

Engineer/ EASY Starter STEP 7/TIA Portal



Application Sample_____

Software Manual

EN



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1 About this documentation

This documentation describes the commissioning steps of a Lenze automation system on the basis of a simple example application. The automation system used consists of a PLC for the control technology and drive components connected via a bus system.



Read the mounting instructions accompanying the inverter first before you start working!

The mounting instructions contain safety instructions that must be observed!



Tip!

Information and tools regarding the Lenze products can be found in the download area under: <http://www.Lenze.com>

Target group

This documentation is intended for persons who want to project, configure and parameterise Lenze devices with the engineering software »Engineer« und »EASY Starter« from Lenze or »STEP 7« and »TIA Portal« from Siemens.

Screenshots/application examples

All screenshots in this documentation are application examples. Depending on the firmware version of the Lenze devices and the software version of the installed engineering tools Lenze »Engineer«/»EASY Starter« and Siemens »STEP 7«/»TIA Portal«, the illustration examples may deviate from the actual screen display.

Information regarding the validity

This documentation describes the »STEP 7«/»TIA Portal« Application Sample and applies to the following software:

Software	From version
Lenze»Engineer«	V2.15 SP1
Lenze»EASY Starter«	V1.9
Siemens »STEP 7«	V5.5 SP1
Siemens »TIA Portal«	V13 SP1 / V14

1 About this documentation

1.1 Document history



1.1 Document history

Version			Description
4.0	12/2016	TD29	Integration Inverter i550 PROFIBUS/PROFINET General updates and corrections
3.0	04/2014	TD11	Sample projects for »TIA Portal« have been added General updates and corrections
2.0	08/2012	TD11	General updates and corrections
1.0	04/2011	TD11	First edition

1 About this documentation

1.2 Conventions used

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

Type of information	Highlighting	Examples/notes
Spelling of numbers		
Decimal separator	Point	The decimal point is always used. For example: 1234.56
Text		
Version information	Blue text colour	All information that only applies to a certain inverter software version or higher is identified accordingly in this documentation. Example: This function extension is available from software version V3.0!
Program name	» «	»Engineer«...
Window	<i>italics</i>	The <i>Message window</i> ... / The dialog box <i>Options</i> ...
Variable names		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 several commands must be used in sequence to carry out a function, the individual commands are separated by an arrow: Select File→Open to...
Shortcut	< bold >	Use < F1 > to open the online help.
		If a shortcut is required for a command to be executed, a "+" has been put between the key identifiers: With < Shift >+< ESC > ...
Hyperlink	<u>underlined</u>	Optically highlighted reference to another topic. It is activated with a mouse-click in this online documentation.
Icons		
Page reference	 7)	Optically highlighted reference to another page. It is activated with a mouse-click in this online documentation.
Step-by-step instructions		Step-by-step instructions are indicated by a pictograph.

1.3

Notes used

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

Safety instructions

Layout of the safety instructions:



Pictograph and signal word!

(characterise the type and severity of danger)

Note

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

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

Application notes

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

2 Safety instructions

Please observe the following safety instructions when you want to commission an inverter or system using the »Engineer«.



Read the documentation supplied with the inverter or the individual components of the system carefully before you start commissioning the devices with the »Engineer«!

The device documentation contains safety instructions which must be observed!



Danger!

According to today's scientific knowledge it is not possible to ensure absolute freedom from defects of a software product.

If necessary, systems with built-in inverters must be provided with additional monitoring and protective equipment complying with the relevant safety regulations (e.g. law on technical equipment, regulations for the prevention of accidents) in each case, so that an impermissible operating status does not endanger persons or facilities.

During commissioning persons must keep a safe distance from the motor or the machine parts driven by the motor. Otherwise there is a risk of injury by the moving machine parts.



Stop!

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

A wrong parameter setting can cause unpredictable motor movements. By an unintended direction of rotation, a too high speed, or jerky operation, the driven machine parts may be damaged!

3

What does the application sample contain?

3.1

Overview: Sample projects

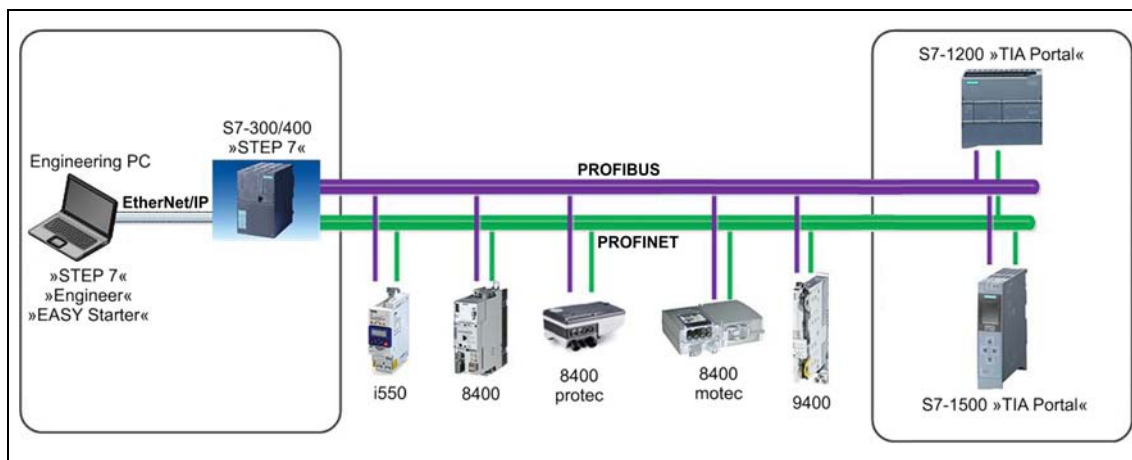
The application sample contains sample projects for ...

- the Lenze software »Engineer«/»EASY Starter«,
- Siemens »STEP 7« SIMATIC Manager,
- Siemens »TIA Portal«.

Siemens I/O controller/CPU	Sample project/file name	Siemens software
CPU 315 PN/DP	S7_app_40.zip	»STEP 7«
CPU 315 PN/DP	S7_300_400_AppSample_V40_TIA.zip	»TIA Portal«
CPU 12xx PN/DP	S7_1200_AppSample_V40_TIA.zip	»TIA Portal«
CPU 15xx PN/DP	S7_1500_AppSample_V40_TIA.zip	»TIA Portal«
CPU 315 PN/DP	STEP_7_AppSample_i550_V40	»STEP 7«
CPU 315 PN/DP CPU 12xx PN/DP CPU 15xx PN/DP	S7_i5_40.zip	»TIA Portal«

3.2

Supported components: Principal system structure



[3-1] Sample configuration: »STEP 7«/»TIA Portal« application sample with Siemens I/O controller and Lenze inverters

Engineering PC and Siemens controller

	Engineering PC	Siemens controller
Hardware	PC/notebook	SIMATIC S7: • 3xx/4xx (»STEP 7«) • 1200/1500 (»TIA Portal«)
Operating system of	Windows XP/7	-
Lenze software	»Engineer« HighLevel from V2.15 SP1	
	»EASY Starter« from V1.9	
Siemens software	»STEP 7« SIMATIC Manager from V5.5 SP1	
	»TIA Portal« from V13 SP1 / V14	

Field devices

Lenze device/device series	Version (firmware)	Communication modules/options	Version (firmware)
Servo Drives 9400 HighLine	from 01.51.0.0	PROFINET E94AYCER (from HW version VB)	from 01.40
Inverter Drives 8400			
StateLine C	from 11.00.0.0	PROFIBUS E84AYCPM (from HW version VA) PROFINET E84AYCER	from 01.00
HighLine C			
TopLine C	from 01.00.0.0		
motec	from 03.01.00.00	PROFIBUS E84DGFCPxxNx	from 02.00.00.09
		PROFINET E84DGFCRxxNx	from 02.03.00.00
protec StateLine	from 06.00.00	PROFIBUS E84DxxxxxxxxxP	from 02.00
protec HighLine	from 06.00.00	PROFINET E84DxxxxxxxxxR	from 02.00
Inverter i550	from 02.01.03	PROFIBUS/PROFINET	from 02.01.03



More information to the field devices can be found in the online help of the »Engineer« or »EASY Starter«.

3.3 Components of the sample projects

The sample projects contain the following libraries:

Library	Description
▶ The "LenzeDataConversion" library (📖 137)	Contains blocks for converting data (example: <i>WordToBits</i>). Note: This library is only available for »STEP 7«.
▶ The "LenzeDriveCommunication" library (📖 110)	Contains blocks for acyclic (DP-V1) parameter communication.
▶ LenzeLogicControlBasic / LenzeDriveControlBasic (📖 48)	This library contains function blocks for converting signals and data types and controlling a technology application (TA): <ul style="list-style-type: none"> • TA "Actuator Speed" • TA "Table Positioning". The function blocks can be used for the following Lenze inverters: <ul style="list-style-type: none"> • Servo Drive 9400 HighLine • Inverter Drive 8400 StateLine/HighLine/TopLine • Inverter Drive 8400 motec/protec • Inverter i550 (only TA "Actuator Speed")

The process data blocks TA "Actuator Speed" and TA "Table Positioning" are implemented and described in detail in the application sample.

The two blocks require a certain assignment of the control/status word of the Lenze inverter. For this purpose, use the supplied »Engineer« project which contains already pre-configured constellations between the TAs and the corresponding inverter.

4 The sample projects in the Application Sample

The sample projects predefined in the Application Sample already contain the supported Lenze inverters.

Optionally, the sample projects can be extended. This serves to use the sample projects as a basis for your individual drive solutions.



Note!

The Lenze library contains various versions of the TA modules. Use the latest version to make use of the extended functions.

From V2 onwards, for instance, a greater process data width and freely assignable variables are available.

4 The sample projects in the Application Sample

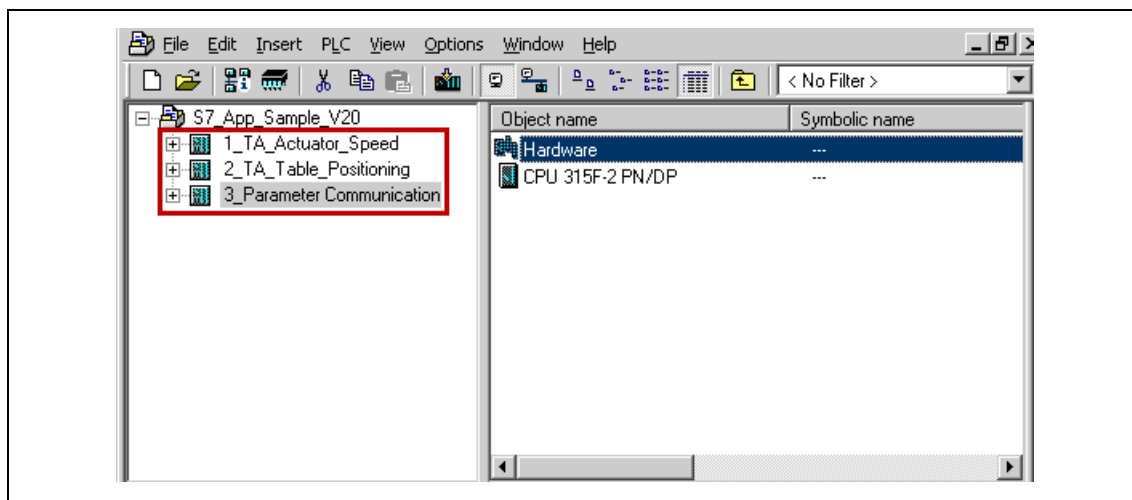
4.1 Open sample projects in the »STEP 7« SIMATIC Manager

4.1 Open sample projects in the »STEP 7« SIMATIC Manager



How to proceed:

1. Unpack the desired »STEP 7« sample project.
2. Start the Siemens SIMATIC Manager.
3. Open the »STEP 7« sample project.



[4-1] Lenze sample project in the SIMATIC Manager V2

1_TA_Actuator_Speed

In this »STEP 7« station, the FB **LCB_Actuator_Speed_V2.1** for the TA "Actuator Speed" is implemented. The FB can be controlled via the predefined **LCB_ActuatorSpeedIntV2.1** variable table.

2_TA_Table_Positioning

In this »STEP 7« station, the FB **LCB_TablePositioning_V2** for the TA "Table Positioning" is implemented. The FB can be controlled via the predefined **LCB_TablePos_IntV2** variable table.

3_Parameter Communication

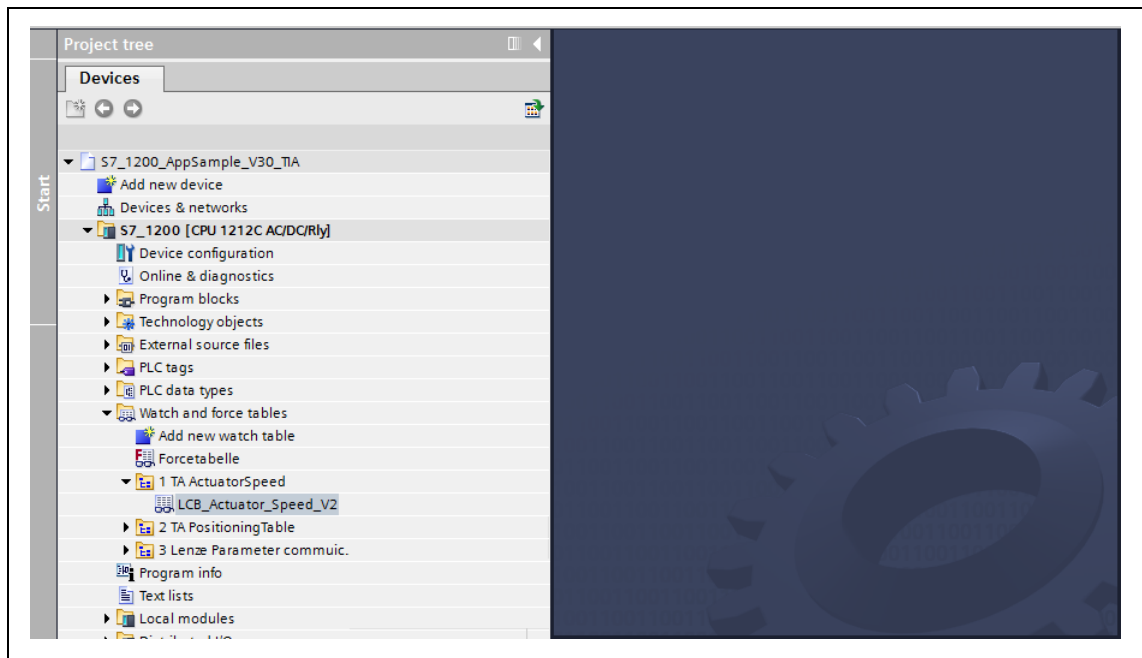
In this »STEP 7« station, the FBs for a parameter communication are implemented.

4.2 Open sample projects in the »TIA Portal«



How to proceed:

1. Start the Siemens »TIA Portal«.
2. Select the »TIA Portal« sample project suitable for the Siemens controller.
3. Select the menu command **Project** → **Dearchive** to unpack the sample project.



[4-2] Lenze sample project in the »TIA Portal« V12

The program block folder contains the following sample projects:

- TA_ActuatorSpeed_V2.1
- TA_TablePositioning_V2
- Parameter_communication

4 The sample projects in the Application Sample

4.3 Open sample projects in the »Engineer«

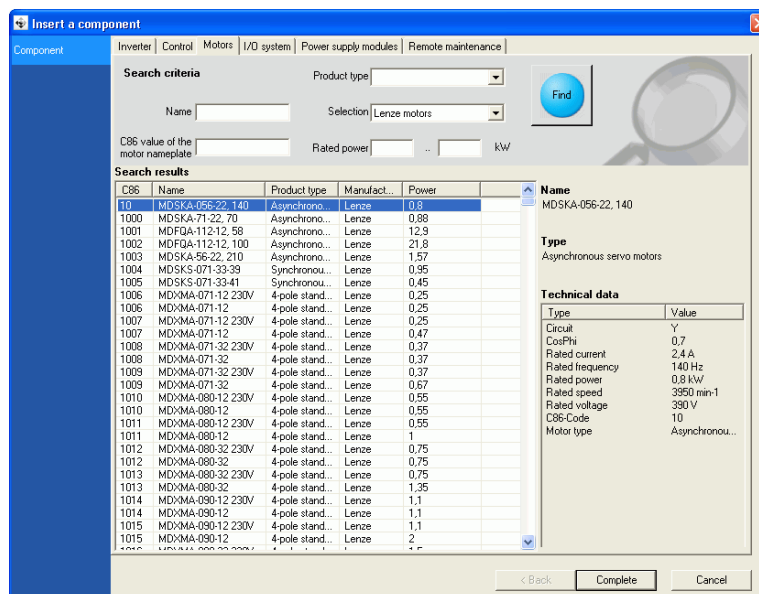
4.3 Open sample projects in the »Engineer«



How to proceed:

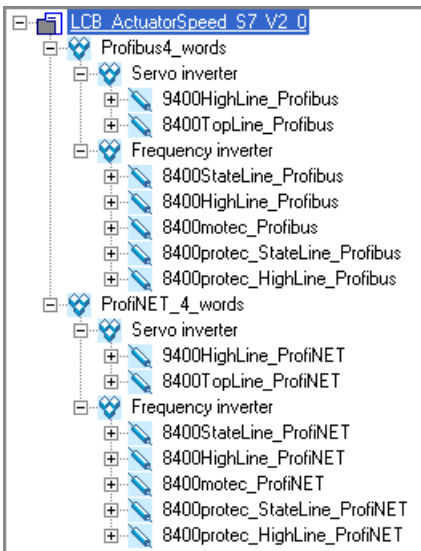
1. Start the »Engineer«.
2. Open the desired sample project using the **File → Open archive** menu command, depending on which technology application you want to use:
 - **LCB_ActuatorSpeed_Vxx.zip** for TA "actuator speed"
 - **LCB_TablePositioning_Vxx.zip** für TA "table positioning"
3. Insert the desired motor into the configuration:

Highlight inverter and select the desired motor with the **Insert a component** command on the "Motors" tab:

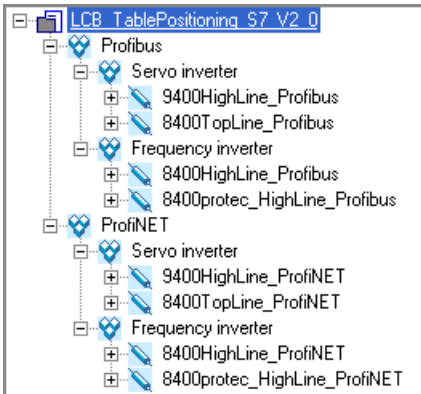


4. By clicking **Complete**, insert the selection in the »Engineer« project.

»Engineer« sample projects



LCB_ActuatorSpeed_S7_V2.0 sample project for TA "actuator speed"



Sample project **LCB_TablePositioning_S7_V2.0** for TA "table positioning"

- The »Engineer« projects contain preconfigured examples for the supported Lenze axes: 9400, 8400, 8400motec/protec.
- Each Lenze axis is implemented for the PROFIBUS and PROFIBUS bus systems each.
- Information on the used firmware versions:
 ▶ [Supported components: Principal system structure](#) (11)
- If you want to use Lenze devices with a different firmware, you have to adapt the »Engineer« project accordingly.

5 »STEP 7« sample projects

5.1 Sample project: TA "Actuator Speed"

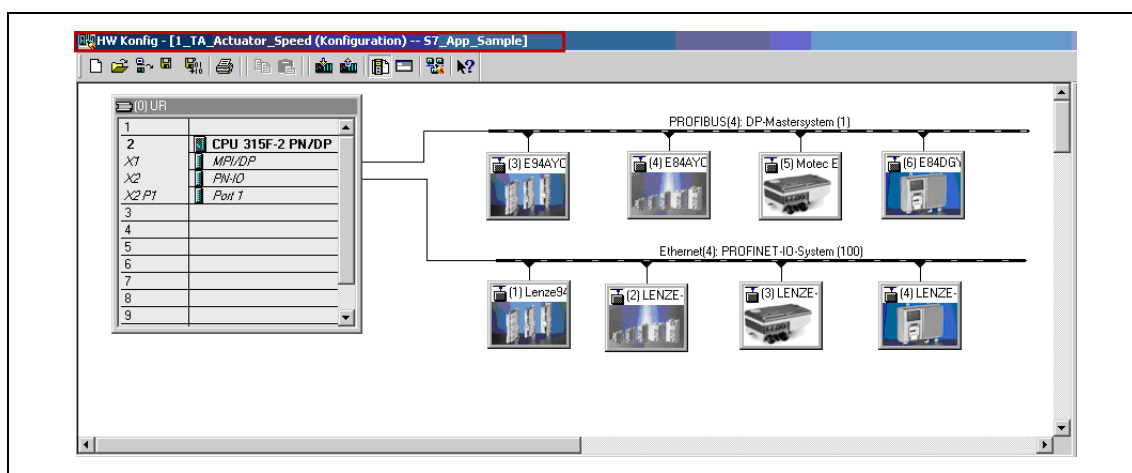
5 »STEP 7« sample projects

The »STEP 7« sample projects contain the following program structures each:

- ▶ [Sample project: TA "Actuator Speed"](#) (18)
- ▶ [Sample project: TA "Table Positioning"](#) (23)
- ▶ [Sample project: Parameter Communication](#) (29)

5.1 Sample project: TA "Actuator Speed"

In the »HW config« of the S7 station **1_TA_Actuator Speed**, the supported Lenze axes are implemented in the PROFIBUS and PROFINET IO bus system each.



[5-1] Siemens »STEP 7«- »HW config«: TA Actuator Speed



Note!

The **LCB_ActuatorSpeed_V2.1** function block requires a process data configuration with at least four consistent process data words in the »HW config«.

In case of the **Inverter i550**, the FB requires a process data width of three words according to the standard configuration in the GSD/GSDML files.

Process data addresses

Lenze field device	PROFIBUS Inputs/outputs	PROFINET IO Inputs/outputs
Inverter Drive 8400		
StateLine/HighLine/TopLine	264 - 271	296 - 303
motec	272 - 279	304 - 311
protec	280 - 287	312 - 319
Servo Drive 9400		
HighLine	256 - 263	288 - 295

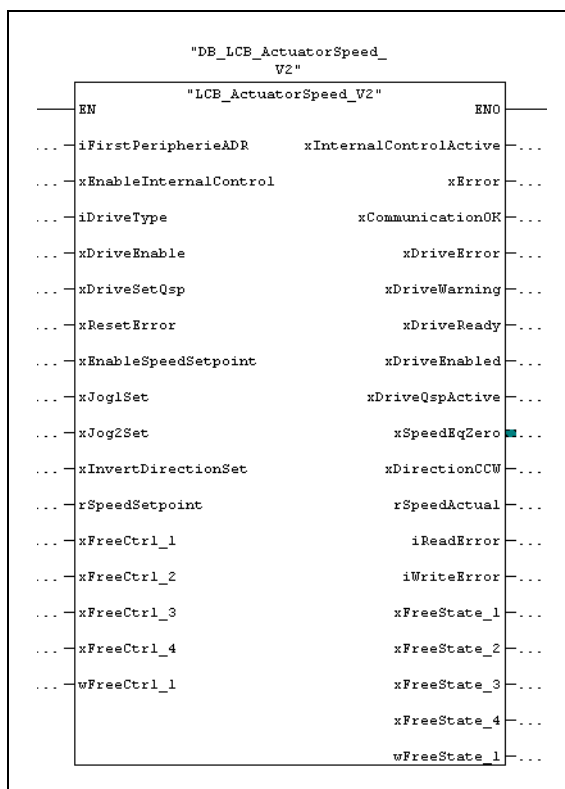
»STEP 7« directly accesses the process data via the I/O addresses.

The **FC 1** function calls the **FB LCB_ActuatorSpeed_V2.1**.

The FB always requires an instance data block (in this example the block **DB 415**).

Optionally, all input and output signals can be controlled via the instance data block. For this purpose, the *xEnableInternalControl* input bit must be set to TRUE.

Assignment of the FB LCB_ActuatorSpeed



- The instance data block **DB 415** has the symbolic name **DB_LCB_ActuatorSpeed_V2.1**.

- More information on the FB:
[LCB_ActuatorSpeed_V2.1](#) (54)

[5-2] View (input/output) of the FB **LCB_ActuatorSpeed**

5 »STEP 7« sample projects

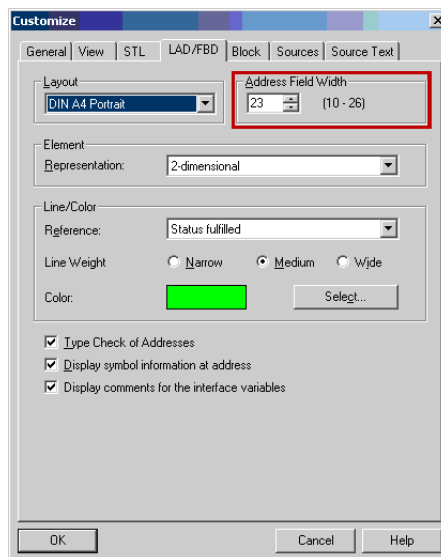
5.1 Sample project: TA "Actuator Speed"



Tip!

The FUP view in »STEP 7« can be set under the **Extra → Settings** menu item (tab *KOP/FUP*).

The width of the blocks can be set in the "address field width" range:



Variable table LCB_ActuatorSpeedIntV2.1

The »STEP 7« sample project contains a predefined variable table for the instance data block **DB 415**.

The variable table contains all inputs and outputs of the FB **LCB_ActuatorSpeed_V2.1**.

LCB_ActuatorSpeedIntV2.1 - S7-350 (SIMATIC 300(1)) CPU 314C-2 PN/DP/S7-Programm(1)						
	Operand	Symbol	Anzeigeformat	Statuswert	Steuervwert	
1	DB411.DBX 2.0	'DB_ActuatorSpeed_V2_1'.xEnableInternalControl	BOOL			
2	DB411.DBW 0	'DB_ActuatorSpeed_V2_1'.FirstPeripherieADR	DEZ		270	
3	DB411.DBW 4	'DB_ActuatorSpeed_V2_1'.DriveType	DEZ		2	
4	DB411.DBX 20.0	'DB_ActuatorSpeed_V2_1'.xDriveInhibit_IC	BOOL			
5	DB411.DBX 30.1	'DB_ActuatorSpeed_V2_1'.xDriveSetCap_IC	BOOL			
6	DB411.DBX 30.2	'DB_ActuatorSpeed_V2_1'.xDriveError_IC	BOOL			
7	DB411.DBX 30.3	'DB_ActuatorSpeed_V2_1'.xEnableSpeedSetpoint_IC	BOOL			
8	DB411.DBX 30.4	'DB_ActuatorSpeed_V2_1'.xJog1Set_IC	BOOL			
9	DB411.DBX 30.5	'DB_ActuatorSpeed_V2_1'.xJog2Set_IC	BOOL			
10	DB411.DBX 30.6	'DB_ActuatorSpeed_V2_1'.xInvertDirectionSet_IC	BOOL			
11	DB411.DBD 32	'DB_ActuatorSpeed_V2_1'.rSpeedSetpoint_IC	GLEITPUNKT		15.0	
12	DB411.DBX 36.0	'DB_ActuatorSpeed_V2_1'.xFreeCtrl_1_IC	BOOL			
13	DB411.DBX 36.1	'DB_ActuatorSpeed_V2_1'.xFreeCtrl_2_IC	BOOL			
14	DB411.DBX 36.2	'DB_ActuatorSpeed_V2_1'.xFreeCtrl_3_IC	BOOL			
15	DB411.DBX 36.3	'DB_ActuatorSpeed_V2_1'.xFreeCtrl_4_IC	BOOL			
16	DB411.DBW 38	'DB_ActuatorSpeed_V2_1'.wFreeCtrl_IC	DEZ		0	
17						
18	DB411.DBX 16.0	'DB_ActuatorSpeed_V2_1'.xInternalControlActive	BOOL			
19	DB411.DBX 16.1	'DB_ActuatorSpeed_V2_1'.xError	BOOL			
20	DB411.DBX 16.2	'DB_ActuatorSpeed_V2_1'.xCommunicationOK	BOOL			
21	DB411.DBX 16.3	'DB_ActuatorSpeed_V2_1'.xDriveError	BOOL			
22	DB411.DBX 16.4	'DB_ActuatorSpeed_V2_1'.xDriveWarning	BOOL			
23	DB411.DBX 16.5	'DB_ActuatorSpeed_V2_1'.xDriveReady	BOOL			
24	DB411.DBX 16.6	'DB_ActuatorSpeed_V2_1'.xDriveInhibit	BOOL			
25	DB411.DBX 16.7	'DB_ActuatorSpeed_V2_1'.xDriveCapActive	BOOL			
26	DB411.DBX 17.0	'DB_ActuatorSpeed_V2_1'.xSpeedRegZero	BOOL			
27	DB411.DBX 17.1	'DB_ActuatorSpeed_V2_1'.xDirectionCCW	BOOL			
28	DB411.DBX 20.0	'DB_ActuatorSpeed_V2_1'.xFreeState_1	BOOL			
29	DB411.DBX 20.1	'DB_ActuatorSpeed_V2_1'.xFreeState_2	BOOL			
30	DB411.DBX 20.2	'DB_ActuatorSpeed_V2_1'.xFreeState_3	BOOL			
31	DB411.DBX 20.3	'DB_ActuatorSpeed_V2_1'.xFreeState_4	BOOL			
32	DB411.DBD 16	'DB_ActuatorSpeed_V2_1'.rSpeedActual	GLEITPUNKT			
33	DB411.DBW 28	'DB_ActuatorSpeed_V2_1'.wFreeState_1	DEZ			
34	DB411.DBW 22	'DB_ActuatorSpeed_V2_1'.ReadError	HEX			
35	DB411.DBW 24	'DB_ActuatorSpeed_V2_1'.WriteError	HEX			
36						

[5-3] Variable table LCB_ActuatorSpeedIntV2.1 (offline)

Control via the variable table



How to proceed:

1. Go online with the variable table.

Identifizierung	Symbol	Arbeitsformel	Statuswert	Steuwert
DB415.DBX 2.0	'DB_LCB_ActuatorSpeed_V2' xEnableInternalControl	BOOL	true	
DB415.DBX 0	'DB_LCB_ActuatorSpeed_V2' xFirstPeripherieADR	DEC	256	256
DB415.DBX 4	'DB_LCB_ActuatorSpeed_V2' xDriveType	DEC	11	
DB415.DBX 32.0	'DB_LCB_ActuatorSpeed_V2' xDriveEnable	BOOL	true	
DB415.DBX 32.1	'DB_LCB_ActuatorSpeed_V2' xDriveSetpoint_K	BOOL	false	
DB415.DBX 32.2	'DB_LCB_ActuatorSpeed_V2' xDriveError_K	BOOL	false	
DB415.DBX 32.3	'DB_LCB_ActuatorSpeed_V2' xDriveSpeedSetpoint_K	BOOL	true	
DB415.DBX 32.4	'DB_LCB_ActuatorSpeed_V2' xJog1Set_K	BOOL	false	
DB415.DBX 32.5	'DB_LCB_ActuatorSpeed_V2' xJog2Set_K	BOOL	false	
DB415.DBX 32.6	'DB_LCB_ActuatorSpeed_V2' xDriveDirectionSet_K	BOOL	false	
DB415.DBX 34	'DB_LCB_ActuatorSpeed_V2' rSpeedSetpoint_K	QUBTUNIT	10.0	10.0
DB415.DBX 38.0	'DB_LCB_ActuatorSpeed_V2' xFreeChn_1_K	BOOL	false	
DB415.DBX 38.1	'DB_LCB_ActuatorSpeed_V2' xFreeChn_2_K	BOOL	false	
DB415.DBX 38.2	'DB_LCB_ActuatorSpeed_V2' xFreeChn_3_K	BOOL	false	
DB415.DBX 38.3	'DB_LCB_ActuatorSpeed_V2' xFreeChn_4_K	BOOL	false	
DB415.DBX 40	'DB_LCB_ActuatorSpeed_V2' xFreeChn_1_K	DEC	4096	4096
DB415.DBX 16.0	'DB_LCB_ActuatorSpeed_V2' xInternalControlActive	BOOL	true	
DB415.DBX 16.1	'DB_LCB_ActuatorSpeed_V2' xError	BOOL	false	
DB415.DBX 16.2	'DB_LCB_ActuatorSpeed_V2' xCommunicationOK	BOOL	true	
DB415.DBX 16.3	'DB_LCB_ActuatorSpeed_V2' xDriveError	BOOL	false	
DB415.DBX 16.4	'DB_LCB_ActuatorSpeed_V2' xDriveWarning	BOOL	false	
DB415.DBX 16.5	'DB_LCB_ActuatorSpeed_V2' xDriveReady	BOOL	true	
DB415.DBX 16.6	'DB_LCB_ActuatorSpeed_V2' xDriveEnabled	BOOL	true	
DB415.DBX 16.7	'DB_LCB_ActuatorSpeed_V2' xDriveControlActive	BOOL	false	
DB415.DBX 17.0	'DB_LCB_ActuatorSpeed_V2' rSpeedSetpoint	BOOL	false	
DB415.DBX 17.1	'DB_LCB_ActuatorSpeed_V2' xDirectionCON	BOOL	false	
DB415.DBX 26.0	'DB_LCB_ActuatorSpeed_V2' xFreeState_1	BOOL	false	
DB415.DBX 26.1	'DB_LCB_ActuatorSpeed_V2' xFreeState_2	BOOL	false	
DB415.DBX 26.2	'DB_LCB_ActuatorSpeed_V2' xFreeState_3	BOOL	false	
DB415.DBX 26.3	'DB_LCB_ActuatorSpeed_V2' xFreeState_4	BOOL	false	
DB415.DBX 18	'DB_LCB_ActuatorSpeed_V2' rSpeedActual	QUBTUNIT	10.16121	
DB415.DBX 36	'DB_LCB_ActuatorSpeed_V2' xFreeState_1	DEC	0	
DB415.DBX 22	'DB_LCB_ActuatorSpeed_V2' rSpeedError	HEX	VW160000	
DB415.DBX 24	'DB_LCB_ActuatorSpeed_V2' rSpeedError	HEX	VW160000	

2. Set the inputs described in the table to let the motor rotate.

Identifier/data type	Value to be set
iFirstPeripherieADR INT	I/O address of the node (assigned in »HW config«).
xEnableInternalControl BOOL	TRUE: Enable internal control
iDriveType INT	Select Lenze inverter <ul style="list-style-type: none"> • 1: 8400 motec • 2: 8400 (protec/Stateline/HighLine/TopLine) • 5: i550 • 11: 9400 HighLine
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)
xEnableSpeedSetpoint BOOL	TRUE: Enable setpoint generator <ul style="list-style-type: none"> • <i>xJog1Set</i> activates jog speed 1 • If no jog speed has been selected, <i>rSpeedSetpoint</i> is active
rSpeedSetpoint REAL	Select setpoint for the speed in [%] (for the inverter i550 in [Hz]).

5 »STEP 7« sample projects

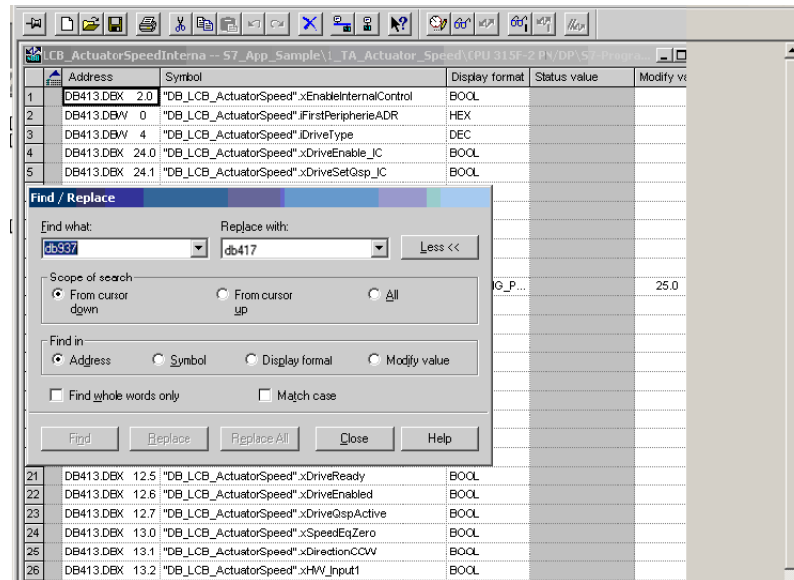
5.1 Sample project: TA "Actuator Speed"



Tip!

In order to use the FB **LCB_ActuatorSpeed_V2.1** several times, you can copy/paste the variable table.

In the pasted variable table, the previous number of the block has to be replaced by the number of the other instance data block:

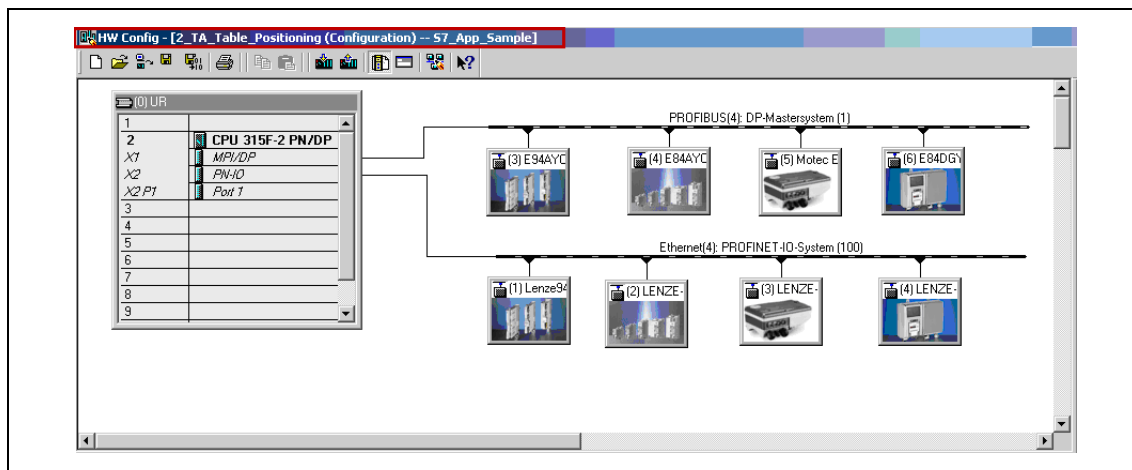


5 »STEP 7« sample projects

5.2 Sample project: TA "Table Positioning"

5.2 Sample project: TA "Table Positioning"

In the »HW config« of the S7 station **2_TA_Table_Positioning**, the supported Lenze axes are implemented in the PROFIBUS and PROFINET IO bus system each.



[5-4] Siemens »STEP 7«- »HW config«: TA Table Positioning



Note!

The FB **LCB_TablePositioning_V2** requires the following process data configuration in the »HW config«:

8400 HighLine/TopLine/protec

- 6 consistent process data words
- The profile number can be set bit-coded via the control word.

9400 HighLine

- 7 consistent process data words
- For selecting the profile number, a process data word is required.

Process data addresses

Lenze field device	PROFIBUS Inputs/outputs	PROFINET IO Inputs/outputs
Inverter Drive 8400		
HighLine/TopLine	270 - 281	308 - 319
protec	282 - 293	320 - 331
Servo Drive 9400		
HighLine	256 - 269	294 - 307

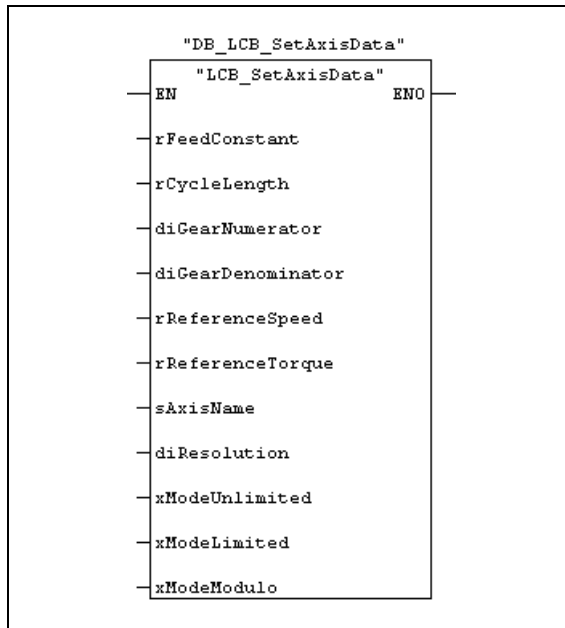
»STEP 7« directly accesses the process data via the I/O addresses.

The **FC 1** function calls the FB **LCB_TablePositioning_V2**.

The FB always requires an instance data block. In this example, it is the **DB 417** block.

Optionally, all input and output signals can be controlled via the instance data block. For this purpose, set the *xEnableInternalControl* input bit to TRUE. Additionally, the FB **LCB_SetAxisData** with the corresponding instance data block **DB 443** is required.

Assignment of the FB **LCB_SetAxisData**



- This FB maps the machine parameters of a higher-level drive.
- The FB provides the parameters of the machine which you specify in the physical units of the machine via parameters.
- More information on the FB:
 - ▶ [LCB_SetAxisData - machine parameters](#) (p. 96)

[5-5] View (inputs/outputs) of the FB **LCB_SetAxisData**

For the functionality of the **LCB_TablePositioning** block, only the following inputs must be connected:

- *rFeedConstant*
- *diGearNumerator*
- *diGearDenominator* and
- *diResolution*.

The *diResolution* input reflects the resolution of a motor revolution in bits (standard value 16).

diResolution can only be changed in case of Servo Drives 9400.

Assignment of the FB LCB_TablePositioning

- At the *AxisData* input of the FB **LCD_TablePositioning_V2** enter the instance data block of the FB **LCD_SetAxisData**. In this example, it is the **DB 443**.
- The instance data block **DB 417** has the symbolic name **DB_LCB_TablePositioning_V2**.
- More information on the FB:
 - ▶ [LCB_TablePositioning_V2](#) (📖 68)

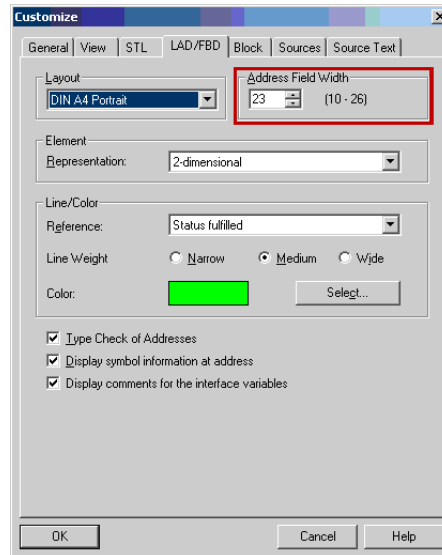
[5-6] View (inputs/outputs) of the FB LCB_TablePositioning_V2



Tip!

The FUP view in »STEP 7« can be set under the **Extra → Settings** menu item (tab *KOP/FUP*).

The width of the blocks can be set in the "address field width" range:



Variable table LCB_TablePos_IntVxx

The »STEP 7« sample project contains a predefined variable table for the instance data block **DB 417**.

[illegible]

- The variable table contains all inputs and outputs of the FB
- LCB_TablePositioning_V2.**

[5-7] Illustration example: Variable table `LCB_TablePos_Internal` (offline)

Control via the variable table



How to proceed:

1. Go online with the variable table.

Operand	Symbol	Accessformat	Statuswert	Statuswert
1	D0417.D00V 0	DB_LCB_TablePositioning_V2.FirstPeripherieADR	DEZ	256
2	D0417.D00V 4.0	DB_LCB_TablePositioning_V2.EnableInternalControl	BN	256
3	D0417.D00V 4	DB_LCB_TablePositioning_V2.DriveType	DEZ	11
4				
5	D0417.D00V 60.0	DB_LCB_TablePositioning_V2.DriveEnable_K	BOOL	false
6	D0417.D00V 60.1	DB_LCB_TablePositioning_V2.DriveStatus_K	BOOL	false
7	D0417.D00V 60.2	DB_LCB_TablePositioning_V2.ResetError_K	BOOL	false
8	D0417.D00V 60.3	DB_LCB_TablePositioning_V2.ManualPos_K	BOOL	false
9	D0417.D00V 60.4	DB_LCB_TablePositioning_V2.ManualNeg_K	BOOL	false
10	D0417.D00V 60.5	DB_LCB_TablePositioning_V2.HomingSet_K	BOOL	false
11	D0417.D00V 60.6	DB_LCB_TablePositioning_V2.HomingStart_K	BOOL	false
12	D0417.D00V 60.7	DB_LCB_TablePositioning_V2.HomingReset_K	BOOL	false
13	D0417.D00V 61.0	DB_LCB_TablePositioning_V2.ProfileStart_K	BOOL	false
14	D0417.D00V 61.1	DB_LCB_TablePositioning_V2.ProfilePosStop_K	BOOL	false
15	D0417.D00V 61.2	DB_LCB_TablePositioning_V2.ProfileReset_K	BOOL	false
16	D0417.D00V 61.3	DB_LCB_TablePositioning_V2.ProfilePosStop_K	BOOL	false
17	D0417.D00V 61.4	DB_LCB_TablePositioning_V2.FreeCh1_1_K	BOOL	false
18	D0417.D00V 61.5	DB_LCB_TablePositioning_V2.FreeCh1_2_K	BOOL	false
19	D0417.D00V 61.6	DB_LCB_TablePositioning_V2.FreeCh1_3_K	BOOL	false
20	D0417.D00V 61.7	DB_LCB_TablePositioning_V2.FreeCh1_4_K	BOOL	false
21	D0417.D00V 62.0	DB_LCB_TablePositioning_V2.FreeCh1_5_K	BOOL	false
22	D0417.D00V 62.1	DB_LCB_TablePositioning_V2.FreeCh1_6_K	BOOL	false
23	D0417.D00V 62.2	DB_LCB_TablePositioning_V2.FreeCh1_7_K	BOOL	false
24	D0417.D00V 62.3	DB_LCB_TablePositioning_V2.FreeCh1_8_K	BOOL	false
25	D0417.D00V 64	DB_LCB_TablePositioning_V2.wFreeCh1_1_K	DEZ	0
26	D0417.D00V 66	DB_LCB_TablePositioning_V2.ProfileNumberSet_K	DEZ	1
27	D0417.D00V 68.0	DB_LCB_TablePositioning_V2.EnableSpeedOverride_K	BN	256
28	D0417.D00V 70	DB_LCB_TablePositioning_V2.SpeedOverrideSet_K	OLETUNK	100.0
29	D0417.D00V 74.0	DB_LCB_TablePositioning_V2.EnablePositionTeach_K	BOOL	false
30	D0417.D00V 76	DB_LCB_TablePositioning_V2.PositionSet_K	OLETUNK	0.0
31				
32	D0417.D00V 20.0	DB_LCB_TablePositioning_V2.InternalControlActive	BOOL	true
33	D0417.D00V 20.1	DB_LCB_TablePositioning_V2.Done	BOOL	false
34	D0417.D00V 20.2	DB_LCB_TablePositioning_V2.CommunicationOK	BOOL	true
35	D0417.D00V 20.3	DB_LCB_TablePositioning_V2.DriveError	BOOL	false
36	D0417.D00V 20.4	DB_LCB_TablePositioning_V2.DriveWarning	BOOL	false
37	D0417.D00V 20.5	DB_LCB_TablePositioning_V2.DriveReady	BOOL	true
38	D0417.D00V 20.6	DB_LCB_TablePositioning_V2.DriveRelated	BOOL	false
39	D0417.D00V 20.7	DB_LCB_TablePositioning_V2.DriveStatusActive	BOOL	false
40	D0417.D00V 20.0	DB_LCB_TablePositioning_V2.SpeedIsZero	BOOL	true
41	D0417.D00V 20.1	DB_LCB_TablePositioning_V2.HomingActive	BOOL	false

2. Set the inputs described in the table to let the motor rotate.

Identifier/data type	Value to be set				
iFirstPeripherieADR INT	I/O address of the node (assigned in »HW config«).				
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block.				
iDriveType INT	Select Lenze inverter: <ul style="list-style-type: none"> • 2: 8400 (protec/HighLine/TopLine) • 11: 9400 HighLine 				
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)				
xManualPos BOOL	TRUE: Manual jog in positive direction (CW rotation)				
xManualNeg BOOL	TRUE: Manual jog in negative direction (CCW rotation)				
xHomingSet BOOL	TRUE: Set home position				
xProfileStart BOOL	Start/stop positioning <table border="1"> <tr> <td>TRUE</td><td>Start positioning /restart <ul style="list-style-type: none"> • The profile with the profile number selected via <i>wProfileNumberSet</i> is executed. • A previously cancelled positioning process is continued. Note: During an active positioning process, another profile can already be defined via <i>wProfileNumberSet</i> which will be executed after the restart (renewed state change "0" to "1").</td></tr> <tr> <td>FALSE</td><td> <ul style="list-style-type: none"> • Cancel the active positioning process. </td></tr> </table>	TRUE	Start positioning /restart <ul style="list-style-type: none"> • The profile with the profile number selected via <i>wProfileNumberSet</i> is executed. • A previously cancelled positioning process is continued. Note: During an active positioning process, another profile can already be defined via <i>wProfileNumberSet</i> which will be executed after the restart (renewed state change "0" to "1").	FALSE	<ul style="list-style-type: none"> • Cancel the active positioning process.
TRUE	Start positioning /restart <ul style="list-style-type: none"> • The profile with the profile number selected via <i>wProfileNumberSet</i> is executed. • A previously cancelled positioning process is continued. Note: During an active positioning process, another profile can already be defined via <i>wProfileNumberSet</i> which will be executed after the restart (renewed state change "0" to "1").				
FALSE	<ul style="list-style-type: none"> • Cancel the active positioning process. 				
xProfilePosStop BOOL	FALSE <ul style="list-style-type: none"> • In case of a positive edge (TRUE), the running positioning process is stopped. • When <i>xProfileStart</i> = TRUE, the profile is restarted. 				
wProfileNumberSet WORD	Profile number of the profile to be executed from the profile data management: <ul style="list-style-type: none"> • Inverter Drives 8400: 3 ... 15 • Servo Drives 9400: 1 ... 75 				

5 »STEP 7« sample projects

5.2 Sample project: TA "Table Positioning"



Tip!

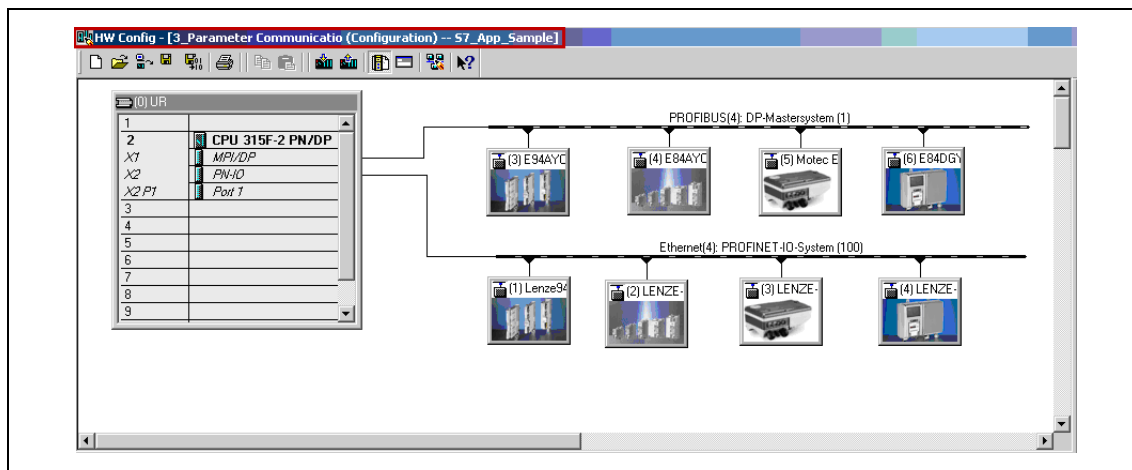
In order to use the FB **LCB_TablePositioning_V2** several times, you can copy/paste the variable table.

In the pasted variable table, the previous number of the block has to be replaced by the number of the other instance data block:

	Operand	Symbol	Anzeigeformat	Statuswert	Steuerwert
1	DB417.DBW 0	"DB_LCB_TablePositioni_V2".fFirstPeripherieADR	DEZ		256
2	DB417.DBX 4.0	"DB_LCB_TablePositioni_V2".xEnableInternalControl	BIN		
3	DB417.DBW 6	"DB_LCB_TablePositioni_V2".dDriveType	DEZ		11
4					
5	DB417.DBX 60.0	"DB_LCB_TablePositioni_V2".xDriveEnable_IC	BOOL		
6	DB417.DBX 60.1	"DB_LCB_TablePositioni_V2".xDriveSetGasp_IC	BOOL		
7	DB417.DBX 60.2	"DB_LCB_TablePositioni_V2".xResetError_IC	BOOL		
8	DB417.DBX 60.3	"DB_LCB_TablePositioni_V2".xManualPos_IC	BOOL		
9	DB417.DBX 60.4	"DB_LCB_TablePositioni_V2".xManualNeg_IC	BOOL		
10	DB417.DBX 60.5	"DB_LCB_TablePositioni_V2".xHomingSet_IC	BOOL		
11	DB417.DBX 60.6				
12	DB417.DBX 60.7				
13	DB417.DBX 61.0				
14	DB417.DBX 61.1				
15	DB417.DBX 61.2				
16	DB417.DBX 61.3				
17	DB417.DBX 61.4				
18	DB417.DBX 61.5				
19	DB417.DBX 61.6				
20	DB417.DBX 61.7				
21	DB417.DBX 62.0				
22	DB417.DBX 62.1				
23	DB417.DBX 62.2				
24	DB417.DBX 62.3				
25	DB417.DBW 64	"DB_LCB_TablePositioni_V2".wProfileNumberSet_IC	DEZ		5678
26	DB417.DBW 66	"DB_LCB_TablePositioni_V2".wProfileNumberSet_IC	DEZ		2
27	DB417.DBX 68.0	"DB_LCB_TablePositioni_V2".xEnableSpeedOverride_IC	BIN		

5.3 Sample project: Parameter Communication

In the »HW config« of the S7 station **3_TA_Parameter Communication**, the supported Lenze axes are implemented in the PROFIBUS and PROFINET IO bus system each.



[5-8] Siemens »STEP 7«- »HW config«: **Parameter Communication**

Diagnostic addresses

The diagnostic addresses of the Lenze axes from the »HW config« are required for the parameter communication.

Lenze field device	PROFIBUS	PROFINET IO
Inverter Drive 8400		
StateLine/HighLine/TopLine	2042	2035
motec	2041	2031
protec	2040	2027
Servo Drive 9400		
HighLine	2043	2039

Function blocks for the parameter communication

The following blocks are implemented exemplarily in the **FC 1** function for parameter communication:

- ▶ [DCO_ReadDriveParameter](#) (113)
- ▶ [DCO_WriteDriveParameter](#) (115)
- ▶ [DCO_ReadDriveArray8b](#) (117)
- ▶ [DCO_ReadDriveArray16b](#) (119)
- ▶ [DCO_ReadDriveArray32b](#) (121)
- ▶ [DCO_ReadDriveParamString](#) (123)
- ▶ [DCO_WriteDriveArray8b](#) (125)
- ▶ [DCO_WriteDriveArray16b](#) (127)
- ▶ [DCO_WriteDriveArray32b](#) (129)
- ▶ [DCO_R_W_n_DrivePar](#) (131)

A variable table for controlling the FBs is available for each block.

6 »TIA Portal« sample projects

The »TIA Portal« sample projects contain the following program structures each:

- ▶ [Sample project: TA "Actuator Speed"](#) (📖 31)
- ▶ [Sample project: TA "Table Positioning"](#) (📖 35)
- ▶ [Sample project: Parameter Communication](#) (📖 41)

The functional range is identical for all three »TIA Portal« sample projects.



Note!

The Siemens »TIA Portal« contains separate blocks for programming the different Siemens control systems SIMATIC S7-300/400, S7-1200 and S7-1500.

- A block designed for the SIMATIC S7-300/400, for instance, cannot be used with a different Siemens control system.
- The Lenze Application Samples contain different libraries for the »TIA Portal«, suitable for the Siemens control systems.

The table shows which Application Sample is suitable for which Siemens control system and bus system:

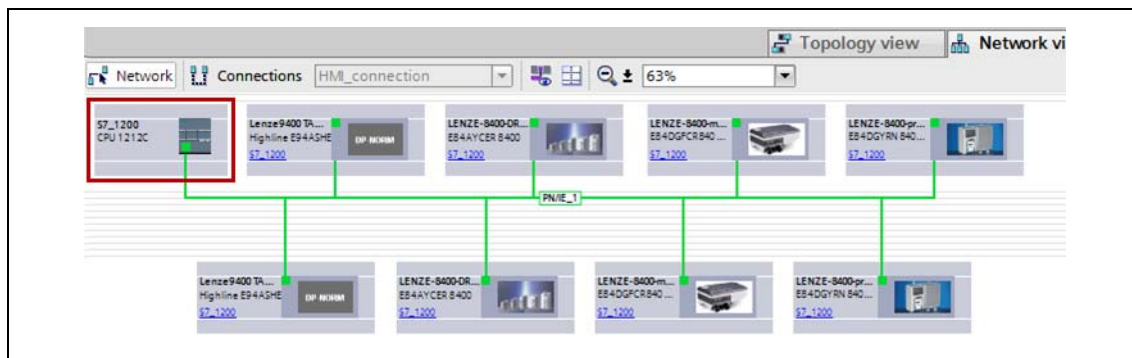
Lenze Application Sample	Suitable for Siemens control	Implemented in the project	Bus system
S7_300_400_AppSample_V40_TIA	SIMATIC S7-300 SIMATIC S7-400	SIMATIC 315 2 PN/DP	PROFIBUS
S7_1200_AppSample_V40_TIA	SIMATIC S7-1200	SIMATIC S7-1212	PROFINET
S7_1500_AppSample_V40_TIA	SIMATIC S7-1500	SIMATIC S7-1511	PROFINET

6 »TIA Portal« sample projects

6.1 Sample project: TA "Actuator Speed"

6.1 Sample project: TA "Actuator Speed"

The Siemens control SIMATIC S7-1212 is implemented with the PROFINET interface ("on board") with eight subordinate Lenze inverters in "Devices & networks":



[6-1] Example: Application Sample "S7_1200_AppSample_V30_TIA"

The four Lenze inverters in the upper PROFINET phase have been prepared for process data communication with the "table positioning" technology application.

The inverters in the lower PROFINET phase have been prepared for the "actuator speed" technology application.

Process data addresses

Lenze field device	PROFINET inputs	PROFINET outputs
Inverter Drive 8400		
StateLine/HighLine/TopLine	76 - 83	76 - 83
motec	84 - 91	84 - 91
protec	92 - 99	92 - 99
Servo Drive 9400		
HighLine	68 - 75	68 - 75

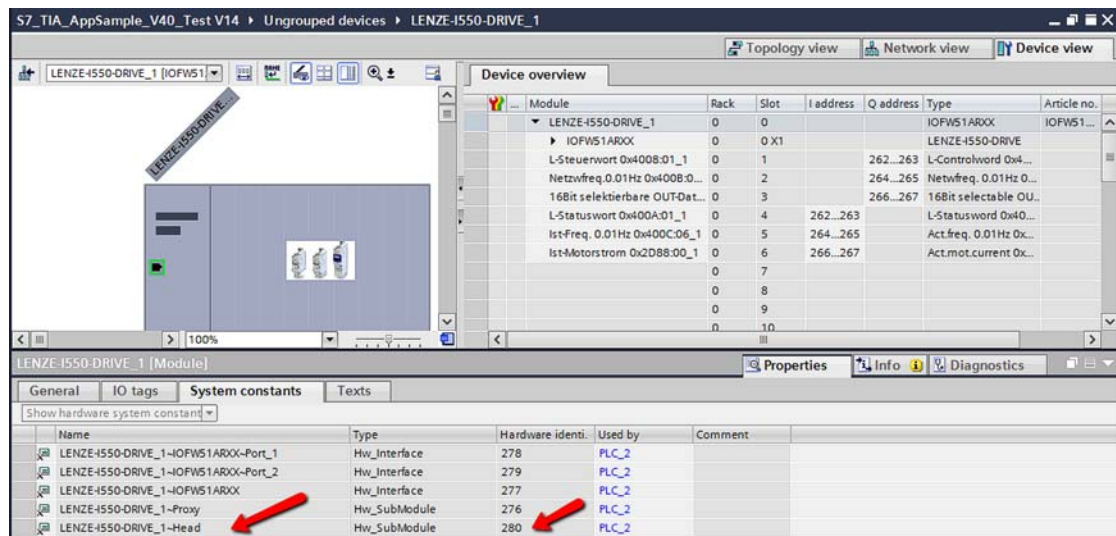
The »TIA Portal« automatically accesses the process data of the field devices via the created PLC variables:

S7_1200_AppSample_V30_TIA ▶ S7_1200 [CPU 1212C AC/DC/Rly] ▶ PLC-Variablen		
PLC tags		
	Name	Value
15	Lenze_8400_TA_Actuator_Speed_PZD(_4W_)_AR_kons[A...	302
16	Lenze_8400_TA_Positioning_Table_PZD(_6W_)_AR_kons[...	322
17	Lenze_8400motec_TA_Actuator_SpeedPZD(_4W_)_AR_k...	303
18	Lenze_8400motec_TA_Positioning_Table_PZD(_6W_)_AR...	331
19	Lenze_8400protec_TA_Actuator_SpeedPZD(_4W_)_AR_k...	304
20	Lenze_8400protec_TA_Positioning_Table_PZD(_6W_)_AR...	340
21	Lenze_9400_TA_Actuator_Speed_PZD(_4W_)_AR_kons[A...	341
22	Lenze_9400_TA_Positioning_Table_PZD(_7W_)_AR_kons[...	313

6 »TIA Portal« sample projects

6.1 Sample project: TA "Actuator Speed"

From »TIA Portal« V14 onwards and with the control type S7-1200 and S7-1500, the access always takes place via the "Head" HW identification of the PROFINET node. This can be detected in the device view of the inverter in the properties window under the "System constants" tab.



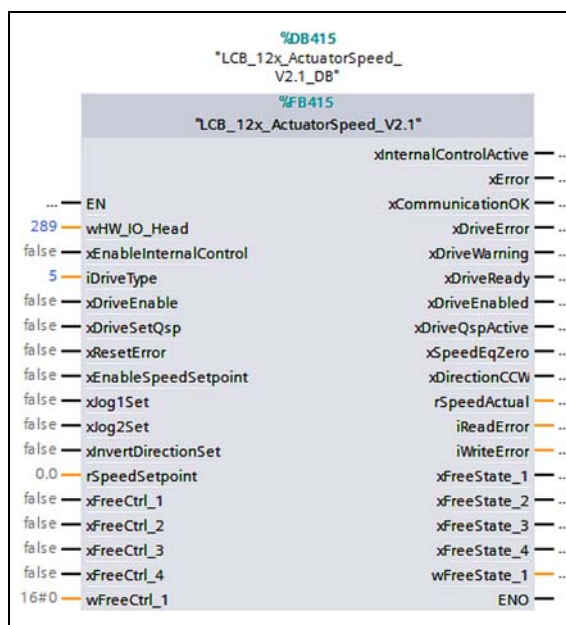
The FC 1 function calls the FB LCB_ActuatorSpeed_V2.1.

The FB requires ...

- a process data configuration of at least four consistent process data words;
- always an instance data block (in this example: Block DB 415);
- in case of the **Inverter i550**, a process data width of three words according to the standard configuration in the GSD/GSDML files.

Optionally, all input and output signals can be controlled via the instance data block. For this purpose, the *xEnableInternalControl* input bit must be set to TRUE.

Assignment of the FB LCB_ActuatorSpeed



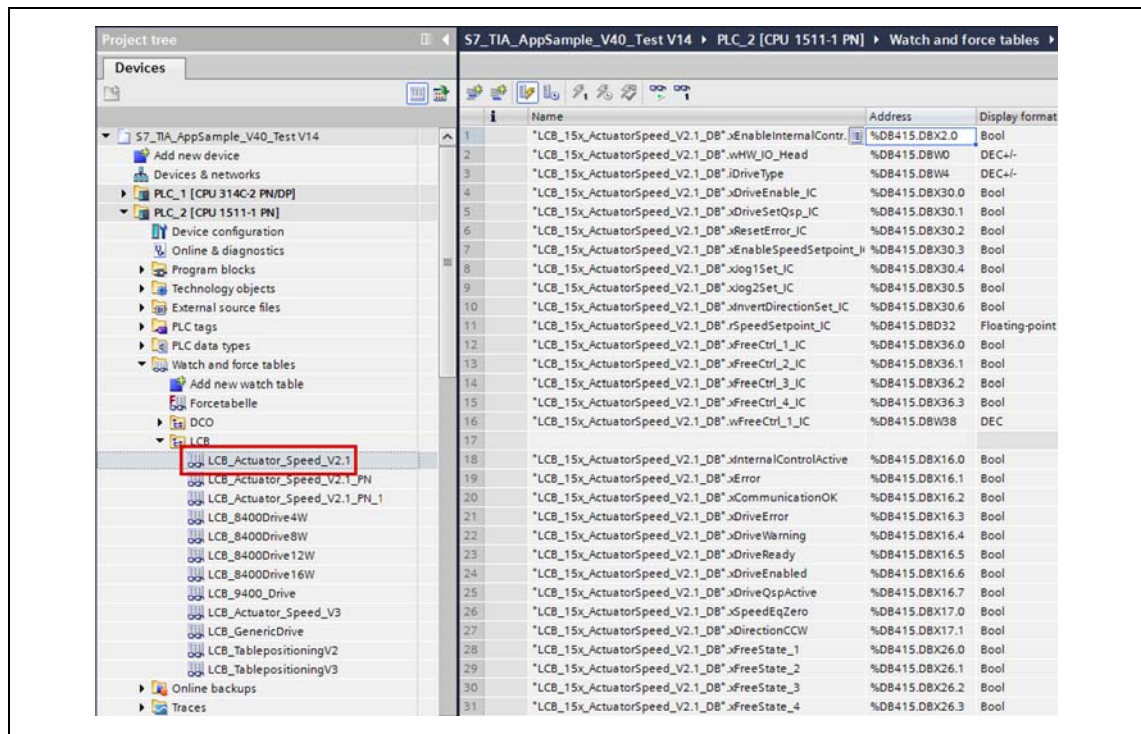
- The instance data block DB 415 has the symbolic name **DB_LCB_ActuatorSpeed_V2.1**.
- More information on the FB:
 ▶ [LCB_ActuatorSpeed_V2.1](#) (p. 54)

[6-2] View (inputs/outputs) of the FB LCB_ActuatorSpeed in the »TIA Portal«

Variable table LCB_ActuatorSpeedIntV2.1

The »TIA Portal« sample project contains a predefined variable table for the instance data block: Monitoring table **LCB_ActuatorSpeedIntV2.1**.

The variable table contains all inputs and outputs of the FB **LCB_ActuatorSpeed_V2.1**.




	Name	Address	Display format
1	"LCB_15x_ActuatorSpeed_V2.1_DB".xEnableInternalContr.	%DB415.DBX2.0	Bool
2	"LCB_15x_ActuatorSpeed_V2.1_DB".xHW_IO_Head	%DB415.DBW0	DEC+/-
3	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveType	%DB415.DBW4	DEC+/-
4	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveEnable_IC	%DB415.DBX30.0	Bool
5	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveSetQsp_IC	%DB415.DBX30.1	Bool
6	"LCB_15x_ActuatorSpeed_V2.1_DB".xResetError_IC	%DB415.DBX30.2	Bool
7	"LCB_15x_ActuatorSpeed_V2.1_DB".xEnableSpeedSetpoint_I	%DB415.DBX30.3	Bool
8	"LCB_15x_ActuatorSpeed_V2.1_DB".xlog1Set_IC	%DB415.DBX30.4	Bool
9	"LCB_15x_ActuatorSpeed_V2.1_DB".xlog2Set_IC	%DB415.DBX30.5	Bool
10	"LCB_15x_ActuatorSpeed_V2.1_DB".xInvertDirectionSet_IC	%DB415.DBX30.6	Bool
11	"LCB_15x_ActuatorSpeed_V2.1_DB".xSpeedSetpoint_IC	%DB415.DBD32	Floating-point
12	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeCtrl_1_IC	%DB415.DBX36.0	Bool
13	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeCtrl_2_IC	%DB415.DBX36.1	Bool
14	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeCtrl_3_IC	%DB415.DBX36.2	Bool
15	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeCtrl_4_IC	%DB415.DBX36.3	Bool
16	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeCtrl_1_IC	%DB415.DBW38	DEC
17			
18	"LCB_15x_ActuatorSpeed_V2.1_DB".xInternalControlActive	%DB415.DBX16.0	Bool
19	"LCB_15x_ActuatorSpeed_V2.1_DB".xError	%DB415.DBX16.1	Bool
20	"LCB_15x_ActuatorSpeed_V2.1_DB".xCommunicationOK	%DB415.DBX16.2	Bool
21	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveError	%DB415.DBX16.3	Bool
22	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveWarning	%DB415.DBX16.4	Bool
23	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveReady	%DB415.DBX16.5	Bool
24	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveEnabled	%DB415.DBX16.6	Bool
25	"LCB_15x_ActuatorSpeed_V2.1_DB".xDriveQspActive	%DB415.DBX16.7	Bool
26	"LCB_15x_ActuatorSpeed_V2.1_DB".xSpeedEqZero	%DB415.DBX17.0	Bool
27	"LCB_15x_ActuatorSpeed_V2.1_DB".xDirectionCCW	%DB415.DBX17.1	Bool
28	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeState_1	%DB415.DBX26.0	Bool
29	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeState_2	%DB415.DBX26.1	Bool
30	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeState_3	%DB415.DBX26.2	Bool
31	"LCB_15x_ActuatorSpeed_V2.1_DB".xFreeState_4	%DB415.DBX26.3	Bool

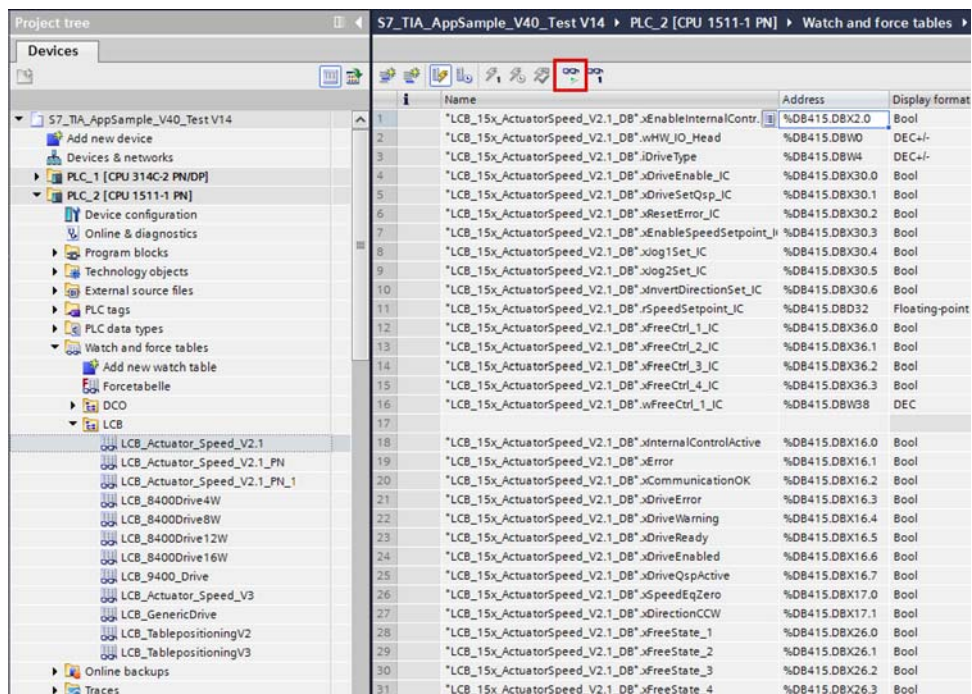
[6-3] Variable table LCB_ActuatorSpeedIntV2.1 (offline)

Control via the variable table



How to proceed:

1. Go online with the variable table by clicking .

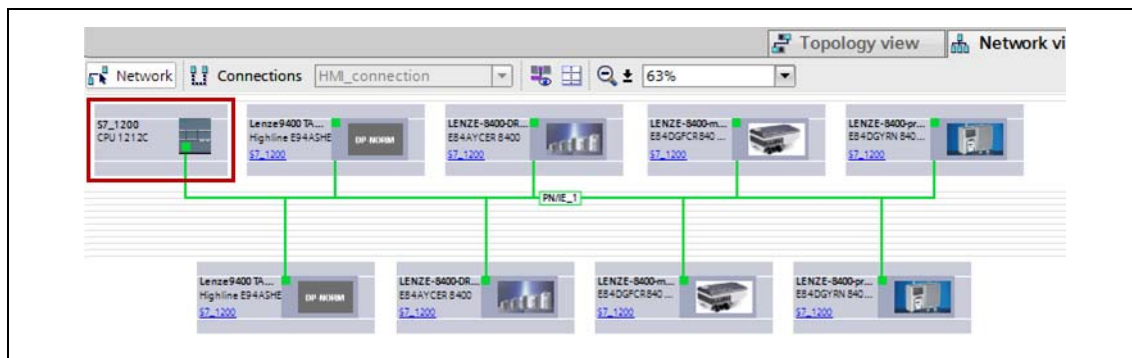


2. Set the following inputs to let the motor rotate.

Identifier/data type	Value to be set
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Enable internal control
iDriveType INT	Select Lenze inverter <ul style="list-style-type: none"> • 1: 8400 motec • 2: 8400 (protec/Stateline/HighLine/TopLine) • 5: i550 • 11: 9400 HighLine
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)
xEnableSpeedSetpoint BOOL	TRUE: Enable setpoint generator <ul style="list-style-type: none"> • <i>xJog1Set</i> activates jog speed 1 • If no jog speed has been selected, <i>rSpeedSetpoint</i> is active
rSpeedSetpoint REAL	Select setpoint for the speed in [%] (for the inverter i550 in [Hz]).

6.2 Sample project: TA "Table Positioning"

The Siemens control SIMATIC S7-1212 is implemented with the PROFINET interface ("on board") with eight subordinate Lenze inverters in "Devices & networks":



[6-4] Example: Application Sample S7_1200_AppSample_V30_TIA

The four Lenze inverters in the upper PROFINET phase have been prepared for process data communication with the TA "table positioning".

The inverters in the lower PROFINET phase have been prepared for the TA "table positioning".



Note!

The FB LCB_TablePositioning_V2 requires the following process data configuration in the »HW config«:

8400 HighLine/TopLine/protect

- 6 consistent process data words
- The profile number can be set bit-coded via the control word.

9400 HighLine

- 7 consistent process data words
- For selecting the profile number, a process data word is required.

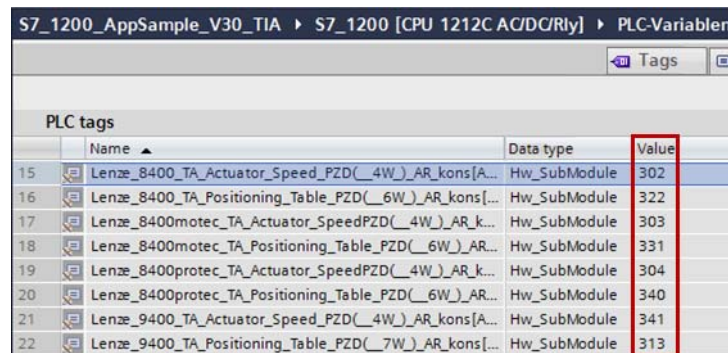
Process data addresses

Lenze field device	PROFINET inputs	PROFINET outputs
Inverter Drive 8400		
StateLine/HighLine/TopLine	114 - 125	114 - 125
motec	126 - 137	126 - 137
protect	138 - 149	138 - 149
Servo Drive 9400		
HighLine	100 - 113	100 - 113

6 »TIA Portal« sample projects

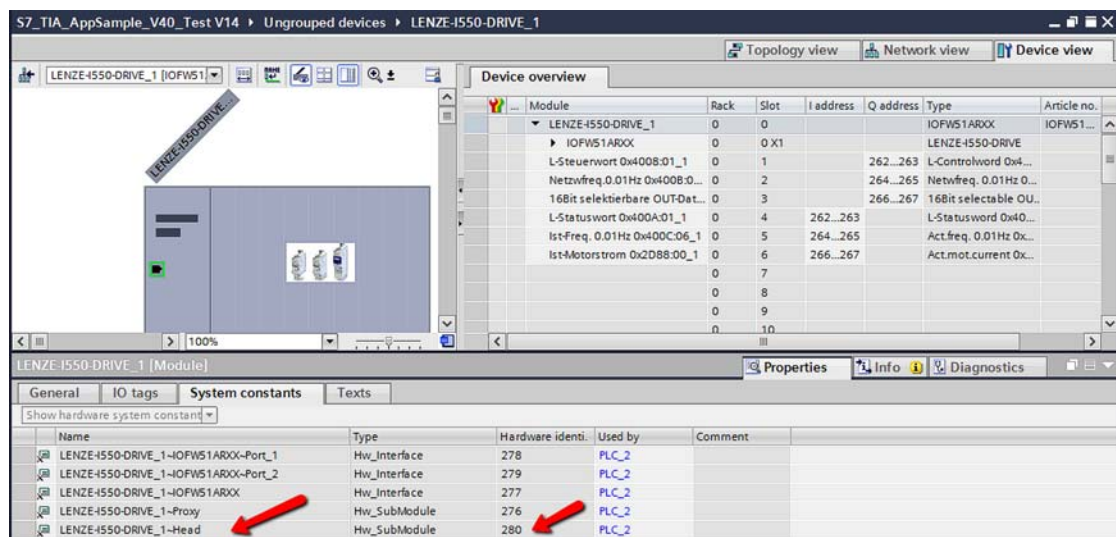
6.2 Sample project: TA "Table Positioning"

The »TIA Portal« automatically accesses the process data of the field devices via the created PLC variables:



	Name	Data type	Value
15	Lenze_8400_TA_Actuator_Speed_PZD(_4W_)_AR_kons[A...	Hw_SubModule	302
16	Lenze_8400_TA_Positioning_Table_PZD(_6W_)_AR_kons[...	Hw_SubModule	322
17	Lenze_8400motec_TA_Actuator_SpeedPZD(_4W_)_AR_k...	Hw_SubModule	303
18	Lenze_8400motec_TA_Positioning_Table_PZD(_6W_)_AR...	Hw_SubModule	331
19	Lenze_8400protec_TA_Actuator_SpeedPZD(_4W_)_AR_k...	Hw_SubModule	304
20	Lenze_8400protec_TA_Positioning_Table_PZD(_6W_)_AR...	Hw_SubModule	340
21	Lenze_9400_TA_Actuator_Speed_PZD(_4W_)_AR_kons[A...	Hw_SubModule	341
22	Lenze_9400_TA_Positioning_Table_PZD(_7W_)_AR_kons[...	Hw_SubModule	313

From »TIA Portal« V14 onwards and with the control type S7-1200 and S7-1500, the access always takes place via the "Head" HW identification of the PROFINET node. This can be detected in the device view of the inverter in the properties window under the "System constants" tab.

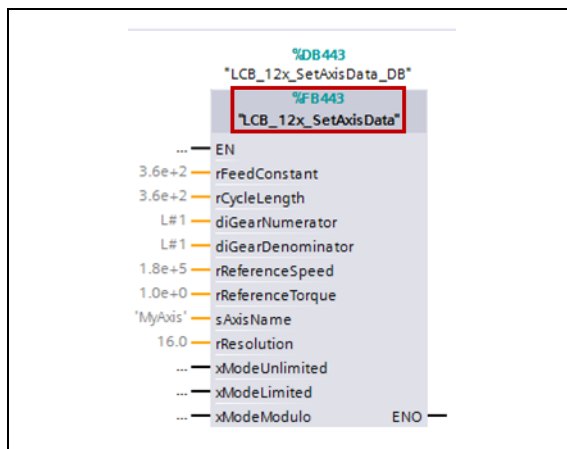


Name	Type	Hardware identi.	Used by	Comment
LENZE-I550-DRIVE_1-IOPWS1ARXX-Port_1	Hw_Interface	278	PLC_2	
LENZE-I550-DRIVE_1-IOPWS1ARXX-Port_2	Hw_Interface	279	PLC_2	
LENZE-I550-DRIVE_1-IOPWS1ARXX	Hw_Interface	277	PLC_2	
LENZE-I550-DRIVE_1-Proxy	Hw_SubModule	276	PLC_2	
LENZE-I550-DRIVE_1-Head	Hw_SubModule	280	PLC_2	

The FB always requires an instance data block. In this example, it is the **DB 417** block.

Optionally, all input and output signals can be controlled via the instance data block. For this purpose, set the *xEnableInternalControl* input bit to TRUE. Additionally, the FB **LCB_SetAxisData** with the corresponding instance data block **DB 443** is required.

Assignment of the FB LCB_SetAxisData



[6-5] View (inputs/outputs) of the FB LCB_SetAxisData in the »TIA Portal«

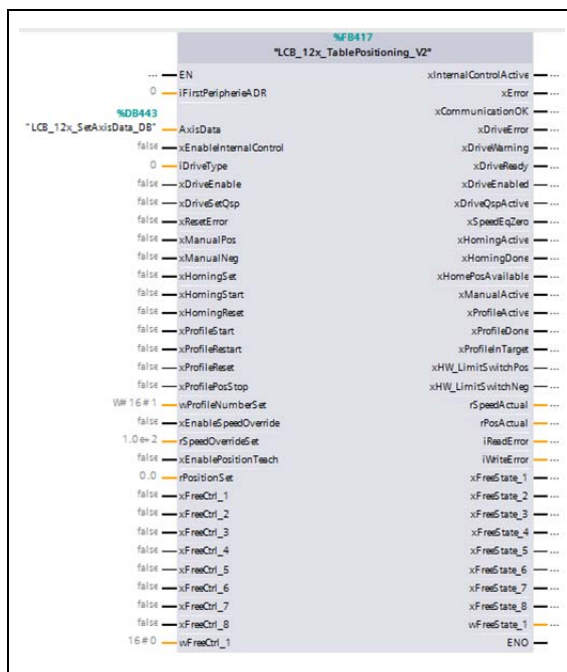
- This FB maps the machine parameters of a higher-level drive.
- The FB provides the parameters of the machine which you specify in the physical units of the machine via parameters.
- More information on the FB:
[LCB_SetAxisData - machine parameters](#) (96)

For the functionality of the **LCB_TablePositioning** block, only the following inputs must be connected:

- *rFeedConstant*
- *diGearNumerator*
- *diGearDenominator* and
- *diResolution*.

The *diResolution* input reflects the resolution of a motor revolution in bits (standard value 16). *diResolution* can only be changed in case of Servo Drives 9400.

Assignment of the FB LCB_TablePositioning



[6-6] View (inputs/outputs) of the FB LCB_TablePositioning_V2 in the »TIA Portal«

- At the *AxisData* input of the FB **LCB_TablePositioning_V2** enter the instance data block of the FB **LCB_SetAxisData**. In this example, it is the **DB 443**.
- The instance data block **DB 417** has the symbolic name **DB_LCB_TablePositioning_V2**.
- More information on the FB:
[LCB_TablePositioning_V2](#) (68)

Variable table LCB_TablePos_IntVxx

The »TIA Portal« sample project contains a predefined variable table for the instance data block **DB 417** in the "Monitoring and force tables" area.

Item	Address	Display	Monitor value	Modify value
1	"LCB_12c_TablePositioning_V2_DB" #FirstPeripheralADR	DB41...	D	313
2	"LCB_12c_TablePositioning_V2_DB" #enableInternalControl	DB41...	Bool	FALSE
3	"LCB_12c_TablePositioning_V2_DB" #DriveType	DB41...	DE C+	0
4				
5	"LCB_12c_TablePositioning_V2_DB" #DriveEnable_IC	DB41...	Bool	FALSE
6	"LCB_12c_TablePositioning_V2_DB" #DriveSetDisp_IC	DB41...	Bool	FALSE
7	"LCB_12c_TablePositioning_V2_DB" #ResetError_IC	DB41...	Bool	FALSE
8	"LCB_12c_TablePositioning_V2_DB" #ManualPos_IC	DB41...	Bool	FALSE
9	"LCB_12c_TablePositioning_V2_DB" #ManualNeg_IC	DB41...	Bool	FALSE
10	"LCB_12c_TablePositioning_V2_DB" #HomingSet_IC	DB41...	Bool	FALSE
11	"LCB_12c_TablePositioning_V2_DB" #HomingStart_IC	DB41...	Bool	FALSE
12	"LCB_12c_TablePositioning_V2_DB" #HomingReset_IC	DB41...	Bool	FALSE
13	"LCB_12c_TablePositioning_V2_DB" #HofileStart_IC	DB41...	Bool	FALSE
14	"LCB_12c_TablePositioning_V2_DB" #HofileReset_IC	DB41...	Bool	FALSE
15	"LCB_12c_TablePositioning_V2_DB" #HofileReset_IC	DB41...	Bool	FALSE
16	"LCB_12c_TablePositioning_V2_DB" #HofilePosStop_IC	DB41...	Bool	FALSE
17	"LCB_12c_TablePositioning_V2_DB" #FreeCh1_IC	DB41...	Bool	TRUE
18	"LCB_12c_TablePositioning_V2_DB" #FreeCh2_IC	DB41...	Bool	FALSE
19	"LCB_12c_TablePositioning_V2_DB" #FreeCh3_IC	DB41...	Bool	FALSE
20	"LCB_12c_TablePositioning_V2_DB" #FreeCh4_IC	DB41...	Bool	FALSE
21	"LCB_12c_TablePositioning_V2_DB" #FreeCh5_IC	DB41...	Bool	FALSE
22	"LCB_12c_TablePositioning_V2_DB" #FreeCh6_IC	DB41...	Bool	FALSE
23	"LCB_12c_TablePositioning_V2_DB" #FreeCh7_IC	DB41...	Bool	FALSE
24	"LCB_12c_TablePositioning_V2_DB" #FreeCh8_IC	DB41...	Bool	FALSE
25	"LCB_12c_TablePositioning_V2_DB" #FreeCh9_IC	DB41...	Hex	16#0000
26	"LCB_12c_TablePositioning_V2_DB" #HofileNumberSet_IC	DB41...	Hex	16#0001
27	"LCB_12c_TablePositioning_V2_DB" #enableSpeedOverride	DB41...	Bool	FALSE
28	"LCB_12c_TablePositioning_V2_DB" #SpeedOverrideSet_IC	DB41...	Float...	100.0
29	"LCB_12c_TablePositioning_V2_DB" #enablePositionReach...	DB41...	Bool	FALSE
30	"LCB_12c_TablePositioning_V2_DB" #PositionSet_IC	DB41...	Float...	-72000.0
31				

- The variable table contains all inputs and outputs of the FB **LCB_TablePositioning_V2**.

Control via the variable table



How to proceed:

1. Go online with the variable table by clicking .

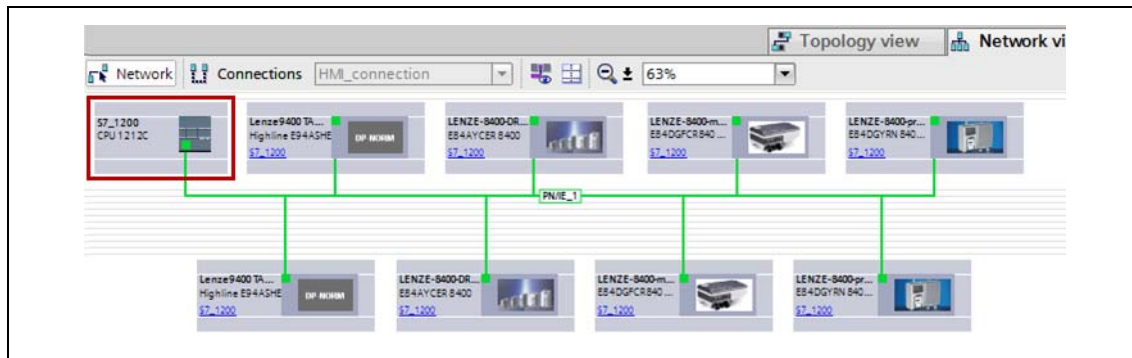
	Project tree	V30_TIA - S7-1200 [CPU 1212C AC/DC] > Watch and force tables > TIA ActuatorSpeed > ICR Actuator Speed
	Overview	
	S7-1200 [CPU 1212C AC/DC]	
	Add new device	
	Device networks	
	S7-1200 [CPU 1212C AC/DC]	
	Device configuration	
	Online diagnostics	
	Program clocks	
	Add new task	
	Main [OB1]	
	Ladder logic	
	TIA ActuatorSpeed	
	I CR ActuatorSpeed	
	O CR ActuatorSpeed	
	System clocks	
	Technology objects	
	External source files	
	RUC types	
	RUC date types	
	Watch and force tables	
	Add new watch table	
	Presetable	
	TIA ActuatorSpeed	
	I CR ActuatorSpeed	
	O CR ActuatorSpeed	
	TIA MonitoringTable	
	Program info	
	Test lists	
	Local modules	
	Distributed IO	
	Coupler data	
	Performance resources	
	Language & resources	
	Online access	
	Download & backup	

2. Set the following inputs to let the motor rotate.

Identifier/data type	Value to be set	
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).	
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block.	
iDriveType INT	Select Lenze inverter • 2: 8400 (protec/HighLine/TopLine) • 11: 9400 HighLine	
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)	
xManualPos BOOL	TRUE: Manual jog in positive direction (CW rotation)	
xManualNeg BOOL	TRUE: Manual jog in negative direction (CCW rotation)	
xHomingSet BOOL	TRUE: Set home position	
xProfileStart BOOL	Start/stop positioning	
	TRUE	Start/restart positioning • The profile with the profile number selected via <i>wProfileNumberSet</i> is executed. • Note: During an active positioning process, another profile can already be defined via <i>wProfileNumberSet</i> which will be executed after the restart (renewed state change "0" to "1"). • A previously cancelled positioning process is continued.
	FALSE	• Cancel the active positioning process.
xProfilePosStop BOOL	FALSE	Positive edge. Stop function of the running positioning process. • When <i>xProfileStart</i> = TRUE: Restart of a profile.
wProfileNumberSet WORD	Profile number of the profile to be executed of the profile data management • 9400 (1...75) • 8400 (3..15),	

6.3 Sample project: Parameter Communication

The Siemens control SIMATIC S7-1212 is implemented with the PROFINET interface ("on board") with eight subordinate Lenze inverters in "Devices & networks":



[6-7] Example: Application Sample `S7_1200_AppSample_V30_TIA`

The four Lenze inverters in the upper PROFINET phase have been prepared for process data communication with the TA "table positioning".

The inverters in the lower PROFINET phase have been prepared for the TA "table positioning".

Diagnostic addresses

The diagnostic addresses of the Lenze axes from the »HW config« are required for the parameter communication.

Lenze device	TA "Actuator Speed"	TA "Actuator Positioning"
Inverter Drive 8400		
StateLine/HighLine/TopLine	281	317
motec	289	326
protec	297	335
Servo Drive 9400		
HighLine	272	308

Function blocks for the parameter communication

The following blocks are implemented exemplarily in the **FC 4** function for parameter communication:

- ▶ [DCO_ReadDriveParameter](#) (113)
- ▶ [DCO_WriteDriveParameter](#) (115)
- ▶ [DCO_ReadDriveArray8b](#) (117)
- ▶ [DCO_ReadDriveArray16b](#) (119)
- ▶ [DCO_ReadDriveArray32b](#) (121)
- ▶ [DCO_ReadDriveParamString](#) (123)
- ▶ [DCO_WriteDriveArray8b](#) (125)
- ▶ [DCO_WriteDriveArray16b](#) (127)
- ▶ [DCO_WriteDriveArray32b](#) (129)
- ▶ [DCO_R_W_n_DrivePar](#) (131)

A variable table for controlling the FBs is available for each block.



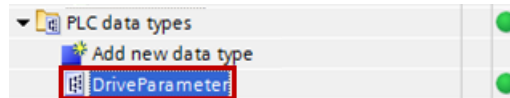
Note!

In order to be able to use the [DCO_R_W_n_DrivePar](#) block, you need the PLC data type **Drive Parameter** from the »TIA Portal« library.



How to proceed:

1. Copy the **Drive Parameter** into the **PLC data type** directory.



In the sample project, the **Drive Parameter** data type is already available in the **PLC data types** directory.

2. Each parameter block can be controlled via a separate variable table.

	Name	Addr...	Display...	Monitor value	Modify value	
1	"DCO_12x_ReadDriveParameter_DB".iDiagnosticADR	%DB...	DEC+/-	272	272	
2	"DCO_12x_ReadDriveParameter_DB".xExecute	%DB...	Bool	<input type="checkbox"/> FALSE	FALSE	
3	"DCO_12x_ReadDriveParameter_DB".iIndex	%DB...	DEC+/-	11	11	
4	"DCO_12x_ReadDriveParameter_DB".iSubIndex	%DB...	DEC+/-	0	0	
5	"DCO_12x_ReadDriveParameter_DB".xUseIndexAsParam	%DB...	Bool	<input checked="" type="checkbox"/> TRUE	TRUE	
6	"DCO_12x_ReadDriveParameter_DB".sciWriteRecord.Index001	%DB...	DEC+/-	24564		
7						
8	"DCO_12x_ReadDriveParameter_DB".xDone	%DB...	Bool	<input type="checkbox"/> FALSE		
9	"DCO_12x_ReadDriveParameter_DB".xBusy	%DB...	Bool	<input type="checkbox"/> FALSE		
10	"DCO_12x_ReadDriveParameter_DB".xError	%DB...	Bool	<input type="checkbox"/> FALSE		
11	"DCO_12x_ReadDriveParameter_DB".dwData	%DB...	Hex	16#0000_0000		
12	"DCO_12x_ReadDriveParameter_DB".iDataType	%DB...	DE...	0		
13	"DCO_12x_ReadDriveParameter_DB".rData	%DB...	Floatin...	0.0		
14	"DCO_12x_ReadDriveParameter_DB".diData	%DB...	DEC+/-	0		
15						
16						
17	"DCO_12x_WriteDriveParameter_DB".iDiagnosticADR	%DB...	DEC+/-	295	295	
18	"DCO_12x_WriteDriveParameter_DB".xExecute	%DB...	Bool	<input type="checkbox"/> FALSE	FALSE	
19	"DCO_12x_WriteDriveParameter_DB".xUseIndexAsParam	%DB...	Bool	<input checked="" type="checkbox"/> TRUE	TRUE	
20	"DCO_12x_WriteDriveParameter_DB".iIndex	%DB...	DEC+/-	11	11	
21	"DCO_12x_WriteDriveParameter_DB".iSubIndex	%DB...	DEC+/-	0	0	

The variable table contains all inputs and outputs of the FB **DCO_ReadDriveParameter**.

7

Implementing Lenze libraries

7.1

Overview of the Lenze function libraries in »STEP 7«/»TIA Portal«

The following function libraries can be used for a bus-independent implementation of Lenze inverters:

Siemens software Folder name	Library/function block	For SIMATIC
»STEP 7« S7_300_400_Libs_V40	▶ LenzeLogicControlBasic / LenzeDriveControlBasic (48) ▶ The "LenzeDriveCommunication" library (110) ▶ The "LenzeDataConversion" library (137)	S7-300 S7-400
»TIA Portal« V13 TIA_300_400_Libs_V40	▶ LenzeLogicControlBasic / LenzeDriveControlBasic (48) ▶ The "LenzeDriveCommunication" library (110)	S7-300 S7-400
»TIA Portal« V13 TIA_1200_Libs_V40	▶ LenzeLogicControlBasic / LenzeDriveControlBasic (48) ▶ The "LenzeDriveCommunication" library (110)	S7-1200
»TIA Portal« V13 TIA_1500_Libs_V40	▶ LenzeLogicControlBasic / LenzeDriveControlBasic (48) ▶ The "LenzeDriveCommunication" library (110)	S7-1500

Library/function block	Description
▶ LenzeLogicControlBasic / LenzeDriveControlBasic (48)	Functions for <u>device-independent</u> control of Lenze inverters at the logic bus: <ul style="list-style-type: none"> • Axis data structure • Interface blocks • Scaling FB for converting machine units
▶ The "LenzeDriveCommunication" library (110)	General functions for communicating with a Lenze inverter: SDO functions
▶ The "LenzeDataConversion" library (137)	Functions for converting data. Note: This library is only available in »STEP 7«

General information on the libraries:

- The initials "FCxxx" indicate functions.
- The initials "FBxxx" indicate function blocks.
- The initials "SFxxx" indicate system functions.

7.1.1 The "LenzeLogicControlBasic" library

In order to be able to activate the implemented Lenze controllers at the bus system in the PLC application, the **LenzeLogicControlBasic** library provides interface blocks.

The function blocks in »STEP 7« are designed for the SIMATIC S7-300/400 target systems.

The »TIA Portal« provides CPU-specific FBs:

- **LCB_300_** for SIMATIC S7-300/400
- **LCB_12x_** for SIMATIC S7-12xx
- **LCB_15x_** for SIMATIC S7-15xx

The interface blocks ...

- are device-independent and optimised for the corresponding application;
- are independent of the bus system used;
- can be used with any application (15 process data words).
- use the ports available by default in the »Engineer«.

Siemens software/function blocks		Description/Further information
»STEP 7«	»TIA Portal«	
FB410 LCB_GenericDrive	LCB_300_GenericDrive LCB_12x_GenericDrive LCB_15x_GenericDrive	Activation of a Lenze device with <u>any</u> application. ▶ LCB_GenericDrive (□ 51)
FB412 LCB_9400Drive	LCB_300_9400Drive LCB_12x_9400Drive LCB_15x_9400Drive	Control of a Servo Drive 9400. ▶ LCB_9400Drive (□ 52)
FB415 LCB_ActuatorSpeed_V2.1	LCB_300_ActuatorSpeed_V2.1 LCB_12x_ActuatorSpeed_V2.1 LCB_15x_ActuatorSpeed_V2.1	Controlling a Lenze device with the "actuator speed" application sample. ▶ LCB_ActuatorSpeed_V2.1 (□ 54)
FB416 LCB_ActuatorSpeed_V3	LCB_300_ActuatorSpeed_V3 LCB_12x_ActuatorSpeed_V3 LCB_15x_ActuatorSpeed_V3	Controlling a Lenze device with the "speed actuating drive" application. ▶ LCB_ActuatorSpeed_V3 (□ 61)
FB417 LCB_TablePositioning_V2	LCB_300_TablePositioning_V2 LCB_12x_TablePositioning_V2 LCB_15x_TablePositioning_V2	Controlling a Lenze device with the "table positioning" application sample. ▶ LCB_TablePositioning_V2 (□ 68)
FB418 LCB_TablePositioning_V3	LCB_300_TablePositioning_V3 LCB_12x_TablePositioning_V3 LCB_15x_TablePositioning_V3	Controlling a Lenze device with the "table positioning" application. ▶ LCB_TablePositioning_V3 (□ 77)
FB420 LCB_8400Drive16Word	LCB_300_8400Drive16Word LCB_12x_8400Drive16Word LCB_15x_8400Drive16Word	Controlling an Inverter Drive 8400 with any application (16 process data words) ▶ LCB_8400Drive16Word (□ 88)
FB421 LCB_8400Drive12Word	LCB_300_8400Drive12Word LCB_12x_8400Drive12Word LCB_15x_8400Drive12Word	Controlling an Inverter Drive 8400 with any application (12 process data words) ▶ LCB_8400Drive12Word (□ 94)
FB422 LCB_8400Drive8Word	LCB_300_8400Drive8Word LCB_12x_8400Drive8Word LCB_15x_8400Drive8Word	Controlling an Inverter Drive 8400 with any application (8 process data words) ▶ LCB_8400Drive8Word (□ 92)
FB423 LCB_8400Drive4Word	LCB_300_8400Drive4Word LCB_12x_8400Drive4Word LCB_15x_8400Drive4Word	Controlling an Inverter Drive 8400 with any application (4 process data words) ▶ LCB_8400Drive4Word (□ 90)
FB443 LCB_SetAxisData	LCB_300_SetAxisData LCB_12x_SetAxisData LCB_15x_SetAxisData	Instance block of the FB LCB_SetAxisData . ▶ LCB_SetAxisData - machine parameters (□ 96)

7.1.2 The "LenzeDataConversion" library

The **LenzeDataConversion** library contains functions for converting data.

▶ [The "LenzeDataConversion" library](#) (📖 137)

7.1.3 The "LenzeDriveCommunication" library

The **LenzeDriveCommunication** library contains blocks for bus-independent parameter communication.

▶ [The "LenzeDriveCommunication" library](#) (📖 110)

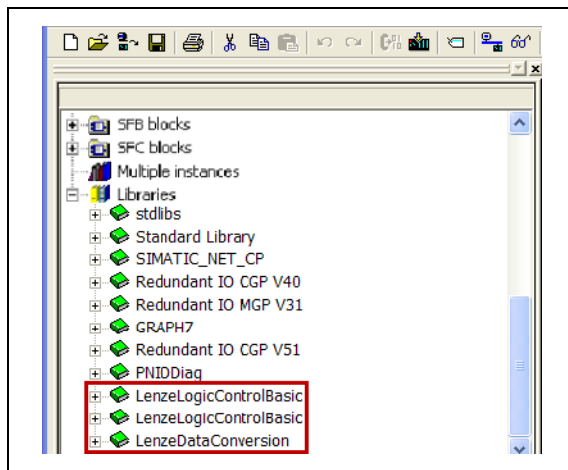
7 Implementing Lenze libraries

7.2 Installing Lenze libraries in »STEP 7«

7.2 Installing Lenze libraries in »STEP 7«

Copy the library projects **LenzeDat** (Lenze Data Conversion) and **LenzeLog** (Lenze Logic Control Basic) into the »STEP 7« library inventory.

Example: C:\Program Files\Siemens\Step7\S7LIBS



[7-1] Lenze libraries in the »SIMATIC« manager

- Optionally, you can store the library projects in any folder. Then open them once in the SIMATIC Manager to record them.
- After a restart of the SIMATIC Manager, the libraries are available in the editors.

7 Implementing Lenze libraries

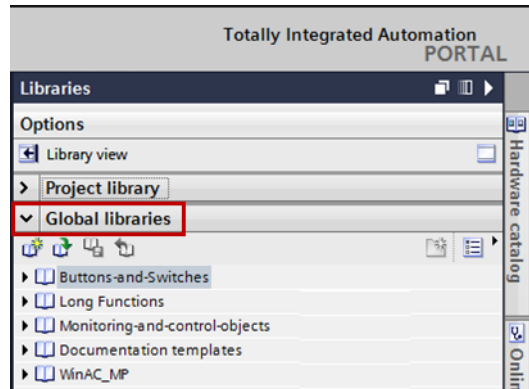
7.3 Installing Lenze libraries in the »TIA Portal«


7.3 Installing Lenze libraries in the »TIA Portal«

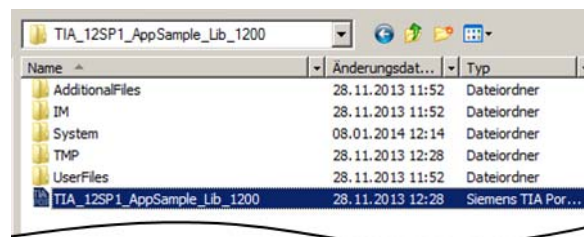


How to proceed:

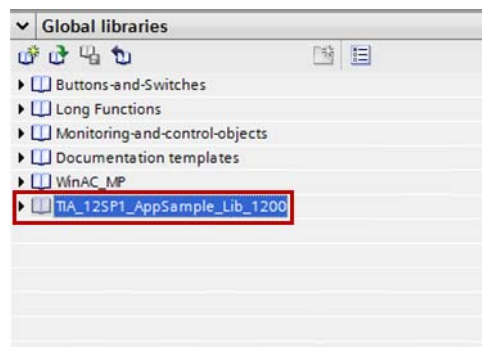
1. Go to the »TIA Portal« and open the **Libraries** navigation interface:



2. Click  to open a global library.
3. Select the desired Lenze S7 Application sample library:



Example: TIA library for the SIMATIC S7-1200 target system



The library selected before is visible in **Global libraries**.

LenzeLogicControlBasic / LenzeDriveControlBasic

The libraries contain function blocks for...

- controlling predefined technology applications "actuator speed" and "table positioning".
- controlling Generic Drives (any Lenze inverter with bus system/any drive interface).
- calculating drive-specific process data.

The functions and function libraries of the **LenzeLogicControlBasic** library are divided into different groups.

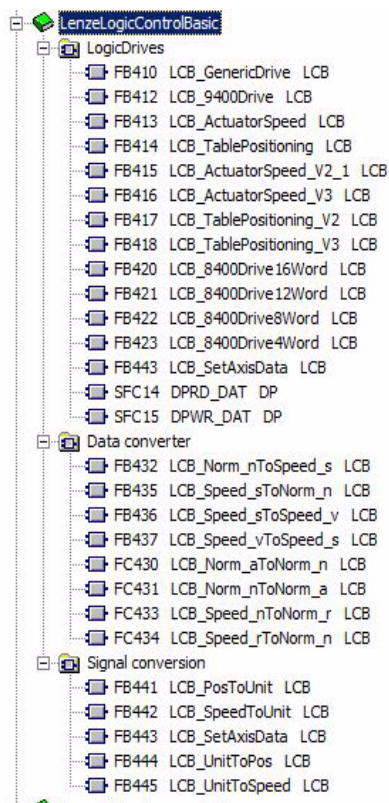
Directory/group	... contains
Logic Drives	FBs for controlling the defined technology applications "actuating drive speed" and "table positioning" and open blocks for a generic process data assignment.
Data converter	FBs with functions for converting drive-specific signals.
Signal conversion	FBs with functions for converting speed and position values.

8.1 Overview of the functions and function blocks

The libraries **LenzeLogicControlBasic** and **LenzeDriveControlBasic** are available for the Siemens software »STEP 7« and »TIA Portal«.

8.1.1 The "LenzeLogicControlBasic" library

Use the library for the following target systems: **SIMATIC S7 300/S7 400**.



LogicDrives

- FB410** ▶ [LCB_GenericDrive](#) (101 51)
- FB412** ▶ [LCB_9400Drive](#) (101 52)
- FB415** ▶ [LCB_ActuatorSpeed_V2.1](#) (101 54)
- FB416** ▶ [LCB_ActuatorSpeed_V3](#) (101 61)
- FB417** ▶ [LCB_TablePositioning_V2](#) (101 68)
- FB418** ▶ [LCB_TablePositioning_V3](#) (101 77)
- FB420** ▶ [LCB_8400Drive16Word](#) (101 88)
- FB421** ▶ [LCB_8400Drive12Word](#) (101 94)
- FB422** ▶ [LCB_8400Drive8Word](#) (101 92)
- FB423** ▶ [LCB_8400Drive4Word](#) (101 90)
- FB443** ▶ [LCB_SetAxisData - machine parameters](#) (101 96)
 - ▶ [SFC 14 DPRD_DAT DP](#) (101 97)
 - ▶ [SFC 15 DPWR_DAT DP](#) (101 97)

Data converter

- FB432** ▶ [LCB_Norm_nToSpeed_s - signal converter](#) (101 98)
- FB435** ▶ [LCB_Speed_sToNorm_n - signal converter](#) (101 99)
- FB436** ▶ [LCB_Speed_sToSpeed_v - signal converter](#) (101 100)
- FB437** ▶ [LCB_Speed_vToSpeed_s - signal converter](#) (101 101)
- FC430** ▶ [LCB_Norm_aToNorm_n - signal converter](#) (101 102)
- FC431** ▶ [LCB_Norm_nToNorm_a - signal converter](#) (101 103)
- FC433** ▶ [LCB_Speed_nToNorm_r - signal converter](#) (101 104)
- FC434** ▶ [LCB_Speed_rToNorm_n - signal converter](#) (101 105)

Signal conversion

- FB441** ▶ [LCB_PosToUnit - conversion block](#) (101 106)
- FB442** ▶ [LCB_SpeedToUnit - conversion block](#) (101 109)
- FB443** ▶ [LCB_SetAxisData - machine parameters](#) (101 96)
- FB444** ▶ [LCB_UnitToPos - conversion block](#) (101 107)
- FB445** ▶ [LCB_UnitToSpeed - conversion block](#) (101 108)

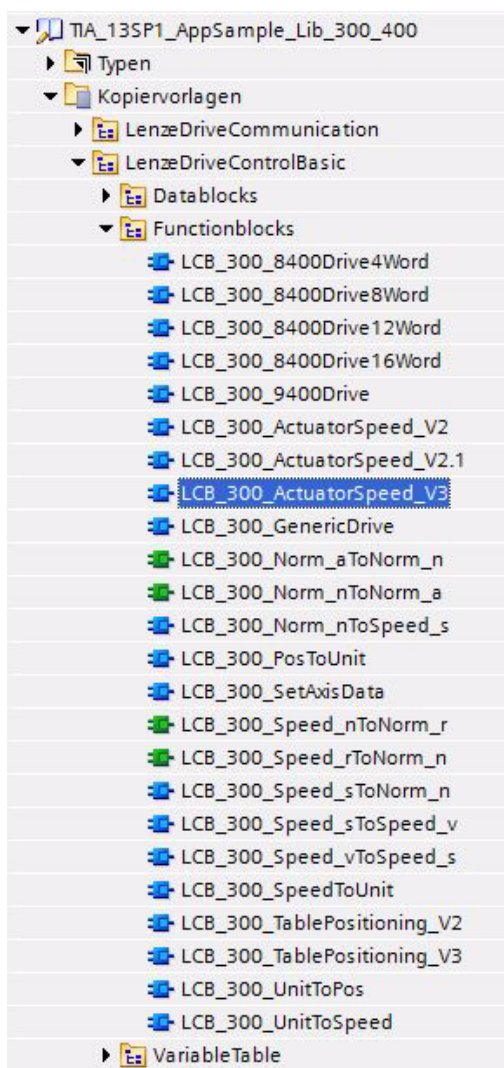
[8-1] Example: The **LenzeLogicControlBasic** library in »STEP 7«

- The initials "FBxxx" indicate function blocks.
- The initials "FCxxx" indicate functions.
- The initials "SFCxxx" indicate system functions.

8.1.2 The "LenzeDriveControlBasic" library

The library is available for the following libraries and target systems:

Library	Target system
TIA_300_400_Libs_V40	SIMATIC S7 300/400
TIA_14_AppSample_Lib_300_400_V40	
TIA_1200_Libs_V40	SIMATIC S7 12xx
TIA_14_AppSample_Lib_1200_V40	
TIA_1500_Libs_V40	SIMATIC S7 15xx
TIA_14_AppSample_Lib_1500_V40	



Function blocks

- ▶ [LCB_8400Drive4Word](#) (□ 90)
- ▶ [LCB_8400Drive8Word](#) (□ 92)
- ▶ [LCB_8400Drive12Word](#) (□ 94)
- ▶ [LCB_8400Drive16Word](#) (□ 88)
- ▶ [LCB_9400Drive](#) (□ 52)
- ▶ [LCB_ActuatorSpeed_V2.1](#) (□ 54)
- ▶ [LCB_ActuatorSpeed_V3](#) (□ 61)
- ▶ [LCB_GenericDrive](#) (□ 51)
- ▶ [LCB_Norm_aToNorm_n - signal converter](#) (□ 102)
- ▶ [LCB_Norm_nToNorm_a - signal converter](#) (□ 103)
- ▶ [LCB_Norm_nToSpeed_s - signal converter](#) (□ 98)
- ▶ [LCB_PosToUnit - conversion block](#) (□ 106)
- ▶ [LCB_SetAxisData - machine parameters](#) (□ 96)
- ▶ [LCB_Speed_nToNorm_r - signal converter](#) (□ 104)
- ▶ [LCB_Speed_rToNorm_n - signal converter](#) (□ 105)
- ▶ [LCB_Speed_sToNorm_n - signal converter](#) (□ 99)
- ▶ [LCB_Speed_sToSpeed_v - signal converter](#) (□ 100)
- ▶ [LCB_Speed_vToSpeed_s - signal converter](#) (□ 101)
- ▶ [LCB_SpeedToUnit - conversion block](#) (□ 109)
- ▶ [LCB_TablePositioning_V2](#) (□ 68)
- ▶ [LCB_TablePositioning_V3](#) (□ 77)
- ▶ [LCB_UnitToPos - conversion block](#) (□ 107)
- ▶ [LCB_UnitToSpeed - conversion block](#) (□ 108)

The contents of the libraries **TIA_S7_300_400**, **TIA_S7_1200** and **TIA_S7_1500** are identical.

Use the libraries which matches the desired target system.

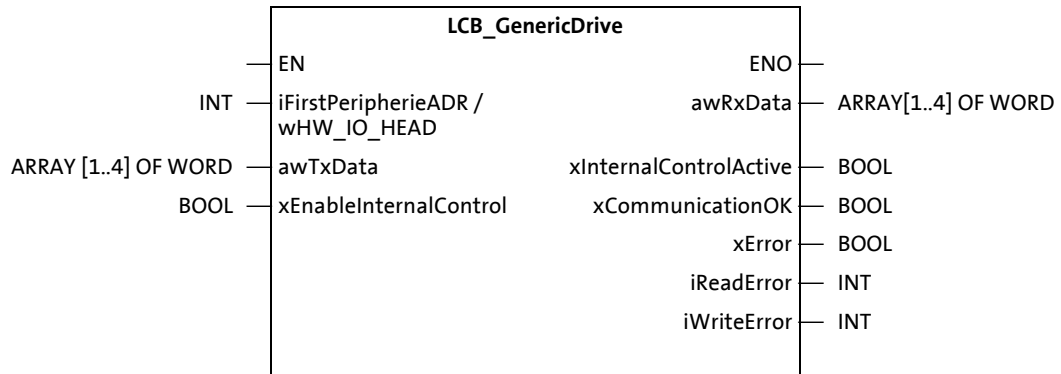
The libraries contain the same function blocks as the **LenzeDriveControlBasic**, the inputs/outputs of the function blocks and the operating mode are identical.

8.2 LCB_GenericDrive

This description applies to the following FBs:

- »STEP 7«: **FB410 LCB_GenericDrive**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_GenericDrive**

This FB controls any Lenze inverter.



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
awTxData ARRAY[1..4] OF WORD	Process data to be transmitted to the inverter
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. <ul style="list-style-type: none"> • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.

Outputs

Identifier/data type	Information/possible settings				
awRxData ARRAY[1..4] OF WORD	Process data received by the inverter				
xInternalControlActive	TRUE: The output signals that the <i>xEnableInternalControl</i> input has been activated. <ul style="list-style-type: none"> • This enables default values via the variable table. • This serves to control the inverter via the visualisation. 				
xCommunicationOk BOOL	Status of bus communication <table border="1"> <tr> <td>FALSE</td><td>No bus communication active</td></tr> <tr> <td>TRUE</td><td>Bus communication available</td></tr> </table>	FALSE	No bus communication active	TRUE	Bus communication available
FALSE	No bus communication active				
TRUE	Bus communication available				
xError BOOL	TRUE: Error of POU active				
iReadError INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (97)				
iWriteError INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (97)				

8.3

LCB_9400Drive

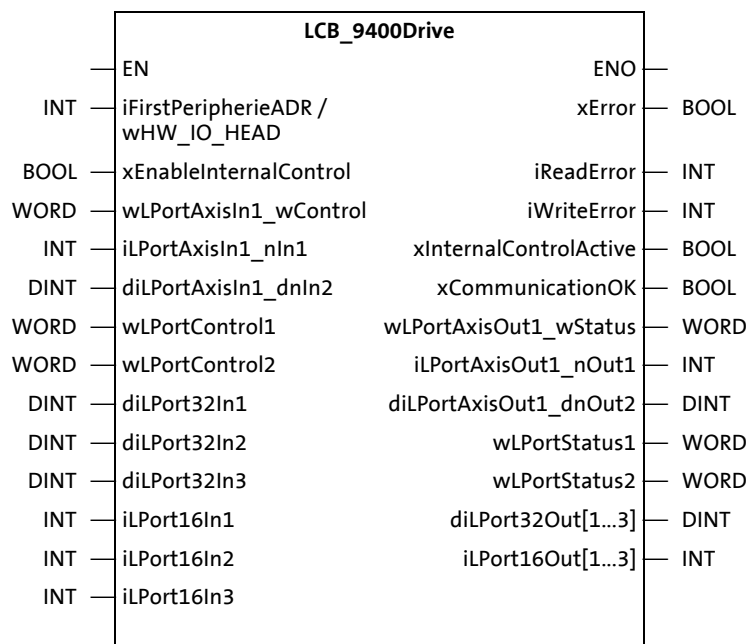
This description applies to the following FBs:

- »STEP 7«: **FB412 LCB_9400Drive**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_9400Drive**

This FB controls the Servo Drives 9400 with an optional application.

**Note!**

For a trouble-free function of the FB, the port configuration of the application on the inverter must be maintained! No ports must be deleted or shifted.

**Inputs**

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
wLPortAxisIn1_wControl WORD	<i>LPortAxisIn1.wControl</i> inverter of the Servo Drive 9400
iLPortAxisIn1_nIn1 INT	<i>LPortAxisIn1.nIn1</i> interface of the Servo Drive 9400
diLPortAxisIn1_dnIn2 DINT	<i>LPortAxisIn1.dnIn2</i> interface of the Servo Drive 9400
wLPortControl1 WORD	<i>LPortControl1</i> interface of the Servo Drive 9400

Identifier/data type	Information/possible settings
wLPortControl2 WORD	<i>LPortControl2</i> interface of the Servo Drive 9400
dilPort32[In1...In3] DINT	<i>LPort32In1</i> interface of the Servo Drive 9400 <i>LPort32In2</i> interface of the Servo Drive 9400 <i>LPort32In3</i> interface of the Servo Drive 9400
iLPort16[In1...In3] INT	<i>LPort16In1</i> interface of the Servo Drive 9400 <i>LPort16In2</i> interface of the Servo Drive 9400 <i>LPort16In3</i> interface of the Servo Drive 9400

Outputs

Identifier/data type	Information/possible settings
xError BOOL	Status signal "Fault"
	FALSE Conversion carried out without errors
	TRUE Error during the conversion
iReadError INT	Error code from the SFC block 14. ► SFC 14 DPRD DAT DP (97)
iWriteError INT	Error code from the SFC block 15. ► SFC 15 DPWR DAT DP (97)
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block via ... • the variables of the instance data block or • the variable table.
xCommunicationOK BOOL	Status of bus communication
	FALSE No bus communication active
	TRUE Bus communication available
wLPortAxisOut1_wStatus WORD	<i>LPortAxisOut1</i> interface of the Servo Drive 9400
iLPortAxisOut1_nOut1 INT	
dilPortAxisOut1_dnOut2 DINT	
wLPort[Status1/Status2] WORD	<i>LPortControl1</i> interface of the Servo Drive 9400 <i>LPortControl2</i> interface of the Servo Drive 9400
dilPort32[Out1...Out3] DINT	<i>LPort32Out1</i> interface of the Servo Drive 9400 <i>LPort32Out2</i> interface of the Servo Drive 9400 <i>LPort32Out3</i> interface of the Servo Drive 9400
iLPort16[Out1...Out3] INT	<i>LPort16Out1</i> interface of the Servo Drive 9400 <i>LPort16Out2</i> interface of the Servo Drive 9400 <i>LPort16Out3</i> interface of the Servo Drive 9400

8.4 LCB_ActuatorSpeed_V2.1

This description applies to the following FBs:

- »STEP 7«: **FB415 LCB_ActuatorSpeed_V2.1**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_ActuatorSpeed_V2.1**

This FB controls the Servo Drives 9400 HighLine, Inverter Drives 8400 protec/motec/StateLine/HighLine/TopLine and inverter i550 in the **speed control** mode.

For a correct function of the FB, load the matching device application on the inverter using the »Engineer«. The matching application is included in the S7-Application Sample.

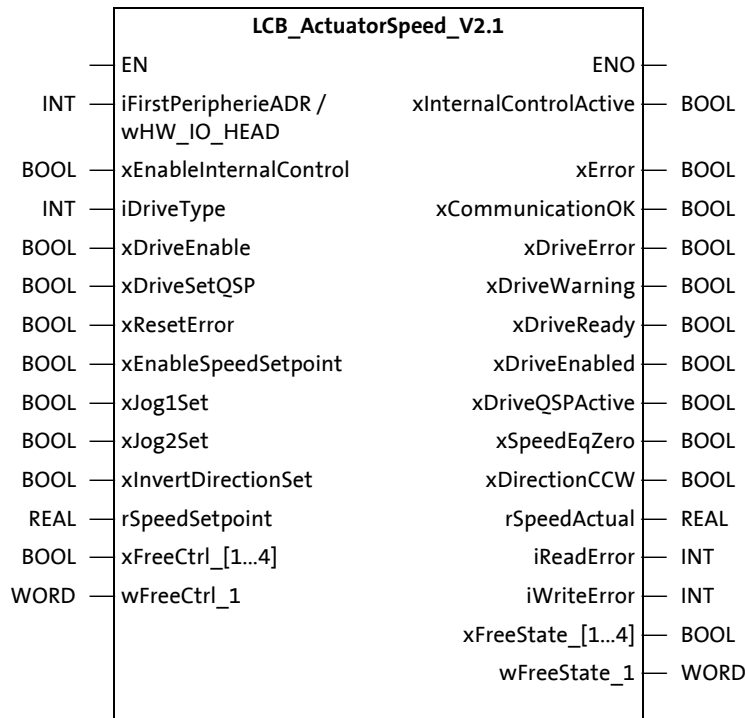
- Communication with the devices is possible via the bus systems PROFIBUS or PROFINET. Process data width: Four words
- Free binary inputs/outputs: 4
- Free word input/output: 1



Note!

The FB needs a process data configuration of at least four consistent process data words. In case of the inverter i550, the FB requires a process data width of three words according to the standard configuration in the GSD/GSDML files.

Further information on the device applications can be found in the following section: [► The sample projects in the Application Sample \(13\)](#)



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block via ... • the variables of the instance data block <u>or</u> • the variable table.
iDriveType INT	Select Lenze inverter • 1: 8400 motec • 2: 8400 (protec/Stateline/HighLine/TopLine) • 5: i550 • 11: 9400 HighLine
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)
xDriveSetQSP BOOL	TRUE: Activate quick stop
xResetError BOOL	TRUE: Reset error message (acknowledged)
xEnableSpeedSetpoint BOOL	TRUE: Jog1 activated • Speed setpoint 1 requested • Active if <i>xEnableSpeedSetpoint</i> = "TRUE"
xJog1Set BOOL	Activate TRUE: Jog1 • Speed setpoint 1 requested. • Active if <i>xEnableSpeedSetpoint</i> = "TRUE"
xJog2Set BOOL	Activate TRUE: Jog2 • Speed setpoint 2 requested. • Active if <i>xEnableSpeedSetpoint</i> = "TRUE"
xInvertDirectionSet BOOL	TRUE: Invert the direction of rotation of the motor (clockwise rotation/counter-clockwise rotation).
rSpeedSetpoint REAL	Setpoint selection for the speed in [%] (for the inverter i550 in [Hz]). Is active if ... • <i>xEnableSpeedSetpoint</i> = "TRUE" und • <i>xJog1Set</i> = "FALSE" and • <i>xJog2Set</i> = "FALSE"
xFreeCtrl_[1...4] BOOL	Freely assignable bits. Information on bit assignment in the »Engineer« sample project: ► Input data of the Lenze devices (port assignment) - TA "Actuator Speed" V2.1 (57)
wFreeCtrl_1 WORD	

Outputs

Identifier/data type	Information/possible settings
xInternalControlActive BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. • This serves to control the inverter via the variable table.
xError BOOL	Status signal "Fault"
	FALSE Conversion carried out without errors
	TRUE Error during the conversion
xCommunicationOK BOOL	Status of the bus communication (without function in case of the inverter i550)
	FALSE No bus communication active
	TRUE Bus communication available
xDriveError BOOL	Status signal "Error in the inverter"
xDriveWarning BOOL	TRUE: Inverter is in "Warning" device state
xDriveReady BOOL	Status signal "Inverter is ready for operation"
xDriveEnabled BOOL	TRUE: Inverter has been enabled
xDriveQSPActive BOOL	TRUE: "Quick stop active"
xSpeedEqZero BOOL	TRUE: Speed is zero.
xDirectionCCW BOOL	Direction of rotation of the motor • TRUE:CCW rotation is active
xHW_ <i>[Input1...Input4]</i> BOOL	Digital input is active • Input1 : Digital input 1 • Input2 : Digital input 2 • Input3 : Digital input 3 • Input4 : Digital input 4
rSpeedActual REAL	Current speed in [%] (for the inverter i550 in [Hz]) • Value range: -199.99...199.99%
iReadError INT	Error code from the SFC block 14 (without function in case of the inverter i550). ► SFC 14 DPRD_DAT DP (97)
iWriteError INT	Error code from the SFC block 15 (without function in case of the inverter i550). ► SFC 15 DPWR_DAT DP (97)
xFreeState_ <i>[1...4]</i> BOOL	Freely assignable bits. Information on bit assignment in the »Engineer« sample project: ► Output data of the Lenze devices (port assignment) - TA "Actuator Speed" V2.1 (59)
wFreeState_1 WORD	

8.4.1 Input data of the Lenze devices (port assignment) - TA "Actuator Speed" V2.1

FB inputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveEnable BOOL	WORD 1	LPortControl1	NOT Bit 0
xDriveSetQSP BOOL			Bit 1
xResetError BOOL			Bit 10
xEnableSpeedSetpoint BOOL			Bit 2
xJog1Set BOOL			Bit 3
xJog2Set BOOL			Bit 5
xInvertDirectionSet BOOL			Bit 5
xFreeCtrl_[1...4] BOOL			Bit 6...9
wFreeCtrl_1 WORD	WORD 2	LPort16In1	-
rSpeedSetpoint WORD	WORD 3 WORD 4	LPort32In1	-

Used input ports TA "Actuator Speed" V2.1 - 9400 HighLine

1. LPortControl1
2. LPort16In1
3. LPort32In1

FB inputs 8400 motec/protec StateLine/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveEnable BOOL	WORD 1	LP_MciIn-W1	Bit 0 and 3
xDriveSetQSP BOOL			Bit 2
xResetError BOOL			Bit 7
xEnableSpeedSetpoint BOOL			-
xJog1Set BOOL			Bit 12 and xEnableSpeedSetpoint
xJog2Set BOOL			Bit 13 and xEnableSpeedSetpoint
xInvertDirectionSet BOOL			Bit 15
xFreeCtrl_[1...4] BOOL	WORD 2	LP_MciIn-W2	Bit 0...3
wFreeCtrl_1 WORD	WORD 4	LP_MciIn-W4	-
rSpeedSetpoint WORD	WORD 3	LP_MciIn-W3	-

FB inputs - inverter i550

Identifier/data type	Process data	i550	Assignment
xDriveEnable BOOL	WORD 1	NetWordIn1	Bit 4
xDriveSetQSP BOOL			Bit 2
xResetError BOOL			Bit 7
xEnableSpeedSetpoint BOOL			
xJog1Set BOOL			Bit 5
xJog2Set BOOL			Bit 6
xInvertDirectionSet BOOL			Bit 12
xFreeCtrl_[1...4] BOOL			Bit 11, 13...15
wFreeCtrl_1 WORD	WORD 3	NetWordIn3	-
rSpeedSetpoint WORD	WORD 2	NetWordIn2	-

8.4.2 Output data of the Lenze devices (port assignment) - TA "Actuator Speed" V2.1

FB outputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveError BOOL	WORD 1	LPortStatus1	Bit 0
xDriveWarning BOOL			Bit 12
xDriveReady BOOL			Bit 15
xDriveEnabled BOOL			NOT Bit 7
xDriveQSPActive BOOL			Bit 3
xSpeedEqZero BOOL			Bit 6
xDirectionCCW BOOL			-
xFreeState_[1...2] BOOL			Bit 4...5
xFreeState_[3...4] BOOL			Bit 14...15
wFreeState_1 WORD	WORD 2	LPort16Out1	-
rSpeedActual WORD	WORD 3 WORD 4	LPort32Out1	

Used output ports TA "Actuator Speed" V2.1 - 9400 HighLine

1. LPortStatus1
2. LPort16Out1
3. LPort32Out1

FB outputs 8400 motec/protec Stateline/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveError BOOL	WORD 1	LP_MciOut-W1	Bit 13
xDriveWarning BOOL			Bit 12
xDriveReady BOOL			Bit 15
xDriveEnabled BOOL			NOT Bit 7
xDriveQSPActive BOOL			Bit 0
xSpeedEqZero BOOL			Bit 6
xDirectionCCW BOOL			Bit 14
xFreeState_[1...2] BOOL	WORD 2	LP_MciOut-W2	Bit 0...1
xFreeState_[3...4] BOOL			Bit 2...3
wFreeState_1 WORD	WORD 4	LP_MciOut-W4	
rSpeedActual WORD	WORD 3	LP_MciOut-W3	

FB outputs - inverter i550

Identifier/data type	Process data	i550	Assignment
xDriveError BOOL	WORD 1	NetWordOut1	Bit 0
xDriveWarning BOOL			Bit 7
xDriveReady BOOL			Bit 0
xDriveEnabled BOOL			Bit 6
xDriveQSPActive BOOL			Bit 5
xSpeedEqZero BOOL			Bit 12
xDirectionCCW BOOL			Bit 13
xFreeState_[1...2] BOOL			Bit 4...5
xFreeState_[3...4] BOOL			Bit 1, 4, 8, 9
wFreeState_1 WORD	WORD 3	NetWordOut3	-
rSpeedActual WORD	WORD 2	NetWordOut2	

8.5 LCB_ActuatorSpeed_V3

This description applies to the following FBs:

- »STEP 7«: **FB416 LCB_ActuatorSpeed_V3**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_ActuatorSpeed_V3**

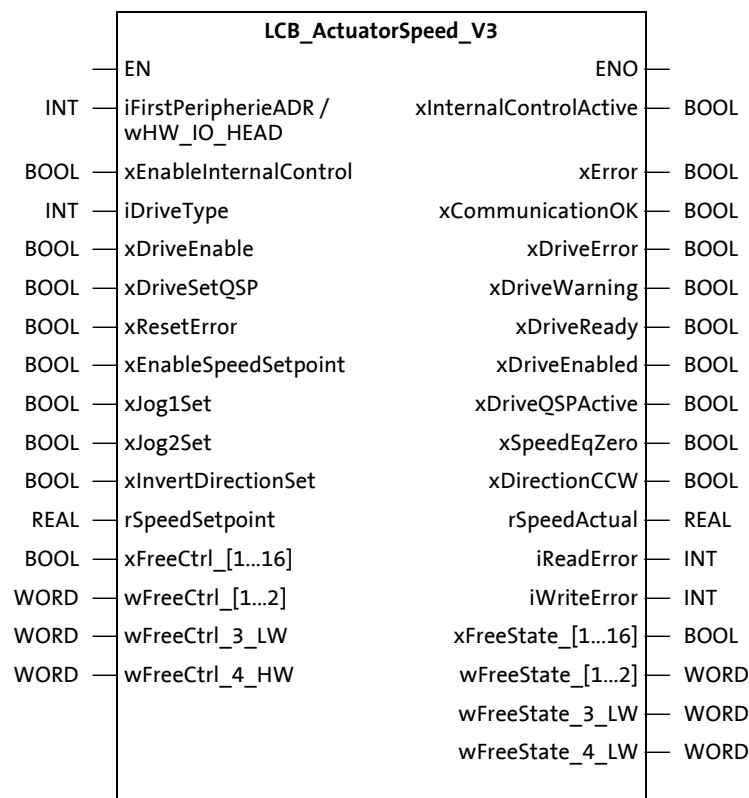
This FB controls the Servo Drives 9400 HighLine and Inverter Drives 8400 protec/motec/StateLine/HighLine/TopLine in the **speed control** mode.

It **cannot** be used together with the inverter i550!

For a correct function of the FB, load the matching device application on the inverter using the »Engineer«. The matching application is included in the S7-Application Sample.

- Communication with the devices is possible via the bus systems PROFIBUS or PROFINET. Process data width: Eight words
- Free binary inputs/outputs: 16
- Free words inputs/outputs: 4 (32-bit values for the Servo Drives 9400 are marked with **_LW/_HW**).

The FB needs a process data width of 8 words.



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
iDriveType INT	Select Lenze inverter • 1: 8400 motec • 2: 8400 (protec/Stateline/HighLine/TopLine) • 11: 9400 HighLine
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)
xDriveSetQSP BOOL	TRUE: Activate quick stop
xResetError BOOL	TRUE: Reset error message (acknowledged)
xEnableSpeedSetpoint BOOL	TRUE: Jog1 activated • Speed setpoint 1 requested • Active if <i>xEnableSpeedSetpoint</i> = "TRUE"
xJog1Set BOOL	Activate TRUE: Jog1 • Speed setpoint 1 requested. • Active if <i>xEnableSpeedSetpoint</i> = "TRUE"
xJog2Set BOOL	Activate TRUE: Jog2 • Speed setpoint 2 requested. • Active if <i>xEnableSpeedSetpoint</i> = "TRUE"
xInvertDirectionSet BOOL	TRUE: Invert the direction of rotation of the motor (clockwise rotation/counter-clockwise rotation).
rSpeedSetpoint REAL	Setpoint selection for speed in [%]. Is active if ... • ... <i>xEnableSpeedSetpoint</i> = "TRUE" and • ... <i>xJog1Set</i> = "FALSE" and • ... <i>xJog2Set</i> = "FALSE"
xFreeCtrl_[1...16] BOOL	Freely assignable bit [1...4]. Information on bit assignment in the »Engineer« sample project: ▶ Input data of the Lenze devices (port assignment) - TA "Actuator Speed" V3 (64)
wFreeCtrl_[1...2] WORD	Freely assignable bits. • LW: "Low Word" • HW: "High Word" Information on bit assignment: ▶ Output data of the Lenze devices (port assignment) - TA "Actuator Speed" V3 (66)
wFreeCtrl_3_LW WORD	
wFreeCtrl_4_HW WORD	

Outputs

Identifier/data type	Information/possible settings
xInternalControlActive BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. • This serves to control the inverter via the variable table.
xError BOOL	Status signal "Fault"
	FALSE Conversion carried out without errors
	TRUE Error during the conversion
xCommunicationOK BOOL	Status of bus communication
	FALSE No bus communication active
	TRUE Bus communication available
xDriveError BOOL	Status signal "Error in the inverter"
xDriveWarning BOOL	TRUE: Inverter is in "Warning" device state
xDriveReady BOOL	Status signal "Inverter is ready for operation"
xDriveEnabled BOOL	TRUE: Inverter has been enabled
xDriveQSPActive BOOL	TRUE: "Quick stop active"
xSpeedEqZero BOOL	TRUE: Speed is zero.
xDirectionCCW BOOL	Direction of rotation of the motor • TRUE:CCW rotation is active
xHW_ <i>[Input1...Input4]</i> BOOL	Digital input is active • Input1 : Digital input 1 • Input2 : Digital input 2 • Input3 : Digital input 3 • Input4 : Digital input 4
rSpeedActual REAL	Current speed in [%] • Value range: -199.99...199.99%
iReadError INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (97)
iWriteError INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (97)
xFreeState_ <i>[1...16]</i> BOOL	Freely assignable bit. Information on bit assignment: ▶ Input data of the Lenze devices (port assignment) - TA "Actuator Speed" V3 (64)
wFreeState_ <i>[1...2]</i> WORD	Freely assignable bits. • LW: "Low Word" • HW: "High Word" Information on bit assignment: ▶ Output data of the Lenze devices (port assignment) - TA "Actuator Speed" V3 (66)
wFreeState_3_LW WORD	
wFreeState_4_HW WORD	

8.5.1 Input data of the Lenze devices (port assignment) - TA "Actuator Speed" V3

FB inputs - 9400 HighLine

Identifier/data type		Process data	Port	Assignment
xDriveEnable	BOOL	WORD 1	LPortControl1	NOT Bit 0
xDriveSetQSP	BOOL			Bit 1
xResetError	BOOL			Bit 10
xEnableSpeedSetpoint	BOOL			Bit 2
xJog1Set	BOOL			Bit 3
xJog2Set	BOOL			Bit 5
xInvertDirectionSet	BOOL			Bit 5
xFreeCtrl_[1...16]	BOOL	WORD 5	LPortControl2	Bit 0...15
wFreeCtrl_1	WORD	WORD 2	LPort16In1	
wFreeCtrl_2	WORD	WORD 6	LPort16In2	
wFreeCtrl_3_LW	WORD	WORD 7	LPort32In2	
wFreeCtrl_4_HW	WORD	WORD 8		
rSpeedSetpoint	WORD	WORD 3 WORD 4	LPort32In1	

Used input ports TA "Actuator Speed" V3 - 9400 HighLine

1. LPortControl1
2. LPort16In1
3. LPort32In1
4. LPortControl2
5. LPort16In2
6. LPort32In32

FB inputs 8400 motec/protec StateLine/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveEnable BOOL	WORD 1	LP_MciIn-W1	Bit 0 and 3
xDriveSetQSP BOOL			Bit 2
xResetError BOOL			Bit 7
xEnableSpeedSetpoint BOOL			-
xJog1Set BOOL			Bit 12 and xEnableSpeedSetpoint
xJog2Set BOOL			Bit 13 and xEnableSpeedSetpoint
xInvertDirectionSet BOOL			Bit 15
xFreeCtrl_[1...16] BOOL	WORD 2	LP_MciIn-W2	Bit 0...15
wFreeCtrl_1 WORD	WORD 4	LP_MciIn-W4	LP_MciIn-W4
wFreeCtrl_2 WORD	WORD 5	LP_MciIn-W5	LP_MciIn-W5
wFreeCtrl_3_LW WORD	WORD 6	LP_MciIn-W6	LP_MciIn-W6
wFreeCtrl_4_HW WORD	WORD 7	LP_MciIn-W7	LP_MciIn-W7
rSpeedSetpoint WORD	WORD 3	LP_MciIn-W3	LP_MciIn-W3

8.5.2 Output data of the Lenze devices (port assignment) - TA "Actuator Speed" V3

FB outputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveError BOOL	WORD 1	LPortStatus1	Bit 0
xDriveWarning BOOL			Bit 12
xDriveReady BOOL			Bit 15
xDriveEnabled BOOL			NOT Bit 7
xDriveQSPActive BOOL			Bit 3
xSpeedEqZero BOOL			Bit 6
xDirectionCCW BOOL			-
xFreeState_[1...16] BOOL	WORD 6	LPortStatus2	Bit 0...15
wFreeState_1 WORD	WORD 2	LPort16Out1	-
wFreeState_2 WORD	WORD 5	LPort16Out2	
wFreeState_3_LW WORD	WORD 7	LPort32Out2	
wFreeState_2_HW WORD	WORD 8		
rSpeedActual WORD	WORD 3 WORD 4	LPort32Out1	

Used output ports TA "Actuator Speed" V3 - 9400 HighLine

1. LPortStatus1
2. LPort16Out1
3. LPort32Out1
4. LPortStatus2
5. LPort16Out2
6. LPort32Out2

FB outputs 8400 motec/protec Stateline/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveError BOOL	WORD 1	LP_MciOut-W1	Bit 13
xDriveWarning BOOL			Bit 12
xDriveReady BOOL			Bit 15
xDriveEnabled BOOL			NOT Bit 7
xDriveQSPActive BOOL			Bit 0
xSpeedEqZero BOOL			Bit 6
xDirectionCCW BOOL			Bit 14
xFreeState_[1...16] BOOL	WORD 2	LP_MciOut-W2	Bit 0...15
wFreeState_1 WORD	WORD 4	LP_MciOut-W4	-
wFreeState_2 WORD	WORD 5	LP_MciOut-W5	
wFreeState_3_LW WORD	WORD 6	LP_MciOut-W6	
wFreeState_2_HW WORD	WORD 7	LP_MciOut-W7	
rSpeedActual REAL	WORD 3	LP_MciOut-W3	

8.6 LCB_TablePositioning_V2

This description applies to the following FBs:

- »STEP 7«: **FB417 LCB_TablePositioning_V2**
- »TIAPortal«: **LCB_300/LCB_12x/LCB_15x_TablePositioning_V2**

This FB controls the inverters 9400 HighLine and 8400 protec/HighLine/TopLine in the **table positioning** mode. It **cannot** be used together with the inverter i550.

For a correct function of the FB, load the matching device application on the inverter using the »Engineer«. The matching application is included in the S7-Application Sample.

- Free binary inputs/outputs: 8
- Free word input/output: 1

The required process data width depends on the device.

- Device series 8400: Six process data words
- Device series 9400: Seven process data words

Further information on the device applications can be found in the following section: [► The sample projects in the Application Sample](#) (13)



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
AxisData DB	Instance block of the FB LCB_SetAxisData. ▶ LCB_SetAxisData - machine parameters (96)
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
iDriveType INT	Select Lenze inverter • 2: 8400 (protec/HighLine/TopLine) • 11: 9400 HighLine
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)
xDriveSetQSP BOOL	TRUE: Activate quick stop
xResetError BOOL	TRUE: Reset error message (acknowledged)
xManualPos BOOL	TRUE: Manual jog in positive direction (CW rotation)
xManualNeg BOOL	TRUE: Manual jog in negative direction (CCW rotation)
xHomingSet BOOL	TRUE: Set home position
xHomingStart BOOL	Start homing
xHomingReset BOOL	Reset home position
xProfileStart BOOL	Start/stop positioning
	TRUE Start/restart positioning • The profile with the profile number selected via <i>wProfileNumberSet</i> is executed. • Note: During an active positioning process, another profile can already be defined via <i>wProfileNumberSet</i> which will be executed after the restart (renewed state change "0" to "1"). • A previously cancelled positioning process is continued.
xProfileRestart BOOL	FALSE
	TRUE Update of the profile data of a currently active profile considering the distance already covered.
xProfileReset BOOL	FALSE
	TRUE A profile previously aborted cannot be continued. • When <i>xProfileStart</i> = TRUE: Restart of a profile.
xProfilePosStop BOOL	FALSE
	TRUE Positive edge. Stop function of the running positioning process. • When <i>xProfileStart</i> = TRUE: Restart of a profile.
wProfileNumberSet WORD	Profile number of the profile to be executed of the profile data management • 9400 (1...75) • 8400 (3...15),
xEnableSpeedOverride BOOL	TRUE: Switch on speed "override". "Override" means changing profile parameters and their transfer during the positioning process.

Identifier/data type	Information/possible settings
rSpeedOverrideSet REAL	Value for speed override in [%] • 0...199.99 %
xEnablePositionTeach BOOL	TRUE: Activate "Teach" function to enable the transfer of the position default to the variable table.
rPositionSet REAL	Position selection in [Units]
xFreeCtrl_[1...8] BOOL wFreeCtrl_1 WORD	Freely assignable bits. • LW: "Low Word" • HW: "High Word" Information on bit assignment: ▶ Input data of the Lenze devices (port assignment) - TA "TablePositioning" V2 (72)

Outputs

Identifier/data type	Information/possible settings
xInternalControlActive BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. This serves to control the inverter via the visualisation.
xError BOOL	Status signal "Fault"
	FALSE Conversion carried out without errors
	TRUE Error during the conversion
xCommunicationOk BOOL	Status of bus communication
	FALSE No bus communication active
	TRUE Bus communication available
xDriveError BOOL	Status signal "Error in the inverter"
xDriveWarning BOOL	TRUE: Inverter is in "Warning" device state
xDriveReady BOOL	Status signal "Inverter is ready for operation"
xDriveEnabled BOOL	TRUE: Inverter has been enabled
xDriveQSPActive BOOL	TRUE: "Quick stop active"
xSpeedEqZero BOOL	TRUE: Speed is zero.
xHomingActive BOOL	Status signal "Homing activated"
xHomingDone BOOL	Status signal "Homing completed"
xHomePosAvailable BOOL	Status signal "Home position is known"
xManualActive BOOL	Status signal "Manual jog active"
xProfileActive BOOL	Status signal "Positioning active"
xProfileDone BOOL	Status signal "Positioning completed"
xProfileInTarget BOOL	Status signal "Target position reached"

Identifier/data type	Information/possible settings
xHW_LimitSwitchPos BOOL	Positive hardware limit switch
xHW_LimitSwitchNeg BOOL	Negative hardware limit switch
rSpeedActual REAL	Current speed of the motor shaft in [%] • Value range: -199.99...199.99%
rPositionActual REAL	Current position in [Units]
iReadError INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (📖 97)
iWriteError INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (📖 97)
xFreeState_[1...8] wFreeState_1 WORD	Freely assignable bits. Information on bit assignment in the »Engineer« sample project: ▶ Output data of the Lenze devices (port assignment) - TA "TablePositioning" V2 (📖 75)

8.6.1 Input data of the Lenze devices (port assignment) - TA "TablePositioning" V2

FB inputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveEnable BOOL	WORD 1	LPortControl1	NOT Bit 0
xDriveSetQSP BOOL			Bit 1
xResetError BOOL			Bit 10
xManualPos BOOL			Bit 14
xManualNeg BOOL			Bit 15
xHomingSet BOOL			Bit 12
xHomingStart BOOL			Bit 3
xHomingReset BOOL			Bit 4
xProfileStart BOOL			Bit 5 Bit 6
xProfileRestart BOOL			Bit 7
xProfileReset BOOL			Bit 6 Bit 7
xProfilePosStop BOOL			Bit 8
xEnableSpeedOverride BOOL			Bit 9
xEnablePosTeach BOOL			Bit 2
wProfileNumberSet.Bit[0...3] BOOL			-
xFreeCtrl_[1...8] BOOL	WORD 6	LPortControl2	Bit 0...7
rPositionSet WORD	WORD 3 WORD 4	LPort32In1	-
rSpeedOverrideSet WORD	WORD 2	LPort16In1	
rFreeCtrl_1 WORD	WORD 7	LPort16In3	
rProfilNumberSet WORD	WORD 5	LPort16In2	

Used input ports TA "TablePositioning" V2 - 9400 HighLine

1. LPortControl1
2. LPort16In1
3. LPort32In1
4. LPort16In2
5. LPortControl2
6. LPort16In3

FB inputs 8400 motec/protec StateLine/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveEnable BOOL	WORD 1	LP_MciIn-W1	Bit 3
xDriveSetQSP BOOL			Bit 15
xResetError BOOL			Bit 11
xManualPos BOOL			Bit 12
xManualNeg BOOL			Bit 13
xHomingSet BOOL			Bit 10
xHomingStart BOOL			Bit 8
xHomingReset BOOL			Bit 14
xProfileStart BOOL			Bit 2 Bit 8
xProfileRestart BOOL			Bit 1
xProfileReset BOOL			-
xProfilePosStop BOOL			Bit 0 Bit 1 Bit 8
xEnableSpeedOverride BOOL			Bit 9
xEnablePosTeach BOOL			Bit 2
wProfileNumberSet.Bit[0...3] BOOL			Bit 4...7
xFreeCtrl_[1...8] BOOL	WORD 2	LP_MciIn-W2	Bit 0...7

Identifier/data type	Process data	MCI	Assignment
rPositionSet WORD	WORD 3 WORD 4	LP_MciIn-dnIn34_p	-
rSpeedOverrideSet WORD	WORD 5	LP_MciIn-W5	
rFreeCtrl_1 WORD	WORD 6	LP_MciIn-W6	
rProfilNumberSet WORD	-		

8.6.2 Output data of the Lenze devices (port assignment) - TA "TablePositioning" V2

FB outputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveError BOOL	WORD 1	LPortStatus1	Bit 0
xDriveWarning BOOL			Bit 9
xDriveReady BOOL			Bit 2
xDriveEnabled BOOL			NOT Bit 1
xDriveQSPActive BOOL			Bit 3
xSpeedEqZero BOOL			Bit 4
xHomingActive BOOL			Bit 5
xHomingDone BOOL			Bit 6
xHomePosAvailable BOOL			Bit 7
xManualActive BOOL			Bit 8
xProfileActive BOOL			Bit 10
xProfileDone BOOL			Bit 11
xProfileInTarget BOOL			Bit 12
xHW_LimitSwitchPos BOOL			Bit 14
xHW_LimitSwitchNeg BOOL			Bit 15
xFreeState_[1...8] BOOL	WORD 6	LPortStatus2	Bit 0...7
rPositionActual WORD	WORD 3 WORD 4	LPort32Out1	-
rSpeedActual WORD	WORD 2	LPort16Out1	
wFreeState_1 WORD	WORD 5	LPort16Out2	

Used output port TA "TablePositioning" V2 - 9400 HighLine

1. LPortStatus1
2. LPort16Out1
3. LPort32Out1
4. LPort16Out2
5. LPortStatus2
6. LPort16Out3 (is not evaluated by the FB, is optional.)

FB outputs 8400 motec/protec Stateline/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveError BOOL	WORD 1	LP_MciOut-W1	Bit 0
xDriveWarning BOOL			Bit 15
xDriveReady BOOL			Bit 4
xDriveEnabled BOOL			NOT Bit 3
xDriveQSPActive BOOL			Bit 14
xSpeedEqZero BOOL			Bit 11
xHomingActive BOOL			Bit 9
xHomingDone BOOL			Bit 6
xHomePosAvailable BOOL			Bit 10
xManualActive BOOL			-
xProfileActive BOOL			Bit 9
xProfileDone BOOL			Bit 7
xProfileInTarget BOOL			Bit 8
xHW_LimitSwitchPos BOOL			Bit 12
xHW_LimitSwitchNeg BOOL			Bit 13
xFreeState_[1...8] BOOL	WORD 2	LP_MciOut-W2	Bit 0...7
rPositionActual WORD	WORD 3 WORD 4	LP_MciOut_dnOut34_p	
rSpeedActual WORD	WORD 5	LP_MciOut-W5	-
wFreeState_1 WORD	WORD 6	LP_MciOut-W6	

8.7 LCB_TablePositioning_V3

This description applies to the following FBs:

- »STEP 7«: **FB418 LCB_TablePositioning_V3**,
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_TablePositioning_V3**

This FB controls the Servo Drives 9400 HighLine and Inverter Drives 8400 protec/HighLine/TopLine in the **table positioning** mode with freely applicable variables.

It **cannot** be used together with the inverter i550.

Communication is possible via the bus systems PROFIBUS and PROFINET.

For a correct function of the FB, load the matching device application on the inverter using the »Engineer«. The matching application is included in the S7-Application Sample.

- Free binary inputs/outputs: 16
- Free word input/output: 5 (32-bit values for the Servo Drives 9400 HighLine are marked with "_LW/_HW").

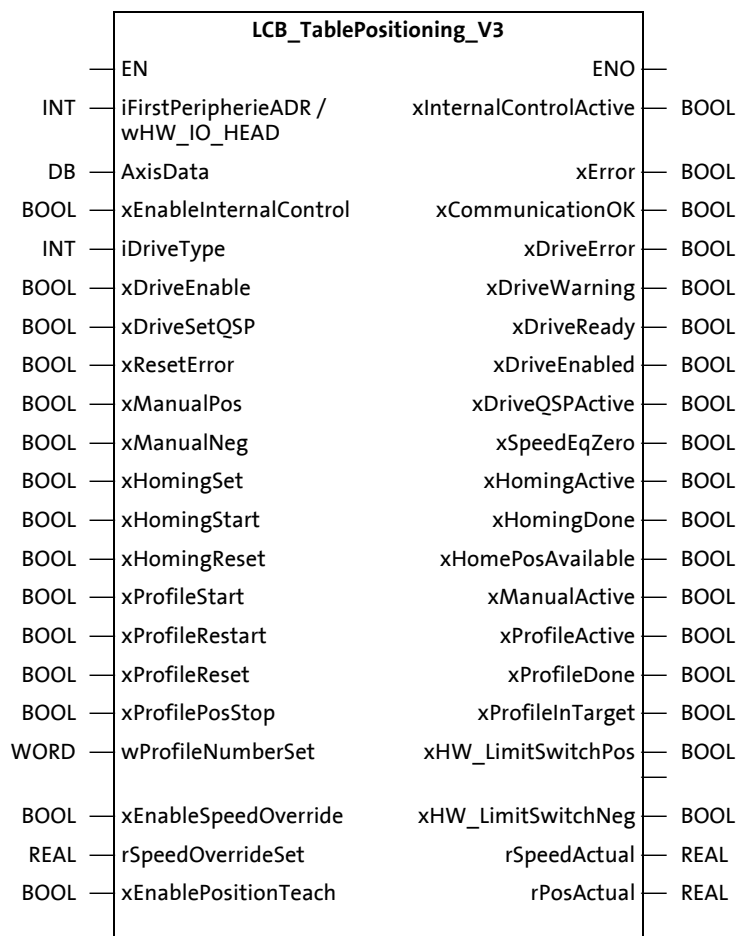
The required process data width depends on the device.

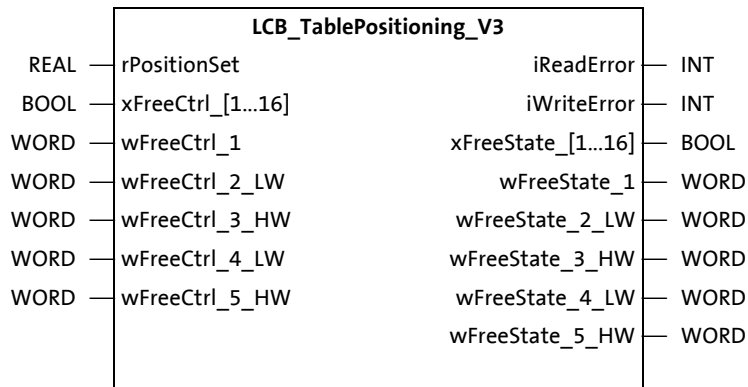
- Device series 8400: Ten process data words
- Device series 9400: Eleven process data words

Information on bit assignment in the »Engineer« sample project:

► [Input data of the Lenze devices \(port assignment\) - TA "TablePositioning" V3](#) (81)

► [Output data of the Lenze devices \(port assignment\) - TA "TablePositioning" V3](#) (85)





Inputs

Identifier/data type	Information/possible settings	
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).	
AxisData DB	Instance block of the FB LCB_SetAxisData . ▶ LCB_SetAxisData - machine parameters (96)	
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block via ... • the variables of the instance data block <u>or</u> • the variable table.	
iDriveType INT	Select Lenze inverter • 2: 8400 (protec/HighLine/TopLine) • 11: 9400 HighLine	
xDriveEnable BOOL	TRUE: Deactivate controller inhibit (inverted)	
xDriveSetQSP BOOL	TRUE: Activate quick stop	
xResetError BOOL	TRUE: Reset error message (acknowledged)	
xManualPos BOOL	TRUE: Manual jog in positive direction (CW rotation)	
xManualNeg BOOL	TRUE: Manual jog in negative direction (CCW rotation)	
xHomingSet BOOL	TRUE: Set home position	
xHomingStart BOOL	Start homing	
xHomingReset BOOL	Reset home position	
xProfileStart BOOL	Start/stop positioning	
	TRUE	Start/restart positioning • The profile with the profile number selected via <i>wProfileNumberSet</i> is executed. • Note: During an active positioning process, another profile can already be defined via <i>wProfileNumberSet</i> which will be executed after the restart (renewed state change "0" to "1"). • A previously cancelled positioning process is continued.
	FALSE	• Cancel the active positioning process.

Identifier/data type		Information/possible settings
xProfileRestart	BOOL	FALSE↗TRUE Update of the profile data of a currently active profile considering the distance already covered.
xProfileReset	BOOL	FALSE↗TRUE A profile previously aborted cannot be continued anymore. • When <i>xProfileStart</i> = TRUE: Restart of a profile.
xProfilePosStop	BOOL	FALSE↗TRUE Positive edge. Stop function of the running positioning process. • When <i>xProfileStart</i> = TRUE: Restart of a profile.
wProfileNumberSet	WORD	Profile number of the profile to be executed of the profile data management • 9400 (1...75) • 8400 (3...15),
xEnableSpeedOverride	BOOL	TRUE: Switch on speed "override". "Override" means changing profile parameters and their transfer during the positioning process.
rSpeedOverrideSet	REAL	Value for speed override in [%] • 0...199.99 %
xEnablePositionTeach	BOOL	TRUE: Activate "Teach" function to enable the transfer of the position default to the variable table.
rPositionSet	REAL	Position selection in [Units]
xFreeCtrl_[1...16]	BOOL	Freely assignable bits. • LW: "Low Word" • HW: "High Word" Information on bit assignment: ▶ Input data of the Lenze devices (port assignment) - TA "TablePositioning" V3 (□ 81)
wFreeCtrl_1	WORD	
wFreeCtrl_2_LW	WORD	
wFreeCtrl_3_HW	WORD	
wFreeCtrl_4_LW	WORD	
wFreeCtrl_5_HW	WORD	
wFreeCtrl_5_HW	WORD	

Outputs

Identifier/data type		Information/possible settings
xInternalControlActive	BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. This serves to control the inverter via the visualisation.
xError	BOOL	Status signal "Fault"
		FALSE Conversion carried out without errors
		TRUE Error during the conversion
xCommunicationOk	BOOL	Status of bus communication
		FALSE No bus communication active
		TRUE Bus communication available
xDriveError	BOOL	Status signal "Error in the inverter"
xDriveWarning	BOOL	TRUE: Inverter is in "Warning" device state
xDriveReady	BOOL	Status signal "Inverter is ready for operation"
xDriveEnabled	BOOL	TRUE: Inverter has been enabled
xDriveQSPActive	BOOL	TRUE: "Quick stop active"

Identifier/data type		Information/possible settings
xSpeedEqZero	BOOL	TRUE: Speed is zero.
xHomingActive	BOOL	Status signal "Homing activated"
xHomingDone	BOOL	Status signal "Homing completed"
xHomePosAvailable	BOOL	Status signal "Home position is known"
xManualActive	BOOL	Status signal "Manual jog active"
xProfileActive	BOOL	Status signal "Positioning active"
xProfileDone	BOOL	Status signal "Positioning completed"
xProfileInTarget	BOOL	Status signal "Target position reached"
xHW_LimitSwitchPos	BOOL	Positive hardware limit switch
xHW_LimitSwitchNeg	BOOL	Negative hardware limit switch
rSpeedActual	REAL	Current speed of the motor shaft in [%] • Value range: -199.99...199.99%
rPositionActual	REAL	Current position in [Units]
iReadError	INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (□ 97)
iWriteError	INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (□ 97)
xFreeState_[1...16]	BOOL	Freely assignable bit. Freely usable status word. • LW: "Low Word" • HW: "High Word" Information on bit assignment: ▶ Output data of the Lenze devices (port assignment) - TA "TablePositioning" V3 (□ 85)
wFreeState_1	WORD	
wFreeState_[2_LW...5_HW]	WORD	

8.7.1 Input data of the Lenze devices (port assignment) - TA "TablePositioning" V3

FB inputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveEnable BOOL	WORD 1	LPortControl1	NOT Bit 0
xDriveSetQSP BOOL			Bit 1
xResetError BOOL			Bit 10
xManualPos BOOL			Bit 14
xManualNeg BOOL			Bit 15
xHomingSet BOOL			Bit 12
xHomingStart BOOL			Bit 3
xHomingReset BOOL			Bit 4
xProfileStart BOOL			Bit 5 Bit 6
xProfileRestart BOOL			Bit 7
xProfileReset BOOL			Bit 6 Bit 7
xProfilePosStop BOOL			Bit 8
xEnableSpeedOverride BOOL			Bit 9
xEnablePosTeach BOOL			Bit 2
wProfileNumberSet.Bit0 BOOL			-
wProfileNumberSet.Bit1 BOOL			
wProfileNumberSet.Bit2 BOOL			
wProfileNumberSet.Bit3 BOOL			
xFreeCtrl_1 BOOL	WORD 6	LPortControl2	Bit 0
xFreeCtrl_[2...16] BOOL			Bit 1...15

Identifier/data type		Process data	Port	Assignment
rPositionSet	WORD	WORD 3 WORD 4	LPort32In1	-
rSpeedOverrideSet	WORD	WORD 2	LPort16In1	
rFreeCtrl_1	WORD	WORD 7	LPort16In3	
rFreeCtrl_2_LW	WORD	WORD 8	LPort32In2	
rFreeCtrl_3_HW	WORD	WORD 9		
rFreeCtrl_4_LW	WORD	WORD 10	LPort32In3	
rFreeCtrl_5_HW	WORD	WORD 11		
wProfilNumberSet	WORD	WORD 5	LPort16In2	

Used input port TA "TablePositioning" V3 - 9400 HighLine

1. LPortControl1
2. LPort16In1
3. LPort32In1
4. LPort16In2
5. LPortControl2
6. LPort16In3
7. LPort32In2
8. LPort32In3

FB inputs 8400 motec/protec StateLine/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveEnable BOOL	WORD 1	LP_MciIn-W1	Bit 3
xDriveSetQSP BOOL			Bit 15
xResetError BOOL			Bit 11
xManualPos BOOL			Bit 12
xManualNeg BOOL			Bit 13
xHomingSet BOOL			Bit 10
xHomingStart BOOL			Bit 8
xHomingReset BOOL			Bit 14
xProfileStart BOOL			Bit 2 Bit 8
xProfileRestart BOOL			Bit 1
xProfileReset BOOL			-
xProfilePosStop BOOL			Bit 0 Bit 1 Bit 8
xEnableSpeedOverride BOOL			Bit 9
xEnablePosTeach BOOL			Bit 2
wProfileNumberSet.Bit0 BOOL			Bit 4
wProfileNumberSet.Bit1 BOOL			Bit 5
wProfileNumberSet.Bit2 BOOL			Bit 6
wProfileNumberSet.Bit3 BOOL			Bit 7
xFreeCtrl_1 BOOL	WORD 2	LP_MciIn-W2	Bit 0
xFreeCtrl_[2...16] BOOL			Bit 1...15

Identifier/data type	Process data	MCI	Assignment
rPositionSet WORD	WORD 3 WORD 4	LP_MciIn-dnIn34_p	-
rSpeedOverrideSet WORD	WORD 5	LP_MciIn-W5	
rFreeCtrl_1 WORD	WORD 6	LP_MciIn-W6	
rFreeCtrl_2_LW WORD	WORD 7	LP_MciIn-W7	
rFreeCtrl_2_HW WORD	WORD 8	LP_MciIn-W8	
rFreeCtrl_2_LW WORD	WORD 9	LP_MciIn-W9	
rFreeCtrl_4_HW WORD	WORD 10	LP_MciIn-W10	
wProfilNumberSet WORD			-

8.7.2 Output data of the Lenze devices (port assignment) - TA "TablePositioning" V3

FB outputs - 9400 HighLine

Identifier/data type	Process data	Port	Assignment
xDriveError BOOL	WORD 1	LPortStatus1	Bit 0
xDriveWarning BOOL			Bit 9
xDriveReady BOOL			Bit 2
xDriveEnabled BOOL			NOT Bit 1
xDriveQSPActive BOOL			Bit 3
xSpeedEqZero BOOL			Bit 4
xHomingActive BOOL			Bit 5
xHomingDone BOOL			Bit 6
xHomePosAvailable BOOL			Bit 7
xManualActive BOOL			Bit 8
xProfileActive BOOL			Bit 10
xProfileDone BOOL			Bit 11
xProfileInTarget BOOL			Bit 12
xHW_LimitSwitchPos BOOL			Bit 14
xHW_LimitSwitchNeg BOOL			Bit 15
xFreeState_[1...16] BOOL	WORD 6	LPortStatus2	Bit 0...15
rPositionActual WORD	WORD 3 WORD 4	LPort32Out1	
rSpeedActual WORD	WORD 2	LPort16Out1	
wFreeState_1 WORD	WORD 5	LPort16Out2	
wFreeState_2_LW WORD	WORD 7	LPort32Out2	
wFreeState_3_HW WORD	WORD 8		
wFreeState_4_LW WORD	WORD 9	LPort32Out3	
wFreeState_5_HW WORD	WORD 10		

Used output port TA "TablePositioning" V3 - 9400 HighLine

1. LPortStatus1
2. LPort16Out1
3. LPort32Out1
4. LPort16Out2
5. LPortStatus2
6. LPort16Out3
7. LPort32Out2
8. LPort32Out3

FB outputs 8400 motec/protec Stateline/HighLine/TopLine

Identifier/data type	Process data	MCI	Assignment
xDriveError BOOL	WORD 1	LP_MciOut-W1	Bit 0
xDriveWarning BOOL			Bit 15
xDriveReady BOOL			Bit 4
xDriveEnabled BOOL			NOT Bit 3
xDriveQSPActive BOOL			Bit 14
xSpeedEqZero BOOL			Bit 11
xHomingActive BOOL			Bit 9
xHomingDone BOOL			Bit 6
xHomePosAvailable BOOL			Bit 10
xManualActive BOOL			-
xProfileActive BOOL			Bit 9
xProfileDone BOOL			Bit 7
xProfileInTarget BOOL			Bit 8
xHW_LimitSwitchPos BOOL			Bit 12
xHW_LimitSwitchNeg BOOL			Bit 13
xFreeState_[1...16] BOOL	WORD 2	LP_MciOut-W2	Bit 0...15
rPositionActual WORD	WORD 3 WORD 4	LP_MciOut_dnOut34_p	
rSpeedActual WORD	WORD 5	LP_MciOut-W5	

Identifier/data type		Process data	MCI	Assignment
wFreeState_1	WORD	WORD 6		LP_MciOut-W6
wFreeState_2_LW	WORD	WORD 7		LP_MciOut-W7
wFreeState_3_HW	WORD	WORD 8		LP_MciOut-W8
wFreeState_4_LW	WORD	WORD 9		LP_MciOut-W9
wFreeState_5_HW	WORD	WORD 10		LP_MciOut-W10

8.8 LCB_8400Drive16Word

This description applies to the following FBs:

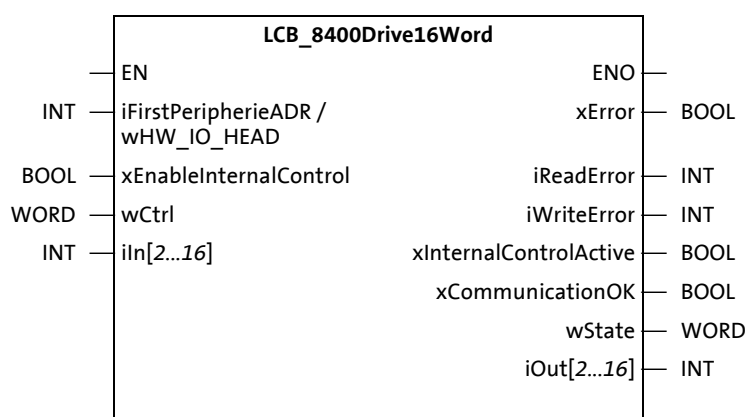
- »STEP 7«: **FB420 LCB_8400Drive16Word**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_8400Drive16Word**

This FB serves to control an inverter of the 8400 device series with maximally **16 process data words**.



Note!

The FB only functions if the process width **16 constant words** has been selected in the »HW config« of »STEP 7« and in the »TIA Portal«!



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
wCtrl WORD	MCI control word (8400 device series)
iIn[2...16] INT	Process input data word [2...16]

Outputs

Identifier/data type	Information/possible settings	
xError BOOL	Status signal "Fault"	
iReadError INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (97)	
iWriteError INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (97)	
xInternalControlActive BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. • This serves to control the inverter via the visualisation.	
xCommunicationOK BOOL	Status of bus communication	
	FALSE	No bus communication active
	TRUE	Bus communication available
wState WORD	MCI control word (8400 device series)	
iOut[2...16] INT	Process output data word [2...16]	

8.9

LCB_8400Drive4Word

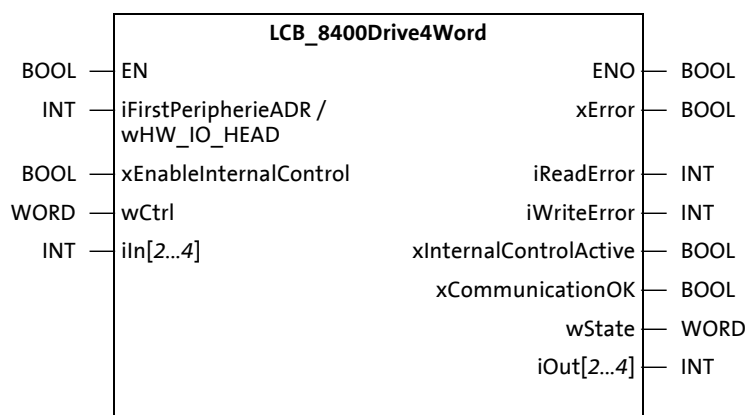
This description applies to the following FBs:

- »STEP 7«: **FB423 LCB_8400Drive4Word**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_8400Drive4Word**

This FB serves to control an inverter of the 8400 device series with maximally **4 process data words**.

**Note!**

The FB only functions if the process width **four constant words** has been selected in the »HW config« of »STEP 7« and in the »TIA Portal«!

**Inputs**

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
wCtrl WORD	MCI control word (8400 device series)
iIn[2...4] INT	Process input data word [2...4]

Outputs

Identifier/data type		Information/possible settings	
xError	BOOL	Status signal "Fault"	
		FALSE	Conversion carried out without errors
		TRUE	Error during the conversion
iReadError	INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (97)	
iWriteError	INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (97)	
xInternalControlActive	BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. • This serves to control the inverter via the visualisation.	
xCommunicationOK	BOOL	Status of bus communication	
		FALSE	No bus communication active
		TRUE	Bus communication available
wState	WORD	MCI control word (8400 device series)	
iOut[2...4]	INT	Process output data word [2...4]	

8.10 LCB_8400Drive8Word

This description applies to the following FBs:

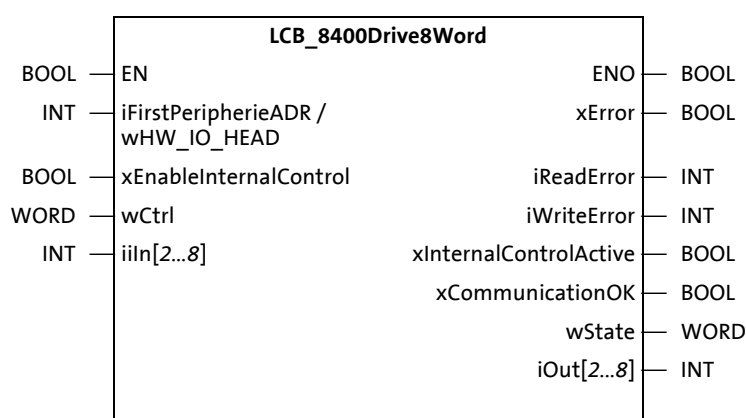
- »STEP 7«: **FB422 LCB_8400Drive8Word**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_8400Drive8Word**

This FB serves to control an inverter of the 8400 device series with maximally **8 process data words**.



Note!

The FB only functions if the process width **eight constant words** has been selected in the »HW config« of »STEP 7« and in the »TIA Portal«!



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
wCtrl WORD	MCI control word (8400 device series)
iIn[2...8] INT	Process input data word [2...8]

Outputs

Identifier/data type	Information/possible settings	
xError BOOL	Status signal "Fault"	
iReadError INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (97)	
iWriteError INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (97)	
xInternalControlActive BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. • This serves to control the inverter via the visualisation.	
xCommunicationOK BOOL	Status of bus communication	
	FALSE	No bus communication active
	TRUE	Bus communication available
wState WORD	MCI control word (8400 device series)	
iOut[2...8] INT	Process output data word [2...8]	

8.11 LCB_8400Drive12Word

This description applies to the following FBs:

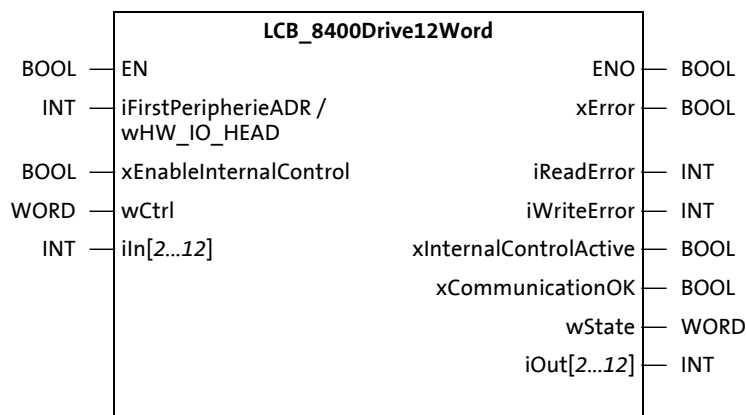
- »STEP 7«: **FB421 LCB_8400Drive12Word**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_8400Drive12Word**

This FB serves to control an inverter of the 8400 device series with maximally **12 process data words**.



Note!

The FB only functions if the process width **12 constant words** has been selected in the »HW config« of »STEP 7« and in the »TIA Portal«!



Inputs

Identifier/data type	Information/possible settings
iFirstPeripherieADR / wHW_IO_HEAD INT	I/O address of the node (assignment in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xEnableInternalControl BOOL	TRUE: Deactivate all inputs of the block. <ul style="list-style-type: none"> • This serves to directly control the block ... • ... via the variables of the instance data block or • ... via the variable table.
wCtrl WORD	MCI control word (8400 device series)
iIn[2...12] INT	Process input data word [2...12]

Outputs

Identifier/data type	Information/possible settings	
xError BOOL	Status signal "Fault"	
iReadError INT	Error code from the SFC block 14. ▶ SFC 14 DPRD_DAT DP (97)	
iWriteError INT	Error code from the SFC block 15. ▶ SFC 15 DPWR_DAT DP (97)	
xInternalControlActive BOOL	TRUE: The output signals that the <i>xEnableInternalControl</i> input and the Internal Control button of the visualisation have been activated. • This serves to control the inverter via the visualisation.	
xCommunicationOK BOOL	Status of bus communication	
	FALSE	No bus communication active
	TRUE	Bus communication available
wState WORD	MCI control word (8400 device series)	
iOut[2...12] INT	Process output data word [2...12]	

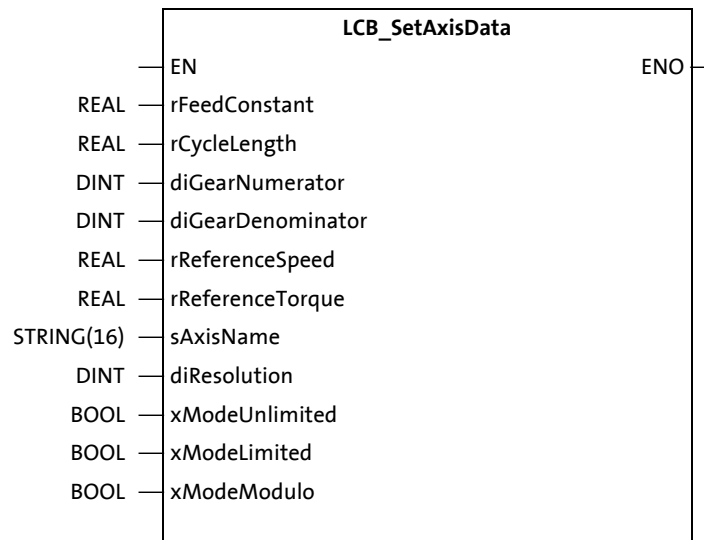
8.12 LCB_SetAxisData - machine parameters

This description applies to the following FBs:

- »STEP 7«: **FB443 LCB_SetAxisData**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_SetAxisData**

With this FB the machine parameters of a higher-level drive can be mapped. The FB conditions the machine parameters, which you specify in the physical units of the machine via parameters, for the internal representation.

- At the AxisData input of [LCB_TablePositioning_V2](#) FB the instance data block of the [LCB_SetAxisData - machine parameters](#) has to be entered.



Inputs

Identifier/data type	Information/possible settings
rFeedConstant REAL	Feed constant (required selection for LCB_xxx_TablePositioning_Vx) • Initialisation: 360.0 units
rCycleLength REAL	Cycle • Initialisation: 360.0 units
diGearNumerator DINT	Gearbox factor numerator (required selection for LCB_xxx_TablePositioning_Vx) • Initialisation: 1
diGearDenominator DINT	Gearbox factor denominator (required selection for LCB_xxx_TablePositioning_Vx) • Initialisation: 1
rReferenceSpeed REAL	Reference speed
rReferenceTorque REAL	Reference torque
sAxisName STRING(16)	Axis name
diResolution DINT	Resolution of one revolution in bits (can only be changed for 9400 HighLine, required for LCB_xxx_TablePositioning_Vx) Initialisation: 16
xModeUnlimited BOOL	Traversing range unlimited

Identifier/data type		Information/possible settings
xModelimited	BOOL	Traversing range limited
xModeModulo	BOOL	Traversing range modulo

8.13**SFC 14 DPRD_DAT DP**

This description applies to the function in »STEP 7«

- System function for reading of consistent data of a DP standard node/PROFINET IO device.
- This serves to consistently exchange the process data between PROFIBUS/PROFINET master and »STEP 7« PLC program.

8.14**SFC 15 DPWR_DAT DP**

This description applies to the function in »STEP 7«

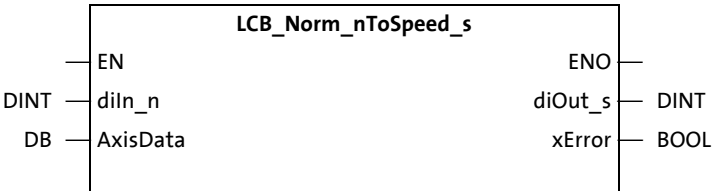
- System function for writing consistent data to a DP standard node/PROFINET IO device.
- This serves to consistently exchange the process data between PROFIBUS/PROFINET master and »STEP 7« PLC program.

8.15 LCB_Norm_nToSpeed_s - signal converter

This description applies to the following FBs:

- »STEP 7«: **FB432 LCB_Norm_nToSpeed_s**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_nToSpeed_s**

This FB converts the 32 bit input signal into a 32 bit speed signal.



Inputs

Identifier/data type	Information/possible settings
diIn_n DINT	Input signal 100 % = $2^{30} = 1073741824$
AxisData DB	Instance block of the FB LenzeSetAxisData . ▶ LCB_SetAxisData - machine parameters (□ 96)

Outputs

Identifier/data type	Information/possible settings
diOut_s DINT	Output signal in [rpm] 15000 rpm = $2^{26} = 67108864$
xError BOOL	Status signal "Fault"
	FALSE Conversion carried out without errors
	TRUE Error during the conversion

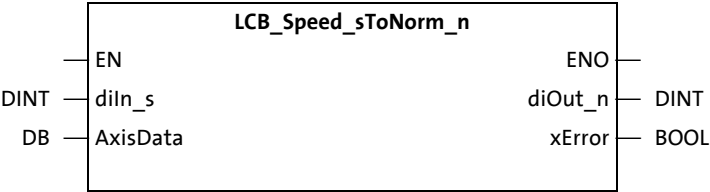
8.16

LCB_Speed_sToNorm_n - signal converter

This description applies to the following FBs:

- »STEP 7«: **FB435 LCB_Speed_sToNorm_n**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_Speed_sToNorm_n**

This FB converts the input signal into a 32-bit signal.



Inputs

Identifier/data type	Information/possible settings
diIn_s DINT	Input signal in [rpm] 15000 rpm = $2^{26} = 67108864$
AxisData DB	Instance block of the FB LCB_SetAxisData . ▶ LCB_SetAxisData - machine parameters (📖 96)

Outputs

Identifier/data type	Information/possible settings
diOut_n DINT	Output signal in [%] 100% = $2^{30} = 1073741824$
xError BOOL	Status signal "Fault"
	FALSE Conversion carried out without errors
	TRUE Error during the conversion

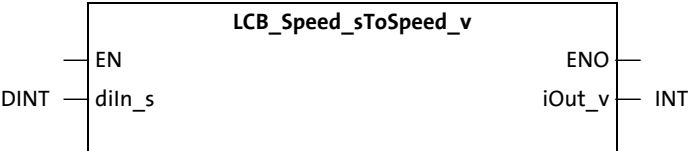
8.17

LCB_Speed_sToSpeed_v - signal converter

This description applies to the following FBs:

- »STEP 7«: **FB436 LCB_Speed_sToSpeed_v**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_Speed_sToSpeed_v**

This FB converts a 32 bit speed signal into a 16 bit speed signal.



Inputs

Identifier/data type	Information/possible settings
diIn_s DINT	Input signal in [rpm] 15000 rpm $\equiv 2^{26} = 67108864$

Outputs

Identifier/data type	Value/meaning
iOut_v INT	Output signal in [rpm]

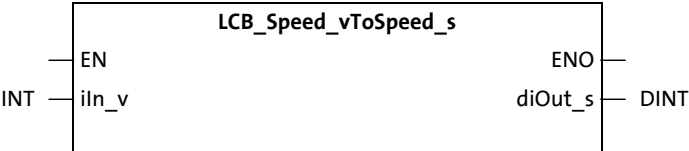
8.18

LCB_Speed_vToSpeed_s - signal converter

This description applies to the following FBs:

- »STEP 7«: **FB437 LCB_Speed_vToSpeed_s**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_Speed_vToSpeed_s**

This FB converts a 16 bit speed signal into a 32 bit speed signal.



Inputs

Identifier/data type	Information/possible settings
iln_v INT	Input signal in [rpm] 15000 rpm = $2^{14} = 16384$

Outputs

Identifier/data type	Value/meaning
diOut_s DINT	Output signal in [rpm] 15000 rpm = $2^{26} = 67108864$

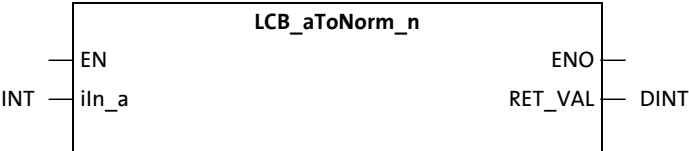
8.19

LCB_Norm_aToNorm_n - signal converter

This description applies to the following functions:

- »STEP 7«: **FC430 LCB_Norm_aToNorm_n**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_Norm_aToNorm_n**

This function converts a 16 bit input signal into a 32 bit output signal.



Inputs

Identifier/data type	Information/possible settings
iln_a INT	$\pm 199.99\% = \pm 2^{15} = \pm 32767$

Outputs

Identifier/data type	Information/possible settings
RET_VAL DINT	$100\% = 2^{30} = 1073741824$

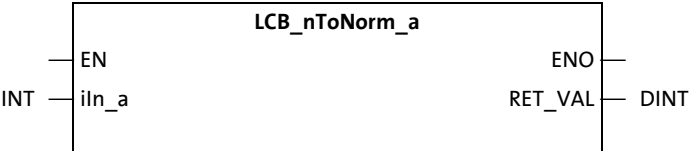
8.20

LCB_Norm_nToNorm_a - signal converter

This description applies to the following functions:

- »STEP 7«: **FC431 LCB_Norm_nToNorm_a**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_Norm_nToNorm_a**

This function converts a 32 bit input signal into a 16 bit output signal.



Inputs

Identifier/data type	Information/possible settings
diln_n INT	Input signal 100 % = $2^{30} = 1073741824$

Outputs

Identifier/data type	Information/possible settings
RET_VAL DINT	100 % = $2^{14} = 16384$

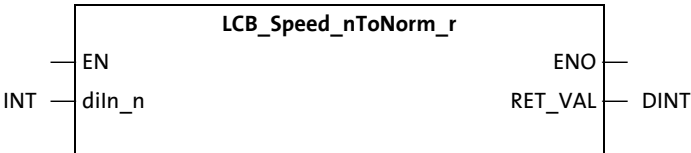
8.21

LCB_Speed_nToNorm_r - signal converter

This description applies to the following FBs:

- »STEP 7«: **FC433 LCB_Speed_nToNorm_r**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_Speed_nToNorm_r**

This function converts a 32 bit input signal into a 32 bit percentage signal.



Inputs

Identifier/data type	Information/possible settings
diIn_n INT	Input signal in [%] 100 % = $2^{30} = 1073741824$

Outputs

Identifier/data type	Information/possible settings
RET_VAL DINT	Output signal in [rpm] 15000 rpm = $2^{26} = 67108864$

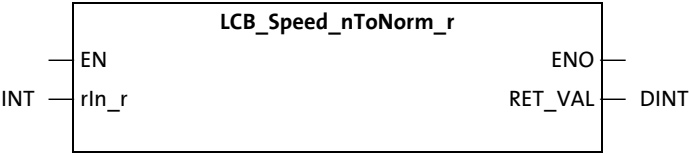
8.22

LCB_Speed_rToNorm_n - signal converter

This description applies to the following functions:

- »STEP 7«: FC434 LCB_Speed_rToNorm_n
- »TIA Portal«: LCB_300/LCB_12x/LCB_15x_Speed_rToNorm_n

This function converts the transferred input signal into a 32-bit signal of DINT data type.



Inputs

Identifier/data type	Information/possible settings
rIn_r INT	Input signal 0-100.0 %

Outputs

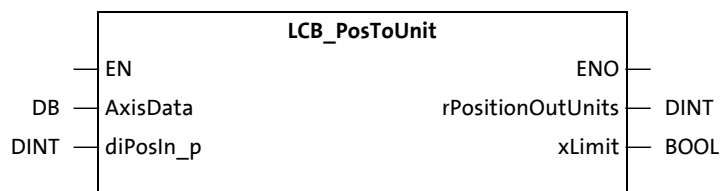
Identifier/data type	Information/possible settings
RET_VAL DINT	$0 - 2^{30} = 1073741824$

8.23 LCB_PosToUnit - conversion block

This description applies to the following FBs:

- »STEP 7«: **FB441 LCB_PosToUnit**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_PosToUnit**

This FB uses the transmitted machine parameters and converts a position defined in the internal unit [inc] into a position in the real unit of the machine.



Inputs

Identifier/data type	Information/possible settings
AxisData DB	Instance block of the FB LCB_SetAxisData . ▶ LCB_SetAxisData - machine parameters (□ 96)
diPosIn_p DINT	Position in [increments]

Outputs

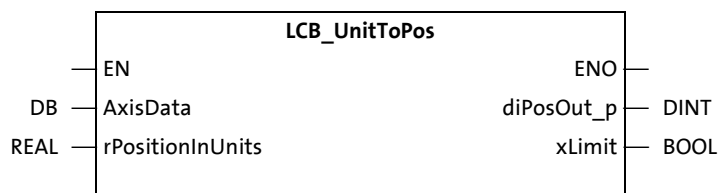
Identifier/data type	Information/possible settings
rPositionOutUnits DINT	Position in [unit] Output in "e4" format (fixed point with four decimal positions)
xLimit BOOL	"Output signal is limited" status <ul style="list-style-type: none"> • TRUE: The output signal is limited to the representable value range ± 214748.3647.

8.24 LCB_UnitToPos - conversion block

This description applies to the following FBs:

- »STEP 7«: **FB444 LCB_UnitToPos**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_UnitToPos**

This FB converts a position value specified in the real unit of the machine into an internal position value on the basis of the machine parameters transmitted.



Inputs

Identifier/data type	Information/possible settings
AxisData DB	Instance block of the FB LCB_SetAxisData. ▶ LCB_SetAxisData - machine parameters (p. 96)
rPositionInUnits REAL	Position in [unit] Selection in "e4" view (fixed point with four decimal positions)

Outputs

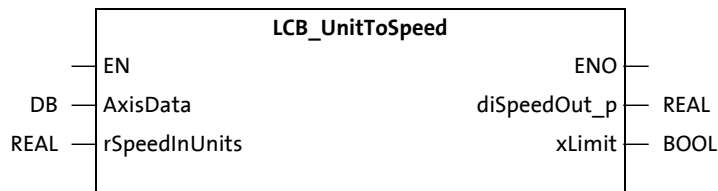
Identifier/data type	Information/possible settings
diPosOut_p DINT	Position in [increments]
xLimit BOOL	"Output signal is limited" status <ul style="list-style-type: none"> • TRUE: The output signal is limited to the representable value range ± 214748.3647.

8.25 LCB_UnitToSpeed - conversion block

This description applies to the following FBs:

- »STEP 7«: **FB445 LCB_UnitToSpeed**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_UnitToSpeed**

This FB converts the transmitted speed value of the real machine into an internal speed value.



Inputs

Identifier/data type	Information/possible settings
AxisData DB	Instance block of the FB LCB_SetAxisData . ▶ LCB_SetAxisData - machine parameters (□ 96)
rSpeedInUnits REAL	Position in [unit] Selection in "e4" view (fixed point with four decimal positions)

Outputs

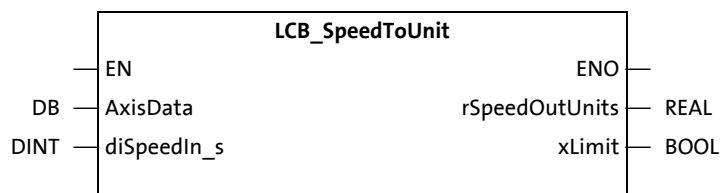
Identifier/data type	Information/possible settings
diSpeedOut_p DINT	Position in [increments]
xLimit BOOL	"Output signal is limited" status • TRUE: The output signal is limited to the representable value range.

8.26 LCB_SpeedToUnit - conversion block

This description applies to the following FBs:

- »STEP 7«: **FB442 LCB_SpeedToUnit**
- »TIA Portal«: **LCB_300/LCB_12x/LCB_15x_SpeedToUnit**

This FB converts a speed value specified in the internal unit [rpm] into a speed value in the real unit of the machine on the basis of the machine parameters transmitted.



Inputs

Identifier/data type	Information/possible settings
AxisData DB	Instance block of the FB LCB_SetAxisData. ▶ LCB_SetAxisData - machine parameters (p. 96)
diSpeedIn_s DINT	Velocity as speed in [rpm] $15000 \text{ rpm} = 2^{26} = 67108864$

Outputs

Identifier/data type	Value/meaning
rSpeedOutUnits REAL	Speed in [unit/s] • Output in "e4" format (fixed point with four decimal positions)
xLimit BOOL	"Output signal is limited" status • TRUE: The output signal is limited to the representable value range ± 214748.3647 .

9 The "LenzeDriveCommunication" library

9.1 Overview of the functions and function blocks

9 The "LenzeDriveCommunication" library

This LenzeDriveCommunication library...

- ...contains function blocks for processing parameters.
- ...is available for the Siemens software »STEP 7« and »TIA Portal«.

9.1 Overview of the functions and function blocks



Note!

The FBs of this library have to be used separately. It is not possible to use several FBs at the same time for accessing parameters of the Controller!

The LenzeDriveCommunication library contains the Siemens system functions (SFB) 52/53. When these blocks are used, you have to observe the maximally possible number of calls that can be used in parallel. Depending on the Siemens-CPU used, a different number of calls is possible. More information can be found in the technical data of the Siemens-CPU.

In »STEP 7«: The "LenzeDriveCommunication" library: Step_7_300_400

Use the library for the following target systems: SIMATIC S7 300/S7 400.

Lenze DriveCommunication		DPV1_Parameter
DPV1_Parameter		
FB300 DCO_ReadDriveParameter DCO		FB300 ▶ DCO_ReadDriveParameter (113)
FB301 DCO_WriteDriveParameter DCO		FB301 ▶ DCO_WriteDriveParameter (115)
FB302 DCO_ReadDriveArray32b DCO		FB302 ▶ DCO_ReadDriveArray32b (121)
FB303 DCO_ReadDriveArray16b DCO		FB303 ▶ DCO_ReadDriveArray16b (119)
FB304 DCO_ReadDriveArray8b DCO		FB304 ▶ DCO_ReadDriveArray8b (117)
FB306 DCO_ReadDriveParamString DCO		FB306 ▶ DCO_ReadDriveParamString (123)
FB308 DCO_WriteDriveArray32b DCO		FB308 ▶ DCO_WriteDriveArray32b (129)
FB309 DCO_WriteDriveArray16b DCO		FB309 ▶ DCO_WriteDriveArray16b (127)
FB310 DCO_WriteDriveArray8b DCO		FB310 ▶ DCO_WriteDriveArray8b (125)
FB312 DCO_R_W_n_DrivePar DCO		FB312 ▶ DCO_R_W_n_DrivePar (131)
FC307 CONCAT IEC		FC307 ▶ FC307 CONCAT (133)
SFB4 TON IEC_TC		SFB4 ▶ SFB4 TON IEC_TC (134)
SFB52 RDREC DP		SFB52 ▶ SFB52 RDREC DP (134)
SFB53 WRREC DP		SFB53 ▶ SFB53 WRREC (134)

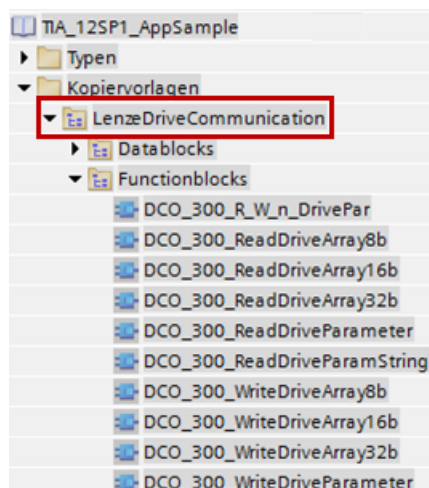
[9-1] The LenzeDriveCommunication library in »STEP 7«

- The initials "FBxxx" indicate function blocks.
- The initials "FCxxx" indicate functions.
- The initials "SFBxxx" indicate function blocks for system functions.

In »TIA Portal«: The "LenzeDriveCommunication" library

The library is available for the following libraries and target systems:

Library	Target system
TIA_S7_300_400	SIMATIC S7 300/400
TIA_S7_1200	SIMATIC S7 12xx
TIA_S7_1500,	SIMATIC S7 15xx



Function blocks

- ▶ [DCO_R_W_n_DrivePar](#) (131)
- ▶ [DCO_ReadDriveArray8b](#) (117)
- ▶ [DCO_ReadDriveArray16b](#) (119)
- ▶ [DCO_ReadDriveArray32b](#) (121)
- ▶ [DCO_ReadDriveParameter](#) (113)
- ▶ [DCO_ReadDriveParamString](#) (123)
- ▶ [DCO_WriteDriveArray8b](#) (125)
- ▶ [DCO_WriteDriveArray16b](#) (127)
- ▶ [DCO_WriteDriveArray32b](#) (129)
- ▶ [DCO_WriteDriveParameter](#) (115)

The contents of the libraries **TIA_S7_300_400**, **TIA_S7_1200** and **TIA_S7_1500** are identical. Use the library which matches the desired target system. The libraries contain the same function blocks as the **LenzeDriveControlBasic** library, thus, the inputs/outputs of the function blocks and the operating mode are identical.

[9-2] Example: The LenzeDriveCommunication library in »TIA Portal«



Note!

The following information is required to access the data of the controller:

- Desired access type: Read/Write
- Parameter number (number of the code/subcode)
- Scaling of the parameter (the number of decimal positions makes the factor). The scaling can be between the factor 1 (parameter has no decimal position) and factor 10 000 (four decimal positions).
- The data type (one byte, two bytes, four bytes, or string parameters)

All blocks have an *xTimeOut* output which indicates after 10 seconds that a request cannot be executed.

Possible data types of the parameters

Data type	Abbreviation	Decimal	Hexadecimal
Integer 8	INT 8	2	0x02
Integer 16	INT 16	3	0x03
Integer 32	INT 32	4	0x04
Unsigned 8	UINT 8	5	0x05
Unsigned 16	UINT 16	6	0x06
Unsigned 32	UINT 32	7	0x07
Visible String	STRING	9	0x09
OCTET string	STRING	10	0x0A
Zero		64	0x040
Byte	BYTE	65	0x041
Word	WORD	66	0x042
Double Word	DWORD	67	0x043
Error	-	68	0x044

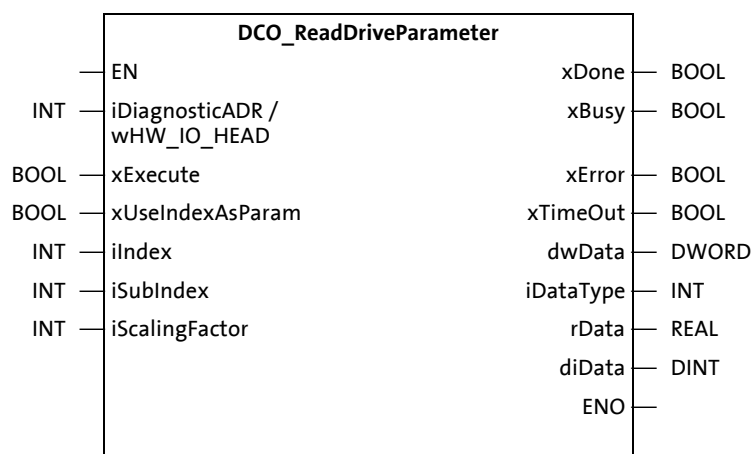
9.2 DCO_ReadDriveParameter

This description applies to the following FBs:

- »STEP 7«: **FB300 DCO_ReadDriveParameter**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_ReadDriveParameter**

This FB reads the parameters of a Lenze inverter and provides them to the application.

- Parameter values of max. 32 bits can be read.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- **S7 VAT ReadDriveParameter**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParam BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be read
iSubIndex INT	Subindex number of the parameter to be read
iScalingFactor INT	Scaling factor for the output of the read value. <ul style="list-style-type: none"> • Can be taken from the table of attributes. • Standard setting = "1"

Outputs

Identifier/data type		Information/possible settings
xDone	BOOL	Read operation completed
xBusy	BOOL	Read operation active
xError	BOOL	Error during read operation
xTimeOut	BOOL	Is TRUE if a job has not been processed after 10 seconds.
dwData	DWORD	Read parameter value (data type: DWORD) If an error occurred during the read operation, this output shows the corresponding error code.
iDataType	INT	Data type of the read parameter value. ▶ Possible data types of the parameters (112) The return value "68" signals an incorrect read operation. ▶ Error information (wErrorCode) (135)
rData	REAL	Read parameter value scaled as REAL (as single value/ARRAY depending on the FB).
diData	DINT	Read parameter value scaled as DINT (as single value/ARRAY depending on the FB).

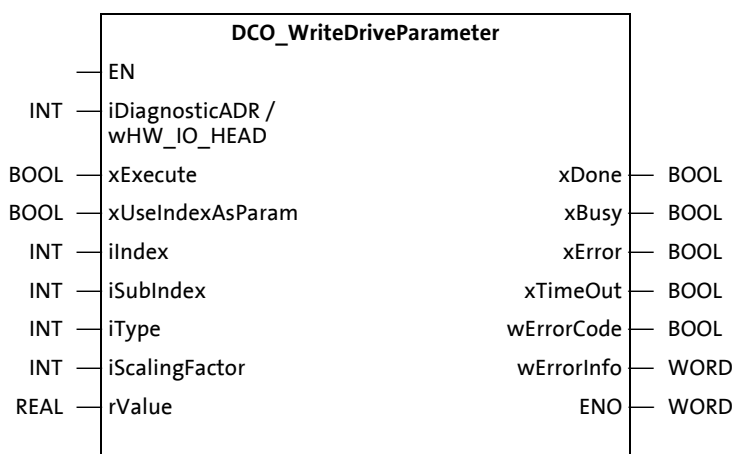
9.3 DCO_WriteDriveParameter

This description applies to the following FBs:

- »STEP 7«: **FB301 DCO_WriteDriveParameter**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_WriteDriveParameter**

This FB writes values into the parameter of a Lenze inverter.

- Parameter values of max. 32 bits can be read.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **WriteDriveParameter**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParam BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be read
iSubIndex INT	First subcode number to be read. <ul style="list-style-type: none"> • Standard setting = "0"
iType INT	Data type of the parameter value to be written. ▶ Possible data types of the parameters (112) <ul style="list-style-type: none"> • The data type must be defined in a decimal way. • Standard setting = "7"

Identifier/data type		Information/possible settings
iScalingFactor	INT	Scaling factor for the output of the read value. <ul style="list-style-type: none"> Can be taken from the table of attributes. Standard setting = "1"
rValue	REAL	Value to be written is scaled as REAL <ul style="list-style-type: none"> The FB scales/converts the value internally via the inputs iType/iScalingFactor.

Outputs

Identifier/data type		Information/possible settings
xDone	BOOL	Write operation completed
xBusy	BOOL	Write operation active
xError	BOOL	Error during write operation
xTimeOut	BOOL	Is TRUE if a job has not been processed after 10 seconds.
wErrorCode	WORD	If an error occurred during the read operation, this output shows the corresponding error code.
wErrorInfo	WORD	Provides additional information on the error if available. ▶ Error information (wErrorCode) (135)

9.4

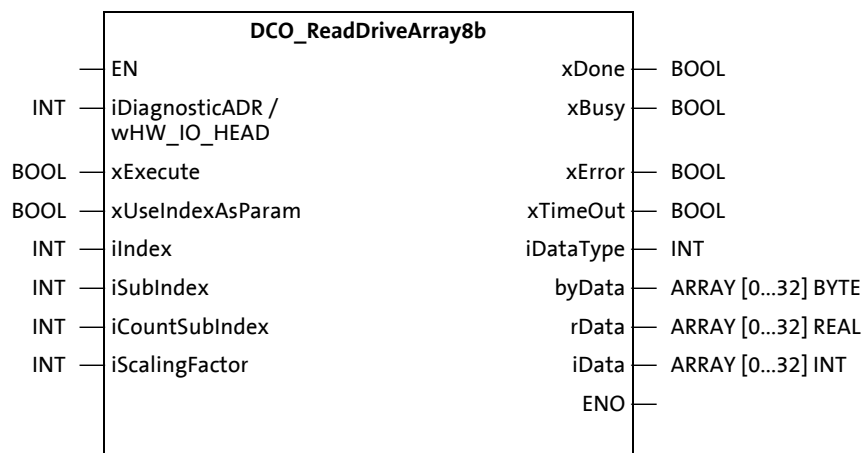
DCO_ReadDriveArray8b

This description applies to the following FBs:

- »STEP 7«: **FB304 DCO_ReadDriveArray8b**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_ReadDriveArray8b**

This FB reads the subcodes of a Lenze inverter (not i550) of 9 bits data type.

- Maximally 32 subcodes can be read.
- Parameter values of max. 8 bits can be read.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **ReadDriveArray8**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParam BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be read
iSubIndex INT	First subcode number to be read. <ul style="list-style-type: none"> • Standard setting = "1"
iCountSubIndex INT	Number of subcodes to be read <ul style="list-style-type: none"> • Standard setting = "32"
iScalingFactor INT	Scaling factor for the output of the read value. <ul style="list-style-type: none"> • Can be taken from the table of attributes. • Standard setting = "1"

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Read operation completed
xBusy BOOL	Read operation active
xError BOOL	Error during read operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
iDataType INT	Data type of the read parameter value. ▶ Possible data types of the parameters (112) <ul style="list-style-type: none"> The return value "68" signals an incorrect read operation. ▶ Error information (wErrorCode) (135)
byData ARRAY [0...32]	Read parameter value (data type: BYTE) <ul style="list-style-type: none"> If an error occurred during the read operation, this output shows the corresponding error code.
rData ARRAY [0...32] REAL	Read parameter value scaled as REAL (as single value/ARRAY depending on the FB).
iData ARRAY [0...32] INT	Read parameter value scaled as INT (as single value/ARRAY depending on the FB).

In the related instance block, the read parameter values are located at the following positions:

Array ...	Position
... byData	DB304.DBB16 - DBB47
... rData	DB304.DBD48 - DBD172
... iData	DB304.DBW176 - DBW300

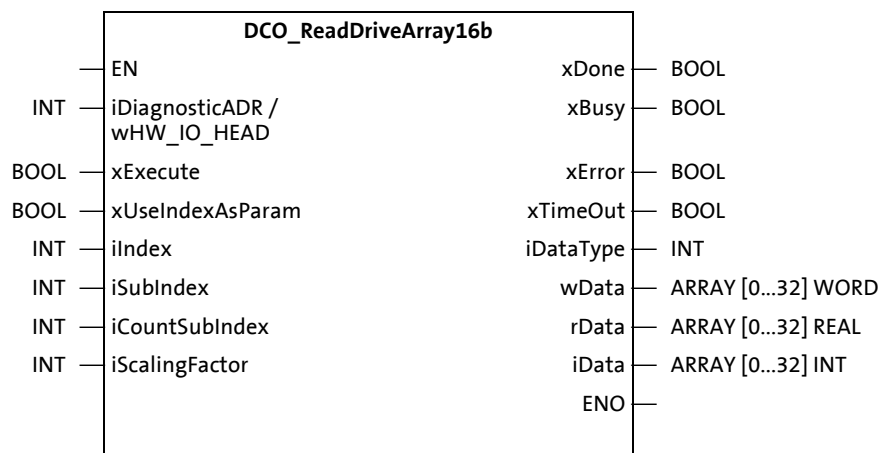
9.5 DCO_ReadDriveArray16b

This description applies to the following FBs:

- »STEP 7«: **FB303 DCO_ReadDriveArray16b**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_ReadDriveArray16b**

This FB reads the subcodes of a Lenze inverter (not i550) of 16 bits data type.

- Maximally 32 subcodes can be read.
- Parameter values of max. 16 bits can be read.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **ReadDriveArray16**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParam BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be read
iSubIndex INT	First subcode number to be read. <ul style="list-style-type: none"> • Standard setting = "1"
iCountSubIndex INT	Number of subcodes to be read <ul style="list-style-type: none"> • Standard setting = "32"
iScalingFactor INT	Scaling factor for the output of the read value. <ul style="list-style-type: none"> • Can be taken from the table of attributes. • Standard setting = "1"

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Read operation completed
xBusy BOOL	Read operation active
xError BOOL	Error during read operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
iDataType INT	Data type of the read parameter value. ▶ Possible data types of the parameters (112) <ul style="list-style-type: none"> The return value "68" signals an incorrect read operation. ▶ Error information (wErrorCode) (135)
wData ARRAY [0...32] WORD	Read parameter value (data type: WORD) <ul style="list-style-type: none"> If an error occurred during the read operation, this output shows the corresponding error code.
rData ARRAY [0...32] REAL	Read parameter value scaled as REAL (as single value/ARRAY depending on the FB).
iData ARRAY [0...32] INT	Read parameter value scaled as INT (as single value/ARRAY depending on the FB).

In the related instance block, the read parameter values are located at the following positions:

Array ...	Position
... wData	DB303.DBW16 - DBW78
... rData	DB303.DBD80 - DBD204
... iData	DB303.DBD208 - DBW270

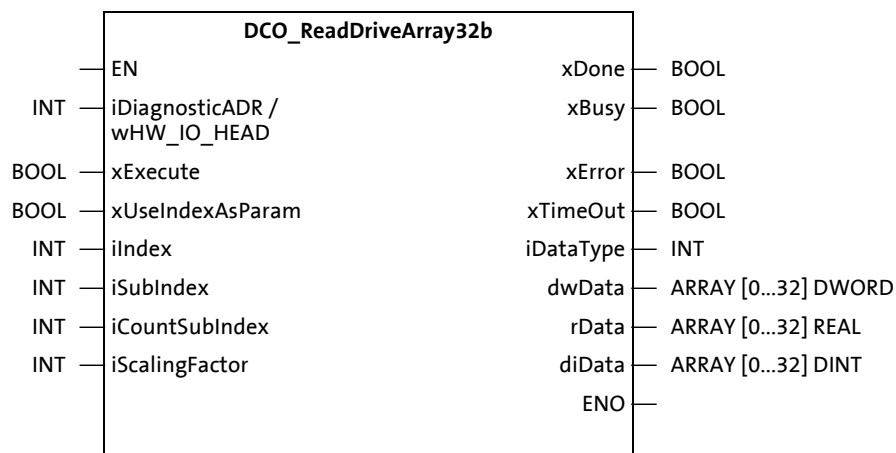
9.6 DCO_ReadDriveArray32b

This description applies to the following FBs:

- »STEP 7«: **FB302 DCO_ReadDriveArray32b**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_ReadDriveArray32b**

This FB reads the subcodes of a Lenze inverter (not i550) of 32 bits data type.

- Maximally 32 subcodes can be read.
- Parameter values of max. 32 bits can be read.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **ReadDriveArray32**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParam BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be read
iSubIndex INT	First subcode number to be read. <ul style="list-style-type: none"> • Standard setting = "0"
iCountSubIndex INT	Number of subcodes to be read <ul style="list-style-type: none"> • Standard setting = "32"
iScalingFactor INT	Scaling factor for the output of the read value. <ul style="list-style-type: none"> • Can be taken from the table of attributes. • Standard setting = "1"

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Read operation completed
xBusy BOOL	Read operation active
xError BOOL	Error during read operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
iDataType INT	Data type of the read parameter value. ▶ Possible data types of the parameters (112) • The return value "68" signals an incorrect read operation. ▶ Error information (wErrorCode) (135)
dwData ARRAY [0...32] DWORD	Read parameter value (data type: DWORD) • If an error occurred during the read operation, this output shows the corresponding error code.
rData ARRAY [0...32] REAL	Read parameter value scaled as REAL (as single value/ARRAY depending on the FB).
diData ARRAY [0...32] DINT	Read parameter value scaled as DINT (as single value/ARRAY depending on the FB).

In the related instance block, the read parameter values are located at the following positions:

Array ...	Position
... dwData	DB302.DBD16 - DBD140
... rData	DB302.DBD144 - DBD268
... diData	DB302.DBD270 - DBD396

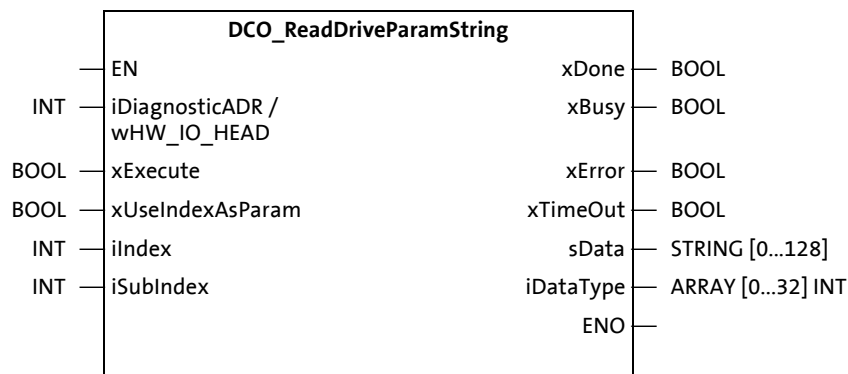
9.7 DCO_ReadDriveParamString

This description applies to the following FBs:

- »STEP 7«: **FB306 DCO_ReadDriveParamString**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_ReadDriveParamString**

This FB reads a code of "String" data type of a Lenze inverter.

- Reads up to 128 characters (bytes) of a STRING code.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **ReadDriveStringParam**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParam BOOL	Activates the direct entry of the code number without index conversion. • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be read
iSubIndex INT	First subcode number to be read. • Standard setting = "1"

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Read operation completed
xBusy BOOL	Read operation active
xError BOOL	Error during read operation

Identifier/data type	Information/possible settings
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
sData STRING [128]	Read parameter value (data type: STRING)
iDataType INT	Data type of the read parameter value. ▶ Possible data types of the parameters (112) <ul style="list-style-type: none"> The return value "68" signals an incorrect read operation. ▶ Error information (wErrorCode) (135)



Note!

The text read in from the inverter at the **sData** output is only visible to a limited extent in the variable table of »STEP 7«!

- In the DB/status view of the variables, the text cannot be read (the variable table can present the single characters of the STRING).
- The **sData** variable, for instance, can be read/presented by a separate HMI device.

In the related instance block, the read parameter values are located at the following positions:

STRING ...	Position
... sData	DB306.DBD10 – DBB140

9.8

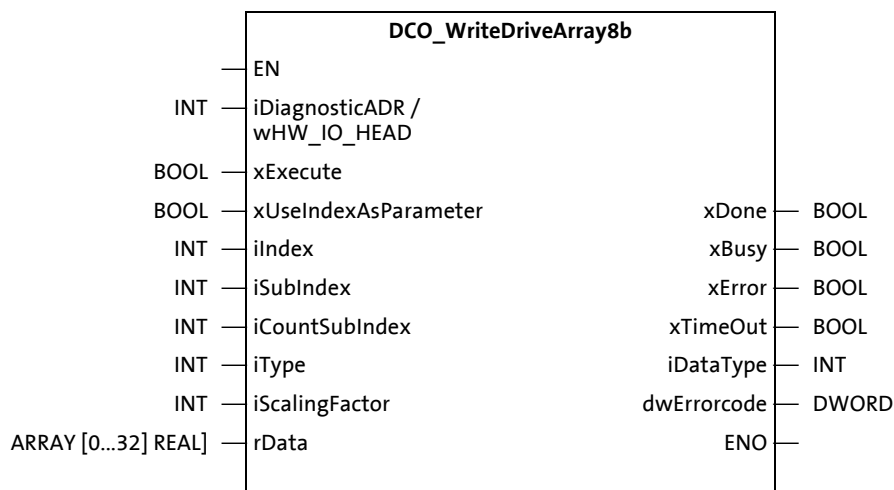
DCO_WriteDriveArray8b

This description applies to the following FBs:

- »STEP 7«: **FB310 DCO_WriteDriveArray8b**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_WriteDriveArray8b**

This FB writes up to 32 subcodes of a Lenze inverter (not i550) of 8 bits data type.

- The FB can write maximally 32 subcodes.
- The FB can write parameter values of 8 bits.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **WriteDriveArray8**

**Inputs**

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParameter BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be written.
iSubIndex INT	First subcode number to be written. <ul style="list-style-type: none"> • Standard setting = "1"
iCountSubIndex INT	Number of subcodes to be written. <ul style="list-style-type: none"> • Standard setting = "32"

Identifier/data type	Information/possible settings
iType INT	Data type of the parameter value to be written. ▶ Possible data types of the parameters (□ 112) <ul style="list-style-type: none"> The data type must be defined in a decimal way. Standard setting = "7"
iScalingFactor INT	Scaling factor for the output of the values to be written. <ul style="list-style-type: none"> Can be taken from the table of attributes. Standard setting = "1"
rData ARRAY [0...32] REAL	Values to be written in array codes (FB 308, FB 309, FB 310)

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Write operation completed
xBusy BOOL	Write operation active
xError BOOL	Error during write operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
iDataType INT	The return value "68" signals an incorrect write operation. ▶ Error information (wErrorCode) (□ 135)
dwErrorCode DWORD	Error number/error info if an error occurred during the write operation.

In the related instance block, the parameter values to be written are located at the following positions:

Array ...	Position
... rData	DB310.DBD14 – DBD138

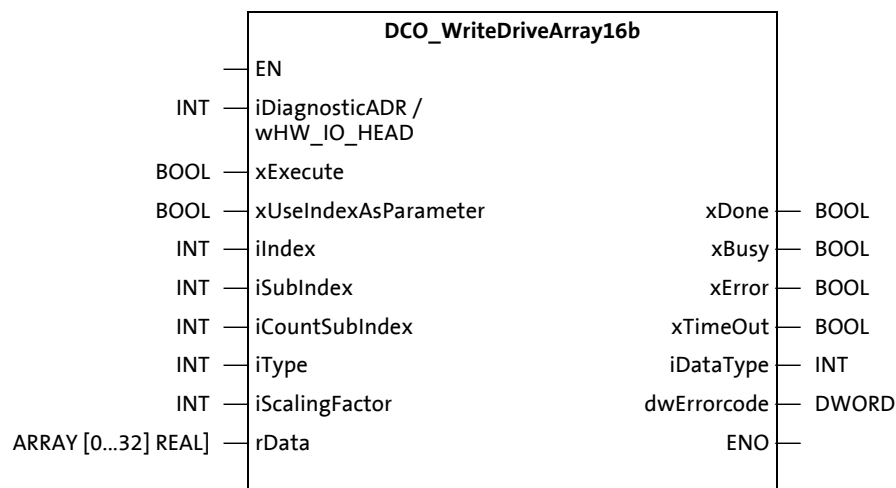
9.9 DCO_WriteDriveArray16b

This description applies to the following FBs:

- »STEP 7«: **FB309 DCO_WriteDriveArray16b**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_WriteDriveArray16b**

This FB writes up to 32 subcodes of a Lenze inverter (not i550) of 16 bits data type.

- The FB can write maximally 32 subcodes.
- The FB can write parameter values of 16 bits.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **WriteDriveArray16**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParameter BOOL	Activates the direct entry of the code number without index conversion. • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be written
iSubIndex INT	First subcode number to be written. • Standard setting = "1"
iCountSubIndex INT	Number of subcodes to be written. • Standard setting = "32"

Identifier/data type	Information/possible settings
iType INT	Data type of the parameter value to be written. ▶ Possible data types of the parameters (□ 112) <ul style="list-style-type: none"> The data type must be defined in a decimal way. Standard setting = "7"
iScalingFactor INT	Scaling factor for the output of the values to be written. <ul style="list-style-type: none"> Can be taken from the table of attributes. Standard setting = "1"
rData ARRAY [0...32] REAL	Values to be written in array codes (FB 308, FB 309, FB 310)

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Write operation completed
xBusy BOOL	Write operation active
xError BOOL	Error during write operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
iDataType INT	The return value "68" signals an incorrect write operation. ▶ Error information (wErrorCode) (□ 135)
dwErrorCode DWORD	Error number/error info if an error occurred during the write operation.

In the related instance block, the parameter values to be written are located at the following positions:

Array ...	Position
... rData	DB309.DBD14 – DBD138

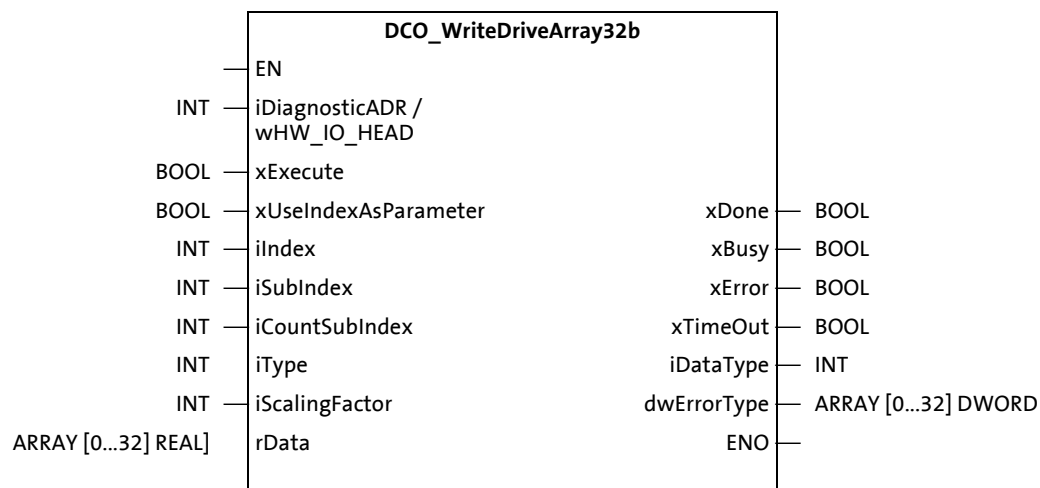
9.10 DCO_WriteDriveArray32b

This description applies to the following FBs:

- »STEP 7«: **FB308 DCO_WriteDriveArray32b**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_WriteDriveArray32b**

This FB writes up to 32 subcodes of a Lenze inverter (not i550) of 32 bits data type.

- The FB can write maximally 32 subcodes.
- The FB can write parameter values of 32 bits.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **WriteDriveArray32**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParameter BOOL	Activates the direct entry of the code number without index conversion. • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iIndex INT	Code number/index of the parameter to be written.
iSubIndex INT	First subcode number to be written. • Standard setting = "1"
iCountSubIndex INT	Number of subcodes to be written: • Standard setting = "32"

Identifier/data type	Information/possible settings
iType INT	Data type of the parameter value to be written. ▶ Possible data types of the parameters (□ 112) <ul style="list-style-type: none"> The data type must be defined in a decimal way. Standard setting = "7"
iScalingFactor INT	Scaling factor for the output of the value to be written. <ul style="list-style-type: none"> Can be taken from the table of attributes. Standard setting = "1"
rData ARRAY [0...32] REAL	Values to be written in array codes (FB 308, FB 309, FB 310)

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Write operation completed
xBusy BOOL	Write operation active
xError BOOL	Error during write operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
iDataType INT	The return value "68" signals an incorrect write operation. ▶ Error information (wErrorCode) (□ 135)
dwErrorCode DWORD	Error number/error info if an error occurred during the write operation.

In the related instance block, the parameter values to be written are located at the following positions:

Array ...	Position
... rData	DB308.DBD14 – DBD138

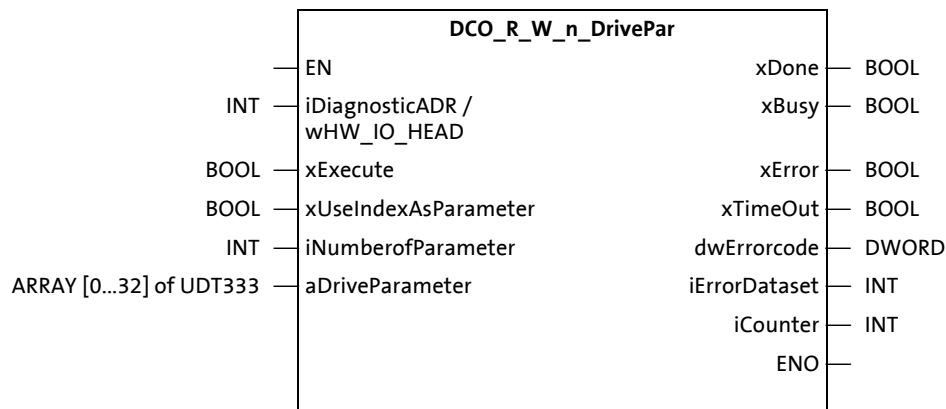
9.11 DCO_R_W_n_DrivePar

This description applies to the following FBs:

- »STEP 7«: **FB312 DCO_R_W_n_DrivePar**
- »TIA Portal«: **DCO_300/DCO_12x/DCO_15x_R_W_n-DrivePar**

This FB reads/writes up to 32 codes/subcodes of a Lenze inverter.

- It can be defined for each of the 32 jobs if it is to be read or written.
- The parameters of a job can be transmitted...
 - ...via array (UDT333 DriveParameter) to the block in »STEP 7«.
 - ...with the DriveParameter data type in »TIA Portal«.
 - ...with the data block DB 313 (DB_DCO_ARRAY_FB312).
- The FBs transmits the individual jobs internally via a loop through FB 300 and FB 301 to the corresponding inverter.
- Supports index values and code numbers.
- The FB is independent of the used bus system.
- »STEP 7« provides a variable list for controlling this FB.
- S7 VAT **RW_ParameterList**



Inputs

Identifier/data type	Information/possible settings
iDiagnosticADR / wHW_IO_HEAD INT	Diagnostic address of the inverter (defined in the hardware configuration of the SIMATIC Manager for S7-300 and S7-400). "Head" HW identification of the inverter for S7-1200 and S7-1500 (from »TIA Portal« V14 onwards).
xExecute BOOL	Start parameter transfer.
xUseIndexAsParameter BOOL	Activates the direct entry of the code number without index conversion. <ul style="list-style-type: none"> • The code number can be directly taken from the table of attributes or the »Engineer«. • Standard setting = "TRUE"
iNumberOfParameter INT	Number of the codes/subcodes to be read/written <ul style="list-style-type: none"> • Standard setting = "1"
aDriveParameter ARRAY [0...32] of UDT333	Parameters to be read/written in case of multi-parameter access

Outputs

Identifier/data type	Information/possible settings
xDone BOOL	Write operation completed
xBusy BOOL	Write operation active
xError BOOL	Error during write operation
xTimeOut BOOL	Is TRUE if a job has not been processed after 10 seconds.
dwErrorCode DWORD	Error number/error info if an error occurred during the write operation.
iErrorDataset INT	Parameter data set that triggered the error.
iCounter INT	Indicates <i>iNumberOfParameter</i> +1 after a successfully processed job (for diagnostic purposes).

Address	Name	Type	Initial value	Actual value	Comment
0.0	ParaData[1].iIndex	INT	0	0	Parameterindex
2.0	ParaData[1].iSubIndex	INT	0	0	Parametersubindex
4.0	ParaData[1].iScalingFactor	INT	1	1	Scaling factor from attributlist
6.0	ParaData[1].iDataType	INT	0	0	2=Int8, 3=Int16, 4=Int32, 5=Unsigned8, 6=Unsigned16, 7=Unsigned32, 65=Byte, 6
8.0	ParaData[1].xReadWrite	BOOL	FALSE	FALSE	0=Read Parameter, 1=Write Parameter
8.1	ParaData[1].xEnablePara	BOOL	FALSE	FALSE	0=Parameter ignored, 1=Parameter would be written or read
10.0	ParaData[1].xWriteData	REAL	0.000000e+000	0.000000e+000	Parametervalue in case of writing a drive parameter
14.0	ParaData[1].dwReadData	DWORD	DW#16#0	DW#16#0	Parametervalue as DWORD If a error xError=True dwData = Errorcode
18.0	ParaData[1].diReadData	DINT	L#0	L#0	Parametervalue as DINT
22.0	ParaData[1].rReadData	REAL	0.000000e+000	0.000000e+000	Parametervalue as REAL
26.0	ParaData[2].iIndex	INT	0	0	Parameterindex
28.0	ParaData[2].iSubIndex	INT	0	0	Parametersubindex
30.0	ParaData[2].iScalingFactor	INT	1	1	Scaling factor from attributlist
32.0	ParaData[2].iDataType	INT	0	0	2=Int8, 3=Int16, 4=Int32, 5=Unsigned8, 6=Unsigned16, 7=Unsigned32, 65=Byte, 6
34.0	ParaData[2].xReadWrite	BOOL	FALSE	FALSE	0=Read Parameter, 1=Write Parameter
34.1	ParaData[2].xEnablePara	BOOL	FALSE	FALSE	0=Parameter ignored, 1=Parameter would be written or read
36.0	ParaData[2].xWriteData	REAL	0.000000e+000	0.000000e+000	Parametervalue in case of writing a drive parameter
40.0	ParaData[2].dwReadData	DWORD	DW#16#0	DW#16#0	Parametervalue as DWORD If a error xError=True dwData = Errorcode
44.0	ParaData[2].diReadData	DINT	L#0	L#0	Parametervalue as DINT
48.0	ParaData[2].rReadData	REAL	0.000000e+000	0.000000e+000	Parametervalue as REAL
52.0	ParaData[3].iIndex	INT	0	0	Parameterindex
54.0	ParaData[3].iSubIndex	INT	0	0	Parametersubindex
56.0	ParaData[3].iScalingFactor	INT	1	1	Scaling factor from attributlist
58.0	ParaData[3].iDataType	INT	0	0	2=Int8, 3=Int16, 4=Int32, 5=Unsigned8, 6=Unsigned16, 7=Unsigned32, 65=Byte, 6
60.0	ParaData[3].xReadWrite	BOOL	FALSE	FALSE	0=Read Parameter, 1=Write Parameter
60.1	ParaData[3].xEnablePara	BOOL	FALSE	FALSE	0=Parameter ignored, 1=Parameter would be written or read
62.0	ParaData[3].xWriteData	REAL	0.000000e+000	0.000000e+000	Parametervalue in case of writing a drive parameter
66.0	ParaData[3].dwReadData	DWORD	DW#16#0	DW#16#0	Parametervalue as DWORD If a error xError=True dwData = Errorcode
70.0	ParaData[3].diReadData	DINT	L#0	L#0	Parametervalue as DINT
74.0	ParaData[3].rReadData	REAL	0.000000e+000	0.000000e+000	Parametervalue as REAL
78.0	ParaData[4].iIndex	INT	0	0	Parameterindex
80.0	ParaData[4].iSubIndex	INT	0	0	Parametersubindex

[9-3] Representation in »STEP 7«: The DB 313 data block shows the individual jobs (marked by squared brackets).

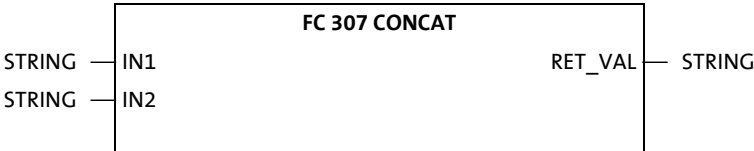
- In the data block, up to 32 parameter requests can be projected.
- A pointer (P#DB313.DBX0.0) is used to transfer the data to the FB312.

9.12 FC307 CONCAT

Corresponds to the function **FC 2 CONCAT** (IEC library from Siemens)

This function combines two **STRING** variables to one string.

- Reads a "STRING" data type from the axes/combines the individual "characters" to one **STRING**.
- If the output string is longer than the variable applied to the output parameter, the resulting string is limited to the maximally defined length the BIE bit is set to "0".
- The parameters can only be assigned with a symbolically defined variable.



Inputs

Identifier/data type	Information/possible settings
IN[1...2] STRING	Input string 1...2

Outputs

Identifier/data type	Information/possible settings
RET_VAL STRING	Combined string

9.13 SFB4 TON IEC_TC

This is a Siemens system function block for generating a switch-on delay.

9.14 SFB52 RDREC DP

This is a Siemens system function block for reading a data set.

**Note!**

When this block is used, you have to observe the maximally possible number of calls that can be used in parallel. Depending on the Siemens-CPU used, a different number of calls is possible. More information can be found in the technical data of the Siemens-CPU.

9.15 SFB53 WRREC

This is a Siemens system function block for writing a data set.

**Note!**

When this block is used, you have to observe the maximally possible number of calls that can be used in parallel. Depending on the Siemens-CPU used, a different number of calls is possible. More information can be found in the technical data of the Siemens-CPU.

9.16 Error information (wErrorCode)

Error code	Description	Explanation	Additional info
0x0000	Impermissible parameter numbers	Access to non-available parameters	-
0x0001	Parameter value cannot be changed	Change access to a non-changeable parameter value	Subindex
0x0002	Lower or upper value limit exceeded	Change access with value outside the value limits	Subindex
0x0003	Incorrect subindex	Access to non-available subindex	Subindex
0x0004	No array	Access with subindex to non-indexed parameter	-
0x0005	Wrong data type	Change access with value which does not match the data type of the parameter	-
0x0006	No setting permitted (can only be reset)	Change access with non-zero value where not permitted	Subindex
0x0007	Description element cannot be changed	Change access to a non-changeable description element	Subindex
0x0008	Reserved	(PROFIdrive profile V2: PPO-Write required in the IR not available)	-
0x0009	Description data not available	Access to non-available description (parameter value is available)	-
0x000A	Reserved	(PROFIdrive profile V2: Wrong access group)	-
0x000B	No operating authorisation	Change access in case operating authorisation is missing	-
0x000C	Reserved	(PROFIdrive profile V2: Wrong password)	-
0x000D	Reserved	(PROFIdrive profile V2: Text cannot be read in cyclic traffic)	-
0x000E	Reserved	(PROFIdrive profile V2: Name cannot be read in cyclic traffic)	-
0x000F	No text array available	Access to non-available text array (parameter value is available)	-
0x0010	Reserved	(PROFIdrive profile V2: PPO-Write is missing)	-
0x0011	Job cannot be executed due to operating status	Access is not possible due to temporary reasons not further specified	-
0x0012	Reserved	(PROFIdrive profile V2: Other error)	-
0x0013	Reserved	(PROFIdrive profile V2: Date cannot be read in cyclic traffic)	-
0x0014	Value is impermissible	Change access with value which is within the value limits but is impermissible due to other permanent reasons (parameter with defined individual values)	Subindex
0x0015	Response too long	The length of the current response exceeds the maximally transferable length	-
0x0016	Impermissible parameter address	Impermissible or not supported values for attribute, number of subindexes, parameter number or subindex or a combination	-
0x0017	Impermissible format	Write request: impermissible or not supported format of the parameter data	-
0x0018	Number of values not consistent	Write request: Number of values of the parameter data does not match the number of subindexes in the parameter address	-

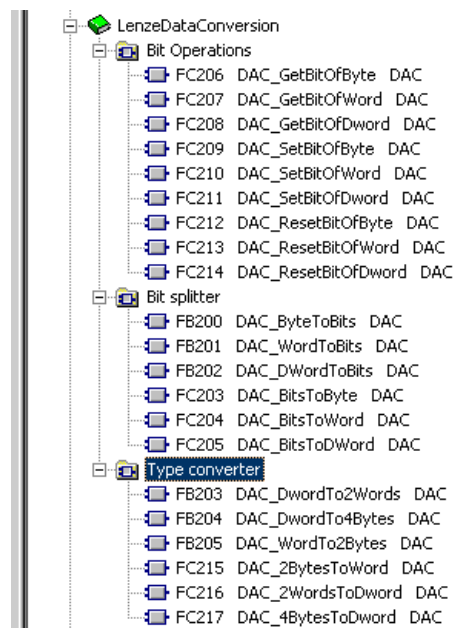
Error code	Description	Explanation	Additional info
0x0019	Reserved	-	-
...			
0x0064			
0x0065	Manufacturer-specific	-	-
...			
0x00FF			

10 The "LenzeDataConversion" library

This library contains the function blocks and functions for converting data and is only available for »STEP 7«.

10.1 Overview of the functions and function blocks

The functions and function blocks of the **LenzeDataConversion** library are divided into the following groups:



Bit operations:

Providing individual bits from bigger data types

- ▶ [FC206 DAC_GetBitOfByte - conversion block \(138\)](#)
- ▶ [FC207 DAC_GetBitOfWord - conversion block \(139\)](#)
- ▶ [FC208 DAC_GetBitOfDWord - conversion block \(140\)](#)
- ▶ [FC209 DAC_SetBitOfByte - bit operation \(141\)](#)
- ▶ [FC210 DAC_SetBitOfWord - bit operation \(142\)](#)
- ▶ [FC211 DAC_SetBitOfDWord - bit operation \(143\)](#)
- ▶ [FC212 DAC_ResetBitOfByte - bit operation \(144\)](#)
- ▶ [FC213 DAC_ResetBitOfWord - conversion block \(145\)](#)
- ▶ [FC214 DAC_ResetBitOfDWord - conversion block \(146\)](#)

Bit splitter:

Converting bits into other data types

- ▶ [FB200 DAC_ByteToBits - bit demultiplexer \(147\)](#)
- ▶ [FB201 DAC_WordToBits - bit demultiplexer \(148\)](#)
- ▶ [FB202 DAC_DWordToBits - bit demultiplexer \(149\)](#)
- ▶ [FC203 DAC_BitsToByte - bit multiplexer \(150\)](#)
- ▶ [FC204 DAC_BitsToWord - bit multiplexer \(151\)](#)
- ▶ [FC205 DAC_BitsToDWord - bit multiplexer \(152\)](#)

Type converter:

Converting bytes/words into other data types.

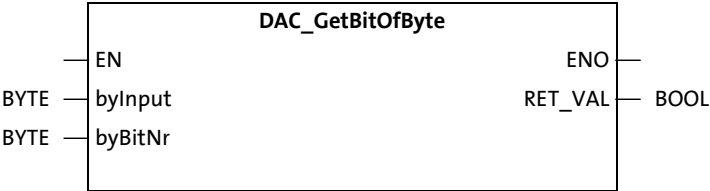
- ▶ [FB203 DAC_DWordTo2Words - type converter \(153\)](#)
- ▶ [FB204 DAC_DWordTo4Bytes - type converter \(154\)](#)
- ▶ [FB205 DAC_WordTo2Bytes - type converter \(155\)](#)
- ▶ [FC215 DAC_2BytesToWord - type converter \(156\)](#)
- ▶ [FC216 DAC_2WordsToDword - type converter \(157\)](#)
- ▶ [FC217 DAC_4BytesToDword - type converter \(158\)](#)

[10-1] The LenzeDataConversion library in »STEP 7«

- The initials "FBxxx" indicate function blocks.
- The initials "FCxxx" indicate functions.

10.2 FC206 DAC_GetBitOfByte - conversion block

This function returns the state of an individual bit value as a "BYTE" value.



Inputs

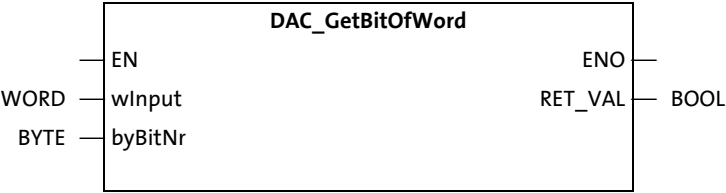
Identifier/data type	Information/possible settings
byInput BYTE	Input signal
byBitNr BYTE	Number of (0...7) the bit of <i>byInput</i> , the status of which is to be determined.

Output

Identifier/data type	Information/possible settings
RET_VAL BOOL	New value of "BOOL" type which results from the respective input signal.
	TRUE The return value is "TRUE" if the bit indicated at the input has the "TRUE" value.

10.3 FC207 DAC_GetBitOfWord - conversion block

This function returns the status of an individual bit within a "WORD" value.



Inputs

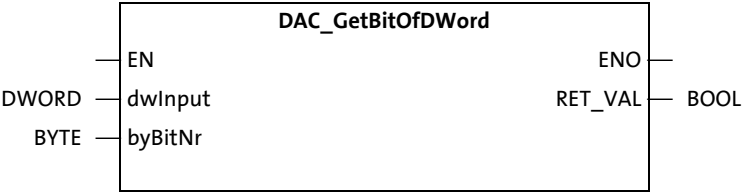
Identifier/data type	Information/possible settings
wInput WORD	Input signal
byBitNr BYTE	Number (0...15) of the bit of <i>dwInput</i> , the status of which is to be determined.

Output

Identifier/data type	Information/possible settings
RET_VAL BOOL	Output signal • TRUE if the respective bit of <i>wInput</i> is TRUE.

10.4 FC208 DAC_GetBitOfDWord - conversion block

This function returns the status of an individual bit value within a "DWORD" value.



Inputs

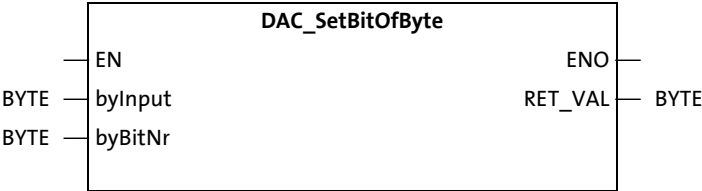
Identifier/data type	Information/possible settings
dwInput DWORD	Input signal
wBitNr BYTE	Number (0...31) of the bit of <i>dwInput</i> , the status of which is to be determined.

Output

Identifier/data type	Information/possible settings
RET_VAL BOOL	Output signal • TRUE if the respective bit of <i>dwInput</i> is "TRUE".

10.5 FC209 DAC_SetBitOfByte - bit operation

This function sets an individual bit to "1" within a value of the "BYTE" type.



Inputs

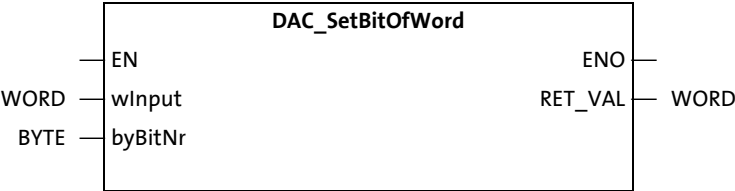
Identifier/data type		Information/possible settings
byInput	BYTE	Input signal
byBitNr	BYTE	Number (0 ... 7) of the bit that is to be set.

Output

Identifier/data type		Information/possible settings
RET_VAL	BYTE	Output signal • Value of the "BYTE" data type which results from the bit set.

10.6 FC210 DAC_SetBitOfWord - bit operation

This function sets an individual bit to "1" within a value of the "WORD" type.



Inputs

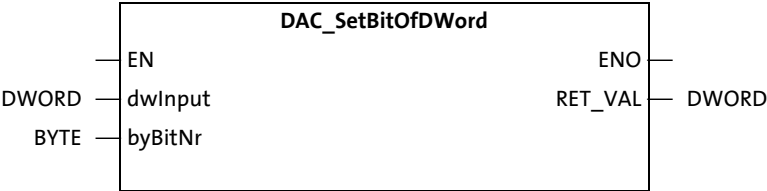
Identifier/data type	Information/possible settings
wInput WORD	Input signal
byBitNr BYTE	Number (0 ... 15) of the bit that is to be set.

Output

Identifier/data type	Information/possible settings
RET_VAL WORD	Output signal • Value of the "WORD" type, which results by the bit set.

10.7 FC211 DAC_SetBitOfDWord - bit operation

This function sets an individual bit to "1" within a value of the "DOUBLE WORD" type.



Inputs

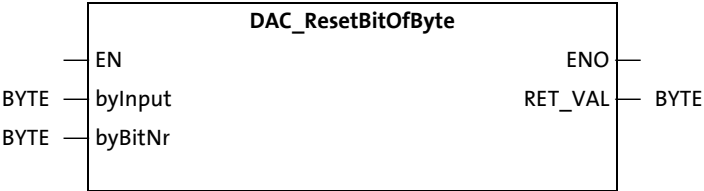
Identifier/data type	Information/possible settings
dwInput DWORD	Input signal
byBitNr BYTE	Input signal of bit 0...7

Output

Identifier/data type	Information/possible settings
RET_VAL DWORD	Output signal • Value of the "DOUBLE WORD" type, which results by the bit set.

10.8 FC212 DAC_ResetBitOfByte - bit operation

This function sets an individual bit to "0" within a value of the "BYTE" type.



Inputs

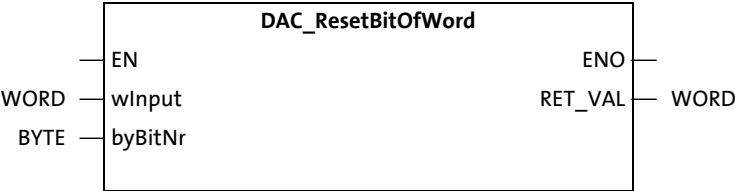
Identifier/data type	Information/possible settings
byInput BYTE	Input signal
byBitNr BYTE	Number (0...7) of the bit that is to be set.

Output

Identifier/data type	Information/possible settings
RET_VAL BYTE	Output signal • Value of the "BYTE" data type which results from the bit set.

10.9 FC213 DAC_ResetBitOfWord - conversion block

This function sets an individual bit to "1" within a value of the "WORD" type.



Inputs

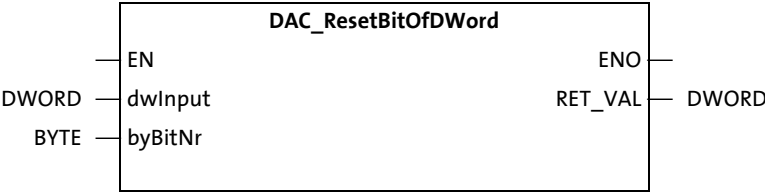
Identifier/data type	Information/possible settings
wInput WORD	Input signal
byBitNr BYTE	Number (0 ... 15) of the bit that is to be set.

Output

Identifier/data type	Information/possible settings
RET_VAL WORD	Output signal • The value results from the deleted bit.

10.10 FC214 DAC_ResetBitOfDWord - conversion block

This function sets an individual bit to "0" within a value of the "DWORD" type.



Inputs

Identifier/data type	Information/possible settings
dwInput DWORD	Input signal
byBitNr BYTE	Number (0 ... 31) of the bit that is to be set.

Output

Identifier/data type	Information/possible settings
RET_VAL DWORD	Output signal • The value results from the deleted bit.

10.11 FB200 DAC_ByteToBits - bit demultiplexer

This FB outputs the individual bit values for one input value of the "BYTE" type.



Inputs

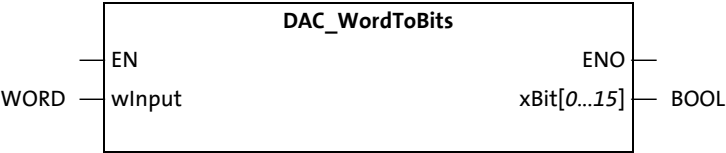
Identifier/data type	Information/possible settings
byInput BYTE	Input signal

Outputs

Identifier/data type	Information/possible settings
xBit[0...7] BOOL	Output bit 0...7 of <i>byInput</i> (valency: 2 ⁰ ...2 ⁷)

10.12 FB201 DAC_WordToBits - bit demultiplexer

This FB outputs the 16 corresponding bit values for an input value of the "WORD" type.



Inputs

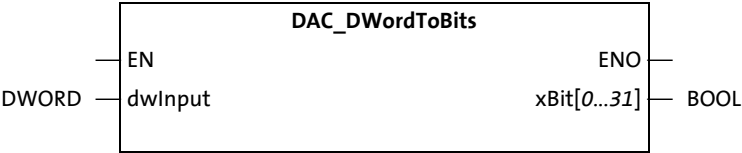
Identifier/data type	Information/possible settings
wInput WORD	Input signal

Outputs

Identifier/data type	Information/possible settings
xBit[0...15] BOOL	Output bit 0 .. bit 15 of wInput (valency: 2 ⁰ ..2 ¹⁵)

10.13 FB202 DAC_DWordToBits - bit demultiplexer

This FB outputs the 32 corresponding bit values for an input value of the "DWORD" type.



Inputs

Identifier/data type	Information/possible settings
dwInput DWORD	Input signal

Outputs

Identifier/data type	Information/possible settings
xBit0..xBit31 BOOL	Output bit 0...31 of <i>dwInput</i> (valency: $2^0 \dots 2^{31}$)

10.14 FC203 DAC_BitsToByte - bit multiplexer

This FB converts eight input bits into a value of the "BYTE" type.



Inputs

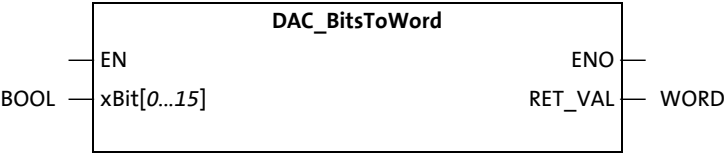
Identifier/data type	Information/possible settings
xBit[0...7] BOOL	Input bits 0...7

Outputs

Identifier/data type	Information/possible settings
byOutput BYTE	Value of the "BYTE" type which results from the set input bits.

10.15 FC204 DAC_BitsToWorld - bit multiplexer

This FB converts the 16 input bits into a value of the "WORD" type.



Inputs

Identifier/data type	Information/possible settings
xBit[0...15] BOOL	Input bits 0...15

Outputs

Identifier/data type	Information/possible settings
RET_VAL WORD	Value of the "WORD" type which results from the set input bits.

10.16 FC205 DAC_BitsToDWord - bit multiplexer

This FB converts 32 input bits into a value of the "DWORD" type.



Inputs

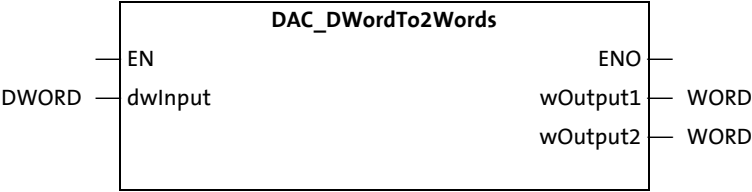
Identifier/data type	Information/possible settings
xBit0..xBit31 BOOL	Input bits 0...31

Outputs

Identifier/data type	Information/possible settings
RET_VAL DWORD	Value of the "DOUBLE WORD" type which results from the set input bits.

10.17 FB203 DAC_DWordTo2Words - type converter

This FB converts an input value of the "DOUBLE WORD" type into two output values of the "WORD" type.



Inputs

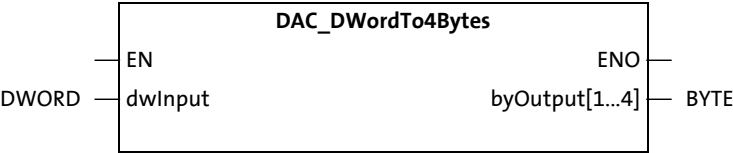
Identifier/data type	Information/possible settings
dwInput DWORD	Input value

Outputs

Identifier/data type	Information/possible settings
wOutput1 WORD	Output value 1 = bit 0...15 of <i>dwInput</i>
wOutput2 WORD	Output value 2 = bit 16...31 of <i>dwInput</i>

10.18 FB204 DAC_DWordTo4Bytes - type converter

This FB converts an input value of the "DWORD" type into four output values of the "BYTE" type.



Inputs

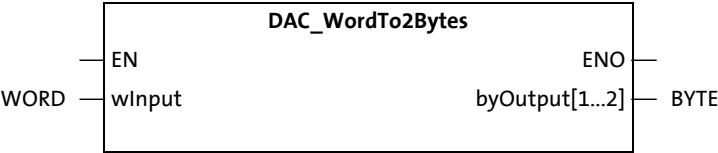
Identifier/data type	Information/possible settings
dwInput DWORD	Input value

Outputs

Identifier/data type	Information/possible settings
byOutput1 BYTE	Output value 1 = bit 0...7 of <i>dwInput</i>
byOutput2 BYTE	Output value 2 = bit 8...15 of <i>dwInput</i>
byOutput3 BYTE	Output value 3 = bit 16...23 of <i>dwInput</i>
byOutput4 BYTE	Output value 4 = bit 24...31 of <i>dwInput</i>

10.19 FB205 DAC_WordTo2Bytes - type converter

This FB converts an input value of the "WORD" type into two output values of the "BYTE" type.



Inputs

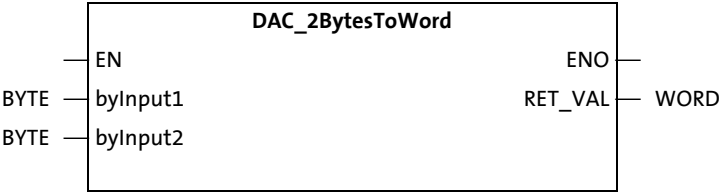
Identifier/data type	Information/possible settings
wInput WORD	Input value

Outputs

Identifier/data type	Information/possible settings
byOutput1 BYTE	Output value 1: bit 0...7 of <i>wInput</i>
byOutput2 BYTE	Output value 2: bit 8...15 of <i>wInput</i>

10.20 FC215 DAC_2BytesToWord - type converter

This function converts two input values of the "BYTE" type into an output value of the "WORD" type.



Inputs

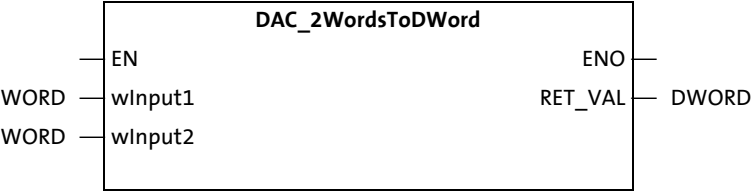
Identifier/data type	Information/possible settings
byInput1 BYTE	Input value 1 = bit 0...7
byInput2 BYTE	Input value 2 = bit 8...15

Outputs

Identifier/data type	Information/possible settings
RET_VAL WORD	Value of the "WORD" type according to the transferred input values.

10.21 FC216 DAC_2WordsToDWord - type converter

This function converts two input values of the "WORD" type into an output value of the "DWORD" type.



Inputs

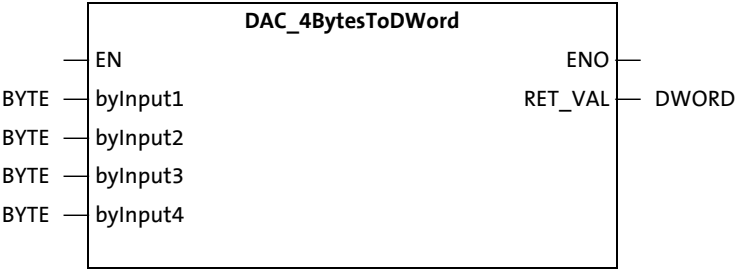
Identifier/data type		Information/possible settings
wInput1	WORD	Input value 1 = bit 0...15
wInput2	WORD	Input value 2 = bit 16...31

Outputs

Identifier/data type		Information/possible settings
RET_VAL	DWORD	Value of the "DOUBLE WORD" type according to the transferred input values.

10.22 FC217 DAC_4BytesToDWord - type converter

This function converts four input values of the "BYTE" type into a value of the "DWORD" type.



Inputs

Identifier/data type		Information/possible settings	
byInput1..4	BYTE	Input value 1...4	
		1	Bit 0...7
		2	Bit 8...15
		3	Bit 16...23
		4	Bit 24...31

Outputs

Lenze4BytesToDWord - value of the "DOUBLE WORD" type according to the transferred input values.

Identifier/data type		Information/possible settings	
RET_VAL	DWORD	Value of the "DWORD" type according to the transferred input values.	

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Your opinion is important to us

These instructions were created to the best of our knowledge and belief to give you the best possible support for handling our product.

Perhaps we have not succeeded in achieving this objective in every respect. If you have suggestions for improvement, please e-mail us to:

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Thank you very much for your support.

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