

Inverter



8400

E84Dxxxxx...

Inverter Drives 8400 protec · Drive-based safety -----

Software manual

EN



13321015

Lenze

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1 About this documentation

1.1 Document history

1 About this documentation

The manual contains the complete information on the application as directed of the decentralised controllers 8400 protec with drive-based safety (safety option 20 and 30).



Please read the mounting instructions supplied with the controller before you start working!

The mounting instructions contain safety instructions that must be observed!

Target group

This manual is intended for all persons who want to parameterise, configure, and diagnose the integrated safety systems in controllers of the 8400 protec series with the L-force »Engineer« engineering software.

Validity

The information given in this manual applies to 8400 protec controllers with the following nameplate data:

Product series	Type designation	From software version
8400 protec StateLine		
with safety option 20	E84DSWTxxxxxxN0xxx-xKxxS	01.00
with safety option 30	E84DSWTxxxxxxN0xxx-xLxxS	01.00
8400 protec HighLine		
with safety option 20	E84DHWTxxxxxxN0xxx-xKxxS	01.00
with safety option 30	E84DHWTxxxxxxN0xxx-xLxxS	01.00

Screenshots/application examples

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



Tip!

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

<http://www.Lenze.com> → Download

1.1 Document history



Version			Description
2.4	05/2013	TD05	Corrections
2.3	01/2013	TD05	Converted to new layout
2.2	02/2010	TD14	Corrections
2.1	11/2009	TD14	Corrections
2.0	09/2009	TD14	Corrections and extension by safety option SO20
1.0	05/2009	TD14	First edition

1 About this documentation

1.2 Conventions used

1.2 Conventions used

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

Type of information	Writing	Examples/notes
Spelling of numbers		
Decimal separators	Point	The decimal point is generally used. For example: 1234.56
Text		
Version information	Blue text colour	Information that is only valid for or from a certain software version of the controller is marked accordingly in this manual. Example: This function extension is available from software version V3.0!
Program name	» «	The Lenze »Engineer« PC software ...
Window	<i>italics</i>	The <i>Message</i> window ... / The <i>Options</i> dialog box...
Variable name		By setting <i>bEnable</i> to TRUE...
Control element	bold	The OK button... / The Copy command... / The Properties tab... / The Name input field...
Sequence of menu commands		If the execution of a function requires several commands, the individual commands are separated by an arrow: Select File→Open to...
Shortcut	< bold >	Press <F1> to open the online help. If a command requires a combination of keys, a "+" is placed between the key symbols: Use <Shift>+<ESC> to...
Hyperlink	<u>Underlined</u>	Optically highlighted reference to another topic. In this documentation activated by mouse-click.
Icons		
Page reference	 5	Optically highlighted reference to another page. In this documentation activated by mouse-click.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

Information that is only valid for or as from a certain software version of the controller are marked accordingly in this manual.

1 About this documentation

1.3 Terminology used

1.3 Terminology used

Term	Meaning
»Engineer«	Lenze PC software which supports you in "engineering" (parameterisation, diagnostics and configuration) throughout the whole life cycle, i.e. from planning to maintenance of the commissioned machine.
Application block	Block for a technology application (e.g. actuating drive - speed) A technology application is a drive solution based on the experience and know-how of Lenze in which function blocks interconnected to a signal flow form the basis for implementing typical drive tasks.
Code	Parameter used for controller parameterisation or monitoring. The term is usually called "index".
Display codes	Parameter that displays the current status or value of a system block input/output.
FB Editor	Function block editor Graphical interconnection tool which is provided for FB interconnections in the »Engineer« on the FB editor tab and by means of which the applications integrated in the drive can also be reconfigured and extended by individual functions.
Function block	General designation of a function block for free interconnection (only HighLine). A function block can be compared with an integrated circuit that contains a certain control logic and delivers one or several values when being executed. <ul style="list-style-type: none">• Each function block has a unique identifier (the instance name) and a processing number which defines the position at which the function block is calculated during the task cycle.
Lenze setting	This setting is the default factory setting of the device.
Port block	Block for implementing the process data transfer via a fieldbus
Subcode	If a code contains several parameters, these are stored in the "subcodes". This Manual uses a slash "/" as a separator between code and subcode (e.g. "C00118/3"). The term is usually called "subindex".
System block	System blocks provide interfaces to basic functions and to the hardware of the controller in the FB editor of the »Engineer« (e.g. to the digital inputs).

1

About this documentation

1.4

Terms and abbreviations used in drive-based safety

1.4

Terms and abbreviations used in drive-based safety

Abbreviation	Meaning
240	24-V voltage supply for non-safe feedback
OFF state	Signal state of the sensors when they are activated or respond
DO	Non-safe feedback output
ON state	Signal state of the sensors in normal operation
F-PLC	Safety PLC
GSE	File with device-specific data for establishing the PROFIBUS communication
GSDML	File with device-specific data for establishing the PROFINET communication
Cat.	Category according to EN 954-1 (valid until 30 November 2009)
Optocoupler supply	Supply of optocouplers to control the driver
OSSD	Output Signal Switching Device, tested signal output
PELV	Protective extra low voltage
PL	Performance Level according to EN ISO 13849-1
PM	P/N switching signal paths
PP	P/P switching signal paths
PS	PROFIsafe
PWM	Pulse width modulation
S bus	Safety bus
SD-In	Safe input (Safe Digital Input)
SD-Out	Safe output (Safe Digital Output)
SELV	Safety extra low voltage
SIA, SIB	Safe input, channel A or channel B
SIL	Safety Integrity Level according to IEC 61508
SO	integrated safety option

Abbreviation	Safety function
AIE	Error acknowledgement (Acknowledge in Error)
AIS	Restart acknowledgement (Acknowledge in Stop)
ES	Safe enable switch (Enable Switch)
OMS	Operation mode selector
SS1	Safe stop 1
SSE	Emergency stop (Safe Stop Emergency)
STO	Safe torque off Formerly: Safe standstill

1 About this documentation

1.5 Notes used

1.5 Notes used

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

Safety instructions

Layout of the safety instructions:



Danger!

(characterises the type and severity of danger)

Note

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

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

Application notes

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

2 Introduction

2.1 Functional range of the functional safety (short overview)

2 Introduction

The safety concept of the decentralised frequency inverters 8400 protec provide three safety options depending on the device version.

Safety option 10 (SO10):

- The drive-based safety implemented in the inverter permits to connect external safety components, e.g. passive sensors. Active sensors with self-testing signals can be directly connected without using further components.

Safety option 20 (SO20):

- The drive is switched off safely by a higher-level safety PLC via PROFIsafe/PROFINET.

Safety option 30 (SO30):

- The safe disconnection can both be carried out by a higher-level safety PLC via PROFIsafe/PROFINET and through the connection of active or passive sensors.



Note!

Safety options 20 and 30 can be parameterised via the »Engineer«.

The motion functions are continued to be executed by the controller. The drive-based safety monitors the safe compliance with the limit values. When the limit values are exceeded, the drive-based safety starts the control functions according to EN 60204-1 directly in the controller.

The safety functions are suitable for applications according to IEC 61508 to SIL 3 and achieve the performance level (PL) e according to EN ISO 13849-1.

The requirements of the EN 954-1 standard which was valid until 30 November 2009 are fulfilled for safety option 10 to control category 4 and for safety option 20 and 30 to control category 3.



Detailed information on technical data and electrical installation can be found in the mounting instructions for the 8400 protec.

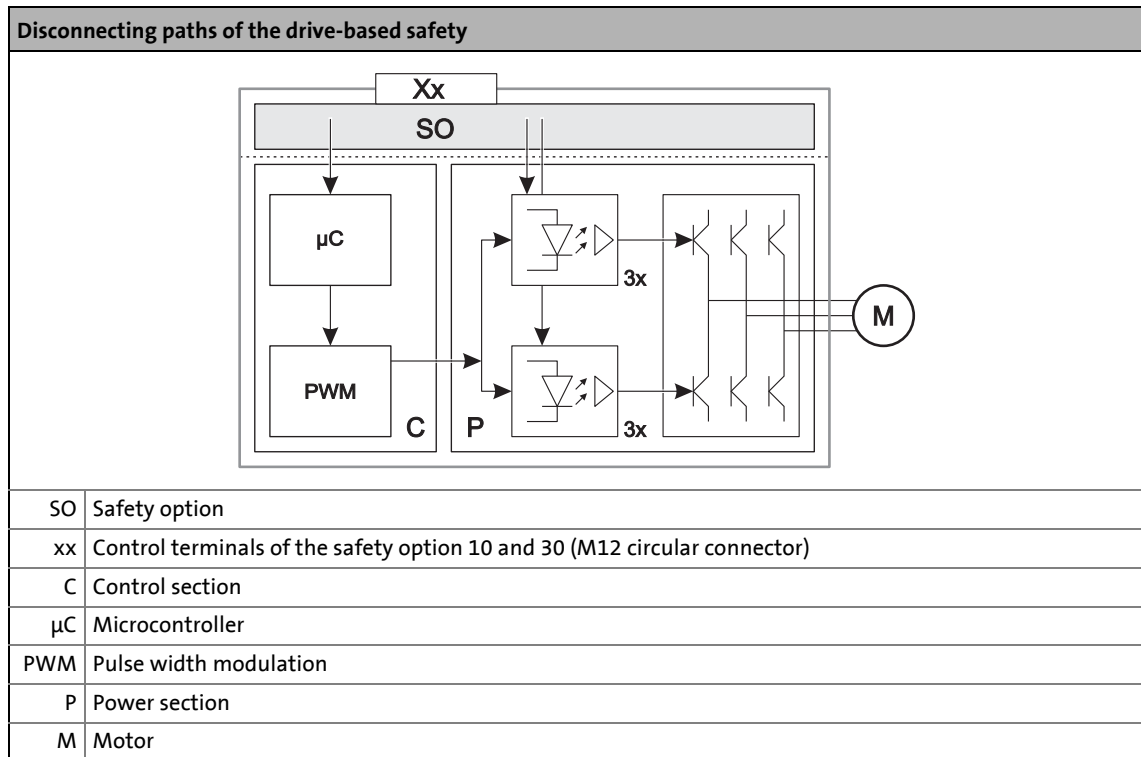
2.1 Functional range of the functional safety (short overview)

Safety option	Safety function					Safety bus PROFINET
	STO	SS1	SSE	OMS	ES	
Safety option 10	✓	✓				
Safety option 20	✓	✓	✓	✓	✓	✓
Safety option 30	✓	✓	✓	✓	✓	✓

2.2 Function mode of safety engineering

Disconnecting paths

The transmission of the pulse width modulation is safely (dis-)connected by the drive-based safety. Hence the drivers do not create a rotating field. The motor is safely switched to torqueless operation (STO).



Safety status

When the controller is switched off by the safety system, it is changed to the "Safe torque off active" status

- "Drive is torque-free" is entered in the logbook.
- C00155 (Bit 10 = 1) displays "Safe torque off active".

Fail-safe status



Note!

If internal errors of the safety system are detected, the motor is safely switched to torqueless operation (fail-safe state).

2.3 Connection to the application

When a safety function is requested, the safety technology activates the corresponding safe monitoring function. The only standstill function executed directly is the "safe torque off" (STO) function. All other safety functions require a controller action which is safely monitored.



Note!

The execution of the corresponding action (e.g. braking, braking to standstill, holding the standstill position) requires an appropriate application interconnection which must be provided by the operator!

"LS_SMInterface" system block

The [LS_SMInterface](#) system block in the function block editor of the »Engineer« serves to transmit the control and status information from the safety system to the application. ([12](#))

Basic procedure

1. Activation of the safety function (e.g. SS1 - safe stop 1).
 - Monitoring starts.
2. Via a control word, the safety system transmits the information to the controller that the safety function has been activated.
3. The application evaluates the control word and starts the required motion sequence (e.g. braking).

Internal communication

The drive-based safety system and the standard device communicate via an internal interface.



Note!

If the communication to the controller is interrupted, e.g. by switching off the controller, the safety system responds with the following actions:

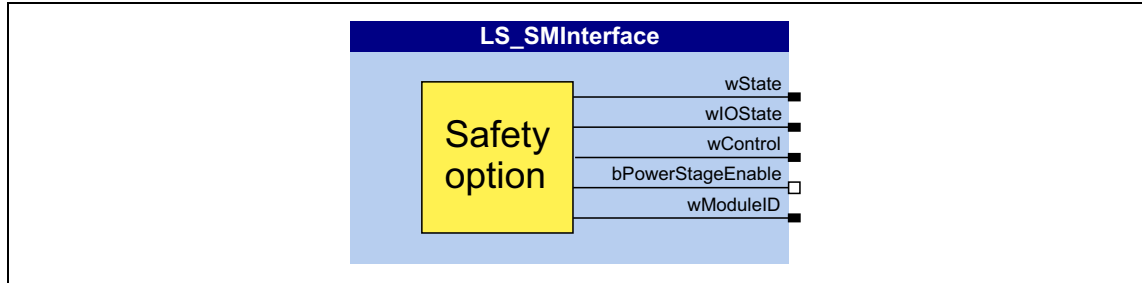
- Error stop with STO is activated.
- Error message "Warning" is transmitted.
- The LED "S-Error" on the front of the controller is on.

The required error acknowledgement (AIE) is possible via the safety bus and with SO30 via the error acknowledgement input (plug X62).

Further information can be found in chapter "[Diagnostics & error management](#)" ([20](#)).

2.3.1 "LS_SMInterface" system block

The system block **LS_SMInterface** is the interface to the integrated safety system in the function block editor of the »Engineer«.



Output	Data type	Value/meaning
wState	WORD	Bit coded status information of the drive-based safety ▶ Status information (12)
wIOState	WORD	Bit coded I/O information of the drive-based safety ▶ I/O-Status information (13)
wControl	WORD	Bit coded control information of the drive-based safety ▶ Control information (13) ▶ Transferring the control information to the application (14)
bPowerStageEnable	BOOL	Status signal "Inverter enable" TRUE Inverter is enabled by the safety system.
wModuleID	WORD	ID of the safety system in the controller
		0 No safety system available
		1 Safety option 10 (SO10):
		2 Reserved
		3 Safety option 20 (SO20):
		4 Safety option 30 (SO30):

2.3.1.1 Status information

The drive-based safety system transmits information about the status of the requested or active safety functions with the bit coded status signal *wState*.

Bit	Name	Meaning
0	STO	Function Safe torque off (STO) is active. • The drive is safely switched to torqueless operation.
3	EC_STO	Error stop category 0: Function Safe torque off (STO) is active.
4	EC_SS1	Error stop category 1: Function Safe stop 1 (SS1) is active.
14	Error active	Drive-based safety system in error status (trouble or warning).
Unlisted bits are reserved for future extensions!		

[2-1] Bit coding of the status signal *wState*

2.3.1.2 I/O-Status information

The bit-coded *wIOState* status signal serves to transfer the status the safe inputs and the safe output:

Bit	Name	Meaning
0	SD-In1	Sensor input 1 in ON state.
1	SD-In2	Sensor input 1 in ON state.
5	AIS	Restart is acknowledged via terminal (negative edge: 1↘0).
6	AIE	Error is acknowledged via terminal (negative edge: 1↘0).
8	PS_AIS	Restart is acknowledged via safety bus (positive edge: 0↗1).
9	PS_AIE	Error is acknowledged via safety bus (positive edge: 0↗1).
Unlisted bits are reserved for future extensions!		

[2-2] Bit coding of the *wIOState* status signal

2.3.1.3 Control information

The bit coded *wControl* control signal serves to transfer information about requested or active safety functions. The application in the controller must evaluate the control signal and carry out the corresponding action.

- It is possible to request/activate several safety functions at the same time.

Bit	Name	Meaning
0	SS1 active	Safe stop 1 (SS1) is active.
2	ES active	Enable switch (ES) function for motion functions in special operations is active.
3	OMS	Operation mode selector (OMS) function for special operations is requested.
4	SSE active	Emergency stop function (SSE) is active. <ul style="list-style-type: none"> • Depending on the parameterisation of the emergency stop function, bit 1 (SS1 active) or bit 0 of the status signal <i>SMI_wState</i> (STO active) is set after the function has ended.
5	OMS active	Special operation is active.
Unlisted bits are reserved for future extensions!		

[2-3] Bit coding of the *wControl* control signal



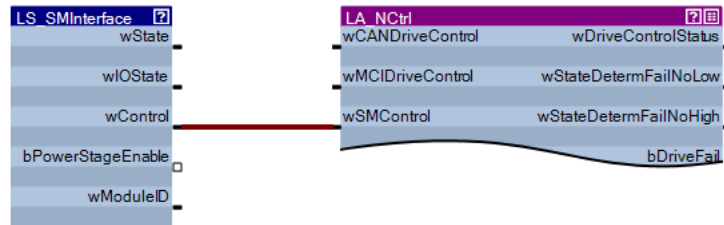
Note!

The application in the controller must evaluate the control signal *wControl* and carry out the corresponding action. The execution of the corresponding action (e.g. braking to standstill) requires an appropriate application interconnection which must be provided by the operator!

See the following subchapter "[Transferring the control information to the application](#)".
(14)

2.3.1.4 Transferring the control information to the application

In the simplest case, you only have to go to the I/O level in the FB editor and connect the *wControl* output of the **LS_SMInterface** system block with the *wSMControl* input of the application block:



On the application level, the *wSMControl* input is connected with the **motion control kernel**. The **motion control kernel** evaluates the transmitted control information and activates the required motion sequence (e.g. braking).



Note!

At present, the **motion control kernel** only evaluates bit 0 ([SS1](#)). When this safety function is requested, the drive will be decelerated to standstill along the stop ramp set in C02610/3.

Additional functions are in preparation.

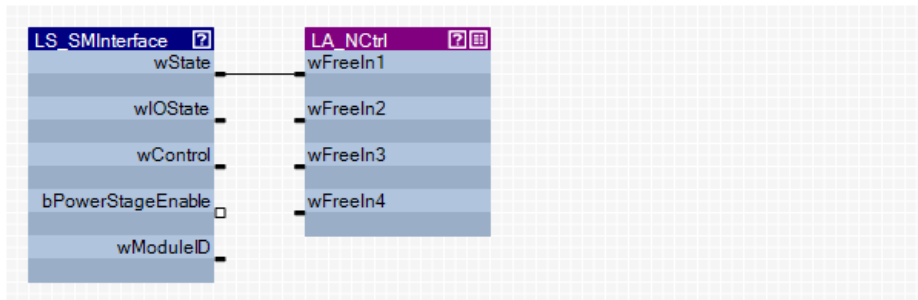
2.3.1.5 Interconnection examples

... for decoding the status and control information of the drive-based safety system into single boolean signals.

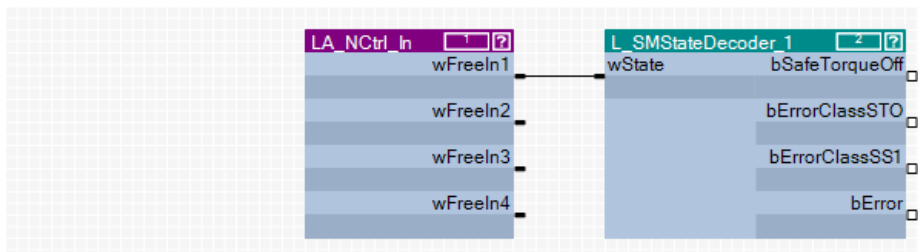


How to decode the status information into single boolean status signals:

- Go to the I/O level in the FB editor and connect the *wState* output of the **LS_SMInterface** system block with one of the free inputs *wFreeIn1* ... *wFreeIn4* of the application block.
 - In the following example, the *wState* output is connected with the free *wFreeIn1* input of the **LA_NCtrl** application block on the I/O level.
 - For a better overview, all other connections of the **LA_NCtrl** application block are not shown here.



- Go to the application level and connect the selected free input *wFreeIn* with the *wState* input of the **L_SMStateDecoder_1** function block.
 - The free inputs *wFreeIn1* ... *wFreeIn4* are outputs on the application level.

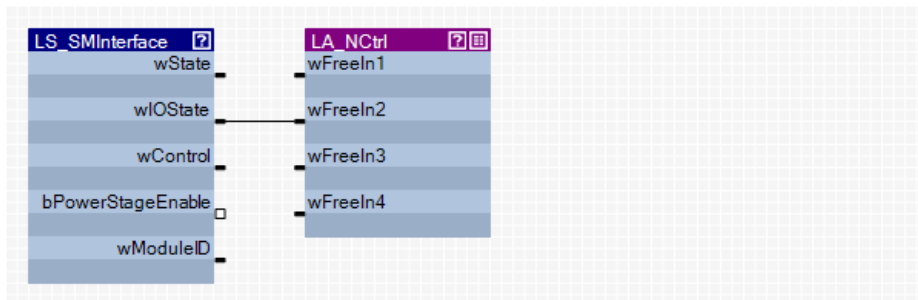


The **L_SMStateDecoder_1** function block decodes the status signal assigned to the *wState* input into single boolean status signals for further use in the FB interconnection.

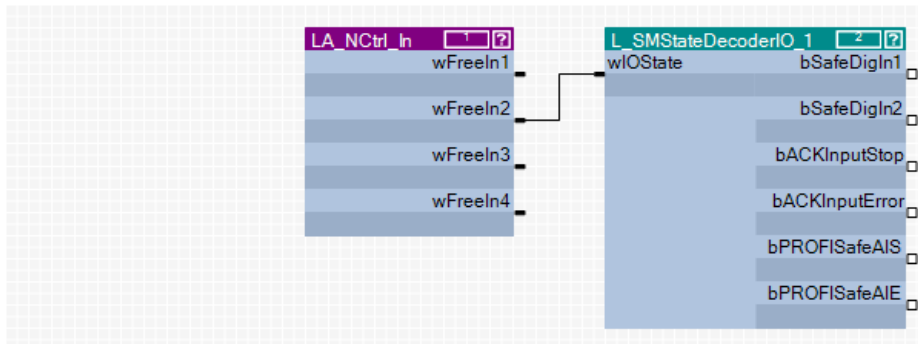


How to decode the I/O status information into single boolean status signals:

- Go to the I/O level in the FB editor and connect the *wIOState* output of the **LS_SMInterface** system block with one of the free inputs *wFreeIn1* ... *wFreeIn4* of the application block.
 - In the following example, the *wIOState* output is connected with the free *wFreeIn2* input of the **LA_NCtrl** application block on the I/O level.
 - For a better overview, all other connections of the **LA_NCtrl** application block are not shown here.



- Go to the application level and connect the selected free input *wFreeIn* with the *wIOState* input of the **L_SMStateDecoderIO_1** function block.
 - The free inputs *wFreeIn1* ... *wFreeIn4* are outputs on the application level.

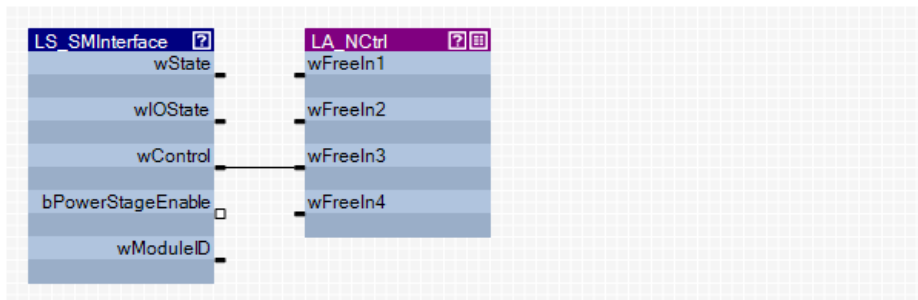


The **L_SMStateDecoderIO_1** function block decodes the status signal assigned to the *wIOState* input into single boolean status signals for further use in the FB interconnection.

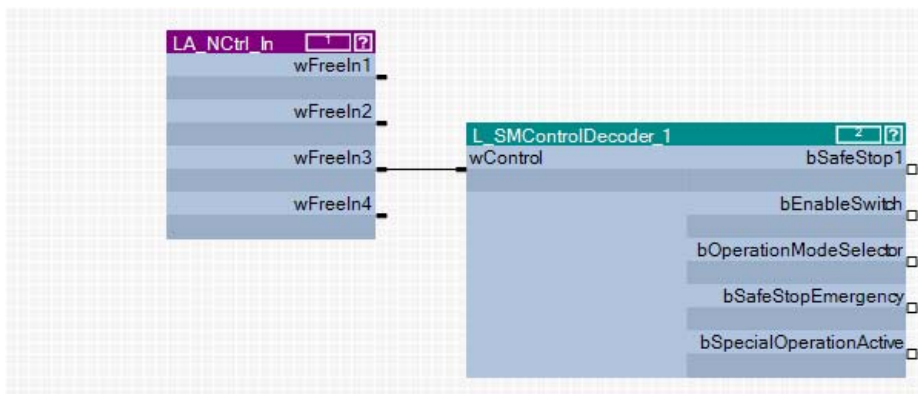


How to decode the control information into single boolean control signals:

- Go to the I/O level in the FB editor and connect the *wControl* output of the **LS_SMInterface** system block with one of the free inputs *wFreeIn1* ... *wFreeIn4* of the application block.
 - In the following example, the *wControl* output is connected with the free *wFreeIn3* input of the **LA_NCtrl** application block on the I/O level.
 - For a better overview, all other connections of the **LA_NCtrl** application block are not shown here.



- Go to the application level and connect the selected free input *wFreeIn*, which is an output on this level, with the *wControl* input of the **L_SMControlDecoder_1** function block.
 - The free inputs *wFreeIn1* ... *wFreeIn4* are outputs on the application level.



The **L_SMControlDecoder_1** function block decodes the control signal assigned to the *wControl* input into single boolean control signals for further use in the FB interconnection.

2.4 Parameter setting and configuration

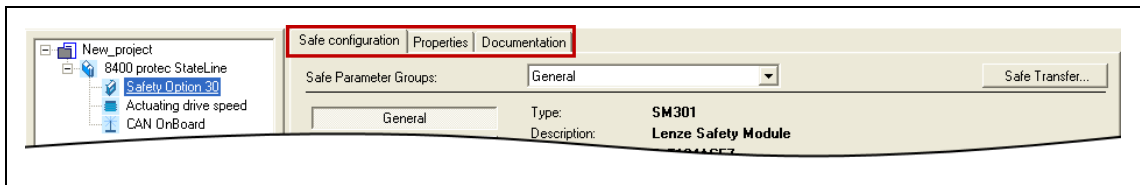


Note!

Safety-relevant parameters can only be transmitted to the drive-based safety system via safe parameter setting with the »Engineer«.

The parameter set is stored in the memory module and in the drive-based safety system with a unique module ID, which must correspond to the effective safety address in the drive-based safety system.

If you select the safety option in the *project view* of the »Engineer«, different tabs for the safety system are available in the *workspace*. The following illustration shows the tabs for safety option 30:



[2-1] Tabs of the integrated safety system (here as an example for safety option 30)

Tab	Information	available for safety option		
		10	20	30
Safe configuration	This tab serves to make the safe configuration of the drive-based safety. ▶ Safe configuration (📖 22)		✓	✓
Features	This tab displays general information on the safety system, e.g. product name, version, etc.	✓	✓	✓
Documentation	This tab serves to add notes and electronic documents to the drive-based safety system. • Detailed information on adding documentations can be found in the »Engineer« documentation in chapter "Project structure".	✓	✓	✓

Safe parameter transfer

By clicking **Safe Transfer** on the *Safe configuration* tab, the *Safe Transfer* dialog box opens which provides the function for a safe parameter transfer.

▶ [Safe parameter transfer](#) (📖 44)

Service status

If you request the "Send safe data to device" function in the *Safe Transfer* dialog box via the **Send** button, the drive-based safety system changes to the "Service status" which is required for a safe parameter setting.

▶ [Send safe data](#) (📖 45)

The service status means:

- The standard stop is active and the drive is safely switched to torqueless operation (STO).
- With safety option 30, the safe inputs are evaluated as OFF state.
- The communication via safety bus is - if possible - active, but passivated.



Note!

- The service status is also active if the parameter set in the memory module does not correspond to the parameter set in the drive-based safety system during the initialisation.
- The service status can be exited by reinitialising the drive-based safety system, i.e. the communication via the safety bus is interrupted.

Supported interfaces for a safe parameter setting

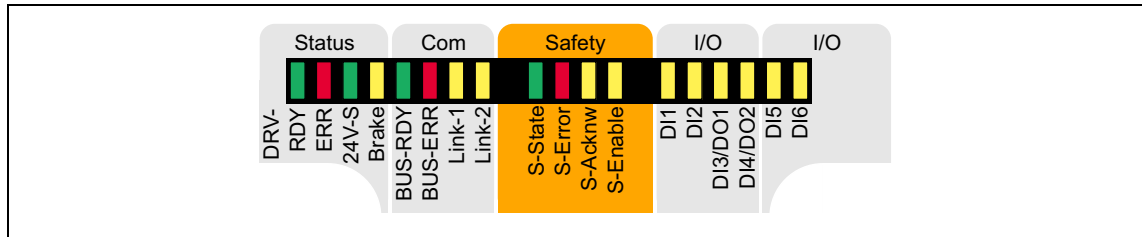
A safe parameter setting with the »Engineer« is supported via the following interfaces:

- Diagnostic interface X70
- CANopen system bus interface

2.5 Diagnostics & error management

LED display

In the "Safety" field in the middle of the LED display on the front of the controller you will get information on the status of the drive-based safety system:



[2-2] LED display on the front of the controller

Labelling	Colour	Status	Description
LED status displays for the integrated safety system			
S-State	green	off	Communication between standard device and safety system is not possible
		blinking	Integrated safety system is in the service status
		on	Communication between standard device and safety system has been established
S-Error	red	off	Error-free operation
		blinking	Integrated safety system is not accepted by standard device
		on	Warning/fault/error
S-Acknw	yellow	on	Parameter set acceptance must be acknowledged
S-Enable	yellow	blinking	Safety function active (non-safe display)
		on	Controller enabled



Note!

The status of safety option 10 is only indicated via the "S-Enable" LED display.

Error states

Detected errors or maloperation of the drive are assigned to error states with definite responses. The response can be co-ordinated with the complete drive via the error states.

Features	Error status		
	System error	Fault	Warning
Event	Fatal internal error	Error	Monitoring function
LED "S_Error"	On	On	On
State of the drive-based safety system	Lockout (CPU stopped)	Error status	Normal operation
The control category according to EN 954-1...	... has been abandoned		... has not been abandoned
Response	The motor is immediately safely switched to torqueless operation via <ul style="list-style-type: none"> • STO 	The motor is immediately safely switched to torqueless operation via <ul style="list-style-type: none"> • STO or shutdown via • SS1 (parameterisable) 	
Acknowledgement after event has been eliminated	<ul style="list-style-type: none"> • Switching off and then on again of the 24-V supply at the safety module 	<ul style="list-style-type: none"> • Error acknowledgement (AIE) plug X62 (positive signal pulse with a signal duration of 0.3 ... 10 s) • Error acknowledgement (AIE) via safety bus (bit "PS_AIE") • Switching off and then on again of the 24-V supply at the safety module 	



Note!

If the system error still occurs after switching the supply voltage, please contact the Lenze service!

Error in PROFIsafe communication

When PROFIsafe is used as safety bus:

- If errors occur in the PROFIsafe communication, the data are passivated by the PROFIsafe driver.
- After the PROFIsafe communication is reinitialised, the drive reenabled if no standstill function has been selected.
- Events which cause an error status are sent as a diagnostic telegram via the safety bus.

Logbook

The logbook function integrated in the controller records important events in the system in chronological order, including error states of the drive-based safety system.



Tip!

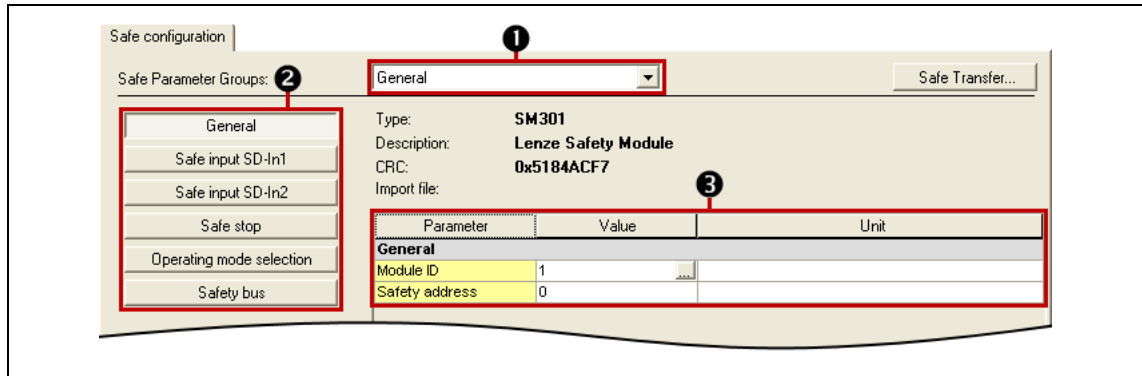
When an online connection has been established, the logbook can be displayed in the »Engineer« via the **Logbook** button on the **Diagnostic** tab for the controller.

Detailed information on the logbook can be found in the Online Help for the controller.

3 Safe configuration

3 Safe configuration

The drive-based safety system can be safely configured in the »Engineer« on the *Safe configuration* tab for the SM301 safety module



[3-1] Example: *Safe configuration* tab for safety option 30

The parameters of the drive-based safety system are divided into different groups according to their functions.

- A group is selected via the **Parameter groups** ❶ list field.
- Some parameter groups are divided into functional subgroups for a better overview which can be selected via the buttons ❷ on the left.
 - [General parameters](#) (□ 25)
 - [Safe inputs](#) (□ 42)
(Safe inputs SD-In1 and SD-In2 are only available in connection with the safety option 30.)
 - [Stop functions](#) (□ 27)
 - [Operation mode selection](#) (□ 31)
 - [Safety bus](#) (□ 33)
- In the parameter list ❸ all parameters of the parameter group/subgroup selected are displayed.
 - The **Value** field serves to change the corresponding parameter value.
 - ▶ [Change parameter settings](#) (□ 23)
 - The *context menu* (right mouse button) provides functions for the import/export of the parameter settings.
 - ▶ [Import/export parameter settings](#) (□ 24)

Tip!

If you put the mouse pointer over a parameter, further information on the parameter will be displayed in a pop-up window.

If you select the entry "All parameters" in the **Parameter groups** list field, all parameters of the drive-based safety system are displayed on the tab.

The **File→Print** command in the »Engineer« *menu bar* serves to print all parameter settings of the drive-based safety system for the purpose of documentation.

3 Safe configuration

3.1 Change parameter settings

3.1 Change parameter settings



Note!

Changed parameters of the drive-based safety system are not transmitted automatically to the device, even if an online connection has been established!

The parameter set for the drive-based safety system is only safely transmitted when clicking the **Send** button in the *Safe transfer* dialog box!

▶ [Send safe data](#) (📄 45)



How to change a parameter setting:

1. Select the parameter to be changed from the list.
2. Enter the new value into the **Value** column or select it from the defined options.
 - Invalid or impermissible values are displayed in "red" in the input field.
 - A selection from the list field may cause a deactivation of parameters which are now irrelevant due to the selection (marked by a grey background colour).
3. Press **<Return key>** or click into another box to accept the changed value.
 - By pressing the **<Esc>** key you can cancel the entry.



Tip!

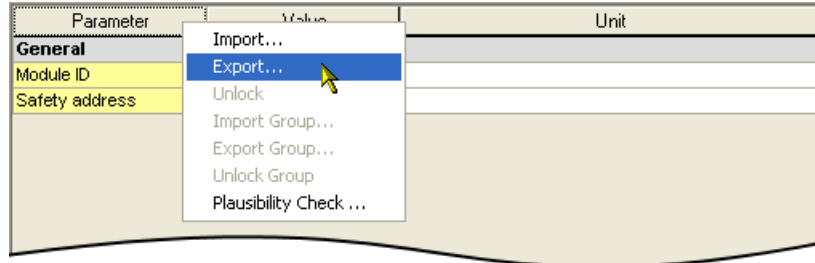
The parameter settings of the drive-based safety system can also be displayed in the »Engineer« parameter list (tab *All parameters* → category **Safety option**) and on the keypad. Changes, however, are only possible via the *Safe configuration* tab!

3 Safe configuration

3.2 Import/export parameter settings

3.2 Import/export parameter settings

For transmitting/copying the parameter settings of the drive-based safety system to other controllers of the 8400 protec series with an identical safety option, the import/export functions can be used which are available in the parameter list via the *Context menu* (right mouse button).



Command in the context menu	Information
Import...	Import all parameter settings from the file.
Export...	Export all parameter settings to the file.
Unlocking	Unlock imported parameter settings. <ul style="list-style-type: none">• After the "Import" function has been executed, the imported parameter settings are protected from change by the user. Only an explicit unlocking enables a change again.
Import group...	Import parameter settings of a group from a file. <ul style="list-style-type: none">• Only possible when selecting a parameter group.
Export group...	Export parameter settings of a group to a file. <ul style="list-style-type: none">• Only possible when selecting a parameter group.
Unlock group	Unlock imported parameter settings of a group. <ul style="list-style-type: none">• After the "Import group" function has been executed, the imported parameter settings are protected from change by the user. Only an explicit unlocking enables a change again.

3 Safe configuration

3.3 Plausibility check

3.3 Plausibility check

Before transmitting the parameter set to the drive-based safety system, a plausibility check always takes place.



Note!

Only a plausible parameter set can be transmitted to the drive-based safety system using the "Send safe data" function!

With the **Plausibility check...** command in the *Context menu* (right mouse button) of the parameter list you can start the plausibility check manually, to check the changes made in the parameter settings with regard to plausibility.

- After the plausibility check a status message indicates whether the plausibility check was successful.
- If the plausibility check failed, the status message contains the parameters with implausible settings.



Tip!

[C15016](#) displays the parameter set version of the drive-based safety system.

3.4 General parameters

Short overview of "General" parameter group:

Parameter	Information	Lenze setting
-	Module ID	1
C15111	Safety address	0

Module ID

Unique identification (1 ... 65534) for the safe device.

Safety address

The safety address serves as a unique identification of the drive-based safety system in systems with several drives.

▶ [Setting of the safety address](#) (□ 26)

3.4.1 Setting of the safety address

The safety address can be set via the "Safety address" parameter ([C15111](#)).

Setting via parameter setting

- Via the parameter "safety address" ([C15111](#)) addresses in the range of 0 ... 65534 can be set.

Effective safety address

The effective safety address is the result of the setting via parameter setting.

- The effective safety address must match the module ID assigned in the safe parameter set.
- If "PROFIsafe" has been selected as safety bus, the effective safety address is accepted simultaneously as the PROFIsafe target address. This address must match the corresponding configuration of the safety PLC.



Tip!

[C15112](#) displays the effective safety address.

3 Safe configuration

3.5 Safety functions

3.5 Safety functions

3.5.1 Stop functions

The stop functions are divided according to the tripping reason:

- Standard stop (simple stop)
 - Tripping by a safe input with the parameterised functions [STO](#), [SS1](#).
 - Tripping by activating the bits STO or SS1 via the safety bus.
 - In special operation ([OMS](#)) the standard stop can be avoided by confirming it with the enable switch ([ES](#)).
- Emergency stop
 - Tripping by a safe input with the parameterised function [SSE](#).
 - Tripping by activating the bit SSE via the safety bus.
 - [STO](#) or [SS1](#) can be set as the function to be executed via the parameter "SSE: Emergency stop function".
 - In special operation ([OMS](#)) the emergency stop cannot be avoided.
- Error stop
 - Tripping as response to an error.
 - In special operation ([OMS](#)) the error stop cannot be avoided.

Short overview of "Safety functions → Safe stop" parameter group:

Parameter	Information	Lenze setting	
		Value	Unit
C15205	SSE: Emergency stop function	STO	
C15300/1	Restart behaviour - STO, SS1	Acknowledged restart	
C15305	SS1: Stop time	0	ms

3.5.1.1 Prioritisation

Stop functions with priority influence the process of already started subordinated functions.

1. [Safe torque off \(STO\)](#)

- The STO function has the highest priority and thus takes priority over all other functions. Functions already started (e.g. SS1) are cancelled and the drive is switched off.

2. [Safe stop 1 \(SS1\)](#)

- Considering the stop time for SS1, the drive is switched to torque-free operation.

3. Monitoring functions

- The monitoring functions have the same priorities. They can be executed at the same time.

3.5.1.2 Restart behaviour

The restart behaviour of the drive after a stop function has been executed can be set via the following parameters:

- "Restart behaviour - STO, SS1" ([C15300/1](#))



Danger!

If the request for the safety function is cancelled, the drive can restart automatically. In case of an automatic restart, you have to provide external measures which ensure that the drive only restarts after a confirmation (EN 60204).

Restart behaviour in case of setting "Acknowledged restart"

- After a standard stop the restart must be acknowledged (AIS) via terminal or safety bus.
- After an error stop, the error must be acknowledged first (AIE), before the restart is acknowledged with AIS.

Acknowledgement	via terminal	via safety bus
AIS	(Positive signal pulse with a signal duration of 0.3 ... 10 s)	PROFIsafe bit "PS_AIS" ▶ Safety bus (33)
AIE	(Positive signal pulse with a signal duration of 0.3 ... 10 s)	PROFIsafe bit "PS_AIE" ▶ Safety bus (33)




Note!

The restart behaviour after an emergency stop corresponds to the restart behaviour parameterised for the STO/SS1 stop function.


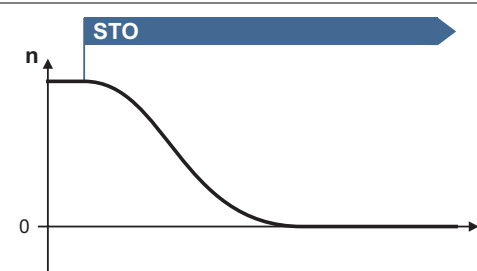
Restart behaviour in case of setting "Automatic restart"

The higher-level control must ensure that the drive only restarts after an acknowledgement. The stop status of the drive is reported to the higher-level control via bit STO.


3.5.1.3 Emergency stop function (SSE)

Safe Stop Emergency / SSE	
Description	The emergency stop function starts STO or SS1 , depending on the setting of the "emergency stop function" parameter.
	<ul style="list-style-type: none"> In special operation the emergency stop cannot be avoided. Connect the emergency stop buttons, which must not be overruled by a special operation, to the emergency stop function. For this purpose, parameterise the safe input as "emergency stop" (C15031).
Parameter	C15205 SSE: Emergency stop function <ul style="list-style-type: none"> Selection of the function to be performed (STO or SS1).
Activation	How to activate the function: <ul style="list-style-type: none"> A data telegram with a corresponding content is sent to the controller via the safety bus. <ul style="list-style-type: none"> Safety bus (33) "OFF state" at a safe input which has been assigned to the function by parameter setting. <ul style="list-style-type: none"> Safe inputs (42)

3.5.1.4 Safe torque off (STO)

Safe torque off / STO (corresponds to a "Stop 0" according to EN 60204)	
Description	By using this function the power supply for the motor is safely interrupted immediately. The motor cannot generate a torque and thus no dangerous motions of the drive.
	<ul style="list-style-type: none"> Additional measures are required against movements caused by external forces, e.g. mechanical brakes. The restart behaviour can be set. Restart behaviour (28)
Priority	Priority function: none Subordinated function: SS1
Function	
Parameter	Function sequence and error response have no adjustable parameters.
Activation	How to activate the function: <ul style="list-style-type: none"> A data telegram with a corresponding content is sent to the controller via the safety bus. <ul style="list-style-type: none"> Safety bus (33) "OFF state" at a safe input which has been assigned to the function by parameter setting. <ul style="list-style-type: none"> Safe inputs (42) As response to the error stop request. As response to the emergency stop request.

3.5.1.5 Safe stop 1 (SS1)

Safe stop 1 / SS1 (corresponds to a "Stop1" according to EN 60204)							
Description	The drive-based safety system monitors whether the drive has reached the set tolerance margin ($n=0$) within the parameterised stopping time and, after the stopping time has elapsed, switches the drive to torque-free operation via the safety function STO .						
	<ul style="list-style-type: none"> • The drive must be braked to standstill through the application! • The speed is calculated from the standard device. • Without an encoder, the function evaluates the speed status $n=0$ of the controller. In this case the stopping time monitored by the drive-based safety system must be 0.5 s longer than the stopping time parameterised on the controller. • Additional measures are required against movements caused by external forces, e.g. mechanical brakes. The application time of a brake must be considered when determining the stopping time. • A restart is only possible after the stopping time has elapsed completely. ▶ Restart behaviour (48) 						
Priority	Priority function: STO						
Function							
Parameter	<table border="0"> <tr> <td>①</td> <td>C15305</td> <td>SS1, SS2: Stop time</td> </tr> <tr> <td>②</td> <td>C15310</td> <td>SOS: Speed window ($n=0$)</td> </tr> </table>	①	C15305	SS1, SS2: Stop time	②	C15310	SOS: Speed window ($n=0$)
①	C15305	SS1, SS2: Stop time					
②	C15310	SOS: Speed window ($n=0$)					
Activation	<p>How to activate the function:</p> <ul style="list-style-type: none"> • A data telegram with a corresponding content is sent to the controller via the safety bus. ▶ Safety bus (33) • "OFF state" at a safe input which has been assigned to the function by parameter setting. ▶ Safe inputs (42) • As response to the error stop request. • As response to the emergency stop request. 						
Normal behaviour	<p>When the stopping time has elapsed, a standard stop is started.</p> <ul style="list-style-type: none"> • The power supply for the motor is safely interrupted immediately (STO). The motor cannot generate a torque and thus no dangerous movements of the drive. 						
Error behaviour	<p>If standstill could not be reached when the stopping time has elapsed, an error message is generated and an error stop is started.</p> <ul style="list-style-type: none"> • The power supply for the motor is safely interrupted immediately (STO). The motor cannot generate a torque and thus no dangerous movements of the drive. 						

3 Safe configuration


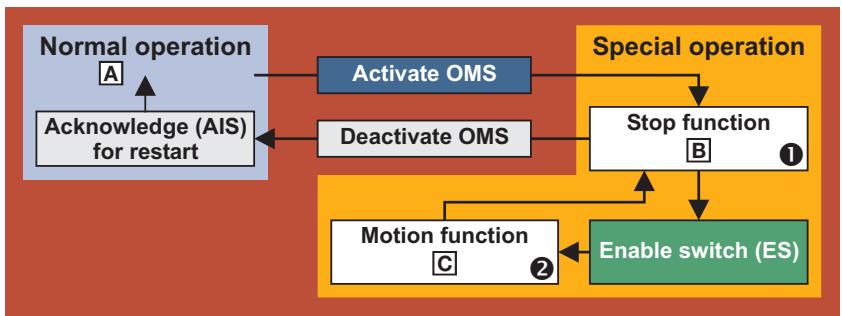
3.5 Safety functions

3.5.2 Operation mode selection


Short overview of "Safety functions → Operation mode selection" parameter group:

Parameter	Information	Lenze setting	
		Value	Unit
C15200	OMS: Stop function	STO	
C15201	OMS: Motion function	Free traversing	

3.5.2.1 Operation mode selector (OMS)

Operation Mode Selector / OMS							
Description	This function serves to switch between normal operation and "special operation" of the drive.						
	The special operation enables the overriding of a standard stop (STO and SS1) by release through an enable switch. ▶ Enable switch (ES) (□ 32)						
Conditions	<ul style="list-style-type: none"> A safe input must be parameterised and interconnected as an operation mode selector. You can only connect and parameterise one operation mode selector. The OMS bit of the safety bus must be deactivated. (C15113). The special operation can also be selected via the safety bus with the OMS bit unless a safety input is set as an operation mode selector. The plausibility check rejects ambiguous settings until you have parameterised them correctly. 						
Function	 <p> A Basic status of normal operation B If special operation is requested, the stop function parameterised for special operation (STO or SS1) is activated. C A release through the enable switch enables the motion function (free traversing) parameterised for the special operation. </p>						
Parameter	<table border="0"> <tr> <td>❶</td> <td>C15200</td> <td>OMS: Stop function</td> </tr> <tr> <td>❷</td> <td>C15201</td> <td>OMS: Motion function • The "Free traversing" setting must be suitable for the application!</td> </tr> </table>	❶	C15200	OMS: Stop function	❷	C15201	OMS: Motion function • The "Free traversing" setting must be suitable for the application!
❶	C15200	OMS: Stop function					
❷	C15201	OMS: Motion function • The "Free traversing" setting must be suitable for the application!					
Requesting the special operation	<p>How to request the special operation:</p> <ul style="list-style-type: none"> "ON state" at a safe input to which the "operation mode selector" function has been assigned by parameter setting. ▶ Safe inputs (□ 42) Only if no safe input is used, the function can be activated via the safety bus by sending a data telegram with a corresponding content to the controller. 						
Deactivating the special operation	<p>A change-over from special operation to normal operation is only possible when the drive is at standstill (stop function STO or SS1 active).</p> <ul style="list-style-type: none"> For a restart, the restart must be acknowledged (AIS) via terminal or safety bus. The automatic restart is not permitted. If the "Automatic restart" is parameterised, this must be prevented by special measures, e.g. programming in the master control. 						
Error behaviour	<ul style="list-style-type: none"> The emergency stop function can be triggered in both operating modes. 						

3.5.2.2 Enable switch (ES)

Enable Switch / ES	
Description	<p>Enable Switch / ES</p> <p>This function enables overriding of the standard stop functions STO and SS1 during special operation.</p>
	<p>A release via the enable switch activates the parameterised motion function during special operation and the drive can be traversed.</p> <p>The stopping times assigned to the stop functions are directly deactivated/stopped.</p>
Conditions	<ul style="list-style-type: none"> • A safe input must be parameterised and interconnected as an enable switch. You can only connect and parameterise one enable switch. The ES bit of the safety bus must be deactivated (C15113). • The confirmation can also be selected via the safety bus using the ES bit unless a safe input is set as an enable switch. • The special operation must be activated. ▶ Operation mode selector (OMS) (□ 31) • The plausibility check rejects ambiguous settings until you have parameterised them correctly.
Activation	<p>How to activate the function:</p> <ul style="list-style-type: none"> • "ON state" at a safe input to which the "enable switch" function has been assigned by parameter setting. ▶ Safe inputs (□ 42) • Only if no safe input is used, the function can be activated via the safety bus by sending a data telegram with a corresponding content to the controller.

3.6 Safety bus

The drive-based safety system provides parameterisable interfaces for standardised safety bus systems. By selecting the bus system, the corresponding parameters are made available.

Short overview of "Safety bus" parameter group:

Parameter	Information	Lenze setting
C15100	S bus: Configuration	No safety bus
C15113	S bus: Filter control data (bit-coded):	
	Bit 0 STO	Passing through
	Bit 1 SS1	Passing through
	Bit 9 ES	Passing through
	Bit 11 OMS	Passing through
	Bit 16 PS_AIS	Passing through
	Bit 17 PS_AIE	Passing through
	Bit 23 SSE	Passing through
Unlisted bits are reserved for future extensions!		

S bus: Configuration

Selection of the safety bus system used. Communication modes that are currently being supported:

- Operation without safety bus
- Operation with PROFIsafe protocol

S bus: Filter control data

Unused functions in the control data of the safety bus must be set to "Inhibit" via this parameter. Then, these functions cannot be activated anymore via the safety bus independently of the transmitted control data.

3.6.1 PROFIsafe connection

Conditions

The safety options 20 and 30 support the transmission of safe information via the PROFIsafe protocol according to the specification "PROFIsafe -Profile for Safety Technology", version 2.0, of the PROFIBUS Nutzerorganisation (PNO). The controller transmits the PROFIsafe information to the drive-based safety system for safe evaluation.

PROFIsafe connection	Setting "S bus: Configuration" (C15100)
PROFINET	PROFIsafe/PROFINET



Note!

The operation with PROFIsafe via PROFINET is only permissible in accordance with the specification "PROFIsafe-Profile for Safety Technology", version 2.0.

Addressing

In order that a data telegram reaches the correct device, a unique PROFIsafe target address is required. If "PROFIsafe" has been selected as safety bus, the safety address is accepted simultaneously as the PROFIsafe target address. This address must match the corresponding configuration of the safety PLC.

▶ [Setting of the safety address](#) ([□ 26](#))

PROFIsafe frame



Note!

The PROFIsafe data is sent in the second slot of a PROFINET data telegram. This must be observed for the hardware configuration of the safety PLC!

PROFINET data telegram			
Header	PROFIsafe data	Data	Trailer
	Slot 2	Slot 1	

PROFIsafe data

In the PROFIsafe data, one bit each is used to control a certain safety function.

- The structure of the PROFIsafe message is described in the PROFIsafe profile.
- The length of the PROFIsafe message is 8 bytes (fix).

PROFIsafe message - V1 mode								
Byte offset	Bit offset							
	7	6	5	4	3	2	1	0
0	PROFIsafe process data (PROFIsafe output data/PROFIsafe input data)							
1								
2								
3								
4	Control byte or status byte							
5	Consecutive number							
6	CRC2 (Signature originating from PROFIsafe process data and PROFIsafe parameters)							
7								

PROFIsafe message - V2 mode								
Byte offset	Bit offset							
	7	6	5	4	3	2	1	0
0	PROFIsafe process data (PROFIsafe output data/PROFIsafe input data)							
1								
2								
3								
4	Control byte or status byte							
5	CRC2 (Signature originating from PROFIsafe process data, PROFIsafe parameters and the consecutive number)							
6								
7								

- In the following subchapters, the meaning of the PROFIsafe process data is separately described for PROFIsafe output data and PROFIsafe input data.

**Tip!**

For detailed information about the PROFIsafe message, please see the PROFINET communication manual.

3.6.1.1 PROFIsafe output data

The PROFIsafe output data (control data) is transmitted from the control to the drive-based safety system.

Bit	Name	Value	Meaning
0	STO	0	The STO function is activated.
1	SS1	0	The SS1 function is activated.
9	ES	1	Confirmation is active: During special operation → motion functions are possible.
11	OMS	0	Normal operation
		1	Special operation
16	PS_AIS	0/1	Activate restart acknowledgement. The bit must be set for at least one PROFIsafe cycle.
17	PS_AIE	0/1	Activation of error acknowledgement. The bit must be set for at least one PROFIsafe cycle.
23	SSE	0	The SSE function is activated.

Unlisted bits are reserved for future extensions and must be transmitted with "0"!

Control byte

For the PROFIsafe V1 mode only the indicated bits of the PROFIsafe control byte are supported:

Assignment Byte	Bit							
	7	6	5	4	3	2	1	0
4	-	-	-	activate_FV	-	-	-	-

[3-1] Structure of the PROFIsafe control byte in V1 mode

Bit coding of control byte			
Bit	Name	Value	Meaning
4	activate_FV	1	The PROFIsafe output data is passivated.
-	-	0	Reserved for future extensions.

[3-2] Detailed specification of the control byte in V1 mode

For the PROFIsafe V2 mode only the indicated bits of the PROFIsafe control byte are supported:

Assignment Byte	Bit							
	7	6	5	4	3	2	1	0
4	-	-	Toggle_h	activate_FV	-	R_cons_nr	-	-

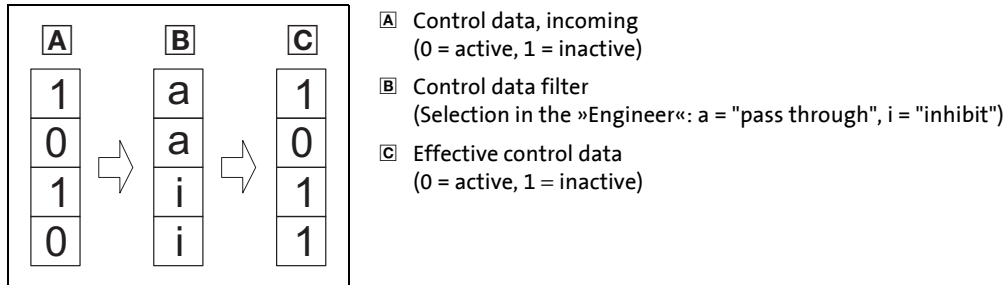
[3-3] Structure of the PROFIsafe control byte in V2 mode

Bit coding of control byte			
Bit	Name	Value	Meaning
2	R_cons_nr	1	Reset of the consecutive number.
4	activate_FV	1	The PROFIsafe output data is passivated.
5	Toggle_h	1/0	Change increases the consecutive number.
-	-	0	Reserved for future extensions.

[3-4] Detailed specification of the control byte in V2 mode

Control data filter

Unused functions in the control data of the safety bus must be set to "Inhibit" via the parameter "S bus: Control data filter" (C15113). Then, these functions cannot be activated anymore via the safety bus independently of the transmitted control data.



[3-2] Function example - filter

From version 1.2 of the drive-based safety system, the filtered control data is displayed in the parameter "S bus: Control data display" (C15115):

Parameter Name: C15115 S bus: display control data		Data type: BITFIELD_32 Index: 9460 _d = 24F4 _h
Display of the safety bus control data after being filtered via C15113		
Value is bit-coded:		Information (From version 1.2 of the drive-based safety system)
Bit 0	STO	▶ Safe torque off
Bit 1	SS1	▶ Safe stop 1
Bit 9	ES	▶ Safe enable switch
Bit 11	OMS	▶ Safe operation mode selector
Bit 16	PS_AIS	Restart acknowledgement via safety bus
Bit 17	PS_AIE	Error acknowledgement via safety bus
Bit 23	SSE	▶ Emergency stop function
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

3.6.1.2 PROFIsafe input data

The PROFIsafe input data (status information) is transmitted from the drive-based safety system to the control system.

Bit	Name	Value	Meaning
0	STO active	1	The STO function is active and the drive is safely switched to torque-free operation. • This bit is also set by SS1 after the stopping time has elapsed.
1	SS1 active	1	The SS1 function is active. • At the end of the function the bit 0 (STO active) is set.
9	ES active	1	ES function is active during special operation: Motion function
		0	ES function is not active during special operation: Stop function
11	OMS	0	Normal operation is requested.
23	SSE active	1	The SSE function is active. • When the emergency stop function STO is parameterised, bit 0 (STO active) is set as well. • When the emergency stop function SS1 is parameterised, first bit 1 (SS1 active) is set and at the end of the function bit 0 (STO active) is set.
24	SD-In1	1	Sensor at I1A and I1B: Channels A and B are in ON state.
25	SD-In2	1	Sensor at I2A and I2B: Channels A and B are in ON state.
29	OMS active	1	The OMS function is active: Special operation. • In contrast to bit 11 (OMS), this bit remains set until the special operation is cancelled and the change-over to normal operation has taken place via the stop function.
		0	The OMS function is not active: Normal operation.
31	Error active	1	Error status is active (fault or warning).
Unlisted bits are reserved for future extensions and must be transmitted with "0"!			

[3-5] Detailed specification of the PROFIsafe input data

3 Safe configuration

3.6 Safety bus

Status byte

For the PROFIsafe V1 mode, only the given bits of the PROFIsafe status byte are supported:

Assignment Byte	Bit							
	7	6	5	4	3	2	1	0
4	-	-	-	FV_activated	COM-Failure WD-Timeout	COM-Failure CRC	-	-

[3-6] Structure of the PROFIsafe status byte in V1 mode

Bit coding of status byte		
Bit	Name	Meaning
2	COM-Failure CRC	Status is active after communication error.
3	COM-Failure WD-Timeout	Status is active after time-out.
4	FV_activated	The PROFIsafe input data are passivated.
-	-	Reserved for future extensions.

[3-7] Detailed specification of the status byte in V1 mode

For the PROFIsafe V2 mode, only the given bits of the PROFIsafe status byte are supported:

Assignment Byte	Bit							
	7	6	5	4	3	2	1	0
4	-	cons_nr_R	Toggle_d	FV_activated	WD-Timeout	CE_CRC	-	-

[3-8] Structure of the PROFIsafe status byte in V2 mode

Bit coding of status byte		
Bit	Name	Meaning
2	CE-CRC	Status is active after communication error.
3	WD-Timeout	Status is active after time-out.
4	FV_activated	The PROFIsafe input data are passivated.
5	Toggle_d	Change shows an increase of the consecutive number.
6	cons_nr_R	Consecutive number has been reset.
-	-	Reserved for future extensions.

[3-9] Detailed specification of the control byte in V2 mode

PROFIsafe parameter

These PROFIsafe parameters and contents are supported:

PROFIsafe parameter		
Name	Description	Valid contents
F_Source_Add	PROFIsafe source address of the safety PLC	0x01 ... 0xFFFFE
F_Dest_Add	PROFIsafe target address of the safety system DIP switch: Code:	0x01 ... 0x03FF 0x01 ... 0xFFFFE
F_WD_Time	PROFIsafe monitoring time of the safety system	110 ... 65535 ms
F_Check_SeqNr	Check of the sequence no. in CRC V1 mode: V2 mode:	0 not relevant
F_Check_iPar	Check of the iParameters CRC3 in CRC	0
F_SIL	Supported SIL (Safety Integrity Level) SIL1: SIL2: SIL3:	0 1 2
F_CRC_Length	Length of CRC V1-mode/2-byte-CRC: V2-mode/3-byte-CRC:	1 0
F_Block_ID	Identification of the parameter type	0
F_Par_Version	Version of the safety layer V1 mode: V2 mode:	0 1
F_Par_CRC	cyclic CRC	is calculated

[3-10] Supported PROFIsafe parameters

Diagnostic messages

Faulty configurations of the PROFIsafe parameters are reported to the safety PLC with a diagnostic telegram (📖 communication manual PROFINET).

Diagnostic information

Error number	Description
64	The set PROFIsafe target address does not comply with the F_Dest_Add parameter.
65	The F_Dest_Add parameter has the invalid value 0x0000 or 0xFFFF
66	The F_Source_Add parameter has the invalid value 0x0000 or 0xFFFF.
67	The F_WD_Time parameter has the invalid value 0 ms.
68	The F_SIL parameter does not have the valid value 0 ... 2.
69	The F_CRC_Length parameter does not have the valid value 1.
70	The version of the PROFIsafe parameter set is wrong.
71	CRC1 error


GSDML file

All information on the configuration of the PROFINET system is contained in the GSDML file. Thus, the integration is easy and user-friendly.

4 Safety option 20

4 Safety option 20

The safety option 20 is exclusively controlled via PROFIsafe/PROFINET.

Information on the PROFIsafe connection can be found in the chapter "[Safety bus](#)". ( 33)

5 Safety option 30

5.1 Safe inputs

5 Safety option 30

The safety option 30 provides interfaces for connecting active or passive sensors. In the following chapter, the safe configuration of the safe inputs is explained.

5.1 Safe inputs

General information

The following applies to the connection of safety sensors:

- Sensor type and function can be parameterised.
- A local evaluation is carried out if a corresponding parameter setting has been made.
- If a safety bus is activated, the sensor signals are sent as status information to the master control.
- Deactivated sensor inputs must not be connected. The status of a non-connected input is in the OFF state.
- If a signal is detected at a deactivated sensor input during initialisation, the drive remains inhibited ([STO](#)).
- Faulty inputs are evaluated as OFF state.



Note!

Make sure that an internal contact function test is carried out at the safe inputs:

- Safe input in the ON state
 - A LOW level at one channel puts the input in the OFF state. The discrepancy monitoring starts simultaneously.
 - A LOW level must be detected at both channels within the discrepancy time, otherwise a discrepancy error will be reported.
 - To be able to confirm the discrepancy error, a LOW level must be detected before at both channels.
- Safe input in the OFF state
 - A HIGH level at one channel starts the discrepancy monitoring.
 - A HIGH level must be detected at both channels within the discrepancy time, otherwise a discrepancy error will be reported.
 - To be able to confirm the discrepancy error, a HIGH level must be detected before at both channels.



Tip!

Detailed information on the contact function test, the connection of passive/active sensors and example circuits can be found in the manual for the drive-based safety system.

Short overview of "Safe inputs" parameter group:

Parameter	Information	Lenze setting	
		Value	Unit
C15030/1...2	SD-In1...2 sensor type	Input is deactivated	
C15031/1...2	SD-In1...2 sensor function	Free assignment	
C15032/1...2	SD-In1...2 free assignment	STO	
C15033/1...2	SD-In1...2 discrepancy time	10	ms
C15034/1...2	SD-In1...2 input delay	0	ms

Sensor type/sensor function

Sensor type and function can be parameterised.



Note!

If an error (e.g. a discrepancy error) occurs at a safe input to which the "operation mode selector" sensor function is assigned, then normal operation (corresponding to the OFF state) is selected.

- The LED "S_Error" is blinking, no [STO](#) is tripped.
- Special operation can only be selected again if the error has been eliminated and acknowledged.



Tip!

Detailed information on sensor inputs, active and passive sensors can be found in the manual for the drive-based safety system.

Free assignment

If "Free assignment" has been selected as sensor function, the safety function selected via this parameter is assigned to the safe input. The following safety functions can be selected:

- [Safe torque off \(STO\)](#) (📖 29)
- [Safe stop 1 \(SS1\)](#) (📖 30)



Note!

If "No function" has been selected, no safety function is assigned to the safe input. Function test and monitoring of the discrepancy time remain active and the status of the input is transmitted to the control via the safety bus (if parameterised).

Discrepancy time

Maximum time for which both channels of a safe input may have non-equivalent states without the safety engineering detecting an error.

Input delay

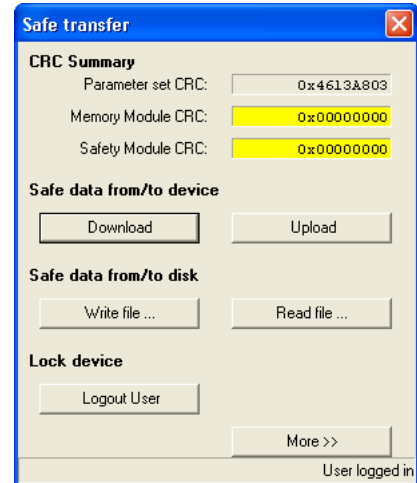
Time between the recognition of the signal change and the effective evaluation of an input signal. As a result, multiple and short signal changes due to contact bounce of the components are not taken into account.

6 Safe parameter transfer

6 Safe parameter transfer

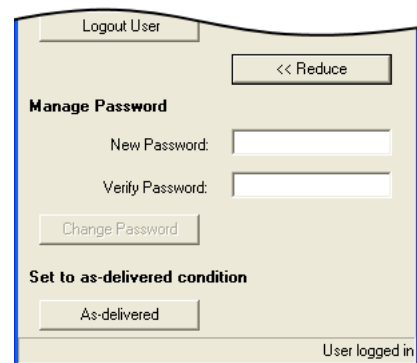
The functions for a safe parameter transfer are available in the *Safe transfer* dialog box.

The *Safe transfer* dialog box is opened via the **Safe transfer** button on the *Safe configuration* tab.



By clicking the **More >>** button in the *Safe transfer* dialog box, the functions for password management and general reset are displayed in addition.

A renewed click on the button now labelled with **<< Reduce** hides these functions again.



Note!

To execute the functions for a safe parameter transfer, you have to enter a device password!

When the memory module is used for the first time together with the drive-based safety system, the required password file for the safe parameter transfer is not yet available in the memory module and the error message "Reading of the password file failed" is displayed. In this case a general reset of the device is required!

With a general reset, the safe parameter set is deleted in the memory module and in the drive-based safety system and the required password file is created in the memory module. After this, the drive-based safety system must be re-parameterised. ▶ [General reset of device](#) (48)

6 Safe parameter transfer

6.1 Send safe data

6.1 Send safe data

After the drive-based safety system has been completely parameterised via the *Safe configuration* tab, the parameter set can be safely transmitted to the device using this function.



Note!

This function serves to overwrite the current parameter settings of the safety system with the settings in the »Engineer«!

Before the parameter set is transferred to the drive-based safety system, a plausibility check is always carried out. Only a plausible parameter set can be transferred to the safety system of the controller!

Before the safe parameter set is transferred, the module ID is checked. If the module ID defined in the parameter set does not correspond to the module ID saved in the drive-based system, a confirmation prompt appears in order to prevent an unintended change of the module ID through parameter setting.

- If - after having checked the module IDs - you answer the confirmation prompt with **Yes**, the module ID defined in the parameter set is stored in the non-volatile memory of the controller.
- [C15017](#) displays the module ID stored in the controller at the last parameter set transfer.
- The module ID stored in the controller also remains available after a general reset.



How to transmit the parameter set to the device:

1. Unless there is an online connection, establish an online connection to the device.
2. Go to the *Safe transfer* dialog box and click **Send**.
 - A confirmation prompt appears asking whether the parameter is really to be transmitted to the device.
3. Answer the confirmation prompt with **Yes** to continue the action.

If you are not yet registered as a user, first the *Password entry* dialog box is displayed.

4. Enter the device password and confirm with **OK**.
 - Unless an individual password has been defined, enter the standard password "Lenze SM301".
 - After the password has been entered, you are registered as a user for a time period of 30 minutes. Within this period, the password does not need to be entered again for calling a password-protected function if the online connection to the device remains established without any interruptions.

After the registration, the parameter set is transmitted to the device, and a status message displays whether the action was successful.

5. Confirm the status message with **OK**.

**Note!**

After the parameter set has been transmitted, make a check of the item designation and a check/acceptance of the safety functions!

Detailed information on the check/acceptance can be found in the manual for drive based safety of the 8400 protec series.

6.2

Read safe data from device

**Note!**

This function serves to overwrite the parameter settings in the »Engineer« with the current settings of the drive-based safety system!

Only a valid parameter set can be read back from the drive-based safety system.

**How to read the parameter set from the device:**

1. Unless there is an online connection, establish an online connection to the device.
2. Go to the *Safe transfer* dialog box and click **Upload**.
 - A confirmation prompt appears asking whether the parameter is really to be uploaded from the device.
3. Answer the confirmation prompt with **Yes** to continue the action.

If you are not yet registered as a user, first the *Password entry* dialog box is displayed.
4. Enter the device password and confirm with **OK**.
 - Unless an individual password has been defined, enter the standard password "Lenze SM301".
 - After the password has been entered, you are registered as a user for a time period of 30 minutes. Within this period, the password does not need to be entered again for calling a password-protected function if the online connection to the device remains established without any interruptions.

After the registration, the parameter set is uploaded from the device, and a status message displays whether the action was successful.

5. Confirm the status message with **OK**.

6.3 Write parameter set into file

**How to write the parameter set into a file:**

1. Go to the *Safe transfer* dialog box and click **Write file**.
 - The *Safe parameter set* dialog box is displayed.
2. Select the directory from the **Save in** list field, in which the file is to be saved.
3. Enter a file name into the **File name** input field.
4. Click **Save**.
 - The current parameter settings are saved in the selected parameter set file (*.bin) and the *Save parameter set* dialog box is closed.
 - After this, a status message displays whether the action could be carried out successfully.
5. Confirm the status message with **OK**.

6.4 Read parameter set out of file

**Note!**

This function serves to overwrite the parameter settings in the »Engineer« with the settings of the selected parameter set file (*.bin)!

**How to read the parameter set out of the file:**

1. Go to the *Safe transfer* dialog box and click **Read file**.
 - A confirmation prompt appears asking whether the data is really to be uploaded and the parameter settings in the »Engineer« are to be overwritten.
2. Answer the confirmation prompt with **Yes** to continue the action.
 - The *Read parameter set* dialog box is displayed.
3. Select the directory which contains the file to be read from the **Search in** list field.
4. Enter the name of the file to be read into the **File name** input field.
5. Click **Open**.
 - The current parameter settings are overwritten with the settings of the selected parameter set file (*.bin) and the *Open parameter set* dialog box is closed.
 - After this, a status message displays whether the action could be carried out successfully.
6. Confirm the status message with **OK**.

6.5 General reset of device

A general reset is, among other things, required for initialising the memory module if the controller (with the memory module) is used together with the drive-based safety system for the first time.



Note!

This function serves to reset the safety system to the delivery status.

- The safe parameter set in the memory module and in the drive-based safety system is deleted.
- The password file required for the safe parameter transfer is re-created in the memory module. This causes the individual device password defined before to be reset to the standard password.
- Afterwards the drive-based safety system must be re-parameterised.



How to execute a general reset of the device:

1. Unless there is an online connection, establish an online connection to the device.
2. Go to the advanced *Safe transfer* dialog box and click **As-delivered**.
 - The *Standard password entry* dialog box is displayed.
3. Enter the standard password and confirm with **OK**.
 - The standard password is "Lenze SM301".

The general reset is executed and then a status message displays whether the action could be carried out successfully.

4. Confirm the status message with **OK**.

6.6 Password management

For a safe parameter transfer, the device password must be entered.

- For initial commissioning, the standard password "Lenze SM301" has to be used as device password.
- The **Change Password** function serves to define an individual device password.



Note!

After the password has been entered, you are registered as a user for a time period of 30 minutes.

- Within this period, the password does not need to be entered again for calling a password-protected function if the online connection to the device remains established without any interruptions.
- The status of registration is displayed in the bottom right corner of the *Safe transfer* dialog box.
- Click the **Logout User** button to log out before the 30 minutes have elapsed.

Change Password

This function serves to define an individual device password.



How to change the device password:

1. Unless there is an online connection, establish an online connection to the device.
2. Go to the advanced *Safe transfer* dialog box and enter the new password into the **New Password** input field.
 - The password must have at least 6 characters.
3. For verifying the new password re-enter it into the **Verify Password** input field.
 - Only if this input matches the input in the **New Password** input field, the password can be changed.
4. Click the **Change Password** button.

If you are not yet registered as a user, first the *Password entry* dialog box is displayed.
5. Enter the device password and confirm with **OK**.
 - Unless an individual password has been defined, enter the standard password "Lenze SM301".

After log-on the password is changed and then a status message displays whether the action could be carried out successfully.

6. Confirm the status message with **OK**.

7 Parameter reference

7.1 Parameter list

7 Parameter reference



Note!

This chapter supplements the parameter list and the table of attributes provided in the online documentation for the controller by parameters of drive-based safety system.



Tip!

General information on parameters can be found in the online documentation for the controller.

7.1 Parameter list

This chapter lists all parameters of the safety option 30 in numerically ascending order.



Note!

Parameter settings are only possible via the *Safe configuration* tab!

▶ [Safe configuration](#) (📖 22)

Only read access is possible to the parameters of the drive-based safety system via the »Engineer« parameter list (tab *All parameters* → category **Safety Option 30**) and the keypad!

C15000

Parameter Name: C15000 Status of safety functions		Data type: BITFIELD_32 Index: 9575 _d = 2567 _h
Bit-coded status word of the safety functions		
Display range (min. hex value max. hex value)		
Value is bit-coded:		Information
Bit 0	STO active	▶ Safe torque off (STO)
Bit 1	SS1 active	▶ Safe stop 1 (SS1)
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	ES active	▶ Enable switch (ES)
Bit 10	Reserved	
Bit 11	OMS	▶ Operation mode selector (OMS)
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Bit 16	Reserved	
Bit 17	Reserved	
Bit 18	Reserved	
Bit 19	Reserved	
Bit 20	Reserved	
Bit 21	Reserved	
Bit 22	Reserved	
Bit 23	SSE active	▶ Emergency stop function
Bit 24	SD-In1 active	
Bit 25	SD-In2 active	
Bit 26	Reserved	
Bit 27	Reserved	
Bit 28	Reserved	
Bit 29	OMS active	▶ Safe operation mode selector
Bit 30	Reserved	
Bit 31	Error active	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

C15002

Parameter Name: C15002 Command		Data type: UNSIGNED_8 Index: 9573 _d = 2565 _h
This code is for device-internal use only and must not be written to by the user!		

7 Parameter reference

7.1 Parameter list | C15003

C15003

Parameter Name: C15003 Command status		Data type: UNSIGNED_16 Index: 9572 _d = 2564 _h
Status of the current command <ul style="list-style-type: none"> • The command is repeated in the high byte. • In the low byte the status is displayed: <ul style="list-style-type: none"> 0x00: No command 0x01: Command executed 0x02: Password invalid 0x03: Command in process 0x04: Command not known 0x05: Command error 		
Display range (min. value unit max. value)		
0		2309
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15010

Parameter Name: C15010 Parameter set status		Data type: UNSIGNED_8 Index: 9565 _d = 255D _h
Selection list (read only)		
0	No parameter set	
1	Valid parameter set	
2	Read error - memory module	
3	Unequal parameter set	
4	CRC error	
5	Version error	
6	Format error	
7	Plausibility error	
8	Assignment error	
9	Local read error	
10	Communication error standard device	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15011

Parameter Name: C15011 Parameter CRC		Data type: UNSIGNED_32 Index: 9564 _d = 255C _h
Parameter checksum (CRC = Cyclic Redundancy Code)		
Display range (min. value unit max. value)		
0		4294967295
Subcodes		Information
C15011/1		CRC safety system
C15011/2		CRC memory module
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15012

Parameter Name: C15012 Password		Data type: UNSIGNED_32 Index: 9563 _d = 255B _h
This code is for device-internal use only and must not be written to by the user!		

7 Parameter reference

7.1 Parameter list | C15013

C15013

Parameter Name: C15013 Parameter set creation time		Data type: UNSIGNED_64 Index: 9562 _d = 255A _h
Time of parameter set creation		
Display range (min. value unit max. value)		
0		18446744073709552000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1		

C15014

Parameter Name: C15014 Time of RTC parameter setting		Data type: VISIBLE_STRING Index: 9561 _d = 2559 _h
Time of acceptance of the parameter set from the memory module as value of the real-time (RTC).		
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

C15015

Parameter Name: C15015 Time of sec. parameter setting		Data type: UNSIGNED_32 Index: 9560 _d = 2558 _h
Time of acceptance of the parameter set from the memory module as value of the power-on time meter from the controller		
Display range (min. value unit max. value)		
0	s	4294967295
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1		

C15016

Parameter Name: C15016 Parameter set version		Data type: UNSIGNED_8 Index: 9559 _d = 2557 _h
Display of the parameter set version available in the drive-based safety system.		
Selection list (read only)		
0	No current parameter set	
1	Parameter set V1.0	
2	Parameter set V1.1	
3	Parameter set V1.2	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1		

C15017

Parameter Name: C15017 Stored module ID		Data type: UNSIGNED_16 Index: 9558 _d = 2556 _h
Display range (min. value unit max. value)		
0		65535
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1		

C15030

Parameter Name: C15030 SD-In Sensor type		Data type: UNSIGNED_8 Index: 9545 _d = 2549 _h
Configuration of sensor types which are connected to the safe inputs.		
Selection list		
0	Input is deactivated	
1	Passive sensor	
2	Active sensor	
Subcodes		Information
C15030/1		SD-In1 sensor type
C15030/2		SD-In2 sensor type
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15031

Parameter Name: C15031 SD-In Sensor function		Data type: UNSIGNED_8 Index: 9544 _d = 2548 _h
Function configuration of the safe inputs.		
Selection list		Information
0	Free assignment	Safety function set in C15032.
1	Emergency stop	
2	Operation mode selector	
3	Enable switch	
Subcodes		Information
C15031/1		SD-In1 sensor function
C15031/2		SD-In2 sensor function
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15032

Parameter Name: C15032 SD-In Free assignment		Data type: UNSIGNED_8 Index: 9543 _d = 2547 _h
Assignment of a safety function to a safe input. • Only possible if the sensor function "Free assignment" is set for the safe input in C15031.		
Selection list		Information
0	STO	▶ Safe torque off (STO)
1	SS1	▶ Safe stop 1 (SS1)
9	No function	
Subcodes		Information
C15032/1		SD-In1 free assignment
C15032/2		SD-In2 free assignment
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

7 Parameter reference

7.1 Parameter list | C15033

C15033

Parameter Name: C15033 SD-In Discrepancy time		Data type: UNSIGNED_16 Index: 9542 _d = 2546 _h
Maximum time for which both channels of a safe input may have non-equivalent states without the safety engineering detecting an error.		
Display range (min. value unit max. value)		
0	ms	30000
Subcodes		Information
C15033/1		SD-In1 discrepancy time
C15033/2		SD-In2 discrepancy time
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15034

Parameter Name: C15034 SD-In Input delay		Data type: UNSIGNED_8 Index: 9541 _d = 2545 _h
Time between the recognition of the signal change and the effective evaluation of an input signal. As a result, multiple and short signal changes due to contact bounce of the components are not taken into account.		
Display range (min. value unit max. value)		
0	ms	100
Subcodes		Information
C15034/1		SD-In1 input delay
C15034/2		SD-In2 input delay
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15035

Parameter Name: C15035 C15035		Data type: UNSIGNED_8 Index: 9540 _d = 2544 _h
This code is for device-internal use only and must not be written to by the user!		

C15036

Parameter Name: C15036 C15036		Data type: UNSIGNED_16 Index: 9539 _d = 2543 _h
This code is for device-internal use only and must not be written to by the user!		

C15040

Parameter Name: C15040 Input image		Data type: BITFIELD_32 Index: 9535 _d = 253F _h
Input image of the external inputs of the drive-based safety system, displayed according to channels.		
Display range (min. hex value max. hex value)		
Value is bit-coded:		Information
Bit 0	SD-In1 channel A	▶ Safe inputs
Bit 1	SD-In1 channel B	▶ Safe inputs
Bit 2	SD-In2 channel A	▶ Safe inputs
Bit 3	SD-In2 channel B	▶ Safe inputs
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	Reserved	
Bit 10	Reserved	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Bit 16	AIE	AIE input (error acknowledgement)
Bit 17	AIS	AIS input (restart acknowledgement)
Bit 18	Module switch	
Bit 19	Reserved	
Bit 20	Reserved	
Bit 21	Reserved	
Bit 22	Reserved	
Bit 23	Reserved	
Bit 24	Reserved	
Bit 25	Reserved	
Bit 26	Reserved	
Bit 27	Reserved	
Bit 28	Reserved	
Bit 29	Reserved	
Bit 30	Reserved	
Bit 31	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

C15051

Parameter Name: C15051 C15051		Data type: BITFIELD_32 Index: 9524 _d = 2534 _h
This code is for device-internal use only and must not be written to by the user!		

7 Parameter reference

7.1 Parameter list | C15052

C15052

Parameter Name: C15052 C15052	Data type: BITFIELD_32 Index: 9523 _d = 2533 _h
This code is for device-internal use only and must not be written to by the user!	

C15055

Parameter Name: C15055 C15055	Data type: UNSIGNED_8 Index: 9520 _d = 2530 _h
This code is for device-internal use only and must not be written to by the user!	

C15060

Parameter Name: C15060 C15060	Data type: BITFIELD_16 Index: 9515 _d = 252B _h
This code is for device-internal use only and must not be written to by the user!	

C15100

Parameter Name: C15100 S bus: Configuration	Data type: UNSIGNED_8 Index: 9475 _d = 2503 _h
Configuration of the safety bus.	
Selection list (read only)	
0	No safety bus
1	PROFIsafe/PROFIBUS
2	PROFIsafe/PROFINET
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1	

C15101

Parameter Name: C15101 C15101	Data type: UNSIGNED_16 Index: 9474 _d = 2502 _h
This code is for device-internal use only and must not be written to by the user!	

C15111

Parameter Name: C15111 Safety address	Data type: UNSIGNED_16 Index: 9464 _d = 24F8 _h
Display range (min. value unit max. value)	
0	65534
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1	

C15112

Parameter Name: C15112 Effective safety address	Data type: UNSIGNED_16 Index: 9463 _d = 24F7 _h
Address used by the safety system	
Display range (min. value unit max. value)	
1	65534
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1	

C15113

Parameter Name: C15113 S bus: Filter control data		Data type: BITFIELD_32 Index: 9462 _d = 24F6 _h
Bit-coded selection of the active bits in the safety bus control data		
Display range (min. hex value max. hex value)		
Value is bit-coded:		Information
Bit 0	STO	▶ Safe torque off
Bit 1	SS1	▶ Safe stop 1
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	ES	▶ Safe enable switch
Bit 10	Reserved	
Bit 11	OMS	▶ Safe operation mode selector
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Bit 16	PS_AIS	Restart acknowledgement via safety bus
Bit 17	PS_AIE	Error acknowledgement via safety bus
Bit 18	Reserved	
Bit 19	Reserved	
Bit 20	Reserved	
Bit 21	Reserved	
Bit 22	Reserved	
Bit 23	SSE	▶ Emergency stop function
Bit 24	Reserved	
Bit 25	Reserved	
Bit 26	Reserved	
Bit 27	Reserved	
Bit 28	Reserved	
Bit 29	Reserved	
Bit 30	Reserved	
Bit 31	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

C15115

Parameter Name: C15115 S bus: Display control data		Data type: BITFIELD_32 Index: 9460 _d = 24F4 _h
Display of the safety bus control data after being filtered via C15113		
Display range (min. hex value max. hex value)		
Value is bit-coded:		Information
Bit 0	STO	▶ Safe torque off
Bit 1	SS1	▶ Safe stop 1
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	ES	▶ Safe enable switch
Bit 10	Reserved	
Bit 11	OMS	▶ Safe operation mode selector
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Bit 16	PS_AIS	Restart acknowledgement via safety bus
Bit 17	PS_AIE	Error acknowledgement via safety bus
Bit 18	Reserved	
Bit 19	Reserved	
Bit 20	Reserved	
Bit 21	Reserved	
Bit 22	Reserved	
Bit 23	SSE	▶ Emergency stop function
Bit 24	Reserved	
Bit 25	Reserved	
Bit 26	Reserved	
Bit 27	Reserved	
Bit 28	Reserved	
Bit 29	Reserved	
Bit 30	Reserved	
Bit 31	Reserved	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

7 Parameter reference

7.1 Parameter list | C15200

C15200

Parameter Name: C15200 OMS: Stop function		Data type: UNSIGNED_8 Index: 9375 _d = 249F _h
Selection of the stop function during special operation		
Selection list (read only)		Information
0	STO	▶ Safe torque off
1	SS1	▶ Safe stop 1
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15201

Parameter Name: C15201 C15201		Data type: UNSIGNED_8 Index: 9374 _d = 249E _h
This code is for device-internal use only and must not be written to by the user!		

C15205

Parameter Name: C15205 SSE: Emergency stop function		Data type: UNSIGNED_8 Index: 9370 _d = 249A _h
Selection of the stop function for emergency stop.		
Selection list (read only)		Information
0	STO	▶ Safe torque off
1	SS1	▶ Safe stop 1
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15300

Parameter Name: C15300 Restart behaviour		Data type: UNSIGNED_8 Index: 9275 _d = 243B _h
Behaviour for the restart after the functions have been deactivated.		
Selection list		
0	Acknowledged restart	
1	Automatic restart	
Subcodes		Information
C15300/1		Restart - STO, SS1
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15305

Parameter Name: C15305 SS1: Stop time		Data type: UNSIGNED_16 Index: 9270 _d = 2436 _h
Display range (min. value unit max. value)		
0	ms	30000
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15310

Parameter Name: C15310 C15310		Data type: UNSIGNED_16 Index: 9265 _d = 2431 _h
This code is for device-internal use only and must not be written to by the user!		

7 Parameter reference

7.1 Parameter list | C15320

C15320

Parameter Name: C15320 C15320	Data type: UNSIGNED_16 Index: 9255 _d = 2427 _h
This code is for device-internal use only and must not be written to by the user!	

C15321

Parameter Name: C15321 C15321	Data type: UNSIGNED_8 Index: 9254 _d = 2426 _h
This code is for device-internal use only and must not be written to by the user!	

C15330

Parameter Name: C15330 C15330	Data type: UNSIGNED_16 Index: 9245 _d = 241D _h
This code is for device-internal use only and must not be written to by the user!	

C15331

Parameter Name: C15331 C15331	Data type: UNSIGNED_16 Index: 9244 _d = 241C _h
This code is for device-internal use only and must not be written to by the user!	

C15332

Parameter Name: C15332 C15332	Data type: UNSIGNED_8 Index: 9243 _d = 241B _h
This code is for device-internal use only and must not be written to by the user!	

C15350

Parameter Name: C15350 C15350	Data type: UNSIGNED_16 Index: 9225 _d = 2409 _h
This code is for device-internal use only and must not be written to by the user!	

C15400

Parameter Name: C15400 C15400	Data type: UNSIGNED_8 Index: 9175 _d = 23D7 _h
This code is for device-internal use only and must not be written to by the user!	

C15401

Parameter Name: C15401 C15401	Data type: UNSIGNED_8 Index: 9174 _d = 23D6 _h
This code is for device-internal use only and must not be written to by the user!	

C15402

Parameter Name: C15402 C15402	Data type: INTEGER_16 Index: 9173 _d = 23D5 _h
This code is for device-internal use only and must not be written to by the user!	

7 Parameter reference

7.1 Parameter list | C15404

C15404

Parameter Name: C15404 C15404	Data type: UNSIGNED_8 Index: 9171 _d = 23D3 _h
This code is for device-internal use only and must not be written to by the user!	

C15410

Parameter Name: C15410 C15410	Data type: UNSIGNED_8 Index: 9165 _d = 23CD _h
This code is for device-internal use only and must not be written to by the user!	

C15420

Parameter Name: C15420 C15420	Data type: UNSIGNED_16 Index: 9155 _d = 23C3 _h
This code is for device-internal use only and must not be written to by the user!	

C15800

Parameter Name: C15800 Current error type	Data type: UNSIGNED_8 Index: 8775 _d = 2247 _h
Type of the currently pending error	
Selection list (read only)	
0	No error
1	Warning
2	Fault
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1	

C15801

Parameter Name: C15801 Service code	Data type: UNSIGNED_16 Index: 8774 _d = 2246 _h
Display range (min. value unit max. value)	
0	65535
Subcodes	Information
C15801/1	Service code
C15801/2	Service code
C15801/3	Service code
C15801/4	Service code
C15801/5	Service code
C15801/6	Service code
C15801/7	Service code
C15801/8	Service code
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer Scaling factor: 1	

7 Parameter reference

7.1 Parameter list | C15805

C15805

Parameter Name: C15805 Service code		Data type: UNSIGNED_32 Index: 8770 _d = 2242 _h
Display range (min. value unit max. value)		
0		4294967295
Subcodes		Information
C15805/1		Service code
C15805/2		Service code
C15805/3		Service code
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC STOP <input type="checkbox"/> No transfer		Scaling factor: 1

C15810

Parameter Name: C15810 Service code		Data type: BITFIELD_32 Index: 8765 _d = 223D _h
Display range (min. hex value max. hex value)		
Value is bit-coded:		Information
Bit 0	STO	▶ Safe torque off
Bit 1	SS1	▶ Safe stop 1
Bit 2	Reserved	
Bit 3	Reserved	
Bit 4	Reserved	
Bit 5	Reserved	
Bit 6	Reserved	
Bit 7	Reserved	
Bit 8	Reserved	
Bit 9	ES	▶ Safe enable switch
Bit 10	Reserved	
Bit 11	OMS	▶ Safe operation mode selector
Bit 12	Reserved	
Bit 13	Reserved	
Bit 14	Reserved	
Bit 15	Reserved	
Bit 16	PS_AIS	Restart acknowledgement via safety bus
Bit 17	PS_AIE	Error acknowledgement via safety bus
Bit 18	Reserved	
Bit 19	Reserved	
Bit 20	Reserved	
Bit 21	Reserved	
Bit 22	Reserved	
Bit 23	SSE	▶ Emergency stop function
Bit 24	Reserved	
Bit 25	Reserved	
Bit 26	Reserved	
Bit 27	Reserved	

7 Parameter reference

7.1 Parameter list | C15900

Parameter Name: C15810 Service code		Data type: BITFIELD_32 Index: 8765 _d = 223D _h
Bit 28	Reserved	
Bit 29	Reserved	
Bit 30	Reserved	
Bit 31	Reserved	
Subcodes		Information
C15810/1		Service code
C15810/2		Service code
C15810/3		Service code
C15810/4		Service code
C15810/5		Service code
C15810/6		Service code
C15810/7		Service code
C15810/8		Service code
C15810/9		Service code
C15810/10		Service code
C15810/11		Service code
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer		

C15900

Parameter Name: C15900 Firmware product type	Data type: VISIBLE_STRING Index: 8675 _d = 21E3 _h
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer	

C15901

Parameter Name: C15901 Firmware compilation date	Data type: VISIBLE_STRING Index: 8674 _d = 21E2 _h
Display of the compilation date	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer	

C15902

Parameter Name: C15902 Firmware version	Data type: VISIBLE_STRING Index: 8673 _d = 21E1 _h
Software of the firmware	
<input checked="" type="checkbox"/> Read access <input type="checkbox"/> Write access <input type="checkbox"/> CINH <input type="checkbox"/> PLC-STOP <input type="checkbox"/> No transfer	

7.2 Table of attributes

The table of attributes contains information which is required for communicating with the controller via parameters.



Note!

Safety-relevant parameters with write access can only be transmitted to the drive-based safety system by safe parameter setting with the »Engineer«.

▶ [Safe parameter transfer](#) (44)

How to read the table of attributes:

Column	Meaning		Entry	
Code	Parameter name		Cxxxxx	
Name	Parameter short 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	Is only required for access via a bus system.
	hex		5FFFh - 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 byte 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 a bus system, depending on the number of decimal positions	Factor	1 = no decimal positions 10 = 1 decimal position 100 = 2 decimal positions 1000 = 3 decimal positions	
Access	R	Read access	<input checked="" type="checkbox"/> Reading allowed	
	W	Write access	<input checked="" type="checkbox"/> Writing permitted (by safe parameter setting with the »Engineer«)	
	CINH	Controller inhibit required	<input checked="" type="checkbox"/> Writing is only possible when the controller is inhibited	

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	Data type	Factor	R	W	CINH
C15000	Status of safety functions	9575	2567	E	1	BITFIELD_32		<input checked="" type="checkbox"/>		
C15003	Command status	9572	2564	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15010	Parameter set status	9565	255D	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15011	Parameter CRC	9564	255C	A	2	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C15013	Parameter set creation time	9562	255A	E	1	UNSIGNED_64	1	<input checked="" type="checkbox"/>		
C15014	Time of RTC parameter setting	9561	2559	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C15015	Time of sec. parameter setting	9560	2558	E	1	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C15016	Parameter set version	9559	2557	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15017	Stored module ID	9558	2556	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15030	SD-In Sensor type	9545	2549	A	2	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15031	SD-In Sensor function	9544	2548	A	2	UNSIGNED_8	1	<input checked="" type="checkbox"/>		

Code	Name	Index		Data				Access		
		dec	hex	DS	DA	Data type	Factor	R	W	CINH
C15032	SD-In Free assignment	9543	2547	A	2	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15033	SD-In Discrepancy time	9542	2546	A	2	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15034	SD-In Input delay	9541	2545	A	2	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15040	Input image	9535	253F	E	1	BITFIELD_32		<input checked="" type="checkbox"/>		
C15100	S bus: Configuration	9475	2503	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15111	Safety address	9464	24F8	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15112	Effective safety address	9463	24F7	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15113	S bus: Filter control data	9462	24F6	E	1	BITFIELD_32		<input checked="" type="checkbox"/>		
C15115	S bus: display control data	9460	24F4	E	1	BITFIELD_32		<input checked="" type="checkbox"/>		
C15200	OMS: Stop function	9375	249F	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15205	SSE: Emergency stop function	9370	249A	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15300	Restart behaviour	9275	243B	A	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15305	SS1: Stop time	9270	2436	E	1	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15800	Current error type	8775	2247	E	1	UNSIGNED_8	1	<input checked="" type="checkbox"/>		
C15801	Service code	8774	2246	A	8	UNSIGNED_16	1	<input checked="" type="checkbox"/>		
C15805	Service code	8770	2242	A	3	UNSIGNED_32	1	<input checked="" type="checkbox"/>		
C15810	Service code	8765	223D	A	11	BITFIELD_32		<input checked="" type="checkbox"/>		
C15900	Firmware product type	8675	21E3	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C15901	Firmware compilation date	8674	21E2	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		
C15902	Firmware version	8673	21E1	E	1	VISIBLE_STRING		<input checked="" type="checkbox"/>		

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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



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