UNSIGNED_16	1		
C00876	MCI input words	Bit coded	23699	5C93	A	16	UNSIGNED_16	1		
C00877	MCI output words	Bit coded	23698	5C92	A	16	UNSIGNED_16	1		
C00890	MCI_InOut: Inversion	Bit coded	23685	5C85	A	4	UNSIGNED_16	1		
C00905	Motor phase direction of rotation	Selection list	23670	5C76	E	1	UNSIGNED_8	1	CINH	
C00909	Speed limitation	Linear value	23666	5C72	A	2	INTEGER_16	100		
C00910	Frequency limitation	Linear value	23665	5C71	A	2	UNSIGNED_16	1		
C00915	Motor cable length	Linear value	23660	5C6C	E	1	UNSIGNED_16	10		
C00916	Motor cable cross-section	Linear value	23659	5C6B	E	1	UNSIGNED_16	100		
C00917	Motor cable resistance	Linear value	23658	5C6A	E	1	UNSIGNED_16	1		
C00919	Load moment of inertia	Linear value	23656	5C68	A	1	UNSIGNED_32	100		
C00937	Field-oriented motor currents	Linear value	23638	5C56	A	2	INTEGER_16	100		
C00938	PSM: Maximum motor current field weakening	Linear value	23637	5C55	E	1	UNSIGNED_16	100		
C00939	Ultimate motor current	Linear value	23636	5C54	E	1	UNSIGNED_16	10		
C00950	L_Interpolator_1: Activation FB functions	Selection list	23625	5C49	A	3	UNSIGNED_8	1		
C00951	L_Interpolator_1: No. of interpolation steps	Linear value	23624	5C48	E	1	UNSIGNED_16	1		
C00952	L_Interpolator_1: Limit value - error cycles	Linear value	23623	5C47	E	1	UNSIGNED_16	1		
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Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C00953	L_Interpolator_1: Speed-up	Linear value	23622	5C46	E	1	UNSIGNED_8	1	
C00965	Max. motor speed	Linear value	23610	5C3A	E	1	UNSIGNED_16	1	
C00966	VFC: Time const. slip comp.	Linear value	23609	5C39	E	1	UNSIGNED_16	1	
C00967	VFC: Frequency interpol. point n	Linear value	23608	5C38	A	11	INTEGER_16	10	
C00968	VFC: Voltage interpol. point n	Linear value	23607	5C37	A	11	UNSIGNED_16	100	
C00969	Motorparameter	Linear value	23606	5C36	A	1	UNSIGNED_8	1	
C00971	VFC: V/f +encoder limitation	Linear value	23604	5C34	A	2	UNSIGNED_16	100	
C00972	VFC: Vp V/f +encoder	Linear value	23603	5C33	E	1	UNSIGNED_16	1000	
C00973	VFC: Ti V/f +encoder	Linear value	23602	5C32	E	1	UNSIGNED_16	10	
C00975	VFC-ECO: Vp CosPhi controller	Linear value	23600	5C30	E	1	UNSIGNED_16	1000	
C00976	VFC-ECO: Ti CosPhi controller	Linear value	23599	5C2F	E	1	UNSIGNED_16	10	
C00977	VFC-ECO: Minimum voltage V/f	Linear value	23598	5C2E	E	1	INTEGER_16	100	
C00978	VFC-ECO: Voltage reduction	Linear value	23597	5C2D	E	1	INTEGER_16	1	
C00979	Cosine phi	Linear value	23596	5C2C	A	2	INTEGER_16	100	
C00980	Output power	Linear value	23595	5C2B	A	2	INTEGER_32	1000	
C00981	Energy display	Linear value	23594	5C2A	A	2	INTEGER_32	100	
C00982	VFC-ECO: Voltage reduction ramp	Linear value	23593	5C29	E	1	UNSIGNED_8	10	
C00983	Delay	Linear value	23592	5C28	A	2	UNSIGNED_16	1	
C00985	SLVC: Field current controller gain	Linear value	23590	5C26	E	1	INTEGER_16	100	
C00986	SLVC: Cross current controller gain	Linear value	23589	5C25	E	1	INTEGER_16	100	
C00987	Inverter motor brake: nAdd	Linear value	23588	5C24	E	1	INTEGER_16	1	
C00988	Inverter motor brake: PT1 filter time	Linear value	23587	5C23	E	1	INTEGER_16	10	
C00989	Restart on the fly: Flying restart frequency fd_add	Linear value	23586	5C22	A	1	INTEGER_16	100	
C00990	Flying restart fct.: Activate	Selection list	23585	5C21	E	1	UNSIGNED_8	1	CINH
C00991	Flying restart fct.: Process	Selection list	23584	5C20	E	1	UNSIGNED_16	1	
C00992	Flying restart fct.: Start frequency	Linear value	23583	5C1F	E	1	INTEGER_16	1	
C00993	Flying restart fct.: Int. time	Linear value	23582	5C1E	E	1	UNSIGNED_16	10	
C00994	Flying restart fct.: Current	Linear value	23581	5C1D	E	1	INTEGER_16	100	
C00995	SLPSM: Controlled current setpoint	Linear value	23580	5C1C	A	2	UNSIGNED_16	100	
C00996	SLPSM: Switching speed	Linear value	23579	5C1B	A	2	INTEGER_16	100	
C00997	SLPSM: Filter cutoff frequency	Linear value	23578	5C1A	E	1	INTEGER_16	100	
C00998	SLPSM: Filter time rotor position	Linear value	23577	5C19	A	2	INTEGER_16	10	
C00999	SLPSM: PLL gain	Linear value	23576	5C18	E	1	INTEGER_16	1	
C01000	MCTRL: Status	Bit coded	23575	5C17	E	1	UNSIGNED_16	1	
C01001	Manual entry of motor type	Selection list	23574	5C16	A	1	UNSIGNED_8	1	
C01082	LS_WriteParamList: Execute Mode	Selection list	23493	5BC5	E	1	UNSIGNED_8	1	
C01083	LS_WriteParamList: Error status	Linear value	23492	5BC4	E	1	UNSIGNED_16	1	
C01084	LS_WriteParamList: Error line	Linear value	23491	5BC3	E	1	UNSIGNED_8	1	
C01085	LS_WriteParamList: Index	Linear value	23490	5BC2	A	32	INTEGER_32	1000	
C01086	LS_WriteParamList: WriteValue_1	Linear value	23489	5BC1	A	32	INTEGER_32	1	
C01087	LS_WriteParamList: WriteValue_2	Linear value	23488	5BC0	A	32	INTEGER_32	1	
C01088	LS_WriteParamList: WriteValue_3	Linear value	23487	5BBF	A	32	INTEGER_32	1	
C01089	LS_WriteParamList: WriteValue_4	Linear value	23486	5BBE	A	32	INTEGER_32	1	
C01090	LS_ParReadWrite 1-3: Index	Linear value	23485	5BBD	A	3	INTEGER_32	1000	
C01091	LS_ParReadWrite 1-3: Cycle time	Selection list	23484	5BBC	A	3	UNSIGNED_16	1	
C01092	LS_ParReadWrite 1-3: FailState	Linear value	23483	5BBB	A	3	UNSIGNED_16	1	
C01093	LS_ParReadWrite 1-3: Arithmetic mode	Selection list	23482	5BBA	A	3	UNSIGNED_8	1	
C01094	LS_ParReadWrite 1-3: Numerator	Linear value	23481	5BB9	A	3	INTEGER_16	1	
C01095	LS_ParReadWrite 1-3: Denominator	Linear value	23480	5BB8	A	3	INTEGER_16	1	
Grayed out = display parameter (read access only)									

Code	Name	Type	Index		Data					
			dec	hex	DS	DA	DT	Factor	CINH	
C01120	Sync signal source	Selection list	23455	5B9F	E	1	UNSIGNED_8	1		
C01121	Sync cycle time setpoint	Linear value	23454	5B9E	E	1	UNSIGNED_16	1		
C01122	Sync phase position	Linear value	23453	5B9D	E	1	UNSIGNED_16	1		
C01123	Sync window	Linear value	23452	5B9C	E	1	UNSIGNED_16	1		
C01124	Sync correction width	Selection list	23451	5B9B	E	1	UNSIGNED_8	1		
C01138	L_Transient 1-4: Function	Selection list	23437	5B8D	A	4	UNSIGNED_8	1		
C01139	L_Transient 1-4: Pulse duration	Linear value	23436	5B8C	A	4	UNSIGNED_16	1000		
C01350	ACDrive: Drive mode	Selection list	23225	5AB9	A	1	UNSIGNED_8	1		
C01351	ACDrive: Control word	Bit coded	23224	5AB8	A	1	UNSIGNED_16	1		
C01352	ACDrive: Status word	Bit coded	23223	5AB7	A	1	UNSIGNED_16	1		
C01353	ACDrive: Setpoint scaling	Linear value	23222	5AB6	A	2	INTEGER_8	1		
C01501	Resp. to communication error with MCI	Selection list	23074	5A22	A	2	UNSIGNED_8	1		
C01770	Filter time - earth-fault detect. is running	Linear value	22805	5915	E	1	UNSIGNED_8	1		
C01902	Diagnostics X6: Max. baud rate	Selection list	22673	5891	E	1	UNSIGNED_16	1		
C01903	Diagnostics X6: Change baud rate	Selection list	22672	5890	E	1	UNSIGNED_8	1		
C01905	Diagnostics X6: Current baud rate	Linear value	22670	588E	E	1	UNSIGNED_32	1		
C02200	LS_WriteParamList: Function	Selection list	22375	5767	A	2	UNSIGNED_8	1		
C02210	LS_WriteParamList: Motor control	Selection list	22365	575D	A	4	UNSIGNED_8	1		
C02212	LS_WriteParamList: VFC: V/f base frequency	Linear value	22363	575B	A	4	UNSIGNED_16	10		
C02213	LS_WriteParamList: VFC: Vmin boost	Linear value	22362	575A	A	4	UNSIGNED_16	100		
C02214	LS_WriteParamList: Switching frequency	Selection list	22361	5759	A	4	UNSIGNED_8	1		
C02215	LS_WriteParamList: Auto-DCB: Threshold	Linear value	22360	5758	A	4	UNSIGNED_16	1		
C02216	LS_WriteParamList: Slip compensation	Linear value	22359	5757	A	4	INTEGER_16	100		
C02217	LS_WriteParamList: Imax in motor mode	Linear value	22358	5756	A	4	UNSIGNED_16	100		
C02218	LS_WriteParamList: Imax in generator mode	Linear value	22357	5755	A	4	INTEGER_16	100		
C02219	LS_WriteParamList: DC braking: Current	Linear value	22356	5754	A	4	INTEGER_16	100		
C02220	LS_WriteParamList: Vp speed controller	Linear value	22355	5753	A	12	UNSIGNED_16	100		
C02221	LS_WriteParamList: Ti speed controller	Linear value	22354	5752	A	12	UNSIGNED_16	10		
C02222	LS_WriteParamList: SC: Tdn speed controller	Linear value	22353	5751	A	4	UNSIGNED_16	100		
C02223	LS_WriteParamList: Imax/M controller gain	Linear value	22352	5750	A	8	UNSIGNED_16	100		
C02224	LS_WriteParamList: Imax/M controller reset time	Linear value	22351	574F	A	8	UNSIGNED_16	1		
C02225	LS_WriteParamList: Vp current controller	Linear value	22350	574E	A	4	UNSIGNED_16	100		
C02226	LS_WriteParamList: Ti current controller	Linear value	22349	574D	A	4	UNSIGNED_16	100		
C02229	LS_WriteParamList: SC: settings	Selection list	22346	574A	A	16	UNSIGNED_8	1		
C02230	LS_WriteParamList: Override point of field weakening	Linear value	22345	5749	A	4	INTEGER_16	1		
C02231	LS_WriteParamList: Rated motor power	Linear value	22344	5748	A	4	UNSIGNED_16	100		
C02232	LS_WriteParamList: Motor rotor resistance	Linear value	22343	5747	A	4	UNSIGNED_32	1		
C02233	LS_WriteParamList: Motor stator resistance	Linear value	22342	5746	A	4	UNSIGNED_32	1		
C02234	LS_WriteParamList: Motor stator leakage inductance	Linear value	22341	5745	A	4	UNSIGNED_16	100		
C02236	LS_WriteParamList: Rated motor speed	Linear value	22339	5743	A	4	UNSIGNED_16	1		
C02237	LS_WriteParamList: Rated motor current	Linear value	22338	5742	A	4	UNSIGNED_16	100		
C02238	LS_WriteParamList: Rated motor frequency	Linear value	22337	5741	A	4	UNSIGNED_16	1		
C02239	LS_WriteParamList: Rated motor voltage	Linear value	22336	5740	A	4	UNSIGNED_16	1		
C02240	LS_WriteParamList: Motor cosine phi	Linear value	22335	573F	A	4	UNSIGNED_8	100		
Grayed out = display parameter (read access only)										

Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C02241	LS_WriteParamList: Motor magnetizing inductance	Linear value	22334	573E	A	4	UNSIGNED_16	10	
C02242	LS_WriteParamList: Motor magnetising current	Linear value	22333	573D	A	4	UNSIGNED_16	100	
C02244	LS_WriteParamList: Auto-DCB: hold time	Linear value	22331	573B	A	4	UNSIGNED_32	1000	
C02245	LS_WriteParamList: DC braking: Hold time	Linear value	22330	573A	A	4	UNSIGNED_32	1000	
C02246	LS_WriteParamList: Setting of motor overload (I ² xt)	Linear value	22329	5739	A	4	INTEGER_16	100	
C02249	LS_WriteParamList: Oscillation damping influence	Linear value	22326	5736	A	4	UNSIGNED_16	100	
C02250	LS_WriteParamList: Filter time - oscill. damping	Linear value	22325	5735	A	4	UNSIGNED_8	1	
C02251	LS_WriteParamList: Oscillation damping field weakening	Linear value	22324	5734	A	4	UNSIGNED_8	1	
C02256	LS_WriteParamList: Moment of inertia	Linear value	22319	572F	A	4	UNSIGNED_32	100	
C02260	LS_WriteParamList: Speed sensor selection	Selection list	22315	572B	A	4	UNSIGNED_8	1	
C02264	LS_WriteParamList: Sensibility - Setpoint feedforward control	Selection list	22311	5727	A	4	UNSIGNED_8	1	
C02272	LS_WriteParamList: Motor phase direction of rotation	Selection list	22303	571F	A	4	UNSIGNED_8	1	CINH
C02273	LS_WriteParamList: Speed limitation	Linear value	22302	571E	A	8	INTEGER_16	100	
C02274	LS_WriteParamList: Frequency limitation	Linear value	22301	571D	A	8	UNSIGNED_16	1	
C02275	LS_WriteParamList: Motor cable length	Linear value	22300	571C	A	4	UNSIGNED_16	10	
C02276	LS_WriteParamList: Motor cable cross-section	Linear value	22299	571B	A	4	UNSIGNED_16	100	
C02278	LS_WriteParamList: PSM: Maximum motor current field weakening	Linear value	22297	5719	A	4	UNSIGNED_16	100	
C02279	LS_WriteParamList: Ultimate motor current	Linear value	22296	5718	A	4	UNSIGNED_16	10	
C02280	LS_WriteParamList: Max. motor speed	Linear value	22295	5717	A	4	UNSIGNED_16	1	
C02281	LS_WriteParamList: VFC: Time const. slip comp.	Linear value	22294	5716	A	4	UNSIGNED_16	1	
C02284	LS_WriteParamList: VFC: limitation V/f +encoder	Linear value	22291	5713	A	8	UNSIGNED_16	100	
C02285	LS_WriteParamList: VFC: Vp V/f +encoder	Linear value	22290	5712	A	4	UNSIGNED_16	1000	
C02286	LS_WriteParamList: VFC: Ti V/f +encoder	Linear value	22289	5711	A	4	UNSIGNED_16	10	
C02287	LS_WriteParamList: VFC-ECO: Vp CosPhi controller	Linear value	22288	5710	A	4	UNSIGNED_16	1000	
C02288	LS_WriteParamList: VFC-ECO: Ti CosPhi controller	Linear value	22287	570F	A	4	UNSIGNED_16	10	
C02289	LS_WriteParamList: VFC-ECO: Minimum voltage U/f	Linear value	22286	570E	A	4	INTEGER_16	100	
C02290	LS_WriteParamList: VFC-ECO: Voltage reduction ramp	Linear value	22285	570D	A	4	UNSIGNED_8	10	
C02291	LS_WriteParamList: SLVC: Field current controller gain	Linear value	22284	570C	A	4	INTEGER_16	100	
C02292	LS_WriteParamList: SLVC: Cross current controller gain	Linear value	22283	570B	A	4	INTEGER_16	100	
C02293	LS_WriteParamList: Inverter motor brake: nAdd	Linear value	22282	570A	A	4	INTEGER_16	1	
C02294	LS_WriteParamList: Inverter motor brake: PT1 filter time	Linear value	22281	5709	A	4	INTEGER_16	10	
C02295	LS_WriteParamList: Flying restart fct.: activation	Selection list	22280	5708	A	4	UNSIGNED_8	1	CINH
C02296	LS_WriteParamList: Flying restart fct.: process	Selection list	22279	5707	A	4	UNSIGNED_16	1	
C02297	LS_WriteParamList: Flying restart: start frequency	Linear value	22278	5706	A	4	INTEGER_16	1	
Grayed out = display parameter (read access only)									

Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C02298	LS_WriteParamList: Flying restart fct: int. time	Linear value	22277	5705	A	4	UNSIGNED_16	10	
C02299	LS_WriteParamList: Flying restart fct.: current	Linear value	22276	5704	A	4	INTEGER_16	100	
C02300	LS_WriteParamList: SLPSM: Controlled current setpoint	Linear value	22275	5703	A	8	UNSIGNED_16	100	
C02301	LS_WriteParamList: SLPSM: Switching speed	Linear value	22274	5702	A	8	INTEGER_16	100	
C02302	LS_WriteParamList: SLPSM: Filter time - rotor position	Linear value	22273	5701	A	4	INTEGER_16	100	
C02303	LS_WriteParamList: SLPSM: Filter time rotor position	Linear value	22272	5700	A	8	INTEGER_16	10	
C02304	LS_WriteParamList: SLPSM: PLL gain	Linear value	22271	56FF	A	4	INTEGER_16	1	
C02305	LS_WriteParamList: PSM: Ppp saturation characteristic	Linear value	22270	56FE	A	68	UNSIGNED_8	1	
C02306	LS_WriteParamList: PSM: Imax Ppp saturation characteristic	Linear value	22269	56FD	A	4	UNSIGNED_16	10	
C02307	LS_WriteParamList: PSM: Activate Ppp saturation char.	Selection list	22268	56FC	A	4	UNSIGNED_8	1	
C02311	LS_WriteParamList: PLI without motion: Adaptation of time duration	Linear value	22264	56F8	A	4	INTEGER_8	1	
C02312	LS_WriteParamList: PLI without motion	Bit coded	22263	56F7	A	4	UNSIGNED_16	1	
C02313	LS_WriteParamList: PLI without motion: Adaptation of ident angle	Linear value	22262	56F6	A	4	INTEGER_8	1	
C02315	LS_WriteParamList: Manual entry of motor type	Selection list	22260	56F4	A	4	UNSIGNED_8	1	
C02580	Holding brake: Operating mode	Selection list	21995	55EB	E	1	UNSIGNED_8	1	
C02581	Holding brake: Speed thresholds	Linear value	21994	55EA	A	5	INTEGER_16	100	
C02582	Holding brake: Setting	Bit coded	21993	55E9	E	1	UNSIGNED_8	1	
C02589	Holding brake: Time system	Linear value	21986	55E2	A	4	UNSIGNED_16	1	
C02593	Holding brake: Activation time	Linear value	21982	55DE	A	4	UNSIGNED_32	1000	
C02607	Holding brake: Status	Bit coded	21968	55D0	E	1	UNSIGNED_16	1	
C02610	MCK: Accel./decel. times	Linear value	21965	55CD	A	3	UNSIGNED_32	1000	
C02611	MCK: Limitations	Linear value	21964	55CC	A	5	INTEGER_16	100	
C02830	DigInX: Debounce time	Selection list	21745	54F1	A	4	UNSIGNED_8	1	
C02840	CountIn1: Parameter	Linear value	21735	54E7	A	2	UNSIGNED_32	1	
C02841	CountIn1: Counter content	Linear value	21734	54E6	A	1	UNSIGNED_32	1	
C02842	FreqInxx: Offset	Linear value	21733	54E5	A	1	INTEGER_16	100	
C02843	FreqInxx: Gain	Linear value	21732	54E4	A	1	INTEGER_16	100	
C02844	FreqIn12: Function	Selection list	21731	54E3	A	1	UNSIGNED_8	1	
C02845	FreqIn12: PosIn comparison value	Linear value	21730	54E2	E	1	INTEGER_32	1	
C02853	PSM: Lss saturation characteristic	Linear value	21722	54DA	A	17	UNSIGNED_8	1	
C02855	PSM: Imax Lss saturation characteristic	Linear value	21720	54D8	E	1	UNSIGNED_16	10	
C02859	PSM: Activate Ppp saturation char.	Selection list	21716	54D4	E	1	UNSIGNED_8	1	
C02864	MCTRL: Optimisations	Bit coded	21711	54CF	A	1	UNSIGNED_16	1	
C02865	MCTRL: Special settings	Bit coded	21710	54CE	A	1	UNSIGNED_16	1	
C02866	MCTRL: Special settings	Selection list	21709	54CD	A	3	UNSIGNED_8	1	CINH
C02867	Identification process	Selection list	21708	54CC	A	1	UNSIGNED_8	1	CINH
C02870	PLI without motion: Optimisation factor	Linear value	21705	54C9	A	1	INTEGER_16	100	
C02871	PLI without motion: Running time	Linear value	21704	54C8	A	1	INTEGER_16	100	
C02872	PLI without motion: Adaptation of time duration	Linear value	21703	54C7	A	1	INTEGER_8	1	
C02873	PLI without motion: Ident. el. rotor displ. angle	Linear value	21702	54C6	A	1	INTEGER_16	1	
C02874	PLI without motion	Bit coded	21701	54C5	A	1	UNSIGNED_16	1	
Grayed out = display parameter (read access only)									

Code	Name	Type	Index		Data				
			dec	hex	DS	DA	DT	Factor	CINH
C02875	PLI without motion: Adaptation of ident angle	Linear value	21700	54C4	A	1	INTEGER_8	1	
C02879	Slip calculation from equivalent circuit diagram	Bit coded	21696	54C0	A	1	UNSIGNED_16	1	
Grayed out = display parameter (read access only)									

16 Working with the FB Editor

The function block editor (in the following called "FB Editor") is available in the »Engineer« from the "StateLine" device version.

The FB Editor can be used to carry out an online monitoring of the technology application running in the device (e.g. for diagnostic purposes) and reconfigure the I/O interconnection of the technology application.

Functional range

The options for processing function block interconnections depend on the device version:

Function	Inverter Drives 8400		
	StateLine C	HighLine C	TopLine C
I/O interconnection can be reconfigured	●	●	●
Application interconnection can be reconfigured	●	●	●
Free interconnection	(●)	●	●
(●) Free interconnection for "StateLine C" is only available from version 12.00.00 and »Engineer« V2.17.			



Note!

The illustrations of the FB Editor user interface and the dialog boxes in this documentation are based on the »Engineer« V2.10.

16.1 Basics

Using the function block interconnection, any signal interconnection can be implemented. Various FBs are available for digital signal processing, signal conversion and logic modules.

For special tasks it has proved of value to use the integrated technology applications as a basis for modifications or extensions of the available FB interconnections. Depending on the device version (see [Functional range](#)), the experienced user has the opportunity to implement own drive solutions independent of the predefined technology applications by using the "free interconnection".

For this purpose, the FB Editor provides the following functions:

- Copying & pasting of interconnection elements (also device-independent)
- Export & import of the interconnection
- Comparison of two interconnections (also online <-> offline comparison)
- Overview window and zoom functions
- Comments on the signal flow
- Online monitoring

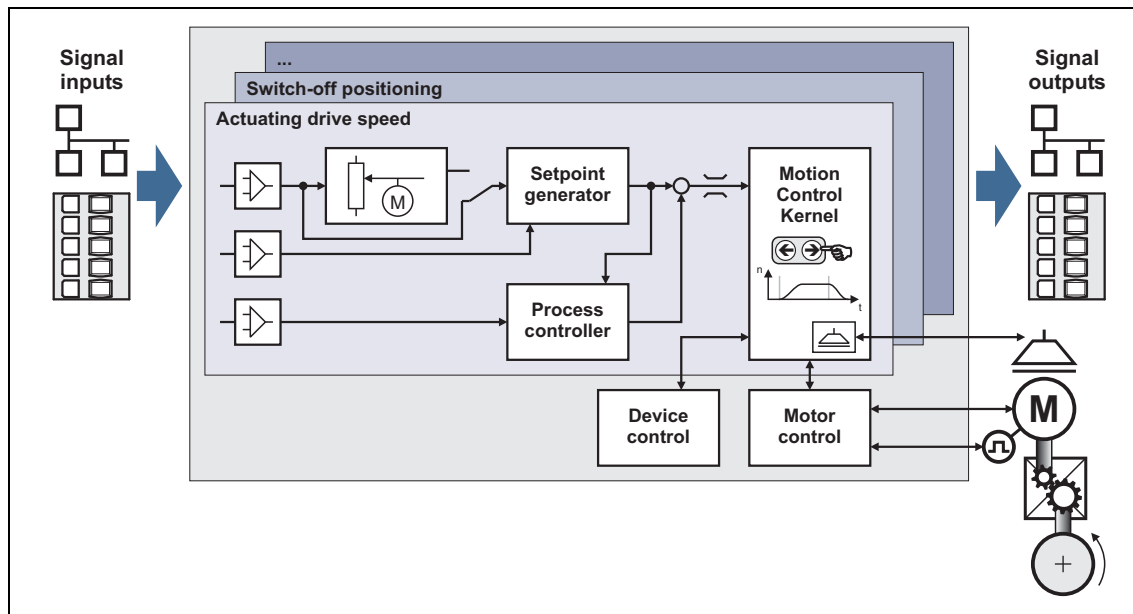
The option to mask out non-used inputs and outputs of modules is also sensible to minimise the complexity of the FB interconnection and to adapt the clarity of the interconnection to the customers need.

All graphical information of the FB interconnection view (positions of the FBs, line or flag presentation of the connection, visibility of the inputs/outputs) are saved with the parameter set in the memory module of the controller and can be uploaded any time into the FB Editor of the »Engineer« even if the Engineer project is not available.

16.1.1 Basic components of a drive solution

A drive solution consists of the following basic components:

- Signal inputs (for control and setpoint signals)
- Signal flow of the technology application
- Signal outputs (for status and actual value signals)



[16-1] Basic components of a drive solution

Regarding the 8400 device series, these three components are available for the FB interconnection and classified as follows:

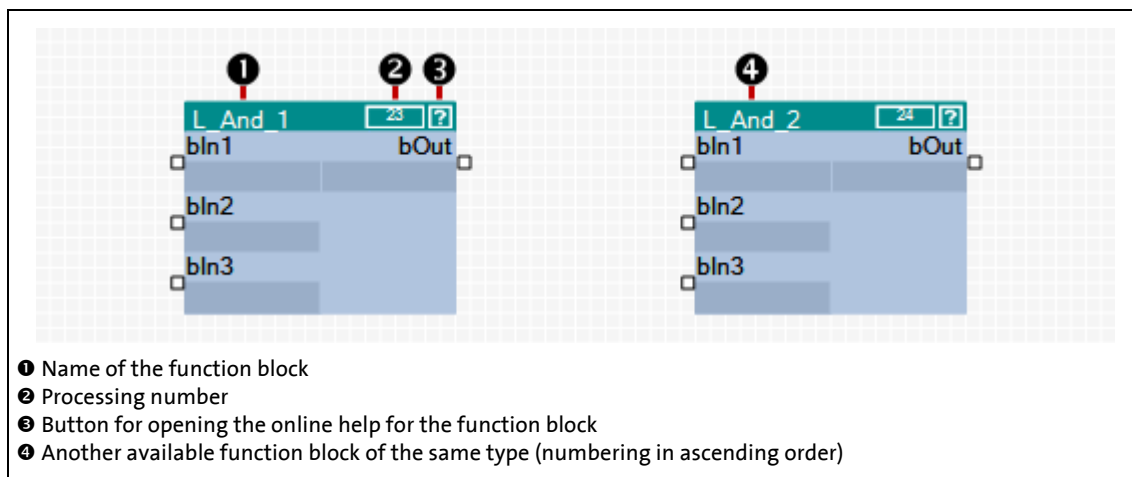
Module type	Name	Task	Example
Function block	L_name	General function block for free interconnection (only HighLine)	L_Compare_1 L_PCTRL_1
System block	LS_name	Signal interface to inverter-internal functions	LS_DigitalInput LS_DriveInterface
Port block	LP_name	• Process data communication via a fieldbus using a communication module • Process data communication via CAN on board	LP_CanIn1 LP_CanOut1 LP_MciIn LP_MciOut
Application block	LA_name	Block for a technology application	LA_NCtrl LA_SwitchPos

Further information on the individual modules can be obtained from the following subchapters!

16.1.1.1 What is a function block?

A function block (FB) can be compared with an integrated circuit that contains a specific control logic and delivers one or several values when being executed.

- The function blocks are classified alphabetically in a "function library".
- Each function block has a unique identifier and a processing number which defines the position at which the function block is calculated during runtime.



[16-2] Information on a function block in the FB Editor



Tip!

A detailed description of all available function blocks can be found in the main chapter "[Function library](#)". (📖 909)

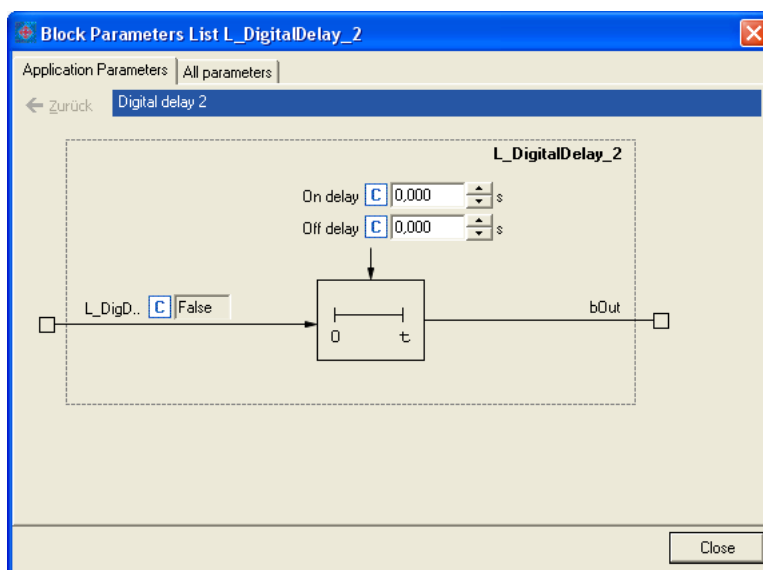
16.1.1.2 Parameterisable function blocks

Some function blocks have parameters which serve to change particular settings during operation, if required, or which display actual values & status information.

- The  icon in the head of the module, a double-click on the module, or the **Parameter...** command in the *Context menu* of the module serve to open the parameterisation dialog or the parameter list for the module.

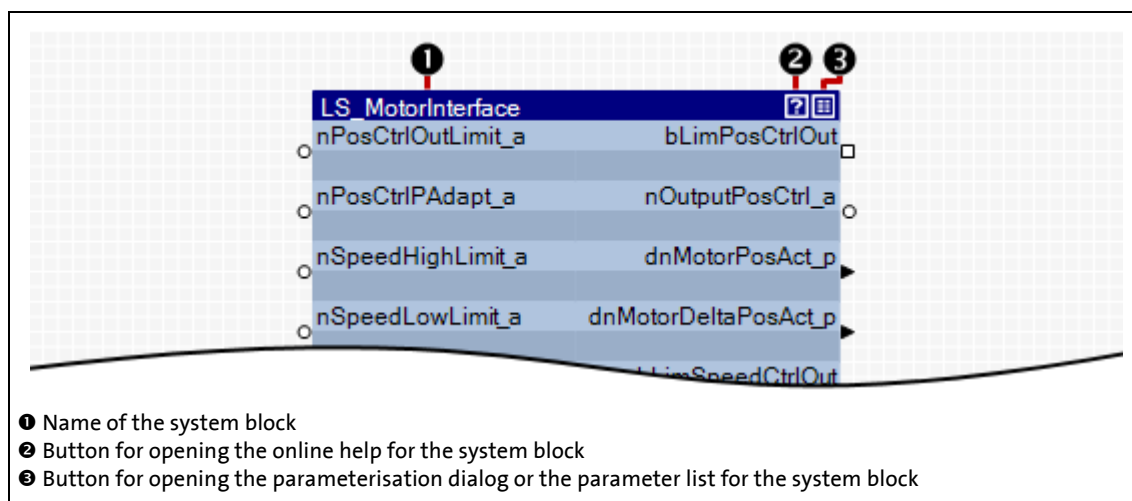
Example

Parameterisation dialog for the FB **L_DigitalDelay_2**:



16.1.1.3 What is a system block?

System blocks are a special variant of a function block. They partly activate real hardware, e. g. the digital and analog inputs/outputs and the motor control.



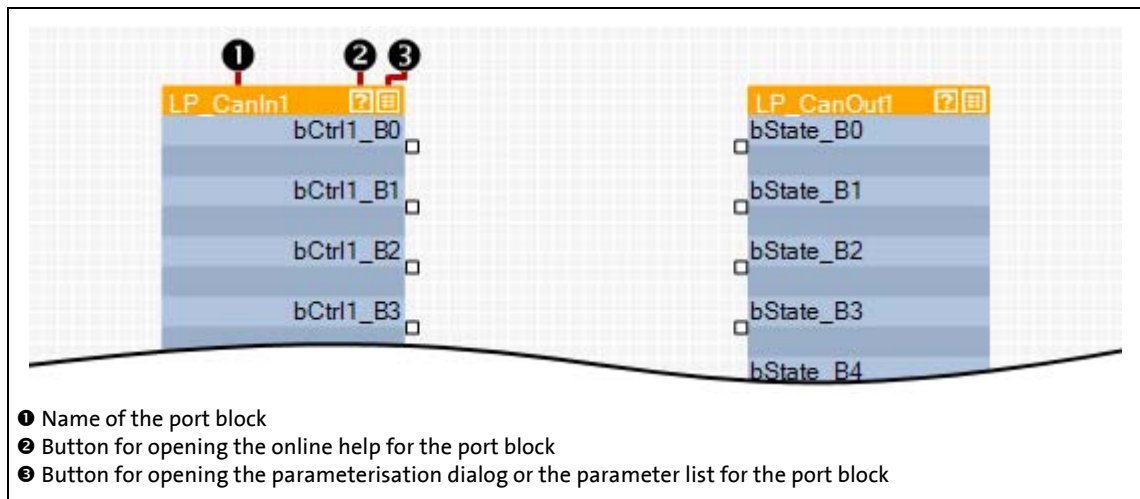
[16-3] Example: System block "LS_MotorInterface" for mapping the motor control

16.1.1.4 What is a port block?

A port block is a signal interface to a fieldbus. Input/output ports represent the input and output process data of the fieldbus.

- Port blocks LP_CanIn/LP_CanOut: Signal interface to the CAN bus
- Port blocks LP_MciIn/LP_MciOut: Signal interface to a plugged fieldbus module

If, for instance, the controller is to be controlled via CAN bus or a fieldbus module, the input/output ports are connected to the application block (device-internal signal processing) in the I/O level of the FB Editor.



[16-4] Example: Input port "LP_CanIn1" and output port "LP_CanOut1"

16.1.1.5 What is an application block?

The application/technology function set in [C00005](#) is shown as application block in the I/O level of the FB Editor.

The application block comprises the signal flow processing generated via function block interconnection for the selected application in each case (e.g. "actuating drive speed" or "switch-off positioning"). The function block interconnection is shown in detail on the application level.



Tip!

Every application block features so-called "free inputs and outputs" which you can use to transfer signals from the I/O level to the application level and vice versa.

- In the Lenze setting, these connectors are hidden in the function block editor.
- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

16.1.2 Conventions used for input/output identifiers

This chapter describes the conventions used for the identifiers of the inputs/outputs of the blocks. The conventions ensure a uniform and consistent terminology and make reading and comprehending the interconnection and application easier.



Tip!

The conventions used by Lenze are based on the "Hungarian Notation". This ensures that the most significant characteristics of the corresponding input/output (e.g. the data type) can be instantly recognised from its identifier.

An identifier consists of

- a data type entry
- an identifier (the "proper" name of the input/output)
- an (optional) signal type specification

Data type entry

The data type entry provides information about the data type of the corresponding input/output:

Data type entry	Meaning	Resolution	Value range
b	BOOL	1 bit	0 ≡ FALSE / 1 ≡ TRUE
dn	DINT	32 bits	-2147483647 ... 2147483647
n	INT	16 bits	-32767 ... 32767
w	WORD	16 bits	0 ... 65535

Identifier

The identifier is the proper name of the input/output and should indicate the application or function.

- Identifiers always start with a capital letter.
- If an identifier consists of several "words", then each "word" must start with a capital letter.
- All other letters are written in lower case.

Signal type entry

In general, it is possible to assign a certain signal type to the inputs and outputs of the Lenze function blocks. There are e.g. digital, scaled, position, acceleration and speed signals.

- A corresponding ending (preceded by an underscore) is added to the identifier of the corresponding input/output to indicate the signal type.

Signal type entry & port symbol in the FB Editor	Meaning	Resolution	Value range
<u>_a</u> ○	Analog/scaled	16 bits	± 199.99 %
<u>_v</u> ◁/▷	Angular velocity	16 bits	± 30000.0 rpm
<u>_p</u> ◁/▷	Position	32 bits	-2 ³¹ ... 2 ³¹ -1 increments
□	Digital (BOOL)	8 bits	0 ≡ FALSE; 1 ≡ TRUE
■	Other (WORD)	16 bits	0 ... 65535
■	Other (DINT)	32 bits	-2147483647 ... 2147483647

16.1.3

Scaling of physical units

With regard to the parameter setting & configuration of the controller it is very helpful to know the signal types and their scaling listed in the following table, which are used to process physical values (e.g. an angular velocity or position) in the function block interconnection.

Signal type entry & port symbol in the FB Editor	Meaning	Scaling	
		External value	≡ internal value
<u>_a</u> ○	Analog/scaled	100 %	≡ 2 ¹⁴ ≡ 16384
<u>_v</u> ◁/▷	Angular velocity	15000 rpm	≡ 2 ¹⁴ ≡ 16384
<u>_p</u> ◁/▷	Position	1 encoder revolution	≡ 2 ¹⁶ increments

16.2

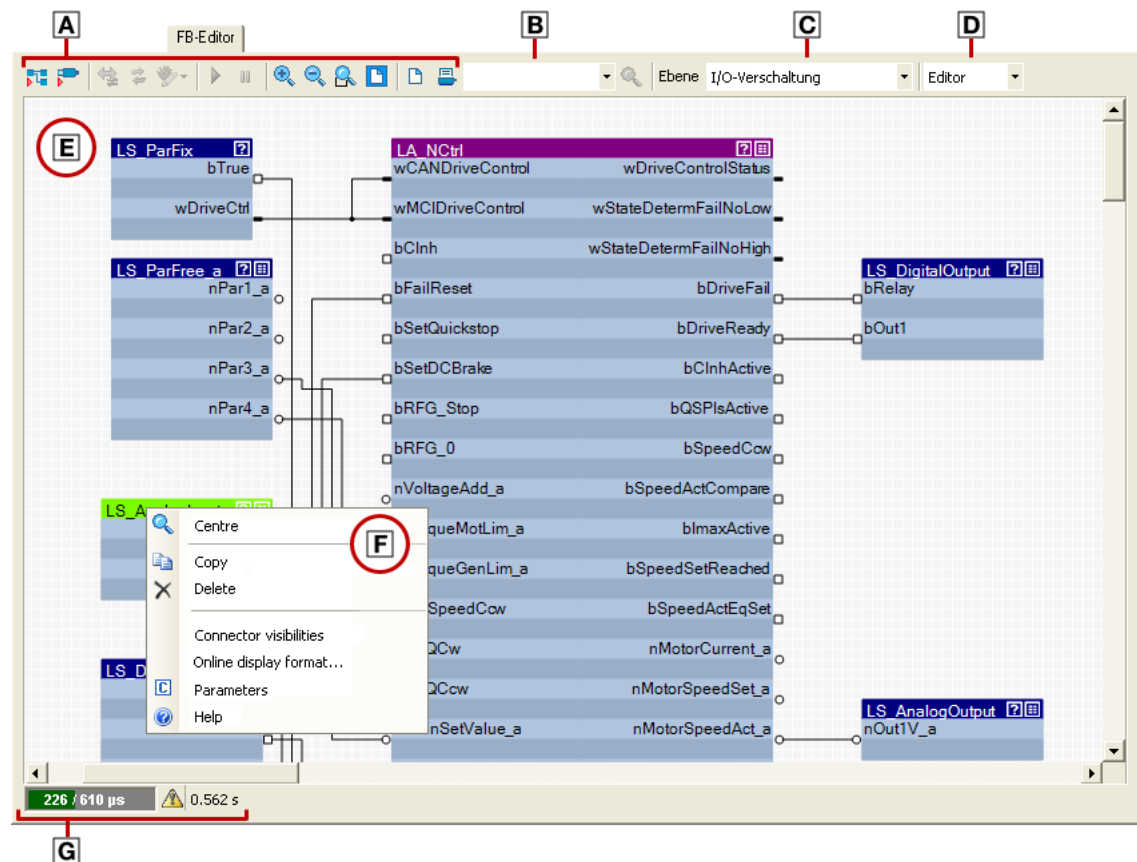
User interface

**How to access the FB Editor:**

1. Go to *Project View* and select the 8400 controller.
2. Go to *Workspace* and select the **FB Editor** tab.

The FB Editor displays the wiring of the technology function selected in [C00005](#). The interconnection of the I/Os of the controller depend on the control mode selected in [C00007](#).

The user interface of the FB Editor includes the following control and function elements:



A [Toolbar](#)

B [Search function](#)

C [Level selection](#)

D [Editor view/overview](#)

E Drawing area

F [Context menu](#)

G [Status bar](#)

Not shown:
[Overview window](#)

**Tip!**

Go to the »Engineer« toolbar and click the  icon to hide the *Project View* and the *Message Window*. This increases the *Workspace* available for the FB Editor. A renewed click on the symbol shows the *Project View* and the *Message Window* again.

16.2.1 Toolbar

The FB Editor is provided with an individual toolbar in the upper position which in the following text is called *FB Editor toolbar*.

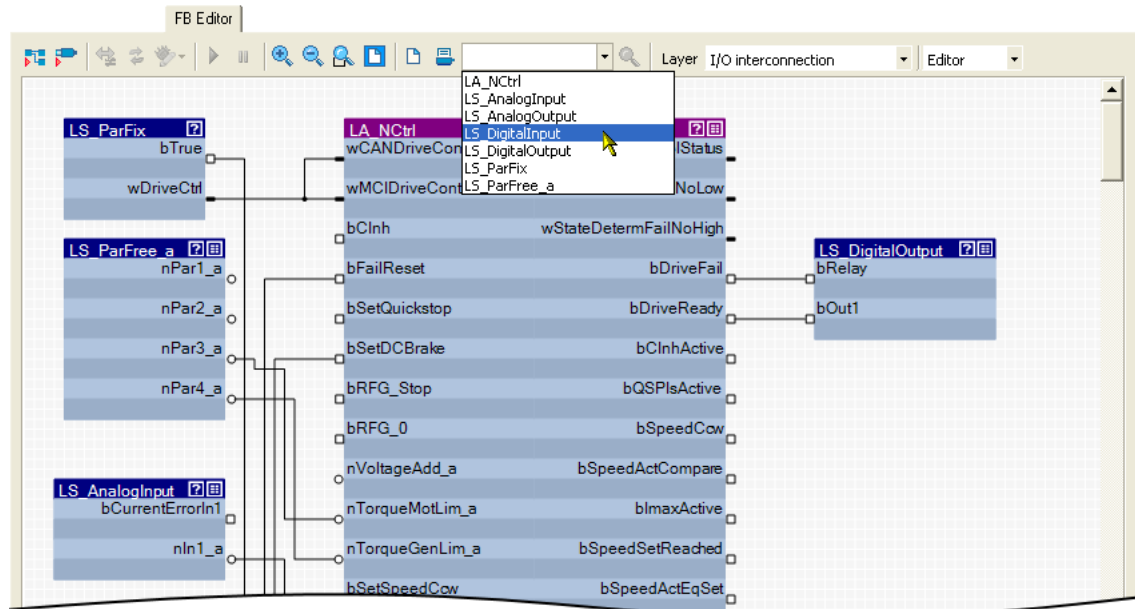
- Click an icon to execute the corresponding function.

Icon	Function
	Insert function block or system block ▶ Inserting a function block (879) ▶ Inserting a system block (881)
	Inserting a port block (883)
	Adjusting online and offline interconnection (902)
	Acknowledge error in the interconnection / reload interconnection
	Correct interconnection
	Start online monitoring
	Interrupt online monitoring
	Close online monitoring
	Enlarge view of interconnection
	Reduce view of interconnection
	Enlarge cutout of interconnection
	Show total interconnection in the drawing area
	Show print view
	Printing the interconnection (903)
	Search function (866)

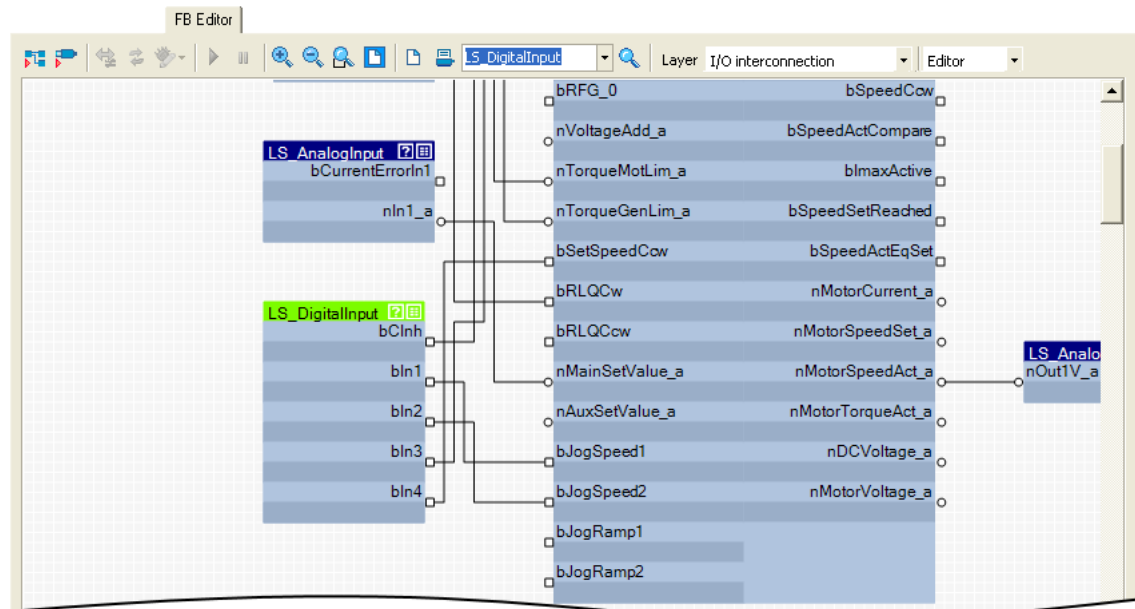
16.2.2 Search function

Use the search function to get quickly to a certain module of the interconnection.

- The list field of the search function contains all function blocks, system blocks, and port blocks of the interconnection:



- When you select a module in the list field, this module is zoomed in and selected at the same time (the following example shows the **LS_DigitalInput** system block):



**Tip!**

You can also enter any search text in the input field.

- If you click the  icon, the cutout is moved to the object which contains this search text.
- Another click on the  icon leads to a new search. Thus, you can navigate successively to all objects which contain the entered search text.
- The search text does not consider case sensitivity.

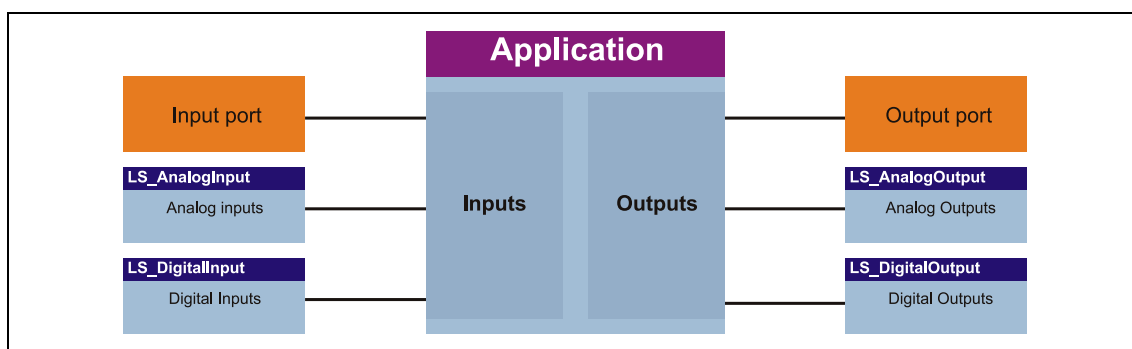
16.2.3 Level selection

Go to the **Level selection** list field and select the interconnection level to be displayed.

"I/O interconnection" level

This level displays only the I/O interconnection of the currently selected technology application for a better overview.

- Details of the application are masked out in this level.
- The interconnection of the I/Os of the controller with the inputs and outputs of the application in detail depends on the control mode selected in [C00007](#).
- The parameterisation dialogs on the **Application parameter** tab correspond to the application block displayed in this level.

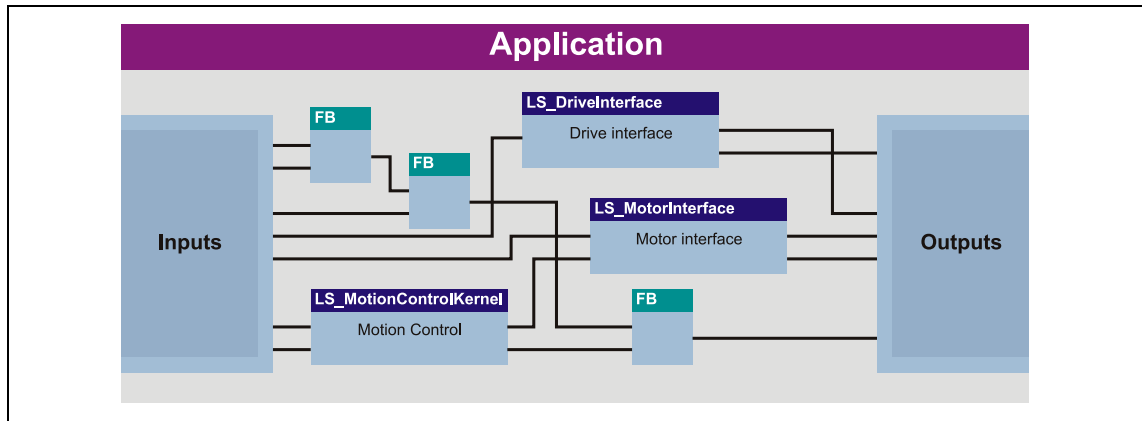


[16-5] Schematic diagram of "I/O interconnection"

"Application interconnection" level

This level displays the interconnection of the application selected in [C00005](#) in detail. All function blocks used in the application and the system blocks which provide the interfaces to the drive and motor interface and to the MotionControlKernel (MCK) are displayed with their connections.

- The interconnection of the I/Os of the controller with the inputs and outputs of the application is masked out in this level.



[16-6] Schematic diagram of "Application interconnection"



Tip!

Every application block features so-called "free inputs and outputs" which you can use to transfer signals from the I/O level to the application level and vice versa.

- In the Lenze setting, these connectors are hidden in the function block editor.
- These connections can be shown via the **Connector visibilities** command in the *Context menu* of the application block.

"Free interconnection" level

This level serves to implement an individual drive solution for the device versions "StateLine C" (from version 12.00.00 and »Engineer« V2.17), "HighLine C" and "TopLine C".



Note!

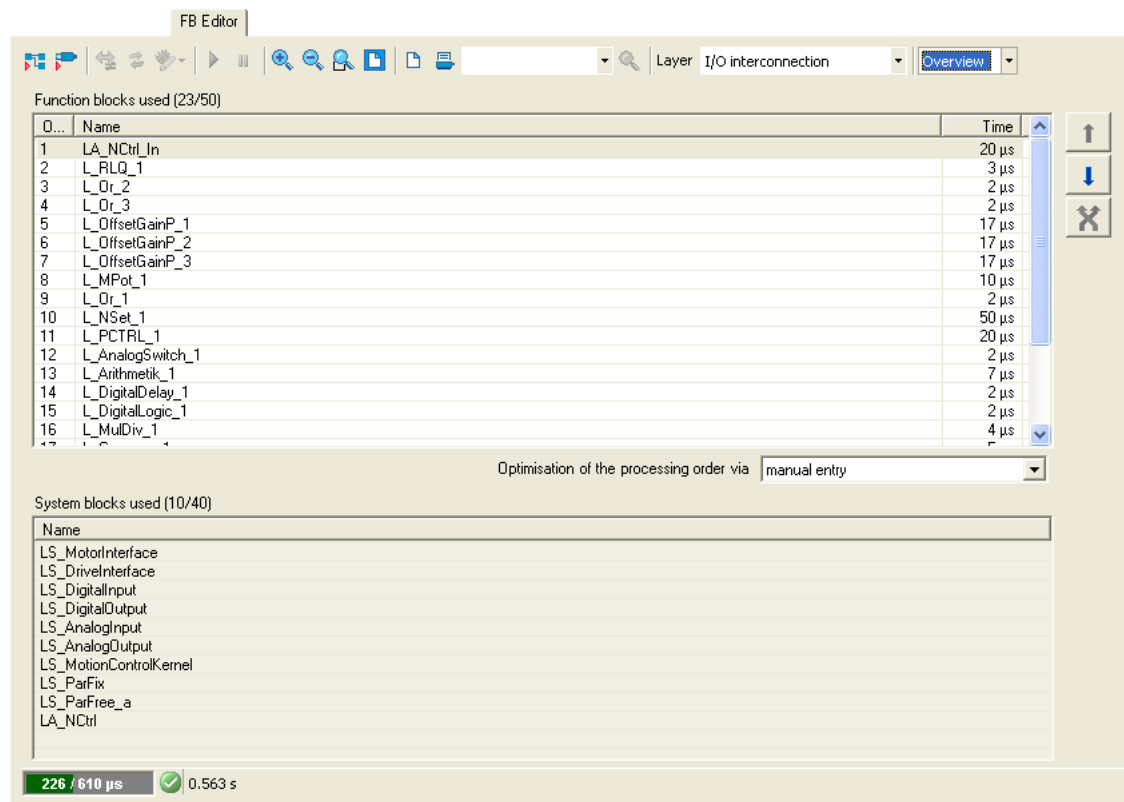
When you select the "Free interconnection" level for the first time, you are prompted to confirm whether the interconnection from the I/O level and the application level are to be combined and copied into this level.

When you confirm this confirmation prompt with **Yes**, the I/O level and the application level are not available anymore. This action can only be undone by resetting the application to a predefined Lenze application! ▶ [Resetting changed interconnection](#) (901)

16.2.4 Editor view/overview

Use the list field at the top right to change from the Editor to the overview and vice versa.

The overview shows all function blocks used of the interconnection in the upper list field in the order of their processing. The lower list field shows all used system blocks.

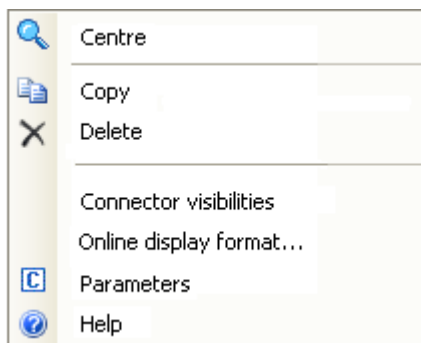


- The processing order of the function blocks can be optimised manually or according to an automatically generated selection. ▶ [Changing the processing order](#) (896)

16.2.5 Context menu

You can open a *context menu* via the right mouse button for each object (function block, system block, line, comment, etc.) and for the drawing area:

- The contents of the *context menu* depend on the type of object you click on.
- Example: *Context menu* for a function block:



16.2.6 Status bar

The status bar of the FB Editor shows, among other things, information about the system load and the error status of the interconnection:



Icon	Meaning
A System load	
	Here: out of the available computing time of 610 µs, 226 µs are required by the application.
B Error status of the interconnection	
	The interconnection has no errors and no warnings
	The interconnection has errors and/or warnings
C Communication status	
	Offline
	Online
	Communication error
D Adjustment status	
	Offline and online interconnection match
	Offline and online interconnection are different
E Update rate for monitoring values	

16.2.7 Overview window

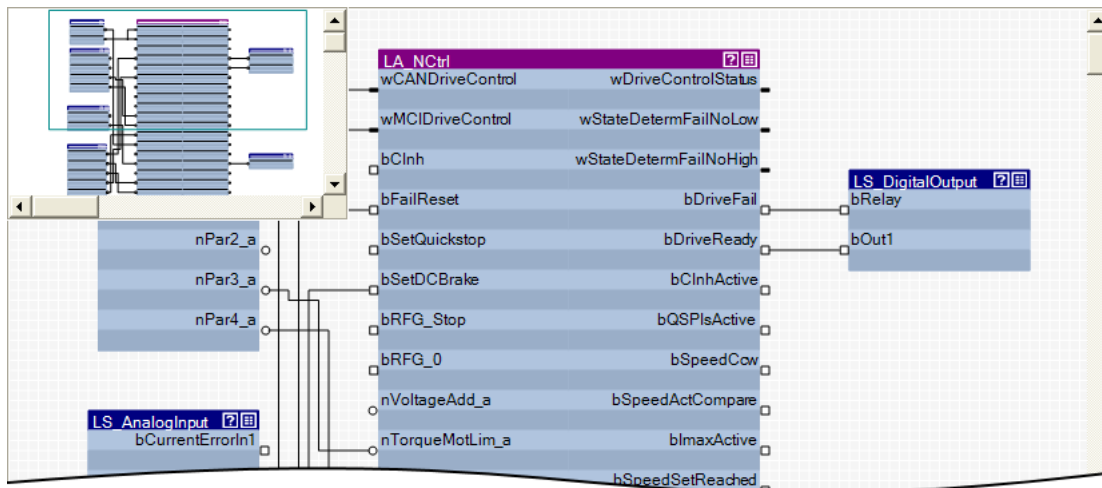
The overview window shows the drawing area in a reduced view. The overview window serves to e.g. move quickly through a more complex interconnection.



How to show the monitor window:

Go to the *Context Menu* of the drawing area and select the **Overview Window**.

- If you execute this command again, the overview window is hidden again.



- The green frame in the overview window indicates the interconnection cutout that is currently displayed in the drawing area.
- Use the mouse pointer to shift and resize the cutout to be displayed.



How to shift the cutout presented in the drawing area:

1. Position the mouse pointer to the green frame in the overview window.
 - The mouse pointer symbol becomes a positioning cross.
2. Click left mouse button and shift the green frame to its new position by keeping the mouse button pressed, so that the desired cutout of the interconnection is displayed in the drawing area.



How to redefine the cutout to be presented:

In the overview window draw a frame around the area of the interconnection which is to be presented in the drawing window by keeping the left mouse button pressed:



- The aspect ratio of the frame is automatically adapted to the aspect ratio of the drawing area.
- According to the size of the frame that is drawn, also the presentation size of the objects in the drawing area changes.



Tip!

Go to the *FB Editor toolbar* and click the  icon to adapt the view size so that all objects included in the interconnection are visible in the drawing area.

Automatic scroll ("AutoScroll function")

If you reach a window limitation in the drawing area when shifting an object or in the overview window when shifting the green frame, and if you then shortly hold the mouse pointer in this position, an automatic scrolling into the corresponding direction is carried out:

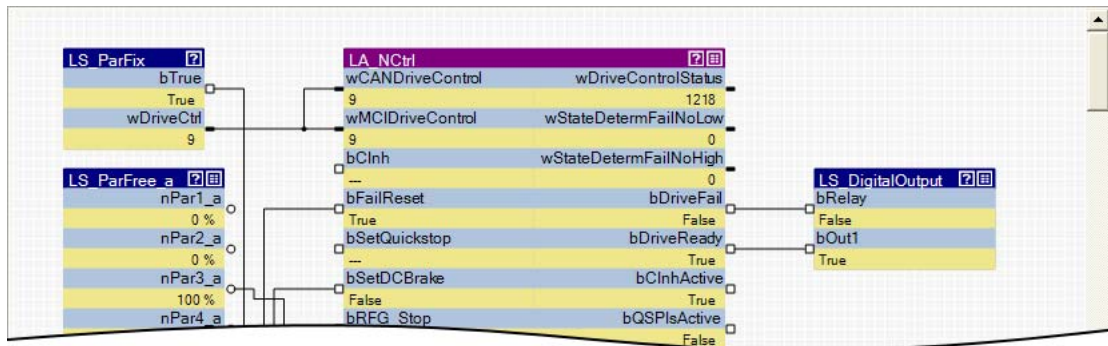
16.3 Using the FB Editor as "Viewer"

The main purpose of the FB Editor is the individual configuration of the selected technology application. However, you can also use the FB Editor to

- make a diagnosis of the application (when an online connection has been established),
- get a better understanding for the operating mode of the application,
- use the interconnection as an alternative parameterisation access.

Diagnostics of the application

When an online connection to the controller has been established, the current values are displayed at the inputs and outputs of the objects.



- Process-scaled signals can be scaled in a "user-defined" way for easy diagnostics in the FB Editor.
 ▶ [Change online display format](#) (876)

Getting a better understanding for the operating mode of the application

Make yourself familiar with the signal flow of the interconnection to get a better understanding of the operating mode of the application or individual functional areas.

- The  symbol in the head of the block or the **Help** command in the *context menu* for the block serve to open the online help for the block.

Using the interconnection as an alternative parameterisation access

- The  icon in the head of the module, a double-click on the module, or the **Parameter...** command in the *Context menu* of the module serve to open the parameterisation dialog or the parameter list for the module.

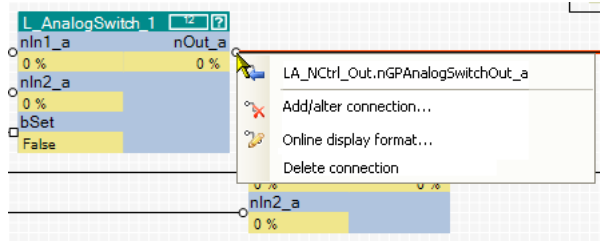
16.3.1 Following connections of inputs and outputs

In addition to the [Search function](#) you can use the *context menu* of inputs and outputs to follow connections and quickly reach certain signals.

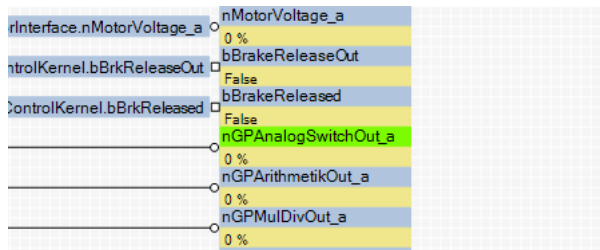


How to navigate from one output to another connected input:

1. Open the *context menu* (right mouse button) of the port symbol at the output.
 - The *context menu* for the port symbol contains all inputs which are connected to the output:



2. Select input in the *context menu* to which you want to navigate.
 - As a result, the selected input is displayed in the centre of the drawing area (in this example: nGPAnalogSwitchOut_a):

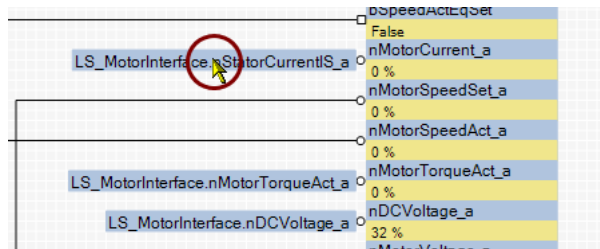




How to navigate from one input to another connected output:

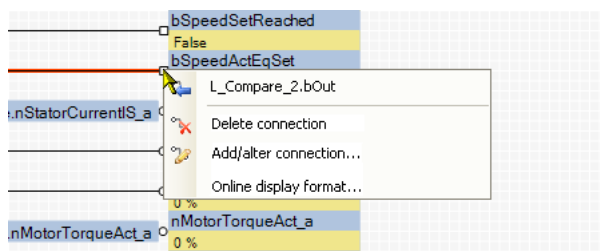
If the input is connected to a flag:

- Double-click the flag:



If the input is connected to a line:

1. Open the *context menu* (right mouse button) of the port symbol at the output:



2. Select output in the *context menu*.
 - Since an output can only be connected to an input, the *context menu* contains only an output.

The output is displayed in the centre of the drawing area.

16.3.2 Keyboard commands for navigation

Keyboard command	Function
<Picture ▲ >	Scroll up
<Picture ▼ >	Scroll down
<Shift> + <picture ▲ >	Scroll to the left
<Shift> + <picture ▼ >	Scroll to the right
<POS1>	Scroll to the left edge of the interconnection
<END>	Scroll to the right edge of the interconnection
<Ctrl> + <Pos1>	Scroll to the left upper corner of the interconnection
<Ctrl> + <End>	Scroll to the right lower corner of the interconnection

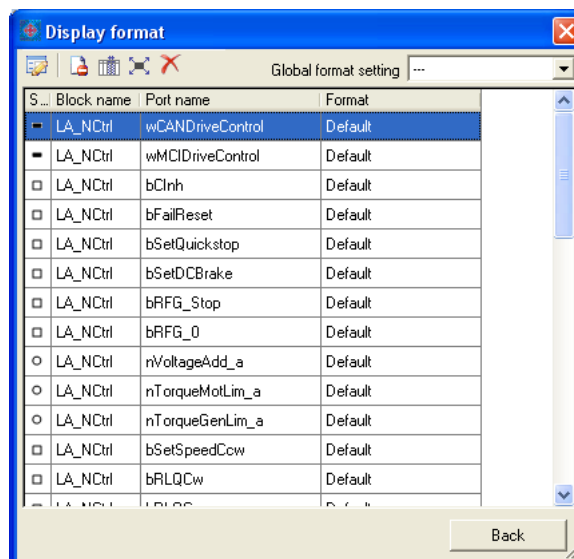
16.3.3 Change online display format

For online monitoring in the FB Editor the display format of the input and output data of a block can be adapted individually. Process-scaled signals can be scaled in a "user-defined" way for easy diagnostics in the FB Editor. Thus, the display of these signals gets a process reference.



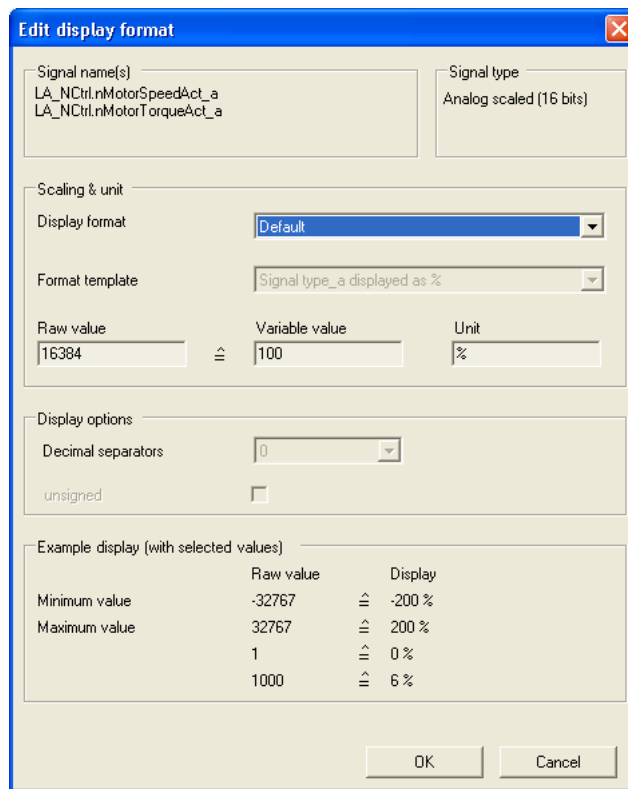
How to change the data display format of block inputs/outputs:

- Go to the *context menu* of the block and select the **Online display format** command.
 - Tip:** You can call the *context menu* of a block by clicking with the right mouse button on the header of the block.
 - The *Display format* dialog box is displayed:



- Select the inputs/outputs from the list the display format of which is to be changed.
 - Note:** In the **Global format setting** list field the "---" entry must be selected so that the display format can be changed.
 - If you click further inputs/outputs while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - The **<Shift>** key serves to select a related area of inputs/outputs.
 - More functions:
 -  Display masked out connections
 -  Display additional information
 -  Select all inputs/outputs
 -  Reset all format information

3. Click the  symbol to edit the display format of the selected inputs/outputs.
 - The *Edit display format* dialog box is displayed:



	Raw value		Display
Minimum value	-32767	≥	-200 %
Maximum value	32767	≤	200 %
	1	≥	0 %
	1000	≤	6 %

4. Go to the **Display format** list field and select the "User-defined" entry.
5. Go to the **Format template** list field and select "No template".
6. Select the required scaling, unit, number of decimal positions, and sign handling.
7. Click **OK** to accept the settings and close the *Edit display format* dialog box.
 - The *Display format* dialog box now displays the text "User-defined" for the changed inputs/outputs in the **Format** column.

After all required formats have been changed:

8. Click **Back** to close the *Display format* dialog box.
 - For online monitoring, the changed format is used.

16.4 Reconfiguring the predefined interconnection

How to proceed:

1. Insert additionally required objects into the interconnection.
2. Hide unneeded inputs/outputs of function blocks and system blocks to obtain a clearly arranged interconnection.
3. Arrange the objects in the drawing area in a reasonable manner.
4. Establish the connections required for the desired function.
5. If required, change (optimise) the processing order of the function blocks.



Tip!

Detailed information on the individual steps can be obtained from the following subchapters!



Note!

With the "StateLine" version, the interconnection shown in the application level cannot be edited.

16.4.1 Inserting/Deleting objects

Objects can be inserted in the interconnection via the *FB Editor toolbar* and the *context menu* of the drawing area. The following subchapters provide detailed information on how to insert/delete the different objects.

Icon	Function
	Inserting a function block (879)
	Inserting a system block (881)
	Inserting a port block (883)
	Inserting a comment (885)



Tip!

Use the *context menu* of the drawing area to insert a function block, system block, port block or comment directly to the current position of the mouse pointer in the drawing area.

If you insert an object via the corresponding icon in the *FB Editor toolbar*, the object is always placed at the top left corner in the drawing area.

Interconnection elements cannot only be copied within the same interconnection but also across all devices within the same project, as long as the devices stem from the same product family. ▶ [Copying interconnection elements \(across all devices\) \(898\)](#)

16.4.1.1 Inserting a function block



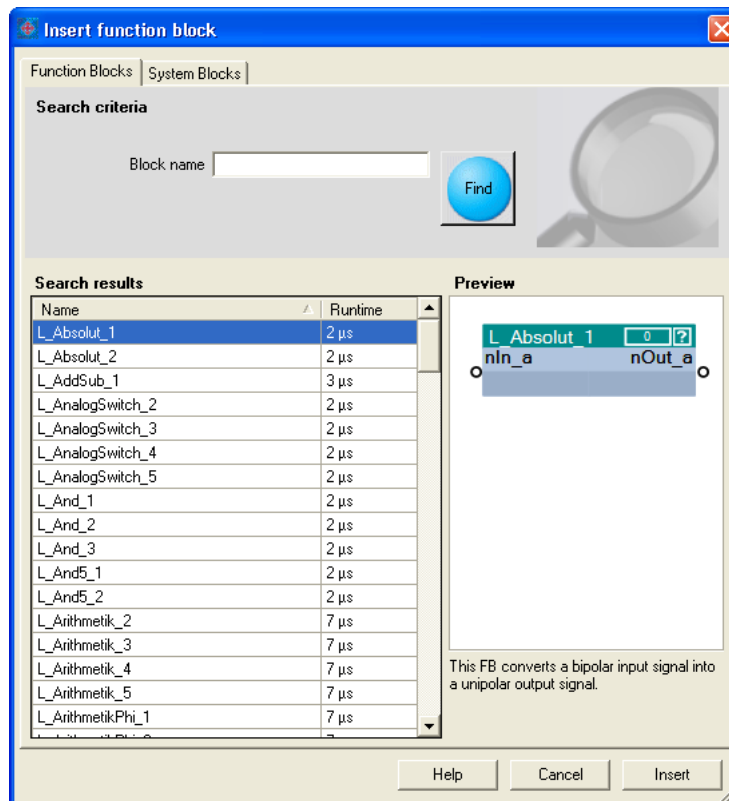
Note!

In the FB Editor, function blocks are only available in the "Application interconnection" level!



How to insert a function block into the interconnection:

1. In the *FB Editor toolbar*, click the icon.
 - The *Insert Function Block* dialog box appears:
2. Unless it is already displayed, select the **Function Blocks** tab.
 - All function blocks available are displayed in the **Search results** list field.



- A preview of the selected function block is displayed.
 - A detailed description of all available function blocks can be found in the main chapter ["Function library"](#). (p 909)
3. If required, define **Search criteria** to narrow down the available function blocks:
 - **Block name:**
String which must be contained in the name of the function block.
 4. After changing the search criteria, press the **Find** button to update the selection.
 - Then, only the function blocks complying with the features set in the search criteria are shown in the **Search Results** list field.
 - If no search criteria are set, all function blocks available are shown.
 5. Select the function block to be inserted in the **Search results** list field.

6. Press **Insert** button.

- The dialog box is closed and the selected function block is inserted into the interconnection.

Context menu for the function block

If you right-click on the header of a function block, a *context menu* opens via which you can execute the following functions in addition to the general processing functions (Copy, Insert, Delete):

Command	Function
 Center	Move the visible cutout of the drawing area so that the block is centred.
Connector visibilities...	Define visible inputs and outputs of the block. ▶ Changing connector visibilities (📖 888)
Online display format...	Adapt the display format of the input and output data of the block individually for online monitoring. ▶ Change online display format (📖 876)
 Parameter...	Open the parameter list/parameterisation dialog for the block. • Only if function block is parameterisable.
 Help	Show online help for the block.

Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 887)
- ▶ [Changing connector visibilities](#) (📖 888)
- ▶ [Arranging objects in the drawing area](#) (📖 889)
- ▶ [Creating/deleting connections](#) (📖 890)
- ▶ [Changing the processing order](#) (📖 896)

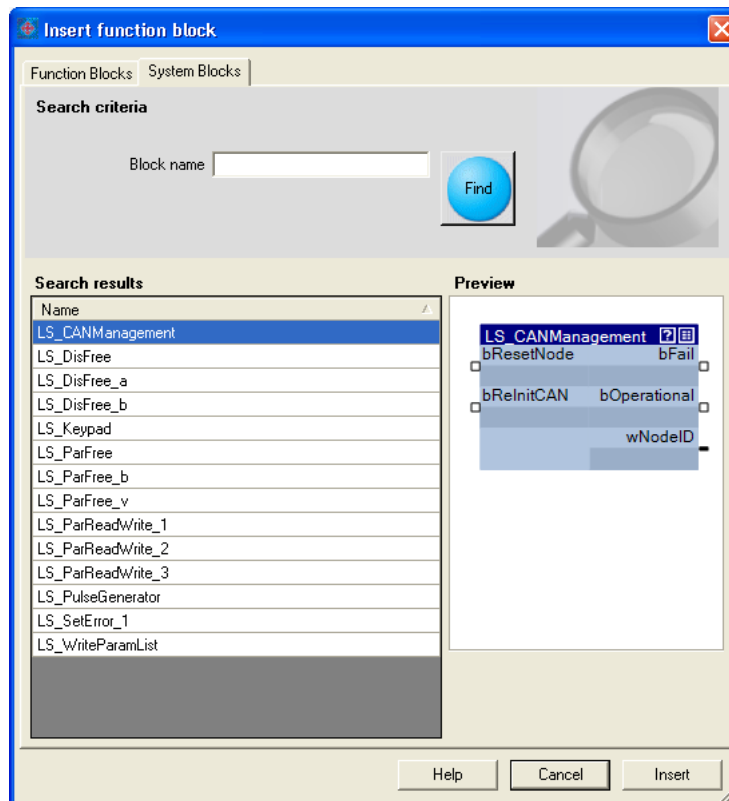
16.4.1.2 Inserting a system block

A system block is inserted similarly to the way a function block is inserted.



How to insert a system block into the interconnection:

1. In the *FB Editor toolbar*, click the  icon.
 - The *Insert Function Block* dialog box appears:
2. Unless it is already displayed, select the **System Blocks** tab.
 - All system blocks available are displayed in the **Search results** list field.



- A preview of the selected function block is displayed.
3. If required, define **Search criteria** to accordingly narrow down the system blocks available:
 - **Block name:**
String which must be contained in the name of the system block.
 4. After changing the search criteria, press the **Find** button to update the selection.
 - Then, only the system blocks complying with the features set in the search criteria are shown in the **Search Results** list field.
 - If no search criteria are set, all system blocks available are shown.

5. Select the system block to be inserted in the **Search results** list field.
6. Press **Insert** button.
 - The dialog box is closed and the selected system block is inserted into the interconnection.

Context menu for the system block

If you right-click on the header of a system block, a *context menu* opens via which you can execute the following functions in addition to the general processing functions (Copy, Insert, Delete):

Command		Function
	Center	Move the visible cutout of the drawing area so that the block is centred.
	Connector visibilities...	Define visible inputs and outputs of the block. ▶ Changing connector visibilities (📖 888)
	Online display format...	Adapt the display format of the input and output data of the block individually for online monitoring. ▶ Change online display format (📖 876)
	Parameter...	Open the parameter list/parameterisation dialog for the block.
	Help	Show online help for the block.

Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 887)
- ▶ [Changing connector visibilities](#) (📖 888)
- ▶ [Arranging objects in the drawing area](#) (📖 889)
- ▶ [Creating/deleting connections](#) (📖 890)

16.4.1.3 Inserting a port block

All input/output ports defined for the application on the **Ports** tab can be inserted into the interconnection in the form of port blocks in order to get access to the associated element variables.



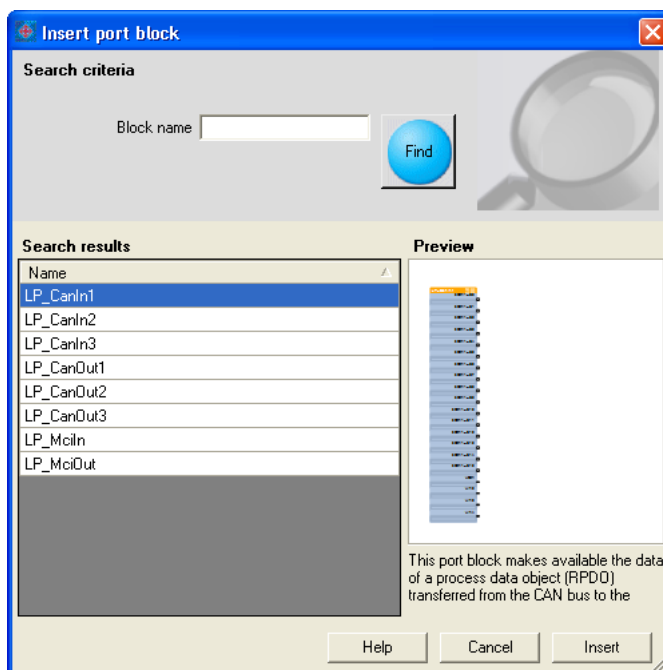
Tip!

You can change between the **Ports** and **FB Editor** tabs at any time to define new ports and afterwards insert them into the interconnection.



How to insert a port block into the interconnection:

1. In the *FB Editor toolbar*, click the  icon.
 - The *Insert port block* dialog box appears.
 - All port blocks available are displayed in the **Search results** list field.



- A preview of the selected port block is displayed.
2. If required, define **search criteria** to accordingly narrow down the port blocks available:
 - **Block name:**
String which must be contained in the name of the port block.
 3. After changing the search criteria, press the **Find** button to update the selection.
 - Then, only the port blocks complying with the features set in the search criteria are shown in the **Search Results** list field.
 - If no search criteria are set, all port blocks available are shown.
 4. Select the port block to be inserted in the **Search results** list field.
 5. Press **Insert** button.
 - The dialog box is closed and the selected port block is inserted into the interconnection.

Context menu for the port block

If you right-click on the header of a port block, a *context menu* opens via which you can execute the following functions in addition to the general processing functions (Copy, Insert, Delete):

Command	Function
 Center	Move the visible cutout of the drawing area so that the block is centred.
Connector visibilities...	Define visible inputs and outputs of the block. ▶ Changing connector visibilities (📖 888)
Online display format...	Adapt the display format of the input and output data of the block individually for online monitoring. ▶ Change online display format (📖 876)
 Parameter...	Open the parameter list/parameterisation dialog for the block.
 Help	Show online help for the block.

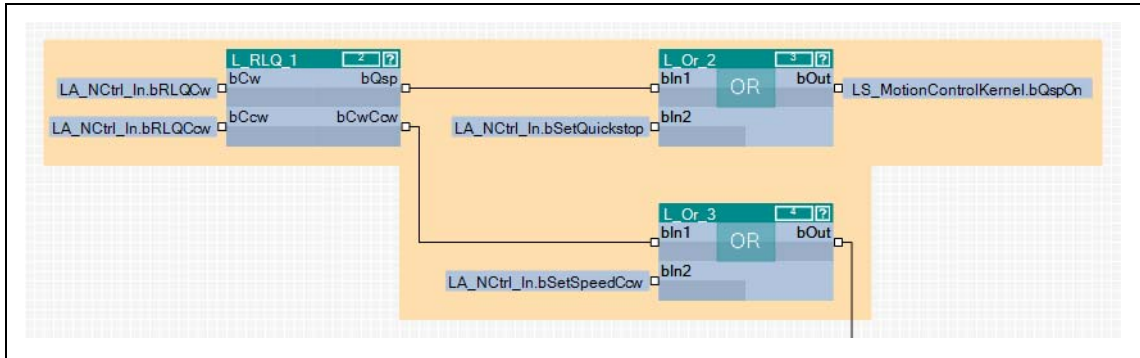
Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 887)
- ▶ [Changing connector visibilities](#) (📖 888)
- ▶ [Arranging objects in the drawing area](#) (📖 889)
- ▶ [Creating/deleting connections](#) (📖 890)

16.4.1.4 Inserting a comment

Comments can be inserted at any position in the drawing area.

As of the »Engineer« V2.10, the interior colour and text alignment of a comment can be changed via a properties dialog. Now the sizes of comments can also be changed using the mouse pointer. When using different interior colours you can use comments to graphically arrange areas that belong together in terms of function or separate them from other areas:



[16-7] Example: Graphical arrangement of FBs by means of two comments that overlap.



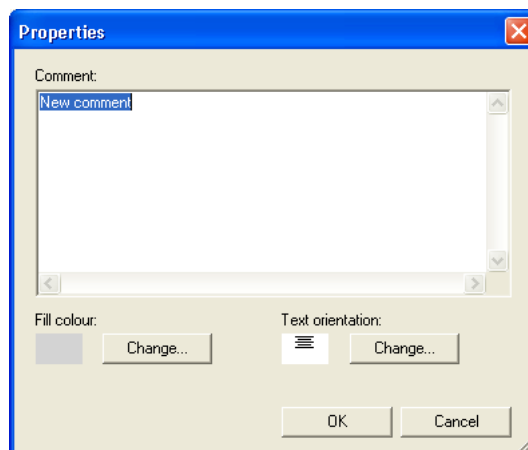
Note!

The term "Arrangement" does not mean a logical arrangement of the function blocks. The comments are only graphical presentation elements of the FB Editor.



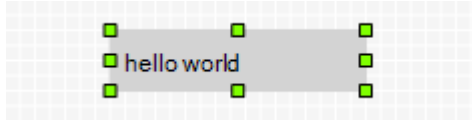
How to insert a new comment into the interconnection:

1. Move the mouse pointer to the (free) position in the drawing area where the comment is to be inserted.
2. Go to the *Context menu* (right mouse key) and select the **New comment** command.
 - The *Properties* dialog box is displayed:



3. Enter the required comment into the text field.
4. Optional: Change preset interior colour.
 - For this purpose, click the left **Change...** button to open the *Colour* dialog box to select another interior colour.

5. Optional: Change preset text alignment.
 - For this purpose, click the right **Change...** button to open the *Text alignment* dialog box to select another text alignment.
6. Press **OK** to close the *Properties* dialog box and insert the comment.
 - After being inserted, the corner points of the comment are shown:



7. Optional: Change size of the comment.
 - For this purpose click one of the corner points with the left mouse button and enlarge the comment to the required size with the mouse button pressed.



8. Optional: Drag comment.
 - For this purpose click the comment with the left mouse button and move the comment to the required position with the mouse button pressed.

**Tip!**

The *Properties* dialog box for a comment already available can be opened by double-clicking the comment.

Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 887)
- ▶ [Arranging objects in the drawing area](#) (📖 889)
- ▶ [Creating/deleting connections](#) (📖 890)

16.4.1.5 Deleting objects that are no longer required

Objects that are no longer required can be easily deleted again. "Delete" only means that the object is removed from the drawing area. If you have deleted an object from the drawing area, you can reinsert it any time into the interconnection.



Note!

Deleting an object cannot be undone.

Together with the object, all available connections to this object are deleted.



How to delete objects that are no longer required:

1. Select objects to be deleted.
 - You can select a single object by clicking the header of the object.
 - You can select objects that are placed together by drawing a frame around these objects while keeping the mouse button pressed.
 - If you click the header of further objects while pressing **<Ctrl>**, these will be added to an already existing selection (multi-selection).
 - All selected objects are highlighted by a light green header.
2. Press **<Del>**.

Related topics

▶ [Deleting connections that are no longer required](#) (📖 895)

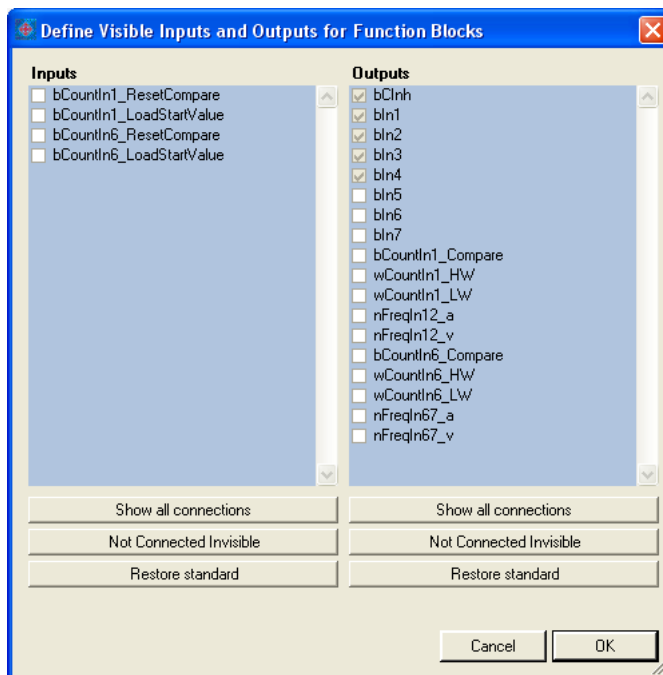
16.4.2 Changing connector visibilities

Inputs and outputs that are not connected can be hidden for each block. This serves to reduce the dimension of the block. The interconnection becomes clearer.



How to define the visible inputs and outputs:

- Go to the context menu of the block and select the **Connector visibilities** command.
 - The *Define Visible Inputs and Outputs for Function Blocks* is displayed:



- All visible connections have a checkmark.
 - In case of a block that is inserted anew, all inputs and outputs are visible at first.
 - Inputs and outputs with a light grey checkbox are already connected and thus cannot be hidden.
- By setting/removing the checkmarks or via the buttons you can define the visible inputs and outputs.
 - Press **OK** to accept the selected definition and close the dialog box.

16.4.3 Arranging objects in the drawing area

All objects can be freely arranged in the drawing area by dragging with the mouse.

We recommend to make an arrangement in which the required connections between the inputs and outputs can be created easily. A division into functional areas may also be sensible to get a better understanding of the application.

Objects which are already connected, can also be dragged to another (free) position in the drawing area. The available connections will be automatically re-routed after dragging.



How to drag an object:

1. Click the header of the object (and keep the button pressed).
2. Keep the button pressed and drag the object to the required position in the drawing area.
 - Via **<Esc>** you can cancel this action.



How to drag several objects at the same time:

1. Select the objects to be dragged.
 - You can select a single object by clicking the header of the object.
 - If you click the header of further objects while pressing **<Ctrl>**, these will be added to an already existing selection (multi-selection).
 - You can easily select objects that are placed together by drawing a frame around these objects while keeping the mouse button pressed.
 - All selected objects are highlighted by a light green header.
2. Keep the mouse button pressed on the header of one of the selected objects and drag it to the required position in the drawing area.
 - Via **<Esc>** you can cancel this action.



Note!

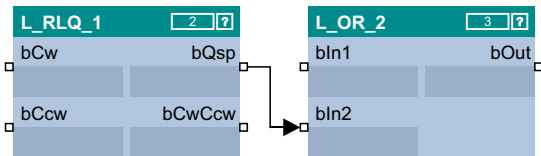
A red header indicates that the object overlaps with other objects in the drawing area!
Arrange the objects so that no overlap occurs.

16.4.4 Creating/deleting connections

After adding objects and arranging them in a reasonable manner within the drawing area, you can create the connections between the available objects which are required for the desired function.

A connection always has a direction and therefore always has a source and a target.

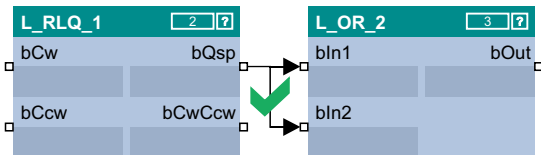
- An output represents a possible source in the interconnection.
- An input represents a possible target in the interconnection.



Permissible/impermissible connections

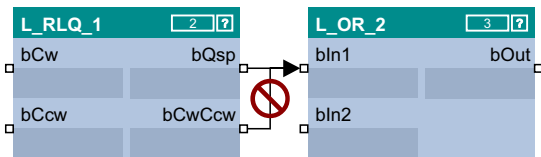
Several connections can lead from one output.

- Therefore it is always possible to start a new connection from an output.



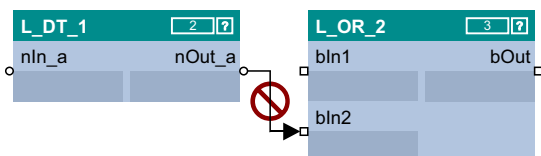
However, maximally one connection may end in an input.

- Therefore it is only possible to start a new connection from an input if there is no connection already ending in this input.



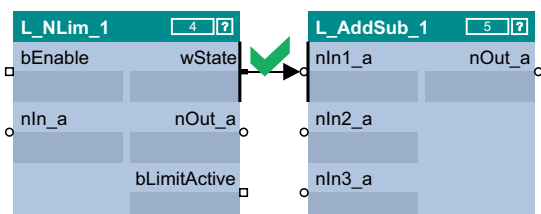
Only inputs/outputs of the same signal type can be connected.

- Thus, a connection between different port symbol cannot be established.



From the »Engineer« V2.12 "Analog/scaled" (_a) and "Miscellaneous (WORD)" signal types can also be interconnected.

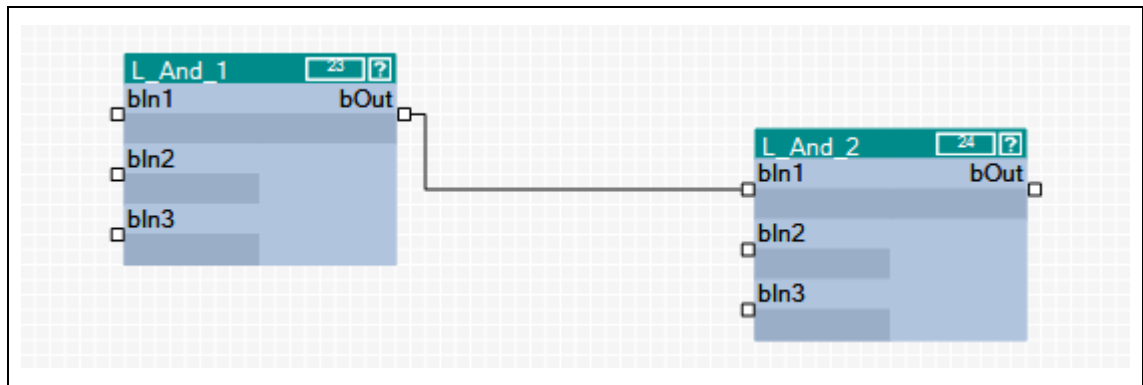
- The implicit type conversion is indicated by a vertical black bar at the port symbol.



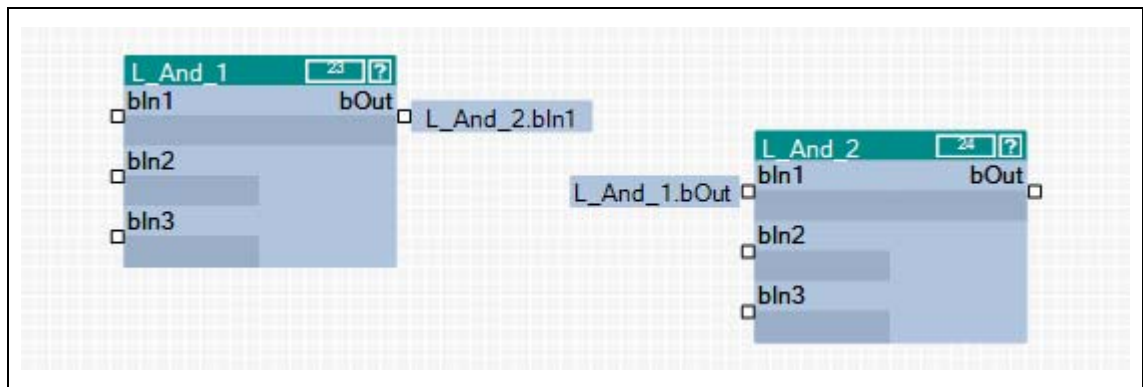
From the »Engineer« V2.13 "Analog/scaled" (_a) and "Angular velocity" (_v) signal types can also be interconnected.

Connection types

Connections can either be created by means of connection lines or port identifiers ("flags")



[16-8] Example 1: Connection via connection line



[16-9] Example 2: Connection via flags



Tip!

The commands **Show as flag** or **Show as line** in the *context menu* of a connection serve to change the representation of the connection at any time.

When an output is connected to several inputs via flags, three points are displayed ("...") at the output instead of the concrete input identifier. The *context menu* of the port symbol shows all inputs which are connected to the output.

16.4.4.1 Creating a connection using the connection line



How to create a connection using the connection line:

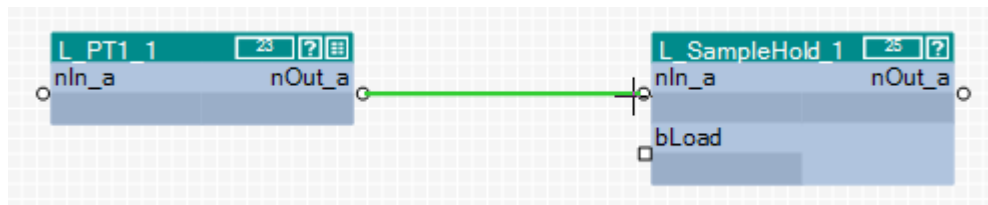
1. Click the port symbol from which the new connection is to be started.
 - It is only possible to start a new connection from an input if there is no connection already ending in this input.
 - If you then move the mouse pointer away from the port symbol, a new connection is "drawn" from this port symbol.
 - Via <Esc> you can cancel this action.
2. Click the port symbol where the connection is to end.
 - Thereupon the corresponding connection is routed automatically if the connection is permissible.



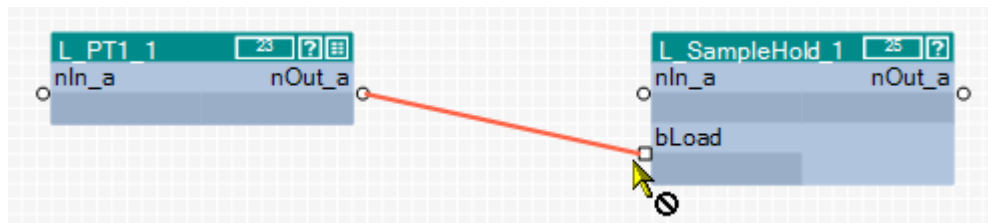
Tip!

If you move the mouse pointer across the port symbol while drawing a new connection, you can see whether the connection is permissible or not from the colour of the drawn line and from the mouse pointer symbol.

- Permissible connection:



- Impermissible connection (different port symbol):



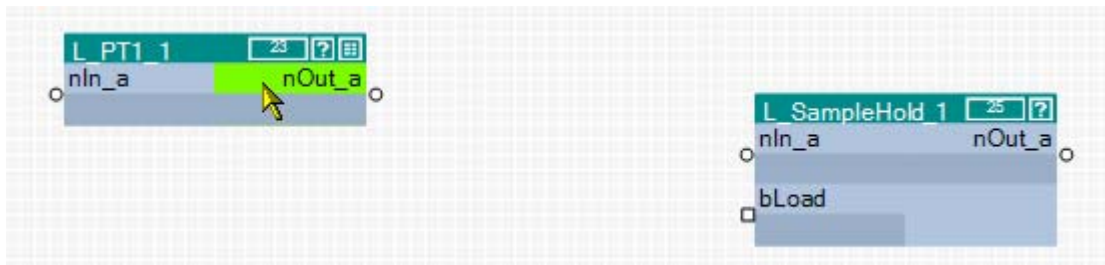
The command **Show as flag** in the *context menu* of a line serves to change the representation of the connection at any time.

16.4.4.2 Creating a connection using port identifiers

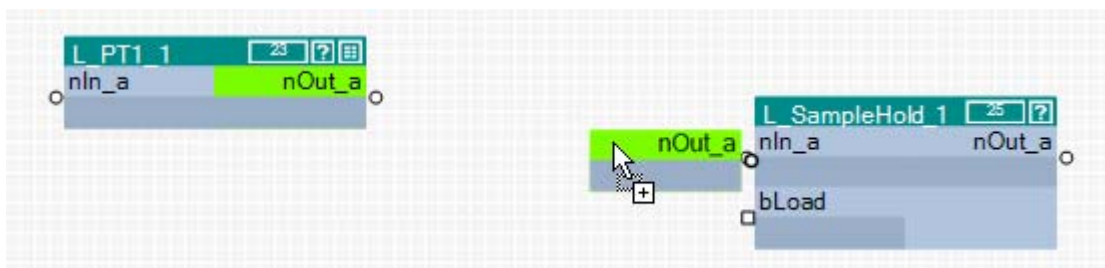


How to create a connection with port identifiers:

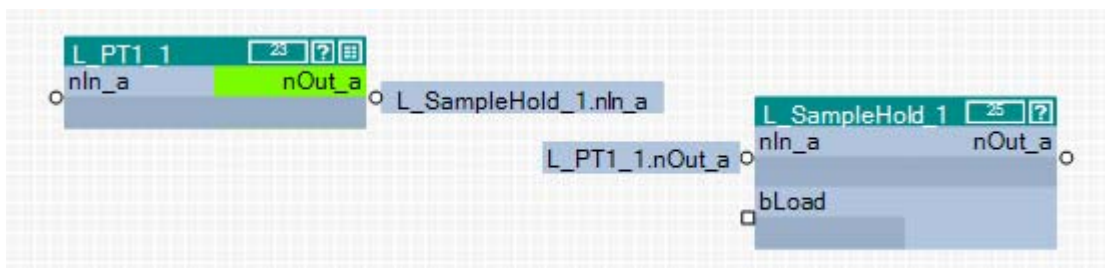
1. Click the port identifier.
 - The selected port is highlighted in light green:



2. Drag the port segment to the required port while keeping the left mouse button pressed:



After releasing the mouse button, the connection via port identifiers (flags) is created. The corresponding port identifier consists of the block name and the name of the input/output:



Tip!

The command **Show as line** in the *context menu* of a flag serves to change the representation of the connection at any time.

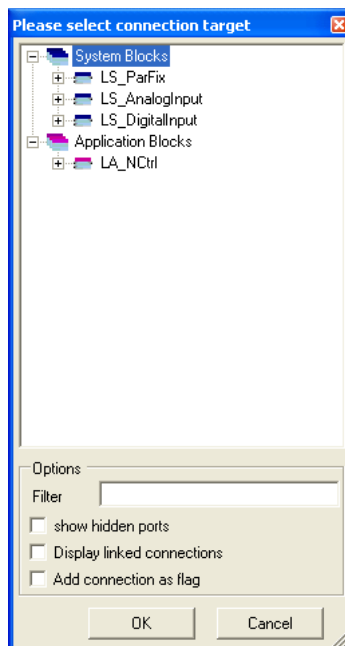
16.4.4.3 Creating a connection via connection dialog

You can also create connections by means of a selection dialog instead of dragging by mouse. This especially makes sense if there is a great distance between the ports to be connected in the drawing area.



How to create a connection using the selection dialog:

1. Right-click the port identifier or click the port symbol from which the connection is to start.
 - The *context menu* for the port is displayed.
2. Go to the *context menu* for the port and select the **Add/change connection...** command.
 - The *Add/change connection* dialog box is displayed:



- In a tree structure all inputs and outputs of the application are shown to which a connection is permissible.
 - You can enter an optional text into the **Filter** input field to reduce the selection to the blocks or ports which contain the entered text.
 - If you activate the **Show hidden ports** control field, the hidden ports for system and function blocks are shown as well.
3. Select the port where the connection is to end from the tree structure.
 4. Activate the **Add connection as flag** control field if a port identifier (flag) is to be inserted instead of a connection line.
 5. Press **OK** to create the connection to the selected port and close the dialog box.

16.4.4.4 Deleting connections that are no longer required



How to delete connection lines:

1. Select connection lines to be deleted.
 - Select a single connection line by directly clicking on the connection line with the right mouse button.
 - If you click further connection lines while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - All connection lines are highlighted in red.
2. Press **<Del>**.



How to delete port identifiers/flags:

1. Select the port identifiers to be deleted.
 - Select a single port identifier by directly clicking on the port identifier with the left mouse button.
 - If you click further port identifiers while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - All selected port identifiers are highlighted by a light green header.
2. Press **<Del>**.

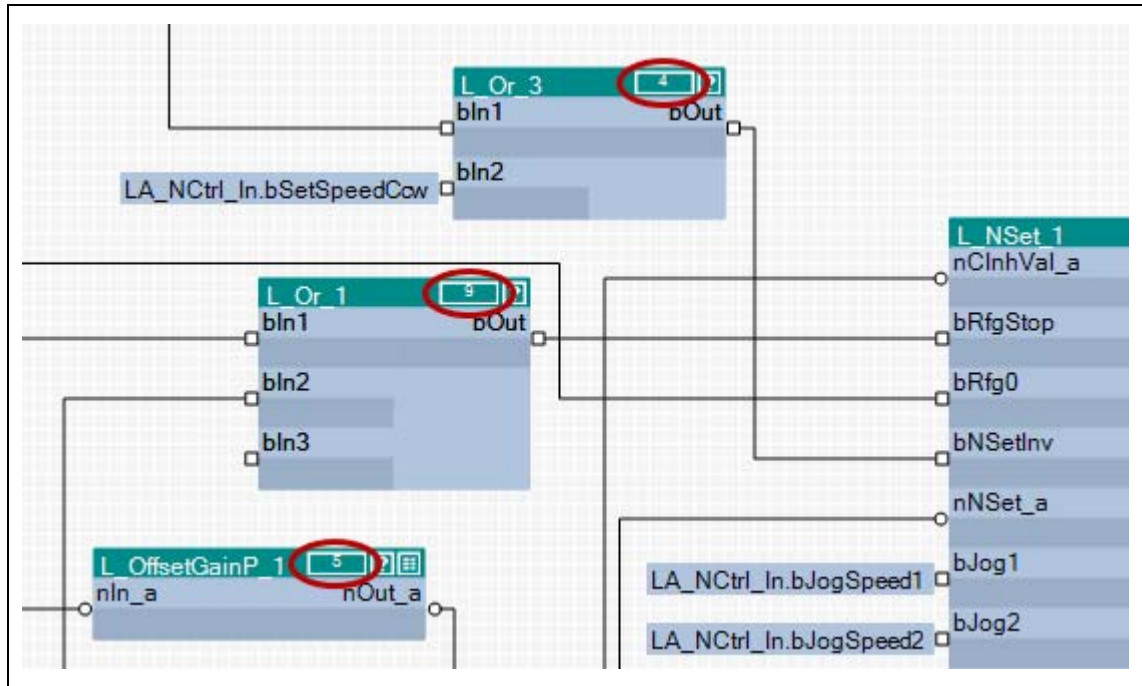
Related topics

- ▶ [Deleting objects that are no longer required](#) (📖 887)

16.4.5 Changing the processing order

If you insert a function block into the interconnection, an order index is automatically assigned to this function block. By means of this order index it is defined in which order the individual function blocks are calculated at runtime.

- The first function block inserted contains the order index "1", the next function block inserted contains the order index "2", etc.
- The respective order index is displayed in the header of the function block in the rectangle after the block name.



[16-10] Example: Function blocks with order index



Note!

When a function block is shifted, its order index is maintained.

The processing order influences the result!

- In certain cases it may be sensible to change the processing order, but if you select an unfavourable processing order, errors may arise!



How to change the processing order manually:

1. Use the list field at the top right to change from the Editor to the overview.
 - The overview displays all function blocks of the interconnection in the order of their processing
 - In the first "Order" column the order index of each function block is listed.
2. Unless already selected, select the entry "Manual selection" in the **Optimisation...** list field.

Function blocks used (23/50)

Q...	Name	Time
1	LA_NCtrl_In	20 µs
2	L_RLQ_1	3 µs
3	L_Or_2	2 µs
4	L_Or_3	2 µs
5	L_OffsetGainP_1	17 µs
6	L_OffsetGainP_2	17 µs
7	L_OffsetGainP_3	17 µs
8	L_MPot_1	10 µs
9	L_Or_1	2 µs
10	L_NSet_1	50 µs
11	L_PCTRL_1	20 µs
12	L_AnalogSwitch_1	2 µs
13	L_Arithmetik_1	7 µs
14	L_DigitalDelay_1	2 µs
15	L_DigitalLogic_1	2 µs
16	L_MulDiv_1	4 µs

3. Select the function block which is to receive a different position within the processing order.
 - If you click further function blocks while pressing **<Ctrl>** they are added to an already existing selection (multi-selection).
 - The **<Shift>** key serves to select a related area of function blocks.
4. Move the function block(s) to the desired position using the and buttons.
 - The button serves to exchange two selected function blocks with regard to their order.
5. Repeat steps 3 and 4 until the required processing order has been established.

Changing the processing order according to an automatically generated selection

In addition to the manual selection, the **Optimisation...** list field also offers two options for an automatic adaptation of the processing order:

- **Signal flow:** The processing order is optimised according to the signal flow.
- **Topology:** The processing order is optimised according to the x/y arrangement of the function blocks in the FB Editor.

As long as an automatic adaptation has been selected, a manual change of the processing order is not possible.

16.4.6 Copying interconnection elements (across all devices)

Interconnection elements can be copied across the devices within the project if the devices belong to the same product family (e.g. Inverter Drives 8400).

All types of blocks and comments can be copied to the clipboard via the **Copy** command or the **<Ctrl>+<c>** shortcut and then be inserted into the FB interconnection of the same or another project device of the same product family using the **Paste** command or the **<Ctrl>+<v>** shortcut.

- During the copy process into the clipboard, existing connections between copied blocks are copied as well, and the layout is kept too. Moreover, the separate technical objects (e.g. port definition) are copied. Selected connections cannot be copied on their own.
- The **Paste** command is available if the clipboard is not empty and if it was copied from a device of the same product family. Within this product family, all device types (e.g. 8400 xxxxLine Vxx.xx) are permitted.
- After the **Paste** command has been selected, a dialog box is displayed which serves to select which elements are to be inserted from the clipboard and how to solve name conflicts, if any.
- After inserting the elements, they are marked in the target interconnection in order to be repositioned or deleted again to undo the insertion.
- Inserting from the clipboard can be repeated. The originally copied contents of the clipboard remains unchanged when it is inserted.



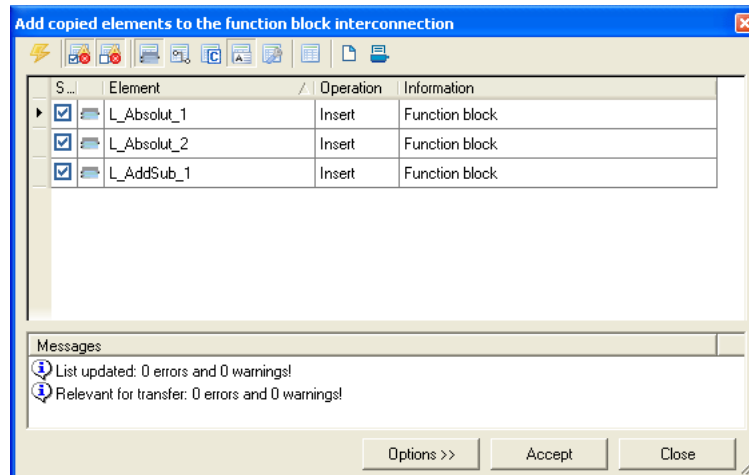
How to copy one or several interconnection elements:

1. Select the objects to be copied.
 - You can select a single object by clicking the header of the object.
 - If you click the header of further objects while pressing **<Ctrl>**, these will be added to an already existing selection (multi-selection).
 - You can easily select elements that are placed together by drawing a frame around these elements while keeping the mouse button pressed.
 - All selected objects are highlighted by a light green header.
2. Go to the *context menu* and select the **Copy** command (or **<Ctrl>+<c>**).
 - The selected elements are copied into the clipboard of the FB Editor.
3. If the elements are to be copied into a function block interconnection of another project device, change to the corresponding interconnection via the *project view*.
4. Go to the *context menu* and select the **Paste** command (or **<Ctrl>+<v>**).
5. Go to the *Insert FB interconnection* dialog box and select the elements to be inserted from the clipboard.
 - Detailed information on this dialog box can be obtained from the following subchapter ["Insert options for copied elements"](#). (900)

6. Click **Insert** to insert the selected elements into the target interconnection as defined.
 - Only possible if at least one element in the list has been selected for insertion.
 - Insertion is also possible via the **<Enter>** button if at least one element is selected from the list for insertion.
 - The original layout and the relative position of the inserted blocks to each other are maintained.
 - When copying across the devices, you also insert the corresponding separate technical objects (e.g. port definition).
 - The inserted elements are deleted from the list. If the list is empty, the dialog box is closed and the connections are inserted depending on the selected option.
7. If there are still elements to be entered in the list, repeat steps 5 and 6 until all elements are inserted as intended.
8. Press **Close** to stop the insertion and close the dialog box.
 - You can also use **<Esc>** or **<Enter>** to close the dialog box if "Insert" is not active.
 - The elements inserted into the target interconnection so far are maintained.
 - The connections for the blocks inserted so far are inserted depending on the selected option.

16.4.6.1 Insert options for copied elements

If interconnection elements have been copied to the clipboard, the »Engineer« will display a list of all elements contained in the clipboard when selecting the command **Insert** in the *Insert FB interconnection* dialog box:



The list shows the elements which can be added to the target interconnection, and the elements which cannot be added.

- In the "Selection" column, you can check/uncheck the elements to be added.
- Connections are only inserted when the dialog box is closed, which applies to all modules inserted so far. They are displayed as lines or flags, like in the original, but re-routed.
- The symbols in the *Toolbar* serve to execute the following functions:

Icon	Function
	Add the selected elements to the interconnection
	Show the elements to be added but are marked with an error or warning.
	Show the elements not to be added and marked with an error or warning.
	Show blocks
	Show connections
	Show parameters
	Show comments
	Show system elements
	Show all
	Print view
	Print list

- The buttons serve to execute the following functions:

Button	Function
Insert	Add elements selected in the list to the target interconnection • Only possible if at least one element in the list has been selected for insertion. • Insertion is also possible via the <Enter> button if at least one element is selected from the list for insertion. • The original layout and the relative position of the inserted blocks to each other are maintained. • When copying across the devices, you also insert the corresponding separate technical objects (e.g. port definition). • The added elements are simultaneously deleted from the list. The connections are added depending on the selected option.
Close	Close dialog box. • You can also use <Esc> or <Enter> to close the dialog box if "Insert" is not active. • The elements inserted into the target interconnection so far are maintained. • The connections for the blocks inserted so far are inserted depending on the selected option.

16.4.7 Resetting changed interconnection

If you only made changes on the I/O level, you can reset them by selecting a predefined control scheme in [C00007](#). If you have also made changes on the application level, you must first reset the changed application to a predefined application in [C00005](#).



How to reset the application interconnection to a predefined application:

1. Go to the **Application parameters** tab.
2. Select the required application in the **Application** list field.

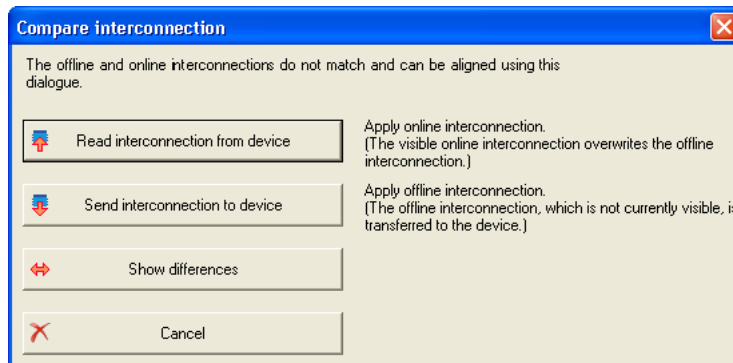


How to reset the I/O interconnection to a predefined control scheme:

1. Go to the **Application parameters** tab.
2. Select the required control scheme in the **Control source** list field.

16.5 Adjusting online and offline interconnection

If the »Engineer« detects that online and offline interconnection differ from each other, the *Compare interconnection* dialog box is displayed with various options for the adjustment:



Tip!

The dialog box can also be opened via the  symbol in the *FB Editor toolbar*.

Button	Function
Accepting the interconnection from the device	Add the interconnection in the device to the FB Editor. The interconnection existing in the FB Editor will be overwritten by this action.
Transferring the interconnection to the device	Transfer the offline interconnection which is currently not visible in the FB Editor to the device. The interconnection existing in the device will be overwritten by this action.
Showing differences	Showing differences between online and offline interconnection.
Cancel	Close the <i>Adjust interconnection</i> dialog box without making an adjustment.

16.6 Printing the interconnection

The interconnection can be printed for documentation purposes, optionally on one page, on four pages, or not scaled.



Tip!

By clicking the  icon in the *FB Editor toolbar*, you can get a print view before printing.



How to print the interconnection:

1. In the *FB Editor toolbar*, click the  icon.
 - The *Circuit print size* dialog box is displayed.
2. Select the desired size and press **OK**.
 - The standard dialog box *Print* appears.
3. Press **OK** to start the printing process.

16.7 Comparing interconnections

The comparison operation serves to compare FB interconnections of 8400 devices within the project. An offline<>online comparison and the comparison of two online devices are possible.



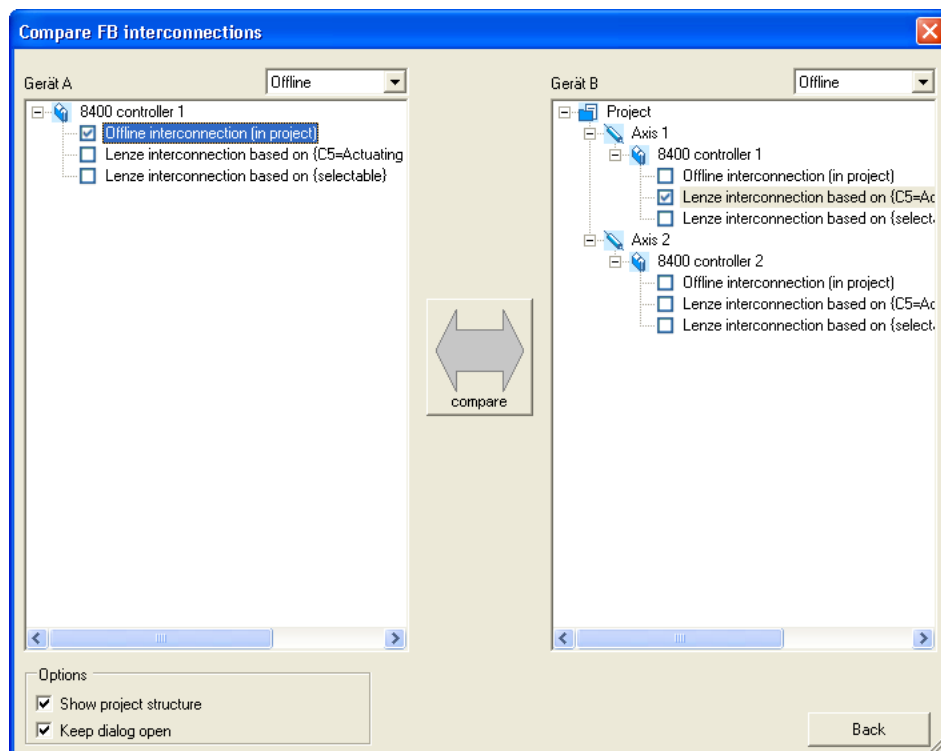
Note!

Only applications can be compared which have been enabled in the FB Editor!
Block positions, line representations, and connector visibilities are not compared.



How to compare two FB interconnections:

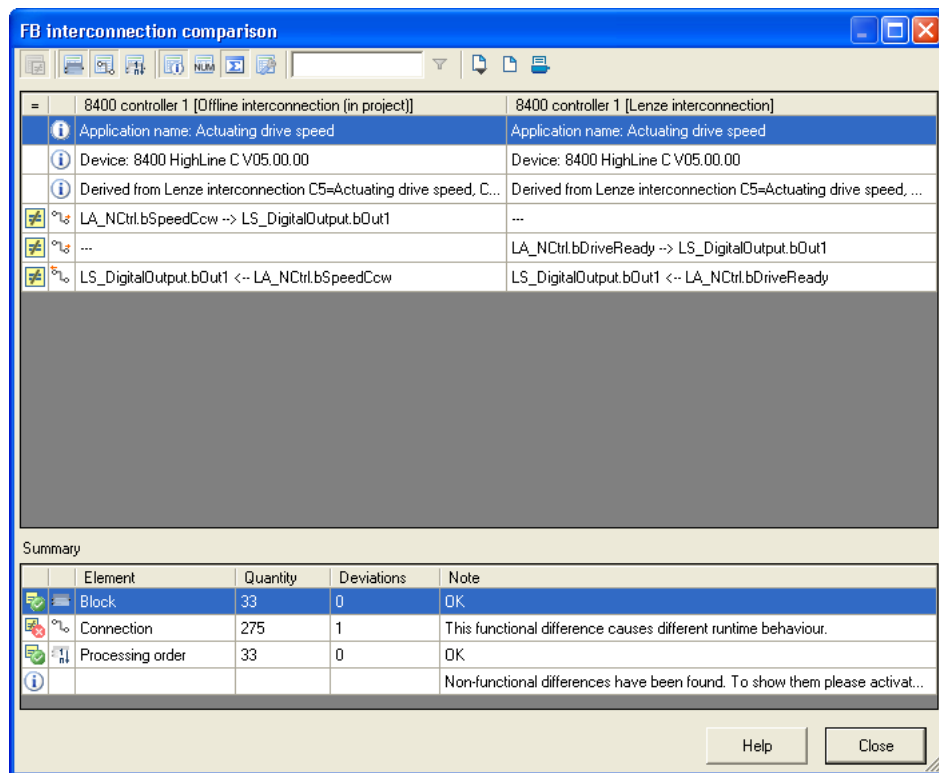
1. Select the command **Application data→Compare FB interconnections....**
 - The *Compare FB interconnections* dialog box is displayed:



2. Select the interconnections to be compared in the project view represented on the left and right.
 - In order to execute a comparison with an online device, select "Online" in one of the two upper list fields. Then all available online devices are displayed for selection.
 - If you select "Online" in one of the two upper list fields, you can also compare the interconnections of two available online devices.
3. Click **Compare**.
 - If the comparison was executed successfully, the comparison result is displayed as a list (see the following section).
 - If a comparison of the selected interconnections is not possible, a corresponding message is displayed.
4. In order to stop the comparison operation and close the dialog box: Press **Back**.

Representation of the comparison result

The comparison result is displayed in the form of a list in the *FB interconnection comparison* dialog box:



- The symbols in the *Toolbar* serve to show or hide different details and export and print the shown list.

Icon	Function
	Only show differences • Button can only be activated in expert mode.
	Show blocks
	Show connections
	Show processing order
	Show properties of blocks and connections • Function is only available in expert mode.
	Show comments • Function is only available in expert mode.
	Show block parameters • Function is only available in expert mode.
	Show application parameters • Function is only available in expert mode.
	Show all • Function is only available in expert mode.
	Show general information
	Show summary

Icon	Function
	Activate expert mode • In the expert mode, also non-functional differences are shown.
	Apply filter • Only show list entries which contain the text entered in the input field. • Function is only available in expert mode.
	Export shown list as comma-separated list (*.csv)
	Print view
	Print list

16.8 Copying an interconnection

In contrast to copying/inserting selected interconnection elements via the clipboard, the function described in this chapter serves to replace the current FB interconnection of a device completely by the FB interconnection of another project device.



Note!

The complete FB interconnection can only be copied between devices of the same device type and version (e.g. 8400 HighLine C V1.0).

A complete interconnection comprises:

- Function blocks (use and parameter values)
- System blocks (application and parameter values)
- Port blocks (use and parameter values)
- Connections
- Comments
- Interconnection layout (arrangement of the modules)
- Port definition of the ports used in the FB interconnection



How to copy the complete interconnection into another project device:

1. Select the application with the FB interconnection to be copied in the *project view*.
2. Select the command **Application data→Copy FB interconnections....**
3. Go to *project view* and select the application which is to be inserted into the copied FB interconnection.
4. Select the command **Application data→Add FB interconnection....**
 - The command can only be activated if an FB interconnection has been copied from a device of the same device type and version.
 - After the command has been executed, the module assembly is compared. If there are relevant deviations, the insertion is refused and a corresponding message is displayed.
 - If an insertion is possible, you are asked if the FB interconnection is to be inserted.
5. Confirm the question if the copied FB interconnection is to be inserted with **Yes**.
 - After the insertion, an update of the project is required.

16.9 Exporting/Importing an interconnection

The interconnection existing in the project can be exported to a file for reuse/transfer to other devices.



Note!

The file can only be imported to devices of the same device type and version (e.g. 8400 HighLine C V1.0).



How to export the interconnection from the project to a file:

1. Go to the *Project view* in the *context menu* of the controller and select the **Export FB interconnection...** command.
2. Enter the memory location and the file name for the interconnection to be exported in the *Export FB interconnection* dialog box.
3. Click **Save** to export the interconnection and close the dialog box.



How to import the interconnection from a file to the project:

1. Go to the *Project view* in the *context menu* of the controller and select the **Import FB interconnection...** command.
2. Select the file with the interconnection to be imported in the *Import FB interconnection* dialog box.
3. Click **Open** to import the interconnection and close the dialog box.

17 Function library

17.1 Function blocks

This chapter describes the function blocks which are available for the controller in the FB Editor.



The system blocks are described in the following chapter "[System blocks](#)". (📖 990)

Overview of function blocks available

Function block	Runtime	Function
L_Absolute_1	2 µs	... converts a bipolar input signal into a unipolar output signal.
L_AddSub_1	3 µs	... adds / subtracts analog input signals.
L_AnalogSwitch_1 L_AnalogSwitch_2 L_AnalogSwitch_3	2 µs	... switches between two analog input signals.
L_And_1 L_And_2 L_And_3	2 µs	... ANDs three binary signals.
L_Arithmetik_1 L_Arithmetik_2	7 µs	... combines two analog signals arithmetically. • L_Arithmetik_2 is available from version 11.00.00 onwards.
L_Compare_1 L_Compare_2 L_Compare_3	5 µs	... compares two analog signals and can be used e.g. to implement a trigger. • L_Compare_3 is available from version 11.00.00 onwards.
L_DFlipFlop_1	1 µs	... provides two stable states depending on the input signals.
L_DigitalDelay_1	2 µs	... delays binary signals.
L_DigitalLogic_1 L_DigitalLogic_3	2 µs	... provides a binary output signal which is generated by the logic combination of three input signals. • L_DigitalLogic_3 is available from version 11.00.00.
L_GainOffset_1 L_GainOffset_2 L_GainOffset_3	3 µs	... can amplify an analog input signal and then add an offset to it. • Gain and offset can be set via FB inputs.
L_Interpolator_1	5 µs	... can interpolate a position setpoint and/or an analog value e.g. to compensate for larger bus transmission cycles or to continue signal characteristics if data telegrams are missing.
L_JogCtrlExtension_1	5 µs	... can be connected upstream to the L_NSet ramp generator to implement a switch-off positioning at limit switch.
L_MPot_1	10 µs	... replaces a hardware motor potentiometer as setpoint source.
L_MulDiv_1	4 µs	... multiplies the analog input signal with a factor.
L_Negation_1	2 µs	... negates an analog input signal.
L_Not_1 L_Not_2 L_Not_3	2 µs	... inverts a digital input signal.
L_NSet_1	50 µs	... contains a ramp generator with comprehensive parameterisation and control options to condition a setpoint signal.
L_OffsetGain_1 L_OffsetGain_2	4 µs	... can add an offset to an analog input signal and amplify it afterwards. • Offset and gain can be set via FB inputs.
L_OffsetGainP_1 L_OffsetGainP_2 L_OffsetGainP_3	17 µs	... can add an offset to an analog input signal and amplify it afterwards. • Offset and gain can be set via parameters.

Function block	Runtime	Function
L_Or_1 L_Or_2 L_Or_3 L_Or_4	2 µs	... ORs three binary signals. • L_Or_4 is available from version 11.00.00.
L_PCTRL_1	20 µs	... is a PID controller and can be used for various control tasks.
L_PT1_1	1 µs	... filters and delays analog signals.
L_RLO_1	3 µs	... links a selected direction of rotation to the QSP function with wire-break protection.
L_SignalMonitor_a	15 µs	... serves to output analog output signals of other FBs, SBs or LAs.
L_SignalMonitor_b	3 µs	... serves to output binary output signals of other FBs, SBs or LAs.
L_Transient_1 L_Transient_2 L_Transient_3 L_Transient_4	3 µs	... evaluates digital signal edges and converts them into timed pulses.

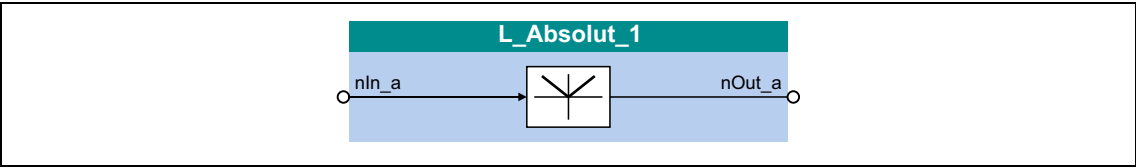
Related topics:

- ▶ [Overview of system blocks available](#) (📖 990)
- ▶ [Working with the FB Editor](#) (📖 857)

17.1.1

L_Absolut_1

This FB converts a bipolar input signal into a unipolar output signal.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal

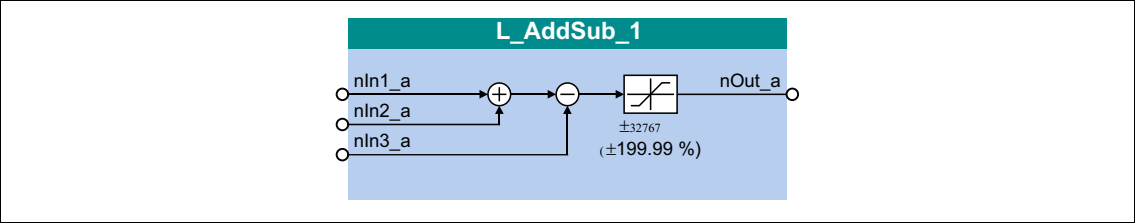
Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal

17.1.2 L_AddSub_1

This FB is provided with two adding inputs and one subtracting input.

- The value provided at the *nOut_a* output is internally limited to ± 32767 .



Inputs

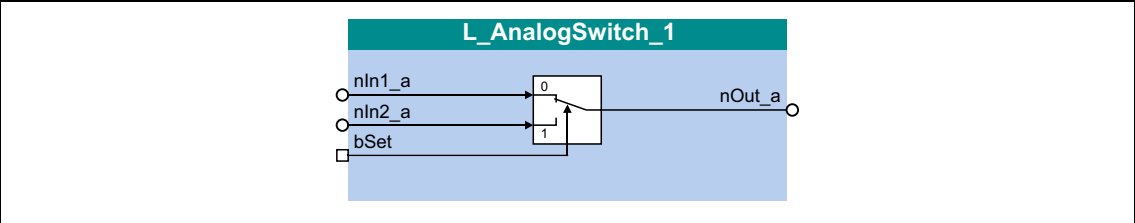
Identifier	Data type	Information/possible settings
nln1_a	INT	Input signal 1 • This input is added
nln2_a	INT	Input signal 2 • This input is added
nln3_a	INT	Input signal 3 • This input is subtracted

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • $nOut\_a = nln1\_a + nln2\_a - nln3\_a$ • Internal limitation to ± 32767 ($\pm 199.99 \%$)

17.1.3 L_AnalogSwitch_1

This function block switches between two analog input signals. The switching is controlled via a boolean input signal.



Inputs

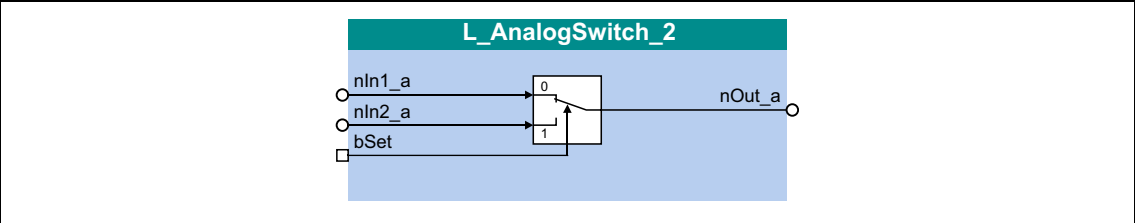
Identifier	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2
bSet	BOOL	Selection of the input signal for the output to <i>nOut_a</i>
		FALSE <i>nln1_a</i>
		TRUE <i>nln2_a</i>

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal

17.1.4 L_AnalogSwitch_2

This function block switches between two analog input signals. The switching is controlled via a boolean input signal.



Inputs

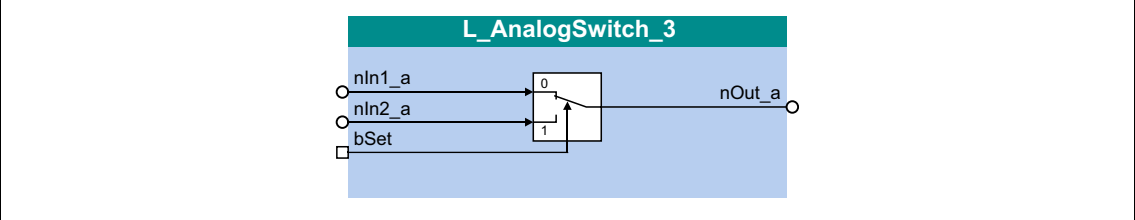
Identifier	Data type	Information/possible settings
<i>nln1_a</i>	INT	Input signal 1
<i>nln2_a</i>	INT	Input signal 2
<i>bSet</i>	BOOL	Selection of the input signal for the output to <i>nOut_a</i>
		FALSE <i>nln1_a</i>
		TRUE <i>nln2_a</i>

Outputs

Identifier	Data type	Value/meaning
<i>nOut_a</i>	INT	Output signal

17.1.5 L_AnalogSwitch_3

This function block switches between two analog input signals. The switching is controlled via a boolean input signal.



Inputs

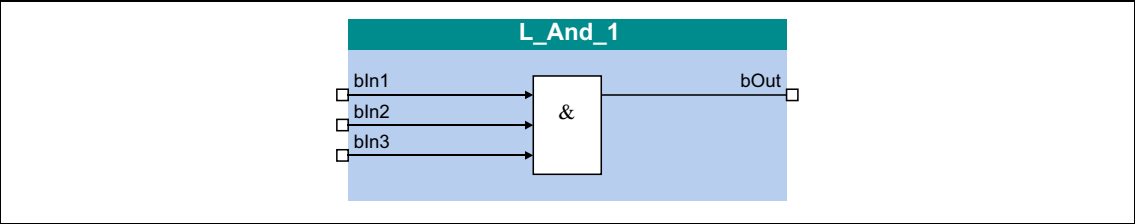
Identifier	Data type	Information/possible settings
<i>nln1_a</i>	INT	Input signal 1
<i>nln2_a</i>	INT	Input signal 2
<i>bSet</i>	BOOL	Selection of the input signal for the output to <i>nOut_a</i>
		FALSE <i>nln1_a</i>
		TRUE <i>nln2_a</i>

Outputs

Identifier	Data type	Value/meaning
<i>nOut_a</i>	INT	Output signal

17.1.6 L_And_1

This FB implements the ANDing of the input signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

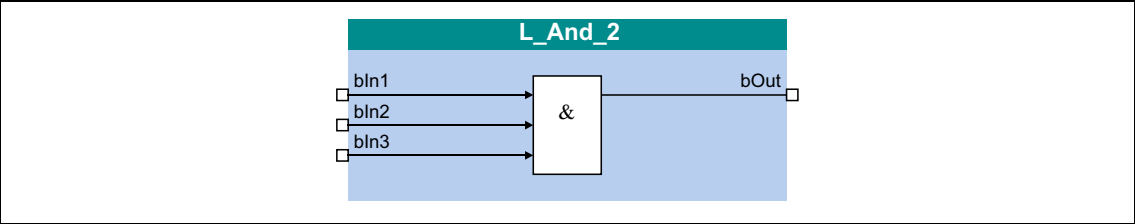
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE

[17-1] Truth table of the FB L_And_1

17.1.7 L_And_2

This FB implements the ANDing of the input signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

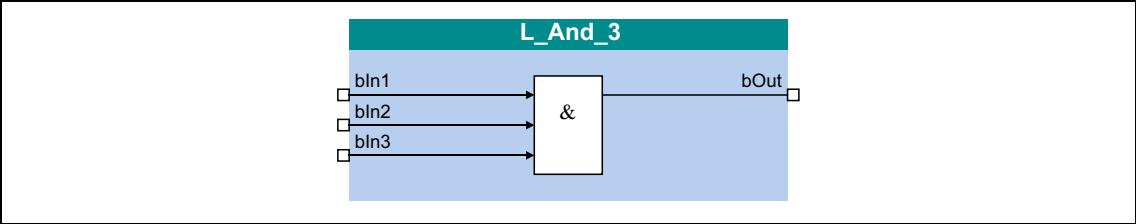
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE

[17-2] Truth table of the FB L_And_2

17.1.8 L_And_3

This FB implements the ANDing of the input signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

Function

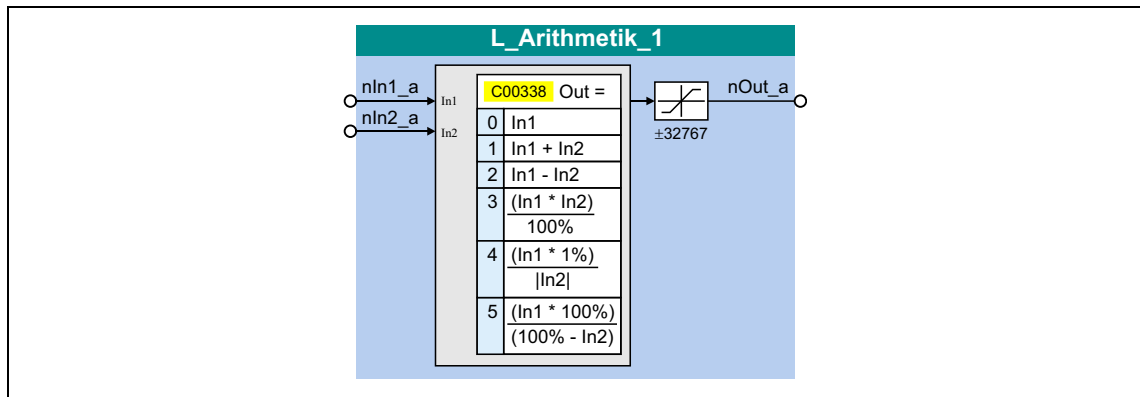
Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE

[17-3] Truth table of the FB L_And_3

17.1.9 L_Arithmetik_1

This FB can combine two analog signals arithmetically.

- The arithmetic function is selected in [C00338](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ± 32767 .
- Division is not remainder considered.



Inputs

Identifier	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ± 32767 ($\pm 199.99\%$)

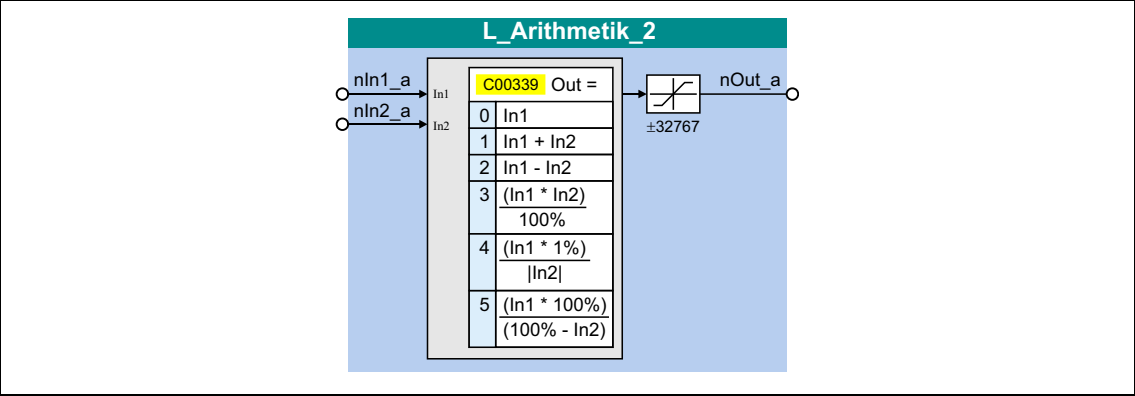
Parameter

Parameter	Possible settings	Info
C00338		Function selection
	0 $nOut\_a = nln1\_a$	
	1 $nOut\_a = nln1\_a + nln2\_a$	
	2 $nOut\_a = nln1\_a - nln2\_a$	
	3 $nOut\_a = \frac{nln1\_a \cdot nln2\_a}{16384}$	
	4 $nOut\_a = \frac{nln1\_a}{ nln2\_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut\_a = \frac{nln1\_a}{16384 - nln2\_a} \cdot 16384$	

17.1.10 L_Arithmetik_2

This FB can combine two analog signals arithmetically.

- The arithmetic function is selected in [C00339](#).
- All internal intermediate results and the value output at the *nOut_a* output are internally limited to ±32767.
- Division is not remainder considered.



Inputs

Identifier	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±32767 (±199.99 %)

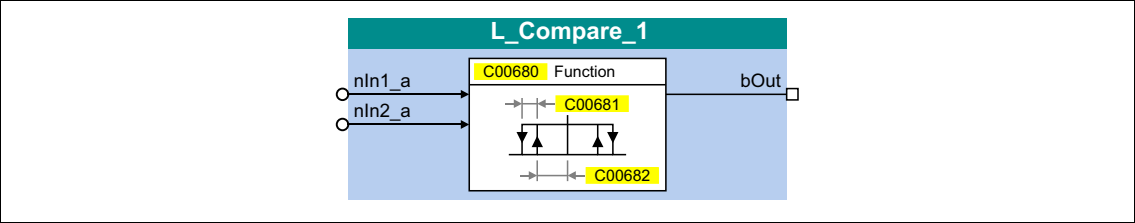
Parameter

Parameter	Possible settings	Info
C00339		Function selection
	0 $nOut\_a = nln1\_a$	
	1 $nOut\_a = nln1\_a + nln2\_a$	
	2 $nOut\_a = nln1\_a - nln2\_a$	
	3 $nOut\_a = \frac{nln1\_a \cdot nln2\_a}{16384}$	
	4 $nOut\_a = \frac{nln1\_a}{ nln2\_a } \cdot 164$	When the denominator has the value "0", it will be set to "1".
	5 $nOut\_a = \frac{nln1\_a}{16384 - nln2\_a} \cdot 16384$	

17.1.11 L_Compare_1

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Identifier	Data type	Information/possible settings
nIn1_a	INT	Input signal 1
nIn2_a	INT	Input signal 2

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

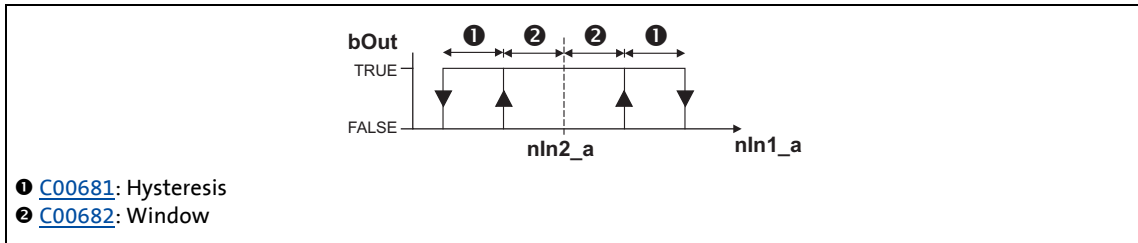
Parameter

Parameter	Possible settings			Info
C00680				Function selection
	1	$nIn1 = nIn2$		
	2	$nIn1 > nIn2$		
	3	$nIn1 < nIn2$		
	4	$ nIn1 = nIn2 $		
	5	$ nIn1 > nIn2 $		
	6	$ nIn1 < nIn2 $		
C00681	0.00	%	100.00	Hysteresis • Lenze setting: 0.50 %
C00682	0.00	%	100.00	Window • Lenze setting: 2.00 %

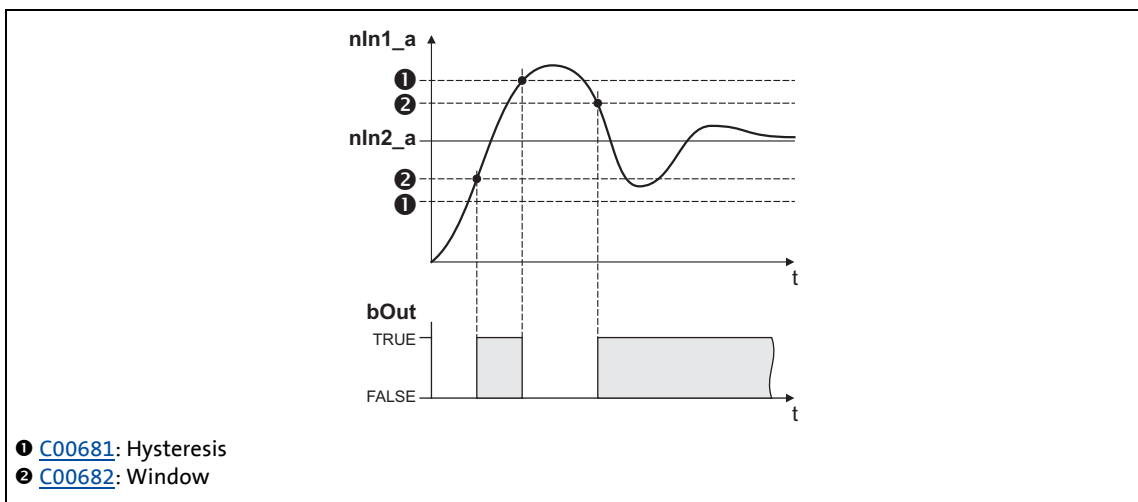
17.1.11.1 Function 1: nln1 = nln2

This function compares two signals with regard to equality. It can, for instance, provide the comparison "actual speed equals setpoint speed" ($n_{act} = n_{set}$).

- Use [C00682](#) to set the window within which the equality is to apply.
- Use [C00681](#) to set a hysteresis if the input signals are not stable and the output oscillates.



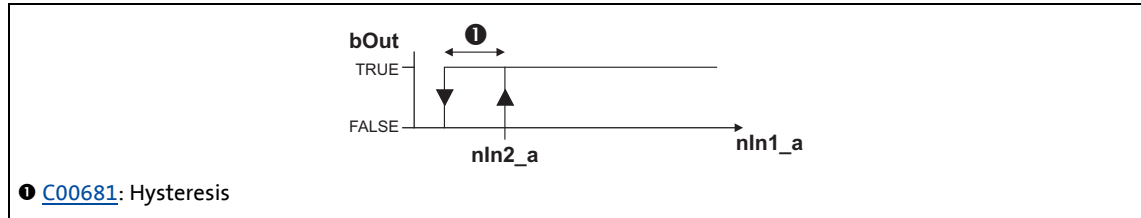
[17-4] Function 1: Switching performance



[17-5] Function 1: Example

17.1.11.2 Function 2: $nln1 > nln2$

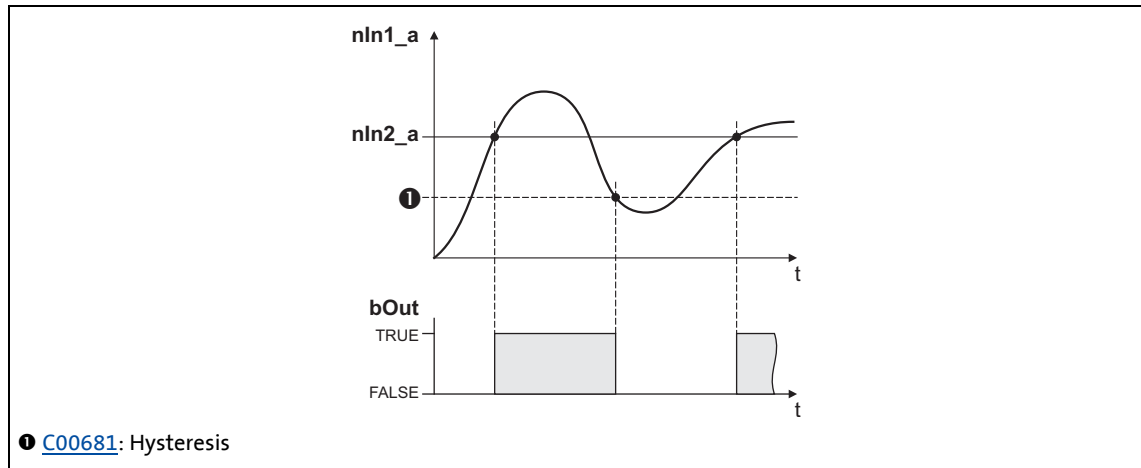
This function serves, for instance, to implement the comparison "actual speed is higher than a limit value" ($n_{act} > n_x$) for one direction of rotation.



[17-6] Function 2: Switching performance

Functional sequence

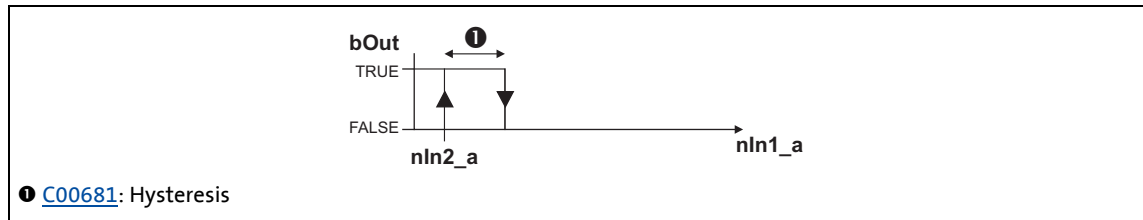
1. If the value at $nln1\_a$ exceeds the value $nln2\_a$, $bOut$ changes from FALSE to TRUE.
2. Only if the signal at $nln1\_a$ falls below the value of $nln2\_a$ - *hysteresis* again, $bOut$ changes back from TRUE to FALSE.



[17-7] Function 2: Example

17.1.11.3 Function 3: $nln1 < nln2$

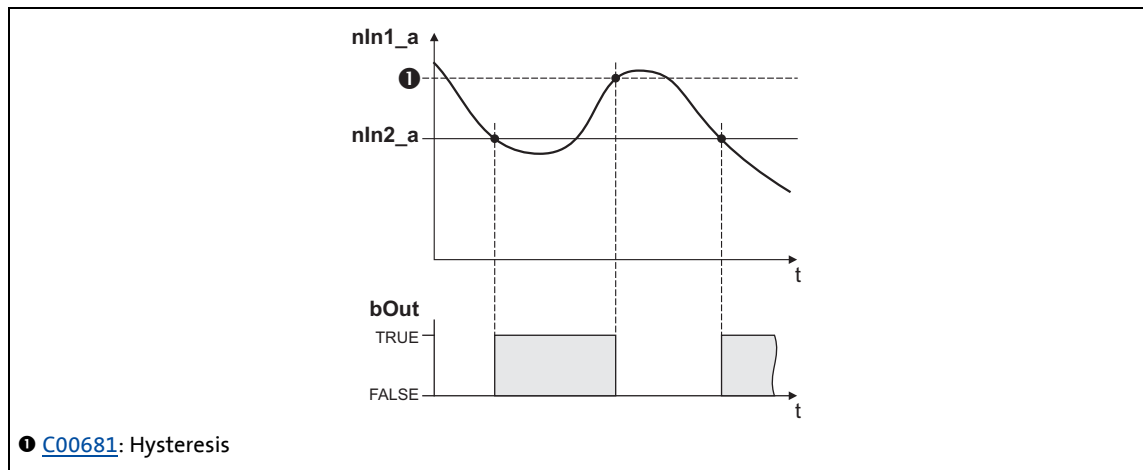
This function serves, for instance, to implement the comparison "actual speed is lower than a limit value" ($n_{act} < n_x$) for one direction of rotation.



[17-8] Function 3: Switching performance

Functional sequence

1. If the value at $nln1\_a$ falls below the value at $nln2\_a$, $bOut$ changes from FALSE to TRUE.
2. Only if the signal at $nln1\_a$ exceeds the value of $nln2\_a$ - *hysteresis* again, $bOut$ changes back from TRUE to FALSE.



[17-9] Function 3: Example

17.1.11.4 Function 4: $|n_{ln1}| = |n_{ln2}|$

This function serves to implement e.g. the comparison " $n_{act} = 0$ ". This function is similar to function 1. However, the amount is generated by the input signals before signal processing (without sign).

► [Function 1: \$n_{ln1} = n_{ln2}\$](#)

17.1.11.5 Function 5: $|n_{ln1}| > |n_{ln2}|$

This function serves to implement e.g. the comparison " $|n_{act}| > |n_x|$ " irrespective of the direction of rotation. This function is similar to function 2. However, the amount is generated by the input signals before signal processing (without sign).

► [Function 2: \$n_{ln1} > n_{ln2}\$](#)

17.1.11.6 Function 6: $|n_{ln1}| < |n_{ln2}|$

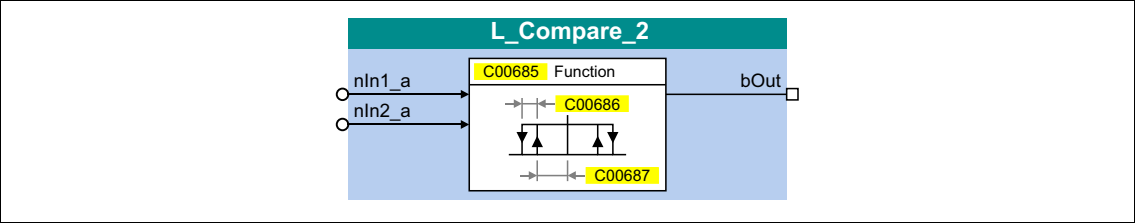
This function serves to implement the comparison " $|n_{act}| < |n_x|$ " independent of the direction of rotation. This function is similar to function 3. However, the amount is generated by the input signals before signal processing (without sign).

► [Function 3: \$n_{ln1} < n_{ln2}\$](#)

17.1.12 L_Compare_2

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Identifier	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameter

Parameter	Possible settings			Info
C00685				Function selection
	1	nln1 = nln2		
	2	nln1 > nln2		
	3	nln1 < nln2		
	4	nln1 = nln2		
	5	nln1 > nln2		
	6	nln1 < nln2		
C00686	0.00	%	100.00	Hysteresis • Lenze setting: 0.50 %
C00687	0.00	%	100.00	Window • Lenze setting: 2.00 %

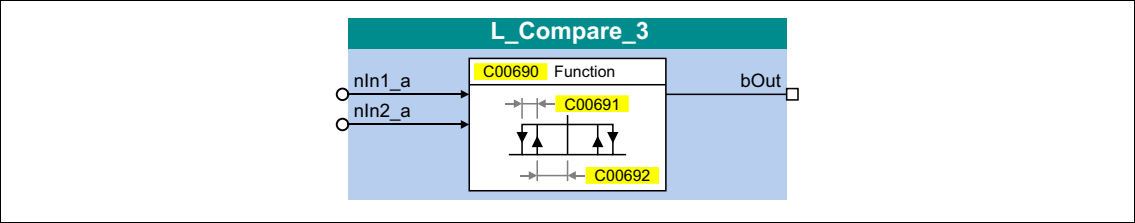


For a detailed functional description see [L_Compare_1](#).

17.1.13 L_Compare_3

This FB compares two analog signals and can be used e.g. to implement a trigger.

- Comparison operation, hysteresis and window size can be parameterised.



Inputs

Identifier	Data type	Information/possible settings
nln1_a	INT	Input signal 1
nln2_a	INT	Input signal 2

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Status signal "Comparison statement is true"
		TRUE The statement of the selected comparison mode is true.

Parameter

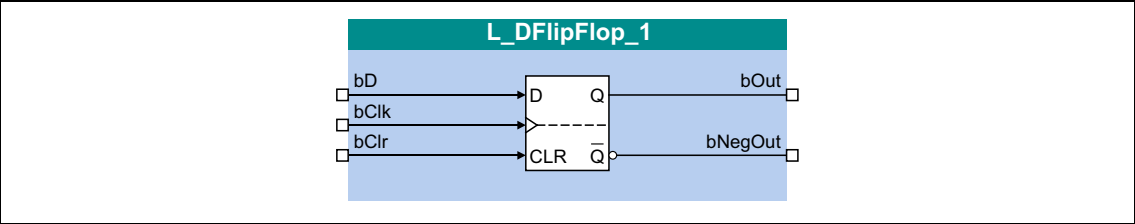
Parameter	Possible settings			Info
C00690				Function selection
	1	$nln1 = nln2$		
	2	$nln1 > nln2$		
	3	$nln1 < nln2$		
	4	$ nln1 = nln2 $		
	5	$ nln1 > nln2 $		
	6	$ nln1 < nln2 $		
C00691	0.00	%	100.00	Hysteresis • Lenze setting: 0.50 %
C00692	0.00	%	100.00	Window • Lenze setting: 2.00 %



For a detailed functional description see [L_Compare_1](#).

17.1.14 L_DFlipFlop_1

The FB saves binary signals (DFlipFlop) in a clock-controlled way.



Inputs

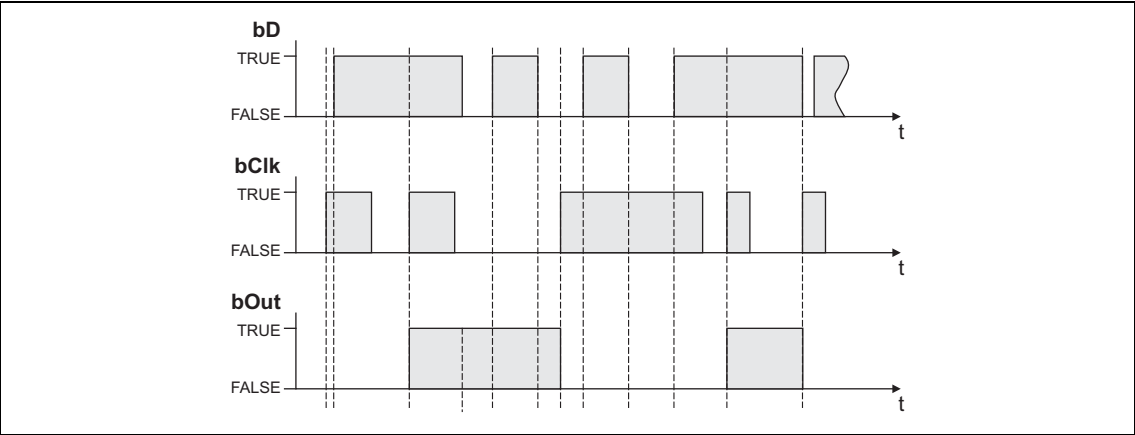
Identifier	Data type	Information/possible settings
bD	BOOL	Data input
bClk	BOOL	Clock input Only FALSE/TRUE edges are evaluated
bClr	BOOL	Reset input
		TRUE - The <i>bOut</i> output is set to FALSE. - The <i>bNegOut</i> output is set to TRUE.

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal
bNegOut	BOOL	Output signal, inverted

Function

If the *bClr* input = FALSE, a signal edge at the *bClk* input switches the static input signal *bD* to the *bOut* output, where it is retained:



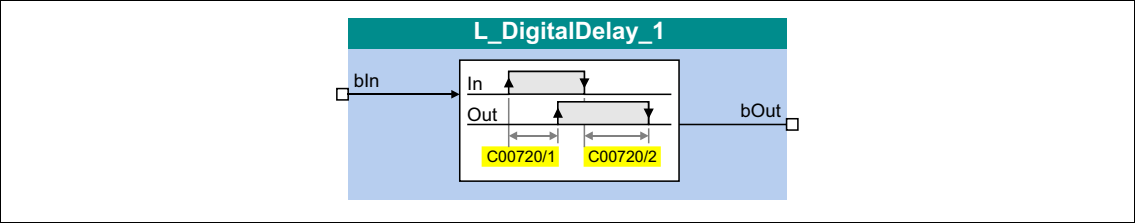
If the *bClr* input = TRUE:

- Due to the priority *bClr* > *bClk*, *bD* the *bOut* output signal can be set any time to the *FALSE* status by the *bClr* input signal = TRUE.
- The output signal is kept in this status independent of the other input signals.

17.1.15 L_DigitalDelay_1

This FB delays binary signals.

- ON and OFF-deceleration can be parameterised separately.



Inputs

Identifier	Data type	Information/possible settings
bIn	BOOL	Input signal

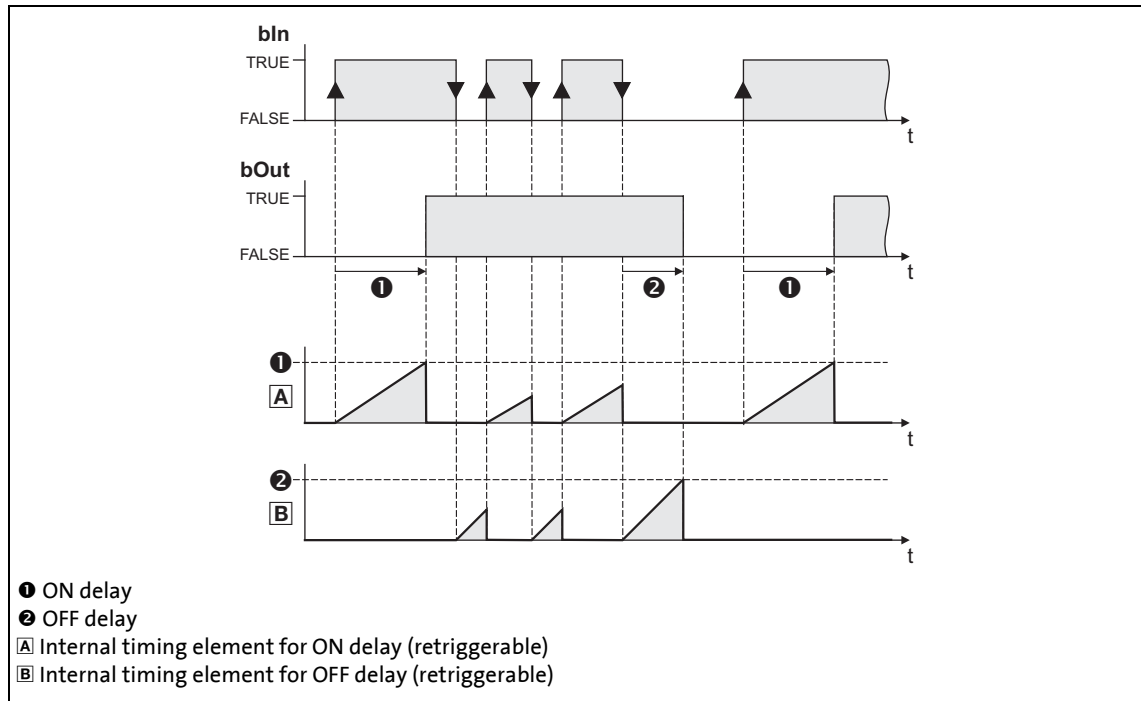
Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal (time-delayed input signal)

Parameter

Parameter	Possible settings			Info
C00720/1	0.000	s	3600.000	ON-deceleration • Lenze setting: 0.000 s
C00720/2	0.000	s	3600.000	OFF-deceleration • Lenze setting: 0.000 s

Function

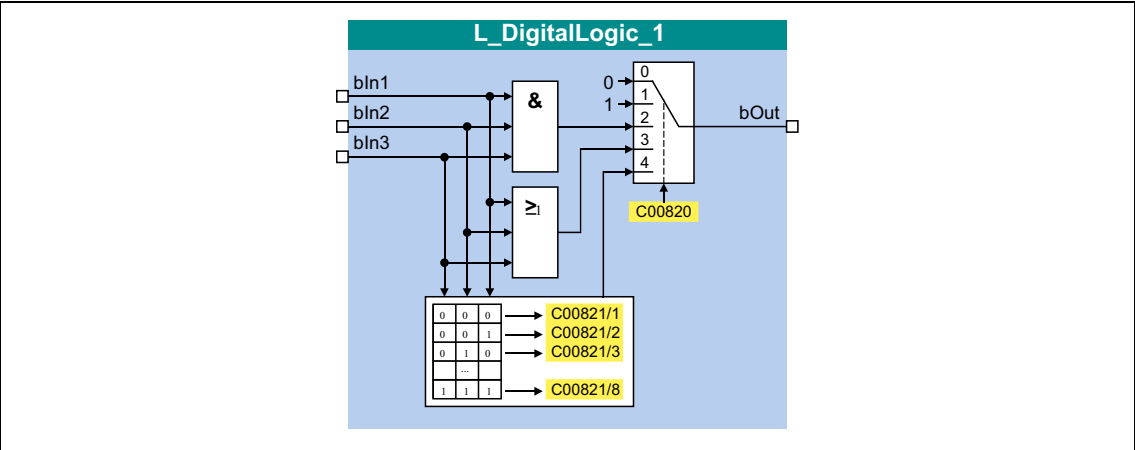


1. A FALSE-TRUE edge at bIn starts the internal timing element for the ON delay.
2. After the defined ON delay, the input signal bIn is output at $bOut$.
3. A TRUE-FALSE edge at bIn starts the internal timing element for the OFF delay.
4. After the defined OFF delay, the input signal bIn is output at $bOut$.

17.1.16 L_DigitalLogic_1

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- AND operation of the inputs
- OR operation of the inputs
- Output depending on the combination of the input signals



Inputs

Identifier	Data type	Information/possible settings
bIn1	BOOL	Input signal 1
bIn2	BOOL	Input signal 2
bIn3	BOOL	Input signal 3

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

Parameter

Parameter	Possible settings	Info
C00820		Function selection
	0 "0"	Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 $bOut = bIn1 \wedge bIn2 \wedge bIn3$	AND operation
	3 $bOut = bIn1 \vee bIn2 \vee bIn3$	OR operation
	4 $bOut = f(\text{truth table})$	The output value depends on the truth table parameterised in C00821/1...8

Parameter	Possible settings	Info
C00821/1...8		Truth table for function "4: bOut = f (truth table)" • Each of the eight possible input combinations can be assigned to the output value FALSE or TRUE. • For an application example see the following section.
	0 FALSE	
	1 TRUE	

Function "4: bOut = f (Truth table)"

When the function "4: bOut = f (truth table)" is selected in [C00820](#), the output value *bOut* depends on the truth table parameterised in [C00821/1...8](#).

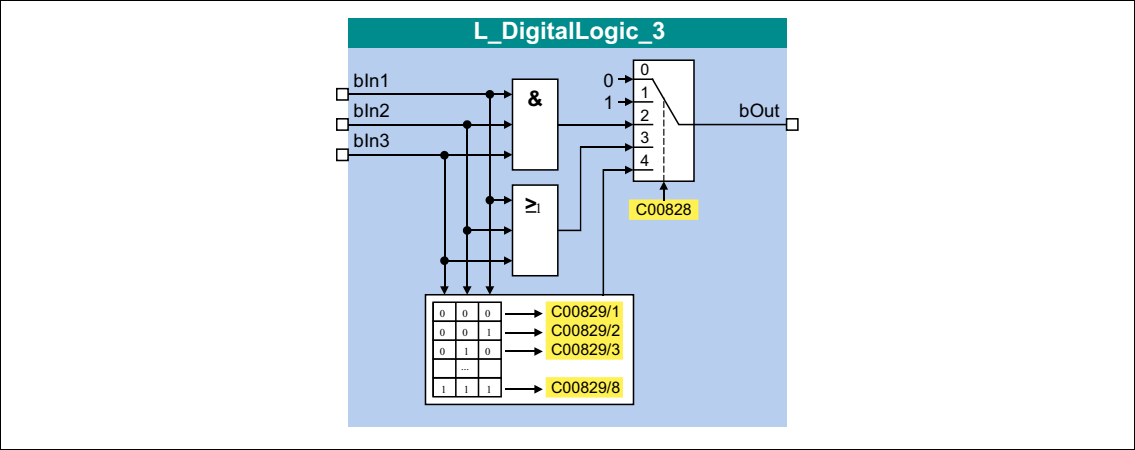
The following table shows which setting may be required in [C00821/1...8](#) to realise the logic operations NAND, NOR, XOR and XNOR:

Input signals			Output <i>bOut</i>	Parameter setting for logic operation:			
<i>bIn3</i>	<i>bIn2</i>	<i>bIn1</i>		NAND	NOR	XOR	XNOR
0	0	0	C00821/1 =	1	1	0	1
0	0	1	C00821/2 =	1	0	1	0
0	1	0	C00821/3 =	1	0	1	0
0	1	1	C00821/4 =	1	0	0	1
1	0	0	C00821/5 =	1	0	1	0
1	0	1	C00821/6 =	1	0	0	1
1	1	0	C00821/7 =	1	0	0	1
1	1	1	C00821/8 =	0	0	0	1

17.1.17 L_DigitalLogic_3

This FB provides a binary output signal created by a logic operation of the input signals. Optionally, one of the constant binary values independent from the input signals can be output.

- Output of a constant binary value
- AND operation of the inputs
- OR operation of the inputs
- Output depending on the combination of the input signals



Inputs

Identifier	Data type	Information/possible settings
bIn1	BOOL	Input signal 1
bIn2	BOOL	Input signal 2
bIn3	BOOL	Input signal 3

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

Parameter

Parameter	Possible settings	Info
C00828		Function selection
	0 "0"	Constant value "FALSE"
	1 "1"	Constant value "TRUE"
	2 $bOut = bIn1 \wedge bIn2 \wedge bIn3$	AND operation
	3 $bOut = bIn1 \vee bIn2 \vee bIn3$	OR operation
	4 $bOut = f(\text{truth table})$	The output value depends on the truth table parameterised in C00829/1...8

Parameter	Possible settings	Info
C00829/1...8		Truth table for function "4: bOut = f (truth table)" • Each of the eight possible input combinations can be assigned to the output value FALSE or TRUE. • For an application example see the following section.
	0 FALSE	
	1 TRUE	

Function "4: bOut = f (Truth table)"

When the function "4: bOut = f (truth table)" is selected in [C00828](#), the output value *bOut* depends on the truth table parameterised in [C00829/1...8](#).

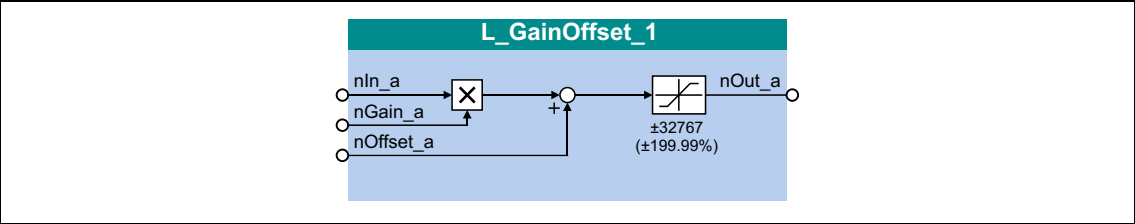
The following table shows which setting may be required in [C00829/1...8](#) to realise the logic operations NAND, NOR, XOR and XNOR:

Input signals			Output <i>bOut</i>	Parameter setting for logic operation:			
<i>bIn3</i>	<i>bIn2</i>	<i>bIn1</i>		NAND	NOR	XOR	XNOR
0	0	0	C00829/1 =	1	1	0	1
0	0	1	C00829/2 =	1	0	1	0
0	1	0	C00829/3 =	1	0	1	0
0	1	1	C00829/4 =	1	0	0	1
1	0	0	C00829/5 =	1	0	1	0
1	0	1	C00829/6 =	1	0	0	1
1	1	0	C00829/7 =	1	0	0	1
1	1	1	C00829/8 =	0	0	0	1

17.1.18 L_GainOffset_1

This FB can amplify an analog input signal and then add an offset to it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to ±199.99 %.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≡ 100 %
nGain_a	INT	Gain factor • Scaling: 16384 ≡ 100 % • 199.99 % ≈ 2
nOffset_a	INT	Offset • Scaling: 16384 ≡ 100 %

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199.99 %

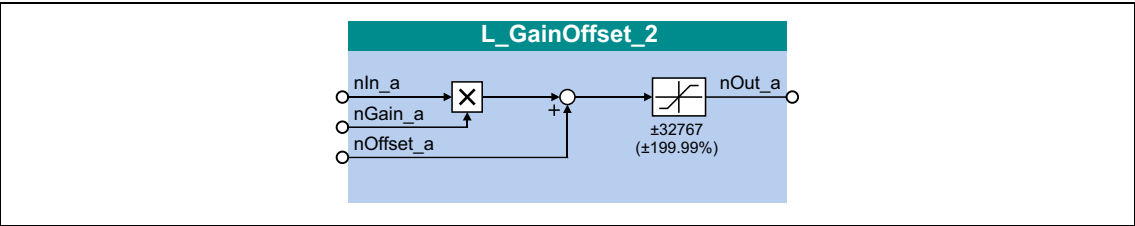
Function

$$nOut\_a = (nIn\_a \cdot \text{Gain factor}) + \text{Offset}$$

17.1.19 L_GainOffset_2

This FB can amplify an analog input signal and then add an offset to it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to ±199.99 %.



Inputs

Identifier	Data type	Information/possible settings
<i>nIn_a</i>	INT	Input signal • Scaling: 16384 ≡ 100 %
<i>nGain_a</i>	INT	Gain factor • Scaling: 16384 ≡ 100 % • 199.99 % ≈ 2
<i>nOffset_a</i>	INT	Offset • Scaling: 16384 ≡ 100 %

Outputs

Identifier	Data type	Value/meaning
<i>nOut_a</i>	INT	Output signal • Internal limitation to ±199.99 %

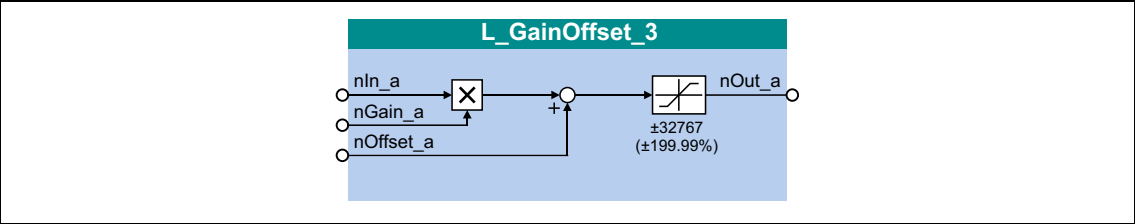
Function

$$nOut\_a = (nIn\_a \cdot \text{Gain factor}) + \text{Offset}$$

17.1.20 L_GainOffset_3

This FB can amplify an analog input signal and then add an offset to it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Gain and offset are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to ±199.99 %.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≡ 100 %
nGain_a	INT	Gain factor • Scaling: 16384 ≡ 100 % • 199.99 % ≈ 2
nOffset_a	INT	Offset • Scaling: 16384 ≡ 100 %

Outputs

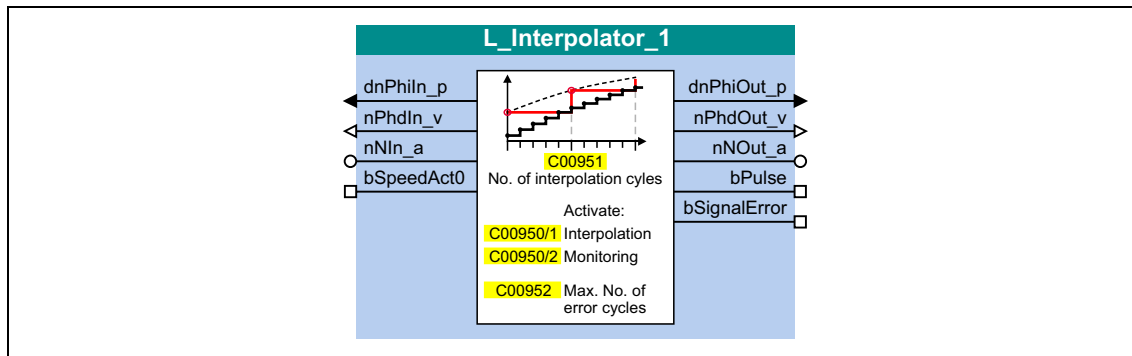
Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199.99 %

Function

$$nOut\_a = (nIn\_a \cdot \text{Gain factor}) + \text{Offset}$$

17.1.21 L_Interpolator_1

This FB interpolates a position setpoint and/or an analog value e.g. to compensate for larger bus transmission cycles or to continue signal characteristics if data telegrams are missing.



Inputs

Identifier	Data type	Information/possible settings
dnPhiIn_p	DINT	Position setpoint Is interpolated and completed when signal interpolation is activated.
nPhdIn_v	INT	Angular velocity Is only passed through to the <i>nPhdOut_v</i> output.
nNIn_a	INT	Analog value Is interpolated when signal interpolation is activated.
bSpeedAct0	BOOL	Input for detecting the "Current speed is zero" status This status signal needs to be transmitted by the setpoint source to ensure trouble-free operation.
		TRUE Current speed is zero.

Outputs

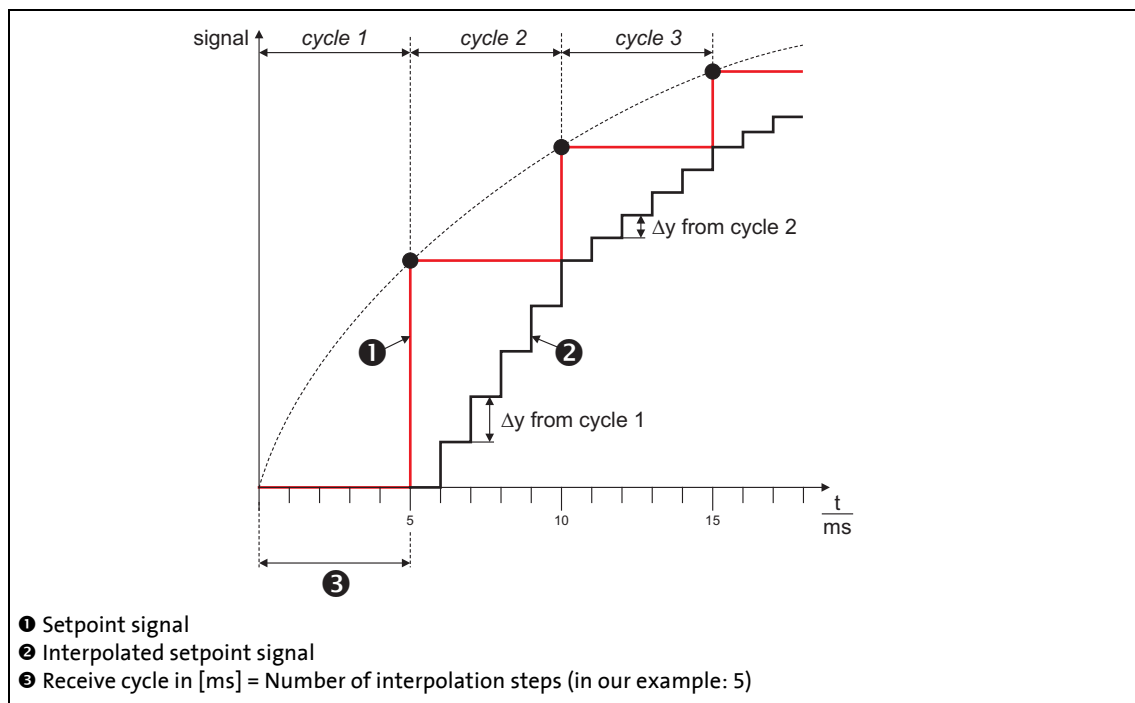
Identifier	Data type	Value/meaning
dnPhiOut_p	DINT	Output of the <i>dnPhiIn_p</i> position setpoint which, if applicable, has been interpolated and completed
nPhdOut_v	INT	Output of the <i>nPhdIn_v</i> angular velocity
nNOut_a	INT	Output of the <i>nNIn_a</i> analog value which, if applicable, has been interpolated
bPulse	BOOL	"Input values have been accepted" status signal
		TRUE The input values have been accepted during this cycle.
bSignalError	BOOL	"Signal error" status signal Only if signal monitoring is active (C00950/2 = "1: On").
		TRUE The number of missing data telegrams has exceeded the limit value parameterised in C00952 .

Parameter

Parameter	Possible settings			Info
C00950/1				Signal interpolation of the <i>dnPhIn_p</i> and <i>nNIn_a</i> input signals • Lenze setting: Off ▶ Signal interpolation (📘 940)
	0	Off		
	1	On		
C00950/2				Signal monitoring of the <i>dnPhIn_p</i> input signal • Lenze setting: Off ▶ Signal monitoring (📘 941)
	0	Off		
	1	On		
C00951	1		65535	Number of interpolation steps • Corresponds to the receive cycle of the data telegrams in [ms]. • Lenze setting: 1
C00952	0		65535	Limit value for missing data telegrams • Lenze setting: 5 ▶ Signal monitoring (📘 941)
C00953	0		100	Speed-up • Limitation of the amount of correction increments per cycle • Scaling: 1 increment/ms $\equiv$ 0.9155 min⁻¹

17.1.21.1 Signal interpolation

If signal interpolation is active ([C00950/1](#) = 1), the output signal will not reach the level of the corresponding input signal until all interpolation steps parameterised in [C00951](#) have been performed:



[17-10] Signal characteristic

**Note!**

Do not change the number of interpolation steps during operation. Otherwise the interpolation becomes inaccurate.

17.1.21.2 Signal monitoring

If signal monitoring is active ([C00950/2](#) = 1), the signal characteristic of the *dnPhIn_p* input signal is continued even if the data telegram is missing (setpoint selection via CAN).

Monitoring is performed on the basis of the *dnPhIn_p* position setpoint and the *bSpeedAct0* status signal:

- If the *dnPhIn_p* position setpoint remains the same in the next device cycle, it is either because the speed is zero or because no data telegram has been received.
- The evaluation of the *bSpeedAct0* status signal gives information about which reason applies. This status signal needs to be transmitted by the setpoint source to ensure trouble-free operation:
 - *bSpeedAct0* = FALSE means that the speed is not zero, so an error is assumed: The signal characteristic of the *dnPhIn_p* input signal is completed (the current slope is retained).
 - *bSpeedAct0* = TRUE means that the speed is zero, so the unchanged position setpoint is not treated as an error.
- If the number of missing data telegrams exceeds the limit value parameterised in [C00952](#), the *bSignalError* output is set to TRUE.
 - The *bSignalError* output is automatically reset to FALSE if correct signals are detected at *dnPhIn_p* and *bSpeedAct0* again.

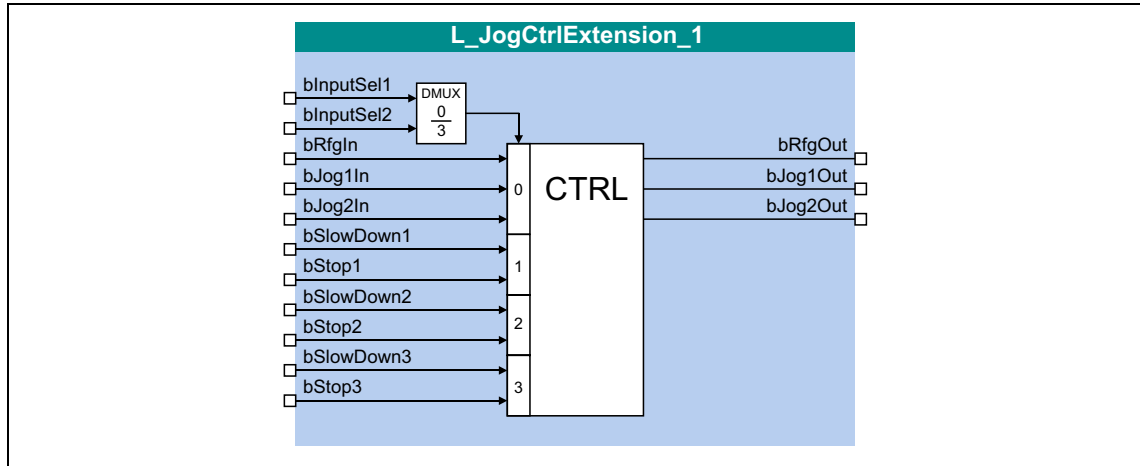
**Note!**

The *nNIn_a* analog value is not monitored!

17.1.22 L_JogCtrlExtension_1

This FB can be connected upstream to the [L_NSet](#) ramp function generator/setpoint generator to implement a switch-off positioning at limit switch.

- Detailed information on this operating mode can be found in the description of the "Switch-off positioning" TA.



Inputs

Identifier	Data type	Information/possible settings
bInputSel1 bInputSel2	BOOL	Activation of the <i>bSlowDown1/bStop1</i> , <i>bSlowDown2/bStop2</i> and <i>bSlowDown3/bStop3</i> signal pairs according to the Truth table
bRfgIn	BOOL	Ramping down of the setpoint generator in the downstream L_NSet FB according to the Truth table
bJog1In bJog2In	BOOL	Selection inputs for setting fixed speeds in the setpoint generator - If the pre-switch off is inactive (<i>bInputSel1</i> and <i>bInputSel2</i> are both set to FALSE), the two control signals are output one-to-one at the <i>bJog1Out</i> and <i>bJog2Out</i> outputs. - To achieve the desired behaviour (starting at high speed, pre-switch off at low speed), both inputs must be set to TRUE. - Fixed setpoint 2 must be less than fixed setpoint 3! Otherwise, the drive will start at a low speed and accelerate after the pre-switch off. - If, in addition to the <i>bJog1In</i> and <i>bJog2In</i> inputs, other jog signals are set at the L_NSet FB, new fixed setpoints are reached, and the drive traverses at speeds that differ from the selection via <i>bJog1In</i> and <i>bJog2In</i>.
bSlowDown1 bSlowDown2 bSlowDown3	BOOL	Activation of fixed setpoint 2 in the downstream L_NSet FB These inputs only fulfil a function if they have been activated via <i>bInputSel1</i> and <i>bInputSel2</i> previously (see Truth table).
bStop1 bStop2 bStop3	BOOL	Ramping down of the ramp function generator in the downstream L_NSet FB These inputs only fulfil a function if they have been activated via <i>bInputSel1</i> and <i>bInputSel2</i> previously (see Truth table).

Outputs

Identifier	Data type	Value/meaning
bRfgOut	BOOL	Control signal for ramping down the setpoint generator • Connect this output to the <i>bRfg0</i> input of the L_NSet FB.
bJog1Out	BOOL	Control signal for setting fixed speeds in the setpoint generator • Connect this output to the <i>bJog1</i> input of the L_NSet FB.
bJog2Out	BOOL	Control signal for setting fixed speeds in the setpoint generator • Connect this output to the <i>bJog2</i> input of the L_NSet FB.

Truth table

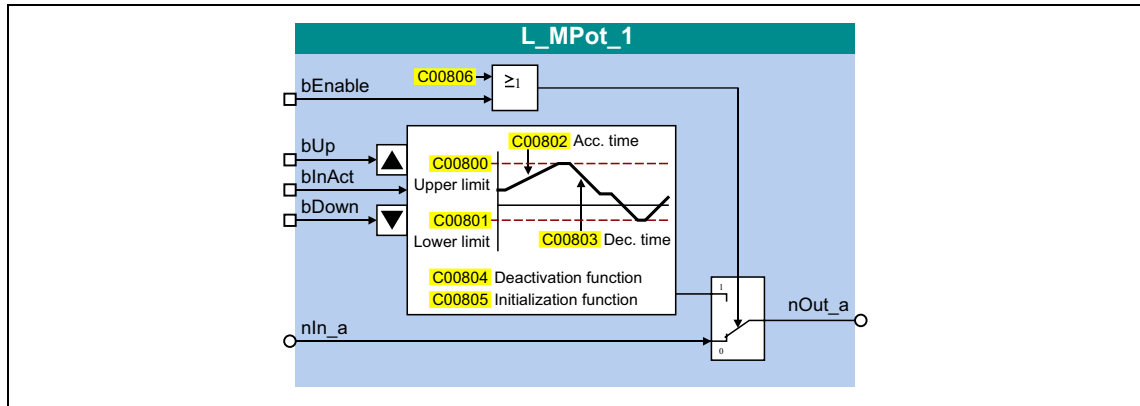
Input		Function	Response in the L_NSet FB
bInputSel1	bInputSel2		
FALSE	FALSE	Pre-switch off inactive	No response • The <i>bRfgIn</i> input signal is directly provided at the <i>bRfgOut</i> output. • The <i>bJogIn1</i> and <i>bJogIn2</i> input signals are directly output at the <i>bJog1Out</i> and <i>bJog2Out</i> outputs.
TRUE	FALSE	The <i>bSlowDown1</i> and <i>bStop1</i> inputs are evaluated.	Pre-switch off can be activated • If the SlowDown function is activated via the selected <i>bSlowDown</i> input, fixed setpoint 2 in the setpoint generator is activated via the <i>bJog1Out</i> and <i>bJog2Out</i> outputs. • If the Stop function is activated via the selected <i>bStop</i> input, the <i>bRfgOut</i> output is set to TRUE and hence the setpoint generator is deactivated.
FALSE	TRUE	The <i>bSlowDown2</i> and <i>bStop2</i> inputs are evaluated.	
TRUE	TRUE	The <i>bSlowDown3</i> and <i>bStop3</i> inputs are evaluated.	

[17-1] Truth table for activating the pre-switch off

17.1.23 L_MPot_1

This FB replaces a hardware motor potentiometer and can be used as an alternative setpoint source which is controlled via two inputs.

- The signal is output via a ramp function generator with linear ramps.
- The acceleration and deceleration times are set via parameters.
- Constant ramping even with speed limit values changed online.
- The motor potentiometer function can be switched on/off online.



Inputs

Identifier	Data type	Information/possible settings
bEnable	BOOL	Switch over motor potentiometer function <i>bEnable</i> input and C00806 code are ORed.
		TRUE Motor potentiometer function is active, setpoint can be changed via <i>bUp</i> and <i>bDown</i> . • With switching to TRUE, the value applied to <i>nIn_a</i> is automatically transferred to the motor potentiometer.
		FALSE The value applied to <i>nIn_a</i> is output at <i>nOut_a</i> .
nIn_a	INT	When bEnable = FALSE, the analog nIn_ is input signal switched to the nOut_a output.
bUp	BOOL	Approaching of the upper speed limit value set in C00800 .
		TRUE The <i>nOut_a</i> output signal runs to its upper limit value (<i>nHighLimit</i>). • If the <i>bDown</i> input is simultaneously set to TRUE, the <i>nOut_a</i> output signal is not changed.
bDown	BOOL	Approaching of the lower speed limit value set in C00801 .
		TRUE The <i>nOut_a</i> output signal runs to its lower limit value (<i>nLowLimit</i>). • If the <i>bUp</i> input is simultaneously set to TRUE, the <i>nOut_a</i> output signal is not changed.
bInAct	BOOL	Deactivate motor potentiometer function • This input has the highest priority. • When the motor potentiometer is deactivated, the <i>nOut_a</i> output signal follows the function set with code C00804 .
		TRUE Motor potentiometer function is deactivated.

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal

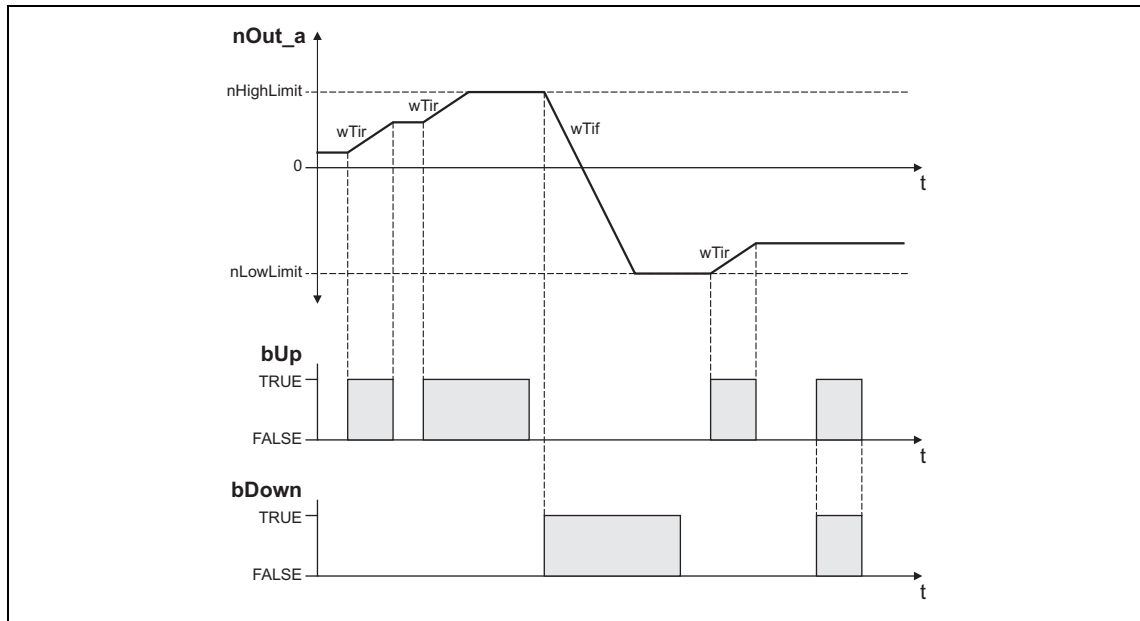
Parameter

Parameter	Possible settings			Info
C00800	-199.99	%	199.99	Upper limit • Lenze setting: 100.00 %
C00801	-199.99	%	199.99	Lower limit • Lenze setting: -100.00 %
C00802	0.1	s	6000.0	Acceleration time • Lenze setting: 10.0 s
C00803	0.1	s	6000.0	Deceleration time • Lenze setting: 10.0 s
C00804				Inactive function • Selection of response when deactivating the motor potentiometer via the input <i>blnAct</i> . • Lenze setting: 0
	0	No further action; <i>nOut_a</i> retains its value.		
	1	The motor potentiometer returns to 0 % within the deceleration time T_{if}		
	2	The motor potentiometer runs to the lower limit value (C00801) within the deceleration time T_{if}		
	3	The motor potentiometer output immediately changes to 0 %		Important for the emergency stop function
	4	The motor potentiometer output immediately changes to the lower limit value (C00801)		
	5	The motor potentiometer runs to the upper limit value (C00800) within the acceleration time T_{ir}		
C00805				Init function • Selection of response when switching on the device. • Lenze setting: 0
	0	The output value being output during mains power-off is saved non-volatilely in the internal memory of the controller. It will be reloaded during mains power-on.		
	1	The lower limit value (C00801) is loaded during mains power-on.		
	2	An output value = 0 % is loaded during mains power-on.		
C00806				Use of the motor potentiometer • When switching to 1: YES, the value applied to <i>nIn_a</i> is automatically transferred to the motor potentiometer. • Lenze setting: 0
	0	No		
	1	Yes		

17.1.23.1 Activate & control motor potentiometer

When *blnAct* is set to FALSE, the motor potentiometer is activated.

- The currently active function depends on the current output signal *nOut_a*, the limit values set and the control signals at *bUp* and *bDown*.
- When the *nOut_a* output signal is outside the limits set, the output signal runs to the next limit with the *Ti* times set. This process is independent of the control signals at *bUp* and *bDown*.
- When the *nOut_a* output signal is inside the limits set, the output signal changes according to the control signals at *bUp* and *bDown*.

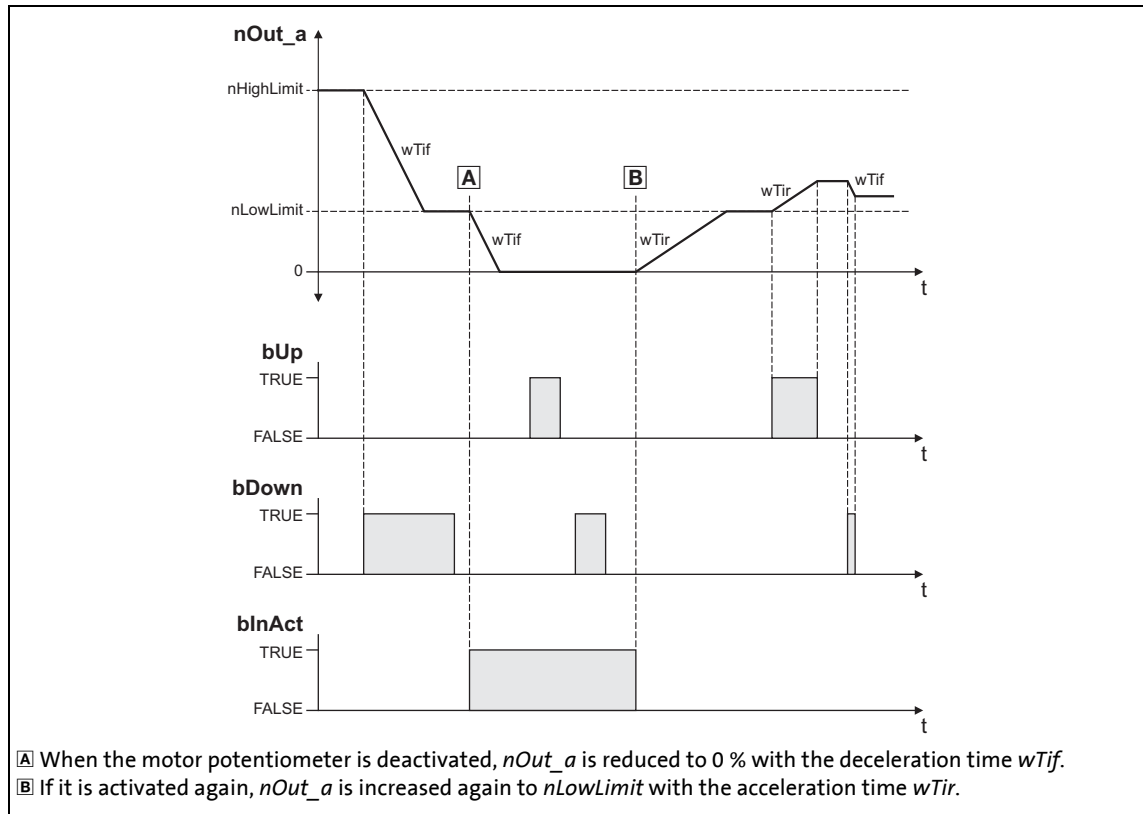


[17-11] Example: Control of the motor potentiometer

bUp	bDown	blnact	Function
FALSE	FALSE	FALSE	The <i>nOut_a</i> output signal remains unchanged.
TRUE	FALSE		The <i>nOut_a</i> output signal runs to its upper limit value (<i>nHighLimit</i>).
FALSE	TRUE		The <i>nOut_a</i> output signal runs to its lower limit value (<i>nLowLimit</i>).
TRUE	TRUE		The <i>nOut_a</i> output signal remains unchanged.
-	-	TRUE	The motor potentiometer function is deactivated. The <i>nOut_a</i> output signal responds according to the function selected via <i>Function</i> .

17.1.23.2 Deactivate motor potentiometer

When the motor potentiometer is deactivated by setting *blnAct* to TRUE, the *nOut_a* output signal responds according to the function selected via *Function*.

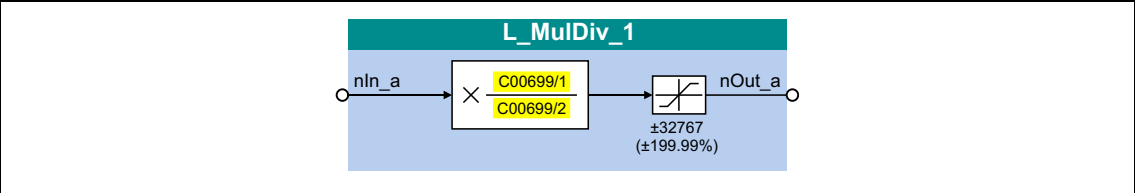


[17-12] Example: Deactivation of the motor potentiometer when the *Function* = 1 has been selected

17.1.24 L_MulDiv_1

This FB multiplies the analog input signal with a parameterisable factor.

- The value of the factor is determined by a quotient consisting of numerator and denominator .
- The value output at *nOut_a* is limited to ±199.99 %.
- Division is not remainder considered.



Inputs

Identifier	Data type	Information/possible settings
nIn1	INT	Input signal

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Product value (result of the multiplication) • Internal limitation to ± 32767

Parameter

Parameter	Possible settings			Info
C00699/1	-32767		32767	Counter
C00699/2	-32767		32767	Denominator

Function

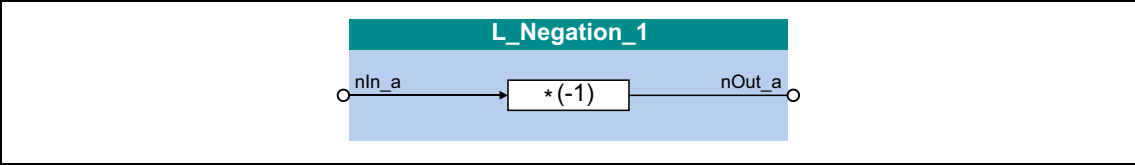
$$nOut\_a = nIn\_a \times \frac{C00699/1}{C00699/2}$$

17.1.25

L_Negation_1

This FB converts the sign of the input signal, i.e. the input signal is multiplied by the value -1 and is then output.

- With the value - 32768 at the *nIn_a* input, the value + 32767 is provided at the *nOut_a* output.



Inputs

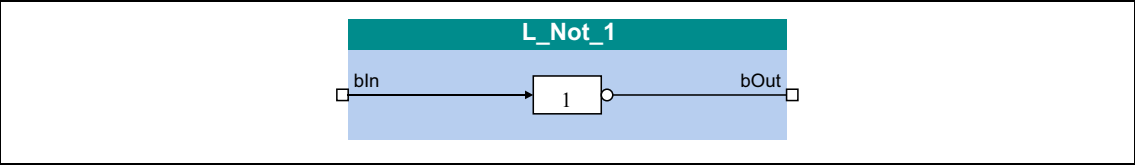
Identifier	Data type	Value/meaning
nIn_a	INT	Input signal

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal

17.1.26 L_Not_1

This FB negates a signal of BOOL data type.



Inputs

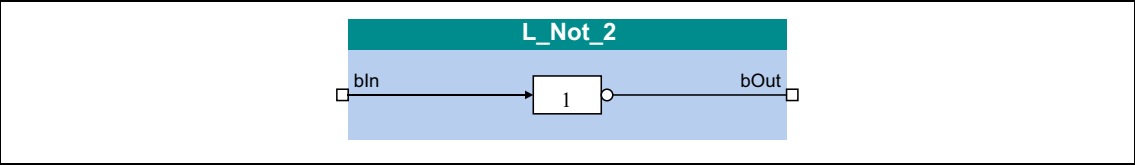
Identifier	Data type	Value/meaning
bIn	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

17.1.27 L_Not_2

This FB negates a signal of BOOL data type.



Inputs

Identifier	Data type	Value/meaning
bIn	BOOL	Input signal

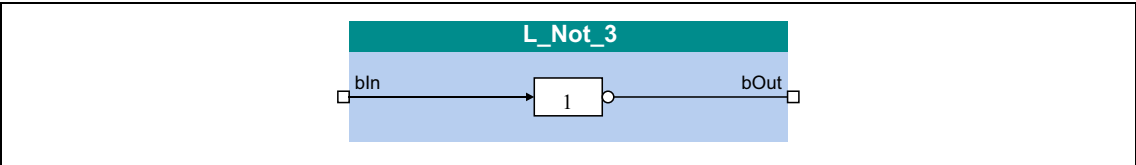
Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

17.1.28

L_Not_3

This FB negates a signal of BOOL data type.



Inputs

Identifier	Data type	Value/meaning
bIn	BOOL	Input signal

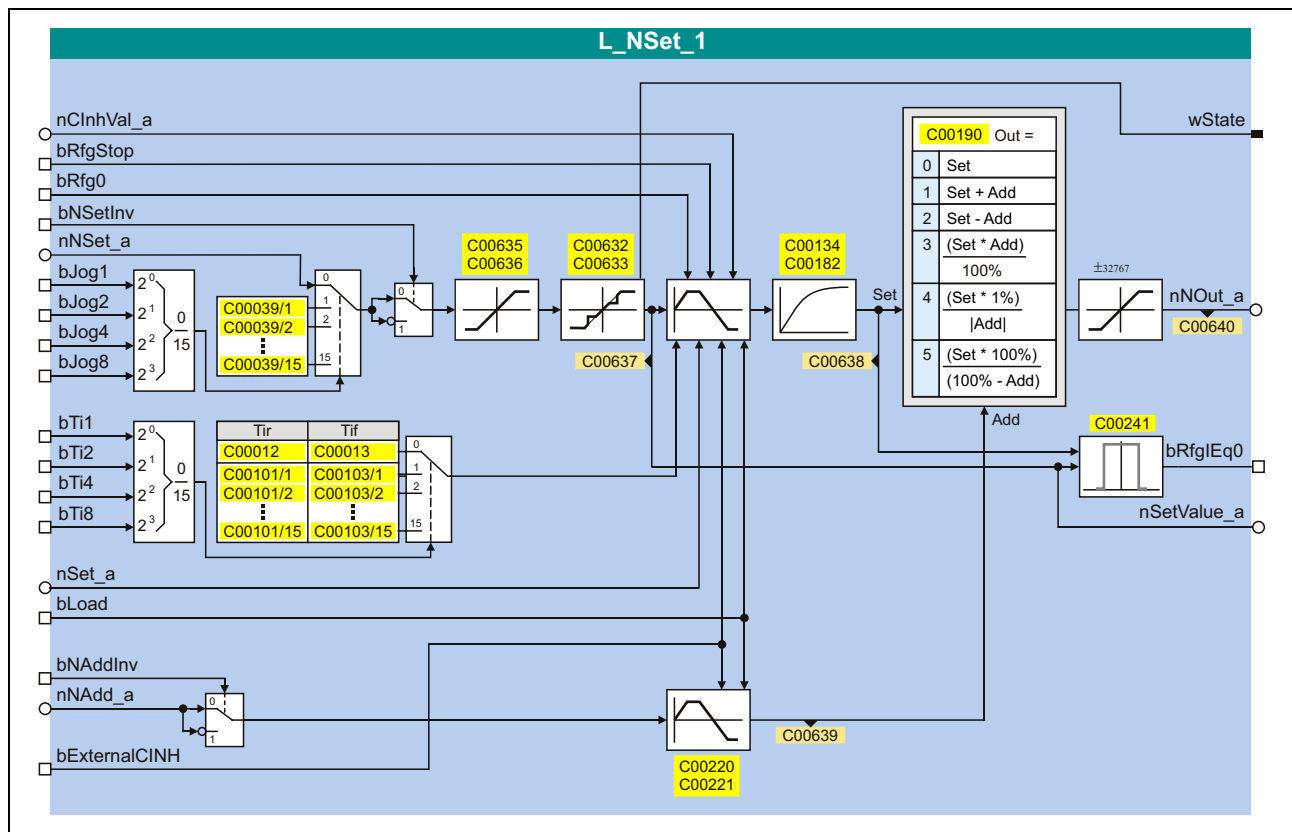
Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Result of the NOT operation (negated input signal)

17.1.29 L_NSet_1

This FB is used for general signal processing of process values and is provided with the following functions:

- Ramp function generator
 - With linear ramps for main and additional setpoint path
 - With S-shaped ramp (PT1 rounding)
 - Setting and holding
- Internal limitation of the input signal
- 3 adjustable blocking zones
- Arithmetic function
- 15 fixed setpoints (JOG setpoints)
- 15 acceleration and deceleration times



Inputs

Identifier	Data type	Information/possible settings
nClnhVal_a	INT	Main setpoint signal which is to be accepted by the main setpoint integrator when the controller is inhibited.
bRfgStop	BOOL	Holding (freezing) of the current value of the main setpoint integrator TRUE The current value of the main setpoint integrator is held.
bRfg0	BOOL	Leading the main setpoint integrator to 0 within the current Ti times TRUE The current value of the main setpoint integrator is led to "0" within the Ti time set.
bNsetInv	BOOL	Signal inversion for the main setpoint TRUE Main setpoint signal is inverted.
nNset_a	INT	Main setpoint signal • Other signals are also permitted
bJog1 ... bJog8	BOOL	Selection inputs for fixed changeover setpoints (JOG setpoints) for the main setpoint • Selection inputs are binary coded.
bTi1 ... bTi8	BOOL	Selection inputs for alternative acceleration/deceleration times for the main setpoint • Selection inputs are binary coded.
nSet_a	INT	Starting value which is loaded into the main setpoint integrator by setting <i>bLoad</i> to TRUE.
bLoad	BOOL	Control of both ramp function generators in special situations, e.g. QSP TRUE The <i>nSet_a</i> input signal is loaded into the main setpoint integrator and the additional setpoint integrator is set to "0".
bAddInv	BOOL	Signal inversion for the additional setpoint TRUE Additional setpoint signal is inverted.
nNAdd_a	INT	Additional setpoint signal • Other signals are also permitted
bExternalCINH	BOOL	Additional load input for the main setpoint integrator and the additional setpoint integrator TRUE The main setpoint integrator is set to the value applied at <i>nClnhVal_a</i> . The additional setpoint integrator is set to "0". ▶ Application example for the additional load function (962)

Outputs

Identifier	Data type	Value/meaning
nNOut_a	INT	Speed setpoint output signal • Scaling: 16384 $\equiv$ 100 %
bRfgIEQO	BOOL	Status signal "setpoint = 0"

Identifier	Data type	Value/meaning
wState	WORD	Bit-coded status word Bits that are not listed are reserved for future extensions.
		Bit 0 No blocking zone active
		Bit 1 Blocking zone 1 active
		Bit 2 Blocking zone 2 active
		Bit 3 Blocking zone 3 active
		Bit 4 Jog in blocking zone
		Bit 5 MaxLimit active
		Bit 6 MinLimit active
nSetValue_a	INT	Speed-setpoint input signal of the ramp function generator Scaling: 16384 $\equiv$ 100 %

Parameter

Parameter	Possible settings			Info
C00012	0.000	s	999.900	Acceleration time T_{ir} for the main setpoint • Lenze setting: 0.000 s
C00013	0.000	s	999.900	Deceleration time T_{if} for the main setpoint • Lenze setting: 0.000 s
C00039/1..15	-199.99	%	199.99	Fixed setpoints (JOG setpoints) • Lenze setting: 0.00 %
C00101/1..15	0.000	s	999.900	Alternative acceleration times (T_{ir}) for the main setpoint • Lenze setting: 0.000 s
C00103/1..15	0.000	s	999.900	Alternative deceleration times (T_{if}) for the main setpoint • Lenze setting: 0.000 s
C00134				Activates ramp rounding with PT1 behaviour for the main setpoint • The corresponding S-ramp time must be set in C00182 . • Lenze setting: 0 (deactivated)
	0	Off		
	1	PT1 behaviour		
C00182	0.01	s	50.00	S-ramp time PT1 • Lenze setting: 20.00 s
C00190				Selection of the arithmetic function for combining main and additional setpoint
	0	NOut = NSet		Lenze setting • The additional setpoint is not processed.
	1	NOut = NSet + NAdd		
	2	NOut = NSet - NAdd		
	3	NOut = (NSet * NAdd) / 100%		
	4	NOut = (NSet * 1%) / NAdd		
	5	NOut = (NSet * 100%) / (100% - NAdd)		
C00220	0.000	s	999.900	Acceleration time T_{ir} for the additional setpoint • Lenze setting: 0.000 s

Parameter	Possible settings			Info
C00221	0.000	s	999.900	Deceleration time T_{if} for the additional setpoint • Lenze setting: 0.000 s
C00241	0.00	%	100.00	Hysteresis window for zero detection of speed output setpoint (output <i>bRfgIEqO</i>) • Lenze setting: 0.50 %
C00632/1...3	0.00	%	199.99	Maximum limit values for the speed blocking zones • Selection of the maximum limit values for the blocking zones in which the speed must not be constant. • Lenze setting: 0.00 %
C00633/1...3	0.00	%	199.99	Minimum limit values for the speed blocking zones • Selection of the minimum limit values for the blocking zones in which the speed must not be constant. • Lenze setting: 0.00 %
C00634				Status (bit-coded) • Bits that are not listed are reserved for future extensions.
	Bit 0	No blocking zone active		
	Bit 1	Blocking zone 1 active		
	Bit 2	Blocking zone 2 active		
	Bit 3	Blocking zone 3 active		
	Bit 4	Jog in blocking zone		
	Bit 5	MaxLimit active		
	Bit 6	MinLimit active		
C00635	-199.99	%	199.99	nMaxLimit • Maximum speed setpoint for speed setpoint limitation • Lenze setting: 199.99 %
C00636	-199.99	%	199.99	nMinLimit • Minimum speed setpoint for speed setpoint limitation • Lenze setting: -199.99 %
C00637	-199.99	%	199.99	Blocking zone output • Display of the speed setpoint after being processed by blocking zone function.
C00638	-199.99	%	199.99	Ramp smoothing output • Display of the speed setpoint after being processed by PT1 filter function.
C00639	-199.99	%	199.99	Additional value output • Display of the additional speed setpoint after being processed by ramp generator.
C00640	-199.99	%	199.99	Output nNOut_a • Display of the generated main speed setpoint at the <i>nNOut_a</i> output.

17.1.29.1 Main setpoint path

- The signals in the main setpoint path are limited to a value range of ± 32767 .
- The signal at *nNSet_a* is first led via the JOG selection function.
- A selected JOG value switches the *nNSet_a* input inactive. Then, the subsequent signal conditioning operates with the JOG value.

17.1.29.2 JOG setpoints

In addition to the direct main setpoint selection via the *nNSet_a* input, so-called JOG setpoints can be preset in [C00039/1...15](#).

- The JOG setpoints are binary-coded and can be called using the *bJog1* ... *bJog8* selection inputs so that 15 options are available:

Selection inputs				Main setpoint Main setpoint
<i>bJog8</i>	<i>bJog4</i>	<i>bJog2</i>	<i>bJog1</i>	
FALSE	FALSE	FALSE	FALSE	<i>nNset_a</i>
FALSE	FALSE	FALSE	TRUE	C00039/1
FALSE	FALSE	TRUE	FALSE	C00039/2
FALSE	FALSE	TRUE	TRUE	C00039/3
FALSE	TRUE	FALSE	FALSE	C00039/4
FALSE	TRUE	FALSE	TRUE	C00039/5
FALSE	TRUE	TRUE	FALSE	C00039/6
FALSE	TRUE	TRUE	TRUE	C00039/7
TRUE	FALSE	FALSE	FALSE	C00039/8
TRUE	FALSE	FALSE	TRUE	C00039/9
TRUE	FALSE	TRUE	FALSE	C00039/10
TRUE	FALSE	TRUE	TRUE	C00039/11
TRUE	TRUE	FALSE	FALSE	C00039/12
TRUE	TRUE	FALSE	TRUE	C00039/13
TRUE	TRUE	TRUE	FALSE	C00039/14
TRUE	TRUE	TRUE	TRUE	C00039/15

- The number of selection inputs to be assigned depends on the number of JOG setpoints required:

Number of JOG setpoints required	Number of selection inputs to be assigned (<i>bJog1</i> ... <i>bJog8</i>)
1	At least 1
2 ... 3	at least 2
4 ... 7	at least 3
8 ... 15	4

17.1.29.3 Setpoint inversion

The output signal of the JOG function is led via an inverter.

The sign of the setpoint changes if *bNSetInv* is set to TRUE.

17.1.29.4 Value range of the input signal

The value range of the input signal can be limited by using the following parameters:

- [C00635](#): MaxLimit (default setting: +199.99 %)
- [C00636](#): MinLimit (default setting: -199.99 %)

17.1.29.5 Skip frequency function

If the speed setpoints in speed-variable drives are linearly increasing, for instance, the frequency/speed range is divided into a number of equal time segments. Therefore, there may be speeds during acceleration time which must be bridged very fast (e.g. natural resonant frequencies).

The skip frequency function offers the opportunity to select a range in which the initial speed is maintained. If the speed setpoint leaves that range, the drive will be accelerated to reach the desired speed.



Note!

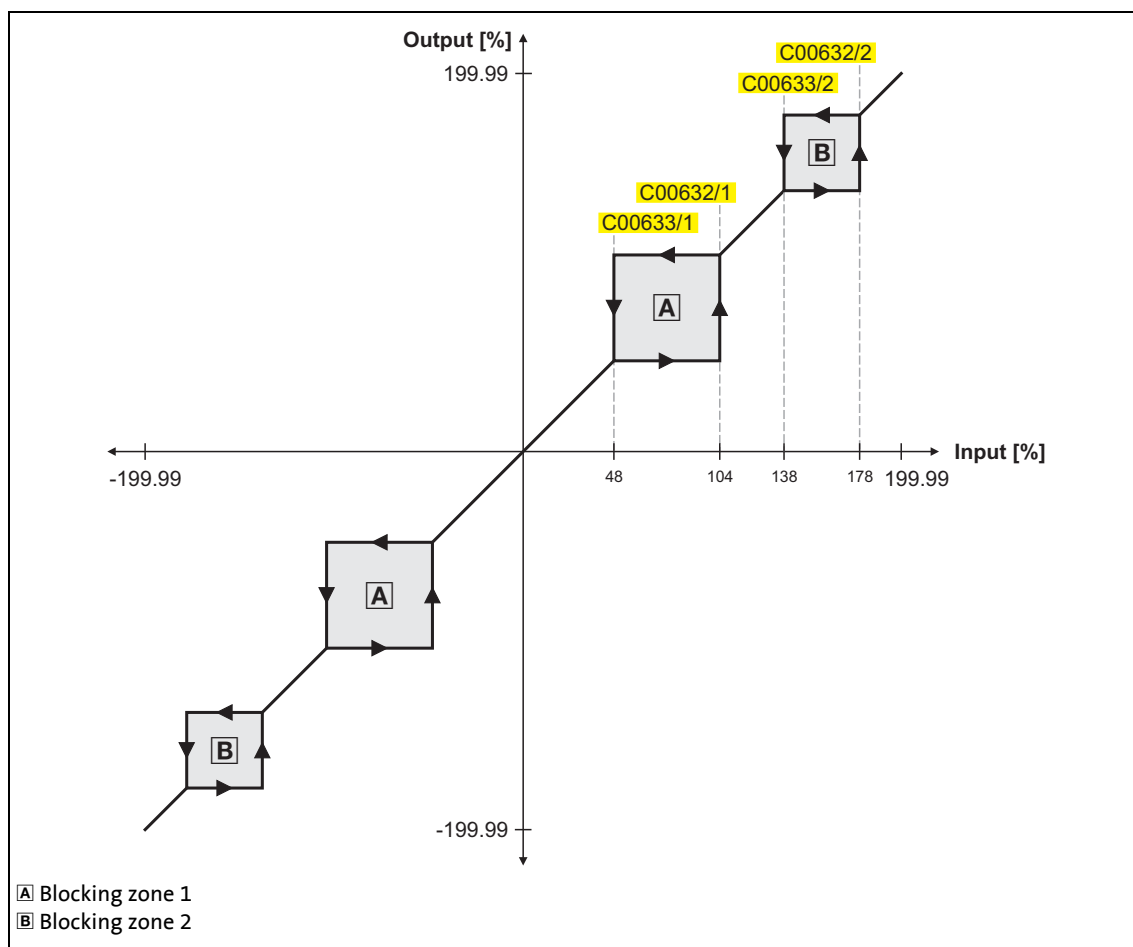
- Skip frequencies only affect main setpoints.
- It is not possible to exclude "0" speed if there is a sign reversal of the speed setpoint.

Definition of the blocking zones

The subcodes of codes [C00632](#) and [C00633](#) can be used to define three zones which are to be skipped by the output setpoint and which are to be passed as fast as possible by the ramp function generator.

The example below shows the parameter setting of two blocking zones:

Parameter	Blocking zone 1	Blocking zone 2	Blocking zone 3
Minimum limit value	C00633/1: 48 %	C00633/2: 138 %	C00633/3: 0 %
Maximum limit value	C00632/1: 104 %	C00632/2: 178 %	C00632/3: 0 %



[17-13] Zone masking by means of parameterisable blocking zones

- The parameterised blocking zones have the same effect on negative input signals.
- A blocking zone is deactivated by entering identical limit values (in our example: blocking zone 3).

Overlapping of blocking zones

If blocking zones overlap, the lowest and highest value of the overlapping zones form a new zone.

In this case, the status display (output *wState* or display parameter [C00634](#)) only indicates one zone (the lower of the two original zones).

Abutting blocking zones

If two blocking zones abut (e.g. 20 ... 30 % and 30 ... 40 %), the limit value between the two zones (in this example 30 %) is also passed through.

The same applies to a limit range of 0 ... xx %. During zero crossing of the speed setpoint, "0" speed is output as setpoint. It is possible to exclude "0" speed. However, in this case, the output speed will remain on the upper limit value when the input setpoint becomes "0".

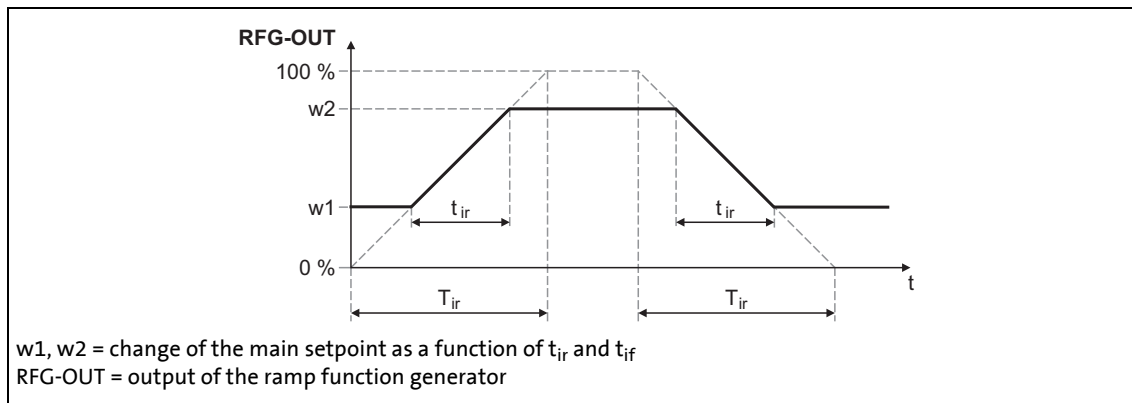


Tip!

As described above, the acceleration phase starts after the blocking zones have been passed through. The ramp function generator integrated in the **L_Nset** function block limits the progression of the speed. For this reason, the time values set for the integrated ramp function generator should be as low as possible whereas the setpoint for the **L_Nset** function block should be generated by a ramp function generator with higher time values (e.g. **L_MPot** function block).

17.1.29.6 Ramp function generator for the main setpoint

The setpoint is now led via a ramp function generator with linear characteristic. The ramp function generator converts setpoint step-changes at the input into a ramp.



[17-14] Acceleration and deceleration times

- t_{ir} and t_{if} are the desired times for changing between $w1$ and $w2$.
- S-ramps are possible by selecting S-ramp times.
- The t_{ir}/t_{if} values are converted into the required T_i times according to the following formula:

$$T_{ir} = t_{ir} \cdot \frac{100\%}{w2 - w1}$$

$$T_{if} = t_{if} \cdot \frac{100\%}{w2 - w1}$$

Setting and selection of Ti times

Via parameters, you can select 16 different Tir and Tif times each for the ramp function generator.

- The selection is made via the binary coded selection inputs *bTI1* ... *bTI8*:

Selection inputs				Used Acceleration time	Used Deceleration time
<i>bTI8</i>	<i>bTI4</i>	<i>bTI2</i>	<i>bTI1</i>		
FALSE	FALSE	FALSE	FALSE	C00012	C00013
FALSE	FALSE	FALSE	TRUE	C00101/1	C00103/1
FALSE	FALSE	TRUE	FALSE	C00101/2	C00103/2
FALSE	FALSE	TRUE	TRUE	C00101/3	C00103/3
FALSE	TRUE	FALSE	FALSE	C00101/4	C00103/4
FALSE	TRUE	FALSE	TRUE	C00101/5	C00103/5
FALSE	TRUE	TRUE	FALSE	C00101/6	C00103/6
FALSE	TRUE	TRUE	TRUE	C00101/7	C00103/7
TRUE	FALSE	FALSE	FALSE	C00101/8	C00103/8
TRUE	FALSE	FALSE	TRUE	C00101/9	C00103/9
TRUE	FALSE	TRUE	FALSE	C00101/10	C00103/10
TRUE	FALSE	TRUE	TRUE	C00101/11	C00103/11
TRUE	TRUE	FALSE	FALSE	C00101/12	C00103/12
TRUE	TRUE	FALSE	TRUE	C00101/13	C00103/13
TRUE	TRUE	TRUE	FALSE	C00101/14	C00103/14
TRUE	TRUE	TRUE	TRUE	C00101/15	C00103/15

Function

- When the controller is inhibited (CINH), the ramp function generator accepts the value applied at *nClnhVal_a* and transfers it to the downstream function. This function has priority over all other functions.
- bRfgStop* = TRUE
 - The ramp function generator is stopped. Changes at the input of the ramp function generator have no effect on the output signal.
- bRfg0* = TRUE
 - The ramp function generator runs to 0 along its deceleration ramp.
- Furthermore it is possible to load the ramp function generator online with a defined value. For this purpose, *bLoad* must be set to TRUE. As long as this input is set, the value at *nSet_a* is transferred to the ramp function generator and provided at the output.

Priorities:

CINH	bLoad	bRfg0	bRfgStop	Function
FALSE	FALSE	FALSE	FALSE	The ramp function generator follows the input value via the set ramps.
FALSE	FALSE	FALSE	TRUE	Stop the ramp function generator: The value at the output of the ramp function generator is held.
FALSE	FALSE	TRUE	FALSE	Ramp down the ramp function generator: The ramp function generator runs to 0 within the set deceleration time.
FALSE	FALSE	TRUE	TRUE	
FALSE	TRUE	FALSE	FALSE	Load ramp function generator online: The ramp function generator accepts the value at <i>nSet_a</i> and provides it at its output.
FALSE	TRUE	FALSE	TRUE	
FALSE	TRUE	TRUE	FALSE	
FALSE	TRUE	TRUE	TRUE	
TRUE	FALSE	FALSE	FALSE	Controller inhibit: The ramp function generator accepts the value at <i>nClnhVal_a</i> and provides it at its output.
TRUE	FALSE	FALSE	TRUE	
TRUE	FALSE	TRUE	FALSE	
TRUE	FALSE	TRUE	TRUE	
TRUE	TRUE	FALSE	FALSE	
TRUE	TRUE	FALSE	TRUE	
TRUE	TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	TRUE	

17.1.29.7 S-shaped ramp

A PT1 element is connected downstream of the linear ramp function generator. This arrangement implements an S-shaped ramp for a nearly jerk-free acceleration and deceleration.

- The PT1 element can be switched on/off via the *bSShapeActive* input.
- The corresponding S-ramp time can be set under [C00182](#).

17.1.29.8 Additional setpoint

Use the *nNAdd_a* input to define an additional value (e.g. a correcting signal) and combine it arithmetically with the main setpoint *nNSet_a*.

- First, the additional setpoint is led via a ramp function generator with linear characteristic. Its Ti times can be set in [C00220](#) (acceleration time) and [C00221](#) (deceleration time).
- When the input *bNAddInv* is set to TRUE, the additional setpoint can be inverted before having an effect on the ramp function generator.
- When the input *bLoad* is set to TRUE, the ramp function generator is set to zero for the additional setpoint and held there without considering the Ti times. The same applies when the controller is inhibited.
- The following arithmetic combination of main setpoint and additional setpoint can be selected in [C00190](#):

Value in C00190	Function	Info
0	$nNOut\_a = nNSet\_a$	The additional setpoint <i>nNAdd_a</i> is not processed.
1	$nNOut\_a = nNSet\_a + nNAdd\_a$	
2	$nNOut\_a = nNSet\_a - nNAdd\_a$	
3	$nNOut\_a = (nNSet\_a * nNAdd\_a) / 100 \%$	Internal scaling: • 100 % $\equiv$ 16384 • 1 % $\equiv$ 164
4	$nNOut_a = (nNSet_a * 1 \%) / nNAdd_a $	
5	$nNOut\_a = (nNSet\_a * 100 \%) / (100 \% - nNAdd\_a)$	

17.1.29.9 Application example for the additional load function

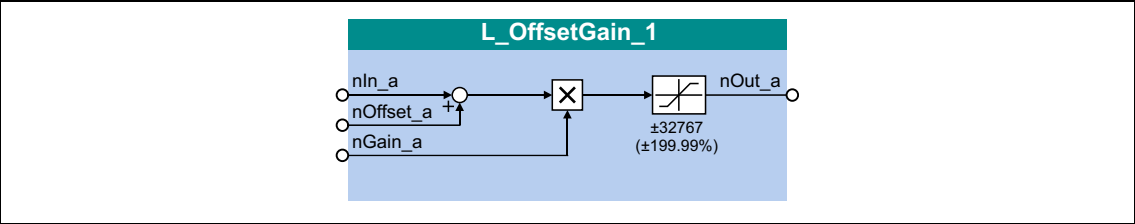
The motor control of the drive is provided with a function for automatically carrying along ramp function generators for "jerk-free" setpoint connection. For speed-controlled drive tasks, the [LS_MotorInterface](#) SB outputs the current actual speed value via the *nHlgSetValue_a* output (e.g. in case of a pulse inhibit, flying restart, controller inhibit).

- In case of a pulse inhibit, the main setpoint generator must be carried along with the current actual speed value to ensure jerk-free setpoint transfer.
- The actual speed value is carried along automatically if the following wiring is provided:
 - [LS_MotorInterface.nHlgSetValue_a](#) $\rightarrow$ [L_NSet_1.nClnhValue_a](#)
 - [LS_MotorInterface.bHlgLoad](#) $\rightarrow$ [L_NSet_1.bExternalCINH](#)

17.1.30 L_OffsetGain_1

This FB can add an offset to an analog input signal and then amplify it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 $\equiv$ 100 %
nOffset_a	INT	Offset • Scaling: 16384 $\equiv$ 100 %
nGain_a	INT	Gain factor • Scaling: 16384 $\equiv$ 100 % • 199.99 % $\approx$ 2

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

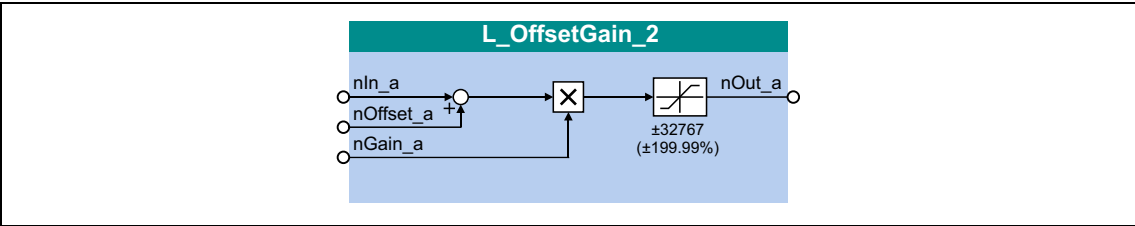
Function

$$nOut\_a = (nIn\_a + Offset) \cdot Gain\ factor$$

17.1.31 L_OffsetGain_2

This FB can add an offset to an analog input signal and then amplify it. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via FB inputs.
- The value provided at the *nOut_a* output is internally limited to ±199.99 %.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal • Scaling: 16384 ≙ 100 %
nOffset_a	INT	Offset • Scaling: 16384 ≙ 100 %
nGain_a	INT	Gain factor • Scaling: 16384 ≙ 100 % • 199.99 % ≈ 2

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to ±199.99 %

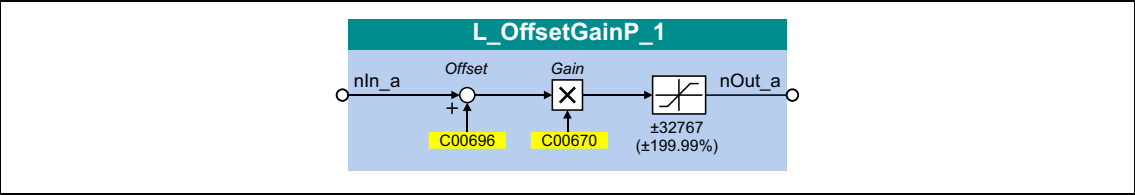
Function

$$nOut\_a = (nIn\_a + Offset) \cdot Gain\ factor$$

17.1.32 L_OffsetGainP_1

This FB can add an offset to an analog input signal and amplify it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameter

Parameter	Possible settings			Info
C00670	-100.0000		100.0000	Gain factor • High gain factor for further processing of smallest input signals. • Please observe the difference with regard to the gain factors of other blocks in percent ($\pm 199.99\% \approx 2$). • Lenze setting: 1.0000
C00696	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

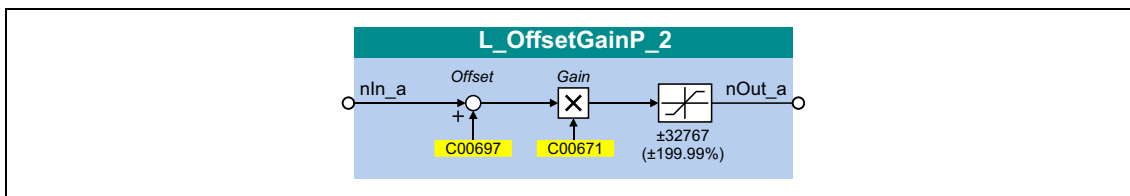
Function

$$nOut\_a = (nIn\_a + Offset) \cdot Gain\ factor$$

17.1.33 L_OffsetGainP_2

This FB can add an offset to an analog input signal and amplify it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameter

Parameter	Possible settings			Info
C00671	-100.0000		100.0000	Gain factor • High gain factor for further processing of smallest input signals. • Please observe the difference with regard to the gain factors of other blocks in percent ($\pm 199.99\% \approx 2$). • Lenze setting: 1.0000
C00697	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

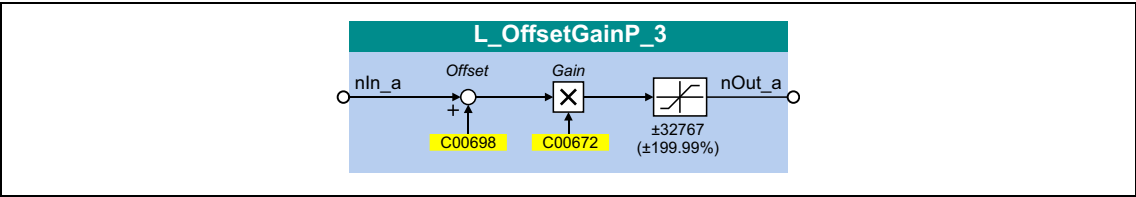
Function

$$nOut\_a = (nIn\_a + Offset) \cdot Gain\ factor$$

17.1.34 L_OffsetGainP_3

This FB can add an offset to an analog input signal and amplify it afterwards. Preferably to be interconnected directly after the analog input terminals.

- The internal calculations (addition and subtraction) are carried out with 32 bits without overflow/underflow. Division is not remainder considered.
- Offset and gain are selected via parameters.
- The value provided at the *nOut_a* output is internally limited to $\pm 199.99\%$.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal

Outputs

Identifier	Data type	Value/meaning
nOut_a	INT	Output signal • Internal limitation to $\pm 199.99\%$

Parameter

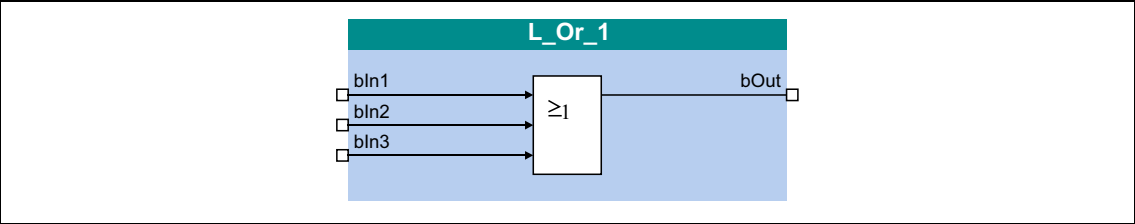
Parameter	Possible settings			Info
C00672	-100.0000		100.0000	Gain factor • High gain factor for further processing of smallest input signals. • Please observe the difference with regard to the gain factors of other blocks in percent ($\pm 199.99\% \approx 2$). • Lenze setting: 1.0000
C00698	-199.99	%	199.99	Offset • Lenze setting: 0.00 %

Function

$$nOut\_a = (nIn\_a + Offset) \cdot Gain\ factor$$

17.1.35 L_Or_1

This FB implements the ORing of the inputs signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

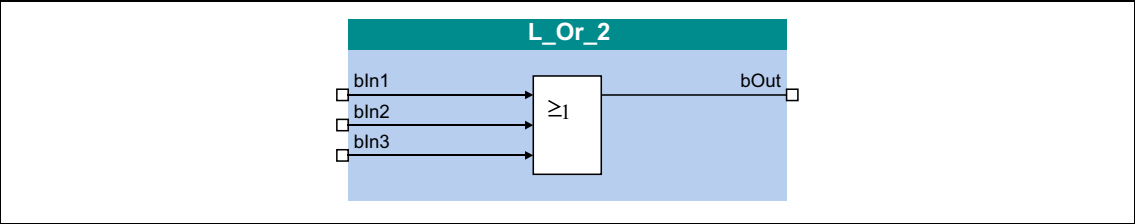
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	

[17-15] Truth table of the FB L_Or_1

17.1.36 L_Or_2

This FB implements the ORing of the inputs signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

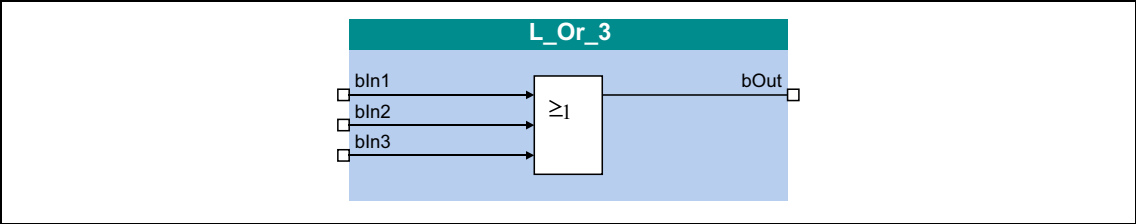
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	

[17-16] Truth table of the FB L_Or_2

17.1.37 L_Or_3

This FB implements the ORing of the inputs signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

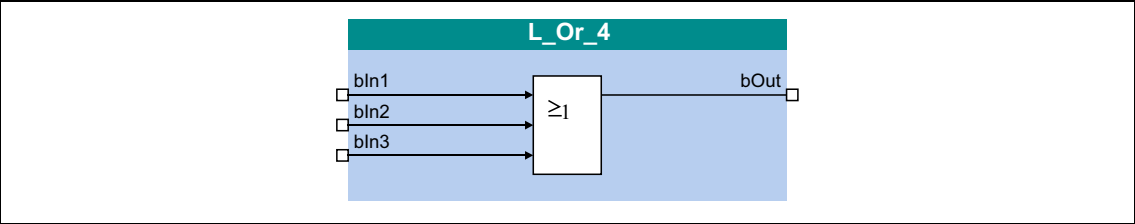
Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	

[17-17] Truth table of the L_Or_3 FB

17.1.38 L_Or_4

This FB implements the ORing of the inputs signals.



Inputs

Identifier	Data type	Information/possible settings
bIn1 bIn2 bIn3	BOOL	Input signal

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output signal

Function

Inputs			Output
bIn3	bIn2	bIn1	bOut
FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	
FALSE	TRUE	TRUE	
TRUE	FALSE	FALSE	
TRUE	FALSE	TRUE	
TRUE	TRUE	FALSE	
TRUE	TRUE	TRUE	

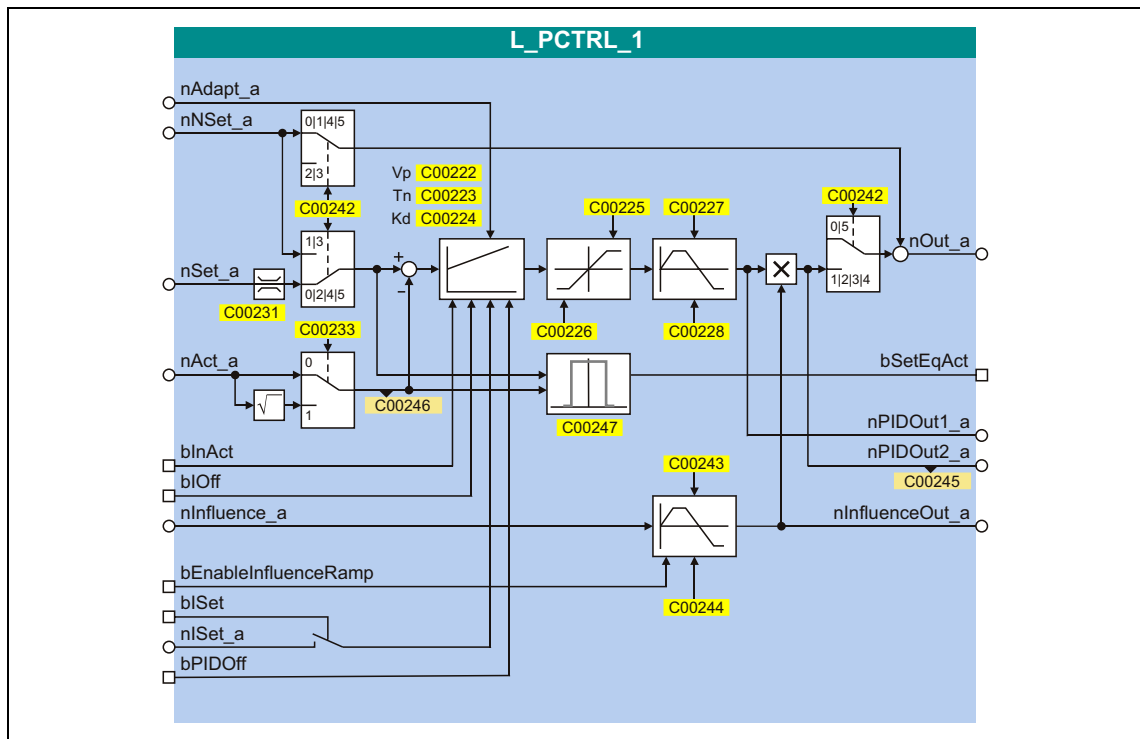
[17-18] Truth table of the L_Or_4 FB

17.1.39 L_PCTRL_1

This FB is a PID controller and can be used for various control tasks (e.g. as dancer position controller, tension controller, or pressure controller).

The FB is provided with the following functions:

- Adjustable control algorithm (P, PI, PID)
- Ramp function generator for preventing setpoint step-changes at the input
- Limitation of the controller output
- Factorisation of the output signal
- Vp adaptation
- Integral action component can be switched off
- Comparison function "Actual value = setpoint"



Inputs

Identifier	Data type	Information/possible settings
nAdapt_a	INT	Percentage adaptation of the gain Vp set in C00222 and the reset time Tn set in C00223. Then, the adapted reset time is as follows: $T_n = \frac{V_{pC222} \cdot nAdapt\_a [\%] \cdot T_{nC223} [ms]}{100 [\%]}$ • Internal limitation to $\pm 199.99 \%$ • Changes can be done online. • Display parameter: C00830/62
nNset_a	INT	Speed setpoint • Scaling: $16384 \equiv 100 \%$ • Internal limitation to $\pm 199.99 \%$ • Display parameter: C00830/89

Identifier	Data type	Information/possible settings	
nSet_a	INT	Sensor and process setpoint for operating modes 2, 4 and 5 • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 % • Display parameter: C00830/63	
nAct_a	INT	Speed or actual sensor value (actual process value) • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 % • Display parameter: C00830/61	
bInAct	BOOL	Deactivate process controller temporarily (stop) • Changes can be done online. • Display parameter: C00833/76 Note: This input is not interconnected in the LA_NCtrl application block.	
		TRUE	• The current output value is frozen. • The internal control algorithm is stopped. • However, a setpoint selected via input <i>nNSet_a</i> is still provided in operating modes 0/1/4/5.
bIOff	BOOL	Switch off the I-component of the process controller • Changes can be done online. • Display parameter: C00833/77	
		TRUE	The I component of the process controller is set to zero.
nInfluence_a	INT	Limitation of the influencing factor in percent • <i>nInfluence_a</i> serves to limit the influencing factor of the PID controller contained in the FB to a required value (- 199.99 % ... + 199.99 %). • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 % • Display parameter: C00830/64	
bEnableInfluenceRamp	BOOL	Activate ramp for influencing factor • Display parameter: C00833/106	
		TRUE	Influencing factor of the PID controller is ramped up to the <i>nInfluence_a</i> value.
		FALSE	Influencing factor of the PID controller is ramped down to "0".
bISet	BOOL	Accept I component <i>nISet_a</i> in PID controller	
		TRUE	The value at the input <i>nISet_a</i> is accepted in the PID controller.
nISet_a	INT	Selection of I component of PID controller • With a TRUE signal at <i>bISet</i>, the assigned value is accepted in the PID controller. • Scaling: 16384 ≡ 100 % • Internal limitation to ± 199.99 %	
bPIDOff	BOOL	Reset the entire PID controller	
		TRUE	• The I component of the controller is set to zero. • The controller output is set to zero. • The internal control algorithm is stopped.

(from version 06.00.00)

Outputs

Identifier	Data type	Value/meaning	
nOut_a	INT	Output signal - Internal limitation to ± 32767 (± 199.99 %) - Scaling: $16384 \equiv 100$ %	
bSetEqAct	INT		Status output "Setpoint and actual value are identical"
		TRUE	Setpoint and actual value are identical, i.e. no system deviation available.
nPIDOut1_a	INT	PID controller output <u>without</u> influencing factor <i>nInfluence_a</i> - Inputs <i>bEnableInfluenceRamp</i> and <i>nInfluence_a</i> do not have any effect here, the limited PID output value influenced by the internal ramp times is output. - There is no connection with the additive input <i>nNSet_a</i>. - Scaling: $16384 \equiv 100$ %	
nPIDOut2_a	INT	PID controller output <u>with</u> influencing factor <i>nInfluence_a</i> . - There is no connection with the additive input <i>nNSet_a</i>. - Scaling: $16384 \equiv 100$ % - Display parameter: C00245	
nInfluenceOut_a	INT	Current influencing factor ("ramp status") on the PID output value Scaling: $16384 \equiv 100$ %	

Parameter

Parameter	Possible settings			Info
C00222	0.1	0.1	500.0	Gain Vp Lenze setting: 1.0
C00223	20	ms	6000	Reset time Tn Lenze setting: 400 ms
C00224	0.0	0.1	5.0	Differential component Kd Lenze setting: 0.0
C00225	-199.99	%	+199.99	MaxLimit - Maximum value of the PID operating range - Lenze setting: 199.99 %
C00226	-199.99	%	+199.99	MinLimit - Minimum value of the PID operating range - Lenze setting: -199.99 %
C00227	0.000	s	999.999	Acceleration time for the ramp at the PID output (should be set as steep as possible) Lenze setting: 0.010 s
C00228	0.000	s	999.999	Deceleration time for the ramp at the PID output Lenze setting: 0.010 s
C00231/1 (Pos. Maximum) C00231/2 (Pos. Minimum) C00231/3 (Neg. Minimum) C00231/4 (Neg. Maximum)	0.00	%	199.99	Operating range - Determination of the operating range for the PID process controller by limiting the input signal <i>nSet_a</i>. - Lenze setting: No limitation (-199.99 % ... +199.99 %)

Parameter	Possible settings			Info
C00233				Root function • Lenze setting: "0: Off"
	0	Off		The actual value at <i>nAct_a</i> is not changed for further processing.
	1	On		The square root of the actual value at <i>nAct_a</i> is taken for further processing.
C00242				Operating mode • Lenze setting: "0: Off"
	0	Off		The input setpoint <i>nNSet_a</i> is output without any changes at the output <i>nOut_a</i> .
	1	<i>nNSet</i> + <i>nNSet_PID</i>		<i>nNSet_a</i> and <i>nAct_a</i> are used as PID input values. The arriving <i>nNSet_a</i> is additively linked to the value output by the PID element.
	2	<i>nSet_PID</i>		<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The input <i>nNSet_a</i> is not considered.
	3	<i>nNSet_PID</i>		<i>nNSet_a</i> and <i>nAct_a</i> are used as PID input values. The input <i>nSet_a</i> is not considered.
	4	<i>nNSet</i> + <i>nSet_PID</i>		<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The arriving <i>nNSet_a</i> setpoint is additively linked to the value output by the PID element.
	5	<i>nNSet</i> <i>nSet_PID</i>		<i>nSet_a</i> and <i>nAct_a</i> are used as PID input values. The setpoint <i>nNSet_a</i> is output at the output <i>nOut_a</i> . The PID output value is output at the output <i>nPIDOut_a</i> .
C00243	0.000	s	999.999	Influence acceleration time • Acceleration time <i>T_{ir}</i> for the influencing factor. • Lenze setting: 5.000 s
C00244	0.000	s	999.999	Influence deceleration time • Deceleration time <i>T_{if}</i> for the influencing factor. • Lenze setting: 5.000 s
C00245	-199.99	%	+199.99	Display of PID output value <i>nPIDOut_a</i>
C00246 (from version 04.00.00)	-199.99	%	+199.99	Display of the internal PID input value <i>nAct_a</i>
C00247 (from version 06.00.00)	0	%	100	Window for comparison function "Actual value = setpoint" • Lenze setting: 2 % • Hysteresis: 1 % (fixed)

17.1.39.1 Control characteristic

The PI algorithm is active in the Lenze setting.

Gain (P component)

The input value is controlled by a linear characteristic. The slope of the characteristic is determined by the controller gain V_p .

The controller gain V_p is set under [C00222](#).

- The controller gain can be adapted via the input $nAdapt\_a$ (also possible in online mode).
- The input value $nAdapt\_a$ has a direct effect on the controller gain:

$$P = nAdapt\_a \cdot C00222$$

Example: With the parameterised controller gain $V_p = 2.0$ and $nAdapt\_a = 75\%$, the resulting gain factor is as follows:

$$P = \frac{75 [\%]}{100 [\%]} \cdot 2.0 = 1.5$$

Integral action component (I component)

The I component can be selected via the input $nISet\_a$. With a TRUE signal at $bISet$, the assigned value is accepted in the PID controller.

- Setting the adjustment time T_n to the maximum value of "6000 ms" deactivates the I component.
- The I component of the controller can also be deactivated by setting the input $bIOff$ to TRUE.
- The I component can be switched on and off online.

Reset time

The adjustment time T_n is set under [C00223](#).

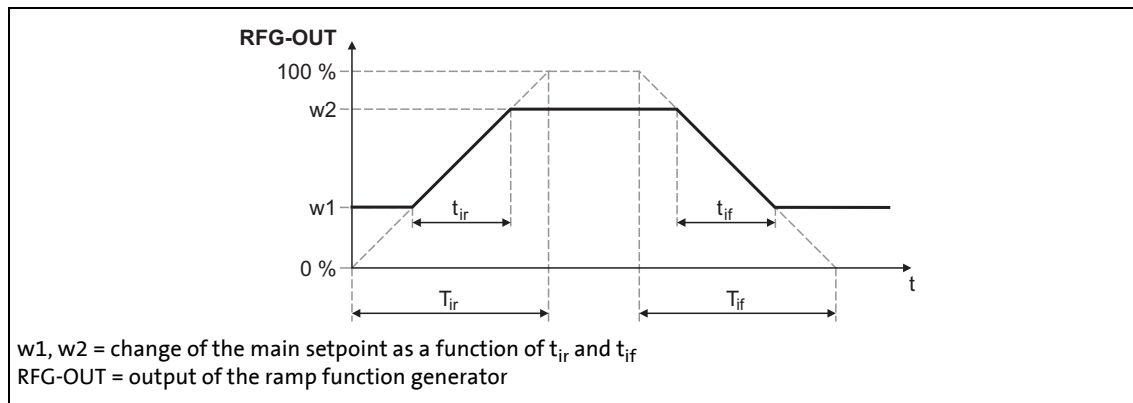
Differential component K_d (D component)

The differential component K_d is set under [C00224](#).

- The setting "0.0 s" deactivates the D component (Lenze setting). In this way, the PID controller becomes a PI controller or P controller, if the I component has been deactivated as well.

17.1.39.2 Ramp function generator

The PID output is led via a ramp function generator with linear characteristic. This serves to transfer setpoint step-changes at the PID output into a ramp which should be as steep as possible.



[17-19] Acceleration and deceleration times

- t_{ir} and t_{if} are the desired times for changing between $w1$ and $w2$.
- The ramps for acceleration and deceleration can be set individually.
 - [C00227](#): Acceleration time t_{ir}
 - [C00228](#): Deceleration time t_{if}
- The t_{ir}/t_{if} values are converted into the required T_i times according to the following formula:

$T_{ir} = t_{ir} \cdot \frac{100\%}{w2 - w1}$	$T_{if} = t_{if} \cdot \frac{100\%}{w2 - w1}$

- The ramp function generator is immediately set to "0" by setting *blnAct* to TRUE.

17.1.39.3 Operating range of the PID process controller

The value range of the input signal *nSet_a* and thus the operating range of the PID process controller can be limited with the following parameters:

- [C00231/1](#): Pos. maximum (default setting: 199.99 %)
- [C00231/2](#): Pos. minimum (default setting: 0.00 %)
- [C00231/3](#): Neg. minimum (default setting: 0.00 %)
- [C00231/4](#): Neg. maximum (default setting: 199.99 %)

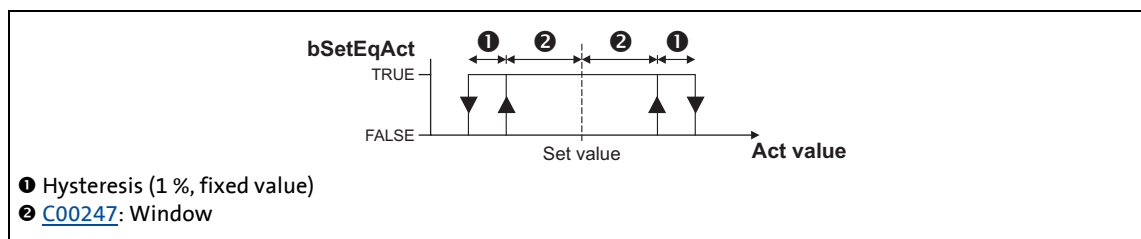
17.1.39.4 Evaluation of the output signal

After the limitation, the output signal is evaluated with the influencing factor *nInfluence_a*. The evaluation is activated/suppressed along a ramp when the *bEnableInfluenceRamp* input is set to TRUE. The ramp times are set with the parameters "Influence acceleration time" ([C00243](#)) and "Influence deceleration time" ([C00244](#)).

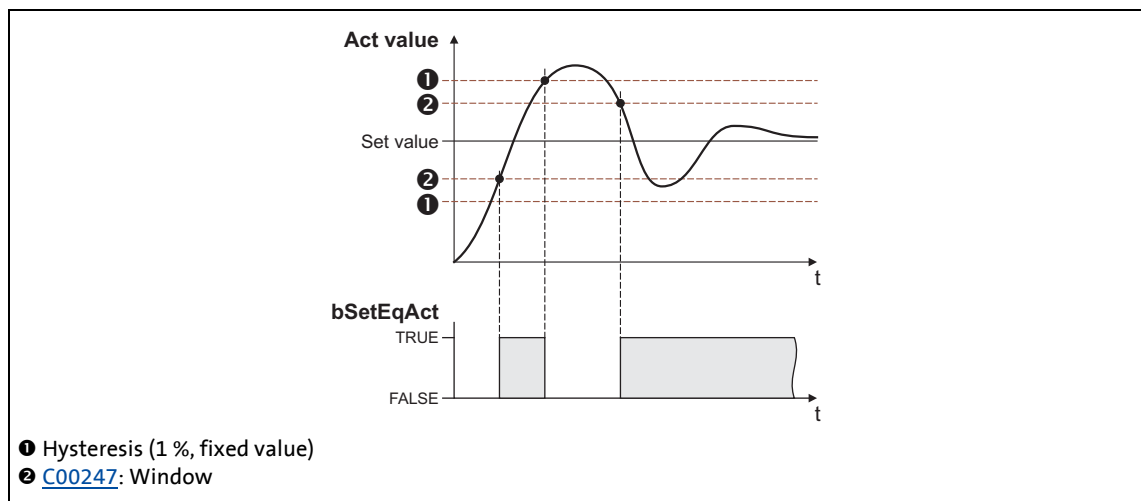
17.1.39.5 Comparison function "Actual value = setpoint"

If setpoint and actual value are identical and there is no system deviation, the *bSetEqAct* status output is set to TRUE.

- The hysteresis of the comparison function has a fixed value of 1 %.
- From version 06.00.00 onwards, the symmetrical window around the setpoint for the comparison function can be set in [C00247](#) (Lenze setting: 2 %).



[17-20] Comparison function: Switching performance



[17-21] Comparison function: Example

17.1.39.6 Control functions

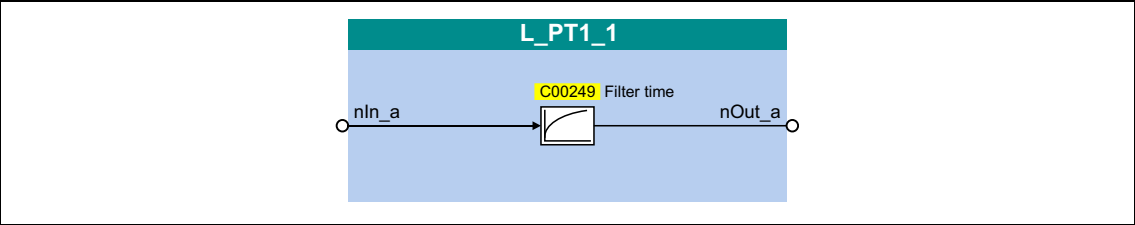
The process controller has various digital inputs for controlling the FB:

Identifier	Data type	Information/possible settings
bInAct	BOOL	Deactivate process controller temporarily (stop) • Changes can be done online. • Display parameter: C00833/76 Note: This input is not interconnected in the LA_NCtrl application block.
		TRUE • The current output value is frozen. • The internal control algorithm is stopped. • However, a setpoint selected via input <i>nNSet_a</i> is still provided in operating modes 0/1/4/5.
bIOff	BOOL	Switch off the I-component of the process controller • Changes can be done online. • Display parameter: C00833/77
		TRUE • The I component of the process controller is set to zero.
bPIDOff (from version 06.00.00)	BOOL	Reset the entire PID controller
		TRUE • The I component of the controller is set to zero. • The controller output is set to zero. • The internal control algorithm is stopped.

17.1.40 L_PT1_1

This FB filters and delays analog signals.

- The filter time constant T can be set under [C00249](#).
- The gain is defined with $V_p = 1$.



Inputs

Identifier	Data type	Information/possible settings
nIn_a	INT	Input signal

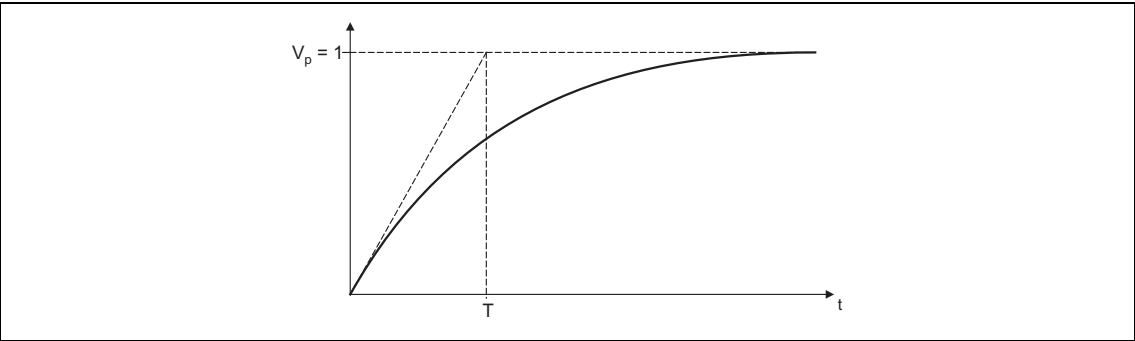
Outputs

Identifier	Data type	Value/meaning
nOut	INT	Output signal

Parameter

Parameter	Possible settings			Info
C00249	0	ms	5000	Filter time constant • The filter is not active with a setting of "0 ms". The input signal is passed through one-to-one to the output. • Lenze setting: 2000 ms

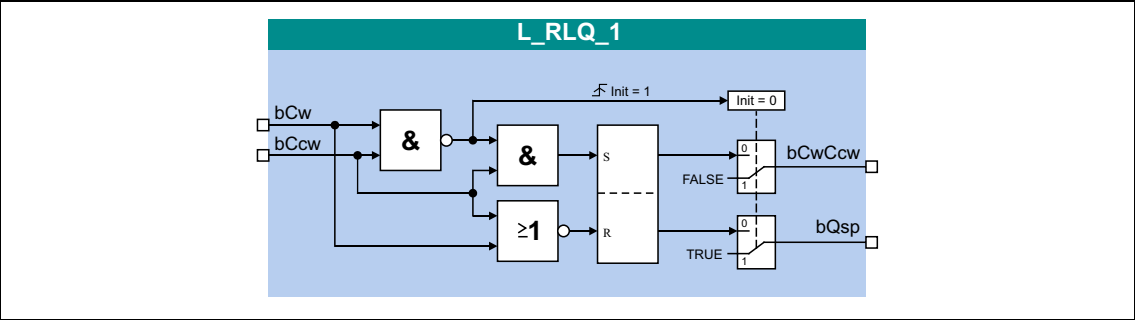
Function



[17-22] Filter time constant T of the first-order delay element

17.1.41 L_RLQ_1

This FB links a selected direction of rotation to the quick stop function with wire-break protection.



Inputs

Identifier	Data type	Information/possible settings
bCw	BOOL	Input • TRUE = CW rotation
bCCw	BOOL	Input • TRUE = CCW rotation

Outputs

Identifier	Data type	Value/meaning
bQSP	BOOL	Output signal for quick stop (QSP)
bCwCcW	BOOL	Output signal for CW/CCW rotation • TRUE = CCW rotation

Function

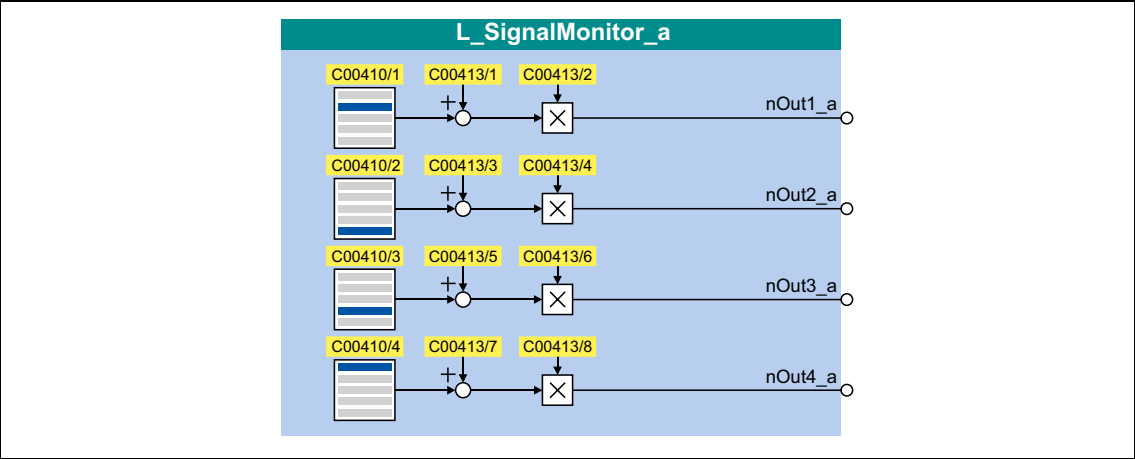
Inputs		Outputs		Notes
bCw	bCCw	bCwCcW	bQSP	
TRUE	TRUE	FALSE	TRUE	The inputs have this status only if a TRUE signal is being applied to <u>both</u> inputs at the moment of switch-on! See also FB illustration above, "Init" = 1.
If <i>one</i> of the inputs has the TRUE status, the following truth table applies:				
FALSE	FALSE	FALSE	TRUE	See also FB illustration above, "Init" = 0.
TRUE	FALSE	FALSE	FALSE	
FALSE	TRUE	TRUE	FALSE	
TRUE	TRUE	X (save)		

[17-23] Truth table of the FB L_RLQ, 0 = FALSE, 1 = TRUE

17.1.42 L_SignalMonitor_a

This FB outputs four analog signals which can be selected from a list of analog output signals of all function blocks provided in the device.

- Offset and gain of the source signals are adjustable.



Outputs

Identifier	Data type	Value/meaning
nOut1_a	INT	Output signal • Internal limitation to ± 32767
nOut2_a	INT	Output signal • Internal limitation to ± 32767
nOut3_a	INT	Output signal • Internal limitation to ± 32767
nOut4_a	INT	Output signal • Internal limitation to ± 32767

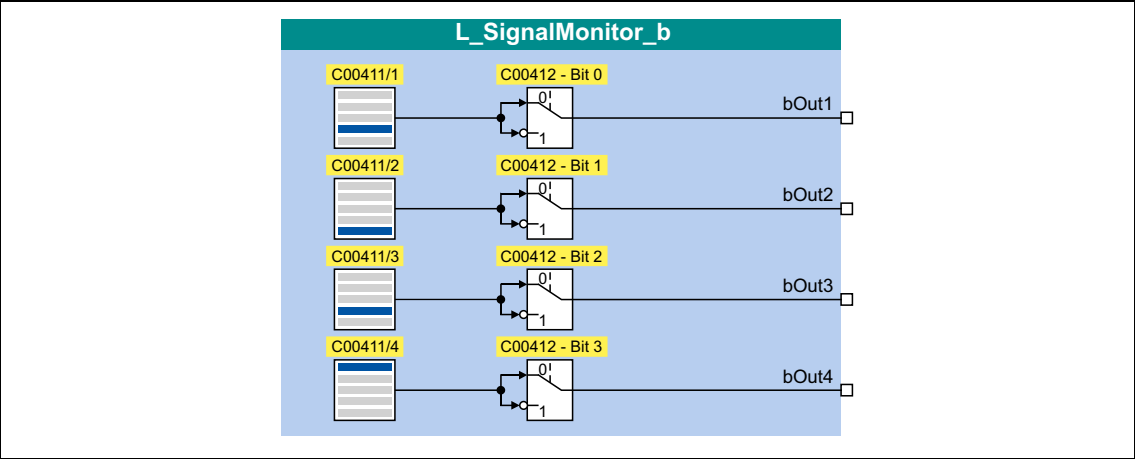
Parameter

Parameter	Possible settings			Info
C00410/1 ... C00410/4	See selection list - analog signals			Selection of the signal sources for <i>nOut1_a ... nOut4_a</i>
C00413/1 C00413/3 C00413/5 C00413/7	-199.99	%	+199.99	Offset
C00413/2 C00413/4 C00413/6 C00413/8	-199.99	%	+199.99	Gain

17.1.43 L_SignalMonitor_b

This FB outputs four binary signals which can be selected from a list of binary output signals of all function blocks provided in the device.

- Inversion of the output signals can be set.



Outputs

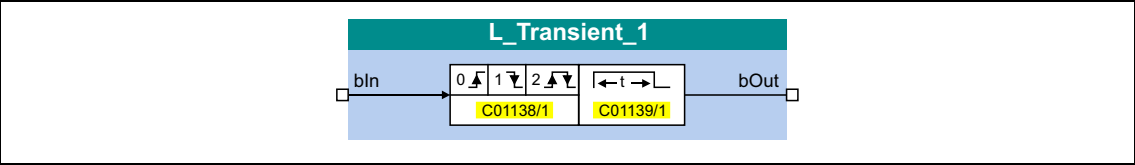
Identifier	Data type	Value/meaning
bOut1 ... bOut4	BOOL	Output signal FALSE / TRUE

Parameter

Parameter	Possible settings	Info																
C00411/1 ... C00411/4	See selection list - digital signals	Selection of the signal sources for <i>bOut1 ... bOut4</i>																
C00412	Value is bit-coded: <table><tr><td>Bit 0</td><td>bOut1 inverted</td></tr><tr><td>Bit 1</td><td>bOut2 inverted</td></tr><tr><td>Bit 2</td><td>bOut3 inverted</td></tr><tr><td>Bit 3</td><td>bOut4 inverted</td></tr><tr><td>Bit 4</td><td>Reserved</td></tr><tr><td>Bit 5</td><td>Reserved</td></tr><tr><td>Bit 6</td><td>Reserved</td></tr><tr><td>Bit 7</td><td>Reserved</td></tr></table>	Bit 0	bOut1 inverted	Bit 1	bOut2 inverted	Bit 2	bOut3 inverted	Bit 3	bOut4 inverted	Bit 4	Reserved	Bit 5	Reserved	Bit 6	Reserved	Bit 7	Reserved	Inversion • Bit set = inversion active
Bit 0	bOut1 inverted																	
Bit 1	bOut2 inverted																	
Bit 2	bOut3 inverted																	
Bit 3	bOut4 inverted																	
Bit 4	Reserved																	
Bit 5	Reserved																	
Bit 6	Reserved																	
Bit 7	Reserved																	

17.1.44 L_Transient_1

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Identifier	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/1 .

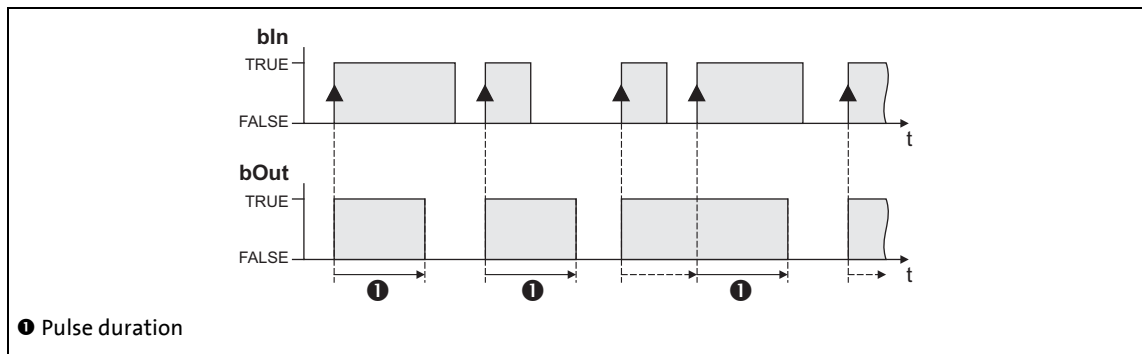
Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameter

Parameter	Possible settings			Info
C01138/1				Function • Selection of edge evaluation
	0	High edge		Lenze setting
	1	Low edge		
	2	High and low edge		
C01139/1	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s

17.1.44.1 Function 0: Evaluate rising signal edges

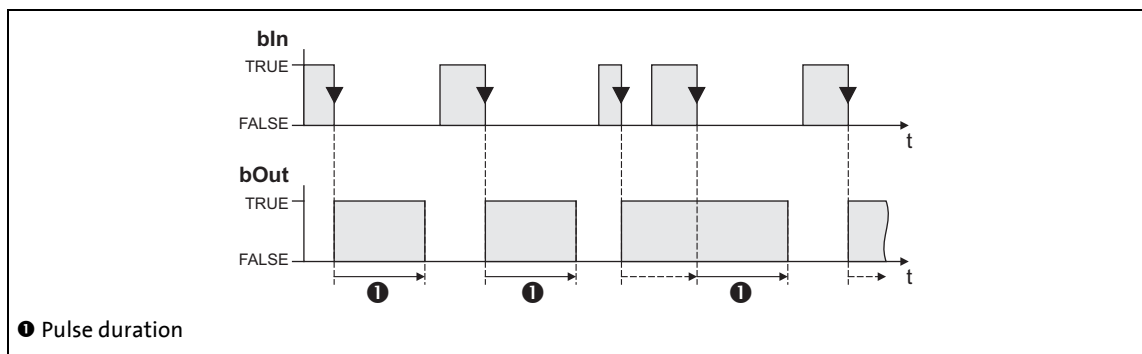


[17-24] Switching performance for function selection "0: High edge"

Functional sequence

1. A FALSE-TRUE edge at the bIn input sets the $bOut$ output to TRUE.
2. After the parameterised pulse duration has elapsed, the $bOut$ output is reset to FALSE unless another FALSE/TRUE edge has been set at the bIn input.
 - If an additional FALSE-TRUE edge occurs at the bIn input, the pulse duration starts again from the beginning, i.e. the $bOut$ output can be retriggered.

17.1.44.2 Function 1: Evaluate falling signal edges

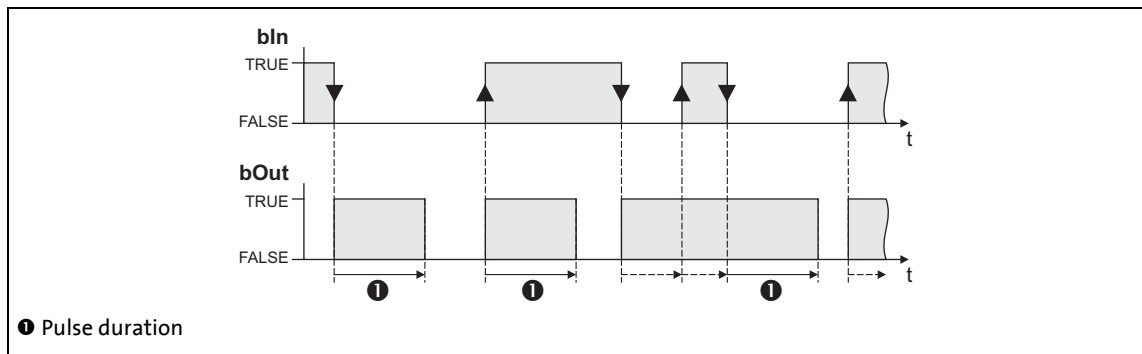


[17-25] Switching performance for function selection "1: Low edge"

Functional sequence

1. A TRUE-FALSE edge at the bIn inputs sets the $bOut$ output to TRUE.
2. After the parameterised pulse duration has elapsed, the $bOut$ output is reset to FALSE unless another TRUE/FALSE edge has been set at the bIn input.
 - If an additional TRUE-FALSE edge occurs at the bIn input, the pulse duration starts again from the beginning, i.e. the $bOut$ output can be retriggered.

17.1.44.3 Function 2: Evaluate rising and falling signal edges



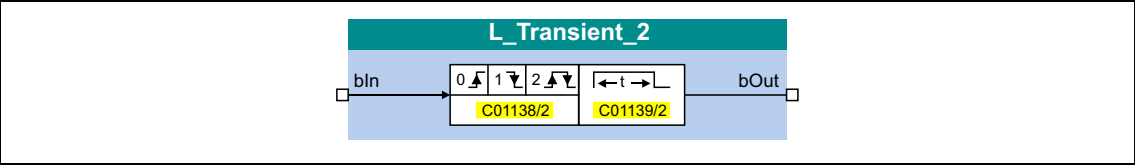
[17-26] Switching performance for function selection "2: High and low edge"

Functional sequence

1. A signal change (FALSE/TRUE edge or TRUE/FALSE edge) at the *bIn* input sets the *bOut* output to TRUE.
2. After the parameterised pulse duration has elapsed, the *bOut* output is reset to FALSE unless another signal change has taken place at the *bIn* input.
 - In case of another signal change at the input *bIn*, the pulse time restarts to elapse, i.e. the output *bOut* can be retriggered.

17.1.45 L_Transient_2

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Identifier	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/2 .

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

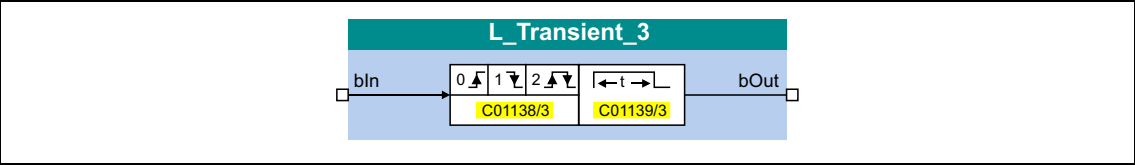
Parameter

Parameter	Possible settings			Info
C01138/2				Function • Selection of edge evaluation
	0	High edge		Lenze setting
	1	Low edge		
	2	High and low edge		
C01139/2	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s

 For a detailed functional description see [L_Transient_1](#).

17.1.46 L_Transient_3

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Identifier	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/3 .

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameter

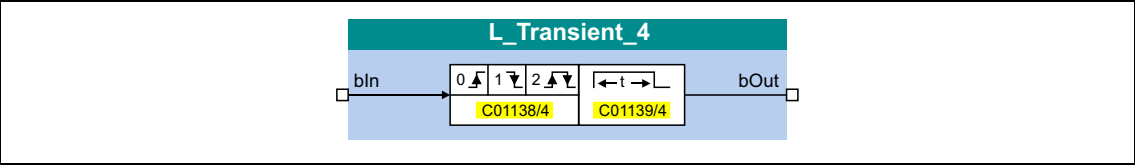
Parameter	Possible settings			Info
C01138/3				Function • Selection of edge evaluation
	0	High edge		Lenze setting
	1	Low edge		
	2	High and low edge		
C01139/3	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

17.1.47 L_Transient_4

This FB serves to evaluate digital signal edges and convert them into timed, retriggerable pulses. Rising signal edges, falling signal edges or both signal edges can be evaluated.



Inputs

Identifier	Data type	Information/possible settings
bIn	BOOL	Input for edge evaluation • The function depends on the selection of edge evaluation in C01138/4 .

Outputs

Identifier	Data type	Value/meaning
bOut	BOOL	Output (retriggerable)

Parameter

Parameter	Possible settings			Info
C01138/4				Function • Selection of edge evaluation
	0	High edge		Lenze setting
	1	Low edge		
	2	High and low edge		
C01139/4	0.001	s	60.000	Pulse duration • Lenze setting: 0.001 s



For a detailed functional description see [L_Transient_1](#).

17.2 System blocks

This chapter describes the system blocks which are available for the controller in the FB Editor.



The function blocks are described in the previous chapter "[Function blocks](#)". (📖 909)

Overview of system blocks available

System block	Function	can be inserted into level:	
		I/O	Appl.
LS_AnalogInput	Interface to the analog input terminals ▶ Analog terminals (📖 280)	●	
LS_CANManagement	Control of internal functions of the CAN driver and display of the "Operational" status as well as the node address ▶ System bus "CAN on board" (📖 488)	●	●
LS_DataAccess	<i>Lenze internal only</i>		●
LS_DeviceMonitor	Motor control status signals ▶ Motor control (MCTRL) (📖 104)		●
LS_DigitalInput	Interface to the digital input terminals ▶ Digital terminals (📖 261)	●	
LS_DigitalOutput	Interface to the digital output terminals ▶ Digital terminals (📖 261)	●	
LS_DisFree	Display of 4 arbitrary 16-bit signals of the application on display codes	●	●
LS_DisFree_a	Display of 4 arbitrary analog signals of the application on display codes	●	●
LS_DisFree_b	Display of 8 arbitrary digital signals of the application on a bit coded display code	●	●
LS_DriveInterface	Interface to drive control (DCTRL) ▶ Device control (DCTRL) (📖 72)		●
LS_Keypad	Control via keypad	●	
LS_MotionControlKernel	Interface to the basic drive function implemented in the Motion Control Kernel (MCK) ▶ Basic drive functions (MCK) (📖 390)		●
LS_MotorInterface	Interface to motor control (MCTRL) ▶ Motor control (MCTRL) (📖 104)		●
LS_ParFix	Output of frequently used constants (TRUE, FALSE, 100 %, etc.) to be used in the interconnection	●	●
LS_ParFree	Output of 4 parameterisable 16-bit signals	●	●
LS_ParFree_a	Output of 4 parameterisable analog signals	●	●
LS_ParFree_b	Output of 16 parameterisable digital signals	●	●
LS_ParFree_p	Output of 4 parameterisable position signals • This SB is available from version 11.00.00.	●	●
LS_ParFree_v	Output of 4 parameterisable speed signals	●	●
LS_ParReadWrite_1 ... LS_ParReadWrite_3	Reading/Writing of local parameters	●	●
LS_PulseGenerator	Output of 9 fixed frequencies and 1 parameterisable frequency	●	●
LS_SetError_1	Parameterisable responses to user-defined events are tripped ▶ Diagnostics & error management (📖 420)	●	●

System block	Function	can be inserted into level:	
		I/O	Appl.
LS_SyncManagement	Output of status information for synchronising the internal time base ▶ Synchronisation of the internal time base (📖 575)	●	●
LS_WriteParamList	Interface to the basic "Parameter change-over" function ▶ Parameter change-over (📖 577) • This SB is available from version 04.00.00.	●	

Related topics:

- ▶ [Overview of function blocks available](#) (📖 909)
- ▶ [Working with the FB Editor](#) (📖 857)

17.2.1 LS_AnalogInput

Interface to the analog input terminals.



For a detailed description see the main chapter "I/O terminals":

► [Internal interfaces | System block "LS_AnalogInput"](#) (📖 287)

17.2.2 LS_CANManagement

Control of internal functions of the CAN driver and display of the "Operational" status as well as the node address.



For a detailed description see the main chapter "System bus CAN on board":

► [Internal interfaces | System block "LS_CANManagement"](#) (📖 567)

17.2.3 LS_DataAccess

Only for Lenze-internal use.

17.2.4 LS_DeviceMonitor

Motor control status signals.



For a detailed description see the main chapter "Motor control (MCTRL)":

► [Internal status signals | System block "LS_DeviceMonitor"](#) (📖 257)

17.2.5 LS_DigitalInput

Interface to the digital input terminals.



For a detailed description see the main chapter "I/O terminals":

► [Internal interfaces | System block "LS_DigitalInput"](#) (📖 273)

17.2.6 LS_DigitalOutput

Interface to the digital output terminals.

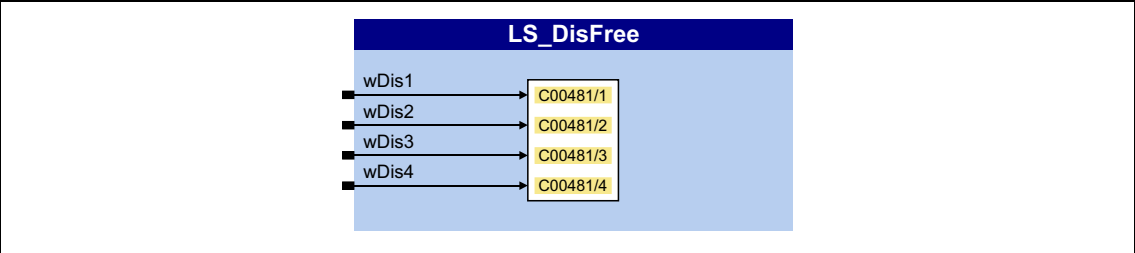


For a detailed description see the main chapter "I/O terminals":

► [Internal interfaces | System block "LS_DigitalOutput"](#) (📖 279)

17.2.7 LS_DisFree

This system block displays 4 arbitrary 16-bit signals of the application on display codes.



Inputs

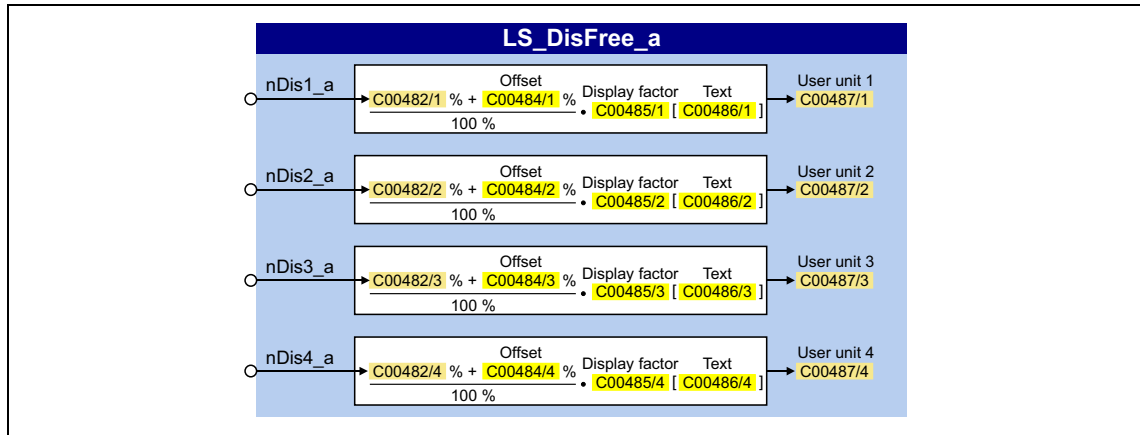
Identifier	Information/possible settings
Data type wDis1 ... wDis4 WORD From version 11.00.00 onwards: wC481_1 ... wC481_4_a	Inputs for any 16-bit signals of the application Note: From version 11.00.00 the inputs are named according to the display parameter for an easier allocation.

Parameter

Parameter	Possible settings	Info
C00481/1...4	0x0000	0xFFFF
		Display of the 16-bit signals which are applied at the wDis1 ... wDis4 inputs

17.2.8 LS_DisFree_a

This system block displays 4 arbitrary analog signals of the application on display codes.



Inputs

Identifier	Data type	Information/possible settings
nDis1_a ... nDis4_a	INT	Inputs for arbitrary analog signals of the application
From version 11.00.00 onwards: nC482_1_a ... nC482_4_a		Note: From version 11.00.00 the inputs are named according to the display parameter for an easier allocation.

Parameter

Parameter	Possible settings	Info
C00482/1...4	-199.99 %	199.99 %
C00484/1...4 ... C00487/1...4	From version 06.00.00 onwards: ► Display of internal process factors in application units	

17.2.8.1 Display of internal process factors in application units

This function extension is available from version 06.00.00!

In addition to the display in percent in [C00482/1...8](#), for the first four analog signals $nDis1\_a$... $nDis4\_a$ the configurable display parameters [C00487/1...4](#) are provided. Via these display parameters, internal process variables can be displayed, e.g. on the keypad, with an individual scaling and an individual unit (from keypad version 02.01).

Configuration of the display parameters ([C00487/1...4](#)):

Parameter	Possible settings			Info
C00484/1...4	-199.99	%	199.99	Offset 1 ... 4 • See formula [17-27] . • Lenze setting: 0.00 %
C00485/1...4	-65536.0000		65536.0000	Display factor 1 ... 4 • Scaling of the input variable for the display. • See formula [17-27] . • Lenze setting: 1.0000
C00486/1...4	String of digits (max. 7 digits)			Text 1 ... 4 • For each display value, an individual unit (e.g. "parts") can be set.

$$\text{User unit 1} = \frac{nDis1\_a [\%] + \text{Offset 1} [\%]}{100 [\%]} \cdot \text{Display factor 1} [\text{text 1}]$$

[17-27] Formula for scaling the display

Example 1:

- Input variable $nDis1\_a = 100 \%$
- Offset 1 ([C00484/1](#)) = 0 %
- Display factor 1 ([C00485/1](#)) = 123.45
- Text 1 ([C00486/1](#)) = "parts"

$$\text{User unit 1} = \frac{100 [\%] + 0 [\%]}{100 [\%]} \cdot 123.45 [\text{parts}] = 123.45 \text{ parts}$$

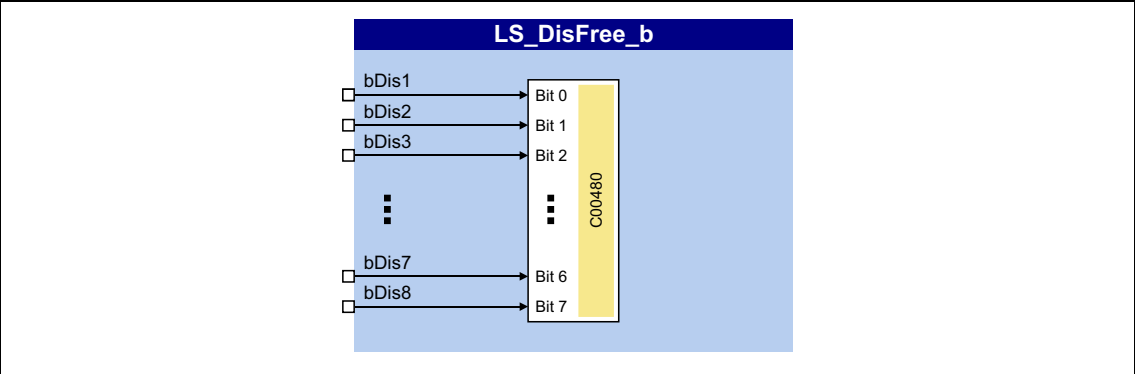
Example 2:

- Input variable $nDis2\_a = 40 \%$
- Offset 2 ([C00484/2](#)) = 35 %
- Display factor 2 ([C00485/2](#)) = 20
- Text 2 ([C00486/2](#)) = "kg"

$$\text{User unit 2} = \frac{40 [\%] + 35 [\%]}{100 [\%]} \cdot 20 [\text{kg}] = 15.00 \text{ kg}$$

17.2.9 LS_DisFree_b

This system block displays 8 arbitrary digital signals of the application on a bit coded display code.



Inputs

Identifier	Data type	Information/possible settings
bDis1 ... bDis8	BOOL	Inputs for arbitrary digital signals of the application
From version 11.00.00 onwards: bC480_B0 ... bC480_B7		Note: From version 11.00.00 the inputs are named according to the display parameter for an easier allocation.

Parameter

Parameter	Possible settings	Info
C00480	0x0000	Display of the digital signals as hexadecimal values which are applied at the <i>bDis1</i> ... <i>bDis8</i> inputs
	Bit 0	
	Bit 1	
	Bit 2	
	...	
	Bit 7	

17.2.10 LS_DriveInterface

Interface to internal device control.



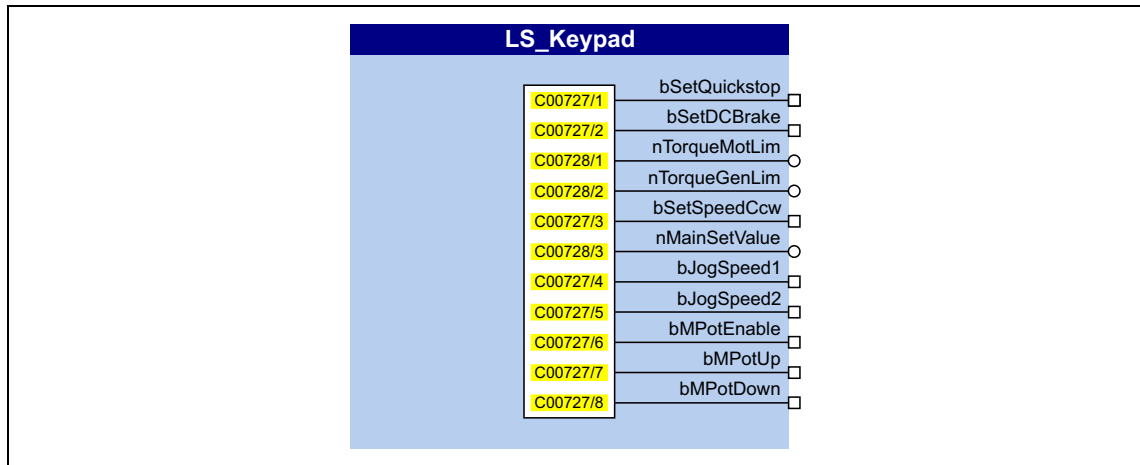
For a detailed description see main chapter "Device control (DCTRL)":

► [Internal interfaces | "LS_DriveInterface" system block](#) (98)

17.2.11 LS_Keypad

This system block is used on I/O interconnection level if the "Keypad" control mode has been selected in [C00007](#).

In the "Keypad" control mode, the **LS_Keypad** system block passes on various setpoints and control commands to the technology application which can be selected/activated via codes using the keypad.



Outputs

Identifier	Data type	Value/meaning
bSetQuickstop	BOOL	C00727/1 = "1" ≡ Request quick stop
bSetDCBrake	BOOL	C00727/2 = "1" ≡ Request DC-injection braking
nTorqueMotLim	INT	Torque limit in motor mode set in C00728/1 • Lenze setting: 100.00 %
nTorqueGenLim	INT	Torque limit in generator mode set in C00728/2 • Lenze setting: 100.00 %
bSetSpeedCcw	BOOL	C00727/3 = "1" ≡ Request reversal
nMainSetValue	INT	Setpoint speed set in C00728/3 • Lenze setting: 0.00 %
bJogSpeed1	BOOL	C00727/4 = "1" ≡ Request fixed speed setpoint 1
bJogSpeed2	BOOL	C00727/5 = "1" ≡ Request fixed speed setpoint 2
bMPotEnable	BOOL	C00727/6 = "1" ≡ Motor potentiometer: Request activation
bMPotUp	BOOL	C00727/7 = "1" ≡ Motor potentiometer: Request positive acceleration
bMPotDown	BOOL	C00727/8 = "1" ≡ Motor potentiometer: Request negative acceleration

Parameter

Parameter	Possible settings			Info
C00727/1...8	0		1	Keypad digital values • Execution of control commands for keypad operation • See the "Outputs" table for the meaning of the individual subcodes
C00728/1...3	-199.99	%	199.99	Analog values - keypad • Selection of various setpoints for operation via keypad • See the "Outputs" table for the meaning of the individual subcodes

17.2.12 LS_MotionControlKernel

Interface to the basic drive functions implemented in **Motion Control Kernel** (MCK).



For a detailed description see the main chapter "Basic drive functions":

► [Internal interfaces | System block "LS_MotionControlKernel"](#) (📖 392)

17.2.13 LS_MotorInterface

Interface to internal motor control.

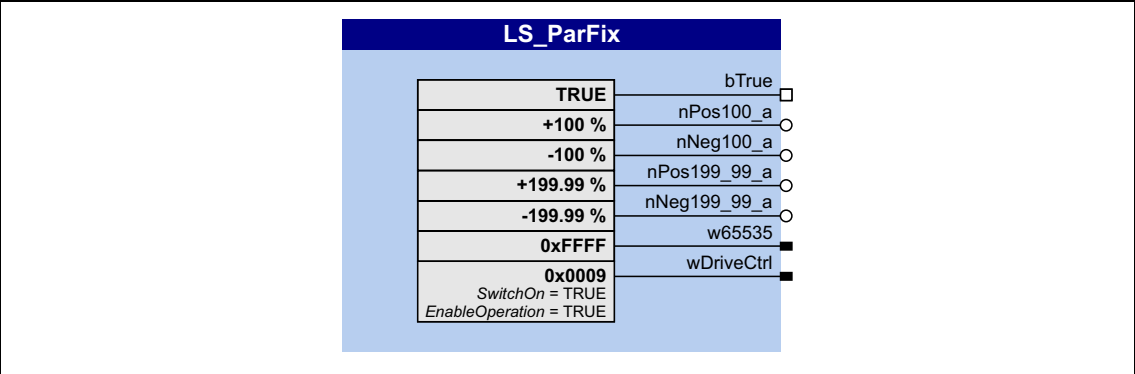


For a detailed description see the main chapter "Motor control (MCTRL)":

► [Internal interfaces | System block "LS_MotorInterface"](#) (📖 251)

17.2.14 LS_ParFix

This system block outputs various fixed values (constants) to be used in the interconnection.



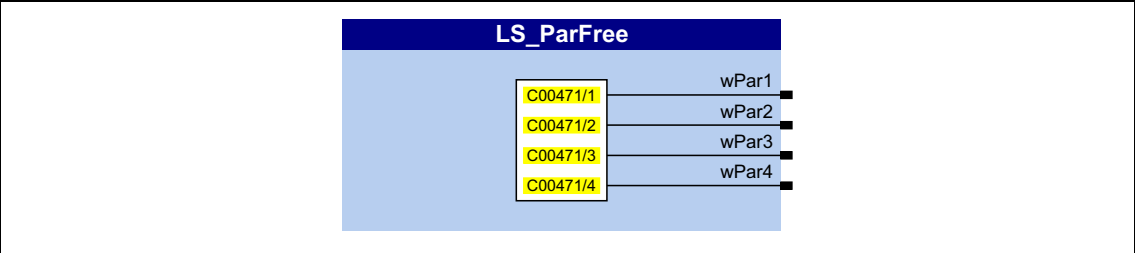
Outputs

Identifier	Data type	Value/meaning
bTrue	BOOL	1 ≡ TRUE
nPos100_a	INT	16384 ≡ + 100 %
nNeg100_a	INT	-16384 ≡ - 100 %
nPos199_99_a	INT	32767 ≡ + 199.99 %
nNeg199_99_a	INT	-32767 ≡ - 199.99 %
w65535	WORD	65535 ≡ 0xFFFF
wDriveCtrl	WORD	9 ≡ 0x0009 • Bit 0, SwitchOn = TRUE • Bit 3, EnableOperation = TRUE • All others: FALSE See also: wCANControl/wMCIControl control words (101)

17.2.15

LS_ParFree

This system block outputs 4 parameterisable 16-bit signals.



Outputs

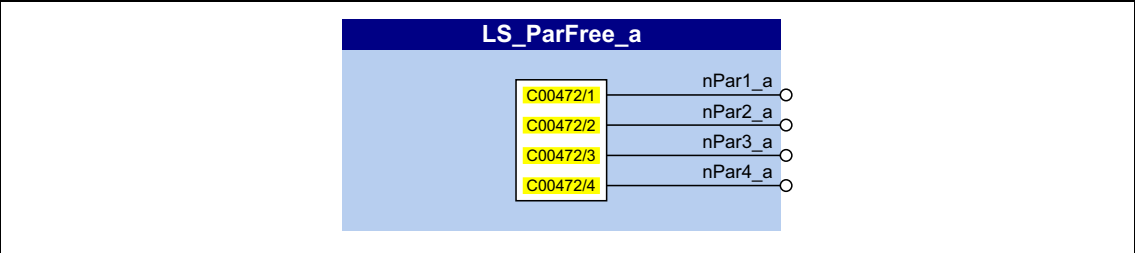
Identifier	Data type	Value/meaning
wPar1 ... wPar4	WORD	Output of the 16-bit signals parameterised in C00471/1...4
From version 11.00.00 onwards: wC471_1 ... wC471_4		Note: From version 11.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameter

Parameter	Possible settings			Info
C00471/1...4	0x0000		0xFFFF	Setting of the 16-bit signals to be output

17.2.16 **LS_ParFree_a**

This system block outputs 4 parameterisable analog signals.



Outputs

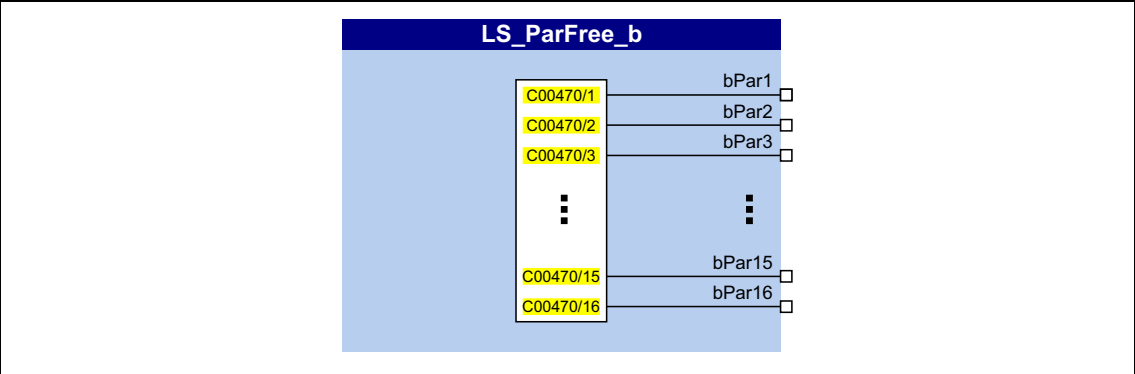
Identifier	Data type	Value/meaning
nPar1_a ... nPar4_a	INT	Output of the analog signals parameterised in C00472/1...4
From version 11.00.00 onwards: nC472_1_a ... nC472_4_a		Note: From version 11.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

Parameter

Parameter	Possible settings			Info
C00472/1...4	-199.99	%	+199.99	Selection of analog signals to be output

17.2.17 LS_ParFree_b

This system block outputs 16 parameterisable digital signals.



Outputs

Identifier	Data type	Value/meaning
bPar1 ... bPar16	BOOL	Output of the signal levels (FALSE/TRUE) parameterised in C00470/1...16
From version 11.00.00 onwards: bC470_1 ... bC470_16		Note: From version 11.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

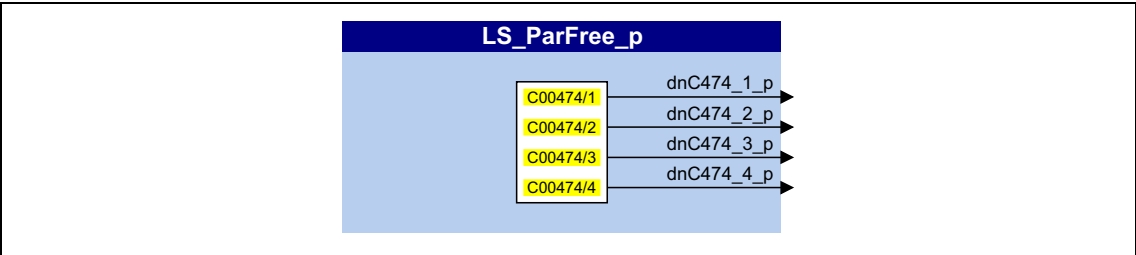
Parameter

Parameter	Possible settings	Info
C00470/1...16		Selection of signal levels to be output • Bit 0 ... 15 = <i>bPar1</i> ... <i>bPar16</i>
	0 "FALSE" signal is output	
	1 "TRUE" signal is output	

17.2.18

LS_ParFree_p

This system block outputs 4 parameterisable position signals.



Outputs

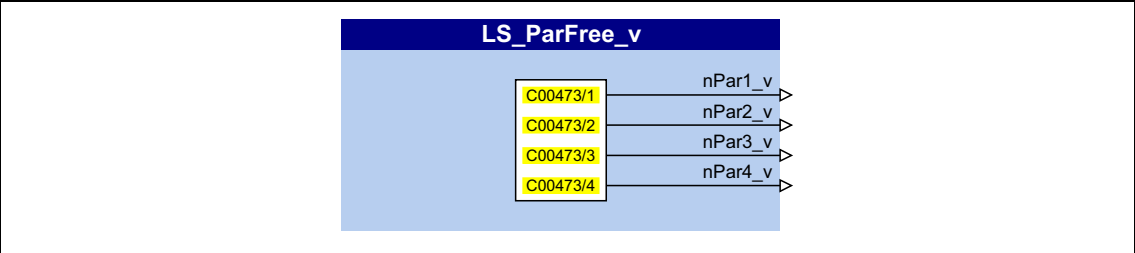
Identifier	Value/meaning
dnC474_1_p ... dnC474_4_p DINT	Output of the position signals parameterised in C00474/1...4

Parameter

Parameter	Possible settings			Info
C00474/1...4	-2147483647	Incr.	2147483647	Setting of the position signals to be output

17.2.19 LS_ParFree_v

This system block outputs 4 parameterisable speed signals.



Outputs

Identifier	Information/possible settings
nPar1_v ... nPar4_v From version 11.00.00 onwards: nC473_1_v ... nC473_4_v INT	Output of the speed signals parameterised in C00473/1...4 Note: From version 11.00.00 the outputs are named according to the respective setting parameter for an easier allocation.

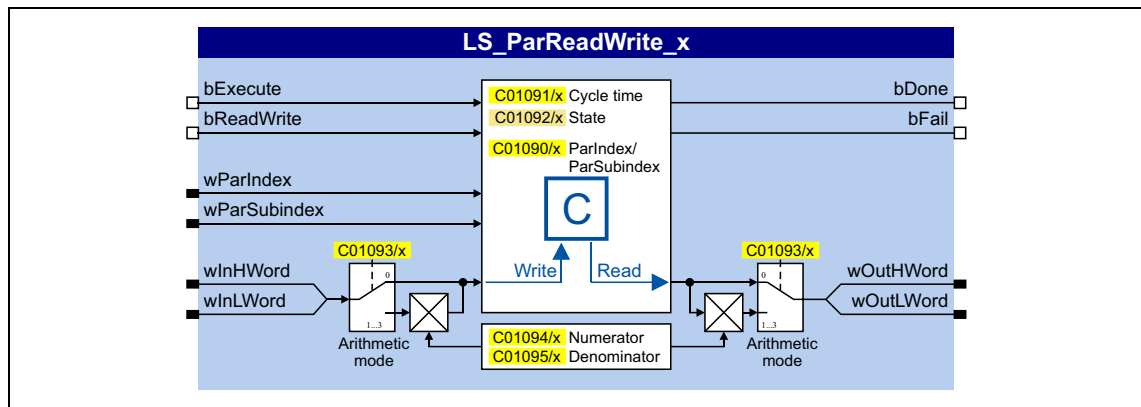
Parameter

Parameter	Possible settings			Info
C00473/1...4	-32767	Incr/ms	+32767	Selection of speed signals to be output

17.2.20 LS_ParReadWrite_1-3

The **LS_ParReadWrite_1 ... LS_ParReadWrite_3** system blocks are used for reading and writing local parameters.

- If several system blocks are activated at the same time, the blocks will be processed one at a time every time the main program is executed.
- The SB supports one-time and cyclic reading/writing in an adjustable time interval.



Inputs

Identifier	Data type	Information/possible settings
bExecute	BOOL	Trip read/write request
		FALSE → TRUE: If cycle time (C01091) = "0 ms": <u>One-time</u> reading/writing of the parameter value which has been addressed via the <i>wParIndex</i> and <i>wParSubindex</i> inputs.
		If cycle time (C01091) > "0 ms": <u>Cyclic</u> reading/writing of the parameter value which has been addressed via the <i>wParIndex</i> and <i>wParSubindex</i> inputs.
		TRUE → FALSE: Deactivate cyclic reading/writing again.
bReadWrite	BOOL	Selection: Read or write request
		FALSE: Read request TRUE: Write request
wParIndex	WORD	Code to be read or written. • From version 06.00.00 onwards, this selection can be optionally carried out via C01090.
wParSubindex	WORD	Subcode to be read or written. • From version 06.00.00 onwards, this selection can be optionally carried out via C01090.
wInHWord wInLWord	WORD	Value to be written (DataHigh/DataLow portion)

Outputs

Identifier	Data type	Value/meaning
bDone	BOOL	"Read/Write request successfully completed" status signal The output is automatically reset to FALSE if a new request is activated via <i>bExecute</i> or the cycle time (C01091) expires.
		TRUE Read/Write request successfully completed.
		FALSE The FALSE status can have the following meanings: - There is no active read/write request. - The read/write request has not been completed yet. - An error has occurred (if <i>bFail</i> = TRUE).
bFail	BOOL	"Error" status
		TRUE An error has occurred (group signal). See display parameter (C01092) for details.
wOutHWord wOutLWord	WORD	Value which was read (DataHigh/DataLow portion) after read request

Parameter

Parameter	Possible settings			Info
C01090/1...3 (from version 06.00.00)	0,000		16000,000	Parameter to be read or written. - For a setting of "0,000", inputs <i>wParIndex</i> and <i>wParSubindex</i> are effective for addressing purposes instead. - Lenze setting: 0.000
	Format: <Code number>,<subcode number>			
C01091/1...3				Cycle time - Subcode 1 = LS_ParReadWrite_1 - Subcode 2 = LS_ParReadWrite_2 - Subcode 3 = LS_ParReadWrite_3 - Lenze setting: 0
	0	One-time reading/writing at <i>bExecute</i> in case of a FALSE/TRUE edge		
	Cyclic reading/writing:			
	20	20 ms		
	50	50 ms		
	100	100 ms		
	200	200 ms		
	500	500 ms		
	1000	1 s		
	2000	2 s		
	5000	5 s		
	10000	10 s		

Parameter	Possible settings			Info
C01092/1...3				Error status • If <i>bFail</i> = TRUE: Error status is displayed. • Subcode 1 = LS_ParReadWrite_1 Subcode 2 = LS_ParReadWrite_2 Subcode 3 = LS_ParReadWrite_3
	0	No error		
	33803	Invalid data type (e.g. STRING)		
	33804	Limit violation		
	33806	Invalid code		
	33813	No element of the selection list		
	33815	Writing of the parameter not permitted		
	33816	Writing of the parameter only permitted if controller is inhibited		
	33829	Invalid subcode		
	33865	No parameter with subcodes		
C01093/1...3 (from version 06.00.00)				Arithmetic mode • Lenze setting: "0: No arithmetic" ▶ Arithmetic function
	0	No arithmetic		
	1	In16Bit: LW=+/-32767		
	2	In16Bit: HW=+/-; LW=0..65535		
	3	In32Bit: HW_LW=+/-2147483647		
C01094/1...3 (from version 06.00.00)	-32767		32767	Counter • For internal conversion in arithmetic modes 1 ... 3. • Lenze setting: 1
C01095/1...3 (from version 06.00.00)	1		32767	Denominator • For internal conversion in arithmetic modes 1 ... 3. • Lenze setting: 1

17.2.20.1 Arithmetic function

This function extension is available from version 06.00.00!

The implemented arithmetic function enables easy arithmetic conversion of the process values to be written or read via parameterisable factors into the format of the target parameter without the need of an additional arithmetic function block.

- In [C01093](#), the interpretation of the *wInHWord* and *wInLWord* inputs can be set to be able to write to parameters:

Arithmetic mode		wInHWord	wInLWord	Internal conversion
0	No arithmetic (Lenze setting)	INTEGER_32 (4 bytes with sign)		No (same behaviour as before)
		DataHigh portion	DataLow portion	
1	In16Bit: LW=+/-32767	-	INTEGER_16 (2 bytes with sign)	Yes (see the following section)
2	In16Bit: HW=+/-; LW=0..65535	Sign (0 ≡ positive value)	UNSIGNED_16 (2 bytes without sign)	
3	In32Bit: HW_LW= +/-2147483647	INTEGER_32 (4 bytes with sign)		
		DataHigh portion	DataLow portion	

Internal conversion

If arithmetic modes 1 ... 3 are selected in [C01093](#), the input value / read parameter value is internally converted via parameterisable factors.

- Division is not remainder considered.

$$\text{parameter value to be written} = \text{Input value}_{[32]} \cdot \frac{\text{Counter}_{[16]}}{\text{Denominator}_{[16]}}$$

[C01094](#): Numerator
[C01095](#): Denominator

[17-28] Internal conversion with write access

$$\text{Output value}_{[32]} = \text{Read parameter value} \cdot \frac{\text{Counter}_{[16]}}{\text{Denominator}_{[16]}}$$

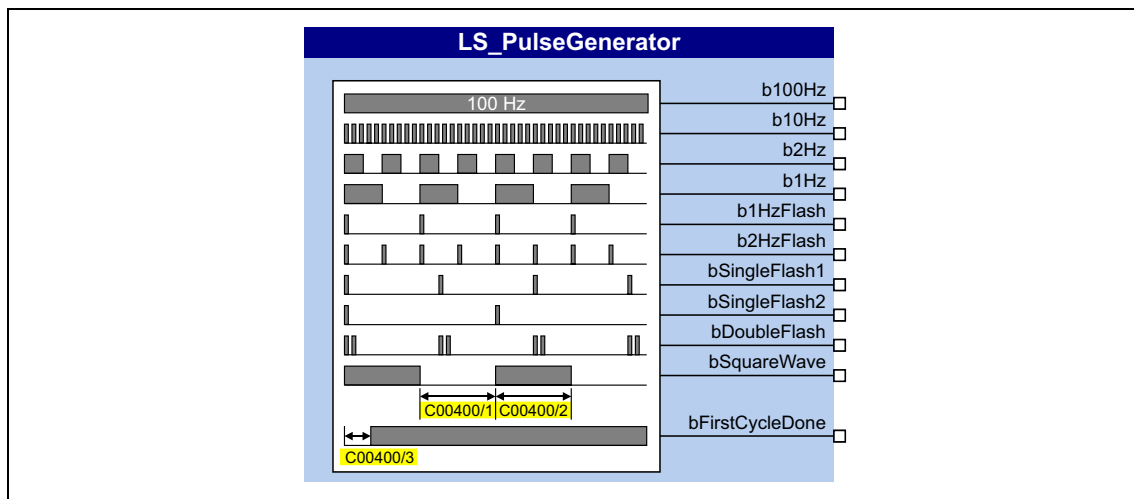
[C01094](#): Numerator
[C01095](#): Denominator

[17-29] Internal conversion with read access

17.2.21 LS_PulseGenerator

This system block outputs 9 different fixed frequencies and 1 frequency with parameterisable pulse/dead time.

From version 06.00.00 onwards, the SB provides a TRUE signal at the *bFirstCycleDone* output when the first 1-ms processing cycle is completed and the time set in [C00400/3](#) has expired. This status signal can e.g. be used for the delayed enable of peripheral devices or motor control setpoints so that all required initial values are calculated first after the controller switch-on.



Outputs

Identifier	Data type	Value/meaning
b100Hz	BOOL	Rectangular signal 100 Hz
b10Hz	BOOL	Rectangular signal 10 Hz
b2Hz	BOOL	Rectangular signal 2 Hz
b1Hz	BOOL	Rectangular signal 1 Hz
b1HzFlash	BOOL	80 ms-pulse, repetition rate every second
b2HzFlash	BOOL	80 ms-pulse, repetition rate every 0.5 seconds
bSingleFlash1	BOOL	80 ms pulse, repetition rate every 1.25 seconds
bSingleFlash2	BOOL	80 ms pulse, repetition rate every 3 seconds
bDoubleFlash	BOOL	80 ms-double pulse, repetition rate every 1.25 seconds
bSquareWave	BOOL	Output frequency with pulse/dead time set in C00400/1...2
bFirstCycleDone	BOOL	Status signal "First processing cycle completed"
(from version 06.00.00)	TRUE	The first 1-ms processing cycle has been completed and the time set in C00400/3 has expired (i.e. all FBs have been called at least once).

Parameter

**Note!**

The real length of the low or high level at the *bSquareWave* output is always 1 ms higher than set in [C00400/1](#) or [C00400/2](#). If "0 ms" is set, a level with a length of 1 ms is created length, for instance, and if "1000 ms" is set, a level with a length of 1001 ms is created.

Parameter	Possible settings			Info
C00400/1	0	ms	60000	Length of the low level (break) + 1 ms • For output <i>bSquareWave</i> • Lenze setting: 1000 ms
C00400/2	0	ms	60000	Length of the high level + 1 ms • For output <i>bSquareWave</i> • Lenze setting: 1000 ms
C00400/3 (from version 06.00.00)	0	ms	60000	Delay of the status <i>bFirstCycleDone</i> • Lenze setting: 100 ms

17.2.22 LS_SetError_1

Parameterisable responses to user-defined events are tripped.



For a detailed description see the main chapter "Diagnostics & error management":

► ["LS_SetError_1" system block](#) (📖 471)

17.2.23 LS_SyncManagement

Output of status information for synchronising the internal time base.



For a detailed description see main chapter "Synchronisation of the internal time base of the controller":

► [Internal interfaces | System block "LS_SyncManagement"](#) (📖 576)

17.2.24 LS_WriteParamList

Writing to a configurable list which contains up to 32 local parameters.



For a detailed description see the main chapter ["Parameter change-over"](#). (📖 577)

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»Engineer« motor catalogue [109](#)

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Your opinion is important to us

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

If you have suggestions for improvement, please e-mail us to:

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Thank you for your support.

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