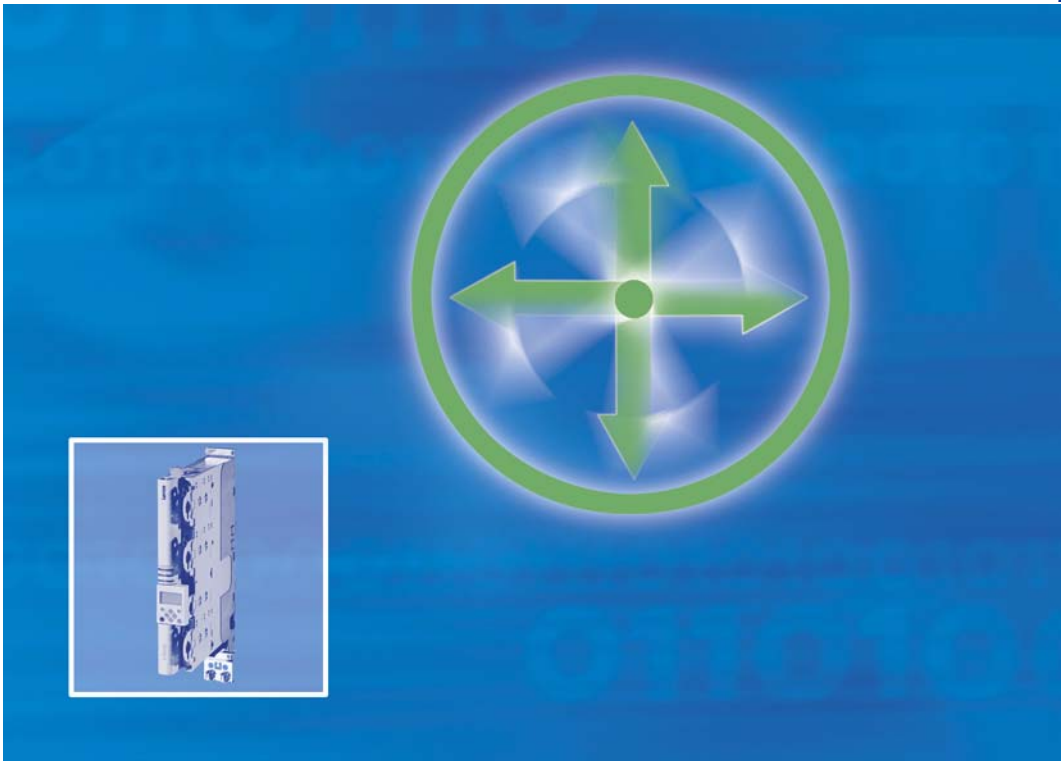
Software Manual

L-force *9400 Servo Drives*



9400 HighLine V01.37

Parameter setting & configuration

Imprint

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Liability

All information given in this documentation has been carefully selected and tested for compliance with the hardware and software described. Nevertheless, discrepancies cannot be ruled out. We do not accept any responsibility or liability for any damage that may occur. Required correction will be included in updates of this documentation.

Depending on the software version of the controller, the screenshots in this documentation may differ from the »Engineer« representation.

Contents

1 About this Manual

This Manual contains information about the parameterisation & configuration of the 9400 HighLine controller by means of the L-force »Engineer« and the keypad.

> **Note!**
>
> The Manual supplements the **Mounting Instructions** attached to the controller and the **Manual** for the 9400 HighLine controller.
>
> **The Mounting Instructions contain safety information which must be observed!**

The information in this Manual applies to the following "9400 Servo Drives":

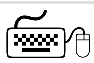
Type	Type designation	As of hardware version	As of software version
9400 HighLine (Single Drive & Multi Drive)	E94AxHExxxx	PD	1.37.00

1.1 Conventions used

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

Type of information	Writing	Examples/notes
Variable identifier	*Italics*	By setting *bEnable* to TRUE...
Window range		The *Message window*... / The *Options* dialog box...
Control element	**Bold**	The **OK** button... / The **Copy** command... / The **Properties** index card... / 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>**	Use **<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...

Program code	`Courier`	`IF var1 < var2 THEN`
		`a = a + 1`
		`END IF`

Keyword	**`Courier bold`**	
Hyperlink	Underlined	A hyperlink is an optically highlighted reference which is activated with a mouse click.
Step-by-step instruction		Like safety information, step-by-step instructions are indicated by a pictograph.

1.2 Terminology used

Term	Meaning
»Engineer«	Lenze software which supports you throughout the whole machine life cycle - from planning to maintenance.
Code	"Container" for one or several parameters used for controller parameter setting or monitoring.
Subcode	If a code contains several parameters, the individual parameters are stored under "subcodes". This Manual uses a slash "/" as a separator between code and subcode (e.g. "C00118/3").
Function block editor	Graphical interconnection tool which is provided for controllers in the MotionControl HighLevel and TopLevel license level in the »Engineer« on the **FB editor** tab and by means of which the technology applications supplied can also be reconfigured and extended by individual functions.
Function block	A function block (FB) can be compared with an integrated circuit that contains a certain control logic and delivers one or several values when being executed. • An entity (reproduction, copy) of the function block is always inserted in the circuit. • It is also possible to insert several instances of a function block in a circuit. • Each entity has an unequivocal identifier (the entity name) and a processing number which defines the position the function block is calculated during the task cycle.
System block	System blocks provide interfaces for basic functions and hardware of the controller in the function block editor of the »Engineer« (e.g. to the digital inputs). • System blocks cannot be instanced in contrast to function blocks.
DIS code	Parameter that displays the current status or value of an input/output of a system block.
TA	Abbreviation for "Technology Application". Technology applications are applications prepared by Lenze which form the basis of solving typical applications.

1.3 Definition of notes used

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

Safety instructions

Structure of safety instructions:

> **Pictograph and signal word!**
>
> (characterise the type and severity of danger)
>
> **Note**
>
> (describes the danger and suggests how to avoid the danger)

Pictograph	Signal word	Meaning
	Danger!	**Danger of personal injury through dangerous electrical voltage** Indicates an impending danger that may lead to death or severe personal injury if the corresponding measures are not taken.
	Danger!	**Danger of personal injury through a general source of danger** Indicates an impending danger that may lead to death or severe personal injury if the corresponding measures are not taken.
	Stop!	**Danger of material 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 for trouble-free operation
	Tip!	Useful tip for simple handling

2 Introduction

The basis of every L-force application is an easy and quick parameter setting of prepared technology applications and solutions*.

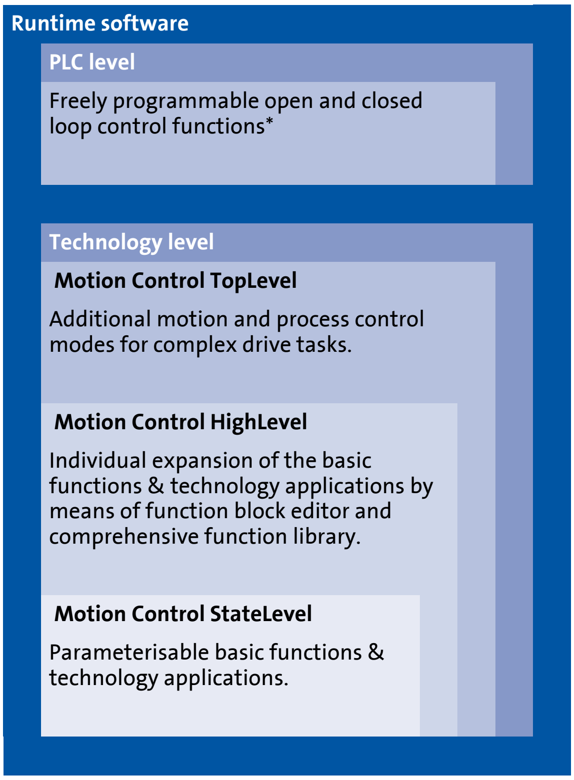
This chapter contains basic information on the runtime software model of L-force and how you can establish very easily an online connection between PC and controller for parameter setting with the »Engineer«.

At the end of this chapter you will find an overview of the different signal types & scalings which serve to process physical values (e.g. speed or position) within the application.

* In preparation!

2.1 Parameter setting, configuring or programming?

The graded runtime software model of L-force provides a simple and universal solution for motion and process tasks as well as for complex machine functions.



Programming*

Configuring
The HighLevel and TopLevel licenses enable you to extend the provided technology applications by individual functions using the graphic function block editor of the »Engineer«. Here, you can access the comprehensive function libraries of Lenze which contain, among other things, process controllers, arithmetic functions, logic blocks, as well as ramp generators and integrators.

Parameter setting
The StateLevel license includes a range of technology which can be put into operation easily with a keypad or via dialogs in the »Engineer«.

* In preparation!

2.1.1 Technology applications

Technology applications (TAs) are applications prepared by Lenze which form the basis of solving typical applications.

- The technology applications available for the 9400 Servo Drives can be selected in the »Engineer« form the application catalog.

Runtime software

Technology level

Motion Control TopLevel

- TA "Multi-purpose positioning"
- TA "Electronic cam" *
- TA "Register control" *
- TA "Winding technology" *

Motion Control HighLevel

- TA "Electronic gearbox"
- TA "Synchronism with mark synchronisation"

Motion Control StateLevel

- TA "Actuator – speed"
- TA "Actuator – torque"
- TA "Table positioning"

Each higher license contains additional technology applications for further application fields.

* In preparation!

2.1.2 Basic functionalities

Important basic drive functions and other basic functionalities are implemented in the firmware of the controller and are always available irrespective of the prevailing runtime software license.

Firmware

Motion Control basic drive functions

- Standard stop
- Quick stop
- Manual jog
- Homing
- Positioning
- Position follower
- Speed follower
- Torque follower
- Limiter
- Brake control

Further basic functionalities

- Drive interface
- Motor interface
- Encoder evaluation
- I/O terminals
- Safety engineering
- Logbook
- Oscilloscope

2.2 Communicating with the controller

The following interfaces/communication modules can be used to build up communication between PC and controller:

- Diagnostic interface X6/Going online via diagnostic adapter
- CAN on-board interface/Going online via system bus (CAN on board) (📖 24)
- Optional interfaces provided by corresponding communication modules in the module receptacles MXI1/MXI2 of the controller.

Note!

For communication with the controller, at least the control electronics of the controller must be supplied with 24 V low voltage via plug X2. For detailed information, please see the Mounting Instructions for the controller.

Tip!

Detailed information about the individual interfaces can be found in the corresponding Communication Manuals.

2.2.1 Going online via diagnostic adapter

For the initial commissioning of the controller, you can use, for instance, the diagnostic adapter offered by Lenze:

Note!

Please observe the documentation for the diagnostic adapter!

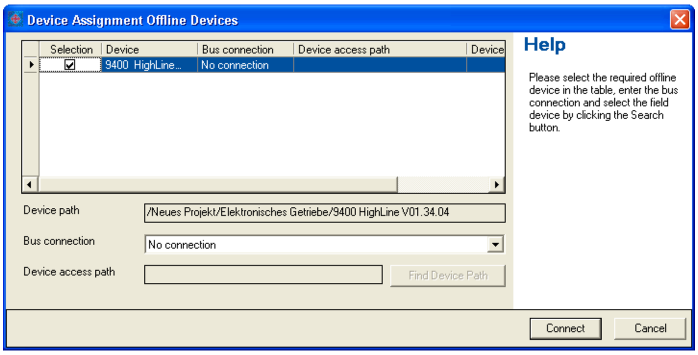
Preconditions:

- The diagnostic adapter is connected to diagnostic interface X6 on the controller and to a free USB port on the PC.
- The driver required for the diagnostic adapter is installed.
- The control electronics of the controller is supplied with 24 V low voltage via plug X2.

How to build up an online connection via the diagnostic adapter:

1. Select the 9400 HighLine controller to which you want to build up an online connection in the *Project view* of the »Engineer«:

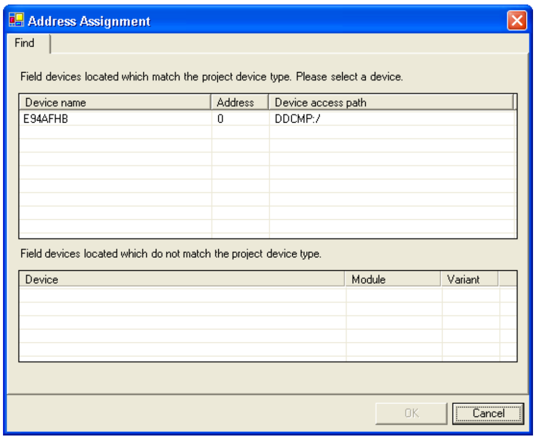
2. Click the icon or select the command **Online→Go online**.
   - If no online connection has been configured for the selected controller so far, the *Assignment of offline controllers* dialog box will be displayed:



   - The dialog box also appears if the online connection is built up via the command **Online→Go online** instead of using the *toolbar* icon.
3. Select the entry "Diagnostic adapter" from the **Bus connection** list field.

Lenze

4. Click **Find controller path** to find the controller in the selected bus system.
   - The *Address assignment* dialog box appears:



5. Select the corresponding controller from the **Identified field devices** list field.
6. Click **OK**.
   - The *Address assignment* dialog box is closed and the selected **Controller access path** (e.g. "DDCMP:/") is indicated in the *Assignment of offline controllers* dialog box.
7. Click **Connect**.
   - The dialog box is closed and the online connection with the controller is built up.
   - In the *Project view*, a yellow icon indicates the online connection with the controller:

Now you can use the icons and to easily build up and end a connection with the controller. The communication settings are only required when communication with a controller is built up for the first time.

▶ If you want to change the existing configuration, select the command **Online→Go online** to open the *Assignment of offline controllers* dialog box and change the settings.

▶ With an online connection, the »Engineer« displays the current parameter settings of the controller with a yellow background colour.

Stop!

If you change parameters in the »Engineer« while the controller is connected online, the changes will be directly accepted by the controller!

2.2.2 Going online via system bus (CAN on board)

As an alternative to the diagnostic adapter, you can use the integrated system bus interface (CAN on-board, terminal X1) of the controller for communication.

▶ 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!
- The online connection is built up as described in the previous chapter Going online via diagnostic adapter, only select the entry "CAN system bus" in the *Assignment of offline controllers* dialog box from the **Bus connection** list field. (📖 22)

2.2.3 Use of other communication interfaces

The controller can be extended by further communication interfaces, if required, e.g. Ethernet TCP/IP, Ethernet Powerlink or PROFIBUS-DP.

▶ For this purpose the controller is provided with the module receptacles MXI1 and MXI2 to plug in communication modules.

▶ Detailed information on this subject can be found in the Hardware Manual and Communication Manual for the corresponding communication system.

2.3 Signal types & scaling

It is very helpful for the parameter setting & configuration of the controller to know the signal types and their scaling listed in the following table, which serve to process physical sizes (e.g. a speed or position) in a function block configuration.

Signal type	Unit	Connection symbol in the FB editor	Resolution	**Scaling** external ≡ internal	**Range**	Number of decimal positions	Identifier suffix
Position	Increments	◀/▶	32 bits	1 motor revolution ≡ 2^{16} increments	-2^{31} ... 2^{31}-1 increments	3	_p
Speed	rpm	◁/▷	16 bits	15000 rpm ≡ 2^{14} ≡ 16384	± 30000.0 rpm	1	_v
		◆	32 bits	15000 rpm ≡ 2^{26} ≡ 67108864	± 480000.0 rpm	1	_s
Speed variation/time	rpm/s	◇	32 bits	15000000 rpm/s ≡ 2^{22} ≡ 4194304	± 7.69 * 10^9 rpm/s	3	_x
Scaled signal	%	●	32 bits	100 % ≡ 2^{30} ≡ 1073741824	± 200.00 %	2	_n
		○	16 bits	100 % ≡ 2^{14} ≡ 16384	± 199.99 %	2	_a
Control/status signal		□	1 bit	0 ≡ FALSE; 1 ≡ TRUE	0 / 1	0	
Time	s	■	28 bits		0 ... 268435.456 s	3	
Status word		■	32 bits		-2147483648 ... 2147483647 (0000 0000_{hex} ... FFFF $FFFF_{hex}$)	0	
Not standardised		■					

Tip!

Only inputs/outputs of the same signal type (with the same connection symbol) can be connected in the function block editor of the »Engineer«.

Non-standardised inputs/outputs can be connected if the input and output have the same resolution.

3 Commissioning

This documentation contains detailed information on parameter setting and configuration of the controller. Sequential reading is not required.

In order to get the information relevant for an initial commissioning, this chapter describes different commissioning scenarios which can also be used as a guide through this Manual:

A. Test commissioning (📖 28)
   - **Target:** Rotating the motor with as few settings as possible in best time.

B. Initial commissioning (📖 29)
   - **Target:** Adapting the controller to electromechanics and control.

C. Standard set-up (📖 31)
   - **Target:** Taking over the application and parameter set of an already preconfigured "Engineer" project in several controllers.

D. Controller replacement (📖 32)
   - **Target:** Replacing a controller which has failed in a running system by a replacement device using the "old" memory module.

E. Motor replacement (📖 33)
   - **Target:** Replacing a motor which has failed in a running system.

3.1 Notes on commissioning using the keypad

For motor with electronic nameplate (ENP)

- A display of the route data offered by ENP via keypad is not provided. The route data must be edited and optimised individually.
- In order that the motor does not start unintentionally without adjusting the route data, the maximum current in the Lenze setting is set to "0 A" in C00022.
- After setting the route data these motor data and the ones read out of the ENP must be stored with mains failure protection on the memory module of the controller (C00002 = "11").

For motor without electronic nameplate (ENP)

- The motor and route data must be edited and set individually.
- In order that the motor does not start unintentionally without adjusting the route data, the maximum current is set to "0 A" in C00022 as factory adjustment.
- After the motor and route data are set, they must be stored with mains failure protection on the memory module of the controller (C00002 = "11").

Commissioning of the application

- The application must already be stored on the memory module of the controller. Otherwise, commissioning with keypad only is not possible.
- All application parameters which deviated from the factory adjustment, must be edited individually. For this purpose, the project planner must provide a corresponding list (including the motor and route data) for the commissioner.
- In case of a standard set-up the rotor position must be adjusted for synchronous motors of a third-party manufacturer and Lenze synchronous motors with Stegmann absolute value encoder.
- After the parameters are set, they must be stored with mains failure protection on the memory module of the controller (C00002 = "11").

3.2 Test commissioning

Worksteps	
Initial commissioning of motor/controller:	
1.	Select motor in the »Engineer« motor catalog. (📖 66) • When the motor connected to the motor has an electronic nameplate (ENP), all motor data are automatically read out of the ENP and a selection from the motor catalog is not required. ▸ Read the motor data out of the controller (📖 66)
2.	Accept/adapt route data. (📖 69)
3.	Parameterise motor encoder. (📖 70)
Save project and parameter set:	
1.	Save parameter set. (📖 57)
2.	Save »Engineer« project.
Commissioning of the application:	
	Note: The following steps require that the technology application "actuator – speed" has been selected in the »Engineer« application catalog. See chapter Technology applications (TAs): ▸ Commissioning using the »Engineer« (📖 235) ▸ TA "Actuator – speed" (📖 244)
1.	Enable controller via terminal RFR.
2.	Enable setpoint follower via digital input DI2.
3.	Define speed setpoint via analog input 1 (terminal AI1+/AI1-).
4.	If required, the direction of rotation can be inverted via the digital input DI3.
5.	Check further Basic drive functions of the applications:
	A quick stop can be activated via the digital input DI1. ▸ Quick stop (📖 152)
	A manual control is available for the setting-up operation. ▸ Manual jog (📖 156) • The enable is executed via the digital input DI6. • The digital inputs DI7 and DI8 activate parameterisable setpoints for both directions of rotation.

3.3 Initial commissioning

Worksteps	
Adapt the motor to the controller:	
1.	Select motor in the »Engineer« motor catalog. (📖 66) • When the motor connected to the motor has an electronic nameplate (ENP), all motor data are automatically read out of the ENP and a selection from the motor catalog is not required. ▸ Read the motor data out of the controller (📖 66)
2.	Accept/adapt route data. (📖 69)
3.	Parameterise motor encoder. (📖 70)
	When an external motor is operated on a controller: • Only in case of a synchronous motor: Set rotor displacement angle. (📖 71) • Only in case of unknown motor parameters: –Optimise the switching performance of the inverter. (📖 73) –Set motor parameters. (📖 75)
4.	Define currents and speed limits. (📖 78)
5.	Select switching frequency. (📖 79)
6.	Optimise current controller. (📖 81) • Required since the controller parameters depend on the maximum switching frequency needed. The default values of the motor catalog only represent theoretically calculated approximate values.
Parameterise/configure application:	
1.	Load & parameterise technology application. See chapter Technology applications (TAs): ▸ Commissioning using the »Engineer« (📖 235) ▸ TA "Actuator – speed" (📖 244)
2.	If required, reconfigure the circuit of the technology application with the function block editor.
Optimise speed control loop:	
1.	Optimise speed controller. (📖 88) • Via traversing profile from the application and oscilloscope
2.	Set current setpoint filter. (📖 90) • In order to suppress or damp (mechanical) resonant frequencies, two current setpoint filters are integrated in the speed control loop of the controller which are switched off in the default setting but can be parameterised accordingly, if required.
Save project and parameter set:	
1.	Save parameter set. (📖 57)
2.	Save »Engineer« project.
Establish network:	
1.	Insert network and machine application into the »Engineer« project.
2.	Interconnect the ports conveniently inside the machine application.
3.	Configure the network (set addresses, baud rates and process data channels sensibly).
4.	Establish communication with the control.
5.	Establish communication with other drive components (e.g. HMIs, I/O extension and other controllers).

Worksteps	
Check & optimise application /DC-bus operation:	
1.	Traverse axis in manual operation. • See chapter Basic drive functions ▸ Manual jog (📖 156)
2.	Check area boundaries (travel, speed, torque).
3.	Traverse axis in automatic operation with set-up speed, possibly together with coupled axes.
4.	Check coupling with other motions (master-/slave axes, tools, ...).
5.	Optimisation of the process at higher speeds.
6.	Recording of signal characteristics using the oscilloscope function for the documentation. • See chapter Oscilloscope (📖 416)
Save & archive project and parameter set:	
1.	Save parameter set. (📖 57)
2.	Save »Engineer« project.
3.	Deposit a safety copy of the »Engineer« project e.g. on CD ROM in the control cabinet.

3.4 Standard set-up

Worksteps	
Transfer application and parameter set to the controller:	
1.	Transfer the application preconfigured in the »Engineer« and the corresponding parameter set to the memory module of the controller.
2.	Save parameter set. (📖 57)
For a motor with an electronic nameplate (ENP):	
1.	Restart controller with connected motor to read out the motor data from the electronic nameplate (ENP). • Restart the controller either by switching off and on again the voltage supply or by the device command "Restart controller" (C00002 = "11000"). • See chapter Motor interface ▸ Read the motor data out of the controller (📖 66)
2.	Save parameter set. (📖 57)
For a motor without an electronic nameplate (ENP):	
ℹ	**Note:** Here, the motor is operated with the motor and route data detected during the initial commissioning. In contrast to the operation of a motor with ENP no resolver errors are compensated and a uniform saturation characteristic is considered only. • See chapter Motor interface ▸ Initial commissioning (📖 65)
1.	If required, detect rotor displacement angle. ▸ Set rotor displacement angle (📖 71) • Required for synchronous motors of an original equipment manufacturer and Lenze synchronous motors with Stegmann absolute value encoder.
2.	Save parameter set. (📖 57)

3.5 Controller replacement

Scenario: The controller has failed in a running system.

Note!

For the following procedure described we assume that the memory module and possibly available extension modules in the controller and the motor are not affected by the failure.

Worksteps	
Replacement of the controller:	
1.	Replace controller. **See Mounting Instructions for the controller!**
2.	Insert the memory module of the failed controller into the replacement device.
3.	If further extension modules are plugged into the failed controller, these must be inserted into the replacement device as well.
Further steps are not required since all data needed are on the memory module.	

3.6 Motor replacement

Scenario: The motor has failed in a running system.

Note!

In the following procedure described we assume that the controller is not affected by the failure.

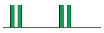
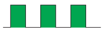
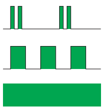
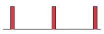
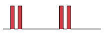
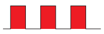
Worksteps	
Replacement of the motor:	
1.	Replace the motor. **See Mounting Instructions for the controller!**
	Note: The motor connection at the controller can be accessed without pulling the basic device out of the installation backplane.
For a motor with an electronic nameplate (ENP):	
1.	Restart controller with connected motor to read out the motor data from the electronic nameplate. • Restart the controller either by switching off and on again the voltage supply or by the device command "Restart controller" (C00002 = "11000"). • See chapter Motor interface ▸ Read the motor data out of the controller (📖 66)
2.	Save parameter set. (📖 57)
For a motor without an electronic nameplate (ENP):	
	Note: The motor is operated with the motor and route data that are stored on the memory module. • See chapter Motor interface ▸ Initial commissioning (📖 65)
1.	If required, detect rotor displacement angle. ▸ Set rotor displacement angle (📖 71) • Required for synchronous motors of an original equipment manufacturer and Lenze synchronous motors with Stegmann absolute value encoder.
2.	Save parameter set. (📖 57)

4 Drive interface

This chapter describes the drive interface which serves to set the controller to different states and query different status information of the controller. Moreover, the machine constants for the motor end can be entered via this drive interface.

4.1 LED status displays

The control of the "DRIVE READY" and "DRIVE ERROR" LED on the front of the controller depends on the device status. ▸ Device states (📖 45)

DRIVE READY	DRIVE ERROR	Meaning
OFF	OFF	Status "initialisation active"
	OFF	Status "Safe torque off active" Consider LED on the safety module!
	OFF	State "Device is ready to switch on"
	OFF	State "Device is switched on"
	OFF	State "Operation"
		State "Warning active" or State "Warning locked active" The controller is ready to start, switched on or the operation is enabled and a warning is indicated.
		State "Quick stop by trouble"
OFF		Status"Trouble active"
OFF		State "Fault active"
OFF		State "System fault active"

Legend
Meaning of the symbols used to describe the LED states:

	LED flashes once approx. every three seconds (*slow flash*)
	LED flashes once approx. every 1.25 seconds (*flash*)
	LED flashes twice approx. every 1.25 seconds (*double flash*)
	LED blinks every second
	LED is permanently on

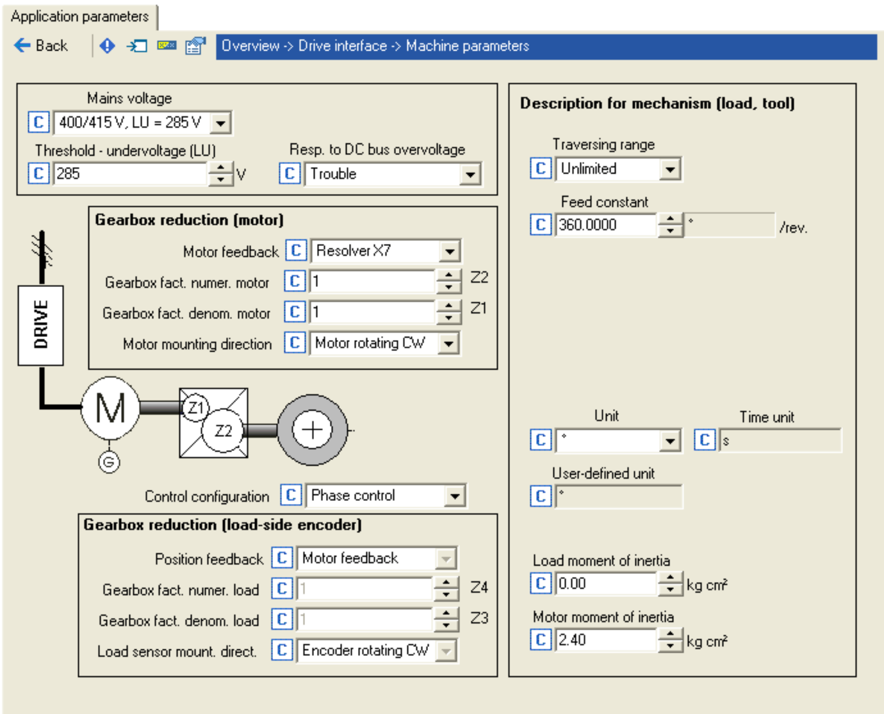
Tip!

The current device state is also displayed in C00183.

4.2 Parameter setting

4.2.1 Machine parameters

The global machine constants ("machine parameters") are set in the »Engineer« on the **Application parameters** tab in the *Overview* → *Drive interface* → *Machine parameters* dialog level:



Tip!

Detailed information on the different machine parameters can be obtained from the following subchapters.

4.2.1.1 Mains voltage

Via the **Mains voltage** list field (C00173) the mains voltage for the drive controller is set.

- If you set a mains voltage with adjustable threshold for undervoltage ("LU adjustable"), this undervoltage threshold can be set in the **Undervoltage threshold (LU)** input field (C00174).
- In the **Resp. to DC bus overvoltage** list field (C00600) the response to the DC-bus overvoltage can be selected.

Note!

Changing the setting in C00173 also affects the permissible device utilisation!

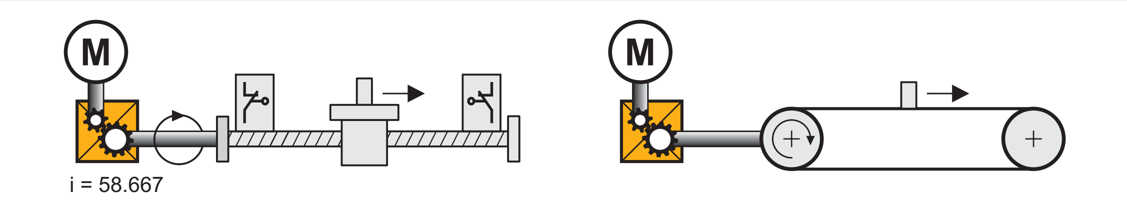
Tip!

The chapter "Rated data" in the Hardware Manual informs which device type has which permissible device utilisation at which mains voltage and switching frequency.

See also: Monitoring of the device utilisation (43)

4.2.1.2 Gearbox ratio

The gearbox ratio specifies the number of revolutions of the motor axis needed for one rotation of the load axis (e.g. spindle or drive roll).

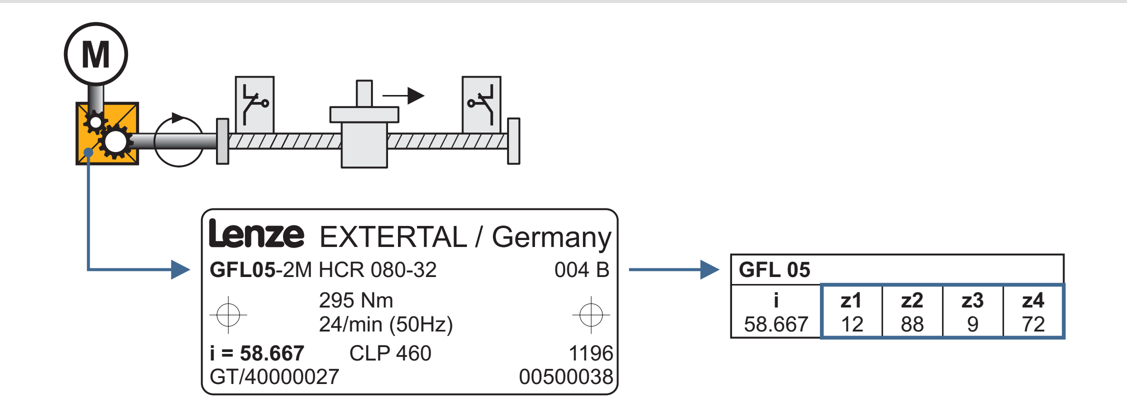


[4-1] Schematic diagram - gearbox ratio

- In the example shown in figure [4-1] 58.667 revolutions of the motor axis result in one revolution of the spindle.

Selection of the gearbox ratio

- The gearbox ratio must be defined in the form of a quotient (numerator/denominator). The required data is included in the technical gearbox data.



[4-2] Example: Technical data gearbox data (from the gearbox catalog)

- Example calculation on the basis of the technical gearbox data:

Gearbox factor numerator	= z2 × z4	= 88 × 72	= 6336	→ C02520
Gearbox factor denominator	= z1 × z3	= 12 × 9	= 108	→ C02521

Tip!

The resulting gearbox factor is displayed in C02531/1.

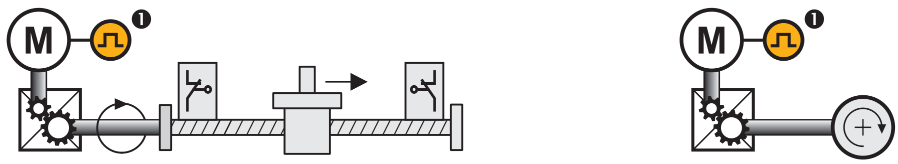
4.2.1.3 Motor mounting direction

Via the **motor mounting direction** list field (C02527) the direction of rotation can be inverted depending on the motor mounting position, if required:

- C02527 = "0": Clockwise motor ≡ positive machine direction.
- C02527 = "1": Counter-clockwise motor ≡ positive machine direction.

4.2.1.4 Configuration feedback

In the most cases, the system only has one motor encoder, i.e. no separate position encoder is installed on the load side. Motor position (angle of rotation) and motor speed are detected via the motor encoder selected in C00495 and converted with regard to the load side.



❶ Motor encoder

[4-3] Schematic diagram - feedback with position encoder = motor encoder

The actual position and speed values on the machine side result from the conversion via the Gearbox ratio on the motor side and the Feed constant.

Tip!

Detailed information on parameter setting of the feedback systems for the motor control can be found in chapter "Encoder evaluation". (📖 108)

4.2.1.5 Unit/application unit

Using these machine parameters you define the real unit of the machine in which the feed constant and the parameters for a travel profile must be specified (e.g. position, speed, acceleration, and deceleration).

- If you set, for instance, the "mm" unit for a linear axis, the position must be specified in [mm] and the speed in [mm/s].
- By means of the freely definable "application unit" the significant production units as e.g. "bottles" can be set.
  - For this, select the entry "User-defined" as unit in C02525 and enter the desired application unit in C02526.

Note!

In this documentation, the term "unit" in the parameter unit data only serves as a wildcard for the real unit of a machine.

Display parameters

Parameters	Information
C02533	Time unit
C02534	User-defined time unit
C02535	User-defined unit
C02537	Unit of speed
C02538	Unit of acceleration
Highlighted in grey = display parameter	

4.2.1.6 Traversing range

The selection of the traversing range ("Unlimited", "Limited" or "Modulo") in the **Traversing range** list field (C02528) serves to define the machine measuring system.

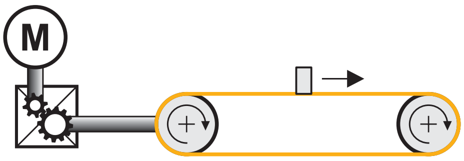
Note!

A change-over of the traversing range results in a loss of the reference information!

"Unlimited" traversing range"

The drive can rotate continuously in one direction.

- By referencing and activating the software limit positions the traversing range can be limited.
- For positioning with absolute travel command the home position must be known.

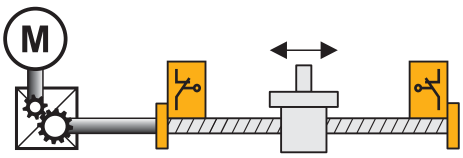


[4-4] Example: Unlimited traversing range - "feed control tape"

"Limited" traversing range"

The travel range is limited by positive and negative position limits (mechanical limits/ travel range limit switches/software limit positions). ▶ Limiter (📖 200)

- After a defined distance the drive must travel in the opposite direction.
- For positioning with absolute travel command the home position must be known.
- Basically the software limit positions are monitored with regard to the internally maximally value range to be displayed (±2^{31} increments) even if the monitoring mode has been deactivated via C02700.
- An overflow of the value range results in a loss of the reference information.

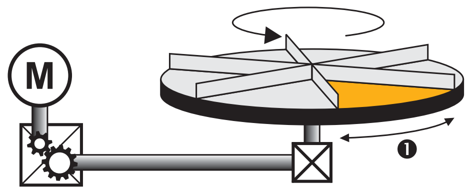


[4-5] Example: Limited traversing range - "spindle drive" (linear axis)

"Modulo" traversing range

The measuring system is repeated.

- If the cycle set in C02536 is exceeded, a defined overflow occurs. The cycle typically corresponds to a rotation or tool distance in a rotative system.
- For positioning with absolute travel command the home position must be known.
- Software limit positions are not effective.
- Absolute targets can be approached by exceeding the measuring system limit, e.g. from 10° to 350°.



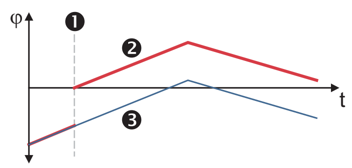
❶ C02536: Cycle (illustration = 60°)

[4-6] Example: Modulo traversing range - "rotary table""

Dependencies - traversing range/basic drive functions

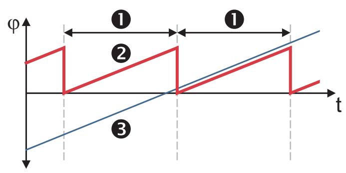
- The following table lists the different dependencies between the traversing range selected and basic drive functions.

Basic drive function	Traversing range		
	Unlimited	Limited	Modulo
Position data for Encoder evaluation	continuously	continuously	clocked
Position data for Position follower	absolute	absolute	absolute (in time)
Positioning modes for Positioning	1, 2, 5, 6, 7, 8	1, 2, 5, 6, 7, 8	5, 6, 11 ... 16
Restrictions for Homing	None	None	Home position must be in time
Limit positions (Limiter)	permitted	permitted	not permitted



❶ Reference setting
❷ Position in the machine measuring system
❸ Position in the motor measuring system

[4-7] Example: Unlimited/limited position display



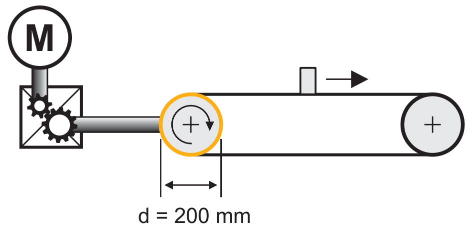
❶ Cycle
❷ Position in the machine measuring system
❸ Position in the motor measuring system

[4-8] Example: Modulo position display

4.2.1.7 Feed constant

The feed constant corresponds to the motion of the machine at one revolution of the gearbox output shaft.

- The input in the **Feed constant** field (C02524) is made in the unit defined in C02525 regarding one revolution.
- In case of a conveyor drive the feed constant results from the circumference of the drive roll which is calculated in the following example based on the diameter given:

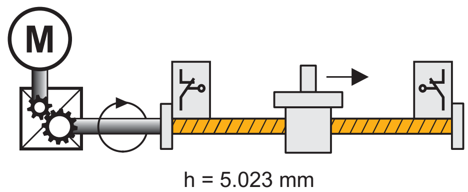


d = diameter

$$\text{Feed constant} = \pi \cdot d \frac{[\text{Unit}]}{\text{Revolution}} = \pi \cdot 200 \frac{\text{mm}}{\text{Revolution}} = 628.3185 \frac{\text{mm}}{\text{Revolution}}$$

[4-9] Schematic diagram: Feed constant in case of a conveyor drive

- In case of a spindle drive (linear axis) the speed constant results from the leadscrew pitch. The feed constant indicates which way the slide travels at one revolution of the spindle (in the following example 5.023 mm).



h = leadscrew pitch (can be obtained from the technical data of the linear axis)

[4-10] Schematic diagram: Feed constant in case of a spindle drive

- In case of a rotary table and defined as an angle the feed constant is = 360°.

4.2.2 Monitoring of the device utilisation

In C00064 the device utilisation (i x t) is displayed over the last 180 seconds in [%].

- If the value displayed in C00064 exceeds the warning threshold set in C00123, the fault message "device utilisation Ixt > C00123" is output and the fault response set in C00604 occurs (default setting: "Warning").
- If the value displayed in C00064 exceeds 100 %, the fault message "device utilisation Ixt > 100 %" is output and the fault response "Fault" occurs.
  - The fault can only be reset if the value displayed in C00064 is < 95 % again.

4.2.3 Parameter for status display

Parameters	Information
C00003	Controller command status
C00007	Active application
C00150	Status word 1
C00155	Status word 2
C00183	Device state
C02530	Active function state
Highlighted in grey = display parameter	

4.3 Monitoring of external events

Use the input *DI_bSetExternError* of the system block LS_DriveInterface to monitor external events by means of corresponding logic operations and activate the error message "External error" in the controller.

Parameterising a response to an external error

The controller response to the error message "External error" can be selected under C00581.

Activation of error message "External error".

The error message "External error" is activated by setting the input *DI_bSetExternError* to TRUE.

- After this, the error number for the error message "External error" "0x20750000" (when "Fault" has been selected as response) will be stored in the internal fault memory (C00168).

Reset of error message

The error message "External error" and other active error messages are reset by setting the input *DI_bResetError* to TRUE.

- If the input *DI_bSetExternError* is still set to TRUE, the reset will not be carried out.
- Error messages can only be reset if the cause of the error has been eliminated.

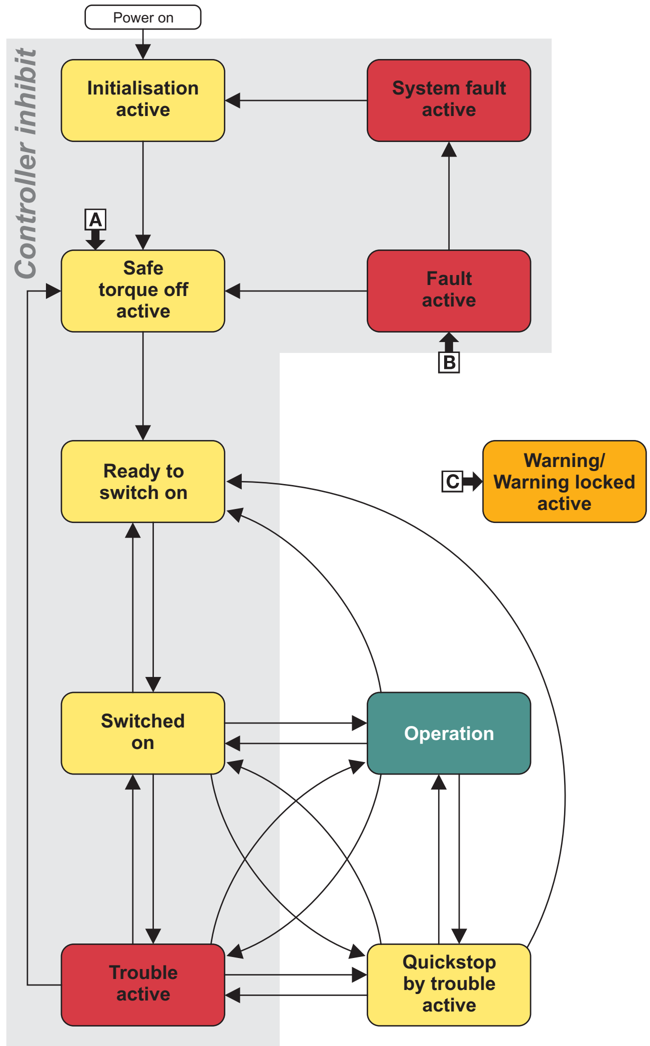
4.4 Set/remove controller inhibit

Setting the controller inhibit inhibits the power stages in the controller and resets the speed/current and position controller of the motor control.

- When the controller is inhibited, the status output *DI_bCInhActive* of the system block LS_DriveInterface is set to TRUE.
- The controller can be inhibited by different sources, e.g. using the digital input RFR, the input *DI_bSetCInh* of the system block LS_DriveInterface or via the device command "Inhibit controller" (C00002 = "41").
- The bit code under C00158 shows the source that inhibited the controller.

4.5 Device states

The state control of the drive is internally controlled via a state machine which can adopt the following "device states":



A, B From all states

C The status "Warning active"/"Warning locked active" can occur parallel to other states.

[4-11] Device states of the state machine for the device control

Note!

The device states of the controller must not be confused with the function states of the Basic drive functions. (📖 140)

- The current device status is displayed in C00183.
- In the "Operation" device state, the Basic drive functions specify the motion control of the drive.

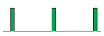
4.5.1 Status "initialisation active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
OFF	OFF	10: Initialisation active

The controller is in this device state directly after switching on the supply voltage.

- In this device status the operating system is initialised.
- The application is not yet processed.
- The monitoring mode is not yet active.
- Communication is not possible yet.
- The controller cannot be parameterised yet and no device commands can be executed.
- When the device initialisation is completed, the device state is automatically changed to "Safe torque off active".

4.5.2 Status "Safe torque off active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
	OFF	101: Safe torque off active

This device state becomes active when the controller receives the request "Safe torque off".

- "Drive is torqueless" (0x00750003) is entered in the logbook.
- If there is no request by the safety module, it is changed into the next state "Device is ready to switch on".

Note!

The "Safe torque off active" state is also passed through after errors have been acknowledged (see fig. [4-11]).

4.5.3 State "Device is ready to switch on"

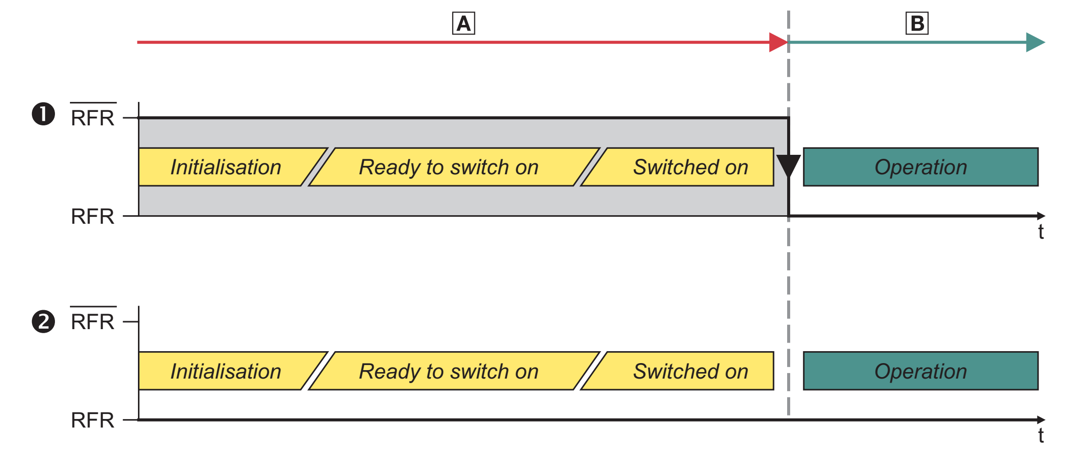
LED DRIVE READY	LED DRIVE ERROR	Display in C00183
	OFF	141: Device is ready to switch on

The controller is in this device state directly after the initialisation is completed and no DC-bus voltage is applied yet.

- The bus systems are running and the terminals and encoders are evaluated.
- The monitoring modes are active.
- The controller can be parameterised and device commands can be executed in a limited way.
- The application is basically executable.
- The function of the user task can be used.
  - Condition: The application has started (status display in C02108).
- The basic drive functions cannot be used yet.
- There are two options for a change from the "Device is ready to switch on" state to the "Device is switched on" state:
  - Auto restart enabled after mains connection (C00142 = "1").
  - Auto restart inhibited after mains connection (C00142 = "0") and controller inhibited.

Auto start option 1: Auto restart enabled after mains connection

- The following figure shows the status change for the automatic start option 1 (Lenze setting) as a function of the controller inhibit:



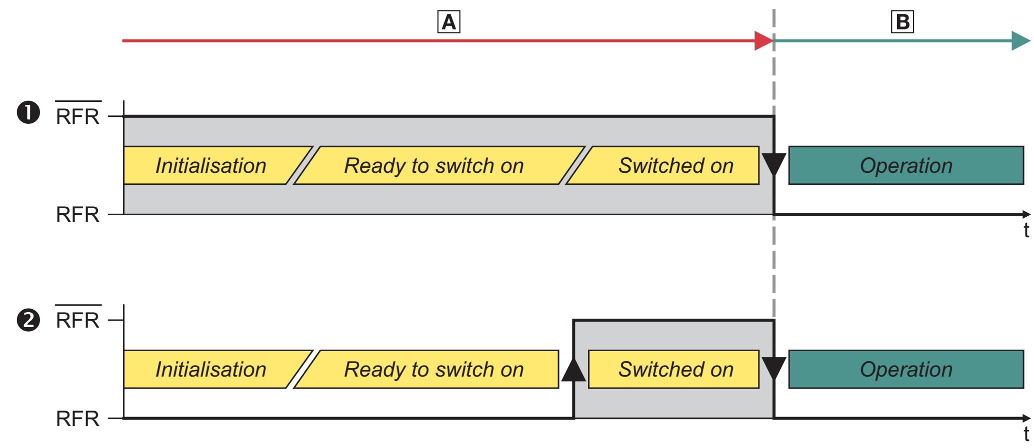
A Controller pulses are inhibited
B Controller pulses are enabled

❶ With controller inhibit during power-on
❷ Without controller inhibit during power-on

[4-12] State change when auto restart is enabled (C00142 = "1")

Auto-start option 0: Auto restart inhibited after mains connection

- When the automatic start option 0 has been selected, the controller inhibit must be explicitly reset after the mains is switched on so that the controller status changes from "Device is ready to switch on" to "Device is switched on":



A Controller pulses are inhibited
B Controller pulses are enabled

❶ With controller inhibit during power-on
❷ Without controller inhibit during power-on

[4-13] State change when the auto restart is inhibited (C00142 = "0")

4.5.4 State "Device is switched on"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
▮▮▮	OFF	90: Device is ready to switch on.

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

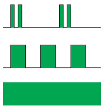
- The bus systems are running and the terminals and encoders are evaluated.
- The monitoring modes are active.
- The controller can be parameterised yet and device commands can be executed in a limited way.
- The application is basically executable.
- The function of the user task can be used.
  - Condition: The application has started (status display in C02108).
- The basic drive functions cannot be used yet.
- When the controller is inhibited, the motor creates a torque.

4.5.5 State "Operation"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
	OFF	0: Operation

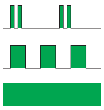
In this device state the motor follows its setpoint according to the selected basic drive function.

4.5.6 State "Warning active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
		1: Operation/warning active

This state can occur parallel to the device states "Device is ready to switch on", "Device is switched on" and "Operation", if a monitoring is activated, the fault response "Warning" has been parameterised for.

4.5.7 State "Warning locked active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
		2: Operation/Warning locked active

This state can occur parallel to the device states "Device is ready to switch on", "Device is switched on" and "Operation", if a monitoring is activated which the fault response "Warning locked" has been parameterised for.

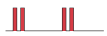
4.5.8 State "Quick stop by trouble"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
		151: Quick stop by trouble active

This device state becomes active as soon as a monitoring mode responds for which the error response "Quick stop in case of trouble" has been parameterised.

- The drive is decelerated to standstill with torque within the parameterised deceleration time independent of the defined setpoint and can be kept there.
- The device state can only be abandoned by acknowledging the error if the error cause is removed.
- When the controller is inhibited, it can be jumped to the "Operation" state even during the error status since the controller inhibit has a higher priority. As long as the error is pending and has not been acknowledged, it is changed back to the "Quick stop by trouble active" when the controller is enabled afterwards.

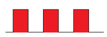
4.5.9 Status"Trouble active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
OFF		104: Trouble active

This device state 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).
- The device state is automatically abandoned if the error cause is removed:
  - "Trouble active" state < 500 ms: Return to the original device state.
  - "Trouble active" > state 500 ms: Return via the device state "Safe torque off active".

4.5.10 State "Fault active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
OFF		102: Fault active

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

4.5.11 State "System fault active"

LED DRIVE READY	LED DRIVE ERROR	Display in C00183
OFF		20: System fault active

This device state becomes active if a system error occurs.

- The device state can only be abandoned by mains switching.

4.6 Controller commands

Different controller commands are available for project management within the controller. They can be activated under code C00002.

- The following subsections describe the most important controller commands for project management and parameter set management in the controller.
- With an online connection, the controller commands can be activated from the »Engineer« by selecting the corresponding command in the **Parameters** tab under C00002. As an alternative, the controller commands can be activated via the keypad.
- In C00003 the number and the status of the device command executed last is indicated. ▸ Status display for device command (📖 54)

Note!

Before the supply voltage is switched off after a device command has been transmitted via C00002, it must be checked via C00003 if the device command has been completed successfully!

- The "0x00" status in the lower 16 bits of C00003 means that the device command has been executed successfully.

Tip!

Many frequently required controller commands (e.g. "Save start parameters") can be executed via the *toolbar* icons of the »Engineers«.

Note!

Controller commands that can be executed via the toolbar of the »Engineers« 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 controller command will be activated in all lower-level controllers having an online connection with the »Engineer«.

For the commands described in the following subsections, the controller must be selected in the *Project view*.

4.6.1 Overview of device commands

Controller command		Information	Status*
0	Load Lenze setting	Load Lenze setting (📖 56)	●
1	Load start parameter	Load parameter set (📖 57)	●
5	Activate application	Activate application (📖 58)	●
7	Save application selection	Save selected application (📖 58)	●
11	Save start parameter	Save parameter set (📖 57)	●
20	Delete logbook	Logbook (📖 436)	●
21	Archive logbook		●
31	Start application	Start/stop application (📖 56)	●
32	Stop application		●
33	Reset program		●
34	Restart program		●
35	Delete program		●
36	Reset runtime measurement		●
41	Inhibit controller	Set/remove controller inhibit (📖 44)	-
42	Enable controller		-
43	Reset error	Reset of error message (📖 447)	-
45	Activate quick stop	Quick stop (📖 152)	-
46	Exit quick stop		-
51	Determine rotor displacement angle	Set rotor displacement angle (📖 71)	●
71	Detect inverter characteristic	Optimise the switching performance of the inverter (📖 73)	●
72	Determine motor parameter	Set motor parameters (📖 75)	●
91	CAN on board: Reset node	See Communication Manual "System bus (CANopen)".	●
92	CAN module: Reset node		●
93	CAN on board: Pred.Connect.Set		●
94	CAN module: Pred.Connect.Set		●
95	CAN on board: Identify node		●
96	CAN module: Identify node		●
101	Ethernet module MXI1 unbind/bind	See Communication Manual "Ethernet".	●
102	Ethernet module MXI2 unbind/bind		●
201	Activate parameter set 1	Activate/archive parameter set (📖 59)	●
202	Activate parameter set 2		●
203	Activate parameter set 3		●
204	Activate parameter set 4		●
301	Archive parameter set 1		●
302	Archive parameter set 2		●
303	Archive parameter set 3		●
304	Archive parameter set 4		●
The device command status is displayed in C00003. Status display for device command			

Controller command		Information	Status*
1021	Export parameter to file	Export current parameter set to file.	●
1030	Format file system	Format file system of the memory module.	●
1040	Restore file system		-
10000	Prepare firmware update		●
11000	Restart controller		●
The device command status is displayed in C00003. ▸ Status display for device command			

4.6.2 Status display for device command

C00003 indicates the number and the status of the last executed controller command. The number of the controller command is indicated in the upper 16 bits and the execution status in the lower 16 bits.

C00003	
Bit 16 ... 31	**Bit 0 ... 15**
Device command executed last	Status of the last executed controller command

▶ The following table lists the most important status messages according to the degree of probability of their occurrence.

Bit 0 ... 15	Status	Concerns device command
0x0000	Execution ok.	All
0x0001	General fault.	All
0x8404	File could not be opened.	201, 202, 203, 204, 301, 302, 303, 304
0x841D	Fault while reading out of a file.	201, 202, 203, 204, 301, 302, 303, 304
0x841E	Fault while writing into a file.	11, 201, 202, 203, 204, 301, 302, 303, 304
0x841F	Invalid file type.	201, 202, 203, 204,
0x8420	Unexpected file end.	201, 202, 203, 204, 301, 302, 303, 304
0x8422	Checksum error	201, 202, 203, 204
0x842B	Fault while reading the parameter set partition.	1
0x842C	Fault while writing the parameter set partition.	11
0x842E	No memory module available.	1, 11
0x8502	Processing of the device command is still active.	All
0x9Axx	CAN fault	0, 1, 5, 91, 92, 201, 202, 203, 204
0x9B07	Rotor position adjustment cannot be executed because of the wrong motor type (asynchronous motor).	51
0x9B08	Rotor position adjustment has been aborted.	51
0x9B09	Rotor position adjustment cannot be executed since another identification is active already.	51
0x9B0A	Rotor position adjustment cannot be executed since the V/f-test mode is active.	51

Bit 0 ... 15	Status	Concerns device command
0x9B0B	Rotor position adjustment cannot be executed since the current controller test mode is active.	51
0x9B12	Motor identification cannot be started since the current controller test mode is active.	71, 72
0x9B13	Motor identification cannot be started since the V/f test mode is active.	71, 72
0x9B14	Motor identification cannot be started since the rotor position adjustment is active.	71, 72
0x9B15	Motor identification has been aborted.	71, 72
0x9B16	Motor identification has been aborted by fault.	71, 72
0xA001	Access to file has been denied since the file is already accessed from another position	11, 201, 202, 203, 204, 301, 302, 303, 304
0xA005	I/O fault when accessing the file system.	11, 201, 202, 203, 204, 301, 302, 303, 304
0xA00C	RAM memory is full.	11, 201, 202, 203, 204, 301, 302, 303, 304
0xA00D	Access authorisation denied.	11, 201, 202, 203, 204, 301, 302, 303, 304
0xA01C	No free memory on the memory module.	11, 201, 202, 203, 204, 301, 302, 303, 304

4.6.3 Start/stop application

With an online connection, these controller commands can be executed via the corresponding *toolbar* icons of the »Engineers«.

- Alternatively, the controller commands can also be activated with the parameter settings listed in the "Controller command" column (e.g. via the keypad).

Symbol	Function	Controller command
	Start application in controller	C00002 = "31"
	Stop application in controller	C00002 = "32"

Note!

If the drive is stopped during operation, the drive is braked to standstill via the basic function "Stop".

▸ Standard stop (📖 148)

4.6.4 Load Lenze setting

This controller command resets the parameter settings to the Lenze setting. All parameter changes get lost.

- Only possible when the application has stopped and the controller is inhibited.
- This controller command only affects the settings of the operating system, application and module parameters, the active application and the configuration selected with the function block editor remain unchanged.

How to load the Lenze setting:

1. Click the icon to stop the current controller program.
2. Click the icon to set the controller inhibit.
3. Execute the controller command "Load Lenze setting" with C00002 = "0".

4.6.5 Save parameter set

Controller parameter changes made via the »Engineer« or keypad will get lost after mains switching of the controller or loading of another application unless the settings have been explicitly saved with the corresponding controller command in the memory module of the controller.

How to save the starting parameters safe against mains failure in the memory module:

Execute the controller command "Save starting parameter" with C00002 = "11".

4.6.6 Load parameter set

Activation of this controller command reloads the parameter set of the active application from the memory module into the controller. All parameter changes made since the parameter set has been saved last will get lost.

- Only possible when the application program has stopped and the controller is inhibited.

How to reload the starting parameters from the memory module:

1. Click the icon to stop the current controller program.
2. Click the icon to set the controller inhibit.
3. Execute the controller command "Load starting parameter" with C00002 = "1".

4.6.7 Activate application

If the memory module contains several applications, you can use this controller command to activate a different application in the controller.

- After mains switching, the preset application will be loaded into the controller.
- If after mains switching another application than the one preset by Lenze is to be loaded, it must be activated first and then the application selection must be saved. ▶ Save selected application

How to activate a different application:

1. Click the icon to stop the current controller program.
2. Select the number of the application to be activated under C00005.
3. Execute the controller command "Activate application" with C00002 = "5".
   - The application with the number set in C00005 is activated. If it is started immediately depends on the automatic start setting selected in C02104.

Note!

When the application is activated, the corresponding parameter set 1 is loaded automatically and parameter settings executed before will get lost unless the parameter set was saved before!

4.6.8 Save selected application

After mains switching, the controller always loads the preset application, even if a different application has been active before.

Use the controller command "Save selected application" to select the active application as presetting, i.e. the memory module will load this application into the controller after every mains switching.

- When the controller command is executed, the parameter set is saved automatically.

Execute the controller command "Save selected application" with C00002 = "7" to select the active application as presetting.

4.6.9 Activate/archive parameter set

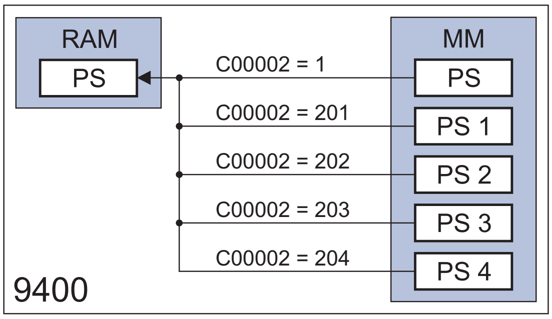
In addition to the current parameter set, it is possible to store up to four additional parameter sets (PS 1 ... PS 4) for each project in the memory module.

Using the corresponding controller commands, you can archive the current parameter set settings in parameter sets PS 1 ... PS 4 and reactivate them, if required.

- This allows you to define different controller settings for an application, which can easily be loaded by means of the corresponding controller command, if required.

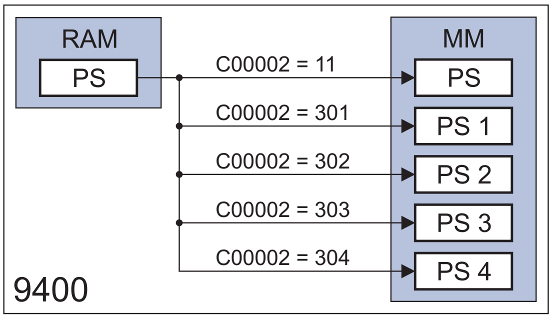
Activate parameter set

The following figure shows the controller commands which activate a parameter set on the memory module (MM):



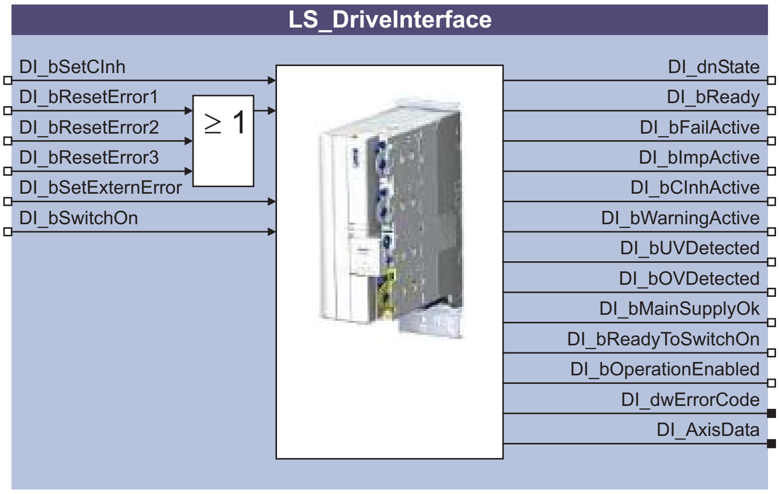
Archive parameter set

The following figure shows the controller commands which archive the current parameter set:



4.7 System block "LS_DriveInterface"

The system block **LS_DriveInterface** displays the drive interface in the function block editor.



Inputs

Input DIS code | Data type	Information/possible settings	
DI_bSetCInh C02549/1 | BOOL	Set/remove controller inhibit (📖 44)	
	TRUE	Set controller inhibit.
DI_bResetError1 C02548/1 | BOOL DI_bResetError2 C02548/2 | BOOL DI_bResetError3 C02548/3 | BOOL	Error message reset (acknowledgement) • This function resets an active error message, if the cause of the error message has been eliminated. • The three inputs are linked via a logic OR gate.	
	TRUE	Reset (acknowledge) error message.
DI_bSetExternError C02548/4 | BOOL	Activation of error message "External error". ▸ Monitoring of external events (📖 44)	
	TRUE	Activate fault message with the response selected in C00581.
DI_bSwitchOn C02549/4 | BOOL	Deactivate switch-on inhibit • If the automatic restart is inhibited (C00142 = "0"), the state machine remains in the "Device is ready to switch on" state after mains switching. ▸ State "Device is ready to switch on" (📖 47)	
	FALSE↗TRUE	The switch-on inhibit is deactivated and the controller changes to the "Device is switched on" device state.

Outputs

Output DIS code | Data type	Value/meaning	
DI_dnState C02547 | DINT	Status (bit coded)	
	Status signals of the momentarily enabled basic function (if available):	
	Bit 0	-
	Bit 1	Basic function is active (signal *bActive*).
	Bit 2	Basic function is completed (signal *bDone*).
	Bit 3	Acceleration/deceleration phase is active (signal *bAccDec*).
	Bit 4	-
	Bit 5	CCW rotation is active (signal *bCcw*).
	Bit 6	-
	Bit 7	Reference is known
	Bit 8	Brake is open.
	Bit 9	Waiting for clutch condition.
	Bit 10	Zero crossing detected or position = "0".
	Bit 11	-
	Bit 12	-
	Bit 13	-
	Bit 14	-
	Bit 15	Fault in active basic function (group signal).
	Status signals of the internal state machine for the basic functions:	
	Bit 16	Torque follower active.
	Bit 17	Speed follower active.
	Bit 18	Position follower active.
	Bit 19	Setpoint follower is active (group signal for bit 16 ...18).
	Bit 20	Positioning active.
	Bit 21	Homing active.
	Bit 22	Manual jog active.
	Bit 23	Brake test is active.
	Bit 24	Drive at standstill.
	Bit 25	Drive is stopped.
	Bit 26	Quick stop active.
	Bit 27	-
	Bit 28	Controller is not ready.
	Bit 29	Initialisation
	Bit 30	State "Fault active" (signal *DI_bFailActive*).
	Bit 31	State machine is not ready to receive setpoints. (Group signal for bit 28 ... 30)
DI_bReady C02549/6 | BOOL	Status signal "Controller is ready for operation"	
	TRUE	The controller is ready for operation.
DI_bFailActive C02549/7 | BOOL	Status signal "Error active acknowledgement is required"	
	TRUE	A monitoring function with the "Fault" response or "Quick stop by trouble" has been activated and the controller is in the device state "Fault active" or "Quick stop by trouble active". To quit the controller state the error must be acknowledged, e.g. via the input *DI_bErrorReset1...3*.

Output DIS code | Data type	Value/meaning	
DI_bImpActive C02549/8 | BOOL	Status signal "Pulse inhibit set"	
	TRUE	Power stages are switched with high resistance.
DI_bCInhActive C02549/9 | BOOL	Status signal "Controller inhibit active"	
	TRUE	The controller inhibit is active.
DI_bWarningActive C02549/10 | BOOL	Status signal "Warning active"	
	TRUE	A warning is active in the controller.
DI_bUVDetected C02549/11 | BOOL	Status signal "Undervoltage detected" • The threshold for the monitoring function depends on the setting under C00173.	
	TRUE	DC bus undervoltage detected.
DI_bOVDetected C02549/12 | BOOL	Status signal "Overvoltage detected" • The threshold for the monitoring function depends on the setting under C00173.	
	TRUE	DC bus overvoltage detected.
DI_bMainSupplyOk C02549/13 | BOOL	Status signal "mains voltage is applied"	
	TRUE	A voltage is applied to the mains voltage inputs L1, L2 and L3.
DI_bReadyToSwitchOn C02549/14 | BOOL	Status signal "Controller ready to start"	
	TRUE	The controller has completed the initialisation and is in the device state "Device is ready to switch on".
DI_bOperationEnabled C02549/15 | BOOL	Status signal "Operation is enabled"	
	TRUE	The controller is in the "operation" device state and the motor follows its setpoint according to the selected basic drive function or is at standstill due to stop or quick stop.
DI_dwErrorCode DWORD	Error number of the current error message ▸ Error messages of the operating system (📖 443)	
DI_AxisData	Data structure, which contains all required machine constants.	

4.7.1 Status signals

The following representation shows which status signals of the system block **LS_DriveInterface** are set to TRUE in different typical cases:

Case 1:
Application has been transmitted to the controller.
No mains voltage available (LU fault).
Controller is inhibited (via RFR terminal).

Case 2:
Mains voltage has been connected.

Case 3:
Controller inhibit has been deactivated.

Case 4:
Fault is active.

Case 5:
Quick stop by trouble is active

Status	Case 1	Case 2	Case 3	Case 4	Case 5	**Status signal (output)**
Ready for operation		●	●			*DI_bReady*
Fault is active				●	●	*DI_bFailActive*
Pulse inhibit is active	●	●		●		*DI_bImpActive*
Controller inhibit is active	●	●		●		*DI_bCinhActive*
Warning is active						*DI_bWarningActive*
Undervoltage detected	●					*DI_bUVDetected*
Overvoltage detected						*DI_bOVDetected*
Mains supply is Ok		●	●	●	●	*DI_bMainSupplyOk*
Ready to switch on						*DI_bReadyToSwitchOn*
Operation enabled			●			*DI_bOperationEnabled*

5 Motor interface

This chapter contains information on initial commissioning of the motor and parameter setting of the internal motor control of the controller.

Note!

To select application-specific setpoints, the motor interface can be extended by appropriate interfaces using the basic functions "Speed follower", "Torque follower" and "Position follower".

The application-specific conditioning of the encoder signals is executed with the basic function "Encoder evaluation".

See also:

- Speed follower (📖 190)
- Torque follower (📖 196)
- Position follower (📖 183)
- Encoder evaluation (📖 108)

5.1 Initial commissioning

An initial commissioning of the motor is required if the motor data in the memory module of the controller and the »Engineer« project is not suitable for the application.

- The following stepwise instructions can be used as "check list" to adjust the motor correctly to the controller.
- Detailed information on the individual steps can be found in the following subchapters:

Worksteps	
1.	Read out the motor data of the controller or select them via the »Engineer« motor catalog. • When the motor connected to the motor has an electronic nameplate (ENP), all motor data are automatically read out of the ENP and a selection from the motor catalog is not required. ▸ Read the motor data out of the controller (📖 66) • If a motor without ENP or an external motor is used, the motor data can be selected via the »Engineer« motor catalog. ▸ Select motor in the »Engineer« motor catalog (📖 66)
2.	Accept/adapt route data. (📖 69)
3.	Parameterise motor encoder. (📖 70)
ℹ	When an external motor is operated on the controller: • Only in case of a synchronous motor: Set rotor displacement angle. (📖 71) • Only in case of unknown motor parameters: – Optimise the switching performance of the inverter. (📖 73) – Set motor parameters. (📖 75)
4.	Define currents and speed limits. (📖 78)
5.	Select switching frequency. (📖 79)
6.	Optimise current controller. (📖 81) • Required since the controller parameters depend on the maximum switching frequency needed. The default values of the motor catalog only represent theoretically calculated approximate values.
7.	Save parameter set. (📖 57)
8.	Save »Engineer« project.

5.1.1 Read the motor data out of the controller

If the Lenze motor connected to the controller has an electronic nameplate (ENP), the motor does not need to be selected in the »Engineer« motor catalog.

- When the controller is switched on initially, all motor data are automatically read out of the electronic motor nameplate and stored at first temporarily in the controller.
- For a permanent acceptance of the motor data, the parameter set must be saved (C00002 = "11").
- If there is an online connection between the »Engineer« and the controller, the motor data of the controller can be taken over into the »Engineer« project.

How to read the motor data out of the controller:

1. Establish an online connection between »Engineer« and controller.
2. Go to the **Application parameter** tab and change to the dialog level *Overview→Motor*.
3. Press the **out of controller** button.
   - Then the motor data are read out of the controller and directly written into the corresponding codes of the »Engineer« project.

5.1.2 Select motor in the »Engineer« motor catalog

If the Lenze motor does not have an electronic nameplate (ENP) or if a motor of a third-party manufacturer is used, select the motor in the »Engineer« via the motor catalog and transfer the motor data to the controller.

- 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 catalog.
- As an alternative you can also insert the motor at a later date into the project via the command **Insert component**.

Tip!

If you use a motor of a third-party manufacturer, you can at first select a suitable motor concerning the rated data for current, voltage and speed and then adapt the motor data exactly to the existing motor.

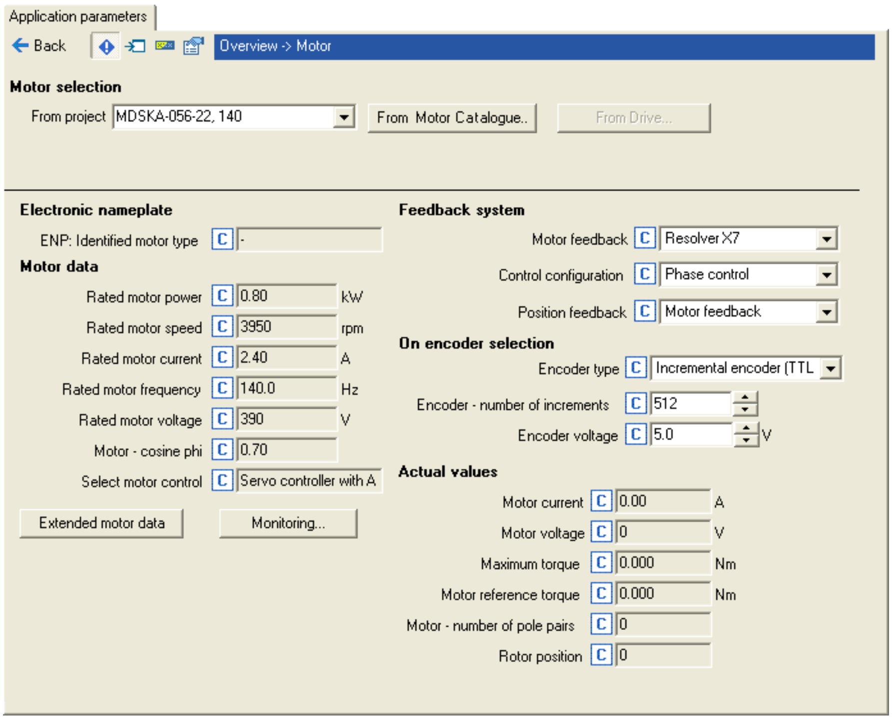
Display/edit motor data in the »Engineer« (67)

5.1.3 Display/edit motor data in the »Engineer«

The "Motor data" only summarises the parameters which depend on the motor. These only characterise the electrical behaviour of the machine.

- The motor data do not depend on the application in which the controller and motor are used.
- The motor data are, if available in the »Engineer« via electronic nameplate or motor catalog, accepted by the controller without confirmation prompt.

In the »Engineer«, the motor data are indicated on the **Application parameters** tab, dialog level *Overview→Motor*:



- If you use a motor of a third-party manufacturer, the displayed motor data can be adapted exactly to the existing motor by selecting the entry "Own motor settings" in the list field **Motor selection**.
- Click **From Motor catalog** to open the motor catalog and select a different motor.
  Read the motor data out of the controller (66)
- Click **From controller** to accept the motor data set in the controller while being online in the »Engineer«. Read the motor data out of the controller (66)

Overview of motor data

Parameters	Information	Lenze setting Value	Unit
C00006	Motor control selection	Servo control with synchronous motor	
C00059	Motor - number of pole pairs	-	
C00074	Feedforward control of current controller	Deactivated	
C00075	Current controller gain	28.66	V/A
C00076	Current controller reset time	1.50	ms
C00077	Field controller gain	165.84	A/Vs
C00078	Field controller reset time	15.1	ms
C00079	Motor - mutual inductance	-	mH
C00081	Motor - rated power	1	kW
C00082	Motor - rotor resistance	-	Ohm
C00083	Motor - rotor time constant	-	MS
C00084	Motor stator resistance	19.8000	Ohm
C00085	Motor stator leakage induct.	30.500	mH
C00087	Rated motor speed	4000	rpm
C00088	Rated motor current	0.9	A
C00089	Rated motor frequency	200	Hz
C00090	Rated motor voltage	245	V
C00091	Motor - cosine phi	1.00	
C00092	Motor - magnetising current	-	A
C00128/1	Therm. time constant coil	1.0	min
C00128/2	Therm. time constant plates	5.0	min
C00186	ENP: Identified motor type	-	
C00187	ENP: Identified serial number	-	
C00188	ENP: Status	-	
C00577	Field weakening controller gain	0.000	Vs/V
C00578	Field weakening controller reset time	2000.0	ms
C01190	Motor thermal sensor	KTY83-110	
C01191/1	Temperature for spec. characteristic	25	°C
C01191/2	Temperature for spec. characteristic	150	°C
C01192/1	Resistor for spec. characteristic	1000	Ohm
C01192/2	Resistor for spec. characteristic	2225	Ohm

Highlighted in grey = display parameter

Note!

If the motor has been selected via the »Engineer« motor catalog or if the motor data have been adapted offline in the »Engineer«, all motor data must be transferred to the controller with an established online connection and stored with mains failure protection in the memory module (C00002 = "11").

5.1.4 Accept/adapt route data

The "route data" summarises all parameters which result from the combination of motor and load. These characterise the transfer behaviour of the entire controlled system including the monitoring modes required.

- The route data depend on the application in which the controller and motor are used.
- The route data offered from the »Engineer« motor catalog or read out of the electronic nameplate (ENP) are compared with the currently set route data in a dialog box.
  - The route data in these dialog box can be selected, adapted and accepted individually.
  - They are both accepted in the controller and the »Engineer« project.

Overview of route data

Parameters	Information	Lenze setting	
		Value	Unit
C00011	Motor reference speed	3000	rpm
C00022	Maximum current	0.00	A
C00070	Speed controller gain	0.500	Nm/rpm
C00071	Speed controller reset time	24.0	ms
C00072	Speed controller D component	0.00	ms
C00254	Phase controller gain	20.00	1/s
C00270/1	Freq. current setpoint filter 1	200.0	Hz
C00270/2	Freq. current setpoint filter 2	400.0	Hz
C00271/1	Width current setp. filter 1	20.0	Hz
C00271/2	Width current setp. filter 2	40.0	Hz
C00272/1	Depth current setp. filter 1	0	db
C00272/2	Depth current setp. filter 2	0	db
C00585	Response to motor PTC overtemperature	Off	
C00596	Threshold max. speed reached	6500	rpm
Highlighted in grey = display parameter			

Note!

If the route data have been adapted offline in the »Engineer«, all route data must be transferred to the controller with an established online connection and stored with mains failure protection in the memory module (C00002 = "11").

5.1.5 Parameterise motor encoder

Tip!

Detailed information on the encoder evaluation and on the use of a separate position encoder can be found in the following main chapter "Encoder evaluation". (📖 108)

- The motor encoder can also be parameterised in the »Engineer« on the **Application parameter** tab in the dialog level *Overview→Motor*.
- The following table shows the required settings for different encoder types:

Encoder type: Motor type:	**Resolver** Tamagawa MCS MCA MDxKS MDXMA	**CDD50** MCA	**ITD21** MDFQA LMR	**ITD22** MDFQA LMR	**SCS70** **SCM70** MDxKS	**SRS50** **SRM50** MCS MCA	**ECN1313** **EQN1325** MCS MCA	**EQI1329** MCS MCA
C00495 Motor encoder	0 Resolver	1 Encoder						
C00080 Resolver - pole pair number	1	-	-	-	-	-	-	-
C00422 Encoder - type	-	0 Incremental encoder (TTL signal)		1 Sin/cos encoder	2 Absolute value encoder (Hiperface)		3 Absolute value encoder (EnDat)	
C00420 Encoder - PPR	-	2048			512	1024	2048	32
C00421 Encoder - voltage	-	5 V			8 V		5 V	

Danger!

When using the encoder/resolver as motor encoder:

In case of an error as safe motor operation cannot be ensured anymore. Thus, the "Fault" response (Lenze setting) should be set permanently for the (open circuit) monitoring of the encoder/resolver!

- C00580: Response to open circuit of encoder
- C00586: Response to open circuit of resolver
- C00601: Response to communication error of encoder

5.1.6 Set rotor displacement angle

Note!

Not required if a Lenze motor is operated on the controller!

For the control of permanent-magnet synchronous machines, the rotor angle – the angle between the motor phase U and the field axis of the rotor – must be known.

- For Lenze motors the rotor displacement angle for different feedback systems is already set correctly in C00058/1...3.
- The device command "Set rotor displacement angle" serves to specify the rotor displacement angle for the current motor encoder activated in C00495 for an external motor (see following instructions).

Note!

During the procedure of setting the rotor displacement angle, the machine must not be braked or blocked.

How to set the rotor displacement angle for an external motor:

1. If the controller is enabled, inhibit the controller, e.g. with the device command "Inhibit controller" (C00002 = "41").
2. Execute device command "Set rotor displacement angle" with C00002 = "51".

   The procedure starts with controller enable, if
   - a synchronous machine is selected,
   - no other identification is active,
   - no error (TRIP) has occurred, and
   - no test mode is activated.

   If one of the above conditions is not met, the procedure is cancelled and the corresponding controller command status is indicated under C00003.

   Note:
   By means of controller inhibit the started procedure can be aborted any time without making a change in C00058.

   For detailed information about the procedure, please see the following section "Sequence".

Tip!

For controller enable all sources for controller inhibit must be reset. In C00158 the sources for controller inhibit are displayed in a bit-coded manner.

The status of the controller command activated under C00002 is indicated under C00003.

Sequence

If all conditions are met, the motor is energised with a direct current corresponding to the lower of the following two values:

$$\sqrt{2} \cdot \text{Rated device current}$$

or

$$\sqrt{2} \cdot \frac{\text{Rated motor current}}{2}$$

- The rotor is aligned through the current flow. This is absolutely necessary for the procedure.
- To ensure that the torque-neutral axis is not accidentally energised and the rotor stops, a 45° current vector is (electrically) generated for 1 second and then (electrically) switched back to 0° (≡ phase U).
  - After this second, you could measure a direct current corresponding to the above-mentioned value in this motor phase.

The next steps of the procedure depend on the feedback system used:

- If an absolute value encoder with Hiperface or EnDat protocol is used, the encoder position is set to zero and the procedure is cancelled.
- If a resolver or an optical encoder without absolute track is used, the difference between the preselected current angle and the mechanical rotor angle is determined. After this, the current vector is (electrically) turned by another 22.5° and the difference between current angle and rotor angle is determined once again.
  - The procedure is repeated 16 times. This corresponds to one electrical revolution. The machine rotates by 360° (mech.)/pole pair number.
  - Take the average value of the 16 measurements to compensate for asymmetries.

After successful completion...

...the controller is inhibited automatically and the rotor displacement angle determined for the activated feedback system is set in the corresponding subcode of C00058.

- For a permanent acceptance of the set rotor displacement angle, the parameter set must be saved (C00002 = "11").
- The device command C00002 = "42" serves to deactivated the controller inhibit automatically set by the procedure.

If an error occurs

If an error occurs during the procedure or the pulse inhibit gets active (e.g. due to short-time undervoltage), the procedure is terminated with controller inhibit without making a change in C00058.

If the machine was braked or blocked during the procedure, this will be recognised at the end of the measurement and no change is made in C00058.

5.1.7 Optimise the switching performance of the inverter

Note!

Not required if a Lenze motor is operated on the controller!

For an external motor with unknown motor parameters the optimisation of the inverter switching performance is necessary for the motor parameter setting described in the following chapter. ▶ Set motor parameters (📖 75)

An inverter generates a pulse-width-modulated, three-phase voltage system. Due to the design of the inverter, current-dependent and chopper-frequency-dependent losses inside of the inverter falsify the output voltage. Since the output voltage is not measured, the losses must be compensated by a suitable feedforward control. This is compensated via an inverter error characteristic.

The inverter error characteristic depends, among other things, on the motor cable length and for a motor with unknown motor parameters it must be detected at least once individually with the device command "Detect inverter characteristic" so that a sinusoidal current is ensured for an automatic selection of the motor parameters.

How to determine the inverter error characteristic:

1. If the controller is enabled, inhibit the controller, e.g. with the device command "Inhibit controller" (C00002 = "41").
2. Execute the device command "Determine inverter characteristic" with C00002 = "71".

   The procedure starts with controller enable, if
   - no other identification is active,
   - no error (TRIP) has occurred, and
   - no test mode is activated.

   If one of the above conditions is not met, the procedure is cancelled and the corresponding controller command status is indicated under C00003.

   Note:
   By means of controller inhibit the started procedure can be aborted any time. Characteristic values already detected are not considered.

   For detailed information about the procedure, please see the following section "Sequence".

Tip!

For controller enable all sources for controller inhibit must be reset. In C00158 the sources for controller inhibit are displayed in a bit-coded manner.

The status of the controller command activated under C00002 is indicated under C00003.

Sequence

If all conditions are met, the motor is energised with a maximum direct current corresponding to the lower of the following two values:

$$\sqrt{2} \cdot \text{Rated device current}$$

or

$$\sqrt{2} \cdot 1.8 \cdot \text{Rated motor current}$$

- Ideally, the first value should be reached, the second value is to ensure that the load on the machine is not too high during the procedure.

During the procedure, the motor current rises up to the specified maximum value and falls back to "0" to repeat the cycle with a negative current sign.

- The maximum value is reached four times.
- The chopper frequency is set to 8 kHz, sine-wave modulation. After the procedure, it is reset to the original value.
  - If the chopper frequency should be changed later during operation, the characteristic will be adapted to the current chopper frequency.
- Presently, the characteristic is only used for the automatic selection of the motor parameters. The use for sensorless control methods is in preparation.

After successful completion...

...the controller is inhibited automatically and the detected characteristic is set in the controller.

- For a permanent acceptance of the characteristic, the parameter set must be saved (C00002 = "11").
- The device command C00002 = "42" serves to deactivated the controller inhibit automatically set by the procedure.

Tip!

The inverter error characteristic must only be detected again if the controller, motor, or motor cable have changed e.g. due to an exchange.

If an error occurs

If an error occurs during the procedure or the pulse inhibit gets active (e.g. due to short-time undervoltage), the procedure is terminated with controller inhibit and the detected characteristic is not considered.

5.1.8 Set motor parameters

Note!

Not required if a Lenze motor is operated on the controller!

To control an electrical machine, the motor parameters must be known.

- The motor parameters for Lenze motors are known and are already set accordingly by selecting them from the »Engineer« motor catalog or reading out the ENP.
- The device command "Set motor parameters" serves to set the motor parameters listed in the following table for an external motor automatically unless they are known:

Parameters	Information	ASM	SM
C00079	Motor - magnetising inductance	☑	
C00082	Motor - rotor resistance	☑	
C00084	Motor stator resistance	☑	☑
C00085	Motor stator leakage induct.	☑	☑
C00091	Motor - cosine phi	☑	
C00092	Motor - magnetising current	☑	

Tip!

The »Engineer« displays an equivalent circuit diagram with these motor parameters when you got to the **Application parameter** tab in the dialog level *Overview→Motor* and press the button **Other motor data...**.

The representation of the equivalent circuit diagram depends on the motor control selected (C00006).

Requirements

- Before the automatic parameter determination is started, the switching performance of the inverter must have been optimised to ensure a sinusoidal current flow.
  - Optimise the switching performance of the inverter (📖 73)
- The motor parameters listed in the following table are excluded from the automatic determination and must be adapted to the motor used (see motor nameplate) before the determination.

Parameters	Information
C00081	Motor - rated power
C00087	Rated motor speed
C00088	Rated motor current (The current amount for the procedure is derived from this specification)
C00089	Rated motor frequency
C00090	Rated motor voltage

How to determine the motor parameters:

1. If the controller is enabled, inhibit the controller, e.g. with the device command "Inhibit controller" (C00002 = "41").
2. Execute the controller command "Determine motor parameters" with C00002 = "72".

   The procedure starts with controller enable, if

   - no other identification is active,
   - no error has occurred, and
   - no test mode is activated.

   If one of the above conditions is not met, the procedure is cancelled and the corresponding controller command status is indicated under C00003.

   Note:
   By means of controller inhibit the started procedure can be aborted any time without changing the codes for the motor parameters.

   For detailed information about the procedure, please see the following section "Sequence".

Tip!

For controller enable all sources for controller inhibit must be reset. In C00158 the sources for controller inhibit are displayed in a bit-coded manner.

The status of the controller command activated under C00002 is indicated under C00003.

Sequence

If all conditions are met, the impedance of the controlled system is determined for approx. 30 different frequencies. These valued are used to determine the electrical machine parameters by means of a mathematical procedure.

- Since the procedure starts with very low frequencies and always considers several complete periods, the whole process takes approx. 3 minutes.
- During the procedure, the motor is energised with a current, the r.m.s. value of which corresponds to the lower of the following two values:

Rated device current

or

$\frac{1}{2} \cdot$ Rated motor current

Note!

During the procedure, the motor should not rotate.

With synchronous machines, this cannot always be ensured. Although the current flow is produced in the torque-neutral axis, asymmetries in the machine lead to a rotation of the rotor.

- In such a case, the measurement would be useless and would have to be repeated.
- As a remedy, we recommend to use a holding brake.

With asynchronous machines, slight rotations might possibly occur. Their influence on the measurements is, however, not worth mentioning.

- In case of uncertainties, the measurement should be repeated several times to check if the results for the stator resistance, the leakage inductance of the stator and the rotor resistance differ widely. This should not be the case.
- The magnetising inductance and the cos(φ) values are not that important for the diagnostics, because they are strongly non-linear.

After successful completion...

...the controller is automatically inhibited and the selected motor data are set in the corresponding codes.

- For a permanent acceptance of the settings, the parameter set must be saved (C00002 = "11").
- The device command C00002 = "42" serves to deactivated the controller inhibit automatically set by the procedure.

If an error occurs

If an error occurs during the procedure or the pulse inhibit gets active (e.g. due to short-time undervoltage), the procedure is terminated with controller inhibit without changing the codes for the motor parameters.

5.1.9 Define currents and speed limits

Maximum current

In C00022 the required maximum current must be set.

- In order that the motor does not start unintentionally without adjusting the route data, the maximum current in the Lenze setting is set to "0 A" in C00022.

Moreover the motor limit current set in C00620 must be checked and the error response required for the motor protection must be selected in C00619.

Motor reference speed

In C00011 the reference speed of the motor must be set.

Note!

When MCS motors are used check if the motor used exceeds the voltage limit in the required operating range up to maximum current/reference speed.

- If so, the reference speed must be reduced to a permissible value.
- Presently the controller does not support a field weakening control for synchronous motors so that an operation at the voltage limit causes an undefined behaviour.

On the part of the application it must be ensured that maximally 100 % of the reference speed set in C00011 are required as speed setpoint.

Maximum system speed

Adapt the maximum system speed in C00596 and select the error response required when this speed limit has been reached in C00607.

5.1.10 Select switching frequency

The controller uses a pulse-width modulation to generate the controller output voltage. The chopper frequency is used to change the control factor of the pulse-width modulation.

- Since the control factor is determined by the current controller, the chopper frequency also limits the response of the current controller: the current controller updates the output voltage only once per switching period.
- Due to the limited response of the current controller, the current ripple and the torque ripple increase with decreasing chopper frequency.

Note!

The maximum output frequency of the controller is limited to 1/8 of the switching frequency selected in C00018! (See the following table.)

Switching frequency (C00018):	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
Maximum output frequency:	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
Motor - number of pole pairs:	Maximum synchronous motor speed [rpm]				
1	7500	15000	30000	60000	120000
2	3750	7500	15000	30000	60000
3	2500	5000	10000	20000	40000
4	1875	3750	7500	15000	30000
5	1500	3000	6000	12000	24000
6	1250	2500	5000	10000	20000

Reduced switching losses through chopper frequency reduction

The advantage of a chopper frequency reduction are the reduced switching losses in the controller, which are monitored by means of an I x evaluation.

- A reduced chopper frequency therefore enables a bigger current-time area at the output than it would be the case with a higher chopper frequency. However, depending on the process, you always have to make a compromise between the torque ripple and the output power.

Tip!

The controller load (I x t) during the last 180 seconds is indicated under C00064.

Automatic chopper frequency reduction

Under C00018, it is possible to select "variable" chopper frequencies for the controller. With this selection, the controller reduces the chopper frequency depending on the setpoint current.

- Depending on the current, the controller switches down to an assigned chopper frequency; the modulation mode remains unchanged.
- The switching thresholds are device-dependent (see 9400 Hardware Manual, chapter "Rated data").
- If instead of a variable switching frequency a fixed switching frequency has been selected in C00018, no switching frequency changeover takes place. Due to the rotating field frequency range of 0...5 Hz only a lower continuous current and maximum currents can be applied (see 9400 Hardware Manual, chapter "Rated data").

Tip!

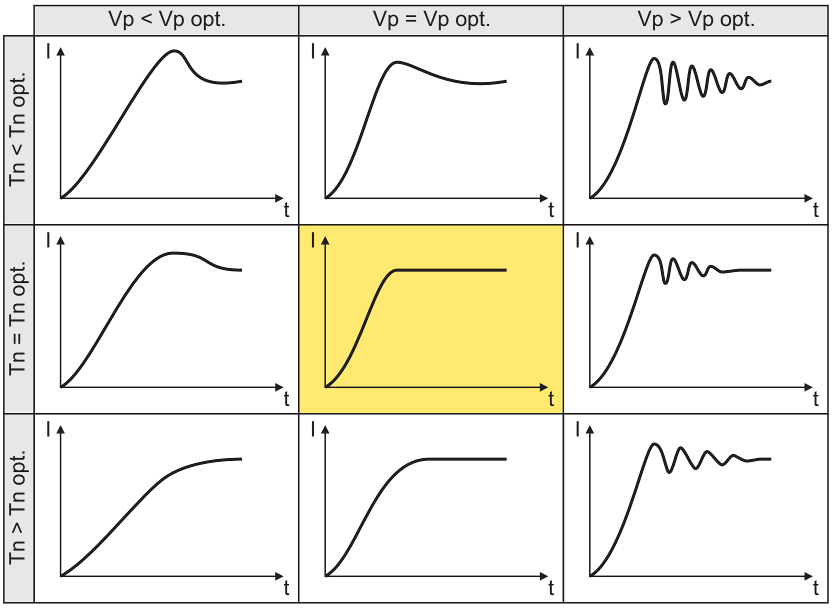
With the same load profile, a deactivation due to an excessive controller load (I x t) is more likely with a fixed chopper frequency setting than with a variable setting.

5.1.11 Optimise current controller

In a test mode you can select current setpoint step-changes and optimise the parameter settings of the current controller (gain and reset time).

How to optimise the current controller in the test mode:

1. If the controller is enabled, inhibit the controller, e.g. with the device command "Inhibit controller" (C00002 = "41").
2. Activate the test mode for the current controller with C00398 = "2".
3. Select the effective value of the current setpoint step change under C00022.
   - The peak value of the measurable motor current will be 1.41 times higher.
4. Enable the controller for a short time and measure the step response of the motor current in the motor phases using the oscilloscope and clamp-on ammeters or record the field-oriented direct-axis current using the Oscilloscope function in the »Engineer«. (📖 416)
   - Motor control variable to be recorded: *current.dnDirectCurrentAct* (field-oriented direct-axis current)
5. Evaluate the step response:



6. Change the gain Vp under C00075 and the reset time Tn under C00076.
7. Repeat steps 4 ... 6 until the optimum step response of the motor brake is reached.
   - After optimisation, the current control time is typically 0.5 ... 1 ms.
   - If the adjustment results are not satisfactory, the decoupling network can be additionally activated via the setting C00074 = "1". After this, repeat the steps 2 ... 6.
   - In case of MCS results may only be achieved with a current-dependent correction of the leakage inductance. For this purpose, it is required to use a motor with an electronic nameplate (ENP) or to set the saturation characteristic manually (see the following section).

8. After the optimisation has been completed with C00398 = "0", deactivate the test mode for the current controller again.
9. Save parameter set (C00002 = "11").

5.1.11.1 Correction of the leakage inductance via saturation characteristic

The current controller must be adjusted to the electrical characteristics of the motor – stator resistance and stator leakage inductance:

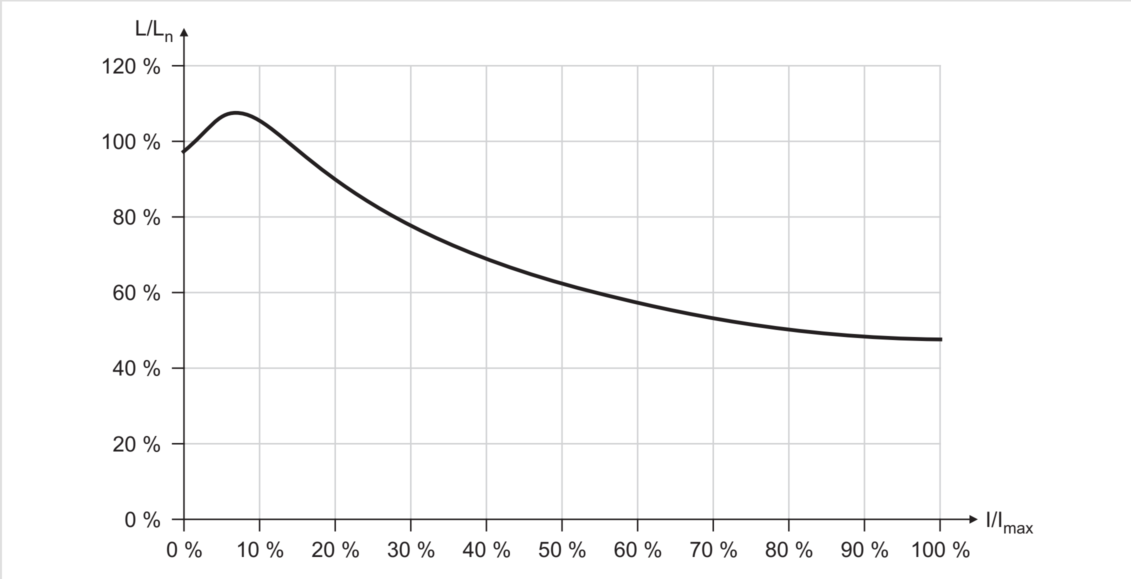
$$\text{Gain Vp} = \frac{\text{Leakage inductance of stator}}{240\ \mu\text{s}}$$

$$\text{Reset time Tn} = \frac{\text{Stator leakage inductance}}{\text{Stator resistance}}$$

In case of modern motors, however, the stator leakage inductance changes (C00085) as a function of the magnitude of current so that each current value requires a new current controller setting.

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 leakage inductance and current controller parameters is possible via a saturation characteristic that can be set in C02853 (17 base points).

The following picture shows a typical saturation characteristic of an MCS motor:



[5-1] Saturation characteristic: Inductance referring to the inductance for rated current

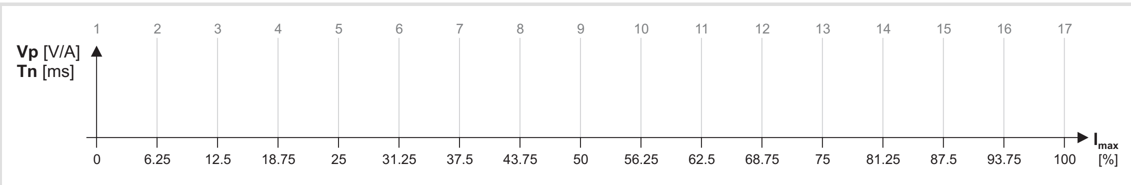
- By optimising different current setpoints such a characteristic can be detected per "trial" and set in C02853.
- The correction by means of this saturation characteristic can be switched off or on via C02859.

Note!

The saturation characteristic is not only used for the correction of the current controller but also influences the current controller feedforward control (C00074).

Distribution of the grid points

- The saturation characteristic is displayed by 17 points which are distributed linearly on the X axis.
- The point 17 represents 100 % of the maximum motor current in the process (C02855).



[5-2] Saturation characteristic: Distribution of the grid points

Tip!

The following chapter provides an example for determining the saturation characteristic. Example for determining the saturation characteristic (84)

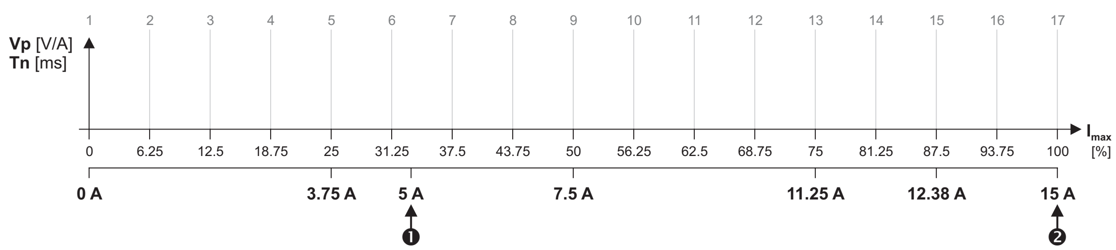
5.1.11.2 Example for determining the saturation characteristic

Given values:

- Rated motor current: 5 A
- Maximum motor current: 20 A
- Maximum process current: 15 A (must be set later in C00022)

Procedure:

1. Deactivate correction (C02859 = "off").
2. Set the maximum current up to which the motor is to be operated in the process in C02855 (in this example "15 A").
   – The value set in C02855 must be higher or the same as C00022.
3. Adjust the current controller with different current setpoints and note the corresponding settings for Vp and Tn.
   – The procedure for the adjustment is described in the chapter "Optimise current controller".
   – The current setpoints that are to be set for the prevailing adjustment in C00022 result from the scaling of the maximum process current to the X axis of the saturation characteristic.
   – Which points are required to display the saturation characteristic with a sufficient quality, varies from motor to motor and must therefore be detected individually.
   – For this example currents have been selected which are situated on the grid points 5, 9, 13 and 15 a measurement has been carried out at rated motor current:

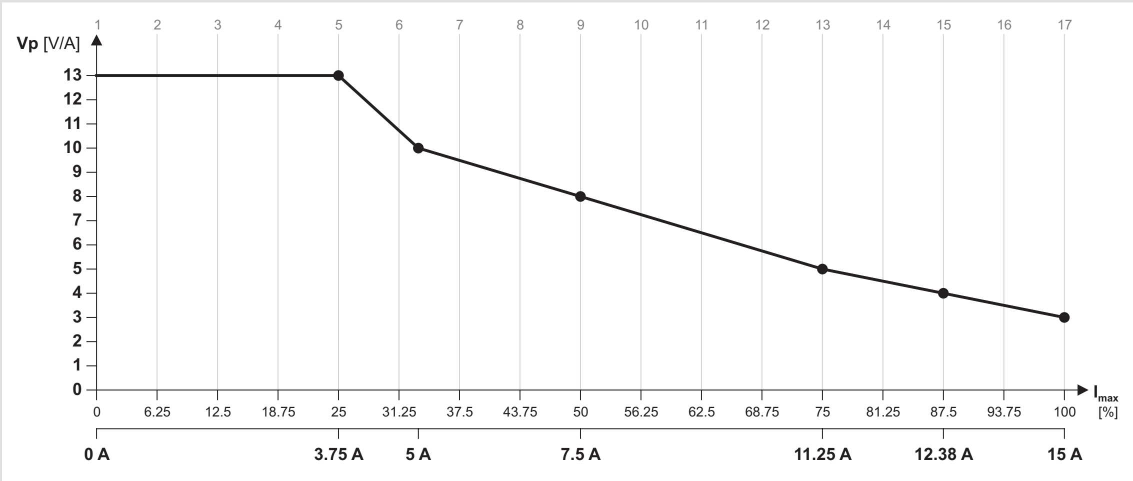


❶ Rated motor current
❷ Maximum process current (≡ 100 %)

[5-3] Saturation characteristic: Distribution of the grid points

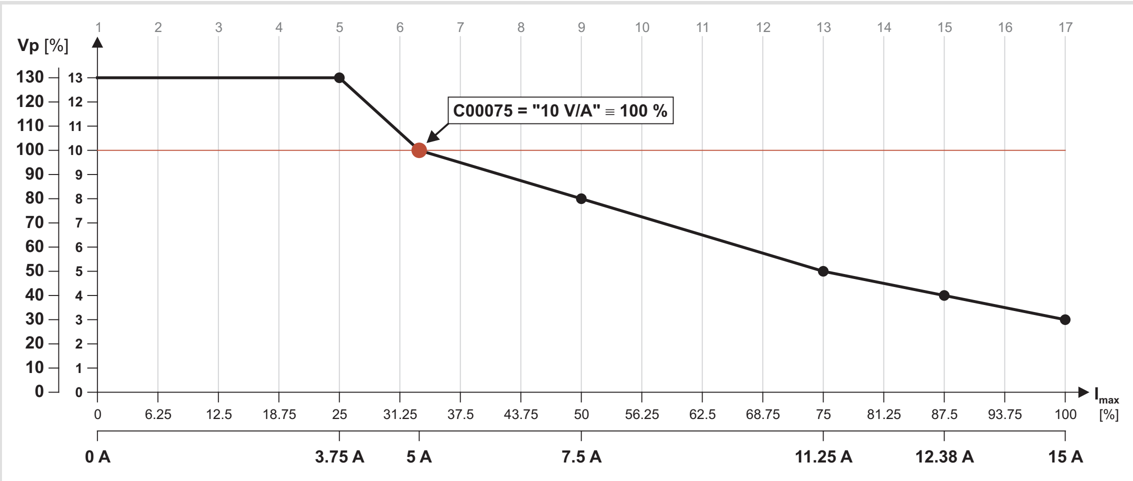
Specifications for adjustment			Measured values	
Grid point	Scaling	Setting C00022	Vp [V/A]	Tn [ms]
5	0.25 * 15 A =	3.75 A	13	6.5
9	0.5 * 15 A =	7.5 A	8	4
13	0.75 * 15 A =	11.25 A	5	2.5
15	0.875 * 15 A =	12.38 A	4	2
17	1.0 * 15 A =	15 A	3	1.7
	Rated motor current =	5 A	10	5

4. Creating a characteristic based on the values calculated for Vp.
   – Here, the values which have not been adjusted, must be determined by interpolation between two values.
   – **Note:** In this example it is assumed that the inductance does not change considerably below 3.75 A. For this reason, the same Vp value resulting from the measurement with a motor current of 3.75 A has been used for all grid points below 3.75 A.



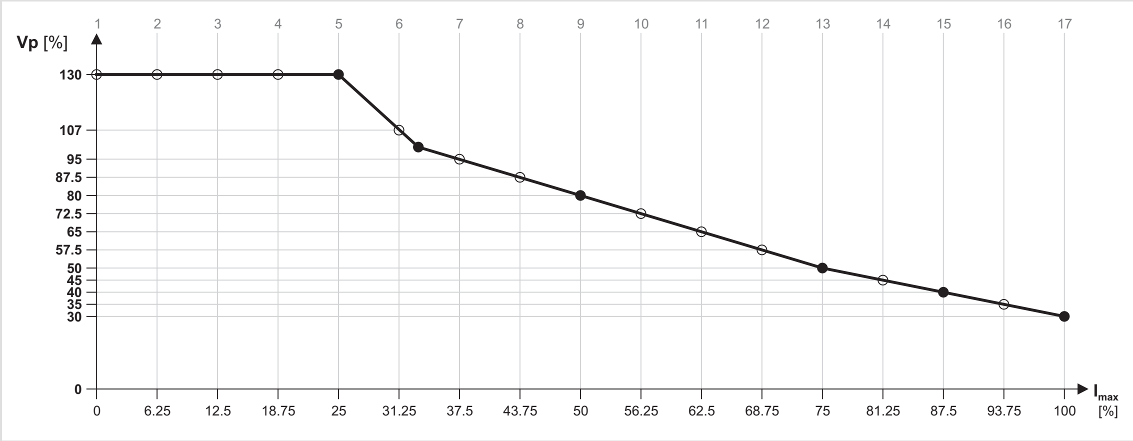
[5-4] Determined saturation characteristic

5. Set the gain Vp in C00075 and reset time Tn in C00076 which were calculated during the adjustment with the rated motor current (in this example "5 A"):
   – Set C00075 = "10 V/A".
   – Set C00076 = "5 ms".
6. Scale the Vp values on the Y axis of the characteristic to the 100 % Vp setting in C00075:



[5-5] Scaling of the determined saturation characteristic to the "100 %" setting in C00075

7. Enter the percentage Vp values situated on the grid points in C02853/1...17:



[5-6] Grid point values of the determined saturation characteristic

Grid point	Setting	Grid point	Setting
1	C02583/1 = 130 %	10	C02583/10 = 72.5 %
2	C02583/2 = 130 %	11	C02583/11 = 65 %
3	C02583/3 = 130 %	12	C02583/12 = 57.5 %
4	C02583/4 = 130 %	13	C02583/13 = 50 %
5	C02583/5 = 130 %	14	C02583/14 = 45 %
6	C02583/6 = 107 %	15	C02583/15 = 40 %
7	C02583/7 = 95 %	16	C02583/16 = 35 %
8	C02583/8 = 87.5 %	17	C02583/17 = 30 %
9	C02583/9 = 80 %		

8. Enter the maximum process current ("15 A") in C00022.
9. Switch on the correction (C02859 = "on").
   – When the correction of the stator leakage inductance is switched on, the same current characteristic is to occur irrespective of the current magnitude.
   – Since the current controller gain is corrected actively, the step responses may differ slightly compared to the previous measurements. In this case C00075 and C00076 must be optimised one last time.
10. Save parameter set (C00002 = "11").

5.2 Extended commissioning

After the initial commissioning of the motor, the required technology application can be selected in the »Engineer« and loaded in the controller.

- Further information on this can be found in chapter Technology applications (TAs). (📖 233)
- During operation (with setpoint selection) further steps can be carried out to optimise the motor control.
- Detailed information on the individual steps can be found in the following subchapters:

Worksteps	
1.	Optimise speed controller. (📖 88) • Via running a typical speed profile and recording the ramp response of the speed controller with the oscilloscope.
2.	If the speed controller optimisation did not achieve the intended result:
	Set current setpoint filter. (📖 90) • In order to suppress or damp (mechanical) resonant frequencies, two current setpoint filters are integrated in the speed control loop of the controller which are switched off in the default setting but can be parameterised accordingly, if required.
	Then readjust the speed controller: Optimise speed controller. (📖 88)
3.	Optimise phase controller. (📖 92) • Via running a typical speed profile and recording the ramp response of the phase controller with the oscilloscope.
4.	Optimise the response to setpoint changes by means of the torque feedforward control. (📖 93) • Via running a typical speed profile and recording the inputs and outputs of the speed controller with the oscilloscope.
5.	Save »Engineer« project.

Tip!

To run a typical speed profile for optimising the motor control, you can also use the basic function "manual jog" with suitably adapted manual jog parameters.
▸ Manual jog (📖 156)

5.2.1 Optimise speed controller

The speed controller has been designed as a PID controller.

Gain, reset time & differential gain setting

The proportional gain Vp is selected under C00070:

1. Select the speed setpoint.
2. Increase C00070 until the drive becomes unstable (observe motor noises).
3. Reduce C00070, until the drive becomes stable again.
4. Reduce C00070 to approx. half the value.

Reset time setting

The reset time is selected under C00071:

1. Reduce C00071 until the drive becomes unstable (observe motor noises).
2. Increase C00071 until the drive becomes stable again.
3. Increase C00071 to approx. double the value.

Differential gain setting

The differential gain Td is selected under C00072:

▶ Increase C00072 during operation until an optimum control behaviour is reached.

Adaptation of the speed controller gain

Via the input *MI_dnSpeedCtrlAdapt_n* of the system block LS_MotorInterface the proportional gain Vp can be changed dynamically during operation:

$$V_p = \text{MI\_dnSpeedCtrlAdapt\_n}\,[\%] \cdot \text{C00070}$$

▶ If the input *MI_dnSpeedCtrlAdapt_n* has not been assigned:

$$V_p = 100\,\% \cdot \text{C00070} = \text{C00070}$$

Using the ramp response for setting the speed controller

When operation of the mechanics at the stability limit is not possible, the ramp response can be used for setting the speed controller. The proceeding is similar to optimising the current controller.

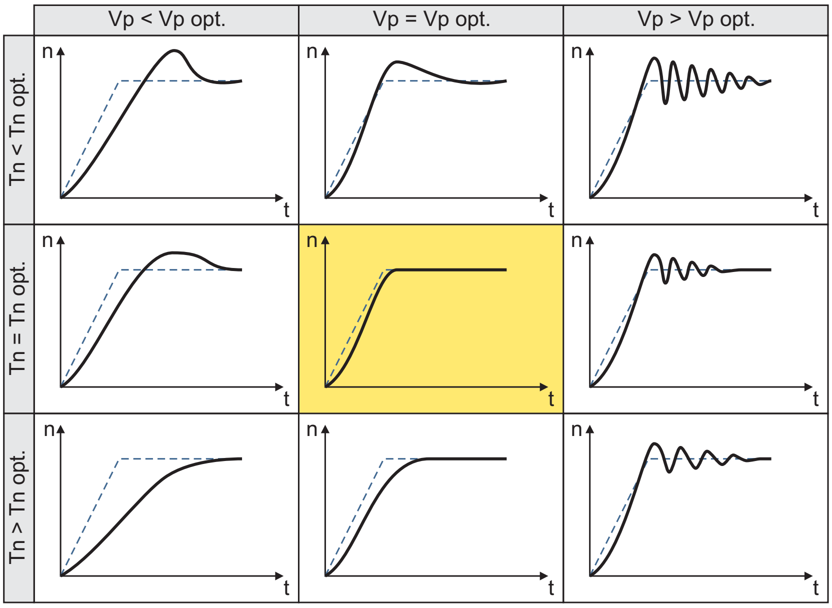
Stop!

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 is very sensitive, the corresponding monitoring functions must be activated.

How to optimise the speed controller setting by means of the ramp response:

1. Run a typical speed profile and record the ramp response of the speed with the Oscilloscope. (📖 416)
   - Motor control variables to be recorded:
     Speed.dnSpeedSetpoint (speed setpoint)
     Speed.dnActualMotorSpeed (actual speed value)
2. Evaluate the ramp response:

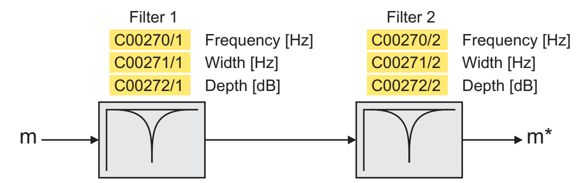


   - Solid line = ramp response (actual speed value)
   - Dash line = Speed setpoint
3. Change the gain Vp under C00070 and the reset time Tn under C00071.
4. Repeat steps 1 ... 3 until the optimum ramp response is reached.
5. Save parameter set (C00002 = "11").

5.2.2 Set current setpoint filter

Due to the high dynamic performance or limit frequency of the closed current control loop mechanical natural frequencies can be activated which may lead to an unstable speed control loop.

In order to suppress or damp these resonant frequencies, two current setpoint filters are integrated in the speed control loop of the controller which are switched off in the default setting but can be parameterised accordingly, if required.



m = Output of the jerk limitation

[5-7] Optional current setpoint filters (filter cascade) in the speed control loop

Since the frequency response of the speed controlled system is only rarely known to such an extent that the current setpoint filters can be adjusted to the controlled system in the run-up, the following example describes how to set current the current setpoint filters.

How to set the current setpoint filters:

1. Adjust the current control loop.
2. In C00071 adjust the reset time of the speed controller to the filter time constant of the speed filter (C00497) and the equivalent time constant of the current control loop: C00071 = 16 * (C00497 + 200 µs)
3. Slowly increase the proportional gain n C00070, until the speed control loop starts to become unstable (noticed acoustically or by measuring the motor current).
4. Measure the oscillation frequency using an oscilloscope (observe current or speed).
5. Set the measured oscillation frequency in C00270/1 as filter frequency.
6. Set "50%" of the filter frequency in C00271/1 as filter width.
   - Example: Filter frequency = 200 Hz → filter width = 100 Hz.
7. Set "40 dB" in C00272/1 as filter depth.
   - If the filter depth is set to "0 dB" (default setting), the filter is not active.
8. Continue to increase the proportional gain in C00070 until the speed control loop starts to become instable again.
   - If the oscillation frequency has changed now, readjust the filter frequency by trimming. The use of a second filter is ineffective here.
   - If the oscillation frequency remains the same, readjust the filter depth and/or the filter width by trimming (the first reduces the amplitude, the second lets the phase rotates faster).
   - Repeat step 8 until the desired behaviour or the limit of a sensible speed controller gain has been reached.
9. Save parameter set (C00002 = "11").

Note!

Readjust the speed controller after setting the current setpoint filter.
▶ Optimise speed controller. (📖 88)

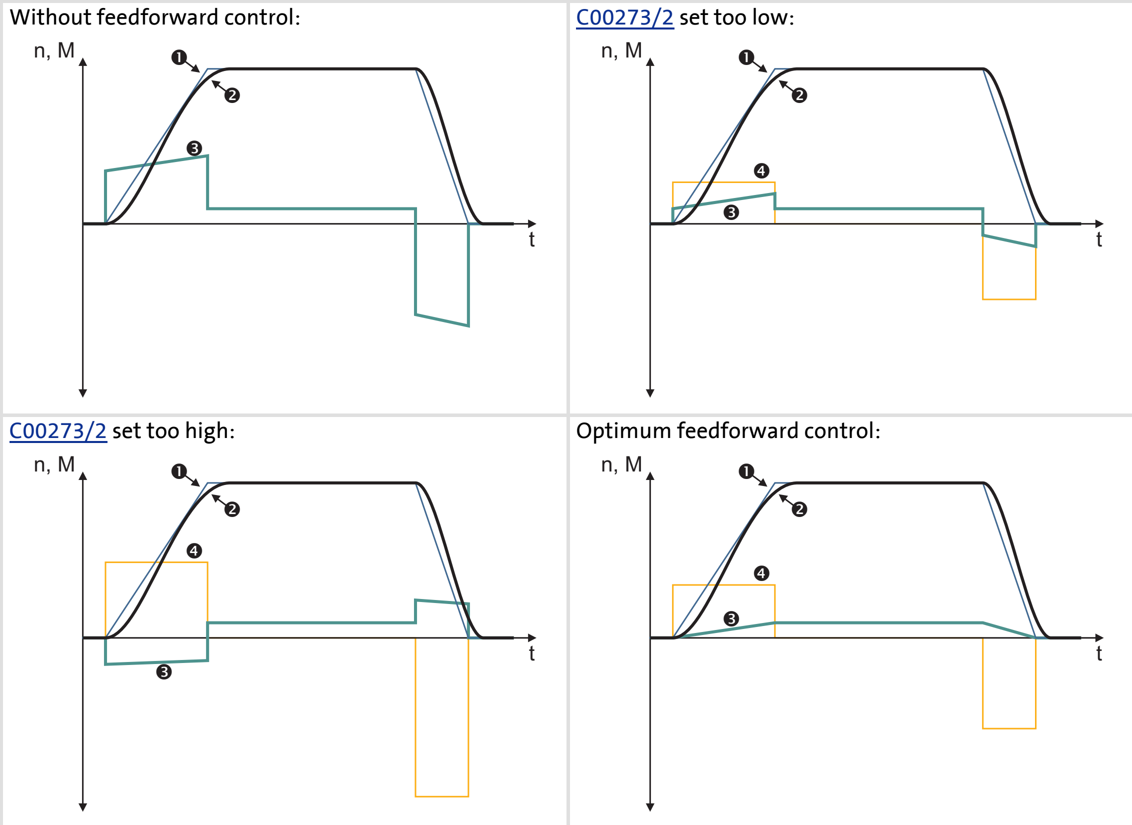
5.2.3 Optimise phase controller

How to optimise the phase controller setting by means of the ramp response:

1. Run a typical speed profile and record the ramp response of the phase controller with the Oscilloscope. (📖 416)
   - Motor control variables to be recorded:
     Speed.dnSpeedSetpoint (speed setpoint)
     Speed.dnActualMotorSpeed (actual speed value)
     Speed.dnOutputPosCtrl (phase controller output)
     Position.dnEncounteringError (following error)
2. Adjust the gain Vp of the phase controller under C00254 and repeat oscilloscope recording until the intended following error behaviour is reached and the motor runs sufficiently smoothly during the constant travel phase.
3. Save parameter set (C00002 = "11").

5.2.4 Optimise the response to setpoint changes by means of the torque feedforward control

Setting the load moment of inertia under C00273/2 does not always provide the optimum torque feedforward control. Depending on the application, an adaptation of the setting under C00273/2 may be necessary to optimise the response to position/speed control setpoint changes.



❶ Speed setpoint (*Speed.dnSpeedSetpoint* signal)
❷ Actual speed value (*Speed.dnActualMotorSpeed* signal)
❸ Speed controller output (*Torque.dnOutputSpeedCtrl* signal)
❹ Torque feedforward control (*Torque.dnTotalTorqueAdd* signal)

[5-8] Typical signal characteristics for different settings of the load moment of inertia

C00273/2 can be used to compensate for effects in addition to the moment of inertia which are detected by the speed controller in the closed speed control loop (e.g. friction torque).

Below you will find a description of a procedure for optimising the feedforward control behaviour starting from the system's moment of inertia.

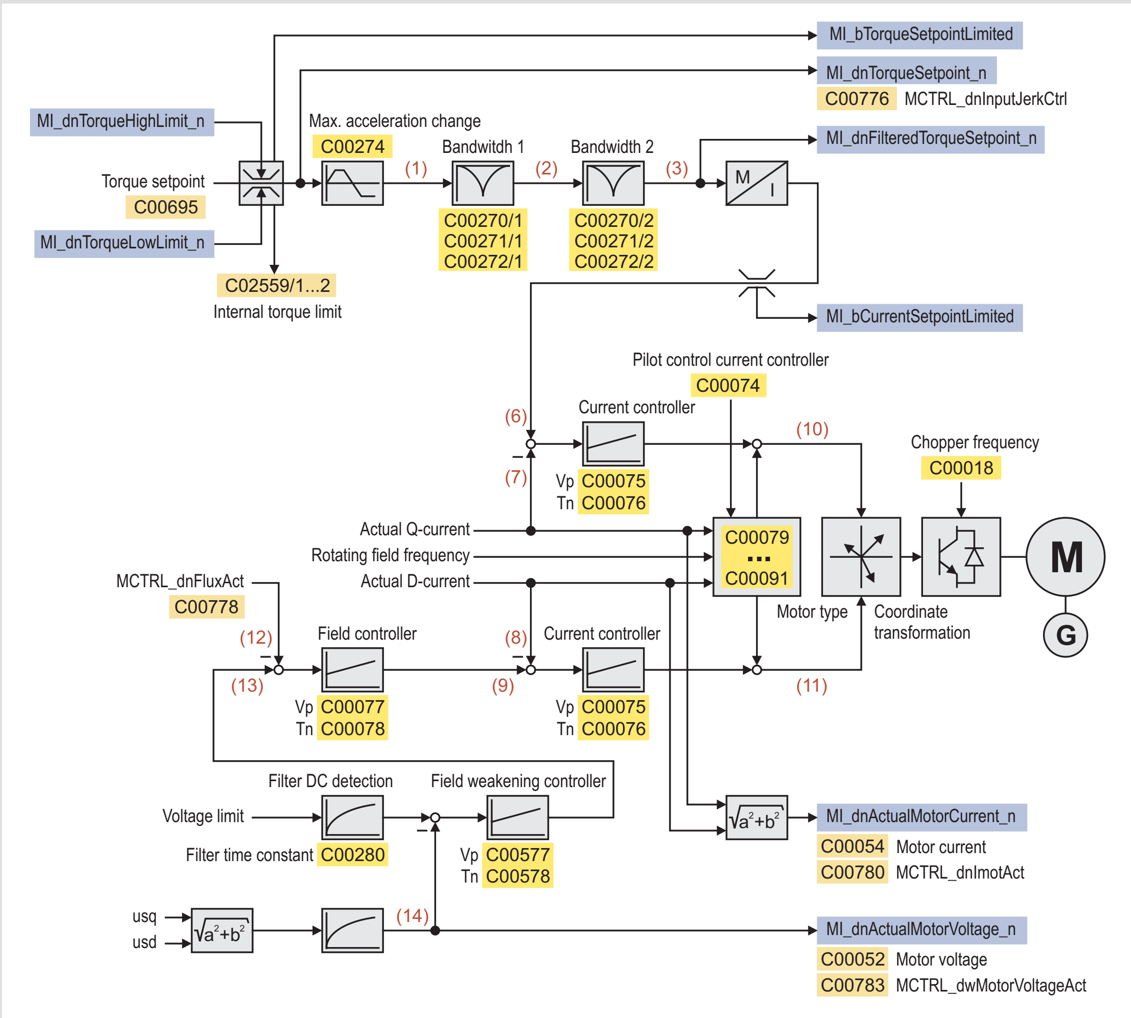
How to optimise the torque feedforward control:

1. Run a typical speed profile and record the inputs and outputs of the speed controller with the Oscilloscope. (📖 416)
   - Motor control variables to be recorded:
     Speed.dnSpeedSetpoint (speed setpoint)
     Speed.dnActualMotorSpeed (actual speed value)
     Torque.dnOutputSpeedCtrl (speed controller output)
     Torque.dnTotalTorqueAdd (torque feedforward control)
   - Application variable to be recorded (if available):
     L_LdMonitFollowError1.dnFollowErrorIn_p (following error)

   It is essential for optimising the response to setpoint changes to monitor the speed controller output (*Torque.dnOutputSpeedCtrl*) and the torque feedforward control (*Torque.dnTotalTorqueAdd*). The effect of the feedforward control can also be observed in the following error.
2. Select the signal source required for the torque setpoint (feedforward control path) under C00276.
3. Estimate the mass inertia of the load and set it under C00273/2.
4. Repeat the oscilloscope recording (see step 1).

   Now the oscillogram should show that part of the required torque is generated by the feedforward control (*Torque.dnTotalTorqueAdd*) and the speed controller output signal (*Torque.dnOutputSpeedCtrl*) should be correspondingly smaller. The resulting following error decreases.
5. Change the setting under C00273/2 and repeat the oscilloscope 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. [5-8]).
6. Save parameter set (C00002 = "11").

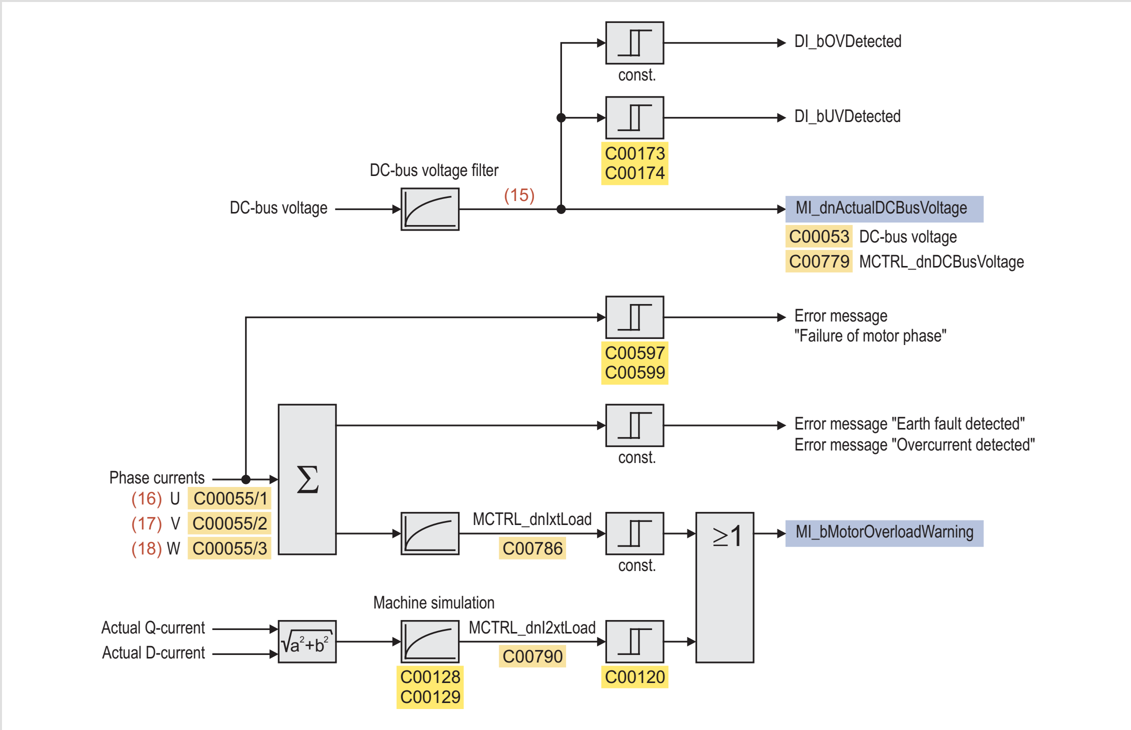
5.3 Signal flow



[5-9] Signal flow - motor interface

See also:

▸ Signal flow - encoder evaluation (📖 109)
▸ Signal flow - speed follower (📖 191)
▸ Signal flow - torque follower (📖 196)
▸ Signal flow - position follower (📖 184)



[5-10] Signal flow of motor interface (monitoring)

Internal variables of the motor control (oscilloscope signals)

▶ The red numbers specified in the signal flow represent internal variables of the motor control, which can be recorded with the Oscilloscope for diagnostic and documentation purposes. (📖 416)

No.	Variable or the motor control	Meaning
(1)	Torque.dnInputNotchFilter1	Torque setpoint at the band-stop filter input 1
(2)	Torque.dnInputNotchFilter2	Torque setpoint at the band-stop filter input 2
(3)	Torque.dnFilteredTorqueSetpoint	Filtered torque setpoint
(4)	-	
(5)	-	
(6)	Current.dnQuadratureCurrentSet	Q current setpoint
(7)	Current.dnActualQuadratureCurrent	Actual Q-current
(8)	Current.dnActualDirectCurrent	Actual D current
(9)	Current.dnDirectCurrentSet	D current setpoint
(10)	Voltage.dnQuadratureVoltage	Q voltage
(11)	Voltage.dnDirectVoltage	D voltage
(12)	Common.dnActualFlux	Actual flux value
(13)	Common.dnFluxSet	Flux setpoint
(14)	Voltage.dnActualMotorVoltage	Current motor voltage
(15)	Voltage.dnActualDCBusVoltage	Actual DC-bus voltage
(16)	Current.dnActualCurrentPhaseU	Actual motor current (phase U)
(17)	Current.dnActualCurrentPhaseV	Actual motor current (phase V)
(18)	Current.dnActualCurrentPhaseW	Actual motor current (phase W)

5.4 Parameter setting

Short overview of the other parameters for the motor interface:

Parameters	Information
C00050/1	Speed setpoint 1
C00050/2	Speed setpoint 2
C00051	Actual speed
C00052	Motor voltage
C00054	Motor current
C00055/1	Phase current - phase zero system
C00055/2	Phase current - phase U
C00055/3	Phase current - phase V
C00055/4	Phase current - phase W
C00056	Torque setpoint
C00057/1	Maximum torque
C00057/2	Torque at maximum current
C00059	Motor - number of pole pairs
C00060	Rotor position
C00063	Motor temperature
C00066	Thermal motor load (I^2xt)
C00120	Motor overload protection (I^2xt)
C00121	Warning threshold - motor temperature
C00127	Warning threshold - motor overload
C00583	Response to motor KTY overtemperature
C00584	Response to motor temperature > C00121
C00585	Response to motor PTC overtemperature
C00606	Resp. to motor overload
C00909/1	Upper speed limit value
C00909/2	Lower speed limit value
C02527	Motor mounting direction
C02550/1	Position setpoint interpolation
C02550/2	Speed setpoint interpolation
C02550/3	Torque setpoint interpolation
C02553	Position controller gain
C02554	Position controller reset time
C02555	Position controller D component
C02556	Pos. contr. limitation
C02557	Motor position controller output
C02558	Position controller output
C02559/1	Upper int. torque limit
C02559/2	Lower int. torque limit
C02560	Messages motor interface
C02567	Control mode
Highlighted in grey = display parameter	

See also:
- Display/edit motor data in the »Engineer« (📖 67)
- Accept/adapt route data (📖 69)

5.4.1 Motor monitoring (I²xt)

The "9400 Servo Drives" are provided with an extended, sensorless thermal I^2xt motor monitoring which is based on a mathematical model that calculates a thermal motor utilisation from the detected motor currents.

- The calculation considers the speed dependency of the torque (difference between standstill torque and rated torque).
- C00066 indicates the calculated motor utilisation in [%].
- If the motor exceeds the advance warning threshold set in C00127, the error message "I2t motor overload OC8" is output and the reaction set in C00606 (default setting: "Warning") is activated.
- If the switch-off threshold set in C00120 is exceeded, the error message "I2t motor overload OC6" is output and the reaction "Fault" is activated.

Stop!

The I^2xt motor monitoring is no full motor protection!

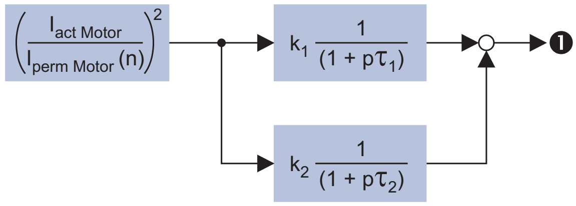
Since the motor utilisation calculated in the thermal model gets lost after mains switching, the following operating states cannot be determined correctly:

- Restarting (after mains switching) of a motor that is already very heated.
- 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 situated directly in the winding of thermal contacts.

Structure of the I2xt monitoring

The introduction of a two-component model with two time constants (one for the winding and the other for the housing/steel plates) serves to display the thermal behaviour of the motor up to 500% of the rated current:



❶ Thermal utilisation of the motor in [%]

[5-11] Structure of the motor monitoring

Parameters		Setting
$I_{act\ motor}$	Current motor current	-
$I_{perm\ motor}(n)$	Permissible motor current (speed-dependent)	-
τ_1	Therm. time constant coil	C00128/1
k_1	Percentage of the winding in the final temperature	C01195
τ_2	Therm. time constant plates	C00128/2
k_2	Percentage of the steel plates in the final temperature	100 % - C01195

Executing the calculation with only one time constant

With the setting C01195 = "0 %" the time constant for the winding is not considered and the thermal model is only calculated with the time constant set for the housing/steel plates.

- The setting C01195 = "0 %" is e.g. sensible if not both time constants are known.
- The calculation simplified due to this setting corresponds to the calculation in the previous Lenze devices (e.g. servo inverter 9300 or ECS).

Speed-dependent evaluation of the motor current

By selecting a characteristic in C01196/1...8 the permissible motor current is evaluated depending on speed for calculating the thermal motor utilisation.

Parameters	Characteristic point	
C01196/1	n_1/n_n	Speed = "0" (standstill)
C01196/2	I_1/I_n	Permissible motor current at standstill
C01196/3	n_2/n_n	Speed from which the torque must be reduced with self-ventilated motors. • Below this speed the cooling air flow of the integral fan is not sufficient anymore.
C01196/4	I_2/I_n	Permissible motor current at speed n_2 (torque reduction)
C01196/5	n_3/n_n	Rated speed
C01196/6	I_3/I_n	Permissible motor current at rated speed
C01196/7	n_4/n_n	Speed above the rated speed (in the field weakening in case of asynchronous motors)
C01196/8	I_4/I_n	Permissible motor current at speed n_4 (field weakening)

▶ The speed-dependent evaluation can be more or less switched off by setting C01196/1...8 to "100 %" each. The calculation simplified due to this setting corresponds to the calculation in previous devices (e.g. servo inverter 9300 or ECS).

Note!

Self-ventilated standard motors are protected insufficiently by setting C01196/1...8 to "100 %" each at low speeds.

Servo motors, however, do not have a point from which the torque must be reduced due to a too low speed.

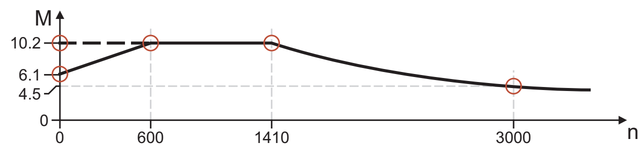
- When setting the characteristic in C01196/1...8 this point must not be ignored. Hence, point 2 is to be set ideally to point 1 or point 3.

5.4.1.1 Example for entry of the characteristic for asynchronous servo motor

Motor type: MDFMARS 090-32

Data from the catalog:

- Rated speed n_N: 1410 rpm → Setting in C00087
- Rated current I: 6.1 A → Setting in C00088
- Rated torque M_N: 10.2 Nm
- Characteristic of maximum torques (50 Hz, star connection):



[5-12] Torque/speed characteristic for motor type MDFMARS 090-32 from catalog

Note!

Currently relative current values are still expected for the specification of the grid points in subcodes 2, 4, 6, 8 of C01196. This example, however, already uses relative torque values the entry of which shall be possible at a later date.

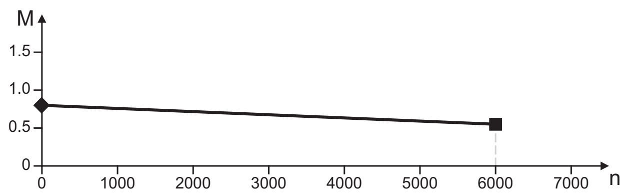
Parameters	Setting	Information
C00128/1	1.0 min	Thermal time constant - winding • Is unknown and is therefore deactivated by setting C01195 = "0 %".
C00128/2	5.0 min	Thermal time constant - steel plates/housing
C01195	0 %	Percentage of the winding in the final temperature.
C01196/1	0 %	Speed = "0" (standstill)
C01196/2	Permissible motor torque at standstill	
Self-ventilated:	60 %	= 6.1 Nm / 10.2 Nm * 100 %
Forced ventilated:	100 %	= 10.2 Nm / 10.2 Nm * 100 %
C01196/3	Speed n_2, from which the torque must be reduced with self-ventilated motors.	
Self-ventilated:	43 %	= 600 rpm / 1410 rpm * 100 %
Forced ventilated:	0 %	No torque reduction required.
C01196/4	100 %	Permissible motor torque at speed n_2 (torque reduction)
C01196/5	100 %	Rated speed (≡ 1410 rpm)
C01196/6	100 %	Permissible motor torque at rated speed (≡ 10.2 Nm)
C01196/7	213 %	Speed above the rated speed (in the field weakening in case of asynchronous motors) = 3000 rpm / 1410 rpm * 100 %
C01196/8	44 %	Permissible motor torque at speed n_4 (field weakening) = 4.5 Nm / 10.2 Nm * 100 %

5.4.1.2 Example for entry of the characteristic for synchronous servo motor

Motor type: MCS 06C60

Data from the catalog:

- Rated speed n_N: 6000 rpm → Setting in C00087
- Rated current I: 2.4 A → Setting in C00088
- Rated torque M_N: 0.5 Nm (in S1 operation: 0.55 Nm)
- Characteristic - maximum torque:



[5-13] Torque/speed characteristic for motor type MCS 06C60 from the catalog

Note!

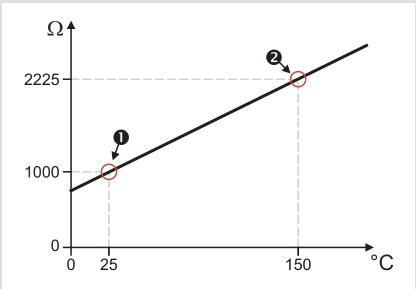
Currently relative current values are still expected for the specification of the grid points in subcodes 2, 4, 6, 8 of C01196. This example, however, already uses relative torque values the entry of which shall be possible at a later date.

Parameters	Setting	Information
C00128/1	1.0 min	Thermal time constant - winding
C00128/2	14.2 min	Thermal time constant - steel plates/housing
C01195	27 %	Percentage of the winding in the final temperature. (Only the steel plate percentage is known.)
C01196/1	0 %	Speed = "0" (standstill)
C01196/2	160 %	Permissible motor torque at standstill = 0.8 Nm / 0.5 Nm * 100 %
C01196/3	0 %	Speed n_2, from which the torque must be reduced with self-ventilated motors.
C01196/4	160 %	Permissible motor torque at speed n_2 (torque reduction)
C01196/5	100 %	Rated speed (≡ 6000 rpm)
C01196/6	100 %	Permissible motor torque at rated speed (≡ 0.5 Nm)
C01196/7	100 %	Speed above rated speed
C01196/8	100 %	Permissible motor torque at speed n_4 (field weakening)

5.4.2 Special characteristic for motor temperature sensor

If required you can select and activate a special characteristic for the motor temperature sensor.

- The special characteristic is selected with two grid points which are to be set in C01191 and C01192. Both grid points define a line which is extrapolated to the right and to the left.
- The special characteristic is activated by setting C01190 = "1".
- In the Lenze setting the special characteristic is defined as follows:



- Grid point ❶
  - C01191/1 = 25°C
  - C01192/1 = 1000 Ω
- Grid point ❷
  - C01191/2 = 150°C
  - C01192/2 = 2225 Ω

[5-14] Lenze setting of the special characteristic

Note!

By selecting a motor from the motor catalog the parameters C01190, C01191 and C01192 are overwritten!

5.4.3 Motor temperature monitoring

If the winding temperature detected by the motor temperature sensor exceeds the limit value set in C00121, the reaction set in C00584 is activated as advance warning.

- In the Lenze setting the reaction "Warning" occurs if the winding temperature exceeds 120 °C.
- As soon as the fixed limit value of 150 °C is exceeded, the reaction set in C00583 is activated (default setting: "Fault").
- If an open circuit is detected in the motor temperature sensor, the reaction set in C00594 (default setting: "Fault") is activated.

Note!

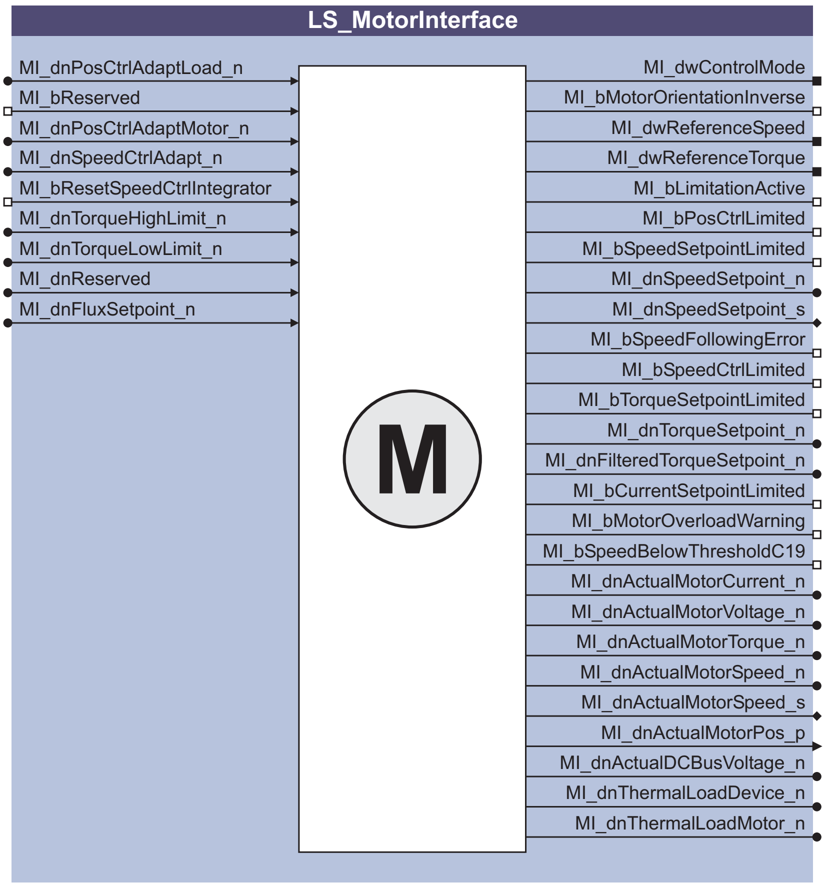
By setting C00583 = "0" the monitoring response and the temperature correction is switched off within the motor control (identification and parameter correction)

This setting is e.g. sensible if no realisable winding temperature signal is available.

5.5 System block "LS_MotorInterface"

The system block **LS_MotorInterface** displays the interface to the driving machine in the function block editor, which consists of phase controller, speed controller and motor control.

- The interface contains all control functions which are not made available via other basic drive functions.
- All input and output signals directly refer to the motor.



Inputs

Input DIS code | Data type	Information/possible settings
MI_dnPosCtrlAdaptLoad_n C02568/1 | DINT	Dynamic change of the proportional gain Vp of the position controller ▸ Signal flow - position follower (🕮 184)
MI_bReserved BOOL	Reserved input for future extensions
MI_dnPosCtrlAdaptMotor_n C02568/2 | DINT	Dynamic change of the proportional gain Vp of the phase controller ▸ Signal flow - position follower (🕮 184)
MI_dnSpeedCtrlAdapt_n C02568/3 | DINT	Dynamic change of the proportional gain Vp of the speed controller ▸ Signal flow - speed follower (🕮 191) ▸ Signal flow - torque follower (🕮 196)

Input DIS code | Data type	Information/possible settings	
MI_-bResetSpeedCtrlIntegrator C02569/2 | BOOL	Reset integral action component in the speed controller Signal flow - speed follower (📖 191)	
	TRUE	Integral action component is reset to "0".
MI_dnTorqueHighLimit_n C02568/4 | DINT MI_dnTorqueLowLimit_n C02568/5 | DINT	Upper/lower bipolar limit value for correcting variable of the speed controller and total torque setpoint • Via these both inputs you can select an external torque limitation. – If the motor torque reaches the selected limits, the drive can no longer follow the speed setpoint! – If the torque limitation is active, the output *MI_bTorqueSetpointLimited* is set to TRUE. • 100 % ≡ C00057/2 • When both values overlap, the upper limit value has priority. • The motor mounting position (C02527) defines the assignment to the limitation inputs of the motor control. • The internally effective torque limit values are displayed in C02559/1...2. Signal flow - motor interface (📖 95)	
MI_dnReserved DINT	Reserved input for future extensions	
MI_dnFluxSetpoint_n C02568/7 | DINT	Setpoint for the field controller	

Outputs

Output DIS code | Data type	Value/meaning	
MI_dwControlMode DWORD	Active control structure of the motor control • Displayed value is bit-coded:	
	Bit 1	Position control without feedback, external following error calculation
	Bit 2	Position control with encoder on the motor side
	Bit 3	Position control with encoder on the load side
	Bit 4	Speed control
	Bit 5	Torque control
MI_-bMotorOrientationInverse BOOL	Parameterised motor mounting position	
	FALSE	Motor mounting position in the same direction, setpoints are not defined.
	TRUE	Motor mounting position in the opposite direction, setpoints are reversed.
MI_dwReferenceSpeed DWORD	Parameterised motor reference speed (C00011) in [rpm]	
MI_dwReferenceTorque DWORD	Reachable motor torque with I_{max_device} (C00022) in [mNm] • 1000 mNm ≡ 1 Nm • Display in C00782 in [Nm]	
MI_bLimitationActive C02569/3 | BOOL	Status signal "Internal limitation active" • Group signal for all limitation messages.	
	TRUE	One of the internal limitations is active.
MI_bPosCtrlLimited C02569/4 | BOOL	Status signal "Phase/position controller in the limitation" Signal flow - position follower (📖 184)	
	TRUE	The limitation of the phase and/or position controller is active.

Output DIS code | Data type	**Value/meaning**	
MI_bSpeedSetPointLimited C02569/5 | BOOL	Status signal "Resulting speed setpoint in the limitation" ▸ Signal flow - position follower (📖 184) ▸ Signal flow - speed follower (📖 191)	
	TRUE	The resulting speed setpoint is limited to the limit values parameterised in C00909/1 and C00909/2.
MI_dnSpeedSetpoint_n DINT	Current speed setpoint from position control and speed feedforward control or direct setpoint selection in [%] • After limitation by the upper speed limit value (C00909/1) and lower speed limit value (C00909/2). • 100 % ≡ Motor reference speed (C00011) ▸ Signal flow - position follower (📖 184) ▸ Signal flow - speed follower (📖 191)	
MI_dnSpeedSetpoint_s DINT	Current speed setpoint from position control and speed feedforward control or direct setpoint selection in [rpm] • After limitation by the upper speed limit value (C00909/1) and lower speed limit value (C00909/2).	
MI_bSpeedFollowingError C02569/10 | BOOL	Status signal "Impermissible speed control deviation" ▸ Signal flow - speed follower (📖 191)	
	TRUE	Speed control deviation is higher than the window set in C00576.
MI_bSpeedCtrlLimited C02569/6 | BOOL	Status signal "Speed controller in the limitation" ▸ Signal flow - speed follower (📖 191) ▸ Signal flow - position follower (📖 184)	
	TRUE	The speed controller limitation is active.
MI_bTorqueSetpointLimited C02569/7 | BOOL	Status signal "Total torque setpoint in the limitation" ▸ Signal flow - motor interface (📖 95)	
	TRUE	The total torque setpoint is limited.
MI_dnTorqueSetpoint_n DINT	Current torque setpoint from speed control and torque feedforward control or direct setpoint selection • After limitation by *MI_dnTorqueLimit_n*. • 100 % ≡ C00057/2 ▸ Signal flow - motor interface (📖 95)	
MI_- dnFilteredTorqueSetpoint_n DINT	Filtered torque setpoint (after jerk limitation and band-stop filter) • 100 % ≡ C00057/2 ▸ Signal flow - motor interface (📖 95)	
MI_bCurrentSetpointLimited C02569/8 | BOOL	Status signal "Setpoint for current controller in the limitation" ▸ Signal flow - motor interface (📖 95)	
	TRUE	The setpoint for the current controller is limited to I_{max_device} (C00022).
MI_- bMotorOverloadWarning C02569/11 | BOOL	Status signal "Motor overload" • Group signal for warning signals from temperature monitoring (KTY, PTC, thermal switch) or I^2xt monitoring.	
	TRUE	One of the monitoring modes for motor overload protection is active.
MI_- bSpeedBelowThresholdC19 C02569/9 | BOOL	Status signal "Standstill reached"	
	TRUE	The current speed is below the threshold set in C00019.
MI_- dnActualMotorCurrent_n DINT	Current motor current • 100 % ≡ I_{max_device} (C00789) • Display in C00780 in [A] ▸ Signal flow - motor interface (📖 95)	
MI_- dnActualMotorVoltage_n DINT	Current motor voltage • 100 % ≡ 1000 V • Display in C00783 in [V] ▸ Signal flow - motor interface (📖 95)	

Output DIS code | Data type	**Value/meaning**
MI_dnActualMotorTorque_n DINT	Current motor torque • 100 % ≡ C00057/2 • Display in C00774 in [Nm] ▸ Signal flow - motor interface (📖 95)
MI_dnActualMotorSpeed_n DINT	Current speed of the motor shaft in [%] • 100 % ≡ Motor reference speed (C00011) ▸ Signal flow - encoder evaluation (📖 109)
MI_dnActualMotorSpeed_s DINT	Current speed of the motor shaft in [rpm] • Display under C00772 ▸ Signal flow - encoder evaluation (📖 109)
MI_dnActualMotorPos_p DINT	Current position of the motor shaft in [increments] • Display under C00770 ▸ Signal flow - encoder evaluation (📖 109)
MI_- dnActualDCBusVoltage_n DINT	Actual DC-bus voltage • 100 % ≡ 1000 V ▸ Signal flow - motor interface (📖 95)
MI_dnThermalLoadDevice_n DINT	Thermal device utilisation in [%] • Current result of the Ixt calculation.
MI_dnThermalLoadMotor_n DINT	Thermal motor utilisation in [%] • Current result of the I^2xt calculation.

6 Encoder evaluation

This chapter informs how to use feedback systems for the motor control.

Note!

The encoder position is stored safe against mains failure in the memory module and is therefore known to the drive control even after the mains has been switched.

The position resolution of higher-level applications follow the resolution of the encoder which will be activated for the position control.

Behaviour of the home position after mains switching

If the home position/information is to be available after mains switching as well, the setting C02652 = "1: Keep" is required.

- One further condition for keeping the home position/information after mains switching is the compliance with the maximally permissible angle of rotation of the encoder which can be set in C02653.
- When resolvers or single-turn absolute value encoders are used and the mains is switched off (24-V supply off), the drive may only be moved by ½ motor revolution since otherwise the home position will get lost due to the ambiguity of the encoder information.

Danger!

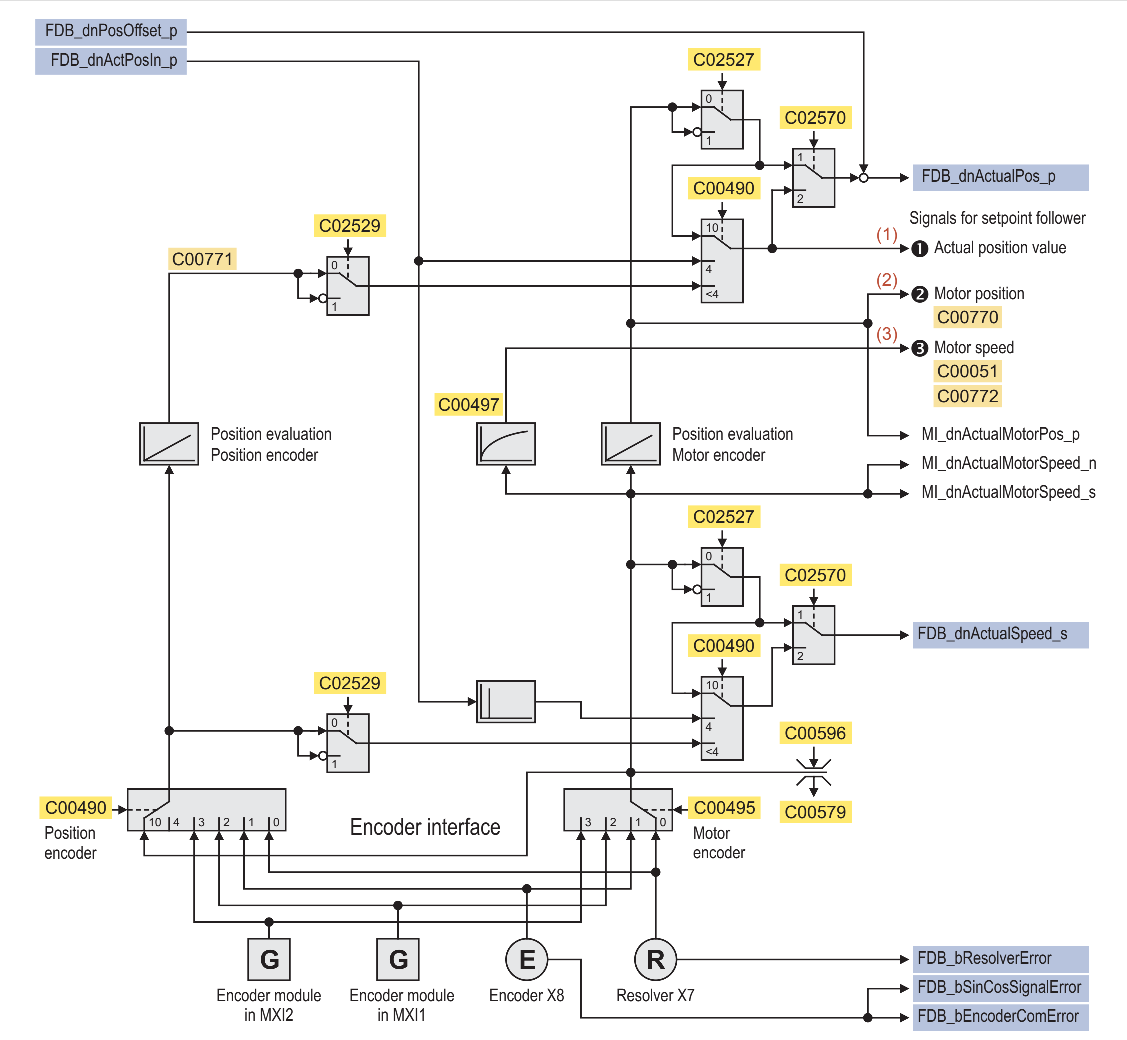
When using the encoder/resolver as motor encoder:

In case of an error as safe motor operation cannot be ensured anymore. Thus, the "Fault" response (Lenze setting) should be set permanently for the (open circuit) monitoring of the encoder/resolver!

- C00580: Response to open circuit of encoder
- C00586: Response to open circuit of resolver
- C00601: Response to communication error of encoder

See also: Parameterise motor encoder (📖 70)

6.1 Signal flow



MI_... = output signals of the motor interface. ▶ System block "LS_MotorInterface" (📖 104)

[6-1] Signal flow - encoder evaluation

Internal variables of the motor control (oscilloscope signals)

▶ The red numbers specified in the signal flow represent internal variables of the motor control, which can be recorded with the Oscilloscope for diagnostic and documentation purposes. (📖 416)

No.	Variable or the motor control	Meaning
(1)	Position.dnActualLoadPos	Actual position
(2)	Position.dnActualMotorPos	Current motor position
(3)	Speed.dnActualMotorSpeed	Current motor speed

See also:

▶ Signal flow - motor interface (📖 95)
▶ Signal flow - speed follower (📖 191)
▶ Signal flow - torque follower (📖 196)
▶ Signal flow - position follower (📖 184)

6.2 Parameter setting

Short overview of parameters for the encoder evaluation:

Parameter	Information	Lenze setting	
		Value	Unit
C00058/1	Rotor displ. angle of resolver	-90.0	°
C00058/2	Rotor displ. angle of encoder	0.0	°
C00058/3	Rotor displ. angle of module	0.0	°
C00080	Resolver pole pair number	1	
C00420	Encoder PPR	512	
C00421	Encoder voltage	5.0	V
C00422	Encoder type	Incremental encoder (TTL signal)	
C00490	Position encoder	Motor encoder	
C00495	Motor encoder	Resolver X7	
C00497	Speed act. val. time const.	0.4	ms
C00579	Resp. to speed monitoring	Off	
C00580	Resp. to encoder open circuit	Fault	
C00586	Resp. to resolver open circuit	Fault	
C00601	Resp. to encoder error	Fault	
C02527	Motor mounting direction	Motor rotating clockwise	
C02529	Mounting direction of position encoder	Motor rotating counter-clockwise	
C02570	Controller configuration	Phase control	
C02572	Speed setpoint	-	Unit/s
C02573	Position setpoint	-	Unit
C02574	Actual speed	-	Unit/s
C02575	Actual position	-	Unit
C02576	Following error	-	Unit
C02577	External actual position	-	Unit
C02578	Offset - actual position value/position setpoint	-	Unit
Highlighted in grey = display parameter			

See also: ▸ Parameterise motor encoder (📖 70)

6.2.1 Controller configuration

The device interfaces for the encoder on the motor side and, if available, on the load side are directly assigned to the corresponding control according to the controller configurations selected (C02570):

	Phase control (Lenze setting)	Position control
Cycle time:	250 µs	Application-dependent
Dead time:	Smaller dead time in the actual value channel	Same dead time for position setpoint and actual position

- If only an encoder on the motor side is available, this "motor encoder" provides the actual value signals for the phase/position control and the speed control.
  - The motor encoder on the motor side supports the secondary servo control irrespective of the use for position and speed control (commutation).
- If an additional encoder is available on the motor side, this "position encoder" exclusively supports the position control, and the controller configuration (C02570) must be set to position control so that the load encoder will be evaluated.
  - The starting position of the position encoder can be set via the basic function "Homing".

Note!

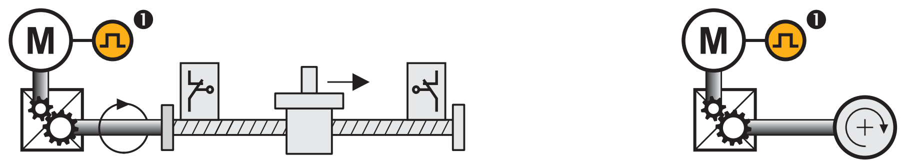
When the basic function "Quick stop" is activated, the controller configuration is internally changed over to phase control independent of the setting in C02570.

- If the basic function "Quick stop" is to be used, the gain of the phase controller (C00254) must also be set correctly for the "Position control" controller configuration.

In case of the technology application for the network via the "Electrical shaft" the controller configuration is preset to position control.

6.2.2 System with motor encoder

No encoder is installed on the load side. The motor position (angle of rotation) and motor speed are detected via the motor encoder selected in C00495 and converted with regard to the load side.



❶ Motor encoder

[6-2] Schematic diagram - feedback with position encoder = motor encoder

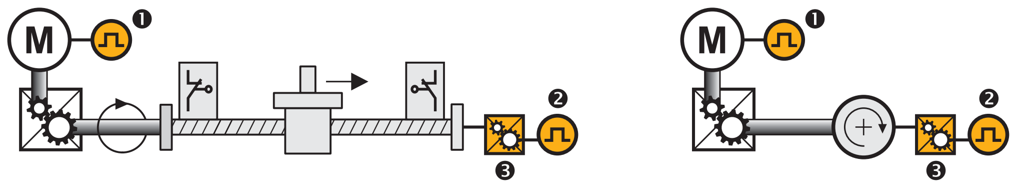
The actual position and speed values on the machine side result from the conversion via the gearbox factor on the motor side (C02520/C02521) and the feed constant (C02524).

See also:

- Gearbox ratio (📖 37)
- Feed constant (📖 42)

6.2.3 System with motor encoder and position encoder

The optional position encoder is used as feedback for the position control and transmits the position of slide or drive roll to the controller.



❶ Motor encoder
❷Position encoder
❸ Gearbox ratio for position encoder

[6-3] Schematic diagram - feedback with separate position encoder

In this case, the actual position and speed values on the machine side result from converting the position encoder position via the resulting gearbox factor (ratio of motor speed to position encoder speed; display in C02531/3) and the feed constant (C02524).

How to activate the use of a separate position encoder:

On the **Application parameter**
tab in the dialog level *Overview* ➜ *Drive interface* ➜ *Machine parameter:*

1. Select the "position control" in the **Controller configuration** list field (C02570) in order that the position encoder will be evaluated.
2. Select the position encoder available in the **Position encoder** list field (C00490).
3. Select the gearbox ratio of the position encoder (ratio of load speed to encoder speed) as a quotient (numerator/denominator) which results from the resulting teeth number:
   - Enter numerator in the input field **Gearbox fact. numer. load** (C02522).
   - Enter denominator in the input field **Gearbox fact. denom. load** (C02523) .
4. If required, adapt the position encoder mounting direction via the list field **Position encoder mounting direction** (C02529). The position encoder mounting direction is preset to "Encoder rotating CW".

Tip!

The resulting gearbox factor for the position encoder is displayed in C02531/2.

See also: ▸ Feed constant (📖 42)

6.2.4 Use external position encoder.

The *FDB_dnActPosIn_p* input of the system block LS_Feedback serves to evaluate an external encoder (CAN, SSI, Profibus).

- Via this input an actual position of an external encoder in [increments] can be directly given to the encoder evaluation.

How to activate the use of the external actual position:

On the **Application parameter**
tab in the dialog level *Overview* ➞ *Drive interface* ➞ *Machine parameter:*

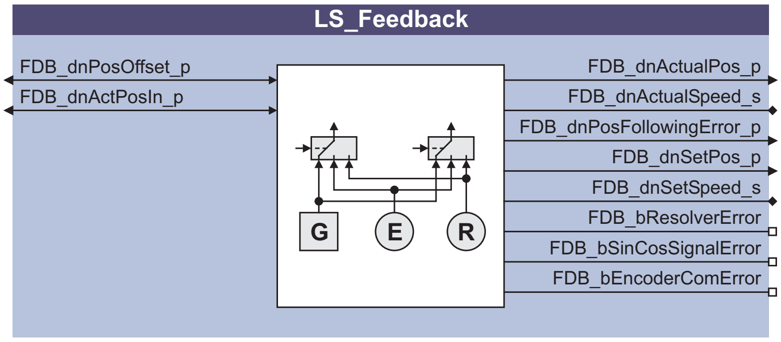
1. Select the "position control" in the **Controller configuration** list field (C02570) in order that the position encoder will be evaluated.
2. Set "From application" in the list field **Position encoder** (C00490).

Note!

- Encoder inversion and offset selection *FDB_dnPositionOffset_p* also affect the external actual position.
- If the use of the external actual position preset via *FDB_dnActPosIn_p* is activated, a, the "Home position known" status (*HM_bHomePosAvailable* = TRUE) is automatically set and homing with the basic function "Homing" cannot be activated anymore.
- When the traversing range (C02528) is set to "Modulo", the external actual position value must also be set to modulo (0 ... cycle-1).

6.3 System block "LS_Feedback"

The system block **LS_Feedback** displays the encoder evaluation in the function block editor d.



Inputs

Input Data type	Information/possible settings
FDB_dnPosOffset_p DINT	Offset for position setpoint and actual position value in [increments]
FDB_dnActPosIn_p DINT	External actual position value in [increments] • For defining an external actual position value with corresponding position control. ▸ Use external position encoder. (🕮 114)

Outputs

Output DIS code | Data type	Value/meaning	
FDB_dnActualPos_p DINT	Current position of the load encoder in [increments]	
FDB_dnActualSpeed_s DINT	Current speed of the position encoder in [rpm]	
FDB_dnPosFollowingError_p DINT	Current following error in [increments]	
FDB_dnSetPos_p DINT	Set position calculated by active basic drive function in [increments] • Considering the motor mounting position.	
FDB_dnSetSpeed_s DINT	Setpoint speed calculated by active basic drive function in [rpm] • Considering the motor mounting position.	
FDB_bResolverError C02579/1 | BOOL	Status signal "Resolver error"	
	TRUE	A resolver error (e.g. open circuit) has occurred.
FDB_bSinCosSignalError C02579/2 | BOOL	Status signal "sin/cos encoder error"	
	TRUE	A sin/cos encoder error has occurred.
FDB_bEncoderComError C02579/3 | BOOL	Status signal "Encoder communication error"	
	TRUE	An encoder communication error has occurred.

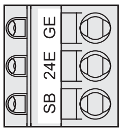
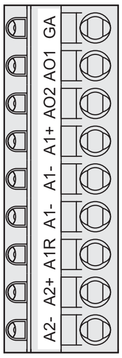
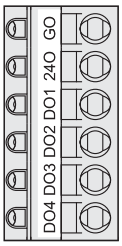
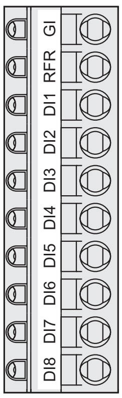
7 I/O terminals

This chapter informs about possible parameter settings and configurations of the controller input and output terminals.

Tip!

Information on wiring the terminals can be found in the Mounting Instructions of the controller!

7.1 Overview

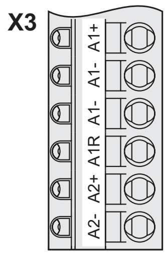
<table>
<tr><th>Front view</th><th>Terminal assignment</th><th>Information</th></tr>
<tr><td rowspan="4">
</td><td>X2 
</td><td>▸ Monitoring function "State bus" (📖 127)</td></tr>
<tr><td>X3 
</td><td>▸ Analog inputs (📖 117)
▸ Analog outputs (📖 120)</td></tr>
<tr><td>X4 
</td><td>▸ Digital outputs (📖 125)</td></tr>
<tr><td>X5 
</td><td>▸ Digital inputs (📖 123)
▸ Touch probe detection (📖 129)</td></tr>
</table>

7.2 Analog inputs

The controller has 2 analog inputs that can be used to detect differential voltage signals in the range of ±10 V, e.g. analog speed setpoint selections or the voltage signals of an external sensor (temperature, pressure, etc.).

- Optionally, analog input 1 can also be used to detect current setpoints.

7.2.1 Terminal assignment/electrical data



Terminal	Use	Electrical data	
X3/A1- X3/A1+	Differential voltage input 1 (no bridge between A1R and A1)	Level:	-10 V ... +10 V
		Resolution:	11 bits + sign
		Normalisation:	When C00034 = "0": ±10 V ≡ $\pm 2^{30}$
		Conversion rate:	1 kHz
	Current input (bridge between A1R and A1)	Level:	-20 mA ... +20 mA
		Resolution:	10 bits + sign
		Normalisation:	When C00034 = "1": -20 mA ... -4 mA = -2^{30} ... 0 +4 mA ... +20 mA = 0 ... 2^{30}
			When C00034 = "2": ±20 mA ≡ $\pm 2^{30}$
		Conversion rate:	1 kHz
X3/A2- X3/A2+	Differential voltage input 2	Level:	-10 V ... +10 V
		Resolution:	11 bits + sign
		Normalisation:	±10 V ≡ $\pm 2^{30}$
		Conversion rate:	1 kHz

7.2.2 Parameter setting

Short overview of parameters for the analog inputs:

Parameter	Information
C00034	Config. analog input 1
C00598	Resp. to open circuit AIN1
C02730/1	AIN1: Gain
C02730/2	AIN2: Gain
C02731/1	AIN1: Offset
C02731/2	AIN2: Offset
C02732/1	AIN1: Dead band
C02732/2	AIN2: Dead band
C02800/1	AIN1: Input signal (-16384 ≡ -100 %, 16383 ≡ 100 %)
C02800/2	AIN2: Input signal (-16384 ≡ -100 %, 16383 ≡ 100 %)
Highlighted in grey = display parameter	

7.2.3 Reconfiguring analog input 1 as a current input

Proceed as follows to reconfigure analog input 1 as a current input:

1. Bridge terminals A1R and A1 on terminal strip X3 by means of wiring.
2. Select the corresponding current loop under C00034.

Tip!

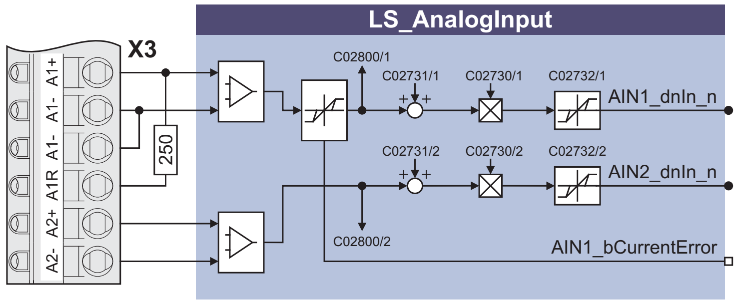
In this way, you can implement a 4 ...20 mA current loop, e.g. for speed setpoint selection.

Open-circuit monitoring

Under
C00598, you can select an error response to an open circuit for the 4 ...20 mA current loop.

7.2.4 System block "LS_AnalogInput"

The system block **LS_AnalogInput** displays the analog inputs in the function block editor.



Output Data type	Value/meaning
AIN1_dnIn_n DINT	Analog input 1 • Scaling: $\pm 2^{30} \equiv \pm 10$ V for use as voltage input $\pm 2^{30} \equiv \pm 20$ mA for use as current input
AIN2_dnIn_n DINT	Analog input 2 • Scaling: $\pm 2^{30} \equiv \pm 10$ V
AIN1_bCurrentError 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: $\lvert I_{AIN1} \rvert < 2$ mA

7.3 Analog outputs

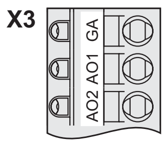
The controller has 2 analog outputs that can be used to output internal analog signals as voltage signals, e.g. for analog indicator control or as setpoint for slave drives.

Note!

Initialisation behaviour:
- After mains switching up to the start of the application the analog outputs remain set to 0 V.

Exception handling:
- In case of a critical exception in the application (e.g. reset) the analog outputs are set to 0 V.

7.3.1 Terminal assignment/electrical data



Terminal	Use	Electrical data	
X3/AO1	Voltage output 1	Level:	-10 V ... +10 V (max. 2 mA)
		Resolution:	11 bits + sign
		Normalisation:	$\pm 2^{30} \equiv \pm 10$ V
		Conversion rate:	1 kHz
X3/AO2	Voltage output 2	Level:	-10 V ... +10 V (max. 2 mA)
		Resolution:	11 bits + sign
		Normalisation:	$\pm 2^{30} \equiv \pm 10$ V
		Conversion rate:	1 kHz
X3/GA	Reference potential (analog ground)		

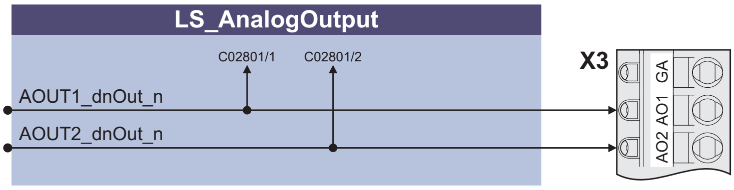
7.3.2 Parameter setting

Short overview of parameters for the analog outputs:

Parameter	Information
C02733/1	AOUT1: Gain
C02733/2	AOUT2: Gain
C02734/1	AOUT1: Offset
C02734/2	AOUT2: Offset
C02801/1	AOUT1: output signal
C02801/2	AOUT2: output signal
Highlighted in grey = display parameter	

7.3.3 System block "LS_AnalogOutput"

The system block **LS_AnalogOutput** displays the interface to the analog outputs in the function block editor.



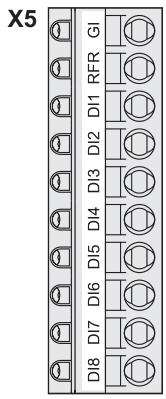
Input Data type	Information/possible settings
AOUT1_dnOut_n DINT	Analog output 1 • Scaling: $\pm 2^{30} \equiv \pm 10$ V
AOUT2_dnOut_n DINT	Analog output 2 • Scaling: $\pm 2^{30} \equiv \pm 10$ V

7.4 Digital inputs

The controller has 8 freely configurable digital inputs.

- All digital inputs can be used for touch probe. ▶ Touch probe detection (📖 129)
- Control input RFR of terminal strip X5 for controller enable is connected to the device control.

7.4.1 Terminal assignment/electrical data



Terminal	Use	Electrical data	
X5/DI1 X5/DI8	Digital inputs 1 ... 8	LOW level:	0 ... +5 V
		HIGH level:	+15 ... +30 V
		Input current:	8 mA per input (at 24 V)
		Electric strength of external voltage:	max. ±30 V
		Conversion rate:	1 kHz
X5/RFR	Controller enable	See digital inputs	
X5/GI	Reference potential (digital ground)		

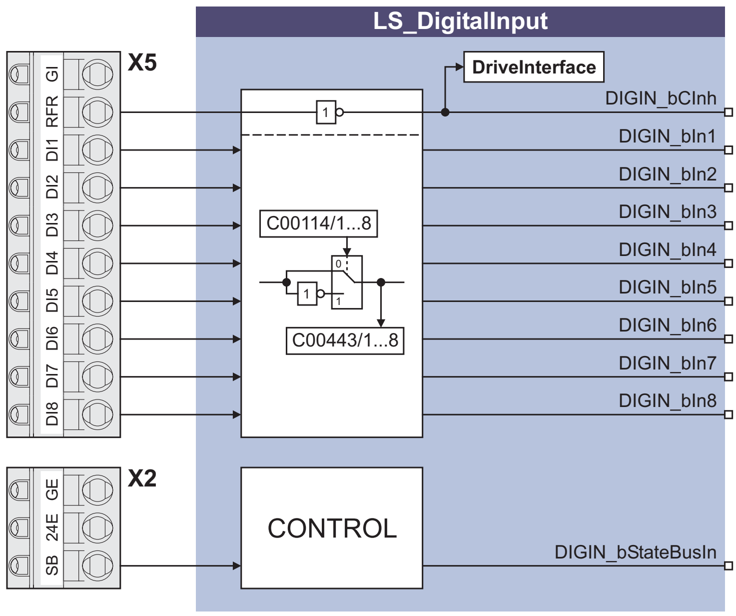
7.4.2 Parameter setting

Short overview of parameters for the digital inputs:

Parameter	Information
C00114	DIx terminal polarity
C00443	DIx status
C02803	Status word dig. inputs
C02830	DIx delay time
Highlighted in grey = display parameter	

7.4.3 System block "LS_DigitalInput"

The system block **LS_DigitalInput** displays the digital inputs and the status of the state bus in the function block editor.



Output DIS code | data type	Value/meaning	
DIGIN_bCInh C00443/9 | BOOL	Status signal "Controller inhibit" • An inverter is used to connect control input RFR (X5/pin 9) for the setting/reset of controller inhibit to the device control (DCTRL).	
	TRUE	Controller inhibit active
DIGIN_bIn1 C00443/1 | BOOL ... DIGIN_bIn8 C00443/8 | BOOL	Digital inputs 1 ... 8	
DIGIN_bStateBusIn C00443/12 | BOOL	State bus status ▸ Monitoring function "State bus" (📖 127)	
	TRUE	A device connected to the state bus has set the state bus to LOW level and the status "Error" has been set. • Status "Error" is also set if a device connected to the state bus is not supplied with voltage.

7.5 Digital outputs

The controller has 4 freely configurable digital outputs.

Note!

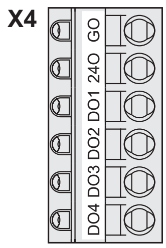
Initialisation behaviour:

- After mains switching up to the start of the application the digital outputs remain set to FALSE.

Exception handling:

- In case of a critical exception in the application (e.g. reset) the digital outputs are set to FALSE considering the terminal polarity parameterised in C00118.

7.5.1 Terminal assignment/electrical data



Terminal	Use	Electrical data	
X4/DO1 ... X4/DO4	Digital outputs 1 ... 4	LOW level:	0 ... +5 V
		HIGH level:	+15 ... +30 V
		Output current:	max. 50 mA per output (external resistance > 480 Ω at 24 V)
		Conversion rate:	1 kHz
X4/24O	External 24 V voltage supply for the digital outputs		
X4/GO	Reference potential (digital ground)		

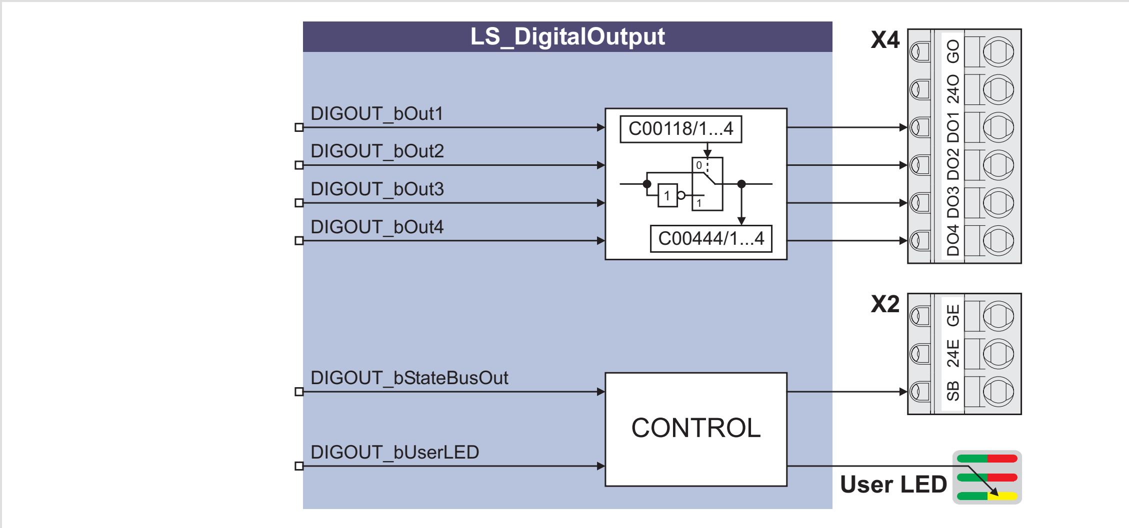
7.5.2 Parameter setting

Short overview of parameters for the digital outputs:

Parameter	Information
C00118	DOx terminal polarity
C00444	DOx status
C02802	Status word dig. outputs
Highlighted in grey = display parameter	

7.5.3 System block "LS_DigitalOutput"

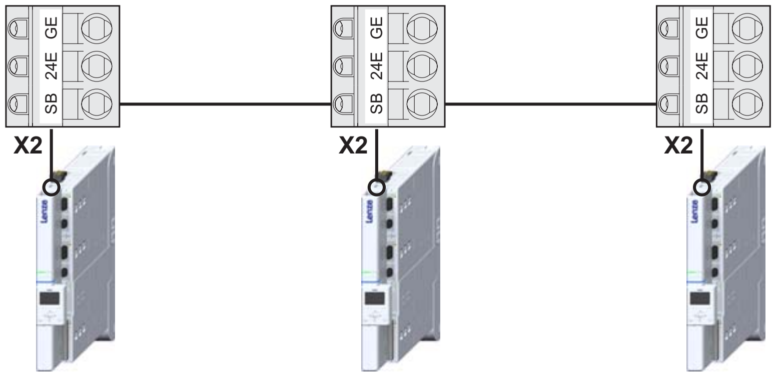
The system block **LS_DigitalOutput** displays the interface to the digital outputs, the state bus and the yellow user LED on the front of the controller in the function block editor.



Input DIS code | Data type	Information/possible settings	
DIGOUT_bOut1 C00444/1 | BOOL ... DIGOUT_bOut4 C00444/4 | BOOL	Digital outputs 1 ... 4	
DIGOUT_bStateBusOut C00444/18 | BOOL	Setting the state bus to the status "Error" ▸ Monitoring function "State bus" (📖 127)	
	TRUE	The state bus is set to LOW level, all devices connected to the state bus start their pre-programmed response.
DIGOUT_bUserLED C00444/9 | BOOL	Control of yellow user LED on the front of the controller	
	TRUE	LED on

7.6 Monitoring function "State bus"

The state bus has been exclusively designed for Lenze controllers. The bus system can interconnect up to 20 controllers and can be used to simulate the function of a "rip cord":



X2/SB = State bus In/Out (reference potential GE)

[7-1] Schematic diagram: Networking via state bus

- The state bus only knows the states "OK" and "Error".
- The state bus is a bus with multi-master capability, i.e. each device connected to the state bus can set the state bus to the status "Error" by setting it to LOW level.
- With "Error", all devices start their adjustable response, e.g. synchronised braking of the drive system.
- Status "Error" is also set if a device connected to the state bus is not supplied with voltage.

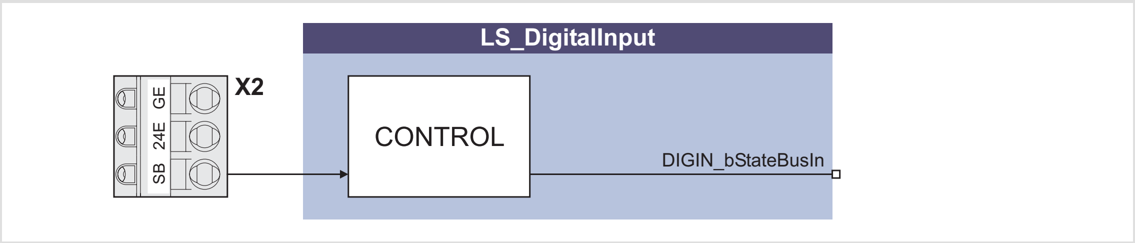
Note!

Exception handling:

- In case of a critical exception in the application (e.g. reset) the "release cord" is not released, the state bus remains in the "OK" state.

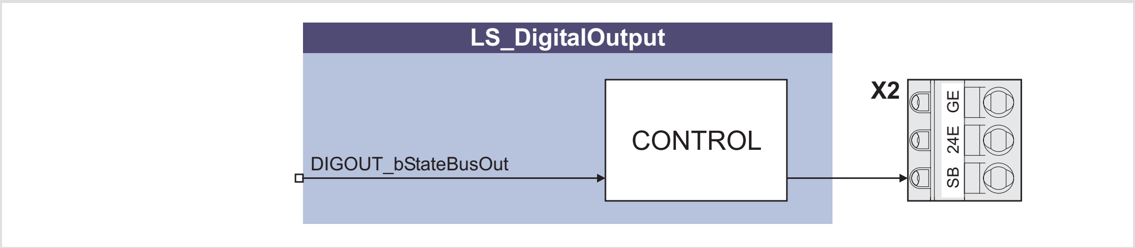
7.6.1 Detecting the current status

Use the output *DIGIN_bStateBusIn* of the system block LS_DigitalInput to display the current state bus status. If an error occurs, the output *DIGIN_bStateBusIn* is set to TRUE.



7.6.2 Setting the state bus to the status "Error"

If the input *DIGOUT_bStateBusOut* of the system block LS_DigitalOutput is set to TRUE, the state bus is set to "Error" and all connected devices start their pre-programmed response.



7.7 Touch probe detection

A "touch probe" is a signal-controlled event that can, for instance, be activated via a digital input to detect an actual value (that rapidly changes) at the latch time and process it in the program.

Overview of the touch probe channels

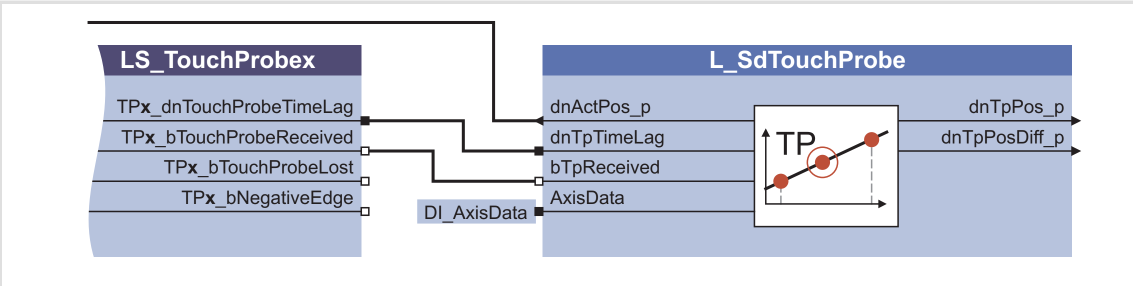
12 touch probe signals which can be configured independently of each other are available for touch probe detection:

Touch probe channel	Activating event	System block
1	Signal change at digital input 1	LS_TouchProbe1...8 (📖 132)
2	Signal change at digital input 2	
3	Signal change at digital input 3	
4	Signal change at digital input 4	
5	Signal change at digital input 5	
6	Signal change at digital input 6	
7	Signal change at digital input 7	
8	Signal change at digital input 8	
9	Motor encoder zero pulse	LS_TouchProbeMotor (📖 133)
10	Load encoder zero pulse	LS_TouchProbeLoad (📖 133)
11	DFIN zero pulse	LS_TouchProbeDFIN
12	DFOUT zero pulse	LS_TouchProbeDFOUT

- Each touch probe channel is assigned to a system block which provides the application with a scaled time stamp.
- The time stamp refers to the sampling time of the encoder signals and outputs the difference compared to the touch probe event.

Touch-probe processing

In order to process the touch probe event the time stamp must be transferred to an entity of the FB **L_SdTouchProbe**:

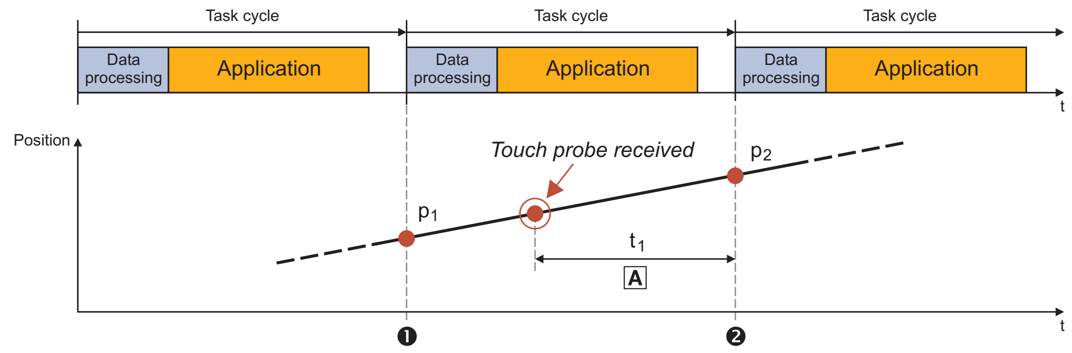


[7-2] Transfer of the FB L_SdTouchProbe

- The FB **L_SdTouchProbe** takes over the interpolation of the input signal based on the time stamp and outputs the interpolated value and the difference compared with the last input signal.

7.7.1 Actual value interpolation (principle)

If a touch probe is detected, the (residual) time to the following task cycle is determined and a time stamp is created from it. Based on this time stamp the FB **L_SdTouchProbe** can execute a linear interpolation between both actual position points. The result is the exact actual position at the time of the physical touch probe event.



❶ Actual position point 1

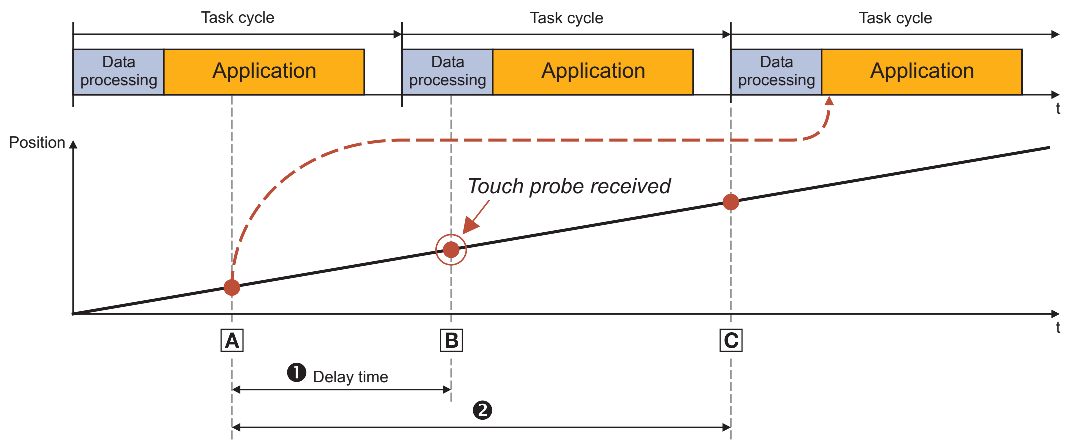
❷ Actual position point 2

A Residual time (*dnTouchProbeTimeLag*)

[7-3] Actual value determination through linear interpolation (principle)

7.7.2 Dead time compensation

For dead time compensation during the detection of the touch probe event, it is possible to select a delay time (*touch probe delay*) in C02810 for each touch probe channel, which will be considered in the touch probe calculation.



A Mechanical event: Switch is closed

B Electrical event: Closed switch contact is registered
- Can, e.g. be delayed by flying times of the mechanical contact or filter.

C Value and position determination for the real (mechanical) event, the determined values are transferred to the application

❶ Delay time (dead time) between mechanical and electrical event
- This dead time can be compensated by a corresponding setting in C02810.

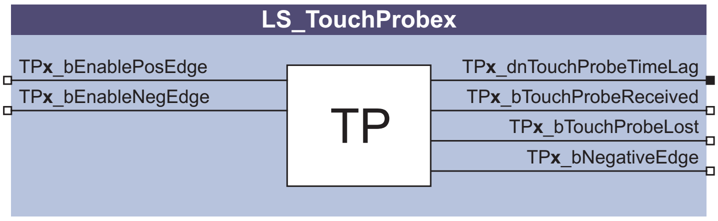
❷ Time considered by touch probe calculation
- If more than one task cycle has passed, the history buffer finds the two actual position values between which the physical event has occurred.

[7-4] Dead time compensation (principle)

- Filtering of the digital inputs influences the electrical detection of the touch probe, i.e. the DIx delay time set in C02830 for the digital inputs must be considered in the delay time C02810.
- For the optional digital frequency input/output the delay times must be set via special parameters:
  – C13021 or C14021: TP delay time - digital frequency input.
  – C13061 or C14061: TP delay time - digital frequency output.

7.7.3 System block "LS_TouchProbe1...8"

The system blocks **LS_TouchProbe1** ... **LS_TouchProbe8** display the touch probe channels 1 ... 8 which are assigned to the digital inputs **DI1** ... **DI8** in the function block editor.



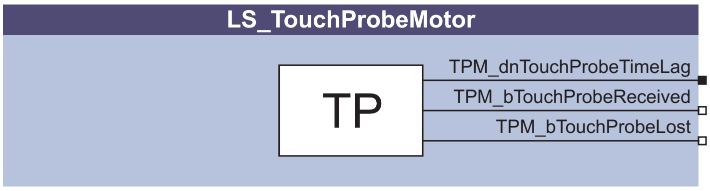
x = 1 ... 8

Input Data type	Value/meaning	
TPx_bEnablePosEdge BOOL	Enable response to rising edge **Note:** • If several positive edges occur within the basic cycle time (HighLine: 1 ms), only the first positive edge initiates the touch probe event and no status signal "touch probe(s) lost" are generated.	
	TRUE	A touch probe event is activated by a positive edge at the digital input DIx.
TPx_bEnableNegEdge BOOL	Enable response to negative edge **Note:** • If several negative edges occur within the basic cycle time (HighLine: 1 ms), only the first negative edge initiates the touch probe event. • If a positive and negative edge occur within the basic cycle time (1 ms) and if the response to both edges is enabled, only the positive edge initiates the touch probe event. • In both cases no status signal "touch probe(s) lost" is generated.	
	TRUE	A touch probe event is activated by a negative edge at the digital input DIx.

Output Data type	Value/meaning	
TPx_dnTouchProbeTimeLag DINT	Scaled time stamp for processing the touch probe event with the FB **L_SdTouchProbe**. • 1 ms ≡ 20 bits	
TPx_bTouchProbeReceived BOOL	Status signal "Touch probe detected" • Status is only set for one task cycle.	
	TRUE	Touch probe event has been activated.
TPx_bTouchProbeLost BOOL	Status signal "Touch probe(s) lost" • Status is only set for one task cycle.	
	TRUE	More than one touch probe event has been released during the task runtime. The output time stamp only refers to the first touch probe event.
TPx_bNegativeEdge BOOL	Status signal "Negative edge detected" • Status is only set for one task cycle.	
	TRUE	A negative edge has been detected at the digital input DIx.

7.7.4 System block "LS_TouchProbeMotor"

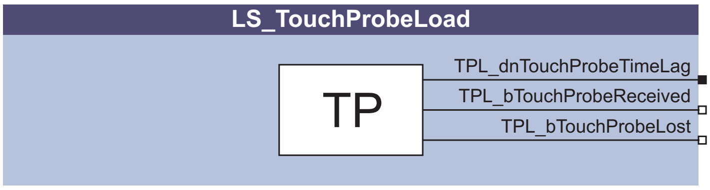
The system block **LS_TouchProbeMotor** displays the touch probe channel, which is assigned to the motor encoder zero pulse, in the function block editor.



Output (Data type)	Value/meaning	
TPM_dnTouchProbeTimeLag DINT	Scaled time stamp for processing the touch probe event with the FB **L_SdTouchProbe**.	
TPM_bTouchProbeReceived BOOL	Status signal "Touch probe detected" • Status is only set for one task cycle.	
	TRUE	Touch probe event has been activated.
TPM_bTouchProbeLost BOOL	Status signal "Touch probe(s) lost" • Status is only set for one task cycle.	
	TRUE	More than one touch probe event has been activated in the task run time and could therefore not be detected.

7.7.5 System block "LS_TouchProbeLoad"

The system block **LS_TouchProbeLoad** displays the touch probe channel, which is assigned to the load encoder zero pulse, in the function block editor.



Output (Data type)	Value/meaning	
TPL_dnTouchProbeTimeLag DINT	Scaled time stamp for processing the touch probe event with the FB **L_SdTouchProbe**.	
TPL_bTouchProbeReceived BOOL	Status signal "Touch probe detected" • Status is only set for one task cycle.	
	TRUE	Touch probe event has been activated.
TPL_bTouchProbeLost BOOL	Status signal "Touch probe(s) lost" • Status is only set for one task cycle.	
	TRUE	More than one touch probe event has been activated in the task run time and could therefore not be detected.

7.8 System bus "CAN on board"

The controller has an integrated CANopen system bus interface for process and parameter data exchange between different devices and the connection of additional modules such as distributed terminals, keypads and input devices ("HMIs") and external controls.

- In the »Engineer« parameter list or in the keypad, category **CAN**, you can find the parameters relevant for the CANopen system bus interface classified in different subcategories.

Note!

For detailed information about the CANopen system bus interface, please see the "System bus (CANopen) - CAN on-board 9400" Communication Manual.

8 Safety engineering

The 9400 HighLine controllers can be equipped with a safety module. The individual safety module types have a different range of functions to optimally meet different requirements.

"Integrated safety technology" stands for user-related safety functions that are applicable to the protection of persons working with machines and the machine protection.

The motion functions are executed by the controller. The safety modules monitor the reliable observation of limit values and provide safe inputs and outputs. When the limit values are exceeded, the safety modules start control functions for the fault scenario according to EN 60204-1 standard directly in the controller.

The safety functions are suitable for applications according to IEC 61508, SIL 3 and, depending on the module, meet the requirements of EN 954, part 1, up to control category 4.

Note!

For detailed information about the integrated safety technology, please see the Controller Manual for the "9400 Servo Drives" and the Manual for the safety module.

8.1 Integration into the application

If a safety function is required, the safety engineering activates a corresponding safe monitoring function. The standstill function, however, is only executed directly in case of the function "Safe torque off" (STO). In case of the other safety functions an action of the controller is required, which is safely monitored. The implementation of the corresponding action (e.g. braking, braking to standstill, holding of the standstill position) must be carried out by the application.

"LS_SafetyModule" system block

For the transmission of the control and status information from the safety module to the application the **LS_SafetyModule** system block is provided in the function block editor of the »Engineers«.

Basic function "Limiter"

Furthermore the **LS_Limiter** system block which contains the basic function Limiter" is provided in the function block editor for the connection of safety engineering to the application. (🕮 200)

The basic function "Limiter" provides a parameter setting surface in the »Engineer« for a comfortable setting of limit positions, limited speeds and limit values and enables the drive to braked selectively **after request** through the safety module.

General procedure

1. Activation of the safety function on the safety module (e. g. SS1 - safe stop 1).
   → Monitoring starts.
2. The safety module informs the controller via a control word that the safety function has been activated.
3. The application evaluates the control word and starts the required motion sequence (e.g. braking).

8.2 Selecting the required safety module

The safety module expected by the application and the controller is selected in C00214.

- In the »Engineer« this setting is carried out automatically by assigning the device module to the controller, i.e., the »Engineer« sets C00214 automatically according to the safety module selected.
- If the safety module selected in C00214 does not correspond to the safety module type connected, an error will be activated.

8.3 Control word of the safety module SM3xx

A safety function is requested via the control word transferred from the SM3xx safety module to the basic device *SM_dwControl*.

- The corresponding actions (e.g. braking, braking to standstill, holding of the standstill position) must be executed by the application, e.g. via the basic function "Limiter". (200)
- The following table shows the bit coding of the control word *SM_dwControl*.
  - The bits that are supported depend on the safety module used.

Bit	Abbreviation	Meaning
0	STO	Safe torque off ("Safe Torque Off")
1	SS1	Safe stop 1 ("Safe Stop")
2	SS2	Safe stop 2
3	SLS1	Safely limited speed 1 ("Safely Limited Speed")
4	SLS2	Safely limited speed 2
5	SLS3	Safely limited speed 3
6	SLS4	Safely limited speed 4
7	SDIpos	Safe direction positive ("Safe Direction positive")
8	SDIneg	Safe direction negative ("Safe Direction negative")
9	ES	Enable switch ("Enable Switch")
10	SLI	Safely limited increment ("Safely Limited Increment")
11	OMS	Operating mode selector switch ("Operation Mode Selector")
12	SLP1	Safely limited position 1 ("Safely Limited Position")
13	SLP2	Safely-limited position 2
14	SLP3	Safely-limited position 3
15	SLP4	Safely-limited position 4
16	SOS	Safe operating stop ("Safe Operating Stop")
17	SLS1 observed	Safely limited speed 1 activated and complied with
18	SLS2 observed	Safely limited speed 2 activated and complied with
19	SLS3 observed	Safely limited speed 3 activated and complied with
20	SLS4 observed	Safely limited speed 4 activated and complied with
21	SDIpos observed	"Safe direction positive" activated and complied with
22	SDIneg observed	"Safe direction negative" activated and complied with
23	SSE	Safe stop emergency ("Safe Stop Emergency")
24 ... 30	-	*Reserved*
31	Error	SM301 safety module reports and error

[8-1] Bit coding of the control word sent by the safety module

8.4 Status information of the SM3xx safety module

In addition to the control word *SM_dwControl* the SM3xx safety module transfers the two status words *SM_wState* and *SM_wIoState* to the basic device.

Status word SM_wState

- The following table shows the bit coding of the status word *SM_dwState*.
  - The bits that are supported depend on the safety module used.

Bit	Abbreviation	Meaning
0	STO	"safe torque off (STO)" function is active. • The drive is safely switched to torqueless operation.
1	-	*Reserved*
2	-	*Reserved*
3	EC_S0	Error stop category 0: "Ssafe torque off (STO)" function is active.
4	EC_S1	Error stop category 1: "Safe stop 1 (SS1)" function is active.
5	EC_S2	Error stop category 2: "Safe stop 2 (SS2)" function is active.
6	-	*Internal use*
7	-	*Internal use*
8 ... 15	-	*Reserved*

[8-2] Bit coding of the status word sent by the safety module

Status word SM_wIoState

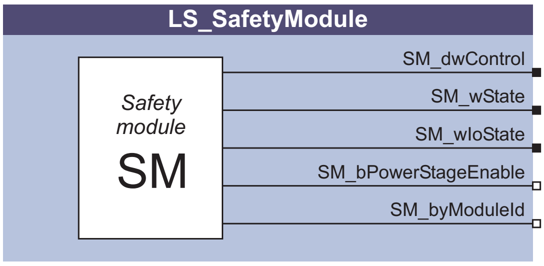
- The following table shows the bit coding of the status word *SM_wIoState*.
  - The bits that are supported depend on the safety module used.

Bit	Abbreviation	Meaning
0	SD-In1	Sensor input 1 in ON state.
1	SD-In2	Sensor input 2 in ON state.
2	SD-In3	Sensor input 3 in ON state.
3	SD-In4	Sensor input 4 in ON state.
4	-	*Reserved*
5	AIS	Restart acknowledgement via terminal effected (negative edge: 1↘0).
6	AIE	Error acknowledgement via terminal effected (negative edge: 1↘0).
7	-	*Reserved*
8	PS_AIS	Restart acknowledgement via safety bus effected (positive edge: 0↗1)
9	PS_AIE	Error acknowledgement via safety bus effected (positive edge: 0↗1)
10	-	*Reserved*
11	-	*Reserved*
12	SD-Out1	Safe output 1 (feedback output) in the ON state.
13	-	*Reserved*
14	-	*Reserved*
15	-	*Reserved*

[8-3] Bit coding of the I/O status word sent by the safety module

8.5 System block "LS_SafetyModule"

The **LS_SafetyModule** system block is used as interface to the (optional) safety module in the function block editor.



Outputs

Output Data type	**Value/meaning**	
SM_dwControl DWORD	Control word of the safety module ▸ Control word of the safety module SM3xx (📖 137)	
SM_wState Word	Status word of the safety module ▸ Status information of the SM3xx safety module (📖 138)	
SM_wIoState Word	I/O status word of the safety module ▸ Status information of the SM3xx safety module (📖 138)	
SM_bPowerStageEnable BOOL	Status signal "Inverter enable"	
	TRUE	Inverter is enabled by the safety module.
SM_byModuleId BYTE	ID of the safety module available in the controller	

9 Basic drive functions

This chapter describes the basic functions of the "Servo Drives 9400".

9.1 General information

Before the basic functions are described in detail, the following subchapter provides general information on how to use the basic functions and the internal state machine which controls the execution of the basic functions.

9.1.1 Conditions for the use of the basic functions

Parameter setting, configuring or programming?

The basic functions described in the following chapters can be executed depending on the controller type and the available MotionControl license as follows:

- Parameter setting by means of »Engineer« or keypad
- Configuration in the function block editor of the »Engineers«
- Programming according to IEC 61131-3 in the »PLC Designer«[1]

Parameter setting

Each basic function can be parameterised and executed in the »Engineer« via a corresponding dialog or alternatively via the keypad.

Configuration

The function block editor of the »Engineers« provides an own system block (SB) for each basic function which is inserted into the application interconnection and linked with the corresponding signals to implement the desired functions.

Note!

Ensure that the corresponding system block is called in a cyclic application task.

Basically projects which only contain an unsolicited task and no cyclic task, are not permissible!

Programming

In the »PLC Designer« the basic functions are also available as separate system blocks which can be inserted in the control configuration, if required, and be accessed from the IEC 61131-3 program via the corresponding system variables.

1 In preparation

9.1.2 Internal state machine

The execution of the different basic functions is internally controlled by a state machine which can adopt the following "function states":

[9-1] Function states of the state machine "Basic functions"

The state machine ensures that:

- one basic function at a time adopts the control of the drive.
- only the basic function with the highest priority (= smallest number) is executed if several basic functions are activated at the same time. ▶ Priorities (📖 145)
- the drive always has a defined state both in case of error and in normal operation.

Note!

The basic functions "Limiter" and "Brake control" run autonomously, but are able to control the state machine to a certain function state, if required.

The function states are not to be confused with the device states ("Operation", "Fault active", "Device is switched on", etc.) of the controller. ▶ Device states (📖 45)

Tip!

In C02530 the currently active function state is displayed.

9.1.2.1 "Initialisation" status

If the controller has completed the device initialisation, the function state "Initialisation" is passed through.

- In the function state "Initialisation", the process data required for processing the basic functions are initialised.
- The monitoring mode is not yet active.
- The basic functions are not yet processed (e.g. brake control) and cannot yet be parameterised or activated either.
- When the basic functions are initialised and no error had occurred, it is automatically changed to the basic state "Drive in standstill".

9.1.2.2 Status "Controller not ready"

In this function state the pulse inhibit is set in the controller, which means that the power output stages are tristated and the drive cannot be controlled.

9.1.2.3 Status "drive in standstill"

This "basic state" is assumed if no other state is active.

- The setpoints for speed and acceleration are set to "0".
- The drive stands position-controlled.
- No error has occurred and quick stop is not active.
- Every basic function can be activated out of this state.

9.1.2.4 Status "Drive is stopped"

This function state is automatically passed through when a basic function is deactivated.

- If the drive does is not yet in the standstill state, it is decelerated to standstill via a parameterisable deceleration ramp.
- If a basic function is activated during the "stopping", this basic function takes over the control of the drive from the current speed on and the function state "Drive is stopped" is abandoned.
- If the drive is at standstill, it is automatically changed to the basic function "Drive in standstill".

9.1.2.5 Status "Manual jog active"

In this function state the drive can be manually directed in CW or CCW rotation ("inching mode"). Manual jog (156)

- If the controller knows the home position, the set software limit positions are monitored and, if available, connected travel range limit switches.
- "Retracting" from an activated travel range limit switch is also possible.

9.1.2.6 Status "Homing active"

In this function state the home position and the machine measuring system for the drive can be determined. Homing (164)

- The home position can be determined by an active homing or reference setting.
- A renewed determination of the home position is only required in case of recommissioning or in case of service (e.g. when drive components are exchanged) or after travel command have been executed which reset the reference.

9.1.2.7 Status "Positioning active"

In this function state all positioning types (absolute, relative, modulo, continuous, touch probe etc.) can be executed. Positioning (176)

- In the position-controlled mode, the drive executes a time-controlled point-to-point setpoint generation based on the defined motion profile.

9.1.2.8 Status "Setpoint follower active"

In this function state the drive directly follows the defined setpoint.

- The setpoint can optionally be specified as speed, torque or position via three separate basic functions:
  - Speed follower (📖 190)
  - Torque follower (📖 196)
  - Position follower (📖 183)

9.1.2.9 Status "Quick stop active"

This function state is active if quick stop has been activated by the user. ▸ Quick stop (📖 152)

- The drive is decelerated to standstill irrespective of the defined setpoint within the parameterised deceleration time.
- If quick stop is deactivated again by the user, it is changed to a setpoint-generating basic function (e.g. "speed follower"), if requested.

Tip!

Quick stop can also be set as error response for many monitoring functions ("quick stop by trouble"). Detailed information can be found in the chapter "Diagnostics & fault analysis".

The source which activated the quick stop function is shown bit-coded in C00159.

9.1.2.10 Status "Error"

This function state is active if an error has occurred and the controller is in the status "Error active" or "Quick stop by trouble active.

- The function state can only be abandoned by acknowledging the error if the error is removed.

9.1.2.11 Interrupting/replacing states

An active function state cannot be interrupted or replaced by the activation of another function state. However, the following exceptions apply:

- The "Initialisation" state replaces all other states.
- The "Error" state can replace all other states except "Initialisation".
- The status "Controller not ready" can replace all other states except "Error" and "Initialisation".
- The status "Quick stop active" can replace all other states except "Initialisation", "Error" and "Controller not ready".

9.1.2.12 Priorities

The function states are assigned to priorities so that, if several basic functions are activated at the same time, it is always changed to the function state with the highest priority:

Priority	Function state	Executable basic function
1	Initialisation	-
2	Error	-
3	Controller not ready	-
4	Quick stop active	▸ Quick stop (📖 152)
5	Manual jog active	▸ Manual jog (📖 156)
6	Homing active	▸ Homing (📖 164)
7	Positioning active	▸ Positioning (📖 176)
8	Setpoint follower (position) active	▸ Position follower (📖 183)
9	Setpoint follower (speed) active	▸ Speed follower (📖 190)
10	Setpoint follower (torque) active	▸ Torque follower (📖 196)
10	Brake check	▸ Brake control (📖 211)
12	Drive is stopped	▸ Standard stop (📖 148)
1 ≡ highest priority; 1 2≡ lowest priority		

Note!

The basic state "Drive in standstill" is accepted automatically if no other state is active.

9.1.3 Requesting control via a basic function

Enable input "bEnable"

The basic functions "Manual jog", "Homing" and "Positioning" and the three setpoint followers each possess an enable input *bEnable*, via which the control of the corresponding basic function can be requested.

- If no other basic function and no error state is active, it is changed to the corresponding function state and the basic function can be controlled now.
- If several enable inputs are set to TRUE at the same time, the change to the function state is executed with the highest priority.

Status outputs "bEnabled", "bActive" and "bDone"

If the basic function is enabled, the status output *bEnabled* of the basic function is set to TRUE and the corresponding drive motion can be started via the control inputs of the basic function.

- If the basic function executes a current drive motion, this is indicated through a TRUE signal at the status output *bActive*.
- The basic functions "Speed follower", "Torque follower" and "Position follower" only have the status output *bEnabled*, since after the enable the drive follows the setpoint selection.
- The basic functions "Homing" and "Positioning" additionally are provided with a status output *bDone*, which display that the drive movement that was started (homing or positioning) has been completed.

Priority	Basic function	Status outputs		
		bEnabled	*bActive*	*bDone*
1	Manual jog	☑	☑	
2	Homing	☑	☑	☑
3	Positioning	☑	☑	☑
4	Speed follower	☑		
5	Torque follower	☑		
6	Position follower	☑		

Re-deactivation the enable of a basic function

When the enable input *bEnable* of the active basic function is reset to FALSE, the control inputs of the basic function are inhibited and the status outputs *bEnabled*, *bActive* and *bDone* are reset to FALSE.

- When the drive is not at standstill, it is decelerated to standstill within the deceleration time for Standard stop unless another basic function takes over the control of the drive. Here, the active function state is changed to the basic state "Drive in standstill" via the function state "Drive is stopped".
- When the enable input of another basic function is set to TRUE, this basic function adopts the control of the drive immediately.

9.2 Standard stop

The standard stop of the drive will be automatically activated by the internal state machine if a basic function is deactivated and the drive is not yet in standstill.

- The drive is braked to standstill via a parameterisable deceleration ramp.
  - While the drive is braked to standstill, the state machine is in the function state "Drive is stopped".
  - If meanwhile another basic function is activated, this basic function takes over the control of the drive from the current speed on and the function state "Drive is stopped" is abandoned.
  - If the drive is at standstill, it is automatically changed to the basic function "Drive in standstill".
- An acceleration phase active at the time of activating the stopping process is considered by the standard stop, i.e. the current acceleration is at first led to "0" with the parameterised S-ramp time before the real deceleration process starts.
- If the controller is enabled while the shaft is coasting (controller inhibit and pulse inhibit are deactivated), the drive is braked from the current speed to standstill.

Stop!

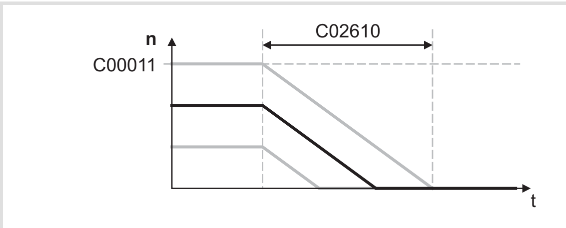
The basic functions "Speed follower", "Torque follower" and "Position follower" take over the control of the drive not from the current speed on but with the defined setpoint which may lead to a jerk!

9.2.1 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → Dialog level *Overview* → *All basic functions* → *Stop*
- Short overview of parameters for standard stop :

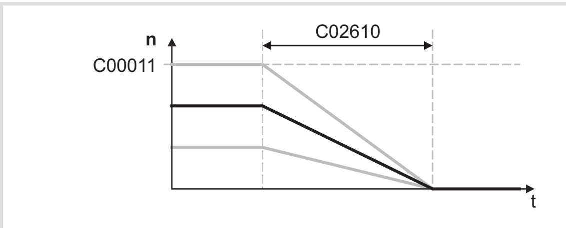
Parameters	Information
C02610	Deceleration time for stop
C02611	S-ramp time for stop
C02612	Ref. for decel. time of stop

Parameter setting of stop



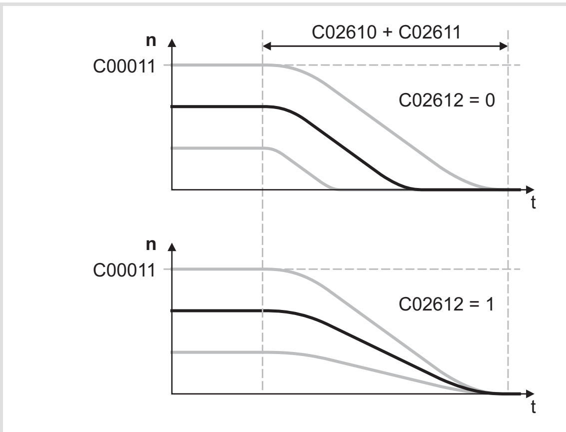
[9-2] Deceleration time referred to the motor reference speed

- The deceleration time set in C02610 for stop refers to a speed variation from the motor reference speed (C00011) to standstill, i. e. the deceleration is constant.



[9-3] Deceleration time referred to the current speed

- When C02612 is set = "1", the deceleration time refers to the current speed, i. e. the braking time is constant.



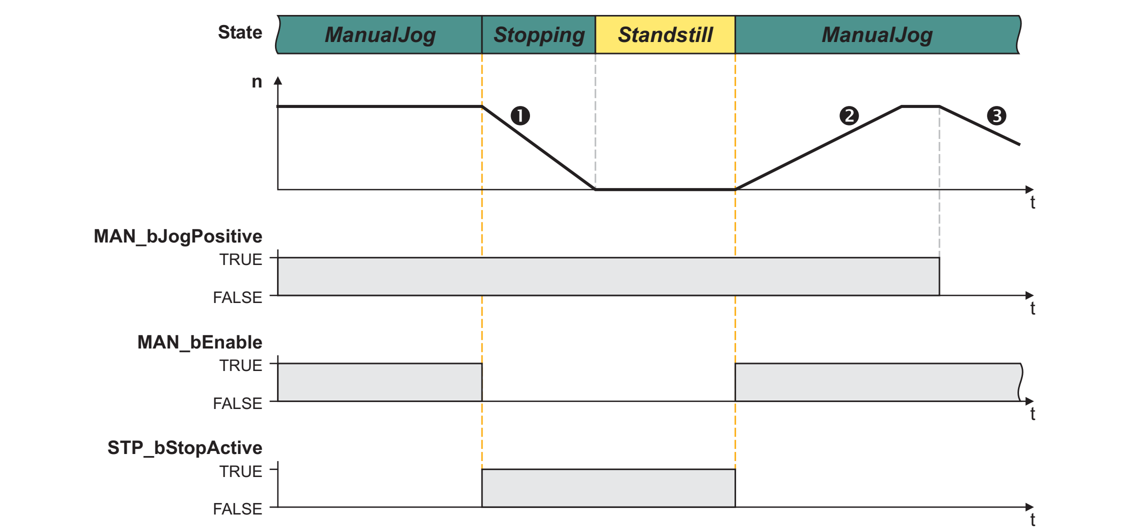
[9-4] S-shaped deceleration ramp through selection of a relative S-ramp time

- Through the entry of a S-ramp time in C02611 an S-shaped deceleration ramp for jerk reduction can be set. This prolongs the total time to standstill by the selected S-ramp time.
- Braking time at motor reference speed or C02612 = "1":

  C02610 [s] + C02611 [s]

9.2.2 Behaviour of the function (example)

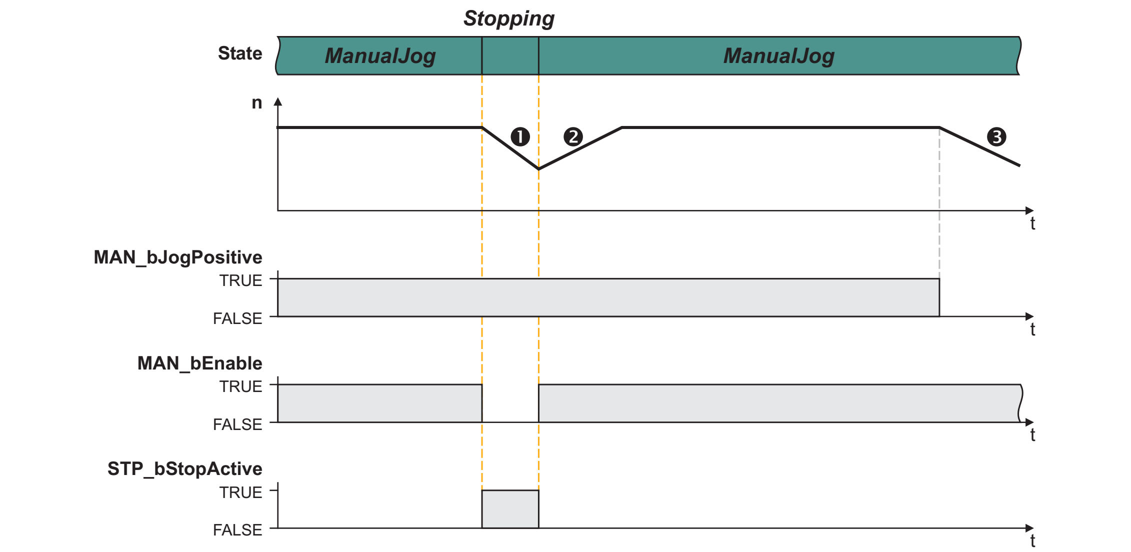
In the following example the enable of manual jog is deactivated during an active manual jog. Then the drive is braked to standstill within the deceleration time ❶ set for stop:



❶ C02610: Deceleration time for stop function
❷ C02622: Manual acceleration
❸ C02623: Manual deceleration

[9-5] Example: Stop with reaching standstill

If the basic function "Manual Jog" is reactivated within the deceleration time ❶, this basic function takes over the control of the drive from the current speed and the function state "Drive is stopped" is abandoned immediately:

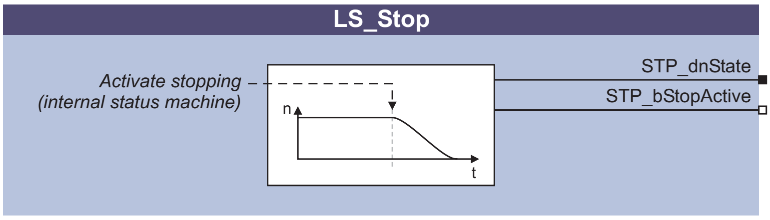


❶ C02610: Deceleration time for stop function
❷ C02622: Manual acceleration
❸ C02623: Manual deceleration

[9-6] Example: Stop without reaching standstill

9.2.3 System block "LS_Stop"

The **LS_Stop** system block in the function block editor maps the basic function "Stop".



Outputs

Identifier DIS code | Data type	Value/meaning	
STP_dnState C02616 | DINT	Status (bit-coded) • When the basic function is not active, all bits are set to "0". • Bits which are not listed are not assigned with a status (always "0").	
	Bit 1	Drive is braked to standstill. • The internal state machine is in the function state "Drive is stopped".
	Bit 2	Drive is at standstill. • The internal state machine is in the function state "Drive in standstill".
	Bit 3	Deceleration phase is active.
	Bit 5	CCW rotation is active.
STP_bStopActive C02617 | BOOL	Status output "stop is active"	
	TRUE	The drive is braked to standstill or is at standstill. • The internal state machine is in the function state "Drive is stopped" or in the function state "Drive in standstill".

9.3 Quick stop

Compared to the Standard stop quick stop (QSP) is determined for a stop in the case of an error. If quick stop is activated, the drive is braked to standstill irrespective of the defined setpoint within the deceleration time set.

Note!

Through this, superimposed controls (e.g. synchronous or position control) may produce following errors. If several drives execute a coordinated motion, the quick stop function should only be used for the motion master (master drive) in order to maintain the coordination.

Tip!

Quick stop can also be set as error response for many monitoring functions ("quick stop by trouble"). Detailed information can be found in the chapter "Diagnostics & fault analysis".

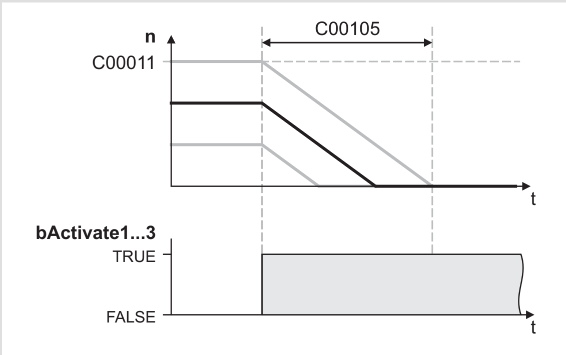
The source which activated the quick stop function is shown bit-coded in C00159.

9.3.1 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → dialog level *Overview* → *All basic functions* → *Quick stop*
- Short overview of the parameters for quick stop:

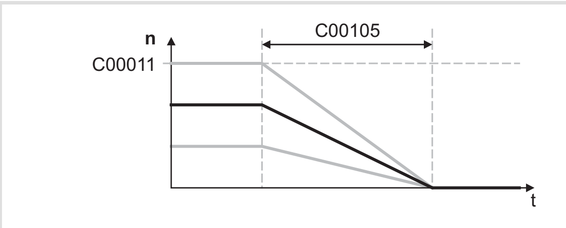
Parameters	Information
C00105	Quick stop deceleration time
C00106	Quick stop S-ramp time
C00107	Reference for "Quick stop" deceleration time

Parameter setting of quick stop



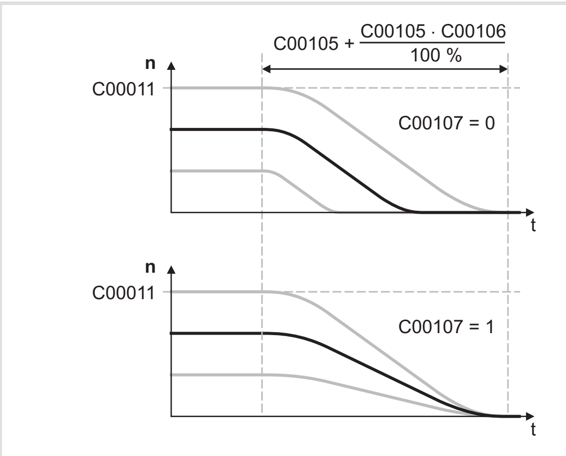
[9-7] Deceleration time referred to the motor reference speed

- The deceleration time set in C00105 for the quick stop function refers to a speed variation from the motor reference speed (C00011) to standstill.



[9-8] Deceleration time referred to the current speed

- When C00107 is set = "1", the deceleration time refers to the current speed.



[9-9] S-shaped deceleration ramp through selection of a relative S-ramp time

- Through the entry of a relative S-ramp time in C00106 an S-shaped deceleration ramp for jerk reduction can be set. This prolongs the total time to standstill by the selected S-ramp time.
- Braking time at motor reference speed or C00107 = "1":

$$C00105 + \frac{C00105 \cdot C00106\ [\%]}{100\ \%}$$

Tip!

After the drive has come to standstill, you can use the torque to hold the standstill position.

- For this purpose, select the phase controller gain in C00254 > "0".
- With C00254 > "0" the phase control is automatically activated after the standstill is reached.

9.3.2 Activating/Deactivating quick stop

Quick stop through the application is activated/deactivated via the three inputs *QSP_bActivate1...3* of the system block LS_Quickstop. (155)

- The three control inputs are linked via a logic OR gate, i.e. in order to activate quick stop, only one of the three inputs must be set to TRUE. To deactivate quick stop, though, all three inputs must be reset to FALSE.
- The control inputs can be linked with terminals (digital inputs) and/or process data in the function block editor.

Note!

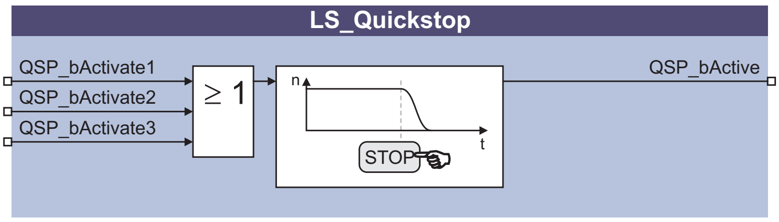
In the standard technology applications the control input *QSP_bActivate1* is linked with the digital input **DI1** in the Lenze setting.

Further options for activating quick stop

- Via controller command "Activate quick stop" (C00002 = "45"), e.g. via a corresponding SDO of a higher-level control, an HMI or the »Engineer«.
- Via the stop key at the keypad, unless the Lenze setting of C00469 (assignment of the key) has been changed.
- Through the response "quick stop by trouble" parameterised for monitoring.

9.3.3 System block "LS_quick stop"

The **LS_quick stop** system block in the function block editor maps the basic function "Quick stop".



Inputs

Identifier DIS code | data type	Information/possible settings	
QSP_bActivate1 C02619/1 | BOOL QSP_bActivate2 C02619/2 | BOOL QSP_bActivate3 C02619/3 | BOOL	Activate quick stop • The three inputs are linked via a logic OR gate.	
	TRUE	If one of the three inputs is set to TRUE, it is changed to the function state "Quick stop active" and the drive is braked to standstill within the deceleration time set for quick stop.
	TRUE↘FALSE	When all three inputs are reset to FALSE, it is changed to a setpoint-generating basic function (e.g. "speed follower") via the function state "Drive is stopped".

Outputs

Identifier DIS code | data type	Value/meaning	
QSP_bActive C02619/4 | BOOL	Status output "quick stop is active"	
	TRUE	Quick stop is active.

9.4 Manual jog

The basic function "Manual jog" serves to traverse the drive manually, e.g. to clean or exchange the tool.

- Optionally, you can change over to a second manual speed during the process.
- A "retracting" from operated travel range limit switches is also supported. Then, you can only traverse in the corresponding retracting direction.

Note!

In the manual mode the travel mode is monitored via limit switches and software limit positions by the basic function "Limiter". (📖 200)

Stop!

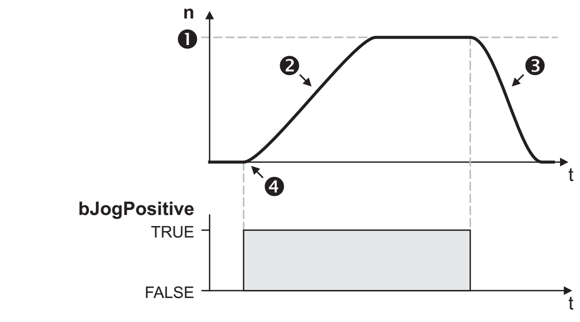
When the reference is **not** known and **no** software limit positions are set, the drive can run into a mechanical limit during the manual jog and machine parts can be destroyed or damaged!

9.4.1 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → dialog level *Overview* → *All basic functions* → *Manual jog*
- Short overview of the parameters for manual jog:

Parameters	Information
C02620	Manual jog speed 1
C02621	Manual jog speed 2
C02622	Manual acceleration
C02623	Manual deceleration
C02624	Inaccuracy time of manual traversing

9.4.1.1 Smooth start and quick stop of the drive



❶ C02620: Manual speed 1
❷ C02622: Manual acceleration
❸ C02623: Manual deceleration
❹ C02624: Manual S-ramp time

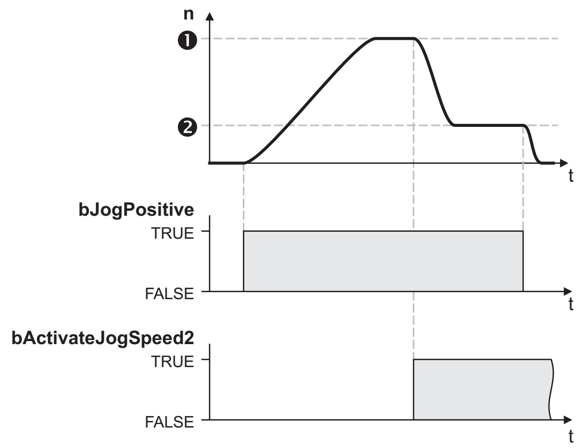
[9-10] Example: Smooth start and quick stop

- Different values for acceleration and deceleration can be set in C02622/C02623 in order to implement a smooth start and a quick stop of the drive.
- By entering a relative S-ramp time in C02624 both ramps can be set in S-shape for jerk reduction.

Tip!

A quick deceleration (C02623) reduces the time from the release of the "Jog key" to the stop of the drive in order to ensure a better positioning of the drive according to one's sense of proportion and to prevent that the desired stop position is not overtravelled.

9.4.1.2 Second manual speed



❶ C02620: Manual speed 1
❷ C02621: Manual speed 2

[9-11] Example: Changeover to a second manual speed

- By setting the input *MAN_bActivateJogSpeed2* to TRUE you can change over to a second manual speed (C02621) during the process.

9.4.2 Executing manual jog

Requirements

- The controller is in the device state "Operation".
- The basic function "manual jog" is part of the active application.
- No other basic function is active.

Activation

To request the control via the basic function, the enable input *MAN_bEnable* in the application must be set to TRUE.

- If no other basic function is active, it is changed to the function state "Manual jog active" and manual jog can be executed via the control inputs.
- A successful change to the function state "Manual jog active" is displayed by a TRUE signal at the status output *MAN_bEnabled*.

Deactivation

If the enable input *MAN_bEnable* is reset to FALSE, an active manual jog is reset, i.e. the control inputs for manual jog are inhibited and the drive is braked to standstill within the deceleration time for Standard stop. (🕮 148)

- The status output *MAN_bEnabled* is reset to FALSE and a changeover from the active function state "Manual jog active" via the function state "Drive is stopped" back to th basic state "Drive in standstill" is effected.

9.4.2.1 Manual jog in positive/negative direction

In the function state "Manual jog active" the drive can be traversed manually via the control inputs according to the following truth table:

MAN_bJogNegative	MAN_bJogPositive	MAN_bActivateJogSpeed2	Function
FALSE	FALSE	-	Stop • The drive is braked to standstill with the deceleration set.
FALSE	TRUE	FALSE	Manual jog • In positive direction • With manual speed 1
		TRUE	Manual jog • In positive direction • With manual speed 2
TRUE	FALSE	FALSE	Manual jog • In negative direction • With manual speed 1
		TRUE	Manual jog • In negative direction • With manual speed 2
TRUE	TRUE	-	When both inputs are set to TRUE at the same time: • The drive is braked to standstill with the deceleration set. When both inputs are not set to TRUE at the same time: • The drive continues to travel to the direction selected first.

Note!

In the standard technology applications "actuator – speed" and "actuator – torque" the control inputs are linked in the Lenze setting with the following digital inputs:

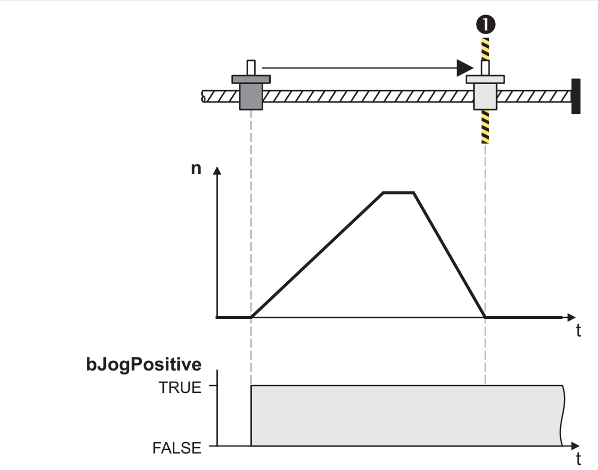
- **DI6**: Activate manual mode
- **DI7**: Manual jog in positive direction
- **DI8**: Manual jog in negative direction

9.4.2.2 Manual jog to limit position

Note!

Detailed information on travel range monitoring via limit switches and software limit positions can be found in the description of the basic function "Limiter". (📖 200)

Manual jog to software limit position

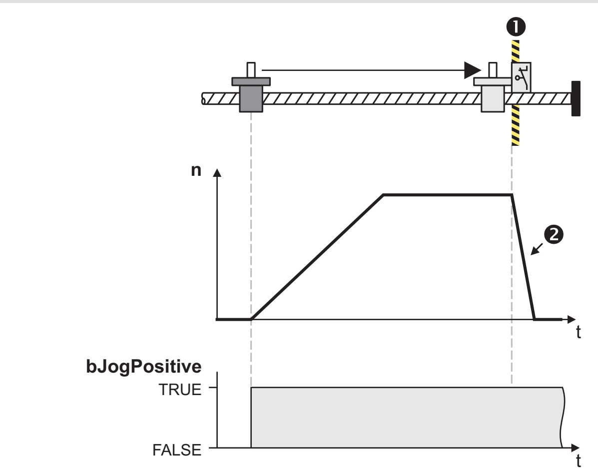


❶Positive software limit position

[9-12] Example: Manual jog to positive software limit position

- When the reference is known and the software limit positions are set, a positioning to the corresponding software limit positions unless the manual jog has been manually stopped by resetting *MAN_bJogNegative* or *MAN_bJogPositive*.
- The drive brakes with the deceleration set (C02623) to the position of the corresponding software limit position.

Manual jog to hardware limit position (limit switch)



❶ Positive limit switch
❷ Deceleration ramp of the quick stop function

[9-13] Example: Manual jog to positive limit switch

- When a limit switch is approached during manual jog, the drive is braked to standstill within the deceleration time set for the quick stop function.

See also:
- Software limit positions (📖 202)
- Hardware limit positions (limit switch) (📖 204)

9.4.2.3 Retracting of an activated limit switch

By setting *MAN_bReleaseLimitSwitch* to TRUE a retraction from an activated limit switch is possible. Travel in the retracting direction until the limit switch is not active anymore.

- If, while retracting, a direction is selected additionally via the control inputs *MAN_bJogPositive* or *MAN_bJogNegative* towards the retracting direction, the travel is continued even the limit switch has been abandoned until *MAN_bJogPositive* or *MAN_bJogNegative* are reset to FALSE.
- If the direction is selected against the retracting direction, the drive stops and a corresponding status is output via the status output *MAN_dnState* of the system block LS_ManualJog.

Note!

It can only be retracted from a limit switch if this is still activated, i.e. the corresponding limit switch input of the limiter is still active. Therefore ensure that while travelling towards a limit switch that the trigger mechanics will not be overtravelled by a too high mass or swing so that the limit switch will not be activated by this.

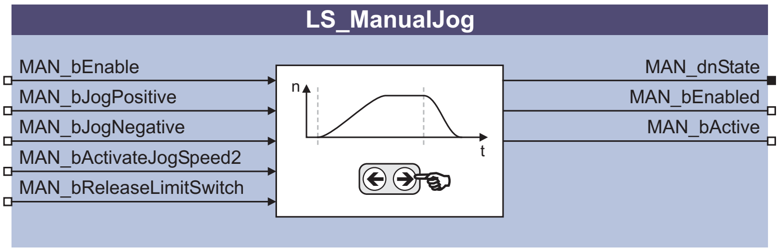
Tip!

An activated limit switch can also be abandoned by manual jog in retracting direction via the control inputs *MAN_bJogPositive* or *MAN_bJogNegative*.

See also: Hardware limit positions (limit switch) (204)

9.4.3 System block "LS_ManualJog"

The **LS_ManualJog** system block in the function block editor maps the basic function "Manual jog".



Inputs

Identifier DIS code | data type		Information/possible settings
MAN_bEnable C02639/1 | BOOL		Requesting control via the basic function
	TRUE	If no other basic function is active, it is changed to the function state "Manual jog active" and manual jog can be executed via the control inputs.
	TRUE↘FALSE	An active manual jog is stopped, i. e. a changeover from the active function state "Manual jog active" via the function state "Drive is stopped" back to the basic state "Drive in standstill" is effected.
MAN_bJogPositive C02639/2 | BOOL		▸ Manual jog in positive/negative direction (📖 159)
MAN_bJogNegative C02639/3 | BOOL		
MAN_bActivateJogSpeed2 C02639/4 | BOOL		Changeover to a second manual speed
	FALSE	Manual speed 1 (C02620) active.
	TRUE	Manual speed 2 (C02621) active.
MAN_bReleaseLimitSwitch C02639/5 | BOOL		Retracting of an activated limit switch
	TRUE	Retracting from each activated limit switch towards the corresponding retracting direction until the limit switch is enabled again (not activated anymore) and the drive is located inside the software limit positions set. Afterwards the drive is braked to standstill with the deceleration set unless the control input *MAN_bJogPositive* or *MAN_bJogNegative* is activated for the corresponding retracting direction.

Outputs

Identifier DIS code | data type	Value/meaning	
MAN_dnState C02638 | DINT	Status (bit-coded) • When the basic function is not enabled, all bits are set to "0". • Bits which are not listed are not assigned with a status (always "0").	
	Bit 1	Manual jog active
	Bit 2	Manual jog is completed.
	Bit 3	Acceleration/deceleration phase is active.
	Bit 5	CCW rotation is active.
	Bit 15	Error in basic function active (group signal).
	Bit 16	Stop by simultaneous selection of negative direction and retraction from limit switch.
	Bit 17	Stop by simultaneous selection of positive and negative direction.
	Bit 18	Stop by simultaneous selection of positive direction and retraction from limit switch.
	Bit 20	Manual speed 2 (C02621) active.
	Bit 21	Manual speed 1 (C02620) active.
	Bit 22	Stop by selecting positive direction and simultaneous activation of the positive software limit position or the positive limit switch.
	Bit 23	Stop by selecting negative direction and simultaneous activation of the negative software limit position or the negative limit switch.
	Bit 24	General abort process (ramp-down of the speed setpoint) • Takes place e.g. when a manual direction initiator is let go or due to an impermissible status (see bit 16, 17, 18, 22, 23).
	Bit 25	Stopping is active.
	Bit 30	Profile generation error.
MAN_bEnabled C02639/6 | BOOL	Status output "Basic function is enabled"	
	TRUE	Manual jog via the control inputs is possible. • The enable input *MAN_bEnable* is set to TRUE and the controller is in the function state "Manual jog active".
MAN_bActive C02639/7 | BOOL	Status output "Basic function is active"	
	TRUE	Manual jog is active (the drive axis is moving).

9.5 Homing

The basic function "Homing" serves to transfer the measuring system to the physically possible travel range of the controller.

- The reference (e.g. zero position of the drive axis in the machine measuring system) can be defined by reference search or reference setting.
- In case of reference search, the drive travels according to the defined homing mode to detect the reference in the measuring system independently.
- In case of reference setting in the homing mode "100: Set reference directly" or via control input *HM_bLoadHomePos* the drive can also be referenced manually when the motor is at standstill. The measuring system is set according to the home position parameterised in C02642 or applied to the input *HM_dnHomePos_p*.

Note!

The encoder position is stored safe against mains failure in the memory module and is therefore known to the drive control even after the mains has been switched.

Behaviour of the home position after mains switching

If the home position/information is to be available after mains switching as well, the setting C02652 = "1: Keep" is required.

- One further condition for keeping the home position/information after mains switching is the compliance with the maximally permissible angle of rotation of the encoder which can be set in C02653.
- When resolvers or single-turn absolute value encoders are used and the mains is switched off (24-V supply off), the drive may only be moved by ½ motor revolution since otherwise the home position will get lost due to the ambiguity of the encoder information.

A renewed reference setting is only required in case of a renewed commissioning or in case of service (e.g. when drive components are exchanged).

9.5.1 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → dialog level *Overview* → *All basic functions* → *Homing*
- Short overview of the parameters for homing:

Parameters	Information
C02528	Traversing range
C02640	Ref. mode
C02642	HM position
C02643	HM target position
C02644	Ref. speed 1
C02645	Home acceleration 1
C02646	Ref. speed 2
C02647	Ref. acceleration 2
C02648	Home S-ramp time
C02649	HM torque limit
C02650	Homing inhibit time
C02651	HM touch probe configuration
C02652	Home position after mains switching
C02653	Max. rot. angle after mains sw.
C02656	Current position

9.5.1.1 Homing mode

The zero position, also called reference, can be defined by a reference search or reference setting:

- In case of a reference search the drive travels according to a defined mode to detect the reference independently.
- In case of reference setting the reference is manually set when the drive has stopped.

Tip!

A reference search is mainly used for continuous systems or if the traversing range or machine cycle of the drive cannot be displayed in the display space of the encoder, e.g. when incremental encoders are used on a motor or single-turn absolute value encoders or resolvers on geared motors.

Reference setting is usually executed only once during commissioning or in case of service (e.g. when drive components are exchanged) and are normally used in systems the machine cycle of which can be displayed in the display space of the encoder, e.g. when multi-turn absolute value encoder or single-turn absolute value encoders/resolvers are used in a machine cycle on one motor revolution.

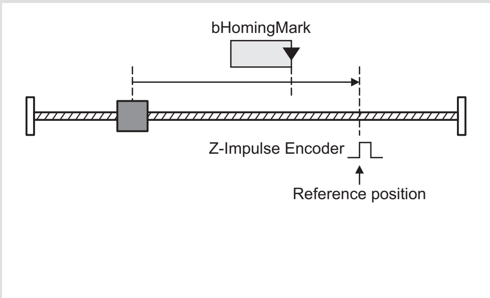
- For reference setting, select the homing mode "100" in C02640.
- The homing modes "0"..."15", which are described in detail in the following sections, are available for a reference search in C02640.
  - Depending on the mode selected the following switches/sensors are evaluated:

Switch	Input for digital input signal
Reference switch	*HM_bHomingMark* on SB LS_Homing
Touch probe sensor	*DIGIN_bIn1* ... *DIGIN_bIn8* (or optional use of the motor encoder or load encoder zero pulse). Configuration: C02651.
Positive travel range limit switch	*LIM_bLimitSwitchPositive* on SB LS_Limiter
Negative travel range limit switch	*LIM_bLimitSwitchNegative* on SB LS_Limiter

Note!

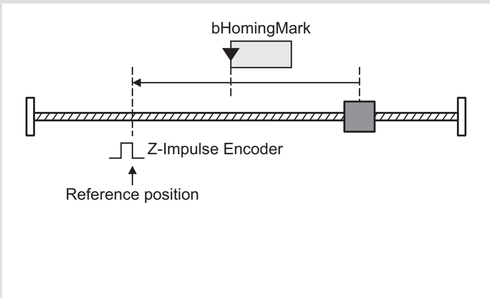
In the homing modes 0...5 as well as 10 and 11, the search for the limit switch/ reference switch is achieved by changing over to a higher speed than for approaching the encoder zero pulse/touch probe sensor. This serves to reduce the homing time and increase the accuracy.

After setting the home position the drive travels to the target position set in C02643.



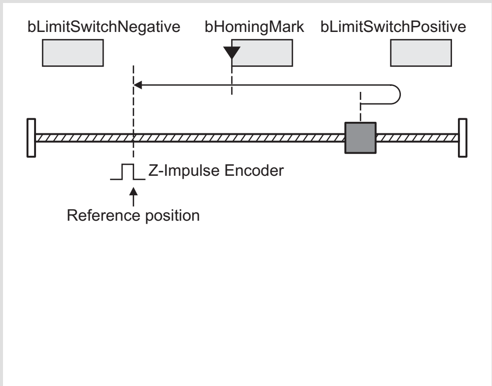
Operation of mode 0:

1. Movement in positive direction.
2. Negative edge at *HM_bHomingMark* enables home position detection.
3. The following positive edge of the encoder zero pulse/touch probe sensor set the reference.



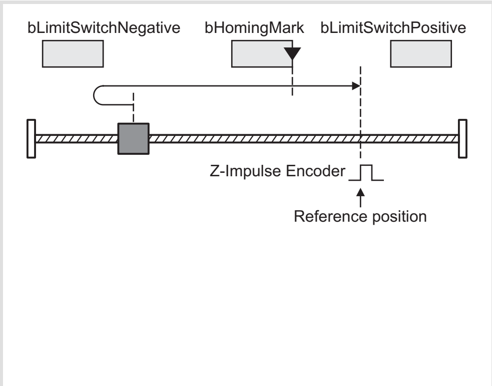
Operation of mode 1:

1. Movement in negative direction.
2. Negative edge at *HM_bHomingMark* enables home position detection.
3. The following positive edge of the encoder zero pulse/touch probe sensor set the reference.



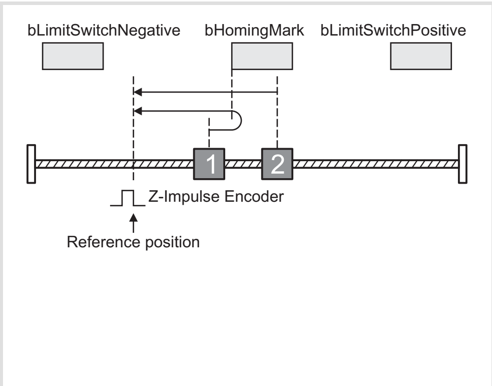
Operation of mode 2:

1. Movement in positive direction.
2. Reversing to positive travel range limit switch.
3. Negative edge at *HM_bHomingMark* enables home position detection.
4. The following positive edge of the encoder zero pulse/touch probe sensor set the reference.



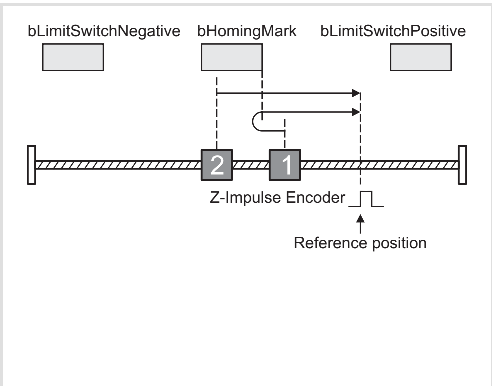
Operation of mode 3:

1. Movement in negative direction.
2. Reversing to negative travel range limit switch.
3. Negative edge at *HM_bHomingMark* enables home position detection.
4. The following positive edge of the encoder zero pulse/touch probe sensor set the reference.



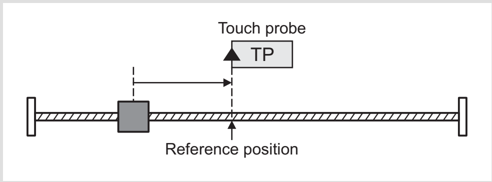
Operation of mode 4:

1. Movement in positive direction.
2. Reversing with positive edge at *HM_bHomingMark*.
3. Negative edge at *HM_bHomingMark* enables home position detection.
4. The following positive edge of the encoder zero pulse/touch probe sensor set the reference.



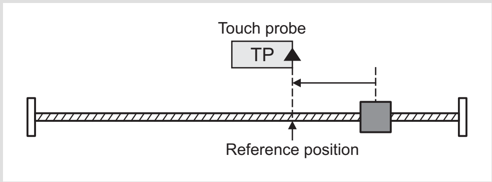
Operation of mode 5:

1. Movement in negative direction.
2. Reversing with positive edge at *HM_bHomingMark*.
3. Negative edge at *HM_bHomingMark* enables home position detection.
4. The following positive edge of the encoder zero pulse/touch probe sensor set the reference.



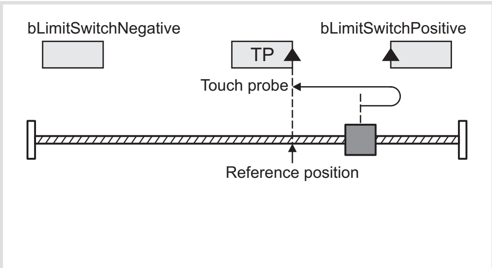
Operation of mode 8:

1. Movement in positive direction.
2. The following positive edge of the touch probe sensor set the reference.



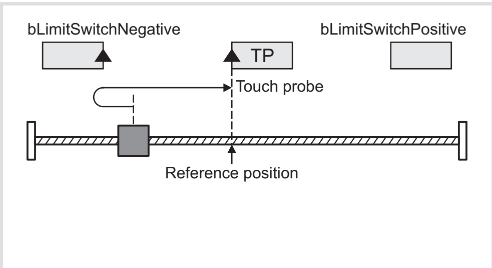
Operation of mode 9:

1. Movement in negative direction.
2. The following positive edge of the touch probe sensor set the reference.



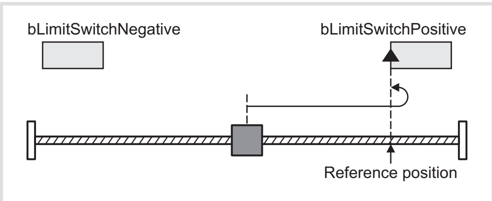
Operation of mode 10:

1. Movement in positive direction.
2. Reversing with positive edge of the positive travel range limit switch.
3. The following positive edge of the touch probe sensor set the reference.



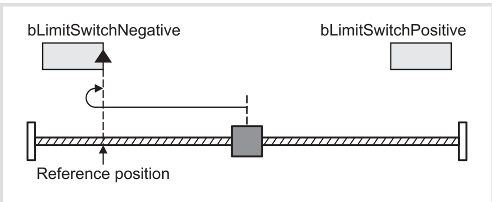
Operation of mode 11:

1. Movement in negative direction.
2. Reversing with positive edge of the negative travel range limit switch.
3. The following positive edge of the touch probe sensor set the reference.



Operation of mode 12:

1. Movement in positive direction.
2. Positive edge of the travel range limit switch sets the reference.



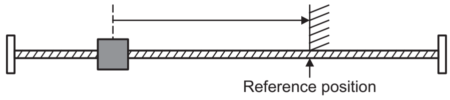
Operation of mode 13:

1. Movement in negative direction
2. Positive edge of the travel range limit switch sets the reference.

Note!

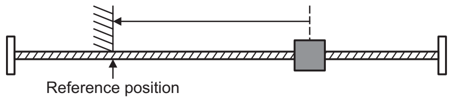
In the homing modes 12 and 13 the load mechanics is able is able to leave the travel range limit switch. It is then travelled back to the home position which has been set with the positive edge of the travel range limit switch. The mechanics may possibly stop on an activated limit switch.

We recommend to set a reference offset to enable the travel range limit switch.



Operation of mode 14:

1. Movement in positive direction with reduced torque.
2. The reference is set if the torque limit has been exceeded via a defined period of time ("homing to end stop").
   – If a reference offset is set, it is traversed by this offset with the correct sign and the reference is set at the end of this travel way.



Operation of mode 15:

1. Movement in negative direction with reduced torque.
2. The reference is set if the torque limit has been exceeded via a defined period of time ("homing to end stop").
   – If a reference offset is set, it is traversed by this offset with the correct sign and the reference is set at the end of this travel way.

9.5.1.2 Home position & target position

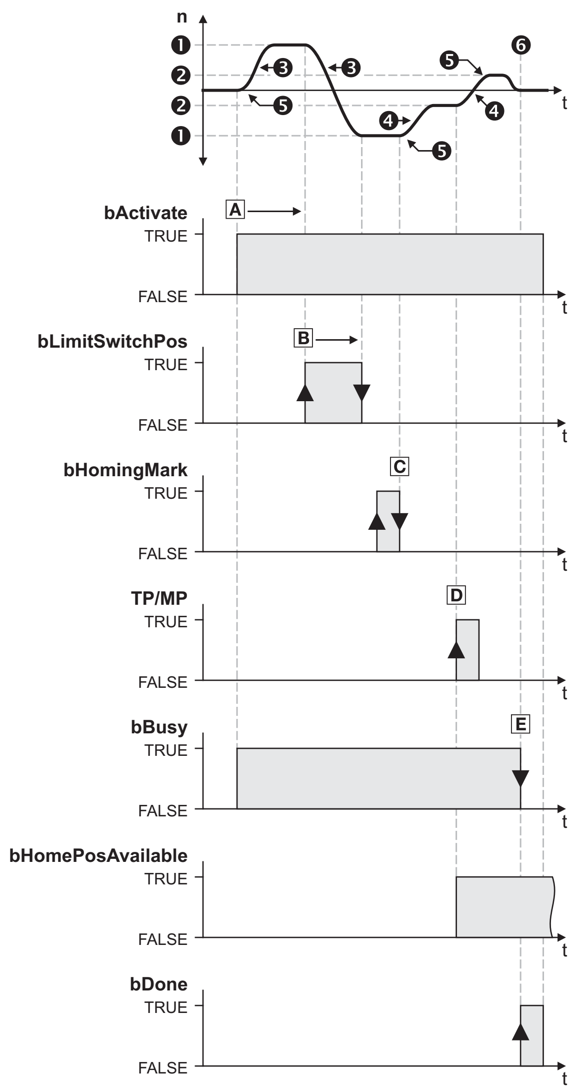
When the home position is set during the reference search, the position detected in the machine measuring system corresponds to the value set in C02642.

Afterwards the drive travels to the target position set in C02643.

9.5.1.3 Second homing speed

For the homing modes 0...5 as well as 10 and 11 two different speeds can be parameterised to reduce the homing time and increase the accuracy:

- The higher speed set in C02644 causes a quick approach of the limit switch/reference switch.
- After reversing to the limit switch/reference switch the encoder zero pulse/touch probe sensor is approached slower but more precisely with the lower speed set in C02646.



❶ C02644: Ref. speed 1
❷ C02646: Ref. speed 2
❸ C02645: Ref. acceleration 1 (and deceleration 1)
❹ C02647: Ref. acceleration 2 (and deceleration 2)
❺ C02648: Ref. S-ramp time
❻ C02643: Ref. target position

Example: Operation of mode 2:

A. Movement in positive direction.
B. Reversing to positive travel range limit switch.
C. Negative edge at *HM_bHomingMark* enables home position detection.
D. The following positive edge of the encoder zero pulse (MP) sets the reference.
E. Drive has reached defined target position.

9.5.1.4 Homing to end stop

By selecting the homing modes 14 & 15, homing to end stop can be executed as follows:

1. The drive travels with reduced torque in positive direction (mode 14) or negative direction (mode 15).
2. When the drives hits an end stop so that the torque limit set in C02649 is exceeded for the period of time defined in C02650, the reference is set.
   – When a reference offset is set, it is traversed by this offset with correct sign.

9.5.1.5 Connection of reference switch

For the homing modes with reference switch, the control input *HM_bHomingMark* of the system block LS_Homing must be connected to the digital input which is connected to the reference switch.

9.5.1.6 Touch probe interface configuration

The touch probe channel to be used for homing with touch probe detection is selected in the »Engineer« on the **Application parameter** tab in the *overview* ➞ *dialog level. All basic functions* ➞ *Homing* ➞ *TP interface*.

- The setting carried out in this parameterisation dialog directly affects the setting of C02651 ("Ref. touch probe configuration") and vice versa.
- For a direct setting of C02651 (e.g. with keypad) the following table lists the decimal values for all possible configurations.

Selection Touch probe channel	Touch probe response		
	Positive edge	Negative edge	Both edges
DigIn 1	1	2	3
DigIn 2	4	8	12
DigIn 3	16	32	48
DigIn 4	64	128	192
DigIn 5	256	512	768
DigIn 6	1024	2048	3072
DigIn 7	4096	8192	12288
DigIn 8	16384	32768	49152
Motor encoder zero pulse	65536		
Load encoder zero pulse	262144		

- Example: For selecting the touch probe channel "DIGIN 8" and response to only one positive edge, it is required to set the decimal value "16384" in C02651.

9.5.2 Executing homing

Requirements

- The controller is in the device state "Operation".
- The basic function "Homing" is part of the active application.
- No other basic function is active.

Activation

To request the control via the basic function, the enable input HM_*bEnable* in the application must be set to TRUE.

- If no other basic function is active, a changeover to the function state "Homing active" is effected and homing can be executed via the control inputs.
- A successful change to the function state "Homing active" is displayed by a TRUE signal at the status output *HM_bEnabled*.

Deactivation

When the enable input *HM_bEnable* is reset to FALSE, an active homing is stopped, i.e. the control inputs for homing are inhibited and the drive is braked to standstill within the deceleration time for stop.

- The status output *HM_bEnabled* is reset to FALSE and a changeover from the active function state "Homing active" via the function state "Drive is stopped" back to th basic state "Drive in standstill" is effected.

9.5.2.1 Setting reference search/setting reference directly

By setting the control input *HM_bActivateHoming* to TRUE, the reference search in the selected homing mode is started.

- During reference search, the status output *HM_bActive* is set to TRUE.
- When the reference search is completed, the status output *HM_bActive* is reset to FALSE and the status output *HM_bDone* is set to TRUE.
- When the home position could be detected, the status output *HM_bHomePosAvailable* is set to TRUE.

Note!

In the homing mode "100: Set reference directly" no reference search will be started but the home position set in C02642 will be directly accepted.

9.5.2.2 Loading home position via input

By setting the control input *HM_bLoadHomePos* to TRUE the "tool position" applied to input *HM_dnHomePos_p* is accepted manually as home position with drive at standstill.

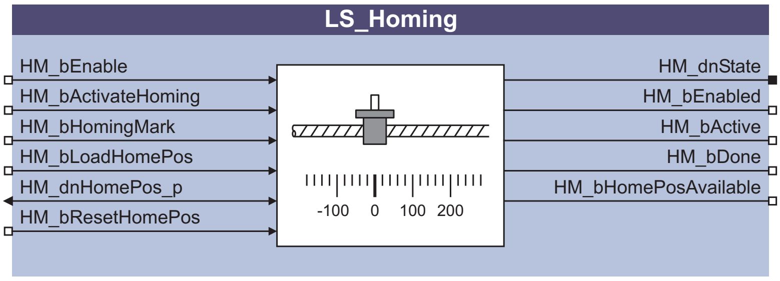
9.5.2.3 Resetting home position

By setting the control input *HM_bResetHomePos* to TRUE the status "Reference known" is reset.

- The status outputs *HM_bDone* and *HM_bHomePosAvailable* are reset to FALSE.

9.5.3 System block "LS_Homing"

The **LS_Homing** system block in the function block editor maps the basic function "Homing".



Inputs

Identifier DIS code | data type	Information/possible settings	
HM_bEnable C02659/1 | BOOL	Requesting control via the basic function.	
	TRUE	If no other basic function is active, a changeover to the function state "Homing active" is effected and homing can be executed via the control inputs.
	TRUE↘FALSE	An active reference search is stopped, i. e. a changeover from the active function state "Homing active" via the function state "Drive is stopped" back to the basic state "Drive in standstill" is effected.
HM_bActivateHoming C02659/2 | BOOL	Starting homing/directly setting reference	
	TRUE	Reference search is started in the homing mode selected (C02640). In the homing mode "100: Set reference directly" no reference search will be started but the home position set in C02642 will be directly accepted.
	TRUE↘FALSE	Active reference search is completed.
HM_bHomingMark C02659/3 | BOOL	Input for reference switch	
	TRUE	Reference switch is activated.
HM_bLoadHomePos C02659/4 | BOOL	Loading home position	
	FALSE↗TRUE	The position applied to input *HM_dnHomePos_p* is accepted as home position.
HM_dnHomePos_p C02658 | DINT	Home position in [increments] for acceptance with *HM_bLoadHomePos*	
HM_bResetHomePos C02659/5 | BOOL	Resetting the status "Reference known"	
	FALSE↗TRUE	The internal status "Reference known" is reset. • The status outputs *HM_bDone* and *HM_bHomePosAvailable* are reset to FALSE.

Outputs

Identifier DIS code | data type	Value/meaning	
HM_dnState C02657 | DINT	Status (bit-coded) • When the basic function is not enabled, all bits are set to "0". • Bits which are not listed are not assigned with a status (always "0").	
	Bit 1	Reference search is active.
	Bit 2	Reference search is completed.
	Bit 3	Acceleration/deceleration phase is active.
	Bit 5	CCW rotation is active.
	Bit 7	Reference is known
	Bit 15	Error in basic function active (group signal).
	Bit 16	Pre-stop (home switch) has been detected.
	Bit 17	Touch probe/zero pulse has been detected.
	Bit 21	Profile data are limited by basic function "Limiter".
	Bit 22	Traversing direction is inhibited by basic function "Limiter".
	Bit 23	Abort by basic function "Limiter".
	Bit 25	Stopping is active. (Homing is enable but not active or speed ≠ 0)
	Bit 30	Profile generation error.
HM_bEnabled C02659/6 | BOOL	Status output "Basic function is enabled"	
	TRUE	Homing via the control inputs is possible. • The enable input *HM_bEnable* is set to TRUE and the controller is in the function state "Homing active".
HM_bActive C02659/7 | BOOL	Status output "Basic function is active"	
	TRUE	Reference search is active (the drive axis is moving).
HM_bDone C02659/8 | BOOL	Status output "Basic function is completed"	
	TRUE	Reference search is completed. • Output is reset to FALSE when input *HM_bActivateHoming* is reset to FALSE.
HM_bHomePosAvailable C02659/9 | BOOL	Status output "Reference is known"	
	TRUE	The drive knows the home position.

9.6 Positioning

The basic function "Positioning" provides the functions for executing the (travel) profiles and supports an "override" of speed and acceleration.

- A profile describes a motion request which can be implemented by the SB LS_Positioner into a rotary motion.
- A profile is described via the following profile parameters: Mode (type of positioning), position, speed, acceleration, deceleration, S-ramp time, final speed, standard sequence profile, TP sequence profile, TP window starting and end position and touch probe signal source(s).

9.6.1 Parameter setting

A parameter setting is not required for the basic function "Positioning".

- After activating the function, the profile is executed which has been transferred to the basic function via the input *POS_ProfileData*.
- For profiles with touch probe positioning mode (residual path positioning) touch probe is detected implicitly.

Options for selecting the profiles

For specifying as well as storing and managing (travel) profiles, the following function blocks are available:

Function block	Function
L_PosPositionerTable	...serves to file and manage up to 100 (travel) profiles and allows the "teaching" of positions, speed, acceleration/deceleration and S-ramp times. • Another important task of this FB is the conversion of the table values according to the scaling selected in the SB **LS_DriveInterface**.
L_PosProfileTable	...serves to file and manage up to four (travel) profiles and allows the "teaching" of target positions. • In contrast to the FB **L_PosPositionerTable** this FB does not use any variable tables but the data of the profile parameters are entered directly into the assigned codes. • Another special feature: When selecting the profile no. 1 as target position, the position applied to input *dnExtPos_p*.
L_PosProfileInterface	...provides a profile data record for the SB **LS_Positioner**.

9.6.2 Carrying out positioning

Requirements

- The controller is in the device state "Operation".
- The basic function "Positioning" is part of the active application.
- No other basic function is active.

Activation

To request the control via the basic function, the enable input POS_*bEnable* in the application must be set to TRUE.

- If no other basic function is active, a changeover to the function state "Positioning active" is effected and positioning can be executed via the control inputs.
- A successful change to the function state "Positioning active" is displayed by a TRUE signal at the status output *POS_bEnabled*.

Deactivation

When the enable input POS_*bEnable* is reset to FALSE, an active homing is stopped, i.e. the control inputs for positioning are inhibited and the drive is braked to standstill within the deceleration time for stop.

- The status output *POS_bEnabled* is reset to FALSE and a changeover from the active function state "Positioning active" via the function state "Drive is stopped" back to the basic state "Drive in standstill" is effected.

9.6.2.1 Starting positioning

By setting the control input *POS_bStart* to TRUE positioning starts.

- The (travel) profile is executed which has been transferred to the basic function via the input *POS_ProfileData*.

9.6.2.2 Aborting/interrupting positioning

By setting the control input *POS_bAbort* to TRUE, the active positioning can be aborted or interrupted.

- The current profile is not completed but braked to standstill with the deceleration defined in the profile data.
- When the control input *POS_bAbort* is remained on TRUE, a restart or the continuation of an interrupted positioning process is inhibited.
- After resetting the control input *POS_bAbort* to FALSE, a restart or the continuation of an interrupted positioning process is possible again.

9.6.2.3 Continuing an interrupted positioning process

By setting the control input *POS_bRestart* to TRUE an interrupted positioning process can be continued if the control input *POS_bAbort* has been reset again to FALSE.

- Distance already covered in a relative positioning process will be considered.

9.6.2.4 Activating override

"Override" is the change of profile parameters and their acceptance during the positioning process.

- When the input *POS_bEnableOverride* is set to TRUE, a speed and acceleration override occurs according to the override values applied to the inputs *POS_dnSpeedOverride_n* and *POS_dnAccOverride_n*.
  - The override values represent percentage multipliers with regard to the current profile parameters for speed and acceleration.
  - For override values ≤ 1 % a status bit is set.
  - Override values ≤ 0 % are set internally to 0 %.
  - Changes of the override values are accepted in each cycle.

Note!

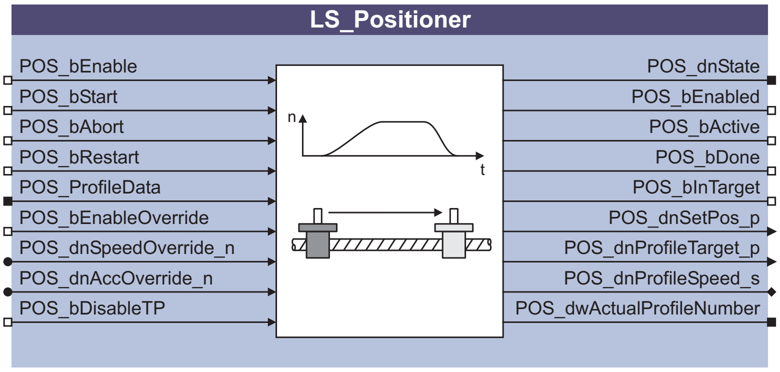
The online change of speed and acceleration is effective from the profile start to the beginning of the deceleration phase. Thus, the deceleration phase cannot be changed via an override!

- In case of an override value of 0 % for speed, the drive is braked to standstill.
- In case of an override value of 0 % for acceleration, no acceleration takes place anymore.

- When the input *POS_bEnableOverride* is reset to FALSE again, the speeds and accelerations defined via the profile parameters are executed again. The drive is immediately accelerated from the override speed to the speed set in the profile.

9.6.3 System block "LS_Positioner"

The **LS_Positioner** system block in the function block editor maps the basic function "Positioning".



Inputs

Identifier DIS code | data type		Information/possible settings
POS_bEnable C02679/1 | BOOL		Requesting control via the basic function
	TRUE	If no other basic function is active, a changeover to the function state "Posiioning active" is effected and positioning can be executed via the control inputs.
	TRUE↘FALSE	An active positioning is stopped, i. e. a changeover from the active function state "Positioning active" via the function state "Drive is stopped" back to the basic state "Drive in standstill" is effected.
POS_bStart C02679/2 | BOOL		Starting positioning
	FALSE↗TRUE	The profile *POS_ProfileData* is executed.
	FALSE↗TRUE (once again)	"Restart" • During an active positioning, another profile can be specified via the input *POS_ProfileData* which is executed after restart.
POS_bAbort C02679/3 | BOOL		Aborting or interrupting positioning
	FALSE↗TRUE	The current profile is not completed but braked to standstill with the deceleration defined in the profile data.
	TRUE	A restart via *POS_bStart* or the continuation of an interrupted positioning via *POS_bRestart* is inhibited.
	FALSE	A restart via *POS_bStart* or the continuation of an interrupted positioning via *POS_bRestart* is possible again. • If the restart signal *POS_bRestart* occurs during the acceleration phase, the positioning is continued immediately.
POS_bRestart C02679/4 | BOOL		Continuing an interrupted positioning process • Only possible when *POS_bAbort* has been reset from TRUE to FALSE again.
	TRUE	The positioning interrupted before via *POS_bAbort* is completed. • Distance already covered in a relative positioning process will be considered.
POS_ProfileData		Pointer to the profile to be executed in internal units (increments) • A profile chaining is caused by the pointer in the profile which points to the sequence profile.
POS_bEnableOverride C02679/5 | BOOL		Activating override
	TRUE	Override of speed and acceleration is active.

Identifier DIS code | data type	Information/possible settings	
POS_dnSpeedOverride_n C02677/1 | DINT	Value of speed override • Percentage multiplier for the current profile parameter "Speed". • Changes are accepted in each cycle. • $2^{30} \equiv$ 100 % of the speed defined in the profile. • In case of values ≤ 1 % the status bit 18 is set. • Values ≤ 0 % are set internally to 0 % and let the drive be braked to standstill.	
POS_dnAccOverride_n C02677/2 | DINT	Value for acceleration override • Percentage multiplier for the current profile parameter "Acceleration". • Changes are accepted in each cycle. • $2^{30} \equiv$ 100 % of the acceleration defined in the profile. • In case of values ≤ 1 % the status bit 19 is set. • Values ≤ 0 % are set internally to 0 % ("no acceleration").	
POS_bDisableTP C02679/6 | BOOL	Deactivating touch probe positioning	
	TRUE	Identified touch probes are ignored. It is not automatically changed to the TP sequence profile defined in the profile data.

Outputs

Identifier DIS code | data type	Value/meaning	
POS_dnState C02675 | DINT	Status (bit-coded) • When the basic function is not enabled, all bits are set to "0". • Bits which are not listed are not assigned with a status (always "0").	
	Bit 1	Positioning is active.
	Bit 2	Positioning is completed (all profiles are executed).
	Bit 3	Acceleration/deceleration phase is active.
	Bit 5	CCW rotation is active.
	Bit 6	Set position reached (in case of sequence profiles the drive continues to travel).
	Bit 10	Zero crossing in the positioning mode "modulo".
	Bit 15	Error in basic function active (group signal).
	Bit 16	Positioning is aborted.
	Bit 17	Reversing phase is active.
	Bit 18	Speed override ≤1 %
	Bit 19	Acceleration override ≤1 %
	Bit 20	Position is limited by basic function "Limiter".
	Bit 21	Profile data are limited by basic function "Limiter".
	Bit 22	Direction is inhibited by basic function "Limiter".
	Bit 23	Abort by basic function "Limiter".
	Bit 24	Home position is not known.
	Bit 25	Stopping is active.
	Bit 26	Cycle is not known.
	Bit 27	Invalid positioning mode.
	Bit 28	Invalid change of the positioning mode.
	Bit 29	Profile data is not plausible or faulty.
	Bit 30	Profile generation error.

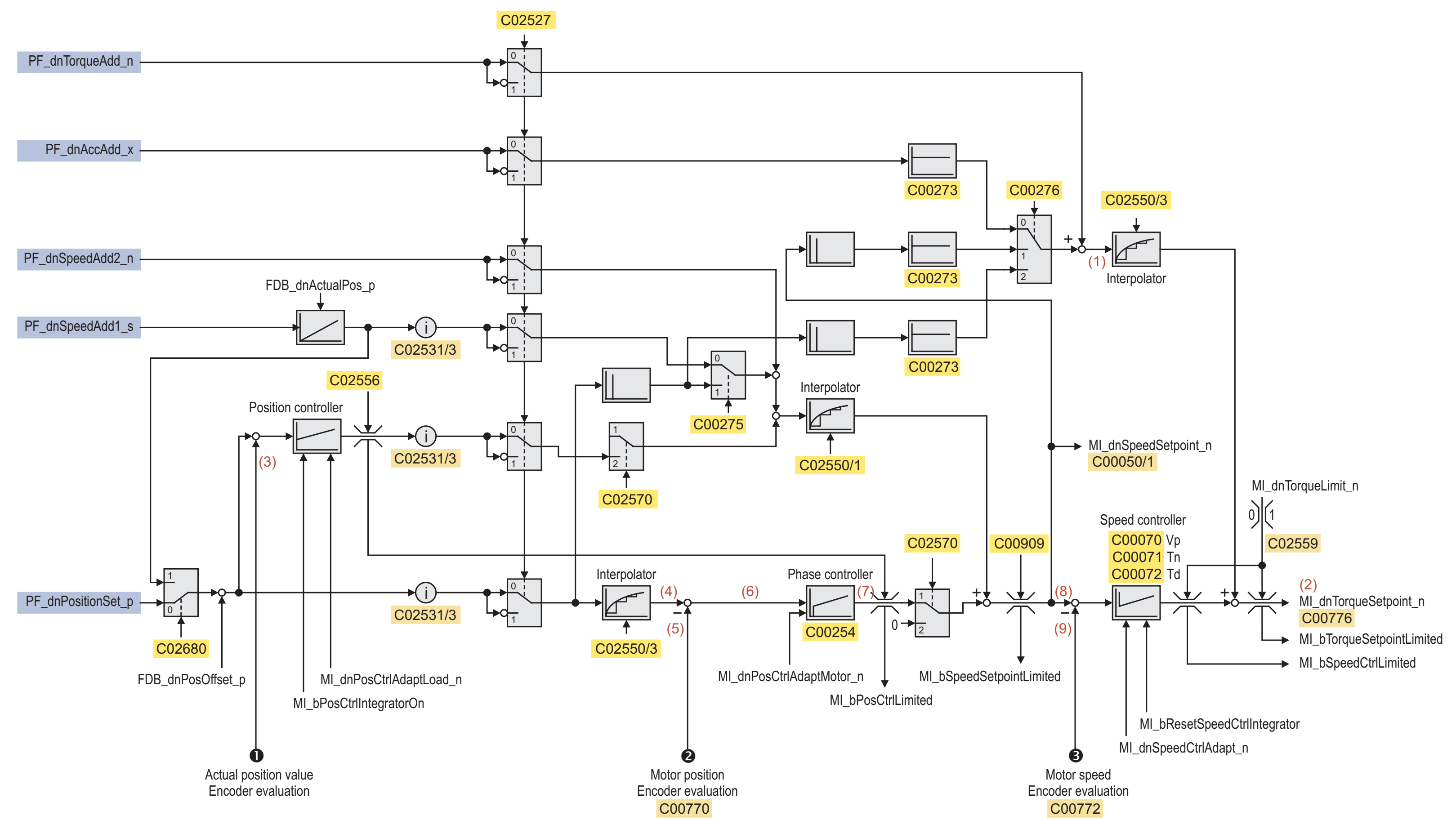
Identifier DIS code | data type	Value/meaning	
POS_bEnabled C02679/7 | BOOL	Status output "Basic function is enabled"	
	TRUE	Positioning via the control inputs is possible. • The enable input *POS_bEnable* is set to TRUE and the controller is in the function state "Positioning active".
POS_bActive C02679/8 | BOOL	Status output "Basic function is active"	
	TRUE	Positioning is active (the drive axis is moving).
POS_bDone C02679/9 | BOOL	Status output "Basic function is completed"	
	TRUE	Positioning is completed. • The profile is executed and no sequence profile is defined.
POS_bInTarget C02679/10 | BOOL	Status output "Target position reached"	
	FALSE	Positioning is still active or has been aborted.
	TRUE	The current position setpoint has reached the target position.
POS_dnSetPos_p C02678/1 | DINT	Current position setpoint in [increments] • Absolute positioning: point of reference is the home position. • Relative positioning: point of reference is the starting position of the current profile.	
POS_dnProfileTarget_p C02678/2 | DINT	Target position of the current profile in [increments] • Absolute positioning: point of reference is the home position. • Relative positioning: point of reference is the starting position of the current profile.	
POS_dnProfileSpeed_s C02676 | DINT	Current setpoint speed of the current profile as speed in [rpm] • In consideration of a speed override.	
POS_-dwActualProfileNumber C02674 | DWORD	Profile number (1 .... 100) of the current profile	

9.7 Position follower

This basic function is used as setpoint interface for position-controlled drives.

- The specified position setpoint can either refer to the encoder on the motor side or to the (load) encoder used additionally to detect the machine position. The selection of the encoder configuration serves to adapt the internal control structure accordingly.
- Instead of a position setpoint a speed setpoint can be specified as well by a corresponding selection in C02680. Then, the set position is calculated by integrating the speed setpoint based on the current actual position (relative positioning).
- As an option, an internal interpolation of the setpoints can be carried out in order to specify setpoints with reduced cycle rates without the drive behaviour being unsteady. The detection of the cycle rate and the synchronisation of the setpoint transfer is carried out automatically.
- If the direction of rotation of the motor must be inverted due to the mounting position of the motor or the existing gearbox ratio the use of the control signals can be changed over accordingly via parameter setting.
- The speed can also be precontrolled with the position setpoint by a corresponding selection in C02681. Then, the speed is calculated by differentiation of the position setpoint.

9.7.1 Signal flow



❶...❸ Signals from Signal flow - encoder evaluation (📖 109)
FDB_... = input/output signals of the Encoder evaluation (📖 108)
MI_... = input/output signals of the Motor interface (📖 64)

[9-1] Signal flow - position follower

See also:

- Signal flow - motor interface (📖 95)
- System block "LS_MotorInterface" (📖 104)

Internal variables of the motor control (oscilloscope signals)

- The red numbers specified in the signal flow represent internal variables of the motor control, which can be recorded with the Oscilloscope for diagnostic and documentation purposes. (📖 416)

No.	Variable or the motor control	Meaning
(1)	Torque.dnTotalTorqueAdd	Additive torque precontrol value
(2)	Torque.dnTorqueSetpoint	Torque setpoint
(3)	Position.dnActualLoadPos	Actual position
(4)	Position.dnPositionSetpoint	Position setpoint
(5)	Position.dnActualMotorPos	Current motor position
(6)	Position.dnContouringError	Following error
(7)	Speed.dnOutputPosCtrl	Output signal - phase controller
(8)	Speed.dnSpeedSetpoint	Speed setpoint
(9)	Speed.dnActualMotorSpeed	Current motor speed

9.7.2 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → dialog level *Overview* → *All basic functions* → *Position follower*
- Short overview of the parameters for the position follower:

Parameters	Information
C00050/1	Speed setpoint 1
C00070	Speed controller gain
C00071	Speed controller reset time
C00072	D component - speed controller
C00273/1	Motor moment of inertia
C00273/2	Load moment of inertia
C00275	Signal source speed setpoint
C00276	Signal source torque setpoint
C00909/1	Upper speed limit value
C00909/2	Lower speed limit value
C02520	Gearbox fact. numer. motor
C02521	Gearbox fact. denom. motor
C02522	Gearbox fact. numer. load
C02523	Gearbox fact. denom. load
C02527	Motor mounting direction
C02550/1	Position setpoint interpolation
C02550/2	Speed setpoint interpolation
C02550/3	Torque setpoint interpolation
C02553	Position controller gain
C02554	Integral-action time of position controller
C02555	D component of position controller
C02559	Internal torque limit
C02680	Source position setpoint
C02681	Source add. speed
Highlighted in grey = display parameter	

9.7.2.1 Setpoint interpolation

When the setpoint interpolation is activated, the motor control creates intermediate values to "smoothly" follow the setpoints which may be transferred from a slower task.

- C02550/1 = "1": The motor control follows the position setpoint in interpolated steps.
- C02550/2 = "1": The motor control follows the speed setpoint in interpolated steps.
- C02550/3 = "1": The motor control follows the torque setpoint in interpolated steps.

9.7.2.2 Inversion of the direction of rotation

Depending on the motor mounting position the direction of rotation can be reversed, if required:

- C02527 = "0": Clockwise motor ≡ positive machine direction.
- C02527 = "1": Counter-clockwise motor ≡ positive machine direction.

9.7.3 Activating setpoint interface

Requirements

- The controller is in the device state "Operation".
- The basic function "Position follower" is part of the active application.
- No other basic function is active.

Activation

To request the control via the basic function, the enable input PF_*bEnable* in the application must be set to TRUE.

- If no other basic function is active, it is changed to the function state "Position follower active". Setpoints can now be specified via the corresponding inputs. ▶ Signal flow
- A successful change to the function state "Position follower" is displayed by a TRUE signal at the status output *PF_bEnabled*.

> **Stop!**
>
> The basic function takes over the control of the drive not from the current speed on but directly with the defined setpoint which may lead to a jerk!

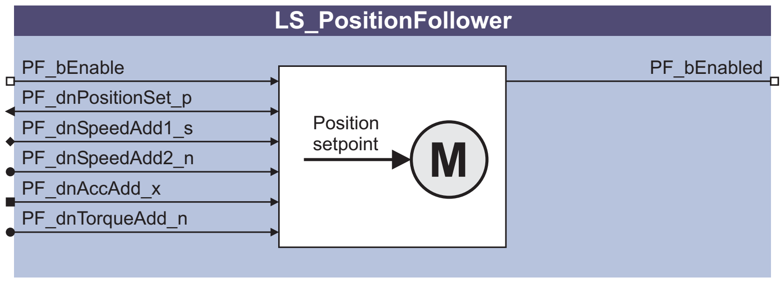
Deactivation

When the enable input *PF_bEnable* is reset to FALSE, the setpoint inputs are inhibited. If the drive is not at standstill, it is braked to standstill within the deceleration time set for stop unless another basic function takes over the control of the drive.

- The status output *PF_bEnabled* is reset to FALSE and a changeover from the active function state "Position follower active" via the function state "Drive is stopped" back to th basic state "Drive in standstill" is effected.

9.7.4 System block "LS_PositionFollower"

The **LS_PositionFollower** system block in the function block editor maps the basic function "Position follower".



Inputs

Identifier DIS code | data type	Information/possible settings	
PF_bEnable C02689/1 | BOOL	Requesting control via the basic function	
	TRUE	If no other basic function is active, it is changed to the function state "Position follower active" and the defined setpoints are accepted.
	TRUE↘FALSE	If no other basic function takes over the control of the drive, the drive is brought to standstill, i. e. a changeover from the active function state "Position follower active" via the function state "Drive is stopped" back to the basic state "drive in standstill" is effected.
PF_dnPositionSet_p C02688/1 | DINT	Position setpoint in [increments]	
PF_dnSpeedAdd1_s C02686 | DINT	Speed precontrol value in [rpm]	
PF_dnSpeedAdd2_n C02687/1 | DINT	Additional speed setpoint in [%] • 100 % ≡ Motor reference speed (C00011)	
PF_dnAccAdd_x C02685 | DINT	Motor acceleration • For calculating the acceleration torque (in case of setting C00276 = "0"). • Specified as speed variation/time in [rpm/s]	
PF_dnTorqueAdd_n C02687/2 | DINT	Additive torque precontrol value in [%] • 100 % ≡ torque at maximum current (C00057/2).	

Outputs

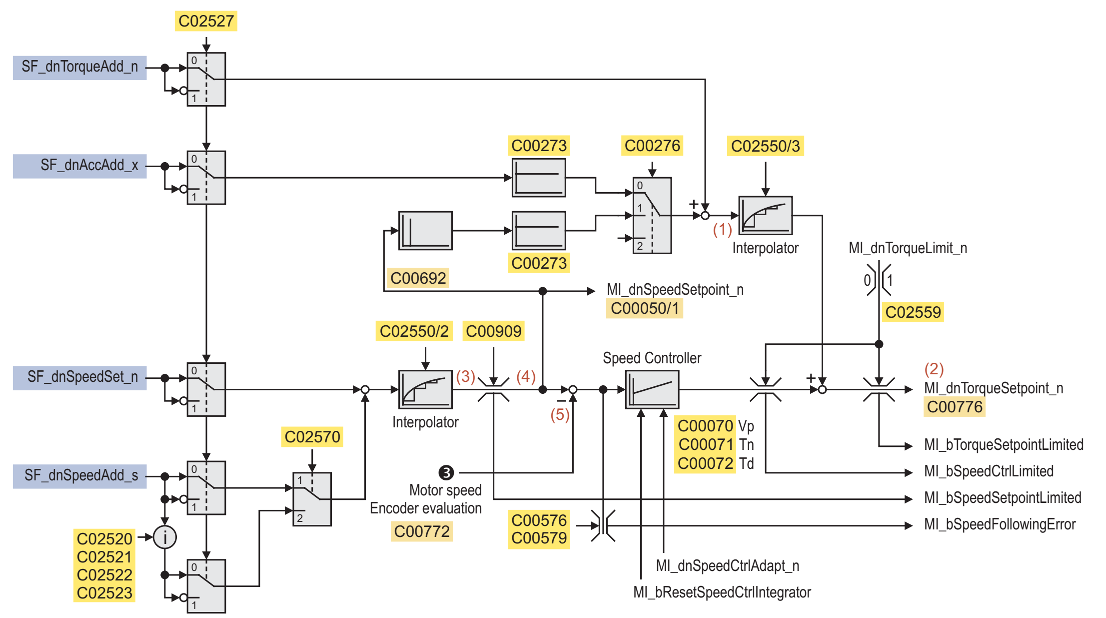
Identifier DIS code | data type	Value/meaning	
PF_bEnabled C02689/2 | BOOL	Status output "Basic function is enabled"	
	TRUE	The defined setpoints are accepted.

9.8 Speed follower

This basic function is used as setpoint interface for speed-controlled drives.

- The motor control is automatically changed over to speed control with torque limitation.
- As an option, an internal interpolation of the setpoints can be carried out in order to specify setpoints with reduced cycle rates without the drive behaviour being unsteady. The detection of the cycle rate and the synchronisation of the setpoint transfer is carried out automatically.
- If the direction of rotation of the motor must be inverted due to the mounting position of the motor or the existing gearbox ratio the use of the control signals can be changed over accordingly via parameter setting.

9.8.1 Signal flow



❸ Signal from Signal flow - encoder evaluation (📖 109)
MI_... = Input/output signals of the motor interface

[9-2] Signal flow - speed follower

Internal variables of the motor control (oscilloscope signals)

▶ The red numbers specified in the signal flow represent internal variables of the motor control, which can be recorded with the Oscilloscope for diagnostic and documentation purposes. (📖 416)

No.	Variable or the motor control	Meaning
(1)	Torque.dnTotalTorqueAdd	Additive torque precontrol value
(2)	Torque.dnTorqueSetpoint	Torque setpoint
(3)	Speed.dnTotalSpeedAdd	Additive speed setpoint
(4)	Speed.dnSpeedSetpoint	Speed setpoint
(5)	Speed.dnActualMotorSpeed	Current motor speed

See also:
▸ Signal flow - motor interface (📖 95)
▸ System block "LS_MotorInterface" (📖 104)

9.8.2 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → dialog level *Overview* → *All basic functions* → *Speed follower*
- Short overview of the parameters for the speed follower:

Parameters	Information
C00050/1	Speed setpoint 1
C00070	Speed controller gain
C00071	Speed controller reset time
C00072	D component - speed controller
C00273/1	Motor moment of inertia
C00273/2	Load moment of inertia
C00276	Signal source torque setpoint
C00576	Window - speed monitoring
C00579	React. speed monitoring
C00909/1	Upper speed limit value
C00909/2	Lower speed limit value
C02520	Gearbox fact. numer. motor
C02521	Gearbox fact. denom. motor
C02522	Gearbox fact. numer. load
C02523	Gearbox fact. denom. load
C02527	Motor mounting direction
C02531/3	Resulting gearbox factor - motor/load
C02550/2	Speed setpoint interpolation
C02550/3	Torque setpoint interpolation
C02570	Controller configuration
C02559	Internal torque limit
Highlighted in grey = display parameter	

9.8.2.1 Setpoint interpolation

When the setpoint interpolation is activated, the motor control creates intermediate values to "smoothly" follow the speed and/or torque setpoints which may be transferred from a slower task.

- C02550/2 = "1": The motor control follows the speed setpoint in interpolated steps.
- C02550/3 = "1": The motor control follows the torque setpoint in interpolated steps.

9.8.2.2 Inversion of the direction of rotation

Depending on the motor mounting position the direction of rotation can be reversed, if required:

- C02527 = "0": Clockwise motor ≡ positive machine direction.
- C02527 = "1": Counter-clockwise motor ≡ positive machine direction.

9.8.3 Activating setpoint interface

Requirements

- The controller is in the device state "Operation".
- The basic function "Speed follower" is part of the active application.
- No other basic function is active.

Activation

To request the control via the basic function, the enable input SF_*bEnable* in the application must be set to TRUE.

- If no other basic function is active, it is changed to the function state "Speed follower active" and the motor control is automatically switched to speed control with torque limitation. Setpoints can now be defined via the corresponding inputs. Signal flow
- A successful change to the function state "Speed follower active" is displayed by a TRUE signal at the status output *SF_bEnabled*.

Stop!

The basic function takes over the control of the drive not from the current speed on but directly with the defined setpoint which may lead to a jerk!

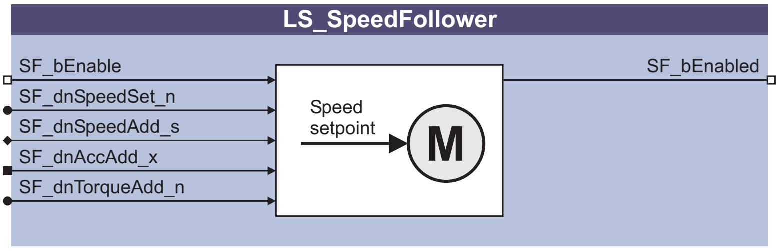
Deactivation

When the enable input SF_*bEnable* is reset to FALSE, the setpoint inputs are inhibited. If the drive is not at standstill, it is braked to standstill within the deceleration time set for stop unless another basic function takes over the control of the drive.

- The status output *SF_bEnabled* is reset to FALSE and a changeover from the active function state "Speed follower active" via the function state "Drive is stopped" back to th basic state "Drive in standstill" is effected.

9.8.4 System block "LS_SpeedFollower"

The **LS_SpeedFollower** system block in the function block editor maps the basic function "Speed follower".



Inputs

Identifier DIS code | data type	Information/possible settings	
SF_bEnable C02695/1 | BOOL	Requesting control via the basic function	
	TRUE	If no other basic function is active, it is changed to the function state "Speed follower active" and the defined setpoints are accepted.
	TRUE↘FALSE	If no other basic function takes over the control of the drive, the drive is brought to standstill, i. e. a changeover from the active function state "Speed follower active" via the function state "Drive is stopped" back to the basic state "drive in standstill" is effected.
SF_dnSpeedSet_n C02694/1 | DINT	Speed setpoint in [%] • 100 % ≡ Motor reference speed (C00011)	
SF_dnSpeedAdd_s C02693 | DINT	Additive speed setpoint in [rpm] • Without position control function.	
SF_dnAccAdd_x C02692 | DINT	Motor acceleration • For calculating the acceleration torque (in case of setting C00276 = "0"). • Specified as speed variation/time in [rpm/s]	
SF_dnTorqueAdd_n C02694/2 | DINT	Additive torque precontrol value in [%] • 100 % ≡ torque at maximum current (C00057/2).	

Outputs

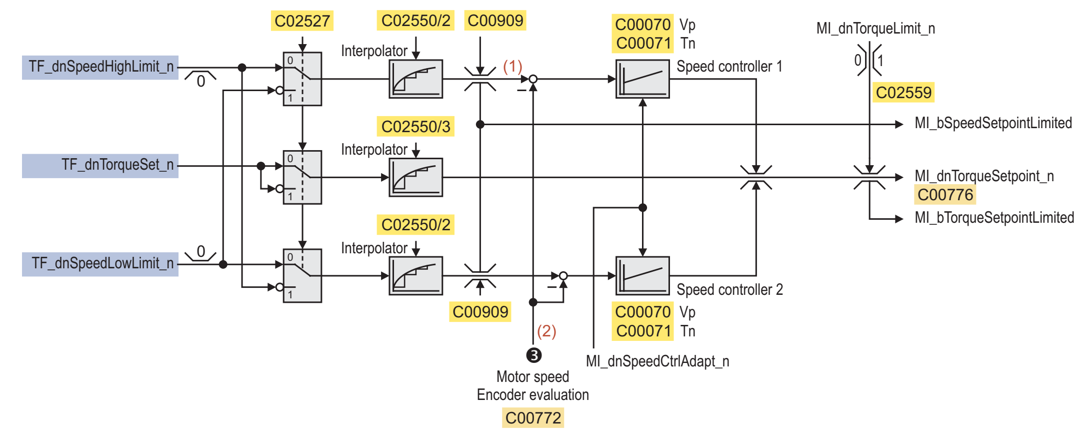
Identifier DIS code | data type	Value/meaning	
SF_bEnabled C02695/2 | BOOL	Status output "Basic function is enabled"	
	TRUE	The defined setpoints are accepted.

9.9 Torque follower

This basic function is used as setpoint interface for torque-controlled drives.

- The motor control is automatically changed over to torque control with speed limitation.
- As an option, an internal interpolation of the torque setpoint can be carried out in order to specify the setpoint with reduced cycle rates without the drive behaviour being unsteady. The detection of the cycle rate and the synchronisation of the setpoint transfer is carried out automatically.
- If the direction of rotation of the motor must be inverted due to the mounting position of the motor or the existing gearbox ratio the use of the control signals can be changed over accordingly via parameter setting.

9.9.1 Signal flow



❸ Signal from Signal flow - encoder evaluation (🕮 109)
MI_... = Input/output signals of the motor interface

[9-3] Signal flow - torque follower

Internal variables of the motor control (oscilloscope signals)

- The red numbers specified in the signal flow represent internal variables of the motor control, which can be recorded with the Oscilloscope for diagnostic and documentation purposes. (🕮 416)

No.	Variable or the motor control	Meaning
(1)	Speed.dnSpeedSetpoint	Speed setpoint
(2)	Speed.dnActualMotorSpeed	Current motor speed

See also:
- Signal flow - motor interface (🕮 95)
- System block "LS_MotorInterface" (🕮 104)

9.9.2 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** → dialog level *Overview* → *All basic functions* → *Torque follower*
- Short overview of the parameters for the torque follower:

Parameters	Information
C00050/1	Speed setpoint 1
C00050/2	Speed setpoint 2
C00070	Speed controller gain
C00071	Speed controller reset time
C00909/1	Upper speed limit value
C00909/2	Lower speed limit value
C02527	Motor mounting direction
C02550/2	Speed setpoint interpolation
C02550/3	Torque setpoint interpolation
C02559	Internal torque limit
Highlighted in grey = display parameter	

9.9.2.1 Setpoint interpolation

When the setpoint interpolation is activated, the motor control creates intermediate values to "smoothly" follow the speed and/or torque setpoints which may be transferred from a slower task.

- C02550/2 = "1": The motor control follows the speed setpoint in interpolated steps.
- C02550/3 = "1": The motor control follows the torque setpoint in interpolated steps.

9.9.2.2 Inversion of the direction of rotation

Depending on the motor mounting position the direction of rotation can be reversed, if required:

- C02527 = "0": Clockwise motor ≡ positive machine direction.
- C02527 = "1": Counter-clockwise motor ≡ positive machine direction.

9.9.3 Activating setpoint interface

Requirements

- The controller is in the device state "Operation".
- The basic function "Torque follower" is part of the active application.
- No other basic function is active.

Activation

To request the control via the basic function, the enable input T F_*bEnable* in the application must be set to TRUE.

- If no other basic function is active, it is changed to the function state "Torque follower active" and the motor control is automatically switched to torque control with speed limitation. Setpoints can now be defined via the corresponding inputs. Signal flow
- A successful change to the function state "Torque follower active" is displayed by a TRUE signal at the status output *TF_bEnabled*.

Stop!

The basic function takes over the control of the drive not from the current speed on but directly with the defined setpoint which may lead to a jerk!

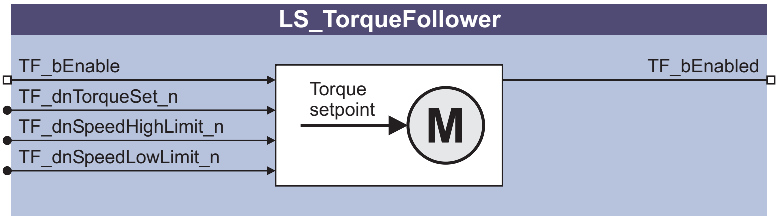
Deactivation

When the enable input *TF_bEnable* is reset to FALSE, the setpoint inputs are inhibited. If the drive is not at standstill, it is braked to standstill within the deceleration time set for stop unless another basic function takes over the control of the drive.

- The status output *TF_bEnabled* is reset to FALSE and a changeover from the active function state "Torque follower active" via the function state "Drive is stopped" back to th basic state "Drive in standstill" is effected.

9.9.4 System block "LS_TorqueFollower"

The **LS_TorqueFollower** system block in the function block editor maps the basic function "Torque follower".



Inputs

Identifier DIS code | data type	Information/possible settings	
TF_bEnable C02699/1 | BOOL	Requesting control via the basic function	
	TRUE	If no other basic function is active, it is changed to the function state "Torque follower active" and the defined setpoints are accepted.
	TRUE↘FALSE	If no other basic function takes over the control of the drive, the drive is brought to standstill, i. e. a changeover from the active function state "Torque follower active" via the function state "Drive is stopped" back to the basic state "drive in standstill" is effected.
TF_dnTorqueSet_n C02698/1 | DINT	Torque setpoint in [%] • 100 % ≡ torque at maximum current (C00057/2).	
TF_dnSpeedHighLimit_n C02698/2 | DINT	Upper speed limit value in [%] for speed limitation • For positive direction of motion. • 100 % ≡ Motor reference speed (C00011). • Negative values are limited internally to the value "0".	
TF_dnSpeedLowLimit_n C02698/3 | DINT	Lower speed limit value in [%] for speed limitation • For negative direction of motion. • 100 % ≡ Motor reference speed (C00011). • Positive values are limited internally to the value "0".	

Outputs

Identifier DIS code | data type	Value/meaning	
TF_bEnabled C02699/2 | BOOL	Status output "Basic function is enabled"	
	TRUE	The defined setpoints are accepted.

9.10 Limiter

The basic function "Limiter" monitors the travel range limits via limit switches and parameterised software limit positions and can lead the drive to defined limit ranges when being asked accordingly by the safety module.

Note!

In order that the basic function "Limiter", **after being asked accordingly by the safety module**, can lead the drive to the defined limit ranges before the limits set for the safety module are reached which stops the drive, the limit values for the basic function "Limiter" must be set lower than the limit values for the safety module!

Danger!

The safety is exclusively ensured by the safety module!

When the request for the safety function is cancelled, the drive restarts automatically.

Ensure by external measures that the drive only starts after a confirmation (EN 60204).

See also: Safety engineering (135)

9.10.1 Parameter setting

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** ➞ dialog level *Overview* ➞ *All basic functions* ➞ *Limiter*
- Short overview of the parameters for the limiter:

Parameters	Information
C02700	Software limit positions are active
C02701/1	Positive software limit position
C02701/2	Negative software limit position
C02702	Limitations effective
C02703	Max. speed
C02704	Max. speed (display in [rpm])
C02705	Max. acceleration
C02706	Min. S-ramp time
C02707	Permissible direction of rotation
C02708/1...4	Limited speed 1 4
C02709/1...4	Limited speed 1 .... 4 (display in [rpm])
C02710/1...4	Delay lim. speed. 1 4
C02711/1...4	S-ramp time lim. speed. 1 4
C02712/1...4	Dec. time lim. speed. 1 4
C02713	Max. path - manual jog
C02714	Max. path - manual jog (display in [increments])
C02715	Active limitation (status display)
C02716/1	Resp. to rotation limitation
C02716/2	Resp. to SW limit pos. excess
C02716/3	Resp. to max. value excess
Highlighted in grey = display parameter	

Note!

The safety module has its own parameters.

Relevant to the basic function "Limiter" are the parameters of the safety modules for setting "Limited direction of rotation", "speed with time limit" and "Limited increment (position)".

Several other parameters of the safety module, however, do not have another meaning for the basic function "Limiter", e.g. the parameters for configuring the inputs of the safety module.

9.10.1.1 Software limit positions

The software limit positions serve to limit the travel range by means of software and prevent that travel commands are executed which would cause an exit of the permissible travel range.

Note!

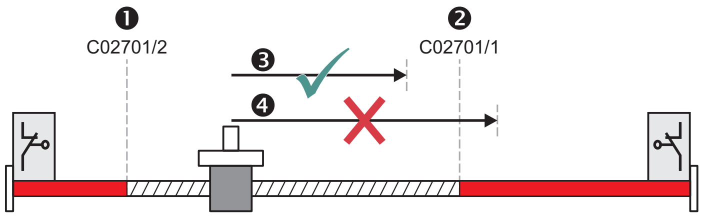
The software limit positions are only evaluated and monitored if the drive knows the home position and the software limit positions are active (C02700 = "1").

- When the traversing range is limited (C02528 = "1") the software limit positions are basically monitored with regard to the internal value range that can be maximally displayed (±2^{31} increments) even if the monitoring mode is deactivated.
- In case of the "Modulo" traversing range (C02528 = "2") the software limit positions are not effective.

The software limit positions are not effective for the basic functions "Speed follower", "Torque follower" and "Position follower".

- When the software limit positions are exceeded, it is only displayed via the status output *LIM_dnState*.
- If a response is to take place (e.g. "fault" or "quick stop by trouble"), this must be set accordingly in C02716/2.

▶ The positive software limit positions are set in C02701/1 and the negative software limit positions are set in C02701/2.

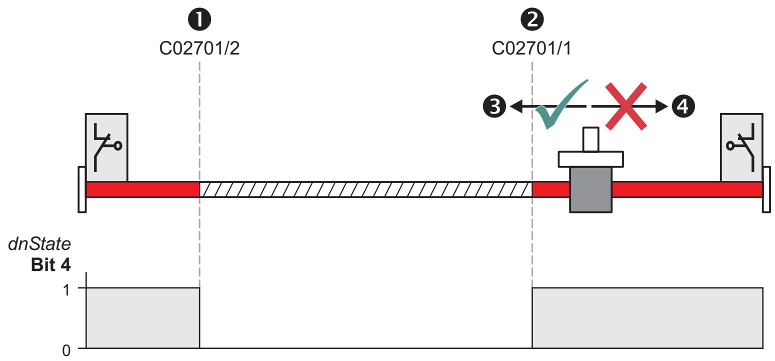


❶ C02701/2: Negative software limit position
❷ C02701/1: Positive software limit position
❸ Travel command possible
❹ Travel command not possible since the target position is outside the permissible traversing range.

[9-4] Example: Traversing range limitation by software limit position

Note!

When the drive is outside the permissible travel range and the software limit positions are switched effectively, only those travel commands can be executed which cause the drive to traverse back into the permissible travel range.



❶ C02701/2: Negative software limit position
❷ C02701/1: Positive software limit position
❸ Traversing in "retracting direction" is possible
❹ Traversing against the "retracting direction" is not possible

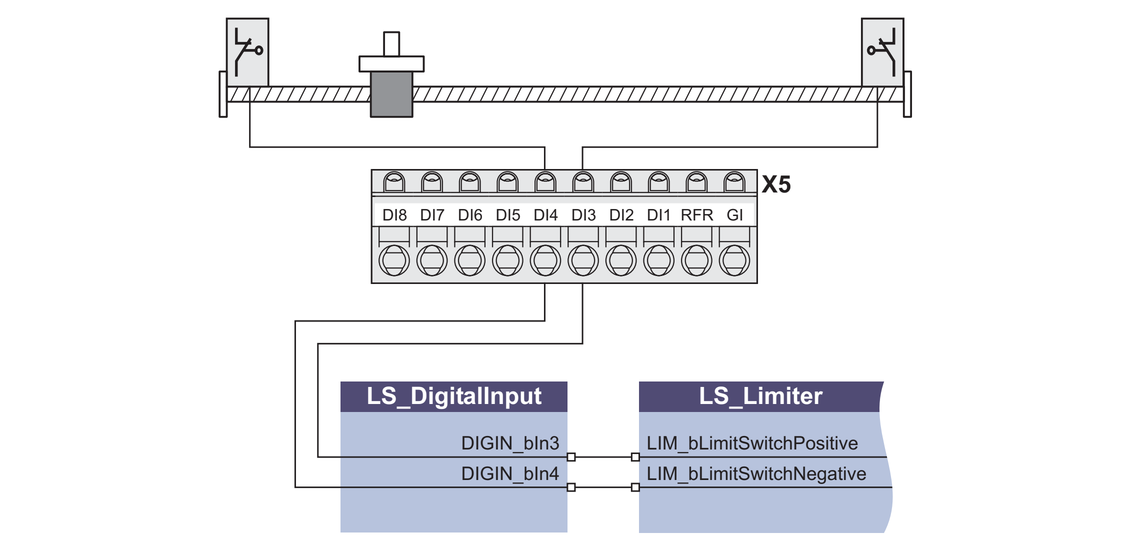
[9-5] Example: Permissible traversing direction with effective software limit positions

See also: ▸ Manual jog to limit position (📖 160)

9.10.1.2 Hardware limit positions (limit switch)

The travel range limits are monitored via limit switch inputs *LIM_bLimitSwitchPositive* and *LIM_bLimitSwitchNegative* of the SB **LS_Limiter**.

Both inputs react to the TRUE status and must be connected to the corresponding digital inputs which are connected with the limit switches.



[9-6] Example: Connection of the travel range limit switches to the digital inputs 3 & 4

- If the limit switch is activated, the drive axis is stopped automatically and a changeover via the function state "Drive is stopped" to the function state "Error" is effected.
- An error is caused via an internal system interface and entered in to the logbook of the controller. The drive can only be traversed again when the error is acknowledged.
- An activated limit switch can be retracted using the function "Retracting the limit switch". ▸ Retracting of an activated limit switch (📖 161)
- When the limit switches are connected to the distributed terminals, both inputs *LIM_bLimitSwitchPositive* and *LIM_bLimitSwitchNegative* of the SB LS_Limiter can be connected via a bus system (e.g. system bus) with the distributed terminal.

Note!

If digital inputs for connecting the limit switch are to be fail-safe (activation at LOW level), simply change the terminal polarity of the corresponding digital inputs in C00114.

See also: ▸ Manual jog to limit position (📖 160)

9.10.1.3 Limitations

Limit values for the basic functions "Manual jog", "Homing" and "Positioning" can be set via the following parameters:

Parameters	Information
C02703	Max. speed • Max. permissible speed that can be driven by the system. • This parameter depends, among other things, by the max. motor speed.
C02705	Max. acceleration • Max. permissible acceleration or deceleration for positioning procedures. • This parameter depends, among other things, on the motor torque and moment of inertia of the entire mechanics which is driven during the positioning process.
C02706	Min. S-ramp time
C02707	Permissible direction of rotation
C02713	Max. path - manual jog

- ▶ The parameters depend on the mechanics (e.g. the tool used).
- ▶ Usually the parameters must be changed when a tool is exchanged, e.g. by means of a recipe management of a superimposed control or via an HMI ("*Human Machine Interface*").

Note!

In order that the limit values set are effective, "1" must be selected in C02702.

- Irrespective of this setting the speed setpoint is basically limited to the motor reference speed (C00011)!

The limitations are not effective for the basic functions "Speed follower", "Torque follower" und "Position follower"!

- In case of these basic functions only speed and acceleration are monitored.
- When the limit values for speed and acceleration are exceeded, the response parameterised in C02716/3 takes place (Lenze setting: No response).
- **Background:** The setpoint followers in technology applications which are synchronised via an electrical shaft may not be limited since this may cause the synchronism to get lost. A possible consequence would be a collision of tools.

Response if limit values are exceeded

When the limit values are switched effectively and a set limit value is exceeded, the following reactions occur:

- The setpoints of the active basic function ("Manual jog", "Homing" or "Positioning") are changed (limited).
- Via the output *LIM_dnState* of the SB LS_Limiter a corresponding status is output.
- The display parameter C02714 is set to "1" ("limitation is active").
- The response parameterised in C02716/3 is activated (Lenze setting: "No response").

9.10.1.4 Limited speed

"Limited speeds" for the basic functions "Manual jog", "Homing" and "Positioning" can be set via the following parameters:

Parameters	Information
C02708/1...4	Limited speed 1 4
C02710/1...4	Delay lim. speed. 1 4
C02711/1...4	S-ramp time lim. speed. 1 4
C02712/1...4	Dec. time lim. speed. 1 4

Note!

The limited speeds are not effective for the basic functions "Speed follower", "Torque follower" and Position follower"!

Request "Limited speed"

"Limited speed 1 ... 4" is requested via the input *LIM_dwControl* of the SB LS_Limiter and normally through the control word of the safety module.

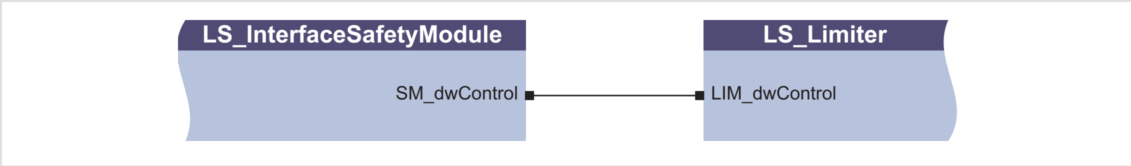
- If no safety module is available, the control word for the input *LIM_dwControl* can also be generated by means of a converter.
- Via the input *LIM_bActivateLimitedSpeed1* of the SB LS_Limiter the "Limited speed 1" can be requested additionally, e.g. via a digital input connected to this input.

Process example: "Manual jog"

1. Manual jog in positive direction is active and the manual speed is higher than the "Limited speed 1" set.
2. Via the control word of the safety module the "Limited speed 1" is requested.
3. The drive is decelerated to the "Limited speed 1" with the deceleration and S-ramp time set for the "Limited speed 1".
4. At the same time a corresponding status is output via the output *LIM_dnState* des SB LS_Limiter.

9.10.2 Control word of the safety module

To provide an easy connection of the safety module to the application the currently valid safety requirement is transferred to the following interface using a bit-coded control word:

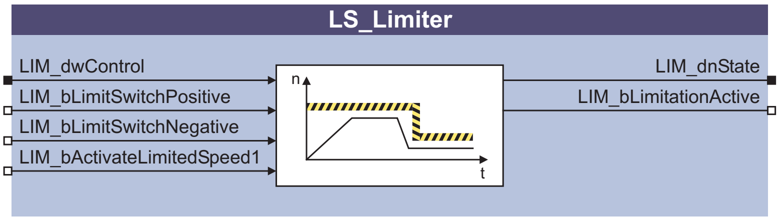


[9-7] Interface to connect the safety module to the basic function "Limiter"

- It is also possible to make several requirements at the same time via the control word, e.g. manual jog with limited increment and limited speed 2.
- If no safety module is connected, the control word can be generated by means of a converter module.
- The bit coding of the control word is described in the "safety engineering" chapter.
  ▸ Control word of the safety module SM3xx (📖 137)

9.10.3 System block "LS_Limiter"

The **LS_Limiter** system block in the function block editor maps the basic function "Limiter".



Inputs

Identifier DIS code | data type	**Information/possible settings**	
LIM_dwControl C02717 | DWORD	Interface to the safety module • Connect this input with the output *SM_dwControl* of the **LS_SafetyModule** system block. ▶ System block "LS_SafetyModule" (📖 139)	
LIM_bLimitSwitchPositive C02719/1 | BOOL	Input for positive travel range limit switch	
	TRUE	Limit switch is activated.
LIM_bLimitSwitchNegative C02719/2 | BOOL	Input for negative travel range limit switch	
	TRUE	Limit switch is activated.
LIM_-bActivateLimitedSpeed1 C02719/3 | BOOL	Request limited speed 1 • If a setpoint follower is active, no limitation takes place, but an exceeding of the limit values is displayed via the output *LIM_dnState*.	
	TRUE	Request limited speed 1.

Outputs

Identifier DIS code | data type	Value/meaning	
LIM_dnState C02718 | DINT	Status word (bit coded) • Bits which are not listed are not assigned with a status (always "0").	
	Bit 0	Controller inhibit is initiated. (Safe torque off is requested.)
	Bit 1	Quick stop is initiated. (Safe stop 1 is requested.)
	Bit 2	Quick stop is initiated. (Safe stop 2 is requested.)
	Bit 3	Profile change due to speed limitation. (Limited speed 1 is requested.)
	Bit 4	Profile change due to speed limitation. (Limited speed 2 is requested.)
	Bit 5	Profile change due to speed limitation. (Limited speed 3 is requested.)
	Bit 6	Profile change due to speed limitation. (Limited speed 4 is requested.)
	Bit 7	Only positive direction of rotation is permissible. • When the direction of rotation is negative while requesting "Only positive direction of rotation", the drive is braked to standstill.
	Bit 8	Only negative direction of rotation is permissible. • When the direction of rotation is negative while requesting "Only negative direction of rotation", the drive is braked to standstill.
	Bit 10	Increment in manual jog mode is limited.
	Bit 12	Limitation of the set position is active.
	Bit 16	Positive limit switch inhibits travel in positive direction.
	Bit 17	Negative limit switch inhibits travel in positive direction.
	Bit 18	Positive software limit position inhibits travel in positive direction.
	Bit 19	Negative software limit position inhibits travel in negative direction.
	Bit 20	Limitation of speed is active.
	Bit 21	Limitation of acceleration is active.
	Bit 22	Limitation of deceleration is active.
	Bit 23	Limitation of jerk is active (S-ramp time is increased).
LIM_bLimitationActive C02715 | BOOL	Status signal "Limitation is active" (group signal)	
	TRUE	A limitation is active.

9.11 Brake control

This basic function is used for wear free control and monitoring of a holding brake which is connected to the optionally available brake module. As an alternative, the holding brake can also be controlled and monitored via the digital inputs/outputs.

Intended use

Motor holding brakes are used to stop axes when controller inhibit or pulse inhibit is set. This is particularly important for unbalanced vertical axes.

Stop!

Basically, holding brakes at Lenze motors are not designed for braking during operation. The increased wear resulting from braking during operation may lead to an early destruction of the motor holding brake!

Danger!

Please note that the holding brake is an important element of the safety concept of the entire machine.

Therefore act with caution when commissioning this part of the system!

9.11.1 Parameter setting

Danger!

For a faultless function of the automatic brake system the different delay times must be set correctly in the following parameters!

If the delay times are set incorrectly, a faulty brake control may be caused!

- Parameterisation dialog in the »Engineer«: Tab **Application parameter** ➞ dialog level *Overview* ➞ *All basic functions* ➞ *Brake control*
- Short overview of parameters for brake control:

Parameters	Information
C02580	Operating mode - brake
C02581	Brake activation threshold
C02582	Brake resp. to pulse inhibit
C02583	Status input monitoring
C02585	Brake control polarity
C02586	Starting torque 1
C02587	Starting torque 2
C02588	Source of starting torque
C02589	Brake closing time
C02590	Brake opening time
C02591	Waiting time - status monit.
C02593	Waiting time - brake active.
C02594	Test torque
C02595	Permissible angle of rotation
C02596	Grinding speed
C02597	Accel./decel. time - grinding
C02598	Grinding ON time
C02599	Grinding OFF time

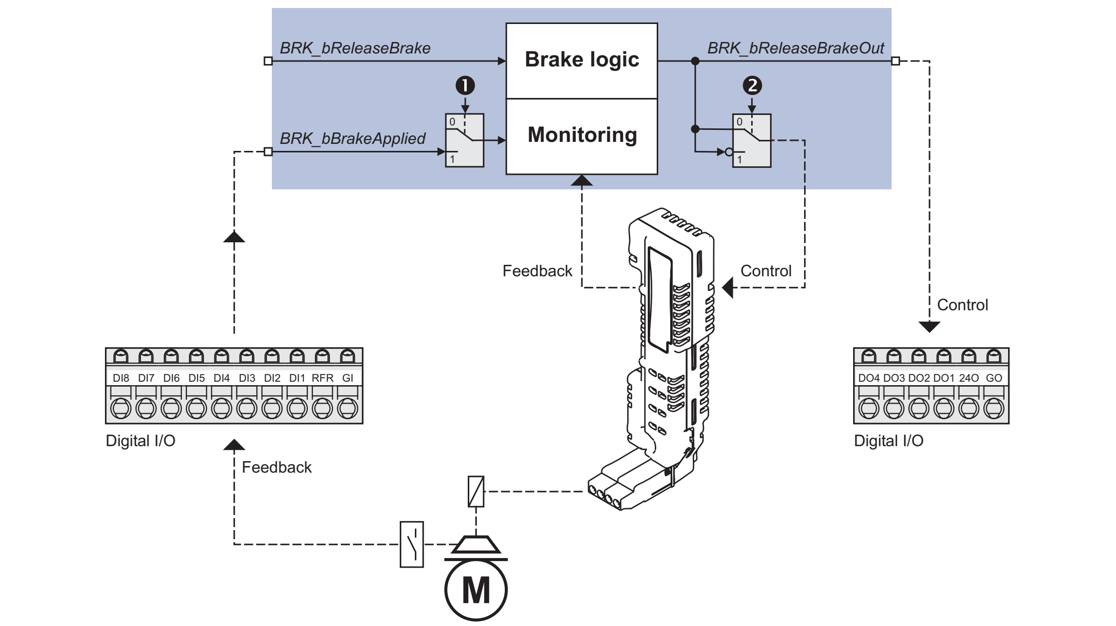
9.11.1.1 Operating mode

Various operating modes are available in C02580 for different applications and tasks:

- Mode 0: Brake control is switched off (🕮 222)
- Mode 1/11: Direct control of the brake (🕮 222)
  - Without using a special logic or automatic, can be used, for instance, to check in a simple manner if the brake operates correctly.
- Mode 2/12: Automatic control of the brake (🕮 223)
  - The common mode for controlling mechanical holding brakes with or without holding torque precontrol.

9.11.1.2 Signal configuration

The signal configuration of the control and status signals for the brake logic and monitoring function is executed via the parameters shown in the following signal flow:



❶ C02583: Status input monitoring
❷ C02585: Brake control polarity (for brake module)

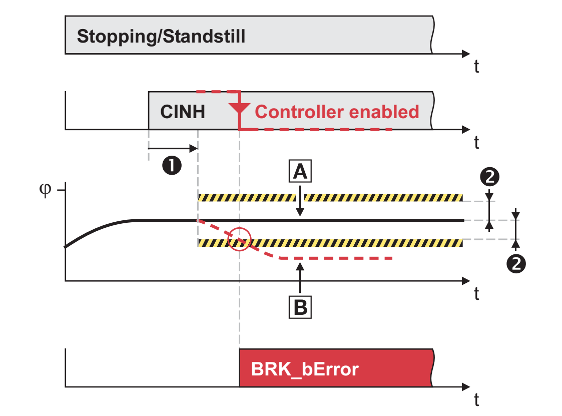
[9-8] Signal configuration of the control and status signals

Note!

- If an electrically holding (self-releasing) brake is to be controlled instead of an electrically releasing (self-holding) brake, the corresponding control and status signals must be inverted!
- For detailed information about the assembly and electrical installation of the motor holding brake, please see the documentation for the brake module and the brake.

9.11.1.3 Standstill monitoring

After the brake closing time and the waiting time for status monitoring have elapsed, the standstill monitoring becomes active, i.e. the stop position is memorised and compared with the permissible angle of rotation set in C02595 (Lenze setting: 5°) when the brake is applied.



A Normal behaviour
B Error behaviour
❶ C02591: Waiting time - status monit.
❷ C02595: Permissible angle of rotation
CINH = controller inhibit

[9-9] Automatic monitoring of the holding position

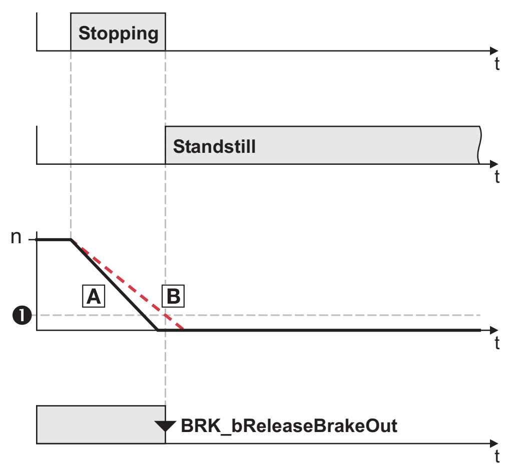
- When the stop position of the motor axis has changed by more than the permissible angle of rotation set in C02595 despite the applied brake:
  - The controller is enabled again and the drive is held at standstill with speed control to prevent a further rotation/acceleration of the drive.
  - The error output *BRK_bError* is set to TRUE for one task cycle.
  - The status "position drift when brake is applied" is displayed at the status output *BRK_dnState* via bit 21 for one task cycle.

Note!

The standstill monitoring function can be switched off via the setting C02595 = "0°".

9.11.1.4 Brake activation in automatic operation

Brake activation through $N < N_{min}$



A speed setpoint
B actual speed value
❶ C02581: Brake activation threshold

[9-10] Process of brake activation through N < Nmin

- If the motor speed falls below the threshold for brake activation set in C02581, the brake is automatically triggered to close in the automatic operation (mode 2/12).
- Here, only the absolute value of the motor speed is considered, the direction of rotation is disregarded.

Tip!

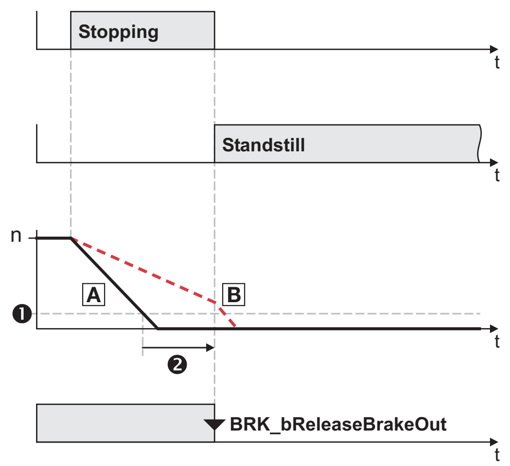
The value at C02581 is to be set to approx. 5 ... 20 % of the maximum speed to minimise the wear of the brake and provide for an optimum brake response by a low grinding of the brake.

Brake activation through time-out

If the waiting time for the brake activation is set > 0 s in C02593, time monitoring is active, i.e. the brake will be triggered to close not later than after the waiting time has elapsed even if the actual speed value is above the threshold for brake activation set in C02581.

Note!

In the Lenze setting the time monitoring function is not active (C02593 = "0 s").



A speed setpoint
B actual speed value
❶ C02581: Brake activation threshold
❷ C02593: Waiting time for brake activation

[9-11] Process of brake activation through time-out

- The lapse of waiting time starts when the speed setpoint has reached the threshold for brake activation.
- If the speed setpoint is still above the threshold after the waiting time has elapsed:
  - The brake is automatically triggered to close in automatic operation (mode 2/12).
  - The "brake activation via waiting time" status is displayed at the status output *BRK_dnState* via bit 23.

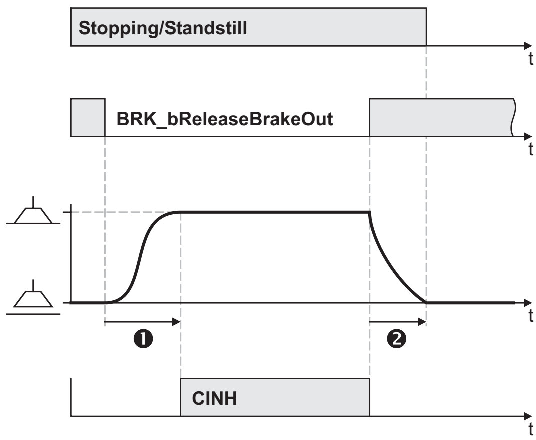
9.11.1.5 Brake time response

Closing and opening time

Danger!

A wrong setting of the closing and opening time can cause a wrong activation of the brake!

- When the closing time is set too low, the controller is inhibited and the drive gets torqueless before the brake is closed completely.

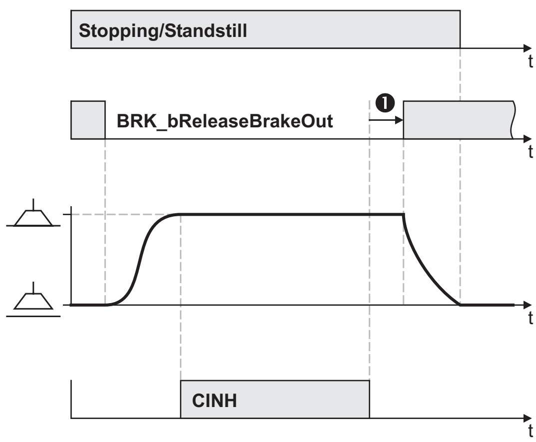


❶ C02589: Brake closing time
❷ C02590: Brake opening time
CINH = controller inhibit

[9-12] Definition of the closing and opening time of the brake

- Every mechanical brake has a construction-conditioned closing and opening time which must be considered by the brake control and must be set in C02589 and C02590.
- The closing and opening time of a Lenze holding brake can be found in the corresponding Operating Instructions in chapter "Technical data".
- If the closing and opening time is set too high, it is not critical with regard to safety but results in needlessly long delays in cyclic braking processes.

Motor magnetising time (only for asynchronous motor)



❶ Motor magnetising time
CINH = controller inhibit

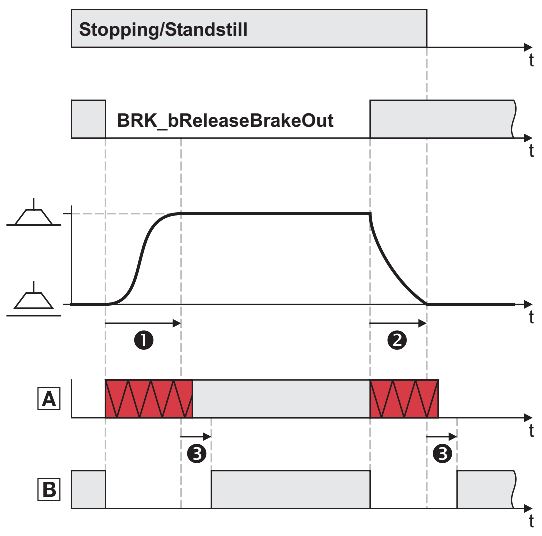
[9-13] Consideration of the motor magnetising time

- In an asynchronous motor the required magnetic field is created (is already available in synchronous motors) after the controller inhibit is deactivated.
- The brake will only be released if the actual torque has reached 90 % of the precontrol torque.

Waiting time for status monitoring

Every time the brake status changes, the waiting time set in C02591 is awaited after the brake opening or brake closing time has elapsed, before the monitoring of the brake module/status input *BRK_bBrakeApplied* (if activated via C02583) and the standstill monitoring function are switched active again.

- During the "Closing the brake" process, a mechanical contact must signal the status "brake closed" after the waiting time has elapsed.
- During the "Releasing the brake" process, a mechanical contact must signal the status "brake released" after the waiting time has elapsed.



A Brake status (with bouncing or transient response)
B Active status monitoring
❶ C02589: Brake closing time
❷ C02590: Brake opening time
❸ C02591: Waiting time - status monit.

[9-14] Definition of the waiting time for status monitoring

- The waiting time in C02591 must be set so that bouncing of a feedback contact and the transient response of the brake current monitoring will be suppressed completely.
- If there is no appropriate feedback after the waiting time has expired, the error output *BRK_bError* is set to TRUE until the next control attempt.

9.11.1.6 Torque feedforward control

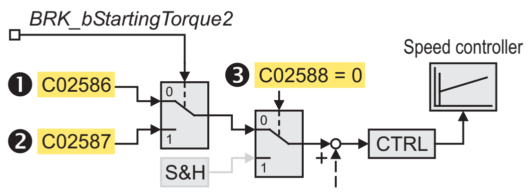
The motor control serves to precontrol the required torque of the drive when the brake is released. Here it must be ensured that the position controller is switched off and the speed setpoint is loaded with the actual value (no additional torque via the P component of the speed controller).

Note!

The torque is precontrolled for one second. During this time, the actual torque must have reached 90 % of the set torque, otherwise a fault is tripped!

Via C02588 it is selected whether a parameterised starting torque or the torque memorised during the last closing operation shall be used for the feedforward control.

Feedforward control with parameterised starting torque



❶ C02586: Starting torque 1
❷ C02587: Starting torque 2
❸ C02588: Waiting torque source

[9-15] Feedforward control with parameterised starting torque

- When C02588 = 0, a change-over between two starting torques is possible via input *BRK_bStartingTorque2*:
  - *BRK_bStartingTorque2* = FALSE: Starting torque 1 (C02586) is used.
  - *BRK_bStartingTorque2* = TRUE: Starting torque 2 (C02587) is used.

Application example:

A hoist drive is to be operated with different loads. Unfortunately we do not know when the load is available, but the starting direction (lifting or lowering) is known.

- In a no-load condition, the hoist drive needs a torque of 10 Nm. For holding the maximum load it needs a torque of 50 Nm.
- The change-over between lifting and lowering at start-up is done via the input *BRK_bStartingTorque2*.

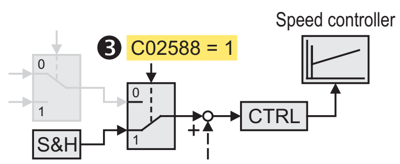
- To ensure the correct direction at start-up, the speed controller is loaded with the following starting torques:

	Lifting	Lowering
Starting torque:	C02586 = 50 Nm	C02587 = 10 Nm

- This results in the following behaviour depending on load and direction:

	Lifting	Lowering
Behaviour at max. load:	Optimum behaviour	Start-up a bit fast, but correct direction (non-critical).
Behaviour without load:	Start-up a bit fast, but correct direction (non-critical).	Optimum behaviour

Feedforward control with memorised torque



❸ C02588: Waiting torque source

[9-16] Feedforward control with parameterised starting torque

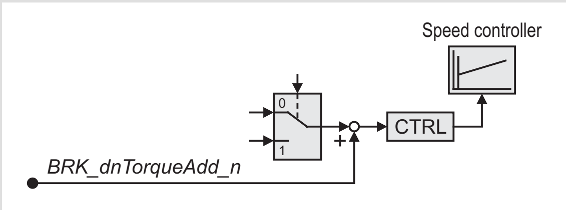
- When C02588 = 1, the starting torque is the setpoint which has been automatically memorised during the last closing process (falling below the speed threshold set in C02581).

Note!

The higher the threshold for brake activation set in C02581, the higher is the dynamic part in the marked torque (e.g. the speed-dependent friction torque).

In the special case that the load changes when the brake is closed, a correction value, which is added to the marked torque, can be defined for the torque precontrol via the input *BRK_dnTorqueAdd_n*.

Further torque feedforward control options



[9-17] Feedforward control with parameterised starting torque

- An additional precontrol value can be set via the input *BRK_dnTorqueAdd_n*.

Application example:

The load for a hoist drive is always known. For an optimum behaviour a torque proportional to the load and 10 Nm in addition as constant precontrol value are to be loaded in the speed controller.

- The starting torque 1 is used as constant precontrol value (C02586 ="10 Nm", C02588 = "0" and *BRK_bStartingTorque2* = FALSE).
- Via the input *BRK_dnTorqueAdd_n* the torque is specified proportional to the load.

9.11.2 Mode 0: Brake control is switched off

If the mode 0 is selected in C02580, the brake activation is switched off.

- If a brake module is available, it will not be triggered.
- The brake monitoring function is not active.
- If a fault is reported by the brake control, it will be reset.
- The output signals of the system block LS_Brake are reset:
  - *BRK_dnState* = 0
  - *BRK_bReleaseBrakeOut* = FALSE
  - *BRK_bBrakeReleased* = FALSE
  - *BRK_bError* = FALSE

Note!

The mode 0 is preset in the Lenze setting to reach a safe status after mains connection.

9.11.3 Mode 1/11: Direct control of the brake

If the mode 1 or 11 has been selected in C02580, the brake is directly controlled via the input *BRK_bReleaseBrake*.

Tip!

Mode 1/11 can be used to easily check if the brake switches correctly.

- At the same time, the selection of the mode defines the type of brake control:
  - Mode 1: Direct brake control via brake module.
  - Mode 11: Direct brake control via a digital output.
- Setting the pulse inhibit or controller inhibit does not influence the output signal.
- After the brake has been activated and the brake closing time has elapsed, the controller inhibit is set automatically by the basic function "brake control".
- For the operation with the brake module (mode 1) the required polarity for brake control can be set in C02585.

9.11.4 Mode 2/12: Automatic control of the brake

If the mode 2 or 12 is selected in C02580, the brake is controlled automatically, i.e. if another basic function is activated which causes the drive to traverse, the brake is opened automatically and the operation is enabled. If the corresponding basic function is deactivated again, the drive is stopped via the basic function "Standard stop" and the brake is automatically closed again, if speed setpoint and actual speed value fall below the speed threshold set in C02581.

Tip!

The mode 2/12 is the common mode for brake control.

In this mode, the input *BRK_bReleaseBrake* is to be set permanently to FALSE. If *BRK_bReleaseBrake* = TRUE, the brake is permanently released and the automatic control cannot close the brake.

- At the same time, the selection of the mode defines the type of brake control:
  - Mode 2: Automatic brake control via brake module.
  - Mode 12: Automatic brake control via a digital output.
- The brake is also activated automatically if a quick stop is activated in the drive, e.g. via the basic function "Quick stop" or as a response to a fault.
- After the brake has been activated automatically and the brake closing time has elapsed, the controller inhibit is set automatically by the basic function "brake control".
- For the operation with the brake module (mode 1) the required polarity for brake control can be set in C02585.

9.11.4.1 Behaviour at pulse inhibit

In case of pulse inhibit the brake is applied. This occurs according to the parameter setting in C02582 either immediately (default setting) or delayed when the threshold set for brake activation is fallen below, which can be selected to protect the brake if high centrifugal masses occur.

Note!

Pulse inhibit can be set in the enabled controller e.g. due to a DC overvoltage during brake operation by a wrong dimensioning of the brake resistor.

Activate the brake in any case

When setting C02582 = "0", the brake is triggered to close to prevent the mechanics from being damaged.

Only activate the brake below the threshold set for brake activation

When C02582 = "1", the brake remains released until the threshold set in C02581 for brake activation has been reached to protect the brake from excessive wear.

- Braking is exclusively executed by the friction of the load mechanics.
- Only when the motor speed has reached the threshold for brake activation, the brake will be closed.

Stop!

Do not set the threshold for brake activation in C02581 too high to protect the brake from wear.

9.11.4.2 Process when brake is released

The following process occurs when a basic function is requested which causes the drive to traverse:

1. The controller inhibit is deactivated.
2. A magnetic field is created in the motor required for the holding torque (is already available in synchronous machines).
3. The precontrol torque is loaded in the speed controller.
4. When the actual torque has reached 90 % of the precontrol torque:
   - The output *BRK_bReleaseBrakeOut* is set to TRUE for releasing the brake.
   - Monitoring of the brake module is deactivated temporarily.
   - Monitoring of the status input is deactivated temporarily (if switched active via C02583).
   - The lapse of brake opening time starts.
5. After the brake opening time has elapsed:
   - The output *BRK_bBrakeReleased* is set to TRUE.
   - The requested basic function is enabled.
6. After the additional waiting time set for the status monitoring in C02591 has elapsed:
   - Monitoring of the brake module is active again.
   - Monitoring of the status input is active again (if switched active via C02583).

9.11.4.3 Process when brake is closed

The following process occurs if the enable of the requested basic function for traversing the drive is deactivated again:

1. The drive is braked to standstill via the basic function "Standard stop", or also via the basic function "Quick stop".
2. When speed setpoint and actual speed value have fallen below the speed threshold set in C02581:
   - The output *BRK_bReleaseBrakeOut* is set to FALSE for opening the brake.
   - The current torque is saved to be used for the feedforward control for the next start, if required.
   - Monitoring of the brake module is deactivated temporarily.
   - Monitoring of the status input is deactivated temporarily (if switched active via C02583).
   - The lapse of brake closing time starts.
3. After the brake closing time has elapsed and the corresponding status change of the status signal:
   - The output *BRK_bBrakeReleased* is reset to FALSE.
   - The controller inhibit is activated.
4. After the additional waiting time set for the status monitoring in C02591 has elapsed:
   - Monitoring of the brake module is active again.
   - Monitoring of the status input is active again (if switched active via C02583).
   - Standstill monitoring is activated. ▸ Standstill monitoring (📖 214)

9.11.5 Grinding the brake

Function only implemented from bundle 1.1!

This function is required if the brake is exchanged. The holding torque listed in the data sheet is only reached if the friction partners are ground after installation.

Stop!

If this function is activated, the drive is automatically accelerated to the grinding speed parameterised in C02596.

- The axis must move freely without driving against the travel range limitations.
- The maximally permissible friction energy of the brake must not be exceeded (observe the specifications of the manufacturer)!

$$W_{total}[J] \sim M_K[Nm] \cdot \frac{2\pi}{60} \cdot N[min^{-1}] \cdot t_{total}[s]$$

[9-18] Formula for estimating the friction energy during grinding process

Requirements

To activate the grinding of the brake, the following conditions must be fulfilled:

- The grinding speed in C02596 is set higher than 0 rpm.
- The brake is activated, i.e. the "brake closing time" (C02589) and the "waiting time for status monitoring" (C02591) are elapsed.
- No other source for controller inhibit is active so that the controller inhibit can be deactivated by the brake control.

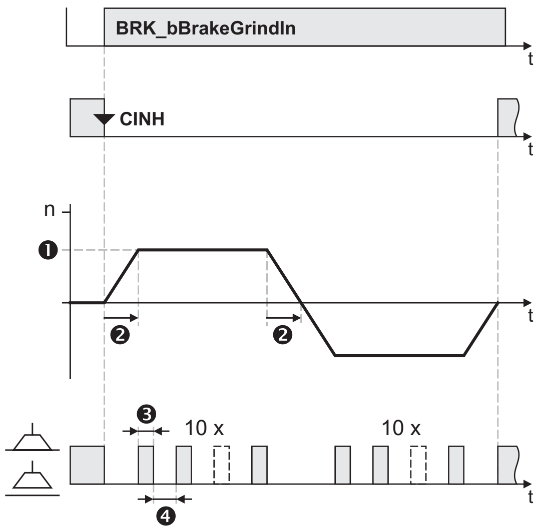
Note!

When grinding the brake it must be ensured that the motor shaft can be kept at speed against the closed brake.

- For this purpose, make sure that the maximum torque of the motor control (C00057/2) is higher than the holding torque of the brake.

Sequence

When all conditions mentioned are fulfilled, the grinding process can be started by setting the input *BRK_bBrakeGrindIn* to TRUE.



❶ C02596: Grinding speed
❷ C02597: Acc./dec. time - grinding
❸ C02598: Grinding ON time
❹ C02599: Grinding OFF time
CINH = controller inhibit

[9-19] Sequence of the grinding operation

- After the grinding speed has been reached, the friction partners in the brake are ground by a pulse-type control.
- After the brake has been closed and opened ten times, the direction of rotation changes and grinding in the opposite direction is carried out.
- By resetting the input *BRK_bBrakeGrindIn* to FALSE the grinding process can be aborted.

9.11.6 Carry out brake test

Function only implemented from bundle 1.1!

This function can be used to check the holding torque of the brake.

Tip!

You can carry out this test regularly to early detect defects or wear of the brake in good time.

Note!

Due to possible deviations in the torque generation, the test of the holding torque cannot determine the holding torque exactly!

- The generated motor torque can deviate up to ±15 % from the default value depending on temperature.

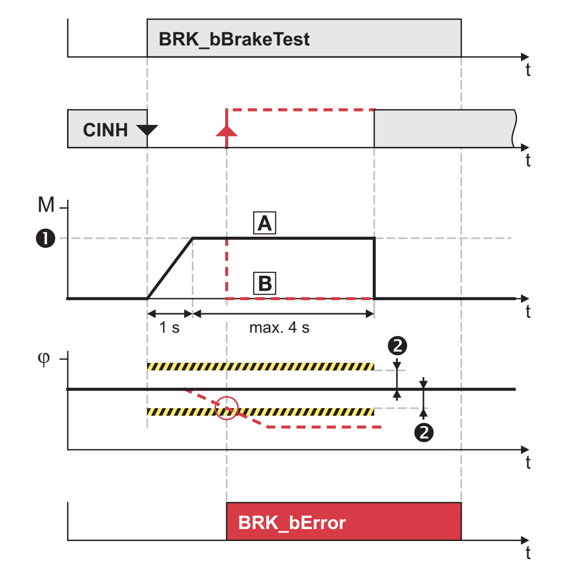
Requirements

To activate the brake test, the following conditions must be fulfilled:

- The test torque in C02594 is set higher than 0 Nm.
- The permissible angle of rotation in C02595 is set higher than 0° and thus standstill monitoring is active. Standstill monitoring (214)
- The brake is activated, i.e. the "brake closing time" (C02589) and the "waiting time for status monitoring" (C02591) are elapsed.
- No other source for controller inhibit is active so that the controller inhibit can be deactivated by the brake control.

Sequence

When all conditions mentioned are fulfilled, the brake test can be started by setting the input *BRK_bBrakeTest* to TRUE.



A Normal behaviour
B Error behaviour
❶ C02594: Test torque
❷ C02595: Permissible angle of rotation
CINH = controller inhibit

[9-20] Sequence of the brake test

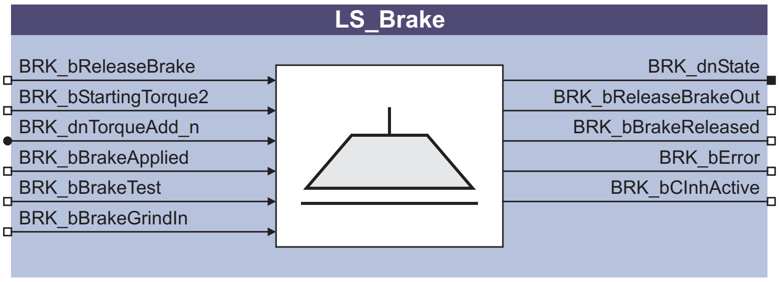
- The specified test torque is created via a ramp generator with an acceleration time of 1 s and held max. 4 s.
  - By this it is tried to rotate the motor shaft while the brake is applied.
- By resetting the input *BRK_bBrakeTest* to FALSE the brake test can be aborted.

Error behaviour

- When the stop position of the motor axis has changed during the brake test by more than the permissible angle of rotation set in C02595 despite the applied brake:
  - The brake test is aborted immediately and the controller is inhibited.
  - The status "position drift when brake is applied" is displayed at the status output *BRK_dnState* via bit 21 and the status "brake error" is displayed via bit 15.
  - The output *BRK_bError* is set to TRUE.
- By resetting the input *BRK_bBrakeTest* to FALSE an error can be reset automatically.

9.11.7 System block "LS_Brake"

The **LS_Brake** system block in the function block editor maps the basic function "brake control".



Inputs

Identifier DIS code | data type	Information/possible settings	
BRK_bReleaseBrake C02609/1 | BOOL	Opening/closing the brake in connection with the selected operating mode	
	FALSE	Close the brake. • In automatic operation the internal brake logic takes over the brake control.
	TRUE	Release brake. • In automatic operation the internal brake logic is deactivated and the brake is opened. If the controller is inhibited by the brake control, it will be deactivated again.
BRK_bStartingTorque2 C02609/2 | BOOL	Selection of the torque feedforward control value • For the general use of the parameterisable starting torque as precontrol value, set C02588 = 0. ▸ Torque feedforward control (📖 219)	
	FALSE	Starting torque 1 (C02586) is active.
	TRUE	Starting torque 2 (C02587) is active.
BRK_dnTorqueAdd_n C02608 | DINT	Additive torque value in [%] for torque feedforward control during start • 100 % ≡ C00057/2 ▸ Torque feedforward control (📖 219)	
BRK_bBrakeApplied C02609/3 | BOOL	Input for status detection via switching contact at the brake • Activation of the input by setting C02583 = 1. ▸ Signal configuration (📖 213)	
	FALSE	Status "Brake is released".
	TRUE	Status "Brake is applied".
BRK_bBrakeTest C02609/4 | BOOL	Start/abort of the brake test ▸ Carry out brake test (📖 229)	
	TRUE	Carry out brake check.
	TRUE↘FALSE	Abort brake test (deactivate mode).
BRK_bBrakeGrindIn C02609/5 | BOOL	Start/abort of the brake grinding process ▸ Grinding the brake (📖 227)	
	TRUE	Brake grinding.
	TRUE↘FALSE	Abort grinding process (deactivate mode).

Outputs

Identifier DIS code | data type	Value/meaning	
BRK_dnState C02607 | BOOL	Status (bit-coded) • Bits which are not listed are not assigned with a status (always "0").	
	Bit 1	Brake control is active.
	Bit 4	Brake module is used.
	Bit 8	Brake status (internal status signal).
	Bit 9	Torque feedforward control is active.
	Bit 10	Controller inhibit is active or set by brake.
	Bit 15	Error is active (collective message).
	Bit 16	Status "Brake grinding-in".
	Bit 17	Status "Brake test".
	Bit 18	Status "Direct control".
	Bit 19	Status "Automatic control".
	Bit 20	Error: External feedback.
	Bit 21	Error: Position drift when brake is applied/checked.
	Bit 22	Error: Brake module monitoring.
	Bit 23	Information: Brake activation via waiting time.
	Bit 24	Information: Brake grinding-in is completed.
	Bit 25	Information: Brake test completed.
	Bit 26	Error: precontrol torque could not be created within one second.
BRK_bReleaseBrakeOut C02609/6 | BOOL	Control signal for triggering an external brake/status signal for control state	
	FALSE	Close the brake.
	TRUE	Release brake.
BRK_bBrakeReleased C02609/7 | BOOL	Status signal of the brake control considering the closing and opening time of the brake	
	FALSE	Brake is applied (after the brake closing time has elapsed).
	TRUE	Brake is released (after the brake opening time has elapsed).
BRK_bError C02609/8 | BOOL	Status signal "Brake error"	
	TRUE	An error has been detected.
BRK_bCInhActive C02609/9 | BOOL	Status signal "Controller inhibit"	
	TRUE	Controller inhibit has been set by brake control.

10 Technology applications (TAs)

Technology applications are block applications with parameter setting interface prepared by Lenze which form the basis of solving typical applications.

Delivery

The technology applications available for the 9400 Servo Drives can be selected in the »Engineer« from the application catalog.

Commissioning

Commissioning is carried out D with the »Engineer« by selection from the catalogue, transmission to the controller, and parameter setting via corresponding dialogs.

▸ Commissioning using the »Engineer« (📖 235)

Licensing

Technology applications require a runtime software license which is determined by the plugged memory module and is higher or equal to the required license.

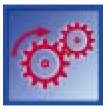
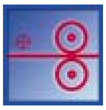
MM□□□
↑

		License	Controller
1	→	Motion Control StateLevel	9400 StateLine
2	→	Motion Control HighLevel	9400 HighLine
3	→	Motion Control TopLevel	9400 HighLine
4	→	PLC	9400 HighLine

[10-1] Indication of the runtime software license in the designation of the memory module

10.1 Overview

Technology application/application ranges		Required license/delivery
TA "Actuator – speed" (📖 244)		
	• General servo drive for speed control of: – Conveyor drives (connected in one system) – Extruder – Test benches – Vibrators – Travelling drives – Presses – Machine tools – Dosing machines • Actuating drives for master control – Positioning drives with external position control – Multi-axis systems with external path control	Available in every license stage. The technology application can be selected in the »Engineer« application catalog.

Technology application/application ranges		Required license/delivery
TA "Actuator – torque" (📖 265)		
	• Slave drives for material transport –Chain conveyors –S-shaped frame structure –Bilateral tandem drives • Test facilities –Test benches for tensile stress –Motor test benches –Brake assemblies • Support of higher-level technology solutions for e.g. traction-controlled winders	Available in every license stage. The technology application can be selected in the »Engineer« application catalog.
TA "Electronic gearbox" (📖 297)		
	• Slitters • Calender drives • Line drives • Conveying belts • Vibrators • Roller mills • Stretching machines • Wire drawing machines	License stage Motion Control HighLevel or higher required. The technology application can be selected in the »Engineer« application catalog.
TA "Synchronism with mark synchronisation" (📖 332)		
	• Printing units • Asynchronous cross cutters • Perforating machines • Insetters • Vibrating drives • Line drives • Labelling machines	License stage Motion Control HighLevel or higher required. The technology application can be selected in the »Engineer« application catalog.
TA "Multi-purpose positioning" (📖 371)		
	**Note:** In this TA the sequence control is carried out through the controller.	
	• Transport units • Rotary tables • Storage and retrieval units • Feed drives • Dosing machines • Hoists	License stage Motion Control TopLevel or higher required. The technology application can be selected in the »Engineer« application catalog.
TA "Table positioning" (📖 411)		
	**Note:** This TA requires an external sequence control.	
	• Transport units • Rotary tables • Storage and retrieval units • Feed drives • Dosing machines • Hoists	Available in every license stage. The technology application can be selected in the »Engineer« application catalog.

10.2 Commissioning using the »Engineer«

Basic procedure

1. Start »Engineer«.
2. Open available project or create a new project.
3. Assign each controller to a technology application from the catalogue.
4. For a project with several interconnected devices:
   - Insert network and machine application.
   - Make suitable network settings.
   - Specialise the predefined ports to concrete interfaces for the devices involved in the network on the **Ports** tab.
   - Interconnect the ports conveniently inside the machine application.
5. Parameterise the application(s).
6. Update devices.
7. Go online.
8. Download application(s) into the controller(s).

Note!

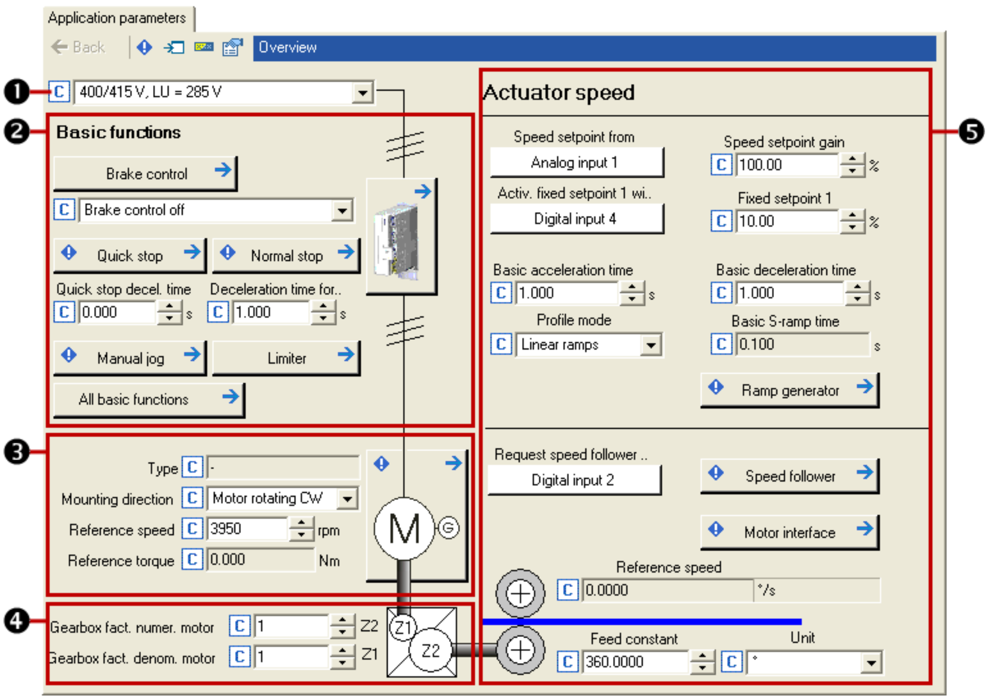
The downloaded application is basically stored in the first application memory location of the controller.

9. Confirm Dialog box *Start application* with **Yes, all devices**.
10. Confirm Dialog box *Enable controller* with **Yes, all devices**.
11. Control application(s) via terminals or network.

10.2.1 Parameterise application

In the »Engineer« all required settings for the technology application can be made via the **Application parameter** tab which contains several levels of parameter dialogs.

- The top level *Overview* includes all parameters required to carry out a short setup.
  - The left half of all technology applications is nearly identical and serves to set mains, motor and gearboxes and the basic functions supported by the technology application.
  - The right half, however, depends on the technology application selected.



❶ Mains voltage
❷ Basic functions
❸ Motor/feedback system
❹ Gearbox
❺ Technology application

[10-2] Example: Parameter setting dialog in the »Engineer« for a technology application

- If you click on one of the pictographs marked with the symbol ➔, you get one level deeper in the corresponding parameter dialog.
- This parameter dialog can also have further subordinate parameter dialogs, depending on the complexity.

Tip!

The online documentation for the »Engineer« contains detailed information on how to work in the **Application parameter** tab.

10.2.2 Parameterise signal combinations

In order to easily change existing signal combinations between the device interfaces and the application inputs and outputs, parameterisable "multiplexers" are implemented in all technology applications.

- From a number of signal sources, each multiplexer combines exactly one with a signal target of the same data type ("combinatorial circuit").
- The signal source is selected by setting the "multiplexer parameter" that is firmly assigned to the signal target. Each multiplexer parameter always offers a selection of sensible signal sources only.
- Thus, signal combinations can also be changed (e.g. the assignment of the digital inputs and outputs) with the keypad only.

Note!

When you enable the function block editor in the »Engineer» on the **FB editor** tab, all multiplexers are removed from the interconnection and the currently set signal combinations are replaced by fixed signal combinations!

This process is irreversible!

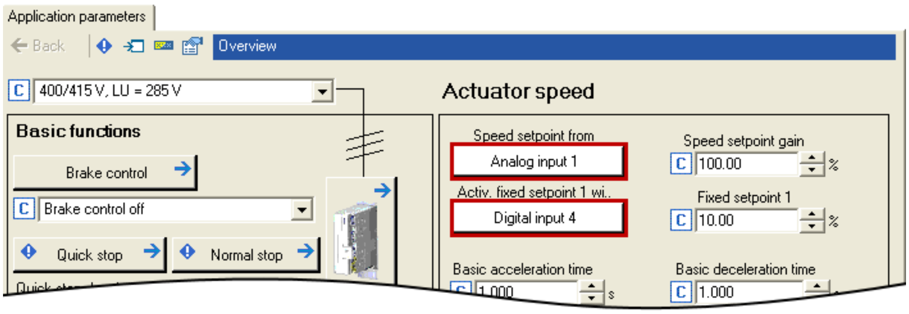
Tip!

The multiplexer parameters are marked by a prefixed "X" in the name and listed in the chapter of the corresponding technology application.

Several options are available for changing the signal combinations which are described in the following sections.

Changing signal combinations via the parameters setting interface

On the **Application parameter** tab all parameterisable signal combinations are marked by white buttons.

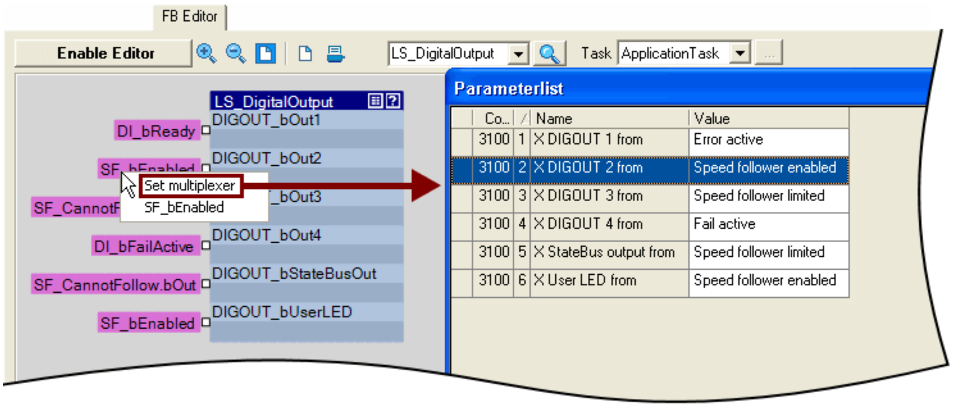


- If you press one of such buttons, the *I/O configuration for...* dialog level is displayed via which another signal source can be selected.

Changing signal combinations in the function block editor

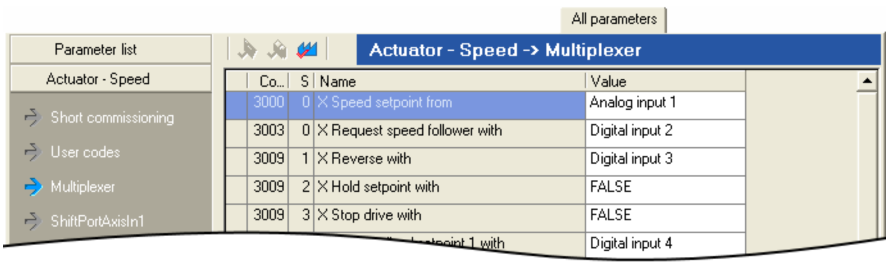
In the function block editor parameterisable signal combinations are marked by the background colour Cyan.

- If the command **Set multiplexer** is selected from the context menu (right mouse button) for the signal source, all multiplexer parameters available are displayed in a parameter list and can also be changed here:



Changing signal combinations via the parameter list

If you go to the **All parameters** tab and select the subcategory **Multiplexer** as technology application, all multiplexer parameters available are displayed in the parameter list and can also be changed here:



10.2.3 Configure application

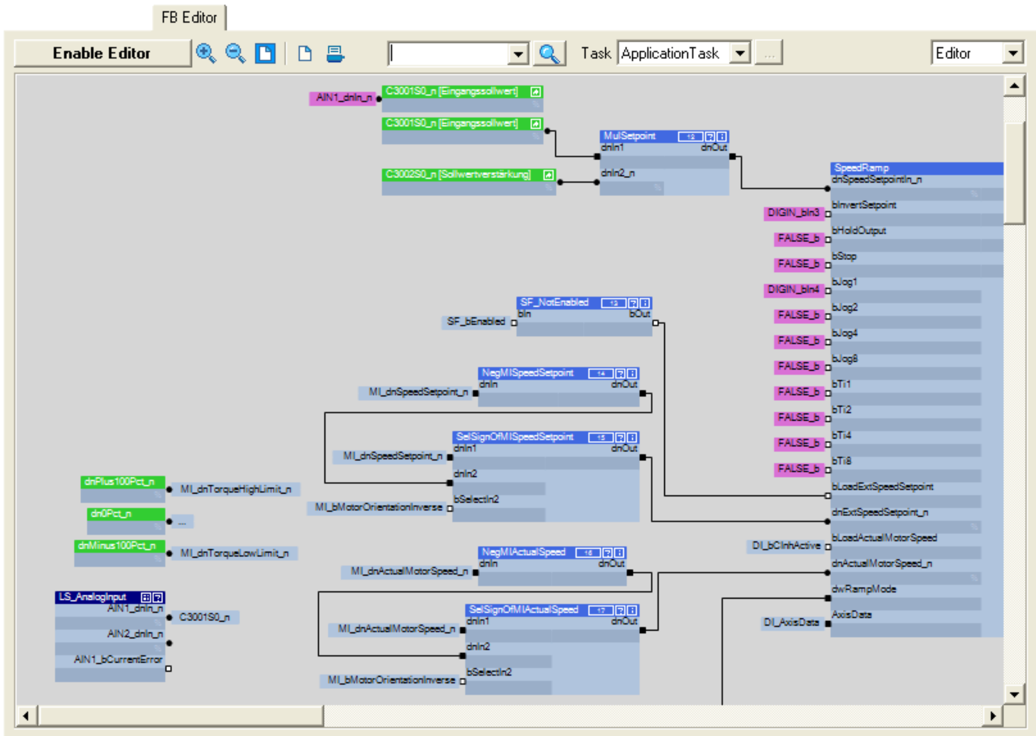
The interconnection of the technology application defined by Lenze is indicated on the **FB-Editor** tab.

- The current values at the inputs and outputs are indicated in the online mode.
- If you click the **Activate editor** button, the defined interconnection can be changed.

Note!

The activation of the function block editor causes the parameter dialogs for the technology application to be replaced by general dialogs. The dialogs for parameter setting of the system and function blocks available in the interconnection can continue to be used.

Moreover all multiplexers are removed from the interconnection and the currently set signal combinations are replaced by configurable signal combinations.



[10-3] Example: Representation of the interconnection of the technology application in the function block editor

Tip!

The online documentation for the »Engineer« contains detailed information on how to use the function block editor.

10.2.4 Networking via standardised ports

For the implementation of different control concepts each technology application has predefined ports:

Input ports	Output ports	Use
LPortAxisIn1	**LPortAxisOut1**	For the connection of several axes ("horizontal communication")
LPortControl1	**LPortStatus1**	For the connection with a master control ("vertical communication")
LPortControl2	**LPortStatus2**	
LPort32In1	**LPort32Out1**	For additional 32 bit process signals
LPort32In2	**LPort32Out2**	
LPort32In3	**LPort32Out3**	
LPort16In1	**LPort16Out1**	For additional 16 bit process signals
LPort16In2	**LPort16Out2**	
LPort16In3	**LPort16Out3**	

Note!

The TA variants for the 9400 HighLine have the ports predefined with the "automatic" interface.

After the addition of a network and interconnection of the ports inside the machine applications the "automatic" interface is specified according to the bus system used during the device update.

For commissioning of the communication the »Engineer« is required.

Tip!

The exact assignment of the ports can be found in the description of the technology application.

11 Standard TAs

The technology applications described in this chapter are available for general drive tasks.

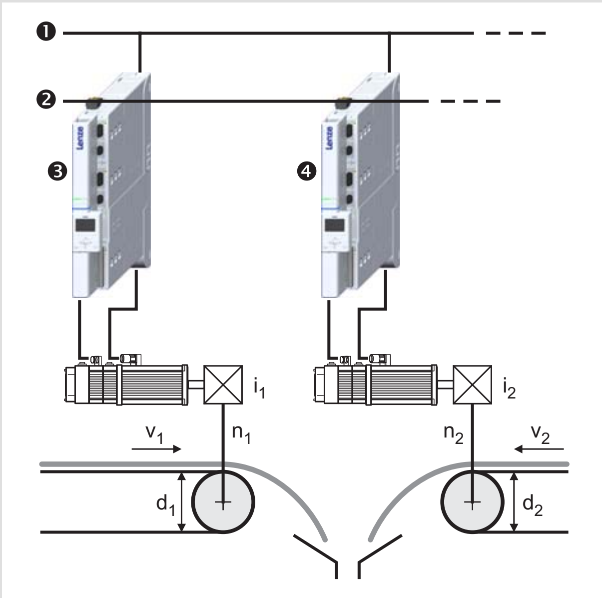
Technology application/application ranges		Required license/delivery
TA "Actuator – speed" (📖 244)		
	• General servo drive for speed control of: – Conveyor drives (connected in one system) – Extruders – Test benches – Vibrators – Travelling drives – Presses – Machine tools – Dosing machines • Actuators for master control – Positioning drives with external position control – Multi-axis systems with external path control	Available in every license stage. The technology application can be selected in the »Engineer« application catalog.
TA "Actuator – torque" (📖 265)		
	• Slave drives for material transport – Chain conveyors – S-shaped frame structure – Bilateral tandem drives • Test facilities – Test benches for tensile stress – Motor test benches – Brake assemblies • Support of higher-level technology solutions for e.g. traction-controlled winders	Available in every license stage. The technology application can be selected in the »Engineer« application catalog.

11.1 Introduction

11.1.1 Application examples

Dosing drives

- Both dosing drives are operated in speed-controlled mode and determine the mix ratio with their speed:



❶ Mains
❷ System bus (CAN)
❸ Drive 1 with TA "actuator – speed"
❹ Drive 2 with TA "actuator – speed"

i = gearbox factor
n = Load reference speed in [rpm]
v = Reference speed in [m/s]
d = roll diameter in [m]

[11-1] Example: Dosing drives with adjustable mix ratio v_1/v_2

- Technical connections/machine parameters:

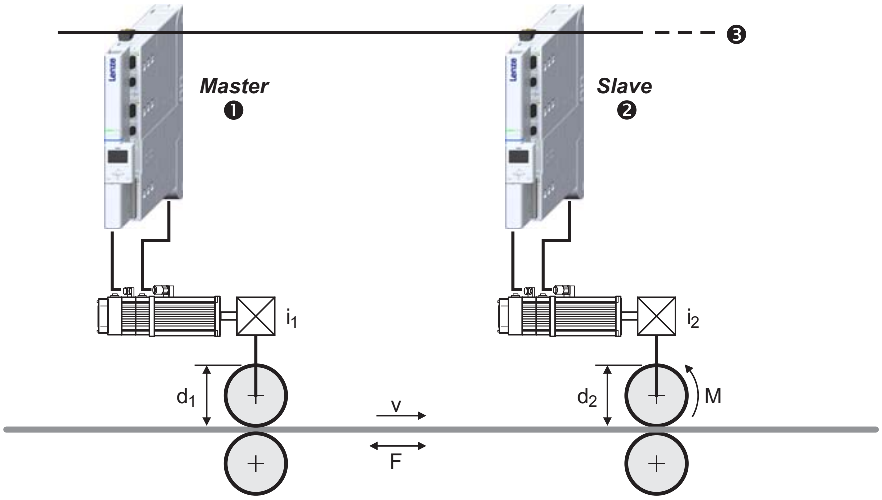
$$\text{Load reference speed [min-1]} = \frac{\text{Motor reference speed [min-1]}}{\text{Gearbox factor}}$$

Parameters	Information
C00011	Motor reference speed
C02520	Gearbox fact. numer. motor
C02521	Gearbox fact. denom. motor
C02542	Load reference speed
Highlighted in grey = display parameter	

$$\text{Reference speed [m/s]} = \frac{\text{Roll diameter [m]} \cdot \pi \cdot \text{Load reference speed [min-1]}}{60}$$

Parameters	Information
C02524	Feed constant → roll diameter in [m] * π
C02525	Selection of the unit → [m]
Highlighted in grey = display parameter	

Conveyor drive with adjustable tension



❶ Master
❷ Slave with technology application "actuator – torque"
❸ System bus (CAN)
v = speed of the material path
F = tensile stress

[11-2] Example: Conveyor drive with adjustable tension

- The master drive is operated speed-controlled and determines the speed of the material path.
- The slave drive with the standard technology application "actuator – torque" ensures that a certain minimum tensile stress is complied with between master and slave drive. When torque-controlled, the slave drive is permanently able to follow the speed specified by the master drive.

11.2 TA "Actuator – speed"

The technology application "actuator – speed" enables the drive to create a speed to be defined. The speed setpoint can be complied with using a speed controller which adopts the motor torque to the prevailing load situation.

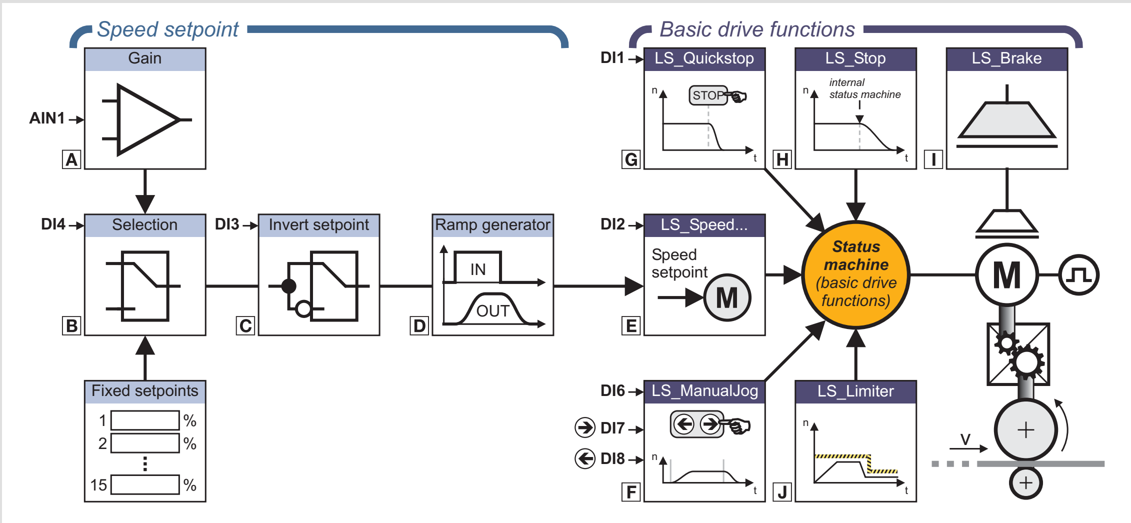
- The speed setpoint of the drive can be specified for both directions. The driven machine parts accordingly moves forwards or backwards. As an alternative to the inversion of the setpoint, the change of the direction of movement can be done via the digital input DI3.
- After the speed-controlled operation is enabled via the digital input DI2 the acceleration/deceleration of the drive to the setpoint is controlled via a ramp generator based on the current setpoint/actual speed.
- The maximum torque of the drive can also be controlled, if required.

Basic drive functions

- A quick stop can be activated via the digital input DI1.
  Quick stop (257)
- A manual control is provided for the setting-up operation. It is enabled via the digital input DI6. The inputs DI7 and DI8 activate parameterisable setpoints for both directions of rotation. Manual jog (256)
- The basic function "limiter" enables the travel range to be monitored via limit switches.
  Limiter (258)
- When a brake is available the brake control opens and closes the brake. Brake control (259)

See also: Basic drive functions (140)

11.2.1 Basic signal flow



[11-3] Signal flow of the TA "Actuator – speed" (schematic diagram)

Speed setpoint conditioning

A Setpoint gain

B Selection of analog input/fixed setpoints

C Setpoint inversion

D Ramp generator

Basic drive functions

E Speed follower

F Manual jog

G Quick stop

H Stop

I Brake control (optional)

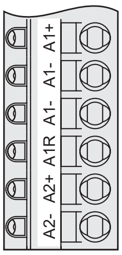
J Limiter (optional)

11.2.2 Assignment of the I/O terminals

11.2.2.1 Setpoint and control signals

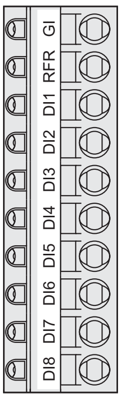
The following tables contain the Lenze assignment of the analog and digital inputs for the technology application "actuator – speed".

Analog inputs



Terminal X3		Signal (Lenze setting)
	AI1- **AI1+**	Speed setpoint ▸ Speed setpoint conditioning (📖 250)
	AI2- **AI2+**	-
▸ I/O terminals ▸ Analog inputs (📖 117)		

Digital inputs



Terminal X5		Signal (Lenze setting)
	DI1	Quick stop • If DI1 is set to LOW level, the drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. • If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time. ▸ Quick stop (📖 257)
	DI2	Enable speed follower ▸ Speed follower (📖 255)
	DI3	Invert speed setpoint ▸ Setpoint inversion (📖 252)
	DI4	Activate fixed setpoint 1 • Instead of the selection via the analog input 1 the fixed setpoint 1 is used as speed setpoint. ▸ Change-over to fixed setpoint (📖 251)
	DI5	Reset error • By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed.
	DI6	Manual jog ▸ Manual jog (📖 256)

DI7	DI8	Function
LOW	LOW	Stop
HIGH	LOW	Manual control in positive direction
LOW	HIGH	Manual control in negative direction
HIGH	HIGH	- (previous state remains active)

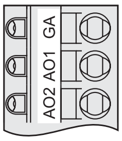
▸ I/O terminals ▸ Digital inputs (📖 123)

11.2.2.2 Actual value and status signals

The following tables contain the Lenze assignment of the analog and digital outputs for the technology application "actuator – speed".

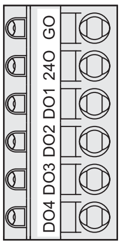
- The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

Analog outputs

Terminal X3		Signal (Lenze setting)	Signal configuration
	**AO1**	Motor speed • Scaling: ±10 V ≡ motor reference speed (C00011)	C03110/1
	AO2	Motor torque (setpoint) • Scaling: ±10 V ≡ Motor reference torque (C00057/2)	C03110/2

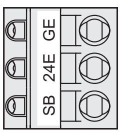
▶ I/O terminals ▶ Analog outputs (📖 120)

Digital outputs

Terminal X4		Signal (Lenze setting)	Signal configuration
	**DO1**	Status "Drive ready" • This operating state is active if the controller is enabled by setting the digital input RFR to HIGH level and no error has occurred.	C03100/1
	DO2	Status "Speed follower enabled" • The speed follower has been enabled via the digital input DI2.	C03100/2
	DO3	Status "Speed follower in limitation" • The enabled speed follower is in the limitation for more than 100 ms. • The setpoint is limited to the upper or lower speed limit value (C00909/1 or C00909/2) .	C03100/3
	DO4	Status "Error active acknowledgement is required" • Monitoring with the error response "Error" or "Quick stop by trouble" has been activated, and the controller is in the device state "Error active" or "Quick stop by trouble active".	C03100/4

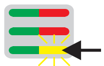
▶ I/O terminals ▶ Digital outputs (📖 125)

State bus

Terminal X2		Signal (Lenze setting)	Signal configuration
	**SB**	Status "Speed follower in limitation" • The enabled speed follower is in the limitation for more than 100 ms. • The setpoint is limited to the upper or lower speed limit value (C00909/1 or C00909/2) . • The state bus is put in the "error" status.	C03100/5

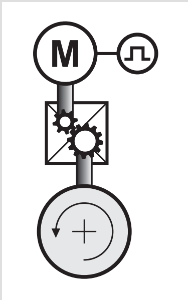
▶ I/O terminals ▶ Monitoring function "State bus" (📖 127)

Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Speed follower enabled" • The speed follower has been enabled via the digital input DI2.	C03100/6

▸ Drive interface ▸ LED status displays (📖 34)

11.2.3 Machine parameters



The machine parameters describe e.g. the motor end of the mechanics used.

The setting of the machine parameters in the »Engineer» is carried out on the **Application parameters** tab in the dialog level *Overview* → *Drive interface* .

Tip!

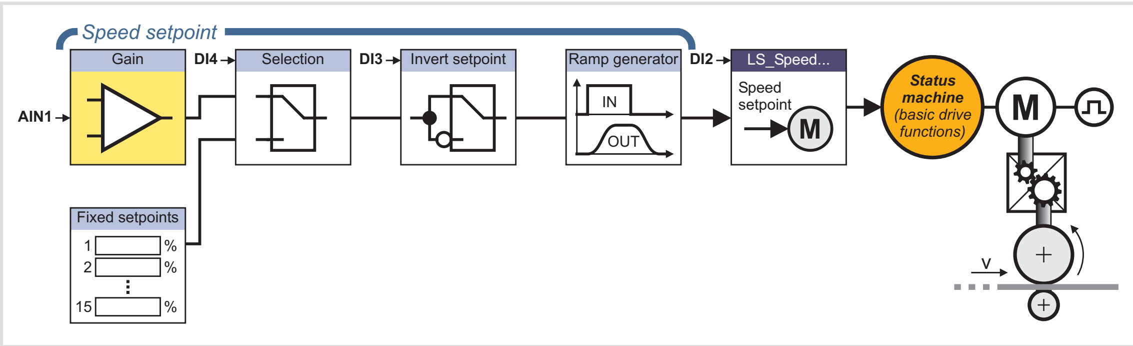
In the »Engineer« the most important machine parameters can be adapted to the machine on the **Application parameter** tab directly in the topmost *Overview* dialog level:

Detailed information for selecting and entering the machine parameters can be found in the chapter "Drive interface". ▶ Machine parameters (📖 35)

Short overview of machine parameters

Parameters		Lenze setting	
		Value	Unit
C00173	Mains - voltage	400/415	V
C00174	Threshold undervoltage (LU)	285	V
C00600	Resp. to DC bus overvoltage	Trouble	
C02520	Gearbox fact. numer. motor	1	
C02521	Gearbox fact. denom. motor	1	
C02527	Motor mounting direction	Motor rotating CW	
C02570	Controller configuration	Phase control	
C02522	Gearbox fact. numer. load	1	
C02523	Gearbox fact. denom. load	1	
Description of the mechanics (load, tool)			
C02528	Traversing range	Unlimited	
C02524	Feed constant	360.0000	Unit
C02525	Unit	°	
C02526	User-defined unit	°	
C02533	Time unit	s	
C00273/1	Motor moment of inertia	Motor-dependent	kg cm^2
C00273/2	Load moment of inertia	0.00	kg cm^2

11.2.4 Speed setpoint conditioning



[11-4] Speed setpoint conditioning (schematic diagram)

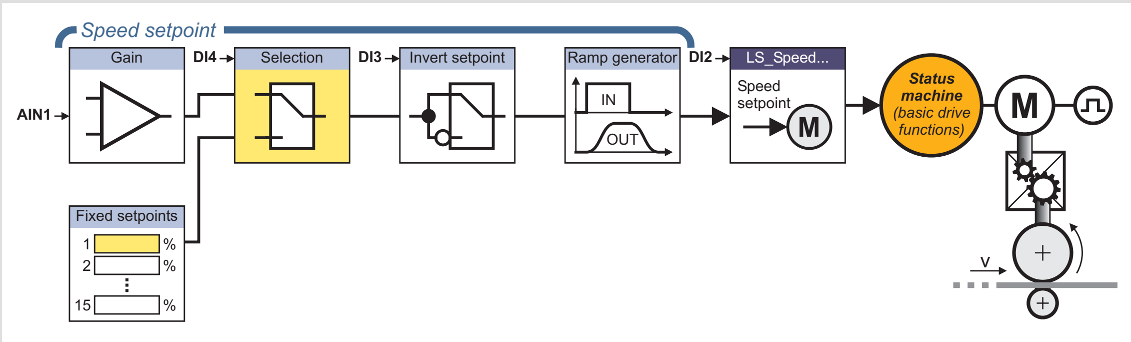
The speed setpoint is defined in the Lenze setting via the analog input 1 and take place in both directions (bipolar) and accordingly the driven machine part moves forward or backward.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview*

Parameters		**Lenze setting**	
		Value	Unit
C03002	Setpoint gain	100.00	%

Setpoint inputs of the function		**Signal configuration**
Lenze setting	**Setpoint input**	**(Multiplexer parameters)**
AIn 1	➞ Speed setpoint	C03000

11.2.4.1 Change-over to fixed setpoint



[11-5] Additional offset for the speed limit value (schematic diagram)

Via the digital input DI4 a change-over to a parameterisable fixed setpoint can take place.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview*

Parameters		Lenze setting	
		Value	Unit
C03500/1	Fixed setpoint 1	10.00	%

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DigIn 4	➞ Activate fixed setpoint 1	C03009/4

Use of further fixed setpoints

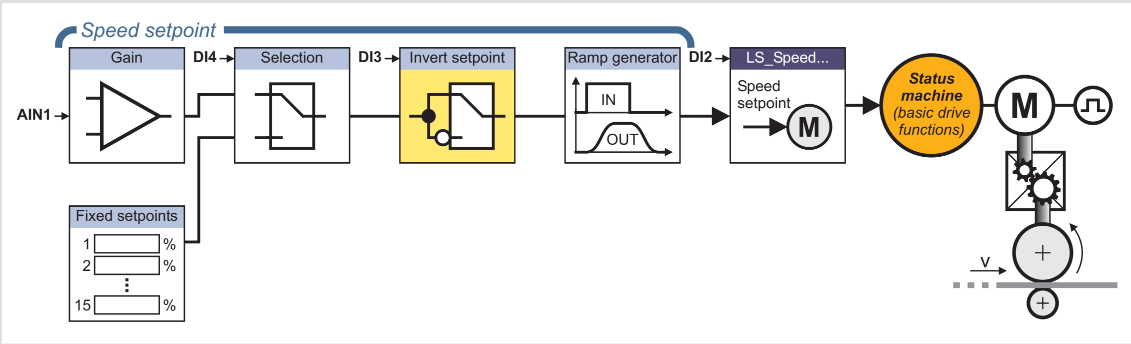
A total of 15 different fixed setpoints can be parameterised. For the selection of the fixed setpoints 2 ... 15 the selection inputs are to be assigned with the corresponding signals. The selection of the fixed setpoints is carried out in a binary coded manner.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Ramp generator* ➞ *All fixed setpoints*

Parameters		Lenze setting	
		Value	Unit
C03500/1	Fixed setpoint 1	10.00	%
C03500/2	Fixed setpoint 2	0.00	%
C03500/...	Fixed setpoint ...	...	...
C03500/15	Fixed setpoint 15	0.00	%

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DigIn 4	➞ Activate fixed setpoint 1	C03009/4
FALSE	➞ Activate fixed setpoint 2	C03009/5
FALSE	➞ Activate fixed setpoint 4 a	C03009/6
FALSE	➞ Activate fixed setpoint 8 a	C03009/7

11.2.4.2 Setpoint inversion



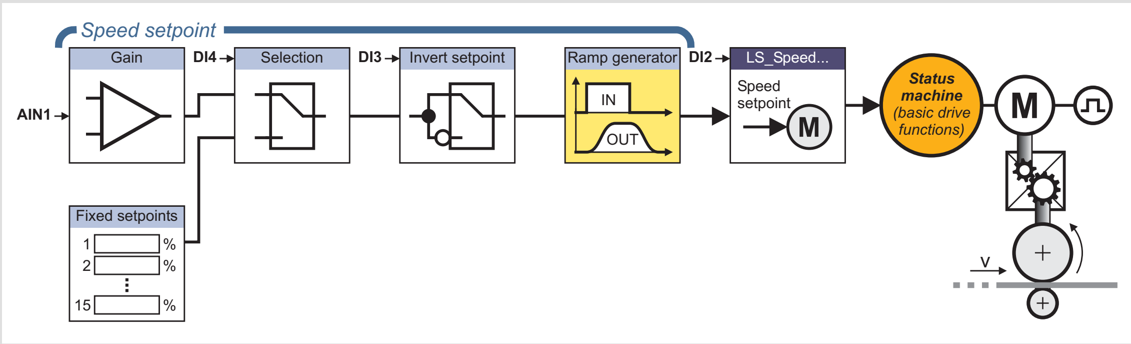
[11-6] Setpoint inversion (schematic diagram)

Via the digital input DI3 the effective direction of the (bipolar) setpoint can be inverted, if required.

▶ Parameter setting: **Application parameter** tab→ dialog level *Overview* → *Ramp generator*

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 3	→ Invert direction of rotation	C03009/1

11.2.4.3 Speed ramp generator



[11-7] Ramp generator (schematic diagram)

In order to avoid setpoint step-changes the speed setpoint passes a ramp generator with a parameterisable acceleration/deceleration and S-ramp time before it is transmitted to the basic drive function "Speed follower".

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview*

Parameters		Lenze setting	
		Value	Unit
C03502	Basic acceleration time	1.000	s
C03503	Basic deceleration time	1.000	s
C03504	Basic S-ramp time	0.100	s
C03510	Profile mode	Linear ramps	

Use of further ramp parameter sets

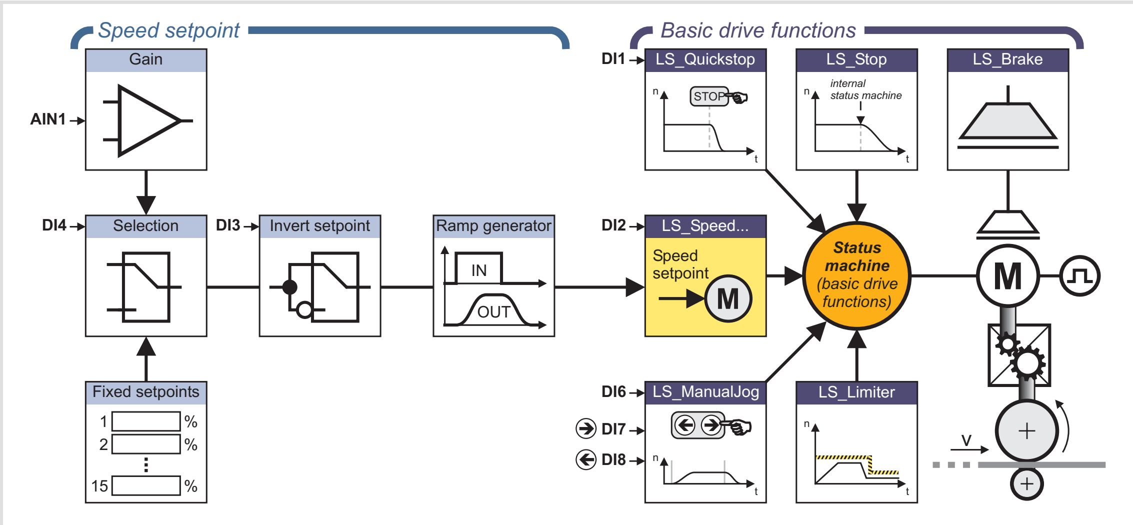
If required, 15 further ramp parameter sets can be parameterised. For the selection of the ramp parameter sets1 ... 15 the selection inputs are to be assigned with the corresponding signals. The selection of the ramp parameter sets is carried out in a binary coded manner.

- Parameter setting: Tab**Application parameter** W Dialog level *Overview* W *Ramp generator* W *All ramp parameters*

Parameters		Lenze setting	
		Value	Unit
C03512/1	Acceleration time 1	0.000	s
C03512/...	Acceleration time ...	...	...
C03512/15	Acceleration time 15	0.000	s
C03513/1	Deceleration time 1	0.000	s
C03513/...	Deceleration time ...	...	...
C03513/15	Deceleration time 15	0.000	s
C03514/1	S-ramp time 1	0.000	s
C03514/...	S-ramp time	...	...
C03514/15	S-ramp time 15	0.000	s

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	→ Activate ramp parameter set 1	C03009/8
FALSE	→ Activate ramp parameter set 2	C03009/9
FALSE	→ Activate ramp parameter set 4	C03009/10
FALSE	→ Activate ramp parameter set 8 a	C03009/11

11.2.5 Speed follower



[11-8] Basic function "Speed follower" (schematic diagram)

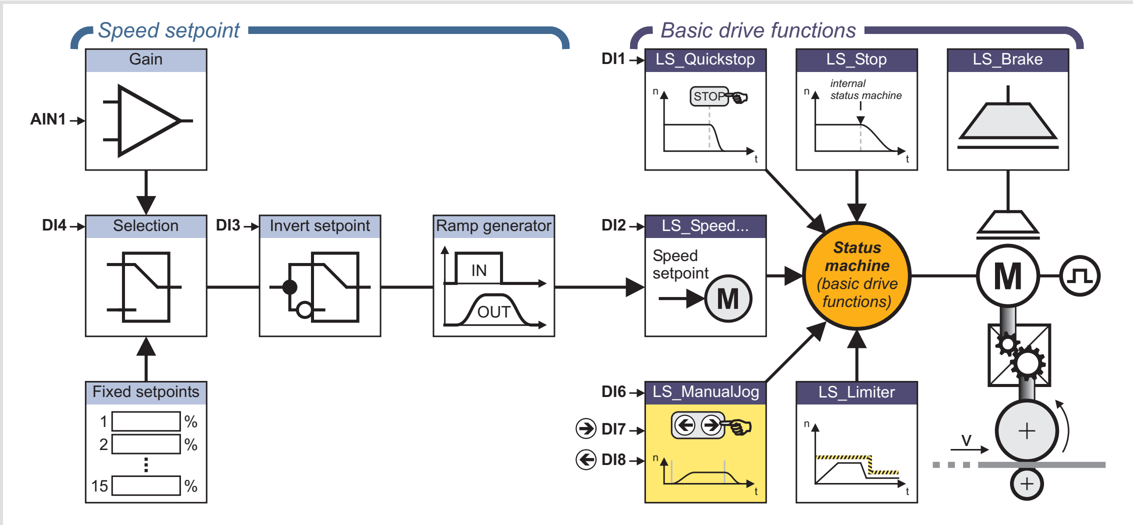
The speed-controlled operation is requested via the digital input DI2. If no other basic function and error state are active, the speed-controlled operation is enabled.

- The acceleration/deceleration of the drive to the setpoint is controlled via a ramp generator based on the current setpoint/actual speed.
- If the enable of the speed-controlled operation is reset via the digital input DI2, the drive is decelerated to standstill via an independent profile generator of the basic function "Stop". ▶ Standard stop (📖 148)

Tip!

Detailed information on the speed follower can be found in the chapter "basic drive functions" ➞ subchapter "Speed follower". (📖 190)

11.2.6 Manual jog



[11-9] Basic function "Manual jog" (schematic diagram)

For the setting-up operation the basic function "Manual jog" is available. It is requested via the digital input DI6. If no other basic function and error status are active, enable is carried out and the manual jog via the inputs DI7 and DI8 is possible.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Manual jog*

Parameters		Lenze setting	
		Value	Unit
C02620	Manual jog speed 1	360.0000	Unit/s
C02621	Manual jog speed 2	720.0000	Unit/s
C02622	Manual acceleration	360.0000	Unit/s^2
C02623	Manual deceleration	1440.0000	Unit/s^2
C02624	Inaccuracy time of manual traversing	0.100	s

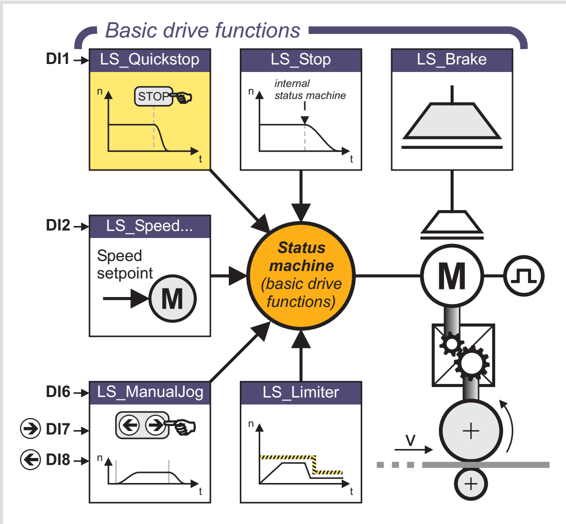
Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DigIn 6	→ Request manual jog	C03155/1
DigIn 7	→ Activate positive manual jog	C03155/2
DigIn 8	→ Activate negative manual jog	C03155/3
FALSE	→ Activate 2. speed	C03155/4

Tip!

Detailed information on the manual jog function can be found in chapter "Basic drive functions" → subchapter "Manual jog". (📖 156)

Lenze

11.2.7 Quick stop



[11-10] Basic function "Quick stop" (schematic diagram)

The basic function "Quick stop" brakes the drive to standstill within the deceleration time set for the quick stop function after a corresponding request independent of the setpoint selection.

If the quick stop function is deactivated, the drive is led to the selected setpoint again via the acceleration time set in the speed ramp generator.

- The quick stop function can be activated as follows in the Lenze setting:
  - By setting the digital input DI1 to LOW level.
  - By a master control via the port *LPortControl1*: By setting bit 2 of the bit-coded control word 1.
- Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Quick stop*

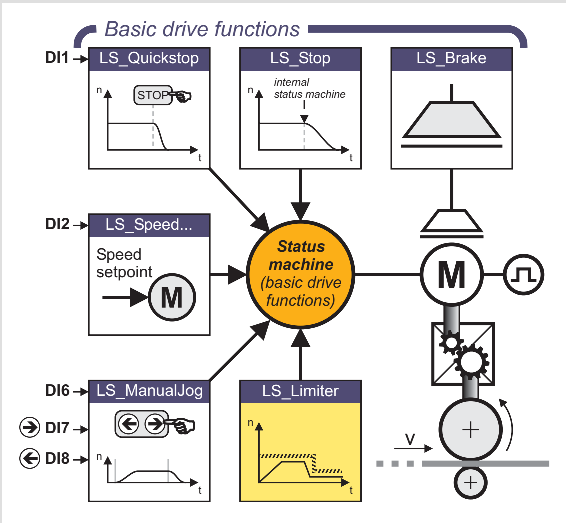
Parameters		Lenze setting	
		Value	Unit
C00105	Quick stop deceleration time	0.000	s
C00106	Quick stop S-ramp time	0.00	%
C00107	Reference for deceleration time "Quick stop"	Motor reference speed (C00011)	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 1	➞ Activate quick stop 1	C03135/1
Control word 1 bit 02	➞ Activate quick stop 2	C03135/2
FALSE	➞ Activate quick stop 3	C03135/3

Tip!

Detailed information on quick stop can be found in chapter "Basic drive functions" ➞ subchapter "Quick stop". (📖 152)

11.2.8 Limiter



[11-11] Basic function "Limiter" (schematic diagram)

The basic function "Limiter", where applicable, by means of limit switches monitors travel range limits.

In the case of homing, positioning and manual jog the basic function "Limiter" if required provides for the compliance with kinematic limit values.

Note!

The parameterised limit values are not effective for the basic functions "Speed follower", "Torque follower" and "Position follower"!

For the exceeding of the limit values an error response can be set.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Limiter*

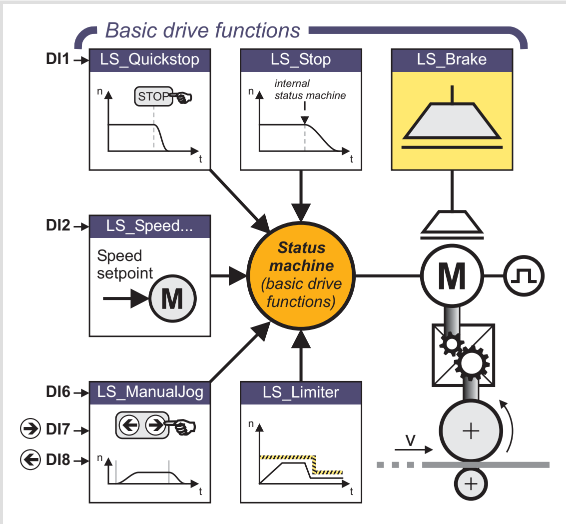
Parameters		Lenze setting Value	Unit
Only for homing, positioning and manual jog			
C02702	Limitations effective	Deactivated	
C02703	Max. speed	3600.0000	Unit/s
C02705	Max. acceleration	3600.0000	Unit/s^2
C02706	Min. S-ramp time	100	ms
C02707	Permissible direction of rotation	Positive and negative	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	→ Positive limit switch	C03150/1
FALSE	→ Negative limit switch	C03150/2

Tip!

Detailed information on the limiter function can be found in chapter "Basic drive functions" → subchapter "Limiter". (📖 200)

11.2.9 Brake control



[11-12] Basic function "Brake control" (schematic diagram)

The basic function "Brake control" serves to the wear free control and monitoring of a holding brake.

In the simplest case, an optionally available brake module is used.

Alternatively the holding brake can also be controlled and monitored via the digital inputs/outputs.

Note!

In the Lenze setting the brake control is switched off to reach a safe status after mains connection.

Tip!

Detailed information on brake control can be found in chapter "Basic drive functions" ➞ subchapter "Brake control". (📖 211)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Brake control*

Parameters		Lenze setting Value	Unit
C02580	Operating mode - brake	Brake control off	
C02581	Brake activation threshold	50	rpm
C02582	Brake resp. to pulse inhibit	Activate the brake immediately	
C02583	Status input monitoring	Not active	
C02585	Brake control polarity	Not inverted	
C02586	Starting torque 1	0.00	Nm
C02587	Starting torque 2	0.00	Nm
C02588	Source of starting torque	Starting torque 1/2	
C02589	Brake closing time	100	ms
C02590	Brake opening time	100	ms
C02591	Waiting time - status monit.	100	ms
C02593	Waiting time - brake active.	0.000	s
C02594	Test torque	0.00	Nm
C02595	Permissible angle of rotation	5	°
C02596	Grinding speed	100	rpm
C02597	Accel./decel. time - grinding	1.000	s
C02598	Grinding ON time	0.5	s
C02599	Grinding OFF time	0.5	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	➞ Open brake (release)	C03165/1
FALSE	➞ Activate starting torque 2	C03165/2
FALSE	➞ Brake status signal	C03165/3
FALSE	➞ Activate brake test	C03165/4
FALSE	➞ Grind brake	C03165/5
0 %	➞ Additional torque	C03166

11.2.10 Signal configuration of drive and motor interface

If required, the preset signal configuration of the control and setpoint inputs of the drive and motor interface can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Drive interface

Signal (Lenze setting)	Control input	Signal configuration
FALSE	→ Set controller inhibit	C03130/1
DigIn 5	→ Reset error 1	C03130/2
Control word 1 bit 07	→ Reset error 2	C03130/3
FALSE	→ Reset error 3	C03130/4
FALSE	→ Set error	C03130/5
Control word 1 bit 00	→ Switch on drive	C03130/6

Motor interface

Signal (Lenze setting)	Setpoint input	Signal configuration
100 %	→ Upper torque limit value	C03141/1
-100 %	→ Lower torque limit value	C03141/2

11.2.11 Signal configuration of the output ports

If required, the preset signal configuration of the output ports can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

"LPortAxisOut1" output port

The output port **LPortAxisOut1** is intended for the connection with a following axis.

Signal (Lenze setting)	Output port	Signal configuration
Axis status word • Application-specific signals can be supplemented.		
Drive ready	→ Axis status word bit 00	C03120/1
FALSE	→ Axis status word bit 01	C03120/2
Operation enabled	→ Axis status word bit 02	C03120/3
Error is active.	→ Axis status word bit 03	C03120/4
FALSE	→ Axis status word bit 04	C03120/5
Quick stop active	→ Axis status word bit 05	C03120/6
Drive is ready to start	→ Axis status word bit 06	C03120/7
Warning active	→ Axis status word bit 07	C03120/8
FALSE	→ Axis status word bit 08	C03120/9
FALSE	→ Axis status word bit 09	C03120/10
FALSE	→ Axis status word bit 10	C03120/11
Motor control limited	→ Axis status word bit 11	C03120/12
FALSE	→ Axis status word bit 12	C03120/13
FALSE	→ Axis status word bit 13	C03120/14
FALSE	→ Axis status word bit 14	C03120/15
FALSE	→ Axis status word bit 15	C03120/16
Setpoints for horizontal communication		
Filtered torque setpoint	→ Axis-Port Out 1	C03124/1
Speed setpoint	→ Axis-Port Out 2	C03124/2

Output port "LPortStatus1"

The output port **LPortStatus1** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 1		
Drive ready	→ Status word 1 bit 00	C03121/1
FALSE	→ Status word 1 bit 01	C03121/2
Operation enabled	→ Status word 1 bit 02	C03121/3
Error is active.	→ Status word 1 bit 03	C03121/4
FALSE	→ Status word 1 bit 04	C03121/5
Quick stop active	→ Status word 1 bit 05	C03121/6
Drive is ready to start	→ Status word 1 bit 06	C03121/7
Warning active	→ Status word 1 bit 07	C03121/8
FALSE	→ Status word 1 bit 08	C03121/9
FALSE	→ Status word 1 bit 09	C03121/10
FALSE	→ Status word 1 bit 10	C03121/11
Motor control limited	→ Status word 1 bit 11	C03121/12
FALSE	→ Status word 1 bit 12	C03121/13
FALSE	→ Status word 1 bit 13	C03121/14
FALSE	→ Status word 1 bit 14	C03121/15
FALSE	→ Status word 1 bit 15	C03121/16

Output port "LPortStatus2"

Signal (Lenze setting)	Output port	Signal configuration
Status word 2		
FALSE	→ Status word 2 bit 00	C03122/1
FALSE	→ Status word 2 bit 01	C03122/2
FALSE	→ Status word 2 bit 02	C03122/3
FALSE	→ Status word 2 bit 03	C03122/4
FALSE	→ Status word 2 bit 04	C03122/5
FALSE	→ Status word 2 bit 05	C03122/6
FALSE	→ Status word 2 bit 06	C03122/7
FALSE	→ Status word 2 bit 07	C03122/8
FALSE	→ Status word 2 bit 08	C03122/9
FALSE	→ Status word 2 bit 09	C03122/10
FALSE	→ Status word 2 bit 10	C03122/11
FALSE	→ Status word 2 bit 11	C03122/12
FALSE	→ Status word 2 bit 12	C03122/13
FALSE	→ Status word 2 bit 13	C03122/14
FALSE	→ Status word 2 bit 14	C03122/15
FALSE	→ Status word 2 bit 15	C03122/16

11.2.12 Application error messages

For the output of application-specific error messages an FB instance *ApplicationError* of the function block **L_DevApplErr** is available in the network.

- Via the 8 boolean inputs up to 8 different application error messages with parameterisable module ID, error ID and error response can be released by the application.

Error message		Error-ID	Error response
1	Speed follower in limitation	8001	Warning locked
2	-	8000	Error
3	-	8000	Error
4	-	8000	Error
5	-	8000	Error
6	-	8000	Error
7	-	8000	Error
8	-	8000	Error

- Parameter setting: Tab **All parameters**

Parameters		Lenze setting
C05900	Module-ID	980
C05901/1...8	Error ID 1 ... 8	See table above
C05902/1...8	Error response 1 ... 8	See table above

Reset of error message

In the Lenze setting the digital input DI5 for resetting (acknowledging) an error message is connected to the input *DI_bResetError1* of the drive interface.

11.3 TA "Actuator – torque"

When the technology application "actuator – torque" is used the drive creates a torque to be specified independent of the motor speed. A superimposed speed limitation prevents the drive from accelerating in an uncontrolled mode. The torque setpoint and torque limit value are the main setpoint values of the application.

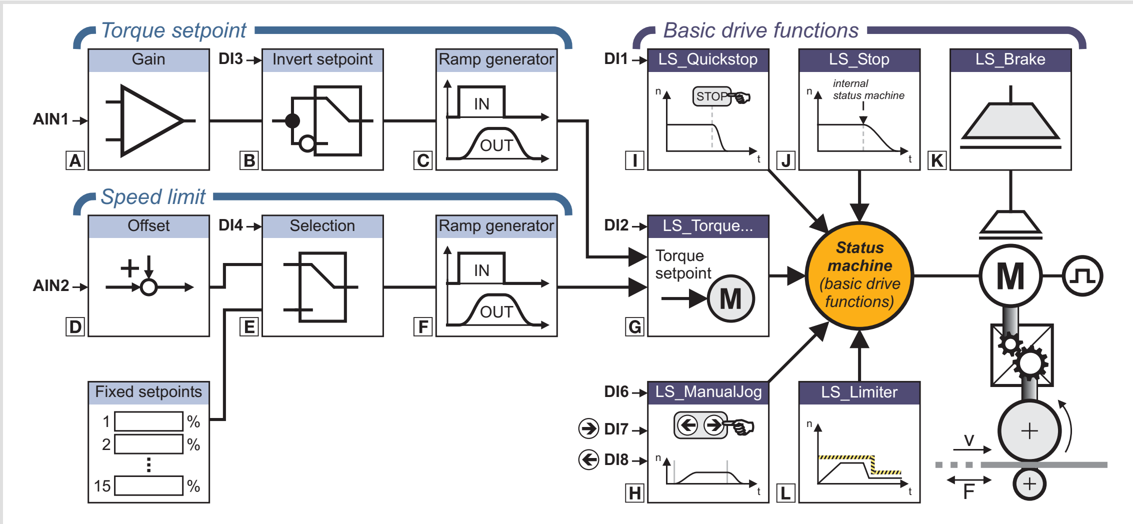
- The setpoint of the motor torque can be specified for both directions. The drive accordingly acts in a driving or braking way. With a unipolar setpoint the effective direction can be changed via the digital input DI3.
- After the enable of the torque-controlled operation via the digital input DI2 the creation of the torque is controlled via a ramp generator starting from the current torque.
- The torque limit value to be specified refers to the freely setting direction of rotation with positive torque. Based on the current motor speed the internal speed limit value is also led to the setpoint via a ramp generator after enable.
- If the specified speed limit value directly corresponds to the line speed, the internal limit value can be increased by entering an offset in C03008.
- The speed limit value in negative direction of rotation equals, according to amount, the limit value for the positive direction of rotation.
- If the speed of the drive is inside the limitations, the motor generates the specified torque.
- If the positive or negative speed limit value (for CW or CCW rotation) is reached, the drive changes to the speed-controlled operation. The set speed limit values are not exceeded.

Basic drive functions

- A quick stop can be activated via the digital input DI1.
  Quick stop (279)
- A manual control is provided for the setting-up operation. It is enabled via the digital input DI6. The inputs DI7 and DI8 activate parameterisable setpoints for both directions of rotation. Manual jog (278)
- The basic function "limiter" enables the travel range to be monitored via limit switches.
  Limiter (258)
- When a brake is available the brake control opens and closes the brake. Brake control (281)

See also: Basic drive functions (140)

11.3.1 Basic signal flow



[11-13] Signal flow of the TA "Actuator – torque" (schematic diagram)

Torque setpoint conditioning

A Setpoint gain

B Setpoint inversion

C Ramp generator

Speed limit value conditioning

D Offset

E Selection of analog input/fixed setpoints

F Speed profile generator

Basic drive functions

G Torque follower

H Manual jog

I Quick stop

J Stop

K Brake control (optional)

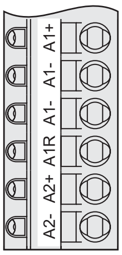
L Limiter (optional)

11.3.2 Assignment of the I/O terminals

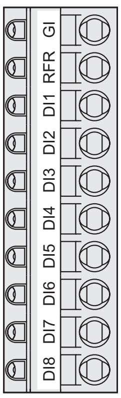
11.3.2.1 Setpoint and control signals

The following tables contain the Lenze assignment of the analog and digital inputs for the technology application "actuator – torque".

Analog inputs

<table>
<tr><th colspan="2">Terminal X3</th><th>Signal (Lenze setting)</th></tr>
<tr><td rowspan="2">
</td><td>AI1-
AI1+</td><td>Torque setpoint
▶ Torque setpoint conditioning (🕮 271)</td></tr>
<tr><td>AI2-
AI2+</td><td>Speed limit value
▶ Speed limit value conditioning (🕮 273)</td></tr>
<tr><td colspan="3">▶ I/O terminals ▶ Analog inputs (🕮 117)</td></tr>
</table>

Digital inputs

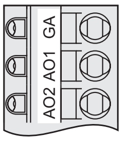
<table>
<tr><th colspan="2">Terminal X5</th><th colspan="3">Signal (Lenze setting)</th></tr>
<tr><td rowspan="11">
</td><td>DI1</td><td colspan="3">Quick stop
• If DI1 is set to LOW level, the drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection.
• If the quick stop function is deactivated, the defined torque is available again, as the case may be, an acceleration via the set acceleration time of the speed limit value is effected.
▶ Quick stop (🕮 279)</td></tr>
<tr><td>DI2</td><td colspan="3">Enable torque follower
▶ Torque follower (🕮 277)</td></tr>
<tr><td>DI3</td><td colspan="3">Invert torque setpoint</td></tr>
<tr><td>DI4</td><td colspan="3">Activate fixed setpoint 1
Instead of the selection via the analog input 2 the fixed setpoint 1 is used as speed limit value.
▶ Change-over to fixed setpoint (🕮 274)</td></tr>
<tr><td>DI5</td><td colspan="3">Reset error
• By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed.</td></tr>
<tr><td rowspan="6">DI6</td><td colspan="3">Manual jog
▶ Manual jog (🕮 278)</td></tr>
<tr><td>DI7</td><td>DI8</td><td>Function</td></tr>
<tr><td>LOW</td><td>LOW</td><td>Stop</td></tr>
<tr><td>HIGH</td><td>LOW</td><td>Manual control in positive direction</td></tr>
<tr><td>LOW</td><td>HIGH</td><td>Manual control in negative direction</td></tr>
<tr><td>HIGH</td><td>HIGH</td><td>- (previous state remains active)</td></tr>
<tr><td colspan="5">▶ I/O terminals ▶ Digital inputs (🕮 123)</td></tr>
</table>

11.3.2.2 Actual value and status signals

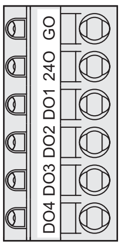
The following tables contain the Lenze assignment of the analog and digital outputs for the technology application "actuator – torque".

▶ The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

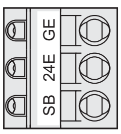
Analog outputs

Terminal X3		Signal (Lenze setting)	Signal configuration
	**AO1**	Motor speed • Scaling: ±10 V ≡ motor reference speed (C00011)	C03110/1
	AO2	Motor torque (setpoint) • Scaling: ±10 V ≡ Motor reference torque (C00057/2)	C03110/2
▸ I/O terminals ▸ Analog outputs (📖 120)			

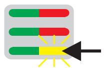
Digital outputs

Terminal X4		Signal (Lenze setting)	Signal configuration
	**DO1**	Status "Drive ready" • This operating state is active if the controller is enabled by setting the digital input RFR to HIGH level and no error has occurred.	C03100/1
	DO2	Status "Torque follower enabled" • The torque follower has been enabled via the digital input DI2.	C03100/2
	DO3	Status "Torque follower in limitation" • If the torque follower is enabled, the torque setpoint or the current setpoint are within the limitation.	C03100/3
	DO4	Status "Error active acknowledgement is required" • Monitoring with the error response "Error" or "Quick stop by trouble" has been activated, and the controller is in the device state "Error active" or "Quick stop by trouble active".	C03100/4
▸ I/O terminals ▸ Digital outputs (📖 125)			

State bus

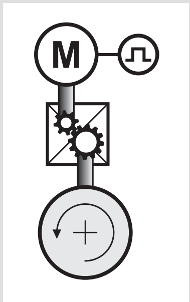
Terminal X2		Signal (Lenze setting)	Signal configuration
	**SB**	Status "Torque follower in limitation" • If the torque follower is enabled, the torque setpoint or the current setpoint are within the limitation. • The state bus is put in the "error" status.	C03100/5
▸ I/O terminals ▸ Monitoring function "State bus" (📖 127)			

Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Torque follower enabled" • The torque follower has been enabled via the digital input DI2.	C03100/6

▸ Drive interface ▸ LED status displays (📖 34)

11.3.3 Machine parameters



The machine parameters describe e.g. the motor end of the mechanics used.

The setting of the machine parameters in the »Engineer» is carried out on the **Application parameters** tab in the dialog level *Overview* ➜ *Drive interface* .

Tip!

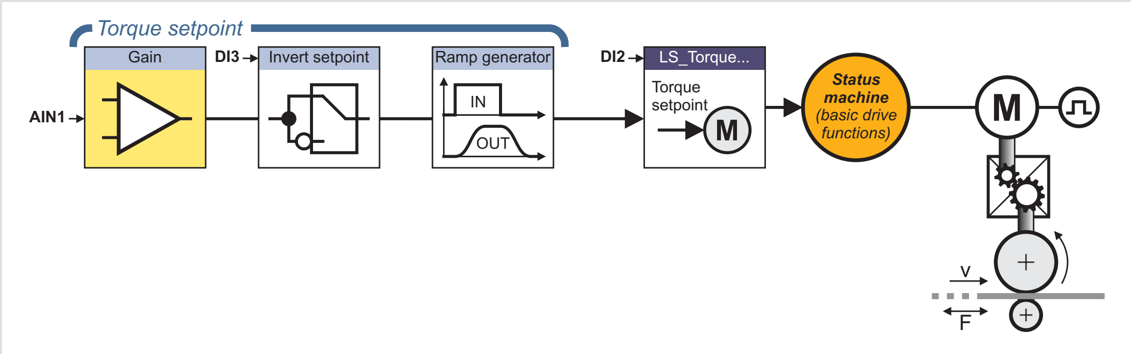
In the »Engineer« the most important machine parameters can be adapted to the machine on the **Application parameter** tab directly in the topmost *Overview* dialog level:

Detailed information for selecting and entering the machine parameters can be found in the chapter "Drive interface". ▸ Machine parameters (📖 35)

Short overview of machine parameters

Parameters		Lenze setting Value	Unit
C00173	Mains - voltage	400/415	V
C00174	Threshold undervoltage (LU)	285	V
C00600	Resp. to DC bus overvoltage	Trouble	
C02520	Gearbox fact. numer. motor	1	
C02521	Gearbox fact. denom. motor	1	
C02527	Motor mounting direction	Motor rotating CW	
C02570	Controller configuration	Phase control	
C02522	Gearbox fact. numer. load	1	
C02523	Gearbox fact. denom. load	1	
Description of the mechanics (load, tool)			
C02528	Traversing range	Unlimited	
C02524	Feed constant	360.0000	Unit
C02525	Unit	°	
C02526	User-defined unit	°	
C02533	Time unit	s	
C00273/1	Motor moment of inertia	Motor-dependent	kg cm^2
C00273/2	Load moment of inertia	0.00	kg cm^2

11.3.4 Torque setpoint conditioning



[11-14] Torque setpoint conditioning (schematic diagram)

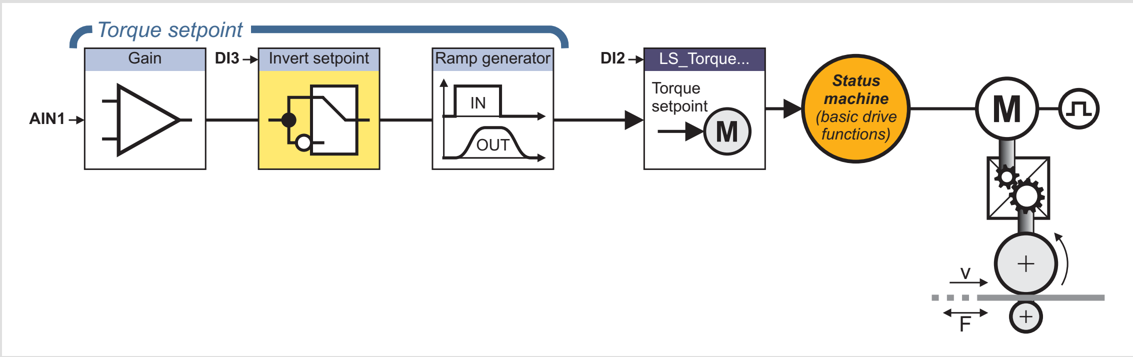
The torque setpoint is defined in the Lenze setting via the analog input 1 and take place in both directions (bipolar) and accordingly the drive acts in a driving or braking manner.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview*

Parameters		Lenze setting	
		Value	Unit
C03002	Setpoint gain	100.00	%

Setpoint inputs of the function		Signal configuration
Lenze setting	Setpoint input	(Multiplexer parameters)
AIn 1	➞ Torque setpoint	C03000

11.3.4.1 Setpoint inversion



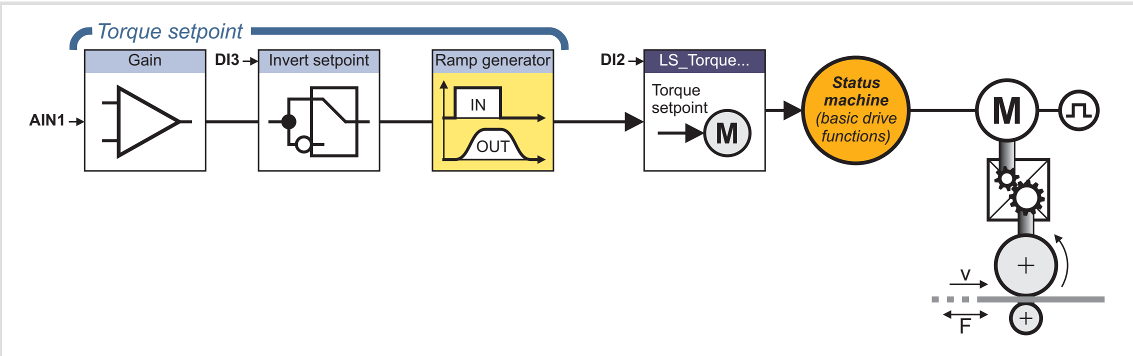
[11-15] Setpoint inversion (schematic diagram)

Via the digital input DI3 the effective direction of the (bipolar) setpoint can be inverted, if required.

▶ Parameter setting: **All parameters** tab ➞ Category *Actuator - torque* ➞ *Multiplexer*

Control inputs of the function		**Signal configuration**
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 3	➞ Invert setpoint	C03003

11.3.4.2 Ramp generator



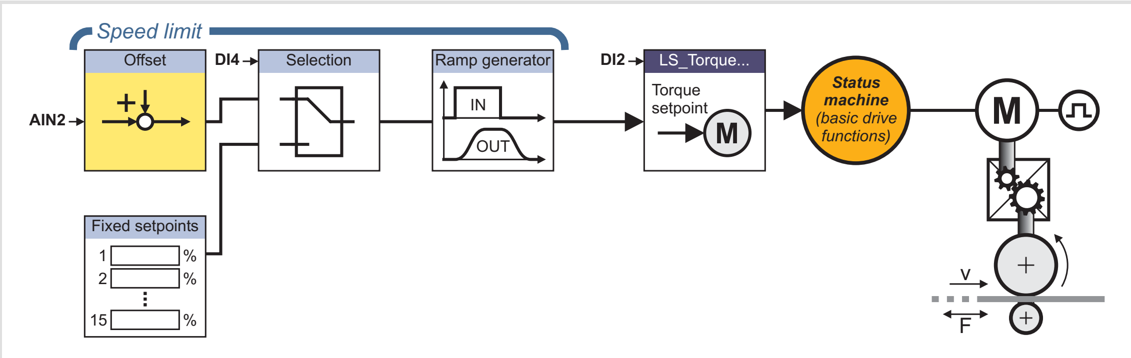
[11-16] Ramp generator (schematic diagram)

In order to avoid setpoint step-changes the torque setpoint passes a ramp generator with a parameterisable acceleration/deceleration and S-ramp time before it is transmitted to the basic drive function "Torque follower".

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview*

Parameters		**Lenze setting**	
		Value	Unit
C03550	Acceleration / deceleration time	0.010	s
C03551	S-ramp time	0.001	s

11.3.5 Speed limit value conditioning



[11-17] Speed limit value conditioning (schematic diagram)

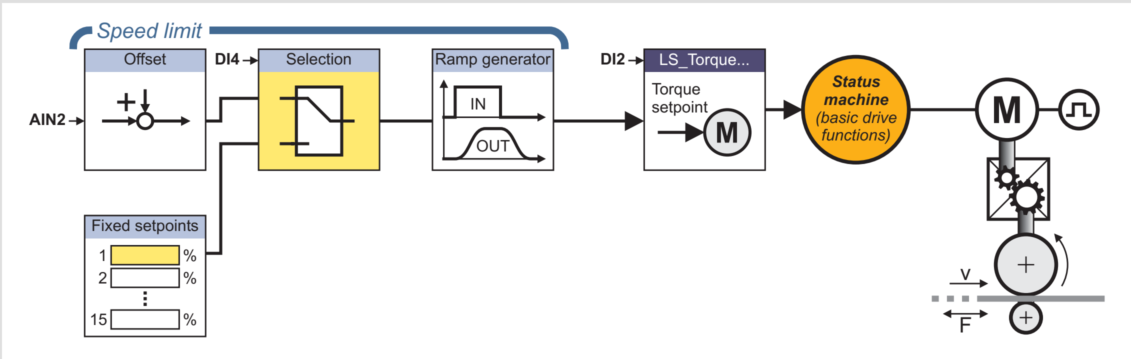
The speed limit value is defined in the Lenze setting via the analog input 2.

- The defined speed limit value refers to the direction of rotation which can be set freely with positive torque.
- The speed limit value in negative direction of rotation equals, according to amount, the limit value for the positive direction of rotation.
- If the speed of the drive is inside the limitations, the motor generates the specified torque.
- If the positive or negative speed limit value (for CW or CCW rotation) is reached, the drive changes to the speed-controlled operation. The set speed limit values are not exceeded.
- If the specified speed limit value directly corresponds to the line speed, the internal limit value can be increased by entering an offset in C03008.
- Parameter setting: Tab **Application parameter** → Dialog level *Overview*

Parameters		**Lenze setting**	
		Value	Unit
C03008	Offset for limit speed	0.00	%

Setpoint inputs of the function		**Signal configuration**
Lenze setting	**Setpoint input**	**(Multiplexer parameters)**
AIn 2	→ Upper limit speed	C03006
Inverted upper limit speed	→ Lower speed limit value	C03171

11.3.5.1 Change-over to fixed setpoint



[11-18] Additional offset for the speed limit value (schematic diagram)

Via the digital input DI4 a change-over to a parameterisable fixed setpoint can take place.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview*

Parameters		Lenze setting Value	Unit
C03500/1	Fixed setpoint 1	10.00	%

Control inputs of the function Lenze setting	Control input	Signal configuration (Multiplexer parameters)
DigIn 4	➞ Activate fixed setpoint 1	C03009/4

Use of further fixed setpoints

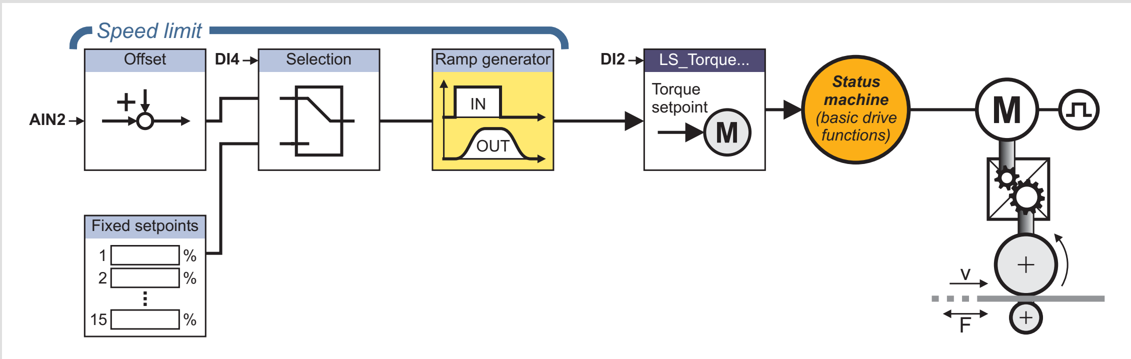
A total of 15 different fixed setpoints can be parameterised. For the selection of the fixed setpoints 2 ... 15 the selection inputs are to be assigned with the corresponding signals. The selection of the fixed setpoints is carried out in a binary coded manner.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Ramp generator* ➞ *All fixed setpoints*

Parameters		Lenze setting Value	Unit
C03500/1	Fixed setpoint 1	10.00	%
C03500/2	Fixed setpoint 2	0.00	%
C03500/...	Fixed setpoint ...	...	...
C03500/15	Fixed setpoint 15	0.00	%

Control inputs of the function Lenze setting	Control input	Signal configuration (Multiplexer parameters)
DigIn 4	➞ Activate fixed setpoint 1	C03009/4
FALSE	➞ Activate fixed setpoint 2	C03009/5
FALSE	➞ Activate fixed setpoint 4 a	C03009/6
FALSE	➞ Activate fixed setpoint 8 a	C03009/7

11.3.5.2 Speed ramp generator



[11-19] Ramp generator (schematic diagram)

In order to avoid setpoint step-changes the speed limit value passes a ramp generator with a parameterisable acceleration and deceleration time before it is transmitted to the basic drive function "Torque follower".

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview*

Parameters		**Lenze setting**	
		Value	Unit
C03502	Basic acceleration time	1.000	s
C03503	Basic deceleration time	1.000	s
C03510	Profile mode	Linear ramps	

Use of further ramp parameter sets

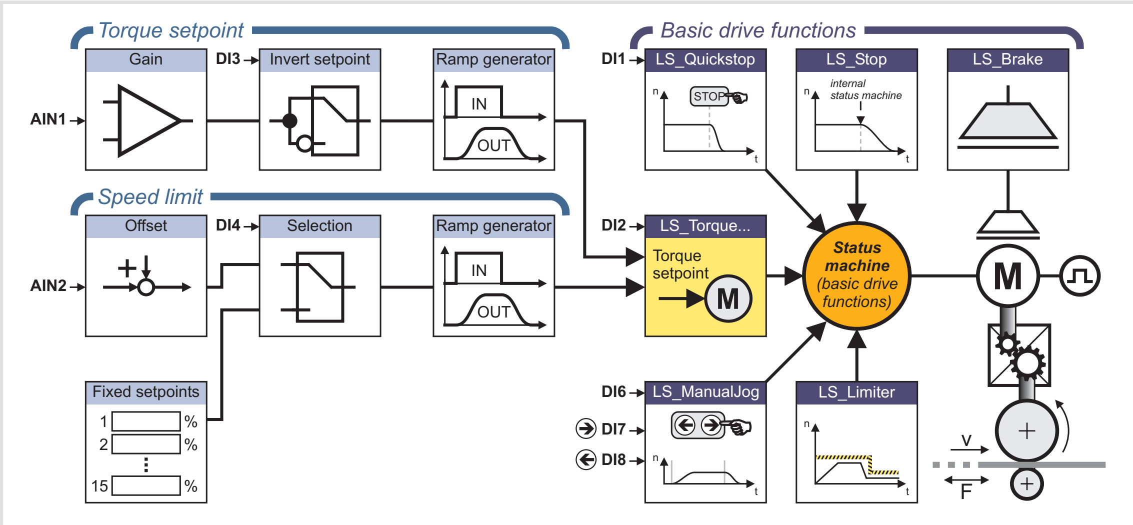
If required, 15 further ramp parameter sets can be parameterised. For the selection of the ramp parameter sets1 ... 15 the selection inputs are to be assigned with the corresponding signals. The selection of the ramp parameter sets is carried out in a binary coded manner.

- Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Ramp generator* ➞ *All ramp parameters*

Parameters		Lenze setting	
		Value	Unit
C03512/1	Acceleration time 1	0.000	s
C03512/...	Acceleration time ...	...	...
C03512/15	Acceleration time 15	0.000	s
C03513/1	Deceleration time 1	0.000	s
C03513/...	Deceleration time ...	...	...
C03513/15	Deceleration time 15	0.000	s
C03514/1	S-ramp time 1	0.000	s
C03514/...	S-ramp time	...	...
C03514/15	S-ramp time 15	0.000	s

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	➞ Activate ramp parameter set 1	C03009/8
FALSE	➞ Activate ramp parameter set 2	C03009/9
FALSE	➞ Activate ramp parameter set 4	C03009/10
FALSE	➞ Activate ramp parameter set 8 a	C03009/11

11.3.6 Torque follower



[11-20] Basic function "Torque follower" (schematic diagram)

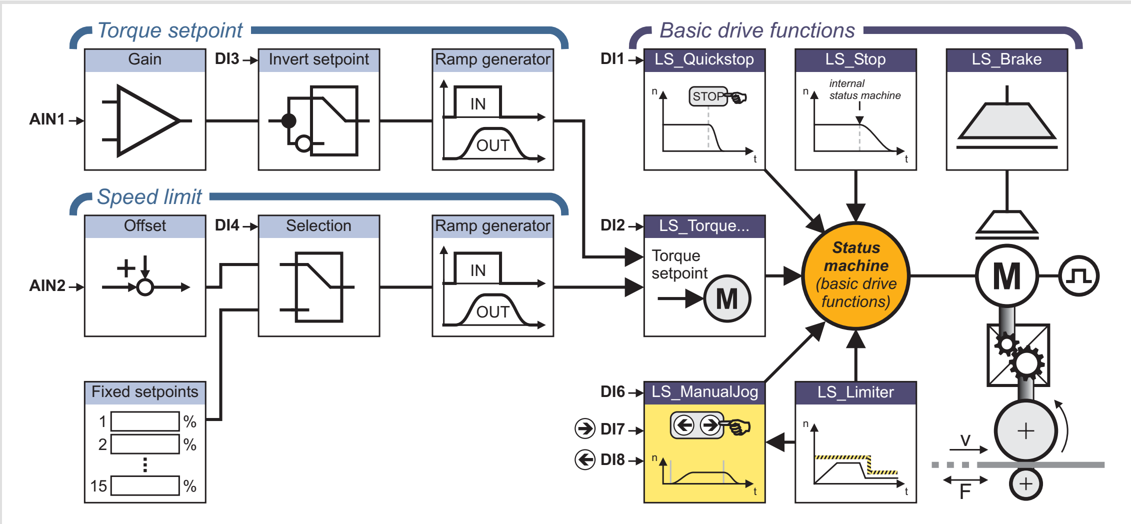
The torque-controlled operation is requested via the digital input DI2. If no other basic function and error state are active, the torque-controlled operation is enabled.

- The build-up of the defined torque is controlled via a ramp generator based on the current torque.
- Based on the current motor speed the internal speed limit value is also led to the setpoint via a ramp generator after the operation is enabled.
- If the enable of the torque-controlled operation is reset via the digital input DI2, the drive is decelerated to standstill via an independent profile generator of the basic function "Stop". ▸ Standard stop (📖 148)

Tip!

Detailed information on the torque follower can be found in the chapter "basic drive functions" → subchapter "Torque follower". (📖 196)

11.3.7 Manual jog



[11-21] Basic function "Manual jog" (schematic diagram)

For the setting-up operation the basic function "Manual jog" is available. It is requested via the digital input DI6. If no other basic function and error status are active, enable is carried out and the manual jog via the inputs DI7 and DI8 is possible.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Manual jog*

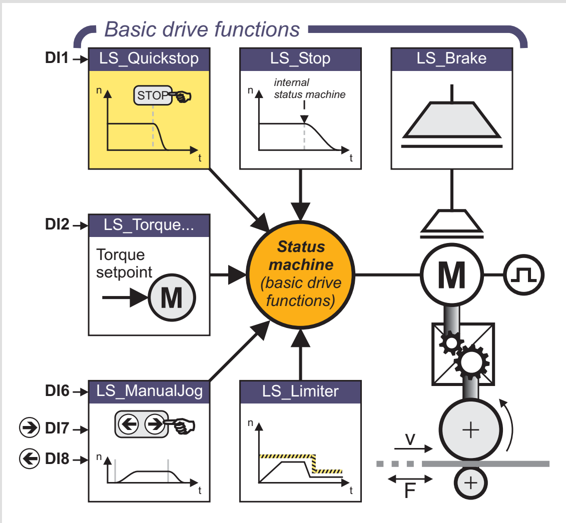
Parameters		Lenze setting	
		Value	Unit
C02620	Manual jog speed 1	360.0000	Unit/s
C02621	Manual jog speed 2	720.0000	Unit/s
C02622	Manual acceleration	360.0000	Unit/s^2
C02623	Manual deceleration	1440.0000	Unit/s^2
C02624	Inaccuracy time of manual traversing	0.100	s

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DigIn 6	➞ Request manual jog	C03155/1
DigIn 7	➞ Activate positive manual jog	C03155/2
DigIn 8	➞ Activate negative manual jog	C03155/3
FALSE	➞ Activate 2. speed	C03155/4

Tip!

Detailed information on the manual jog function can be found in chapter "Basic drive functions" ➞ subchapter "Manual jog". (📖 156)

11.3.8 Quick stop



[11-22] Basic function "Quick stop" (schematic diagram)

The basic function "Quick stop" brakes the drive to standstill within the deceleration time set for the quick stop function after a corresponding request independent of the setpoint selection.

If the quick stop is deactivated, the defined torque is available again, as the case may be, an acceleration via the set acceleration time of the speed limit value is effected.

- The quick stop function can be activated as follows in the Lenze setting:
  - By setting the digital input DI1 to LOW level.
  - By a master control via the port *LPortAxisIn1*:
    By setting bit 3 of the bit-coded axis control word.
- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Quick stop*

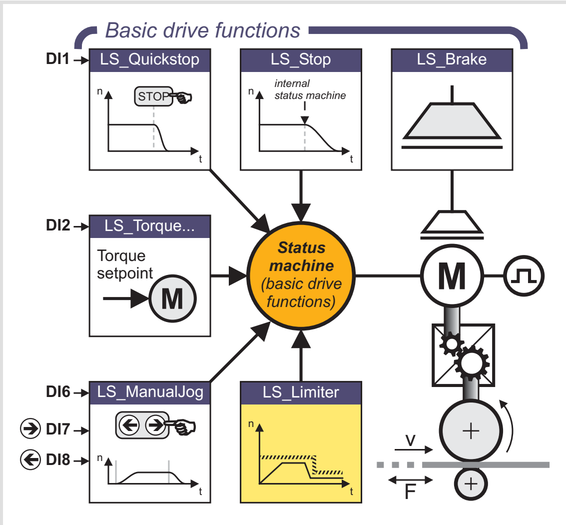
Parameters		Lenze setting	
		Value	Unit
C00105	Quick stop deceleration time	0.000	s
C00106	Quick stop S-ramp time	0.00	%
C00107	Reference for deceleration time "Quick stop"	Motor reference speed (C00011)	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 1	→ Activate quick stop 1	C03135/1
Axis control word bit 03	→ Activate quick stop 2	C03135/2
FALSE	→ Activate quick stop 3	C03135/3

Tip!

Detailed information on quick stop can be found in chapter "Basic drive functions" → subchapter "Quick stop". (📖 152)

11.3.9 Limiter



[11-23] Basic function "Limiter" (schematic diagram)

The basic function "Limiter", where applicable, by means of limit switches monitors travel range limits.

In the case of homing, positioning and manual jog the basic function "Limiter" if required provides for the compliance with kinematic limit values.

Note!

The parameterised limit values are not effective for the basic functions "Speed follower", "Torque follower" and "Position follower"!

For the exceeding of the limit values an error response can be set.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Limiter*

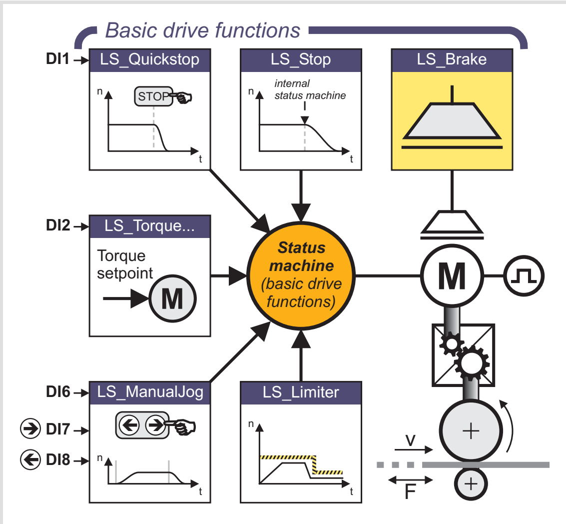
Parameters		Lenze setting	
		Value	Unit
Only for homing, positioning and manual jog			
C02702	Limitations effective	Deactivated	
C02703	Max. speed	3600.0000	Unit/s
C02705	Max. acceleration	3600.0000	Unit/s^2
C02706	Min. S-ramp time	100	ms
C02707	Permissible direction of rotation	Positive and negative	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	➞ Positive limit switch	C03150/1
FALSE	➞ Negative limit switch	C03150/2

Tip!

Detailed information on the limiter function can be found in chapter "Basic drive functions" ➞ subchapter "Limiter". (📖 200)

11.3.10 Brake control



[11-24] Basic function "Brake control" (schematic diagram)

The basic function "Brake control" serves to the wear free control and monitoring of a holding brake.

In the simplest case, an optionally available brake module is used.

Alternatively the holding brake can also be controlled and monitored via the digital inputs/outputs.

Note!

In the Lenze setting the brake control is switched off to reach a safe status after mains connection.

Tip!

Detailed information on brake control can be found in chapter "Basic drive functions" ➜ subchapter "Brake control". (📖 211)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Brake control*

Parameters		Lenze setting Value	Unit
C02580	Operating mode - brake	Brake control off	
C02581	Brake activation threshold	50	rpm
C02582	Brake reaction in case of pulse inhibit	Activate the brake immediately	
C02583	Status input monitoring	Not active	
C02585	Brake control polarity	Not inverted	
C02586	Starting torque 1	0.00	Nm
C02587	Starting torque 2	0.00	Nm
C02588	Source of starting torque	Starting torque 1/2	
C02589	Brake closing time	100	ms
C02590	Brake opening time	100	ms
C02591	Waiting time - status monit.	100	ms
C02593	Waiting time - brake active.	0.000	s
C02594	Test torque	0.00	Nm
C02595	Permissible angle of rotation	5	°
C02596	Grinding speed	100	rpm
C02597	Accel./decel. time - grinding	1.000	s
C02598	Grinding ON time	0.5	s
C02599	Grinding OFF time	0.5	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	➞ Open brake (release)	C03165/1
FALSE	➞ Activate starting torque 2	C03165/2
FALSE	➞ Brake status signal	C03165/3
FALSE	➞ Activate brake test	C03165/4
FALSE	➞ Grind brake	C03165/5
0 %	➞ Additional torque	C03166

11.3.11 Signal configuration of drive and motor interface

If required, the preset signal configuration of the control and setpoint inputs of the drive and motor interface can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Drive interface

Signal (Lenze setting)	Control input	Signal configuration
FALSE	➞ Set controller inhibit	C03130/1
FALSE	➞ Set error	C03130/2
Axis control word bit 00	➞ Switch on drive	C03130/3
DigIn 5	➞ Reset error 1	C03130/4
Axis control word bit 07	➞ Reset error 2	C03130/5
FALSE	➞ Reset error 3	C03130/6

Motor interface

Signal (Lenze setting)	Setpoint input	Signal configuration
100 %	➞ Upper torque limit value	C03141/1
-100 %	➞ Lower torque limit value	C03141/2

11.3.12 Signal configuration of the output ports

If required, the preset signal configuration of the output ports can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

"LPortAxisOut1" output port

The output port **LPortAxisOut1** is intended for the connection with a following axis.

Signal (Lenze setting)	Output port	Signal configuration
Axis status word • Application-specific signals can be supplemented.		
Drive ready	→ Axis status word bit 00	C03120/1
FALSE	→ Axis status word bit 01	C03120/2
Operation enabled	→ Axis status word bit 02	C03120/3
Error is active.	→ Axis status word bit 03	C03120/4
FALSE	→ Axis status word bit 04	C03120/5
Quick stop active	→ Axis status word bit 05	C03120/6
Drive is ready to start	→ Axis status word bit 06	C03120/7
Warning active	→ Axis status word bit 07	C03120/8
FALSE	→ Axis status word bit 08	C03120/9
FALSE	→ Axis status word bit 09	C03120/10
FALSE	→ Axis status word bit 10	C03120/11
Motor control limited	→ Axis status word bit 11	C03120/12
FALSE	→ Axis status word bit 12	C03120/13
FALSE	→ Axis status word bit 13	C03120/14
FALSE	→ Axis status word bit 14	C03120/15
FALSE	→ Axis status word bit 15	C03120/16
Setpoints for horizontal communication		
Filtered torque limit value	→ Axis-Port Out 1	C03124/1
Filtered torque setpoint	→ Axis-Port Out 2	C03124/2

Output port "LPortStatus1"

The output port **LPortStatus1** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 1		
Drive ready	→ Status word 1 bit 00	C03121/1
FALSE	→ Status word 1 bit 01	C03121/2
Operation enabled	→ Status word 1 bit 02	C03121/3
Error is active.	→ Status word 1 bit 03	C03121/4
FALSE	→ Status word 1 bit 04	C03121/5
Quick stop active	→ Status word 1 bit 05	C03121/6
Drive is ready to start	→ Status word 1 bit 06	C03121/7
Warning active	→ Status word 1 bit 07	C03121/8
FALSE	→ Status word 1 bit 08	C03121/9
FALSE	→ Status word 1 bit 09	C03121/10
FALSE	→ Status word 1 bit 10	C03121/11
Motor control limited	→ Status word 1 bit 11	C03121/12
FALSE	→ Status word 1 bit 12	C03121/13
FALSE	→ Status word 1 bit 13	C03121/14
FALSE	→ Status word 1 bit 14	C03121/15
FALSE	→ Status word 1 bit 15	C03121/16

Output port "LPortStatus2"

Signal (Lenze setting)	Output port	Signal configuration
Status word 2		
FALSE	→ Status word 2 bit 00	C03122/1
FALSE	→ Status word 2 bit 01	C03122/2
FALSE	→ Status word 2 bit 02	C03122/3
FALSE	→ Status word 2 bit 03	C03122/4
FALSE	→ Status word 2 bit 04	C03122/5
FALSE	→ Status word 2 bit 05	C03122/6
FALSE	→ Status word 2 bit 06	C03122/7
FALSE	→ Status word 2 bit 07	C03122/8
FALSE	→ Status word 2 bit 08	C03122/9
FALSE	→ Status word 2 bit 09	C03122/10
FALSE	→ Status word 2 bit 10	C03122/11
FALSE	→ Status word 2 bit 11	C03122/12
FALSE	→ Status word 2 bit 12	C03122/13
FALSE	→ Status word 2 bit 13	C03122/14
FALSE	→ Status word 2 bit 14	C03122/15
FALSE	→ Status word 2 bit 15	C03122/16

11.3.13 Application error messages

For the output of application-specific error messages an FB instance *ApplicationError* of the function block **L_DevApplErr** is available in the network.

- Via the 8 boolean inputs up to 8 different application error messages with parameterisable module ID, error ID and error response can be released by the application.

Error message		Error-ID	Error response
1	Torque follower in limitation	8001	Warning locked
2	-	8000	Error
3	-	8000	Error
4	-	8000	Error
5	-	8000	Error
6	-	8000	Error
7	-	8000	Error
8	-	8000	Error

- Parameter setting: Tab **All parameters**

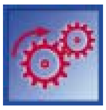
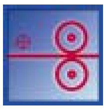
Parameters		Lenze setting
C05900	Module-ID	980
C05901/1...8	Error ID 1 ... 8	See table above
C05902/1...8	Error response 1 ... 8	See table above

Reset of error message

In the Lenze setting the digital input DI5 for resetting (acknowledging) an error message is connected to the input *DI_bResetError1* of the drive interface.

12 TAs for interconnection via electrical shaft

The technology applications described in this chapter are available for a DC-bus operation of several drives via the electrical shaft.

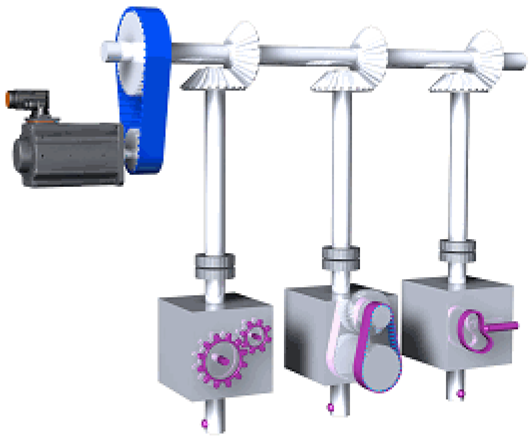
Technology application/application ranges		Required license/delivery
TA "Electronic gearbox" (🕮 297)		
	• Slitters • Calender drives • Line drives • Conveying belts • Vibrators • Roller mills • Stretching machines • Wire drawing machines	License stage Motion Control HighLevel or higher required. The technology application can be selected in the »Engineer« application catalog.
TA "Synchronism with mark synchronisation" (🕮 332)		
	• Printing units • Asynchronous cross cutters • Perforating machines • Insetters • Vibrating drives • Line drives • Labelling machines	License stage Motion Control HighLevel or higher required. The technology application can be selected in the »Engineer« application catalog.

12.1 Introduction

The following subchapters provide information on the electrical shaft.

12.1.1 Synchronisation of the drives via a master angle

By coupling the drives via a master angle the positions are firmly allocated to each other like a mechanical shaft.



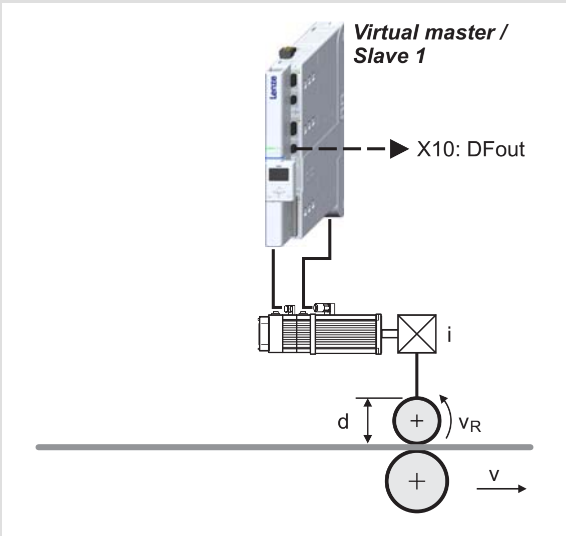
- A drive with a virtual master or a real master (encoder) is able to create the master angle and transmit this to the other drives which follow this master angle.

Advantages of this type of synchronisation

- The communication between the drives is very simple. A time-consuming evaluation of the status signals of each drive and the control signals to be generated from it for each single drive is not required.
- Due to the flexible electronics trimming functions can be carried out very easily. Thus, motion sequences in machines can be easily synchronised and optimised.
- A variation of the master angle speed changes the number of cycles of the machine. The drives keep the position allocation.

12.1.2 Virtual master/real master

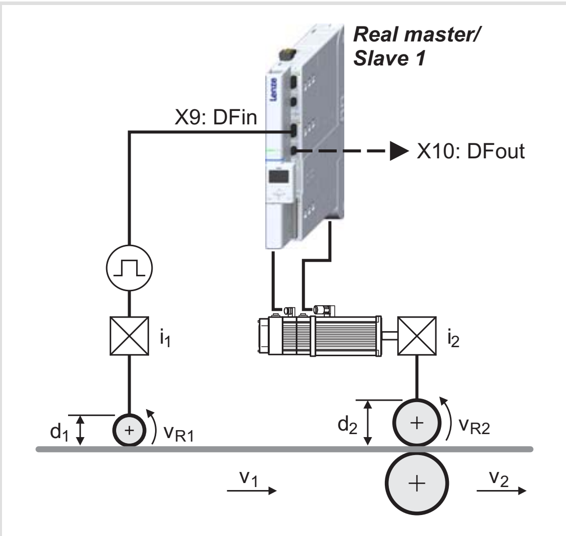
Virtual master



- In an interconnection, a drive takes over the task of the (virtual) master and is the first slave drive at the same time.
- The master value created in the TA by the "Virtual master" function is transmitted via a bus system or the digital frequency output to the other slave drives.

[12-1] Example "Virtual master" (with master value transmission via digital frequency extension module)

Real master



- The master value for a slave drive can be also specified by a real master (e.g. external encoder).
- The master value can be specified e.g. via the digital frequency input of the master frequency extension module or a bus system.
- The master value (possibly conditioned in the TA) by the "Virtual master" function is transmitted via a bus system or the digital frequency output to the other slave drives.

[12-2] Example "Real master" (with master value transmission via digital frequency extension module)

12.1.3 Transmission of the master angle

The master value/angle can be transmitted via the following transmission media:

- Digital frequency
- System bus (CAN)
- ETHERNET Powerlink (in preparation)

The suitable bus medium is selected according to the criteria listed in the following sections:

Digital frequency (simulation of an incremental encoder)

- Rail or cascade structure is possible.
- Only relative master value/master angle possible.
- Max resolution 16 bits/revolution
- Cable length is virtually unlimited but must not exceed 50 m from drive to drive.
- Digital frequency extension module is required.

System bus (CAN)

- No cascade structure possible.
- Optionally absolute or relative master angle transfer possible.
- Resolution up to 28 bits/revolution (in preparation; currently 16 bits/revolution).
- Cable length is limited (dependent on baud rate, number of nodes and cable cross-section).
  - With a baud rate of 500 Kbit/s the total cable length is limited to e.g. 117 metres.
- Interface of 9400 HighLine is already integrated.
  System bus "CAN on board" (134)

Note!

For detailed information about the CANopen system bus interface, please see the "CAN on-board 9400" Communication Manual.

ETHERNET Powerlink (in preparation)

- Rail or cascade structure is possible.
- Optionally absolute or relative master angle transfer possible.
- Resolution up to 28 bits/revolution.
- Cable length is virtually unlimited but must not exceed 100 m from drive to drive.
- Additional hardware (communication module ETHERNET Powerlink) is required.

Note!

For detailed information about the ETHERNET Powerlink, please see the "Ethernet" Communication Manual.

12.1.4 Speed or angular synchronism?

The decision whether to use a speed or angular synchronism mainly refers to the TA "Electronic gearbox" (📖 297)

Angular synchronism

Use the angular synchronism if the material is not able to absorb any force and no remaining positional variation may be available. Please note that a position controller always causes additional trouble in a track since disturbances and reference value variations must be compensated exactly.

Speed synchronism

Use the speed synchronism if the material is able to absorb force which ensures a better concentricity.

12.1.5 Rail or cascade structure?

Rail structure

All drives obtain the same master value/master angle.

Cascade structure

Each drive obtains its own master value/master angle which is created or merely prepared through the upstream drive.

12.1.6 Master or actual value transfer?

Master value transmission

The master value transfer results in a much quieter machine running. The mark corrections, superimposed control functions and disturbances of the drive, however, do not affect the system.

Actual value transfer

The actual value transfer results in an uneven machine running. Mark corrections, superimposed control functions and disturbances of the leading drive affect the system.

12.1.7 Absolute or relative master angle processing?

Absolute master angle processing

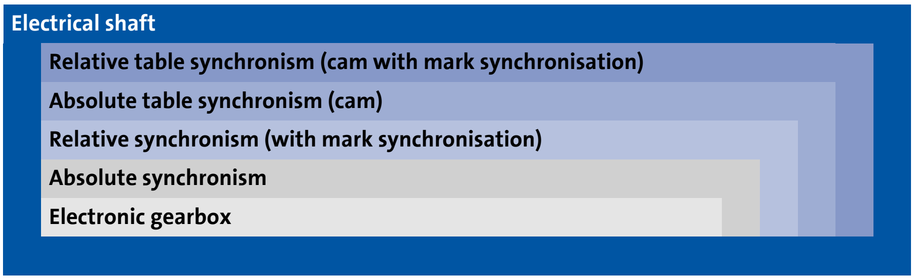
All drives have a common fix reference to each other via the position of the master angle.

Relative master value/master angle processing

Stands for a high-precision transmission of the master value. However, there is no firm reference to the other drives (e.g. in case of a material path each printing roll is synchronised one by one to the print image).

12.1.8 Functions with synchronisation via the electrical shaft

The functions of the electrical shaft are built on each other and thus are scalable:



Electronic gearbox

The electronic gearbox respresents the simplest function in the DC-bus operation via the electrical shaft. The function is suited for e.g. material transport or material processing. A direct synchronism of tools to a material path can be created without direct position reference or for stretching plants with adjustable stretching ratio.

▸ TA "Electronic gearbox" (📖 297)

Absolute synchronism

This function is suited for applications with continuously rotating tools (e.g. groove cylinder), which are fed with material in a fixed machine cycle and for which several tools have to be synchronised to each other.

Relative synchronism (with mark synchronisation)

This function is suited for processing continuous material in the form of a material web. Here the tools (e.g. pressure cylinders) are aligned via marks to e.g. print images which are located on the web. There must be no risk of collision. We distinguish between "Relative synchronism with register formation and mark synchronisation" and "Relative synchronism with register control".

▸ TA "Synchronism with mark synchronisation" (📖 332)

Absolute table synchronism (cam)

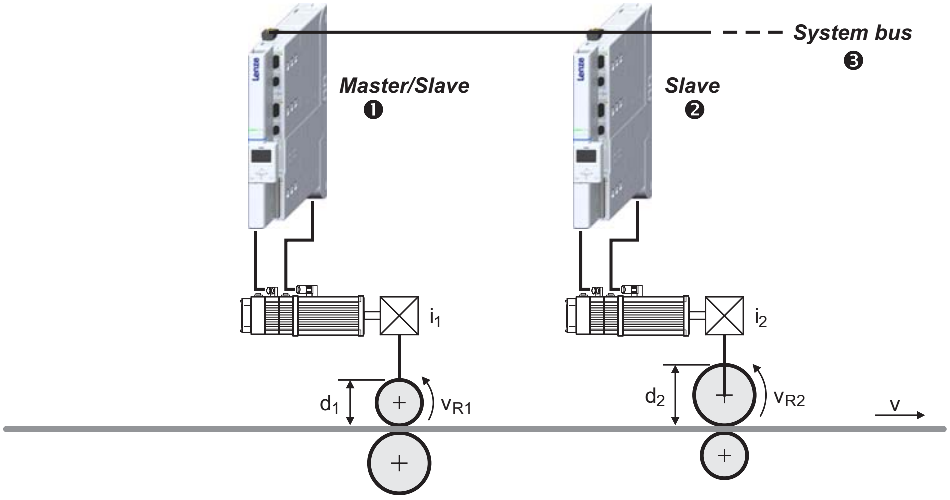
Like "Absolute synchronism", although the tools can also perform a non-linear movement.

Relative table synchronism (with mark synchronisation)

Like "Relative synchronism", although the tools can also perform a non-linear movement.

12.1.9 Application examples

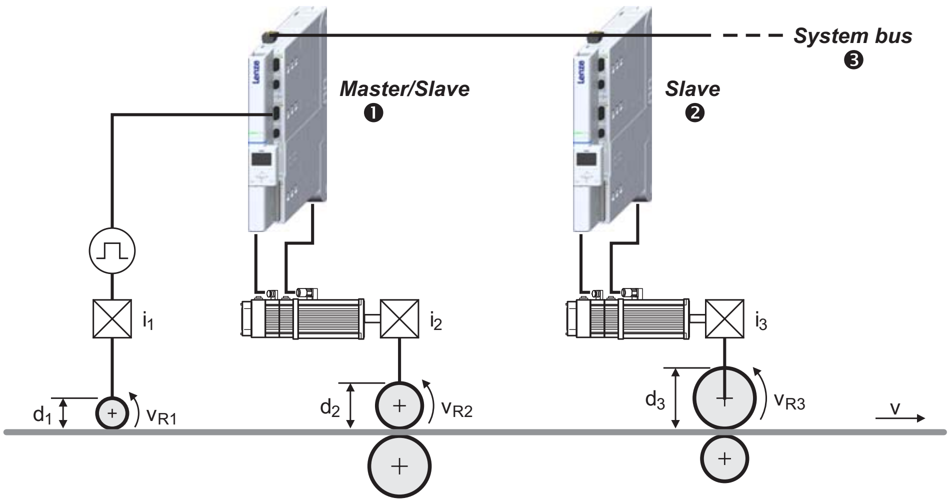
Electronic gearbox with virtual master



❶ Virtual master (and slave 1)
❷ Slave 2
❸ Electrical shaft, implemented here via system bus (CAN).

[12-3] Electronic gearbox with virtual master (rail)

Electronic gearbox with real master



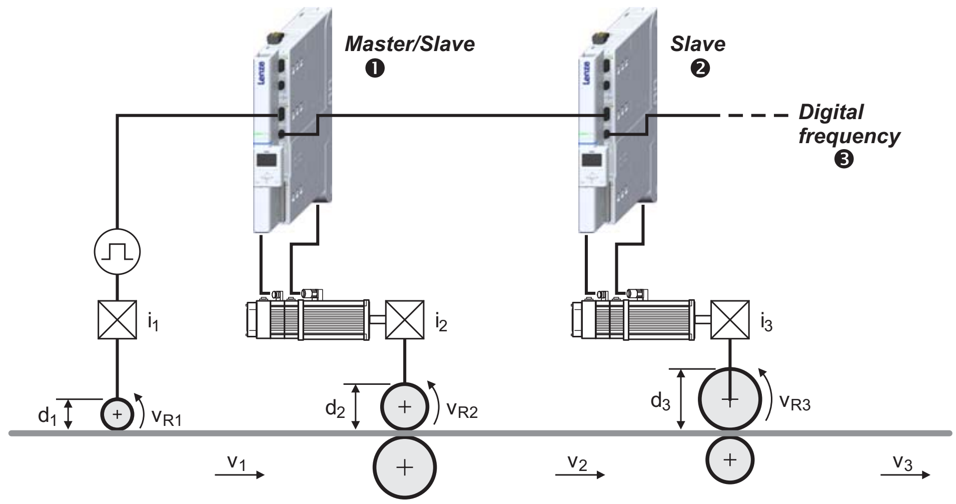
❶ Real master/slave 1 (digital frequency extension module required)
❷ Slave 2
❸ Electrical shaft, implemented here via system bus (CAN).

[12-4] Electronic gearbox with real master (rail)

Electronic gearbox as cascade

The technology application "Electronic gearbox" is often operated as cascade since changes of speed/gearbox ratio of an upstream drive also have an effect on the subsequent drive.

- Typical applications are, for instance, stretching machines, wire drawing machines and roller mills.
- There is no position reference between tool and material. However, it may be required to position the tools for maintenance work.
- The master speed is transmitted via the digital frequency or ETHERNET Powerlink (in preparation).



❶ Real master/slave 1
❷ Slave 2
❸ Digital frequency cascade (digital frequency extension module required)

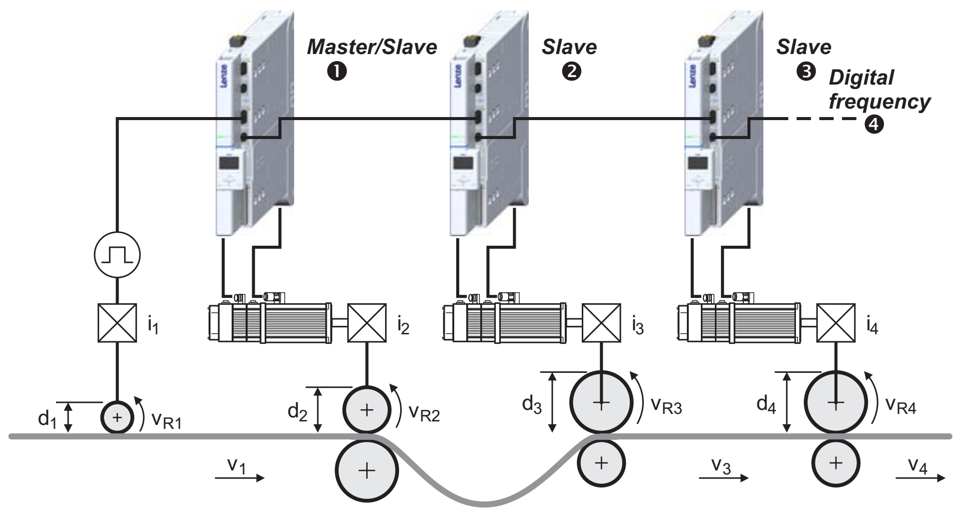
[12-5] Electronic gearbox with real master (cascade)

- The following applies to the speed of the web in case of a cascade:

$$v_3 > v_2$$
$$v_3 = v_2 \cdot K$$

Tighten the web via trimming function with cascade

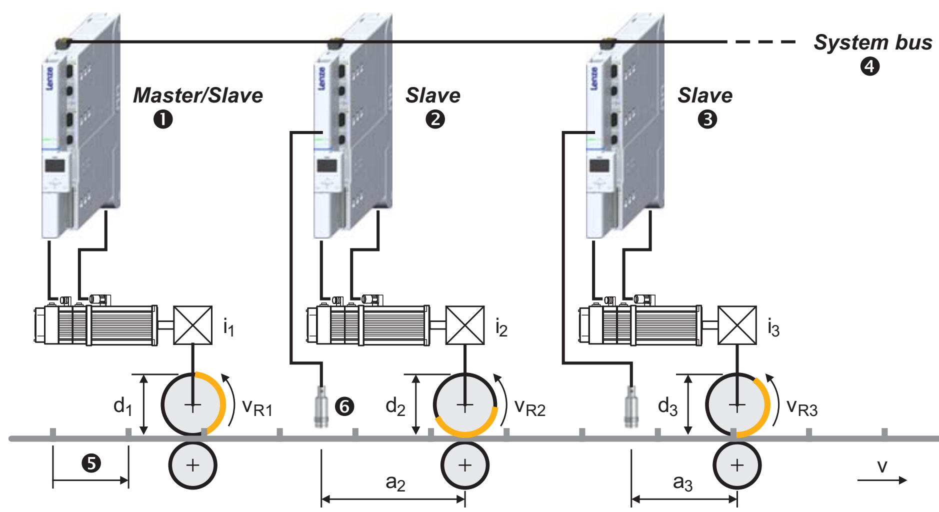
In case a clearance has developed, the web must be "tightened" again. Only then the machine can be accelerated again via the master. The subsequent slave (cascade structure) must run along in the set ratio. Thus, the trimming function acts directly before or after the stretching factor.



❶ Real master/slave 1
❷ Slave 2 with master value trimming
❸ Slave 3
❹ Digital frequency cascade (digital frequency extension module required)

[12-6] Trimming function in case of the electronic gearbox as cascade

Relative synchronism with mark synchronisation and virtual master



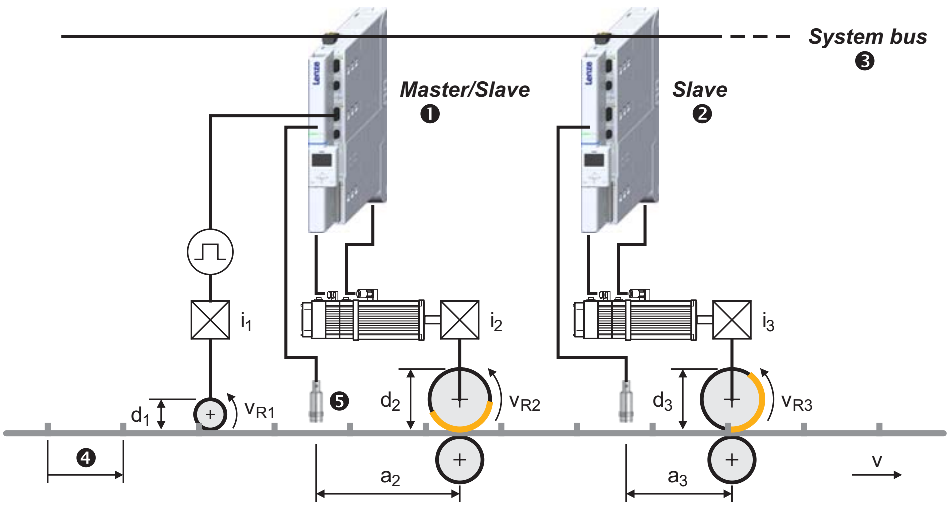
❶ Virtual master (and slave 1)
❷ Slave 2
❸ Slave 3
❹ Electrical shaft, implemented here via system bus (CAN).
❺ Register (cycle of guiding angle/guiding angle)
❻ Sensor for mark synchronisation

[12-7] Relative synchronism with virtual master (rail)

In case of the relative synchronism with mark synchronisation, there is a position reference between tool and web, which occurs in each register. For this, a slight correction is superimposed to the synchronous motion with regard to the web. Such applications are, for instance, printing machines.

For the mark synchronisation in particular the register ❺ (the cycle of the guiding angle) and the distance of the sensor ❻ from the home position of the tool (distances a_2 and a_3) are relevant.

Relative synchronism with mark synchronisation and real master



❶ Real master/slave 1 (digital frequency extension module required)
❷ Slave 2
❸ Electrical shaft, implemented here via system bus (CAN).
❹ Register (cycle of guiding angle/guiding angle)
❺ Sensor for mark synchronisation

[12-8] Relative synchronism with real master (track)

12.2 TA "Electronic gearbox"

The technology application "Electronic gearbox" serves to implement a synchronism with adjustable stretching ratio between the drives in the system.

- The ratio can be freely adjusted, the values are input in the form of a fraction (numerator/denominator) with 32 bit resolution.
- The master value can be specified either by a "Virtual master", or via a bus system or the digital frequency extension module. It is selected from the **Application parameter** tab via the **Master value source** list field (C03052).
- The master value transmission (high speed stability) is preset. The actual values can be transmitted by the corresponding selection in the list fields **Master value output** (C3054/1, C3054/2, C3197).

Note!

The electrical shaft can be implemented with a bus system as e.g. system bus (CAN) or Ethernet Powerlink or via digital frequency transmission.

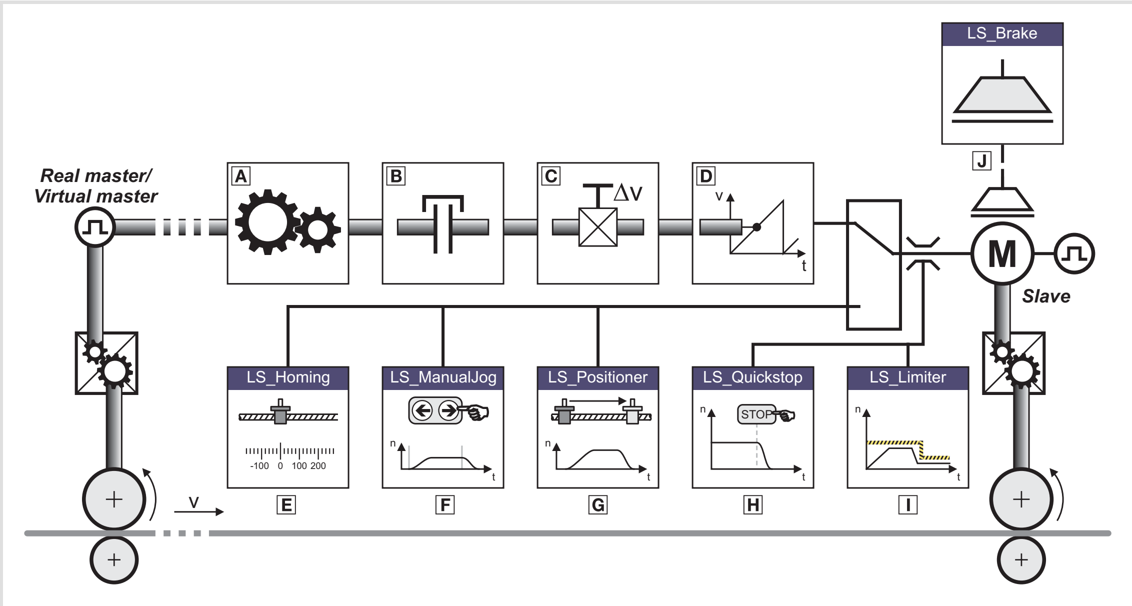
With regard to the configuration of the digital frequency extension module in the controller, two variants of technology applications are available in the »Engineer« application catalog.

- In the TA variant "Electronic gearbox" the configuration of a digital frequency extension module is expected. Therefore, the TA can provide the function of the electrical shaft either via digital frequency transmission and via a bus system.
- In the TA variant "Electronic gearbox *MotionBus*" the configuration of a digital frequency extension module is not included and corresponding interfaces are not available in the TA. Thus the function of the electrical shaft with this TA can only be provided via a bus system.

Functions

- Virtual master with inching, handwheel and reduced speed.
- Master value conditioning (master shaft) with master value scaling, stretch factor and reversal of rotation direction.
- Virtual clutch with emergency stop and basic speed
- Trimming function via profile generator.
- Master value conditioning (machine axis/tool) with setpoint scaling.
- Additional operating modes for activating the basic drive functions "Homing", "Manual jog (inching)" and "Position override function".
- Support of the basic drive functions "Quick stop" and "Limiter".
- Following error monitoring.
- Optional control of a holding brake.

12.2.1 Basic signal flow



[12-9] Signal flow of the TA "Electronic gearbox" (schematic diagram)

Functions in the operating mode "Electronic gearbox"

A Master value processing with stretch factor

B Virtual clutch

C Master value trimming

D Setpoint conditioning

Basic drive functions

E Homing

F Manual jog (inching)

G Position override function

H Quick stop

I Limiter (optional)

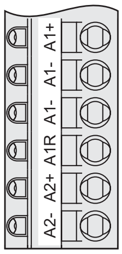
J Brake control (optional)

12.2.2 Assignment of the I/O terminals

12.2.2.1 Setpoint and control signals

The following tables contain the Lenze assignment of the analog and digital inputs for the technology application "Electronic gearbox".

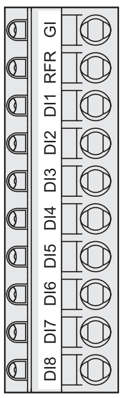
Analog inputs



Terminal X3		Signal (Lenze setting)
	AI1- **AI1+**	-
	AI2- **AI2+**	-

▸ I/O terminals ▸ Analog inputs (📖 117)

Digital inputs



Terminal X5		Signal (Lenze setting)
	DI1	Quick stop • If DI1 is set to LOW level, the drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. • If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time. ▸ Basic drive functions ▸ Quick stop (📖 152)
	DI2	Connection of reference switch
	DI3	-
	DI4	Close clutch
	DI5	Reset error • By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed.
	DI6	-
	DI7	-
	DI8	-

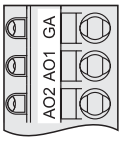
▸ I/O terminals ▸ Digital inputs (📖 123)

12.2.2.2 Actual value and status signals

The following tables contain the Lenze assignment of the analog and digital outputs for the technology application "Electronic gearbox".

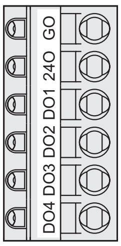
▶ The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

Analog outputs

Terminal X3		Signal (Lenze setting)	Signal configuration
	**AO1**	Motor speed • Scaling: ±10 V ≡ motor reference speed (C00011)	C03110/1
	AO2	Motor torque (setpoint) • Scaling: ±10 V ≡ Motor reference torque (C00057/2)	C03110/2

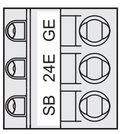
▶ I/O terminals ▶ Analog outputs (📖 120)

Digital outputs

Terminal X4		Signal (Lenze setting)	Signal configuration
	**DO1**	Status "Drive ready" • This operating state is active if the controller is enabled by setting the digital input RFR to HIGH level and no error has occurred.	C03100/1
	DO2	Status "Electrical shaft enabled"	C03100/2
	DO3	Status "Limitation active" • A setpoint is limited at the moment.	C03100/3
	DO4	"Error" status • If the controller is in the error state, the digital output DO4 is set to HIGH level.	C03100/4

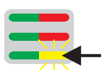
▶ I/O terminals ▶ Digital outputs (📖 125)

State bus

Terminal X2		Signal (Lenze setting)	Signal configuration
	**SB**	"Application error" status • The state bus is put in the "error" status.	C03100/5

▶ I/O terminals ▶ Monitoring function "State bus" (📖 127)

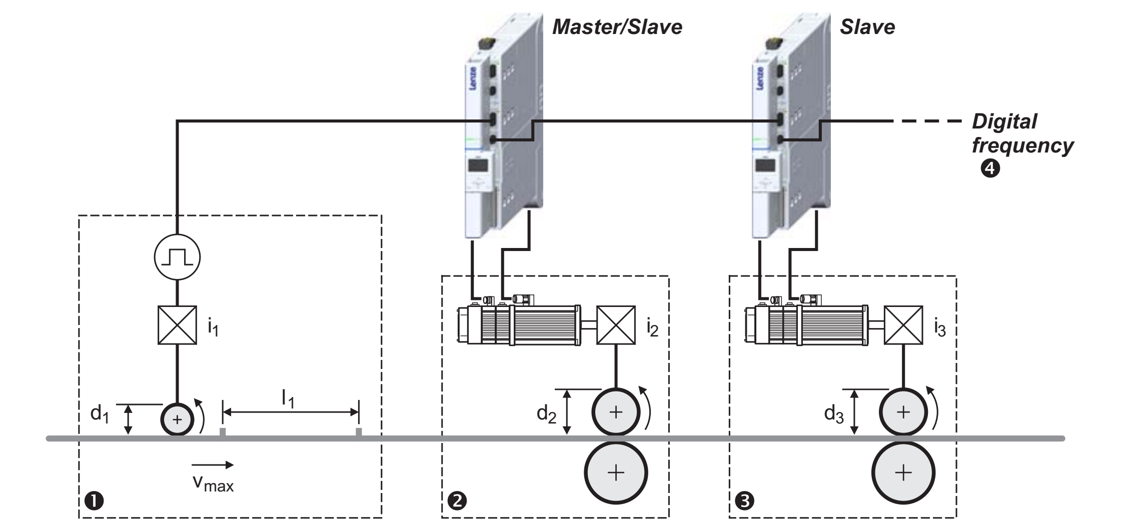
Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Electrical shaft enabled"	C03100/6

▶ Drive interface ▶ LED status displays (📖 34)

12.2.3 Machine parameters

The following schematic diagram shows the relevant global data (machine parameters) for the interconnection via the electrical shaft:



❶ Master axis (here: master value encoder as real master)
❷ Slave axis 1
❸ Slave axis 2
❹ Digital frequency cascade (digital frequency extension module required)

[12-10] Schematic diagram of the most important machine parameters

Symbol	Description
i_1	Gearbox ratio of master value encoder
d_1	Diameter of the master roll
l_1	Master value cycle (if available)
v_{max}	Maximum speed
i_2, i_3	Gearbox ratio of the slave axes
d_2, d_3	Diameter of the slave rolls

Detailed information for setting the machine parameters can be obtained from the following subchapters.

12.2.3.1 Master axis (master shaft)

For scaling and imaging the master value in the application, the machine parameters of the higher-level drive (master shaft) must be set.

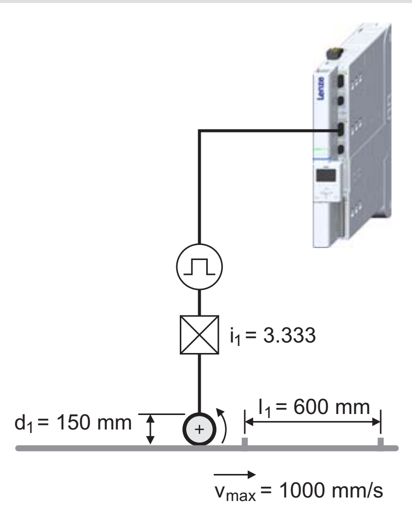
Note!

When setting (scaling) the electrical shaft, ensure that the ratio and encoder constants are identical for all drives in the system. The reference to the scaling of the master drive is sensible.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Electronic gearbox* ➞ *Master value scaling*

Parameters		Lenze setting	
		Value	Unit
C03930	Gearbox ratio - numerator	1	
C03931	Gearbox ratio - denominator	1	
C03932	Feed constant	360.0000	Unit/incr.
C03933	Path units	User-defined	
C03934	User-defined path unit	°	
C03938	Cycle	360.0000	Unit
C03941	Reference speed	500.0000	Unit/t

Example of determining the machine parameters for the master axis



1. Set gearbox ratio for the master value in the form of a quotient (numerator and denominator):
   $i_1 = 3.333 = 10/3$
   – Numerator (C03930) = 10
   – Denominator (C03931) = 3
2. Set feed constant (C03932).
   – For the master value: $Vk = d_1 * \pi = 471,2389$ mm
3. Set the selection "mm" as path unit (C03933).
4. As reference speed (C03941) set the max. machine speed v_{max} = "1000 mm/s".

Tip!

Setting the cycle (C03938) ony is required if the selection "Modulo" is set as traversing range (C02528).

For operation with a virtual master the following setting of the gearbox ratio is recommended to achieve a good resolution of the guiding angle/master value:

- Numerator (C03930) = 100
- Denominator (C03931) = 1

12.2.3.2 Slave axis (machine axis)

Among other things, the following machine parameters describe the motor end of the mechanics used.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Electronic gearbox* → *Machine parameters*

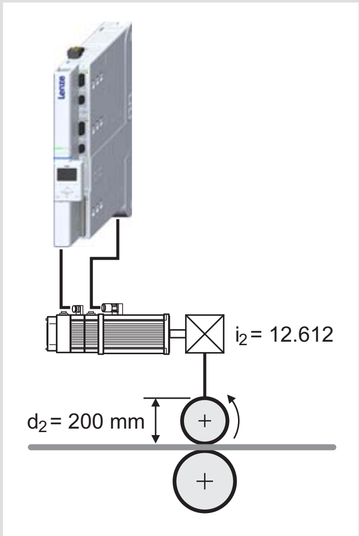
Parameters		Lenze setting Value	Unit
C00173	Mains - voltage	400/415	V
C00174	Threshold undervoltage (LU)	285	V
C00600	Resp. to DC bus overvoltage	Trouble	
C02520	Gearbox fact. numer. motor	1	
C02521	Gearbox fact. denom. motor	1	
C02527	Motor mounting direction	Motor rotating CW	
C02570	Controller configuration	Position control	
C02522	Gearbox fact. numer. load	1	
C02523	Gearbox fact. denom. load	1	
C02529	Mounting direction of position encoder	Encoder rotating CW	
Description of the mechanics (load, tool)			
C02528	Traversing range	Modulo	
C02524	Feed constant	360.0000	Unit
C02525	Unit	°	
C02526	User-defined unit	°	
C02533	Time unit	s	
C00273/1	Motor moment of inertia	Motor-dependent	kg cm^2
C00273/2	Load moment of inertia	0.00	kg cm^2

Tip!

Detailed information for selecting and entering the machine parameters for the machine axis can be found in the chapter "Drive interface

▸ Machine parameters (📖 35)

Example of determining the machine parameters for the slave axis



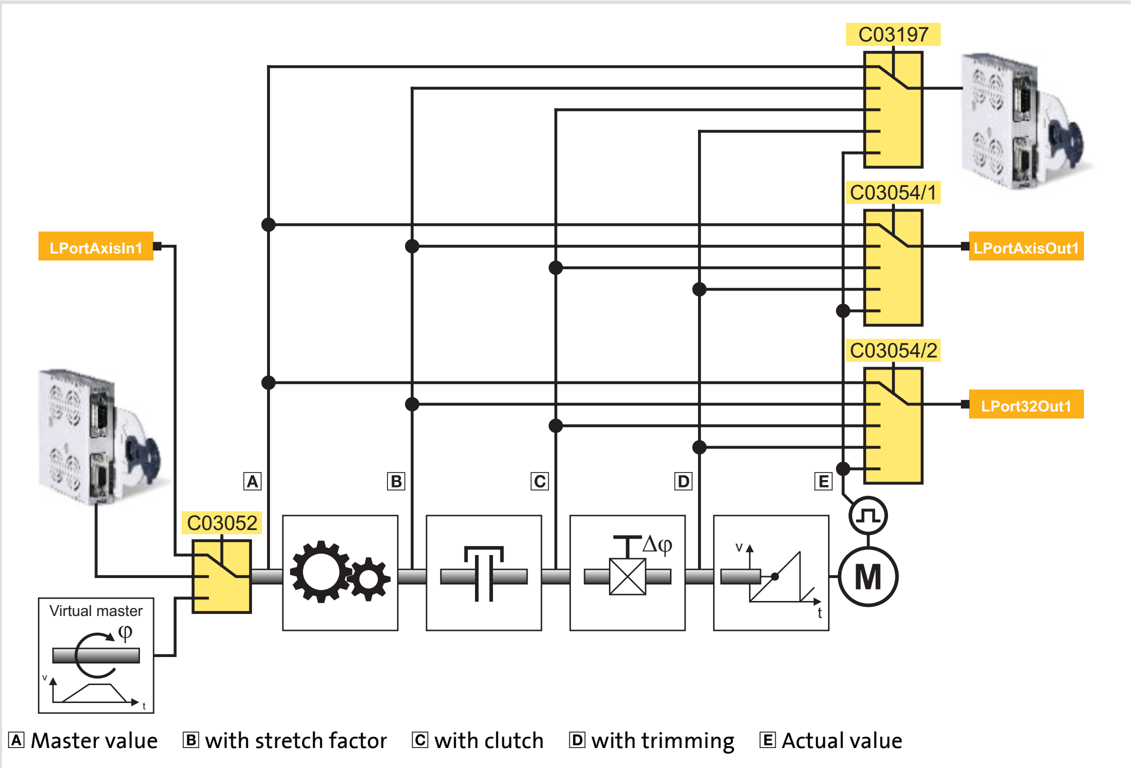
1. Set gearbox ratio for the motor in the form of a quotient (numerator and denominator): i_2 = 12.612 = 12612/1000
   - Numerator (C02520) = 12612
   - Denominator (C02521) = 1000
2. Set the same gearbox ratio for the encoder on the load side:
   - Numerator (C02522) = 12612
   - Denominator (C02523) = 1000
3. Set feed constant (C02524).
   - For the conveyor drive: Vk = $d_2 * \pi$ = 628,3185 mm
4. Set the selection "mm" as unit (C02525).

Tip!

The feed constant corresponds to the movement on the machine side when the gearbox output shaft carries out one revolution (for selection as angle = 360°).

When the unit is set, the real unit of the machine for the selection of physical values (e. g. speeds, accelerations and decelerations) is defined.

12.2.4 Selection of master value source and output



[12-11] Signal flow for selecting the master value source and the master values to be output

Master value source

The master values can be either selected by a "Virtual master", via a bus system or the digital frequency extension module. ▶ Transmission of the master angle (📖 290)

- They can be selected on the **Application parameter** tab via the **Master value source** list field or via C03052.

Master value output

The master value to be output (A ... E) is selected individually for the three possible communication channels:

- List field **Master value output DF module** (C03197):
  Selection of the master value output for the digital frequency module.
- List field **Master value output MotionBus** (C03054/1):
  Selection of the master value output for horizontal communication.
- List field **Master value output LPort32Out1** (C03054/2):
  Selection of the master value output for vertical communication.

12.2.4.1 Master value source: Virtual master

If the "Virtual master" is selected as master value source, the master value is created in the TA and transmitted via a bus system or the digital frequency output to the other slave drives.

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Virtual master*

Parameters		Lenze setting	
		Value	Unit
C03565	Operating mode	Continuous operation	
C03568/1	Master speed 1	500.0000	Unit/t
C03568/2	Master speed 2	0.1000	Unit/t
C03569/1	Speed inching right	50.0000	Unit/t
C03569/2	Speed inching left	25.0000	Unit/t
C03570/1	Inching ramp	0.010	s
C03570/2	Continuous operation ramp	1.000	s
C03570/3	Stop ramp	1.000	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	→ VMas master shaft STOP1	C03058/1
C03016	→ Activate master function	C03058/3
C03017	→ VMas inching positive	C03058/4
C03018	→ VMas inching negative	C03058/5
FALSE	→ VMas start continuous operation	C03058/7
FALSE	→ VMas 2. master speed	C03058/8
0	→ VMaster handwheel	C03056

- Configuration: Tab **FB editor** → FB *VirtualMaster*

12.2.4.2 Master value source: Digital frequency input

To use the digital frequency input as master value source, the controller must be provided with digital frequency extension module (E94AYFLF).

To ensure the integration of the extension module in the application, the TA "Electronic gearbox" must be used as technology application.

Note!

The technology application "Electronic gearbox" *MotionBus*" which can also be selected in the application catalog does not contain any interfaces to the digital frequency extension module.

Tip!

Detailed information on the digital frequency extension module can be found in the User Manual "Digital frequency extension module (E94AYFLF) – parameter setting & configuration".

12.2.4.3 Master value source: Bus system

When the master value is selected via a bus system as e.g. system bus (CAN) it is possible to first extrapolate the received position information to compensate higher bus transmission cycles.

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Electronic gearbox* → *Master value extrapolation*

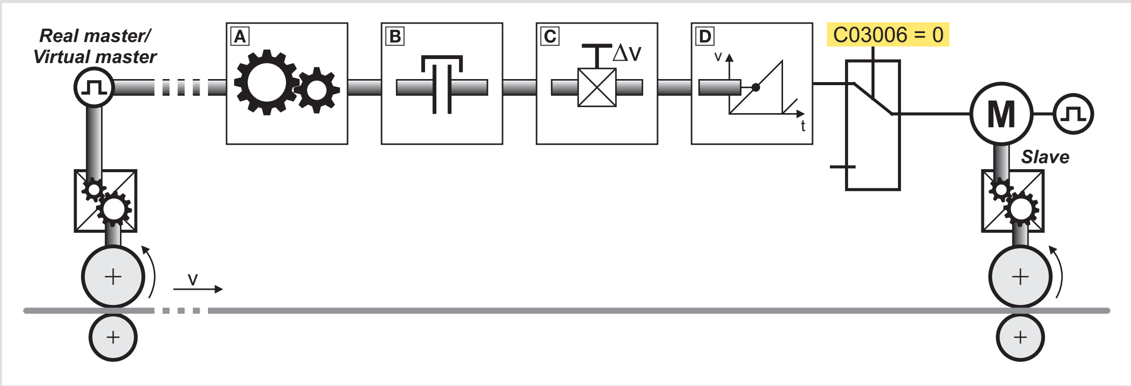
Parameters		Lenze setting	
		Value	Unit
C03550	Number of extrapolation cycles	1	

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
TRUE	→ Activate extrapolation	C03058/9

- Configuration: Tab **FB editor** → FB *MotionBusIn*

12.2.5 Operating mode "Electronic gearbox"

In the "Electronic gearbox" (C03006 = "0") operating mode the drive follows the master value of the electrical shaft if the clutch is engaged.



[12-12] "Electronic gearbox" operating mode (schematic diagram)

Functions in the "Electronic gearbox" operating mode

A Master value processing

B Virtual clutch

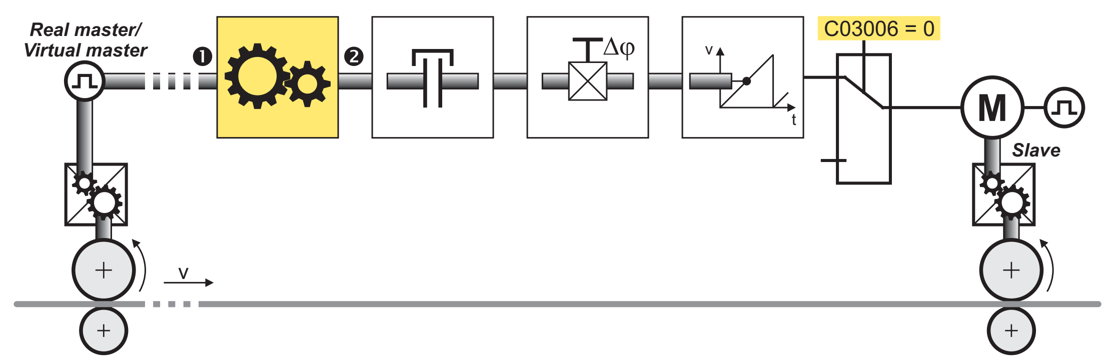
C Master value trimming

D Setpoint conditioning

Tip!

A description of the different functions for conditioning the master value can be found in the following subchapters.

12.2.5.1 Master value processing



❶ Master value
❷ Master value with stretch factor

[12-13] "Master value processing" function in the signal flow (schematic diagram)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Electronic gearbox*

Parameters		Lenze setting Value	Unit
C03957	Master value	-	Unit/t
C03000	Stretch factor - numerator	1000000000	
C03001	Stretch factor - denominator	1000000000	
C03673	Master value with stretch factor	-	Unit/t

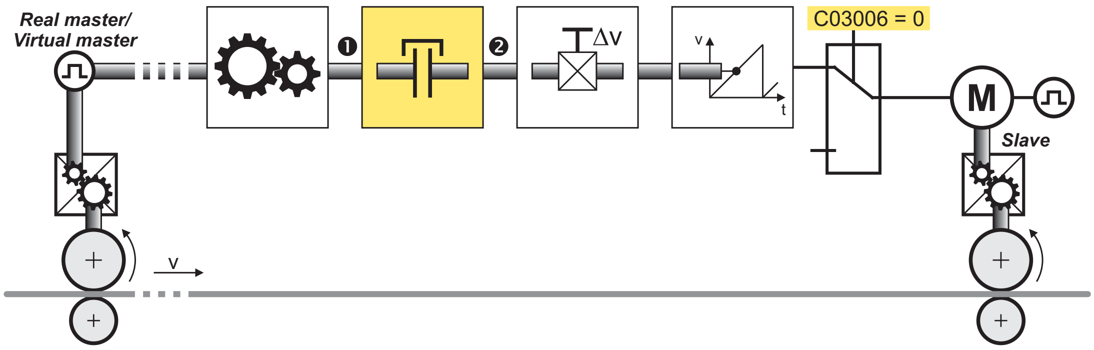
▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Electronic gearbox* ➞ *Master value processing*

Parameters		Lenze setting Value	Unit
C03025	Master value - direction of rotation	Not inverted	

Setpoint inputs of the function		Signal configuration
Lenze setting	**Setpoint input**	**(Multiplexer parameters)**
C03000	➞ Stretch factor - numerator	C03050/1
C03001	➞ Stretch factor - denominator	C03050/2

▶ Configuration: Tab **FB editor** ➞ FB *GearElectricalShaft*

12.2.5.2 Virtual clutch



❶Master value with stretch factor
❷ Master value with clutch

[12-14] Function "Virtual clutch" in the signal flow (schematic diagram)

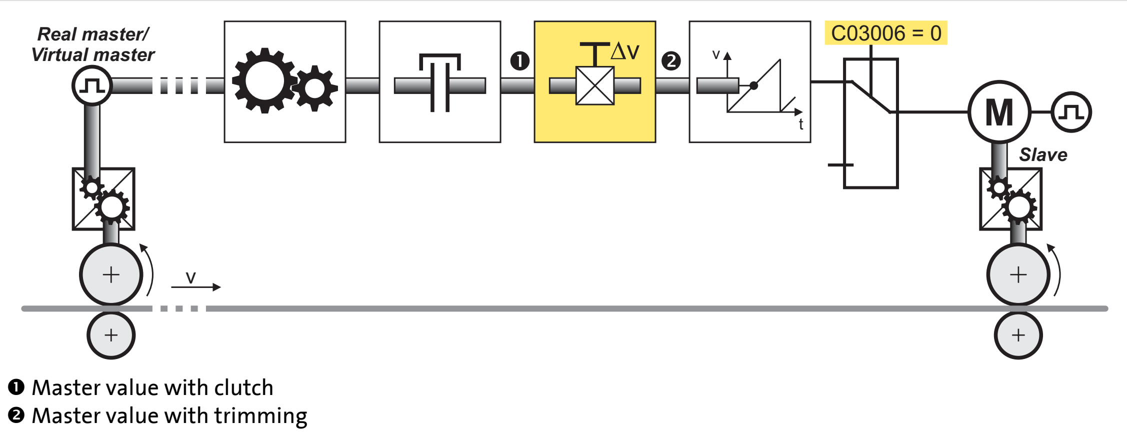
▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Electronic gearbox* ➞ *Virtual clutch*

Parameters		Lenze setting Value	Unit
C03673	Master value with stretch factor	-	Unit/t
C03021	Activate clutch	Deactivated	
C03665/1	Clutch in ramp	1.000	s
C03665/2	Decoupling ramp	1.000	s
C03665/3	Stop ramp	1.000	s
C03668	Jerk limitation	1.000	s
C03674	Master value with clutch	-	Unit/t

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DigIn 4	➞ Close clutch	C03058/12
FALSE	➞ Clutch - positive opening operation	C03058/13

▶ Configuration: Tab **FB editor** ➞ FB *ClutchElectricalShaft*

12.2.5.3 Master value trimming



[12-15] "Master value trimming" function in the signal flow (schematic diagram)

This function serves to adjust the master value.

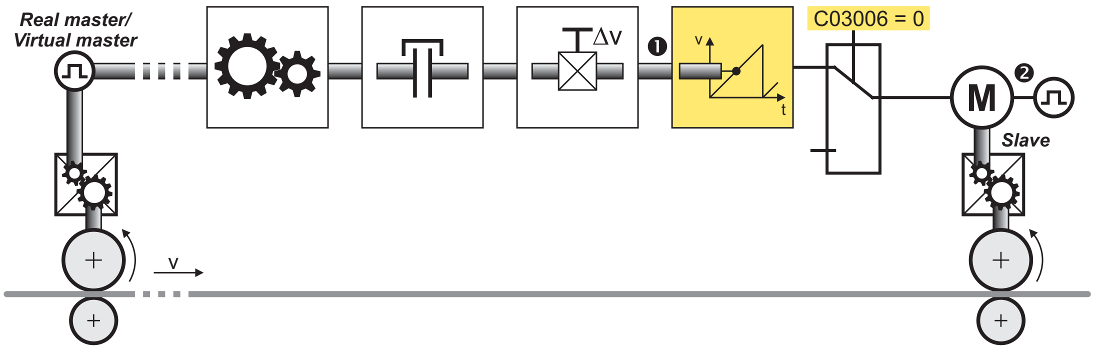
▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Electronic gearbox* → *Master value trimming*

Parameters		Lenze setting	
		Value	Unit
C03674	Master value with clutch	-	Unit/t
C03026	Activate trimming	Deactivated	
C03027	Positive trimming	Inactive	
C03028	Negative trimming	Inactive	
C03685	Positive speed	400.0000	Unit/t
C03686	Negative speed	-200.0000	Unit/t
C03687	Acceleration ramp	1.000	s
C03688	Deceleration ramp	1.000	s
C03689	Disable ramp	1.000	s
C03690	Master value with trimming	-	Unit/t

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
C03026	→ Activate trimming	C03058/15
C03027	→ Positive trimming	C03058/17
C03028	→ Negative trimming	C03058/18

▶ Configuration: Tab **FB editor** → FB *Trimming*

12.2.5.4 Setpoint conditioning



❶ Master value with trimming
❷ Actual value

[12-16] "Setpoint conditioning" function in the signal flow (schematic diagram)

This function is used for speed ratio between the master shaft and the machine axis.

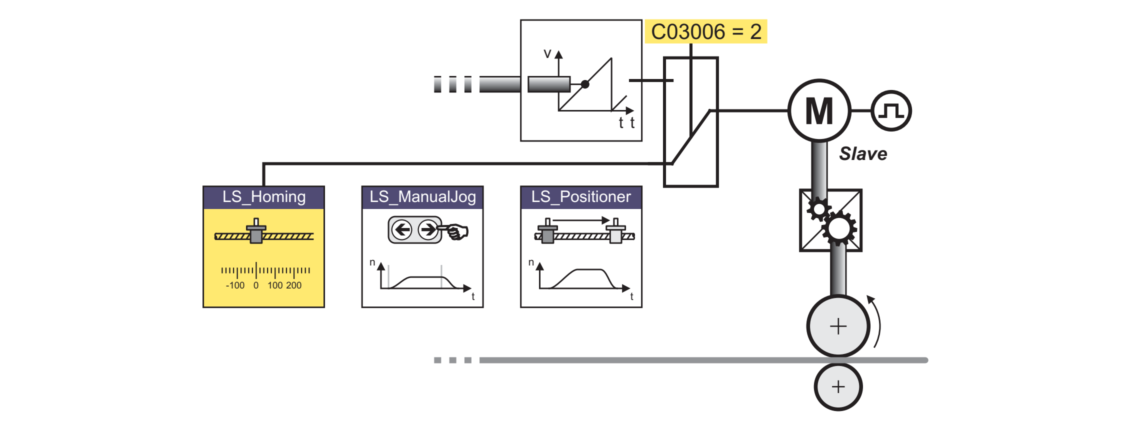
▶ Parameter setting: Tab **All parameters** → Category *Electronic gearbox* → *ConvertElShaftMotor*

Parameters		Lenze setting	
		Value	Unit
C03715	Operating mode	Unit coupling	
C03717/1	Reference variable X	1.0000	
C03717/2	Reference variable Y	1.0000	

▶ Configuration: Tab **FB editor** → FB *ConvertElShaftMotor*

12.2.6 "Homing" mode

In the "Homing" mode (C03006 = "2") the drive is decoupled from the electrical shaft and the basic function "Homing" is enabled:



[12-17] "Homing" mode (schematic diagram)

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Homing*

Parameters		Lenze setting	
		Value	Unit
C02528	Traversing range	Modulo	
C02640	Ref. mode	Set home pos. directly	
C02642	HM position	0.0000	Unit
C02643	HM target position	0.0000	Unit
C02644	Ref. speed 1	360.0000	Unit/s
C02645	Home acceleration 1	720.0000	Unit/s^2
C02646	Ref. speed 2	180.0000	Unit/s
C02647	Ref. acceleration 2	360.0000	Unit/s^2
C02648	Home S-ramp time	100	ms
C02649	HM torque limit	10.00	%
C02650	Homing inhibit time	1.000	s
C02652	Home position after mains switching	Delete	
C02653	Max. rot. angle after mains sw.	180	°
C3011	Set home position	Inactive	
C3012	Home position	100.0000	Unit

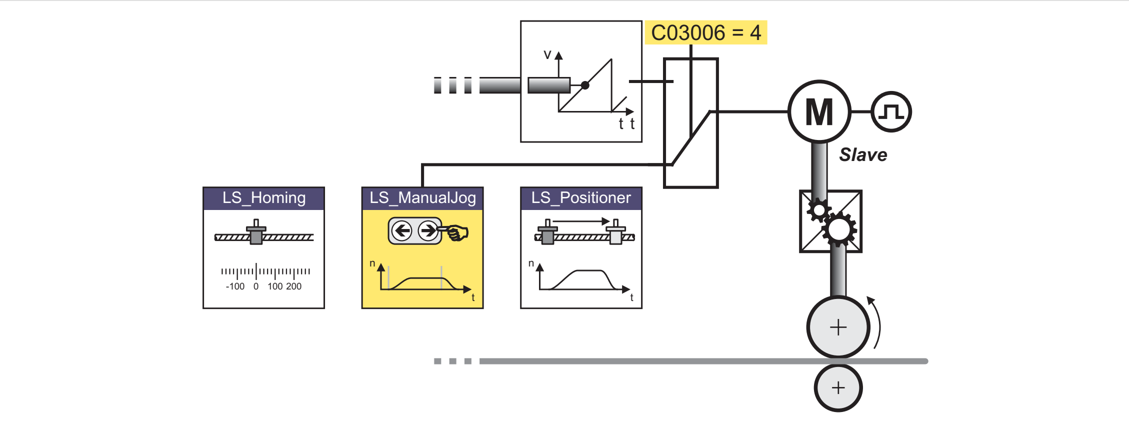
Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	➞ Start homing	C03160/2
DigIn 2	➞ Home mark	C03160/3
C03011	➞ Set home position	C03160/4
C03012	➞ Home position	C03163
FALSE	➞ Reset home position	C03160/5

Tip!

Detailed information on homing can be found in chapter "Basic drive functions" ➞ subchapter "Homing". (🕮 164)

12.2.7 "Manual jog" mode

In the "Manual jog" mode (C03006 = "4") the drive is decoupled from the electrical shaft and the basic function "Manual jog" is enabled:



[12-18] "Manual jog" mode (schematic diagram)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Manual jog*

Parameters		Lenze setting	
		Value	Unit
C02620	Manual jog speed 1	360.0000	Unit/s
C02621	Manual jog speed 2	720.0000	Unit/s
C02622	Manual acceleration	360.0000	Unit/s^2
C02623	Manual deceleration	1440.0000	Unit/s^2
C02624	Inaccuracy time of manual traversing	0.100	s
C03007	Positive manual jog	Inactive	
C03008	Negative manual jog	Inactive	

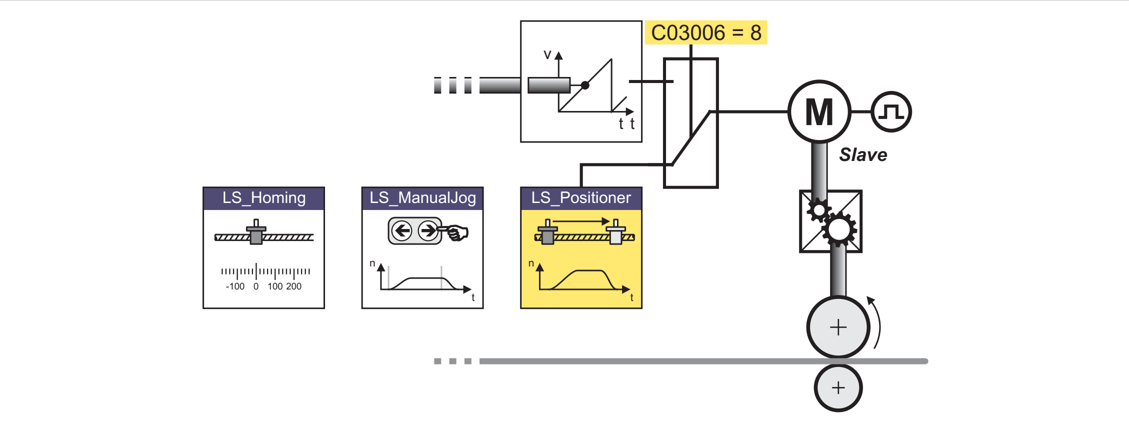
Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
C03007	➞ Activate positive manual jog	C03155/2
C03008	➞ Activate negative manual jog	C03155/3
FALSE	➞ Activate 2. speed	C03155/4
FALSE	➞ Retract limit switch	C03155/5

Tip!

Detailed information on the manual jog function can be found in chapter "Basic drive functions" ➞ subchapter "Manual jog". (📖 156)

12.2.8 "Positioning" mode

In the "Positioning" mode (C03006 = "8") the drive is decoupled from the electrical shaft and the basic function "Positioning" is enabled:



[12-19] "Positioning" mode (schematic diagram)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *All basic functions* ➞ *Positioning*

Parameters		Lenze setting	
		Value	Unit
C00070	Speed controller gain	0.00700	Nm/rpm
C00071	Speed controller reset time	10.0	ms
C00072	D component - speed controller	0.00	ms
C02570	Controller configuration	Phase control	
C02554	Integral-action time of position controller	60.000	s
C02553	Position controller gain	20.00	1/s
C03040	Positioning - profile no.	0	
C03041	Positioning - teach profile no.	0	

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	➞ Start positioning step	C03185/2
FALSE	➞ Abort positioning step	C03185/3
FALSE	➞ Restart positioning step	C03185/4
FALSE	➞ Activate override	C03185/5
100 %	➞ Speed override	C03186/1
100 %	➞ Acceleration override	C03186/2
FALSE	➞ Inhibit touch probe evaluation	C03185/6
FALSE	➞ Teach position	C03185/7

Profile data record management

For the profile data record management the FB **L_PosProfileTable** is used. This FB serves to file and manage up to four (travel) profiles and to "teach" target positions.

- A profile describes a motion request which can be implemented by the SB **LS_Positioner** into a rotary motion.
- A profile is described via the following profile parameters: Mode (type of positioning), position, speed, acceleration, deceleration, S-ramp time, standard sequence profile, TP sequence profile and TP selection.
- The data of the profile parameters is directly input in the assigned codes:

Profile parameters	Unit	Profile no. 1	Profile no. 2	Profile no. 3	Profile no. 4
Positioning mode	-	C03970/1	C03970/2	C03970/3	C03970/4
Position	Unit	Set position	C03971/2	C03971/3	C03971/4
Speed	Unit/t	C03972/1	C03972/2	C03972/3	C03972/4
Acceleration	Unit/t^2	C03973/1	C03973/2	C03973/3	C03973/4
Delay	Unit/t^2	C03974/1	C03974/2	C03974/3	C03974/4
S-ramp time	s	C03975/1	C03975/2	C03975/3	C03975/4
TP sequence profile	-	C03976/1	C03976/2	C03976/3	C03976/4
TP selection	-	C03977/1	C03977/2	C03977/3	C03977/4

Note!

For profile no. 1 the set position of the tool which belongs to the master position is always used as target position.

- Application: Returning the tool e.g. from a maintenance position to the network.

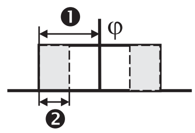
"Teach" position

When the control input "Teach position" is set to TRUE, the current tool position is saved in the profile the number of which is set in C03041. After the control input is reset to FALSE the position saved last is maintained in the profile.

12.2.9 Following error monitoring

In the Lenze setting the following error monitoring is active.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Electronic gearbox* → *Following error monitoring*



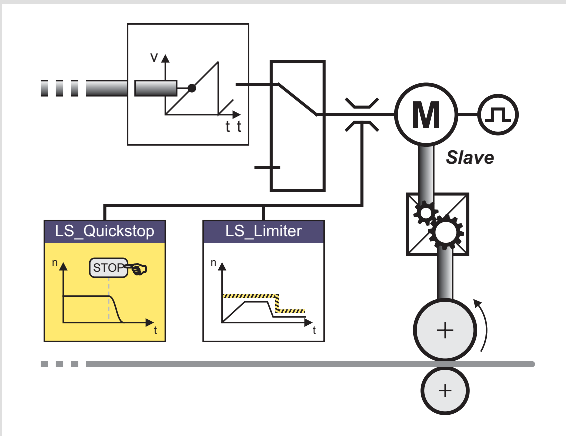
❶ Switching threshold
❷ Hysteresis

Parameters		Lenze setting Value	Unit
C03911	Switching threshold	1.0000	Unit
C03916	Hysteresis	0.5000	Unit

Control inputs of the function Lenze setting	Control input	Signal configuration (Multiplexer parameters)
TRUE	→ Activate following error monitoring	C03058/21

▶ Configuration: Tab **FB editor** → FB *MonitFollowError*

12.2.10 Quick stop



The basic function "Quick stop" brakes the drive to standstill within the deceleration time set for the quick stop function after a corresponding request independent of the setpoint selection.

If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time.

[12-20] Basic function "Quick stop" (schematic diagram)

- The quick stop function can be activated as follows in the Lenze setting:
  - By setting the digital input DI1 to LOW level.
  - By a master control via the port *LPortControl1*:
    By setting bit 2 of the bit-coded control word 1.
- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *All basic functions* → *Quick stop*

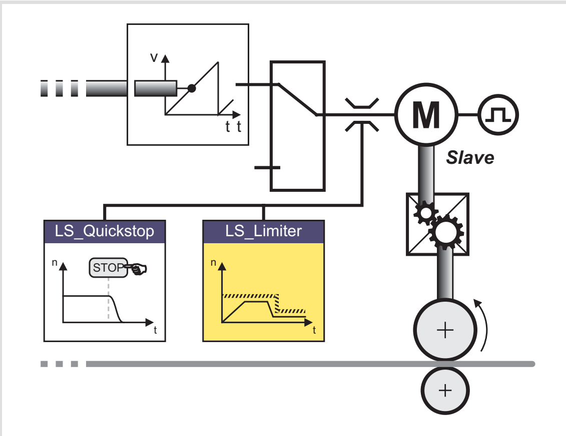
Parameters		Lenze setting	
		Value	Unit
C00105	Quick stop deceleration time	0.000	s
C00106	Quick stop S-ramp time	0.00	%
C00107	Reference for deceleration time "Quick stop"	Motor reference speed (C00011)	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 1	→ Activate quick stop 1	C03135/1
Control word 1 bit 02	→ Activate quick stop 2	C03135/2
FALSE	→ Activate quick stop 3	C03135/3

Tip!

Detailed information on quick stop can be found in chapter "Basic drive functions" → subchapter "Quick stop". (152)

12.2.11 Limiter



[12-21] Basic function "Limiter" (schematic diagram)

The basic function "Limiter" monitors the travel range limits via limit switches and parameterised software limit positions and can lead the drive to defined limit ranges when being asked accordingly by the safety module.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Limiter*

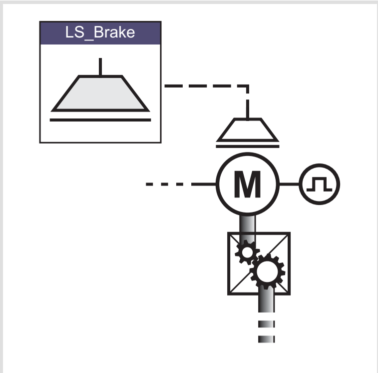
Parameters		Lenze setting Value	Unit
Limit values			
C02707	Permissible direction of rotation	Positive and negative	
C02700	Software limit positions are active	Deactivated	
C02701/1	Positive software limit position	0.0000	Unit
C02701/2	Negative software limit position	0.0000	Unit
Only for homing, positioning and manual jog			
C02702	Limitations effective	Deactivated	
C02703	Max. speed	3600.0000	Unit/s
C02705	Max. acceleration	3600.0000	Unit/s^2
C02706	Min. S-ramp time	100	ms
Limited speed 1 ... 4 (only for homing, positioning, and manual jog)			
C02708/1	Limited speed 1	3600.0000	Unit/s
C02710/1	Delay lim. speed 1	0.0100	Unit/s^2
C02711/1	S-ramp time lim. speed 1	100	ms
C02708/2	Limited speed 2	7200.0000	Unit/s
C02710/2	Delay lim. speed 2	0.0100	Unit/s^2
C02711/2	S-ramp time lim. speed 2	100	ms
C02708/3	Limited speed 3	14400.0000	Unit/s
C02710/3	Delay lim. speed 3	0.0100	Unit/s^2
C02711/3	S-ramp time lim. speed 3	100	ms
C02708/4	Limited speed 4	28800.0000	Unit/s
C02710/4	Delay lim. speed 4	0.0100	Unit/s^2
C02711/4	S-ramp time lim. speed 4	100	ms
For manual jog only			
C02713	Max. path - manual jog	360.0000	Unit

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	➞ Positive limit switch	C03150/1
FALSE	➞ Negative limit switch	C03150/2

Tip!

Detailed information on the limiter function can be found in chapter "Basic drive functions" ➞ subchapter "Limiter". (🕮 200)

12.2.12 Brake control



The basic function "Brake control" serves to the wear free control and monitoring of a holding brake.

In the simplest case, an optionally available brake module is used.

Alternatively the holding brake can also be controlled and monitored via the digital inputs/outputs.

[12-22] Basic function "Brake control" (schematic diagram)

Note!

In the Lenze setting the brake control is switched off to reach a safe status after mains connection.

Tip!

Detailed information on brake control can be found in chapter "Basic drive functions" → subchapter "Brake control". (📖 211)

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Brake control*

Parameters		Lenze setting Value	Unit
C02580	Operating mode - brake	Brake control off	
C02581	Brake activation threshold	50	rpm
C02582	Brake resp. to pulse inhibit	Activate the brake immediately	
C02583	Status input monitoring	Not active	
C02585	Brake control polarity	Not inverted	
C02586	Starting torque 1	0.00	Nm
C02587	Starting torque 2	0.00	Nm
C02588	Source of starting torque	Starting torque 1/2	
C02589	Brake closing time	100	ms
C02590	Brake opening time	100	ms
C02591	Waiting time - status monit.	100	ms
C02593	Waiting time - brake active.	0.000	s
C02594	Test torque	0.00	Nm
C02595	Permissible angle of rotation	5	°
C02596	Grinding speed	100	rpm
C02597	Accel./decel. time - grinding	1.000	s
C02598	Grinding ON time	0.5	s
C02599	Grinding OFF time	0.5	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	→ Release brake	C03165/1
FALSE	→ Activate starting torque 2	C03165/2
FALSE	→ Brake status signal	C03165/3
FALSE	→ Activate brake test	C03165/4
FALSE	→ Grind brake	C03165/5
0 %	→ Additional torque	C03166

12.2.13 Signal configuration of drive and motor interface

If required, the preset signal configuration of the control and setpoint inputs of the drive and motor interface can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Drive interface

Signal (Lenze setting)	Control input	Signal configuration
FALSE	➞ Set controller inhibit	C03130/1
DigIn 5	➞ Reset error 1	C03130/2
Control word 1 bit 07	➞ Reset error 2	C03130/3
FALSE	➞ Reset error 3	C03130/4
FALSE	➞ Set error	C03130/5
Control word 1 bit 00	➞ Switch on drive	C03130/6

Motor interface

Signal (Lenze setting)	Setpoint input	Signal configuration
100 %	➞ Position controller adaption	C03141/1
100 %	➞ Phase controller adaption	C03141/2
100 %	➞ Adaptation of speed controller	C03141/3
100 %	➞ Upper torque limit value	C03141/4
-100 %	➞ Lower torque limit value	C03141/5
100 %	➞ Flux setpoint	C03141/6

12.2.14 Signal configuration of the output ports

If required, the preset signal configuration of the output ports can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

"LPortAxisOut1" output port

The output port **LPortAxisOut1** is intended for the connection with a following axis.

Signal (Lenze setting)	Output port	Signal configuration
Axis status word • Application-specific signals can be supplemented.		
FALSE	→ Axis status word bit 00	C03120/1
FALSE	→ Axis status word bit 01	C03120/2
FALSE	→ Axis status word bit 02	C03120/3
FALSE	→ Axis status word bit 03	C03120/4
FALSE	→ Axis status word bit 04	C03120/5
FALSE	→ Axis status word bit 05	C03120/6
FALSE	→ Axis status word bit 06	C03120/7
FALSE	→ Axis status word bit 07	C03120/8
FALSE	→ Axis status word bit 08	C03120/9
FALSE	→ Axis status word bit 09	C03120/10
FALSE	→ Axis status word bit 10	C03120/11
FALSE	→ Axis status word bit 11	C03120/12
FALSE	→ Axis status word bit 12	C03120/13
FALSE	→ Axis status word bit 13	C03120/14
FALSE	→ Axis status word bit 14	C03120/15
FALSE	→ Axis status word bit 15	C03120/16
Setpoints for horizontal communication		
0 %	→ Axis-Port Out 1	C03124/1
Master value	→ Axis-Port Out 2	C03054/1

Output port "LPortStatus1"

The output port **LPortStatus1** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 1		
Drive ready	→ Status word 1 bit 00	C03121/1
FALSE	→ Status word 1 bit 01	C03121/2
Drive is ready to start	→ Status word 1 bit 02	C03121/3
Error is active.	→ Status word 1 bit 03	C03121/4
FALSE	→ Status word 1 bit 04	C03121/5
Quick stop active	→ Status word 1 bit 05	C03121/6
Switch-on inhibit is active	→ Status word 1 bit 06	C03121/7
Warning active	→ Status word 1 bit 07	C03121/8
FALSE	→ Status word 1 bit 08	C03121/9
FALSE	→ Status word 1 bit 09	C03121/10
FALSE	→ Status word 1 bit 10	C03121/11
Drive in the limitation	→ Status word 1 bit 11	C03121/12
Homing complete	→ Status word 1 bit 12	C03121/13
Home position available	→ Status word 1 bit 13	C03121/14
FALSE	→ Status word 1 bit 14	C03121/15
FALSE	→ Status word 1 bit 15	C03121/16

Output port "LPortStatus2"

The output port **LPortStatus2** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 2		
Virtual master is active	→ Status word 2 bit 00	C03122/1
Clutch is disengaged	→ Status word 2 bit 01	C03122/2
Trimming is active	→ Status word 2 bit 02	C03122/3
FALSE	→ Status word 2 bit 03	C03122/4
FALSE	→ Status word 2 bit 04	C03122/5
FALSE	→ Status word 2 bit 05	C03122/6
FALSE	→ Status word 2 bit 06	C03122/7
FALSE	→ Status word 2 bit 07	C03122/8
FALSE	→ Status word 2 bit 08	C03122/9
FALSE	→ Status word 2 bit 09	C03122/10
FALSE	→ Status word 2 bit 10	C03122/11
FALSE	→ Status word 2 bit 11	C03122/12
FALSE	→ Status word 2 bit 12	C03122/13
FALSE	→ Status word 2 bit 13	C03122/14
FALSE	→ Status word 2 bit 14	C03122/15
FALSE	→ Status word 2 bit 15	C03122/16

12.2.15 Application error messages

For the output of application-specific error messages an FB instance *ApplicationError* of the function block **L_DevApplErr** is available in the network.

- Via the 8 boolean inputs up to 8 different application error messages with parameterisable module ID, error ID and error response can be released by the application.
- The first four inputs can be connected to the multiplexer parameters with the desired tripping signals. The next four inputs are firmly connected to the tripping signals of the application.

Error message		Error-ID	Error response
1	Free (configurable via C03060/1)	8001	No reaction
2	Free (configurable via C03060/2)	8002	Error
3	Free (configurable via C03060/3)	8003	Error
4	Free (configurable via C03060/4)	8004	Error
5	Following error	8005	Warning
6	Drive cannot follow	8006	Warning
7	Drive system interrupted	8007	Quick stop by trouble
8	External fault in drive system	8008	Quick stop by trouble

- Parameter setting: Tab **All parameters**

Parameters		Lenze setting
C03990	Module-ID	999
C03991/1...8	Error ID 1 ... 8	See table above
C03992/1...8	Error response 1 ... 8	See table above

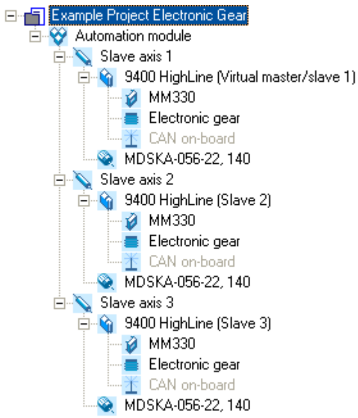
Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	➞ Application fault 1	C03060/1
FALSE	➞ Application fault 2	C03060/2
FALSE	➞ Application fault 3	C03060/3
FALSE	➞ Application fault 4	C03060/4

12.2.16 Step by step: Electrical shaft via system bus (CAN)

The following instructions describe step by step the proceeding for commissioning the electrical shaft via the system bus (CAN).

Create project view

1. Start »Engineer«.
2. Go to *Start-up wizard* and select the option "New project (empty)" and enter a name for the project in a next step.
3. Insert system module.
4. Enter axes for master and slave(s).
   – Add the corresponding components (controller, motor, extension module) to the axes.
   – Select for each controller the application "Electronic gearbox".
   – Example *project view* in the »Engineer«:



Parameterise the virtual master

1. Go to the *Project view* and select the controller which is to take over the part of the "Virtual master" in the network.
2. Go to the **Application parameter** tab and select the entry "Virtual master in the list field **Master value source** (C03052).
3. Click **Technology application** to change to the dialog level *Overview* → *Electronic gearbox*.
4. Click **Master value scaling** to change to the dialog level *Overview* → *Electronic gearbox* → *Master value scaling*.
   – Parameterise gearbox ratio, feed constant, cycle, path unit, and reference speed for the master value.
5. Click **Back** to change to the previous dialog level.
6. Click **virtual master** to change to the dialog level *Overview* → *Electronic gearbox* → *Virtual master*.
   – Parameterise desired operating mode, speed and ramps.

Parameterising slave(s)

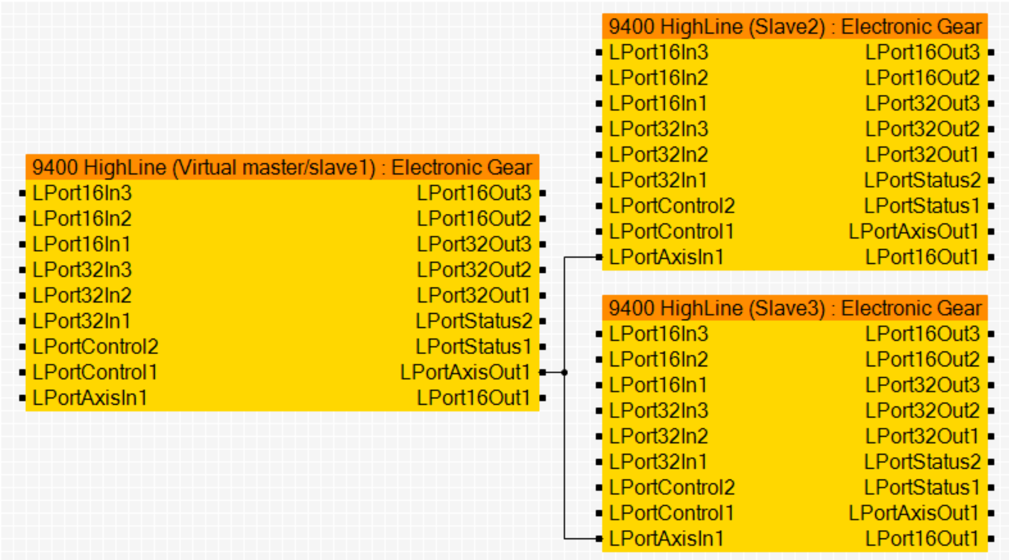
1. Go to *Project view* and select the first slave controller .
2. Go to the **Application parameter** tab and select the entry "Virtual master in the list field **Virtual master** (C03052).
3. Make the same settings for all other slave controllers.

Establish network

1. Go to *Project view* and select the system module .
2. Insert network.
   – Go to the dialog box *Insert network* to select the entry "System bus (CAN) from the list field.
   – The checkmark in the control field **Insert and configure node** must be set so that a machine application is inserted in the *Project view* together with the network.
3. On the **Node** tab for the inserted network:
   – Set node addresses for the controllers according to the DIP switch setting of the CAN address of the memory module.
   – Go to *Context menu* for the master controller (right mouse button) and the select the command **Set as master**.
4. On the **Synchronisation** tab for the inserted network:
   – Select the master controller as sync source in the list field **Node**.
   – Select all slave controllers as sync receivers by setting the checkmark in the first column **Appl.**.

Connect ports in the machine application

1. Go to *Project view* and select the machine application which has been inserted automatically with the insertion of the network.
2. Go to the **Connections** tab and connect the output port *LPortAxisOut1* of the master controller with the input port *LPortAxisIn1* of all slave controllers.



Compile the project

1. Go to *Project view* and select the system module .
2. Update devices.
   - Set the checkmark in the control field **Recreate all**.
   - Click **Create** to start the compiling process.

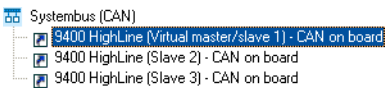
Optimise bus load

In order that the bus load will not be too high, the transmission time for the master controller can be set to a value > 1 ms. Then the same time must be set in the slave controllers for the master value extrapolation.

Note!

This setting is only possible after the compiling process is completed since only then the process data objects are defined for the data exchange among the devices.

1. Go to *Project view* below the network and select the master controller.



2. Go to the **Process data objects** tab and set a transmission time > 1 ms (e.g. 5 ms) for the process data object.

3. Go to *Project view* and select the first slave controller .
4. Go to the **Application parameter** and change to the dialog level *Electronic gearbox* ➞ *Electronic gearbox* ➞ *Master value extrapolation*.
5. Set the number of extrapolation cycles to the same value than the transmission time set before.
   – This means: In case of a transmission time of 5 ms set for the master set the number of extrapolation cycles for the slave to the value "5".
6. Make the same settings for all other slave controllers.

Transmit applications to the controller

1. Go online.
2. Download applications in the controller.

Note!

The downloaded application is basically stored in the first application memory location of the controller.

The preinstalled technology applications on the following memory locations are still available.

3. Confirm Dialog box *Save parameter set* with **Yes, all devices**.
4. Confirm Dialog box *Start application* with **Yes, all devices**.
5. Confirm Dialog box *Enable controller* with **Yes, all devices**.
6. Control applications via terminals or network.

12.3 TA "Synchronism with mark synchronisation"

The technology application "Synchronism with register formation and mark synchronisation" serves to implement a high-precision angular synchronism between the drives in the system.

- Thanks to a free adjustable position resolution of up to 24 bits per motor revolution a very good synchronism result is achieved so that applications with direct drive can be resolved with high precision.
- The ratio can be freely adjusted, the values are input in the form of a fraction (numerator/denominator) with 32 bit resolution.
- The master value can be specified either by a "Virtual master", or via a bus system or the digital frequency extension module. It is selected from the **Application parameter** tab via the **Master value source** list field (C03052).
- The master value transmission (high speed stability) is preset. The actual values can be transmitted by the corresponding selection in the list fields **Master value output** (C3054/1, C3054/2, C3197).

Note!

The electrical shaft can be implemented with a bus system as e.g. system bus (CAN) or Ethernet Powerlink or via digital frequency transmission.

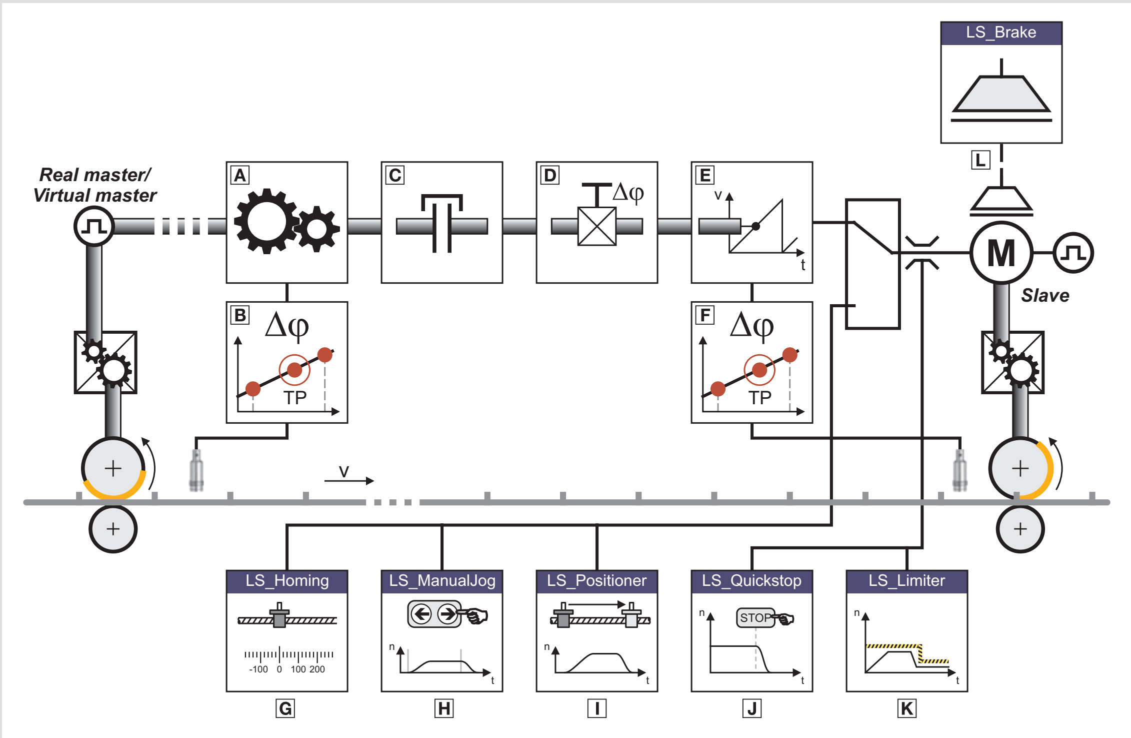
With regard to the configuration of the digital frequency extension module in the controller, two variants of technology applications are available in the »Engineer« application catalog.

- In the TA variant "Synchronism with mark synchronisation" the configuration of a digital frequency extension module is expected. Therefore, the TA can provide the function of the electrical shaft either via digital frequency transmission and via a bus system.
- In the TA variant "Synchronism with mark synchronisation *MotionBus*" the configuration of a digital frequency extension module is not included and corresponding interfaces are not available in the TA. Thus the function of the electrical shaft with this TA can only be provided via a bus system.

Functions

- Virtual master with inching, handwheel and reduced speed.
- Conditioning of the master value (master shaft) with master value scaling, register generation, stretch factor, reversal of rotation direction, and mark synchronisation via profile generator.
- Virtual clutch with emergency stop and basic speed
- Trimming function via profile generator.
- Conditioning of the setpoint (machine axis/tool) with setpoint scaling, register generation, and mark synchronisation via profile generator.
- Additional operating modes for activating the basic drive functions "Homing", "Manual jog (inching)" and "Position override function".
- Support of the basic drive functions "Quick stop" and "Limiter".
- Following error monitoring.
- Optional control of a holding brake.

12.3.1 Basic signal flow



[12-23] Signal flow of the TA "Synchronism" (schematic diagram)

Functions in the "Synchronism" operating mode

A Master value processing

B Mark synchronisation (master value)

C Virtual clutch

D Master value adjustment

E Setpoint conditioning

F Mark synchronisation (setpoint)

Basic drive functions

G Homing

H Manual jog (inching)

I Position override function

J Quick stop

K Limiter (optional)

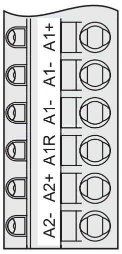
L Brake control (optional)

12.3.2 Assignment of the I/O terminals

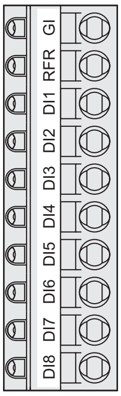
12.3.2.1 Setpoint and control signals

The following tables contain the Lenze assignment of the analog and digital inputs for the technology application "Synchronism".

Analog inputs

Terminal X3		Signal (Lenze setting)
	**AI1-** **AI1+**	-
	AI2- **AI2+**	-
▸ I/O terminals ▸ Analog inputs (📖 117)		

Digital inputs

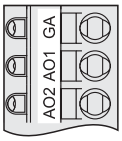
Terminal X5		Signal (Lenze setting)
	**DI1**	Quick stop • If DI1 is set to LOW level, the drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. • If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time. ▸ Basic drive functions ▸ Quick stop (📖 152)
	DI2	Connection of reference switch/touch probe sensor for tool synchronisation
	DI3	Connection of touch probe sensor for master value synchronisation
	DI4	Close clutch
	DI5	Reset error • By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed.
	DI6	Start trimming
	DI7	-
	DI8	-
▸ I/O terminals ▸ Digital inputs (📖 123)		

12.3.2.2 Actual value and status signals

The following tables contain the Lenze assignment of the analog and digital outputs for the technology application "Synchronism".

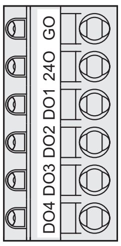
▶ The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

Analog outputs

Terminal X3		Signal (Lenze setting)	Signal configuration
	**AO1**	Motor speed • Scaling: ±10 V ≡ motor reference speed (C00011)	C03110/1
	AO2	Motor torque (setpoint) • Scaling: ±10 V ≡ Motor reference torque (C00057/2)	C03110/2

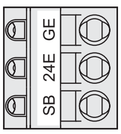
▸ I/O terminals ▸ Analog outputs (📖 120)

Digital outputs

Terminal X4		Signal (Lenze setting)	Signal configuration
	**DO1**	Status "Drive ready" • This operating state is active if the controller is enabled by setting the digital input RFR to HIGH level and no error has occurred.	C03100/1
	DO2	Status "Electrical shaft enabled"	C03100/2
	DO3	Status "Limitation active" • A setpoint is limited at the moment.	C03100/3
	DO4	"Error" status • If the controller is in the error state, the digital output DO4 is set to HIGH level.	C03100/4

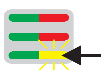
▸ I/O terminals ▸ Digital outputs (📖 125)

State bus

Terminal X2		Signal (Lenze setting)	Signal configuration
	**SB**	"Application error" status • The state bus is put in the "error" status.	C03100/5

▸ I/O terminals ▸ Monitoring function "State bus" (📖 127)

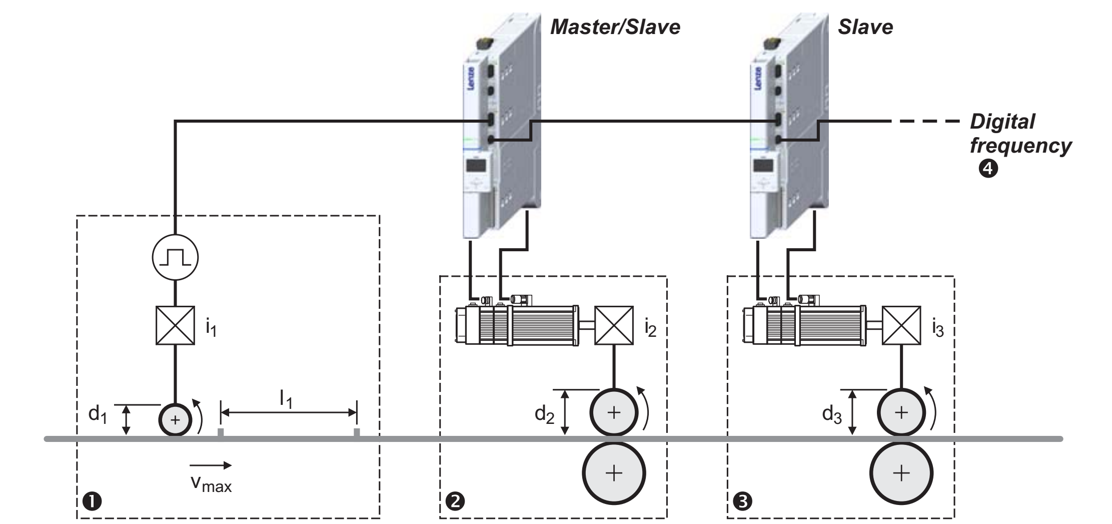
Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Electrical shaft enabled"	C03100/6

▸ Drive interface ▸ LED status displays (📖 34)

12.3.3 Machine parameters

The following schematic diagram shows the relevant global data (machine parameters) for the interconnection via the electrical shaft:



❶ Master axis (here: master value encoder as real master)
❷ Slave axis 1
❸ Slave axis 2
❹ Digital frequency cascade (digital frequency extension module required)

[12-24] Schematic diagram of the most important machine parameters

Symbol	Description
i_1	Gearbox ratio of master value encoder
d_1	Diameter of the master roll
l_1	Master value cycle (if available)
v_{max}	Maximum speed
i_2, i_3	Gearbox ratio of the slave axes
d_2, d_3	Diameter of the slave rolls

Detailed information for setting the machine parameters can be obtained from the following subchapters.

12.3.3.1 Master axis (master shaft)

For scaling and imaging the master value in the application, the machine parameters of the higher-level drive (master shaft) must be set.

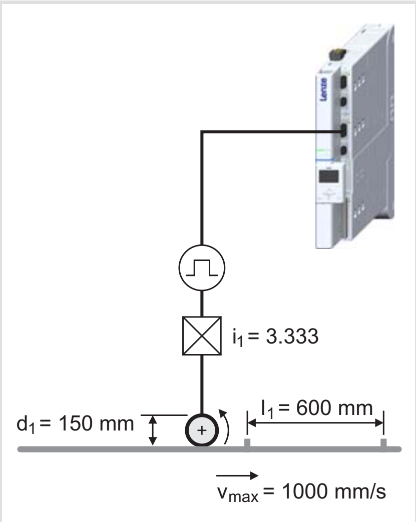
Note!

When setting (scaling) the electrical shaft, ensure that the ratio and encoder constants are identical for all drives in the system. The reference to the scaling of the master drive is sensible.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *Master value scaling*

Parameters		Lenze setting	
		Value	Unit
C03930	Gearbox ratio - numerator	1	
C03931	Gearbox ratio - denominator	1	
C03932	Feed constant	360.0000	Unit/incr.
C03933	Path units	User-defined	
C03934	User-defined path unit	°	
C03938	Cycle	360.0000	Unit
C03941	Reference speed	500.0000	Unit/t

Example of determining the machine parameters for the master axis



1. Set gearbox ratio for the master value in the form of a quotient (numerator and denominator): $i_1 = 3.333 = 10/3$
   – Numerator (C03930) = 10
   – Denominator (C03931) = 3
2. Set feed constant (C03932).
   – For the master value: $Vk = d_1 * \pi$ = 471,2389 mm
3. Set the selection "mm" as path unit (C03933).
4. As reference speed (C03941) set the max. machine speed v_{max} = "1000 mm/s".

Tip!

Setting the cycle (C03938) only is required if the selection "Modulo" is set as traversing range (C02528).

For operation with a virtual master the following setting of the gearbox ratio is recommended to achieve a good resolution of the guiding angle/master value:

- Numerator (C03930) = 100
- Denominator (C03931) = 1

12.3.3.2 Slave axis (machine axis)

Among other things, the following machine parameters describe the motor end of the mechanics used.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *Machine parameters*

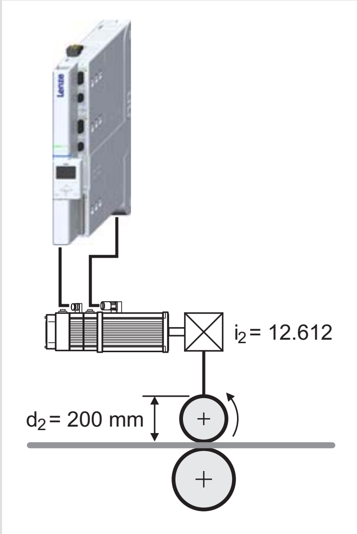
Parameters		Lenze setting	
		Value	Unit
C00173	Mains - voltage	400/415	V
C00174	Threshold undervoltage (LU)	285	V
C00600	Resp. to DC bus overvoltage	Trouble	
C02520	Gearbox fact. numer. motor	1	
C02521	Gearbox fact. denom. motor	1	
C02527	Motor mounting direction	Motor rotating CW	
C02570	Controller configuration	Position control	
C02522	Gearbox fact. numer. load	1	
C02523	Gearbox fact. denom. load	1	
C02529	Mounting direction of position encoder	Encoder rotating CW	
Description of the mechanics (load, tool)			
C02528	Traversing range	Modulo	
C02524	Feed constant	360.0000	Unit
C02525	Unit	°	
C02526	User-defined unit	°	
C02533	Time unit	s	
C00273/1	Motor moment of inertia	Motor-dependent	kg cm^2
C00273/2	Load moment of inertia	0.00	kg cm^2

Tip!

Detailed information for selecting and entering the machine parameters for the machine axis can be found in the chapter "Drive interface

▸ Machine parameters (📖 35)

Example of determining the machine parameters for the slave axis



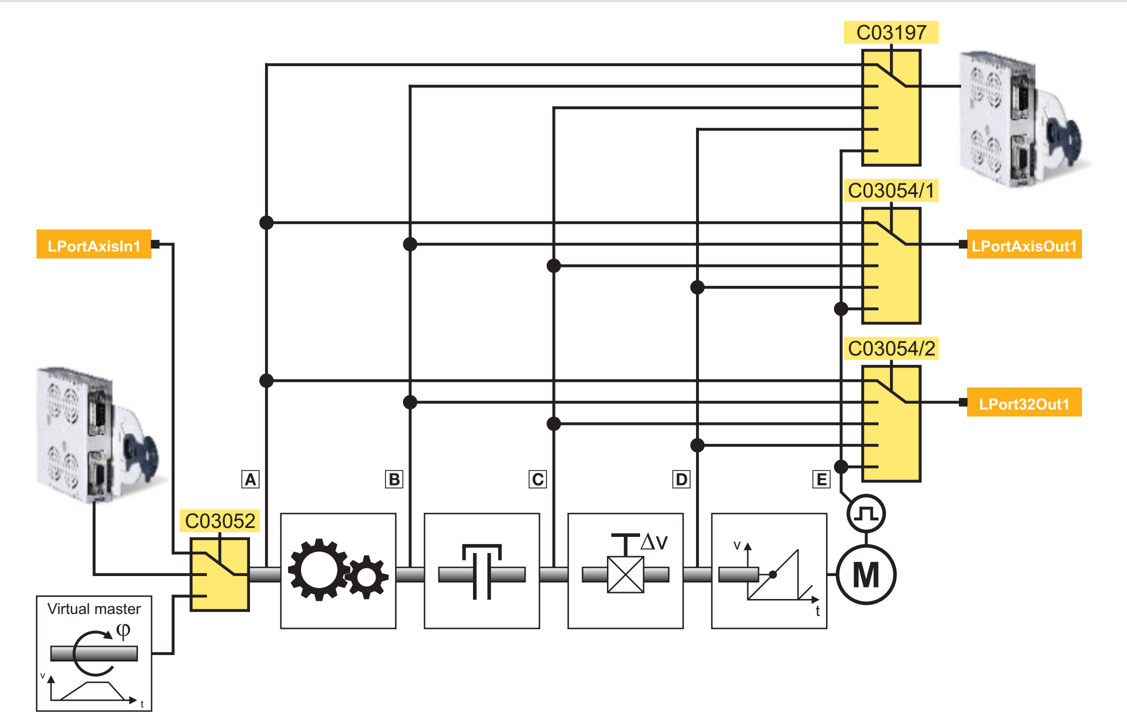
1. Set gearbox ratio for the motor in the form of a quotient (numerator and denominator): i_2 = 12.612 = 12612/ 1000
   – Numerator (C02520) = 12612
   – Denominator (C02521) = 1000
2. Set the same gearbox ratio for the encoder on the load side:
   – Numerator (C02522) = 12612
   – Denominator (C02523) = 1000
3. Set feed constant (C02524).
   – For the conveyor drive: Vk = $d_2 * \pi$ = 628,3185 mm
4. Set the selection "mm" as unit (C02525).

Tip!

The feed constant corresponds to the movement on the machine side when the gearbox output shaft carries out one revolution (for selection as angle = 360°).

When the unit is set, the real unit of the machine for the selection of physical values (e. g. speeds, accelerations and decelerations) is defined.

12.3.4 Selection of master value source and output



A Master value B with stretch factor C with clutch D with trimming E Actual value

[12-25] Signal flow for selecting the master value source and the master values to be output

Master value source

The master values can be either selected by a "Virtual master", via a bus system or the digital frequency extension module.

- They can be selected on the **Application parameter** tab via the **Master value source** list field or via C03052.

Master value output

The master value to be output (A ... E) is selected individually for the three possible communication channels:

- List field **Master value output DF module** (C03197):
  Selection of the master value output for the digital frequency module.
- List field **Master value output MotionBus** (C03054/1):
  Selection of the master value output for horizontal communication.
- List field **Master value output LPort32Out1** (C03054/2):
  Selection of the master value output for vertical communication.

12.3.4.1 Master value source: Virtual master

If the "Virtual master" is selected as master value source, the master value is created in the TA and transmitted via a bus system or the digital frequency output to the other slave drives.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Virtual master*

Parameters		Lenze setting	
		Value	Unit
C03565	Operating mode	Continuous operation	
C03566	STOP position	0.0000	Unit
C03567	START position	0.0000	Unit
C03568/1	1. master speed	360.0000	Unit/t
C03568/2	2. master speed	180.0000	Unit/t
C03569/1	Speed - inching - CW rotation	900.0000	Unit/t
C03569/2	Speed - inching - CCW rotation	900.0000	Unit/t
C03570/1	Inching ramp	5.000	s
C03570/2	Ramp - single cycle/continuous operation	5.000	s
C03570/3	STOP ramp	0.5000	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	→ VMas master shaft STOP1	C03058/1
C03016	→ Activate master function	C03058/3
C03017	→ VMas inching positive	C03058/4
C03018	→ VMas inching negative	C03058/5
FALSE	→ VMas start single cycle	C03058/6
FALSE	→ VMas start continuous operation	C03058/7
FALSE	→ VMas 2. master speed	C03058/8
0	→ VMaster handwheel	C03056

▶ Configuration: Tab **FB editor** → FB *VirtualMaster*

12.3.4.2 Master value source: Digital frequency input

To use the digital frequency input as master value source, the controller must be provided with digital frequency extension module (E94AYFLF).

To ensure the integration of the extension module in the application, the TA "Synchronism with mark synchronisation" must be used as technology application.

Note!

The technology application "Synchronism with mark synchronisation" *MotionBus*" which can also be selected in the application catalog does not contain any interfaces to the digital frequency extension module.

Tip!

Detailed information on the digital frequency extension module can be found in the User Manual "Digital frequency extension module (E94AYFLF) – parameter setting & configuration".

12.3.4.3 Master value source: Bus system

When the master value is selected via a bus system as e.g. system bus (CAN) it is possible to first extrapolate the received position information to compensate higher bus transmission cycles.

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *Master value extrapolation*

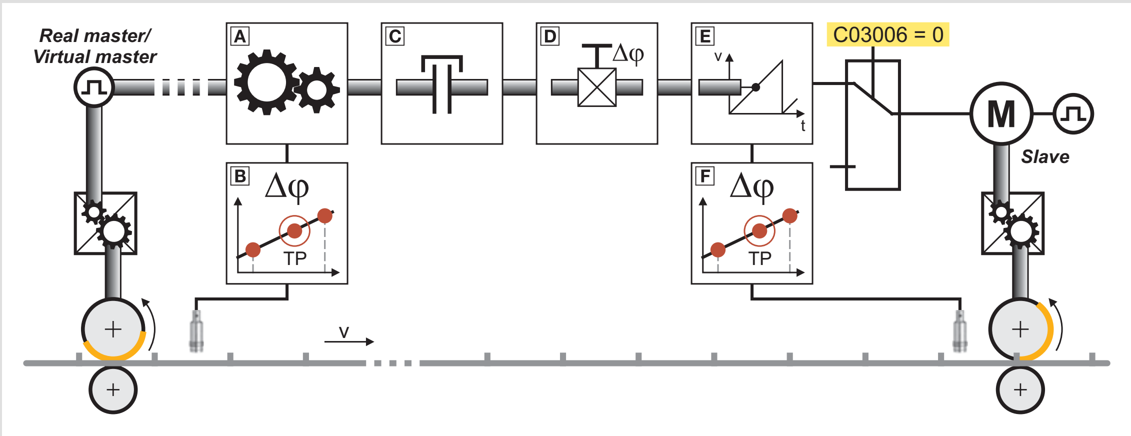
Parameters		Lenze setting	
		Value	Unit
C03550	Number of extrapolation cycles	1	

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	→ Activate extrapolation	C03058/9

- Configuration: Tab **FB editor** → FB *MotionBusIn*

12.3.5 "Synchronism" mode"

In the "Synchronism" (C03006 = "0") operating mode the drive follows the master value of the electrical shaft if the clutch is engaged.



[12-26] "Synchronism" mode (schematic diagram)

Functions in the "Synchronism" operating mode

A Master value processing

B Mark synchronisation (master value)

C Virtual clutch

D Master value adjustment

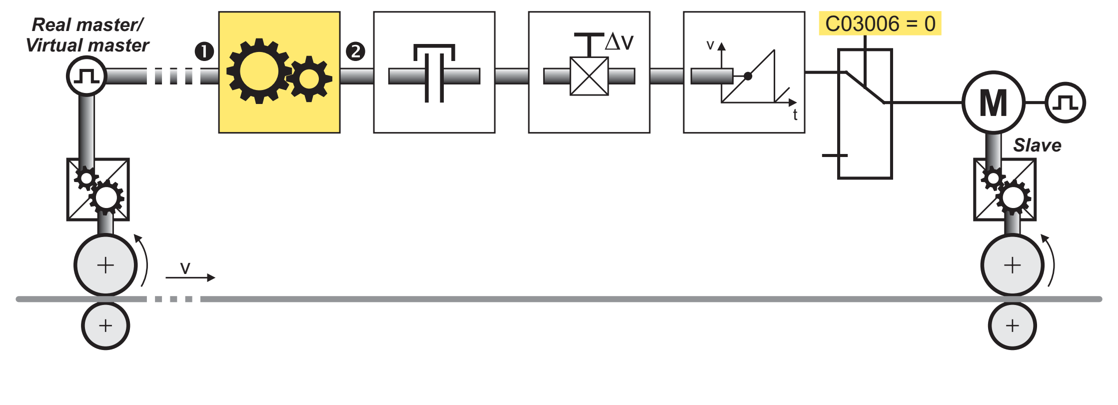
E Setpoint conditioning

F Mark synchronisation (setpoint)

Tip!

A description of the different functions for conditioning the master value can be found in the following subchapters.

12.3.5.1 Master value processing



❶ Master value
❷Master value with stretch factor

[12-27] "Master value processing" function in the signal flow (schematic diagram)

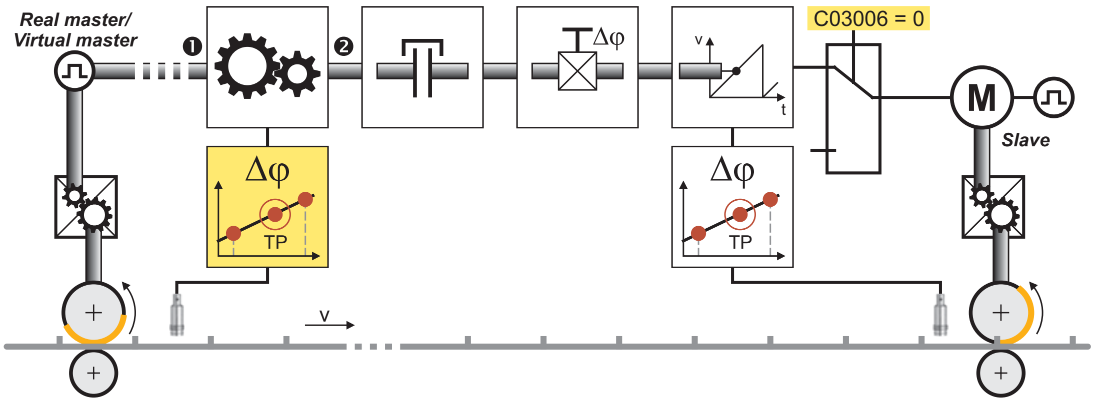
▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Synchronism* ➞ *Master value conditioning*

Parameters		Lenze setting	
		Value	Unit
C03587	Master value	-	Unit
C03000	Stretch factor - numerator	1000000000	
C03001	Stretch factor - denominator	1000000000	
C03025	Master value - direction of rotation	Not inverted	
C03034	Starting position	0.0000	Unit
C03938	Master value cycle (register)	360.0000	Unit
C03672	Master value with stretch factor	-	Unit

Setpoint inputs of the function		Signal configuration
Lenze setting	Setpoint input	(Multiplexer parameters)
DIGIN CINH	➞ Set starting position of master shaft	C03058/11
C03034	➞ Master shaft starting position	C03053/1
C03000	➞ Stretch factor - numerator	C03050/1
C03001	➞ Stretch factor - denominator	C03050/2

▶ Configuration: Tab **FB editor** ➞ FB *ElectricalShaftVal*

12.3.5.2 Mark synchronisation (master value)



❶ Master value
❷Master value with stretch factor

[12-28] "Mark synchronisation" function in signal flow (schematic diagram)

This function serves to carry out a mark synchronisation of the master value via touch probe sensor.

Note!

For this purpose, the touch probe sensor must be connected to the digital input DI3!

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *Master value conditioning*

Parameters		Lenze setting	
		Value	Unit
C03023	Master value synchronisation (TP)	Deactivated	
C03612	TP position (register)	0.0000	Unit
C03651	TP limit	1.0000	Unit
C03656	Hysteresis	0.0000	Unit/t^2

▶ Configuration: Tab **FB editor** → FB *ElectricalShaftVal*

TP profile parameters

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *TP profile parameter*

Parameters		Lenze setting	
		Value	Unit
C03620	Positioning mode	0	
C03621	Deactivation mode	0	
C03623/1	Positive speed	3600.0000	Unit/t
C03623/2	Negative speed	3600.0000	Unit/t
C03626/1	Acceleration ramp	1.000	s
C03626/2	Deceleration ramp	1.000	s
C03626/3	Stop ramp	1.000	s

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	→ Activate master value TP correction	C03058/12

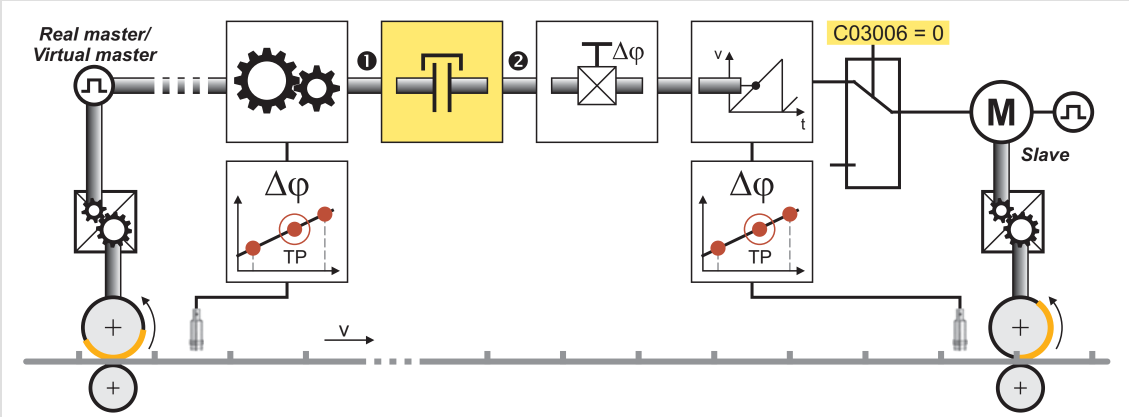
▶ Configuration: Tab **FB editor** → FB *MarkSynchronizationShaft*

TP interface

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *TP interface*

Parameters		Lenze setting	
		Value	Unit
C02810/3	Signal delay TP3	0	µs
C03022	Edge evaluation of positive edge	TRUE	
C03024	Edge evaluation of negative edge	FALSE	

12.3.5.3 Virtual clutch



[12-29] Function "Virtual clutch" in the signal flow (schematic diagram)

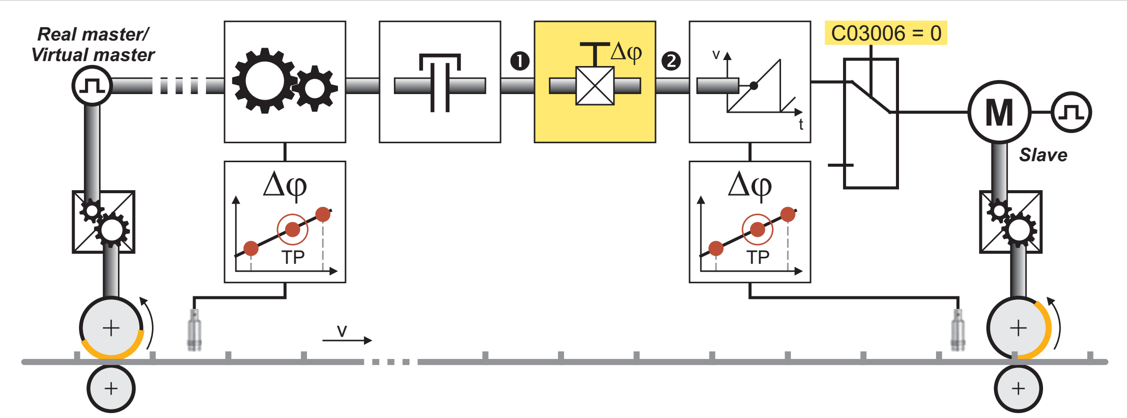
▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Virtual clutch*

Parameters		**Lenze setting**	
		Value	Unit
C03672	Master value with stretch factor	-	Unit
C03021	Activate clutch	Deactivated	
C03665/1	Clutch in ramp	1.000	s
C03665/2	Decoupling ramp	2.000	s
C03665/3	Stop ramp	1.000	s
C03674	Master value with clutch	-	Unit

Control inputs of the function		**Signal configuration**
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 4	➞ Close clutch	C03058/13
FALSE	➞ Clutch - positive opening operation	C03058/14

▶ Configuration: Tab **FB editor** ➞ FB *ClutchElectricalShaft*

12.3.5.4 Master value trimming



[12-30] "Master value trimming" function in the signal flow (schematic diagram)

This function serves to adjust the master value.

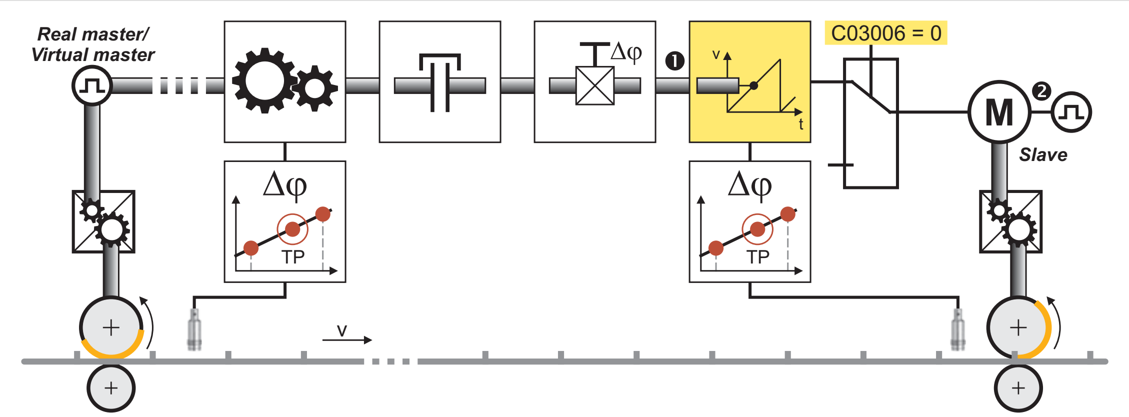
▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *Master value trimming*

Parameters		**Lenze setting** Value	Unit
C03674	Master value with clutch	-	Unit
C03026	Activate trimming	Deactivated	
C03676	Adjustable range	0.0000	Unit/t
C03685	Positioning mode	0	
C03686	Deactivation mode	1	
C03688/1	Positive speed	1000.0000	Unit/t
C03688/2	Negative speed	1000.0000	Unit/t
C03691/1	Acceleration ramp	0.500	s
C03691/2	Deceleration ramp	0.500	s
C03691/3	Stop ramp	1.000	s
C03723	Master value with trimming	-	Unit

Control inputs of the function		**Signal configuration**
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	→ Start trimming	C03058/15
C03026	→ Activate trimming	C03058/16
FALSE	→ Set trimming setpoint to 0	C03058/17

▶ Configuration: Tab **FB editor** → FB *Trimming*

12.3.5.5 Setpoint conditioning



[12-31] "Setpoint conditioning" function in the signal flow (schematic diagram)

This function is used for position ratio between the master shaft and the machine axis.

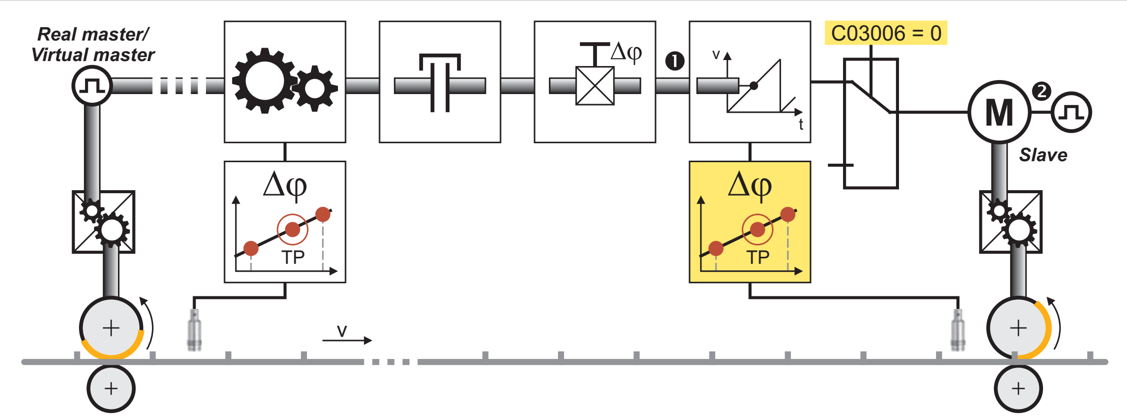
▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Synchronism* ➞ *Setpoint conditioning*

Parameters		Lenze setting	
		Value	Unit
C02527	Motor mounting direction	Motor rotating CW	
C02536	Cycle	360.0000	Unit

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
Controller inhibit active	➞ Delete following error	C03058/20

▶ Configuration: Tab **FB editor** ➞ FB *ToolControl*

12.3.5.6 Mark synchronisation (setpoint)



[12-32] "Mark synchronisation" function in signal flow (schematic diagram)

This function serves to carry out a mark synchronisation of the setpoint via touch probe sensor.

Note!

For this purpose, the touch probe sensor must be connected to the digital input DI2!

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Synchronism* ➞ *Overview* ➞ *Setpoint conditioning*

Parameters		Lenze setting	
		Value	Unit
C03033	Tool synchronisation (TP)	Deactivated	
C03851	Positive TP limit	1.0000	Unit
C03876	TP limit - hysteresis	0.0000	Unit

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	➞ Set TP position	C03058/24

▶ Configuration: Tab **FB editor** ➞ FB *ElectricalShaftVal*

TP profile parameters

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *TP profile parameter*

Parameters		Lenze setting	
		Value	Unit
C03855	Positioning mode	0	
C03856	Deactivation mode	0	
C03858/1	Positive speed	1000.0000	Unit/t
C03858/2	Negative speed	1000.0000	Unit/t
C03861/1	Acceleration ramp	1.000	s
C03861/2	Deceleration ramp	1.000	s
C03861/3	Stop ramp	1.000	s

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	→ Activate tool TP correction	C03058/23

- Configuration: Tab **FB editor** → FB *MarkSynchronizationTool*

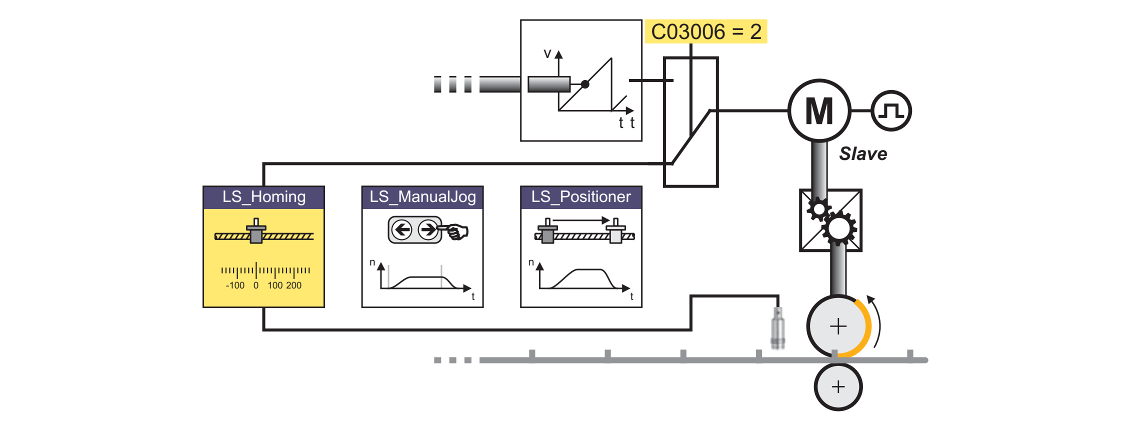
TP interface

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Synchronism* → *TP interface*

Parameters		Lenze setting	
		Value	Unit
C02810/2	Signal delay TP2	0	µs
C03031	Edge evaluation of positive edge	TRUE	
C03032	Edge evaluation of negative edge	FALSE	

12.3.6 "Homing" mode

In the "Homing" mode (C03006 = "2") the drive is decoupled from the electrical shaft and the basic function "Homing" is enabled:



[12-33] "Homing" mode (schematic diagram)

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Homing*

Parameters		Lenze setting	
		Value	Unit
C02528	Traversing range	Modulo	
C02640	Ref. mode	Set home pos. directly	
C02642	HM position	0.0000	Unit
C02643	HM target position	0.0000	Unit
C02644	Ref. speed 1	360.0000	Unit/s
C02645	Home acceleration 1	720.0000	Unit/s^2
C02646	Ref. speed 2	180.0000	Unit/s
C02647	Ref. acceleration 2	360.0000	Unit/s^2
C02648	Home S-ramp time	100	ms
C02649	HM torque limit	10.00	%
C02650	Homing inhibit time	1.000	s
C02652	Home position after mains switching	Delete	
C02653	Max. rot. angle after mains sw.	180	°
C3011	Set home position	Inactive	
C3012	Home position	0.0000	Unit

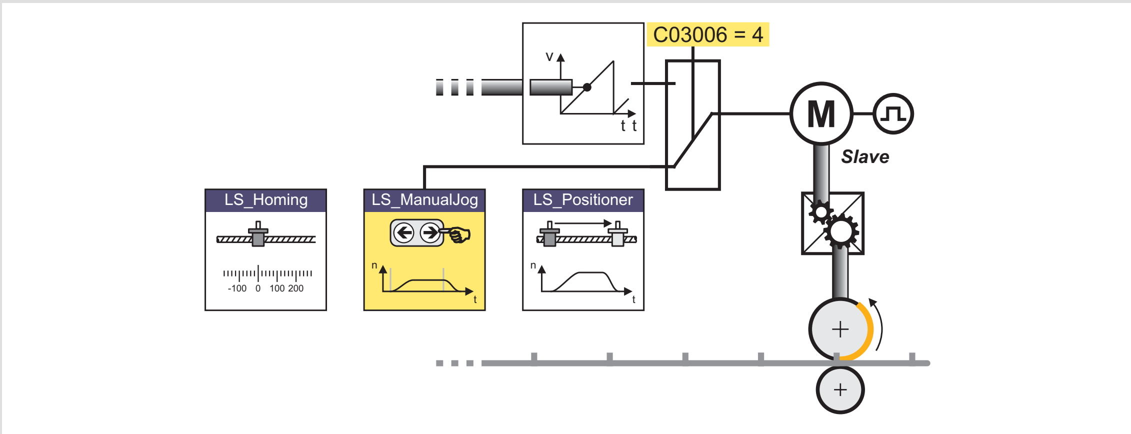
Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	→ Start homing	C03160/2
DigIn 2	→ Home mark	C03160/3
C03011	→ Set home position	C03160/4
C03012	→ Home position	C03163
FALSE	→ Reset home position	C03160/5

Tip!

Detailed information on homing can be found in chapter "Basic drive functions" → subchapter "Homing". (🕮 164)

12.3.7 "Manual jog" mode

In the "Manual jog" mode (C03006 = "4") the drive is decoupled from the electrical shaft and the basic function "Manual jog" is enabled:



[12-34] "Manual jog" mode (schematic diagram)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Manual jog*

Parameters		Lenze setting Value	Unit
C02620	Manual jog speed 1	360.0000	Unit/s
C02621	Manual jog speed 2	720.0000	Unit/s
C02622	Manual acceleration	360.0000	Unit/s^2
C02623	Manual deceleration	1440.0000	Unit/s^2
C02624	Inaccuracy time of manual traversing	0.100	s
C03007	Positive manual jog	Inactive	
C03008	Negative manual jog	Inactive	

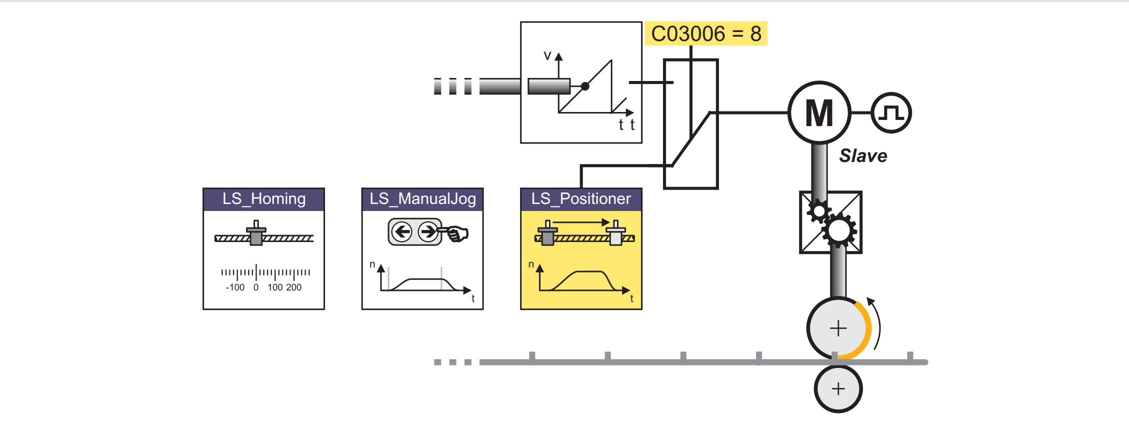
Control inputs of the function Lenze setting	Control input	Signal configuration (Multiplexer parameters)
C03007	➞ Activate positive manual jog	C03155/2
C03008	➞ Activate negative manual jog	C03155/3
FALSE	➞ Activate 2. speed	C03155/4
FALSE	➞ Retract limit switch	C03155/5

Tip!

Detailed information on the manual jog function can be found in chapter "Basic drive functions" ➞ subchapter "Manual jog". (📖 156)

12.3.8 "Positioning" mode"

In the "Positioning" mode (C03006 = "8") the drive is decoupled from the electrical shaft and the basic function "Positioning" is enabled:



[12-35] "Positioning" mode (schematic diagram)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Positioning*

Parameters		Lenze setting	
		Value	Unit
C00070	Speed controller gain	0.00700	Nm/rpm
C00071	Speed controller reset time	10.0	ms
C00072	D component - speed controller	0.00	ms
C02570	Controller configuration	Phase control	
C02554	Integral-action time of position controller	60.000	s
C02553	Position controller gain	20.00	1/s
C03040	Positioning - profile no.	0	
C03041	Positioning - teach profile no.	0	

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	➞ Start positioning step	C03185/2
FALSE	➞ Abort positioning step	C03185/3
FALSE	➞ Restart positioning step	C03185/4
FALSE	➞ Activate override	C03185/5
0 %	➞ Speed override	C03186/1
0 %	➞ Acceleration override	C03186/2
FALSE	➞ Inhibit touch probe evaluation	C03185/6
FALSE	➞ Teach position	C03185/7

Profile data record management

For the profile data record management the FB **L_PosProfileTable** is used. This FB serves to file and manage up to four (travel) profiles and to "teach" target positions.

- A profile describes a motion request which can be implemented by the SB **LS_Positioner** into a rotary motion.
- A profile is described via the following profile parameters: Mode (type of positioning), position, speed, acceleration, deceleration, S-ramp time, standard sequence profile, TP sequence profile and TP selection.
- The data of the profile parameters is directly input in the assigned codes:

Profile parameters	Unit	Profile no. 1	Profile no. 2	Profile no. 3	Profile no. 4
Positioning mode	-	C03970/1	C03970/2	C03970/3	C03970/4
Position	Unit	Set position	C03971/2	C03971/3	C03971/4
Speed	Unit/t	C03972/1	C03972/2	C03972/3	C03972/4
Acceleration	Unit/t^2	C03973/1	C03973/2	C03973/3	C03973/4
Delay	Unit/t^2	C03974/1	C03974/2	C03974/3	C03974/4
S-ramp time	s	C03975/1	C03975/2	C03975/3	C03975/4
TP sequence profile	-	C03976/1	C03976/2	C03976/3	C03976/4
TP selection	-	C03977/1	C03977/2	C03977/3	C03977/4

Note!

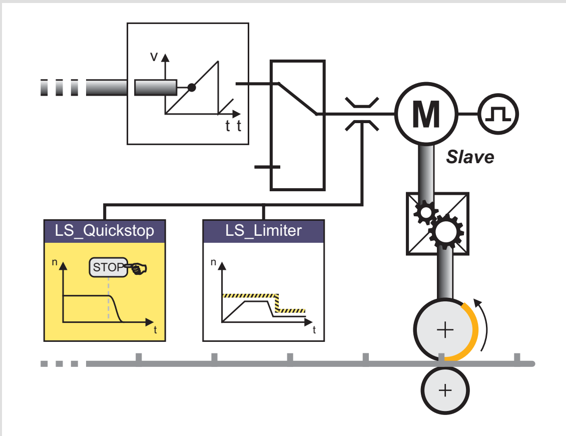
For profile no. 1 the set position of the tool which belongs to the master position is always used as target position.

- Application: Returning the tool e.g. from a maintenance position to the network.

"Teach" position

When the control input "Teach position" is set to TRUE, the current tool position is saved in the profile the number of which is set in C03041. After the control input is reset to FALSE the position saved last is maintained in the profile.

12.3.9 Quick stop



[12-36] Basic function "Quick stop" (schematic diagram)

The basic function "Quick stop" brakes the drive to standstill within the deceleration time set for the quick stop function after a corresponding request independent of the setpoint selection.

If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time.

- The quick stop function can be activated as follows in the Lenze setting:
  - By setting the digital input DI1 to LOW level.
  - By a master control via the port *LPortControl1*: By setting bit 2 of the bit-coded control word 1.
- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *All basic functions* → *Quick stop*

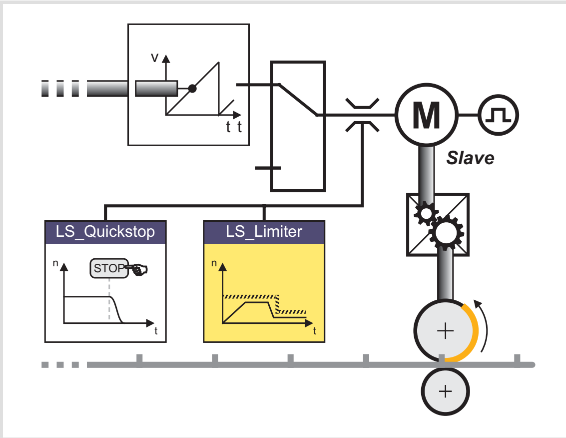
Parameters		Lenze setting Value	Unit
C00105	Quick stop deceleration time	0.000	s
C00106	Quick stop S-ramp time	0.00	%
C00107	Reference for deceleration time "Quick stop"	Motor reference speed (C00011)	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
DigIn 1	→ Activate quick stop 1	C03135/1
Control word 1 bit 02	→ Activate quick stop 2	C03135/2
FALSE	→ Activate quick stop 3	C03135/3

Tip!

Detailed information on quick stop can be found in chapter "Basic drive functions" → subchapter "Quick stop". (📖 152)

12.3.10 Limiter



The basic function "Limiter" monitors the travel range limits via limit switches and parameterised software limit positions and can lead the drive to defined limit ranges when being asked accordingly by the safety module.

[12-37] Basic function "Limiter" (schematic diagram)

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Limiter*

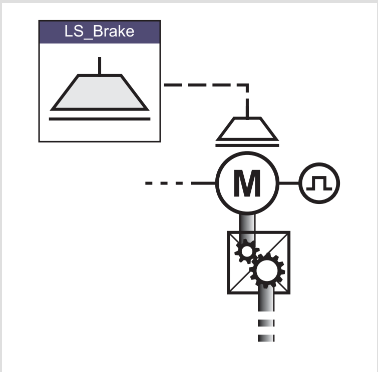
Parameters		Lenze setting Value	Unit
Limit values			
C02707	Permissible direction of rotation	Positive and negative	
C02700	Software limit positions are active	Deactivated	
C02701/1	Positive software limit position	0.0000	Unit
C02701/2	Negative software limit position	0.0000	Unit
Only for homing, positioning and manual jog			
C02702	Limitations effective	Deactivated	
C02703	Max. speed	3600.0000	Unit/s
C02705	Max. acceleration	3600.0000	Unit/s^2
C02706	Min. S-ramp time	100	ms
Limited speed 1 ... 4 (only for homing, positioning, and manual jog)			
C02708/1	Limited speed 1	3600.0000	Unit/s
C02710/1	Delay lim. speed 1	0.0100	Unit/s^2
C02711/1	S-ramp time lim. speed 1	100	ms
C02708/2	Limited speed 2	7200.0000	Unit/s
C02710/2	Delay lim. speed 2	0.0100	Unit/s^2
C02711/2	S-ramp time lim. speed 2	100	ms
C02708/3	Limited speed 3	14400.0000	Unit/s
C02710/3	Delay lim. speed 3	0.0100	Unit/s^2
C02711/3	S-ramp time lim. speed 3	100	ms
C02708/4	Limited speed 4	28800.0000	Unit/s
C02710/4	Delay lim. speed 4	0.0100	Unit/s^2
C02711/4	S-ramp time lim. speed 4	100	ms
For manual jog only			
C02713	Max. path - manual jog	360.0000	Unit

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
FALSE	➞ Positive limit switch	C03150/1
FALSE	➞ Negative limit switch	C03150/2

Tip!

Detailed information on the limiter function can be found in chapter "Basic drive functions" ➞ subchapter "Limiter". (📖 200)

12.3.11 Brake control



The basic function "Brake control" serves to the wear free control and monitoring of a holding brake.

In the simplest case, an optionally available brake module is used.

Alternatively the holding brake can also be controlled and monitored via the digital inputs/outputs.

[12-38] Basic function "Brake control" (schematic diagram)

Note!

In the Lenze setting the brake control is switched off to reach a safe status after mains connection.

Tip!

Detailed information on brake control can be found in chapter "Basic drive functions" ➜ subchapter "Brake control". (📖 211)

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Brake control*

Parameters		**Lenze setting** Value	Unit
C02580	Operating mode - brake	Brake control off	
C02581	Brake activation threshold	50	rpm
C02582	Brake resp. to pulse inhibit	Activate the brake immediately	
C02583	Status input monitoring	Not active	
C02585	Brake control polarity	Not inverted	
C02586	Starting torque 1	0.00	Nm
C02587	Starting torque 2	0.00	Nm
C02588	Source of starting torque	Starting torque 1/2	
C02589	Brake closing time	100	ms
C02590	Brake opening time	100	ms
C02591	Waiting time - status monit.	100	ms
C02593	Waiting time - brake active.	0.000	s
C02594	Test torque	0.00	Nm
C02595	Permissible angle of rotation	5	°
C02596	Grinding speed	100	rpm
C02597	Accel./decel. time - grinding	1.000	s
C02598	Grinding ON time	0.5	s
C02599	Grinding OFF time	0.5	s

Control/setpoint inputs of the function		**Signal configuration**
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	➞ Release brake	C03165/1
FALSE	➞ Activate starting torque 2	C03165/2
FALSE	➞ Brake status signal	C03165/3
FALSE	➞ Activate brake test	C03165/4
FALSE	➞ Grind brake	C03165/5
0 %	➞ Additional torque	C03166

12.3.12 Signal configuration of drive and motor interface

If required, the preset signal configuration of the control and setpoint inputs of the drive and motor interface can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Drive interface

Signal (Lenze setting)	Control input	Signal configuration
FALSE	→ Set controller inhibit	C03130/1
DigIn 5	→ Reset error 1	C03130/2
Control word 1 bit 07	→ Reset error 2	C03130/3
FALSE	→ Reset error 3	C03130/4
FALSE	→ Set error	C03130/5
Control word 1 bit 00	→ Switch on drive	C03130/6

Motor interface

Signal (Lenze setting)	Setpoint input	Signal configuration
100 %	→ Position controller adaption	C03141/1
100 %	→ Phase controller adaption	C03141/2
100 %	→ Adaptation of speed controller	C03141/3
100 %	→ Upper torque limit value	C03141/4
-100 %	→ Lower torque limit value	C03141/5
100 %	→ Flux setpoint	C03141/6

12.3.13 Signal configuration of the output ports

If required, the preset signal configuration of the output ports can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

"LPortAxisOut1" output port

The output port **LPortAxisOut1** is intended for the connection with a following axis.

Signal (Lenze setting)	Output port	Signal configuration
Axis status word • Application-specific signals can be supplemented.		
FALSE	→ Axis status word bit 00	C03120/1
FALSE	→ Axis status word bit 01	C03120/2
FALSE	→ Axis status word bit 02	C03120/3
FALSE	→ Axis status word bit 03	C03120/4
FALSE	→ Axis status word bit 04	C03120/5
FALSE	→ Axis status word bit 05	C03120/6
FALSE	→ Axis status word bit 06	C03120/7
FALSE	→ Axis status word bit 07	C03120/8
FALSE	→ Axis status word bit 08	C03120/9
FALSE	→ Axis status word bit 09	C03120/10
FALSE	→ Axis status word bit 10	C03120/11
FALSE	→ Axis status word bit 11	C03120/12
FALSE	→ Axis status word bit 12	C03120/13
FALSE	→ Axis status word bit 13	C03120/14
FALSE	→ Axis status word bit 14	C03120/15
FALSE	→ Axis status word bit 15	C03120/16
Setpoints for horizontal communication		
0 %	→ Axis-Port Out 1	C03124/1
Master value	→ Axis-Port Out 2	C03054/1

Output port "LPortStatus1"

The output port **LPortStatus1** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 1		
Drive ready	→ Status word 1 bit 00	C03121/1
FALSE	→ Status word 1 bit 01	C03121/2
Drive is ready to start	→ Status word 1 bit 02	C03121/3
Error is active.	→ Status word 1 bit 03	C03121/4
FALSE	→ Status word 1 bit 04	C03121/5
Stop active	→ Status word 1 bit 05	C03121/6
Switch-on inhibit is active	→ Status word 1 bit 06	C03121/7
Warning active	→ Status word 1 bit 07	C03121/8
FALSE	→ Status word 1 bit 08	C03121/9
FALSE	→ Status word 1 bit 09	C03121/10
FALSE	→ Status word 1 bit 10	C03121/11
Drive in the limitation	→ Status word 1 bit 11	C03121/12
Homing complete	→ Status word 1 bit 12	C03121/13
Home position available	→ Status word 1 bit 13	C03121/14
FALSE	→ Status word 1 bit 14	C03121/15
FALSE	→ Status word 1 bit 15	C03121/16

Output port "LPortStatus2"

The output port **LPortStatus2** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 2		
FALSE	→ Status word 2 bit 00	C03122/1
FALSE	→ Status word 2 bit 01	C03122/2
FALSE	→ Status word 2 bit 02	C03122/3
FALSE	→ Status word 2 bit 03	C03122/4
FALSE	→ Status word 2 bit 04	C03122/5
FALSE	→ Status word 2 bit 05	C03122/6
FALSE	→ Status word 2 bit 06	C03122/7
FALSE	→ Status word 2 bit 07	C03122/8
FALSE	→ Status word 2 bit 08	C03122/9
FALSE	→ Status word 2 bit 09	C03122/10
FALSE	→ Status word 2 bit 10	C03122/11
FALSE	→ Status word 2 bit 11	C03122/12
FALSE	→ Status word 2 bit 12	C03122/13
FALSE	→ Status word 2 bit 13	C03122/14
FALSE	→ Status word 2 bit 14	C03122/15
FALSE	→ Status word 2 bit 15	C03122/16

12.3.14 Application error messages

For the output of application-specific error messages an FB instance *ApplicationError* of the function block **L_DevApplErr** is available in the network.

- Via the 8 boolean inputs up to 8 different application error messages with parameterisable module ID, error ID and error response can be released by the application.
- The first four inputs can be connected to the multiplexer parameters with the desired tripping signals. The next four inputs are firmly connected to the tripping signals of the application.

Error message		Error-ID	Error response
1	Free (configurable via C03060/1)	8001	Error
2	Free (configurable via C03060/2)	8002	Error
3	Free (configurable via C03060/3)	8003	Error
4	Activate Modulo mode	8004	Warning
5	Following error	8005	Warning
6	Drive cannot follow	8006	No reaction
7	Drive system interrupted	8007	Quick stop by trouble
8	Reserved	8008	Warning

- Parameter setting: Tab **All parameters**

Parameters		Lenze setting
C03990	Module-ID	999
C03991/1...8	Error ID 1 ... 8	See table above
C03992/1...8	Error response 1 ... 8	See table above

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
FALSE	→ Application fault 1	C03060/1
FALSE	→ Application fault 2	C03060/2
FALSE	→ Application fault 3	C03060/3

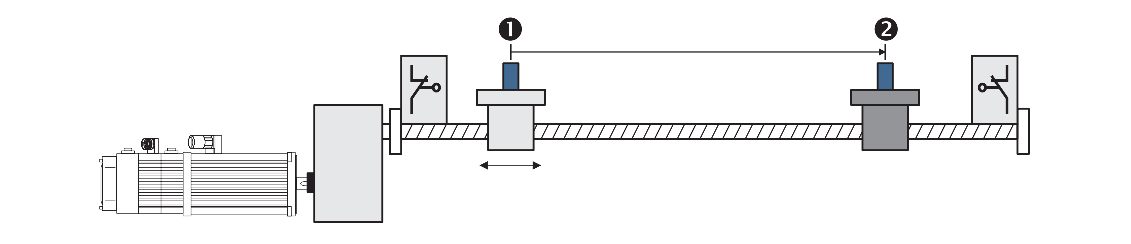
13 TAs for positioning tasks

The technology applications described in this chapter are available for positioning tasks.

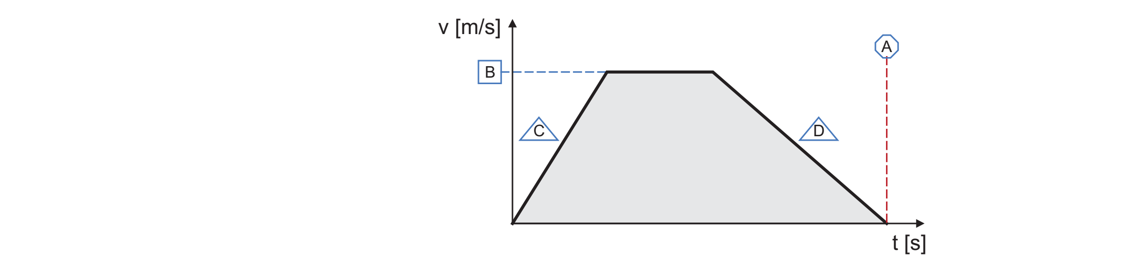
Technology application/application ranges		Required license/delivery
TA "Multi-purpose positioning" (371)		
	**Note:** In this TA the sequence control is carried out through the controller.	
	• Transport units • Rotary tables • Storage and retrieval units • Feed drives • Dosing machines • Hoists	License stage Motion Control TopLevel or higher required. The technology application can be selected in the »Engineer« application catalog.
TA "Table positioning" (411)		
	**Note:** This TA requires an external sequence control.	
	• Transport units • Rotary tables • Storage and retrieval units • Feed drives • Dosing machines • Hoists	Available in every license stage. The technology application can be selected in the »Engineer« application catalog.

13.1 Introduction

Positioning means to move a workpiece/tool or a piece of material from a starting position ❶ to a defined target❷.



For this purpose a travel profile is to be provided in the controller, for which at least the following profile parameters are required:

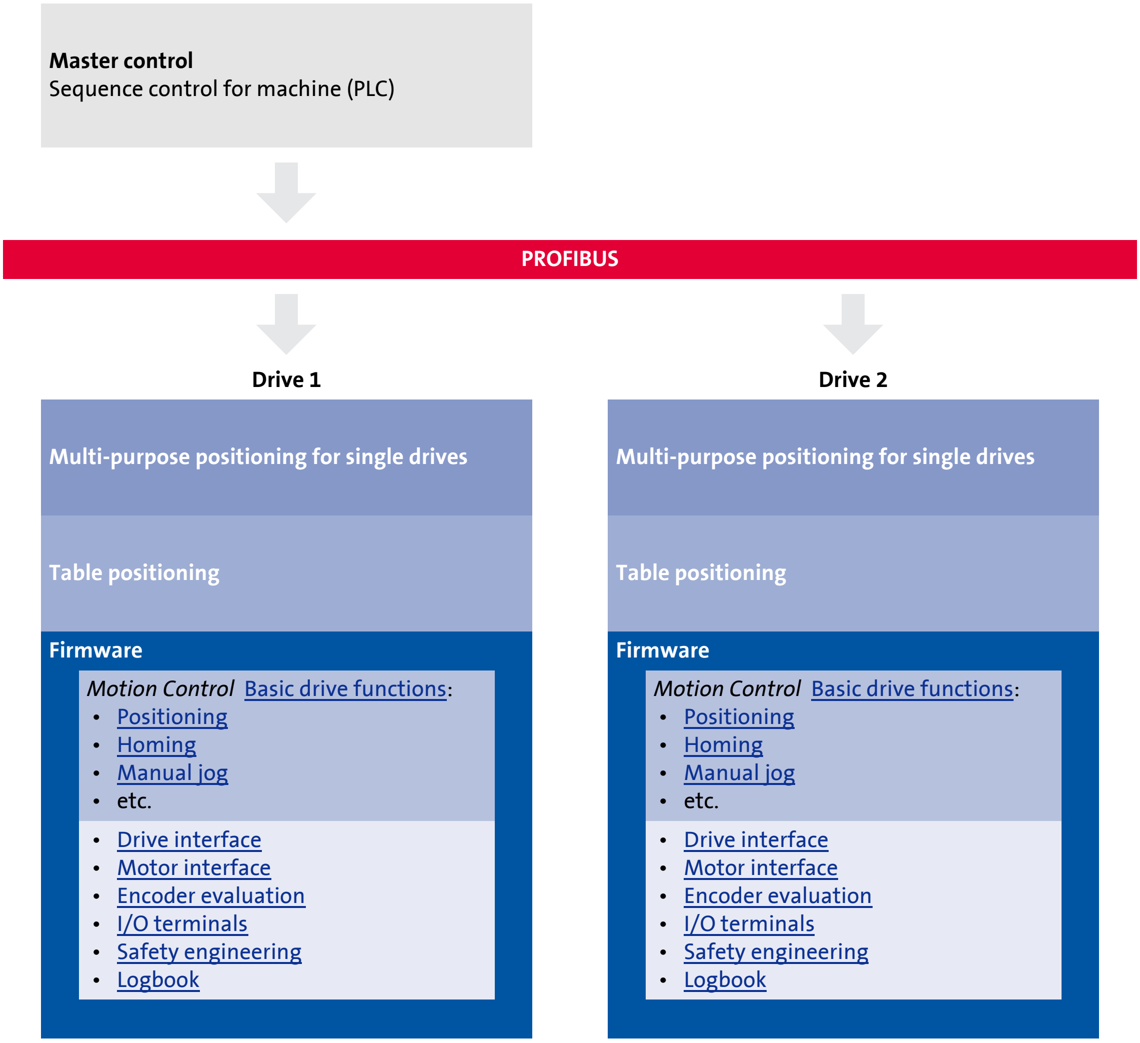


Icon	Profile parameters
A	**Position** Target position or path distance to be traversed.
B	**Speed** Maximum speed with which the target is to be approached.
C	**Acceleration** Selection of the change in speed by which acceleration is to be carried out maximally.
D	**Deceleration** Selection of the change in speed by means of which decleration to standstill is to be maximally effected again.

- A positioning can consist of several profiles which are executed in a specified mode.
- A detailed explanation of all profile parameters can be found in the description of the TA in subchapter "Profile parameters". (📖 390)

13.1.1 Application examples

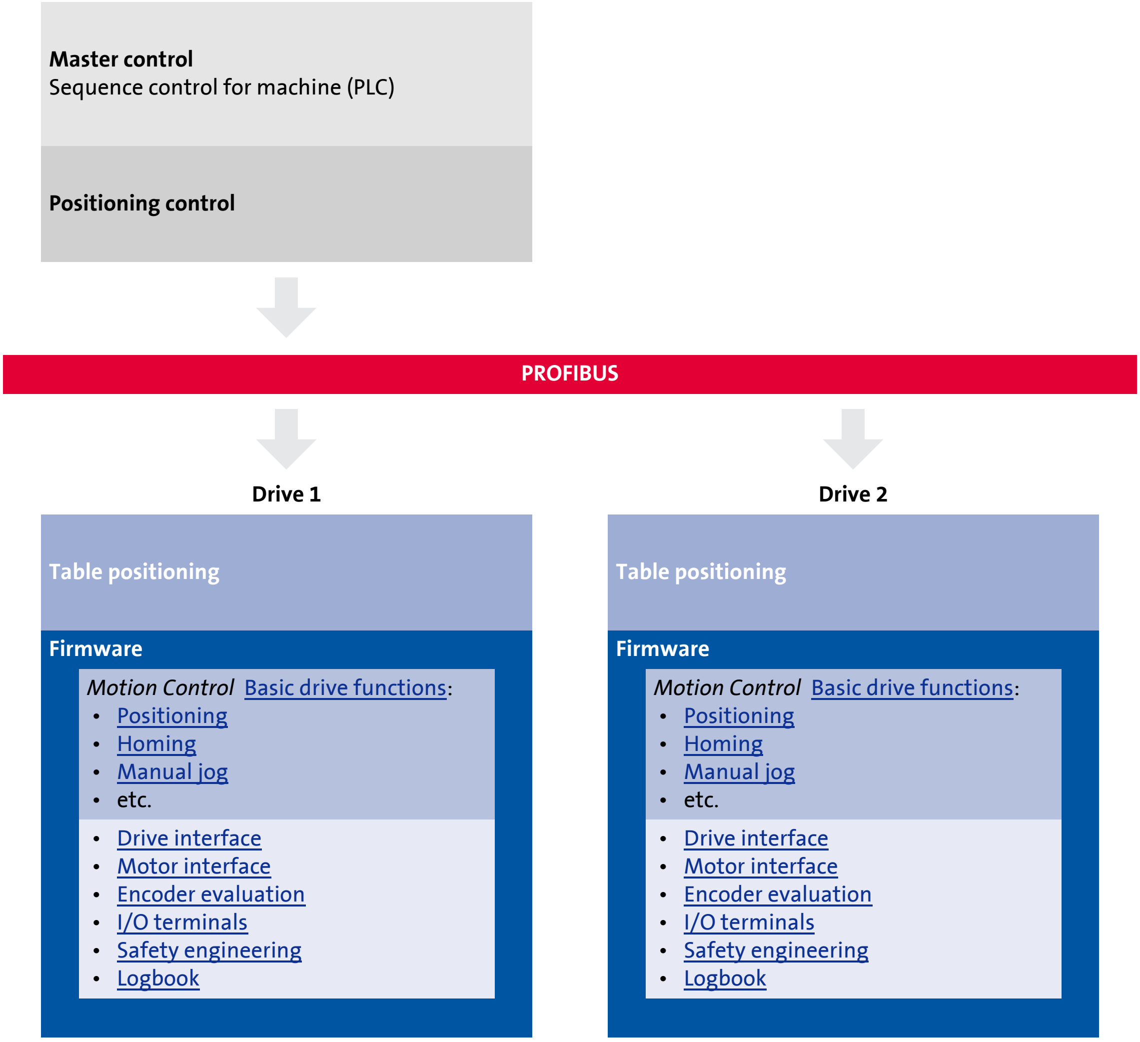
Multi-purpose positioning



[13-1] Example: Multi-purpose positioning with networking via PROFIBUS

- The sequential positioning control utilises the traversing blocks of the table positioning and like this activates the basic function "Positioning" containing the profile generation.
- Here, the multi-purpose positioning only control the "own motor".
- The sequence of the motor/tool/material control are defined in the multi-purpose positioning.

Table positioning with higher-level positioning control



[13-2] Example: Table positioning with higher-level positioning control and networking via PROFIBUS

13.2 TA "Multi-purpose positioning"

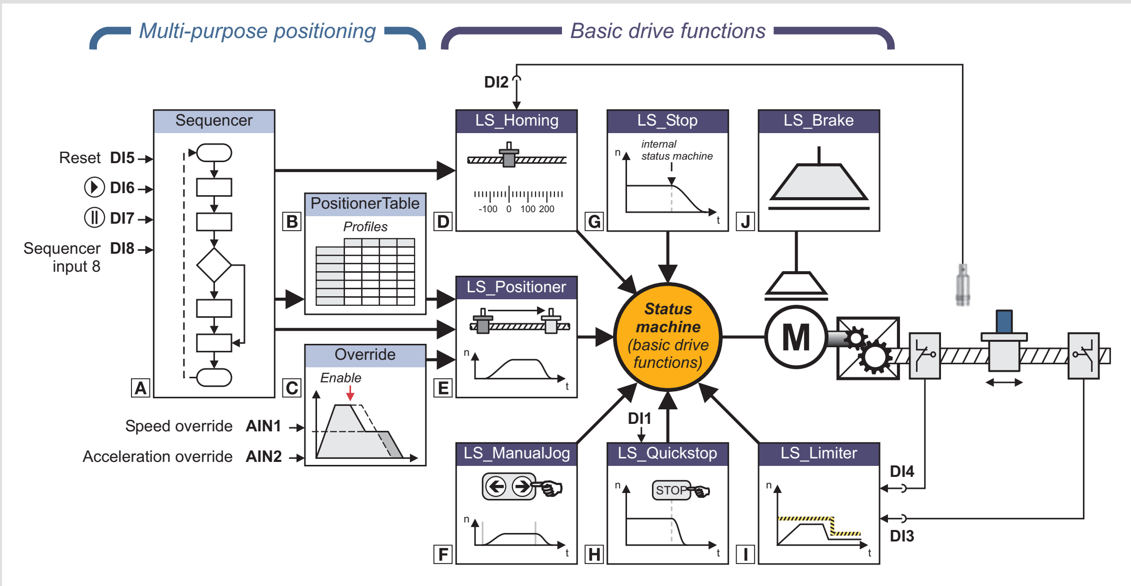
The technology application "Multi-purpose positioning" enables the drive to execute parameterisable travel profiles. The program sequence is defined by a sequence table.

Functions

- Sequence control for several successive positioning steps with a break and stop functions and different auxiliary functions (e. g. deriving, counting, waiting).
- Positioning in different positioning modes
  - Point-to-point positioning
  - Touch probe positioning (residual path positioning)
  - Profile chaining with velocity changeover (overchange)
- Homing in different homing modes
- Profile data management
  - Support of S profiles (jerk limitation)
  - Separate setting for acceleration and deceleration
  - "Teach" function
- Speed-/acceleration override
- Path-dependent switching of outputs
- Following error monitoring
- Support of absolute value encoders
- Support of the basic drive functions "Manual jog" and "Quick stop"
- Monitoring of travel range limits with the basic drive function "Limiter"
- Optional control of a holding brake with the basic drive function "Brake control"

13.2.1 Basic signal flow

The functional core of the multi-purpose positioning is formed by the sequence table and the profile data management, which transmit the required control signals and profile data to the basic drive function "Positioning".



[13-3] Signal flow of the TA "Multi-purpose positioning" (schematic diagram)

Multi-purpose positioning

A Sequence table

B Profile data management

C Speed/acceleration override

Basic drive functions

D Homing

E Positioning

F Manual jog

G Stop

H Quick stop

I Limiter

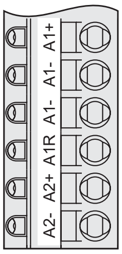
J Brake control (optional)

13.2.2 Assignment of the I/O terminals

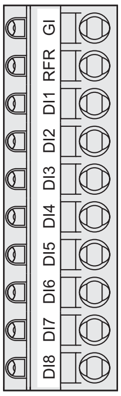
13.2.2.1 Setpoint and control signals

The following tables contain the Lenze assignment of the analog and digital inputs for the technology application "Multi-purpose positioning".

Analog inputs

Terminal X3		Signal (Lenze setting)
	AI1- AI1+	Selection for speed override ▸ Speed/acceleration override (📖 399)
	AI2- AI2+	Selection for acceleration override ▸ Speed/acceleration override (📖 399)
▸ I/O terminals ▸ Analog inputs (📖 117)		

Digital inputs

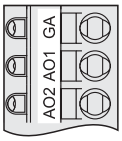
Terminal X5		Signal (Lenze setting)
	DI1	Quick stop • If DI1 is set to LOW level, the positioning program is interrupted and drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. • After the quick stop function is deactivated, a new LOW/HIGH edge is required at DI6 in order that the positioning program is continued with the next step. ▸ Quick stop (📖 402)
	DI2	Connection of reference switch/touch probe sensor ▸ Action type "Homing" (📖 382)
	DI3 DI4	Connection of travel range limit switch for basic function "Limiter". (📖 403) • DI3 = positive travel range limit switch, DI4 = negative travel range limit switch. • The inputs respond to the FALSE state (fail-safe).
	DI5	Reset error and positioning program • By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed. At the same time the positioning program is reset.
	DI6	Start positioning program ▸ Control of the sequence table (📖 389)
	DI7	Stop positioning program (break) ▸ Control of the sequence table (📖 389)
	DI8	Sequencer input 8 for positioning program • The action types "Positioning", Branching", "Waiting" and "Stand-by" have the parameter "Input for...". If this is non-zero, it describes the number of the sequencer input where the positioning program awaits the level defined before it executes the action. In the Lenze assignment the terminal DI8 is available as sequencer input 8. ▸ Program flow (📖 378)
▸ I/O terminals ▸ Digital inputs (📖 123)		

13.2.2.2 Actual value and status signals

The following tables contain the Lenze assignment of the analog and digital outputs for the technology application "Multi-purpose positioning".

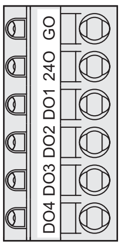
- The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

Analog outputs

Terminal X3		Signal (Lenze setting)	Signal configuration
	**AO1**	Motor speed • Scaling: ±10 V ≡ motor reference speed (C00011)	C03110/1
	AO2	Motor torque (setpoint) • Scaling: 10 V ≡ Motor reference torque (C00057/2)	C03110/2

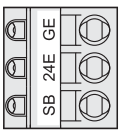
▸ I/O terminals ▸ Analog outputs (📖 120)

Digital outputs

Terminal X4		Signal (Lenze setting)	Signal configuration
	**DO1**	Status "Drive ready" • This operating state is active if the controller is enabled by setting the digital input RFR to HIGH level and no error has occurred.	C03100/1
	DO2	Status "Positioner active"	C03100/2
	DO3	Status "Limitation active" • At the moment a setpoint is limited or a software or hardware limit switch has been reached.	C03100/3
	DO4	Status "Error active acknowledgement is required" • Monitoring with the error response "Error" or "Quick stop by trouble" has been activated, and the controller is in the device state "Error active" or "Quick stop by trouble active".	C03100/4

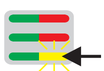
▸ I/O terminals ▸ Digital outputs (📖 125)

State bus

Terminal X2		Signal (Lenze setting)	Signal configuration
	**SB**	Status "Error active acknowledgement is required" • Monitoring with the error response "Error" or "Quick stop by trouble" has been activated, and the controller is in the device state "Error active" or "Quick stop by trouble active". • The state bus is put in the "error" status.	C03100/5

▸ I/O terminals ▸ Monitoring function "State bus" (📖 127)

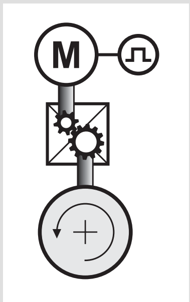
Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Sequence control active"	C03100/6

▸ Drive interface ▸ LED status displays (📖 34)

13.2.3 Basic settings

13.2.3.1 Machine parameters



The machine parameters describe e.g. the motor end of the mechanics used.

The setting of the machine parameters in the »Engineer» is carried out on the **Application parameters** tab in the dialog level *Overview* → *Machine parameters*.

Tip!

In the »Engineer« the most important machine parameters can be adapted to the machine on the **Application parameter** tab directly in the topmost *Overview* dialog level:

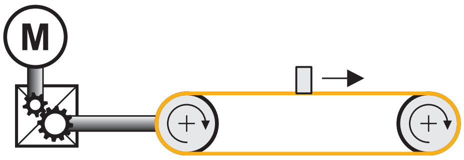
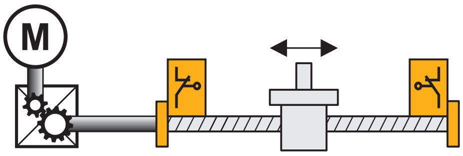
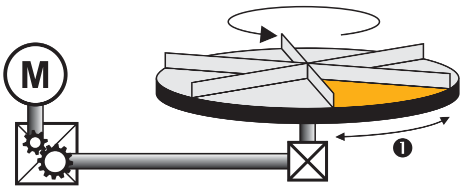
Detailed information for selecting and entering the machine parameters can be found in the chapter "Drive interface". ▶ Machine parameters (📖 35)

Short overview of machine parameters

Parameters		Lenze setting	
		Value	Unit
C00173	Mains - voltage	400/415	V
C00174	Threshold undervoltage (LU)	285	V
C00600	Resp. to DC bus overvoltage	Trouble	
C02520	Gearbox fact. numer. motor	1	
C02521	Gearbox fact. denom. motor	1	
C02527	Motor mounting direction	Motor rotating CW	
C02570	Controller configuration	Phase control	
C02522	Gearbox fact. numer. load	1	
C02523	Gearbox fact. denom. load	1	
C02529	Mounting direction of position encoder	Encoder rotating CW	
Description of the mechanics (load, tool)			
C02528	Traversing range	Unlimited	
C02524	Feed constant	360.0000	Unit
C02525	Unit	°	
C02526	User-defined unit	°	
C02533	Time unit	s	
C00273/1	Motor moment of inertia	Motor-dependent	kg cm^2
C00273/2	Load moment of inertia	0.00	kg cm^2

13.2.3.2 Traversing range

By setting the traversing range the machine type/measuring system is set:

Traversing range	
Unlimited 	The drive can traverse optionally in both directions without reaching limitations. • Positionings here generally are effected in the positioning modes "Relative with/without TP" or "Speed with/ without TP". • The positioning measuring system is reset to zero with every new positioning process. • By homing, the positioning measuring system receives a fixed reference point (zero point), so that also the positioning modes "Absolute with/without TP"can be used. Then also the software limit positions for limiting the traversing range are provided. ▸ Software limit positions (📖 202)
Limited 	After reaching the position limits, the drive must travel in the opposite direction again. • For positioning, the home position has to be known. By homing, the positioning measuring system receives a fixed reference point (zero point). • Basically, monitoring to the internally maximum usable value range (±2^{31} increments) takes place (software limit position monitoring of the internal value range). An overflow of the value range results in the loss of the home position. • Additionally parameterisable software limit positions can be activated on the user side for limiting the travel range. ▸ Software limit positions (📖 202)
Modulo 	The measuring system is repeated. • If the cycles ❶ set are exceeded a defined overflow occurs. The cycle typically corresponds to a rotation or tool distance in a rotative system. • For positioning, the home position has to be known. • Software limit positions are not effective • Absolute targets can be approached by exceeding the measuring system limit, e.g. from 10° via 0° to 350°.

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview*

Parameters		Lenze setting	
		Value	Unit
C02528	Traversing range	Unlimited	
C02536	Cycle (only relevant for traversing range "Modulo")	360.0000	Unit

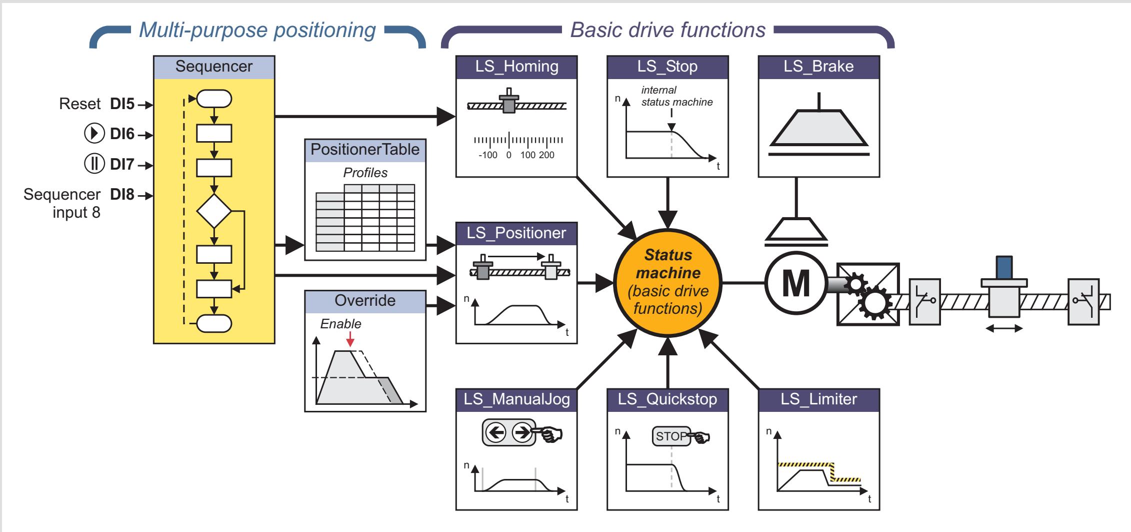
13.2.3.3 Position control

The dialog level *Overview* → *S_Positioner* and the subordinated and dialog levels serve to adapt the parameters relevant for the position control, if required.

Parameters		Lenze setting	
		Value	Unit
C00254	Phase controller gain	20.00	1/s
C02553	Position controller gain	20.00	1/s
C02556	Pos. contr. limitation	214748.3647	Unit/s

13.2.4 Program flow

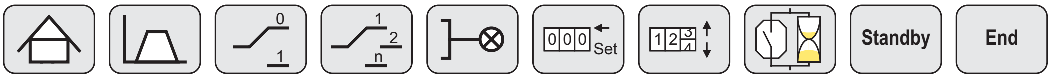
The program flow of the multi-purpose positioning is selected according to a sequence table which can contain up to 100 references to "actions".



[13-4] Sequence table (schematic diagram)

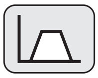
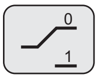
What is an action?

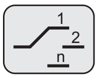
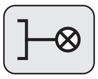
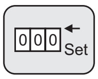
- An action comprises a clear functionality which is described with a few parameters.
- Different action types are available which serve to implement, for instance, program branching, switching operations, waiting times and counters.



- Before every action type a defined number of actions is available which can be individually parameterised. The parameters of the actions of the same type only differ in the subcode.
- An action can be used in several steps if always exactly the same task is to be carried out.
- After an action has been processed, the action in the next step of the sequence table is automatically processed unless it is jumped to another step in the sequence table due to a branch.
- One action can be maximally processed per computing cycle.

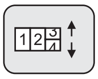
13.2.4.1 Overview of action types

Action type	Function/parameter		
Homing			
	In order to execute a homing process, the action type "Homing" is available which activates the basic function "Homing". **Note:** The "Homing" action does not have its own parameters. The settings for homing are made via the parameters of the basic function "Homing". ▸ Homing (📖 164)		
Positioning			
	To execute a profile, 50 actions of type "Positioning" are available. • The execution of the adjusted profile is only started with activated waiting function if the sequencer input selected for the waiting function accepts the selected signal state. ▸ Sequencer inputs (📖 386)		
	Parameters		**Information**
	C04513/1...50	Profile number	Specification of the profile to be executed. • Press the "Set up profile" button to open a dialog box to enter the corresponding profile parameters. • In this dialog a sequence profile can also be set.
	C04511/1...50	Input for waiting function	Sequence input 1 ... 32 to be evaluated. • With the default setting "0" the waiting function is skipped and the profile execution is started immediately.
	C04512/1...50	Signal state for waiting function	Only when the sequencer input to be evaluated has this state, the profile is executed.
	C04514/1...50	Sequence step	Step inside the sequence table which will be processed after the profile has been executed.
Branching			
	25 actions of type "Branching" are available for conditional and unconditional branches (jumps). • A branch to the indicated step is executed when the selected sequencer input has the selected signal state at the time of processing. If not, the sequence step is processed in the sequence table. ▸ Sequencer inputs (📖 386)		
	Parameters		**Information**
	C04530/1...25	Input for comparison	Sequence input 1 ... 32 to be evaluated. • With the default setting "0" a branch to the adjusted sequence step is executed.
	C04531/1...25	Comparison value	State in which the sequencer input to be evaluated is compared.
	C04532/1...25	Sequence step in case of equality	If the sequencer input to be evaluated equals the comparison value, a branch to the step set here is executed. In the case of inequality or "0" setting, the next step in the sequence table is processed instead.

Action type	Function/parameter		
Variable branching			
	For variable branches (jumps) 5 actions of type "Variable branching" are available. • The branch to one of 20 possible steps is executed depending on the value in C03001 ... C03005 at the time or processing. • The parameters C03001 ... C03005 are firmly assigned to the five available actions: –C03001 determines the branch for action 1. –C03002 determines the branch for action 2, etc. **Example:** If C03002 is assigned to the value "15" at the time of processing the action no. 2, it is branched to the step which is entered in the parameter "Sequence step at branch value 15" for action no. 2 (C04554/2).		
	Parameters		**Information**
	C04540/1...5	Sequence step at branch value 1	Step which is executed next when C03001 ... C03005 = "1". • With the default setting "0" the branching is deactivated (sequence step is processed).
	C04541/1...5	Sequence step at branch value 2	Step which is executed next when C03001 ... C03005 = "2". • In the default setting "0", branching is deactivated and the next step in the sequence table is processed.
	...	...	...
	C04559/1...5	Sequence step at branch value 20	Step which is executed next when C03001 ... C03005 = "20". • In the default setting "0", branching is deactivated and the next step in the sequence table is processed.
Switching			
	In order to switch digital output signals 25 actions of type "Switching" are available. • Each action can set two selectable sequencer outputs to FALSE or TRUE independently of each other. ▸ Sequencer outputs (📖 386)		
	Parameters		**Information**
	C04520/1...25	Output A switching	Sequencer output 1 ... 32 to be switched. • With the setting "0" switching is deactivated.
	C04521/1...25	Signal state for A switching	State to which the sequencer output is to be set.
	C04522/1...25	Output for B switching	Sequencer output 1 ... 32 to be switched. • With the setting "0" switching is deactivated.
	C04523/1...25	Signal state for B switching	State to which the sequencer output is to be set.
Set counter			
	10 actions of type "Set counter" are available for setting one of the 10 available counters to a certain starting value. • The 10 actions of type "Set counter" are not firmly assigned to the 10 actions of the "Counting" type. • You can use, for instance, an action of type "Set counter" to set a counter to a value and later you can set the same counter with another action of type "Set counter" to another value.		
	Parameters		**Information**
	C04580/1...10	Counter selection	With the setting "0" the setting of the counter is deactivated.
	C04581/1...10	New counter content	-2147483648 ... 2147483648
	C04582/1...10	Current counter content	Read only

Action type	Function/parameter

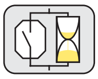
Count



25 actions of type "Count" are available for counting processes.
- With each action processing the counter content of the counter selected is increased or reduced by the specified step value depending on the setting (count upwards or downwards).
- When the comparison condition for comparing the counter content with an adjustable comparison value is fulfilled, a branch to any step is possible.
- 10 actions of type "Set counter" are available for setting a counter to a starting value.

Parameters		Information
C04590/1...25	Counter selection	With the setting "0" the setting of the counter is deactivated.
C04591/1...25	Step value	Value by which the counter is increased or reduced. • Range: -2147483648 ... 2147483648
C04592/1...25	Comparison value	Value with which the counter is compared. • Range: -2147483648 ... 2147483648
C04593/1...25	Sequence step	When the set comparison condition is met, a branch to the step set here is executed. If the condition is not met, the next step in the sequence table is processed instead.
C04594/1...25	Comparison condition	Selection of the condition for the comparison of the counter content with the comparison value.

Wait



25 actions of type "Wait" are available for the insertion into the program flow.
- The sequence step is only processed after the waiting time has elapsed or when the selected sequencer input has the selected signal state at the time of processing. ▶ Sequencer inputs (📖 386)

Parameters		Information
C04571/1...25	Waiting time	With setting "0", the waiting time is deactivated.
C04572/1...25	Input for waiting function	Sequence input 1 ... 32 to be evaluated. • The sequence step will be processed when this input has the set state, but no later than after the set waiting time has elapsed.
C04573/1...25	Signal state for waiting function	Required state for completing the waiting function.

Stand-by

Standby

5 actions of type "Stand-by" are available for the temporary activation of a setpoint follower.
- For a sensible use of the "Standby" action, appropriate signal combinations are required in the (enabled) function block editor.
- The setpoint follower is enabled until the condition for exiting the stand-by is met.

Parameters		Information
C04601/1...5	Input for "Stand-by" end	Sequence input 1 ... 32 to be evaluated.
C04602/1...5	Signal state for "Stand-by" end	Only if the sequencer input to be evaluated has this state, the standby step is exited, and the next step in the sequence table is processed.

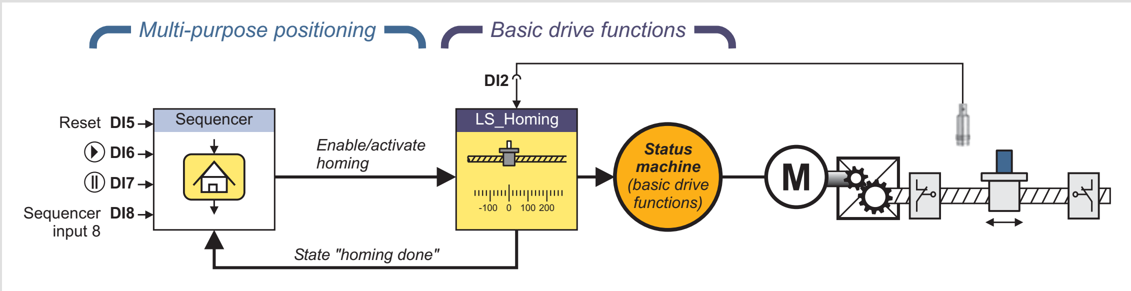
Program end

End

To define the program end in the sequence table or delete a program step, the action of type "Program end" is available.

13.2.4.2 Action type "Homing"

In order to execute a homing process, the action type "Homing" is available for the sequence table which activates the basic function "Homing".



[13-5] "Homing" (schematic diagram for limited traversing range)

Note!

The "Homing" action for the sequence table does not have its own parameters. The settings for homing are made via the parameters of the basic function "Homing".

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Homing*

Parameters		Lenze setting	
		Value	Unit
C02528	Traversing range	Unlimited	
C02640	Ref. mode	Set home pos. directly	
C02642	HM position	0.0000	Unit
C02643	HM target position	0.0000	Unit
C02644	Ref. speed 1	360.0000	Unit/s
C02645	Home acceleration 1	720.0000	Unit/s^2
C02646	Ref. speed 2	180.0000	Unit/s
C02647	Home acceleration 2	360.0000	Unit/s^2
C02648	Home S-ramp time	100	ms
C02649	HM torque limit	10.00	%
C02650	Homing inhibit time	1.000	s
C02652	Home position after mains switching	Delete	
C02653	Max. rot. angle after mains sw.	180	°

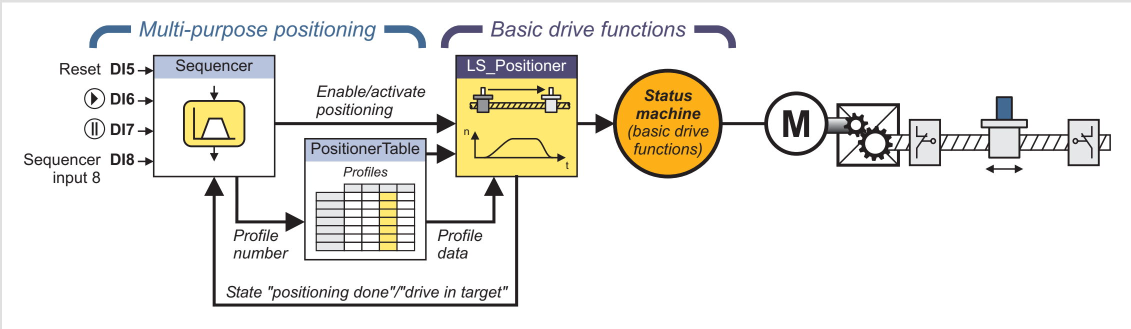
Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
Sequencer Enable Homing	→ Request homing	C03160/1
Sequencer Activate Homing	→ Start homing	C03160/2
DigIn 2	→ Home mark	C03160/3
FALSE	→ Set home position	C03160/4
FALSE	→ Reset home position	C03160/5
Zero position	→ Home position	C03163

Tip!

Detailed information on homing can be found in chapter "Basic drive functions" → subchapter "Homing". (📖 164)

13.2.4.3 Action type "Positioning"

In order to execute a positioning process, 50 actions of "Positioning" type are available for the sequence table which activates the basic function "Positioning":



[13-6] "Positioning" (schematic diagram for limited traversing range)

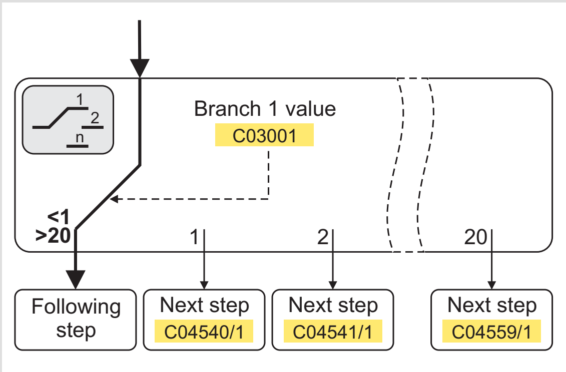
- Use the parameter **Profile number** of the action to select the number or the table position of the profile to be executed. The final profile data are then given to the basic function by the Profile data management. (📖 390)
- The execution of the adjusted profile is only started with activated waiting function if the sequencer input selected for the waiting function accepts the selected signal state. ▶ Sequencer inputs (📖 386)

Tip!

Detailed information on positioning can be found in the chapter "Basic drive functions" → subchapter "Positioning". (📖 176)

13.2.4.4 Action type "Variable branching"

For variable branches (jumps) 5 actions of type "Variable branching" are available for the sequence table.



[13.1] Principle of the variable branch (here for action no. 1)

- The branch to one of 20 possible steps is executed in the Lenze setting depending on the value in C03001 ... C03005 at the time or processing.
- The parameters C03001 ... C03005 are firmly assigned to the five available actions, i.e. C03001 determines the branch for action 1, C03002 for action 2, etc.

Tip!

Instead of the parameters C03001 ... C03005 you can also assign other signal sources of the application to the "branch" inputs via multiplexer parameters.

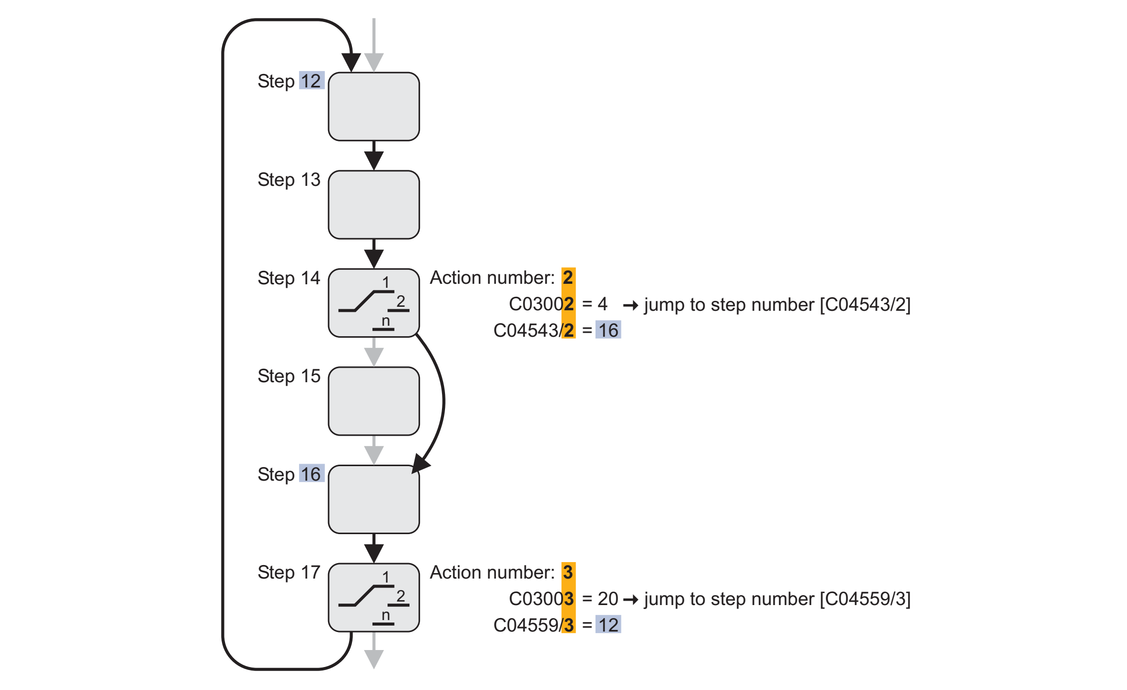
- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → L_Sequencer

Parameters		Lenze setting	
		Value	Unit
C03001	Branch value 1	1	
C03002	Branch value 2	1	
C03003	Branch value 3	1	
C03004	Branch value 4	1	
C03005	Branch value 5	1	

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
C03001	→ Sequencer branch 1	C03079/1
C03002	→ Sequencer branch 2	C03079/2
C03003	→ Sequencer branch 3	C03079/3
C03004	→ Sequencer branch 4	C03079/4
C03005	→ Sequencer branch 5	C03079/5

Example

The following example illustrates the function of the variable branch based on a program flow which contains, among other things, two actions of the "Variable branching" type.



[13.2] Example "Variable branch"

13.2.4.5 Sequencer inputs

In order to control conditional branches and the optional waiting function of some action types during the program flow, 32 sequencer inputs of "BOOL" type.

- The sequencer inputs 1 ... 16 can be linked with the signal sources of the application or device interfaces in the dialog level *Overview* → *L_Sequencer* → *Program inputs* via multiplexer parameters.
- In case of the action types "positioning", "branching", "waiting" and "stand-by" it can be defined for each action which of the sequencer inputs can be called during the program sequence for the corresponding function.

Note!

The sequencer input 8 in the Lenze setting is linked with the digital input DI8.

Parameterise signal combinations (237)

13.2.4.6 Sequencer outputs

Via a DWORD-to-BIT-converter, 32 sequencer outputs of type "BOOL" are available for "switching" which can be set to FALSE or TRUE with the action type "switching".

- These sequencer outputs can be connected with the inputs of the application or device interfaces via multiplexer parameters.

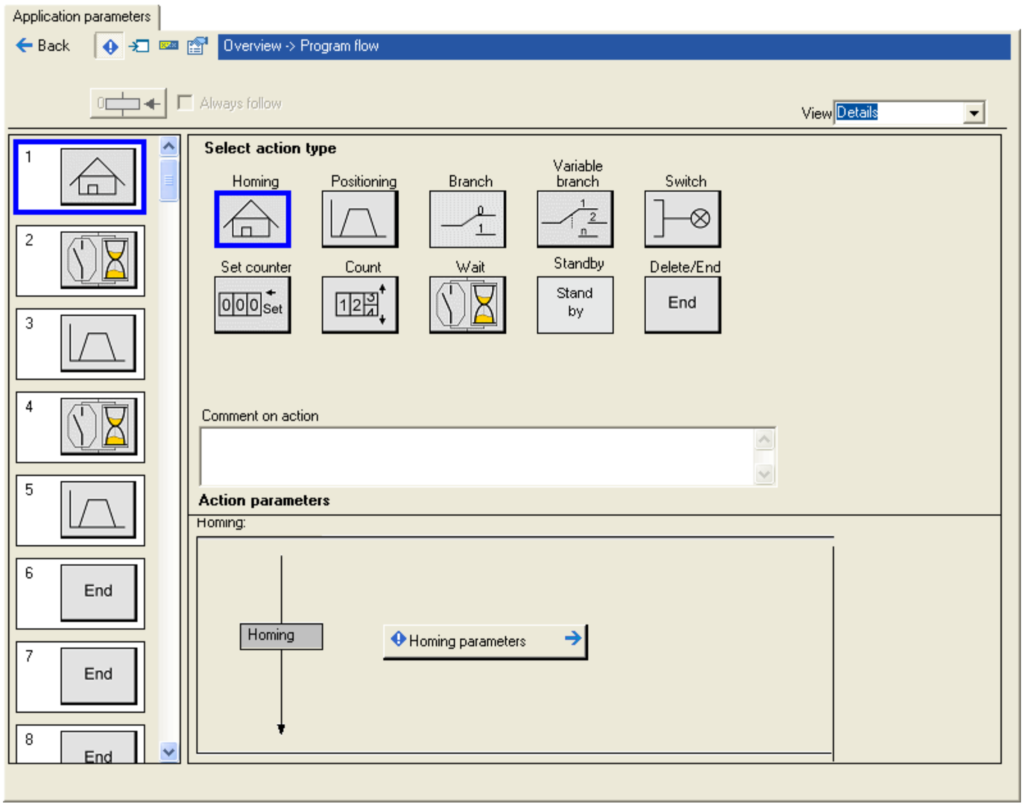
- The following table lists the corresponding module outputs of the FB interconnection and the corresponding selection numbers for the multiplexer parameters:

Module output	Signal type	Selection no.	Selection text
SequencerOutput.bBit0	□	551	Sequencer output 1
SequencerOutput.bBit1		552	Sequencer output 2
SequencerOutput.bBit2		553	Sequencer output 3
...		...	...
SequencerOutput.bBit31		582	Sequencer output 32

Parameterise signal combinations (237)

13.2.4.7 Parameter setting of the program flow in the Engineer

Go to the »Engineer« to the **Application parameter** tab and click **Program flow** in the topmost dialog level to change to the dialog for the sequence table:



Basic procedure

In the default setting the sequence table contains a small "Positioning program", which first rotates the axis 360° clockwise and afterwards 360° counter-clockwise.

Proceed as follows to define the desired program flow:

1. Select the program step (1 .... 100) to be edited on the left in the sequence table.
2. Select the action type for the selected program step by clicking it.
3. If the selected action type provides more than one action, select the action to be parameterised from the list field **Selection of action number**.
   – The next free action is suggested automatically.
4. Enter a comment about the action (optional).
5. Set parameters of the action.
   – If required, call the corresponding subsequent dialogs.
6. Repeat step 1 ... 5 until all actions required for the program flow are parameterised.

13.2.4.8 Control of the sequence table

A LOW/HIGH edge at the digital input DI6 starts the parameterised program flow if the controller is enabled and no error is pending.

- The first step set in C03000 of the sequence table is executed.
- By setting the digital input DI7 to HIGH level, the program flow can be stopped, if required (break).

Note!

In the following cases the program flow is interrupted:
- The controller inhibit is activated.
- Quick stop is activated.
- The drive interface changes to an error status.

If the controller is not inhibited, a shutdown of the drive via the basic function "Quick stop" is effected.

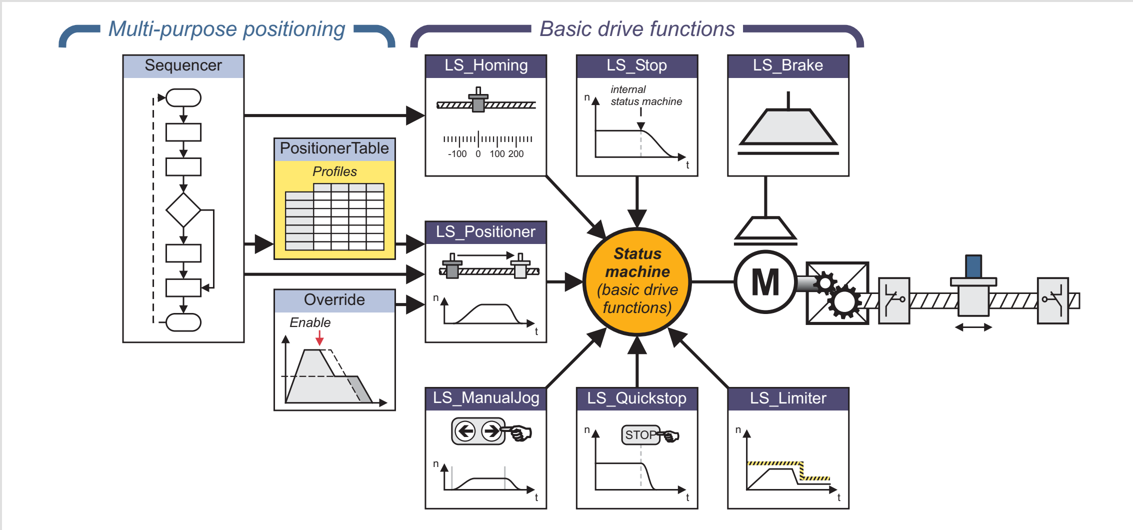
After the interruption is deactivated again (e.g. because an activated quick stop has been deactivated again), a renewed LOW/HIGH edge is required at the digital input DI6 in order that the positioning program can be continued with the sequence step.

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → L_Sequencer

Parameters		Lenze setting	
		Value	Unit
C03000	Starting step	1	
C04504	Jump destination	0	

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
C03000	→ First step	C03079/6
DigIn 6	→ Sequencer start	C03070/1
DigIn 7	→ Sequencer break	C03070/2
Controller inhibit or Quick stop active or Error is active.	→ Sequencer abort	C03070/6
FALSE	→ Sequencer jump	C03070/7
DigIn 5	→ Reset program/error status	C03070/8

13.2.5 Profile data management



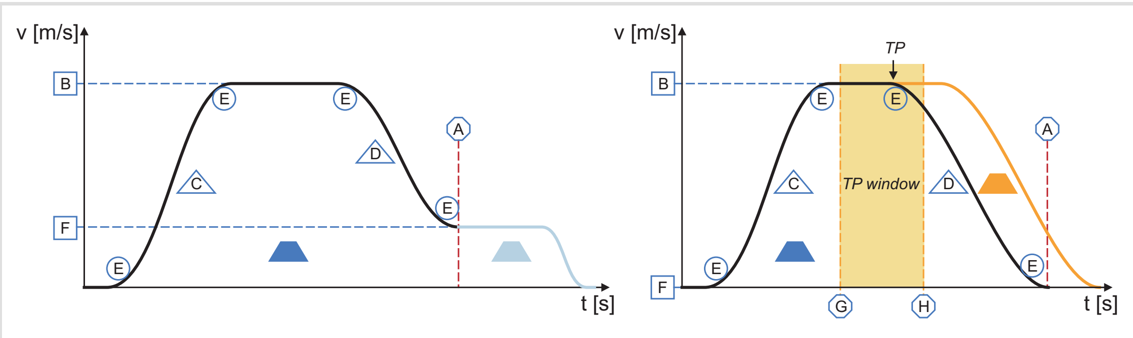
[13-7] Profile data management (schematic diagram)

The profile data management serves to file and manage up to 100 (travel) profiles.

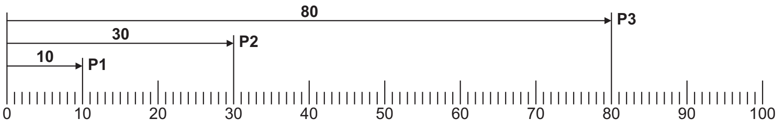
- A profile describes a motion request which can be converted by the basic drive function "Positioning" into a rotary motion.
- To execute a profile, 50 actions of type "Positioning" are available for the sequence table.
- The profile data management also enables the "teaching" of speed, acceleration/ deceleration and S-ramp times. ▶ "Teach" function (📖 398)

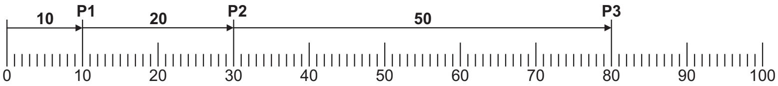
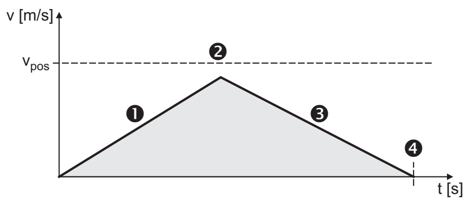
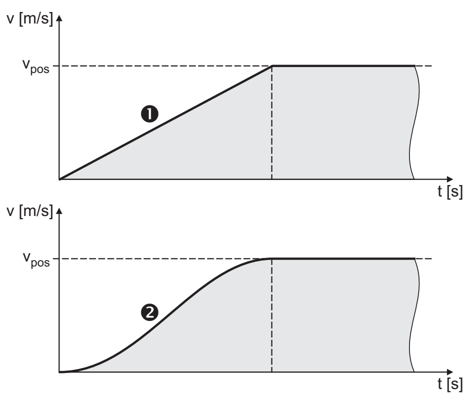
13.2.5.1 Profile parameters

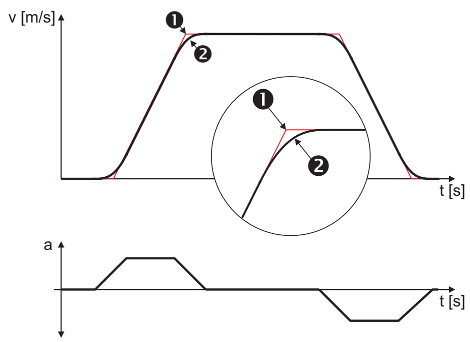
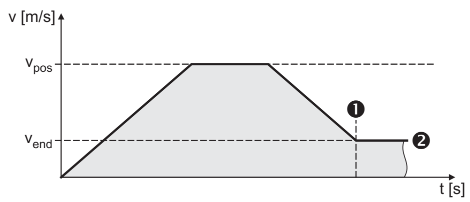
A profile is described by the following profile parameters:



[13-8] Profile parameters

<table>
<tr><th>Icon</th><th colspan="2">Profile parameters</th></tr>
<tr><td></td><td colspan="2">(Standard) profile
Profile data set (profile no. 1 ... 100) in which the profile data are stored.</td></tr>
<tr><td></td><td colspan="2">Mode
Selection of the positioning mode. ▶ Positioning modes (📖 395)</td></tr>
<tr><td>A</td><td colspan="2">Position
Target position or path distance to be traversed.
The position is either indicated as absolute or relative position.
• An absolute position always specifies the distance to the zero position defined:
absolute position = target position


• A relative position indicates the distance to the starting position (current position):
Relative position = target position - starting position

</td></tr>
<tr><td>B</td><td colspan="2">Speed
Maximum speed with which the target is to be approached.
• Depending on the profile parameter position, acceleration and deceleration, it is possible that the drive may not reach the maximum speed. In this case, the graph would display a triangle instead of a trapezium.</td></tr>
<tr><td></td><td>
</td><td>❶ Acceleration
❷ Travelling speed (is not reached here)
❸Deceleration
❹ Target position (or feed distance)</td></tr>
<tr><td>C</td><td colspan="2">Acceleration
Selection of the change in speed by which acceleration is to be carried out maximally.
• The following two acceleration types are distinguished:
–Constant acceleration: the speed increases linearly.
–Linearly increasing acceleration: The speed increases in S-shapes.</td></tr>
<tr><td></td><td>
</td><td>❶ Constant acceleration
❷ Linearly increasing acceleration</td></tr>
<tr><td>D</td><td colspan="2">Deceleration
Selection of the change in speed by means of which decleration to standstill is to be maximally effected again.</td></tr>
</table>

<table>
<tr><th>Icon</th><th colspan="2">Profile parameters</th></tr>
<tr><td rowspan="2">E</td><td colspan="2">S-ramp time
When the S-ramp time is selected for a profile, it is executed with S-shaped ramps, e.g. acceleration and deceleration processes are started smoothly to reduce the jerk and thus prevent the drive components from damage.
• The acceleration/deceleration specified in the profile are only reached after the defined S-ramp time has elapsed.
• This type of acceleration/deceleration is required for e.g. sensitive machine parts with clearance.
• The slower acceleration increase with the S profile prolongs the positioning time compared to the time optimal L profile.</td></tr>
<tr><td></td><td>❶ without jerk limitation (L profile)
❷ with jerk limitation (S profile)</td></tr>
<tr><td rowspan="2">F</td><td colspan="2">Final speed
Selection of the speed by which the drive is to start the next profile after reaching the target position. "Velocity changeover" or "Overchange" can be implemented with a final speed that is non-zero, i.e. when the target position is reached, a second positioning process is started immediately without the drive being decelerated to standstill at the first target position:</td></tr>
<tr><td></td><td>❶ Target position
❷ Final speed (here non zero)</td></tr>
<tr><td>G H</td><td colspan="2">Start of TP window / End of TP window
These profile parameters serve to restrict the range for a touch probe positioning (residual path positioning) in which touch probes are to be detected.</td></tr>
<tr><td></td><td colspan="2">Sequence profile with TP
Profile data set (profile no. 1 ... 100) in which the profile data of the profile are stored which is to be executed after a touch probe has been detected.
• For the setting "0" no further profile connection by touch probe is effected.</td></tr>
<tr><td></td><td colspan="2">Sequence profile without TP
Profile data set (profile no. 1 ... 100) in which the profile data of the profile is stored which is to be executed after the standard profile has been executed (profile chaining).
• With the setting "0" no profile chaining is carried out.
• The sequence profile defined in this profile parameter is executed even if no touch probe has been detected within the defined TP window.</td></tr>
</table>

13.2.5.2 Variable tables

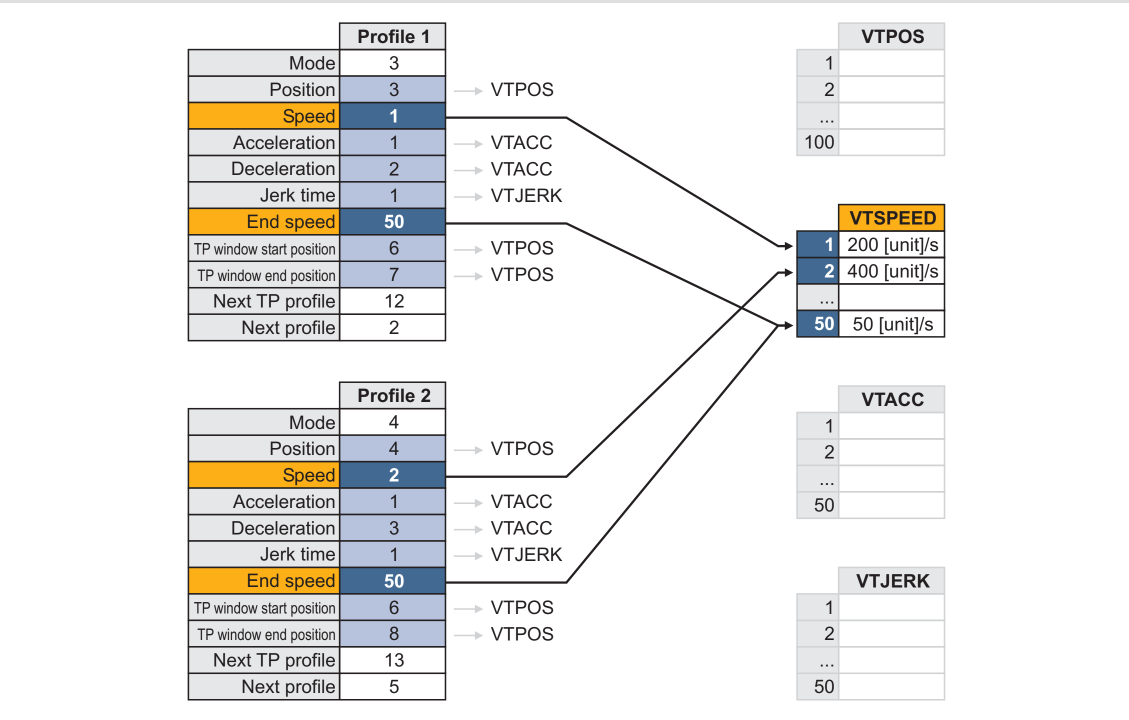
To simplify parameter handling, the four most important physical sizes for profile parameters are stored in separate "variable tables".

	VTPos Positions	**VTSpeed** Speeds	**VTAcc** Acceleration/ deceleration	**VTJerk** S-ramp times
Unit	Unit	Unit/s	Unit/s^2	s
Data format	DINT with four decimal positions			
Memory locations	100	50	50	50
Code	C04711/1...100	C04712/1...50	C04713/1...50	C04714/1...50
For profile parameters	Target position TP window starting position TP window end position	Speed Final speed	Acceleration Deceleration	S-ramp time

Note!

A value is assigned to a profile parameter by referring to a table position of the assigned variable table.

- Hence, not the value itself is entered into the profile parameter but the index of the table position which contains the value to be used.
- See the example in the illustration [13-9]. (📖 393)



[13-9] Principle: References to variable tables (here: References to VTSPEED)

▶ In case of several references to the same table position, a change of the value in this table position affects several profiles at the same time. Thus, recurring profile parameters only need to be changed on one position.

- If e.g. in case of a profile chaining, several profiles are to be executed with the same speed, the corresponding profile parameters "speed" can all refer to the same table position.
- For an easier assignment and identification of the entered values, each table position can be optionally provided with a comment in the »Engineer«.

13.2.5.3 Positioning modes

According to the traversing range/application, different position modes are available for a positioning function which are described in the following table.

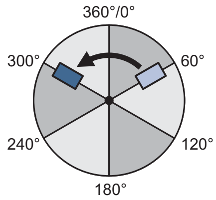
Note!

For absolute positioning the home position must be known!

If an absolute positioning (positioning modes 1 ... 2 and 11 ... 16) is started although the home position is not known, an error message is output.

- In this case a programming error has occurred and the program flow must be reset.
- If the error only occurs in a sequence profile, the last valid deceleration is used to decelerate the drive to standstill.

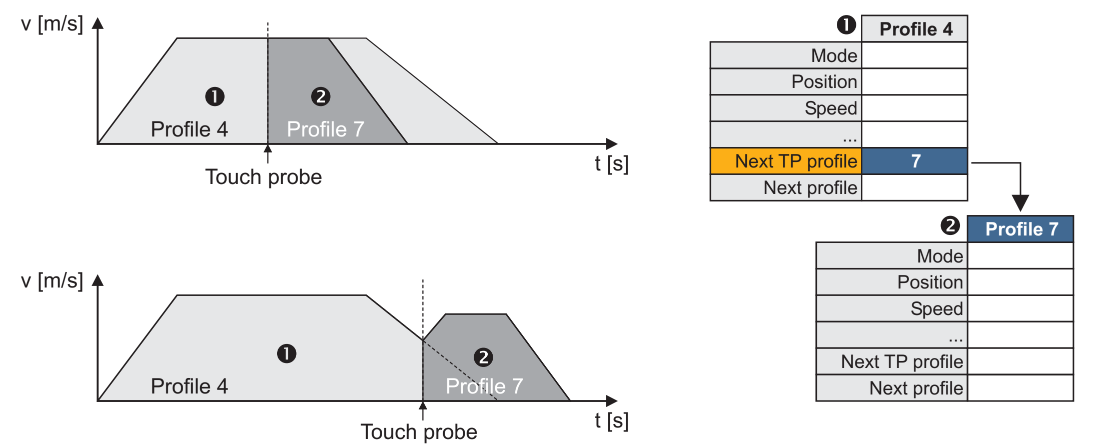
Positioning mode	
1	**Absolute** The axis travels to an absolute position. • Reference for the absolute position is zero position. • The home position must be known. • The traversing range is limited: –to 214748.3647 [unit] –by the internal display area (±2^{31} increments) • Not possible with "modulo" traversing range.
2	**Absolute TP** Like mode 1, but with profile change when a touch probe is detected. ▶ Touch probe positioning. (📖 397)
5	**Relative** The axis is traversed by a distance. • Reference for the distance is the target position of the profile executed before. • The feed per positioning is limited: –to 214748.3647 [unit] –by the internal display area (±2^{31} increments)
6	**Relative TP** Like mode 5, but with profile change when a touch probe is detected. ▶ Touch probe positioning. (📖 397)
7	**Speed** Continuous constant travel. • Only possible with "unlimited" and "limited" traversing range • This mode does not approach a defined position, but follows the profile. • Acceleration and deceleration are based on profile values. • The traversing direction is defined by the sign of the traversing speed. • Stopped through break signal.
8	**Speed TP** Like mode 7, but with profile change when a touch probe is detected. ▶ Touch probe positioning. (📖 397)
11	**Absolute CW** The axis travels in CW direction to an absolute position. • Only possible with "modulo" traversing range • Reference for the absolute position is zero position. • In this direction the zero position of the axis can be overtravelled.
12	**Absolute CW TP** Like mode 11, but with profile change when a touch probe is detected. ▶ Touch probe positioning. (📖 397)

Positioning mode	
13	**Absolute CCW** The axis travels in CCW direction to an absolute position. • Only possible with "modulo" traversing range • Reference for the absolute position is zero position. • In this direction the zero position of the axis can be overtravelled.
14	**Absolute CCW TP** Like mode 13, but with profile change when a touch probe is detected. ▸ Touch probe positioning. (📖 397)
15	**Absolute ShortestWay** The axis travels in best time to an absolute position. • Only possible with "modulo" traversing range • Reference for the absolute position is zero position. • The rotary table positioning is basically an absolute positioning with target positions between 0 and 360 angular degree [°]. In this mode the zero point can also be overtravelled if this is the shortest way to the target position: 
16	**Absolute ShortestWay TP** Like mode 15, but with profile change when a touch probe is detected. ▸ Touch probe positioning. (📖 397)

13.2.5.4 Touch probe positioning

In the touch probe positioning mode, the profile is first executed according to the Profile parameters set. If a touch probe is detected during the process, it is automatically changed to the profile specified in the profile parameter "Sequence profile with TP".

- Here the current actual position is stored at the time of the touch probe activation (by a touch probe sensor).
- In the following relative positioning process, the "residual path" to this stored position is travelled according to the increments.



❶ "Starting profile"
❷ "Residual path profile" that is defined in the profile parameter "Sequence profile with TP" of the starting profile.

[13-10] Examples for a "residual path positioning" after a touch probe is detected

- The profile parameters "TP window start" and "TP window end" the range in which touch probes are to be detected can be restricted.
  - If both profile parameters = "0", touch probe detection will be active for the whole profile/the whole traversing range.
- If no touch probe is detected and after the profile is executed, the positioning is continued with the profile defined in the profile parameter "Sequence profile without TP" (profile chaining).

Note!

If a profile is travelled with high speed and touch probe positioning is started, the residual path of which is smaller than the result from current speed and set deceleration ramp, the target position is "overtravelled".

- Normally a reversing movement occurs, i.e. the drive returns.
- If, for instance, a CCW rotation of the drive is forbidden by the safety module, the target cannot be approached since in this case the reversing movement is not permissible.

Further constellations are possible in connection with profile chaining in which an approach of the target position is impossible.

13.2.5.5 "Teach" function

The "Teach" function of the profile data management enables the teaching of positions, speeds, accelerations and S-ramp times.

The basic function "Manual jog" serves, for instance to approach the desired position manually and transmits it via "Teaching" to the variable table for positions.

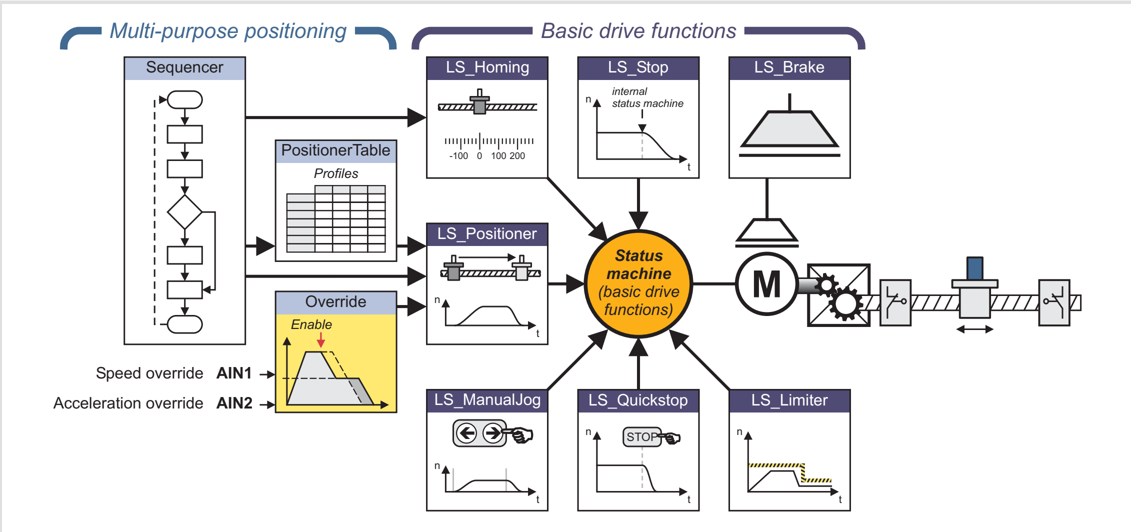
- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → L_PositionerTable

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	→ Teach position	C03020/1
C03016	→ Selection of table position for position	C03029/1
Zero position	→ Teach position	C03125
FALSE	→ Teach speed	C03020/2
C03017	→ Selection of table position for speed	C03029/2
Speed setpoint	→ Teach speed	C03024
FALSE	→ Teach acceleration	C03020/3
C03018	→ Selection of table position for acceleration	C03029/3
0	→ Teach acceleration	C03027
FALSE	→ Teach S-ramp time	C03020/4
C03019	→ Selection of table position for S-ramp time	C03029/4
0	→ Teach S-ramp time	C03028

Note!

After the function block editor is enabled the "Teach" function must be configured directly in the FB interconnection instead of via the parameters mentioned before!

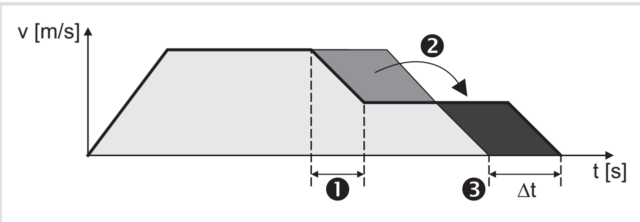
13.2.6 Speed/acceleration override



[13-11] Speed/acceleration override (schematic diagram)

"Override" is the change of profile parameters and their acceptance during the positioning process.

In this case the travel profile is adapted accordingly so that if the speed is changed during the positioning process ("speed override"), the specified target position is still positioned exactly.



❶ The speed is reduced during the positioning process.

❷ To reach the defined position, the missing surface must be "attached" to the profile.

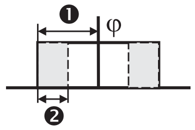
❸ When the speed is reduced the positioning process takes a longer time (Δt).

[13-12] Override (here: Speed override)

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → LS_Positioner

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
C03013	→ Activate override	C03185/5
AIn 1	→ Speed override	C03186/1
AIn 2	→ Acceleration override	C03186/2

13.2.7 Following error monitoring



❶ Switching threshold
❷ Hysteresis

[13-13] Following error monitoring

In the Lenze setting a two-stage following error monitoring is active.

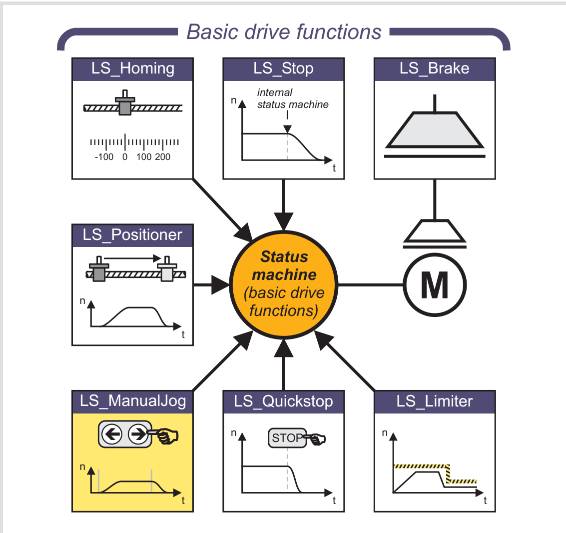
If the parameterisable switching threshold 1 is exceeded, a warning appears. If the higher-set switching threshold 2 is exceeded, a "warning locked" appears.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Following error*

Parameters		Lenze setting	
		Value	Unit
C03911	Switching threshold 1	100.0000	Unit
C03914	Switching threshold 2	200.0000	Unit
C03917	Hysteresis 1	0.0000	Unit
C03920	Hysteresis 2	0.0000	Unit
C05902/1	Error response - following error 1	Warning	
C05902/2	Error response - following error 2	Warning locked	

Control inputs of the function		Signal configuration
Lenze setting	**Control input**	**(Multiplexer parameters)**
TRUE	➞ Activate following error limit 1	C03058/1
TRUE	➞ Activate following error limit 2	C03058/2

13.2.8 Manual jog



[13-14] Basic function "Manual jog" (schematic diagram)

For the setting-up operation and "Teaching" of positions the basic function "Manual jog" is available.

Manual jog is controlled via parameters (e. g. via HMI).

Manual jog can always be carried out if the sequence control is not active abd no other basic function and no error status are active. The request of manual jog then is effected automatically with the travel commands.

▶ Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *Manual jog*

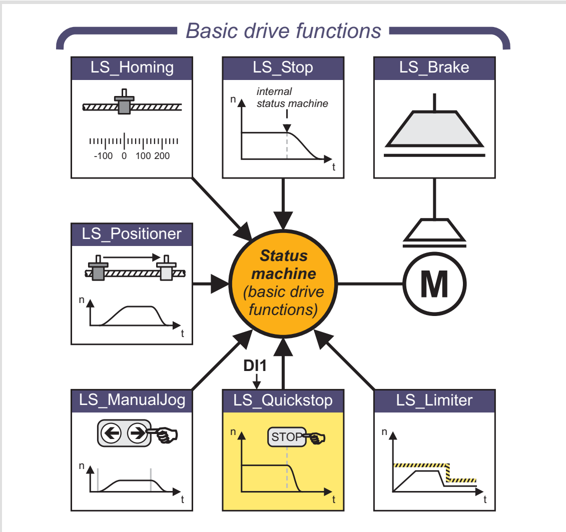
Parameters		Lenze setting	
		Value	Unit
C02620	Manual jog speed 1	360.0000	Unit/s
C02621	Manual jog speed 2	720.0000	Unit/s
C02622	Manual acceleration	360.0000	Unit/s^2
C02623	Manual deceleration	1440.0000	Unit/s^2
C02624	Inaccuracy time of manual traversing	0.100	s
C03007	Activate positive manual jog	FALSE	
C03008	Activate negative manual jog	FALSE	
C03009	Activate "Retract limit switch"	FALSE	

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
Automatic activation	➞ Request manual jog	C03155/1
C03007	➞ Activate positive manual jog	C03155/2
C03008	➞ Activate negative manual jog	C03155/3
FALSE	➞ Activate 2. speed	C03155/4
C03009	➞ Activate "Retract limit switch"	C03155/5

Tip!

Detailed information on the manual jog function can be found in chapter "Basic drive functions" ➞ subchapter "Manual jog". (📖 156)

13.2.9 Quick stop



[13-15] Basic function "Quick stop" (schematic diagram)

The basic function "Quick stop" brakes the drive to standstill within the deceleration time set for the quick stop function after a corresponding request independent of the setpoint selection. The sequence control is interrupted.

If the quick stop is deactivated, the drive remains in standstill until the sequence control is started again and takes over the drive control.

- The quick stop function can be activated as follows in the Lenze setting:
  - By setting the digital input DI1 to LOW level.
  - By a master control via the port *LPortControl*:
    By setting bit 2 of the bit-coded control word 1.
- Parameter setting: Tab **Application parameter** ➞ Dialog level *Overview* ➞ *All basic functions* ➞ *Quick stop*

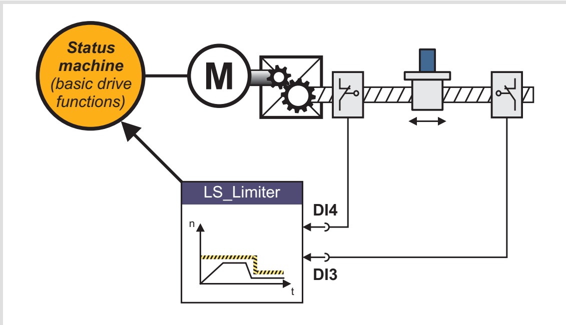
Parameters		Lenze setting	
		Value	Unit
C00105	Quick stop deceleration time	0.000	s
C00106	Quick stop S-ramp time	0.00	%
C00107	Reference for deceleration time "Quick stop"	Motor reference speed (C00011)	

Control inputs of the function		Signal configuration
Lenze setting	Control input	(Multiplexer parameters)
DigIn 1	➞ Activate quick stop 1	C03135/1
Control word 1 bit 02	➞ Activate quick stop 2	C03135/2
FALSE	➞ Activate quick stop 3	C03135/3

Tip!

Detailed information on quick stop can be found in chapter "Basic drive functions" ➞ subchapter "Quick stop". (📖 152)

13.2.10 Limiter



The basic function "Limiter" monitors the travel range limits via limit switches and parameterisable software limit positions and after an according request from the safety module can lead the drive into defined limit ranges. Furthermore higher-level limit values for travel profiles can be entered and activated.

[13-16] Basic function "Limiter" (schematic diagram)

- The software limit positions which can be set via parameters serve to limit the travel range by means of software and prevent that travel commands are executed which would cause an exit of the permissible travel range.
- Moreover, the travel range limits are monitored via limit switches via the digital inputs **DI3** and **DI4**.

Note!

The digital inputs **DI3** and **DI4** are configured fail-safe in C00114/3 and C00114/4 , i.e. a HIGH level is expected at both inputs in idle state.

- If the travel range limits should not be monitored (e.g. in case of a rotary axis), set the limit switch inputs of the basic function "Limiter" permanently to FALSE.

The parameterised limit values for travel profiles are not effective for the basic functions "Speed follower", "Torque follower" and "Position follower"!

- For the exceeding of the limit values an error response can be set.

- Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Limiter*

Parameters		Lenze setting	
		Value	Unit
Limit values			
C02707	Permissible direction of rotation	Positive and negative	
C02700	Software limit positions are active	Deactivated	
C02701/1	Positive software limit position	0.0000	Unit
C02701/2	Negative software limit position	0.0000	Unit
Only for homing, positioning and manual jog			
C02702	Limitations effective	Deactivated	
C02703	Max. speed	3600.0000	Unit/s
C02705	Max. acceleration	3600.0000	Unit/s^2
C02706	Min. S-ramp time	100	ms

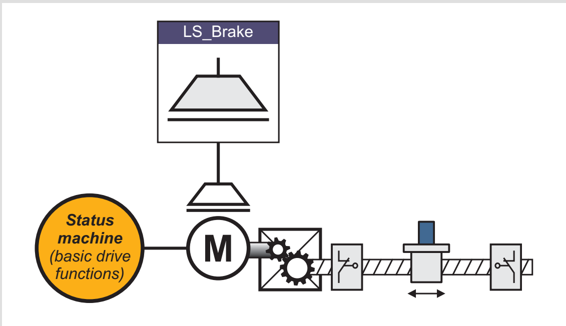
Parameters		Lenze setting Value	Unit
For manual jog only			
C02713	Max. path -manual jog	360.0000	Unit
Limited speed 1 ... 4 (only for homing, positioning, and manual jog)			
C02708/1	Limited speed 1	3600.0000	Unit/s
C02710/1	Delay lim. speed 1	0.0100	Unit/s^2
C02711/1	S-ramp time lim. speed 1	100	ms
C02708/2	Limited speed 2	7200.0000	Unit/s
C02710/2	Delay lim. speed 2	0.0100	Unit/s^2
C02711/2	S-ramp time lim. speed 2	100	ms
C02708/3	Limited speed 3	14400.0000	Unit/s
C02710/3	Delay lim. speed 3	0.0100	Unit/s^2
C02711/3	S-ramp time lim. speed 3	100	ms
C02708/4	Limited speed 4	28800.0000	Unit/s
C02710/4	Delay lim. speed 4	0.0100	Unit/s^2
C02711/4	S-ramp time lim. speed 4	100	ms

Control inputs of the function Lenze setting	 Control input	Signal configuration (Multiplexer parameters)
DigIn 3	➞ Positive limit switch	C03150/1
DigIn 4	➞ Negative limit switch	C03150/2

Tip!

Detailed information on the limiter function can be found in chapter "Basic drive functions" ➞ subchapter "Limiter". (📖 200)

13.2.11 Brake control



[13-17] Basic function "Brake control" (schematic diagram)

The basic function "Brake control" serves to the wear free control and monitoring of a holding brake.

In the simplest case, an optionally available brake module is used.

Alternatively the holding brake can also be controlled and monitored via the digital inputs/outputs.

Note!

In the Lenze setting the brake control is switched off to reach a safe status after mains connection.

If the automatic operation (operating mode 2 or 12) is selected in C02580, the brake is controlled automatically, i.e. if the multi-purpose positioning or another basic function is activated which causes the drive to traverse, the brake is opened automatically and the operation is enabled.

Tip!

Detailed information on brake control can be found in chapter "Basic drive functions" ➜ subchapter "Brake control". (📖 211)

▶ Parameter setting: Tab **Application parameter** → Dialog level *Overview* → *Brake control*

Parameters		Lenze setting Value	Unit
C02580	Operating mode - brake	Brake control off	
C02581	Brake activation threshold	50	rpm
C02582	Brake resp. to pulse inhibit	Activate the brake immediately	
C02583	Status input monitoring	Not active	
C02585	Brake control polarity	Not inverted	
C02586	Starting torque 1	0.00	Nm
C02587	Starting torque 2	0.00	Nm
C02588	Source of starting torque	Starting torque 1/2	
C02589	Brake closing time	100	ms
C02590	Brake opening time	100	ms
C02591	Waiting time - status monit.	100	ms
C02593	Waiting time - brake active.	0.000	s
C02594	Test torque	0.00	Nm
C02595	Permissible angle of rotation	5	°
C02596	Grinding speed	100	rpm
C02597	Accel./decel. time - grinding	1.000	s
C02598	Grinding ON time	0.5	s
C02599	Grinding OFF time	0.5	s

Control/setpoint inputs of the function		Signal configuration
Lenze setting	**Control/setpoint input**	**(Multiplexer parameters)**
FALSE	→ Open brake (release)	C03165/1
FALSE	→ Activate starting torque 2	C03165/2
FALSE	→ Brake status signal	C03165/3
FALSE	→ Activate brake test	C03165/4
FALSE	→ Grind brake	C03165/5
0 %	→ Additional torque	C03166

13.2.12 Signal configuration of drive and motor interface

If required, the preset signal configuration of the control and setpoint inputs of the drive and motor interface can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

Drive interface

Signal (Lenze setting)	Control input	Signal configuration
FALSE	→ Set controller inhibit	C03130/1
DigIn 5	→ Reset error 1	C03130/4
FALSE	→ Reset error 2	C03130/5
FALSE	→ Reset error 3	C03130/6
FALSE	→ Set error	C03130/2
FALSE	→ Switch on drive	C03130/3

Motor interface

Signal (Lenze setting)	Setpoint input	Signal configuration
100 %	→ Position controller adaption	C03141/1
100 %	→ Phase controller adaption	C03141/2
100 %	→ Adaptation of speed controller	C03141/3
100 %	→ Upper torque limit value	C03141/4
-100 %	→ Lower torque limit value	C03141/5
100 %	→ Flux setpoint	C03141/6

13.2.13 Signal configuration of the output ports

If required, the preset signal configuration of the output ports can be easily reconfigured per parameter setting of the assigned multiplexer parameters.

"LPortAxisOut1" output port

The output port **LPortAxisOut1** is intended for the connection with a following axis.

Signal (Lenze setting)	Output port	Signal configuration
Axis status word • The bits are assigned as in case of status word 1/2. • Application-specific signals can be supplemented.		
Drive ready	→ Axis status word bit 00	C03120/1
FALSE	→ Axis status word bit 01	C03120/2
Operation enabled	→ Axis status word bit 02	C03120/3
Error is active.	→ Axis status word bit 03	C03120/4
FALSE	→ Axis status word bit 04	C03120/5
Quick stop active	→ Axis status word bit 05	C03120/6
Drive is ready to start	→ Axis status word bit 06	C03120/7
Warning active	→ Axis status word bit 07	C03120/8
FALSE	→ Axis status word bit 08	C03120/9
FALSE	→ Axis status word bit 09	C03120/10
FALSE	→ Axis status word bit 10	C03120/11
Motor control limited	→ Axis status word bit 11	C03120/12
FALSE	→ Axis status word bit 12	C03120/13
FALSE	→ Axis status word bit 13	C03120/14
FALSE	→ Axis status word bit 14	C03120/15
FALSE	→ Axis status word bit 15	C03120/16
Setpoints for horizontal communication		
Motor torque	→ Axis-Port Out 1	C03124/1
Motor speed	→ Axis-Port Out 2	C03124/2

Output port "LPortStatus1"

The output port **LPortStatus1** is intended for the connection with a higher-level control.

Signal (Lenze setting)	Output port	Signal configuration
Status word 1		
Drive ready	→ Status word 1 bit 00	C03121/1
FALSE	→ Status word 1 bit 01	C03121/2
Operation enabled	→ Status word 1 bit 02	C03121/3
Error is active.	→ Status word 1 bit 03	C03121/4
FALSE	→ Status word 1 bit 04	C03121/5
Quick stop active	→ Status word 1 bit 05	C03121/6
Drive is ready to start	→ Status word 1 bit 06	C03121/7
Warning active	→ Status word 1 bit 07	C03121/8
FALSE	→ Status word 1 bit 08	C03121/9
FALSE	→ Status word 1 bit 09	C03121/10
FALSE	→ Status word 1 bit 10	C03121/11
Motor control limited	→ Status word 1 bit 11	C03121/12
FALSE	→ Status word 1 bit 12	C03121/13
FALSE	→ Status word 1 bit 13	C03121/14
FALSE	→ Status word 1 bit 14	C03121/15
FALSE	→ Status word 1 bit 15	C03121/16

Output port "LPortStatus2"

Signal (Lenze setting)	Output port	Signal configuration
Status word 2		
FALSE	→ Status word 2 bit 00	C03122/1
FALSE	→ Status word 2 bit 01	C03122/2
FALSE	→ Status word 2 bit 02	C03122/3
FALSE	→ Status word 2 bit 03	C03122/4
FALSE	→ Status word 2 bit 04	C03122/5
FALSE	→ Status word 2 bit 05	C03122/6
FALSE	→ Status word 2 bit 06	C03122/7
FALSE	→ Status word 2 bit 07	C03122/8
FALSE	→ Status word 2 bit 08	C03122/9
FALSE	→ Status word 2 bit 09	C03122/10
FALSE	→ Status word 2 bit 10	C03122/11
FALSE	→ Status word 2 bit 11	C03122/12
FALSE	→ Status word 2 bit 12	C03122/13
FALSE	→ Status word 2 bit 13	C03122/14
FALSE	→ Status word 2 bit 14	C03122/15
FALSE	→ Status word 2 bit 15	C03122/16

13.2.14 Application error messages

For the output of application-specific error messages, the FB instances *ApplicationError1* and *ApplicationError2* of the function block **L_DevApplErr** are available in the network.

- Via the boolean inputs up to 16 different application error messages with parameterisable module ID, error ID and error response can be released by the application.

Error message		Error-ID	Error response
FB instance "ApplicationError1"			
1	Following error limit 1	8001	Warning
2	Following error limit 2	8002	Warning locked
3	Positioner: Home position is not known	8003	Warning
4	Positioner: Cycle is not known	8004	Warning
5	Positioner: Wrong positioning mode	8005	Warning
6	Positioner: Invalid change of the positioning mode	8006	Warning
7	Positioner: Profile data is not plausible or faulty	8007	Warning
8	Positioner: Error in profile generation	8008	Warning
FB instance "ApplicationError2"			
1	Free fault message 1	8011	Information
2	Free fault message 2	8012	Information
3	PositionerTable: Invalid axis data structure	8013	Warning
4	PositionerTable: Invalid profile no.	8014	Information
5	PositionerTable: Invalid table no.	8015	Warning
6	Watch-Dog	8016	Quick stop by trouble
7	Sequencer: Error due to variable branch	8017	Warning
8	Sequencer: Pause	8018	Information

- Parameter setting: Tab **All parameters**

Parameters		Lenze setting
FB instance "ApplicationError1"		
C05900	Function block ID	999
C05901/1...8	Error ID 1 ... 8	See table above
C05902/1...8	Error response 1 ... 8	See table above
FB instance "ApplicationError2"		
C05903	Function block ID	998
C05904/1...8	Error ID 1 ... 8	See table above
C05905/1...8	Error response 1 ... 8	See table above

Reset of error message

In the Lenze setting the digital input DI5 for resetting (acknowledging) an error message is connected to the input *DI_bResetError1* of the drive interface.

13.3 TA "Table positioning"

The technology application "table positioning" enables the drive to execute parameterisable travel profiles. The sequence is controlled by a superimposed control (e.g. PLC).

Functions

- Control of the program flow via predefined ports
- Positioning in different positioning modes
  - Point-to-point positioning
  - Touch probe positioning (residual path positioning)
  - Profile chaining with velocity changeover (overchange)
- Homing in different homing modes
- Profile data management
  - Support of S profiles (jerk limitation)
  - Separate setting for acceleration and deceleration
  - "Teach" function
- Speed-/acceleration override
- Following error monitoring
- Support of absolute value encoders
- Support of the basic drive functions "Manual jog" and "Quick stop"
- Monitoring of travel range limits with the basic drive function "Limiter"
- Optional control of a holding brake with the basic drive function "Brake control"

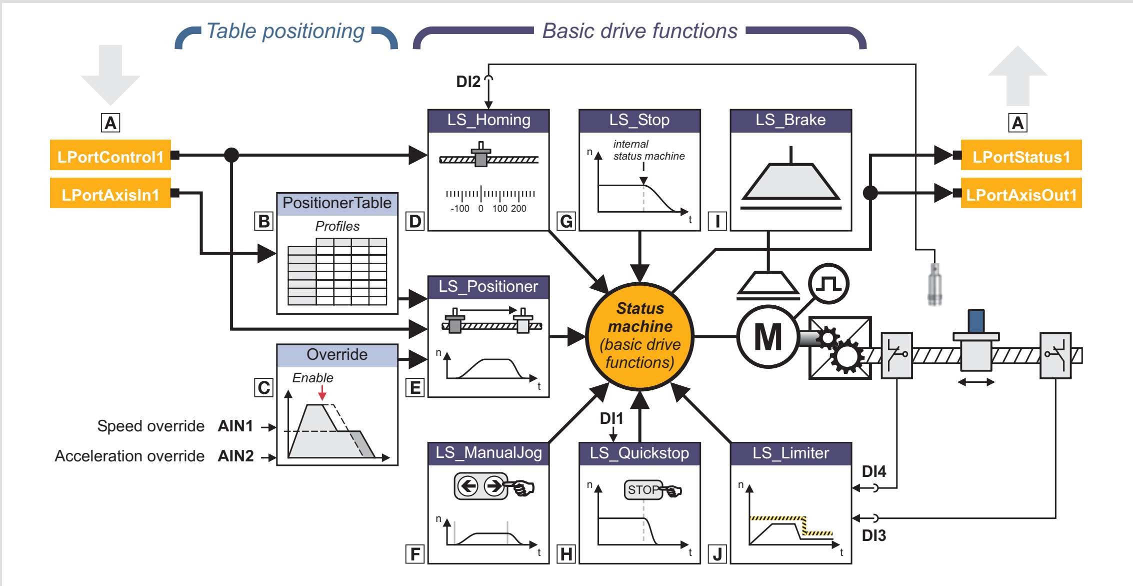
Note!

With the exception of the sequence table, the functionality of the table positioning is identical to the multi-purpose positioning.

The different functions are described in the previous chapter on TA "Multi-purpose positioning". (📖 371)

13.3.1 Basic signal flow

The functional core of the table positioning is the profile data management which transmits the required profile data to the basic drive function "Positioning". The true sequence control is carried out by a master control (e.g. PLC) which communicates with the application via predefined ports.



[13-18] Signal flow of the TA "Table positioning" (schematic diagram)

Table positioning

A Predefined ports for the communication with a master control

B Profile data management

C Speed/acceleration override

Basic drive functions

D Homing

E Positioning

F Manual jog

G Stop

H Quick stop

I Brake control (optional)

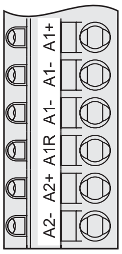
J Limiter (optional)

13.3.2 Assignment of the I/O terminals

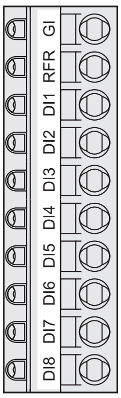
13.3.2.1 Setpoint and control signals

The following tables contain the Lenze assignment of the analog and digital inputs for the technology application "Table positioning".

Analog inputs

Terminal X3		Signal (Lenze setting)
	**AI1-** **AI1+**	Selection for speed override ▶ Speed/acceleration override (📖 399)
	AI2- **AI2+**	Selection for acceleration override ▶ Speed/acceleration override (📖 399)
▶ I/O terminals ▶ Analog inputs (📖 117)		

Digital inputs

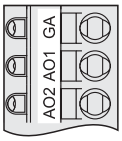
Terminal X5		Signal (Lenze setting)
	**DI1**	Quick stop • If DI1 is set to LOW level, the drive is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. • If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time. ▶ Quick stop (📖 402)
	DI2	Connection of reference switch/touch probe sensor ▶ Action type "Homing" (📖 382)
	DI3 **DI4**	Connection of travel range limit switch positive/negative for basic function "Limiter". (📖 403) • The inputs respond to the FALSE state (fail-safe).
	DI5	Reset error • By means of a LOW-HIGH edge an existing error status can be reset if the cause of the fault is removed.
	DI6	-
	DI7	-
	DI8	-
▶ I/O terminals ▶ Digital inputs (📖 123)		

13.3.2.2 Actual value and status signals

The following tables contain the Lenze assignment of the analog and digital outputs for the technology application "Table positioning".

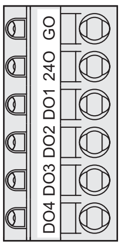
- The default signal configuration if required can be easily changed by parameterising the multiplexer parameters assigned.

Analog outputs

Terminal X3		Signal (Lenze setting)	Signal configuration
	**AO1**	Scaled following error	C03110/1
	AO2	Motor torque (setpoint) • Scaling: ±10 V ≡ Motor reference torque (C00057/2)	C03110/2

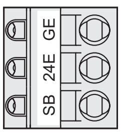
▸ I/O terminals ▸ Analog outputs (📖 120)

Digital outputs

Terminal X4		Signal (Lenze setting)	Signal configuration
	**DO1**	Status "Drive ready" • This operating state is active if the controller is enabled by setting the digital input RFR to HIGH level and no error has occurred.	C03100/1
	DO2	-	C03100/2
	DO3	Status "Limitation active" • At the moment a setpoint is limited or a software or hardware limit switch has been reached.	C03100/3
	DO4	Status "Error active acknowledgement is required" • Monitoring with the error response "Error" or "Quick stop by trouble" has been activated, and the controller is in the device state "Error active" or "Quick stop by trouble active".	C03100/4

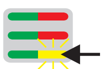
▸ I/O terminals ▸ Digital outputs (📖 125)

State bus

Terminal X2		Signal (Lenze setting)	Signal configuration
	**SB**	Status "Error active acknowledgement is required" • Monitoring with the error response "Error" or "Quick stop by trouble" has been activated, and the controller is in the device state "Error active" or "Quick stop by trouble active". • The state bus is put in the "error" status.	C03100/5

▸ I/O terminals ▸ Monitoring function "State bus" (📖 127)

Display elements

User LED	Signal (Lenze setting)	Signal configuration
	Status "Positioning enabled"	C03100/6

▸ Drive interface ▸ LED status displays (📖 34)

13.3.3 Control of the program flow via predefined ports

For a sequence control by a higher-level control (e.g. PLC) the application is provided with predefined ports the signals of which are linked with the setpoint and control inputs of the application via multiplexer parameters.

Input port "LPortAxisIn1" for control and setpoint signals

Element variable/data type	Information/possible settings
nIn1 INT	Profile number (1 .... 100) of the profile of the profile data management to be executed

Input port "LPortControl1" for control signals

The input port **LPortControl1** is intended for the connection with a master control.

Element variable/data type		Information/possible settings
LPortControl1 WORD		Control word (bit coded) • Bits which are not listed are not assigned with a function.
	Bit 3	Activate quick stop • The is decelerated to standstill within the deceleration time set for the quick stop function independent of the setpoint selection. • If the quick stop function is deactivated, the drive is led to the selected setpoint again via the set acceleration time.
	Bit 7	Reset error • An existing error status is reset if the cause of the fault is removed.
	Bit 11	Requesting control via the basic function "Positioning" • If no other basic function is active, it is changed to the "Positioning" function state and positioning can be executed via the control inputs. • If bit 11 is reset, an active positioning is stopped, i.e. it is changed from the active function state "Positioning" to the basic function " Standstill" via the function state "Stopping".
	Bit 12	Start positioning/restart • The profile with the profile number defined via *nIn2* is executed. • During an active positioning process, another profile can be defined via *nIn2* which is executed after restart (renewed state change of bit 12 from "0" to "1").
	Bit 14	Continuing an interrupted positioning process • The positioning process interrupted before is completed. • Distance already covered in a relative positioning process will be considered.
	Bit 15	Request control via the basic function "Homing" and start reference search in the selected homing mode (C02640).

See also: Signal configuration of the output ports (📖 408)

14 Oscilloscope

The integrated oscilloscope function of the 9400 High Line controller can be used as support for commissioning, maintenance and troubleshooting.

Typical applications

- Graphical representation of any 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
- Documentation of production quality in the context of product liability and quality assurance

Special features

- Recording and saving measured values in the controller
- Measuring on eight independent channels at the same time
- Measuring fast and slow signals by adjustable sample rate
- Triggering on channel, variable or error message
- Detecting measured values before and after a trigger event (pre-/post-trigger)
- Graphical representation and evaluation of measured values on a PC
- Cursor and zoom function for the measurement analysis
- Saving & loading of oscilloscope configurations
- Exporting measured values via the clipboard for further processing

14.1 Technical data

9400 HighLine	
Memory depth	Max. 16384 measured values, depending on the number of channels and the size of the variables to be recorded.
Memory capacity	32768 bytes
Data width of a channel	1 ... 4 bytes, corresponding to the size of the variables to be recorded
Number of channels	1 ... 8
Trigger level	Corresponding to the value range of the variable to be triggered
Trigger selection	Immediate triggering, rising/falling edge, signal change
Trigger delay	-100 % ... +400 %
Trigger source	Channels 1 ... 8, any variable or error message
Max. time base	8 channels 32 bits each ≡ 26 hours
Max. recording time	8 channels 32 bits each ≡ 10 days

14.2 Function description

With an online connection to the controller, use the oscilloscope user interface of the »Engineer« to set the trigger condition and the sample rate and select the variables to be recorded.

When the measurement is started, the set parameters are transferred to the controller and checked. If invalid settings are found, the oscilloscope sends an error. Otherwise, the measurement is started.

With an online connection, the measured controller data are transferred to the »Engineer« and graphically represented on the oscilloscope user interface as soon as the measurement has been completed.

Recording variable values

The operating system scans the oscilloscope in fixed 1 ms-cycles, i.e. the oscilloscope can record variable values with a sample rate of max. 1 kHz.

Recording system variable values of the internal motor control

Unlike the variables declared in the application, the system variables of the internal motor control (MCTRL) can also be recorded with a sample rate higher than 1 kHz.

Note!

In the servo operating modes, recordings with a time-based resolution of 31.25 µs and 125 µs are not possible!

Recording I/O variable values referring to a task

When selecting the variables to be measured, it is possible to indicate a task reference for the variables. If the behaviour of a certain task is to be examined, you can indicate the task reference to exactly record the values valid for the task run-time.

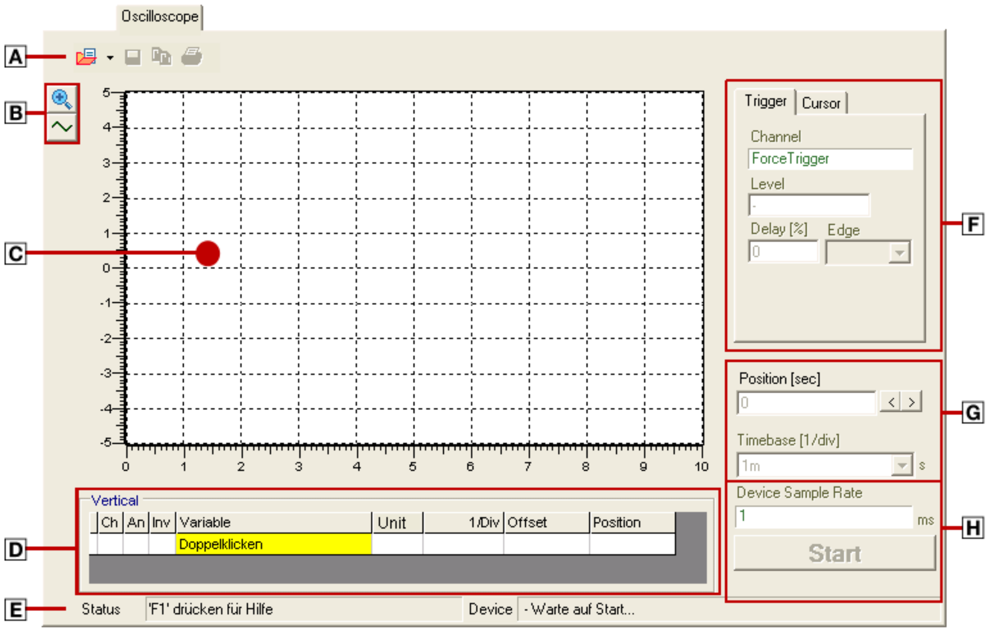
- The variable values are recorded during the process output image generation of the task.

14.3 User interface

How to go to the oscilloscope user interface:

1. Go to *Project view* and select the 9400 HighLine controller.
2. Select the **Oscilloscope** tab from the *Workspace*.

The oscilloscope user interface contains the following control and function elements:



A Oscilloscope toolbar	D Vertical settings	F Trigger/cursor settings
B Oscilloscope function bar	E Status bar	G Horizontal settings
C Oscillograph		H Recording settings

14.3.1 Oscilloscope toolbar

Icon	Function
	Loading/importing a data record (📖 428)
	Saving/exporting a data record (📖 427)
	Copying data record to clipboard (📖 430)
	Print oscillogram

14.3.2 Oscilloscope function bar

Icon	Function
	Activate zoom function ▸ Adjusting the representation (📖 424)
	Activate automatic scaling function ▸ Adjusting the representation (📖 424)
	Delete offline data record

14.3.3 Oscillograph

The oscillograph is used to visualise data records.

- Use the zoom and the automatic scaling function to adjust the representation.
- 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.

14.3.4 Vertical settings

Use the **Vertical** list field to configure the variables to be recorded.

- Simply click into a field to change the corresponding setting.

Column	Designation	Meaning
1	-	Curve colour for representation in the oscillograph
2	Ch	Channel number
3	On	On/off
4	Inv	Inversion on/off
5	Variable	Selection of variable to be recorded
6	Unit	Scaling
7	1/div	Vertical scale factor
8	Offset	Offset value • The offset value depends on the scale factor and is designated by a dotted line in curve colour at the left edge of the oscillograph.
9	Position	Position value • The position value is independent of the scale factor and designated by a line at the left edge of the oscillograph.

14.3.5 Status bar

The status messages are displayed in the status bar.

14.3.6 Trigger/cursor settings

Trigger

Use the **Trigger** tab to configure the trigger condition.

▸ Selecting the trigger condition (📖 422)

Cursor

If the **Cursor** tab is on top, you can use a vertical measuring line to read individual measured values of a selectable channel in the oscilloscope. Using a second vertical measuring line, it is possible to indicate the difference between two measured values. ▸ Reading individual measured values (📖 426)

Group box	Meaning
Channel	Channel selection
Value	Display of the value measured at the position of the active measuring line
Difference	Display of the difference between the values measured at the two measuring lines

14.3.7 Horizontal settings

Use the **Horizontal** group box to select the time base and the horizontal position. ▸ Selecting the recording time/sample rate (📖 422)

Input field	Meaning
Time base [1/Div]	Selection of time base • The current time base setting multiplied by ten results in the recording time. • Change the time base to stretch or compress measurements that have already been completed.
Position	Selection of the horizontal display position • The position value can be directly entered into the input field or selected by using the arrow buttons. • When the arrow buttons are used and the **<Ctrl>** key is pressed, you can increase the step width to accelerate the shift.

14.3.8 Recording settings

Use the **Recording** group box to select the sample rate and start recording.

▶ Since the measured data memory has a limited capacity, a compromise must be found between the sample rate and the recording time that results from the time base setting. ▸ Selecting the recording time/sample rate (📖 422)

14.4 Operation

This chapter describes step-by-step how to record the signal characteristics of controller variables and represent, analyse, document and process them in the oscilloscope.

Note!

In the oscilloscope, settings can only be selected and recording can only be started, when the controller is connected online.

14.4.1 Selecting the variables to be recorded

The oscilloscope supports up to eight channels, i.e. max. eight variables can be recorded in a data record. Use the **Vertical** group box to select the variables.

How to select a variable for recording:

1. Go to the **Variable** column in the **Vertical** group box and double-click in the yellow field to open the *Select variable* dialog box.
   - The dialog box lists all variables declared in the PLC program of the controller and the system variables of the internal motor (MCTRL).
2. Select the variable to be recorded from the list field.
3. Click **OK**.
   - The dialog box is closed and the selection is accepted.
4. Repeat steps 1 ... 3 to select up to seven more variables to be recorded.

Of course, it is any time possible to change or delete a selection later.

How to change a selection:

1. Go to the **Vertical** group box and double-click the variable to be changed in the **Variable** 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** group box and double-click the variable to be removed in the **Variable** column.
2. Click **Delete channel** in the *Select variable* dialog box.
   - The dialog box is closed and the selection is deleted.

14.4.2 Selecting the recording time/sample rate

How to select the recording time and the sample rate:

1. Go to the **Horizontal** group box and 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 controller has a limited capacity, usually a comprise is made between sample rate and recording time.
2. Enter the desired sample rate [ms] in the **Record** group box in the **Device sample rate** input field.

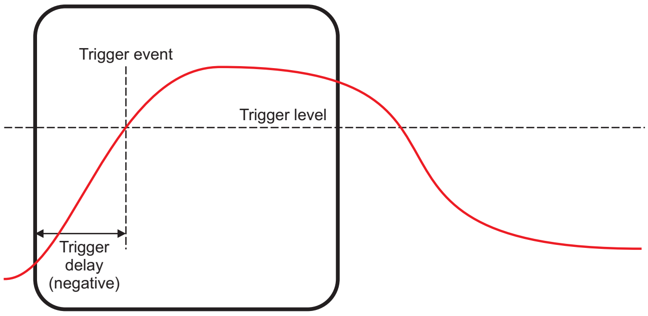
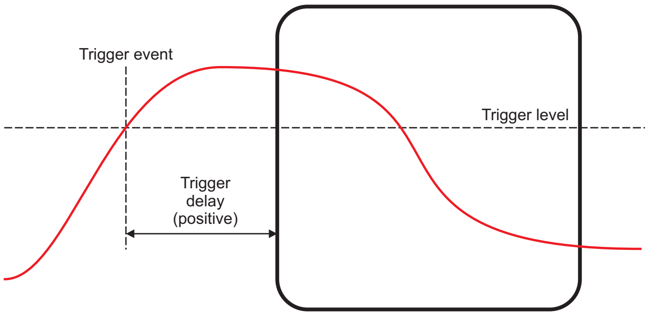
14.4.3 Selecting the trigger condition

With the trigger condition, you can select when recording is to be started in the controller.

▶ The oscilloscope provides different trigger conditions that can be used to control measured value recording.

Select the corresponding settings in the **Trigger** tab to define the trigger condition.

Setting	Function
Source	Selection of trigger source:
Variable	The oscilloscope triggers on any variable of the PLC program. • Unlike triggering on a channel, triggering on a variable requires no recording channel.
Channel	The oscilloscope triggers on a channel configured in the **Vertical** table.
System event	Triggering is started on occurrence of a selectable controller event (e.g. TRIP, message or warning). • Select a negative trigger delay to record signals prior to occurrence of the event.
Force trigger	No trigger condition, recording starts immediately after the start.
Trigger value	Value from which on triggering is activated. • The trigger level is not effective for triggering on Boolean variables.

Setting	Function
Delay	Delay between recording and trigger event.
Pre-trigger	Select a negative delay time to detect signals **prior to** the trigger event.  • In the oscillograph, the trigger time is designated by a dotted line. • With 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	If the trigger source is a channel or a variable, you can choose between the following trigger modes:
Positive edge	For triggering on a BOOL variable: • Trigger activation requires a FALSE-TRUE transition. For triggering on a different variable: • For trigger activation, the selected trigger value must be exceeded.
Negative edge	For triggering on a BOOL variable: • Trigger activation requires a TRUE-FALSE transition. For triggering on a different variable: • For trigger activation, the selected trigger value must be fallen below.
Change	For triggering on a BOOL variable: • Trigger activation requires a status change. For triggering on a different variable: • For trigger activation, the current value must be different than the last value.

14.4.4 Starting recording

Click **Start** to start recording.

For obtaining a maximum sample rate when recording the variable values, the data is first stored in the measured data memory of the controller and then transferred as a data record to the PC.

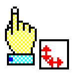
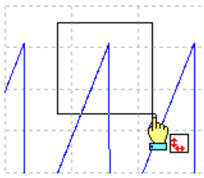
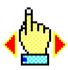
▶ The current recording status is displayed in the status bar.

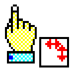
14.4.5 Adjusting the representation

After the variable values have been recorded and the online data record has been transferred to the PC, the data record is visualised in the oscillograph. If required, the representation can now be adjusted by using the zoom or the automatic scaling function.

Zoom function

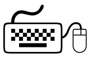
Go to the *oscilloscope function bar* and click the icon to activate the zoom function.

Zoom function	Procedure	
Zoom selection		Hold down the left mouse button and draw the oscilloscope section to be zoomed:  • The selection is shown with a frame. • When the left mouse button is released, the selection is zoomed in the oscilloscope.
Horizontal/vertical shift of selection		Hold down the left and right mouse button and move the mouse pointer on the horizontal scale to the left or right or on the vertical scale to the top or bottom to shift the selection accordingly. • With a three-button mouse, you can use the mouse button in the middle.
Horizontal stretching		Hold down the left mouse button and move the mouse pointer on the horizontal scale to the left to stretch the shown selection from the right edge. • Moving the mouse pointer in opposite direction continuously reduces the stretching.
		Hold down the right mouse button and move the mouse pointer on the horizontal scale to the right to stretch the shown selection from the left edge. • Moving the mouse pointer in opposite direction continuously reduces the stretching.

Zoom function	Procedure	
Vertical stretching		Hold down the left mouse button and move the mouse pointer on the vertical scale to the bottom to stretch the shown selection from the top. • Moving the mouse pointer in opposite direction continuously reduces the stretching.
		Hold down the right mouse button and move the mouse pointer on the vertical scale 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 oscillograph 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 oscillograph and reset the offset to "0".

 **How to carry out automatic scaling:**

1. Go to the *oscilloscope function bar* 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.

14.4.6 Reading individual measured values

In addition to the zoom and the 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.

▶ If the **Cursor** tab is on top, the cursor function is active and two movable vertical measuring lines are shown in the oscillograph.

How to use the cursor function:

1. Select the **Cursor** tab.
2. Select the channel for which individual measured values are to be indicated from the **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 indicated by a dotted 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.

14.5 Data records

If several data records are loaded in the oscilloscope at the same time, the data record to be displayed is selected via the list field **Data record**. There are three types of data records:

Online data record

The online data record is the only data record serving to establish a connection to the target system. When the online data record has established the connection completely, it can communicate with the target system.

▶ In the list field **Data record** the online data record is marked with a prefixed asterisk (*).

Offline data record

The offline data record is already stored in the project and loaded in the oscilloscope again, or imported from a file.

Merge data record

The merge data record is automatically available in the list field **Data record** if two or more data records are loaded in the oscilloscope at the same time.

▶ In the merge data record, several characteristics from the currently loaded data records can be laid on top of each other, e.g. to compare signal characteristics from different recordings. ▶ Overlay function (📖 429)

14.5.1 Saving/exporting a data record

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.

How to save the data record in the project:

1. Go to *Oscilloscope toolbar* and click .
   - The *Save data record* dialog box appears.
2. Enter a name in the **Name of the data record to be stored** input field.
3. Click **Filing in the project**.
   - The dialog box is closed and the current data record is filed in the project.

Note!

The data record is only saved if the entire project is saved!

How to export the data record to a file:

1. Go to *Oscilloscope toolbar* and click .
   - The *Save data record* dialog box appears.
2. Enter a name in the **Name of the data record to be stored** input field.
3. Click the **Export to file** button.
4. Specify the data record to be stored and the filing folder in the *Save as* dialog box.
5. Click **Save**.
   - The dialog box is closed and the current data record is saved.

14.5.2 Loading/importing a data record

Configurations/data records already stored can be loaded in the oscilloscope any time again, e.g. for the superposition function.

How to load a data record from the project:

1. Go to *Oscilloscope toolbar* and click .
   - The *Load data record* dialog box appears.
2. Select the data record to be loaded from the **Data record** list field.
3. Click **Open**.
   - The dialog box is closed and the selected data record is saved.
   - 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 record from a file:

1. Go to *Oscilloscope toolbar* and click .
   - The *Load data record* dialog box appears.
2. Click the **Import** button.
3. Select the file to be imported within the desktop environment from the *Open* dialog box.
4. Click **Open**.
   - The dialog box is closed and the selected data record 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.

14.5.3 Deleting data record in the project

How to delete a data record to be saved in the project:

1. Go to *Oscilloscope toolbar* and click .
   - The *Load data record* dialog box appears.
2. Click the data record to be deleted with the right mouse key in the **Data record** list field to open the *Context menu* for the data record.
3. Select the **Delete data record** in the *Context menu*.
4. Click **Abort** to close the dialog box again.

14.5.4 Overlay function

The overlay function serves to lay several characteristics from the currently loaded data records on top of each other, e.g. to compare signal characteristics from different recordings.

- If two or several data records are loaded in the oscilloscope, e.g. an online data record and a data record saved before in the project, a "merge" data record is available in the **Data record** list field.
- When the merge data record is selected, the desired characteristics can be selected from the loaded data records in the **Vertical channel settings** group field which are to be overlaid or compared.
- 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.

14.5.5 Copying data record to clipboard

For documentation purposes, it is possible to copy the measured data of a data record as a table or, alternatively, the oscilloscope user interface as a picture, to the clipboard for use in other programs.

How to copy measured data or a picture of the user interface to the clipboard:

1. Go to *Oscilloscope toolbar* and click .
   - The *Clipboard* dialog box appears.
2. Select **Curve points** if the measured data is to be copied to the clipboard as a table, or select **Screen shot** if the oscilloscope user interface is to be copied as a picture.
3. Click **OK**.
   - The dialog box is closed and the selected option is copied to the clipboard.

14.6 Variables of the motor control (oscilloscope signals)

The internal variables of the motor control listed in the following table can be recorded with the oscilloscope for diagnostic and documentation purposes.

Tip!

The exact position of a variable in the motor control can be obtained from the corresponding signal flow.

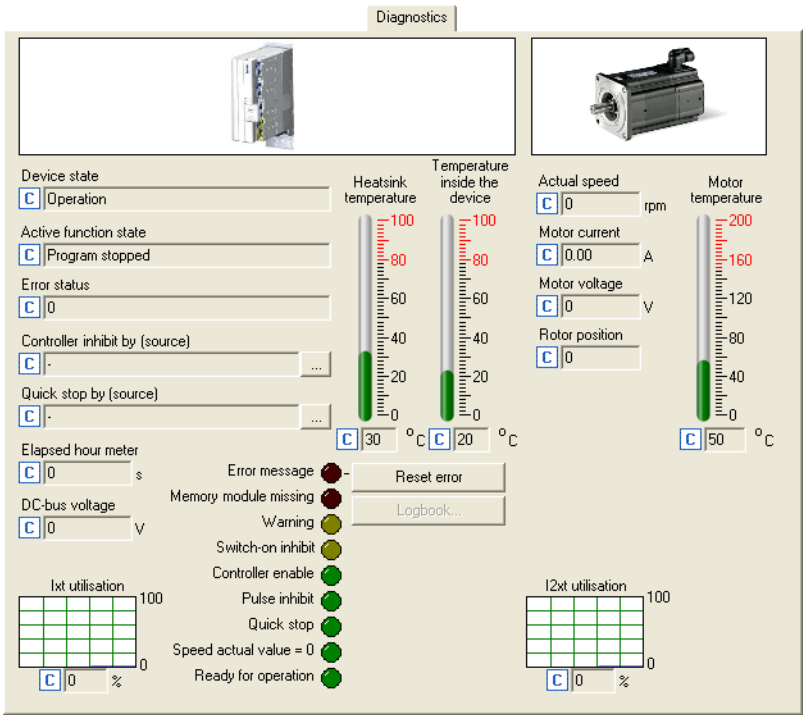
No.	Variable or the motor control	Meaning
▶ Signal flow - motor interface		
	Common.dnActualFlux	Actual flux value
	Common.dnFluxSet	Flux setpoint
	Current.dnActualCurrentPhaseU	Actual motor current (phase U)
	Current.dnActualCurrentPhaseV	Actual motor current (phase V)
	Current.dnActualCurrentPhaseW	Actual motor current (phase W)
	Current.dnActualDirectCurrent	Actual D current
	Current.dnActualQuadratureCurrent	Actual Q-current
	Current.dnDirectCurrentSet	D current setpoint
	Current.dnQuadratureCurrentSet	Q current setpoint
	Torque.dnActualMotorTorque	Actual torque
	Torque.dnFilteredTorqueSetpoint	Filtered torque setpoint
	Torque.dnInputNotchFilter1	Torque setpoint at the band-stop filter input 1
	Torque.dnInputNotchFilter2	Torque setpoint at the band-stop filter input 2
	Voltage.dnActualDCBusVoltage	Actual DC-bus voltage
	Voltage.dnActualMotorVoltage	Current motor voltage
	Voltage.dnDirectVoltage	D voltage
	Voltage.dnQuadratureVoltage	Q voltage
▶ Signal flow - encoder evaluation		
	Position.dnActualLoadPos	Actual position
	Position.dnActualMotorPos	Current motor position
	Speed.dnActualMotorSpeed	Current motor speed
▶ Signal flow - position follower		
	Position.dnActualLoadPos	Actual position
	Position.dnActualMotorPos	Current motor position
	Position.dnContouringError	Following error
	Position.dnPositionSetpoint	Position setpoint
	Speed.dnActualMotorSpeed	Current motor speed
	Speed.dnOutputPosCtrl	Output signal - phase controller
	Speed.dnSpeedSetpoint	Speed setpoint
	Torque.dnTorqueSetpoint	Torque setpoint
	Torque.dnTotalTorqueAdd	Additive torque precontrol value

No.	Variable or the motor control	Meaning
Signal flow - speed follower		
	Speed.dnActualMotorSpeed	Current motor speed
	Speed.dnSpeedSetpoint	Speed setpoint
	Speed.dnTotalSpeedAdd	Additive speed setpoint
	Torque.dnTorqueSetpoint	Torque setpoint
	Torque.dnTotalTorqueAdd	Additive torque precontrol value
Signal flow - torque follower		
	Speed.dnActualMotorSpeed	Current motor speed
	Speed.dnSpeedSetpoint	Speed setpoint

15 Diagnostics & error analysis

15.1 Drive diagnostics with the »Engineer«

With an online connection to the controller, you can use the »Engineer« to carry out a diagnostics for the connected controller and get a clear visualisation of important controller states:



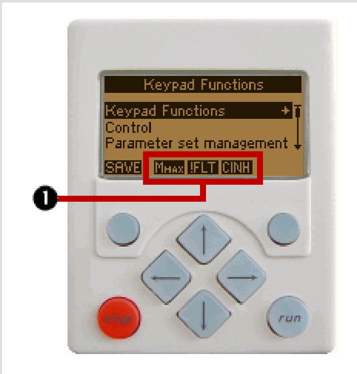
- ▶ Use the **Reset error** button to acknowledge an existing error message if the cause of the error has been eliminated.
- ▶ Use the **Logbook** button to display the logbook of the controller. For detailed information about the logbook, please see the chapter "Logbook". (📖 436)

How to carry out a drive diagnostics with the »Engineer«:

1. Select the 9400 HighLine controller to be diagnosed in the *Project view*.
2. Click the icon or select the command **Online→Go online** 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.

15.2 Drive diagnostics via keypad/bus system

Keypad display of the controller state



- When the keypad at the front of the controller is connected to the diagnostic interface X6, the status of the controller is displayed via different symbols on the LDC display in the area ❶.

Icon	Meaning	Note
RDY	Controller is ready for operation.	
RUN	Controller is enabled.	
STP	Application in the controller is stopped.	
QSP	Quick stop is active	
CINH	Controller is inhibited.	The power outputs are inhibited.
OFF	Controller is ready to start.	
Mmax	Speed controller 1 in the limitation.	The drive is torque-controlled.
Imax	Set current limit has been exceeded in motor or generator mode.	
IMP	Pulse inhibit is active	The power outputs are inhibited.
!SFLT	System fault is active	
!FLT	Fault is active	
!TRB	Trouble is active	
!TQSP	Quick stop by trouble is active	
WRN	Warning is active	

Display parameters

Via the parameters listed in the following tables current states and actual values of the controller can be queried 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.
- For a detailed parameter description, please see the chapter "Parameter reference". (📖 537)

Parameters	Display
C00183	Device state
C00168	Error number
C00051	Actual speed
C00052	Motor voltage

Parameters	Display
C00054	Motor current
C00057/1	Maximum torque
C00057/2	Torque at maximum current
C00059	Motor - number of pole pairs
C00060	Rotor position
C00061	Heatsink temperature
C00062	Temperature inside the controller
C00063	Motor temperature
C00064	Controller load (I x t) during the last 180 seconds
C00065	External. 24-V voltage
C00066	Thermal motor load (I^2xt)
C00068	Electrolytic capacitor temperature
C00069	CPU temperature
C00178	Time the controller was enabled (elapsed-hour meter)
C00179	Power-up time (power-on time meter)
C00186	ENP: detected motor type

Identification data

The parameters listed in the following table which are entered in the »Engineer« parameter list and in the keypad in the **Identification → Controller** category, serve to display the identification data of the controller:

Parameters	Display
C00099	Firmware version
C00200	Firmware product type
C00201	Firmware - compile date
C00203/1...9	HW product types
C00204/1...9	HW serial numbers
C00205/1...6	HW descriptions
C00206/1...6	HW manufacturing data
C00208/1...6	HW manufacturer
C00209/1...6	HW countries of origin
C00210/1...6	HW versions
C02113	Program name

15.3 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 (📖 443)
- Error messages generated by the application
- Controller enable
- Starting / stopping the application
- Loading/saving of parameter sets, loading of the Lenze setting
- Transmitting an application or firmware to the controller
- Connection/disconnection of the controller
- Formatting of the file system

Tip!

Use a parameterisable filter to exclude certain events from logbook entry. Filtering logbook entries (📖 437)

Information saved

For each event, the following information are saved in the logbook:

- Type of response (e.g. fault, warning or information) to the event
- Module that activated the event (e.g. MCTRL or TEMPCONTROL).
- Event
- Date/time (for memory module with real-time clock)
- Value of power-on time meter

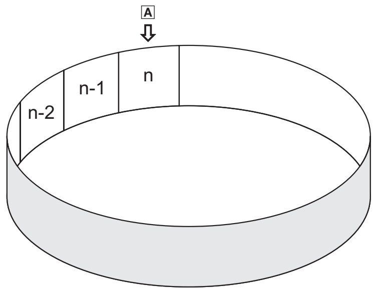
Memory depth

The number of possible logbook entries depends on the memory module used:

- MM1xx, MM2xx: 7 entries
- MM3xx, MM4xx: 439 entries

15.3.1 Function description

The structure of the logbook corresponds to a ring buffer structure:



A Current event

[15-1] Ring buffer structure

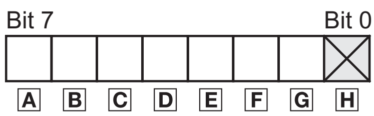
- As long as free logbook memory capacity is available, the entries will be saved at the next free memory location.
- If all memory locations are occupied, the oldest entries will be deleted to save new entries.

15.3.2 Filtering logbook entries

Before the logbook logs new entries in the ring buffer, the entries are filtered by a parameterisable filter.

This filter is used to exclude events with a certain error response (fault, warning, information, etc.) from entry into the logbook.

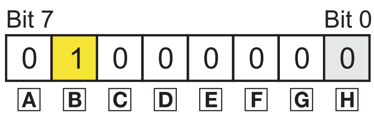
- The filter parameters are set under C00169 by means of a bit mask:



Meaning:
A System error
B Information
C Warning
D Warning locked
E Quick stop by trouble
F Trouble
G Fault
H Not assigned

[15-2] Bit mask for event-type filter

- Example: Bit 6 must be set to "1" to exclude all events with "Information" response from entry into the logbook:



Meaning:
A System error
B **Information**
C Warning
D Warning locked
E Quick stop by trouble
F Trouble
G Fault
H Not assigned

[15-3] Example: Bit mask for hiding events with "Information" response

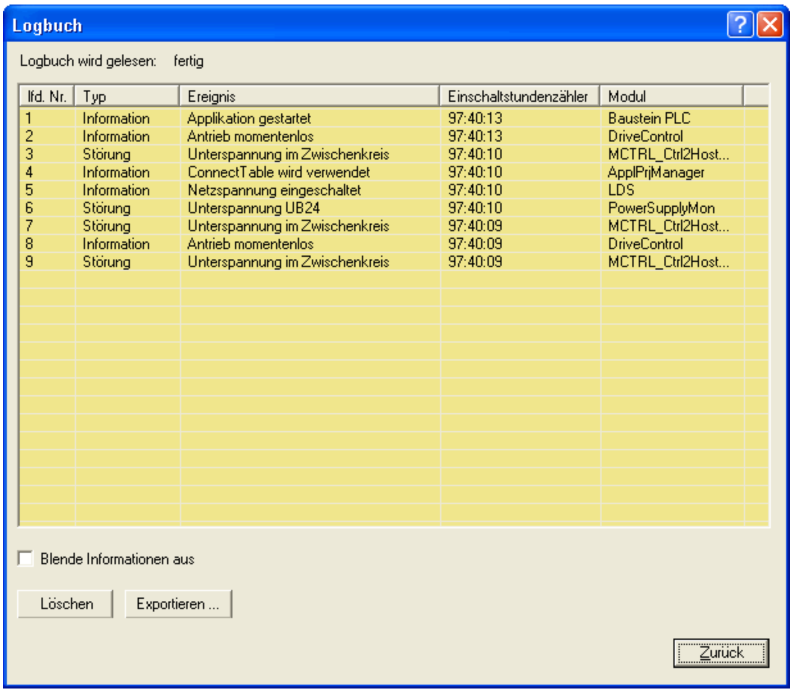
> **Note!**
>
> Events with the set "None" response are not entered into the logbook.

15.3.3 Reading logbook entries

With an online connection, the existing logbook entries can simply be displayed in the »Engineer«. Alternatively, the logbook entries can also be read via the corresponding parameters (e.g. using the keypad).

How to display logbook entries in the »Engineer«:

1. Go to the *Project view* and select the 9400 HighLine controller whose logbook entries are to be read.
2. Click the icon or select the command **Online→Go online** to build up an online connection with the controller.
3. Select the **Diagnostics** tab from the *Workspace*.
4. Click **Logbook**.
   - The *Logbook* dialog box appears:

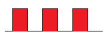
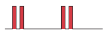
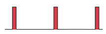


   - Click **Delete** to delete an entry from the logbook.
   - Click **Export** to export the entries from the logbook into a *.log file.
   - Activating the **Hide system messages** checkbox, hides all "Information" system messages in the logbook.
5. Click **Previous** to close the *Logbook* dialog box.

15.4 Monitoring

The controller includes different monitoring functions that 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 (quick stop by trouble, warning, fault, etc.) selected for the monitoring function will be activated,
  - the status of the internal device control changes according to the selected response, controller inhibit is set, and the "DRIVE ERROR" LED on the front of the controller goes on:

Response	Logbook entry	Display under C00168	Pulse inhibit	Controller inhibit	Acknowledgement required	LED "DRIVE ERROR"
None						OFF
Fault	☑	☑	☑	☑	☑	
Trouble	☑	☑	☑	☑ (after 0.5 s)		
Quick stop by trouble	☑	☑			☑	
Warning locked	☑	☑			☑	
Warning	☑	☑				
Information	☑					OFF
System error	☑	☑	☑	☑	Mains switching is required!	

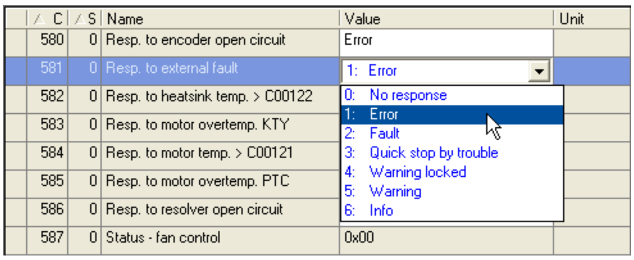
See also:

▸ LED status displays (📖 34)
▸ Device states (📖 45)

15.4.1 Setting the error response

When a monitoring function is addressed, the response set for this monitoring function (quick stop by trouble, warning, fault, etc.) will be activated.

- For many monitoring functions the response can be individually parameterised via parameters.



C	S	Name	Value	Unit
580	0	Resp. to encoder open circuit	Error	
581	0	Resp. to external fault	1: Error	
582	0	Resp. to heatsink temp. > C00122		
583	0	Resp. to motor overtemp. KTY		
584	0	Resp. to motor temp. > C00121		
585	0	Resp. to motor overtemp. PTC		
586	0	Resp. to resolver open circuit		
587	0	Status - fan control	0x00	

Tip!

When the response can be set for a monitoring function, the parameter for the setting and the preset response is listed in the description of the corresponding error message. ▶ Error list (📖 448)

Short overview of the parameters for setting error responses:

Parameters	Selection of the error response for:
C00573	Brake chopper overload
C00574	Overtemperature of brake resistor
C00579	Speed monitoring
C00580	Encoder - open circuit
C00581	External error
C00582	Heatsink temperature > C00122
C00583	Motor overtemperature - KTY
C00584	Motor temperature > C00121
C00585	Motor overtemperature - PTC
C00586	Resolver - open circuit
C00588	Failure of controller temperature sensor
C00589	CPU temperature > C00126
C00591	CAN RPDOx error
C00594	Failure of motor temperature sensor
C00595	CAN bus-off
C00597	Motor phase failure
C00598	Open circuit AIN1
C00600	DC bus overvoltage
C00601	Encoder communication error
C00604	Device overload
C00606	Motor overload
C00607	Maximum speed reached
C00610	Failure of heatsink fan
C00611	Failure of integral fan
C00612	CAN node-guarding error
C00613	CAN heartbeat error
C00614	CAN life guarding error
C00615	Impermissible device configuration
C00619	Maximum motor current
C00635	new firmware - standard device
C00636	New module in MXI1
C00637	New module in MXI2
C01501	Communication error with MXI1
C01502	Communication error with MXI2

Warning thresholds

Some of the monitoring functions are activated if a defined warning threshold (e.g. temperature) have been exceeded.

- The corresponding preset threshold values can be changed via the following parameters:

Parameters	Information
C00120	Motor overload protection (I^2xt)
C00121	Warning threshold - motor temperature
C00122	Warning threshold - heatsink temperature
C00123	Warning threshold - device utilisation
C00126	Warning threshold - CPU temperature
C00127	Warning threshold - motor overload
C00128	Thermal motor time constant
C00132	Max. temperature of brake resistor
C00174	Undervoltage (LU) threshold
C00185	Threshold - mains recovery recognition
C00576	Window - speed monitoring
C00596	Threshold of maximum speed reached
C00599	Threshold - motor phase failure
C00620	Max. motor current threshold

15.5 Maloperation of the drive

The motor does not rotate.

Cause	Remedy
DC-bus voltage is too low.	Check mains voltage.
Controller is inhibited.	Deactivate controller inhibit (can be set by several sources).
Holding brake is not released	Release holding brake.
Quick stop is active	Deactivate quick stop.
Setpoint = 0	Select setpoint.

With a positive speed setpoint selection, the motor rotates clockwise instead of counter-clockwise (when looking at the motor shaft).

Cause	Remedy
Feedback system is not connected in correct phase relation.	Connect feedback system in correct phase relation.

The maximum current (C00022) flows and the motor does not rotate according to the defined speed setpoint.

Cause	Remedy
Two motor phases are interchanged, i.e. an anti-clockwise rotating field is applied to the motor.	Proceed the following steps for verification: 1. Ensure that the motor shaft is not blocked and can rotate freely without damaging the system. 2. Activate "U rotation test mode" for the motor control (C00398 = "1"). – In this test mode a voltmeter is applied to the machine with the frequency set in C00399/1 and the amplitude from the linear characteristic of rated voltage and rated frequency. This corresponds to a clockwise rotating field. 3. Increase the frequency step by step for the test mode in C00399/1 until the motor shaft starts to rotate. – If the motor shaft does not rotate, check the electrical connection. 4. While the motor shaft is rotating check if it rotates clockwise when looking at the A end shield. If not, two motor phases are interchanged. 5. Additionally check if the actual speed value displayed in C00051 is positive and corresponds to the defined frequency in consideration of the number of pole pairs of the machine (C00059). If not, the connection and the parameter setting of the feedback system must be checked. 6. Deactivate the test mode for the motor control again (C00398 = "0").

15.6 Error messages of the operating system

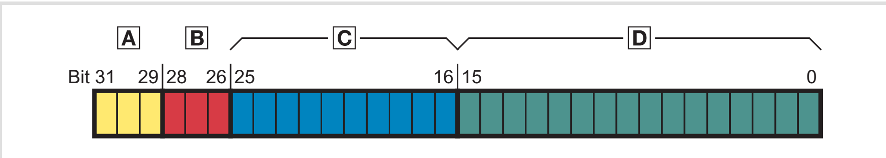
This chapter describes all error messages of the controller operating system and possible causes & remedies.

Tip!

All error messages are saved in chronological order in the logbook. For detailed information about the logbook, please see the chapter "Diagnostics & error analysis". Logbook (436)

15.6.1 Format of the error numbers saved in the fault memory

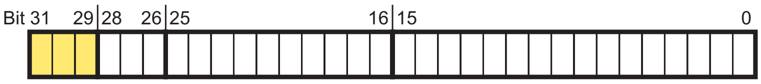
If an error occurs in the controller, a 32-bit value will be saved in decimal format in the internal history buffer (C00168) which contains the following information:



A Response
B Instance-ID
C Module ID
D Error ID

[15-4] Structure of the error number

15.6.1.1 Response

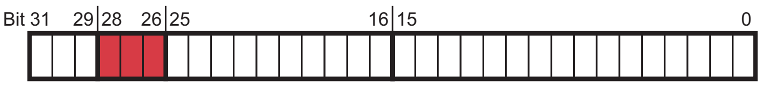


Bit 31	Bit 30	Bit 29	Response
0	0	0	0: No response
0	0	1	1: Fault
0	1	0	2: Trouble
0	1	1	3: Quick stop by trouble
1	0	0	4: Warning locked
1	0	1	5: Warning
1	1	0	6: Information
1	1	1	7: System error

The status of the internal device control changes according to the selected response to an error, controller inhibit is set and the "DRIVE ERROR" LED at the front of the controller goes on:

Response	Logbook entry	Display under C00168	Pulse inhibit	Controller inhibit	Acknowledgement required	LED "DRIVE ERROR"
None						OFF
Fault	☑	☑	☑	☑	☑	
Trouble	☑	☑	☑	☑ (after 0.5 s)		
Quick stop by trouble	☑	☑			☑	
Warning locked	☑	☑			☑	
Warning	☑	☑				
Information	☑					OFF
System error	☑	☑	☑	☑	Mains switching is required!	

15.6.1.2 Instance-ID

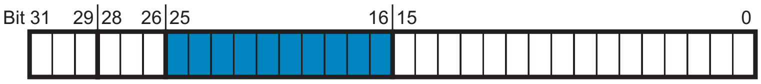


The instance-ID is dynamically assigned by the operating system.

Bit 28	Bit 27	Bit 26	Meaning
0	0	0	Instance-ID 0
0	0	1	Instance-ID 1
0	1	0	Instance-ID 2
0	1	1	Instance-ID 3
1	0	0	Instance-ID 4
1	0	1	Instance-ID 5

Bit 28	Bit 27	Bit 26	Meaning
1	1	0	Instance-ID 6
1	1	1	Instance-ID 7

15.6.1.3 Module ID

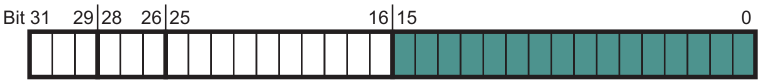


Use the module-ID to identify the module in which the error has occurred.

▶ The following table lists the module-ID in hexadecimal format:

Module-ID	Module
0x0065	Logbook module
0x0068	Module identification
0x0069	Error check of the program memory during runtime
0x006a	Run-time environment for IEC 61131-3 programs
0x006e	Supply voltage monitoring
0x0072	SERVICEREGISTER
0x0075	Device control
0x0077	Temperature monitoring
0x0078	Analog signal monitoring
0x0079	Motor data interface
0x007a	Processing of digital inputs/outputs
0x007b	Motor control
0x007d	Processing of analog inputs/outputs
0x007f	Intelligent communication module
0x0083	CAN dispatcher
0x0084	CAN NMT handler
0x0085	CAN emergency handler
0x0086	CAN NMT master
0x0087	CAN PDO handler
0x0088	CAN SDO server
0x0089	CAN SDO client
0x008c	Application Project Manager
0x008e	Communication interface for internal communication
0x0090	Parameter Manager
0x0091	Lenze run-time system
0x0092	Interface for safety module
0x0093	Sync signal generation

15.6.1.4 Error ID



16-bit value (0 ... 65535_{dec}) for error identification.

15.6.1.5 Example for bit coding of the error number

C00168 displays the error number "1148911631".

- This decimal value corresponds to the following bit sequence:

Bit 31 29|28 26|25 16|15 0

| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |

Assignment	Information	Meaning in the example
0 1 0	Response	2: Trouble
0 0 1	Instance-ID	1: Instance ID 1
0 0 0 1 1 1 1 0 1 1	Module ID	Module ID 0x007b: MCTRL
0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1	Error ID	Error ID 0x000f for MCTRL: DC-bus undervoltage

- Error number "1148911631" thus means:
  The "DC-bus undervoltage" error with the response "Trouble" occurred in the MCTRL module with the instance ID 1.

15.6.2 Reset of error message

An error message with the response "Fault", "Trouble", "Quick stop by trouble" 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 the device command C00002 = "43".

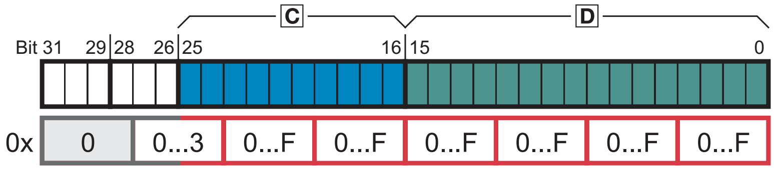
Tip!

With an online connection to the controller, use the **Diagnostics** tab of the »Engineer« and click **Error message reset** to reset a pending error message.

15.6.3 Error list

The following sections describe all error messages of the controller operating system.

- The error messages are described in ascending order of the hexadecimal number resulting from the **Module-ID** C and the **Error-ID** D.



Tip!

The index of this online documentation which contains all error numbers (in the entry "Error numbers") and all error messages allows you to quickly find a description of an error message.

Note!

Please observe that depending on the Instance-ID and the selected Response the first two hexadecimal places of the hexadecimal number indicated in the internal history buffer (C00168) may differ from the following error messages.

Example:

For information about the error message for the value "0x20077002" indicated under C00168, please see the index entry "error number 0x00077002".

Structure of the system error message descriptions

All error message descriptions have a uniform structure:

1. **Error message** and associated **module ID** & **error ID** in hexadecimal format.
2. Information on the **Response** to the error message
3. Information on the **cause** and possible **remedies**.

Logbook: overflow [0x00650000]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Too many events/errors have occurred in a very short time. It was therefore not possible to list all of them in the logbook.	Check if application generates too many error messages.

Logbook: reset (read error) [0x00650001]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
The logbook has been reset due to a read error..	- (is irreversible)

Logbook: reset (version error) [0x00650002]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
The logbook has been reset due to a version conflict.	- (is irreversible)

Memory module missing [0x00650003]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Memory module is defective or not available.	Use a different memory module.

Control card is defective [0x00680000]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the control card.	Mains switching • Please contact Lenze, if the error occurs again.

Power section is defective [0x00680001]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the power stage.	Mains switching • Please contact Lenze, if the error occurs again.

Memory module is defective or missing [0x00680002]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the memory module.	Mains switching • If the error occurs again: Switch off the controller, remove memory module and plug in again, switch on the controller again. • If the error still occurs: Switch off controller and use a different memory module.

Safety module is defective or missing [0x00680003]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the safety module.	Mains switching • If the error occurs again: Switch off the controller, remove safety module and plug in again, switch on the controller again. • If the error still occurs: Switch off controller and use a different safety module.

MXI1: Module changed during operation [0x00680004]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
The extension module you have tried to plug into the module receptacle MXI1 is not "hot plug" capable.	Plug in valid module and restart controller. • Through mains switching, the system accepts modules without "hot plug" capability in the following switch-on phase.

MXI2: Module changed during operation [0x00680005]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
The extension module you have tried to plug into the module receptacle MXI2 is not "hot plug" capable.	Plug in valid module and restart controller. • Through mains switching, the system accepts modules without "hot plug" capability in the following switch-on phase.

Memory module has been removed [0x00680006]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
You have tried to remove or change the memory module during operation.	Switch off the controller, plug in memory module and switch on the controller again. • If the error occurs again, the memory module is defective and must be replaced.

Safety module has been removed [0x00680007]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
You have tried to remove or change the safety module during operation.	Switch off the controller, plug in safety module and switch on the controller again. • If the error occurs again, the safety module is defective and must be replaced.

Control card is defective [0x00680008]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the control card.	Please contact Lenze.

Power section is defective [0x00680009]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the power stage.	Please contact Lenze.

MXI1: Module is defective or missing [0x0068000a]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify extension module in module receptacle MXI1.	• Use a different extension module. • Please contact Lenze.

MXI2: Module is defective or missing [0x0068000b]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify extension module in module receptacle MXI2.	• Use a different extension module. • Please contact Lenze.

Memory module is defective or missing [0x0068000c]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Operating system could not identify the memory module.	• Use a different memory module. • Please contact Lenze.

Safety module is defective or missing [0x0068000d]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Operating system could not identify the safety module.	• Use a different safety module. • Please contact Lenze.

Control card is not compatible [0x0068000e]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The control card is not supported by the operating system.	Please contact Lenze.

Power section is not compatible [0x0068000f]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The power section is not supported by the operating system.	Please contact Lenze.

MXI1: Wrong module [0x00680010]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The extension module in the module receptacle MXI1 is not supported by the operating system.	• Use a different module. • Please contact Lenze.

MXI2: Wrong module [0x00680011]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The extension module in the module receptacle MXI2 is not supported by the operating system.	• Use a different module. • Please contact Lenze.

Wrong memory module [0x00680012]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The memory module is not supported by the operating system.	• Use a different module. • Please contact Lenze.

Wrong safety module [0x00680013]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The safety module is not supported by the operating system.	• Use a different module. • Please contact Lenze.

Power section has been changed [0x00680014]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☒ **Information**	
Cause	**Remedy**
"The power section has changed since the last mains switching."	- (Only information or warning locked if the hardware type has changed as well)

MXI1: Module has been changed [0x00680015]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☒ **Information**	
Cause	**Remedy**
"The extension module in the module receptacle MXI1 has changed since the last mains switching."	- (Only information or warning locked if the hardware type has changed as well)

MXI2: Module has been changed [0x00680016]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☒ **Information**	
Cause	**Remedy**
"The extension module in the module receptacle MXI2 has changed since the last mains switching."	- (Only information or warning locked if the hardware type has changed as well)

Memory module has been changed [0x00680017]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☒ **Information**	
Cause	**Remedy**
"The memory module has changed since the last mains switching."	- (Only information or warning locked if the hardware type has changed as well)

Safety module has been changed [0x00680018]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☒ **Information**	
Cause	**Remedy**
"The safety module has changed since the last mains switching."	- (Only information or warning locked if the hardware type has changed as well)

Combination MXI1/MXI2 not possible [0x00680019]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The combinations of the extension modules plugged into the module receptacles MXI1 & MXI2 is not supported.	Create permitted module combination.

Firmware has been changed [0x0068001a]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The firmware of the operating system has been updated.	- (Information only)

Electronic nameplate: Communication error [0x0068001b]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
Communication with the electronic nameplate is disrupted, the data could not be read.	Check correct connection of the encoder cable.

Memory module: File system is faulty [0x0068001c]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Memory module is plugged in incorrectly or is defective.	• Plug in the memory module correctly. • Exchange defective memory module.

Electronic nameplate: Checksum error [0x0068001d]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
The checksum of the electronic nameplate is defective.	Please contact Lenze.

Firmware is not compatible [0x0068001e]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Firmware is not compatible with the hardware.	Transfer the compatible firmware.

Combination memory module/device not possible [0x0068001f]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The memory module used is not supported by the controller according to the license model.	Plug in supported module and switch the mains. • Only memory module MM220 or MM330 may be plugged in the 9400 HighLine.

Combination module in MXI1/device not possible [0x00680020]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The extension module in the module receptacle MXI1 is not supported by the controller.	• Remove the extension module and switch the mains. • Plug in supported extension module and switch the mains.

Combination module in MXI2/device not possible [0x00680021]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The extension module in the module receptacle MXI2 is not supported by the controller.	• Remove the extension module and switch the mains. • Plug in supported extension module and switch the mains.

Internal error (CRC code - RAM) [0x00690000]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (logbook memory area) [0x00690001]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (LDS instance data) [0x00690002]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (LDS tasks) [0x00690003]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (storage blocks) [0x00690004]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (task queue) [0x00690005]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (message memory) [0x00690006]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (message queue) [0x00690007]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (name data base) [0x00690008]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (event mechanism) [0x00690009]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (event mechanism) [0x0069000a]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (semaphores) [0x0069000b]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (faulty binary semaphores) [0x0069000c]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Serious device error or component failure.	Switch off and on controller. • Please contact Lenze, if the problem occurs again.

Internal error (file system) [0x0069000d]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
In case of the memory module the maximum number of permissible writing cycles has been reached.	Exchange memory module, otherwise data may get lost.

General application error [0x006a0000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
General application error.	Mains switching. Transmit the application to the controller again. • Please contact Lenze, if the problem occurs again.

Program download is faulty [0x006a0001]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Transmission of the application to the controller is faulty (checksum error).	Repeat transmission.

Error during input and output update [0x006a0002]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Mains switching. Transmit the application to the controller again. • Please contact Lenze, if the problem occurs again.

New application loaded [0x006a0003]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Application has been changed by transmission from the engineer or loading from the memory module.	- (Information only)

User task 1: Overflow [0x006a0004]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 1 is too high.	Reduce program runtime by means of: • Omitting functions (e.g. by reducing the number of active FBs). • Optimising the computing time of specific functions

User task 2: Overflow [0x006a0005]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 2 is too high.	See remedy for "Overflow of user task 1".

User task 3: Overflow [0x006a0006]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 3 is too high.	See remedy for "Overflow of user task 1".

User task 4: Overflow [0x006a0007]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 4 is too high.	See remedy for "Overflow of user task 1".

User task 5: Overflow [0x006a0008]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 5 is too high.	See remedy for "Overflow of user task 1".

User task 6: Overflow [0x006a0009]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 6 is too high.	See remedy for "Overflow of user task 1".

User task 7: Overflow [0x006a000a]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 7 is too high.	See remedy for "Overflow of user task 1".

User task 8: Overflow [0x006a000b]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 8 is too high.	See remedy for "Overflow of user task 1".

User task 9: Overflow [0x006a000c]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Program runtime in user task 9 is too high.	See remedy for "Overflow of user task 1".

Runtime error [0x006a000d]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
A run-time error has occurred in the application. The application processing has been interrupted.	Remove run-time error in the application and retransmit the application to the controller.

Application has been stopped [0x006a000e]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The application has been stopped using the device command C00002="32". All user tasks are stopped.	Restart application with controller command C00002="31".

Breakpoint has been reached [0x006a000f]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The application has reached a set breakpoint and the user task with the breakpoint has stopped.	Delete breakpoint and restart application.

Faulty application parameter [0x006a0010]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
An invalid parameter description has occurred.	Transmit application and parameter set to the controller again.

Division by zero [0x006a0011]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
A forbidden division by zero occurred in the application. The division has been intercepted and the divisor has been replaced by the value "1".	Exchange application.

Pointer access in impermissible memory area [0x006a0012]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
An invalid pointer access to a protected area occurred in the application.	Exchange application.

Application has been started [0x006a0013]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The application in the controller has been started.	- (Information only)

Application has been stopped [0x006a0014]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
The application in the controller has been stopped.	- (Information only)

PDO mapping (MXI1): Faulty configuration [0x006a0015]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI1: Incorrectly configured process data mapping. • The corresponding PDO channel is not installed, since, for instance, no communication module has been selected for the module receptacle MXI1 in the Engineer project. • The communication module selected for the module receptacle MXI1 in the Engineer project does not support PDO mapping. • The mapping information downloaded to the controller is faulty.	• Integrate suitable communication module into the Engineer project for the module receptacle MXI1. • Check the configuration of the network. Then recompile the project and transmit it to the controller.

PDO mapping (MXI2): Faulty configuration [0x006a0016]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI2: Incorrectly configured process data mapping. • The corresponding PDO channel is not installed, since, for instance, no communication module has been selected for the module receptacle MXI2 in the Engineer project. • The communication module selected for the module receptacle MXI2 in the Engineer project does not support PDO mapping. • The mapping information downloaded to the controller is faulty.	• Integrate suitable communication module into the Engineer project for the module receptacle MXI2. • Check the configuration of the network. Then recompile the project and transmit it to the controller.

Control card: Supply voltage (24 V DC) too low [0x006f0000]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☒ **Trouble** ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
External supply voltage UB24 of the control card is lower than 18 V.	Check external supply voltage. • If the external supply voltage is available and the error message does not disappear, please contact Lenze.

Read error - service register [0x00720000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
An error has occurred while reading or writing the service register.	Mains switching • Please contact Lenze, if the problem occurs again.

External error [0x00750000]

Response (Lenze setting printed in bold)	**Setting:** C00581 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
The drive interface has activated the error message "External error". • The input *DI_bSetExternError* of the system block **LS_DriveInterface** has been set to TRUE.	• Check external device to be monitored. • Check assignment of the input *DI_bSetExternError* in the application.

Controller is enabled [0x00750001]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The controller is enabled and has the "Operation" state.	- (Information only)

Controller has been initialised [0x00750002]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The controller has left the "Initialisation active" state.	- (Information only)

Controller in STO state [0x00750003]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The controller has received the "safe torque off" request and is now in the "Safe Torque Off active" state.	- (Information only)

Controller: Pulse inhibit is active [0x00750005]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The pulse inhibit is active in the controller.	- (Information only)

PLC configuration is invalid [0x00750006]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
An invalid control configuration has occurred.	Load other application.

Heatsink: Temperature > C00122 [0x00770000]

Response (Lenze setting printed in bold)	**Setting:** C00582 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
Heatsink temperature higher than variable limit temperature (C00122). • Controller ambient temperature too high. • Dirty fan or ventilation slots. • Value set under C00122 is too low.	• Check control cabinet temperature. • Clean filter. • Clean controller. • Set a higher value under C00122.

Heatsink: Overtemperature [0x00770001]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Heatsink temperature higher than fixed limit temperature (90 °C). • Controller ambient temperature too high. • Dirty fan or ventilation slots.	• Check control cabinet temperature. • Clean filter. • Clean controller.

Motor: Temperature > C00121 [0x00770002]

Response (Lenze setting printed in bold)	**Setting:** C00584 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
Motor temperature higher than variable limit temperature (C00121). • Motor too hot due to impermissibly high currents or frequent and too long acceleration. • No PTC connected. • Value set under C00121 is too low.	• Check drive dimensioning. • Connect PTC or switch off monitoring (C00584="3"). • Set a higher value under C00121.

Motor: Overtemperature [0x00770003]

Response (Lenze setting printed in bold)	**Setting:** C00583 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
Motor temperature higher than fixed limit temperature (150 °C). • Motor too hot due to impermissibly high currents or frequent and too long acceleration. • No PTC connected.	• Check drive dimensioning. • Connect PTC or switch off monitoring (C00584="3").

DC-bus capacitor: Temperature > CXXXXX [0x00770004]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
Electrolytic capacitor temperature higher than warning threshold.	• Check control cabinet temperature. • Clean filter. • Clean controller.

DC-bus capacitor: overtemperature [0x00770005]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Electrolytic capacitor temperature higher than limit temperature (120 °C).	• Check control cabinet temperature. • Clean filter. • Clean controller.

Inside the device: Temperature > CXXXXX [0x00770006]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
Inside temperature higher than warning threshold.	• Check control cabinet temperature. • Clean filter. • Clean controller.

Inside the device: Overtemperature [0x00770007]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Inside temperature higher than limit temperature (85 °C).	• Check control cabinet temperature. • Clean filter. • Clean controller.

CPU: Temperature > C00126 [0x00770008]

Response (Lenze setting printed in bold)	**Setting:** C00589 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
CPU temperature higher than variable limit temperature (C00126). • Controller ambient temperature too high. • Dirty fan or ventilation slots. • Value set under C00126 is too low.	• Check control cabinet temperature. • Clean filter. • Clean controller. • Set a higher value under C00126.

CPU: Overtemperature [0x00770009]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	

Cause	**Remedy**
CPU temperature higher than fixed limit temperature (85 °C). • Controller ambient temperature too high. • Dirty fan or ventilation slots.	• Check control cabinet temperature. • Clean filter. • Clean controller.

Heatsink: Temperature sensor defective [0x0077000a]

Response (Lenze setting printed in bold)	**Setting:** C00588 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
Encoder for heatsink temperature supplies undefined values.	Check control cabinet temperature, maybe it is too low.

Inside the device: Temperature sensor defective [0x0077000b]

Response (Lenze setting printed in bold)	**Setting:** C00588 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
Encoder for interior temperature supplies undefined values.	Check control cabinet temperature, maybe it is too low.

Motor: Temperature sensor defective [0x0077000c]

Response (Lenze setting printed in bold)	**Setting:** C00594 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
The signals of the connected encoder of the motor temperature detection (resolver at X7 or encoder at X8) are outside the defined operating range of detection.	• Check bonding of the encoder cable at the motor and controller. • Check selection of the motor temperature sensor in C01190 and make sure that it complies with the assembly in the motor. • Possibly switch off temperature sensor monitoring (C00594="0"). • If a PTC is in the motor, activate the monitoring of the PTC temperature in C00585 instead.

DC-bus capacitor: Temperature sensor defective [0x0077000d]

Response (Lenze setting printed in bold)	**Setting:** C00588 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
Encoder for capacitor temperature supplies undefined values.	Check control cabinet temperature, maybe it is too low.

CPU: Temperature sensor defective [0x0077000e]

Response (Lenze setting printed in bold)	**Setting:** C00588 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
Encoder for CPU temperature supplies undefined values.	Check control cabinet temperature, maybe it is too low.

Motor: PTC has triggered [0x0077000f]

Response (Lenze setting printed in bold)	**Setting:** C00585 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
The motor temperature detected via the terminals T1/T2 is too high. • Motor is too hot due to an increased effective current that results from an operation with too high/too frequent acceleration. • Motor too hot due to increased ambient conditions. • Motor too hot due to lacking cooling in case of self-ventilation and continuous operation with speeds lower than the rated speed. • Terminals T1/T2 are not assigned. • Open circuit of the supply cables for terminals T1/T2	• Check drive dimensioning. • Connect PTC or thermal contact to terminals T1/T2. • In case of a motor without integrated temperature monitoring switch off the monitoring function (C00585="0").

Heatsink: Fan is defective [0x00770010]

Response (Lenze setting printed in bold)	**Setting:** C00610 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
Speed of heatsink fan too low, e.g. due to dirt.	Check/clean fan.

Inside the device: Fan is defective [0x00770011]

Response (Lenze setting printed in bold)	**Setting:** C00611 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☑ Warning ☐ Information	

Cause	**Remedy**
Speed of internal fan is too low, e.g. due to dirt.	Check/clean fan.

Device utilisation Ixt > C00123 [0x00780000]

Response (Lenze setting printed in bold)	**Setting:** C00604 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	

Cause	**Remedy**
Frequent and too long acceleration with overcurrent > C00123.	Check drive dimensioning.

Device utilisation Ixt > 100 % [0x00780001]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	**Remedy**
Frequent and too long acceleration with overcurrent.	Check drive dimensioning.

Motor load I²xt > C00127 [0x00780002]

Response (Lenze setting printed in bold)	**Setting:** C00606 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	

Cause	**Remedy**
Motor is thermally overloaded, e.g. due to: • impermissible continuous current • frequent or too long acceleration	• Check drive dimensioning. • Check setting under C00127.

Motor load I²xt > C00120 [0x00780003]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	**Remedy**
Motor is thermally overloaded, e.g. due to: • impermissible continuous current • frequent or too long acceleration	• Check drive dimensioning. • Check setting under C00120.

Control card is defective (UB24) [0x00780004]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	**Remedy**
Device error	Please contact Lenze.

Control card is defective (VCC15) [0x00780005]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	**Remedy**
Device error	Please contact Lenze.

Control card is defective (UB8) [0x00780006]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	**Remedy**
Device error	Please contact Lenze.

Control card is defective (VCC15 neg.) [0x00780007]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	**Remedy**
Device error	Please contact Lenze.

Control card is defective (UB18 neg.) [0x00780008]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Device error	Please contact Lenze.

Control card is defective (VCC5) [0x00780009]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Device error	Please contact Lenze.

Electronic nameplate: Data incompatible [0x0078000a]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The connected motor with feedback is not supported by the controller firmware.	Check drive dimensioning.

Device command transmitted incorrectly [0x00790000]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error	If the error occurs frequently, please contact Lenze.

Time error - controller interface [0x00790001]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error	If the error occurs frequently, please contact Lenze.

Violation of the time dial [0x00790002]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error	If the error occurs frequently, please contact Lenze.

Motor: Calculated motor impedance unrealistic [0x007b0001]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
Faulty motor parameterisation.	Check motor parameters.

Motor: Calculated mutual inductance unrealistic [0x007b0002]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters.

Motor data is inconsistent [0x007b0003]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters.

Motor: Phase resistance is too high [0x007b0004]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters.

Motor: Device current is too low for rated magnetisation [0x007b0006]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Controller current is too low for rated magnetisation, i.e. the controller cannot energise the motor sufficiently.	Check drive dimensioning.

Motor: Rated current < rated magnetisation current [0x007b0007]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters and setting of C00022.

Motor: Calculated rotor resistance unrealistic [0x007b0009]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters.

Motor: Calculated mutual inductance unrealistic [0x007b000a]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters.

Motor: Calculated electromotive force factor unrealistic [0x007b000b]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
Faulty motor parameterisation.	Check motor parameters.

Motor: Calculated rotor time constant unrealistic [0x007b000c]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
Faulty motor parameterisation.	Check motor parameters.

Motor: Calculated flux factor unrealistic [0x007b000d]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
Faulty motor parameterisation.	Check motor parameters.

DC-bus overvoltage [0x007b000e]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☒ **Trouble** ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
• Since the braking energy is too high, the DC-bus voltage is higher than the overvoltage threshold which results from the mains setting in C00173.	• Use brake resistor or feedback module. • Check setting under C00173.

DC-bus undervoltage [0x007b000f]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☒ **Trouble** ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
DC bus voltage is lower than the undervoltage threshold resulting from the mains setting under C00173.	• Check mains voltage. • Check setting under C00173.

Overcurrent detected [0x007b0010]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
• Short circuit/earth fault in motor cable. • Excessive capacitive charging current in the motor cable.	• Check motor cable. • Use motor cable which is shorter or has a lower capacitance.

Earth fault detected [0x007b0011]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
• Earth fault in motor cable. • Excessive capacitive charging current in the motor cable.	• Check motor cable. • Use motor cable which is shorter or has a lower capacitance.

Actual speed value out of monitoring window C00576 [0x007b0012]

Response (Lenze setting printed in bold)	Setting: C00579 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
Difference between actual and setpoint speed is too big.	• Increase speed tolerance margin under C00576. • Check drive dimensioning.

Motor control: Task overflow [0x007b0013]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error (motor control).	Please contact Lenze.

Internal communication error (host MCTRL) [0x007b0014]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error (motor control).	Please contact Lenze.

Motor data is inconsistent [0x007b0017]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
Faulty motor parameterisation.	Check motor parameters.

Resolver: Open circuit [0x007b0018]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
• Resolver cable interrupted. • Resolver defective.	• Check resolver cable. • Check resolver. • Switch off monitoring, if necessary (C00586="3").

Motor: Calculated leakage inductance unrealistic [0x007b0019]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Faulty motor parameterisation.	Check motor parameters.

Absolute value encoder: Communication error [0x007b001a]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Absolute value encoder does not send any data.	• Check supply cable. • Check encoder. • Check voltage supply (C00421).

Encoder: Open circuit [0x007b001b]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
• Encoder cable interrupted. • Encoder defective. • Faulty parameter setting of the encoder.	• Check encoder cable. • Check encoder. • Check parameter setting (C00422). • Switch off monitoring, if necessary (C00580="3").

Brake chopper: Ixt overload [0x007b001c]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Too frequent and too long brake operations.	Check drive dimensioning.

Brake resistor: I²xt overload [0x007b001d]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Too frequent and too long brake operations.	• Check drive dimensioning. • Check parameter setting (C00129, C00130, C00131, C00132).

Motor: Actual current value > C00620 [0x007b001e]

Response (Lenze setting printed in bold)	**Setting:** C00619 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	

Cause	Remedy
The instantaneous value of the motor current has exceeded the value set in C00620.	• Set a higher value in C00620. • Reduce maximum current (C00022). • Change response (C00619).

Resolver: Calculated acceleration unrealistic [0x007b001f]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Resolver evaluation faulty (implausible acceleration at the resolver).	Check set-up.

Motor: Actual speed value > C00596 [0x007b0020]

Response (Lenze setting printed in bold)	**Setting:** C00607 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	

Cause	Remedy
Threshold for speed monitoring set in C00596 has been exceeded.	Check drive dimensioning.

Brake chopper: Overcurrent [0x007b0021]

Response (Lenze setting printed in bold)	**Setting:** C00573 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	

Cause	Remedy
Brake chopper short circuit/earth fault detected.	Check brake chopper cable and brake resistor.

Position encoder: Module selected under C00490 not available [0x007b0023]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The position encode selected under C00490 has not been recognised.	• Check position encoder. • Check parameter setting (C00490).

Motor encoder: Module selected under C00495 not available [0x007b0024]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The motor encoder selected under C00495 has not been recognised.	• Check motor encoder. • Check parameter setting (C00495).

Motor temperature: Module selected under C01193 not available [0x007b0025]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The module for temperature feedback selected in C01193 has not been recognised.	• Check feedback module. • Check parameter setting (C01193).

EnDat encoder: Lamp error [0x007b0026]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

EnDat encoder: Signal error [0x007b0027]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

EnDat encoder: Position error [0x007b0028]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

EnDat encoder: Overvoltage [0x007b0029]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

EnDat encoder: Undervoltage [0x007b002a]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

EnDat encoder: Overcurrent [0x007b002b]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

EnDat encoder: Flat battery [0x007b002c]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
EnDat encoder defective.	Check EnDat encoder.

Failure of motor phase U [0x007b002d]

Response (Lenze setting printed in bold)	**Setting:** C00597 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
U phase interruption of motor cable.	• Check cabling between controller and motor. • Check parameter setting (C00599).

Failure of motor phase V [0x007b002e]

Response (Lenze setting printed in bold)	**Setting:** C00597 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
V phase interruption of the motor cable.	• Check cabling between controller and motor. • Check parameter setting (C00599).

Failure of motor phase W [0x007b002f]

Response (Lenze setting printed in bold)	**Setting:** C00597 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
W phase interruption of the motor cable.	• Check cabling between controller and motor. • Check parameter setting (C00599).

Electronic nameplate: Data loaded [0x007b0030]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
New electronic nameplate (ENP) has been found.	- (Information only)

Electronic nameplate: Not found [0x007b0031]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
Electronic nameplate (ENP) is not available.	- (Information only)

Electronic nameplate: Unknown encoder protocol [0x007b0032]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The connected motor with feedback is not supported by the controller firmware.	Check drive dimensioning.

Electronic nameplate: Unknown encoder signal [0x007b0033]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The connected motor with feedback is not supported by the controller firmware.	Check drive dimensioning.

Internal communication error (DMA) [0x007b0034]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error.	Please contact Lenze.

Internal communication error (MCTRL host) [0x007b0036]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Internal error.	Please contact Lenze.

Invalid PLC configuration [0x007b0037]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
An invalid control configuration has occurred.	Load other application.

Motor parameter identification has been cancelled [0x007b0038]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The motor current during identification was too high.	• The motor must not move during identification. • Check motor parameters

Electronic nameplate: Data out of parameter limits [0x007b0039]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
The motor parameters of the electronic nameplate are out of the limit values of the controller and therefore cannot be accepted.	Please contact Lenze.

Memory module: File system has been formatted [0x007c0000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
File system of the memory module has been formatted.	- (Information only)

Memory module: File system has been restored [0x007c0001]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
File system of the memory module has been restored.	- (Information only)

Analog input 1: Master current < 4 mA [0x007d0000]

Response (Lenze setting printed in bold)	**Setting:** C00598 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
Master current is in the impermissible range -4 ... +4 mA, e.g. due to a line break or a defective master current value encoder. • Only for parameterisation as master current input (see C00034).	Remove open circuit.

Invalid PLC configuration [0x007d0001]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
An invalid control configuration has occurred.	Load other application.

Communication error between device and device module [0x007f0002]

Response (Lenze setting printed in bold)	**Setting:** C01501 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☐ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☐ Information	
Cause	**Remedy**
Communication between controller and extension module is interrupted, e.g. due to disturbances in the ambience (EMC), a defective hardware or loose contact. • This monitoring is designed for safe process data communication.	• Remove EMC fault. • Properly connect module. • Switch the mains or restart controller. • Exchange module/controller. • Please contact Lenze, if the problem occurs again.

CAN on board: Bus-off [0x00830000]

Response (Lenze setting printed in bold)	**Setting:** C00595 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN on board: "Bus-off" state • Too many faulty telegrams received. • Cable defective (e.g. loose contact). • Two nodes with the same ID.	• Remove fault (e.g. EMC). • Remove loose contact, screw down adapter. • Assign different node IDs.

CAN on board: Invalid node address 0 [0x00830001]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information	
Cause	**Remedy**
CAN on board: Initialisation error • The node address has been selected via DIP switch by means of hardware and the DIP switches of the node address are set to zero. • Note: Instead of the impermissible node address 0 the node address 1 is used.	• Use the DIP switches to set a node address unequal 0 and restart the controller. • Activate the node number assignment by means of software by changing the position of DIP switch 2 and restart the controller.

CAN on board: Invalid basic configuration [0x00830002]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CAN on board: Configuration error • Faulty download of an Engineer or PLC Designer project • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN on board: Heartbeat error index 1 [0x00840000]

Response (Lenze setting printed in bold)	**Setting:** C00613/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN on board: Cyclic node monitoring • Node device has not received a heartbeat telegram from node 1 within the defined time.	• Reactivate CAN node by restarting the controller, restart of the controller (C00002="11000") or CAN reset node. • Select a different heartbeat producer monitoring time or switch off monitoring and reset locked error status, if necessary. Tip: Safe the current parameter set before mains switching and restart (C00002="11").

CAN on board: Heartbeat error index 2 [0x00840001]

Response (Lenze setting printed in bold)	**Setting:** C00613/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 2.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 3 [0x00840002]

Response (Lenze setting printed in bold)	**Setting:** C00613/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 3.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 4 [0x00840003]

Response (Lenze setting printed in bold)	**Setting:** C00613/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 4.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 5 [0x00840004]

Response (Lenze setting printed in bold)	**Setting:** C00613/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 5.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 6 [0x00840005]

Response (Lenze setting printed in bold)	**Setting:** C00613/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 6.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 7 [0x00840006]

Response (Lenze setting printed in bold)	**Setting:** C00613/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 7.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 8 [0x00840007]

Response (Lenze setting printed in bold)	**Setting:** C00613/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 8.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 9 [0x00840008]

Response (Lenze setting printed in bold)	**Setting:** C00613/9 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 9.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 10 [0x00840009]

Response (Lenze setting printed in bold)	**Setting:** C00613/10 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: No heartbeat telegram received from node 10.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 11 [0x0084000a]

Response (Lenze setting printed in bold)	**Setting:** C00613/11 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: No heartbeat telegram received from node 11.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 12 [0x0084000b]

Response (Lenze setting printed in bold)	**Setting:** C00613/12 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: No heartbeat telegram received from node 12.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 13 [0x0084000c]

Response (Lenze setting printed in bold)	**Setting:** C00613/13 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: No heartbeat telegram received from node 13.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 14 [0x0084000d]

Response (Lenze setting printed in bold)	**Setting:** C00613/14 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: No heartbeat telegram received from node 14.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 15 [0x0084000e]

Response (Lenze setting printed in bold)	**Setting:** C00613/15 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: No heartbeat telegram received from node 15.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 16 [0x0084000f]

Response (Lenze setting printed in bold)	**Setting:** C00613/16 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 16.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 17 [0x00840010]

Response (Lenze setting printed in bold)	**Setting:** C00613/17 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 17.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 18 [0x00840011]

Response (Lenze setting printed in bold)	**Setting:** C00613/18 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 18.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 19 [0x00840012]

Response (Lenze setting printed in bold)	**Setting:** C00613/19 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 19.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 20 [0x00840013]

Response (Lenze setting printed in bold)	**Setting:** C00613/20 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 20.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 21 [0x00840014]

Response (Lenze setting printed in bold)	**Setting:** C00613/21 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 21.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 22 [0x00840015]

Response (Lenze setting printed in bold)	**Setting:** C00613/22 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 22.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 23 [0x00840016]

Response (Lenze setting printed in bold)	**Setting:** C00613/23 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 23.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 24 [0x00840017]

Response (Lenze setting printed in bold)	**Setting:** C00613/24 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 24.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 25 [0x00840018]

Response (Lenze setting printed in bold)	**Setting:** C00613/25 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 25.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 26 [0x00840019]

Response (Lenze setting printed in bold)	**Setting:** C00613/26 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 26.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 27 [0x0084001a]

Response (Lenze setting printed in bold)	**Setting:** C00613/27 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 27.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 28 [0x0084001b]

Response (Lenze setting printed in bold)	**Setting:** C00613/28 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 28.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 29 [0x0084001c]

Response (Lenze setting printed in bold)	**Setting:** C00613/29 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 29.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 30 [0x0084001d]

Response (Lenze setting printed in bold)	**Setting:** C00613/30 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 30.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 31 [0x0084001e]

Response (Lenze setting printed in bold)	**Setting:** C00613/31 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 31.	See remedy for "Heartbeat error index 1".

CAN on board: Heartbeat error index 32 [0x0084001f]

Response (Lenze setting printed in bold)	**Setting:** C00613/32 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: No heartbeat telegram received from node 32.	See remedy for "Heartbeat error index 1".

CAN on board: Life guarding error [0x00840020]

Response (Lenze setting printed in bold)	**Setting:** C00614 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN on board: Cyclic node monitoring • Slave response: Maximum time between two node guarding telegrams (remote transmission request telegram) from the master has been exceeded.	Select a different life guarding monitoring time or switch off monitoring.

CAN on board: Faulty NMT slave configuration [0x00840021]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CAN on board: A configuration error has occurred in the network management of the CAN slave. • Faulty download of an Engineer or PLC Designer project • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer. • Incorrect parameterisation of node guarding or heartbeat.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN on board: Faulty emergency configuration [0x00850000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CAN on board: A configuration error has occurred in the CAN emergency module. • Faulty download of an Engineer or PLC Designer project • Invalid CAN emergency settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN on board: Node guarding error 1 [0x00860000]

Response (Lenze setting printed in bold)	**Setting:** C00612/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN on board: Cyclic node monitoring • CAN master has not received a response to a node guarding telegram (remote transmission request telegram) from node 1 within the defined time.	• Reactivate CAN node by restarting the controller, restart of the controller (C00002="11000") or CAN reset node. • Select a different node guarding monitoring time or switch off monitoring. • Reset error state if latched. Tip: Safe the current parameter set before mains switching and restarting the controller (C00002="11").

CAN on board: Node guarding error 2 [0x00860001]

Response (Lenze setting printed in bold)	**Setting:** C00612/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 2.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 3 [0x00860002]

Response (Lenze setting printed in bold)	**Setting:** C00612/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 3.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 4 [0x00860003]

Response (Lenze setting printed in bold)	**Setting:** C00612/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 4.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 5 [0x00860004]

Response (Lenze setting printed in bold)	**Setting:** C00612/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 5.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 6 [0x00860005]

Response (Lenze setting printed in bold)	**Setting:** C00612/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 6.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 7 [0x00860006]

Response (Lenze setting printed in bold)	**Setting:** C00612/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 7.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 8 [0x00860007]

Response (Lenze setting printed in bold)	**Setting:** C00612/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 8.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 9 [0x00860008]

Response (Lenze setting printed in bold)	**Setting:** C00612/9 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 9.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 10 [0x00860009]

Response (Lenze setting printed in bold)	**Setting:** C00612/10 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 10.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 11 [0x0086000a]

Response (Lenze setting printed in bold)	**Setting:** C00612/11 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 11.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 12 [0x0086000b]

Response (Lenze setting printed in bold)	**Setting:** C00612/12 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 12.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 13 [0x0086000c]

Response (Lenze setting printed in bold)	**Setting:** C00612/13 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 13.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 14 [0x0086000d]

Response (Lenze setting printed in bold)	**Setting:** C00612/14 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 14.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 15 [0x0086000e]

Response (Lenze setting printed in bold)	**Setting:** C00612/15 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 15.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 16 [0x0086000f]

Response (Lenze setting printed in bold)	**Setting:** C00612/16 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 16.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 17 [0x00860010]

Response (Lenze setting printed in bold)	**Setting:** C00612/17 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 17.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 18 [0x00860011]

Response (Lenze setting printed in bold)	**Setting:** C00612/18 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 18.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 19 [0x00860012]

Response (Lenze setting printed in bold)	**Setting:** C00612/19 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 19.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 20 [0x00860013]

Response (Lenze setting printed in bold)	**Setting:** C00612/20 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 20.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 21 [0x00860014]

Response (Lenze setting printed in bold)	**Setting:** C00612/21 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 21.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 22 [0x00860015]

Response (Lenze setting printed in bold)	**Setting:** C00612/22 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 22.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 23 [0x00860016]

Response (Lenze setting printed in bold)	**Setting:** C00612/23 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 23.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 24 [0x00860017]

Response (Lenze setting printed in bold)	**Setting:** C00612/24 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 24.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 25 [0x00860018]

Response (Lenze setting printed in bold)	**Setting:** C00612/25 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 25.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 26 [0x00860019]

Response (Lenze setting printed in bold)	**Setting:** C00612/26 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 26.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 27 [0x0086001a]

Response (Lenze setting printed in bold)	**Setting:** C00612/27 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 27.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 28 [0x0086001b]

Response (Lenze setting printed in bold)	**Setting:** C00612/28 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 28.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 29 [0x0086001c]

Response (Lenze setting printed in bold)	**Setting:** C00612/29 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 29.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 30 [0x0086001d]

Response (Lenze setting printed in bold)	**Setting:** C00612/30 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 30.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 31 [0x0086001e]

Response (Lenze setting printed in bold)	**Setting:** C00612/31 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 31.	See remedy for "Node guarding error 1".

CAN on board: Node guarding error 32 [0x0086001f]

Response (Lenze setting printed in bold)	**Setting:** C00612/32 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CAN master has not received a response to a node guarding telegram from node 32.	See remedy for "Node guarding error 1".

CAN on board: Faulty NMT master configuration [0x00860020]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	**Remedy**
CAN on board: A configuration error has occurred in the network management of the CAN master. • Faulty download of an Engineer or PLC Designer project. • Invalid CAN master settings according to DS301V402 and DS405 in the Engineer or PLC Designer. • Incorrect parameterisation of node guarding or heartbeat.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN on board RPDO1: Telegram not received or faulty [0x00870000]

Response (Lenze setting printed in bold)	**Setting:** C00591/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: CAN-IN 1 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN on board RPDO2: Telegram not received or faulty [0x00870001]

Response (Lenze setting printed in bold)	**Setting:** C00591/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: CAN-IN 2 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN on board RPDO3: Telegram not received or faulty [0x00870002]

Response (Lenze setting printed in bold)	**Setting:** C00591/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: CAN-IN 3 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN on board RPDO4: Telegram not received or faulty [0x00870003]

Response (Lenze setting printed in bold)	**Setting:** C00591/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CAN on board: CAN-IN 4 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN on board PDO manager: Faulty configuration [0x00870008]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CAN on board: CAN-PDO configuration error • Faulty project download. • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer. • Mapping variables have incorrect CANopen indices according to DS405.	• Repeat download. • Correct CAN settings in the project and regenerate project.

CAN on board SDO server: Faulty configuration [0x00880000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CAN on board: A configuration error has occurred in the CAN SDO server. • Faulty project download. • Invalid SDO server settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download. • Correct CAN settings in the project and regenerate project.

CAN on board SDO client: Faulty configuration [0x00890000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CAN on board: A configuration error has occurred in the CAN SDO client. • Faulty project download. • Invalid SDO client settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

ProjectSelection.dat file faulty [0x008c0000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

ProjectList.dat file faulty [0x008c0001]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

DeviceCFG.dat file faulty [0x008c0002]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

ProjectSelection.dat missing [0x008c0003]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

ProjectList.dat file missing [0x008c0004]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

DeviceCFG.dat file missing [0x008c0005]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

ProjectSelection.dat file invalid [0x008c0006]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

ProjectList.dat file invalid [0x008c0007]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

DeviceCFG.dat file invalid [0x008c0008]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Reformat memory module (C00002="1030") and repeat project download.

Project is not loaded [0x008c0009]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Application could not be loaded because of a file error.	Load new or different application.

Project is not available [0x008c000a]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Application not available.	• Download application with the Engineer • Switch off controller and use a different memory module with an existing application.

Required license missing [0x008c000b]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
Memory module could not be initialised.	Two possibilities: • Use the Engineer to download and activate an application suitable for the memory module. • Switch off controller and use memory module suitable for the application.

MXI1: Module missing or incompatible [0x008c000d]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The extension module in module receptacle MXI1 is incompatible with the application.	Use extension module supported by the application.

MXI2: Module missing or incompatible [0x008c000e]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The extension module in module receptacle MXI2 is incompatible with the application.	Use extension module supported by the application.

MXI1: PROFIBUS module missing or incompatible [0x008c000f]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The communication module E94AYCPM (PROFIBUS) in module receptacle MXI1 is incompatible with the application.	Use communication module supported by the application.

MXI2: PROFIBUS module missing or incompatible [0x008c0010]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
The communication module E94AYCPM (PROFIBUS) in module receptacle MXI2 is incompatible with the application.	Use communication module supported by the application.

MXI1: Ethernet module missing or incompatible [0x008c0011]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The communication module E94AYCEN (Ethernet) in the module receptacle MXI1 is incompatible with the application.	Use communication module supported by the application.

MXI2: Ethernet module missing or incompatible [0x008c0012]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The communication module E94AYCEN (Ethernet) in the module receptacle MXI2 is incompatible with the application.	Use communication module supported by the application.

MXI1: Digital frequency module missing or incompatible [0x008c0013]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The digital frequency extension module in module receptacle MXI1 is incompatible with the application.	Use extension module supported by the application.

MXI2: Digital frequency module missing or incompatible [0x008c0014]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The digital frequency extension module in module receptacle MXI2 is incompatible with the application.	Use extension module supported by the application.

MXI1: ICM module missing or incompatible [0x008c0015]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The ICM extension module in module receptacle MXI1 is incompatible with the application.	Use extension module supported by the application.

MXI2: ICM module missing or incompatible [0x008c0016]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The ICM extension module in module receptacle MXI2 is incompatible with the application.	Use extension module supported by the application.

MXI1: CAN module missing or incompatible [0x008c0017]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The CANopen communication module in module receptacle MXI1 is incompatible with the application.	Use communication module supported by the application.

MXI2: CAN module missing or incompatible [0x008c0018]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The CANopen communication module in module receptacle MXI2 is incompatible with the application.	Use communication module supported by the application.

Connection table in use [0x008c001a]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
This application is provided with a connection table which means that connections can be changed online without executing a completely new download.	- (Information only)

Internal error (CRC application) [0x008c001d]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The checksum of the application is faulty.	Retransmit the application to the controller.

Parameter set faulty [0x00900000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Parameter set is invalid.	Transfer parameter set from Engineer to the controller and save with C00002="11".

Lenze setting loaded [0x00900001]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
"Lenze setting has been loaded."	- (Information only)

Parameter set saved [0x00900002]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Parameter set has been saved.	- (Information only)

Parameter set loaded [0x00900003]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Parameter set has been loaded.	- (Information only)

Loading of Lenze setting failed [0x00900004]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Lenze setting of a parameter is not within the valid limits.	Remove error in the application and retransmit the application to the controller.

Parameter set restored [0x00900005]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
An error has occurred while loading the selected parameter set.	Transfer parameter set from Engineer to the controller and save with C00002="11".

Saving of parameters failed [0x00900006]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
An error has occurred while saving the current parameter set.	Use a different memory module.

Parameter set: Version conflict [0x00900007]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The parameter set version on the memory module is not compatible with the firmware of the controller.	Transfer parameter set from Engineer to the controller and save with C00002="11".

Code number assigned twice [0x00900008]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
Code number of the operating system has been assigned to the application.	Remove error in the application and retransmit the application to the controller.

Parameter set: Variant conflict [0x00900009]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
The firmware has loaded a parameter set the type code of which does not comply with the type code of the controller.	Load a suitable parameter set.

No parameters for module in MXI1 [0x0090000a]

Response (Lenze setting printed in bold) **Setting:** C00615/2 (☑ Adjustable response)

☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information

Cause	Remedy
The parameter set contains no parameters for the module inserted in MXI1.	Integrate the module inserted in MXI1 into the Engineer project and then retransmit the parameter set to the controller.

No parameters for module in MXI2 [0x0090000b]

Response (Lenze setting printed in bold) **Setting:** C00615/3 (☑ Adjustable response)

☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information

Cause	Remedy
The parameter set contains no parameters for the module inserted in MXI2.	Integrate the module inserted in MXI2 into the Engineer project and then retransmit the parameter set to the controller.

Mains voltage switched on [0x00910000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Mains voltage has been switched on.	- (Information only)

Mains voltage switched off [0x00910001]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**

Cause	Remedy
Mains voltage has been switched off.	- (Information only)

No heartbeat signal detected [0x00910002]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Heartbeat not periodic [0x00910003]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Internal error: See C00180 [0x00910004]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Internal error: See C00180 [0x00910005]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	Please contact Lenze.

Internal error: See C00180 [0x00910006]

Response (Lenze setting printed in bold)

☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Divisor of division was "0".	Exchange application.

Internal error: See C00180 [0x00910008]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Internal error: See C00180 [0x00910009]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

System task 1: Task overflow [0x0091000a]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
System overload.	Please contact Lenze.

System task 2: Task overflow [0x0091000b]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
System overload.	Please contact Lenze.

System task 3: Task overflow [0x0091000c]

Response (Lenze setting printed in bold)	
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
System overload.	Please contact Lenze.

System task: Task overflow [0x0091000d]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
System overload.	Please contact Lenze.

Communication task: Standstill > 3 s [0x0091000e]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information	
Cause	**Remedy**
System overload or communication task crash.	Reduce system load. • This is possible in the application or data transfer of the communication interfaces.

Cyclic task: Standstill > 60 s [0x0091000f]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☒ **Information**	
Cause	**Remedy**
System overload or CRC check task crash.	Reduce system load. • This is possible in the application or data transfer of the communication interfaces.

Position value faulty [0x00910010]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Error during initialisation [0x00910011]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Blocking function in MEC task [0x00910012]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Internal error	If the error occurs frequently, please contact Lenze.

Safety module: Incompatible to setting under C00214 [0x00920000]

Response (Lenze setting printed in bold)
☐ None ☒ **System fault** ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The controller has detected a safety module which does not match the setting under C00214.	Change setting underC00214 or use a suitable safety module. • Then, restart the controller.

DFIN (MXI1): A-/A track error [0x00990000]

Response (Lenze setting printed in bold)	**Setting:** C13040 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
Digital frequency extension module in MXI1: Interruption (open circuit) of the signal cable for track A.	• Check signal cable for track A. • Check encoder.

DFIN (MXI1): B-/B track error [0x00990001]

Response (Lenze setting printed in bold)	**Setting:** C13040 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
Digital frequency extension module in MXI1: Interruption (open circuit) of the signal cable for track B.	• Check signal cable for track B. • Check encoder.

DFIN (MXI1): Z-/Z track error [0x00990002]

Response (Lenze setting printed in bold)	**Setting:** C13040 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI1: Interruption (open circuit) of the signal cable for track Z.	• Check signal cable for track Z. • Check encoder.

DFIN (MXI1): Enable/lamp control signal error [0x00990003]

Response (Lenze setting printed in bold)	**Setting:** C13041 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☒ **Warning** ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI1: Interruption (open circuit) of the signal cable for the "Enable" signal or no "Enable" signal available.	• Check signal cable for "Enable" signal. • Check encoder.

DFIN (MXI1): Supply cannot be corrected anymore [0x00990004]

Response (Lenze setting printed in bold)	**Setting:** C13042 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☒ **Warning** ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI1: The encoder voltage controlled by the digital frequency input has reached the voltage limit.	Check encoder.

DFOUT (MXI1): Maximum frequency reached [0x00990005]

Response (Lenze setting printed in bold)	**Setting:** C13080 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☒ **Warning** ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI1: Limit frequency at the digital frequency output reached. • The digital frequency has reached the limit value set in C013053.	Check set limit value.

CAN module (MXI1): Bus-off [0x009d0000]

Response (Lenze setting printed in bold)	**Setting:** C13595 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☒ **Information**	

Cause	**Remedy**
CANopen communication module in MXI1: "Bus-off" state • Too many faulty telegrams received. • Cable defective (e.g. loose contact). • Two nodes with the same ID.	• Remove fault (e.g. EMC). • Remove loose contact, screw down adapter. • Assign different node IDs.

CAN module (MXI1): Invalid node address 0 [0x009d0001]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information

Cause	Remedy
CANopen communication module in MXI1: Initialisation error • The node address has been selected via DIP switch by means of hardware and the DIP switches of the node address are set to zero. • Note: Instead of the impermissible node address 0 the node address 1 is used.	• Use the DIP switches to set a node address unequal 0 and restart the controller. • Activate the node number assignment by means of software by changing the position of DIP switch 2 and restart the controller.

CAN module (MXI1): Basic configuration invalid [0x009d0002]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI1: Configuration error • Faulty download of an Engineer or PLC Designer project • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI1): Heartbeat error index 1 [0x009e0000]

Response (Lenze setting printed in bold) **Setting:** C13613/1 (☑ Adjustable response)

☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information

Cause	Remedy
CANopen communication module in MXI1: Cyclic node monitoring • Node device has not received a heartbeat telegram from node 1 within the defined time.	• Reactivate CAN node by restarting the controller, restart of the controller (C00002="11000") or CAN reset node. • Select a different heartbeat producer monitoring time or switch off monitoring and reset locked error status, if necessary. Tip: Safe the current parameter set before mains switching and restarting the controller (C00002="11").

CAN module (MXI1): Heartbeat error index 2 [0x009e0001]

Response (Lenze setting printed in bold) **Setting:** C13613/2 (☑ Adjustable response)

☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 2.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 3 [0x009e0002]

Response (Lenze setting printed in bold) **Setting:** C13613/3 (☑ Adjustable response)

☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 3.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 4 [0x009e0003]

Response (Lenze setting printed in bold)	Setting: C13613/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 4.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 5 [0x009e0004]

Response (Lenze setting printed in bold)	Setting: C13613/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 5.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 6 [0x009e0005]

Response (Lenze setting printed in bold)	Setting: C13613/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 6.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 7 [0x009e0006]

Response (Lenze setting printed in bold)	Setting: C13613/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 7.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 8 [0x009e0007]

Response (Lenze setting printed in bold)	Setting: C13613/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 8.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 9 [0x009e0008]

Response (Lenze setting printed in bold)	Setting: C13613/9 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 9.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 10 [0x009e0009]

Response (Lenze setting printed in bold)	Setting: C13613/10 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 10.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 11 [0x009e000a]

Response (Lenze setting printed in bold)	Setting: C13613/11 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 11.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 12 [0x009e000b]

Response (Lenze setting printed in bold)	Setting: C13613/12 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 12.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 13 [0x009e000c]

Response (Lenze setting printed in bold)	Setting: C13613/13 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 13.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 14 [0x009e000d]

Response (Lenze setting printed in bold)	Setting: C13613/14 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 14.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 15 [0x009e000e]

Response (Lenze setting printed in bold)	Setting: C13613/15 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 15.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 16 [0x009e000f]

Response (Lenze setting printed in bold)	**Setting:** C13613/16 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: No heartbeat telegram received from node 16.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 17 [0x009e0010]

Response (Lenze setting printed in bold)	**Setting:** C13613/17 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: No heartbeat telegram received from node 17.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 18 [0x009e0011]

Response (Lenze setting printed in bold)	**Setting:** C13613/18 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: No heartbeat telegram received from node 18.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 19 [0x009e0012]

Response (Lenze setting printed in bold)	**Setting:** C13613/19 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: No heartbeat telegram received from node 19.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 20 [0x009e0013]

Response (Lenze setting printed in bold)	**Setting:** C13613/20 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: No heartbeat telegram received from node 20.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 21 [0x009e0014]

Response (Lenze setting printed in bold)	**Setting:** C13613/21 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: No heartbeat telegram received from node 21.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 22 [0x009e0015]

Response (Lenze setting printed in bold)	**Setting:** C13613/22 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 22.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 23 [0x009e0016]

Response (Lenze setting printed in bold)	**Setting:** C13613/23 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 23.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 24 [0x009e0017]

Response (Lenze setting printed in bold)	**Setting:** C13613/24 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 24.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 25 [0x009e0018]

Response (Lenze setting printed in bold)	**Setting:** C13613/25 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 25.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 26 [0x009e0019]

Response (Lenze setting printed in bold)	**Setting:** C13613/26 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 26.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 27 [0x009e001a]

Response (Lenze setting printed in bold)	**Setting:** C13613/27 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 27.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 28 [0x009e001b]

Response (Lenze setting printed in bold)	Setting: C13613/28 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 28.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 29 [0x009e001c]

Response (Lenze setting printed in bold)	Setting: C13613/29 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 29.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 30 [0x009e001d]

Response (Lenze setting printed in bold)	Setting: C13613/30 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 30.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 31 [0x009e001e]

Response (Lenze setting printed in bold)	Setting: C13613/31 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 31.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Heartbeat error index 32 [0x009e001f]

Response (Lenze setting printed in bold)	Setting: C13613/32 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: No heartbeat telegram received from node 32.	See remedy for "Heartbeat error index 1".

CAN module (MXI1): Life guarding error [0x009e0020]

Response (Lenze setting printed in bold)	Setting: C13614 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: Cyclic node monitoring • Slave response: Maximum time between two node guarding telegrams (remote transmission request telegram) from the master has been exceeded.	Select a different life guarding monitoring time or switch off monitoring.

CAN module (MXI1): Faulty NMT slave configuration [0x009e0021]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI1: A configuration error has occurred in the network management of the CAN slave. • Faulty download of an Engineer or PLC Designer project • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer. • Incorrect parameterisation of node guarding or heartbeat.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI1): Faulty emergency configuration [0x009f0000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI1: In the CAN emergency module a configuration error has occurred. • Faulty download of an Engineer or PLC Designer project • Invalid CAN emergency settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI1): Node guarding error 1 [0x00a00000]

Response (Lenze setting printed in bold)	**Setting:** C13612/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI1: Cyclic node monitoring • CAN master has not received a response to a node guarding telegram (remote transmission request telegram) from node 1 within the defined time.	• Reactivate CAN node by restarting the controller, restart of the controller (C00002="11000") or CAN reset node. • Select a different node guarding monitoring time or switch off monitoring. • Reset error state if latched. Tip: Safe the current parameter set before mains switching and restarting the controller (C00002="11").

CAN module (MXI1): Node guarding error 2 [0x00a00001]

Response (Lenze setting printed in bold)	**Setting:** C13612/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 2.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 3 [0x00a00002]

Response (Lenze setting printed in bold)	**Setting:** C13612/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 3.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 4 [0x00a00003]

Response (Lenze setting printed in bold)	**Setting:** C13612/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 4.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 5 [0x00a00004]

Response (Lenze setting printed in bold)	**Setting:** C13612/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 5.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 6 [0x00a00005]

Response (Lenze setting printed in bold)	**Setting:** C13612/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 6.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 7 [0x00a00006]

Response (Lenze setting printed in bold)	**Setting:** C13612/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 7.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 8 [0x00a00007]

Response (Lenze setting printed in bold)	**Setting:** C13612/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 8.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 9 [0x00a00008]

Response (Lenze setting printed in bold)	Setting: C13612/9 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 9.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 10 [0x00a00009]

Response (Lenze setting printed in bold)	Setting: C13612/10 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 10.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 11 [0x00a0000a]

Response (Lenze setting printed in bold)	Setting: C13612/11 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 11.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 12 [0x00a0000b]

Response (Lenze setting printed in bold)	Setting: C13612/12 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 12.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 13 [0x00a0000c]

Response (Lenze setting printed in bold)	Setting: C13612/13 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 13.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 14 [0x00a0000d]

Response (Lenze setting printed in bold)	Setting: C13612/14 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 14.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 15 [0x00a0000e]

Response (Lenze setting printed in bold)	**Setting:** C13612/15 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 15.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 16 [0x00a0000f]

Response (Lenze setting printed in bold)	**Setting:** C13612/16 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 16.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 17 [0x00a00010]

Response (Lenze setting printed in bold)	**Setting:** C13612/17 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 17.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 18 [0x00a00011]

Response (Lenze setting printed in bold)	**Setting:** C13612/18 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 18.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 19 [0x00a00012]

Response (Lenze setting printed in bold)	**Setting:** C13612/19 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 19.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 20 [0x00a00013]

Response (Lenze setting printed in bold)	**Setting:** C13612/20 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 20.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 21 [0x00a00014]

Response (Lenze setting printed in bold)	**Setting:** C13612/21 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 21.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 22 [0x00a00015]

Response (Lenze setting printed in bold)	**Setting:** C13612/22 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 22.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 23 [0x00a00016]

Response (Lenze setting printed in bold)	**Setting:** C13612/23 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 23.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 24 [0x00a00017]

Response (Lenze setting printed in bold)	**Setting:** C13612/24 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 24.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 25 [0x00a00018]

Response (Lenze setting printed in bold)	**Setting:** C13612/25 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 25.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 26 [0x00a00019]

Response (Lenze setting printed in bold)	**Setting:** C13612/26 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 26.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 27 [0x00a0001a]

Response (Lenze setting printed in bold)	**Setting:** C13612/27 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 27.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 28 [0x00a0001b]

Response (Lenze setting printed in bold)	**Setting:** C13612/28 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 28.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 29 [0x00a0001c]

Response (Lenze setting printed in bold)	**Setting:** C13612/29 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 29.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 30 [0x00a0001d]

Response (Lenze setting printed in bold)	**Setting:** C13612/30 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 30.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 31 [0x00a0001e]

Response (Lenze setting printed in bold)	**Setting:** C13612/31 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 31.	See remedy for "Node guarding error 1".

CAN module (MXI1): Node guarding error 32 [0x00a0001f]

Response (Lenze setting printed in bold)	**Setting:** C13612/32 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI1: CAN master has not received a response to a node guarding telegram from node 32.	See remedy for "Node guarding error 1".

CAN module (MXI1): Faulty NMT master configuration [0x00a00020]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI1: A configuration error has occurred in the network management of the CAN master. • Faulty download of an Engineer or PLC Designer project. • Invalid CAN master settings according to DS301V402 and DS405 in the Engineer or PLC Designer. • Incorrect parameterisation of node guarding or heartbeat.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI1) RPDO1: Telegram not received or faulty [0x00a10000]

Response (Lenze setting printed in bold)	**Setting:** C13591/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 1 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO2: Telegram not received or faulty [0x00a10001]

Response (Lenze setting printed in bold)	**Setting:** C13591/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 2 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO3: Telegram not received or faulty [0x00a10002]

Response (Lenze setting printed in bold)	**Setting:** C13591/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 3 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO4: Telegram not received of faulty [0x00a10003]

Response (Lenze setting printed in bold)	**Setting:** C13591/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 4 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO5: Telegram not received or faulty [0x00a10004]

Response (Lenze setting printed in bold)	**Setting:** C13591/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 5 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO6: Telegram not received or faulty [0x00a10005]

Response (Lenze setting printed in bold)	**Setting:** C13591/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 6 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO7: Telegram not received or faulty [0x00a10006]

Response (Lenze setting printed in bold)	**Setting:** C13591/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 7 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) RPDO8: Telegram not received or faulty [0x00a10007]

Response (Lenze setting printed in bold)	**Setting:** C13591/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI1: CAN-IN 8 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI1) PDO manager: Faulty configuration [0x00a10008]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI1: CAN-PDO configuration error • Faulty project download. • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer. • Mapping variables have incorrect CANopen indices according to DS405.	• Repeat download. • Correct CAN settings in the project and regenerate project.

CAN module (MXI1) SDO server: Faulty configuration [0x00a20000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI1: In the CAN SDP server a configuration error has occurred. • Faulty project download. • Invalid SDO server settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download. • Correct CAN settings in the project and regenerate project.

CAN module (MXI1) SDO client: Faulty configuration [0x00a30000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI1: In the CAN SDP client a configuration error has occurred. • Faulty project download. • Invalid SDO client settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

DFIN (MXI2): A-/A track error [0x00aa0000]

Response (Lenze setting printed in bold)	**Setting:** C14040 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
Digital frequency extension module in MXI2: Interruption (open circuit) of the signal cable for track A.	• Check signal cable for track A. • Check encoder.

DFIN (MXI2): B-/B track error [0x00aa0001]

Response (Lenze setting printed in bold)	**Setting:** C14040 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
Digital frequency extension module in MXI2: Interruption (open circuit) of the signal cable for track B.	• Check signal cable for track B. • Check encoder.

DFIN (MXI2): Z-/Z track error [0x00aa0002]

Response (Lenze setting printed in bold)	**Setting:** C14040 (☑ Adjustable response)
☑ None ☐ System fault ☒ **Fault** ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI2: Interruption (open circuit) of the signal cable for track Z.	• Check signal cable for track Z. • Check encoder.

DFIN (MXI2): Enable/lamp control signal error [0x00aa0003]

Response (Lenze setting printed in bold)	**Setting:** C14041 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☒ **Warning** ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI2: Interruption (open circuit) of the signal cable for the "Enable" signal or no "Enable" signal available.	• Check signal cable for "Enable" signal. • Check encoder.

DFIN (MXI2): Supply cannot be corrected anymore [0x00aa0004]

Response (Lenze setting printed in bold)	**Setting:** C14042 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☒ **Warning** ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI2: The encoder voltage controlled by the digital frequency input has reached the voltage limit.	Check encoder.

DFOUT (MXI2): Maximum frequency reached [0x00aa0005]

Response (Lenze setting printed in bold)	**Setting:** C14080 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☒ **Warning** ☑ Information	

Cause	**Remedy**
Digital frequency extension module in MXI2: Limit frequency at the digital frequency output reached. • The digital frequency has reached the limit value set in C014053.	Check set limit value.

CAN module (MXI2): Bus-off [0x00ac0000]

Response (Lenze setting printed in bold)	**Setting:** C14595 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☒ **Information**	

Cause	**Remedy**
CANopen communication module in MXI2: "Bus-off" state • Too many faulty telegrams received. • Cable defective (e.g. loose contact). • Two nodes with the same ID.	• Remove fault (e.g. EMC). • Remove loose contact, screw down adapter. • Assign different node IDs.

CAN module (MXI2): Invalid node address 0 [0x00ac0001]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☒ **Warning** ☐ Information

Cause	Remedy
CANopen communication module in MXI2: Initialisation error • The node address has been selected via DIP switch by means of hardware and the DIP switches of the node address are set to zero. • Note: Instead of the impermissible node address 0 the node address 1 is used.	• Use the DIP switches to set a node address unequal 0 and restart the controller. • Activate the node number assignment by means of software by changing the position of DIP switch 2 and restart the controller.

CAN module (MXI2): Basic configuration invalid [0x00ac0002]

Response (Lenze setting printed in bold)
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI2: Configuration error • Faulty download of an Engineer or PLC Designer project • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI2): Heartbeat error index 1 [0x00ad0000]

Response (Lenze setting printed in bold)	**Setting:** C14613/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: Cyclic node monitoring • Node device has not received a heartbeat telegram from node 1 within the defined time.	• Reactivate CAN node by restarting the controller, restart of the controller (C00002="11000") or CAN reset node. • Select a different heartbeat producer monitoring time or switch off monitoring and reset locked error status, if necessary. Tip: Safe the current parameter set before mains switching and restarting the controller (C00002="11").

CAN module (MXI2): Heartbeat error index 2 [0x00ad0001]

Response (Lenze setting printed in bold)	**Setting:** C14613/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 2.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 3 [0x00ad0002]

Response (Lenze setting printed in bold)	**Setting:** C14613/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 3.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 4 [0x00ad0003]

Response (Lenze setting printed in bold)	Setting: C14613/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 4.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 5 [0x00ad0004]

Response (Lenze setting printed in bold)	Setting: C14613/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 5.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 6 [0x00ad0005]

Response (Lenze setting printed in bold)	Setting: C14613/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 6.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 7 [0x00ad0006]

Response (Lenze setting printed in bold)	Setting: C14613/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 7.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 8 [0x00ad0007]

Response (Lenze setting printed in bold)	Setting: C14613/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 8.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 9 [0x00ad0008]

Response (Lenze setting printed in bold)	Setting: C14613/9 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 9.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 10 [0x00ad0009]

Response (Lenze setting printed in bold)	Setting: C14613/10 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 10.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 11 [0x00ad000a]

Response (Lenze setting printed in bold)	Setting: C14613/11 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 11.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 12 [0x00ad000b]

Response (Lenze setting printed in bold)	Setting: C14613/12 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 12.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 13 [0x00ad000c]

Response (Lenze setting printed in bold)	Setting: C14613/13 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 13.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 14 [0x00ad000d]

Response (Lenze setting printed in bold)	Setting: C14613/14 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 14.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 15 [0x00ad000e]

Response (Lenze setting printed in bold)	Setting: C14613/15 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 15.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 16 [0x00ad000f]

Response (Lenze setting printed in bold)	**Setting:** C14613/16 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 16.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 17 [0x00ad0010]

Response (Lenze setting printed in bold)	**Setting:** C14613/17 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 17.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 18 [0x00ad0011]

Response (Lenze setting printed in bold)	**Setting:** C14613/18 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 18.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 19 [0x00ad0012]

Response (Lenze setting printed in bold)	**Setting:** C14613/19 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 19.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 20 [0x00ad0013]

Response (Lenze setting printed in bold)	**Setting:** C14613/20 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 20.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 21 [0x00ad0014]

Response (Lenze setting printed in bold)	**Setting:** C14613/21 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 21.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 22 [0x00ad0015]

Response (Lenze setting printed in bold)	**Setting:** C14613/22 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 22.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 23 [0x00ad0016]

Response (Lenze setting printed in bold)	**Setting:** C14613/23 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 23.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 24 [0x00ad0017]

Response (Lenze setting printed in bold)	**Setting:** C14613/24 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 24.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 25 [0x00ad0018]

Response (Lenze setting printed in bold)	**Setting:** C14613/25 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 25.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 26 [0x00ad0019]

Response (Lenze setting printed in bold)	**Setting:** C14613/26 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 26.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 27 [0x00ad001a]

Response (Lenze setting printed in bold)	**Setting:** C14613/27 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: No heartbeat telegram received from node 27.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 28 [0x00ad001b]

Response (Lenze setting printed in bold)	Setting: C14613/28 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 28.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 29 [0x00ad001c]

Response (Lenze setting printed in bold)	Setting: C14613/29 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 29.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 30 [0x00ad001d]

Response (Lenze setting printed in bold)	Setting: C14613/30 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 30.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 31 [0x00ad001e]

Response (Lenze setting printed in bold)	Setting: C14613/31 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 31.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Heartbeat error index 32 [0x00ad001f]

Response (Lenze setting printed in bold)	Setting: C14613/32 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: No heartbeat telegram received from node 32.	See remedy for "Heartbeat error index 1".

CAN module (MXI2): Life guarding error [0x00ad0020]

Response (Lenze setting printed in bold)	Setting: C14614 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: Cyclic node monitoring • Slave response: Maximum time between two node guarding telegrams (remote transmission request telegram) from the master has been exceeded.	Select a different life guarding monitoring time or switch off monitoring.

CAN module (MXI2): Faulty NMT slave configuration [0x00ad0021]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI2: A configuration error has occurred in the network management of the CAN slave. • Faulty download of an Engineer or PLC Designer project • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer. • Incorrect parameterisation of node guarding or heartbeat.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI2): Faulty emergency configuration [0x00ae0000]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI2: In the CAN emergency module a configuration error has occurred. • Faulty download of an Engineer or PLC Designer project • Invalid CAN emergency settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI2): Node guarding error 1 [0x00af0000]

Response (Lenze setting printed in bold)	**Setting:** C14612/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: Cyclic node monitoring • CAN master has not received a response to a node guarding telegram (remote transmission request telegram) from node 1 within the defined time.	• Reactivate CAN node by restarting the controller, restart of the controller (C00002="11000") or CAN reset node. • Select a different node guarding monitoring time or switch off monitoring. • Reset error state if latched. Tip: Safe the current parameter set before mains switching and restarting the controller (C00002="11").

CAN module (MXI2): Node guarding error 2 [0x00af0001]

Response (Lenze setting printed in bold)	**Setting:** C14612/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 2.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 3 [0x00af0002]

Response (Lenze setting printed in bold)	**Setting:** C14612/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 3.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 4 [0x00af0003]

Response (Lenze setting printed in bold)	**Setting:** C14612/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 4.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 5 [0x00af0004]

Response (Lenze setting printed in bold)	**Setting:** C14612/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 5.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 6 [0x00af0005]

Response (Lenze setting printed in bold)	**Setting:** C14612/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 6.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 7 [0x00af0006]

Response (Lenze setting printed in bold)	**Setting:** C14612/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 7.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 8 [0x00af0007]

Response (Lenze setting printed in bold)	**Setting:** C14612/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 8.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 9 [0x00af0008]

Response (Lenze setting printed in bold)	**Setting:** C14612/9 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 9.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 10 [0x00af0009]

Response (Lenze setting printed in bold)	**Setting:** C14612/10 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 10.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 11 [0x00af000a]

Response (Lenze setting printed in bold)	**Setting:** C14612/11 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 11.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 12 [0x00af000b]

Response (Lenze setting printed in bold)	**Setting:** C14612/12 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 12.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 13 [0x00af000c]

Response (Lenze setting printed in bold)	**Setting:** C14612/13 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 13.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 14 [0x00af000d]

Response (Lenze setting printed in bold)	**Setting:** C14612/14 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 14.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 15 [0x00af000e]

Response (Lenze setting printed in bold)	**Setting:** C14612/15 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 15.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 16 [0x00af000f]

Response (Lenze setting printed in bold)	**Setting:** C14612/16 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 16.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 17 [0x00af0010]

Response (Lenze setting printed in bold)	**Setting:** C14612/17 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 17.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 18 [0x00af0011]

Response (Lenze setting printed in bold)	**Setting:** C14612/18 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 18.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 19 [0x00af0012]

Response (Lenze setting printed in bold)	**Setting:** C14612/19 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 19.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 20 [0x00af0013]

Response (Lenze setting printed in bold)	**Setting:** C14612/20 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 20.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 21 [0x00af0014]

Response (Lenze setting printed in bold)	**Setting:** C14612/21 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 21.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 22 [0x00af0015]

Response (Lenze setting printed in bold)	**Setting:** C14612/22 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 22.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 23 [0x00af0016]

Response (Lenze setting printed in bold)	**Setting:** C14612/23 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 23.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 24 [0x00af0017]

Response (Lenze setting printed in bold)	**Setting:** C14612/24 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 24.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 25 [0x00af0018]

Response (Lenze setting printed in bold)	**Setting:** C14612/25 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 25.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 26 [0x00af0019]

Response (Lenze setting printed in bold)	**Setting:** C14612/26 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	Remedy
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 26.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 27 [0x00af001a]

Response (Lenze setting printed in bold)	**Setting:** C14612/27 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 27.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 28 [0x00af001b]

Response (Lenze setting printed in bold)	**Setting:** C14612/28 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 28.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 29 [0x00af001c]

Response (Lenze setting printed in bold)	**Setting:** C14612/29 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 29.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 30 [0x00af001d]

Response (Lenze setting printed in bold)	**Setting:** C14612/30 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 30.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 31 [0x00af001e]

Response (Lenze setting printed in bold)	**Setting:** C14612/31 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 31.	See remedy for "Node guarding error 1".

CAN module (MXI2): Node guarding error 32 [0x00af001f]

Response (Lenze setting printed in bold)	**Setting:** C14612/32 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN master has not received a response to a node guarding telegram from node 32.	See remedy for "Node guarding error 1".

CAN module (MXI2): Faulty NMT master configuration [0x00af0020]

Response (Lenze setting printed in bold)	
☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information	
Cause	**Remedy**
CANopen communication module in MXI2: A configuration error has occurred in the network management of the CAN master. • Faulty download of an Engineer or PLC Designer project. • Invalid CAN master settings according to DS301V402 and DS405 in the Engineer or PLC Designer. • Incorrect parameterisation of node guarding or heartbeat.	• Repeat download • Correct CAN settings in the project and regenerate project.

CAN module (MXI2) RPDO1: Telegram not received or faulty [0x00b00000]

Response (Lenze setting printed in bold)	**Setting:** C14591/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 1 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO2: Telegram not received or faulty [0x00b00001]

Response (Lenze setting printed in bold)	**Setting:** C14591/2 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 2 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO3: Telegram not received or faulty [0x00b00002]

Response (Lenze setting printed in bold)	**Setting:** C14591/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	
Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 3 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO4: Telegram not received or faulty [0x00b00003]

Response (Lenze setting printed in bold)	**Setting:** C14591/4 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 4 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO5: Telegram not received or faulty [0x00b00004]

Response (Lenze setting printed in bold)	**Setting:** C14591/5 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 5 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO6: Telegram not received or faulty [0x00b00005]

Response (Lenze setting printed in bold)	**Setting:** C14591/6 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 6 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO7: Telegram not received or faulty [0x00b00006]

Response (Lenze setting printed in bold)	**Setting:** C14591/7 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 7 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) RPDO8: Telegram not received or faulty [0x00b00007]

Response (Lenze setting printed in bold)	**Setting:** C14591/8 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
CANopen communication module in MXI2: CAN-IN 8 error • Incorrect PDO telegram length. • Transmission error. • PDO time monitoring has released.	• Set the correct telegram length for the CAN master (transmitter). • Remove electromagnetic interference (e.g. EMC). • Select a different time monitoring or switch off time monitoring.

CAN module (MXI2) PDO manager: Faulty configuration [0x00b00008]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI2: CAN-PDO configuration error • Faulty project download. • Invalid CAN settings according to DS301V402 in the Engineer or PLC Designer. • Mapping variables have incorrect CANopen indices according to DS405.	• Repeat download. • Correct CAN settings in the project and regenerate project.

CAN module (MXI2) SDO server: Faulty configuration [0x00b10000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI2: In the CAN SDP server a configuration error has occurred. • Faulty project download. • Invalid SDO server settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download. • Correct CAN settings in the project and regenerate project.

CAN module (MXI2) SDO client: Faulty configuration [0x00b20000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☐ Fault ☐ Trouble ☐ Quick stop by trouble ☒ **Warning locked** ☐ Warning ☐ Information

Cause	Remedy
CANopen communication module in MXI2: In the CAN SDP client a configuration error has occurred. • Faulty project download. • Invalid SDO client settings according to DS301V402 in the Engineer or PLC Designer.	• Repeat download • Correct CAN settings in the project and regenerate project.

Invalid PLC configuration [0x00b80000]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
An invalid control configuration has occurred.	Load other application.

Positive limit switch has tripped [0x00b80001]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The travel range limit switch in positive traversing direction has tripped.	Reset error message and retract limit switch.

Negative limit switch has tripped [0x00b80002]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
The travel range limit switch in negative traversing direction has tripped.	Reset error message and retract limit switch.

Motor brake: Angular drift with closed brake is too large [0x00b80003]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Despite the applied brake, the stop position of the motor axis has changed by more than the permissible angle of rotation set in C02595.	• Deactivate standstill monitoring (C02595 = 0). • Increase waiting time for status monitoring (C02591). The standstill monitoring only starts after this waiting time has elapsed. • Increase brake closing time (C02589) since during the brake closing time the standstill monitoring is not active. • Reduce threshold for brake activation (C02581).

Motor brake: Automatically activated when the waiting time has elapsed [0x00b80004]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
This time monitoring will only be active if the speed setpoint has reached the threshold for brake activation (C02581). If the actual speed value does not reach/fall below the threshold set in C02581 within the parameterised waiting time for brake activation (C02593), the brake will be closed due to time-out.	• Increase waiting time for brake activation (C02593). • Reduce threshold for brake activation (C02581).

Motor brake: Status monitoring error [0x00b80005]

Response (Lenze setting printed in bold)

☐ None ☐ System fault ☒ **Fault** ☐ Trouble ☐ Quick stop by trouble ☐ Warning locked ☐ Warning ☐ Information

Cause	Remedy
Faulty external feedback of the brake status to the brake control.	• Check brake configuration with regard to the control selection in C02580. • Check setting for status input monitoring in C02583. When monitoring is active, the bBrakeApplied input must be triggered correctly (*bBrakeApplied = bBrakeReleased*). • Check voltage supply of the brake module.

Positive software limit switch has been overtravelled [0x00b80007]

Response (Lenze setting printed in bold)	**Setting:** C02716/2 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☒ **Quick stop by trouble** ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The positive software limit position parameterised in C02702/2 has been overtravelled.	• Position within the software limit positions. • Increase permissible traversing range (change setting of the software limit positions). • Deactivate monitoring of the software limit positions by the basic function "Limiter".

Negative software limit switch has been overtravelled [0x00b80008]

Response (Lenze setting printed in bold)	**Setting:** C02716/2 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☒ **Quick stop by trouble** ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The negative software limit position parameterised in C02702/1 has been overtravelled.	• Position within the software limit positions. • Increase permissible traversing range (change setting of the software limit positions). • Deactivate monitoring of the software limit positions by the basic function "Limiter".

Positive direction of rotation has been limited [0x00b80009]

Response (Lenze setting printed in bold)	**Setting:** C02716/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
Due to the setting of C02707 it was tried to traverse in the impermissible positive direction of rotation.	• Only traverse in permissible (negative) direction of rotation. • Change setting of the permissible direction of rotation (C02707).

Negative direction of rotation has been limited [0x00b8000a]

Response (Lenze setting printed in bold)	**Setting:** C02716/1 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
Due to the setting of C02707 it was tried to traverse in the impermissible negative direction of rotation.	• Only traverse in permissible (positive) direction of rotation. • Change setting of the permissible direction of rotation (C02707).

Speed has been limited [0x00b8000b]

Response (Lenze setting printed in bold)	**Setting:** C02716/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The requested profile speed is higher than the maximum speed set in C02703 and has been limited to this speed.	• Reduce speed of the traversing profile of the basic function (manual jog, referencing or positioning). • Increase maximum speed (C02703). • Deactivate monitoring of the limit values by the basic function "Limiter".

Acceleration has been limited [0x00b8000c]

Response (Lenze setting printed in bold)	**Setting:** C02716/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The requested profile acceleration is higher than the maximum acceleration set in C02705 and has been limited to this acceleration.	• Reduce acceleration of the traversing profile of the basic function (manual jog, referencing or positioning). • Increase maximum acceleration (C02705). • Deactivate monitoring of the limit values by the basic function "Limiter".

Deceleration has been limited [0x00b8000d]

Response (Lenze setting printed in bold)	**Setting:** C02716/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The requested profile deceleration is higher than the maximum acceleration set in C02705 and has been limited to this acceleration.	• Reduce acceleration of the traversing profile of the basic function (manual jog, referencing or positioning). • Increase maximum acceleration (C02705). • Deactivate monitoring of the limit values by the basic function "Limiter".

Jerk has been limited [0x00b8000e]

Response (Lenze setting printed in bold)	**Setting:** C02716/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The requested S-ramp time is lower than the minimum S-ramp time set in C02706 and has been limited to this S-ramp time.	• Increase S-ramp time of the traversing profile of the basic function (manual jog, referencing or positioning). • Reduce minimum S-ramp time (C02706). • Deactivate monitoring of the limit values by the basic function "Limiter".

Position target is outside software limit positions [0x00b8000f]

Response (Lenze setting printed in bold)	**Setting:** C02716/2 (☑ Adjustable response)
☑ None ☐ System fault ☑ Fault ☑ Trouble ☒ **Quick stop by trouble** ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
It was tried to position to a target outside the software limit positions.	• Select position target inside the software limit positions. • Increase permissible traversing range (change setting of the software limit positions). • Deactivate monitoring of the software limit positions by the basic function "Limiter".

Maximum speed has been exceeded [0x00b80010]

Response (Lenze setting printed in bold)	**Setting:** C02716/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The max. speed parameterised in C02703 has been exceeded.	• Reduce speed. • Increase maximum speed (C02703). • Deactivate monitoring of the limit values by the basic function "Limiter".

Maximum acceleration has been exceeded [0x00b80011]

Response (Lenze setting printed in bold)	**Setting:** C02716/3 (☑ Adjustable response)
☒ **None** ☐ System fault ☑ Fault ☑ Trouble ☑ Quick stop by trouble ☑ Warning locked ☑ Warning ☑ Information	

Cause	**Remedy**
The max. acceleration parameterised in C02705 has been exceeded.	• Reduce acceleration. • Increase maximum acceleration (C02705). • Deactivate monitoring of the limit values by the basic function "Limiter".

16 Parameter reference

All parameters for controller parameter setting or monitoring are stored within so-called "codes".

- The codes are numbered and designated by a "C" in front of the code, e.g. "C00002".
- 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".

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.

For general information on how to read and change parameters please see the online documentation for the »Engineer«.

16.1 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 notes:

- Parameter number (Cxxxxx)
- Parameter name (display text in the »Engineer» and keypad)
- Data type
- Decimal and hexadecimal parameter index for access via bus systems

Table contents

The table contains further general explanations & notes on the parameter and the possible settings the representation of which depends on the parameter type:

- Parameters with read-only access
- Parameters with write access

Table footer

The table footer contains the Parameter attributes.

16.1.1 Data type

The following data types are available for parameters:

Data type	Meaning
INTEGER_8	8-bit value with sign
INTEGER_16	16-bit value with sign
INTEGER_32	32-bit value with sign
INTEGER_64	64-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
UNSIGNED_64	64-bit value without sign
FLOATING_POINT	32-bit floating point number
VISIBLE_STRING	String of digits from printable digits
OCTET_STRING	String of digits from any digits
BITFIELD_8	8-bit value bit coded
BITFIELD_16	16-bit value bit coded
BITFIELD_32	32-bit value bit coded

16.1.2 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			

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
	61	0	Heatsink temperature	30	°C

16.1.3 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 are either selected by means of a selection list or through direct value entry.
- Values outside the valid setting range are represented in red in the »Engineer«.

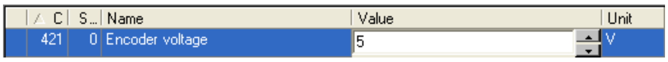
16.1.3.1 Parameters with setting range

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				

Parameter setting in the »Engineer«

- In the »Engineer«, parameters are set by entering the desired value into the input field or by means of the arrow buttons:



- Alternatively, the indicated value can be step-by-step increased or reduced by means of the arrow buttons.

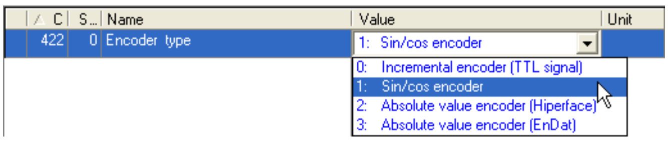
16.1.3.2 Parameters with selection list

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			

Parameter setting in the »Engineer«

- In the »Engineer«, a list field is used for parameter setting:



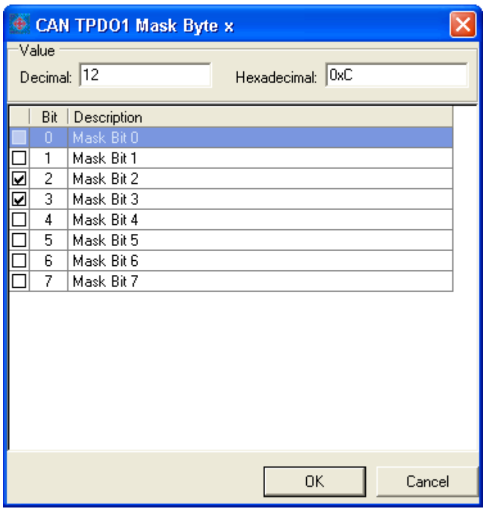
16.1.3.3 Parameters with bit-code setting

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		

Parameter setting in the »Engineer«

- The »Engineer« uses a dialog box for parameter setting in which the individual bits can be set or reset or, alternatively, the value can be entered as a decimal or hexadecimal value:



16.1.3.4 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			

Parameter setting in the »Engineer«

- The »Engineer« parameter list lists all subcodes separately:

C	S...	Name	Value	Unit
114	1	DIx terminal polarity	0	
114	2	DIx terminal polarity	0	
114	3	DIx terminal polarity	0	
114	4	DIx terminal polarity	0	

- The parameters are set as described in the previous chapters.

16.1.4 Parameter attributes

Type of access

▶ The first four attributes provide information about the parameter access:

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	Change of the parameter value is only possible when the application is stopped.

Additional features

▶ The following attributes refer to the parameter set transfer to the controller:

Attribute	Meaning
☑ No transfer	Parameter is **not** transferred to controller when the command **Download parameter set** is executed.
☑ COM	"PC communication parameter" • In the *Download parameter set* or *Download application* dialog box, you can select that PC communication parameters are **not** to be transferred to the controller.
☑ MOT	"Motor data parameter" • In the *Download parameter set* or *Download application* dialog box, you can select that motor data parameters are **not** to be transferred to the controller.

Scaling factor

▶ The "scaling factor" is important for parameter access via bus systems. It is only indicated for parameters using a data format with decimal positions:

Read value (via bus system) = Scaling factor · indicated value (Engineer)

16.2 Abbreviations used in parameter & selection texts

Since the parameter/selection texts are limited to 31 characters, the following abbrevations are used:

Abbreviation	Meaning
CAN module	CANopen communication module (type E94AYCCA)
DF module	Digital frequency extension module (type E94AYFLF)
ETS	Electronic nameplate
Ethernet module	Ethernet communication module (type E94AYCEN)
MXI1	*eXtension Interface module* 1 - module receptacle for extension 1
MXI2	*eXtension Interface module* 2 - module receptacle for extension 2
Profibus module	PROFIBUS communication module (type E94AYCPM)

Abbreviated units

Abbreviation	Meaning
Incr.	Increments
Rev.	Revolutions

16.3 Parameter list

This chapter describes all parameters of the operating system in numerically ascending order.

C00002

Parameter | Name: **C00002 | Controller commands**		Data type: UNSIGNED_32 Index: 24573_d = $5FFD_h$

Controller commands

- C00003 shows the status of the last executed controller command.
- Under C00150 you can query the current status of the device control.

Selection list (Lenze setting printed in bold)		Information
0	Load Lenze setting	Resets parameters to Lenze setting. • Only possible when the application has stopped and the controller is inhibited.
1	Load start parameters	Loads parameters from the memory module. • Only possible when the application has stopped and the controller is inhibited.
5	Activate application	Activates the application selected under C00005. • If the application is also started, depends on the auto-start setting selected. • Only possible when the application has stopped.
7	Save selected application	Selects the active application as start application.
11	Save start parameters	Saves parameters fail-safe in the memory module.
20	Delete logbook	Deletes all logbook entries.
21	Archive log file	Exports logbook entries to file.
31	Start application	
32	Stop application	
33	Reset program	Executes a reset • All variables except for the RETAIN variables are reset to their initialisation value. • The situation corresponds to a power failure or deactivation/activation of the controller (warm start) while the program is running.
34	Delete program	Executes a reset (original) • All variables including RETAIN and PERSISTENT variables are reset to their initialisation value. • The application program is deleted and the controller is reset to its original status.
35	Restart program	Executes a reset (warm start) • All variables except for the PERSISTENT variables are reset to their initialisation value. • The situation corresponds to the start of a new program loaded into the control (cold start).
36	Reset runtime measurement	
41	Inhibit controller	
42	Enable controller	
43	Reset error	
45	Activate quick stop	▶ "Basic functionQuick stop"
46	Quick stop reset	▶ "Basic functionQuick stop"
47	Internal command 47	For Lenze service only
48	Internal command 48	For Lenze service only

Parameter | Name: **C00002 | Controller commands**		Data type: UNSIGNED_32 Index: 24573_d = $5FFD_h$
51	Set rotor displacement angle	Executes rotor position adjustment • The function can only be activated when the controller is inhibited. • After this, the adjustment starts automatically when the controller is enabled. • During the rotor position adjustment, the motor makes one electrical revolution. This leads to a mechanical rotation of the motor shaft. • The determined rotor angle is indicated under code C00058. ▸ Motor interface
71	Calculate inv. characteristic	Detects inverter error characteristic • The function can only be activated when the controller is inhibited. • After this, the adjustment starts automatically when the controller is enabled. ▸ Motor interface
72	Set motor parameters	Automatically detects motor parameter • The function can only be activated when the controller is inhibited. • After this, the adjustment starts automatically when the controller is enabled. ▸ Motor interface
91	CAN on board: reset node	Reinitialises the "CAN on-board" interface. • Required when the baud rate, node address or identifiers are changed.
92	CAN module: reset node	Reinitialises CANopen interface of the CANopen communication module. • Required when the baud rate, node address or identifiers are changed.
93	CAN on-board: Pred.Connect.Set	Sets basic identifier for the "CAN on board" interface according to the "Predefined Connection Set" (DS301V402).
94	CAN module: Pred.Connect.Set	Sets basic identifier for the CANopen interface of the CANopen communication module according to the "Predefined Connection Set" (DS301V402).
95	CAN on-board: Identify node	Detects nodes connected to the "CAN on board" interface. • The result of the CAN bus scan is displayed in C00393.
96	CAN module: Identify node	Detects the nodes connected to the CANopen interface of the CANopen communication module. • The result of the CAN bus scan is displayed in C00393.
101	Unbind/bind Ethernet module MXI1	Reinitialises the Ethernet interface of the Ethernet communication module in the module receptacle MXI1. • Required when a new IP or gateway address is to be accepted without mains switching.
102	Unbind/bind Ethernet module MXI2	Reinitialises the Ethernet interface of the Ethernet communication module in the module receptacle MXI2. • Required when a new IP or gateway address is to be accepted without mains switching.
201	Activate parameter set 1	Loads parameter set 1 from the memory module. • Only possible when the application has stopped and the controller is inhibited.
202	Activate parameter set 2	Loads parameter set 2 from the memory module. • Only possible when the application has stopped and the controller is inhibited.

Parameter | Name: **C00002 | Controller commands**		Data type: UNSIGNED_32 Index: 24573_d = $5FFD_h$
203	Activate parameter set 3	Loads parameter set 3 from the memory module. • Only possible when the application has stopped and the controller is inhibited.
204	Activate parameter set 4	Loads parameter set 4 from the memory module. • Only possible when the application has stopped and the controller is inhibited.
301	Archive parameter set 1	Stores the current parameter set as parameter set 1 in the memory module.
302	Archive parameter set 2	Stores the current parameter set as parameter set 2 in the memory module.
303	Archive parameter set 3	Stores the current parameter set as parameter set 3 in the memory module.
304	Archive parameter set 4	Stores the current parameter set as parameter set 4 in the memory module.
401	Internal command 401	For Lenze service only
730	Internal command 730	For Lenze service only
731	Internal command 731	For Lenze service only
732	Internal command 732	For Lenze service only
733	Internal command 733	For Lenze service only
800	Internal command 800	For Lenze service only
1001	Internal command 1001	For Lenze service only
1020	Internal command 1020	For Lenze service only
1021	Export parameters to file	Export current parameter set to file.
1030	Format file system	Format file system of the memory module.
1040	Restore file system	
10000	Prepare firmware update	
11000	Restart controller	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT		

C00003

Parameter | Name: **C00003 | Controller command status**			Data type: UNSIGNED_32 Index: 24572_d = $5FFC_h$
Display of the number/status of the device command last executed (C00002). • The number of the command stands in the upper 16 bits (for the meaning of the number, see code C00002). • The result of the command stands in the lower 16 bits.			
Display range (min. value | unit | max. value)			
0		4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00004

Parameter | Name: **C00004 | Service password**			Data type: UNSIGNED_32 Index: 24571_d = $5FFB_h$
Service code to unlock protected device commands (C00002).			
Setting range (min. value | unit | max. value)			**Lenze setting**
0		4294967295	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT			

C00005

Parameter | Name: **C00005 | Application selection**			Data type: INTEGER_32 Index: 24570_d = $5FFA_h$
Application selection • Use the controller command C00002="5" to activate the selected application.			
Setting range (min. value | unit | max. value)			**Lenze setting**
-1		16	**0**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT			

C00006

Parameter | Name: **C00006 | Motor control selection**		Data type: UNSIGNED_32 Index: 24569_d = $5FF9_h$
Selection list (Lenze setting printed in bold)		**Information**
1	**Servo control with SM**	For synchronous motors with speed sensor
2	Servo controller with ASM	For asynchronous motors with speed sensor
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00007

Parameter | Name: **C00007 | Active application**			Data type: UNSIGNED_32 Index: 24568_d = $5FF8_h$
Display range (min. value | unit | max. value)			
0		4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00011

Parameter | Name: **C00011 | Motor reference speed**			Data type: UNSIGNED_32 Index: 24564_d = $5FF4_h$
For parameter setting via interface: In case of bigger changes, only change the setting in one step when the controller is inhibited!			
Setting range (min. value | unit | max. value)			**Lenze setting**
50	rpm	50000	**3000 rpm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00018

Parameter | Name: **C00018 | Chopper frequency**		Data type: UNSIGNED_32 Index: 24557_d = $5FED_h$
Selection list (Lenze setting printed in bold)		**Information**
2	1 kHz fixed	**Note:** The maximum output frequency of the controller is limited to 1/8 of the switching frequency selected here!
3	2 kHz fixed	
4	4 kHz fixed	
5	8 kHz fixed	
8	2 kHz variable	
9	4 kHz variable	
10	**8 kHz variable**	
11	16 kHz variable	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00019

Parameter | Name: **C00019 | Zero speed detection threshold**			Data type: UNSIGNED_32 Index: 24556_d = $5FEC_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0	rpm	450	**5 rpm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00022

Parameter | Name: **C00022 | Maximum current**			Data type: UNSIGNED_32 Index: 24553_d = $5FE9_h$
Note: In order that the motor does not start unintentionally without adjusting the route data, the maximum current in the Lenze setting is set to "0 A"!			
Setting range (min. value | unit | max. value)			**Lenze setting**
0.00	A	21474836.47	**0.00 A**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C00034

Parameter | Name: **C00034 | Config. analog input 1**		Data type: UNSIGNED_32 Index: 24541_d = $5FDD_h$
Selection list (Lenze setting printed in bold)		
0	**-10 ... +10 V**	
1	-20...-4 mA, +4...+20 mA	
2	-20 ... +20 mA	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00050

Parameter | Name: **C00050 | Speed setpoint**			Data type: INTEGER_32 Index: 24525_d = $5FCD_h$
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
Subcodes			**Information**
C00050/1			Speed setpoint 1
C00050/2			Speed setpoint 2
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00051

Parameter | Name: **C00051 | Actual speed**			Data type: INTEGER_32 Index: 24524_d = $5FCC_h$
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00052

Parameter | Name: **C00052 | Motor voltage**			Data type: UNSIGNED_32 Index: 24523_d = $5FCB_h$
Display range (min. value | unit | max. value)			
0	V	2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00053

Parameter | Name: **C00053 | DC bus voltage**			Data type: UNSIGNED_32 Index: 24522_d = $5FCA_h$
Display range (min. value | unit | max. value)			
0	V	2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00054

Parameter | Name: **C00054 | Motor current**			Data type: UNSIGNED_32 Index: 24521_d = $5FC9_h$
Display range (min. value | unit | max. value)			
0.00	A	500.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00055

Parameter | Name: **C00055 | Phase currents**			Data type: INTEGER_32 Index: 24520_d = $5FC8_h$
Display range (min. value | unit | max. value)			
-500.00	A	500.00	
Subcodes			**Information**
C00055/1			Zero phase-sequence system
C00055/2			Phase U
C00055/3			Phase V
C00055/4			Phase W
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00056

Parameter | Name: **C00056 | Torque setpoint**			Data type: INTEGER_32 Index: 24519_d = $5FC7_h$
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00057

Parameter | Name: **C00057 | Torque**			Data type: UNSIGNED_32 Index: 24518_d = $5FC6_h$
Display range (min. value | unit | max. value)			
0.000	Nm	2147483.647	
Subcodes			**Information**
C00057/1			Maximum torque
C00057/2			Torque at maximum current (C00022)
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00058

Parameter | Name: **C00058 | Rotor displacement angle**			Data type: INTEGER_32 Index: 24517_d = $5FC5_h$
Setting range (min. value | unit | max. value)			
-179.9	°	179.9	
Subcodes	**Lenze setting**		**Information**
C00058/1	-90.0 °		Rotor displ. angle resolver
C00058/2	0.0 °		Rotor displ. angle encoder
C00058/3	0.0 °		Rotor displ. angle module
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00059

Parameter | Name: **C00059 | Motor - pole pair number**			Data type: UNSIGNED_32 Index: 24516_d = $5FC4_h$
Display range (min. value | unit | max. value)			
0		200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00060

Parameter | Name: **C00060 | Rotor position**			Data type: INTEGER_32 Index: 24515_d = $5FC3_h$
Display range (min. value | unit | max. value)			
0		2047	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00061

Parameter | Name: **C00061 | Heatsink temperature**			Data type: INTEGER_32 Index: 24514_d = $5FC2_h$
Display range (min. value | unit | max. value)			
-200	°C	200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00062

Parameter | Name: **C00062 | Temp. inside the controller**			Data type: INTEGER_32 Index: 24513_d = $5FC1_h$
Display range (min. value | unit | max. value)			
-200	°C	200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00063

Parameter | Name: **C00063 | Motor temperature**			Data type: INTEGER_32 Index: 24512_d = $5FC0_h$
Display range (min. value | unit | max. value)			
-200	°C	200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00064

Parameter | Name: **C00064 | Device utilisation (Ixt)**			Data type: UNSIGNED_32 Index: 24511_d = $5FBF_h$
Controller load during the last 180 seconds • C00064 > 100 % activates error (OC5). • Error reset only possible if C00064 < 95 %.			
Display range (min. value | unit | max. value)			
0	%	250	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00065

Parameter | Name: **C00065 | Ext. 24-V voltage**			Data type: INTEGER_32 Index: 24510_d = $5FBE_h$
Display range (min. value | unit | max. value)			
0.0	V	1000.0	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00066

Parameter | Name: **C00066 | Thermal motor load (I²xt)**			Data type: UNSIGNED_32 Index: 24509_d = $5FBD_h$
A 100 % load corresponds to a permanently flowing rated motor current			
Display range (min. value | unit | max. value)			
0	%	250	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00068

Parameter | Name: **C00068 | Capacitor temperature**			Data type: INTEGER_32 Index: 24507_d = $5FBB_h$
Display range (min. value | unit | max. value)			
-200	°C	200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00069

Parameter | Name: **C00069 | CPU temperature**			Data type: INTEGER_32 Index: 24506_d = $5FBA_h$
Display range (min. value | unit | max. value)			
-200	°C	200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00070

Parameter | Name: **C00070 | Speed controller gain**			Data type: UNSIGNED_32 Index: 24505_d = $5FB9_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0	Nm/rpm	2000000000	**44 Nm/rpm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100000			

C00071

Parameter | Name: **C00071 | Speed contr. reset time**			Data type: UNSIGNED_32 Index: 24504_d = $5FB8_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
1.0	ms	6000.0	**14.4 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00072

Parameter | Name: **C00072 | Speed controller D component**			Data type: UNSIGNED_32 Index: 24503_d = $5FB7_h$
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			

C00074

Parameter | Name: **C00074 | current controller feedforward control**		Data type: UNSIGNED_8 Index: 24501_d = $5FB5_h$
Selection list (Lenze setting printed in bold)		
0	**Deactivate feedforward control**	
1	Activate feedforward control	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00075

Parameter | Name: **C00075 | Current controller gain**			Data type: UNSIGNED_32 Index: 24500_d = $5FB4_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.00	V/A	750.00	**105.00 V/A**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C00076

Parameter | Name: **C00076 | Current contr. integr.-act. time**			Data type: UNSIGNED_32 Index: 24499_d = $5FB3_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.01	ms	2000.00	**2.00 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C00077

Parameter | Name: **C00077 | Field controller gain**			Data type: UNSIGNED_32 Index: 24498_d = $5FB2_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.00	A/Vs	50000.00	**165.84 A/Vs**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C00078

Parameter | Name: **C00078 | Field contr. reset time**			Data type: UNSIGNED_32 Index: 24497_d = $5FB1_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
1.0	ms	6000.0	**15.1 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00079

Parameter | Name: **C00079 | Motor - mutual inductance**			Data type: UNSIGNED_32 Index: 24496_d = $5FB0_h$
Display range (min. value | unit | max. value)			
0.0	mH	214748364.7	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00080

Parameter | Name: **C00080 | Resolver - number of pole pairs**			Data type: UNSIGNED_32 Index: 24495_d = $5FAF_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
1		10	**1**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00081

Parameter | Name: **C00081 | Rated motor power**			Data type: UNSIGNED_32 Index: 24494_d = $5FAE_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.01	kW	500.00	**0.25 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 = $5FAD_h$
Display range (min. value | unit | max. value)			
0.0000	Ohm	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C00083

Parameter | Name: **C00083 | Motor - rotor time constant**			Data type: UNSIGNED_32 Index: 24492_d = $5FAC_h$
Display range (min. value | unit | max. value)			
0.00	ms	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00084

Parameter | Name: **C00084 | Motor stator resistance**			Data type: UNSIGNED_32 Index: 24491_d = $5FAB_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Ohm	125.0000	**18.2200 Ohm**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10000			

C00085

Parameter | Name: **C00085 | Motor stator leakage induct.**			Data type: UNSIGNED_32 Index: 24490_d = $5FAA_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	mH	500.000	**51.000 mH**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 1000			

C00087

Parameter | Name: **C00087 | Rated motor speed**			Data type: UNSIGNED_32 Index: 24488_d = $5FA8_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
50	rpm	50000	**4050 rpm**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00088

Parameter | Name: **C00088 | Motor - rated current**			Data type: UNSIGNED_32 Index: 24487_d = $5FA7_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.01	A	1500.00	**1.30 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_32 Index: 24486_d = $5FA6_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.1	Hz	1000.0	**270.0 Hz**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00090

Parameter | Name: **C00090 | Rated motor voltage**			Data type: UNSIGNED_32 Index: 24485_d = $5FA5_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
50	V	15000	**225 V**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00091

Parameter | Name: **C00091 | Motor - cosine phi**			Data type: UNSIGNED_32 Index: 24484_d = $5FA4_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.50		1.00	**0.80**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C00092

Parameter | Name: **C00092 | Motor - magnetising current**			Data type: UNSIGNED_32 Index: 24483_d = $5FA3_h$
Display range (min. value | unit | max. value)			
0.00	A	500.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00099

Parameter | Name: **C00099 | Firmware version**	Data type: VISIBLE_STRING Index: 24476_d = $5F9C_h$
Format: "xx.xx.xx.xx" (main version, subversion, release version, build number)	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00100

Parameter | Name: **C00100 | Service code**	Data type: UNSIGNED_32 Index: 24475_d = $5F9B_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00105

Parameter | Name: **C00105 | Quick stop decel. time**			Data type: UNSIGNED_32 Index: 24470_d = $5F96_h$
Time between quick stop activation and standstill plus relative inaccuracy time (C00106).			
			▸ "Basic functionQuick stop"
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			

C00106

Parameter | Name: **C00106 | Quick stop S-ramp time**			Data type: UNSIGNED_32 Index: 24469_d = $5F95_h$
S-ramp time in [%] referred to the deceleration time set under C00105.			
			▸ "Basic functionQuick stop"
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			

C00107

Parameter | Name: **C00107 | Ref. quick stop decel. time**		Data type: UNSIGNED_8 Index: 24468_d = $5F94_h$
Reference for the deceleration time set in C00105.		
		▸ "Basic functionQuick stop"
Selection list (Lenze setting printed in bold)		
0	**Reference = reference speed (C00011)**	
1	Ref. = Current speed	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00114

Parameter | Name: **C00114 | DIx terminal polarity**			Data type: UNSIGNED_8 Index: 24461_d = $5F8D_h$
"0" = positive logic (HIGH level = TRUE, LOW level = FALSE) "1" = negative logic (HIGH level = FALSE, LOW level = TRUE)			
Setting range (min. value | unit | max. value)			
0		1	
Subcodes	**Lenze setting**		**Information**
C00114/1	0		Terminal polarity of digital inputs 1 ... 8
C00114/...			
C00114/8			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00118

Parameter | Name: **C00118 | DOx terminal polarity**			Data type: UNSIGNED_8 Index: 24457_d = $5F89_h$
"0" ≡ positive logic (TRUE ≡ HIGH level, FALSE ≡ LOW level) "1" ≡ negative logic (FALSE ≡ HIGH level, TRUE ≡ LOW level)			
Setting range (min. value | unit | max. value)			
0		1	
Subcodes	**Lenze setting**		**Information**
C00118/1	0		Terminal polarity of digital outputs 1 ... 4
C00118/...			
C00118/4			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00120

Parameter | Name: **C00120 | Mot. overload protection (I²xt)**			Data type: UNSIGNED_32 Index: 24455_d = $5F87_h$
Threshold for I^2 x t disconnection • Disconnection is carried out if the thermal motor load (C00066) is higher than the set threshold. • A 100 % thermal motor load corresponds to a permanently flowing rated motor current			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	%	200	**105 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00121

Parameter | Name: **C00121 | Motor temp. warning threshold**			Data type: UNSIGNED_32 Index: 24454_d = $5F86_h$
Temperature threshold for motor temperature advance warning • The reaction for reaching the threshold can be selected in C00584.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	°C	150	**120 °C**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00122

Parameter | Name: **C00122 | Heatsink temp. warn. threshold**			Data type: UNSIGNED_32 Index: 24453_d = $5F85_h$
Temperature threshold for heatsink temperature advance warning • The reaction for reaching the threshold can be selected in C00582.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	°C	85	**85 °C**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00123

Parameter | Name: **C00123 | Device util. warning threshold**			Data type: UNSIGNED_32 Index: 24452_d = $5F84_h$
Adjustable threshold for I x t advance warning • The advance warning is sent if the controller load (C00064) is higher than the set threshold. • The reaction for reaching the threshold can be selected in C00604.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	%	100	**90 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00126

Parameter | Name: **C00126 | CPU temp. warning threshold**			Data type: UNSIGNED_32 Index: 24449_d = $5F81_h$
Temperature threshold for advance warning of CPU temperature on the control card • The reaction for reaching the threshold can be selected in C00589.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	°C	85	**70 °C**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00127

Parameter | Name: **C00127 | Mot. overload warning threshold**			Data type: UNSIGNED_32 Index: 24448_d = $5F80_h$
Adjustable threshold for I^2 x t advance warning • The advance warning is sent if the thermal motor load (C00066) is higher than the set threshold. • The reaction for reaching the threshold can be selected in C00606.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	%	200	**100 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00128

Parameter | Name: **C00128 | Therm. motor time constant**			Data type: UNSIGNED_32 Index: 24447_d = $5F7F_h$
Setting range (min. value | unit | max. value)			
0.1	min	600.0	
Subcodes	**Lenze setting**		**Information**
C00128/1	1.0 min		Therm. time constant coil
C00128/2	5.0 min		Therm. time constant plates
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00129

Parameter | Name: **C00129 | Brake resistance value**			Data type: INTEGER_32 Index: 24446_d = $5F7E_h$
Required for monitoring of the brake resistor temperature.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0	Ohm	500	**180 Ohm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00130

Parameter | Name: **C00130 | Max. power of brake resistor**			Data type: INTEGER_32 Index: 24445_d = $5F7D_h$
Required for monitoring of the brake resistor temperature.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0	W	800000	**5600 W**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00131

Parameter | Name: **C00131 | Therm. capacity of brake resistor**			Data type: INTEGER_32 Index: 24444_d = $5F7C_h$
Required for monitoring of the brake resistor temperature.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0	kWs	1000	**485 kWs**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00132

Parameter | Name: **C00132 | Max. temp. of brake resistor**			Data type: INTEGER_32 Index: 24443_d = $5F7B_h$
When this temperature is reached, the brake resistor will be switched off and switched on again if the temperature is fallen below with a hysteresis of 5 K.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0	°C	1000	**200 °C**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00142

Parameter | Name: **C00142 | Autom. restart after mains ON**		Data type: UNSIGNED_32 Index: 24433_d = $5F71_h$
Starting performance of the controller after mains connection or fault		
Selection list (Lenze setting printed in bold)		
0	Inhibited	
1	**Enabled**	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00150

Parameter | Name: **C00150 | Status word 1**	Data type: BITFIELD_16 Index: 24425_d = $5F69_h$
Status word 1 of the drive interface	
Value is bit-coded:	
Bit 0	User-defined status (bit 0)
Bit 1	Pulse inhibit active
Bit 2	User-defined status (bit 2)
Bit 3	User-defined status (bit 3)
Bit 4	User-defined status (bit 4)
Bit 5	User-defined status (bit 5)
Bit 6	Actual speed value = 0
Bit 7	Controller inhibit active
Bit 8	Device state - Bit 1
Bit 9	Device state - Bit 2
Bit 10	Device state - Bit 3
Bit 11	Device state - Bit 4
Bit 12	Warning active
Bit 13	Trouble active
Bit 14	User-defined status (bit 14)
Bit 15	User-defined status (bit 15)

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00155

Parameter | Name: **C00155 | Status word 2**	Data type: BITFIELD_16 Index: 24420_d = $5F64_h$
Status word 2 of the drive interface	
Value is bit-coded:	
Bit 0	Error status active
Bit 1	Torque limit reached
Bit 2	Current limit reached
Bit 3	Reserved
Bit 4	Drive switched on/in operation
Bit 5	Drive ready for operation
Bit 6	Error active
Bit 7	Drive initialisation
Bit 8	Motor CCW rotation active
Bit 9	Quick stop by trouble active
Bit 10	Safe torque off active
Bit 11	Application active
Bit 12	Reserved
Bit 13	Reserved
Bit 14	Quick stop active
Bit 15	Reserved

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00156

Parameter | Name: **C00156 | Status/Control word MCTRL**			Data type: UNSIGNED_32 Index: 24419_d = $5F63_h$
Status and control word of the motor interface			
Display range (min. value | unit | max. value)			
0		4294967295	
Subcodes			**Information**
C00156/1			Status word motor control
C00156/2			Control word motor control
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00158

Parameter | Name: **C00158 | Controller inhibit by (source)**		Data type: BITFIELD_16 Index: 24417_d = $5F61_h$
Value is bit-coded:		
Bit 0	Terminal	
Bit 1	Reserved	
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Application	
Bit 5	Controller command	
Bit 6	Error response	
Bit 7	Internal PLC	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Operating system	
Bit 11	Identification program	
Bit 12	Brake	
Bit 13	Limiter	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00159

Parameter | Name: **C00159 | Quick stop by (source)**	Data type: BITFIELD_16 Index: 24416_d = $5F60_h$
Value is bit-coded:	
Bit 0	Reserved
Bit 1	Reserved
Bit 2	Reserved
Bit 3	Reserved
Bit 4	Application
Bit 5	Controller command
Bit 6	Error response
Bit 7	Internal PLC
Bit 8	Reserved
Bit 9	Reserved
Bit 10	Reserved
Bit 11	Reserved
Bit 12	Reserved
Bit 13	Reserved

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00166

Parameter | Name: **C00166 | Error status**	Data type: VISIBLE_STRING Index: 24409_d = $5F59_h$
Error message for error number indicated in C00168	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00167

Parameter | Name: **C00167 | Service code**	Data type: VISIBLE_STRING Index: 24408_d = $5F58_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00168

Parameter | Name: **C00168 | Error number**			Data type: UNSIGNED_32 Index: 24407_d = $5F57_h$
Display of the error number of the first error with highest priority			
Display range (min. value | unit | max. value)			
0		4294967295	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00169

Parameter | Name: **C00169 | Logbook event filter**			Data type: UNSIGNED_32 Index: 24406_d = $5F56_h$
Bit coded word for the filtering of system events (fault, warning, info) • A set filter bit inhibits entry into the log file.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0		4294967295	**0**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00171

Parameter | Name: **C00171 | Service code**	Data type: UNSIGNED_32 Index: 24404_d = $5F54_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00173

Parameter | Name: **C00173 | Mains voltage**	Data type: UNSIGNED_8 Index: 24402_d = $5F52_h$

Adaptation of the DC bus voltage thresholds
- Check during commissioning and adapt, if necessary.
- All drive components in DC bus connections must have the same thresholds.
- LU = Undervoltage threshold, OU = Overvoltage threshold

Note: Altering this setting also has an impact on the permissible device utilisation!
In the chapter "Rated data" of the Hardware Manual the corresponding permissible device utilisation for the different device types at a certain mains voltage and switching frequency is specified.

Selection list (Lenze setting printed in bold)		Information
0	230 V, LU = 150 V	Operation on 230 V mains • LU = 150 V, OU = 400 V • Brake chopper threshold = 390 V
1	**400/415 V, LU = 285 V**	Operation on 400 V mains/415 V mains • LU = 285 V, OU = 800 V • Brake chopper threshold = 725 V
2	460/480 V, LU = 328 V	Operation on 460 V mains/480 V mains • LU = 328 V, OU = 800 V • Brake chopper threshold = 765 V
3	500 V, LU = 342 V	Operation on 500 V mains • LU = 342 V, OU = 800 V • Brake chopper threshold = 790 V
4	230 V, LU configurable	Operation on 230 V mains • LU is selected under C00174 • OU = 400 V • Brake chopper threshold = 390 V
5	400/415 V, LU configurable	Operation on 400 V mains/415 V mains • LU is selected under C00174 • OU = 800 V • Brake chopper threshold = 725 V
6	460/480 V, LU configurable	Operation on 460 V mains/480 V mains • LU is selected under C00174 • OU = 800 V • Brake chopper threshold = 765 V
7	500 V, LU configurable	Operation on 500 V mains • LU is selected under C00174 • OU = 800 V • Brake chopper threshold = 790 V

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00174

Parameter | Name: **C00174 | Threshold - undervoltage (LU)**	Data type: UNSIGNED_32 Index: 24401_d = $5F51_h$

With C00173 = 4 ... 7 the LU threshold can be freely selected

Setting range (min. value | unit | max. value)			Lenze setting
15	V	342	**285 V**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00175

Parameter | Name: **C00175 | Service code**	Data type: UNSIGNED_32 Index: 24400_d = $5F50_h$

This code is used internally by the controller and must not be overwritten by the user!

C00176

Parameter | Name: **C00176 | Service code**	Data type: UNSIGNED_32 Index: 24399_d = $5F4F_h$

This code is used internally by the controller and must not be overwritten by the user!

C00177

Parameter | Name: **C00177 | Service code**	Data type: UNSIGNED_32 Index: 24398_d = $5F4E_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00178

Parameter | Name: **C00178 | Elapsed-time meter**			Data type: UNSIGNED_32 Index: 24397_d = $5F4D_h$
Display range (min. value | unit | max. value)			
0	s	4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00179

Parameter | Name: **C00179 | Power-on time meter**			Data type: UNSIGNED_32 Index: 24396_d = $5F4C_h$
Display range (min. value | unit | max. value)			
0	s	4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00180

Parameter | Name: **C00180 | Service code**	Data type: VISIBLE_STRING Index: 24395_d = $5F4B_h$
For Lenze service only	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT	

C00181

Parameter | Name: **C00181 | Red. brake chopper threshold**			Data type: UNSIGNED_32 Index: 24394_d = $5F4A_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0	V	100	**0 V**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00183

Parameter | Name: **C00183 | Device state**	Data type: UNSIGNED_32 Index: 24392_d = $5F48_h$
Display of the device state for controller diagnostics.	
Selection list (display only)	
0	Operation
1	Operation/Warning active
2	Operation/warning locked active
3	Operation/Quick stop active
4	Operation/Application stopped
10	Initialisation active
20	System error active
90	Drive switched on
91	Device switched-on/QSP fault
101	Safe torque off active
102	Error active
104	Trouble active
141	Drive ready to start
151	Quick stop by trouble active
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00185

Parameter | Name: **C00185 | Threshold - mains recov. detect.**			Data type: UNSIGNED_32 Index: 24390$_d$ = 5F46$_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0	%	100	**90 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00186

Parameter | Name: **C00186 | ENP: Identified motor type**	Data type: VISIBLE_STRING Index: 24389$_d$ = 5F45$_h$
Motor type read from the electronic nameplate (ENP)	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00187

Parameter | Name: **C00187 | ENP: Identified serial number**	Data type: VISIBLE_STRING Index: 24388$_d$ = 5F44$_h$
Serial number read from the electronic nameplate (ENP)	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00188

Parameter | Name: **C00188 | ENP: Status**		Data type: UNSIGNED_8 Index: 24387$_d$ = 5F43$_h$
Selection list (display only)		
0	**No ENP found**	
1	ENP data loaded	
2	Known ENP found	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00199

Parameter | Name: **C00199 | Device name**	Data type: VISIBLE_STRING Index: 24376$_d$ = 5F38$_h$
Device name to be defined by the user (e.g. "Cross cutter" or "hoist axis 1") with max. 128 characters	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00200

Parameter | Name: **C00200 | Firmware product type**	Data type: VISIBLE_STRING Index: 24375$_d$ = 5F37$_h$
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00201

Parameter | Name: **C00201 | Firmware - compile date**	Data type: VISIBLE_STRING Index: 24374$_d$ = 5F36$_h$
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00203

Parameter | Name: **C00203 | HW product types**	Data type: VISIBLE_STRING Index: 24372_d = $5F34_h$
Subcodes	**Information**
C00203/1	Type: Control card
C00203/2	Type: Power section
C00203/3	Type: Module in MXI1
C00203/4	Type: Module in MXI2
C00203/5	Type: Memory module
C00203/6	Type: Safety module
C00203/7	Type: Standard device
C00203/8	Type: Complete device
C00203/9	Type: ENP

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00204

Parameter | Name: **C00204 | HW serial numbers**	Data type: VISIBLE_STRING Index: 24371_d = $5F33_h$
Subcodes	**Information**
C00204/1	Serial no.: Control card
C00204/2	Serial no.: Power section
C00204/3	Serial no.: Module in MXI1
C00204/4	Serial no.: Module in MXI2
C00204/5	Serial no.: Memory module
C00204/6	Serial no.: Safety module
C00204/7	Serial no.: Standard device
C00204/8	Serial no.: Complete device
C00204/9	Serial No.: ENP

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00205

Parameter | Name: **C00205 | HW descriptions**	Data type: VISIBLE_STRING Index: 24370_d = $5F32_h$
Subcodes	**Information**
C00205/1	Info: Control card
C00205/2	Info: Power section
C00205/3	Info: Module in MXI1
C00205/4	Info: Module in MXI2
C00205/5	Info: Memory module
C00205/6	Info: Safety module

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00206

Parameter | Name: **C00206 | HW manufacturing data**	Data type: VISIBLE_STRING Index: 24369_d = $5F31_h$
Subcodes	**Information**
C00206/1	Date: Control card
C00206/2	Date: Power section
C00206/3	Date: Module in MXI1
C00206/4	Date: Module in MXI2
C00206/5	Date: Memory module
C00206/6	Date: Safety module
C00206/7	Date: Standard device
C00206/8	Date: Complete device
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00208

Parameter | Name: **C00208 | HW manufacturer**	Data type: VISIBLE_STRING Index: 24367_d = $5F2F_h$
Subcodes	**Information**
C00208/1	Manufacturer: Control card
C00208/2	Manufacturer: Power section
C00208/3	Manufacturer: Module in MXI1
C00208/4	Manufacturer: Module in MXI2
C00208/5	Manufacturer: Memory module
C00208/6	Manufacturer: Safety module
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00209

Parameter | Name: **C00209 | HW countries of origin**	Data type: VISIBLE_STRING Index: 24366_d = $5F2E_h$
Subcodes	**Information**
C00209/1	Country: Control card
C00209/2	Country: Power section
C00209/3	Country: Module in MXI1
C00209/4	Country: Module in MXI2
C00209/5	Country: Memory module
C00209/6	Country: Safety module
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00210

Parameter | Name: **C00210 | HW versions**	Data type: VISIBLE_STRING Index: 24365_d = $5F2D_h$
Subcodes	**Information**
C00210/1	HW version: Control card
C00210/2	HW version: Power section
C00210/3	HW version: Module in MXI1
C00210/4	HW version: Module in MXI2
C00210/5	HW version: Memory module
C00210/6	HW version: Safety module
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00211

Parameter | Name: **C00211 | Application: Version**	Data type: VISIBLE_STRING Index: 24364_d = $5F2C_h$
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00212

Parameter | Name: **C00212 | Application: Type code**	Data type: VISIBLE_STRING Index: 24363_d = $5F2B_h$
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00213

Parameter | Name: **C00213 | Application: Compilation date**	Data type: VISIBLE_STRING Index: 24362_d = $5F2A_h$
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00214

Parameter | Name: **C00214 | Required safety module**	Data type: UNSIGNED_8 Index: 24361_d = $5F29_h$

Setting of the expected safety module
- If a different safety module is detected, an error (trouble) will be activated. The error can only be eliminated by restarting the controller.

Selection list (Lenze setting printed in bold)	
1	**SM0**
2	SM100
4	SM300

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00217

Parameter | Name: **C00217 | Parameter error information**	Data type: UNSIGNED_32 Index: 24358_d = $5F26_h$

This code is used internally by the controller and must not be overwritten by the user!

C00218

Parameter | Name: **C00218 | Application: ID number**	Data type: UNSIGNED_32 Index: 24357_d = $5F25_h$

Display range (min. value | unit | max. value)		
0		0

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00225

Parameter | Name: **C00225 | Check configuration**	Data type: UNSIGNED_32 Index: 24350_d = $5F1E_h$

This code is used internally by the controller and must not be overwritten by the user!

C00254

Parameter | Name: **C00254 | Phase controller gain**	Data type: UNSIGNED_32 Index: 24321_d = $5F01_h$

Setting range (min. value | unit | max. value)			**Lenze setting**
0.00	1/s	1000.00	**20.00 1/s**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100

C00270

Parameter | Name: **C00270 | Freq. - current setpoint filter**			Data type: UNSIGNED_32 Index: 24305_d = $5EF1_h$
Setting range (min. value | unit | max. value)			
1.0	Hz	1000.0	
Subcodes	**Lenze setting**		**Information**
C00270/1	200.0 Hz		Freq. current setpoint filter 1
C00270/2	400.0 Hz		Freq. current setpoint filter 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00271

Parameter | Name: **C00271 | Width - current setpoint filter**			Data type: UNSIGNED_32 Index: 24304_d = $5EF0_h$
Setting range (min. value | unit | max. value)			
0.0	Hz	500.0	
Subcodes	**Lenze setting**		**Information**
C00271/1	20.0 Hz		Width current setp. filter 1
C00271/2	40.0 Hz		Width current setp. filter 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00272

Parameter | Name: **C00272 | Depth - current setpoint filter**			Data type: UNSIGNED_32 Index: 24303_d = $5EEF_h$
With the setting "0 dB" the current setpoint filter is deactivated			
Setting range (min. value | unit | max. value)			
0	db	100	
Subcodes	**Lenze setting**		**Information**
C00272/1	0 db		Depth current setp. filter 1
C00272/2	0 db		Depth current setp. filter 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00273

Parameter | Name: **C00273 | Moment of inertia**			Data type: UNSIGNED_32 Index: 24302_d = $5EEE_h$
Setting range (min. value | unit | max. value)			
0.00	kg cm²	10000.00	
Subcodes	**Lenze setting**		**Information**
C00273/1	0.14 kg cm²		Motor moment of inertia
C00273/2	0.00 kg cm²		Load moment of inertia
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00274

Parameter | Name: **C00274 | Max. acceleration change**			Data type: UNSIGNED_32 Index: 24301_d = $5EED_h$
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 | Signal source - speed setpoint**		Data type: UNSIGNED_16 Index: 24300_d = $5EEC_h$
Selection list (Lenze setting printed in bold)		
0	**SpeedAdd signal**	
1	Differentiated PosSet signal	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00276

Parameter | Name: **C00276 | Signal source - torque setpoint**		Data type: UNSIGNED_16 Index: 24299_d = $5EEB_h$
Selection list (Lenze setting printed in bold)		
0	**TorqueAdd/AccAdd signal**	
1	Differentiated SpeedSet signal	
2	2x diff. PosSet signal	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00280

Parameter | Name: **C00280 | Filter time const. DC detection**			Data type: UNSIGNED_32 Index: 24295_d = $5EE7_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
1.0	ms	1000.0	**25.0 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00308

Parameter | Name: **C00308 | Service code**	Data type: UNSIGNED_16 Index: 24267_d = $5ECB_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00309

Parameter | Name: **C00309 | Service code**	Data type: UNSIGNED_32 Index: 24266_d = $5ECA_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00310

Parameter | Name: **C00310 | Service code**	Data type: UNSIGNED_8 Index: 24265_d = $5EC9_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00311

Parameter | Name: **C00311 | CAN TPDO1 mask byte x** — Data type: BITFIELD_8 Index: 24264_d = $5EC8_h$

A mask can be parameterised for each byte of the TPDO1 in the assigned subcode.
- In case of an event-controlled PDO transmission, only the masked bits will be considered for event control.
- Mask "0x0" means that no bit of the corresponding byte activates PDO transmission.
- Mask "0xff" means that each bit of the corresponding byte can activate PDO transmission.

Value is bit-coded:		
Bit 0	Mask bit 0	
...	...	
Bit 7	Mask bit 7	
Subcodes	**Lenze setting**	**Information**
C00311/1	0x00	Mask for byte 1 ... byte 8 of TPDO1
C00311/...		
C00311/8		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00312

Parameter | Name: **C00312 | CAN TPDO2 mask byte x**		Data type: BITFIELD_8 Index: 24263_d = $5EC7_h$
A mask can be parameterised for each byte of the TPDO2 in the assigned subcode. • In case of an event-controlled PDO transmission, only the masked bits will be considered for event control. • Mask "0x0" means that no bit of the corresponding byte activates PDO transmission. • Mask "0xff" means that each bit of the corresponding byte can activate PDO transmission.		
Value is bit-coded:		
Bit 0	Mask bit 0	
...	...	
Bit 7	Mask bit 7	
Subcodes	**Lenze setting**	**Information**
C00312/1	0x00	Mask for byte 1 ... byte 8 of TPDO2
C00312/...		
C00312/8		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00313

Parameter | Name: **C00313 | CAN TPDO3 mask byte x**		Data type: BITFIELD_8 Index: 24262_d = $5EC6_h$
A mask can be parameterised for each byte of the TPDO3 in the assigned subcode. • In case of an event-controlled PDO transmission, only the masked bits will be considered for event control. • Mask "0x0" means that no bit of the corresponding byte activates PDO transmission. • Mask "0xff" means that each bit of the corresponding byte can activate PDO transmission.		
Value is bit-coded:		
Bit 0	Mask bit 0	
...	...	
Bit 7	Mask bit 7	
Subcodes	**Lenze setting**	**Information**
C00313/1	0x00	Mask for byte 1 ... byte 8 of TPDO3
C00313/...		
C00313/8		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00314

Parameter | Name: **C00314 | CAN TPDO4 mask byte x**		Data type: BITFIELD_8 Index: 24261_d = $5EC5_h$
A mask can be parameterised for each byte of the TPDO4 in the assigned subcode. • In case of an event-controlled PDO transmission, only the masked bits will be considered for event control. • Mask "0x0" means that no bit of the corresponding byte activates PDO transmission. • Mask "0xff" means that each bit of the corresponding byte can activate PDO transmission.		
Value is bit-coded:		
Bit 0	Mask bit 0	
...	...	
Bit 7	Mask bit 7	
Subcodes	**Lenze setting**	**Information**
C00314/1	0x00	Mask for byte 1 ... byte 8 of TPDO4
C00314/...		
C00314/8		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00320

Parameter | Name: **C00320 | CAN TPDOx identifier**		Data type: BITFIELD_32 Index: 24255_d = $5EBF_h$
Identifier for TPDO1 ... TPDO4 • If bit 31 is set (0x8nnnnnnn), the TPDO is deactivated (see DS301V402). • The basic setting is according to the "Predefined Connection Set" of DS301V402.		
Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: SDO invalid
...	...	
Bit 31	PDO invalid	
Subcodes	**Lenze setting**	**Information**
C00320/1	0x00000181	Identifier TPDO1 • After a node address change and CAN reset node, the value 0x180 + node address will be set by default.
C00320/2	0x00000281	Identifier TPDO2 • After a node address change and CAN reset node, the value 0x280 + node address will be set by default.
C00320/3	0x00000381	Identifier TPDO3 • After a node address change and CAN reset node, the value 0x380 + node address will be set by default.
C00320/4	0x00000481	Identifier TPDO4 • After a node address change and CAN reset node, the value 0x480 + node address will be set by default.
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00321

Parameter | Name: **C00321 | CAN RPDOx identifier**		Data type: BITFIELD_32 Index: 24254_d = $5EBE_h$
Identifier for RPDO1 ... RPDO4 • If bit 31 is set (0x8nnnnnnn), the RPDO is deactivated (see DS301V402). • The basic setting is according to the "Predefined Connection Sets" of DS301V402.		
Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: SDO invalid
...	...	
Bit 31	PDO invalid	
Subcodes	**Lenze setting**	**Information**
C00321/1	0x00000201	Identifier RPDO1 • After a node address change and CAN reset node, the value 0x200 + node address will be set by default.
C00321/2	0x00000301	Identifier RPDO2 • After a node address change and CAN reset node, the value 0x300 + node address will be set by default.
C00321/3	0x00000401	Identifier RPDO3 • After a node address change and CAN reset node, the value 0x400 + node address will be set by default.
C00321/4	0x00000501	Identifier RPDO4 • After a node address change and CAN reset node, the value 0x500 + node address will be set by default.
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00322

Parameter | Name: **C00322 | CAN TPDOx Tx mode**			Data type: UNSIGNED_8 Index: 24253_d = $5EBD_h$
TPDO transmission mode according to DS301V402 • Types 0 (acyclic sync), 1-240 (cyclic sync), 254 (event-controlled manufacturer-specific), 255 (event-controlled device-profile-specific) are supported. • The basic PDO setting is "254" (event-controlled).			
Setting range (min. value | unit | max. value)			
0		255	
Subcodes	**Lenze setting**		**Information**
C00322/1	254		Transmission mode for TPDO1 ... TPDO4
C00322/...			
C00322/4			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00323

Parameter | Name: **C00323 | CAN RPDOx Rx mode**			Data type: UNSIGNED_8 Index: 24252_d = $5EBC_h$
RPDO transmission mode according to DS301V402 • With the RPDO used as monitoring setting for sync-controlled PDOs. • Types 0 (acyclic sync), 1-240 (cyclic sync), 254 (event-controlled manufacturer-specific), 255 (event-controlled device-profile-specific) are supported. • The basic PDO setting is "254" (event-controlled).			
Setting range (min. value | unit | max. value)			
0		255	
Subcodes	**Lenze setting**		**Information**
C00323/1	254		Transmission mode for RPDO1 ... RPDO4
C00323/...			
C00323/4			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00324

Parameter | Name: **C00324 | CAN TPDOx delay time**			Data type: UNSIGNED_16 Index: 24251_d = $5EBB_h$
Minimum time between the sending of two identical TPDOs (see DS301V402). • The delay time is entered in 1/10 ms and automatically rounded to full milliseconds by the code.			
Setting range (min. value | unit | max. value)			
0	1/10 ms	65535	
Subcodes	**Lenze setting**		**Information**
C00324/1	0 1/10 ms		Delay time for TPDO1 ... TPDO4
C00324/...			
C00324/4			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00325

Parameter | Name: **C00325 | Service code**	Data type: UNSIGNED_8 Index: 24250_d = $5EBA_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00326

Parameter | Name: **C00326 | Service code**	Data type: UNSIGNED_8 Index: 24249_d = $5EB9_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00327

Parameter | Name: **C00327 | Service code**	Data type: BITFIELD_32 Index: 24248_d = $5EB8_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00328

Parameter | Name: **C00328 | Service code**	Data type: BITFIELD_32 Index: 24247_d = $5EB7_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00329

Parameter | Name: **C00329 | Service code**	Data type: BITFIELD_32 Index: 24246_d = $5EB6_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00330

Parameter | Name: **C00330 | Service code**	Data type: BITFIELD_32 Index: 24245_d = $5EB5_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00335

Parameter | Name: **C00335 | Service code**	Data type: BITFIELD_32 Index: 24240_d = $5EB0_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00336

Parameter | Name: **C00336 | Service code**	Data type: BITFIELD_32 Index: 24239_d = $5EAF_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00337

Parameter | Name: **C00337 | Service code**	Data type: BITFIELD_32 Index: 24238_d = $5EAE_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00338

Parameter | Name: **C00338 | Service code**	Data type: BITFIELD_32 Index: 24237_d = $5EAD_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00345

Parameter | Name: **C00345 | CAN error**		Data type: UNSIGNED_8 Index: 24230_d = $5EA6_h$
Selection list **(display only)**		
0	**No error**	
1	Guard Event	
2	Warning	
3	Bus off	
4	Sync telegram error	
6	Overrun	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00346

Parameter | Name: **C00346 | CAN heartbeat activity**		Data type: BITFIELD_32 Index: 24229_d = $5EA5_h$
Value is bit-coded:		
Bit 0	Heartbeat node 1	
...	...	
Bit 31	Heartbeat node 32	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00347

Parameter | Name: **C00347 | CAN heartbeat status**		Data type: UNSIGNED_8 Index: 24228_d = $5EA4_h$
Selection list (display only)		
0	Unknown	
4	Stopped	
5	Operational	
127	Pre-operational	
Subcodes		**Information**
C00347/1		Status node 1 ... 32
C00347/...		
C00347/32		
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00348

Parameter | Name: **C00348 | CAN status DIP switch**			Data type: UNSIGNED_8 Index: 24227_d = $5EA3_h$
• The value "1" means that the CAN DIP switch has been identified after mains switching and a valid baud rate and node address have been set. • "0" means that no CAN DIP switch or no valid setting has been identified or the setting has been overwritten by writing code C00350 or C00351.			
Display range (min. value | unit | max. value)			
0		1	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00349

Parameter | Name: **C00349 | DIP switch CAN setting**			Data type: UNSIGNED_8 Index: 24226_d = $5EA2_h$
Setting of the CAN DIP switch at the last mains connection			
Display range (min. value | unit | max. value)			
0		255	
Subcodes			**Information**
C00349/1			Node address
C00349/2			Baud rate: 0: 10 kbit/s 1: 20 kbit/s 2: 50 kbit/s 3: 125 kbit/s 4: 250 kbit/s 5: 500 kbit/s 6: 800 kbit/s 7: 1000 kbit/s
☑ 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 = $5EA1_h$

- A change of the node address only gets active after a CAN reset node.
- The basic server channel RX/TX is automatically provided by the node address (C00372 and C00373; subcode 1).
- Overwriting the value deactivates a possible node address selection entered by means of hardware.

Setting range (min. value | unit | max. value)			**Lenze setting**
1		127	**1**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☑ COM ☐ MOT

C00351

Parameter | Name: **C00351 | CAN baud rate**	Data type: UNSIGNED_8 Index: 24224_d = $5EA0_h$

- A change of the baud rate only gets active after a CAN reset node.
- Overwriting the value deactivates a possible node address selection entered by means of hardware.

Selection list (Lenze setting printed in bold)	
0	**500 kbit/s**
1	250 kbit/s
2	125 kbit/s
3	50 kbit/s
4	1 mbit/s
5	20 kbit/s
6	10 kbit/s
8	Reserved
9	Reserved
10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	800 kbit/s
15	Reserved
255	Auto baud

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☑ COM ☐ MOT

C00352

Parameter | Name: **C00352 | CAN slave/master**	Data type: UNSIGNED_8 Index: 24223_d = $5E9F_h$

If "1" is entered and saved, the drive will start as CAN master after mains switching.

Selection list (Lenze setting printed in bold)	
0	**Slave**
1	Master

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00356

Parameter | Name: **C00356 | CAN TPDOx cycle time**			Data type: UNSIGNED_16 Index: 24219_d = $5E9B_h$
TPDO event time from DS301V402. • With a value unequal "0", the TPDO will be sent after the set time without considering the transmission type.			
Setting range (min. value | unit | max. value)			
0	ms	65535	
Subcodes	**Lenze setting**		**Information**
C00356/1	0 ms		Cycle time for TPDO1 ... TPDO4
C00356/...			
C00356/4			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00357

Parameter | Name: **C00357 | CAN RPDOx monitoring time**			Data type: UNSIGNED_16 Index: 24218_d = $5E9A_h$
RPDO event time from DS301V402. • With a value unequal "0", the RPDO will be expected after the set time. • If the RPDO is not received within this time, a parameterisable error message can be activated.			
Setting range (min. value | unit | max. value)			
0	ms	65535	
Subcodes	**Lenze setting**		**Information**
C00357/1	3000 ms		Monitoring time for RPDO1 ... RPDO4
C00357/...			
C00357/4			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00359

Parameter | Name: **C00359 | CAN status**		Data type: UNSIGNED_8 Index: 24216_d = $5E98_h$
Selection list (display only)		
0	**Operational**	
1	Pre-operational	
4	Boot up	
5	Stopped	
7	Reset	
8	INITIALISATION	
9	Unknown	
10	Autom. baud rate detection active	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00360

Parameter | Name: **C00360 | CAN telegram and error counter**			Data type: UNSIGNED_16 Index: 24215_d = $5E97_h$
• After mains connection, counting restarts with "0". • After the maximum value has been reached, counting restarts with "0".			
Display range (min. value | unit | max. value)			
0		65535	
Subcodes			**Information**
C00360/1			Stuffing bit error counter • More than five identical bits have been detected.
C00360/2			Format error counter • CAN frame has not been observed.
C00360/3			Acknowledge error counter • No device has acknowledged the telegram.
C00360/4			Bit1 error counter • "1" should be sent after bus arbitration, but "0" was read.
C00360/5			Bit0 error counter • "0" should be sent after bus arbitration, but "1" was read.
C00360/6			CRC error counter • Check sum check has indicated an error.
C00360/7			Tx telegram counter • Correctly received telegrams.
C00360/8			Rx telegram counters • Correctly transmitted telegrams.
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00361

Parameter | Name: **C00361 | CAN bus load**			Data type: UNSIGNED_32 Index: 24214_d = $5E96_h$
Restart the controller or use the controller command "Reset node" (C00002) to reset the display of the maximum node load.			
Display range (min. value | unit | max. value)			
0	%	100	
Subcodes			**Information**
C00361/1			Current node load in Tx direction
C00361/2			Current node load in Rx direction
C00361/3			Current node load through faulty telegrams
C00361/4			Maximum node load in Tx direction
C00361/5			Maximum node load in Rx direction
C00361/6			Maximum node load through faulty telegrams
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00367

Parameter | Name: **C00367 | CAN SYNC Rx identifier**			Data type: UNSIGNED_32 Index: 24208_d = $5E90_h$
Identifier with which the sync slave is to receive sync telegrams. • Connected with CANopen index 0x1005 of DS301V402.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0		2047	**128**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00368

Parameter | Name: **C00368 | CAN SYNC Tx identifier**			Data type: UNSIGNED_32 Index: 24207_d = $5E8F_h$
Identifier with which the sync master is to send sync telegrams. • Connected with CANopen index 0x1005 of DS301V402.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0		2047	**128**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00369

Parameter | Name: **C00369 | CAN SYNC transmit cycle time**			Data type: UNSIGNED_16 Index: 24206_d = $5E8E_h$
Cycle in which the CAN sync master is to send its sync telegrams. • Connected with CANopen index 0x1006 of DS301V402.			
Setting range (min. value | unit | max. value)			
0	ms	65535	
Subcodes	**Lenze setting**		**Information**
C00369/1	0 ms		
C00369/2	0 ms		
C00369/3	0 ms		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00372

Parameter | Name: **C00372 | CAN SDO server Rx identifier**		Data type: BITFIELD_32 Index: 24203_d = $5E8B_h$
Identifier which serves to reach the assigned SDO server. • Setting bit 31 (0x8nnnnnnn) deactivates the corresponding SDO server (see DS301V402).		
Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: SDO invalid
...	...	
Bit 31	SDO invalid	
Subcodes	**Lenze setting**	**Information**
C00372/1	0x00000601	SDO server channel 1 RX • Subcode 1 contains the basic SDO channel which can neither be changed nor deactivated, according to DS301V402. Writing to the subcode is ineffective. • The value under subcode 1 results from the node address (C00350) + 0x600.
C00372/2	0x80000000	SDO server channel 2 RX
C00372/3	0x80000000	SDO server channel 3 RX
C00372/4	0x80000000	SDO server channel 4 RX
C00372/5	0x80000000	SDO server channel 5 RX
C00372/6	0x80000000	SDO server channel 6 RX
C00372/7	0x80000000	SDO server channel 7 RX
C00372/8	0x80000000	SDO server channel 8 RX
C00372/9	0x80000000	SDO server channel 9 RX
C00372/10	0x80000000	SDO server channel 10 RX
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☑ COM ☐ MOT		

C00373

Parameter | Name: **C00373 | CAN SDO server Tx identifier**		Data type: BITFIELD_32 Index: 24202_d = $5E8A_h$
Identifier with which the assigned SDO server is able to transmit. • Setting bit 31 (0x8nnnnnnn) deactivates the corresponding SDO server (see DS301V402).		
Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: SDO invalid
...	...	
Bit 31	SDO invalid	
Subcodes	**Lenze setting**	**Information**
C00373/1	0x00000581	SDO server channel 1 TX • Subcode 1 contains the basic SDO channel which can neither be changed nor deactivated, according to DS301V402. Writing to the subcode is ineffective. • The value under subcode 1 results from the node address (C00350) + 0x580.
C00373/2	0x80000000	SDO server channel 2 TX
C00373/3	0x80000000	SDO server channel 3 TX
C00373/4	0x80000000	SDO server channel 4 TX
C00373/5	0x80000000	SDO server channel 5 TX
C00373/6	0x80000000	SDO server channel 6 TX
C00373/7	0x80000000	SDO server channel 7 TX
C00373/8	0x80000000	SDO server channel 8 TX
C00373/9	0x80000000	SDO server channel 9 TX
C00373/10	0x80000000	SDO server channel 10 TX
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☑ COM ☐ MOT		

C00374

Parameter | Name: **C00374 | CAN SDO client node address**			Data type: UNSIGNED_8 Index: 24201_d = $5E89_h$
Node address of the client which is assigned to this server (see DS301V402).			
Setting range (min. value | unit | max. value)			
1		127	
Subcodes	**Lenze setting**		**Information**
C00374/1	1		SDO server channel 1 remote client node address • Subcode 1 contains the basic SDO channel which does not include this entry, according to DS301V402. Writing to the subcode is ineffective. • The value of subindex 1 results in 0.
C00374/2	1		SDO server channel 2 remote client node address
C00374/3	1		SDO server channel 3 remote client node address
C00374/4	1		SDO server channel 4 remote client node address
C00374/5	1		SDO server channel 5 remote client node address
C00374/6	1		SDO server channel 6 remote client node address
C00374/7	1		SDO server channel 7 remote client node address
C00374/8	1		SDO server channel 8 remote client node address
C00374/9	1		SDO server channel 9 remote client node address
C00374/10	1		SDO server channel 10 remote client node address
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☑ COM ☐ MOT			

C00375

Parameter | Name: **C00375 | CAN SDO client Rx identifier**		Data type: BITFIELD_32 Index: 24200_d = $5E88_h$

Identifier which serves to reach the assigned SDO client.
- Setting bit 31 (0x8nnnnnnn) deactivates the corresponding SDO client channel (see DS301V402).
- The client channels need not be parameterised right now. Their functionality will only be required when using the Gateway services.

Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: SDO invalid
...	...	
Bit 31	SDO invalid	
Subcodes	**Lenze setting**	**Information**
C00375/1	0x80000000	SDO client channel 1 RX ... 10 RX
C00375/...		
C00375/10		

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00376

Parameter | Name: **C00376 | CAN SDO client Tx identifier**		Data type: BITFIELD_32 Index: 24199_d = $5E87_h$

Identifier with which the assigned SDO client is able to transmit.
- Setting bit 31 (0x8nnnnnnn) deactivates the corresponding SDO client channel (see DS301V402).
- The client channels need not be parameterised right now. Their functionality will only be required when using the Gateway services.

Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: SDO invalid
...	...	
Bit 31	SDO invalid	
Subcodes	**Lenze setting**	**Information**
C00376/1	0x80000000	SDO client channel 1 TX ... 10 TX
C00376/...		
C00376/10		

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00377

Parameter | Name: **C00377 | CAN SDO server node address**		Data type: UNSIGNED_8 Index: 24198_d = $5E86_h$

Node address of the server with which the SDO client communicates via the selected client channel.
- The client functionality need not be activated.
- Activation of the CAN SDO client channel requires an entry (see DS301V402).

Setting range (min. value | unit | max. value)			
1		127	
Subcodes	**Lenze setting**		**Information**
C00377/1	1		Remote server node address for SDO client channel 1 ... 10
C00377/...			
C00377/10			

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00378

Parameter | Name: **C00378 | CAN boot-up delay - operational**			Data type: UNSIGNED_16 Index: 24197_d = $5E85_h$
Time after mains switching after which the CAN NMT master sends the "Start remote node" telegram to the bus. • The delay time is only used when the master bit is activated (C00352) and the controller has been restarted.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0	ms	65535	**3000 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00379

Parameter | Name: **C00379 | Service code**	Data type: UNSIGNED_8 Index: 24196_d = $5E84_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00381

Parameter | Name: **C00381 | CAN heartbeat producer time**			Data type: UNSIGNED_16 Index: 24194_d = $5E82_h$
Time interval at which the device sends a heartbeat telegram with its device status to the bus. • Selection of the "node guarding" monitoring function deactivates the "heartbeat" monitoring function.			
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			

C00382

Parameter | Name: **C00382 | CAN guard time**			Data type: UNSIGNED_16 Index: 24193_d = $5E81_h$
After the set guard time multiplied by the life time factor (C00383), a node guarding telegram must have been received.			
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			

C00383

Parameter | Name: **C00383 | CAN life time factor**			Data type: UNSIGNED_8 Index: 24192_d = $5E80_h$
The life time factor multiplied by the guard time (C00382) results in the time in which a node guarding telegram must have been received.			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0		255	**0**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00385

Parameter | Name: **C00385 | CAN heartbeat consumer time**		Data type: BITFIELD_32 Index: 24190_d = $5E7E_h$

The 32 subcodes represent the nodes to be monitored by means of heartbeat.
- Each subcode entry contains the expected "heartbeat" time and the node ID (node address) from which the heartbeat telegram is expected in the form of a bit code.
- The response to a non received heartbeat telegram can be parameterised.

Value is bit-coded:		**Information**
Bit 0	Heartbeat time bit 0	• Bit 0 ... 15: Heartbeat time • Bit 16 ... 23: Node address • Bit 24 ... 31: Reserved
...	...	
Bit 31	Reserved	
Subcodes	**Lenze setting**	**Information**
C00385/1	0x00000000	Monitoring entry 1 ... 32
C00385/...		
C00385/32		

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00386

Parameter | Name: **C00386 | CAN node guarding**		Data type: BITFIELD_32 Index: 24189_d = $5E7D_h$

The 32 subcodes represent the nodes to be monitored by the master by means of node guarding.
- Each subcode entry contains the guard time, the lifetime factor and the node ID (node address) from which the heartbeat telegram is expected in the form of a bit code.
- The response to a non received node guarding response can be parameterised.

Value is bit-coded:		**Information**
Bit 0	Guard time bit 0	• Bit 0 ... 15: Guard time • Bit 16 ... 23: Node address • Bit 24 ... 31: Lifetime factor
...	...	
Bit 31	Lifetime factor bit 7	
Subcodes	**Lenze setting**	**Information**
C00386/1	0x00000000	Monitoring entry 1 ... 32
C00386/...		
C00386/32		

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00387

Parameter | Name: **C00387 | CAN node guarding activity**		Data type: BITFIELD_32 Index: 24188_d = $5E7C_h$

Value is bit-coded:		
Bit 0	Node guarding node 1	
...	...	
Bit 31	Node guarding node 32	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00388

Parameter | Name: **C00388 | CAN node guarding status**		Data type: UNSIGNED_8 Index: 24187_d = $5E7B_h$
Selection list (display only)		
0	Unknown	
4	Stopped	
5	Operational	
127	Pre-operational	
Subcodes		**Information**
C00388/1		Status node 1 ... 32
C00388/...		
C00388/32		

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00390

Parameter | Name: **C00390 | CAN error register (DS301V402)**		Data type: BITFIELD_8 Index: 24185_d = $5E79_h$
CAN error register according to DS301V402		
Value is bit-coded:		**Information**
Bit 0	Generic error	Currently only bit 0 and bit 4 contain the corresponding information.
Bit 1	Current error (not used)	
Bit 2	Voltage error (not used)	
Bit 3	Temperature error (not used)	
Bit 4	Communication error	
Bit 5	Device profile-spec. error (not used)	
Bit 6	Reserved	
Bit 7	Manufacturer-spec. error (not used)	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00391

Parameter | Name: **C00391 | CAN emergency object**		Data type: BITFIELD_32 Index: 24184_d = $5E78_h$
Identifier of the emergency telegram • Setting bit 31 of this code (0x8nnnnnnn) deactivates the generation of emergency telegrams.		
Value is bit-coded:		**Information**
Bit 0	COB-ID bit 0	• Bit 0 ... 10: COB-ID • Bit 11 ... 30: Reserved • Bit 31: Emergency stop
...	...	
Bit 31	Emergency inactive/active	

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00392

Parameter | Name: **C00392 | CAN emergency delay time**			Data type: UNSIGNED_16 Index: 24183_d = $5E77_h$
Minimum time between two successive emergency telegrams. • Setting "0" deactivates the inhibit time check. • The inhibit time is entered in 1/10 ms. The code automatically rounds the entries down to the preceding full millisecond.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0		65535	**0**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00393

Parameter | Name: **C00393 | CAN result - bus scan**			Data type: UNSIGNED_8 Index: 24182_d = $5E76_h$
Result of CAN bus scanning (see controller commands under C00002). • Subcode number 1 ... 128 corresponds to CAN node address 1 ... 128.			
Display range (min. value | unit | max. value)			
0		1	
Subcodes			**Information**
C00393/1			Result of CAN bus scanning for CAN node address 1 ... 128 • The value "1" means that a device with the corresponding node address has been found.
C00393/...			
C00393/128			
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00395

Parameter | Name: **C00395 | Service code**	Data type: UNSIGNED_32 Index: 24180_d = $5E74_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00396

Parameter | Name: **C00396 | Service code**	Data type: UNSIGNED_32 Index: 24179_d = $5E73_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00397

Parameter | Name: **C00397 | Service code**	Data type: UNSIGNED_32 Index: 24178_d = $5E72_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00398

Parameter | Name: **C00398 | Test mode - motor control**		Data type: UNSIGNED_32 Index: 24177_d = $5E71_h$
Selection list (Lenze setting printed in bold)		
0	**Test mode deactivated**	
1	U rotation test mode	
2	I rotation test mode	
3	Current controller optimisation mode	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT		

C00399

Parameter | Name: **C00399 | Settings for test mode**			Data type: INTEGER_32 Index: 24176_d = $5E70_h$
Setting range (min. value | unit | max. value)			
-1000.0	Hz/1°	1000.0	
Subcodes	**Lenze setting**		**Information**
C00399/1	0.0 Hz/1°		Frequency [Hz] for test mode
C00399/2	0.0 Hz/1°		Start angle [°] for test mode
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00416

Parameter | Name: **C00416 | Resolver error correction**			Data type: UNSIGNED_32 Index: 24159_d = $5E5F_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0		99999999	**0**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00420

Parameter | Name: **C00420 | Number of increments of the encoder**			Data type: UNSIGNED_16 Index: 24155_d = $5E5B_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
1		16384	**512**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C00421

Parameter | Name: **C00421 | Encoder voltage**			Data type: UNSIGNED_16 Index: 24154_d = $5E5A_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
5.0	V	9.0	**5.0 V**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00422

Parameter | Name: **C00422 | Encoder type**		Data type: UNSIGNED_16 Index: 24153_d = $5E59_h$
Selection list (Lenze setting printed in bold)		
0	**Incremental encoder (TTL signal)**	
1	Sin/cos encoder	
2	Absolute value encoder (Hiperface)	
3	Absolute value encoder (EnDat)	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00427

Parameter | Name: **C00427 | TTL encoder signal evaluation**		Data type: UNSIGNED_16 Index: 24148_d = $5E54_h$
Selection list (Lenze setting printed in bold)		
0	**4x evaluation (A, B)**	
1	A:Increments B:Sign	
2	Increments A:pos. B:neg.	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00443

Parameter | Name: **C00443 | DIx status**			Data type: UNSIGNED_8 Index: 24132_d = $5E44_h$
Display range (min. value | unit | max. value)			
0		1	
Subcodes			**Information**
C00443/1			Digital input 1
C00443/2			Digital input 2
C00443/3			Digital input 3
C00443/4			Digital input 4
C00443/5			Digital input 5
C00443/6			Digital input 6
C00443/7			Digital input 7
C00443/8			Digital input 8
C00443/9			Controller inhibit (inversion of input X5/RFR)
C00443/10			Internal signal
C00443/11			Feedback input of holding brake
C00443/12			State bus input
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00444

Parameter | Name: **C00444 | DOx status**			Data type: UNSIGNED_8 Index: 24131_d = $5E43_h$
Display range (min. value | unit | max. value)			
0		1	
Subcodes			**Information**
C00444/1			Digital output 1
C00444/2			Digital output 2
C00444/3			Digital output 3
C00444/4			Digital output 4
C00444/5			Internal signal
C00444/6			Internal signal
C00444/7			Internal signal
C00444/8			Internal signal
C00444/9			User LED
C00444/10			Internal signal
C00444/11			Internal signal
C00444/12			Internal signal
C00444/13			Control output of holding brake
C00444/14			Internal signal
C00444/15			Internal signal
C00444/16			Internal signal
C00444/17			Internal signal
C00444/18			State bus output
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00465

Parameter | Name: **C00465 | Keypad: Welcome screen time-out**	Data type: UNSIGNED_8 Index: 24110_d = $5E2E_h$
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

C00466

Parameter | Name: **C00466 | Keypad: Default parameters**			Data type: UNSIGNED_16 Index: 24109_d = $5E2D_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0		65535	**0**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00467

Parameter | Name: **C00467 | Keypad: Default welcome screen**	Data type: UNSIGNED_8 Index: 24108_d = $5E2C_h$
Selection list (Lenze setting printed in bold)	
0	**Main menu**
1	Parameter list

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00468

Parameter | Name: **C00468 | Service code**	Data type: UNSIGNED_8 Index: 24107_d = $5E2B_h$

This code is used internally by the controller and must not be overwritten by the user!

C00469

Parameter | Name: **C00469 | Keypad: Fct. STOP key**	Data type: UNSIGNED_8 Index: 24106_d = $5E2A_h$
Selection list (Lenze setting printed in bold)	
0	No function
1	Inhibit controller
2	**Activate quick stop**
3	Stop application

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00490

Parameter | Name: **C00490 | Position encoder**	Data type: UNSIGNED_16 Index: 24085_d = $5E15_h$
Selection list (Lenze setting printed in bold)	
0	Resolver X7
1	Encoder X8
2	Encoder module in MXI1
3	Encoder module in MXI2
4	From application
10	**Motor encoder**

☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT

C00494

Parameter | Name: **C00494 | Motor standstill time constant**			Data type: UNSIGNED_32 Index: 24081_d = $5E11_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0	ms	100000	**0 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00495

Parameter | Name: **C00495 | Motor encoder**		Data type: UNSIGNED_16 Index: 24080_d = $5E10_h$
Selection list (Lenze setting printed in bold)		
0	**Resolver X7**	
1	Encoder X8	
2	Encoder module in MXI1	
3	Encoder module in MXI2	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00497

Parameter | Name: **C00497 | Speed act. val. time const.**			Data type: UNSIGNED_32 Index: 24078_d = $5E0E_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0	ms	50.0	**2.0 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00512

Parameter | Name: **C00512 | Service code**	Data type: UNSIGNED_32 Index: 24063_d = $5DFF_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00513

Parameter | Name: **C00513 | Service code**	Data type: VISIBLE_STRING Index: 24062_d = $5DFE_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00514

Parameter | Name: **C00514 | Service code**	Data type: UNSIGNED_32 Index: 24061_d = $5DFD_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00515

Parameter | Name: **C00515 | Service code**	Data type: UNSIGNED_32 Index: 24060_d = $5DFC_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00516

Parameter | Name: **C00516 | Service code**	Data type: UNSIGNED_32 Index: 24059_d = $5DFB_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00573

Parameter | Name: **C00573 | Resp. to brake chopper overload**		Data type: UNSIGNED_32 Index: 24002_d = $5DC2_h$
Response to release of brake chopper monitoring		
Selection list (Lenze setting printed in bold)		
0	**No response**	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00574

Parameter | Name: **C00574 | Resp. to overtemp. brake resist.**		Data type: UNSIGNED_32 Index: 24001_d = $5DC1_h$
Response to release of brake resistor monitoring		
Selection list (Lenze setting printed in bold)		
0	**No response**	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00576

Parameter | Name: **C00576 | Window speed monitoring**			Data type: UNSIGNED_32 Index: 23999_d = $5DBF_h$
Monitoring window for speed control error in [%] of nmax			
Setting range (min. value | unit | max. value)			**Lenze setting**
0	%	100	**100 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00577

Parameter | Name: **C00577 | Field weakening controller gain**			Data type: UNSIGNED_32 Index: 23998_d = $5DBE_h$
With setting "0", the proportional component is deactivated and an integral-action controller is used.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	Vs/V	2147483.647	**0.000 Vs/V**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 1000			

C00578

Parameter | Name: **C00578 | Field weak. contr. reset time**			Data type: UNSIGNED_32 Index: 23997_d = $5DBD_h$
With setting "240000.0 ms", the integral-action component of the field weakening controller is deactivated.			
Setting range (min. value | unit | max. value)			**Lenze setting**
1.0	ms	240000.0	**2000.0 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C00579

Parameter | Name: **C00579 | Resp. to speed monitoring**	Data type: UNSIGNED_32 Index: 23996_d = $5DBC_h$
Response to release of speed monitoring	

Selection list (Lenze setting printed in bold)	
0	**No response**
1	Error
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00580

Parameter | Name: **C00580 | Resp. to encoder open circuit**	Data type: UNSIGNED_32 Index: 23995_d = $5DBB_h$

Response to open circuit in encoder
- **For the use of the encoder as motor encoder:** If an error occurs, the safe operation of the motor is no longer ensured, therefore for safety reasons always the "Error" response should be set!

Selection list (Lenze setting printed in bold)	
0	No response
1	**Error**
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT

C00581

Parameter | Name: **C00581 | Resp. to external fault**	Data type: UNSIGNED_32 Index: 23994_d = $5DBA_h$

Response to an external error

Drive interface

Selection list (Lenze setting printed in bold)	
0	No response
1	**Error**
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning
6	Information

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00582

Parameter | Name: **C00582 | Resp. to heatsink temp. > C00122**	Data type: UNSIGNED_32 Index: 23993_d = $5DB9_h$
Response, if heatsink temperature > variable limit temperature (C00122)	
Selection list (Lenze setting printed in bold)	
0	No response
1	Error
5	**Warning**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00583

Parameter | Name: **C00583 | Resp. to motor overtemp. KTY**	Data type: UNSIGNED_32 Index: 23992_d = $5DB8_h$
Response, if motor temperature > fixed limit temperature	
Selection list (Lenze setting printed in bold)	
0	No response
1	**Error**
5	Warning
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00584

Parameter | Name: **C00584 | Resp. to motor temp. > C00121**	Data type: UNSIGNED_32 Index: 23991_d = $5DB7_h$
Response, if motor temperature > variable limit temperature (C00121)	
Selection list (Lenze setting printed in bold)	
0	No response
1	Error
5	**Warning**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00585

Parameter | Name: **C00585 | Resp. to motor overtemp. PTC**	Data type: UNSIGNED_32 Index: 23990_d = $5DB6_h$
Response, if motor temperature above PTC input T1/T2 too high	
Selection list (Lenze setting printed in bold)	
0	**No response**
1	Error
5	Warning
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00586

Parameter | Name: **C00586 | Resp. to resolver open circuit**	Data type: UNSIGNED_32 Index: 23989_d = $5DB5_h$

Response to open circuit in resolver
- **For the use of the resolver as motor encoder:** If an error occurs, the safe operation of the motor is no longer ensured, therefore for safety reasons always the "Error" response should be set!

Selection list (Lenze setting printed in bold)	
0	No response
1	**Error**
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT

C00587

Parameter | Name: **C00587 | Status - fan control**	Data type: BITFIELD_8 Index: 23988_d = $5DB4_h$

Value is bit-coded:	
Bit 0	Heatsink fan ON
Bit 1	Integral fan ON
Bit 2	Heatsink fan status 1
Bit 3	Heatsink fan status 2
Bit 4	Integral fan status
Bit 5	Reserved
Bit 6	Reserved
Bit 7	Reserved

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00588

Parameter | Name: **C00588 | Resp. to t. sensor drive failure**	Data type: UNSIGNED_32 Index: 23987_d = $5DB3_h$

Response, to error/failure of temperature sensor for heatsink/temperature inside the controller

Selection list (Lenze setting printed in bold)	
0	No response
1	**Error**
5	Warning

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00589

Parameter | Name: **C00589 | Resp. to CPU temp. > C00126**	Data type: UNSIGNED_32 Index: 23986_d = $5DB2_h$

Response, if CPU temperature on the control card > variable limit temperature (C00126).

Selection list (Lenze setting printed in bold)	
0	**No response**
1	Error
5	Warning

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00591

Parameter | Name: **C00591 | Resp. to CAN-RPDOx error**		Data type: UNSIGNED_8 Index: 23984_d = $5DB0_h$
Response, if the corresponding CAN RPDO has not been received in the configured time or with the configured sync.		
Selection list		
0	No response	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	
Subcodes	**Lenze setting**	**Information**
C00591/1	0: No response	Response to non received RPDO1 ... RPDO4
C00591/...		
C00591/4		

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00594

Parameter | Name: **C00594 | Resp. to t. sensor motor failure**		Data type: UNSIGNED_32 Index: 23981_d = $5DAD_h$
Response to motor temperature sensor error.		
Selection list (Lenze setting printed in bold)		
0	No response	
1	**Error**	
5	Warning	

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT

C00595

Parameter | Name: **C00595 | Resp. to CAN bus off**		Data type: UNSIGNED_8 Index: 23980_d = $5DAC_h$
Response, if CAN node switches to the bus off status.		
Selection list (Lenze setting printed in bold)		
0	**No response**	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00596

Parameter | Name: **C00596 | Threshold max. speed reached**			Data type: UNSIGNED_32 Index: 23979_d = $5DAB_h$
Threshold for speed monitoring • The reaction for reaching the threshold can be selected in C00607.			
Setting range (min. value | unit | max. value)			**Lenze setting**
50	rpm	50000	**6500 rpm**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00597

Parameter | Name: **C00597 | Resp. to motor phase failure**	Data type: UNSIGNED_32 Index: 23978_d = $5DAA_h$
Response to release of motor phase failure monitoring	
Selection list (Lenze setting printed in bold)	
0	**No response**
1	Error
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00598

Parameter | Name: **C00598 | Resp. to open circuit AIN1**	Data type: UNSIGNED_32 Index: 23977_d = $5DA9_h$
Response if with master current at AIN1 and mode LifeZero (±4...±20 mA) the current is in the non permitted range (-4...+4 mA).	
Selection list (Lenze setting printed in bold)	
0	No response
1	**Error**
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning
6	Information

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C00599

Parameter | Name: **C00599 | Threshold motor phase failure**			Data type: INTEGER_32 Index: 23976_d = $5DA8_h$
Threshold for motor phase failure monitoring • The response when reaching the threshold can be selected in C00597.			
Setting range (min. value | unit | max. value)			**Lenze setting**
1.0	%	10.0	**5.0 %**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10

C00600

Parameter | Name: **C00600 | Resp. to DC bus overvoltage**	Data type: UNSIGNED_32 Index: 23975_d = $5DA7_h$
Response to DC bus overvoltage	
Selection list (Lenze setting printed in bold)	
1	Error
2	**Fault**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT

C00601

Parameter | Name: **C00601 | Resp. to comm. encoder error**	Data type: UNSIGNED_32 Index: 23974_d = $5DA6_h$
Response to release of encoder monitoring • **For the use of the encoder as motor encoder:** If an error occurs, the safe operation of the motor is no longer ensured, therefore for safety reasons always the "Error" response should be set!	
Selection list **(Lenze setting printed in bold)**	
0	No response
1	**Error**
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00604

Parameter | Name: **C00604 | Resp. to device overload**	Data type: UNSIGNED_32 Index: 23971_d = $5DA3_h$
Response, if adjustable "I x t" warning threshold (C00123) is reached.	
Selection list **(Lenze setting printed in bold)**	
0	No response
1	Error
5	**Warning**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00606

Parameter | Name: **C00606 | Resp. to motor overload**	Data type: UNSIGNED_32 Index: 23969_d = $5DA1_h$
Response, if adjustable "I^2 x t" warning threshold (C00127) is reached.	
Selection list **(Lenze setting printed in bold)**	
0	No response
1	Error
5	**Warning**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT	

C00607

Parameter | Name: **C00607 | Resp. to max. speed reached**	Data type: UNSIGNED_32 Index: 23968_d = $5DA0_h$
Response if adjustable speed threshold (C00596) is reached.	
Selection list **(Lenze setting printed in bold)**	
0	No response
1	**Error**
2	Trouble
3	Quick stop by trouble
4	Warning locked
5	Warning
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C00610

Parameter | Name: **C00610 | Resp. to heatsink fan failure**		Data type: UNSIGNED_32 Index: 23965_d = $5D9D_h$
Response if fan speed of heatsink fan is too low.		
Selection list (**Lenze setting printed in bold**)		
0	No response	
1	**Error**	
5	Warning	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00611

Parameter | Name: **C00611 | Resp. to integral fan failure**		Data type: UNSIGNED_32 Index: 23964_d = $5D9C_h$
Response if fan speed of interior fan is too low.		
Selection list (**Lenze setting printed in bold**)		
0	No response	
1	**Error**	
5	Warning	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00612

Parameter | Name: **C00612 | Resp. to CAN node guarding error**		Data type: UNSIGNED_8 Index: 23963_d = $5D9B_h$
Response of master, if the corresponding node guarding response is not received.		
Selection list		
0	No response	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	
Subcodes	**Lenze setting**	**Information**
C00612/1	0: No response	Response to non received telegram for monitoring entry 1 ... 32
C00612/...		
C00612/32		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00613

Parameter | Name: **C00613 | Resp. to CAN heartbeat error**		Data type: UNSIGNED_8 Index: 23962_d = $5D9A_h$
Response, if the corresponding heartbeat telegram is not received.		
Selection list		
0	No response	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	
Subcodes	**Lenze setting**	**Information**
C00613/1	0: No response	Response to non received telegram for monitoring entry 1 ... 32
C00613/...		
C00613/32		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00614

Parameter | Name: **C00614 | Resp. to CAN life guarding error**		Data type: UNSIGNED_8 Index: 23961_d = $5D99_h$
Response of slave if node guarding request is not sent.		
Selection list (Lenze setting printed in bold)		
0	**No response**	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00615

Parameter | Name: **C00615 | Resp. to imp. device config.**		Data type: UNSIGNED_32 Index: 23960_d = $5D98_h$
Selection list		
0	No response	
1	Error	
3	Quick stop by trouble	
4	Warning locked	
6	Information	
Subcodes	**Lenze setting**	**Information**
C00615/1	0: No response	Reserved
C00615/2	1: Error	Resp. to imp. module in MXI1
C00615/3	1: Error	Resp. to imp. module in MXI2
C00615/4	0: No response	Reserved
C00615/5	0: No response	Reserved
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00618

Parameter | Name: **C00618 | Number of CRC cycles**			Data type: UNSIGNED_32 Index: 23957_d = $5D95_h$
Display range (min. value | unit | max. value)			
0		4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00619

Parameter | Name: **C00619 | Resp. to max. motor current**		Data type: UNSIGNED_32 Index: 23956_d = $5D94_h$
Response if the adjustable maximum motor current threshold (C00620) is exceeded.		
Selection list (Lenze setting printed in bold)		
0	No response	
1	**Error**	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C00620

Parameter | Name: **C00620 | Max. motor current threshold**			Data type: UNSIGNED_32 Index: 23955_d = $5D93_h$
Threshold for maximum motor current monitoring • The response when reaching the threshold can be selected in C00619.			
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			

C00625

Parameter | Name: **C00625 | CAN behaviour in the case of error**		Data type: UNSIGNED_8 Index: 23950_d = $5D8E_h$
Selection list (Lenze setting printed in bold)		
0	**Pre-operational state**	
1	No state change	
2	"Stopped" state	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00635

Parameter | Name: **C00635 | Resp. to new firmware of drive**		Data type: UNSIGNED_32 Index: 23940_d = $5D84_h$
Selection list (Lenze setting printed in bold)		
0	No response	
1	**Error**	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00636

Parameter | Name: **C00636 | Resp. to new module in MXI1**		Data type: UNSIGNED_32 Index: 23939_d = $5D83_h$
Selection list (Lenze setting printed in bold)		
0	No response	
1	Error	
3	Quick stop by trouble	
4	**Warning locked**	
5	Warning	
6	Information	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00637

Parameter | Name: **C00637 | Resp. to new module in MXI2**		Data type: UNSIGNED_32 Index: 23938_d = $5D82_h$
Selection list (Lenze setting printed in bold)		
0	No response	
1	Error	
3	Quick stop by trouble	
4	**Warning locked**	
5	Warning	
6	Information	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C00691

Parameter | Name: **C00691 | Total speed setpoint**			Data type: INTEGER_32 Index: 23884_d = $5D4C_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00692

Parameter | Name: **C00692 | Speed setpoint**			Data type: INTEGER_32 Index: 23883_d = $5D4B_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00693

Parameter | Name: **C00693 | Actual speed**			Data type: INTEGER_32 Index: 23882_d = $5D4A_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00694

Parameter | Name: **C00694 | Speed controller output**			Data type: INTEGER_32 Index: 23881_d = $5D49_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00695

Parameter | Name: **C00695 | Total torque setpoint**			Data type: INTEGER_32 Index: 23880_d = $5D48_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00696

Parameter | Name: **C00696 | Torque setpoint**			Data type: INTEGER_32 Index: 23879_d = $5D47_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00697

Parameter | Name: **C00697 | Filtered torque setpoint**			Data type: INTEGER_32 Index: 23878_d = $5D46_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00698

Parameter | Name: **C00698 | Actual torque**			Data type: INTEGER_32 Index: 23877_d = $5D45_h$
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00730

Parameter | Name: **C00730 | GDO common parameter**	Data type: INTEGER_32 Index: 23845_d = $5D25_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00731

Parameter | Name: **C00731 | GDO channel 1/trigger 1**	Data type: INTEGER_32 Index: 23844_d = $5D24_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00732

Parameter | Name: **C00732 | GDO channel 2/trigger 2**	Data type: INTEGER_32 Index: 23843_d = $5D23_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00733

Parameter | Name: **C00733 | GDO channel 3**	Data type: INTEGER_32 Index: 23842_d = $5D22_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00734

Parameter | Name: **C00734 | GDO channel 4**	Data type: INTEGER_32 Index: 23841_d = $5D21_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00735

Parameter | Name: **C00735 | GDO channel 5**	Data type: INTEGER_32 Index: 23840_d = $5D20_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00736

Parameter | Name: **C00736 | GDO channel 6**	Data type: INTEGER_32 Index: 23839_d = $5D1F_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00737

Parameter | Name: **C00737 | GDO channel 7**	Data type: INTEGER_32 Index: 23838_d = $5D1E_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00738

Parameter | Name: **C00738 | GDO channel 8**	Data type: INTEGER_32 Index: 23837_d = $5D1D_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00739

Parameter | Name: **C00739 | GDO status information**	Data type: INTEGER_32 Index: 23836_d = $5D1C_h$
This code is used internally by the controller and must not be overwritten by the user!	

C00770

Parameter | Name: **C00770 | MCTRL_dnMotorPosAct**			Data type: UNSIGNED_32 Index: 23805_d = $5CFD_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	Incr.	4294967295	
Subcodes			**Information**
C00770/1			Low Word
C00770/2			High Word
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00771

Parameter | Name: **C00771 | MCTRL_dnLoadPosAct**			Data type: UNSIGNED_32 Index: 23804_d = $5CFC_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	Incr.	4294967295	
Subcodes			**Information**
C00771/1			Low Word
C00771/2			High Word
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00772

Parameter | Name: **C00772 | MCTRL_dnMotorSpeedAct**			Data type: INTEGER_32 Index: 23803_d = $5CFB_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00773

Parameter | Name: **C00773 | MCTRL_dnLoadSpeedAct**			Data type: INTEGER_32 Index: 23802_d = $5CFA_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00774

Parameter | Name: **C00774 | MCTRL_dnTorqueAct**			Data type: INTEGER_32 Index: 23801_d = $5CF9_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00775

Parameter | Name: **C00775 | MCTRL_dnOutputSpeedCtrl**			Data type: INTEGER_32 Index: 23800_d = $5CF8_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00776

Parameter | Name: **C00776 | MCTRL_dnInputJerkCtrl**			Data type: INTEGER_32 Index: 23799_d = $5CF7_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00777

Parameter | Name: **C00777 | MCTRL_dnInputTorqueCtrl**			Data type: INTEGER_32 Index: 23798_d = $5CF6_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00778

Parameter | Name: **C00778 | MCTRL_dnFluxAct**			Data type: INTEGER_32 Index: 23797_d = $5CF5_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00779

Parameter | Name: **C00779 | MCTRL_dnDCBusVoltage**			Data type: INTEGER_32 Index: 23796_d = $5CF4_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	V	1000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00780

Parameter | Name: **C00780 | MCTRL_dnImotAct**			Data type: INTEGER_32 Index: 23795_d = $5CF3_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-500.00	A	500.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00781

Parameter | Name: **C00781 | MCTRL_dwMaxMotorSpeed**			Data type: UNSIGNED_32 Index: 23794_d = $5CF2_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00782

Parameter | Name: **C00782 | MCTRL_dwMaxMotorTorque**			Data type: UNSIGNED_32 Index: 23793_d = $5CF1_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0.000	Nm	2147483.647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00783

Parameter | Name: **C00783 | MCTRL_dwMotorVoltageAct**			Data type: UNSIGNED_32 Index: 23792_d = $5CF0_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	V	2000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00784

Parameter | Name: **C00784 | MCTRL_dnMotorFreqAct**			Data type: INTEGER_32 Index: 23791_d = $5CEF_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-800.0	Hz	800.0	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C00786

Parameter | Name: **C00786 | MCTRL_dnIxtLoad**			Data type: INTEGER_32 Index: 23789_d = $5CED_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00787

Parameter | Name: **C00787 | MCTRL_dnFlyingSpeedAct**			Data type: INTEGER_32 Index: 23788_d = $5CEC_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00788

Parameter | Name: **C00788 | MCTRL_dwMaxEffMotorTorque**			Data type: INTEGER_32 Index: 23787_d = $5CEB_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0.000	Nm	2147483.647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00789

Parameter | Name: **C00789 | MCTRL_dwMaxDeviceCurrent**			Data type: INTEGER_32 Index: 23786_d = $5CEA_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0.00	A	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00790

Parameter | Name: **C00790 | MCTRL_dnI2xtLoad**			Data type: INTEGER_32 Index: 23785_d = $5CE9_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00791

Parameter | Name: **C00791 | MCTRL_dnDeltaMotorPos_p**			Data type: INTEGER_32 Index: 23784_d = $5CE8_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-2147483647	Incr.	2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00792

Parameter | Name: **C00792 | MCTRL_dnOutputPosCtrlMotor_s**			Data type: INTEGER_32 Index: 23783_d = $5CE7_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200	%	200	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00800

Parameter | Name: **C00800 | MCTRL_dnPosSet**			Data type: UNSIGNED_32 Index: 23775_d = $5CDF_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	Incr.	4294967295	
Subcodes			**Information**
C00800/1			Low Word
C00800/2			High Word
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00802

Parameter | Name: **C00802 | MCTRL_dnSpeedAdd**			Data type: INTEGER_32 Index: 23773_d = $5CDD_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00803

Parameter | Name: **C00803 | MCTRL_dnTorqueAdd**			Data type: INTEGER_32 Index: 23772_d = $5CDC_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-2147483.647	Nm	2147483.647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00804

Parameter | Name: **C00804 | MCTRL_dnAccelerationAdd**			Data type: INTEGER_32 Index: 23771_d = $5CDB_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-2147483.647	1/s²	2147483.647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C00805

Parameter | Name: **C00805 | MCTRL_dnSpeedLowLimit**			Data type: INTEGER_32 Index: 23770_d = $5CDA_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00806

Parameter | Name: **C00806 | MCTRL_dnTorqueLowLimit**			Data type: INTEGER_32 Index: 23769_d = $5CD9_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00807

Parameter | Name: **C00807 | MCTRL_dnTorqueHighLimit**			Data type: INTEGER_32 Index: 23768_d = $5CD8_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-21474836.47	Nm	21474836.47	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00808

Parameter | Name: **C00808 | MCTRL_dnPosCtrlOutLimit**			Data type: INTEGER_32 Index: 23767_d = $5CD7_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00809

Parameter | Name: **C00809 | MCTRL_dnTorqueCtrlAdapt**			Data type: INTEGER_32 Index: 23766_d = $5CD6_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00810

Parameter | Name: **C00810 | MCTRL_dnSpeedCtrlAdapt**			Data type: INTEGER_32 Index: 23765_d = $5CD5_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00811

Parameter | Name: **C00811 | MCTRL_dnPosCtrlAdapt**			Data type: INTEGER_32 Index: 23764_d = $5CD4_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00812

Parameter | Name: **C00812 | MCTRL_dnMotorPosRefValue**			Data type: UNSIGNED_32 Index: $23763_d = 5CD3_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	Incr.	4294967295	
Subcodes			**Information**
C00812/1			Low Word
C00812/2			High Word
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00813

Parameter | Name: **C00813 | MCTRL_dnLoadPosRefValue**			Data type: UNSIGNED_32 Index: $23762_d = 5CD2_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
0	Incr.	4294967295	
Subcodes			**Information**
C00813/1			Low Word
C00813/2			High Word
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00814

Parameter | Name: **C00814 | MCTRL_dnBoost**			Data type: INTEGER_32 Index: $23761_d = 5CD1_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-1000	V	1000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00815

Parameter | Name: **C00815 | MCTRL_dnSpeedCtrlIntegrator**			Data type: INTEGER_32 Index: $23760_d = 5CD0_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	Nm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00816

Parameter | Name: **C00816 | MCTRL_dnFieldWeak**			Data type: INTEGER_32 Index: $23759_d = 5CCF_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C00817

Parameter | Name: **C00817 | MCTRL_dnSpeedSet_s**			Data type: INTEGER_32 Index: $23758_d = 5CCE_h$
Internal motor control (MCTRL) signal			
Display range (min. value | unit | max. value)			
-480000	rpm	480000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00854

Parameter | Name: **C00854 | ID status**			Data type: UNSIGNED_32 Index: 23721_d = $5CA9_h$
Display range (min. value | unit | max. value)			
0		100	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00878

Parameter | Name: **C00878 | Status DCTRL control input**			Data type: UNSIGNED_8 Index: 23697_d = $5C91_h$
Display range (min. value | unit | max. value)			
0		1	
Subcodes			**Information**
C00878/1			
C00878/2			
C00878/3			
C00878/4			
C00878/5			
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C00909

Parameter | Name: **C00909 | Speed limitation**			Data type: INTEGER_16 Index: 23666_d = $5C72_h$
Speed limitation for speed setpoint			
Setting range (min. value | unit | max. value)			
-175.0	%	175.0	
Subcodes	**Lenze setting**		**Information**
C00909/1	175.0 %		Upper speed limit value
C00909/2	-175.0 %		Lower speed limit value
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C01120

Parameter | Name: **C01120 | Sync source**		Data type: UNSIGNED_8 Index: 23455_d = $5B9F_h$
Selection list (Lenze setting printed in bold)		
0	**Off**	
1	CAN on-board	
2	CAN module	
4	Module in MXI1	
5	Module in MXI2	
6	Digital input 1	
7	Digital input 2	
8	Digital input 3	
9	Digital input 4	
10	Digital input 5	
11	Digital input 6	
12	Digital input 7	
13	Digital input 8	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C01121

Parameter | Name: **C01121 | Sync cycle time**			Data type: UNSIGNED_32 Index: 23454_d = $5B9E_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
250	µs	13000	**1000 µs**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C01122

Parameter | Name: **C01122 | Sync phase position**			Data type: UNSIGNED_32 Index: 23453_d = $5B9D_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
0	µs	64000	**0 µs**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C01123

Parameter | Name: **C01123 | Sync window**			Data type: UNSIGNED_32 Index: 23452_d = $5B9C_h$
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			

C01124

Parameter | Name: **C01124 | Sync PLL increment**		Data type: UNSIGNED_8 Index: 23451_d = $5B9B_h$
Selection list (Lenze setting printed in bold)		
1	**10 ns**	
2	21 ns	
3	31 ns	
4	41 ns	
5	52 ns	
6	63 ns	
7	73 ns	
8	83 ns	
9	94 ns	
10	104 ns	
11	115 ns	
12	125 ns	
13	135 ns	
14	146 ns	
15	156 ns	
16	167 ns	
17	174 ns	
18	182 ns	
19	190 ns	
20	198 ns	
21	206 ns	
22	213 ns	
23	221 ns	
24	229 ns	
25	237 ns	
26	245 ns	
27	252 ns	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C01190

Parameter | Name: **C01190 | Motor thermal sensor**		Data type: UNSIGNED_32 Index: 23385_d = $5B59_h$
Selection list (Lenze setting printed in bold)		**Information**
0	**KTY83-110**	Lenze standard KTY83-110 (MDSKX, MCS06)
1	Spec. characteristic	Characteristic defined via C01191 and C01192.
2	KTY83-110 + 2 x PTC	Lenze standard KTY83-110 + 2 x PTC 150°C (MCS09-MCS19)
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C01191

Parameter | Name: **C01191 | Temperature for spec. characteristic**			Data type: UNSIGNED_32 Index: 23384_d = $5B58_h$
The special thermal sensor characteristic is selected by setting C01190="1"			
Setting range (min. value | unit | max. value)			
0	°C	255	
Subcodes	**Lenze setting**		**Information**
C01191/1	25 °C		Value 1 for spec. thermal sensor characteristic
C01191/2	150 °C		Value 2 for spec. thermal sensor characteristic
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C01192

Parameter | Name: **C01192 | Resistor for spec. characteristic**			Data type: UNSIGNED_32 Index: 23383_d = $5B57_h$
The special thermal sensor characteristic is selected by setting C01190="1"			
Setting range (min. value | unit | max. value)			
0	Ohm	30000	
Subcodes	**Lenze setting**		**Information**
C01192/1	1000 Ohm		Value 1 for spec. thermal sensor characteristic
C01192/2	2225 Ohm		Value 2 for spec. thermal sensor characteristic
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C01193

Parameter | Name: **C01193 | Motor temp. feedback system**		Data type: UNSIGNED_16 Index: 23382_d = $5B56_h$
Selection of feedback system for motor temperature detection.		
Selection list (Lenze setting printed in bold)		
0	**Speed feedback**	
1	Resolver X7	
2	Encoder X8	
3	Encoder module in MXI1	
4	Encoder module in MXI2	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C01194

Parameter | Name: **C01194 | Motor operating temperature**			Data type: INTEGER_32 Index: 23381_d = $5B55_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
1	°C	200	**140 °C**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C01195

Parameter | Name: **C01195 | Influence winding I²xt mon.**			Data type: UNSIGNED_32 Index: 23380_d = $5B54_h$
I^2xt motor monitoring: Influence of the winding temperature • By setting "0 %" the time constant for the winding is not considered and the thermal model is only calculated with the time constant set for the housing/steel plates.			
Setting range (min. value | unit | max. value)			**Lenze setting**
0	%	100	**0 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C01196

Parameter | Name: **C01196 | S1 torque characteristic I²xt mon.**			Data type: UNSIGNED_32 Index: 23379_d = $5B53_h$
I^2xt motor monitoring: Speed-dependent evaluation of the motor current • By selecting a characteristic the permissible motor current is evaluated depending on speed for calculating the thermal motor utilisation.			
Setting range (min. value | unit | max. value)			
0	%	600	
Subcodes	**Lenze setting**		**Information**
C01196/1	0 %		S1 torque characteristic n1/nn
C01196/2	100 %		S1 torque characteristic I1/In
C01196/3	0 %		S1 torque characteristic n2/nn
C01196/4	100 %		S1 torque characteristic I2/In
C01196/5	100 %		S1 torque characteristic n3/nn
C01196/6	100 %		S1 torque characteristic I3/In
C01196/7	100 %		S1 torque characteristic n4/nn
C01196/8	100 %		S1 torque characteristic I4/In

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT

C01203

Parameter | Name: **C01203 | Counter: Brake chopper overload**			Data type: UNSIGNED_16 Index: 23372_d = $5B4C_h$
Display range (min. value | unit | max. value)			
0		65535	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01204

Parameter | Name: **C01204 | Counter: Ixt overload**			Data type: UNSIGNED_16 Index: 23371_d = $5B4B_h$
Display range (min. value | unit | max. value)			
0		65535	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01205

Parameter | Name: **C01205 | Counter: DC bus overvoltage**			Data type: UNSIGNED_16 Index: 23370_d = $5B4A_h$
Display range (min. value | unit | max. value)			
0		65535	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01206

Parameter | Name: **C01206 | Counter: Mains switching**			Data type: UNSIGNED_16 Index: 23369_d = $5B49_h$
Display range (min. value | unit | max. value)			
0		65535	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01208

Parameter | Name: **C01208 | Counter: heatsink overtemp.**			Data type: UNSIGNED_16 Index: 23367_d = $5B47_h$
Display range (min. value | unit | max. value)			
0		65535	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01209

Parameter | Name: **C01209 | Counter: housing overtemp.**			Data type: UNSIGNED_16 Index: 23366_d = $5B46_h$
Display range (min. value | unit | max. value)			
0		65535	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C01210

Parameter | Name: **C01210 | Electrolyt. capacitor av. temp.**			Data type: UNSIGNED_8 Index: 23365_d = $5B45_h$
Display range (min. value | unit | max. value)			
0		255	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C01211

Parameter | Name: **C01211 | Service code**	Data type: UNSIGNED_32 Index: 23364_d = $5B44_h$
This code is used internally by the controller and must not be overwritten by the user!	

C01212

Parameter | Name: **C01212 | Counter: power section overload**			Data type: UNSIGNED_16 Index: 23363_d = $5B43_h$
Display range (min. value | unit | max. value)			
0		65535	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C01213

Parameter | Name: **C01213 | Service code DataFlash**	Data type: UNSIGNED_32 Index: 23362_d = $5B42_h$
This code is used internally by the controller and must not be overwritten by the user!	

C01214

Parameter | Name: **C01214 | Internal clock**	Data type: VISIBLE_STRING Index: 23361_d = $5B41_h$
System time of the controller in the format "dd/mm/yyyy hh:mm:ss"	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C01501

Parameter | Name: **C01501 | Resp. to comm. error with MXI1**		Data type: UNSIGNED_32 Index: 23074_d = $5A22_h$
Response to communication error between "intelligent" module in module slot 1 and basic device		
Selection list (Lenze setting printed in bold)		
0	**No response**	
1	Error	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C01502

Parameter | Name: **C01502 | Resp. to comm. error with MXI2**	Data type: UNSIGNED_32 Index: 23073_d = $5A21_h$
Response to communication error between "intelligent" module in module slot 2 and basic device	

Selection list (Lenze setting printed in bold)		
0	**No response**	
1	Error	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01510

Parameter | Name: **C01510 | Ethernet IP address client x**	Data type: VISIBLE_STRING Index: 23065_d = $5A19_h$

Display of the five possible server channels
- If a client is connected via one of these server channels, the IP address and the port of the client will be indicated in the form of "xxx.xxx.xxx.xxx : yyyy".
- If no client is connected via the server channel, "---.---.---.--- : ----" will be indicated.

Subcodes	**Information**
C01510/1	Server channel 1 ... 5
C01510/...	
C01510/5	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01511

Parameter | Name: **C01511 | Ethernet status client x**	Data type: UNSIGNED_8 Index: 23064_d = $5A18_h$
Status of the five possible server channels	

Selection list		
0	Not connected	
1	Connected	
2	Stop	
3	Unknown status	

Subcodes	**Information**
C01511/1	Status of server channel 1 ... 5
C01511/...	
C01511/5	

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C01902

Parameter | Name: **C01902 | Diagnostics X6: Max. baud rate**	Data type: UNSIGNED_32 Index: 22673_d = 5891_h

Maximum permissible baud rate of the basic device after determination of the baud rate at the diagnostics interface X6
- Communication starts with the default baud rate 19200 of the basic device.

Selection list (Lenze setting printed in bold)	
9600	9600 baud
19200	19.200 baud
38400	38.400 baud
57600	57.600 baud
115200	115.200 baud
230400	230.400 baud
375000	375.000 baud
750000	750.000 baud
1500000	1.500.000 baud
3000000	**3.000.000 baud**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☑ COM ☐ MOT

C01903

Parameter | Name: **C01903 | Diagnostics X6: Change baud rate**	Data type: UNSIGNED_32 Index: 22672_d = 5890_h

New Determination of the baud rate at the diagnostics interface X6

Selection list (Lenze setting printed in bold)	
0	**Ignore changes**
1	Set a higher baud rate

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☑ No transfer ☐ COM ☐ MOT

C01905

Parameter | Name: **C01905 | Diagnostics X6: Curr. baud rate**	Data type: UNSIGNED_32 Index: 22670_d = $588E_h$

Current baud rate at diagnostics interface X6

Display range (min. value | unit | max. value)		
0		3000000

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02104

Parameter | Name: **C02104 | Program auto-start**	Data type: UNSIGNED_32 Index: 22471_d = $57C7_h$

Selection list (Lenze setting printed in bold)	
0	Off
1	**Autom. after mains connection**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02108

Parameter | Name: **C02108 | Program status**	Data type: UNSIGNED_8 Index: 22467_d = $57C3_h$

Selection list (display only)	
0	Program is running
1	Program stopped
2	Program stopped at breakpoint

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02109

Parameter | Name: **C02109 | Program runtime**			Data type: UNSIGNED_16 Index: 22466_d = $57C2_h$
Display range (min. value | unit | max. value)			
0	µs	65535	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02113

Parameter | Name: **C02113 | Program name**	Data type: VISIBLE_STRING Index: 22462_d = $57BE_h$
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C02121

Parameter | Name: **C02121 | Runtime task 1**			Data type: UNSIGNED_32 Index: 22454_d = $57B6_h$
Display range (min. value | unit | max. value)			
0	µs	3600000000	
Subcodes			**Information**
C02121/1			Curr. runtime task 1
C02121/2			max. runtime task 1
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02122

Parameter | Name: **C02122 | Runtime task 2**			Data type: UNSIGNED_32 Index: 22453_d = $57B5_h$
Display range (min. value | unit | max. value)			
0	µs	3600000000	
Subcodes			**Information**
C02122/1			Curr. runtime task 2
C02122/2			max. runtime task 2
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02123

Parameter | Name: **C02123 | Runtime task 3**			Data type: UNSIGNED_32 Index: 22452_d = $57B4_h$
Display range (min. value | unit | max. value)			
0	µs	3600000000	
Subcodes			**Information**
C02123/1			Curr. runtime task 3
C02123/2			max. runtime task 3
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02520

Parameter | Name: **C02520 | Gearbox fact. numer. motor**			Data type: INTEGER_32 Index: 22055_d = 5627_h
			▶ Drive interface
Setting range (min. value | unit | max. value)			**Lenze setting**
1		2147483647	**1**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02521

Parameter | Name: **C02521 | Gearbox fact. denom. motor**			Data type: INTEGER_32 Index: 22054_d = 5626_h
			▶ Drive interface
Setting range (min. value | unit | max. value)			**Lenze setting**
1		2147483647	**1**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02522

Parameter | Name: **C02522 | Gearbox fact. numer. load**			Data type: INTEGER_32 Index: 22053_d = 5625_h
			▶ Drive interface
Setting range (min. value | unit | max. value)			**Lenze setting**
1		2147483647	**1**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02523

Parameter | Name: **C02523 | Gearbox fact. denom. load**			Data type: INTEGER_32 Index: 22052_d = 5624_h
			▶ Drive interface
Setting range (min. value | unit | max. value)			**Lenze setting**
1		2147483647	**1**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02524

Parameter | Name: **C02524 | Feed constant**			Data type: UNSIGNED_32 Index: 22051_d = 5623_h
			▶ Drive interface
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0001	Unit/rev.	214748.3647	**360.0000 Unit/rev.**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02525

Parameter | Name: **C02525 | Unit**		Data type: UNSIGNED_32 Index: 22050_d = 5622_h
		▶ Drive interface
Selection list (Lenze setting printed in bold)		**Information**
0	User-defined	The text entered in C02526 is displayed for the unit.
1	Incr.	
2	µm	
3	mm	
4	M	
5	inch	
6	yard	
7	**°**	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02526

Parameter | Name: **C02526 | User-defined unit**	Data type: VISIBLE_STRING Index: 22049_d = 5621_h
User-defined unit which is displayed when C02525="0" is selected.	
	▶ Drive interface
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C02527

Parameter | Name: **C02527 | Motor mounting direction**	Data type: UNSIGNED_32 Index: 22048_d = 5620_h

▶ Drive interface

Selection list (Lenze setting printed in bold)	
0	**Motor rotating CW**
1	Motor rotating CCW

☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02528

Parameter | Name: **C02528 | Traversing range**	Data type: UNSIGNED_32 Index: 22047_d = $561F_h$

▶ Drive interface

Selection list (Lenze setting printed in bold)	
0	**Unlimited**
1	Limited
2	Modulo

☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02529

Parameter | Name: **C02529 | Load sensor mounting direction**	Data type: UNSIGNED_32 Index: 22046_d = $561E_h$

▶ Drive interface

Selection list (Lenze setting printed in bold)	
0	**Sensor rotating CW**
1	Encoder rotating CCW

☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02530

Parameter | Name: **C02530 | Active function state**	Data type: INTEGER_32 Index: 22045_d = $561D_h$
Displays the basic drive function that currently controls the drive.	
	▸ Basic drive functions: Internal state machine

Selection list (display only)	
0	**Program stopped**
1	Initial/boot state active
2	Torque follower active
3	Speed follower active
4	Position follower active
5	Setpoint follower active
6	Positioning active
7	Homing active
8	Manual jog active
9	Brake test active
10	Drive at standstill
11	Drive is stopped
12	Quick stop active
13	Reserve 1
14	Controller is not ready
15	Initialisation
16	Error

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02531

Parameter | Name: **C02531 | Resulting gearbox factors**	Data type: UNSIGNED_32 Index: 22044_d = $561C_h$

Note: In subcode 3 the resulting gearbox factor between the motor and the load is displayed if a separate position encoder is configured and the position control is activated (C02570="2"). For a different encoder configuration (without a separate position encoder) the value "1" is shown in subcode 3.

▸ Drive interface

Display range (min. value | unit | max. value)			
0.001		2147483.647	
Subcodes			**Information**
C02531/1			Res. gearbox fact. motor end
C02531/2			Res. gearbox fact. load end
C02531/3			Res. gearbox fact. motor/load

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000

C02532

Parameter | Name: **C02532 | Resolution of a unit**	Data type: UNSIGNED_32 Index: 22043_d = $561B_h$

▸ Drive interface

Display range (min. value | unit | max. value)		
0.0000	Incr./Unit	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02533

Parameter | Name: **C02533 | Time unit**	Data type: UNSIGNED_32 Index: 22042_d = $561A_h$

▸ Drive interface

Selection list (display only)	
2	s

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02534

Parameter | Name: **C02534 | User-defined time unit**	Data type: VISIBLE_STRING Index: 22041_d = 5619_h

▸ Drive interface

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02535

Parameter | Name: **C02535 | User-defined unit**	Data type: VISIBLE_STRING Index: 22040_d = 5618_h

▸ Drive interface

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02536

Parameter | Name: **C02536 | Cycle**	Data type: UNSIGNED_32 Index: 22039_d = 5617_h

▸ Drive interface

Setting range (min. value | unit | max. value)			Lenze setting
0.0000	Unit	214748.3647	**360.0000 Unit**

☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02537

Parameter | Name: **C02537 | Speed unit**	Data type: VISIBLE_STRING Index: 22038_d = 5616_h

▸ Drive interface

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02538

Parameter | Name: **C02538 | Acceleration unit**	Data type: VISIBLE_STRING Index: 22037_d = 5615_h

▸ Drive interface

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02539

Parameter | Name: **C02539 | Maximum position to be displayed**	Data type: INTEGER_32 Index: 22036_d = 5614_h

▸ Drive interface

Display range (min. value | unit | max. value)		
-214748.3647	Unit	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02540

Parameter | Name: **C02540 | Max. speed to be displayed**	Data type: INTEGER_32 Index: 22035_d = 5613_h

▸ Drive interface

Display range (min. value | unit | max. value)		
-214748.3647	Unit/s	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02541

Parameter | Name: **C02541 | Max. accel. to be displayed**			Data type: INTEGER_32 Index: 22034_d = 5612_h
			Drive interface
Display range (min. value | unit | max. value)			
-214748.3647	Unit/s²	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02542

Parameter | Name: **C02542 | Load reference speed**			Data type: UNSIGNED_32 Index: 22033_d = 5611_h
			Drive interface
Display range (min. value | unit | max. value)			
0.000	rpm	4294967.295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02543

Parameter | Name: **C02543 | Load reference torque**			Data type: UNSIGNED_32 Index: 22032_d = 5610_h
			Drive interface
Display range (min. value | unit | max. value)			
0.000	Nm	4294967.295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02547

Parameter | Name: **C02547 | DI_dnState**			Data type: INTEGER_32 Index: 22028_d = $560C_h$
Status of the drive interface (LS_DriveInterface).			
Display range (min. value | unit | max. value)			
-2147483648		2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02548

Parameter | Name: **C02548 | DI_bErrors**		Data type: UNSIGNED_32 Index: 22027_d = $560B_h$
Display of the boolean error signals of the drive interface (LS_DriveInterface).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02548/1		DI_bResetError1
C02548/2		DI_bResetError2
C02548/3		DI_bResetError3
C02548/4		DI_bSetExternError
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02549

Parameter | Name: **C02549 | Drive interface: Signals**	Data type: UNSIGNED_32 Index: 22026_d = $560A_h$
Display of the boolean signals of the drive interface (LS_DriveInterface).	
Selection list	
0 FALSE	
1 TRUE	
Subcodes	**Information**
C02549/1	DI_bSetCInh
C02549/2	Reserved
C02549/3	Reserved
C02549/4	DI_bSwitchOn
C02549/5	Reserved
C02549/6	DI_bReady
C02549/7	DI_bFailActive
C02549/8	DI_bImpActive
C02549/9	DI_bCInhActive
C02549/10	DI_bWarningActive
C02549/11	DI_bUVDetected
C02549/12	DI_bOVDetected
C02549/13	DI_bMainSupplyOk
C02549/14	DI_bReadyToSwitchOn
C02549/15	DI_bOperationEnabled
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT	

C02550

Parameter | Name: **C02550 | Setpoint interpolation**		Data type: UNSIGNED_32 Index: 22025_d = 5609_h
		▸ Motor interface
Selection list		
0	Off	
1	ON	
Subcodes	**Lenze setting**	**Information**
C02550/1	0: Off	Position setpoint interpolat.
C02550/2	0: Off	Speed setpoint interpolat.
C02550/3	0: Off	Torque setpoint interpolat.
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02552

Parameter | Name: **C02552 | Position setpoint**			Data type: INTEGER_32 Index: 22023_d = 5607_h
			▸ Motor interface
Display range (min. value | unit | max. value)			
-214748.3647	Unit	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02553

Parameter | Name: **C02553 | Position controller gain**			Data type: UNSIGNED_32 Index: 22022_d = 5606_h
			Motor interface
Setting range (min. value | unit | max. value)			**Lenze setting**
0.00	1/s	1000.00	**20.00 1/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02554

Parameter | Name: **C02554 | Int.-act. time of position controller**			Data type: UNSIGNED_32 Index: 22021_d = 5605_h
			Motor interface
Setting range (min. value | unit | max. value)			**Lenze setting**
0.001	s	60.000	**60.000 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02555

Parameter | Name: **C02555 | Pos. contr. D comp.**			Data type: UNSIGNED_32 Index: 22020_d = 5604_h
			Motor interface
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000		100.000	**0.000**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02556

Parameter | Name: **C02556 | Pos. contr. limitation**			Data type: INTEGER_32 Index: 22019_d = 5603_h
			Motor interface
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s	214748.3647	**214748.3647 Unit/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02557

Parameter | Name: **C02557 | Motor pos. contr. output**			Data type: INTEGER_32 Index: 22018_d = 5602_h
			Motor interface
Display range (min. value | unit | max. value)			
-214748.3647	Unit/s	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02558

Parameter | Name: **C02558 | Pos. contr. output**			Data type: INTEGER_32 Index: 22017_d = 5601_h
			Motor interface
Display range (min. value | unit | max. value)			
-214748.3647	Unit/s	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02559

Parameter | Name: **C02559 | Internal torque limits**			Data type: INTEGER_32 Index: 22016_d = 5600_h
			▸ Motor interface
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes			**Information**
C02559/1			Upper int. torque limit
C02559/2			Lower int. torque limit
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02560

Parameter | Name: **C02560 | Messages - motor interface**			Data type: UNSIGNED_32 Index: 22015_d = $55FF_h$
			▸ Motor interface
Display range (min. value | unit | max. value)			
0		4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02567

Parameter | Name: **C02567 | Control mode**		Data type: UNSIGNED_32 Index: 22008_d = $55F8_h$
		▸ Motor interface
Selection list (display only)		
0	**Position control**	
1	Speed control	
2	Torque control	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02568

Parameter | Name: **C02568 | Motor interface: % signals**			Data type: INTEGER_32 Index: 22007_d = $55F7_h$
Display of the scaled signals of the motor interface (LS_MotorInterface).			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes			**Information**
C02568/1			MI_dnPosCtrlAdaptLoad_n
C02568/2			MI_dnPosCtrlAdaptMotor_n
C02568/3			MI_dnSpeedCtrlAdapt_n
C02568/4			MI_dnTorqueHighLimit_n
C02568/5			MI_dnTorqueLowLimit_n
C02568/6			Reserved
C02568/7			MI_dnFluxSetpoint_n
C02568/8			Reserved
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02569

Parameter | Name: **C02569 | Motor interface: Dig. signals**		Data type: UNSIGNED_32 Index: 22006_d = $55F6_h$
Display of the boolean signals of the motor interface (LS_MotorInterface).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02569/1		Reserved
C02569/2		MI_bResetSpeedCtrlIntegrator
C02569/3		MI_bLimitationActive
C02569/4		MI_bPosCtrlLimited
C02569/5		MI_bSpeedSetPointLimited
C02569/6		MI_bSpeedCtrlLimited
C02569/7		MI_bTorqueSetpointLimited
C02569/8		MI_bCurrentSetpointLimited
C02569/9		MI_bSpeedBelowC19
C02569/10		MI_bSpeedFollowingError
C02569/11		MI_bMotorOverloadWarning
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02570

Parameter | Name: **C02570 | Controller configuration**		Data type: UNSIGNED_32 Index: 22005_d = $55F5_h$
		▶ Encoder evaluation
Selection list (Lenze setting printed in bold)		**Information**
1	**Phase control**	Motor encoder selection is effected in C00495.
2	Position control	Position controller selection is effected in C00490.
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02572

Parameter | Name: **C02572 | Speed setpoint**			Data type: INTEGER_32 Index: 22003_d = $55F3_h$
			▶ Encoder evaluation
Display range (min. value | unit | max. value)			
-214748.3647	Unit/s	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02573

Parameter | Name: **C02573 | Position setpoint**			Data type: INTEGER_32 Index: 22002_d = $55F2_h$
			▶ Encoder evaluation
Display range (min. value | unit | max. value)			
-214748.3647	Unit	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02574

Parameter | Name: **C02574 | Actual speed**			Data type: INTEGER_32 Index: 22001_d = $55F1_h$

▶ Encoder evaluation

Display range (min. value | unit | max. value)		
-214748.3647	Unit/s	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02575

Parameter | Name: **C02575 | Actual position**			Data type: INTEGER_32 Index: 22000_d = $55F0_h$

▶ Encoder evaluation

Display range (min. value | unit | max. value)		
-214748.3647	Unit	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02576

Parameter | Name: **C02576 | Following error**			Data type: INTEGER_32 Index: 21999_d = $55EF_h$

▶ Encoder evaluation

Display range (min. value | unit | max. value)		
-214748.3647	Unit	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02577

Parameter | Name: **C02577 | External actual position**			Data type: INTEGER_32 Index: 21998_d = $55EE_h$

▶ Encoder evaluation

Display range (min. value | unit | max. value)		
-214748.3647	Unit	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02578

Parameter | Name: **C02578 | Offset actual pos. value/setp.**			Data type: INTEGER_32 Index: 21997_d = $55ED_h$

▶ Encoder evaluation

Display range (min. value | unit | max. value)		
-214748.3647	Unit	214748.3647

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000

C02579

Parameter | Name: **C02579 | Encoder eval.: Dig. signals**	Data type: UNSIGNED_32 Index: 21996_d = $55EC_h$

Display of the boolean signals of the encoder evaluation (LS_Feedback).

Selection list	
0	FALSE
1	TRUE

Subcodes	**Information**
C02579/1	FDB_bResolverError
C02579/2	FDB_bSinCosSignalError
C02579/3	FDB_bEncoderComError

☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02580

Parameter | Name: **C02580 | Brake operating mode**	Data type: UNSIGNED_32 Index: 21995_d = $55EB_h$
	▸ Basic function "Brake control"

Selection list (Lenze setting printed in bold)	
0	**Brake control off**
1	Directly with brake module
2	Autom. with brake module
11	Direct - external switching
12	Autom. - external switching

☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02581

Parameter | Name: **C02581 | Brake activation threshold**	Data type: INTEGER_32 Index: 21994_d = $55EA_h$
	▸ Basic function "Brake control"

Setting range (min. value | unit | max. value)			Lenze setting
0	rpm	50000	**50 rpm**

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02582

Parameter | Name: **C02582 | Brake resp. to pulse inhibit**	Data type: UNSIGNED_32 Index: 21993_d = $55E9_h$
	▸ Basic function "Brake control"

Selection list (Lenze setting printed in bold)	
0	**Activate the brake immediately**
1	Acivate brake when n <nmin

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02583

Parameter | Name: **C02583 | Status input monitoring**	Data type: UNSIGNED_32 Index: 21992_d = $55E8_h$
	▸ Basic function "Brake control"

Selection list (Lenze setting printed in bold)	
0	**Not active**
1	active

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02585

Parameter | Name: **C02585 | Brake control polarity**	Data type: UNSIGNED_32 Index: 21990_d = $55E6_h$
	▸ Basic function "Brake control"

Selection list (Lenze setting printed in bold)	
0	**Not inverted**
1	Inverted

☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT

C02586

Parameter | Name: **C02586 | Starting torque 1**			Data type: INTEGER_32 Index: 21989_d = $55E5_h$
			Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
-21474836.47	Nm	21474836.47	**0.00 Nm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02587

Parameter | Name: **C02587 | Starting torque 2**			Data type: INTEGER_32 Index: 21988_d = $55E4_h$
			Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
-21474836.47	Nm	21474836.47	**0.00 Nm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02588

Parameter | Name: **C02588 | Starting torque source**		Data type: UNSIGNED_32 Index: 21987_d = $55E3_h$
		Basic function "Brake control"
Selection list (Lenze setting printed in bold)		
0	**Starting torque 1/2**	
1	Stopping value	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02589

Parameter | Name: **C02589 | Brake closing time**			Data type: UNSIGNED_32 Index: 21986_d = $55E2_h$
			Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	ms	60000	**100 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02590

Parameter | Name: **C02590 | Brake opening time**			Data type: UNSIGNED_32 Index: 21985_d = $55E1_h$
			Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	ms	60000	**100 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02591

Parameter | Name: **C02591 | Waiting time- status monitoring**			Data type: UNSIGNED_32 Index: 21984_d = $55E0_h$
			Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	ms	60000	**100 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02593

Parameter | Name: **C02593 | Waiting time - brake activation**			Data type: UNSIGNED_32 Index: 21982_d = $55DE_h$
			▶ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	s	1000.000	**0.000 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02594

Parameter | Name: **C02594 | Test torque**			Data type: INTEGER_32 Index: 21981_d = $55DD_h$
			▶ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
-21474836.47	Nm	21474836.47	**0.00 Nm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02595

Parameter | Name: **C02595 | Permissible angle of rotation**			Data type: INTEGER_32 Index: 21980_d = $55DC_h$
			▶ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	°	360	**5 °**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02596

Parameter | Name: **C02596 | Grinding speed**			Data type: INTEGER_32 Index: 21979_d = $55DB_h$
			▶ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	rpm	300	**100 rpm**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02597

Parameter | Name: **C02597 | Acc./dec. time - grinding**			Data type: UNSIGNED_32 Index: 21978_d = $55DA_h$
			▶ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	s	60.000	**1.000 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02598

Parameter | Name: **C02598 | Grinding ON time**			Data type: UNSIGNED_32 Index: 21977_d = $55D9_h$
			▶ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.2	s	2.0	**0.5 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02599

Parameter | Name: **C02599 | Grinding OFF time**			Data type: UNSIGNED_32 Index: 21976_d = $55D8_h$
			▸ Basic function "Brake control"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.2	s	2.0	**0.5 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02607

Parameter | Name: **C02607 | BRK_dnState**			Data type: INTEGER_32 Index: 21968_d = $55D0_h$
Status of the "brake control" basic function (LS_Brake).			
Display range (min. value | unit | max. value)			
-2147483648		2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02608

Parameter | Name: **C02608 | BRK_dnTorqueAdd_n**			Data type: INTEGER_32 Index: 21967_d = $55CF_h$
Display of the additive torque value of the "brake control" basic function (LS_Brake).			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02609

Parameter | Name: **C02609 | Brake control: Dig. signals**		Data type: UNSIGNED_32 Index: 21966_d = $55CE_h$
Display of the boolean signals of the "brake control" basic function (LS_Brake).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02609/1		BRK_bReleaseBrake
C02609/2		BRK_bStartingTorque2
C02609/3		BRK_bBrakeApplied
C02609/4		BRK_bBrakeTest
C02609/5		BRK_bBrakeGrindIn
C02609/6		BRK_bReleaseBrakeOut
C02609/7		BRK_bBrakeReleased
C02609/8		BRK_bError
C02609/9		BRK_bCInhActive
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02610

Parameter | Name: **C02610 | Decel. time - stop function**			Data type: UNSIGNED_32 Index: 21965_d = $55CD_h$
			▸ Basic function"Stop"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	s	1000.000	**1.000 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02611

Parameter | Name: **C02611 | S-ramp time - stop function**			Data type: UNSIGNED_32 Index: 21964_d = $55CC_h$
			▶ Basic function"Stop"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	s	10.000	**0.100 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02612

Parameter | Name: **C02612 | Ref. for decel. time - stop**		Data type: UNSIGNED_32 Index: 21963_d = $55CB_h$
		▶ Basic function"Stop"
Selection list (Lenze setting printed in bold)		
0	**Reference speed (C00011)**	
1	Current speed	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02616

Parameter | Name: **C02616 | STP_dnState**			Data type: INTEGER_32 Index: 21959_d = $55C7_h$
Status of the basic function "Stop" (LS_Stop).			
Display range (min. value | unit | max. value)			
-2147483648		2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02617

Parameter | Name: **C02617 | STP_bStopActive**		Data type: UNSIGNED_32 Index: 21958_d = $55C6_h$
Display of the boolean signals of the basic function " Stop" (LS_Stop).		
Selection list (display only)		
0	**Stop not active**	
1	Stop active	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02619

Parameter | Name: **C02619 | Quick stop: Dig. signals**		Data type: UNSIGNED_32 Index: 21956_d = $55C4_h$
Display of the boolean signals of the basic function "quick stop" (LS_quick stop).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02619/1		QSP_bActivate1
C02619/2		QSP_bActivate2
C02619/3		QSP_bActivate3
C02619/4		QSP_bActive
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02620

Parameter | Name: **C02620 | Manual control speed 1**			Data type: INTEGER_32 Index: $21955_d = 55C3_h$
			▸ Basic function "Manual jog"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s	214748.3647	**360.0000 Unit/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02621

Parameter | Name: **C02621 | Manual control speed 2**			Data type: INTEGER_32 Index: $21954_d = 55C2_h$
			▸ Basic function "Manual jog"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s	214748.3647	**720.0000 Unit/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02622

Parameter | Name: **C02622 | Manual control acceleration**			Data type: INTEGER_32 Index: $21953_d = 55C1_h$
			▸ Basic function "Manual jog"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s²	214748.3647	**360.0000 Unit/s²**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02623

Parameter | Name: **C02623 | Manual control deceleration**			Data type: INTEGER_32 Index: $21952_d = 55C0_h$
			▸ Basic function "Manual jog"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s²	214748.3647	**1440.0000 Unit/s²**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02624

Parameter | Name: **C02624 | Manual control S-ramp time**			Data type: UNSIGNED_32 Index: $21951_d = 55BF_h$
			▸ Basic function "Manual jog"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	s	10.000	**0.100 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02638

Parameter | Name: **C02638 | Manual control status**			Data type: INTEGER_32 Index: $21937_d = 55B1_h$
Status of the basic function "Manual jog" (LS_ManualJog).			
Display range (min. value | unit | max. value)			
0		8	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02639

Parameter | Name: **C02639 | Manual control: Dig. signals**		Data type: UNSIGNED_32 Index: 21936_d = $55B0_h$
Display of the boolean signals of the basic function "Manual jog" (LS_ManualJog).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02639/1		MAN_bEnable
C02639/2		MAN_bJogPositive
C02639/3		MAN_bJogNegative
C02639/4		MAN_bActivateJogSpeed2
C02639/5		MAN_bReleaseLimitSwitch
C02639/6		MAN_bEnabled
C02639/7		MAN_bActive
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02640

Parameter | Name: **C02640 | Ref. mode**		Data type: UNSIGNED_32 Index: 21935_d = $55AF_h$
		▸ Basic function "Homing"
Selection list (Lenze setting printed in bold)		
0	cw_Rn_TP	
1	ccw_Rn_TP	
2	cw_Lp_ccw_Rn_TP	
3	ccw_Ln_cw_Rn_TP	
4	cw_Rp_ccw_Rn_TP	
5	ccw_Rp_cw_Rn_TP	
8	cw_TP	
9	ccw_TP	
10	cw_Lp_ccw_TP	
11	ccw_Ln_cw_TP	
12	cw_Lp	
13	ccw_Ln	
14	cw_Trq_Lim	
15	ccw_Trq_Lim	
100	**Set home pos. directly**	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02642

Parameter | Name: **C02642 | Home position**			Data type: INTEGER_32 Index: 21933_d = $55AD_h$
			▸ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
-214748.3647	Unit	214748.3647	**0.0000 Unit**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02643

Parameter | Name: **C02643 | Ref. target position**			Data type: INTEGER_32 Index: 21932_d = $55AC_h$
			▶ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
-214748.3647	Unit	214748.3647	**0.0000 Unit**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02644

Parameter | Name: **C02644 | Ref. speed 1**			Data type: INTEGER_32 Index: 21931_d = $55AB_h$
			▶ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s	214748.3647	**360.0000 Unit/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02645

Parameter | Name: **C02645 | Ref. acceleration 1**			Data type: INTEGER_32 Index: 21930_d = $55AA_h$
			▶ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s²	214748.3647	**720.0000 Unit/s²**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02646

Parameter | Name: **C02646 | Ref. speed 2**			Data type: INTEGER_32 Index: 21929_d = $55A9_h$
			▶ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s	214748.3647	**180.0000 Unit/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02647

Parameter | Name: **C02647 | Ref. acceleration 2**			Data type: INTEGER_32 Index: 21928_d = $55A8_h$
			▶ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s²	214748.3647	**360.0000 Unit/s²**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02648

Parameter | Name: **C02648 | Ref. S-ramp time**			Data type: INTEGER_32 Index: 21927_d = $55A7_h$
			▶ Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	ms	10000	**100 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02649

Parameter | Name: **C02649 | Ref. torque limit**			Data type: INTEGER_32 Index: 21926_d = $55A6_h$
			Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.00	%	200.00	**10.00 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02650

Parameter | Name: **C02650 | Ref. blocking time**			Data type: UNSIGNED_32 Index: 21925_d = $55A5_h$
			Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.000	s	120.000	**1.000 s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 1000			

C02651

Parameter | Name: **C02651 | Ref. touch probe configuration**			Data type: UNSIGNED_32 Index: 21924_d = $55A4_h$
			Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0		4294967295	**16**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02652

Parameter | Name: **C02652 | Home pos. after mains switching**		Data type: UNSIGNED_32 Index: 21923_d = $55A3_h$
		Basic function "Homing"
Selection list (Lenze setting printed in bold)		
0	**Delete**	
1	Received	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02653

Parameter | Name: **C02653 | Max. angle of after mains switch.**			Data type: INTEGER_32 Index: 21922_d = $55A2_h$
			Basic function "Homing"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	°	1000000	**180 °**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02656

Parameter | Name: **C02656 | Current position**			Data type: INTEGER_32 Index: 21919_d = $559F_h$
			Basic function "Homing"
Display range (min. value | unit | max. value)			
-214748.3647	Unit	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02657

Parameter | Name: **C02657 | HM_dnState**			Data type: INTEGER_32 Index: 21918_d = $559E_h$
Status of the basic function "Homing" (LS_Homing).			
Display range (min. value | unit | max. value)			
-2147483648		2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02658

Parameter | Name: **C02658 | HM_dnHomePos_p**			Data type: INTEGER_32 Index: 21917_d = $559D_h$
Display of the position signals of the basic function "Homing" (LS_Homing).			
Display range (min. value | unit | max. value)			
-214748.3647		214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02659

Parameter | Name: **C02659 | Homing: Dig. signals**		Data type: UNSIGNED_32 Index: 21916_d = $559C_h$
Display of the boolean signals of the basic function "Homing" (LS_Homing).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02659/1		HM_bEnable
C02659/2		HM_bActivateHoming
C02659/3		HM_bHomingMark
C02659/4		HM_bLoadHomePos
C02659/5		HM_bResetHomePos
C02659/6		HM_bEnabled
C02659/7		HM_bActive
C02659/8		HM_bDone
C02659/9		HM_bHomePosAvailable
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02674

Parameter | Name: **C02674 | POS_dwActualProfileNumber**			Data type: UNSIGNED_32 Index: 21901_d = $558D_h$
Current profile of the basic function "Positioning" (LS_Positioner).			
Display range (min. value | unit | max. value)			
0		1000	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02675

Parameter | Name: **C02675 | POS_dnState**			Data type: INTEGER_32 Index: 21900_d = $558C_h$
Status of the basic function "Positioning" (LS_Positioner).			
Display range (min. value | unit | max. value)			
-2147483648		2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02676

Parameter | Name: **C02676 | POS_dnProfileSpeed_s**			Data type: INTEGER_32 Index: 21899_d = $558B_h$
Display of the max. speed of the current profile of the basic function "Positioning" (LS_Positioner).			
Display range (min. value | unit | max. value)			
-214748.3647		214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02677

Parameter | Name: **C02677 | Positioning: % signals**			Data type: INTEGER_32 Index: 21898_d = $558A_h$
Display of the scaled signals of the basic function "Positioning" (LS_Positioner).			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes			**Information**
C02677/1			POS_dnSpeedOverride_n
C02677/2			POS_dnAccOverride_n
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02678

Parameter | Name: **C02678 | Positioning: Pos. signals**			Data type: INTEGER_32 Index: 21897_d = 5589_h
Display of the position signals of the basic function "Positioning "(LS_Positioner).			
Display range (min. value | unit | max. value)			
-214748.3647		214748.3647	
Subcodes			**Information**
C02678/1			POS_dnSetPos_p
C02678/2			POS_dnProfileTarget_p
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02679

Parameter | Name: **C02679 | Positioning: Dig. signals**		Data type: UNSIGNED_32 Index: 21896_d = 5588_h
Display of the boolean signals of the basic function "Positioning" (LS_Positioner).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02679/1		POS_bEnable
C02679/2		POS_bStart
C02679/3		POS_bAbort
C02679/4		POS_bRestart
C02679/5		POS_bEnableOverride
C02679/6		POS_bDisableTP
C02679/7		POS_bEnabled
C02679/8		POS_bActive
C02679/9		POS_bDone
C02679/10		POS_bInTarget
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02680

Parameter | Name: **C02680 | Source position setpoint**		Data type: UNSIGNED_32 Index: 21895_d = 5587_h
		▸ Basic function "Positioning"
Selection list (Lenze setting printed in bold)		
0	**Position setpoint input**	
1	From add. speed	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02681

Parameter | Name: **C02681 | Additional speed source**		Data type: UNSIGNED_32 Index: 21894_d = 5586_h
		▸ Basic function "Positioning"
Selection list (Lenze setting printed in bold)		
0	**Additional speed input**	
1	From position setpoint	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02685

Parameter | Name: **C02685 | PF_dnMotorAcc_x**			Data type: INTEGER_32 Index: 21890_d = 5582_h
Display of the motor acceleration of the basic function "Position follower" (LS_PositionFollower).			
Display range (min. value | unit | max. value)			
-7680000.0		7680000.0	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02686

Parameter | Name: **C02686 | PF_dnSpeedAdd1_s**			Data type: INTEGER_32 Index: 21889_d = 5581_h
Display of the speed precontrol value of the basic function "Position follower" (LS_PositionFollower).			
Display range (min. value | unit | max. value)			
-480000.0	rpm	480000.0	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02687

Parameter | Name: **C02687 | Position follower: % signals**			Data type: INTEGER_32 Index: 21888_d = 5580_h
Display of the scaled signals of the basic function "Position follower" (LS_PositionFollower).			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes			**Information**
C02687/1			PF_dnSpeedAdd2_n
C02687/2			PF_dnTorqueAdd_n
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02688

Parameter | Name: **C02688 | Position follower: Pos. signal**			Data type: INTEGER_32 Index: 21887_d = $557F_h$
Display of the position signals of the basic function "Position follower" (LS_PositionFollower).			
Display range (min. value | unit | max. value)			
-214748.3648	Incr.	214748.3647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02689

Parameter | Name: **C02689 | Position follower: Dig. signals**			Data type: UNSIGNED_32 Index: 21886_d = $557E_h$
Display of the boolean signals of the basic function "Position follower" (LS_PositionFollower).			
Selection list			
0	FALSE		
1	TRUE		
Subcodes		**Information**	
C02689/1		PF_bEnable	
C02689/2		PF_bEnabled	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02692

Parameter | Name: **C02692 | SF_dnMotorAcc_x**			Data type: INTEGER_32 Index: 21883_d = $557B_h$
Display of the motor acceleration of the basic function "Speed follower" (LS_SpeedFollower).			
Display range (min. value | unit | max. value)			
-7680000.0		7680000.0	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02693

Parameter | Name: **C02693 | SF_dnSpeedAdd_s**			Data type: INTEGER_32 Index: 21882_d = $557A_h$
Display of the additive speed setpoint of the basic function "Speed follower" (LS_SpeedFollower).			
Display range (min. value | unit | max. value)			
-480000.0	rpm	480000.0	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02694

Parameter | Name: **C02694 | Speed follower: % signals**			Data type: INTEGER_32 Index: 21881_d = 5579_h
Display of the scaled signals of the basic function "Speed follower" (LS_SpeedFollower).			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes			**Information**
C02694/1			SF_dnSpeedSet_n
C02694/2			SF_dnTorqueAdd_n
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02695

Parameter | Name: **C02695 | Speed follower: Dig. signals**			Data type: UNSIGNED_32 Index: 21880_d = 5578_h
Display of the boolean signals of the basic function "Speed follower" (LS_SpeedFollower).			
Selection list			
0	FALSE		
1	TRUE		
Subcodes		**Information**	
C02695/1		SF_bEnable	
C02695/2		SF_bEnabled	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02698

Parameter | Name: **C02698 | Torque follower: % signals**			Data type: INTEGER_32 Index: $21877_d = 5575_h$
Display of the boolean input/output signals of the basic function "Torque follower" (LS_TorqueFollower).			
Display range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes			**Information**
C02698/1			TF_TorqueSet_n
C02698/2			TF_dnSpeedHighLimit_n
C02698/3			TF_dnSpeedLowLimit_n
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02699

Parameter | Name: **C02699 | Torque follower: Dig. signals**		Data type: UNSIGNED_32 Index: $21876_d = 5574_h$
Display of the boolean input/output signals of the basic function "Torque follower" (LS_TorqueFollower).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02699/1		TF_bEnable
C02699/2		TF_bEnabled
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02700

Parameter | Name: **C02700 | Software limit pos. effective**		Data type: UNSIGNED_32 Index: $21875_d = 5573_h$
		▸ Basic function "Limiter"
Selection list (Lenze setting printed in bold)		
0	**Deactivated**	
1	Activated	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02701

Parameter | Name: **C02701 | Software limit positions**			Data type: INTEGER_32 Index: $21874_d = 5572_h$
			▸ Basic function "Limiter"
Setting range (min. value | unit | max. value)			
-214748.3647	Unit	214748.3647	
Subcodes	**Lenze setting**		**Information**
C02701/1	0.0000 Unit		Positive software limit position
C02701/2	0.0000 Unit		Negative software limit position
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02702

Parameter | Name: **C02702 | Limitations effective**		Data type: UNSIGNED_32 Index: $21873_d = 5571_h$
		▸ Basic function "Limiter"
Selection list (Lenze setting printed in bold)		
0	**Deactivated**	
1	Activated	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02703

Parameter | Name: **C02703 | Max. speed**			Data type: INTEGER_32 Index: 21872_d = 5570_h
			Basic function "Limiter"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s	214748.3647	**3600.0000 Unit/s**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02704

Parameter | Name: **C02704 | Max. speed [rpm]**			Data type: INTEGER_32 Index: 21871_d = $556F_h$
			Basic function "Limiter"
Display range (min. value | unit | max. value)			
0.0	rpm	214748364.7	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02705

Parameter | Name: **C02705 | Max. acceleration**			Data type: INTEGER_32 Index: 21870_d = $556E_h$
			Basic function "Limiter"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit/s²	214748.3647	**3600.0000 Unit/s²**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02706

Parameter | Name: **C02706 | Min. S-ramp time**			Data type: UNSIGNED_32 Index: 21869_d = $556D_h$
			Basic function "Limiter"
Setting range (min. value | unit | max. value)			**Lenze setting**
0	ms	10000	**100 ms**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02707

Parameter | Name: **C02707 | Permissible direction of rot.**		Data type: UNSIGNED_32 Index: 21868_d = $556C_h$
		Basic function "Limiter"
Selection list (Lenze setting printed in bold)		
0	**Positive and negative**	
1	Positive only	
2	Negative only	
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02708

Parameter | Name: **C02708 | Limited speed**			Data type: INTEGER_32 Index: 21867_d = $556B_h$
			▶ Basic function "Limiter"
Setting range (min. value | unit | max. value)			
0.0000	Unit/s	214748.3647	
Subcodes	**Lenze setting**		**Information**
C02708/1	3600.0000 Unit/s		Limited speed 1 ... 4
C02708/2	7200.0000 Unit/s		
C02708/3	14400.0000 Unit/s		
C02708/4	28800.0000 Unit/s		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02709

Parameter | Name: **C02709 | Limited speed**			Data type: INTEGER_32 Index: 21866_d = $556A_h$
			▶ Basic function "Limiter"
Display range (min. value | unit | max. value)			
0.0	rpm	214748364.7	
Subcodes			**Information**
C02709/1			Limited speed 1 ... 4
C02709/2			
C02709/3			
C02709/4			
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10			

C02710

Parameter | Name: **C02710 | Delay lim. speed**			Data type: UNSIGNED_32 Index: 21865_d = 5569_h
			▶ Basic function "Limiter"
Setting range (min. value | unit | max. value)			
0.0000	Unit/s²	214748.3647	
Subcodes	**Lenze setting**		**Information**
C02710/1	0.0100 Unit/s²		Delays for limited speed 1 ... 4
C02710/2	0.0100 Unit/s²		
C02710/3	0.0100 Unit/s²		
C02710/4	0.0100 Unit/s²		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02711

Parameter | Name: **C02711 | S-ramp time lim. speed**			Data type: UNSIGNED_32 Index: 21864_d = 5568_h
			▶ Basic function "Limiter"
Setting range (min. value | unit | max. value)			
0	ms	10000	
Subcodes	**Lenze setting**		**Information**
C02711/1	100 ms		S-ramp times for limited speed 1 ... 4
C02711/2	100 ms		
C02711/3	100 ms		
C02711/4	100 ms		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02712

Parameter | Name: **C02712 | Decel. time lim. speed**			Data type: UNSIGNED_32 Index: 21863_d = 5567_h
			Basic function "Limiter"
Display range (min. value | unit | max. value)			
0	ms	10000	
Subcodes			**Information**
C02712/1			Deceleration times for limited speed 1 ... 4
C02712/2			
C02712/3			
C02712/4			
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02713

Parameter | Name: **C02713 | Max. dist. manual control**			Data type: UNSIGNED_32 Index: 21862_d = 5566_h
			Basic function "Limiter"
Setting range (min. value | unit | max. value)			**Lenze setting**
0.0000	Unit	214748.3647	**360.0000 Unit**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 10000			

C02714

Parameter | Name: **C02714 | Max. dist. manual control**			Data type: UNSIGNED_32 Index: 21861_d = 5565_h
			Basic function "Limiter"
Display range (min. value | unit | max. value)			
0	Incr.	2147483647	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02715

Parameter | Name: **C02715 | Limitation active**		Data type: UNSIGNED_32 Index: 21860_d = 5564_h
		Basic function "Limiter"
Selection list (display only)		
0	**Deactivated**	
1	Activated	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02716

Parameter | Name: **C02716 | Resp. to limitation**		Data type: UNSIGNED_32 Index: 21859_d = 5563_h
		▸ Basic function "Limiter"
Selection list		
0	No response	
1	Error	
2	Trouble	
3	Quick stop by trouble	
4	Warning locked	
5	Warning	
6	Information	
Subcodes	**Lenze setting**	**Information**
C02716/1	0: No response	Resp. to rotation limitation
C02716/2	3: Quick stop by trouble	Resp. to SW limit pos. excess
C02716/3	0: No response	Resp. to max. value excess
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02717

Parameter | Name: **C02717 | LIM_dwControl**			Data type: UNSIGNED_32 Index: 21858_d = 5562_h
Control word of the basic function "Limiter" (LS_Limiter).			
Display range (min. value | unit | max. value)			
0		4294967295	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02718

Parameter | Name: **C02718 | LIM_dnState**			Data type: INTEGER_32 Index: 21857_d = 5561_h
Status of the basic function "Limiter" (LS_Limiter).			
Display range (min. value | unit | max. value)			
0		1	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02719

Parameter | Name: **C02719 | Limiter: Dig. signals**		Data type: UNSIGNED_32 Index: 21856_d = 5560_h
Display of the boolean input signals of the basic function "Limiter" (LS_Limiter).		
Selection list		
0	FALSE	
1	TRUE	
Subcodes		**Information**
C02719/1		LIM_bLimitSwitchPositive
C02719/2		LIM_bLimitSwitchNegative
C02719/3		LIM_bActivateLimitedSpeed1
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02730

Parameter | Name: **C02730 | AINx: Gain**			Data type: INTEGER_32 Index: 21845_d = 5555_h
Setting range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes	**Lenze setting**		**Information**
C02730/1	100.00 %		Gain of analog input 1
C02730/2	100.00 %		Gain of analog input 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02731

Parameter | Name: **C02731 | AINx: Offset**			Data type: INTEGER_32 Index: 21844_d = 5554_h
Setting range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes	**Lenze setting**		**Information**
C02731/1	0.00 %		Offset of analog input 1
C02731/2	0.00 %		Offset of analog input 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02732

Parameter | Name: **C02732 | AINx: Dead band**			Data type: INTEGER_32 Index: 21843_d = 5553_h
Setting range (min. value | unit | max. value)			
0.00	%	100.00	
Subcodes	**Lenze setting**		**Information**
C02732/1	0.00 %		Dead band of analog input 1
C02732/2	0.00 %		Dead band of analog input 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02733

Parameter | Name: **C02733 | AOUTx: Gain**			Data type: INTEGER_32 Index: 21842_d = 5552_h
Setting range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes	**Lenze setting**		**Information**
C02733/1	100.00 %		Gain of analog output 1
C02733/2	100.00 %		Gain of analog output 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02734

Parameter | Name: **C02734 | AOUTx: Offset**			Data type: INTEGER_32 Index: 21841_d = 5551_h
Setting range (min. value | unit | max. value)			
-200.00	%	200.00	
Subcodes	**Lenze setting**		**Information**
C02734/1	0.00 %		Offset of analog output 1
C02734/2	0.00 %		Offset of analog output 2
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT Scaling factor: 100			

C02800

Parameter | Name: **C02800 | AINx: Input signal**			Data type: INTEGER_16 Index: 21775_d = $550F_h$
Scaling: -16384 ≡ -100 %, +16383 ≡ +100 %			
Display range (min. value | unit | max. value)			
-16384		16383	
Subcodes			**Information**
C02800/1			Input signal of analog input 1
C02800/2			Input signal of analog input 2
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02801

Parameter | Name: **C02801 | AOUTx: Output signal**			Data type: INTEGER_16 Index: 21774_d = $550E_h$
Scaling: -16384 ≡ -100 %, +16383 ≡ +100 %			
Display range (min. value | unit | max. value)			
-16384		16383	
Subcodes			**Information**
C02801/1			Output signal of analog output 1
C02801/2			Output signal of analog output 2
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02802

Parameter | Name: **C02802 | Status word dig. outputs**			Data type: BITFIELD_32 Index: 21773_d = $550D_h$
Display of the hexadecimal value of the digital output port • Important: All digital levels are indicated without considering the level logic. Internal signals are displayed as well.			
Display range (min. value | unit | max. value)			
0x00000000		0xFFFFFFFF	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02803

Parameter | Name: **C02803 | Status word dig. inputs**			Data type: BITFIELD_32 Index: 21772_d = $550C_h$
Display of the hexadecimal value of the digital input port • Important: All digital levels are indicated without considering the level logic. Internal signals are displayed as well.			
Display range (min. value | unit | max. value)			
0x00000000		0xFFFFFFFF	
☑ Read access ☐ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02810

Parameter | Name: **C02810 | Delay time for TPx**			Data type: UNSIGNED_32 Index: 21765$_d$ = 5505$_h$
The set delay time will be considered when the position is determined at the touch probe time and will be used to compensate for dead times, if necessary. • Please observe the setting of the input filter for the digital inputs (C02830).			
Setting range (min. value | unit | max. value)			
0	us	7000	
Subcodes	**Lenze setting**		**Information**
C02810/1	0 us		Delay for touch probe 1 ... 8
C02810/...			
C02810/10			
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT			

C02830

Parameter | Name: **C02830 | DIx delay time**		Data type: UNSIGNED_8 Index: 21745$_d$ = 54F1$_h$
Input filter for digital inputs • Can be used to filter "spikes" at the digital inputs, if necessary. • Each digital input is assigned to a subcode. • Since the filter is a "counting" filter, the indicated times are only approximate values.		
Selection list		**Information**
0	2 µs	Filter time
1	4 µs	
2	8 µs	
3	16 µs	
4	32 µs	
5	64 µs	
6	128 µs	
7	256 µs	
8	512 µs	
9	1024 µs	
10	2048 µs	
11	4096 µs	
12	8192 µs	
13	16384 µs	
14	32768 µs	
Subcodes	**Lenze setting**	**Information**
C02830/1	0: 2 µs	Setting of digital input 1 ... 8
C02830/...		
C02830/8		
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☐ MOT		

C02850

Parameter | Name: **C02850 | Service code**	Data type: UNSIGNED_32 Index: 21725$_d$ = 54DD$_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02851

Parameter | Name: **C02851 | Service code**	Data type: UNSIGNED_32 Index: 21724$_d$ = 54DC$_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02852

Parameter | Name: **C02852 | Service code**	Data type: UNSIGNED_16 Index: 21723_d = $54DB_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02853

Parameter | Name: **C02853 | Vp Lss saturat. characteristic**			Data type: UNSIGNED_16 Index: 21722_d = $54DA_h$
Setting range **(min. value | unit | max. value)**			
0	%	400	
Subcodes	**Lenze setting**		**Information**
C02853/1	100 %		Saturation characteristic to correct the leakage inductance and the current controller parameters. • The saturation characteristic is displayed by 17 points which are distributed linearly on the X axis. • The point 17 represents 100 % of the maximum motor current in the process (C02855). • The values to be entered in the subcodes represent the y values of the grid points 1 ... 17. ▶ Correction of the leakage inductance via saturation characteristic
C02853/2	100 %		
C02853/3	100 %		
C02853/4	100 %		
C02853/5	100 %		
C02853/6	100 %		
C02853/7	100 %		
C02853/8	100 %		
C02853/9	100 %		
C02853/10	100 %		
C02853/11	100 %		
C02853/12	100 %		
C02853/13	100 %		
C02853/14	100 %		
C02853/15	100 %		
C02853/16	100 %		
C02853/17	100 %		
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT			

C02854

Parameter | Name: **C02854 | Service code**	Data type: UNSIGNED_32 Index: 21721_d = $54D9_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02855

Parameter | Name: **C02855 | Imax Lss saturat. characteristic**			Data type: UNSIGNED_32 Index: 21720_d = $54D8_h$
Maximum motor current in the process • Defines the grid point 17 of the saturation characteristic set in C02853. ▶ Correction of the leakage inductance via saturation characteristic			
Setting range **(min. value | unit | max. value)**			**Lenze setting**
0.0	A	6000.0	**5.4 A**
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 10			

C02856

Parameter | Name: **C02856 | Service code**	Data type: VISIBLE_STRING Index: 21719_d = $54D7_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02857

Parameter | Name: C02857 | Service code	Data type: VISIBLE_STRING Index: 21718_d = $54D6_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02858

Parameter | Name: C02858 | Service code	Data type: UNSIGNED_8 Index: 21717_d = $54D5_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02859

Parameter | Name: C02859 | Lss sat. characteristic		Data type: UNSIGNED_8 Index: 21716_d = $54D4_h$
Selection list (Lenze setting printed in bold)		
0	**Deactivated**	
1	Activated	
☑ Read access ☑ Write access ☑ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT		

C02860

Parameter | Name: C02860 | Rr adaptation			Data type: UNSIGNED_32 Index: 21715_d = $54D3_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
50.00	%	200.00	**100.00 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C02861

Parameter | Name: C02861 | Lh adaptation			Data type: UNSIGNED_32 Index: 21714_d = $54D2_h$
Setting range (min. value | unit | max. value)			**Lenze setting**
50.00	%	200.00	**100.00 %**
☑ Read access ☑ Write access ☐ CINH ☐ PLC STOP ☐ No transfer ☐ COM ☑ MOT Scaling factor: 100			

C02996

Parameter | Name: C02996 | Service code	Data type: UNSIGNED_32 Index: 21579_d = $544B_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02997

Parameter | Name: C02997 | Service code	Data type: UNSIGNED_32 Index: 21578_d = $544A_h$
This code is used internally by the controller and must not be overwritten by the user!	

C02998

Parameter | Name: C02998 | Service code	Data type: UNSIGNED_32 Index: 21577_d = 5449_h
This code is used internally by the controller and must not be overwritten by the user!	

C02999

Parameter | Name: C02999 | Service code	Data type: UNSIGNED_32 Index: 21576_d = 5448_h
This code is used internally by the controller and must not be overwritten by the user!	

16.4 Attribute table

The Attribute table contains information required for communicating with the controller via parameters.

How to read the table of attributes:

Column		Meaning	Entry	
Code		Parameter designation	Cxxxxx	
Name		Short parameter text (display text)	*Text*	
Index	dec	Index under which the parameter is addressed. The subindex of array variables corresponds to the Lenze subcode number.	24575 - Lenze code number	Only required for access via 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	BITFIELD_8	1 byte bit-coded
			BITFIELD_16	2 bytes bit-coded
			BITFIELD_32	4 bytes bit-coded
			INTEGER_8	1 byte with sign
			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	ASCII string
	Factor	Factor for data transmission via 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
Access	R	Read access	☑ Reading allowed	
	W	Write access	☑ Writing allowed	
	CINH	Controller inhibit required	☑ Writing only possible when controller is inhibited	

Attribute table

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C00002	Controller commands	24573	5FFD	E	1	UNSIGNED_32	1	☑	☑	
C00003	Device command status	24572	5FFC	E	1	UNSIGNED_32	1	☑		
C00004	Service password	24571	5FFB	E	1	UNSIGNED_32	1	☑	☑	
C00005	Application selection	24570	5FFA	E	1	INTEGER_32	1	☑	☑	
C00006	Motor control selection	24569	5FF9	E	1	UNSIGNED_32	1	☑	☑	☑
C00007	Active application	24568	5FF8	E	1	UNSIGNED_32	1	☑		
C00011	Motor reference speed	24564	5FF4	E	1	UNSIGNED_32	1	☑	☑	
C00018	Chopper frequency	24557	5FED	E	1	UNSIGNED_32	1	☑	☑	
C00019	Standstill recognitionthreshold	24556	5FEC	E	1	UNSIGNED_32	1	☑	☑	
C00022	Maximum current	24553	5FE9	E	1	UNSIGNED_32	100	☑	☑	
C00034	Config. analog input 1	24541	5FDD	E	1	UNSIGNED_32	1	☑	☑	
C00050	Speed setpoint	24525	5FCD	A	2	INTEGER_32	1	☑		
C00051	Actual speed value	24524	5FCC	E	1	INTEGER_32	1	☑		
C00052	Motor voltage	24523	5FCB	E	1	UNSIGNED_32	1	☑		
C00053	DC-bus voltage	24522	5FCA	E	1	UNSIGNED_32	1	☑		

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C00054	Motor current	24521	5FC9	E	1	UNSIGNED_32	100	☑		
C00055	Phase currents	24520	5FC8	A	4	INTEGER_32	100	☑		
C00056	Torque setpoint	24519	5FC7	E	1	INTEGER_32	100	☑		
C00057	Torque	24518	5FC6	A	2	UNSIGNED_32	1000	☑		
C00058	Rotor displacement angle	24517	5FC5	A	3	INTEGER_32	10	☑	☑	
C00059	Motor - number of pole pairs	24516	5FC4	E	1	UNSIGNED_32	1	☑		
C00060	Rotor position	24515	5FC3	E	1	INTEGER_32	1	☑		
C00061	Heatsink temperature	24514	5FC2	E	1	INTEGER_32	1	☑		
C00062	Temperature inside the controller	24513	5FC1	E	1	INTEGER_32	1	☑		
C00063	Motor temperature	24512	5FC0	E	1	INTEGER_32	1	☑		
C00064	Device utilisation (Ixt)	24511	5FBF	E	1	UNSIGNED_32	1	☑		
C00065	Ext. 24-V voltage	24510	5FBE	E	1	INTEGER_32	10	☑		
C00066	Thermal motor load (I^2xt)	24509	5FBD	E	1	UNSIGNED_32	1	☑		
C00068	Electrolytic capacitor temperature	24507	5FBB	E	1	INTEGER_32	1	☑		
C00069	CPU temperature	24506	5FBA	E	1	INTEGER_32	1	☑		
C00070	Speed controller gain	24505	5FB9	E	1	UNSIGNED_32	100000	☑	☑	
C00071	Speed controller reset time	24504	5FB8	E	1	UNSIGNED_32	10	☑	☑	
C00072	D component - speed controller	24503	5FB7	E	1	UNSIGNED_32	100	☑	☑	
C00074	Feedfwd. ctrl. - current contr.	24501	5FB5	E	1	UNSIGNED_8	1	☑	☑	
C00075	Current controller gain	24500	5FB4	E	1	UNSIGNED_32	100	☑	☑	
C00076	Integral-action time current contr.	24499	5FB3	E	1	UNSIGNED_32	100	☑	☑	
C00077	Field controller gain	24498	5FB2	E	1	UNSIGNED_32	100	☑	☑	
C00078	Field contr. reset time	24497	5FB1	E	1	UNSIGNED_32	10	☑	☑	
C00079	Mutual motor inductance	24496	5FB0	E	1	UNSIGNED_32	10	☑		
C00080	Resolver - pole pair number	24495	5FAF	E	1	UNSIGNED_32	1	☑	☑	☑
C00081	Rated motorpower	24494	5FAE	E	1	UNSIGNED_32	100	☑	☑	☑
C00082	Motor - rotor resistance	24493	5FAD	E	1	UNSIGNED_32	10000	☑		
C00083	Motor - rotor time constant	24492	5FAC	E	1	UNSIGNED_32	100	☑		
C00084	Motor stator resistance	24491	5FAB	E	1	UNSIGNED_32	10000	☑	☑	☑
C00085	Motor stator leakage induct.	24490	5FAA	E	1	UNSIGNED_32	1000	☑	☑	☑
C00087	Rated motor speed	24488	5FA8	E	1	UNSIGNED_32	1	☑	☑	☑
C00088	Rated motor current	24487	5FA7	E	1	UNSIGNED_32	100	☑	☑	☑
C00089	Rated motor frequency	24486	5FA6	E	1	UNSIGNED_32	10	☑	☑	☑
C00090	Rated motor voltage	24485	5FA5	E	1	UNSIGNED_32	1	☑	☑	☑
C00091	Motor - cosine phi	24484	5FA4	E	1	UNSIGNED_32	100	☑	☑	☑
C00092	Motor - magnetising current	24483	5FA3	E	1	UNSIGNED_32	100	☑		
C00099	Firmware version	24476	5F9C	E	1	VISIBLE_STRING	1	☑		
C00105	Quick stop deceleration time	24470	5F96	E	1	UNSIGNED_32	1000	☑	☑	
C00106	Quick stop S-ramp time	24469	5F95	E	1	UNSIGNED_32	100	☑	☑	
C00107	Ref. deceleration time quick stop	24468	5F94	E	1	UNSIGNED_8	1	☑	☑	
C00114	DIx terminal polarity	24461	5F8D	A	8	UNSIGNED_8	1	☑	☑	
C00118	DOx terminal polarity	24457	5F89	A	4	UNSIGNED_8	1	☑	☑	
C00120	Mot. overload protection (I^2xt)	24455	5F87	E	1	UNSIGNED_32	1	☑	☑	
C00121	Warning threshold - motor temperature	24454	5F86	E	1	UNSIGNED_32	1	☑	☑	
C00122	Warning threshold heatsink temp.	24453	5F85	E	1	UNSIGNED_32	1	☑	☑	
C00123	Warning threshold - device utilisation	24452	5F84	E	1	UNSIGNED_32	1	☑	☑	
C00126	Warning threshold - CPU temperature	24449	5F81	E	1	UNSIGNED_32	1	☑	☑	
C00127	Warning threshold - motor overload	24448	5F80	E	1	UNSIGNED_32	1	☑	☑	
C00128	Therm. motor time constant	24447	5F7F	A	2	UNSIGNED_32	10	☑	☑	
C00129	Brake resistor value	24446	5F7E	E	1	INTEGER_32	1	☑	☑	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C00130	Max. power brake resistor	24445	5F7D	E	1	INTEGER_32	1	☑	☑	
C00131	Therm. capacity brake resistor	24444	5F7C	E	1	INTEGER_32	1	☑	☑	
C00132	Max. temp. of brake resistor	24443	5F7B	E	1	INTEGER_32	1	☑	☑	
C00142	Autom. restart after power on	24433	5F71	E	1	UNSIGNED_32	1	☑	☑	
C00150	Status word 1	24425	5F69	E	1	BITFIELD_16	1	☑		
C00155	Status word 2	24420	5F64	E	1	BITFIELD_16	1	☑		
C00156	Status/Control word MCTRL	24419	5F63	A	2	UNSIGNED_32	1	☑		
C00158	Controller inhibit by (source)	24417	5F61	E	1	BITFIELD_16	1	☑		
C00159	Quick stop by (source)	24416	5F60	E	1	BITFIELD_16	1	☑		
C00166	Error status	24409	5F59	E	1	VISIBLE_STRING	1	☑		
C00168	Error number	24407	5F57	E	1	UNSIGNED_32	1	☑		
C00169	Logbook event filter	24406	5F56	E	1	UNSIGNED_32	1	☑	☑	
C00173	Mains - voltage	24402	5F52	E	1	UNSIGNED_8	1	☑	☑	
C00174	Threshold undervoltage (LU)	24401	5F51	E	1	UNSIGNED_32	1	☑	☑	
C00178	Elapsed hour meter	24397	5F4D	E	1	UNSIGNED_32	1	☑		
C00179	Power-on time meter	24396	5F4C	E	1	UNSIGNED_32	1	☑		
C00180	Service code	24395	5F4B	E	1	VISIBLE_STRING	1	☑	☑	
C00181	Red. brake chopper threshold	24394	5F4A	E	1	UNSIGNED_32	1	☑	☑	
C00183	Device state	24392	5F48	E	1	UNSIGNED_32	1	☑		
C00185	Threshold mains recovery detect.	24390	5F46	E	1	UNSIGNED_32	1	☑	☑	
C00186	ENP: detected motor type	24389	5F45	E	1	VISIBLE_STRING	1	☑		
C00187	ETS: Identified serial number	24388	5F44	E	1	VISIBLE_STRING	1	☑		
C00188	ETS: Status	24387	5F43	E	1	UNSIGNED_8	1	☑		
C00199	Device name	24376	5F38	E	1	VISIBLE_STRING	1	☑	☑	
C00200	Firmware product type	24375	5F37	E	1	VISIBLE_STRING	1	☑		
C00201	Firmware - compile date	24374	5F36	E	1	VISIBLE_STRING	1	☑		
C00203	HW product types	24372	5F34	A	9	VISIBLE_STRING	1	☑		
C00204	HW serial number	24371	5F33	A	9	VISIBLE_STRING	1	☑		
C00205	HW descriptions	24370	5F32	A	6	VISIBLE_STRING	1	☑		
C00206	HW manufacturing data	24369	5F31	A	8	VISIBLE_STRING	1	☑		
C00208	HW manufacturer	24367	5F2F	A	6	VISIBLE_STRING	1	☑		
C00209	HW countries of origin	24366	5F2E	A	6	VISIBLE_STRING	1	☑		
C00210	HW versions	24365	5F2D	A	6	VISIBLE_STRING	1	☑		
C00211	Application: Version	24364	5F2C	E	1	VISIBLE_STRING	1	☑		
C00212	Application: Type code	24363	5F2B	E	1	VISIBLE_STRING	1	☑		
C00213	Application: Compiler date	24362	5F2A	E	1	VISIBLE_STRING	1	☑		
C00214	Required safety module	24361	5F29	E	1	UNSIGNED_8	1	☑	☑	
C00218	Application: ID number	24357	5F25	E	1	UNSIGNED_32	1	☑		
C00254	Phase controller gain	24321	5F01	E	1	UNSIGNED_32	100	☑	☑	
C00270	Freq. current setpoint filter	24305	5EF1	A	2	UNSIGNED_32	10	☑	☑	
C00271	Width - current setp. filter	24304	5EF0	A	2	UNSIGNED_32	10	☑	☑	
C00272	Depth - current setp. filter	24303	5EEF	A	2	UNSIGNED_32	1	☑	☑	
C00273	Moment of inertia	24302	5EEE	A	2	UNSIGNED_32	100	☑	☑	
C00274	Max. change in acceleration	24301	5EED	E	1	UNSIGNED_32	10	☑	☑	
C00275	Signal source speed setpoint	24300	5EEC	E	1	UNSIGNED_16	1	☑	☑	
C00276	Signal source torque setpoint	24299	5EEB	E	1	UNSIGNED_16	1	☑	☑	
C00280	Filter time const. DC detection	24295	5EE7	E	1	UNSIGNED_32	10	☑	☑	
C00311	CAN TPDO1 mask byte x	24264	5EC8	A	8	BITFIELD_8	1	☑	☑	
C00312	CAN TPDO2 mask byte x	24263	5EC7	A	8	BITFIELD_8	1	☑	☑	
C00313	CAN TPDO3 mask byte x	24262	5EC6	A	8	BITFIELD_8	1	☑	☑	
C00314	CAN TPDO4 mask byte x	24261	5EC5	A	8	BITFIELD_8	1	☑	☑	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C00320	CAN TPDOx identifier	24255	5EBF	A	4	BITFIELD_32	1	☑	☑	
C00321	CAN RPDOx identifier	24254	5EBE	A	4	BITFIELD_32	1	☑	☑	
C00322	CAN TPDOx Tx mode	24253	5EBD	A	4	UNSIGNED_8	1	☑	☑	
C00323	CAN RPDOx Rx mode	24252	5EBC	A	4	UNSIGNED_8	1	☑	☑	
C00324	CAN TPDOx delay time	24251	5EBB	A	4	UNSIGNED_16	1	☑	☑	
C00345	CAN error	24230	5EA6	E	1	UNSIGNED_8	1	☑		
C00346	CAN heartbeat activity	24229	5EA5	E	1	BITFIELD_32	1	☑		
C00347	CAN heartbeat status	24228	5EA4	A	32	UNSIGNED_8	1	☑		
C00348	CAN status DIP switch	24227	5EA3	E	1	UNSIGNED_8	1	☑		
C00349	CAN setting of DIP switch	24226	5EA2	A	2	UNSIGNED_8	1	☑		
C00350	CAN node address	24225	5EA1	E	1	UNSIGNED_8	1	☑	☑	
C00351	CAN baud rate	24224	5EA0	E	1	UNSIGNED_8	1	☑	☑	
C00352	CAN slave/master	24223	5E9F	E	1	UNSIGNED_8	1	☑	☑	
C00356	CAN TPDOx cycle time	24219	5E9B	A	4	UNSIGNED_16	1	☑	☑	
C00357	CAN RPDOx monitoring time	24218	5E9A	A	4	UNSIGNED_16	1	☑	☑	
C00359	CAN status	24216	5E98	E	1	UNSIGNED_8	1	☑		
C00360	CAN telegram and error counter	24215	5E97	A	8	UNSIGNED_16	1	☑		
C00361	CAN bus load	24214	5E96	A	6	UNSIGNED_32	1	☑		
C00367	CAN SYNC Rx identifier	24208	5E90	E	1	UNSIGNED_32	1	☑	☑	
C00368	CAN SYNC Tx identifier	24207	5E8F	E	1	UNSIGNED_32	1	☑	☑	
C00369	CAN SYNC transmit cycle time	24206	5E8E	A	3	UNSIGNED_16	1	☑	☑	
C00372	CAN SDO server Rx identifier	24203	5E8B	A	10	BITFIELD_32	1	☑	☑	
C00373	CAN SDO server Tx identifier	24202	5E8A	A	10	BITFIELD_32	1	☑	☑	
C00374	CAN SDO client node address	24201	5E89	A	10	UNSIGNED_8	1	☑	☑	
C00375	CAN SDO client Rx identifier	24200	5E88	A	10	BITFIELD_32	1	☑	☑	
C00376	CAN SDO client Tx identifier	24199	5E87	A	10	BITFIELD_32	1	☑	☑	
C00377	CAN SDO server node address	24198	5E86	A	10	UNSIGNED_8	1	☑	☑	
C00378	CAN delay boot-up - Operational	24197	5E85	E	1	UNSIGNED_16	1	☑	☑	
C00381	CAN Heartbeat Producer Time	24194	5E82	E	1	UNSIGNED_16	1	☑	☑	
C00382	CAN Guard Time	24193	5E81	E	1	UNSIGNED_16	1	☑	☑	
C00383	CAN Life Time Factor	24192	5E80	E	1	UNSIGNED_8	1	☑	☑	
C00385	CAN Heartbeat Consumer Time	24190	5E7E	A	32	BITFIELD_32	1	☑	☑	
C00386	CAN Node Guarding	24189	5E7D	A	32	BITFIELD_32	1	☑	☑	
C00387	CAN Node Guarding Activity	24188	5E7C	E	1	BITFIELD_32	1	☑		
C00388	CAN Node Guarding Status	24187	5E7B	A	32	UNSIGNED_8	1	☑		
C00390	CAN error register (DS301V402)	24185	5E79	E	1	BITFIELD_8	1	☑		
C00391	CAN emergency object	24184	5E78	E	1	BITFIELD_32	1	☑	☑	
C00392	CAN emergency delay time	24183	5E77	E	1	UNSIGNED_16	1	☑	☑	
C00393	CAN event bus scan	24182	5E76	A	128	UNSIGNED_8	1	☑		
C00398	Test mode motor control	24177	5E71	E	1	UNSIGNED_32	1	☑	☑	☑
C00399	Settings for test mode	24176	5E70	A	2	INTEGER_32	10	☑	☑	
C00416	Resolver error compensation	24159	5E5F	E	1	UNSIGNED_32	1	☑	☑	☑
C00420	Encoder - PPR	24155	5E5B	E	1	UNSIGNED_16	1	☑	☑	☑
C00421	Encoder voltage	24154	5E5A	E	1	UNSIGNED_16	10	☑	☑	☑
C00422	Encoder - type	24153	5E59	E	1	UNSIGNED_16	1	☑	☑	☑
C00427	TTL encoder signal evaluation	24148	5E54	E	1	UNSIGNED_16	1	☑	☑	☑
C00443	DIx status	24132	5E44	A	12	UNSIGNED_8	1	☑		
C00444	DOx status	24131	5E43	A	18	UNSIGNED_8	1	☑		
C00465	Keypad: Welcome screen time-out	24110	5E2E	E	1	UNSIGNED_8	1	☑	☑	
C00466	Keypad: Default parameters	24109	5E2D	E	1	UNSIGNED_16	1	☑	☑	
C00467	Keypad: Def. welcome screen	24108	5E2C	E	1	UNSIGNED_8	1	☑	☑	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C00469	Keypad: Fct. STOP key	24106	5E2A	E	1	UNSIGNED_8	1	☑	☑	
C00490	Position encoder	24085	5E15	E	1	UNSIGNED_16	1	☑	☑	☑
C00494	Motor standstill time constant	24081	5E11	E	1	UNSIGNED_32	1	☑	☑	
C00495	Motor encoder	24080	5E10	E	1	UNSIGNED_16	1	☑	☑	☑
C00497	Speed act. val. time const.	24078	5E0E	E	1	UNSIGNED_32	10	☑	☑	
C00573	Resp. to overload brake chopper	24002	5DC2	E	1	UNSIGNED_32	1	☑	☑	
C00574	Resp. to overtemp. brake resist.	24001	5DC1	E	1	UNSIGNED_32	1	☑	☑	
C00576	Window - speed monitoring	23999	5DBF	E	1	UNSIGNED_32	1	☑	☑	
C00577	Gain field weakening controller	23998	5DBE	E	1	UNSIGNED_32	1000	☑	☑	
C00578	Integr.-act. time field weak. contr.	23997	5DBD	E	1	UNSIGNED_32	10	☑	☑	
C00579	React. speed monitoring	23996	5DBC	E	1	UNSIGNED_32	1	☑	☑	
C00580	Resp. to encoder open circuit	23995	5DBB	E	1	UNSIGNED_32	1	☑	☑	
C00581	Resp. to external fault	23994	5DBA	E	1	UNSIGNED_32	1	☑	☑	
C00582	Resp. to heatsink temp. > C00122	23993	5DB9	E	1	UNSIGNED_32	1	☑	☑	
C00583	Resp. to motor overtemp. KTY	23992	5DB8	E	1	UNSIGNED_32	1	☑	☑	
C00584	Resp. to motor temp. > C00121	23991	5DB7	E	1	UNSIGNED_32	1	☑	☑	
C00585	Resp. to motor overtemp. PTC	23990	5DB6	E	1	UNSIGNED_32	1	☑	☑	
C00586	Resp. to resolver open circuit	23989	5DB5	E	1	UNSIGNED_32	1	☑	☑	
C00587	Status fan control	23988	5DB4	E	1	BITFIELD_8	1	☑		
C00588	Resp. to t. sensor drive failure	23987	5DB3	E	1	UNSIGNED_32	1	☑	☑	
C00589	Resp. to CPU temp. > C00126	23986	5DB2	E	1	UNSIGNED_32	1	☑	☑	
C00591	Resp. to CAN-RPDOx error	23984	5DB0	A	4	UNSIGNED_8	1	☑	☑	
C00594	Resp. to t. sensor motor failure	23981	5DAD	E	1	UNSIGNED_32	1	☑	☑	
C00595	Resp. to CAN bus OFF	23980	5DAC	E	1	UNSIGNED_8	1	☑	☑	
C00596	Threshold max. speed reached	23979	5DAB	E	1	UNSIGNED_32	1	☑	☑	
C00597	Resp. to motor phase failure	23978	5DAA	E	1	UNSIGNED_32	1	☑	☑	
C00598	Resp. to open circuit AIN1	23977	5DA9	E	1	UNSIGNED_32	1	☑	☑	
C00599	Threshold - motor phase failure	23976	5DA8	E	1	INTEGER_32	10	☑	☑	
C00600	Resp. to DC bus overvoltage	23975	5DA7	E	1	UNSIGNED_32	1	☑	☑	
C00601	Resp. to comm. encoder error	23974	5DA6	E	1	UNSIGNED_32	1	☑	☑	
C00604	Resp. to device overload	23971	5DA3	E	1	UNSIGNED_32	1	☑	☑	
C00606	Resp. to motor overload	23969	5DA1	E	1	UNSIGNED_32	1	☑	☑	
C00607	Resp. to max. speed reached	23968	5DA0	E	1	UNSIGNED_32	1	☑	☑	
C00610	Resp. to heatsink fan failure	23965	5D9D	E	1	UNSIGNED_32	1	☑	☑	
C00611	Resp. to integral fan failure	23964	5D9C	E	1	UNSIGNED_32	1	☑	☑	
C00612	Resp. to CAN node guarding error	23963	5D9B	A	32	UNSIGNED_8	1	☑	☑	
C00613	Resp. to CAN heartbeat error	23962	5D9A	A	32	UNSIGNED_8	1	☑	☑	
C00614	Resp. to CAN life guarding error	23961	5D99	E	1	UNSIGNED_8	1	☑	☑	
C00615	Resp. to imp. device config.	23960	5D98	A	5	UNSIGNED_32	1	☑	☑	
C00618	No. of CRC cycles	23957	5D95	E	1	UNSIGNED_32	1	☑		
C00619	Resp. to max. motor current	23956	5D94	E	1	UNSIGNED_32	1	☑	☑	
C00620	Threshold max. motor current	23955	5D93	E	1	UNSIGNED_32	10	☑	☑	
C00625	CAN behaviour in case of fault	23950	5D8E	E	1	UNSIGNED_8	1	☑	☑	
C00635	Resp to new firmw. standard dev.	23940	5D84	E	1	UNSIGNED_32	1	☑	☑	
C00636	Resp. to new module in MXI1	23939	5D83	E	1	UNSIGNED_32	1	☑	☑	
C00637	Resp. to new module in MXI2	23938	5D82	E	1	UNSIGNED_32	1	☑	☑	
C00691	Total speed setpoint	23884	5D4C	E	1	INTEGER_32	100	☑		
C00692	Speed setpoint	23883	5D4B	E	1	INTEGER_32	100	☑		
C00693	Actual speed value	23882	5D4A	E	1	INTEGER_32	100	☑		
C00694	Speed controller output	23881	5D49	E	1	INTEGER_32	100	☑		
C00695	Total torque setpoint	23880	5D48	E	1	INTEGER_32	100	☑		

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C00696	Torque setpoint	23879	5D47	E	1	INTEGER_32	100	☑		
C00697	Filtered torque setpoint	23878	5D46	E	1	INTEGER_32	100	☑		
C00698	Actual torque	23877	5D45	E	1	INTEGER_32	100	☑		
C00770	MCTRL_dnMotorPosAct	23805	5CFD	A	2	UNSIGNED_32	1	☑		
C00771	MCTRL_dnLoadPosAct	23804	5CFC	A	2	UNSIGNED_32	1	☑		
C00772	MCTRL_dnMotorSpeedAct	23803	5CFB	E	1	INTEGER_32	1	☑		
C00773	MCTRL_dnLoadSpeedAct	23802	5CFA	E	1	INTEGER_32	1	☑		
C00774	MCTRL_dnTorqueAct	23801	5CF9	E	1	INTEGER_32	100	☑		
C00775	MCTRL_dnOutputSpeedCtrl	23800	5CF8	E	1	INTEGER_32	100	☑		
C00776	MCTRL_dnInputJerkCtrl	23799	5CF7	E	1	INTEGER_32	100	☑		
C00777	MCTRL_dnInputTorqueCtrl	23798	5CF6	E	1	INTEGER_32	100	☑		
C00778	MCTRL_dnFluxAct	23797	5CF5	E	1	INTEGER_32	100	☑		
C00779	MCTRL_dnDCBusVoltage	23796	5CF4	E	1	INTEGER_32	1	☑		
C00780	MCTRL_dnImotAct	23795	5CF3	E	1	INTEGER_32	100	☑		
C00781	MCTRL_dwMaxMotorSpeed	23794	5CF2	E	1	UNSIGNED_32	1	☑		
C00782	MCTRL_dwMaxMotorTorque	23793	5CF1	E	1	UNSIGNED_32	1000	☑		
C00783	MCTRL_dwMotorVoltageAct	23792	5CF0	E	1	UNSIGNED_32	1	☑		
C00784	MCTRL_dnMotorFreqAct	23791	5CEF	E	1	INTEGER_32	10	☑		
C00786	MCTRL_dnIxtLoad	23789	5CED	E	1	INTEGER_32	100	☑		
C00787	MCTRL_dnFlyingSpeedAct	23788	5CEC	E	1	INTEGER_32	1	☑		
C00788	MCTRL_ dwMaxEffMotorTorque	23787	5CEB	E	1	INTEGER_32	1000	☑		
C00789	MCTRL_ dwMaxDeviceCurrent	23786	5CEA	E	1	INTEGER_32	100	☑		
C00790	MCTRL_dnI2xtLoad	23785	5CE9	E	1	INTEGER_32	100	☑		
C00791	MCTRL_dnDeltaMotorPos_p	23784	5CE8	E	1	INTEGER_32	1	☑		
C00792	MCTRL_dnOutputPosCtrlMotor_s	23783	5CE7	E	1	INTEGER_32	1	☑		
C00800	MCTRL_dnPosSet	23775	5CDF	A	2	UNSIGNED_32	1	☑		
C00802	MCTRL_dnSpeedAdd	23773	5CDD	E	1	INTEGER_32	1	☑		
C00803	MCTRL_dnTorqueAdd	23772	5CDC	E	1	INTEGER_32	1000	☑		
C00804	MCTRL_dnAccelerationAdd	23771	5CDB	E	1	INTEGER_32	1000	☑		
C00805	MCTRL_dnSpeedLowLimit	23770	5CDA	E	1	INTEGER_32	1	☑		
C00806	MCTRL_dnTorqueLowLimit	23769	5CD9	E	1	INTEGER_32	100	☑		
C00807	MCTRL_dnTorqueHighLimit	23768	5CD8	E	1	INTEGER_32	100	☑		
C00808	MCTRL_dnPosCtrlOutLimit	23767	5CD7	E	1	INTEGER_32	1	☑		
C00809	MCTRL_dnTorqueCtrlAdapt	23766	5CD6	E	1	INTEGER_32	100	☑		
C00810	MCTRL_dnSpeedCtrlAdapt	23765	5CD5	E	1	INTEGER_32	100	☑		
C00811	MCTRL_dnPosCtrlAdapt	23764	5CD4	E	1	INTEGER_32	100	☑		
C00812	MCTRL_dnMotorPosRefValue	23763	5CD3	A	2	UNSIGNED_32	1	☑		
C00813	MCTRL_dnLoadPosRefValue	23762	5CD2	A	2	UNSIGNED_32	1	☑		
C00814	MCTRL_dnBoost	23761	5CD1	E	1	INTEGER_32	1	☑		
C00815	MCTRL_dnSpeedCtrlIntegrator	23760	5CD0	E	1	INTEGER_32	1	☑		
C00816	MCTRL_dnFieldWeak	23759	5CCF	E	1	INTEGER_32	100	☑		
C00817	MCTRL_dnSpeedSet_s	23758	5CCE	E	1	INTEGER_32	1	☑		
C00854	ID status	23721	5CA9	E	1	UNSIGNED_32	1	☑		
C00878	Status DCTRL control input	23697	5C91	A	5	UNSIGNED_8	1	☑		
C00909	Speed limitation	23666	5C72	A	2	INTEGER_16	10	☑	☑	
C01120	Sync source	23455	5B9F	E	1	UNSIGNED_8	1	☑	☑	
C01121	Sync cycle time	23454	5B9E	E	1	UNSIGNED_32	1	☑	☑	
C01122	Sync phase position	23453	5B9D	E	1	UNSIGNED_32	1	☑	☑	
C01123	Sync window	23452	5B9C	E	1	UNSIGNED_32	1	☑	☑	
C01124	Sync PLL increment	23451	5B9B	E	1	UNSIGNED_8	1	☑	☑	
C01190	Motor thermal sensor	23385	5B59	E	1	UNSIGNED_32	1	☑	☑	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C01191	Temperature for spec. characteristic	23384	5B58	A	2	UNSIGNED_32	1	☑	☑	
C01192	Resistor for spec. characteristic	23383	5B57	A	2	UNSIGNED_32	1	☑	☑	
C01193	Motor temp. feedback system	23382	5B56	E	1	UNSIGNED_16	1	☑	☑	☑
C01194	Motor operating temperature	23381	5B55	E	1	INTEGER_32	1	☑	☑	
C01195	Influence winding I²xt mon.	23380	5B54	E	1	UNSIGNED_32	1	☑	☑	
C01196	S1 torque characteristic I²xt mon.	23379	5B53	A	8	UNSIGNED_32	1	☑	☑	
C01203	Counter: Brake chopper overload	23372	5B4C	E	1	UNSIGNED_16	1	☑		
C01204	Counter: Ixt overload	23371	5B4B	E	1	UNSIGNED_16	1	☑		
C01205	Counter: DC bus overvoltage	23370	5B4A	E	1	UNSIGNED_16	1	☑		
C01206	Counter: Mains switching	23369	5B49	E	1	UNSIGNED_16	1	☑		
C01208	Counter: Heatsink overtemp.	23367	5B47	E	1	UNSIGNED_16	1	☑		
C01209	Counter: Housing overtemp.	23366	5B46	E	1	UNSIGNED_16	1	☑		
C01210	Electrolytic capacitor av. temp.	23365	5B45	E	1	UNSIGNED_8	1	☑		
C01212	Counter: Power section overload	23363	5B43	E	1	UNSIGNED_16	1	☑		
C01214	Internal clock	23361	5B41	E	1	VISIBLE_STRING	1	☑		
C01501	Resp. to comm. error with MXI1	23074	5A22	E	1	UNSIGNED_32	1	☑	☑	
C01502	Resp. to comm. error with MXI2	23073	5A21	E	1	UNSIGNED_32	1	☑	☑	
C01510	Ethernet IP address client x	23065	5A19	A	5	VISIBLE_STRING	1	☑		
C01511	Ethernet status client x	23064	5A18	A	5	UNSIGNED_8	1	☑		
C01902	Diagnostics X6: Max. baud rate	22673	5891	E	1	UNSIGNED_32	1	☑	☑	
C01903	Diagnostics X6: Change baud rate	22672	5890	E	1	UNSIGNED_32	1	☑	☑	
C01905	Diagnostics X6: Curr. baud rate	22670	588E	E	1	UNSIGNED_32	1	☑		
C02104	Program auto-start	22471	57C7	E	1	UNSIGNED_32	1	☑	☑	
C02108	Program status	22467	57C3	E	1	UNSIGNED_8	1	☑		
C02109	Program runtime	22466	57C2	E	1	UNSIGNED_16	1	☑		
C02113	Program name	22462	57BE	E	1	VISIBLE_STRING	1	☑		
C02121	Runtime task 1	22454	57B6	A	2	UNSIGNED_32	1	☑		
C02122	Runtime task 2	22453	57B5	A	2	UNSIGNED_32	1	☑		
C02123	Runtime task 3	22452	57B4	A	2	UNSIGNED_32	1	☑		
C02520	Gearbox fact. numer. motor	22055	5627	E	1	INTEGER_32	1	☑	☑	☑
C02521	Gearbox fact. denom. motor	22054	5626	E	1	INTEGER_32	1	☑	☑	☑
C02522	Gearbox fact. numer. load	22053	5625	E	1	INTEGER_32	1	☑	☑	☑
C02523	Gearbox fact. denom. load	22052	5624	E	1	INTEGER_32	1	☑	☑	☑
C02524	Feed constant	22051	5623	E	1	UNSIGNED_32	10000	☑	☑	☑
C02525	Unit	22050	5622	E	1	UNSIGNED_32	1	☑	☑	☑
C02526	User-defined unit	22049	5621	E	1	VISIBLE_STRING	1	☑	☑	☑
C02527	Motor mounting direction	22048	5620	E	1	UNSIGNED_32	1	☑	☑	☑
C02528	Traversing range	22047	561F	E	1	UNSIGNED_32	1	☑	☑	☑
C02529	Mounting direction of position encoder	22046	561E	E	1	UNSIGNED_32	1	☑	☑	☑
C02530	Active function state	22045	561D	E	1	INTEGER_32	1	☑		
C02531	Resulting gearbox factors	22044	561C	A	3	UNSIGNED_32	1000	☑		
C02532	Resolution of a unit	22043	561B	E	1	UNSIGNED_32	10000	☑		
C02533	Time unit	22042	561 A	E	1	UNSIGNED_32	1	☑		
C02534	User-defined time unit	22041	5619	E	1	VISIBLE_STRING	0	☑		
C02535	User-defined unit	22040	5618	E	1	VISIBLE_STRING	0	☑		
C02536	Cycle	22039	5617	E	1	UNSIGNED_32	10000	☑	☑	☑
C02537	Speed unit	22038	5616	E	1	VISIBLE_STRING	0	☑		
C02538	Acceleration unit	22037	5615	E	1	VISIBLE_STRING	0	☑		
C02539	Max. presentable position	22036	5614	E	1	INTEGER_32	10000	☑		
C02540	Max. speed to be shown	22035	5613	E	1	INTEGER_32	10000	☑		

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C02541	Max. acceleration to be shown	22034	5612	E	1	INTEGER_32	10000	☑		
C02542	Load reference speed	22033	5611	E	1	UNSIGNED_32	1000	☑		
C02543	Load reference torque	22032	5610	E	1	UNSIGNED_32	1000	☑		
C02547	DI_dnState	22028	560C	E	1	INTEGER_32	1	☑		
C02548	DI_bErrors	22027	560B	A	4	UNSIGNED_32	1	☑		
C02549	Drive interface: Signals	22026	560 A	A	15	UNSIGNED_32	1	☑		
C02550	Setpoint interpolation	22025	5609	A	3	UNSIGNED_32	1	☑	☑	
C02552	Position setpoint	22023	5607	E	1	INTEGER_32	10000	☑		
C02553	Position controller gain	22022	5606	E	1	UNSIGNED_32	100	☑	☑	
C02554	Integral-actoin time of position controller	22021	5605	E	1	UNSIGNED_32	1000	☑	☑	
C02555	D component of position controller	22020	5604	E	1	UNSIGNED_32	1000	☑	☑	
C02556	Pos. contr. limitation	22019	5603	E	1	INTEGER_32	10000	☑	☑	
C02557	Motor pos. contr. output	22018	5602	E	1	INTEGER_32	10000	☑		
C02558	Pos. contr. output	22017	5601	E	1	INTEGER_32	10000	☑		
C02559	Internal torque limit	22016	5600	A	2	INTEGER_32	100	☑		
C02560	Motor interface messages	22015	55FF	E	1	UNSIGNED_32	1	☑		
C02567	Control mode	22008	55F8	E	1	UNSIGNED_32	1	☑		
C02568	Motor interface: % signals	22007	55F7	A	8	INTEGER_32	100	☑		
C02569	Motor interface.: Dig. signals	22006	55F6	A	11	UNSIGNED_32	1	☑		
C02570	Controller configuration	22005	55F5	E	1	UNSIGNED_32	1	☑	☑	☑
C02572	Speed setpoint	22003	55F3	E	1	INTEGER_32	10000	☑		
C02573	Position setpoint	22002	55F2	E	1	INTEGER_32	10000	☑		
C02574	Actual speed value	22001	55F1	E	1	INTEGER_32	10000	☑		
C02575	Actual position	22000	55F0	E	1	INTEGER_32	10000	☑		
C02576	Following error	21999	55EF	E	1	INTEGER_32	10000	☑		
C02577	External actual position	21998	55EE	E	1	INTEGER_32	10000	☑		
C02578	Offset actual pos. value/setp.	21997	55ED	E	1	INTEGER_32	10000	☑		
C02579	Encoder eval.: Dig. signals	21996	55EC	A	3	UNSIGNED_32	1	☑		
C02580	Operating mode - brake	21995	55EB	E	1	UNSIGNED_32	1	☑	☑	☑
C02581	Brake activation threshold	21994	55EA	E	1	INTEGER_32	1	☑	☑	
C02582	Brake resp. to pulse inhibit	21993	55E9	E	1	UNSIGNED_32	1	☑	☑	
C02583	Status input monitoring	21992	55E8	E	1	UNSIGNED_32	1	☑	☑	
C02585	Brake control polarity	21990	55E6	E	1	UNSIGNED_32	1	☑	☑	
C02586	Starting torque 1	21989	55E5	E	1	INTEGER_32	100	☑	☑	
C02587	Starting torque 2	21988	55E4	E	1	INTEGER_32	100	☑	☑	
C02588	Source of starting torque	21987	55E3	E	1	UNSIGNED_32	1	☑	☑	
C02589	Brake closing time	21986	55E2	E	1	UNSIGNED_32	1	☑	☑	
C02590	Brake opening time	21985	55E1	E	1	UNSIGNED_32	1	☑	☑	
C02591	Waiting time - status monit.	21984	55E0	E	1	UNSIGNED_32	1	☑	☑	
C02593	Waiting time - brake active.	21982	55DE	E	1	UNSIGNED_32	1000	☑	☑	
C02594	Test torque	21981	55DD	E	1	INTEGER_32	100	☑	☑	
C02595	Permissible angle of rotation	21980	55DC	E	1	INTEGER_32	1	☑	☑	
C02596	Grinding speed	21979	55 db	E	1	INTEGER_32	1	☑	☑	
C02597	Accel./decel. time - grinding	21978	55DA	E	1	UNSIGNED_32	1000	☑	☑	
C02598	Grinding ON time	21977	55D9	E	1	UNSIGNED_32	10	☑	☑	
C02599	Grinding OFF time	21976	55D8	E	1	UNSIGNED_32	10	☑	☑	
C02607	BRK_dnState	21968	55D0	E	1	INTEGER_32	1	☑		
C02608	BRK_dnTorqueAdd_n	21967	55CF	E	1	INTEGER_32	100	☑		
C02609	Brake control: Dig. signals	21966	55CE	A	9	UNSIGNED_32	1	☑		
C02610	Deceleration time for stop	21965	55CD	E	1	UNSIGNED_32	1000	☑	☑	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C02611	S-ramp time for stop	21964	55CC	E	1	UNSIGNED_32	1000	☑	☑	
C02612	Ref. for decel. time of stop	21963	55CB	E	1	UNSIGNED_32	1	☑	☑	
C02616	STP_dnState	21959	55C7	E	1	INTEGER_32	1	☑		
C02617	STP_bStopActive	21958	55C6	E	1	UNSIGNED_32	1	☑		
C02619	Quick stop: Dig. signals	21956	55C4	A	4	UNSIGNED_32	1	☑		
C02620	Manual jog speed 1	21955	55C3	E	1	INTEGER_32	10000	☑	☑	
C02621	Manual jog speed 2	21954	55C2	E	1	INTEGER_32	10000	☑	☑	
C02622	Manual acceleration	21953	55C1	E	1	INTEGER_32	10000	☑	☑	
C02623	Manual deceleration	21952	55C0	E	1	INTEGER_32	10000	☑	☑	
C02624	Inaccuracy time of manual traversing	21951	55BF	E	1	UNSIGNED_32	1000	☑	☑	
C02638	Manual jog status	21937	55B1	E	1	INTEGER_32	1	☑		
C02639	Manual control: Dig. signals	21936	55B0	A	7	UNSIGNED_32	1	☑		
C02640	Ref. mode	21935	55AF	E	1	UNSIGNED_32	1	☑	☑	
C02642	HM position	21933	55AD	E	1	INTEGER_32	10000	☑	☑	
C02643	HM target position	21932	55AC	E	1	INTEGER_32	10000	☑	☑	
C02644	Ref. speed 1	21931	55AB	E	1	INTEGER_32	10000	☑	☑	
C02645	Home acceleration 1	21930	55AA	E	1	INTEGER_32	10000	☑	☑	
C02646	Ref. speed 2	21929	55A9	E	1	INTEGER_32	10000	☑	☑	
C02647	Ref. acceleration 2	21928	55A8	E	1	INTEGER_32	10000	☑	☑	
C02648	Home S-ramp time	21927	55A7	E	1	INTEGER_32	1	☑	☑	
C02649	HM torque limit	21926	55A6	E	1	INTEGER_32	100	☑	☑	
C02650	Homing inhibit time	21925	55A5	E	1	UNSIGNED_32	1000	☑	☑	
C02651	HM touch probe configuration	21924	55A4	E	1	UNSIGNED_32	1	☑	☑	
C02652	Home position after mains switching	21923	55A3	E	1	UNSIGNED_32	1	☑	☑	
C02653	Max. rot. angle after mains sw.	21922	55A2	E	1	INTEGER_32	1	☑	☑	
C02656	Current position	21919	559F	E	1	INTEGER_32	10000	☑		
C02657	HM_dnState	21918	559E	E	1	INTEGER_32	1	☑		
C02658	HM_dnHomePos_p	21917	559D	E	1	INTEGER_32	10000	☑		
C02659	Homing: Dig. signals	21916	559C	A	9	UNSIGNED_32	1	☑		
C02674	POS_ dwActualProfileNumber	21901	558D	E	1	UNSIGNED_32	1	☑		
C02675	POS_dnState	21900	558C	E	1	INTEGER_32	1	☑		
C02676	POS_dnProfileSpeed_s	21899	558B	E	1	INTEGER_32	10000	☑		
C02677	Positioning: % signals	21898	558 A	A	2	INTEGER_32	100	☑		
C02678	Positioning: Pos. signals	21897	5589	A	2	INTEGER_32	10000	☑		
C02679	Positioning: Dig. signals	21896	5588	A	10	UNSIGNED_32	1	☑		
C02680	Source position setpoint	21895	5587	E	1	UNSIGNED_32	1	☑	☑	
C02681	Source add. speed	21894	5586	E	1	UNSIGNED_32	1	☑	☑	
C02685	PF_dnMotorAcc_x	21890	5582	E	1	INTEGER_32	10	☑		
C02686	PF_dnSpeedAdd1_s	21889	5581	E	1	INTEGER_32	10	☑		
C02687	Position follower: % signals	21888	5580	A	2	INTEGER_32	100	☑		
C02688	Position follower: Pos. signal	21887	557F	E	1	INTEGER_32	10000	☑		
C02689	Position follower: Dig. signals	21886	557E	A	2	UNSIGNED_32	1	☑		
C02692	SF_dnMotorAcc_x	21883	557B	E	1	INTEGER_32	10	☑		
C02693	SF_dnSpeedAdd_s	21882	557 A	E	1	INTEGER_32	10	☑		
C02694	Speed follower: % signals	21881	5579	A	2	INTEGER_32	100	☑		
C02695	Speed follower: Dig. signals	21880	5578	A	2	UNSIGNED_32	1	☑		
C02698	Torque follower: % signals	21877	5575	A	3	INTEGER_32	100	☑		
C02699	Torque follower: Dig. signals	21876	5574	A	2	UNSIGNED_32	1	☑		
C02700	Software limit positions are active	21875	5573	E	1	UNSIGNED_32	1	☑	☑	
C02701	Software limit positions	21874	5572	A	2	INTEGER_32	10000	☑	☑	
C02702	Limitations effective	21873	5571	E	1	UNSIGNED_32	1	☑	☑	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	DT	Factor	R	W	CINH
C02703	Max. speed	21872	5570	E	1	INTEGER_32	10000	☑	☑	
C02704	Max. speed [rpm]	21871	556F	E	1	INTEGER_32	10	☑		
C02705	Max. acceleration	21870	556E	E	1	INTEGER_32	10000	☑	☑	
C02706	Min. S-ramp time	21869	556D	E	1	UNSIGNED_32	1	☑	☑	
C02707	Permissible direction of rotation	21868	556C	E	1	UNSIGNED_32	1	☑	☑	
C02708	Limited speed	21867	556B	A	4	INTEGER_32	10000	☑	☑	
C02709	Limited speed	21866	556 A	A	4	INTEGER_32	10	☑		
C02710	Delay lim. speed	21865	5569	A	4	UNSIGNED_32	10000	☑	☑	
C02711	S-ramp time lim. speed	21864	5568	A	4	UNSIGNED_32	1	☑	☑	
C02712	Decel. time lim. speed	21863	5567	A	4	UNSIGNED_32	1	☑		
C02713	Max. Strecke Handfahren	21862	5566	E	1	UNSIGNED_32	10000	☑	☑	
C02714	Max. Strecke Handfahren	21861	5565	E	1	UNSIGNED_32	1	☑		
C02715	Limitation active	21860	5564	E	1	UNSIGNED_32	1	☑		
C02716	Resp. to limitation	21859	5563	A	3	UNSIGNED_32	1	☑	☑	
C02717	LIM_dwControl	21858	5562	E	1	UNSIGNED_32	1	☑		
C02718	LIM_dnState	21857	5561	E	1	INTEGER_32	1	☑		
C02719	Limiter: Dig. signals	21856	5560	A	3	UNSIGNED_32	1	☑		
C02730	AINx: Gain	21845	5555	A	2	INTEGER_32	100	☑	☑	
C02731	AINx: Offset	21844	5554	A	2	INTEGER_32	100	☑	☑	
C02732	AINx: Dead band	21843	5553	A	2	INTEGER_32	100	☑	☑	
C02733	AOUTx: Gain	21842	5552	A	2	INTEGER_32	100	☑	☑	
C02734	AOUTx: Offset	21841	5551	A	2	INTEGER_32	100	☑	☑	
C02800	AINx: Input signal	21775	550F	A	2	INTEGER_16	1	☑		
C02801	AOUTx: Output signal	21774	550E	A	2	INTEGER_16	1	☑		
C02802	Status word dig. outputs	21773	550D	E	1	BITFIELD_32	1	☑		
C02803	Status word dig. inputs	21772	550C	E	1	BITFIELD_32	1	☑		
C02810	Delay time for TPx	21765	5505	A	10	UNSIGNED_32	1	☑	☑	
C02830	DIx delay time	21745	54F1	A	8	UNSIGNED_8	1	☑	☑	
C02853	Vp Lss sat. characteristic	21722	54DA	A	17	UNSIGNED_16	1	☑	☑	☑
C02855	Imax Lss saturat. characteristic	21720	54D8	E	1	UNSIGNED_32	10	☑	☑	☑
C02859	Lss sat. characteristic	21716	54D4	E	1	UNSIGNED_8	1	☑	☑	☑
C02860	Rr adjustment	21715	54D3	E	1	UNSIGNED_32	100	☑	☑	
C02861	Lh adaptation	21714	54D2	E	1	UNSIGNED_32	100	☑	☑	

17 Index

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FEEDBACK

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.

Your Lenze documentation team