



Engineer

Configuring drives _ _ _ _ _

Software Manual

DE



Target group

This documentation is intended for all persons who want to use the »Engineer« engineering software to parameterise, configure and diagnose field devices and control systems.

Screenshots/application examples

All screenshots provided in this documentation are application examples. Depending on the firmware version of the Lenze devices and installed engineering tools (here: Lenze »Engineer«), the representation may differ from the actual screen display.

Information regarding the validity

The information in this documentation is valid for the following Lenze software:

Software	From version
»Engineer«	2.19

Document history

Version			Description
2.12	10/2013	TD11	Updated contents for the »Engineer« V2.19 software version
2.11	11/2012	TD11	Updated contents for the »Engineer« V2.17 software version
2.10	05/2012	TD11	Updated contents for the »Engineer« V2.16 software version
2.9	11/2011	TD11	Updated contents for the »Engineer« V2.15 software version
2.8	04/2011	TD11	Updated contents for the »Engineer« V2.14 software version
2.7	11/2010	TD11	Updated contents for the »Engineer« V2.13 software version
2.6	04/2010	TD11	Updated contents for the »Engineer« V2.12 software version
2.5	10/2009	TD11	Updated contents for the software version »Engineer« V2.10 SP3
2.4	08/2009	TD11	Updated chapter: Managing cam data with the »Cam Manager« (📖 272)
2.3	04/2009	TD11	Optimised structures, update of dialog boxes & extension by new functions of »Engineer« V2.10: • Data logger • Compare and copy parameter sets
2.2	11/2008	TD11	Extended by new functions of »Engineer« V2.9: • L-force Loader Export, optimised menu control, device data update and establishing an online connection. • New chapter "Handling catalogues".
2.1	07/2008	TD11	Extended by new functions: User motors, Cam Manager, Cam Editor
2.0	10/2007	TD16	First edition

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1 About this documentation

This documentation contains information about the Lenze »Engineer«.

The »Engineer« is a Lenze engineering tool for different types of devices and is used for parameterising, configuring and diagnosing Lenze devices (such as controllers, motors, I/O systems) as well as machine control systems.

Short overview

Chapter	Contents
▶ Safety instructions (📖 12)	...contains safety instructions which have to be observed if you want to commission a controller or a system by means of the »Engineer«.
▶ User interface (📖 13)	...describes the user interface structure in the »Engineer«
▶ Getting started: creating a project (📖 30)	...describes how to create a project in the »Engineer«.
▶ Establishing an online connection (📖 75)	... describes how to establish an online connection to one or several devices.
▶ Device functions with active online connection (📖 98)	... describes how to execute the control functions of a device and a parameter set/program transfer between the device and the »Engineer«. ...describes the diagnostics options when an online connection has been established to the device.
▶ Defining the system functionality (📖 128)	...describes how to define the functionality of your entire system in the »Engineer«.
▶ Inserting & configuring a network (📖 202)	...describes how to add networks to the project and configure them to ensure the communication between the devices of the system.

About this documentation

Conventions used

1.1 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 separators	Point	The decimal point is generally used. For example: 1234.56
Text		
Version information	Text colour blue	All pieces of information that only apply to or from a specific software version of the inverter are highlighted correspondingly 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 <i>Options</i> dialog box...
Variable names		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	underlined	Reference to further information: Hyperlink to further information.
Symbols		
Page reference	(10)	Reference to further information: Page number in PDF file.
Step-by-step instructions		Step-by-step instructions are marked by a pictograph.

About this documentation

Definition of notes used

1.2 Definition of notes used

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

Safety instructions

Structure of the safety instructions:



Danger!

(characterises the type and severity of danger)

Note

(describes the danger and informs how to prevent dangerous situations)

Pictograph	Signal word	Meaning
	Danger!	Danger of personal injuries through dangerous electrical voltage Reference to an imminent danger that may result in death or serious personal injury unless the corresponding measures are 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 unless the corresponding measures are taken.
	Stop!	Danger of material damage Indicates a potential danger that may lead to material damage unless the corresponding measures are taken.

Application notes

Pictograph	Signal word	Meaning
	Note!	Important note to ensure troublefree 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 a controller or system using the »Engineer«.



Read the documentation supplied with the controller or the individual components of the system carefully before you start to commission the devices with the »Engineer«!

The device documentation contains safety instructions which must be observed!



Danger!

If required, systems with integrated controllers have to be equipped with additional monitoring and protective equipment in accordance with the safety regulations valid in each case (e.g. law on technical equipment, regulations for the prevention of accidents), so that an impermissible operating status does not endanger persons or equipment.

During commissioning persons must keep a safe distance from the motor or the machine parts driven by the motor. Otherwise there would be 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!

An incorrect parameterisation can result in unpredictable motor movements. By an unintentional direction of rotation, too high speeds or jerky operation, powered machine parts can be damaged!

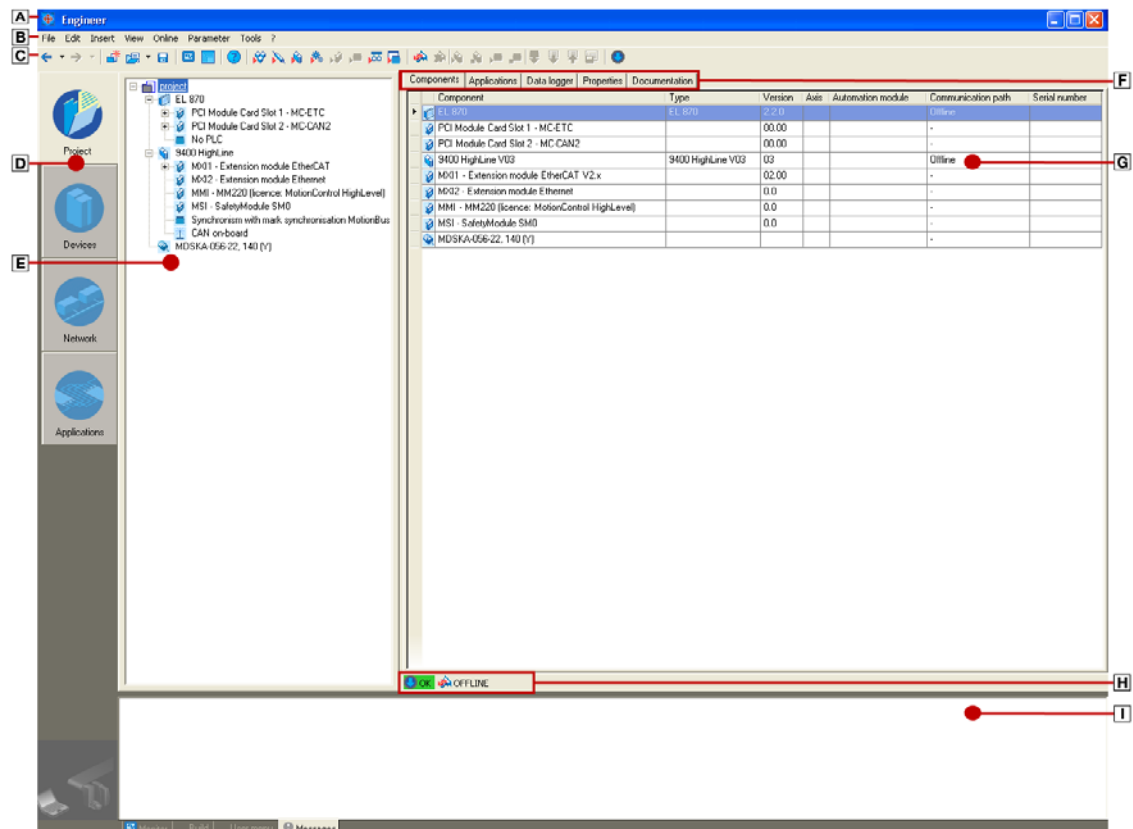
3 User interface



Note!

Different licence levels are available for the Engineering tools of Lenze. Depending on the licence level used, the functional range varies on the user interface. Current information can be found at: <http://www.Lenze.com>

The user interface is principally divided into the following areas:



A Title bar/available licence level

B Menu commands

► [Menu reference - Overview of the menu commands](#) (125)

C [Toolbar](#) (15)

D [Project view bar: Filtering the project tree](#) (17)

E [Project structure \(project tree\)](#) (18)

► [Getting started: creating a project](#) (30)

F Tabs (context-dependent)

► [Parameterising & configuring the devices](#) (132)

G [Workspace](#) (21)

H [Status information](#) (23)

I [Monitor: Monitoring parameters](#) (24) /
[Create](#) (27) /
[User menu](#) (170) / [Messages](#) (27)

without illustration: [Wizards](#) (28)



Tip!

In order to increase the *workspace*, you can **reduce** the size of the buttons of the *project view bar* on the left side or **mask them out**.

- Alternatively the settings of the *Project view bar* 3 can be executed via the menu command **Extras→Options** in the *Environment* tab. ▶ [Options for the representation/project memory location](#) (29)

3.1 Toolbar

Via the *Toolbar* frequently used functions can be accessed without the need to use the menu commands.



Note!

Depending on the project context, different icons can be activated or are deactivated (greyed out).

- Some icons, for instance, are only available when a controller is selected.

Icon/button	Menu command	Function
History of the operating steps (back/next)		
	-	One step forwards or backwards in the history of the previously selected elements. ▶ History of the preselected elements (📘 19)
	-	
Managing projects		
	File→New project...	▶ Updating projects while opening them: Adapting project file from previous version (📘 39)
	File→Open...	▶ Opening the project file (📘 38)
	File→Save	▶ Save a project (📘 42)
Configure user interfaces		
	-	▶ Adapt monitor window: Show parameters graphically (instruments) (📘 25)
	-	Maximise or minimise <i>workspace</i> ▶ Workspace (📘 21)
Call context help		
	-	Display online help in the context of the selected device
Inserting project elements		
	Insert→System module	▶ Inserting system modules (📘 47)
	Insert→Axis	▶ Inserting an axis (📘 48)
	Insert→Component	▶ Inserting components (📘 51)
	Insert→Gearbox	▶ Inserting a gearbox (📘 67)
	Insert→Device module	▶ Inserting device modules (📘 57)

User interface

Toolbar

Icon/button	Menu command	Function
	Insert→Application	▶ Inserting application (📘 55)
	Insert→Network	▶ Inserting a network (📘 207)
	Insert→Machine application	▶ Inserting a machine application with a port interconnection (📘 174)
Going online/offline		
	Online→Go online	Establish a connection to a device ▶ Going online (📘 77)
	Online→Go offline	Break the connection to a device ▶ Going offline (📘 96)
	Online→Optical location	Device search function (signalling via device LEDs) ▶ Optical tracking - device identification within the machine (📘 107)
	Online→Manual control	Manual control (available depending on the device) • Can only be activated if <u>one</u> device is selected and the device supports this function. ▶ Manual control of the motor direction of rotation: Rotating the axes manually (📘 109)
	-	Commissioning wizard for guided commissioning of controllers of the 8400 device series • ... is available in case there is an active online connection to the device. ▶ Going online
Device functions with active online connection		
	Online→Enable controller  ▶ Safety instructions (📘 12)	Enable device (cancel controller inhibit) ▶ Enable controller (📘 100)
	Online→Inhibit controller	Inhibit device (set controller inhibit) ▶ Inhibit controller (📘 101)
	Online→Start application  ▶ Safety instructions (📘 12)	Start application in the device ▶ Start application (📘 101)
	Online→Stop application	Stop application in the device ▶ Stop application (📘 101)
Application / parameter transfer		
	Online→Download program	Download application to the device ▶ Download program to device (📘 103)
	Online→Download parameter set	Download parameter set to the device ▶ Download parameter set to device (📘 105)
	Online→Upload parameter set	Upload parameter set ▶ Upload parameter set (📘 106)
	Online→Save parameter set	Save parameter set in the device safe against mains failure ▶ Save parameter set (📘 107)

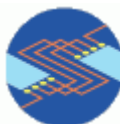
User interface

Project view bar: Filtering the project tree

Icon/button	Menu command	Function
Build project (compile)		
	Tools→Build project	Build project (individual project elements or whole project). ▶ Build project (📖 76)

3.2 Project view bar: Filtering the project tree

Via the following buttons/icons in area  of the application window you can filter the view of the *Project tree*:

Button	Representation in the project tree
 Project	Show Project tree in the Project view . • This button serves to show <u>all</u> available project elements. • <u>All</u> project elements can be edited.
 Devices	Filter Project tree in the Device view • The project tree only shows the root element and the devices inserted. Details (like for example interfaces) are masked out.
 Network	Filter project tree in the Network view • The project tree only shows the root element and the networks inserted.
 Applications	Filter Project tree in the Application view • The project tree only shows the root element and the applications that are inserted in the project.



Note!

In order to be able to completely edit the project, you have to be in the *Project view* (**Project** button in the *Project view bar*).

- Depending on the button selected in the *Project view bar*, the available icons in the *Toolbar*, the elements shown in the *Project view*, and the *Workspace* change.

User interface

Project structure (project tree)

Representing the project view bar in a reduced size/masking it out

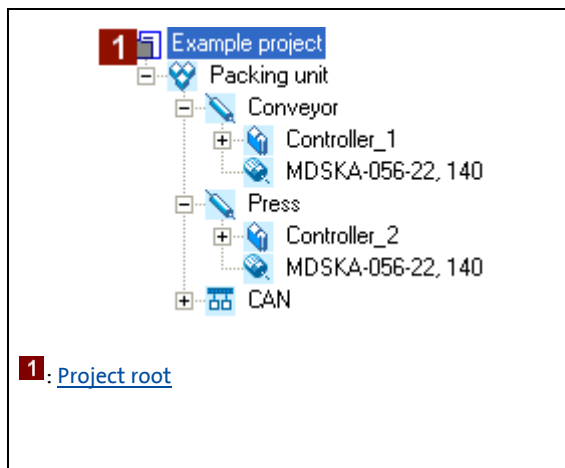


Tip!

In order to increase the *workspace*, you can use the context menu (right-hand mouse button) to **reduce** the size of the buttons in the *project view bar* or **mask them out**. Alternatively, the settings of the *project view bar* can be executed via the menu command **Extras→Options** in the *Environment*. ▶ [Options](#) (99)

3.3 Project structure (project tree)

Similar to the folder view in the *Windows Explorer*, the *project structure* shows the individual machine components in the form of a tree topology:



[3-1] Example for the hierarchical representation of the project structure in the *Project tree*

- If you select a project element and then change to the *workspace*, the project element is still shown on a grey background and is underlined at the same time.
 - Like this you can clearly see which project element the active *workspace* belongs to.
- By clicking the / icons, sub-elements can be shown / hidden.
- In the *workspace*, the properties and settings of the currently selected element/device are shown and can be edited there.



Tip!

You can alter the width and height of the *Project view* by using the mouse pointer to shift the screen divider between the *Project view* and the *Workspace* or between the *Project view* and the *Message window*.

By clicking with the **right-hand mouse button**, you can open a *Context menu* containing functions relevant to the elements.

3.3.1 History of the preselected elements

All elements selected in the *Project view* during project processing are stored in a "history".



Note!

The history is emptied automatically when the project is closed, i.e. the history is always empty when you open a project.

The / buttons in the *Toolbar* jump to the project element selected previously / next.



Tip!

If the *Project tree* contains multiple devices, use to return to the component edited last (e.g. a controller).

- If you click the arrow, ▼, next to the / buttons, a selection list including the elements selected last is available.
 - Every entry is provided in the following form: "*project name: element name*".

3.3.2 General editing functions in the project view

The following processing functions apply to all elements in the *Project view*.

- ▶ [Drag element \(cut & paste\)](#) (📖 19)
- ▶ [Duplicate element \(copy & paste\)](#) (📖 20)
- ▶ [Delete element](#) (📖 20)
- ▶ [Rename element](#) (📖 20)

Drag element (cut & paste)

1. Select the element to be shifted including all subelements.
2. Click and hold the element with your left mouse button and drag it to the desired position. The current position of the element is displayed in one of the following manners:
 - **Highlighting** the respective element:

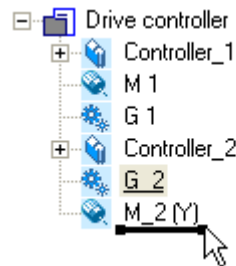
The element to be shifted becomes the sub-element of the highlighted element. This behaviour corresponds to the following command chain: **Edit→Cut**, and then **Edit→Paste**.

User interface

Project structure (project tree)

- Element representation as horizontal bar:

The shifted element is positioned as desired between the two adjacent elements. The order of elements of the same level can be changed in the *Project tree*:



or

1. Select the element to be shifted including all subelements.
2. Select menu command **Edit→Cut**.
3. Select the element into which the element cut before is to be pasted.
4. Select menu command **Edit→Insert**.

Duplicate element (copy & paste)

1. Select the element which is to be copied including all subelements.
2. Select menu command **Edit→Copy**.
3. Select the element into which the element copied before is to be pasted.
4. Select menu command **Edit→Insert**.

Delete element

1. Select the element to be deleted including all subelements.
2. Select menu command **Edit→Delete** or press the **<Del>** button in order to delete the element selected.

Rename element

1. Select the element to be renamed.
2. Select menu command **Edit→Rename** or press the **<F2>** function key.
3. Enter new name.
4. Press the **<input key>** to accept the new name.

3.3.3 Shortcuts in the project view



Tip!

As an alternative to directly selecting elements with the help of the mouse pointer, you can use keyboard shortcuts (for example, if you are running »Engineer« on a notebook). This enables faster movement within the *Project view* in order to select elements for editing.

You can use the following shortcuts for navigating within the *Project view* if an element is focused on in the *Project view*:

Shortcut	Function
<PG UP>	Browsing upwards in the <i>Project tree</i> .
<PG DN>	Browsing downwards in the <i>Project tree</i> .
<UP ARROW>	Selection of the next element up.
<DOWN ARROW>	Selection of the next element down.
<LEFT ARROW>	Depending on the symbol shown in front of the element: + / □ Selection of the higher-level/lower-level element in the hierarchy.
<RIGHT ARROW>	Depending on the symbol shown in front of the element: + / □ Selection of the higher-level/lower-level element in the hierarchy.
<BACKSPACE>	Selection of the higher-level element in the hierarchy in each case.
<POS1>	Selection of the first project element.
<END>	Selection of the last (shown) project element.



Tip!

In order to focus on an element in the *Project view*, click on a project element or press the <Tab> key until you reach the desired element.

3.3.4 Project root

The project root  is the topmost element in the *Project tree* (root element). The name corresponds to the file name of the project.

- If the project root is selected, the tabs including general project properties are visible in the *workspace*.

Tab	Function
Components	Tabulates all components inserted into the project. • The properties of the respective component are visible (device type, firmware version, communication path) as well as the structural integration in the form of system modules/axes.
Applications	Tabulates all applications inserted into the project. • The assignment to system modules/axes is visible.
Data logger	The data logger serves to record the temporal course of parameter values and display it as a line diagram. ▶ Data logger (□ 111) • Note: For using this function, an online connection to the desired device is required!
Documentation	Provides the opportunity to enter detailed information on the project and the projected machine plant. • Notes and file attachments can be added to each project element. ▶ Documentation - Add project details (□ 71)
Protection	Settings for protecting the safe configuration • Assign a project-related password for protecting the safe configuration (tab <i>Safe configuration</i>, safe parameters. ▶ Protecting safe parameters - project-related password entry (□ 74)

3.4 Workspace

The *workspace* (area ) has various tabs which show the properties and settings of the project element currently selected in the *project tree*. A project element can be for instance a device: Servo Drives 9400 HighLine.



Tip!

The representation of the tabs in the *workspace* depends on the selected project element / device type.

You can alter the width and height of the *Workspace* by using the mouse pointer to move the screen divider between the *Project view* and the *Workspace* or between the *Workspace* and the *Message window* as required.

► [Parameterising & configuring the devices](#) (📖 132)

3.4.1 Displaying parameter values

Device parameter settings shown in the workspace of the »Engineer« (e.g. in the **Parameters** tab for a device) are displayed with different background colours with the following meaning:

Colour	Example	Meaning
Offline representation		
White		Offline parameter The device is not connected "online" with the »Engineer«. The "offline" parameter value set in the project is displayed.
Light grey		Offline display parameter So-called "display parameters" are parameters which are only used to show status information and actual values and which feature a read-only access.
Online representation		
Yellow		Online parameter (value can be changed) - The device is connected "online" with the »Engineer«. The current parameter value of the device is displayed. - The ≠ symbol in front of a parameter value indicates that the value in the device differs from the parameter value set in the project.
Pale yellow		Online display parameter (read only) The device is "online", i.e. connected to »Engineer«. The current parameter value of a display parameter of the device is shown.
Red		Communication error (time-out) Communication to a device is interrupted, the online parameter could not be read out of the device within a certain time.

User interface

Status information

If you edit a parameter value in an input field, you can see from the colour of the text whether the altered value has already been integrated into the project or the device and is within the valid range.

Colour	Example	Meaning
Black	1,2345	Parameter value that is within the valid range and that has already been integrated into the project or device.
Blue	1,2345	Altered parameter value that has not yet been integrated into the project or the device. • By pressing the <input key>, you accept the altered value. • You can reject the change by pressing the <ESC> key.
Red	1,2345	Changed parameter value which is outside the valid range. • You can reject the change by pressing the <ESC> key.

3.5 Status information

Information on the status of the project and devices/applications.

Information	Meaning
Project status	
 OK	All project information is up to date. • The project element selected in the <i>Project tree</i> does not have to be updated.
 Changed	The project contains unsaved changes. • Build the project by pressing the  button in the <i>Toolbar</i>. ▶ Build project (□ 76)
Device status	
 OFFLINE	The device is offline. • No online connection to the device.
 ONLINE	Active online connection to the device. • The »Engineer« communicates with device via a bus connection. ▶ Establishing an online connection (□ 75)
 ONLINE	Active online connection is interrupted. • An established online connection between the device and the »Engineer« is interrupted (communication error).
DDCMP : /	Device-dependent access path • The access path depends on the respective bus connection.
 Controller inhibit set	The controller is inhibited. • The controller inhibit is set. Move the mouse pointer over the status information of the controller in the status line to display the source of the controller inhibit.
 Controller enabled	The controller is enabled.

Depending on the device connection used, more information can be displayed in the status line, as for instance the application status or unsaved changed of the parameter set.

User interface

Monitor: Monitoring parameters

3.6 Monitor: Monitoring parameters

In the *Monitor* area below the *project view* and *workspace*, the parameters of a device to be selected can be displayed as display parameters. This is reasonable, for instance, for monitoring certain parameters for diagnostic purposes.

3.6.1 Show monitor window: Accept parameters/type of presentation



How to show the monitor window:

1. Click the **Monitor** tab at the bottom of the user window.
2. Select the desired *monitor window* in the **1 View** list field:
 - *-Project tree selection-*: The monitor window always shows the parameters for device currently marked in the project tree.
 - *System*: Multi-device monitor window with your compiled parameters for several devices of the automation system.
 - Monitor window for a certain device. This leaves the focus on this device although a different device has been marked in the project tree.

1 View - Project tree selection - (8400 TopLine C)		2 Adjust...		3 Store selection		Restore selection		4 Instruments	
Output frequency	DC-bus voltage	Motor current	MCTRL: Actual speed vs	Device state	Mess. - error state	Status-determining error			
0,00 Hz	331 V	0,00 A	0 rpm	SwitchedON	No Fail	00.0000.00000			

- The *monitor window* is preconfigured with display parameters. The display parameters visible in the monitor window can be changed by clicking the **2 Adjust** button.



Tip!

Increase individual display parameter: By clicking the window symbol in the top right display field, you show a display parameter across the entire width of the *monitor window*. For reducing it again, click the displayed window icon . This serves to show all display parameters again in the monitor window.

Using the parameter compilation for another device

Using the **3 Store selection** and **Restore selection** buttons, you can use the parameter compilation of a monitor window for another device in the same project.

- After a monitor window has been created with device 1, click the **Store selection** button.
- Mark the desired device 2 in the *project tree* the application is to apply to as well.
- Click the **Restore selection** button to accept the parameter selection for the monitor window for device 2.

Change type of presentation: Graphic or tabular

The list field **4** changes the type of presentation: Graphic as *Instruments* or tabular as *single-column/two-column list*.

User interface

Monitor: Monitoring parameters

3.6.2 Adapt monitor window: Show parameters graphically (instruments)

The *instruments* option serves to present your requested parameters graphically.



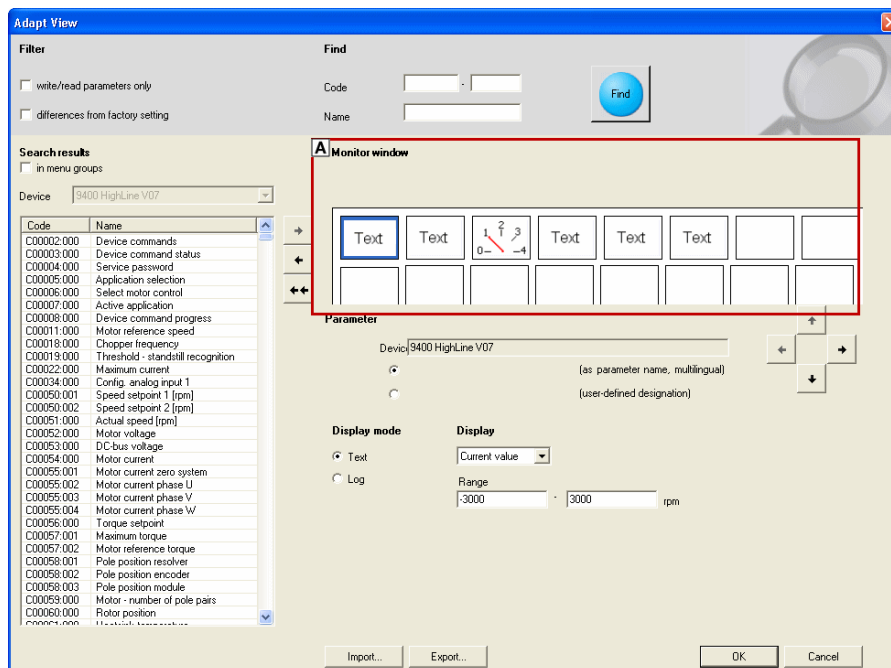
Tip!

Any value from the parameter list (*All parameters* tab) of a device can be transferred to the monitor window via right-click: Command: **Add to monitor window**



How to add the parameters to the monitor window:

1. Select the desired monitor window:
 - Select the *monitor window* to be configured in the **View** list field (above the monitor window).
2. Click the **Adapt** button:



- Click the display field you want to configure in the **A** area. The currently selected display field is highlighted by a blue frame.
3. In the area **B**, select the parameter from all parameters of the device ...
... to be displayed in the display field of the monitor window (area **A**).
...by clicking the arrow key /undoing the selection by using the arrow key . In order to remove all parameters from the monitor window, use the double arrow key .
 - In order that only certain parameters are visible in the area **B**, activate the corresponding filter options.
 - Activate the **in menu groups** control field to arrange the parameters according to menu groups.
4. Repeat the steps 1 to 4 to display more parameters in the display fields in area **A** (one parameter each per display field is possible).

User interface

Monitor: Monitoring parameters

5. In the  field, the **Import/Export** buttons serve to **import/export** composed monitor views. This serves, for instance, to use them in another »Engineer« project.
6. Press **OK** to transfer the selection to the monitor window.

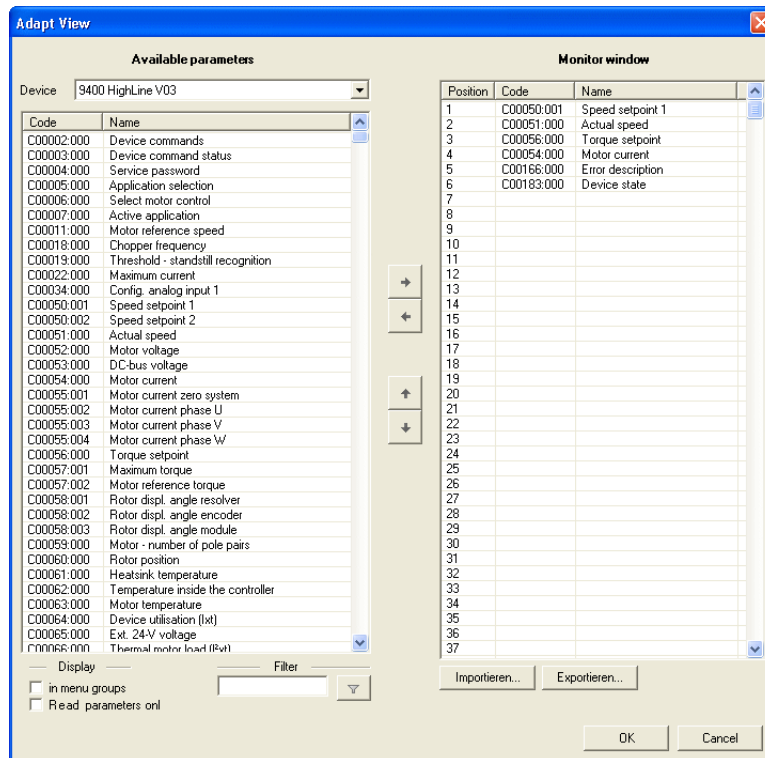
3.6.3 Adapt monitor window: Present parameters graphically (list)

The *instruments* option serves to present your requested parameters in table form in the monitor window.



How to add the parameters to the monitor window:

1. In the **View** list field, select the *Monitor window* to be configured.
2. Click the **Adapt** button to open the *Adapt view* dialog box.



3. Go to area  and select the parameters to be transferred to the *monitor window*.
 - Multi-selection of parameters shown one above the other: Hold down the **<CTRL>** key and highlight the parameters.
 - Multi-selection of individual parameters: Hold down the **<SHIFT>** key and highlight the desired parameters individually.
 - In order that only certain parameters are visible in the  area, optionally activate the corresponding **filters**.
 - Activate the **in menu groups** control field to arrange the parameters according to menu groups.

User interface

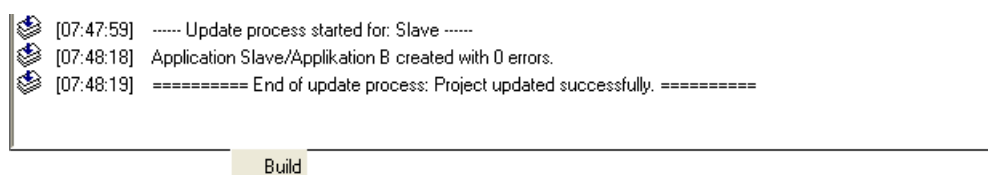
Create

4. Select the highlighted parameters (area **B**) by using the arrow key  /undoing the selection by using the arrow key . In order to remove all parameters from the monitor window, use the double arrow key .

As an alternative, press the  button to open a GDC file which includes the required parameter selection.

- Field **B** shows the parameters selected for display.
 - Press **OK**.
5. In the **C** field, the **Import/Export** buttons serve to **import/export** composed monitor views. This serves, for instance, to use them in another »Engineer« project.
 6. Press **Ok** to add the selection to the *monitor window*.

3.7 Create



The *Build* tab shows information on the individual creation and updating processes. ▶ [Build project](#) (📖 76)

3.8 User menu

The *User menu* tab shows the selection of parameters compiled by the user.

More information on how to create a user menu can be found in the following section: ▶ [User menu](#) (📖 170)

3.9 Messages

The *Message window* displays status and error messages relating to an executed program operation or the current status of the program.

Icon	Time stamp	Text
	[hh.mm.ss]	Information text
		Note
		Error text
		Program error text

Context menu

The following commands can be called in the *message window* via right-click:

Command	Function
Delete	Delete all messages in the message window.
Display	Submenu to select the elements to be displayed.
Copy list	Copy all messages to the clipboard.
Copy message	Copy the selected message to the clipboard.



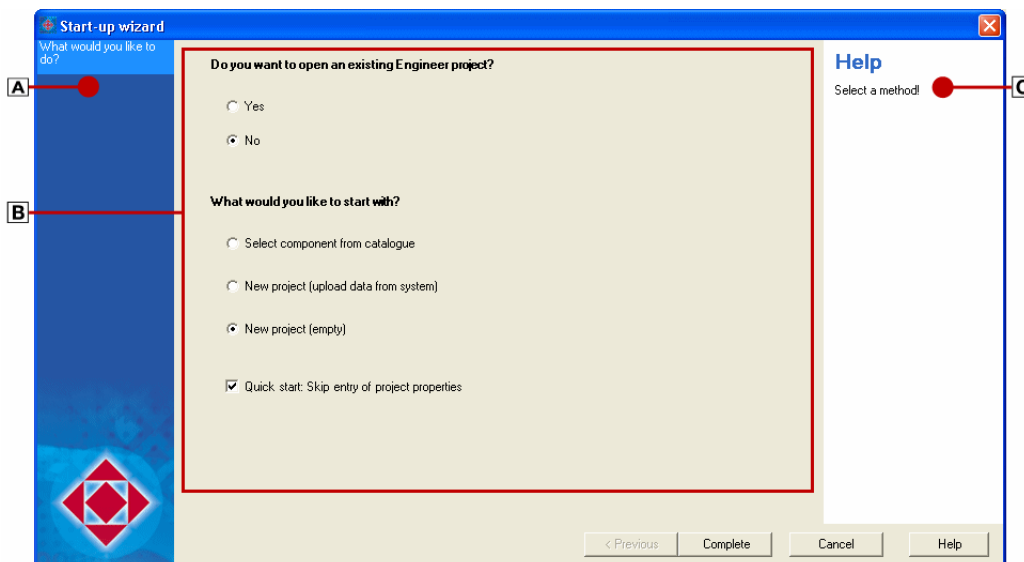
Tip!

Using the mouse pointer, the height of the *Message window* can be changed by dragging the screen divider between *Workspace* and *Message window* up or down.

3.10 Wizards

The »Engineer« is provided with several "wizards", e.g. for creating a project or setting up and configuring a network.

- The wizards are structured as follows. Select step by step the desired settings:



- Area **A** shows within which step of the wizard you are right now.
- Area **B** contains the main dialog box for entering the data and selecting the desired options.
- Area **C** displays further information and input requests for the respective step.

User interface

Options for the representation/project memory location

3.11 Options for the representation/project memory location

Via the **Tools→Options** menu command you open the *Options* dialog box. In this dialog box you can carry out general settings for the user interface in the **Environment** tab.

- In the **Environment** tab general settings can be edited.
- The settings are not a project property. Thus the settings are maintained for the following »Engineer« projects.



Option	Description
• Activate confirmation prompt when deleting components	Activate/deactivate confirmation prompt that is shown when components are deleted. • If this option is deactivated, the »Engineer« directly deletes the desired component without a confirmation prompt.
• Register external applications automatically	Specifies that the »Engineer« automatically writes the required entries into the Windows registry to start external programs. • Like this the external program is registered for use in the »Engineer« and can thus be called by the »Engineer«. Registration is effected in accordance with the general Windows operating system standards. • This option is activated by default. Example: When a Servo Drive 9400 HighLine is <i>updated</i>, the »Engineer« calls the »PLC Designer« to compile the program code which was previously created from the function block interconnection. On the Engineering PC several versions of »Engineer« and/or the »PLC Designer« can be installed. When the option is activated, the »Engineer« automatically ensures that the "suitable" (expected) »PLC Designer« version is used for the compilation process. Note: If unexpected malfunction on your system occurs by this procedure, you can deactivate this option. For instance administrated access authorisation can prevent the »Engineer« from writing into the registry. In order to ensure that the external programs can be called by the »Engineer«, you then have to make sure that after installing the »Engineer« no other version of the program to be called by the »Engineer« has been installed on your Engineering PC. Otherwise malfunction or an unexpected response of the controller may result!
• Change representation of the <i>Project view bar</i>	Specify the form of representation of the Project view bar: Filtering the project tree. • For instance, the <i>Project view bar</i> can be masked out to increase the size of the <i>Workspace</i>. ▶ User interface (□ 13)
• Standard memory location for »Engineer« projects	Specify the standard memory location for the creation of »Engineer« projects • The standard memory location can also be defined when a new project is created. ▶ Updating projects while opening them: Adapting project file from previous version (□ 39)
• Representation of descriptive texts	Specify the type of representation of the descriptive texts. • The standard setting is "simple and self-explanatory". By this the respective descriptive text is reduced to the essential. • "Formally more clearly" provides further information. Hence, the descriptive texts are written in greater detail. • The option for instance has a (device-independent) effect on all codes and selection texts in the »Engineer«, which contain further descriptive texts. • The option will become effective after an »Engineer« restart.

4 Getting started: creating a project

Projects are created in the »Engineer« to show the machine/system concept in the *project tree*. In this project file, all parameterisation and configuration settings of the automation system are saved.

- When you start the »Engineer«, no project is loaded at first. The *Start-up wizard* enables ...
 - ... you to open existing projects. ▶ [Opening the project file](#) (📖 38)
 - ... you to create new projects. ▶ [Updating projects while opening them: Adapting project file from previous version](#) (📖 39)

Getting started: creating a project

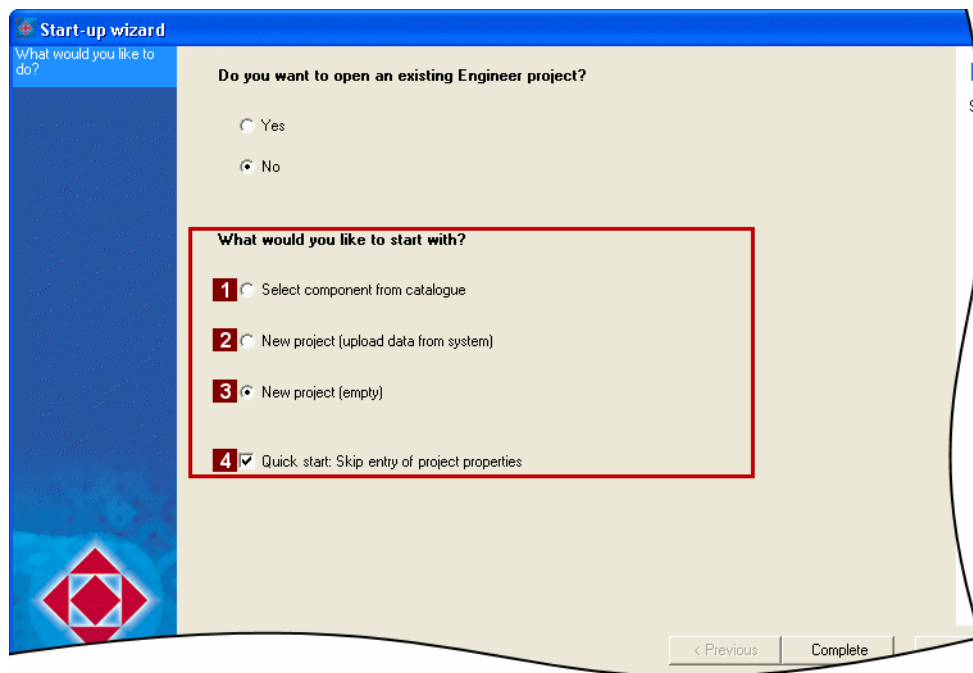
Creating a new project

4.1 Creating a new project

Create a new project using the *Start-up wizard*.

- Define the desired options for inserting components and project properties.

How would you like to start?



Step	Option	Function
What would you like to do?	1 • Select a component from the catalogue	Create a project including components from the selection lists of the catalogues. ▶ Creating a new project (selecting a component from the catalogue) (□ 32)
	2 • Start the search for devices connected	Search for devices that can be accessed online to insert all identified devices into the project tree. ▶ Creating a new project (starting the search for devices connected) (□ 34)
	3 • Empty project	▶ Creating an empty project (□ 37)
	4 • Quick start guide: Skip entry of the project properties (optionally)	• Skip project properties (properties/memory location). For the time being the project is named <i>My Project</i> and is stored at the standard memory location. • The quick start guide for instance is helpful when you need projects temporarily for testing purposes.
Project properties		

Getting started: creating a project

Creating a new project

Step	Option	Function
Product features	• Project name • Project data • Descriptive text	Define desired properties in order to be able to clearly identify the project.
Memory location	• Name of the project folder • Memory location for projects	Define desired memory location. • Optionally a standard memory location can be defined.

Project properties

The project properties entered in the *Start-up wizard* can be edited any time later on. ▶ [Project properties](#) (📖 41)

Memory location

An »Engineer« project includes a project file (*.afs format, ) as well as other directories and files which are stored in a project directory.

- The name and path for the project directory can be selected in the *Start-up wizard*.
- The memory location can be changed later. ▶ [Options for the representation/project memory location](#) (📖 29)

4.1.1 Creating a new project (selecting a component from the catalogue)

By this procedure you create a project with components (for example controller, I/O system, etc.). The components are chosen from the selection lists of the catalogues in the »Engineer«.

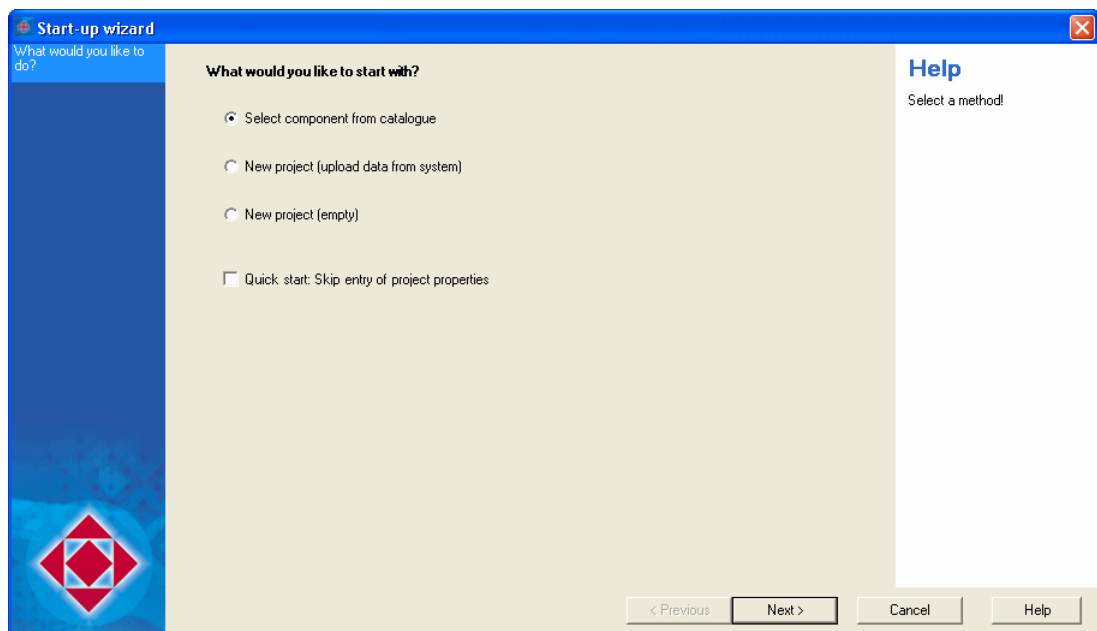
- By means of this option you can go online with the inserted controller directly after having created the project, in order to transfer e.g. parameters.



How to create a new project with components:

1. Click the  icon or select the menu command **File→New** to call the *start-up wizard*.

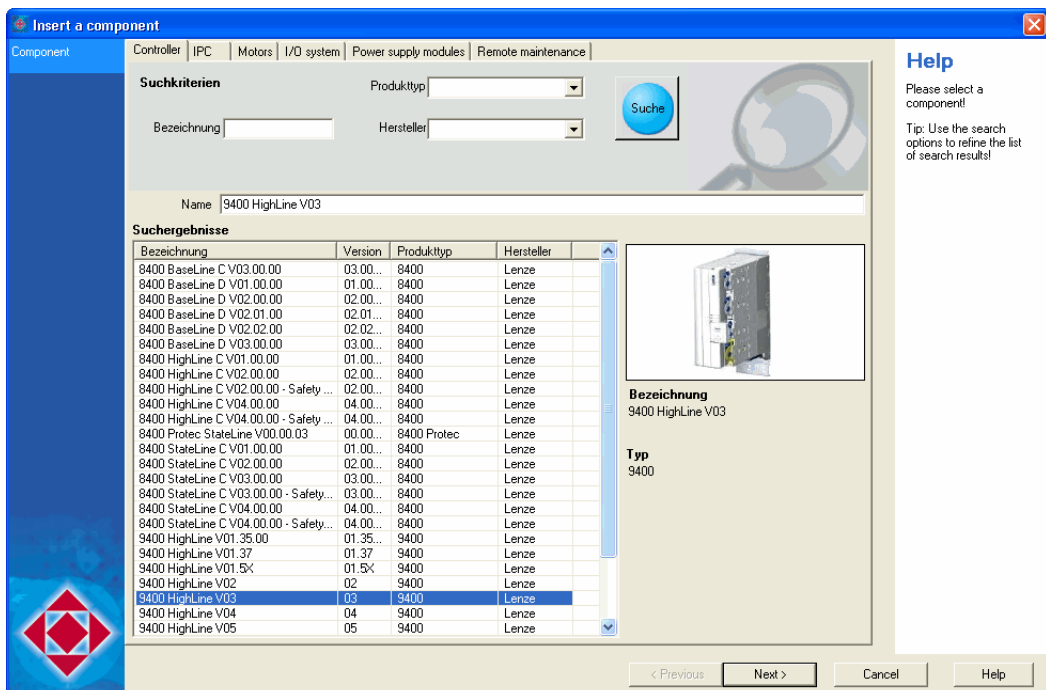
Step 1 - What would you like to do?



Getting started: creating a project

Creating a new project

2. Select the **Select component from catalogue** option.
3. Click the **Next** button.
4. **Step 2 - Properties**
Enter the corresponding properties of the project (name, order number etc.) in the input fields.
 - Enter desired **Properties**.
 - The **Name** can be found later in the *Project view* as the name of the project element.
5. Click the **Next** button.
6. **Step 3 - Memory location**
As **Project name** the previously entered **Project designation** is suggested. If required, correct the suggestion accordingly.
 - The **Project name** at the same time is the name for the project directory to be created.
 - Specify the storage location for the project directory in the **Directory** input field.
 - If the folder specified is not available, it will be created.
 - As an alternative you can select an existing directory in your workplace environment via the **Browse...** button.
 - The *Always save projects here* option determines the folder specified to be the standard storage location for future »Engineer« projects. Activate this option for the central management of all projects within the same folder.
7. Specify the storage location for the project directory in the **Directory** input field.
 - If the specified directory does not exist, it will be created.
 - As an alternative you can select an existing directory in your workplace environment via the **Browse...** button.
8. Click the **Next** button.



9. Select the required component.
 - The search results show the components available.

Getting started: creating a project

Creating a new project

10. Click the **Next** button.

- Further proceeding is described in the chapter entitled "Project structure". ▶ [Inserting components](#) (51)

4.1.2 Creating a new project (starting the search for devices connected)

Instead of beginning with an empty project, you can ask »Engineer« to look for devices that can be reached *online*.

- After the search has been carried out, you can open the *Start-up wizard* and select the identified devices that are to be included in the project.



Note!

A communication link to the system via CAN or via the X6 diagnostic interface (in the case of the Inverter Drives 8400 and Servo Drives 9400 device series) is needed in order to read out the data.



Stop!

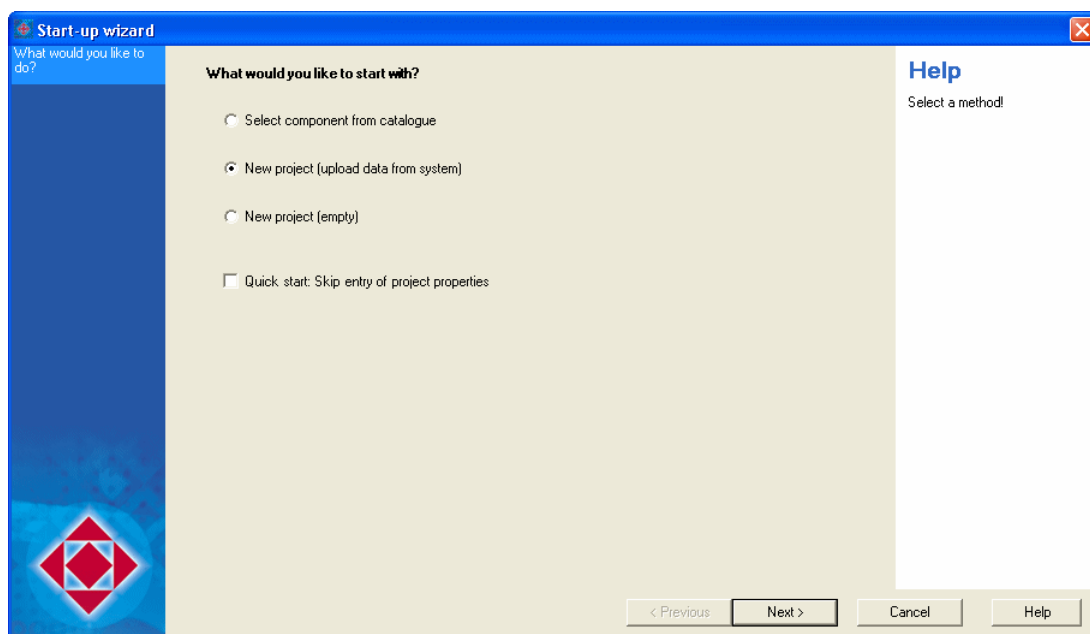
In the step "Reading online data", the *Start-up wizard* (after the **Start search** button has been clicked) automatically establishes an online connection via the selected interface in order to enable the read-out of data from the connected devices.



How to create a new project with connected devices:

1. Click the  icon or select the menu command **File→New** to call the *start-up wizard*.

Step 1 - What would you like to do?



2. Select the option **Search for connected devices**.
3. Click the **Next** button.

Getting started: creating a project

Creating a new project

4. Step 2 - Properties

Enter the corresponding properties of the project (name, order number etc.) in the input fields.

- Enter desired **Properties**.
- The **Name** can be found later in the *Project view* as the name of the project element.

5. Click the **Next** button.

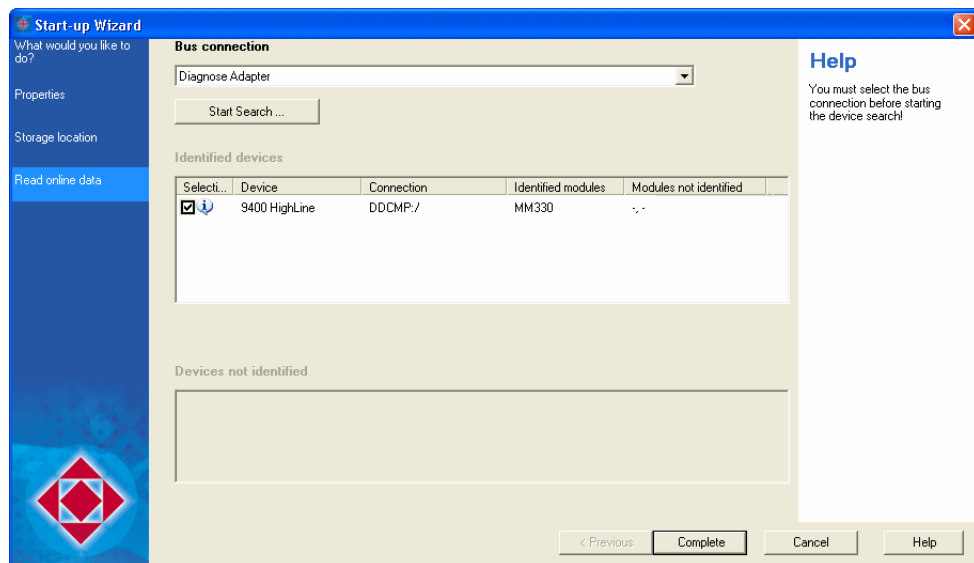
6. Step 3 - Memory location

As **Project name** the previously entered **Project designation** is suggested. If required, correct the suggestion accordingly.

- The **Project name** at the same time is the name for the project directory to be created.
- Specify the storage location for the project directory in the **Directory** input field.
- If the folder specified is not available, it will be created.
- As an alternative you can select an existing directory in your workplace environment via the **Browse...** button.
- The *Always save projects here* option determines the folder specified to be the standard storage location for future »Engineer« projects. Activate this option for the central management of all projects within the same folder.

7. Click the **Next** button.

Step 4 - Reading online data



8. Select the interface to be used in the **Bus connection** list field.

9. Press **Start Search**.

- *Identified devices* can be inserted into the project. Information provided under  must be observed if the device description is not suitable.
- *Unidentified devices* do not have suitable device descriptions. *Unidentified devices cannot* be inserted into the project.

Note: The CAN bus connection only lists devices that are not yet included in the *Project tree*.

10. Press **Complete**.

- The project is created with the defined settings.
- **There is now an online connection to the selected devices!**

Getting started: creating a project

Creating a new project

In the *Project view*, the Project root together with the name assigned to the project is displayed and, below the project element, all the previously selected devices are shown in a flat system structure.



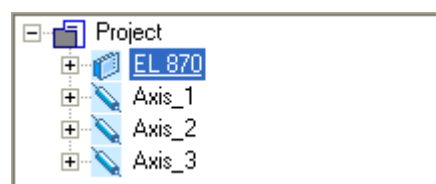
Stop!

There is now an online connection to the devices which is signalled by the yellow-highlighted device symbol in the *Project view*.

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



Example 1: Project with 9400 HighLine, to which an online connection already exists



Example 2: Project with a Controller EL870 and three axes

Next steps

continue to add items to the system structure now and, for example, convert the flat system structure into a hierarchical system structure by adding system modules and/or axes to the project.

Getting started: creating a project

Creating a new project

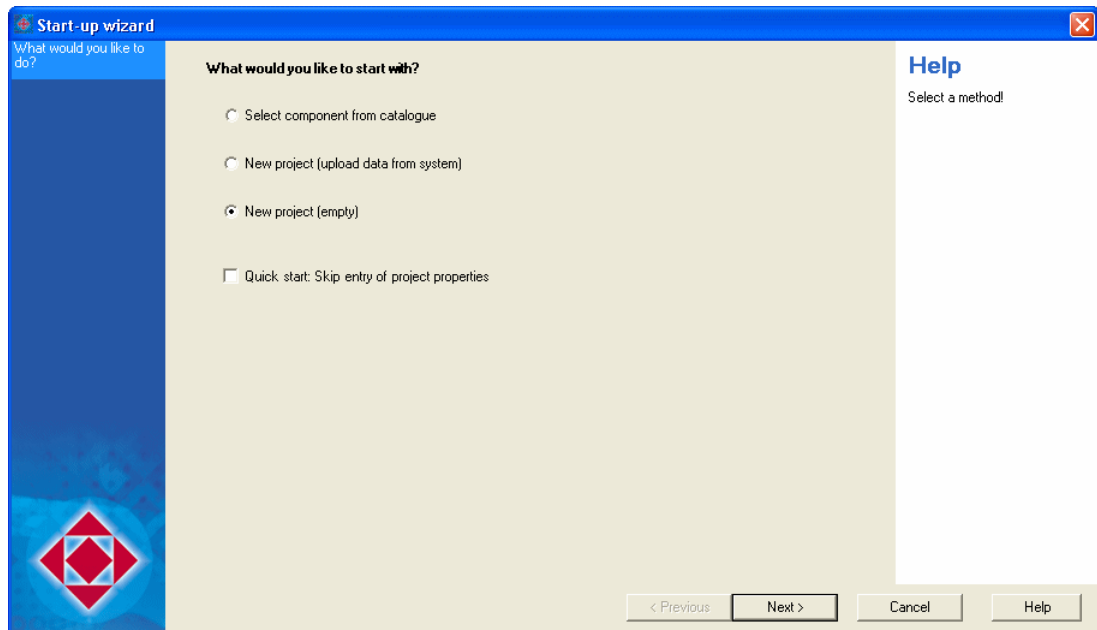
4.1.3 Creating an empty project



How to create a new (empty) project:

1. Click the  icon or select the menu command **File→New** to call the *start-up wizard*.

Step 1 - What would you like to do?



2. Select the **Empty project** option.
3. Click the **Next** button.
4. **Step 2 - Properties**
Enter the corresponding properties of the project (name, order number etc.) in the input fields.
 - Enter desired **Properties**.
 - The **Name** can be found later in the *Project view* as the name of the project element.
5. Click the **Next** button.
6. **Step 3 - Memory location**
As **Project name** the previously entered **Project designation** is suggested. If required, correct the suggestion accordingly.
 - The **Project name** at the same time is the name for the project directory to be created.
 - Specify the storage location for the project directory in the **Directory** input field.
 - If the folder specified is not available, it will be created.
 - As an alternative you can select an existing directory in your workplace environment via the **Browse...** button.
 - The *Always save projects here* option determines the folder specified to be the standard storage location for future »Engineer« projects. Activate this option for the central management of all projects within the same folder.
7. Click the **Next** button.
8. Press **Complete** to create the project with the defined settings.

Getting started: creating a project

Opening the project file



Tip!

- The individual elements in the *Project view* can be edited any time.
- The standard memory location for »Engineer« projects can be defined any time via the menu command **Tools→Options** in the **Environment** tab. ▶ [Options for the representation/project memory location](#) (📖 29)

Next steps

The next step is to create a system structure. ▶ [Anlagenmodule einfügen](#) (📖 53)

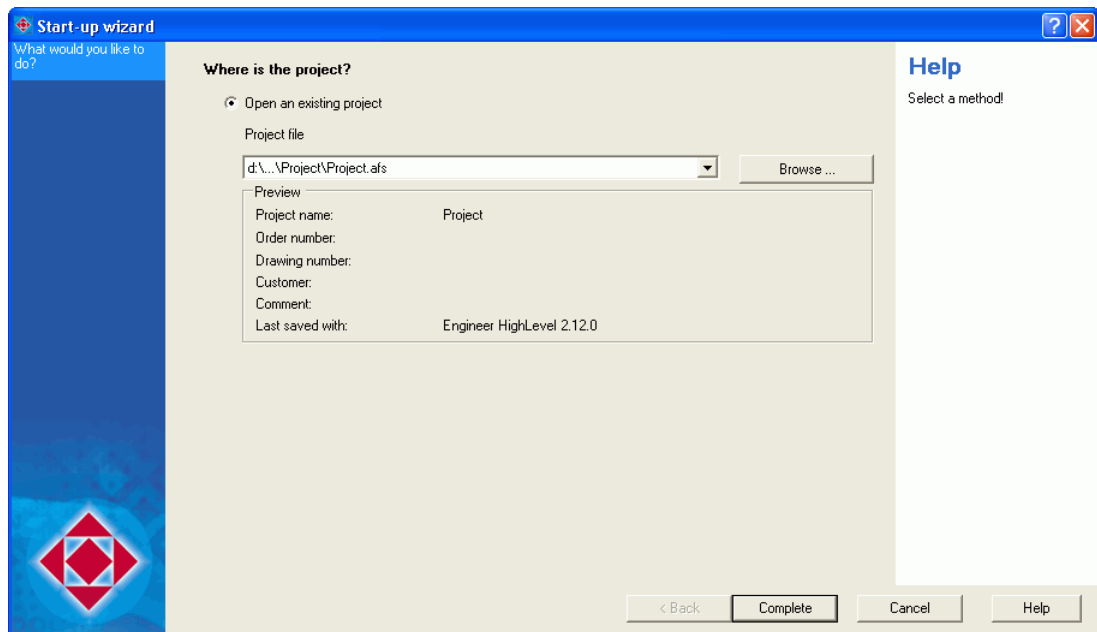
4.2 Opening the project file



How to open an existing project:

1. Click the  icon or select the menu command **File→Open** to call the *start-up wizard*.

Step 1 - What would you like to do?



2. In the **Project file** list field, select one of the recently processed project files or click the **Browse...** button to select an existing project file (*.afs format, ) in the workspace environment.
 - The *Preview* area shows additional details for the project selected, which you can add during saving the project. Like this the respective project can be better identified.
3. Press the **Complete** button to open the selected project file.

- If a project is opened (from »Engineer« HighLevel V2.12) that was created in a previous »Engineer« version, the data structure of the project is automatically optimised. Thus, the optimised project can then only be used with the current »Engineer« version (and higher).

Getting started: creating a project

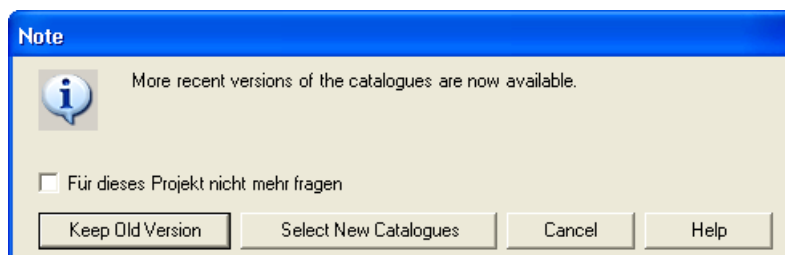
Updating projects while opening them: Adapting project file from previous version

- If a project to be opened contains out-of-date catalogues, you can update the catalogue versions for this project. ▶ [Updating projects while opening them: Adapting project file from previous version](#) (📖 39)

4.3 Updating projects while opening them: Adapting project file from previous version

This function is available from »Engineer« HighLevel V2.9!

The »Engineer« is downwards compatible to project files which have been created with a previous version. It is reasonable to update the project file of the previous version. When a project is opened with out-of-date catalogue versions, the following note dialog box appears:



Tip!

If you do not want to update the catalogues of a project continuously to newer catalogue versions, the query can be switched off. For this purpose, activate the checkbox *Do not ask any more for this project*. Afterwards save the project in order to activate the setting.



Note!

If the **Keep old version** button is inactive, the catalogue versions of the elements used are not available in the »Engineer«. Therefore, unchanged opening of the project is not possible.

Button	Function
Keep old version	The project maintains its previously used versions of multiple existing catalogue packages. For single existing catalogue packages, a selection is not possible. In this case, the »Engineer« always uses the present version. If you open an unchanged project, you can nevertheless update the catalogue versions subsequently.
Select new catalogues	Opens the <i>Update catalogues</i> dialog box for selecting the new catalogues. ▶ Updating catalogues (📖 40)

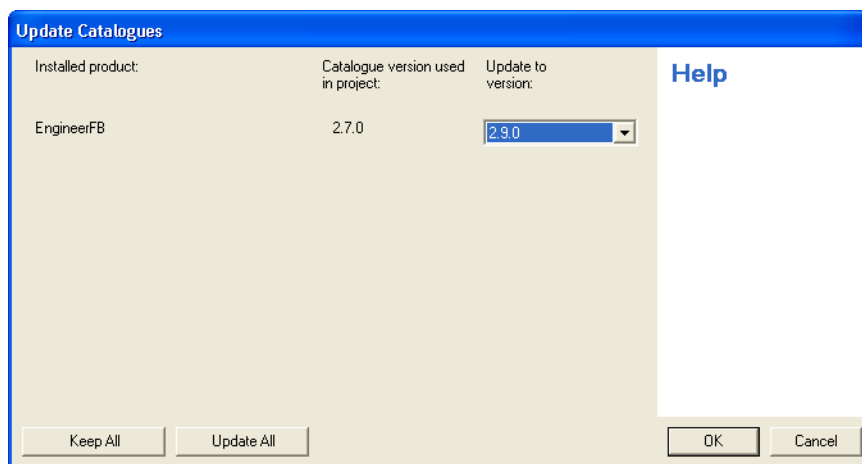
4.4 Updating catalogues

This function is available from »Engineer« HighLevel V2.9!

The *Update catalogues* dialog box can be called by ...

- ... clicking the **Select New Catalogues** button in the note dialog box when opening a project with previous catalogue versions.
- ... selecting the **Tools→Catalogues** menu command and clicking the **Select New Catalogues** button in the *Catalogues* dialog box. If the button is grayed out, no new catalogues are available.

The catalogues used so far in the project can be updated in the *Update catalogues* dialog box:



The *Installed product* is the multiple existing catalogue package (example: *EngineerFB*). The project uses a certain version of the catalogue package. The previous and higher versions available are provided for an update.

Button	Function
Keep all	Keep the catalogue versions used in the project so far.
Update all	Select the highest available catalogue version for all catalogue packages displayed in the dialog box.
OK	Open the project with the selected catalogues.
Cancel	Do not open the project.



Note!

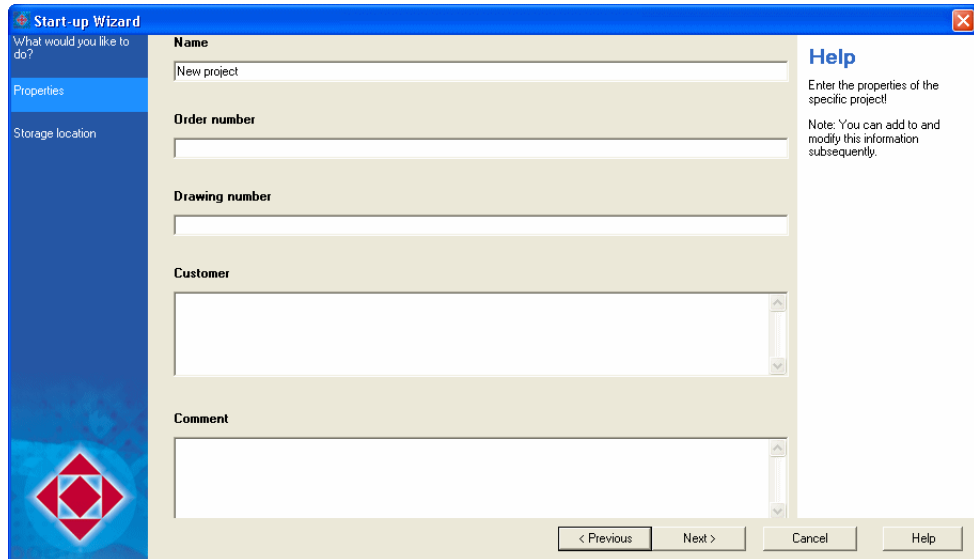
- If the **Keep all** button is inactive, the catalogue versions used so far are not available in »Engineer«. »Engineer« marks the missing versions in red.
- For a permanent update of the catalogues, the project has to be saved. If the project is closed without being saved, the dialog box will appear again when the project is reopened.
- Independently of whether you use new catalogues when opening the project or not, the project cannot be opened again with an older »Engineer« version after being saved. The saved project can only be opened with the respective »Engineer« version used.

Getting started: creating a project

Project properties

4.5 Project properties

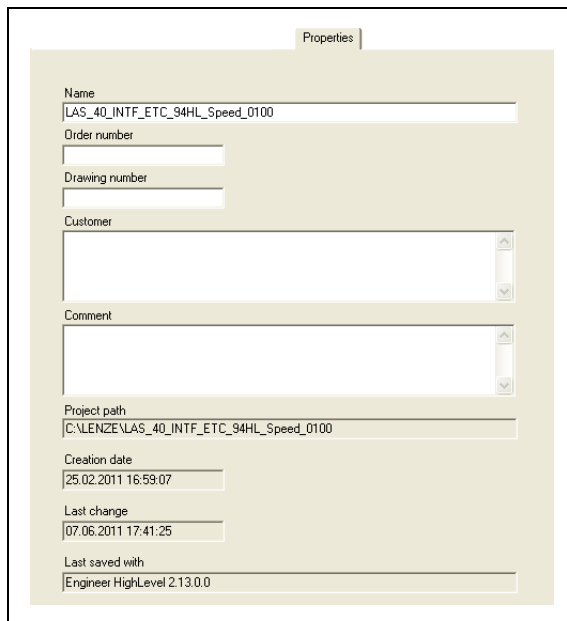
The properties of a project can be defined initially during creation in the start-up wizard:



The Start-up Wizard dialog box is shown with the 'Properties' tab selected. The 'Name' field contains 'New project'. The 'Order number', 'Drawing number', 'Customer', and 'Comment' fields are empty. A 'Help' button is located on the right side of the dialog. The 'Previous' and 'Next' buttons are at the bottom.

The project properties entered in the *Start-up wizard* can be changed any time later on.

- Go to the *Project tree* and select the Glossary in order to display the *Properties* tab for the project in the *Workspace*.



The Properties tab in the Project tree is shown. The 'Name' field contains 'LAS_40_INTF_ETC_94HL_Speed_0100'. The 'Order number', 'Drawing number', 'Customer', and 'Comment' fields are empty. The 'Project path' field contains 'C:\LENZE\LAS_40_INTF_ETC_94HL_Speed_0100'. The 'Creation date' field contains '25.02.2011 16:59:07'. The 'Last change' field contains '07.06.2011 17:41:25'. The 'Last saved with' field contains 'Engineer HighLevel 2.13.0.0'.



Tip!

The data entered when saving a project will be available as a preview when the project is opened.

Memory location

In addition to the project file (*.afs format, ) , a project includes other directories and files that are stored in a project directory.

Getting started: creating a project

Save a project

- The name and path for the project directory can be selected in the *Start-up wizard*.
- The **Standard memory location** for »Engineer« projects can be changed later: ▶ [Options for the representation/project memory location](#) (p. 29)

4.6 Save a project



Note!

In the »Engineer«, projects can be used which have been created with a previous version. After the project file has been saved in the current »Engineer« version, the structures are adapted to the new version. Hence, the project file cannot be used anymore together with the previous »Engineer« version.



Click the  symbol or select the **File→Save** menu command in order to save the project.

Alternatively: Use the **File→Save as** menu command to save your project. In this case, the *Save as...* dialog box will appear. In this dialog box you can change the project data or save the project under a different name. The length of the designation will also be checked.



Tip!

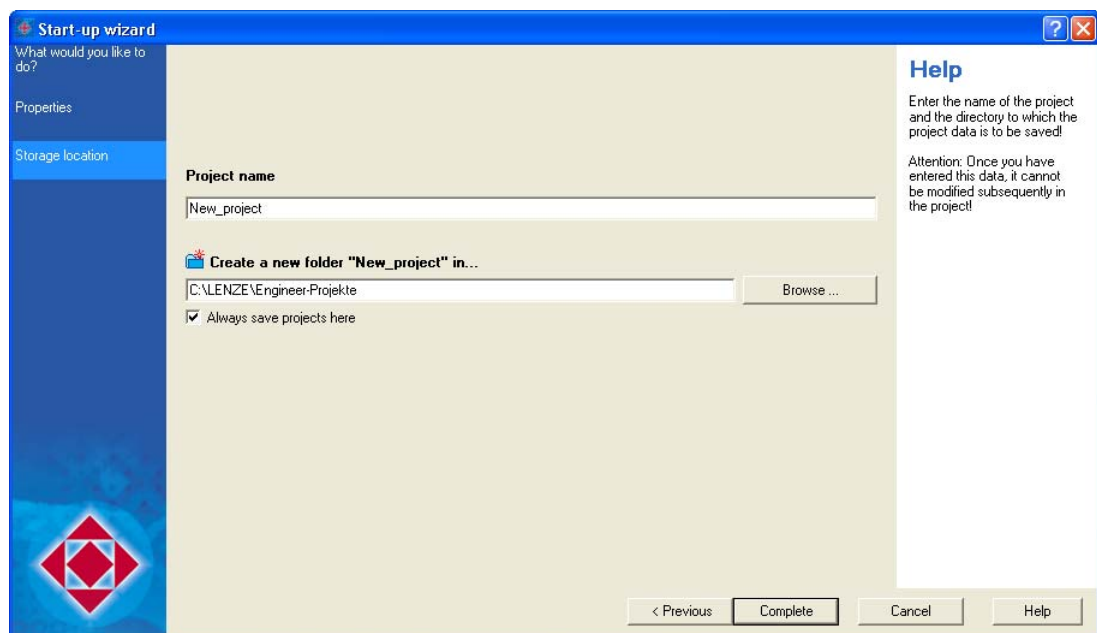
- Save the project at regular intervals to protect your work from power failure or system problems.
- When saving a project ([as of »Engineer« HighLevel V2.14](#)) that has been created in a previous »Engineer« version, you can optimise the data structure of the project. Confirm this query to reduce the memory requirement of the project file.

Defining the memory location

The **Standard memory location** for projects can be defined initially in the start-up wizard. For this, activate the option *Always save projects here* to specify the indicated directory as standard memory location.

Getting started: creating a project

Managing projects in a packed archive



- During the work with the project the standard memory location can be altered via the menu command **Tools→Options** . ▶ [Options for the representation/project memory location](#) (429)

4.7 Managing projects in a packed archive

This function is available from »Engineer« HighLevel V2.9!

In addition to the regular saving of the project you can also save the project to an archive. The »Engineer« will save the project to a packed archive file (ZIP format) which for instance is suitable for the transfer via e-mail or which can be used as a backup copy. Saved archives can be opened in the »Engineer«.

▶ [Saving an archive](#) (43)

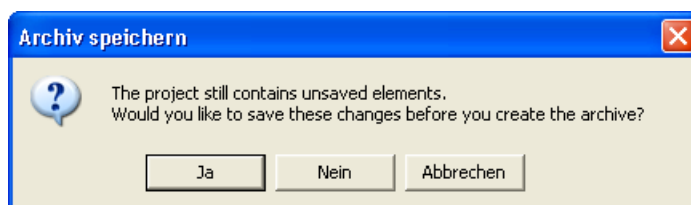
▶ [Open an archive](#) (44)

4.7.1 Saving an archive



How to save a project to an archive:

1. Execute the menu command **File→Save archive**,
 - If the project has not been saved yet, a dialog box will pop up:



2. Assign an optional password.

Getting started: creating a project

Managing projects in a packed archive

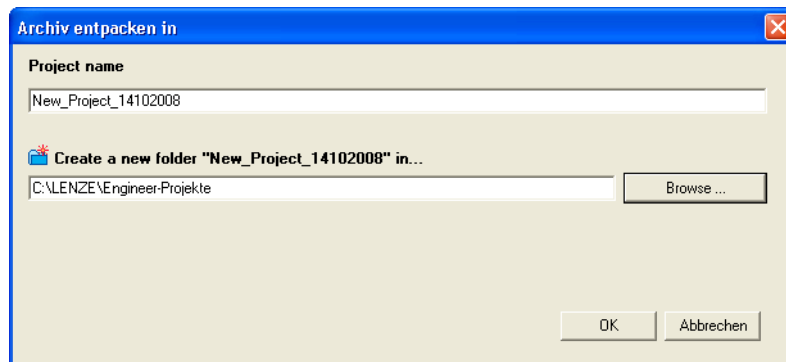
3. Select a storage location for the archive.
 - By activating the *Divide into files* checkbox, you can split up the archive into several files. Specify the respective file size in the associated input field. [This function extension is available from »Engineer« HighLevel V2.10 upwards.](#)
4. Save the archive under the file name specified.

4.7.2 Open an archive



How to open an archive saved using the »Engineer«:

1. Execute the menu command **File→Open archive**,
2. Open »Engineer«-project archive
 - Select the project archive saved in ZIP format.
3. Select the destination folder for unpacking the archive:



4. Assign a project name.
5. Select a storage location.
6. Click the **OK** button to unpack the archive in the destination folder specified and to open it afterwards.

5 Mapping the system structure in the »Engineer« project

The »Engineer« provides for a cross-device parameterisation, configuration, and diagnostics of individual components and machine control systems. For this, map the system structure of your automation system in the »Engineer«.

Getting started

In the *project tree*/device tree, you create the hierarchical project structure that usually results from the following components:

- ... the functional division of the whole system into different partial systems/modules (e.g. conveyor and press) as well as from
- ... components of the automation system (e.g. inverters, control systems, motors).



Tip!

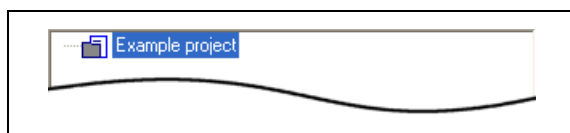
On the basis of your system you can represent this structure 1:1 in the »Engineer« project.

You can modularise the structure of the machine system with several system modules/axes.

General procedure

Step	Activity
1st	► Modularising with system modules and axes (47)
2nd	► Inserting components (51)
3rd	► Inserting a gearbox (67)
4th	► Documentation - Add project details (71)

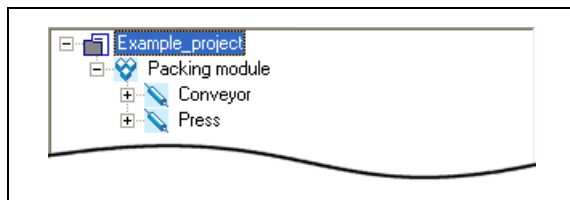
Representing the real system structure in the project tree



- If you create a new (empty) project, all that can be seen at first in the *Project tree* is the Project root including the project name.

From here you can add items to the system structure by inserting other system modules and/or axes: **Right-click** the desired project element→Insert system module/**Insert axis**

Extending the system structure



- In our example project, the projected system includes a *Packing module* system module.
- The packing module is divided into two axes: *Conveyor* and *Press*.

► [Inserting system modules](#) (47)

► [Inserting an axis](#) (48)

Mapping the system structure in the »Engineer« project

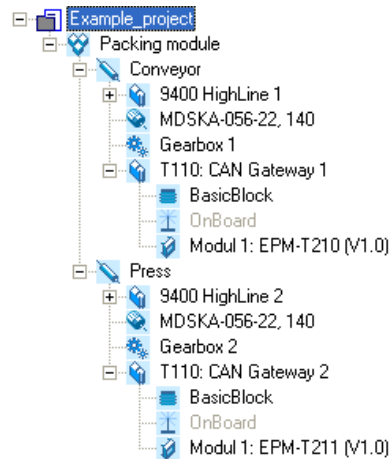


Tip!

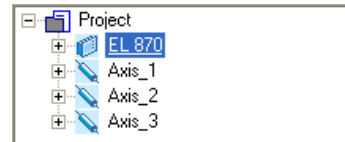
Name the individual system modules uniquely. Orient yourself on your real machine structure in order to be able to clearly identify the individual project elements.

Inserting components

After the system structure has been represented in the form of system modules and axes, the suitable components (inverters, motors, I/O systems, gearboxes, etc.) must be inserted:



Example 1: Two 9400 HighLine drive controllers



Example 2: EL 870 controller

[5-1] Examples of projects with different components



[Inserting components](#) (51)

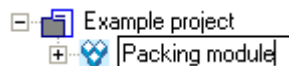


Tip!

For documentation purposes, every element in the *Project view* can be provided with notes and file attachments (images, circuit diagrams, CAD data, etc.).

Documentation referring to the whole system can be attached to the Project root, for instance. ▶ [Documentation - Add project details](#) (71)

If you select an element in the *Project view* and press the <F2> function key, you can change the name of the element:



- Press the <Input key> to accept the change, or the <ESC> key to discard the change.

Ambiguous designation

If the name of a component already exists in a project, it will be symbolised by the following icon:



- By specifying the **Current designation** and the **Designations already assigned** you can define a **New designation** in order to be able to clearly identify the corresponding component in the project.

Mapping the system structure in the »Engineer« project

Modularising with system modules and axes

Next steps



Network

Have all components of the real machine structure been inserted into the project structure?

- Now the system structure can be extended by the networks available in the system by using the network representation.
▶ [Inserting & configuring a network](#) (📖 202)

5.1 Modularising with system modules and axes

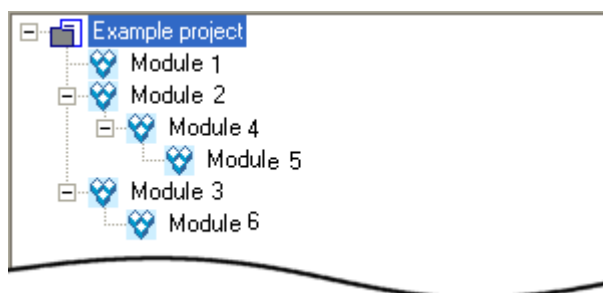
In the *Project tree*, you can structure certain elements of a machine by means of a **System module** or an **Axis**.

- A system module includes the implementation of a specific function (e.g. winding, positioning, pressing) within the entire system.

Form of modularisation	Description
System module 	A system module ... • ... can include devices, communication networks, applications and documentation. • ... can include other system modules and one or more axes.
Axis 	An axis ... • ... represents a defined variant of a system module and generally includes at least one controller and one motor. • ... can include other devices such as gearboxes in addition.

5.1.1 Inserting system modules

You can insert system modules to represent a clearly arranged system structure with multiple levels:

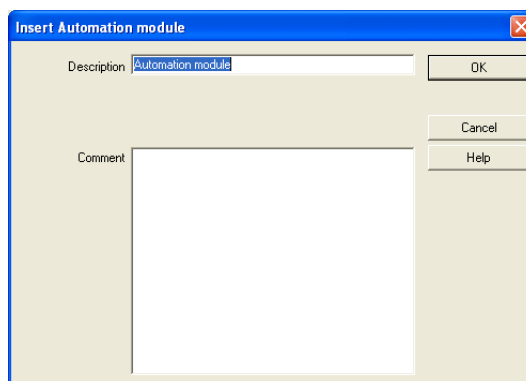


How to insert a system module:

1. In the *Project view*, either select ...
 - ... the project element , or
 - ... the desired system module  another system module is to be inserted into.
2. Click the .

Mapping the system structure in the »Engineer« project

Modularising with system modules and axes



- Enter the **Description** of the system module.
 - Enter an optional **Comment** for the axis which helps identifying the axis during later edition.
3. Click the **OK** button to insert the system module into the selected element.

Components, properties & documentation

If a system module is selected in the *Project view*, the *Workspace* contains the **Components**, **Properties** and **Documentation** tabs.

Tab	Contents
Components	All components of the system module
Data logger	▶ Data logger (📖 111)
Product features	General information about the system module (e.g. version and person in charge)
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (📖 71)

5.1.2 Inserting an axis

In order to represent hierarchical system structures, you can insert one or more axes into the project element or into a lower-level system module to achieve a clearly arranged project structure.

- An axis ...
 - ... represents a specific variant of a system module.
 - ... includes at least one controller and one motor and, depending on the application, can include other devices such as gearboxes and encoders in addition.



Tip!

If you have inserted an axis, you can also select the further components of the axis (drive controller, motor, gearbox, etc.). This saves you from having to call the **Add component** function again.



How to insert an axis:

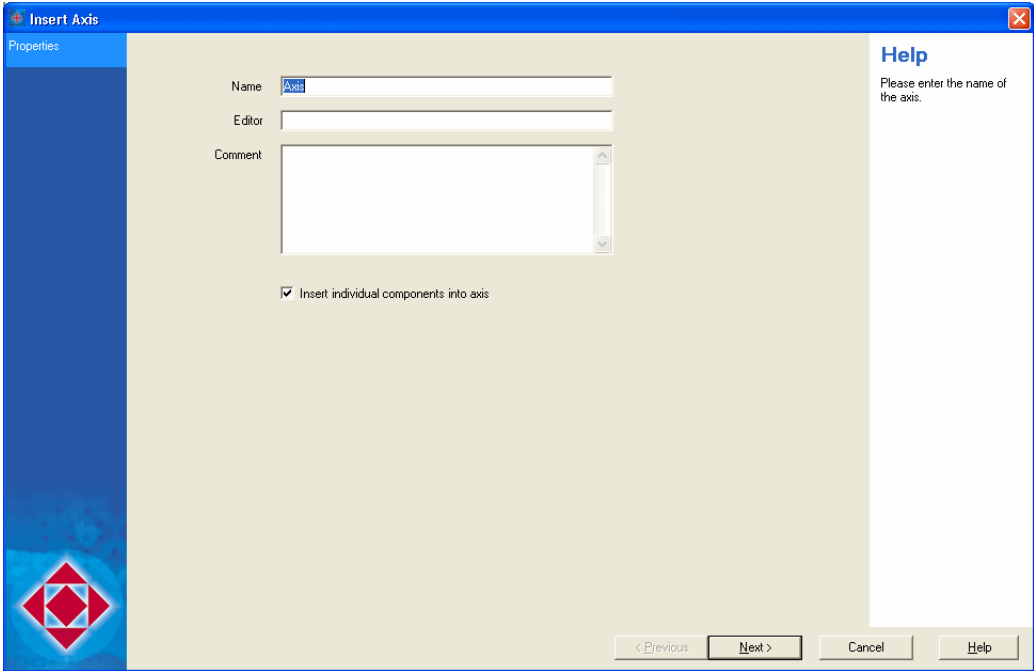
1.  Open the *Project view* and select the system module into which the axis is to be inserted.
 - An axis can directly be inserted into the project element.

Mapping the system structure in the »Engineer« project

Modularising with system modules and axes

2. Click the  icon to open the wizard for adding an axis.

Step 1 - Properties

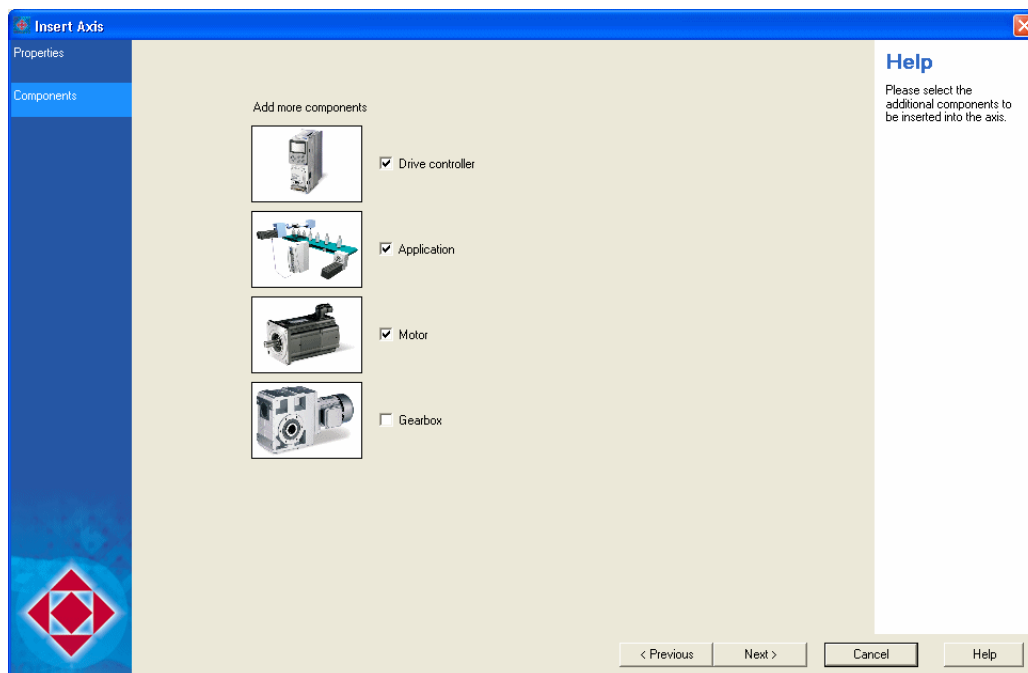


3. Enter the **Description** of the axis.
 - Enter an optional **Comment** for the axis which helps identifying the axis during later edition.
 - If the control field **Insert individual components into the axis** has been activated, you must click the **Next** button to select the components (drive controller, motor, etc.) that the axis is to contain.
4. Press **Continue** or **Complete**.
 - Optionally, you can **Insert individual components into axis** or insert other components later on.

Mapping the system structure in the »Engineer« project

Modularising with system modules and axes

Step 2 - Components



5. Select the components to be contained in the axis.
6. Click the **Next** button.
 - In the following steps, you can select the desired components for the axis.
 - Click **Complete** to insert the axis with the selected components into the highlighted project element.

Components, properties & documentation

If an axis has been selected in the *Project tree*, the *Workspace* contains the **Components**, **Properties** and **Documentation** tabs.

Tab	Contents
Components	All components of the axis
Data logger	► Data logger (📖 111)
Product features	General information about the axis (e.g. version and person in charge)
Documentation	Optionally, notes regarding the device module and file attachments can be added. ► Documentation - Add project details (📖 71)

5.2 Inserting components



Tip!

Divide the real machine structure into functional subsystems which are structured by means of system modules  and axes  in the »Engineer«. Then, insert the desired components inside the system modules/axes into the project structure.

Component	Example	Icon	Description
Controller			▶ Inserting controllers (43 53)
Motors			▶ Inserting a motor (43 58)
I/O system			▶ Inserting an I/O system (43 60)
Power supply module			▶ Inserting a power supply module (43 63)
Remote maintenance			▶ Inserting the remote maintenance (43 66)

Applications & device modules

When entering a controller, insert the respective application as well. ▶  [Inserting application](#) (43 55)

Optionally, device modules can be inserted into the device. ▶  [Inserting device modules](#) (43 57)



Tip!

When inserting an axis, you can select the components of the axis if you ...

- ... activate the **Select individual components of axis** control field in a first step and
- ... then select the corresponding components. ▶ [Inserting an axis](#) (43 48)

Mapping the system structure in the »Engineer« project

Inserting components

The **Show latest version only** option restricts the display of the search results to the most up-to-date versions of the respective device series.

Tabs of the different components

If a component has been selected in the *Project tree*, the *Workspace* contains various tabs.

Tab	Contents
Product features	Name and identification of the component
All parameters	Parameters of the component selected in the <i>Project tree</i>
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (📖 71)

Inserting gearboxes / Inserting components

	Icon	Description
Gearboxes		▶ Inserting a gearbox (📖 67)
Components ... • ... recognised online • ... from a referential project		▶ Inserting a device detected online (📖 67) ▶ Insert from referential project (📖 70)

Mapping the system structure in the »Engineer« project

Inserting components

5.2.1 Inserting controllers

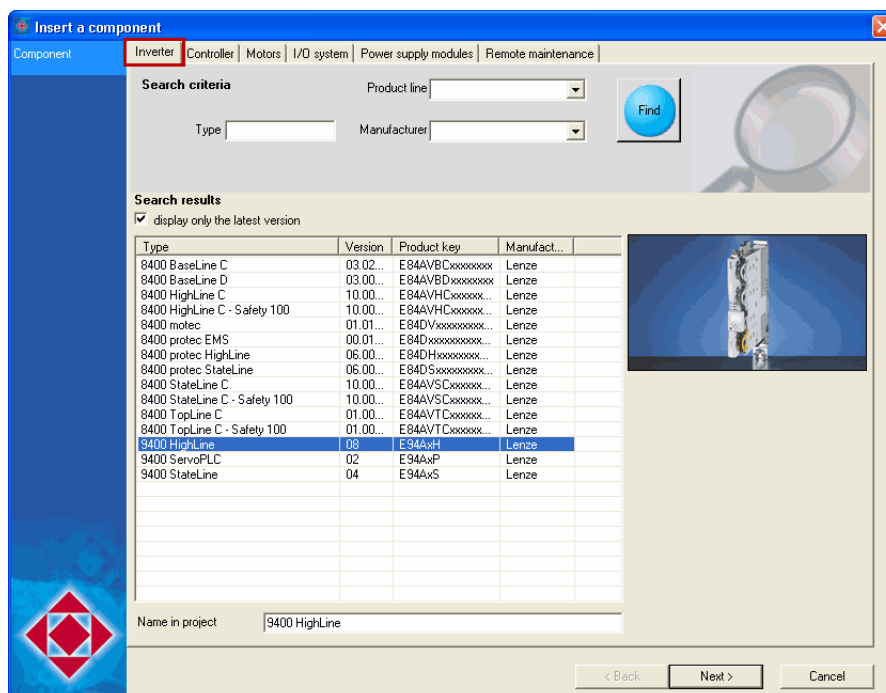


How to insert a drive controller:

1. Open the *Project view* and select the desired system module / axis the drive controller is to be inserted into.
2. In the *Toolbar*, click to open the insertion wizard.

Step 1 - component/device series (example: 9400 HighLine)

3. Select the **Controller** tab.
 - The **Search results** list field shows the controllers which can be used together with the »Engineer«:



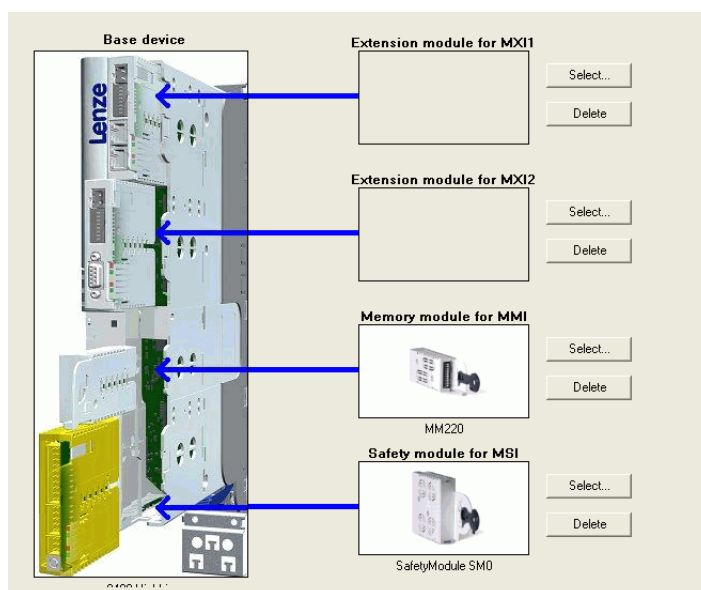
- Optionally, you can define **Search criteria** for restricting the **Search results**.
 - Click the **Search** button to update the search results.
4. Select the controller to be inserted in the **Search results** list field.
 5. Click the **Next** button.

Step 2 - Device modules (example: 9400 HighLine)

Select the device modules plugged in the device.

Mapping the system structure in the »Engineer« project

Inserting components



- **Select/Delete** desired device modules.

6. Click the **Next** button.

7. **Step 3 - application**

Select the application of the automation solution you want to implement.

8. Click the **Next / Complete** button to insert the controller.

- If no other components have been selected, the controller will be inserted into the selected axis / system module without any other components.

► [Inserting application](#) (55)

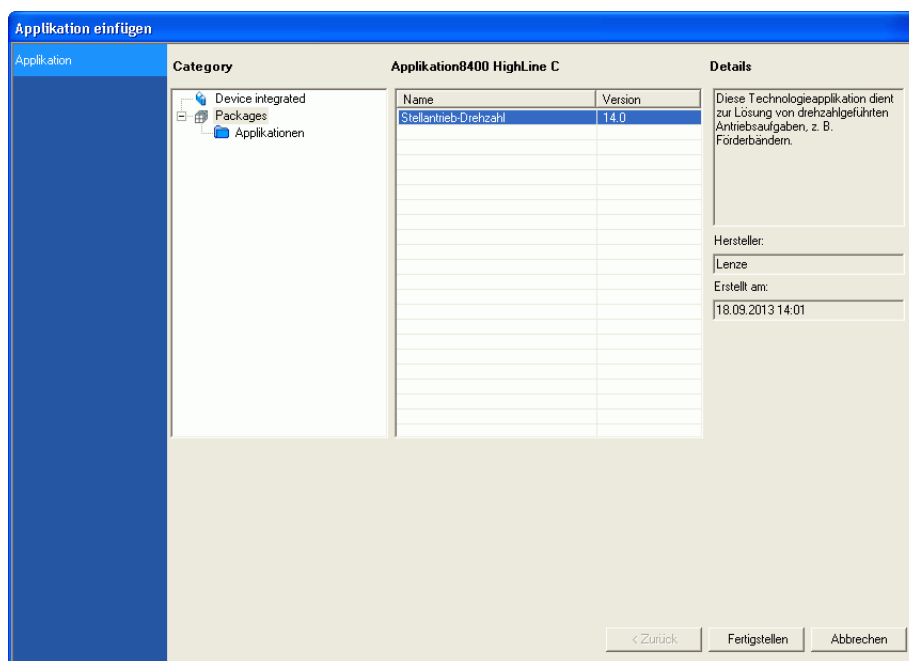
Mapping the system structure in the »Engineer« project

Inserting components

5.2.2 Inserting application

While inserting a controller as component, you can directly select the application. An application can be subsequently inserted to the controller via right-click: **Insert→Application**

Example: Inverter Drive 8400



Category/icon		Contents
	Inside the device	Displays the integrated technology application.
The following categories are available after you have exported an application package from the »Engineer« and imported it into the »EASY Package Manager«: ▶ Export applications to a Lenze package (LPK file) (□ 267)		
	Packages	Applications available in the »EASY Package Manager« as Lenze packages.
	• Applications	Displays the previously applications exported from the »Engineer« and imported to the »EASY Package Manager« which have been created by Lenze.
	• User applications	Displays the user-defined applications which have been exported from the »Engineer« and imported to the »EASY Package Manager« .

Mapping the system structure in the »Engineer« project

Inserting components

Example: Servo Drives 9400



Tip!

Activate the **Show latest version only** option to only display the most up-to-date versions of the respective applications.

Insert a component

Component

Device Modules

Application

Additional components

Filter criteria

Name Type

Id

☒ display only the latest version

Search results

Name	Version	Type	Id
Actuator - Speed	4.0.1	Standard	100102101
Actuator - Torque	4.0.1	Standard	100202101
CiA402	2.0.0	Standard	110102102
Electronic gearbox	5.0.1	Electrical shaft	100302202
Electronic gearbox MotionBus	5.0.1	Electrical shaft	100302102
No application	1.0.1	Standard	100000000
Synchronism with mark synchronisation	5.0.1	Electrical shaft	100402202
Synchronism with mark synchronisation...	5.0.1	Electrical shaft	100402102
Table positioning	5.0.1	Positioning	100502101

Details

Function with speed ramp generators for simple speed control tasks.

< Back Next > Cancel



Note!

If you select **No application**, a so-called "empty" application is assigned to the drive controller, which you can replace with another application any time.

Mapping the system structure in the »Engineer« project

Inserting components

5.2.3 Inserting device modules

Optional device modules (such as memory modules, safety modules, function modules and/or communication modules) can be inserted into the controller when a project is created or any time later on.



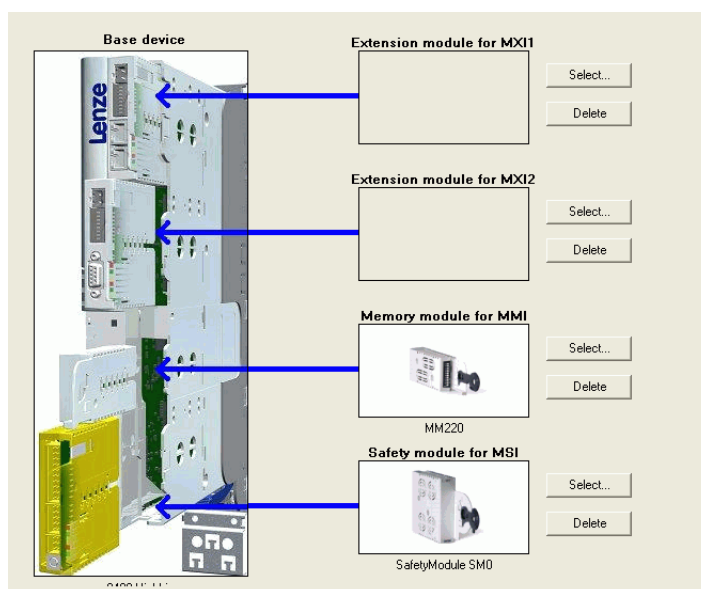
Tip!

- The steps described in the following instructions must be carried out to replace the device module assigned to a device by another device module.
- The **Show latest version only** option restricts the display of the search results to the most up-to-date versions of the respective device modules.

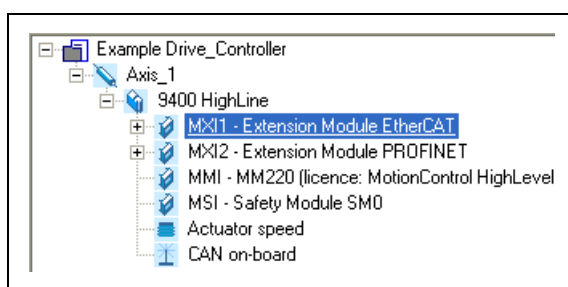


How to insert device modules into a device:

1. In the *Project tree*, select the device  the device modules are to be inserted into.
2. In the *Toolbar*, click on .



- The device modules assigned to the device are visible.
 - **Select ... / Delete** desired device modules.
3. Click the **Complete** button to insert the device modules into the controller.



- The inserted device modules are visible in the *Project tree* below the device.

Mapping the system structure in the »Engineer« project

Inserting components

Memory module manager, properties & documentation

If a device module has been selected in the *Project tree*, the *Workspace* contains the **Properties**, **Memory module manager** and **Documentation** tabs.

Tab	Contents
Memory module manager	All parameters of the memory module
Product features	Name and identification of the memory module
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (📖 71)

5.2.4 Inserting controllers

This function is available up to »Engineer« HighLevel V2.17!

From »Engineer« version V2.18 on, the industrial PCs (Controllers) of the Lenze automation system "PC-based Automation" cannot be used anymore as components. Existing »Engineer« projects which contain Controllers as components can continued to be used.

5.2.5 Inserting a motor



Tip!

When inserting an axis, you can also select a motor and other components if you ...
... activate the **Select individual components of axis** control field in a first step and
... then select the corresponding components. ▶ [Inserting an axis](#) (📖 48)

You can insert Lenze motors or user motors. For this purpose, a catalogue of user motors must be available. Information on how to create and use user motors is provided in the following chapter:

▶ [User motors](#) (📖 293)

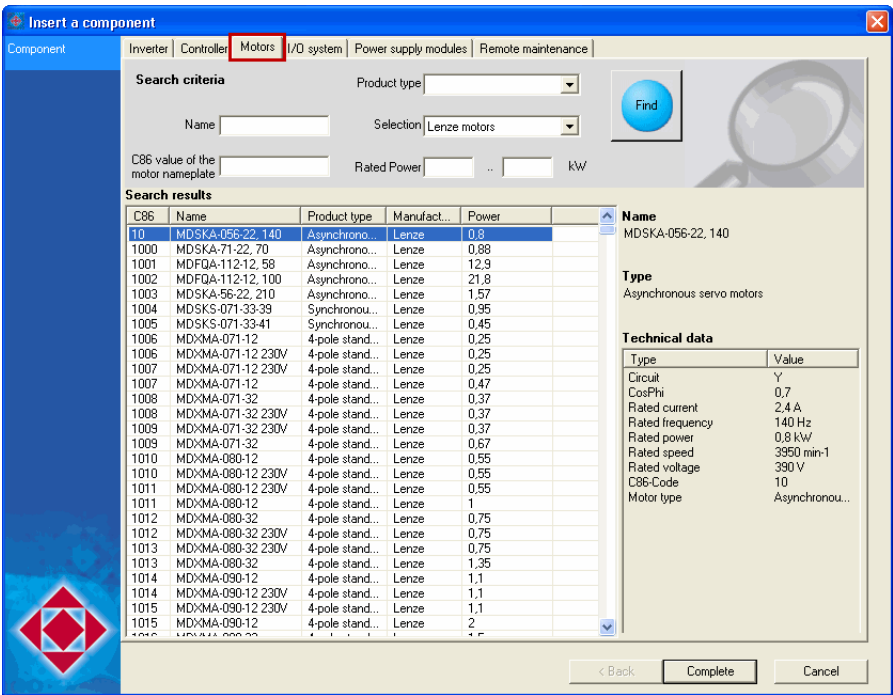


How to insert a motor:

1. Open the *Project tree* and select the desired system module  or axis  the motor is to be inserted into.
2. In the *Toolbar*, click  to open the insertion wizard.
Step 1 - Component
3. Select the **Motors** tab.

Mapping the system structure in the »Engineer« project

Inserting components



- The **Search results** list field displays all available motors.
 - Select Lenze motors or user motors from the **Selection** list field.
 - Optionally, you can define **Search criteria** for restricting the **Search results**.
 - Click the **Search** button to update the search results.
4. Select the motor to be inserted in the **Search results** list field.
 5. Click the **Complete** button to insert the motor.

Motor parameters, properties & documentation

If a motor has been selected in the *Project tree*, the *Workspace* contains the **Motor parameters**, **Properties** and **Documentation** tabs.

Tab	Contents
Motor parameters	All parameters of the motor and the respective controller
Product features	Name and identification of the motor
Documentation	Optionally, notes regarding the device module and file attachments can be added. ► Documentation - Add project details (71)

Mapping the system structure in the »Engineer« project

Inserting components

5.2.6 Inserting an I/O system

In the »Engineer«, the I/O system 1000 and compact as well as modular IP20 systems are available.

- Modular I/O systems offer the advantage of a flexible modular structure where individual modules can be relocated.



Detailed information on the "I/O system IP20" can be found in the "I/O system IP20 (SHB)" system manual.

Detailed information on the "I/O system 1000" can be found in the "I/O system 1000 system manual (SHB) - Modular I/O system"

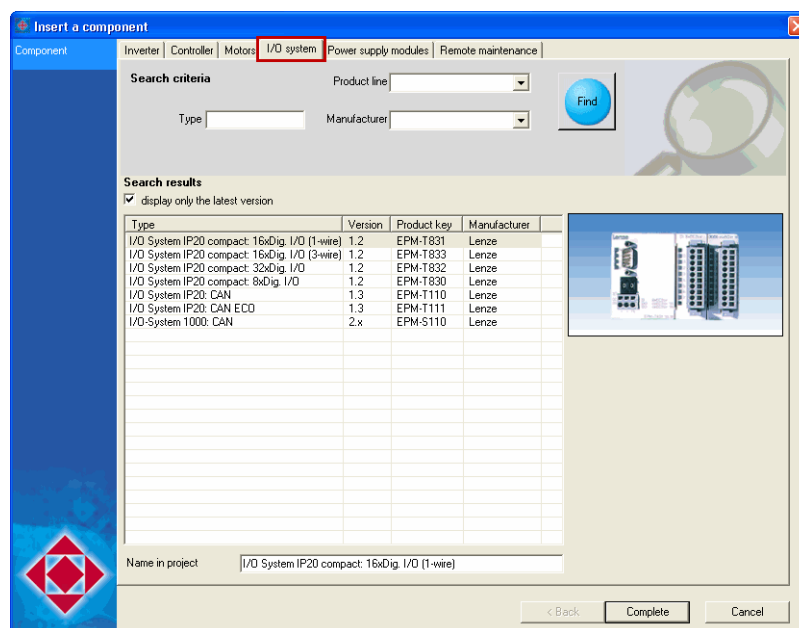


How to add an I/O system:

1. In the *Toolbar*, click to open the insertion wizard.

Step 1 - Component

2. Select the **I/O system** tab.



- The **Search results** list field displays all available I/O systems.
 - Optionally, you can define **Search criteria** for restricting the **Search results**.
 - Click the **Search** button to update the search results.
3. Select the I/O system to be inserted in the **Search results** list field.
 4. Click the **Next** button.
 5. Carry out the further instructions as described in the subchapter for the corresponding I/O system:
 - ▶ [Compact I/O system IP20](#) 61)
 - ▶ [Modular I/O system IP20](#) 61)

Mapping the system structure in the »Engineer« project

Inserting components

5.2.6.1 System 1000



Further information on *Parameter setting & configuration* of the L-force I/O system 1000 can be found in the **I/O system 1000 software manual**

5.2.6.2 Compact I/O system IP20

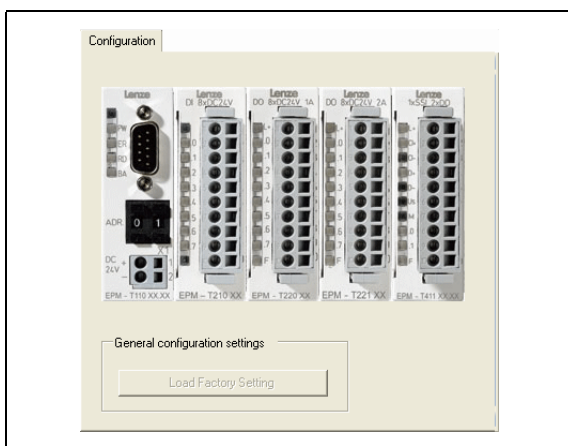
A compact I/O system has a fixed number of digital inputs and outputs.



How to add a compact I/O system:

1. Carry out steps 1 ... 5 as described in the instructions in the chapter entitled "[Inserting an I/O system \(p 60\)](#)".
2. Click the **Complete** button to insert the I/O system.

5.2.6.3 Modular I/O system IP20



[5-1] Example of a modular I/O system IP20



Note!

At least one module must be inserted at the CAN gateway base station.



How to add a modular I/O system:

1. Carry out steps 1 ... 5 as described in the instructions in the chapter entitled "[Inserting an I/O system \(p 60\)](#)".
2. Select a modular I/O system (CAN Gateway) and click the **Next** button.
3. **Attach module / Insert module** in question.
4. Click the **Complete** button to insert the I/O modules.

Mapping the system structure in the »Engineer« project

Inserting components



Note!

Depending on the inserted I/O module, different tabs are available!

Tabs of the I/O systems

If you select an I/O module in the *Project tree*, the *Workspace* contains different tabs.

CAN gateway

Tab	Contents
Configuration	Represents the I/O system.
Ports	Represents the input and output ports of the CAN gateway.
All parameters	Parameters (codes) of the I/O system.
Product features	Project / catalogue information about the I/O system.
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (📖 71)

CAN gateway module

Tab	Contents
Status	Status of the inputs / outputs.
Parameter	Parameters (codes) of the I/O system. • The parameters of the digital modules, for instance, define how the control signals must be transmitted (original / inverted polarity).
Product features	Project / catalogue information about the I/O system.
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (📖 71)

Compact modules

Tab	Function
Configuration	Represents the I/O system.
Ports	Represents the input / output ports of the I/O module.
All parameters	Parameters (codes) of the I/O system. • The parameters of the digital modules, for instance, define how the control signals must be transmitted (original / inverted polarity).
Product features	Project / catalogue information about the I/O system.
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (📖 71)

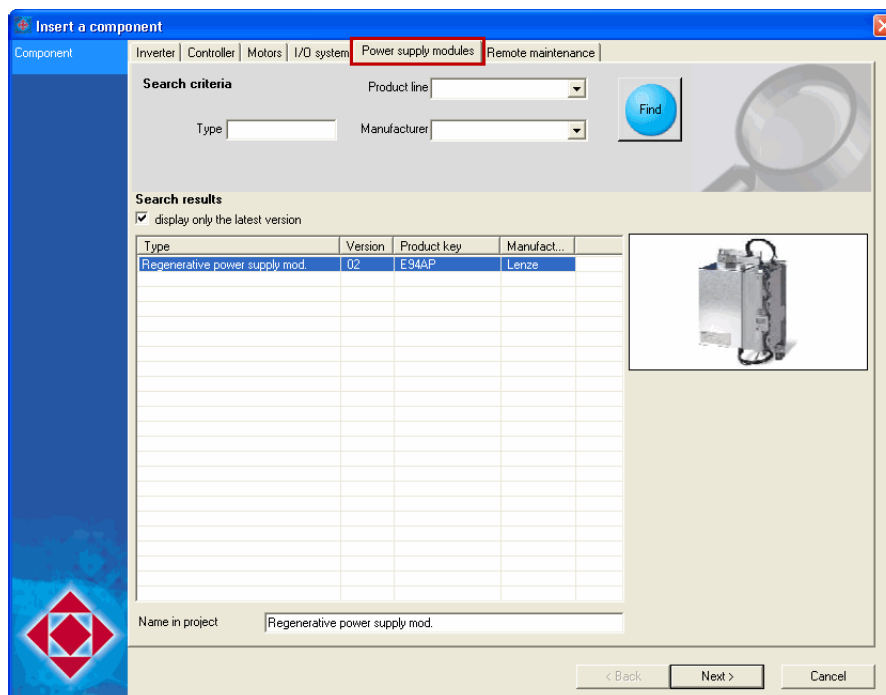
5.2.7 Inserting a power supply module



How to insert a power supply module:

1. Open the *Project view* and select the desired system module / axis the power supply module is to be inserted into.
2. In the *Toolbar*, click to open the insertion wizard.

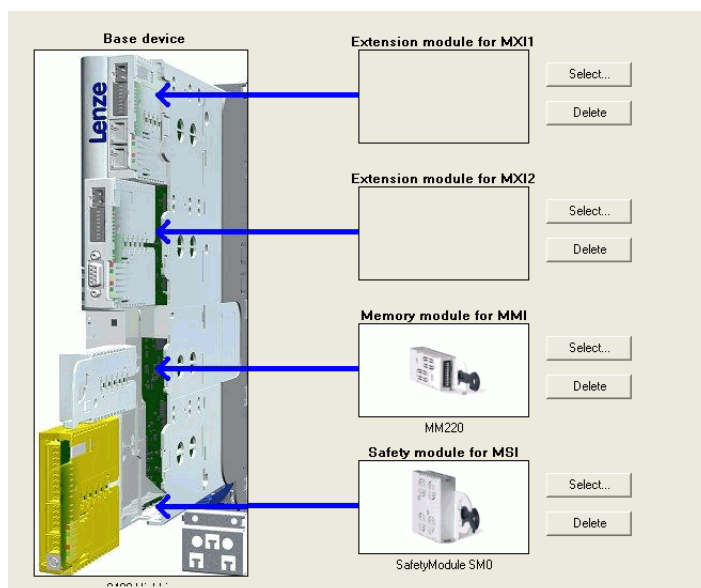
Step 1 - Component



3. Select the **Power supply modules** tab.
 - The **Search results** list field displays all available power supply modules.
 - Optionally, you can define **Search criteria** for restricting the **Search results**.
 - Click the **Search** button to update the search results.
4. Select the power supply module to be inserted in the **Search results** list field.
5. Click the **Next** button.

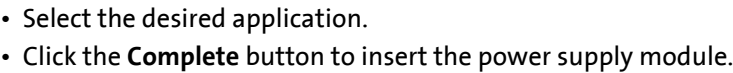
Step 2 - Device modules

- Depending on the selected power supply module, various modules can be inserted into the *Device modules* dialog box.



- The device modules assigned to the device are visible.
 - Select ... / Delete** desired device modules.
- Click the **Next / Complete** button to insert the device modules.
 - Step 3 - Other components**
Select other components that are to be inserted into the power supply module.
 - Click the **Next** button.
 - The applications for the power supply module selected are displayed.
 - If no specific device application has been selected for the device in this step, the controller will be assigned an "empty" application. The application can be replaced by another device application later on. ▶ [Inserting application](#) (p. 55)

Inserting components



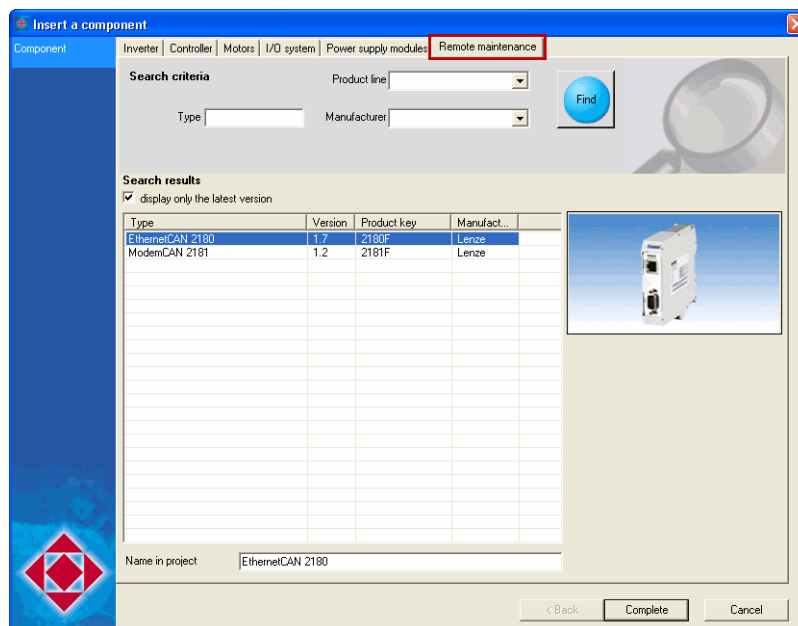
5.2.8 Inserting the remote maintenance



How to insert a remote maintenance module:

1. Open the *Project tree* and select the desired system module  / axis  the power supply module is to be inserted into.
2. In the *Toolbar*, click  to open the insertion wizard.

Step 1 - Component



3. Select the **Remote maintenance** tab.
 - The **Search results** list field displays the available **Remote maintenance modules**.
4. Select the desired remote maintenance module.
5. Press **Complete**.

Mapping the system structure in the »Engineer« project

Inserting a gearbox

5.3 Inserting a gearbox



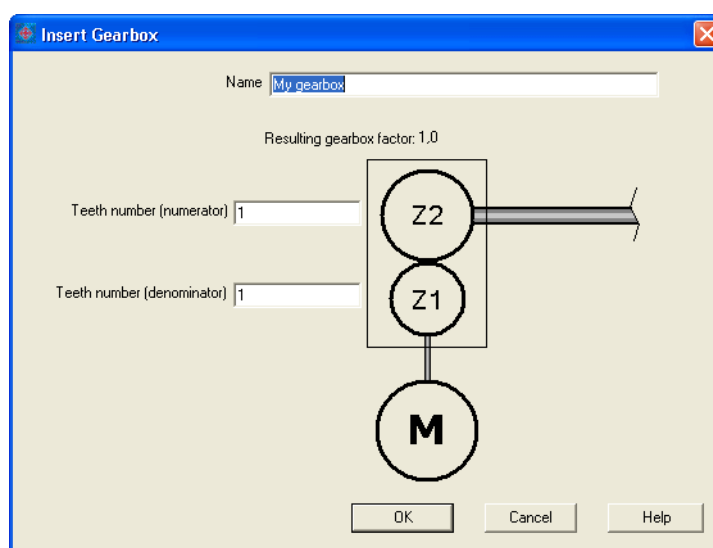
Tip!

The gearbox and other components can be selected when inserting an axis by activating the **Select individual components of axis** option in a first step. ▶ [Inserting an axis](#) (48)



How to add a gearbox:

1. Open the *Project view* and select the desired system module  / axis  the gearbox is to be inserted into.
2. In the *Toolbar*, click on .



3. Enter the **Description** of the gearbox.
4. Enter the **Teeth number (numerator)** and **Teeth number (denominator)** of the gearbox to have the resulting gearbox factor calculated.
5. Click the **OK** button to insert the gearbox into the selected project element.

Gearbox parameters, properties & documentation

If you select an inserted gearbox in the *Project view*, the *workspace* contains the **Gearbox parameters**, **Properties** and **Documentation** tabs.

Tab	Contents
Gearbox factor	Settings for the ratio and the moment of inertia of the gearbox.
Product features	Name and identification of the gearbox.
Documentation	Optionally, notes regarding the device module and file attachments can be added. ▶ Documentation - Add project details (71)

5.4 Inserting a device detected online

If the machine structure includes multiple controllers which are not contained in the *Project tree*, they can be inserted into the project via online recognition.

Mapping the system structure in the »Engineer« project

Inserting a device detected online



Note!

- For online recognition, the desired field device must ...
 - ... be switched on.
 - ... support online recognition.
- An *unidentified device/module* **cannot** be inserted into the project.

- The »Engineer« reads out the device configuration (firmware version and module assembly). The »Engineer« determines the original configuration the application was created for if this process is supported by the device.
- If there is a difference between the original and the actual configuration, you can select which configuration is to be inserted into the project tree.



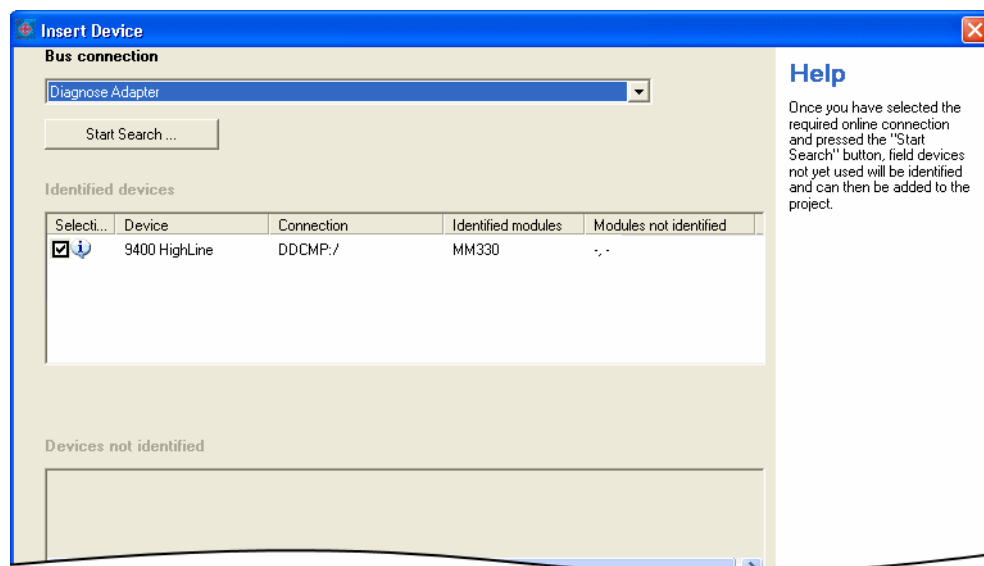
Note!

- Only the original version can be inserted if ...
 - ... the version of the safe parameter set for the SM301 safety module varies: Insertion into the project without further inquiry.
 - ... a device description for the current firmware version is missing. The »Engineer« is only provided with the version used for the original creation of the application:
The device recognised online is listed with the icon under *identified devices*.



How to insert the field device online into the project:

1. Select the desired position for insertion in the *Project tree*.
2. Select the **Insert→Device detected online** menu command.



3. Select the suitable bus connection from the **Bus connection** selection field.
4. Press **Start Search**.
 - *Identified devices* can be inserted into the project. Information provided under must be observed if the device description is not suitable.

Mapping the system structure in the »Engineer« project

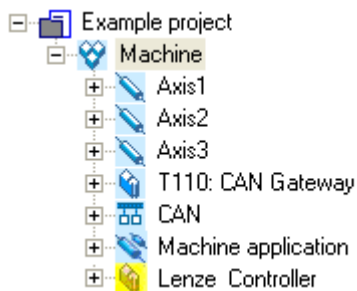
Inserting a device detected online

Note: The CAN bus connection only lists devices that are not yet included in the *Project tree*.

- *Unidentified devices* do not have suitable device descriptions. *Unidentified devices cannot* be inserted into the project.

5. Select the desired field devices and click **OK**.

- Click **Start** to transfer the device parameters to the »Engineer« project.
- Click **Close** to insert the field device (without parameter download) into the »Engineer« project.
- The field device has been inserted online into the *Project tree*:



Mapping the system structure in the »Engineer« project

Insert from referential project

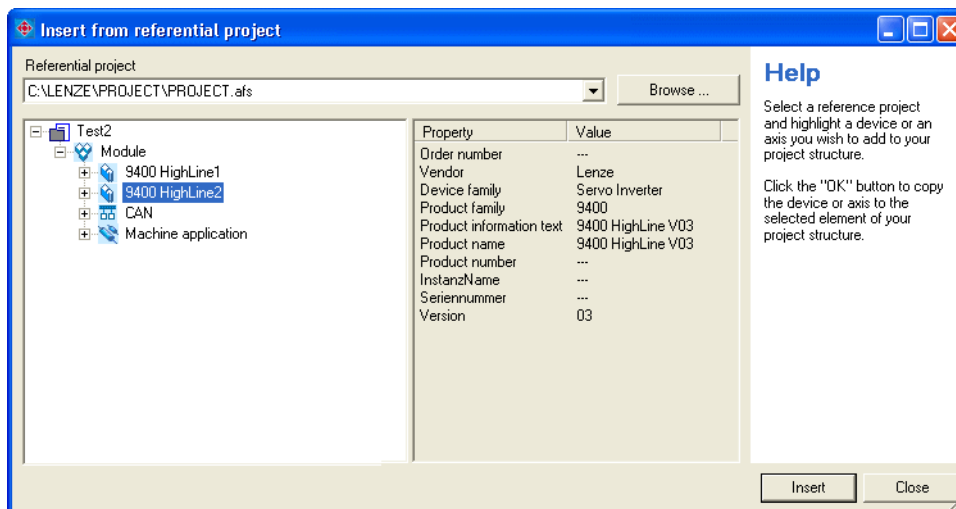
5.5 Insert from referential project

With this function you can import already configured field devices from other »Engineer« projects into a current »Engineer« project.



How to insert field devices from other projects:

1. Open the *Project view* and select the desired system module  / axis  the field device is to be inserted into.
2. Select the menu command **Insert→Insert from referential project**.
3. Click **Search** to open the desired project (*.afs format, ).



4. Select the desired field device and click **Insert**.

5.6 Replace component

Replace component enables you to replace devices of the same device series.

- It makes sense to replace a component within a project, for instance, if the device software is updated.



Note!

The function **Replace component** can only be executed within the same device series!



How to replace a component:

1. Select the component to be replaced in the *Project tree*.
2. Select the command **Replace component** in the context menu.
3. Select the desired component in the **Replacing a component** dialog box.
 - If no more recent software version of the corresponding component is available, no components can be selected.
4. After clicking **OK** the component is inserted in the project and replaces the previous component.

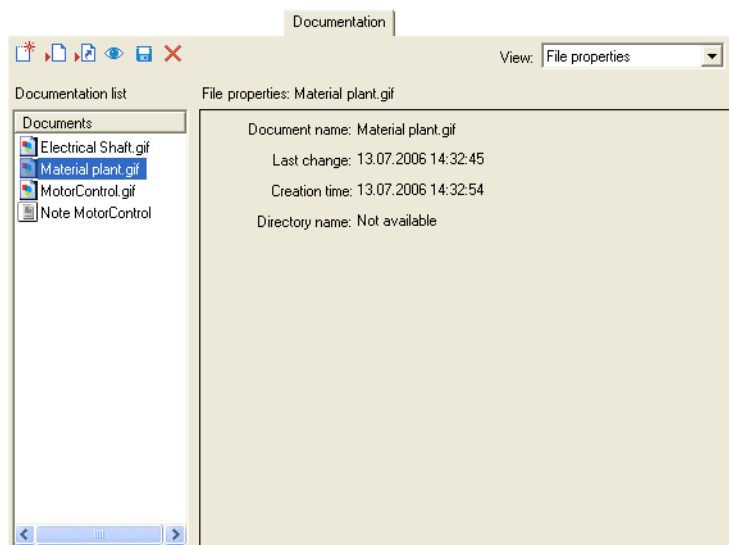
5.7 Documentation - Add project details

Every *Project element* can be added notes and file attachments via the **Documentation** tab.

- That way, detailed documentation for every project element is possible.
- Using detailed documentation, the element or the whole system can be documented and important information on the project can be made available to other people working on the project, e.g:
 - Sketches & photographs of the system,
 - Processing tasks,
 - Work instructions,
 - Circuit diagrams,
 - CAD data,
 - Lists of parts, etc.

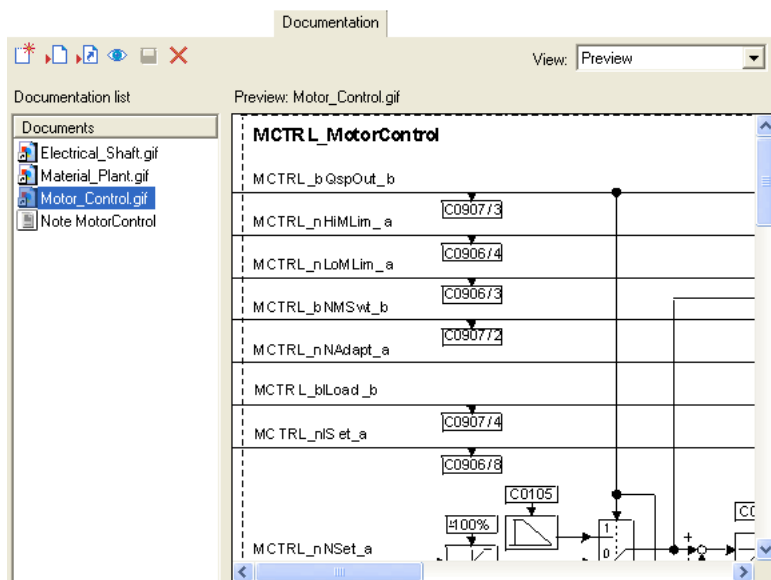
Mapping the system structure in the »Engineer« project

Documentation - Add project details



The **Documentation list** shows documents available for the project element.

On the right-hand side the properties of the element selected from the **Documentation list** are shown.



If you select the **Preview** from the **View** list field, on the right a preview of the element selected from the **Documentation list** is shown instead.



Tip!

The **Preview** shows all types of documents the Microsoft® Internet Explorer is able to display, e.g. HTML and ASCII files, graphics in the JPEG or GIF format, or PDF files..

The document types which can be shown in detail depend on the display plug-ins installed for the Microsoft® Internet Explorer.

Mapping the system structure in the »Engineer« project

Documentation - Add project details

Editing the documentation list

Icon	Function
	Insert note
	Copy file into the project • After you have selected the corresponding file within your desktop environment, a copy of this file is stored in the project folder.
	Add a linkage to a file • After you have selected the corresponding file within your desktop environment, a link to this document is stored in the project folder.
	Open document • By means of this function you can open a selected document from the documentation list.
	Save document selected • By means of this function you can save a copy of the selected document from the project folder to a selectable folder within your desktop environment.
	Delete element selected from the documentation list

Display area

Above the display area, the **View** list field shows the selection preview and the file characteristics:

Command	Function
Preview	Showing properties relating to the element selected in the documentation list
File properties	Showing a preview of the selected document or text of the selected note

5.8 Protecting safe parameters - project-related password entry

This function is available from »Engineer« HighLevel V2.14!

The »Engineer« provides a password protection which serves to protect the parameter setting of the higher-order safety functions from alterations in the project for the device series 8400 and 9400.

The password...

- ... can be set on the *Protection* tab if the project root has been selected in the project tree.
- ...is only valid inside the project (no transmission to the controller or safety module). If a password is stored in the project and this project is used, the safe parameters can only be edited after the password has been entered.



How to activate the protection of the save parameters:

1. Select the project root  in the project tree.
2. Assign the desired password on the *Protection* tab.
 - After the password has been set, the safe parameters (tab *Safe configuration*, safe parameters) of all included devices can only be edited inside the project after the corresponding password has been entered.

6 Establishing an online connection

In this chapter you will learn about how you can establish an online connection with the »Engineer« and how you can close this online connection again.

An online connection is required to e.g. make parameter settings in the device or for diagnosing the device. The »Engineer« can have online connections to multiple devices at the same time.

To establish an online connection, the desired device / devices must

- ... be inserted into the *Project tree* and
- ... be connected to the Engineering PC via suitable communication accessories (e.g. diagnostic adapters, system bus adapters or Ethernet).



Stop!

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



Detailed information about the respective bus system can be found in the corresponding communication manual

- The functions for establishing/closing an online connection can be executed via the *Toolbar* or the **Online** menu:

Icon	Menu command	Shortcut
	Going online (📖 77)	<F4>
	▶ Setting the communication path (📖 79)	
	Bus connection	
	• Diagnostic adapter (📖 80)	
	• CAN (📖 81)	
	• Ethernet / Ethernet IPC (📖 83)	
	• PROFIBUS (📖 84)	
	• PROFINET (📖 85)	
	• Gateway controller -> CAN (📖 85)	
	• Gateway controller -> EtherCAT (📖 86)	
	• Gateway Controller -> EtherCAT ADS (Beckhoff) (📖 87)	
	• Gateway Siemens - STEP 7 Communication Server (available by call in STEP 7) (📖 89)	
	Going offline (📖 96)	<Shift>+<F4>

Establishing an online connection

Build project



Tip!

In the »Engineer« an existing online connection can be identified by the animated graphics below the *Project view bar*:



6.1 Build project

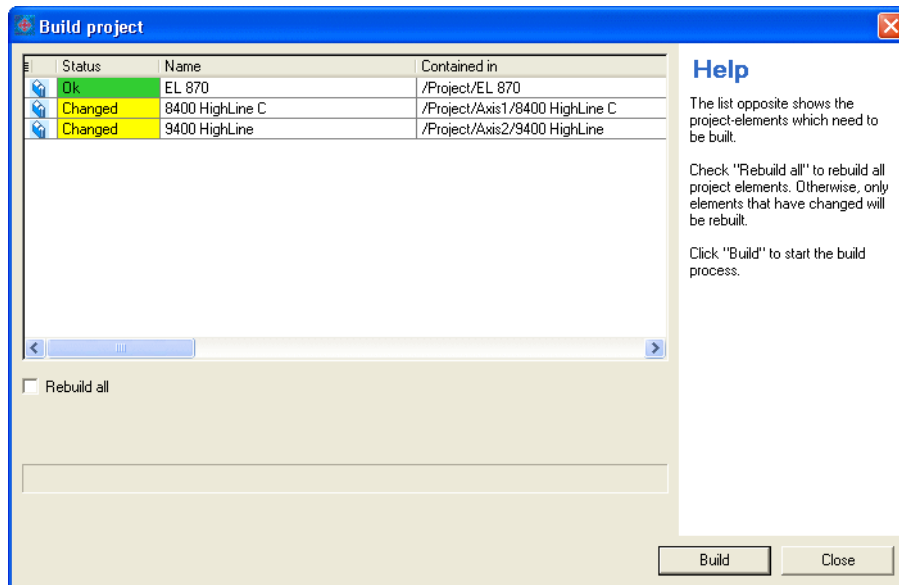
In order to render changes on a project effective, the project must be updated manually. Each device inserted in the »Engineer« has a separate update status. Like this the update is only required for the device changed in each case (and not for the whole project).



How to update the project:

1. In the *Toolbar*, activate .
 - Confirm the note to open the *Build project* dialog box.

Tip: The dialog box can be opened via the  button in the *Toolbar*, the **Tools** → **Build project** menu command, or the <F11> key.



- Activate the **Rebuild all** option to update all project elements. The update process can take longer in case of bigger projects.
2. Click the **Build** button.
 - When the update is completed, a note appears whether the update was successful.

Establishing an online connection

Going online

3. Confirm the note with **OK**.
 - When the update has been executed successfully, the *Build project* dialog box is closed and the Go online process is continued.
 - If an error has occurred during the update, the *Build project* dialog box remains open. In this case, please observe the messages in the "Build" window. Click **Close** to close the dialog box and cancel the Go online process.

6.2 Going online



Stop!

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

Going online with a changed project

When the **Go online** command is executed, the »Engineer« checks whether the current project settings have been transferred to the devices. If one or several devices have the "changed" status, a note asks you to update the project.

- Confirm the query in order to update the project. This serves to transfer the changes to the device. ▶ [Build project](#) (76)

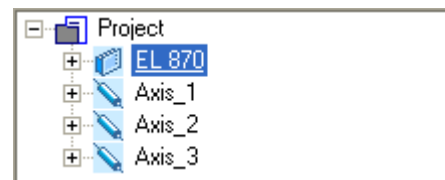


How to go online to a device:

1. Select the device with which the online connection is to be established in the *Project view* of the :



Example 1: 9400 HighLine controller



Example 2: EL 870 controller and three axes



Tip: You can establish an online connection to **all** or **multiple** devices by selecting the project root or a system module in the *Project view*. Then select the devices included in the selected element for the online connection in the *Communication path* dialog box.

2. Click on the  icon or select the **Online → Go online** menu command (keyboard command <F4>).

If the changes made in the project have not been accepted yet, update the project. ▶ [Build project](#) (76)

If an update is to be carried out:

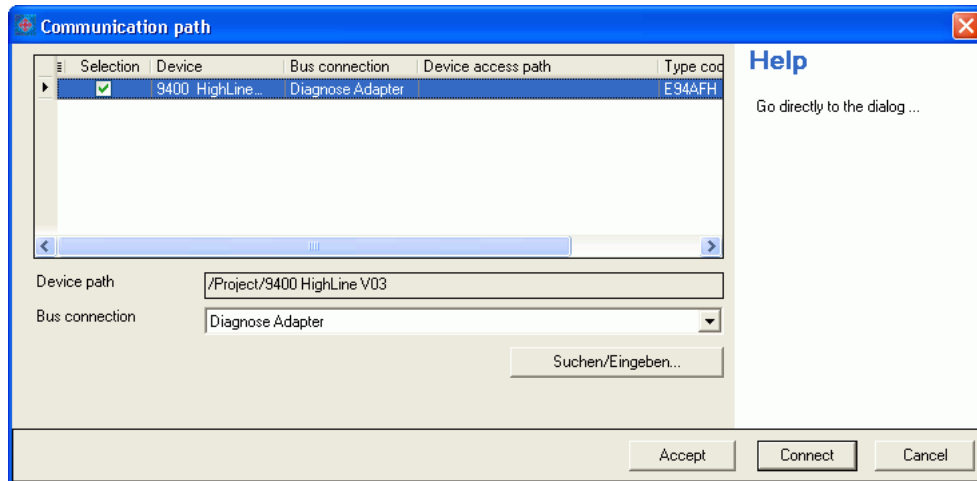
- Click **Yes** to open the *Build project* dialog box.
- Click **Build** in the *Build project* dialog box to update the changed project elements.
- When the update is completed, a note appears whether the update was successful.

If a communication path has not yet been set for the device, the *Communication path*

Establishing an online connection

Going online

dialog box appears after the update has been carried out:

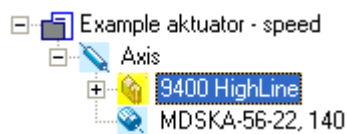


- Detailed information on how to set the communication path can be found in the following subchapter "[Setting the communication path](#)". (📖 79)

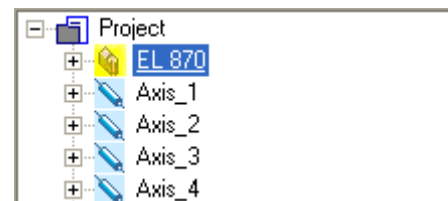
After the communication path to be used has been set correctly:

3. Click **Connect**.

- The dialog box closes and the online connection to the device is established.
- The available online connection to the device is displayed by a yellow highlighted icon in the *Project view*:



Example 1: 9400 HighLine controller



Example 2: EL 870 controller and four axes

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

- If you want to change the communication path configured, select the **Online → Set communication path and go online** menu command.
 - The desired changes for all devices of the project are to be carried out in the *Communication path* dialog box.
- When an online connection has been established the current parameter settings in the device are displayed in the »Engineer«
 - The yellow background colour signals an online connection and the online parameters of a device. ▶ [Displaying parameter values](#) (📖 22)

Establishing an online connection

Going online

6.2.1 Setting the communication path



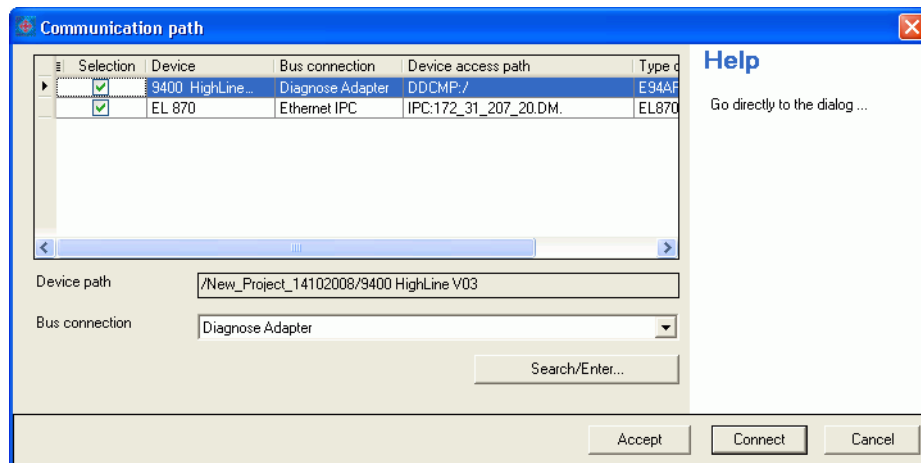
Note!

For "**going online**" the communication settings are only required when the first connection to the device is established. When the **Go online** command is executed again, the *Communication path* dialog box is no longer shown and the online connection via the bus connection set is established immediately.

To open the *Communication path* again, select the **Online→Set communication path and go online** menu command. Like this you can alter a communication path that has already been set.

In the *Communication path* dialog box, the selected device is shown in the upper list field together with the currently selected bus connection.

- If, instead of a device, the uppermost project element or a system module has been selected in the *Project view*, all the devices contained in the element selected are displayed:



[6-1] Example: Communication path with a 9400 HighLine controller and a controller

- If you select a device from the upper list field, you can set or alter the communication settings for this device in the lower dialog area.
 - The bus connection suitable for the respective device is preselected in the **Bus connection** list field and can be checked with the **Search/Enter** button.
 - The other bus connections available for a device in the **Bus connection** list field depend on the respective device and its communication modules/interfaces.
- By clicking the checkmark ☒ in the **Selection** column you can exclude the corresponding device from going online.

If you press **Connect**, the online connection is established to all devices with the checkmark ☒ in the **Selection** column.

Configuring a bus connection

Detailed information on how to configure the respective bus connection can be found in the corresponding subchapter of the desired bus connection:

▶ [Diagnostic adapter](#) (80)

▶ [CAN](#) (81)

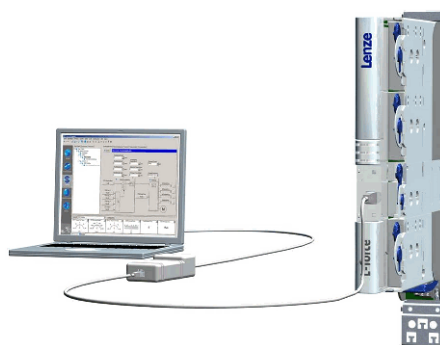
Establishing an online connection

Going online

- ▶ [Ethernet / Ethernet IPC](#) (📖 83)
- ▶ [PROFIBUS](#) (📖 84)
- ▶ [PROFINET](#) (📖 85)
- ▶ [Gateway controller -> CAN](#) (📖 85)
- ▶ [Gateway controller -> EtherCAT](#) (📖 86)
- ▶ [Gateway Controller -> EtherCAT ADS \(Beckhoff\)](#) (📖 87)
- ▶ [Gateway Siemens - STEP 7 Communication Server \(available by call in STEP 7\)](#) (📖 89)

6.2.1.1 Diagnostic adapter

For commissioning and diagnostics of a controller of the Inverter Drives 8400 and Servo Drives 9400 series you can e.g. use the diagnostic adapter offered by Lenze:



[6-2] Example of a connection via diagnostic adapter between an Engineering PC and a 9400 HighLine.



Note!

Observe the documentation supplied with the diagnostic adapter!
The online connection to the diagnostic adapter is a 1:1 connection.



Tip!

Via the menu command **Online→Status of diagnostic adapter**, you can have the operating status of the diagnostic adapters connected to the Engineering PC displayed.

Preconditions:

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



How to configure an online connection via the diagnostic adapter:

1. Go to the *Communication path* dialog box and select "Diagnostic adapter" from the **Bus connection** list field.

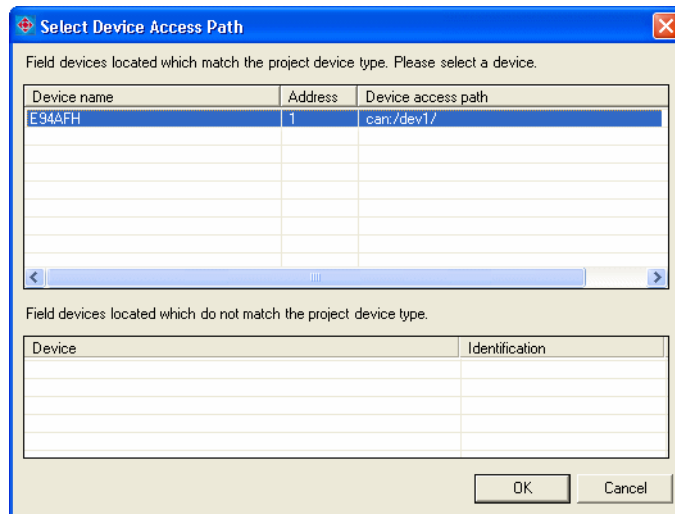
The following step is only required if several diagnostic adapters are connected to the PC:

Establishing an online connection

Going online

2. Press **Search/Enter....**

- The *Select device access path* dialog box is shown:



3. Select the corresponding device from the **Field devices located** list field.

4. Press **OK**.

- The *Select device access path* dialog box is closed.
- In the *Communication path* dialog box, the **Device access path** column displays the corresponding device access path (e.g. "can:/dev1/").

6.2.1.2 CAN

Certain Lenze products are provided with an integrated CAN interface.

- Among other things, process data and parameter values can be exchanged between the nodes via the CAN interface. Furthermore, the interface allows for the connection of other components such as peripheral terminals, operator and input devices (HMI), as well as external control and host systems.
- The CAN interface transfers data objects in accordance with the CANopen communication profile (CiA DS301, version 4.02), which was created under the umbrella association of CiA (CAN in Automation) to conform with the CAL (CAN Application Layer).



Tip!

Detailed information about the subject "CAN" can be found in the Lenze library in the "CAN" Communication Manual.



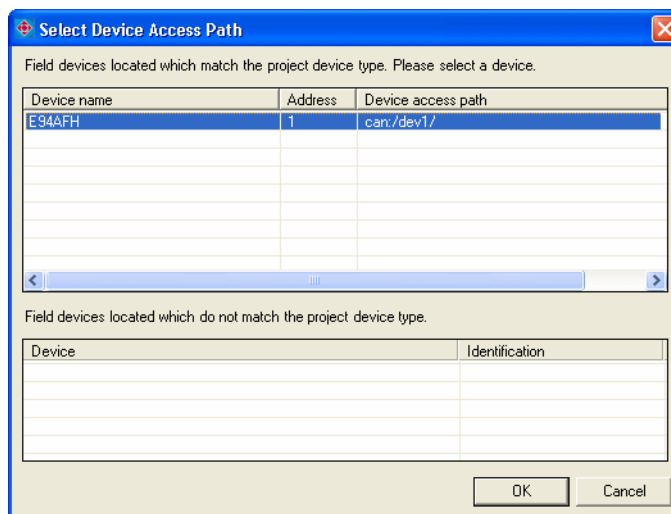
How to configure an online connection via CAN:

1. Go to the *Communication path* dialog box and select "CAN " from the **Bus connection** list field.
2. Press **Search/Enter....**

Establishing an online connection

Going online

- The *Select device access path* dialog box is shown:



3. Select the corresponding device from the **Field devices located** list field.
4. Press **OK**.
 - The *Select device access path* dialog box is closed.
 - In the *Communication path* dialog box, the **Device access path** column displays the corresponding device access path (e.g. "can:/dev1/").

Establishing an online connection

Going online

6.2.1.3 Ethernet / Ethernet IPC

You can establish an online connection to the device via a TCP/IP network if the device (e.g. a controller) is equipped with an Ethernet network adapter and the PC is also provided with an access to this TCP/IP network (e.g. via a network interface card).



Note!

For the communication settings in the »Engineer« you require the IP address of the device.



Tip!

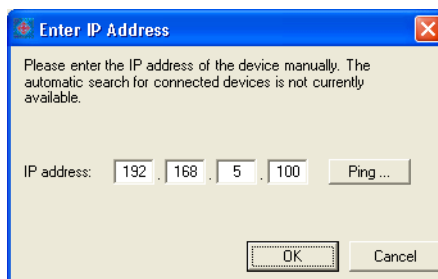
Note down the set IP address using an adhesive label on the device.

Detailed information on the "Ethernet" can be found in the "Ethernet" communication manual.



How to configure an online connection via Ethernet:

1. Select desired device in the *Project tree*.
2. Execute the **Online→Set communication path and go online** menu command.
3. Go to the *Communication path* dialog box and select "Ethernet IPC " from the **Bus connection** list field.
4. Press **Search/Enter....**
 - The *Enter IP address* dialog box is displayed:



5. Enter the IP address of the device.
 - By clicking the **Ping ...** button, you can check whether a device can be reached via the set IP address.
Caution: This does not mean that the intended device can be reached via this IP address!
6. Press **OK**.
 - The **Device access path** column displays the IP address (e.g. "IPC:192_168_5_99.DM.").

Establishing an online connection

Going online

6.2.1.4 PROFIBUS

For each of the Inverter Drives 8400 and Servo Drives 9400 series of devices, there is a PROFIBUS communication module with which you can set up an online connection to a field device via PROFIBUS. »Engineer« uses the PROFIBUS DPV1 function as a Class 2 master.



Note!

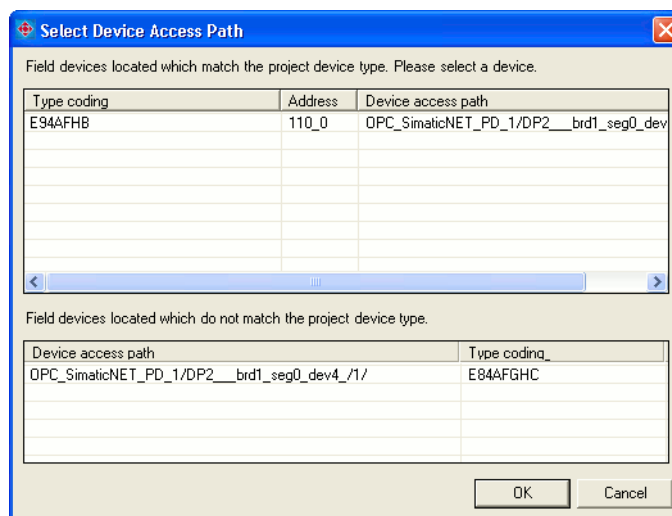
In order to be able to set up an online connection via PROFIBUS, the following requirements must first be met:

- Installation of the ProfilServer: The ProfilServer is available as a separate setup on the »Engineer« installation CD.
- The Engineering PC (Windows PC on which »Engineer« has been installed) must have a suitable PROFIBUS interface. For this purpose, a PROFIBUS card and the associated driver software have to be installed. For more information on installation of the PROFIBUS card, please refer to the manufacturer's documentation.



How to configure an online connection via PROFIBUS:

1. Open the *Communication path* dialog box in the **Bus connection** list field and select the "PROFIBUS" entry.
2. Press **Search/Enter....**
 - The *Select device access path* dialog box is shown:



3. Select the corresponding device from the **Field devices located** list field.
4. Press **OK**.
 - The *Select device access path* dialog box is closed.
 - In the *Communication path* dialog box, the **Device access path** column displays the corresponding device access path (e.g. "OPC_SimaticNET_PD_1/DP2___brd1_seg0_dev4_/1/").

Establishing an online connection

Going online

6.2.1.5 PROFINET

For the Servo Drives 9400 device series a PROFINET communication module is provided, by means of which you can establish an online connection to a field device via PROFINET.



More information on *Parameter setting & configuration* with PROFINET can be found in the **PROFINET communication manual**, section "*Establish online connection via PROFINET using the Lenze »Engineer«*"

6.2.1.6 Gateway controller -> CAN

The controller offers a gateway function to establish an online connection to a field device via CAN.



How to configure an online connection to a field device which is connected to the controller via CAN:

1. Go to the *Communication path* dialog box and select the entry "Gateway controller -> CAB" from the **Bus connection** list field.
2. Press **Search/Enter....**
 - The *Gateway controller -> Set up CAN system bus* dialog box is shown:

IPC name	IP address	IPC interface	CAN address
EL 870	172.31.207.20	CAN1	1
EL 870	172.31.207.20	CAN2	1

IPC (Gateway)

Name:

IP address: . . .

Interface:

Field device

Be absolutely sure to use a free parameter channel of the device to ensure unhindered access of the PLC

Name:

CAN address:

Diagram: Gateway device (Ethernet) --- CAN --- Field device

3. Enter the IP address of the controller.
 - By pressing **Ping** you can carry out a simple test on whether a device can actually be reached via the IP address set.

Please note: However, this has not necessarily got to mean that the intended device can be reached via this IP address!

Establishing an online connection

Going online

4. Press **OK**.

- In the *Communication path* dialog box, the **Device access path** column displays the corresponding device access path (e.g. "IPC:172_31_207_254.CAN.can1.dev1.").

6.2.1.7 Gateway controller -> EtherCAT

The controller offers a gateway function to establish an online connection to a field device via EtherCAT.



How to configure an online connection to a field device which is connected to the controller via EtherCAT:

1. Go to the *Communication path* dialog box and select the entry "Gateway controller -> EtherCAT" from the **Bus connection** list field.
2. Press **Search/Enter....**
 - The *Gateway controller -> Set up EtherCAT bus* dialog box is shown:

IPC name	IP address	IPC interface
EL 870	172.31.207.20	ECAT1

IPC (Gateway)

Name:

IP address: . . .

Interface:

Field device

Name:

Ethercat address:

Diagram: Gateway device (Ethernet) --- EtherCAT --- Field device

OK Cancel

3. Enter the IP address of the controller.

- By pressing **Ping** you can carry out a simple test on whether a device can actually be reached via the IP address set.

Please note: However, this has not necessarily got to mean that the intended device can be reached via this IP address!

4. Press **OK**.

- The *Enter IP address* dialog box is closed.
- In the *Communication path* dialog box, the **Device access path** column displays the corresponding device access path (e.g. "IPC:172_31_207_254.ECAT.ecat1.dev1001.").

Establishing an online connection

Going online

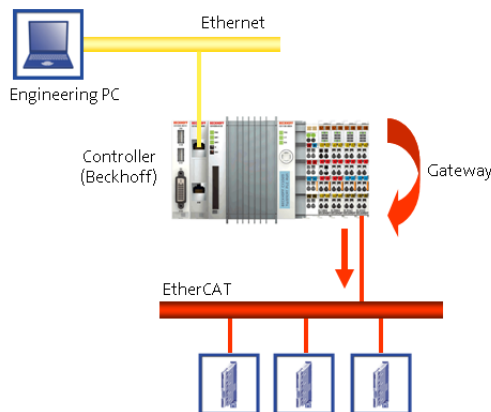
6.2.1.8 Gateway Controller -> EtherCAT ADS (Beckhoff)

The **Gateway EtherCAT ADS** bus connection enables you to establish an online connection to a Lenze controller that is connected to a Beckhoff control system via EtherCAT (gateway function).



Note!

In order to go online, the EtherCAT fieldbus must be at least in the *Pre-Operational* status.



[6-3] Sample configuration for using the ADS EtherCAT bus server



How to proceed:

1. Select the project root  in the project. Alternative: [▶ Creating a new project \(starting the search for devices connected\)](#) (34)
2. Execute the menu command **Insert→Device detected online**.
3. Select **Gateway Controller -> EtherCAT ADS** as bus connection.
4. Entering access data
 - Enter the access data suitable for control via the **Insert address** button.
 - The **Search** button prompts the control (Beckhoff) to display the fieldbus nodes connected to the EtherCAT segment.

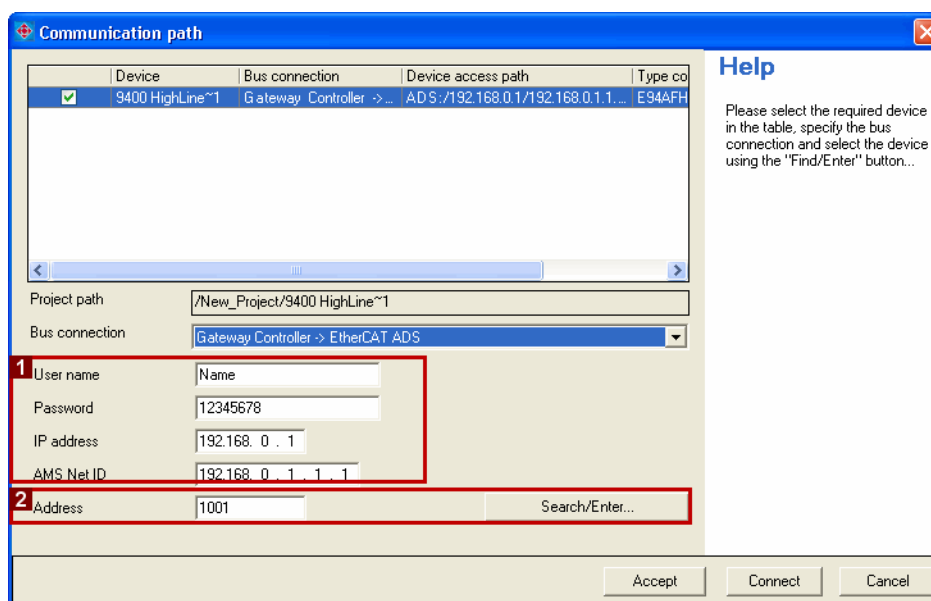


How to use the communication path EtherCAT ADS:

1. Mark the desired controller in the project tree to which a gateway connection is to be built up via EtherCAT ADS.
2. Call the online command **Online → Set communication path and go online** (F4).

Establishing an online connection

Going online



- Select **Gateway -> EtherCAT ADS** as bus connection.
3. In the area **1** enter the access data suitable for the control.
 - Enter the user name, password as well as IP address and AMS-NetID of the EtherCAT interface of the control.
 4. In area **2**, enter the EtherCAT address of the field device to which an online connection is to be established.
 - Alternatively, you can press **Search/enter** which calls the *Select Device Access Path* dialog window. As a consequence, the »Engineer« prompts the control to display the devices detected at the EtherCAT segment.

Establishing an online connection

Going online

6.2.1.9 Gateway Siemens - STEP 7 Communication Server (available by call in STEP 7)

The »Engineer« internally provides a interface for communication purposes via TCI.



Note!

To be able to select TCI as bus connection, the »Engineer« must be called from the »STEP 7« software by Siemens.

- That way, the »Engineer« then provides the "STEP 7 Communication Server" bus connection.

Please assure yourself that the used Siemens PLC supports the TCI function! Further information is provided e.g. in the Siemens support database.

Standard procedure - example: PROFIBUS bus system

This section provides information about the basic steps which are required to be able to use the "STEP 7 Communication Server" bus connection in the »Engineer«.

Components	Version
Controller	Firmware
Communication module	
Technology application	
Inverter Drives 8400 StateLine	03.00.00
PROFIBUS module	1.0
TA - actuating drive speed	1.0
Servo Drives 9400 HighLine	05.00.42
PROFIBUS module	1.0
TA - actuating drive speed	03.0.3
Software	
• Lenze »Engineer«	2.9
• Siemens »STEP 7«	5.4 (SP4)



Note!

The following description refers to the stated versions. Depending on the version, individual steps of this description may be irrelevant, or additional steps may be required.



How to proceed:

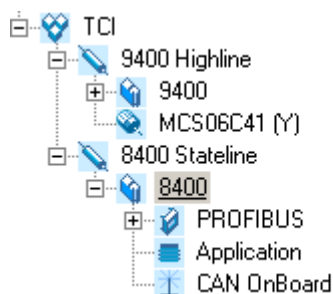
1. Create a new project in the »Engineer« including the desired modules, axes and components. ▶ [Getting started: creating a project](#) (30)

Establishing an online connection

Going online

Observe the naming of the controllers (the names of the components in question must be identical in the »Engineer« and in »STEP 7«):

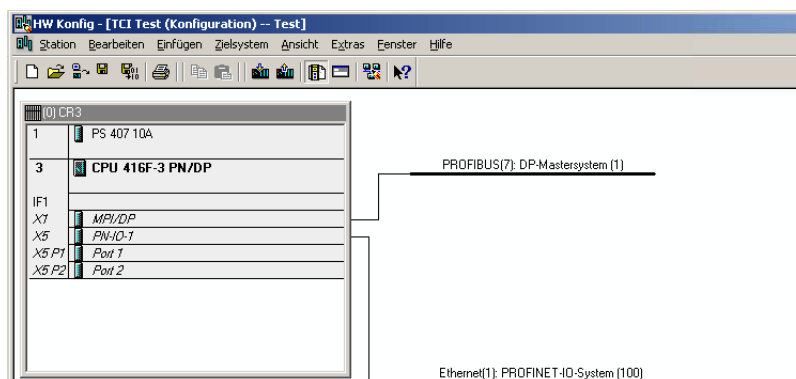
- **9400** for 9400 HighLine
- **8400** for 8400 StateLine



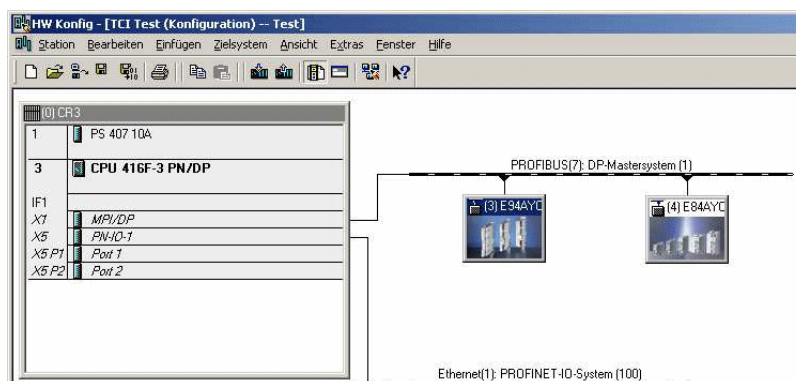
2. In the *HW Config* of »STEP 7« ...

...you create a PROFIBUS network.

... you create the desired Lenze PROFIBUS nodes and their respective node addresses.



- Example: a 94xx (address: 3) and an 84xx (address: 4) PROFIBUS:



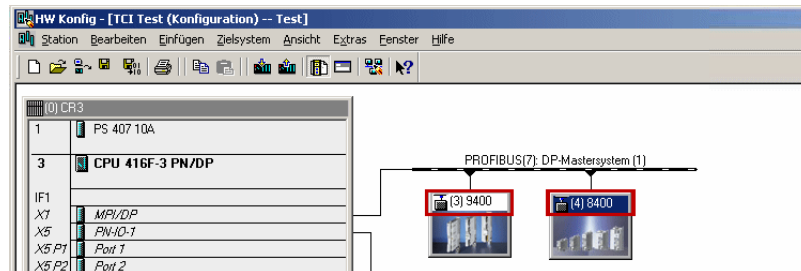
Note: The selection of the process data configuration does not affect the TCI communication!

Establishing an online connection

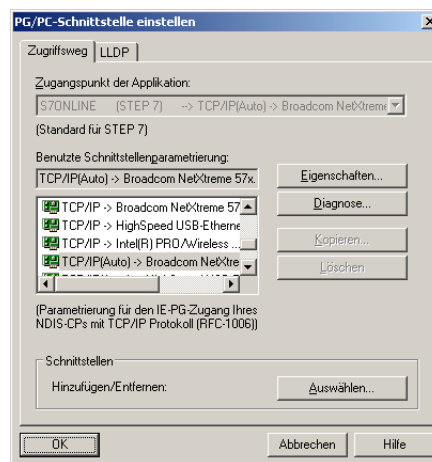
Going online

Name the controller according to the naming in the »Engineer« project:

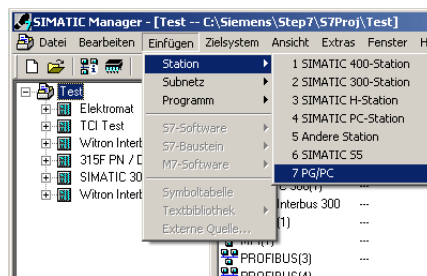
- **9400** for 9400 HighLine
- **8400** for 8400 StateLine



3. Establish an Ethernet connection to the PROFIBUS-CPU



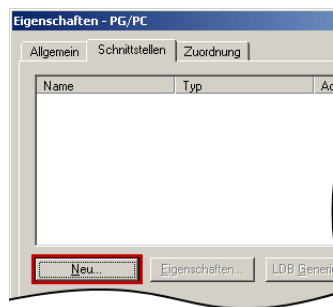
- Load the »STEP 7« project into the CPU.
4. Integrate the PG/PC connection in the »STEP 7« project.
- If there is no PG/PC connection, an error message appears in the »Engineer« ("Insert PG/PC station").
5. Insert PG/PC station.
- Menu command **Insert→Station→PG/PC**



6. Select interface.
- Double-click on the inserted PC/PC station to display the properties.

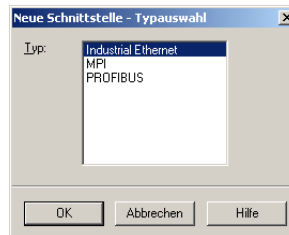
Establishing an online connection

Going online



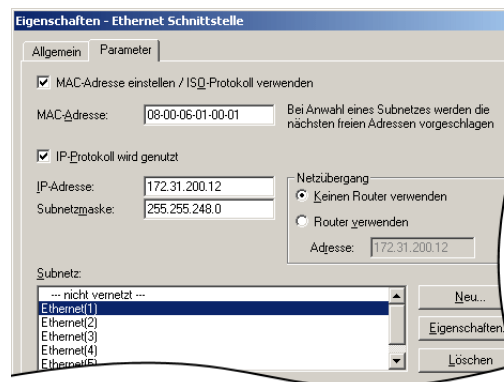
- On the **Interfaces** tab, click the **New** button.

7. Select the Ethernet connection to be used for the online connection.



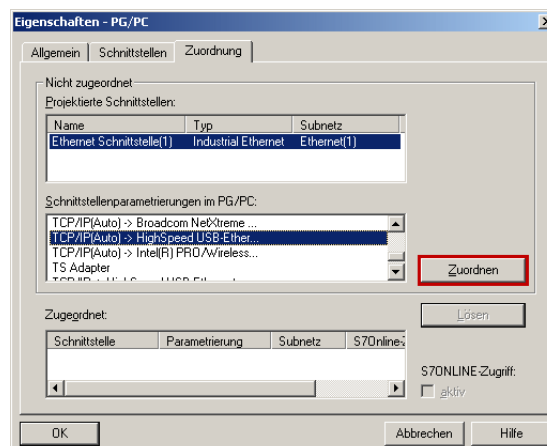
The Ethernet connection must be the connection previously projected in the HWCONFIG.

- Example: select Ethernet connection **Ethernet(1)**



- Accept selection with **OK**.

8. The previously selected Ethernet interface must be assigned to the PG/PC connection.



- Assign selected PG/PC connection: click the **Assign** button.
- Confirm following query with **OK** to assign the connection.

Establishing an online connection

Going online

The PG/PC station is active in the »STEP 7« project.

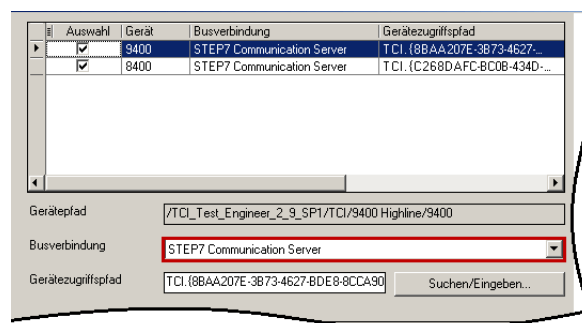
- The  icon symbolises that the connection is active.

9. Transfer the TCI communication parameters in the *HW Config* in the context menu of the connection by executing the **Start device tool→L-force Engineer** command.

If the previously created »Engineer« project is open, confirm the query with **Yes**.

Alternatively, the »Engineer« is started and the corresponding project must be opened.

- The query indicates that the opened »Engineer« project has not been set to a TCI communication path. By confirming the query with **Yes**, the »Engineer« automatically accepts the TCI communication settings from »STEP 7«.
10. The message window indicates the acceptance of the TCI communication parameters.
 11. Going online: **Online→Set communication path and go online (F4)**



- If the acceptance of the communication parameters has failed, the parameters can be entered manually by clicking the **Search/Enter** button.
- Select **STEP 7 Communication Server** as bus connection.
- Click the **Accept** button.
- Click the **Connect** button to go online.

Establishing an online connection

Going online

6.2.2 Checking the serial number

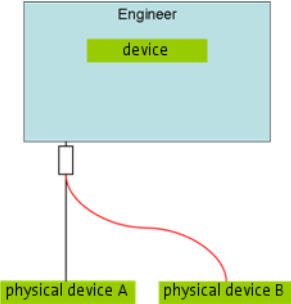
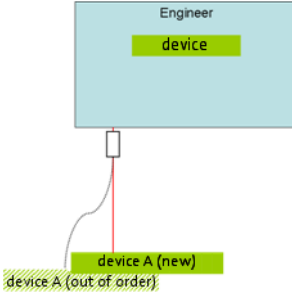
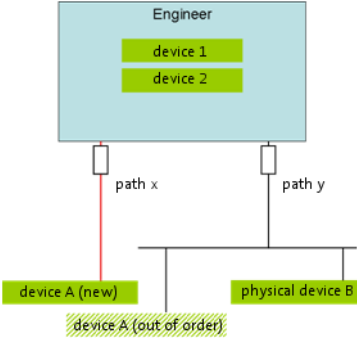
This function extension is available from »Engineer« HighLevel V2.9 upwards!

The »Engineer« checks the serial number of the device when going online.

- The serial number is visible in the *Properties* tab.
- If a device accesses a communication path which is already in use, an error message will be issued.
- The following situations may occur when establishing a connection:
 - [Communication path is currently being used by another device](#) (94)
 - [Communication path is currently being used by another device](#) (95)

6.2.2.1 Communication path is currently being used by another device

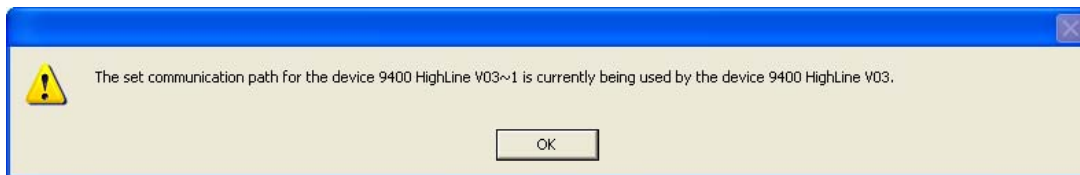
By means of the serial number the »Engineer« can spot a device that is connected online being replaced by another device. Every time an online connection is established the »Engineer« compares the serial number of the physical device with the serial number saved for this device. If the communication path is currently being used by another device, a note will give information on the use of the communication path.

Physical device replaced	Physical device replaced	Physical device and communication path replaced
Example 1: "Replug" device on diagnostic adapter	Example 2: Device exchange for service purposes	Example 3: Device exchange and different communication path
		
• The physical device A has been projected as the device in the »Engineer«. • The physical device A is "replugged" and replaced by the physical device B. • After confirming the query dialog the present connection can be used with the physical device B.	• The physical device A has been projected as the device in the »Engineer«. • The physical device A (out of order) is replaced by device A (new). • If servicing is required, device A (new) can go online using the present connection.	• The two devices A and B have been projected and commissioned in the »Engineer«. • Ethernet, for instance, is the communication path. • The physical device A (out of order) is replaced. • Device A (new) goes online using a new communication path, e.g. diagnostic adapters. • Device 2 goes online using another communication path. Device B remains unchanged.

Establishing an online connection

Going online

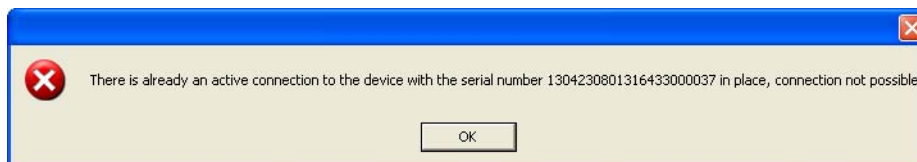
- Another projected device is using the communication path selected. Example:



- The physical device is already using another communication path:
 - The »Engineer« displays the serial number and the name of the project device:
The real device with the serial number <xyz> has already been connected to <name of the project device>.
 - A connection to the project device can be established by confirming the query with **Yes**.

6.2.2.2 Communication path is currently being used by another device

The »Engineer« issues a warning if several devices within the same project attempt to access the same communication path. This prevents several devices from being online via the same communication path. Example:



- Further use of the communication path is not possible. Activating the **OK** button closes the dialog box. Select another configuration for the communication path of the other device.
 - ▶ [Setting the communication path](#) (📖 79)

Several project devices access the same physical device	Function
A diagram showing a light blue box labeled "Engineer" containing two green boxes labeled "device 1" and "device 2". Below the "Engineer" box, there are two ports labeled "path x" and "path y". "path x" is connected to a green box labeled "physical device A". "path y" is connected to a red box labeled "physical device A".	• By means of the serial number the »Engineer« detects that several project devices attempt to access the same physical device via different device access paths. • If one of the other project devices is online, the communication path will be occupied. The second device attempting to use the communication path will be set offline immediately. Remedy: The communication path must be set. • The reading out of the serial number must be switched off manually. ▶ Setting the communication path (📖 79) ▶ Switching off the serial number check (📖 96)

Establishing an online connection

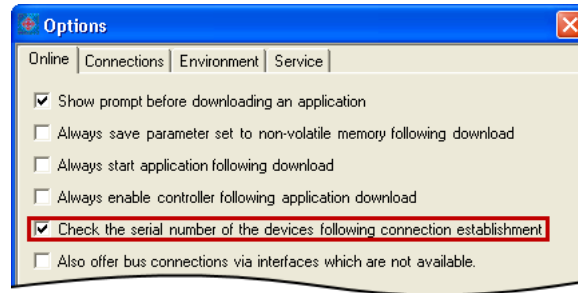
Going offline

6.2.2.3 Switching off the serial number check



How to switch off the check of the serial number:

1. Select the **Tools → Options** menu command.
2. In the **Online** tab, deactivate the option **Check serial numbers of the devices after establishment of connection**:



3. Click **OK** to close the *Options* dialog box.

6.3 Going offline



How to terminate an online connection to a device:

1. Open the *Project tree* and select the device to which an online connection is to be established.
 - Alternatively you can select the upper project element in the *Project view* to close the online connection to all devices contained in the project or in the system module.
2. In the *Toolbar*, click on  or press <Shift>+<F4>.

6.4 System bus configurator

The menu command **Online→System bus configurator** serves to open the system bus configurator which can be used to configure the communication parameters of the Lenze PC system bus adapters connected to the PC.

Moreover the system bus configurator serves to do the following:

- Activate/deactivate available PC system bus adapters for the use with the Lenze tools,
- Define one of the active PC system bus adapters as standard for the use with the Lenze tools,
- Add more PC system bus adapters for configuration or removing available PC system bus adapters from the configuration again,
- Carry out a diagnostic process on whether a PC system bus adapter is able to communicate with all nodes,
- Display information on the device drivers used.

Establishing an online connection

PROFINET address configurator



Tip!

Detailed information on the system bus configurator can be found in the online help for the system bus configurator.

6.5 PROFINET address configurator

Use the menu command **Online→PROFINET address configurator** to open the "Allocate IP addresses" dialog window, via which you can display and change the IP settings of PROFINET nodes.



Note!

The device search only shows devices which are connected via the local Ethernet segment. Devices connected via a router/switch are not displayed.

- Use this command to prepare the desired PROFINET nodes for an online connection.
- By clicking the **Search devices** button you can carry out the search for connected devices again any time.

6.6 EtherNet / IP addresses configurator

Use the menu command **Online→ETHERNET/IP address configurator** to open the "Allocate IP addresses" dialog window, via which you can display and change the IP settings of Ethernet nodes.



Note!

The device search only shows devices which are connected via the local Ethernet segment. Devices connected via a router/switch are not displayed.

- Use this command to prepare the desired Ethernet nodes for an online connection.
- By clicking the **Search devices** button you can carry out the search for connected devices again any time.

7 Device functions with active online connection

This chapter describes how you can do the following when an online connection to a device has been established:

- Executing control functions such as "Start program" or "Inhibit controller" in the device via the »Engineer«
- Transferring parameter settings of the »Engineer« project (and optionally the drive application) to the device.
- Transferring the parameter settings currently stored in the device to the »Engineer« project.

Overview of device functions in the online mode

Device function		Devices supported			
		Inverter Drives 8400	Servo Drives 9400	Controller	I/O system
Controlling an inverter: Enable/inhibit, start stop application (100)					
	Enable controller (100)	●	●	-	-
	Inhibit controller (101)	●	●	-	-
	Start application (101)	-	●	-	-
	Stop application (101)	-	●	-	-
Application and parameter set transfer (102)					
	Download program to device (103)	-	●	-	-
	Download parameter set to device (105)	●	●	●	●
	Upload parameter set (106)	●	●	●	●
	Save parameter set (107)	●	●	●	-
Diagnostics (110)		●	●	●	●
Data logger (111)		●	●	-	●
Oscilloscope (127)		●	●	-	-



Tip!

Detailed information on how to establish an online connection to the device is provided in the following section: "[Establishing an online connection](#)". (75)

Device functions with active online connection

Options

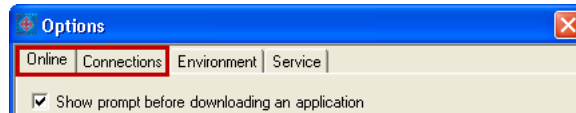
7.1 Options

You use the **Tools→Options** menu command to open the *Options* dialog box. In this dialog box, you can then carry out general settings for data transfer in the **Online / Connections** tabs:



Note!

The **Service** tab solely addresses to Lenze service staff.



Tab	Function
Online	Optional settings relating to the response during an online connection: • Activate confirmation prompt • Behaviour after the application has been downloaded • Prompt asking for the serial number of a device • Representation of the bus connections
Connections	Specifying the (<i>Timeout / Scan Timeout</i>) transfer values for the following forms of communication: • CAN • Ethernet NRT • Diagnostics
Environment	General settings for the user interface. ▶ Options for the representation/project memory location (□ 29)
Service (for Lenze employees only!)	Note: The activation of the service settings can result in a malfunction of the corresponding device! The service settings may only be carried out by (and on instruction by) Lenze service personnel! Activating advanced service settings: • Display service codes (invisible parameters) • Go online with a device without checking the firmware version • Extended channel selection for internal motor control in the oscilloscope (Servo Drives 9400 device series) • Define option for behaviour after the application has been transferred to the device (Servo Drives 9400 device series)

Device functions with active online connection

Controlling an inverter: Enable/inhibit, start stop application

7.2 Controlling an inverter: Enable/inhibit, start stop application

The control functions can be executed when a device has been inserted into the project (example: Inverter Drives 8400 and Servo Drives 9400) and an online connection to the device has been established.



Stop!

If a system module that contains several devices has been selected instead of a device in the *Project view*, the respective control function is executed in all the devices of the system module to which an online connection has been established.

- The control functions can be executed via the *Toolbar* or the **Online** menu:

Icon	Menu command	Be sure to observe:	Shortcut
	Enable controller (📖 100)	▶ Safety instructions (📖 12)	<F8>
	Inhibit controller (📖 101)		<F9>
	Start application (📖 101)	▶ Safety instructions (📖 12)	
	Stop application (📖 101)		

7.2.1 Enable controller



Danger!

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



How to deactivate controller inhibit:

1. Select the controller for which the controller inhibit is to be deactivated in the *Project view*.
2. If no online connection to the device has been established yet:
Click the icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (📖 77)
3. Click the icon or select the menu command **Online → Enable controller**.
4. Confirm the safety query on whether the controller is to be enabled with **Yes**.
 - Then the controller inhibit in the controller is deactivated if there is no further precondition for a controller inhibit (e. g. via digital terminal).
 - By clicking or via the menu command **Online → Inhibit controller** you can set controller inhibit in the controller again.

The controller enable is displayed in the status bar: ▶ [Status information](#) (📖 23)

Device functions with active online connection

Controlling an inverter: Enable/inhibit, start stop application

7.2.2 Inhibit controller



How to set the controller inhibit:

1. Select the controller for which the controller inhibit is to be set in the *Project view*.
2. If no online connection to the device has been established yet:
Click the  icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (□ 77)
3. Click the  icon or select the menu command **Online → Inhibit controller**.
4. Confirm the safety query on whether the controller is to be inhibited with **Yes**.
 - The controller then is inhibited.
 - By clicking the  icon or via the menu command **Online → Enable controller** you can cancel the controller inhibit in the drive controller.

An active controller inhibit is displayed in the status bar: ▶ [Status information](#) (□ 23)

7.2.3 Start application



Danger!

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



How to start the application in the controller:

1. Select the controller for which the application is to be started in the *Project view*.
2. If no online connection to the device has been established yet:
Click the  icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (□ 77)
3. Click the  icon or select the menu command **Online → Start application**.
4. Confirm the safety query on whether the application in the controller is to be started with **Yes**.
 - Then the application in the controller is started.
 - By clicking  or via the menu command **Online → Stop application** you can stop the application in the controller.

The application status is displayed in the status bar: ▶ [Status information](#) (□ 23)

7.2.4 Stop application



How to stop the application in the controller:

1. Select the controller for which the application is to be stopped in the *Project view*.

Device functions with active online connection

Application and parameter set transfer

2. If no online connection to the device has been established yet:
Click the  icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (📘 77)
3. Click the  icon or select the menu command **Online → Stop application**.
4. Confirm the safety query on whether the application in the controller is to be stopped with **Yes**.
 - Then the application in the controller is stopped and controller inhibit is set.
 - By clicking  or via the menu command **Online → Start application** you can start the application in the controller.

The application status is displayed in the status bar. ▶ [Status information](#) (📘 23)

7.3 Application and parameter set transfer

If an online connection to the device has been established you can transfer the parameter set of the device to the »Engineer« project, and vice versa. Furthermore you can transfer a (modified) application from the »Engineer« to the device.



Stop!

If a system module that contains several devices is selected instead of a device in the *Project view*, the selected transfer function is executed with all the devices of the system module to which an online connection has been established.

- The transfer functions can be executed via the *Toolbar* or the **Online** menu:

Icon	Menu command	Shortcut
	Download program to device (📘 103)	
	Download parameter set to device (📘 105)	<F5>
	Upload parameter set (📘 106)	<F7>
	Save parameter set (📘 107)	

Order of data transfer to the device

The data transfer to the device is used to be carried out in the following sequence:

1. **Stop devices:** In this phase the data transfer is prepared, e.g. controllers are inhibited and applications are stopped.
2. **Transfer data:** In this phase, the application, the parameters, and, if so, other data (e.g. cam data) are transferred (depending on the command selected).
3. **Start devices:** In this phase the data transfer has been completed. Devices and applications are started and controller is enabled.

Device functions with active online connection

Application and parameter set transfer

7.3.1 Download program to device



Note!

This function is available for the Servo Drives 9400 device series. Together with the application, the complete (offline) parameter set is transferred to the inverter as well.



How to transfer an application from the »Engineer« project to the device:

1. Select the device to which the application is to be transferred in the *Project view*.
2. Establish an online connection to the device: Click the icon or select the menu command **Online→Go online**. ▶ [Going online](#) (77)
3. Transfer application: Click the icon or select the menu command **Online→Download program to device**.

Step 1 - Settings

Device functions with active online connection

Application and parameter set transfer

4. Select the parameters/files to be transmitted/excluded from the data transfer. Activate the desired control fields in the  area to exclude the respective parameters from the data transfer.

Note: Observe "know-how" protection of the function block interconnection in the application!

By default, the application download transmits HighLine information to the Servo Drives 9400 which provide for a subsequent display of function block interconnections active in the device in the FB editor. Thus, the display of the function block interconnection is also possible without the original »Engineer« project.

- In order to protect the know-how of your specific function block interconnection from being read out of the device, the "application information" control field in the  area has to be activated before starting the download. Thus, the »Engineer« does not transmit any application information into the device. Hence, the function block interconnection cannot be read out of the device subsequently. **Tip:** In this case, make sure that the original »Engineer« project is available for service purposes.
- Click **Detail...** to get an overview of the parameters which are not transferred to the device. The attached columns indicate why the respective parameter has been excluded from the data transfer (source of exclusion). If selected, the column data correspond to the selected control fields of / .
- The **Options...** button opens the dialog box *Options* which contains general settings for transferring the data transfer. ▶ [Options](#) ( 99)

- 5.

Click **Next**.

Step 2 - stop devices: Define the desired options for stopping the devices.

- When transferring data to several devices, in this step you can for instance define the sequence in which the devices are to be stopped for the data transfer.

6. Click **Next**.

7. Confirm the query on whether the selected devices are to be stopped now with **Yes** to stop the devices.

Step 3 - data transfer: The data transfer starts. The progress of data transfer is displayed.

Step 4 - Start devices Define the desired options (and for several devices, the sequence) for starting the devices.

8. Click **Complete**.

- Start the selected devices.
- After a successful execution, the dialog box is closed automatically if you have activated the **Also show if successful** option in the first step.

Device functions with active online connection

Application and parameter set transfer

7.3.2 Download parameter set to device

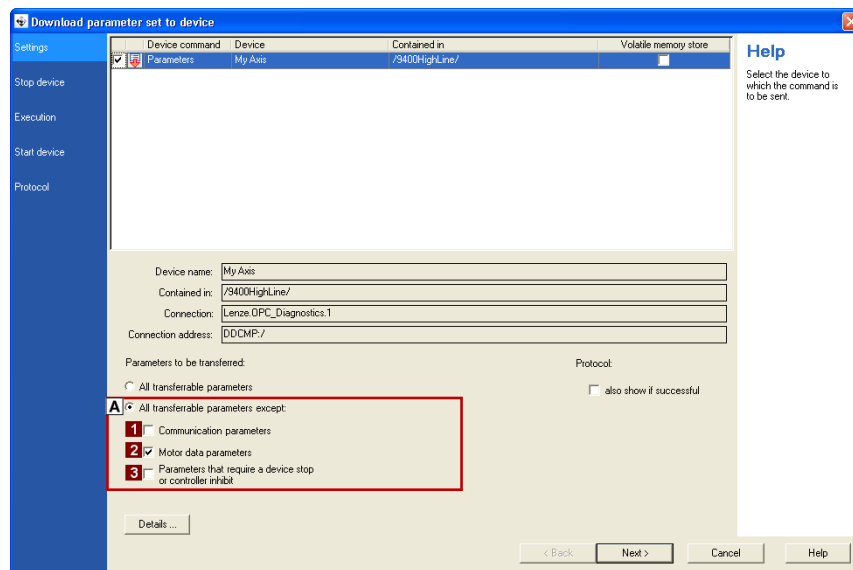
This command serves to transfer the offline parameter set of the »Engineer« project to the device.



How to transfer the parameter set from the »Engineer« to the device:

1. Select the device to which the parameter set is to be transferred in the *Project view*.
2. Establish an online connection to the device: Click the  icon or select the menu command **Online → Go online**. ▶ [Going online](#) (📖 77)
3. Click the  icon or select the menu command **Online → Download parameter set**.

Step 1 - Settings



4. Define the desired options for the data transfer.
 - **All transferable parameters** can be transferred to the device. Optionally, certain parameters can be excluded from the data transfer in the **A** area.

Activate the desired control fields in the **A** area to exclude the respective parameters from the data transfer: **1**: *Communication*, **2**: *Motor*, **3**: *Stop*.

- Click **Detail...** to get an overview of the parameters which are not transferred to the device. The attached columns indicate why the respective parameter has been excluded from the data transfer (source of exclusion). If selected, the column data correspond to the selected control fields of **1** ... **3**.
- The **Options...** button opens the dialog box *Options* which contains general settings for transferring the data transfer. ▶ [Options](#) (📖 99)

5. Click **Next**.
6. **Step 2 - Stop devices (optional, required for specific parameters)**
 - Define the required options for stopping the devices.
 - When transferring data to several devices, in this step you can for instance define the sequence in which the devices are to be stopped for the data transfer.
7. Click **Next**.
8. Confirm the query whether the selected devices are to be stopped now with **Yes...**
 - ...to stop the selected devices **and**
 - ...start the data transfer.

Device functions with active online connection

Application and parameter set transfer

Step 3 - data transfer: The progress of data transfer is displayed.

Step 4 - Start devices Define the desired options and, for several devices, the sequence for starting the devices.

9. Click **Complete**.

- Start the selected devices.
- After a successful execution, the dialog box is closed automatically if you have activated the **Also show if successful** option in the first step.

7.3.3 Upload parameter set

...transfers the parameter set currently available in the device to the »Engineer« project.



How to transfer the parameter set from the device to the »Engineer«:

1. Select the device from which the parameter set is to be read in the *Project view*.
2. If no online connection to the device has been established yet:

Click the  icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (📖 77)

3. When there is an online connection to the device:

Click the  icon or select the menu command **Online → Upload parameter set**.

- The *Upload parameter set* dialog box is displayed:

Step 1 - Settings

to be transferred	Device	Contained in
Parameters	S400 HighLine	/Projekt/

Device name: S400 HighLine
Contained in: /Projekt/
Connection: Lenze DPC_Diagnostics.1
Connection address: DDCMP:/

Protocol:
☐ Also show if successful

4. Define the required options for the transfers to be executed.
 - The **Options...** button opens the dialog box *Options* which contains general settings for transferring the data transfer. ▶ [Options](#) (📖 99)
5. Click **Next** to start the data transfer.

Step 2 - data transfer: The progress of data transfer is displayed.

- After a successful execution, the dialog box is closed automatically if you have activated the **Also show if successful** option in the step 1.

Device functions with active online connection

Optical tracking - device identification within the machine

7.3.4 Save parameter set

In order to prevent parameter settings carried out in the device from being lost by mains switching, use this function to save the parameter set with mains failure protection in the device.



How to save the parameter set in the device:

1. Select the device in which the current parameter settings are to be saved with mains failure protection in the *Project view*.
2. If no online connection to the device has been established yet:

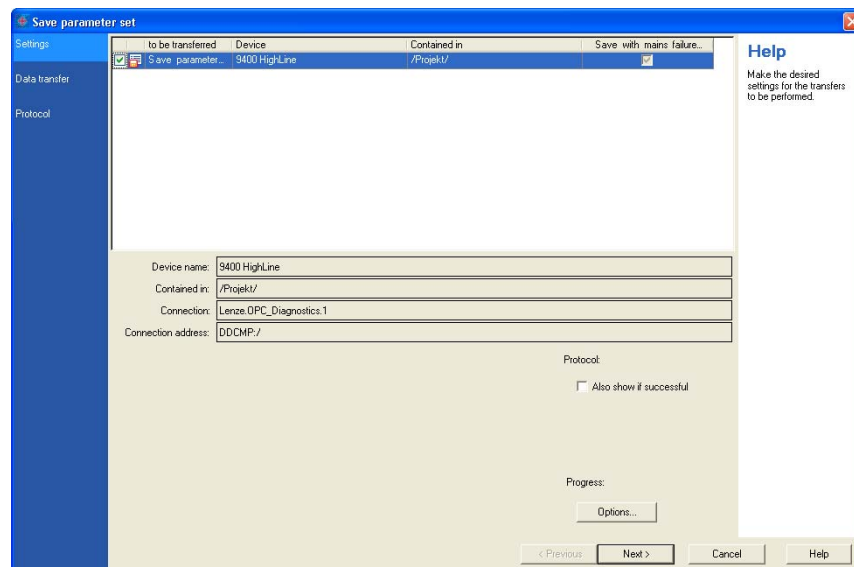
Click the  icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (📖 77)

3. When there is an online connection to the device:

Click the  icon or select the menu command **Online → Save parameter set**.

- The *Save parameter set* is displayed.

Step 1 - Settings



4. Define the required options for the transfers to be executed.
 - The **Options...** button serves to open the *Options* dialog box where you can make general settings for the data transfer. ▶ [Options](#) (📖 99)
5. Click **Next** to start data transfer.

Step 2 - data transfer: The progress of data transfer is displayed

- After a successful execution, the dialog box is closed automatically if you have activated the **Also show if successful** option in the step 1.

7.4 Optical tracking - device identification within the machine

The "Optical tracking" function serves to locate the position of a specific device within a machine system.

Device functions with active online connection

Optical tracking - device identification within the machine

If the "Optical tracking" function is activated, the »Engineer« causes the device connected online to blink with all LEDs for an adjustable time. After the time has elapsed, or if the user exits the function beforehand, the device controls its LEDs normally again.



Note!

- The "Optical tracking" function is available depending on the device.
- An online connection to the device that is to be located has to be established.



How to activate the optical tracking:

1. Select desired device in the project tree
 - Establish online connection to the device ▶ [Going online](#) (📖 77)
2. Click the  icon or select the menu command **Online→Optical tracking**
 - Optionally the period for which the device to be located is to be activated can be selected from the selection list.

Device functions with active online connection

Manual control of the motor direction of rotation: Rotating the axes manually

7.5 Manual control of the motor direction of rotation: Rotating the axes manually

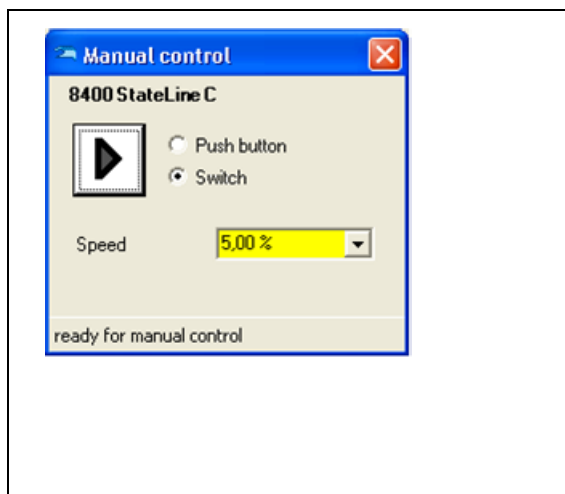
This function enables the axes to be rotated manually. This allows, for instance, for maintenance work or diagnostics of the electrical connection.

- The respective axis can be simply rotated with the preset speed setpoint without the need of a separate control program for motion control.



How to start the function:

Click  in the toolbar.



Select the desired options:

- Speed: Determine setpoint
- Runtime: Determine period/time after which the motor stops automatically.

Depending on the device, more options can be available:

- Current: Enter value [A]
- Axis selection: For controllers which support a double axis, you can select between the axes *Axis A*/*Axis B*.

Start rotation of the motor: Click ► .

Stop rotation of the motor: Click ■ .

[7-1] **Example:** Manual direction of rotation control with an 8400 TopLine C

Direction of rotation check for multi-axis systems

The direction of rotation control can be used for multi-axis systems with a controller that supports this function (example: i700 servo inverter).

- The additional selection list serves to select the desired axis which is to be rotated manually.
 - If, for instance, the direction of rotation control of Axis A is activated, the direction of rotation control of the second axis can be activated in addition by selecting Axis B.
- Close the dialog window to deactivate the direction of rotation control in the previously triggered axes.

7.6 Diagnostics

With the »Engineer« you can carry out diagnostics of the device connected (if an online connection has been established).



Note!

The available diagnostics options for a device depend on the respective device and can therefore only be explained here with an example!

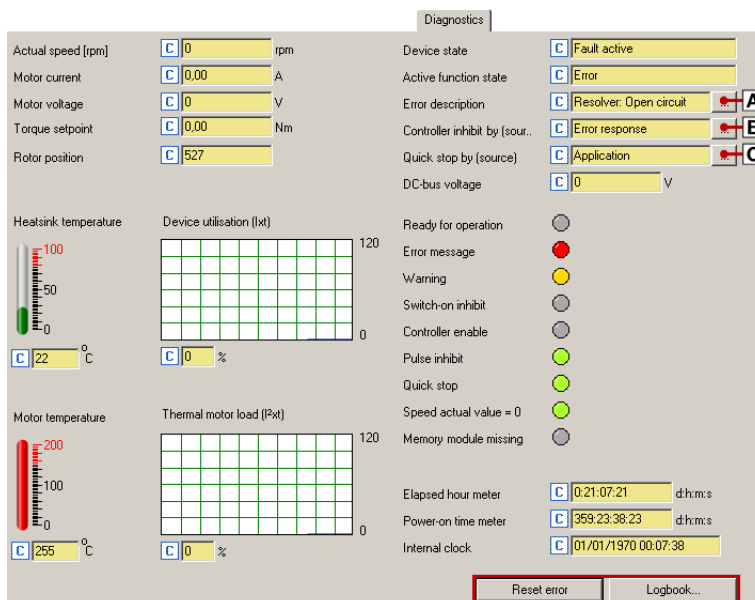
Read the documentation supplied with the corresponding device before you start working!



How to carry out diagnostics:

1. Select the corresponding device in the *Project view*.
2. If no online connection to the device has been established yet:
Click the icon or select the menu command **Online → Go online** to establish an online connection to the device. ▶ [Going online](#) (📖 77)
3. Select the **Diagnostics** tab.
 - When an online connection has been established, the **Diagnostics** tab shows the current device parameters that are relevant for diagnostic purposes.

Example: Diagnostics for Servo Drives 9400 HighLine



Button	Function
	A Show details of the current error.
	B Show all active sources for the controller inhibit.
	C Show all active sources for quick stop.
Resetting an error	Acknowledge error message (if the error cause has been removed).
Logbook...	Show logbook of the controller.

7.7 Data logger

This function is available from »Engineer« HighLevel V2.10!

The data logger serves to record the temporal course of parameter values and display it as a line diagram.

- The data logger is available in the »Engineer« for all parameterisable devices.
- For cross-device recording, the data logger is also available for the upper project element, for system modules, and for axes.



Note!

In contrast to the oscilloscope function integrated in some controllers, the data logger records the parameter value only with the aid of the computer. Thus, the measurement is not time-equidistant (not in real time)!

General procedure

Go to the data logger user interface, select the parameters to be recorded and set the required trigger condition and sampling rate. If there is an online connection to the device, the measurement can be started. With a valid configuration, the values of the selected parameters are then read in via the existing online connection and displayed graphically as a line diagram.

Typical applications

- Graphic display of any measured variable (e.g. output frequency, DC-bus voltage, and motor current)
- Detection of process factors without additional measuring devices (as e.g. oscilloscope, voltmeter, and ammeter)
- Support during commissioning, maintenance, and troubleshooting
- Comfortable documentation of the device behaviour/application in connection with product liability and quality assurance

Special features

- Measuring on four independent channels at the same time
- Triggering to a channel, a parameter, or immediate start
- Detecting measured values before and after the trigger event (pre/post trigger)
- Cursor and zoom function for analysing the measurement
- Saving & loading the data logger recording
- Reuse of data logger configurations
- Export of the measured values via the clipboard for further processing

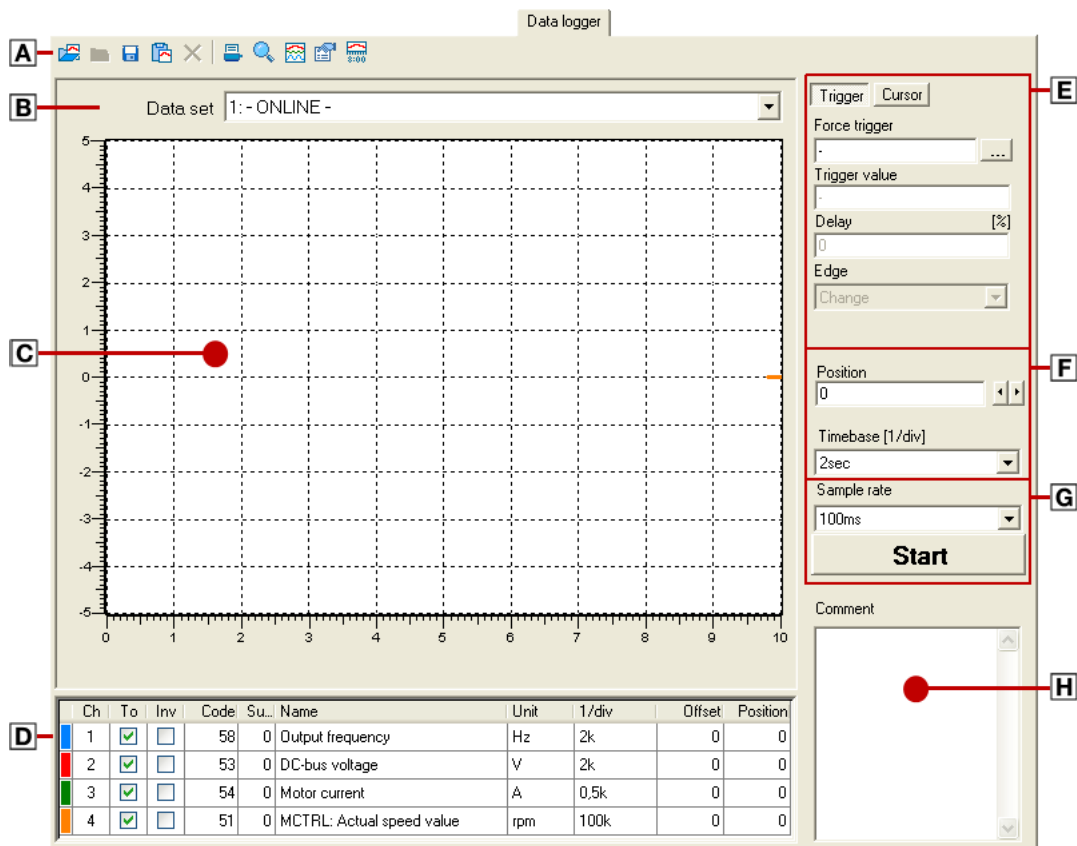
7.7.1 User interface



How to get to the data logger user interface:

1. Select the device the parameter values of which are to be recorded in the *Project view*.
 - For a cross-device recording, you can alternatively select the upper project element, a system module, or an axis.
2. Select the **Data logger** tab in the *Workspace*.

The user interface of the data logger contains the following control and function elements:



[A Data logger toolbar](#)

[B Data record selection](#)

[C Diagram](#)

[D Vertical settings](#)

[E Trigger/cursor settings](#)

[F Horizontal settings](#)

[G Recording settings](#)

[H Comment](#)

7.7.1.1 Data logger toolbar

Icon	Function
	Loading/importing data records (124)
	Closing the data record (125)

Device functions with active online connection

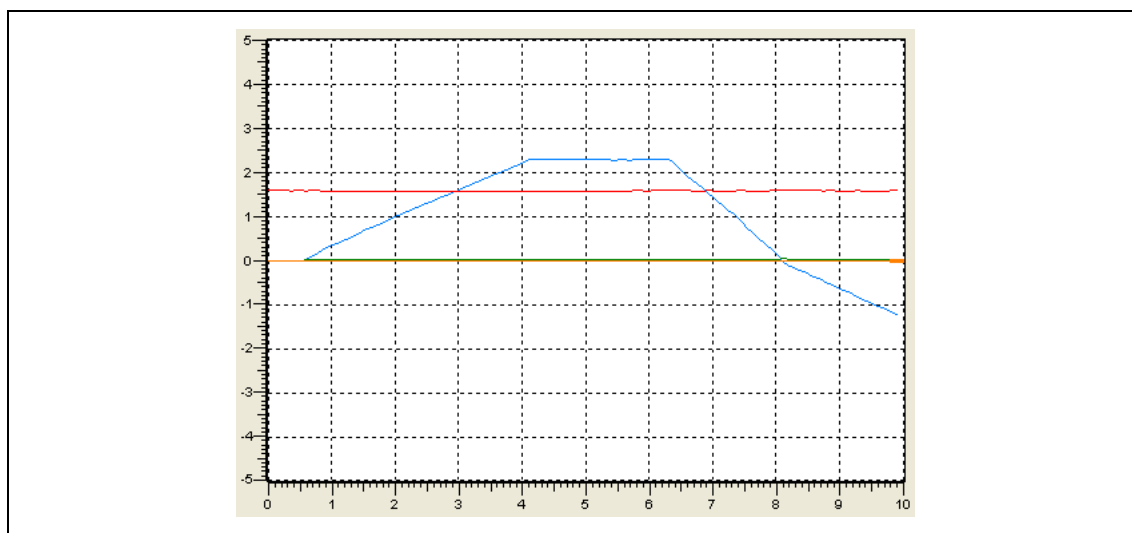
Data logger

Icon	Function
	Saving/exporting a data record (📖 123)
	Copying a data record to the clipboard (📖 126)
	Deleting a data record in the project (📖 125)
	Print diagram
	Activate zoom function ▶ Adjusting the representation (📖 120)
	Activate automatic scaling function ▶ Adjusting the representation (📖 120)
	Commenting a data record (📖 122)
	Using the time axis (📖 119)

7.7.1.2 Diagram

The diagram represents the detected parameter values as interpolated curves.

- In order to adapt the representation, we provide you with a zoom function and an automatic scaling function.
- The curves can be optionally shown/masked out, presented in any colour, and overlapped with the signal characteristics of other recorded parameters.



[7-2] Example diagram

Device functions with active online connection

Data logger

7.7.1.3 Vertical settings

The parameters to be recorded are configured via the list field below the diagram:

Ch	To	Inv	Code	Sub.	Name	Unit	1/div	Offset	Position
1	☒	☐	58	0	Output frequency	Hz	20	0	0
2	☒	☐	53	0	DC-bus voltage	V	0,2k	0	0
3	☒	☐	54	0	Motor current	A	5	0	0
4	☒	☐	51	0	MCTRL: Actual speed value	min-1	0,5k	0	0

Column	Meaning
-	Curve colour for the representation in the diagram • Double-click this field to open the <i>Colour</i> dialog box for selecting another curve colour.
Ch	Channel number • Read only
On	On/off
Inv	Inversion on/off
Code	Code of the parameter to be recorded • Read only
Subcode	Subcode of the parameter to be recorded • Read only
Device	Name of the device that contains the parameter to be recorded. • »Engineer« From »Engineer« V2.10, the data logger is also available for the upper project element, for system modules, and for axes for a cross-device recording. In this case, the list field additionally contains the "device" column.
Name	Name of the parameter to be recorded • Double-click this field to open the <i>Insert channel</i> dialog box for selecting the parameter to be recorded. ▶ Selecting the variables to be recorded (116)
Unit	Scaling • Double-click this field to open the <i>Scaling</i> dialog box for setting the scaling for the parameter to be recorded.
1/Div	Vertical scale factor • Click this field to open the list field for selecting the vertical scale factor.
Offset	Offset value • The offset value depends on the scale factor and is marked by a dashed line in the curve colour in the left-most position of the diagram.
Position	Position value • The position value is independent of the scale factor and marked by a line in the left-most position of the diagram.

7.7.1.4 Trigger/cursor settings

Trigger

When the **Trigger** button is active, the input fields for configuring the trigger condition are shown.

► [Defining the trigger condition](#) (📘 118)

Cursor

If the **Cursor** button is active instead, you can read single measured values of a selectable channel by means of a vertical measurement line in the diagram. A second vertical measurement line serves to display the difference between two measured values. ► [Reading individual measured values](#) (📘 121)

Group field	Meaning
Channel	Channel selection
Value	Display of the measured value positioned at the active measurement line
Differential value	Display of the difference between the measured values positioned at the two measurement lines

7.7.1.5 Horizontal settings

The **Horizontal** group field serves to define the time base and the horizontal position. ► [Defining the recording time/sampling rate](#) (📘 117)

Input field	Meaning
Position	Definition of the horizontal display position • You can either enter a value directly into the input field or define the position by the arrow buttons. • When pressing the arrow buttons and the <Ctrl> key at the same time, you can increase the increment to accelerate the shift.
Time base [1/Div]	Selection of the time base • The current time base setting multiplied by ten results in the recording time. • Change the time base to stretch or compress measurements that have already been completed.

7.7.1.6 Recording settings

Use the **Recording** group field to select the sampling rate and start recording.

- Since the measured data memory has a limited capacity, a compromise must be found between the sample rate and the recording time that results from the time base setting. ► [Defining the recording time/sampling rate](#) (📘 117)

7.7.2 Operation

This chapter describes step-by-step how to record the signal characteristics of controller variables and represent, analyse, document and process them in the oscilloscope.

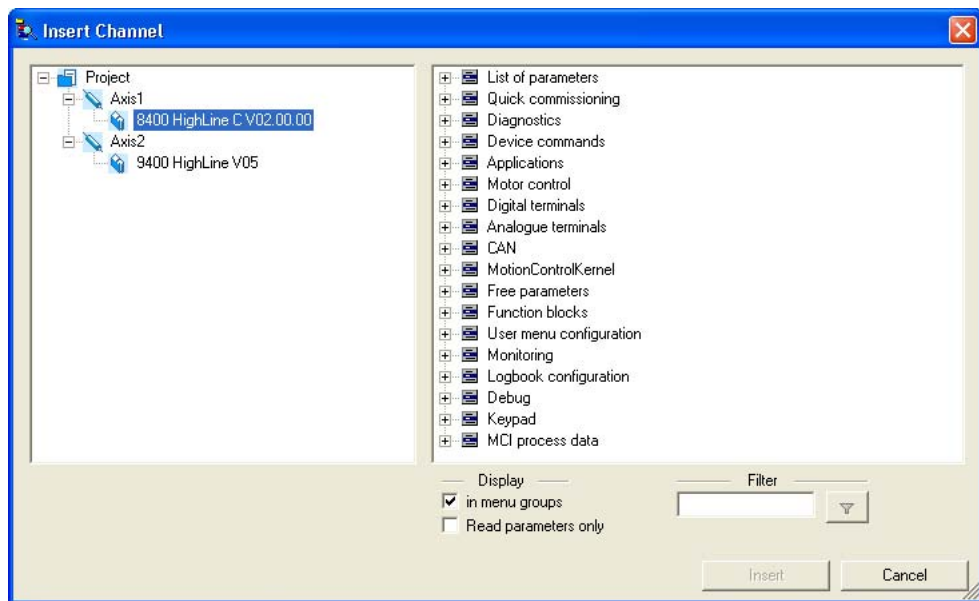
7.7.2.1 Selecting the variables to be recorded

The data logger supports up to four channels, i.e. max. four parameters can be recorded in a data record. The list field below the diagram serves to select desired parameters.



How to select a parameter for recording:

1. Double-click the **Name** field for the channel to be set.
 - The *Insert channel* dialog box is displayed:



- »Engineer« From »Engineer« V2.10, the data logger for a cross-device recording is also available for the upper project element, system modules, and axes. The *Insert channel* dialog box additionally contains a project view on the left which serves to select the corresponding device.
- The **In menu groups** option sorts all parameters by functions and devices.
- The **Read parameters only** option only shows the display parameters of the device.
- In the **Filter** area, the parameters can be filtered by entering the corresponding search texts.

Example: Enter the "terminal" search text and click the  button to get a filtered view. Only those parameters are visible the names of which contain the search text.

2. Select the parameter to be recorded from the list field.
3. Press **Insert** button.
 - The dialog box then closes and the selection is accepted.
4. Repeat the steps 1 ... 3 to select further parameters to be recorded.

You can change and cancel a selection subsequently at any time.



How to change a selection:

1. Double-click the **Name** field for the channel to be changed.
2. Make a new selection in the *Insert channel* dialog box.
3. Press **Insert** button.
 - The dialog box then closes and the selection is accepted.



How to cancel a selection again:

1. Right-click the channel to be deleted.
 - A *Context menu* for this channel appears.
2. Select the **Delete channel** menu command from the *Context menu*.

7.7.2.2 Defining the recording time/sampling rate



Note!

If you change the time base or the sampling rate, the currently represented line diagram will be deleted.



How to define the duration and sampling rate for recording:

1. Select the required time base from the **Time base** list field in the **Horizontal** group field.
 - The current time base setting multiplied by ten results in the recording time.
 - Since the size of the measured data memory is limited, a compromise between sampling rate and recording time is generally required.
2. Select the required sampling rate from the **Sampling rate** in the **Recording** group field.

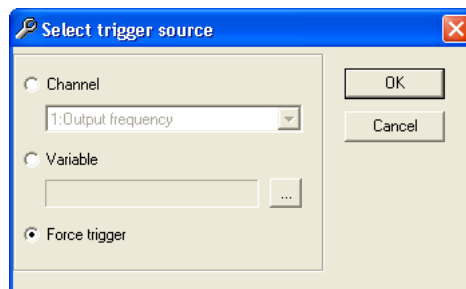
7.7.2.3 Defining the trigger condition

The trigger condition serves to define at what time the recording is started. The data logger provides different trigger conditions which serve to control the recording of the measured values.



How to define the trigger condition:

1. When the cursor display is activated:
Click the **Trigger** button to show the input fields for configuring the trigger condition.
2. Click the  button after the first input field to open the *Select trigger source* dialog box:

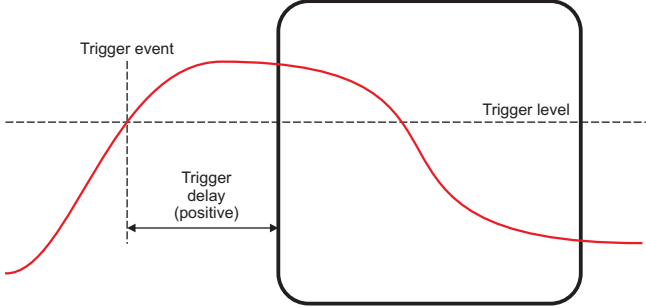


3. Select the required trigger source:
 - **Channel:** Triggering can be configured by means of the **Vertical** table.
 - **Variable:** It is triggered via any parameter. In contrast to triggering to a channel, no recording channel is required here.
 - **Force trigger:** No trigger condition, recording starts immediately after the start
4. Click **OK** to accept the selection and close the dialog box again.
5. Set trigger value, delay and edge.
 - Further information on this can be obtained from the following table.

Setting	Function
Trigger value	Value from which on triggering is activated. • The trigger level is not effective for triggering on Boolean variables.
Deceleration	Time delay between recording and trigger event.
Pre-trigger	Select a negative delay time to detect signals prior to the trigger event. • The trigger time is designated by a dotted line in the diagram. • With triggering on occurrence of an event, it is thus possible to detect the values that have caused the event.

Device functions with active online connection

Data logger

Setting	Function
Post-trigger	Select a positive delay time to detect signals occurring a certain time after the trigger event. 
Edge	If the trigger source is a channel or a variable, you can choose between the following trigger modes:
Positive edge	For triggering on a BOOL parameter: • Trigger activation requires a FALSE-TRUE transition. For triggering on a different parameter: • For trigger activation, the selected trigger value must be exceeded.
Negative edge	For triggering on a BOOL parameter: • Trigger activation requires a TRUE-FALSE transition. For triggering on a different parameter: • For trigger activation, the selected trigger value must be fallen below.
Change	For triggering on a BOOL parameter: • Trigger activation requires a state change. For triggering on a different parameter: • For trigger activation, the current value must be different than the last value.

7.7.2.4 Using the time axis

The  icon in the *Data logger toolbar* serves to activate the "Time axis" mode for a continuous measurement.

In this mode, the data memory for the measured data operates according to the ring buffer principle, i.e. if the data memory is full and new measured data arrive, the oldest measured data will be deleted. The time axis is tracking, similar to a cardiogram.



Note!

If you change the mode, the currently represented line diagram will be deleted.

7.7.2.5 Starting/stopping recording



How to start/stop recording:

Click **Start** to start recording.

- Instead of **Start** the **Stop** button is displayed now.
- In the standard mode, recording automatically stops at the end of the time axis. The **Stop** button serves to abort recording.
- In the "Time axis" mode, recording will only be stopped if you click **Stop**.

7.7.2.6 Adjusting the representation

After recording, the measured values are visualised in the diagram. If required, you can now adjust the representation using the zoom function or the automatic scaling function.



Tip!

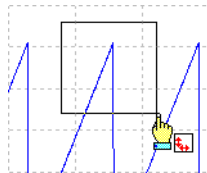
»Engineer« From »Engineer« V2.10, a scrollbar appears below the time axis as soon as the diagram does not show the complete measurement anymore.

You can use the scrollbar to move the visible section horizontally. The time-axis inscription and the position indicator are automatically corrected during scrolling.

Zoom function



Go to the *Data logger toolbar* and click the  icon to activate the zoom function.

Zoom function	Procedure	
Zoom selection		Hold down the left mouse button and draw the section to be zoomed:  • The selection is shown with a frame. • When the left mouse button is released, the selection is zoomed in the diagram.
Horizontal/vertical shift of selection		Hold down the left and right mouse button and move the mouse pointer on the horizontal scale to the left or right or on the vertical scale to the top or bottom to shift the selection accordingly. • With a three-button mouse, you can use the mouse button in the middle.
Horizontal stretching		Hold down the left mouse button and move the mouse pointer on the horizontal scale to the left to stretch the shown selection from the right edge. • Moving the mouse pointer in opposite direction continuously reduces the stretching.
		Hold down the right mouse button and move the mouse pointer on the horizontal scale to the right to stretch the shown selection from the left edge. • Moving the mouse pointer in opposite direction continuously reduces the stretching.
Vertical stretching		Hold down the left mouse button and move the mouse pointer on the vertical scale to the bottom to stretch the shown selection from the top. • Moving the mouse pointer in opposite direction continuously reduces the stretching.
		Hold down the right mouse button and move the mouse pointer on the vertical scale to the top to stretch the shown selection from the bottom. • Moving the mouse pointer in opposite direction continuously reduces the stretching.
Return to original representation		Click the right mouse button in the diagram to return step by step to the original representation.

Automatic scaling function

Use the automatic scaling function to automatically scale and reposition the representation of selectable signal characteristics in the oscillograph and reset the offset to "0".



How to carry out automatic scaling:

1. Go to the *Data logger toolbar* and click the  icon to activate the automatic scaling function.
2. Select the channels/parameters for automatic scaling in the *Select variable* dialog box.
3. Press **OK**.
 - The dialog box is closed and the selected channels/variables are scaled automatically.

7.7.2.7 Reading individual measured values

In addition to the zoom and scaling function, the data logger offers a "cursor function" that can be used to display individual measured values of a selectable channel or the difference between two measured values.

- If the **Cursor** has been pressed, the cursor function is active and two movable vertical measuring lines are shown in the diagram.



How to use the cursor function:

1. Click the **Cursor** button.
2. Select the channel for which individual measured values are to be indicated from the **Channel** list field.
3. Hold down the left mouse button and drag the red vertical measuring line to the desired position.
 - The active measuring line is represented by a continuous line, the inactive measuring line is represented by a dotted line.
 - If you position the mouse pointer over the inactive measuring line, the measuring line automatically becomes active.
 - The value measured at the position of the active measuring line is indicated in the **Value** group field.
 - The difference between the values measured at the two measuring lines is indicated in the **Differential value** group field.

7.7.2.8 Comparing peak values

[This function is available from »Engineer« V2.10!](#)

Several values displayed in the data logger can be compared to each other using a horizontal measurement line.

- The horizontal measurement line is displayed when the **Cursor** button has been pressed.
- The measurement line is automatically created based on the current cursor point and thus cannot be shifted.

7.7.3 Data records

If several data records are loaded in the data logger at the same time, the data record to be displayed has to be selected via the **Data record** list field. There are three types of data records:

Online data record

The online data record is the only data record which serves to establish a connection to the target system. When the online data record has established the connection completely, it can communicate with the target system.

- In the **Data record** list field, the online data record is marked with a prefixed asterisk (*).

Offline data record

The offline data record is a data record already stored in the project and loaded in the data logger again, or a data record imported from a file.

Merge data record

The merge data record is automatically available in the **Data record** list field if two or more data records are loaded in the data logger at the same time.

- In the merge data record, several characteristics from the currently loaded data records can be overlaid, e.g. to compare signal characteristics from different recordings. ▶ [Overlay function](#) (126)

7.7.3.1 Commenting a data record

This function is available from »Engineer« V2.10!

You can add a comment to the selected data record.

- The comment is saved together with the data record, both when being saved in a file and in a project.
- When you select a data record with a comment for loading in the *Load data record* dialog box, this comment will be shown in the dialog box.



How to add a comment to the selected data record:

Option 1: Enter the comment directly into the **Comment** text field.

Option 2: Go to the *Data logger toolbar* and click the  icon to open the *Comment* dialog box for entering the comment.

7.7.3.2 Saving/exporting a data record

After the variables to be recorded have been selected and the required settings have been entered, you can save the configuration and recording, if already executed, for future use in the project or export them to a file.



Note!

The reuse of a saved configuration is only reasonable for controllers of the same type, as otherwise due to a scaling of the oscilloscope channels that is not adapted, incorrect values are displayed!



How to save the data record in the project:

1. Go to the *Data logger toolbar* and click the  icon.
 - The *Save data record* dialog box appears.
2. Enter a name in the **Name of the data record to be stored** input field.
3. Click the **Filing in the project** button.
 - The dialog box is closed and the current data record is filed in the project.



Note!

The data record will only be saved if you save the whole project.



How to export the data record to a file:

1. Go to the *Data logger toolbar* and click the  icon.
 - The *Save data record* dialog box appears.
2. Enter a name in the **Name of the data record to be stored** input field.
3. Click the **Export to file** button.
4. Specify the data record to be stored and the filing folder in the *Save as* dialog box.
5. Click the **Save** button.
 - The dialog box is closed and the current data record is saved.

7.7.3.3 Loading/importing data records

Configurations/data records already stored can be reloaded into the data logger any time, e.g. for the overlay function.



Note!

The reuse of a saved configuration is only reasonable for controllers of the same type, as otherwise due to a scaling of the oscilloscope channels that is not adapted, incorrect values are displayed!



How to load a data record from the project:

1. Go to the *Data logger toolbar* and click the  icon.
 - The *Load data record* dialog box appears.
2. Select the data record to be loaded from the **Data record** list field.
3. If the data record is to be used as configuration, select the **As configuration...** option.
4. Click **Open**.
 - The dialog box is closed and the selected data record is loaded.
 - If the configuration to be loaded contains variables that are no longer available in the controller, these variables are automatically removed from the configuration.



How to import a data record from a file:

1. Go to the *Data logger toolbar* and click the  icon.
 - The *Load data record* dialog box appears.
2. Select the **From a file** option.
3. Click the **Search...** button.
4. Select the file to be imported within the desktop environment from the *Open* dialog box.
5. If the data record is to be used as configuration, select the **As configuration...** option.
6. Click **Open**.
 - The dialog box is closed and the selected data record or configuration is imported.
 - If the configuration to be loaded contains variables that are no longer available in the controller, these variables are automatically removed from the configuration.

7.7.3.4 Closing the data record

This function is available from »Engineer« V2.10!

You can close an open offline data record at any time.

- After a data record is closed, it will not be available anymore in the **Data record** list field. The data logger changes automatically to the display of the next offline data record in the list field.
- If the closed data record was included in the MERGE data record, its channels will be removed from the MERGE data record.
- If all offline data records have been closed, the data logger changes to the online data record if the device is currently online. Otherwise, no data record will be displayed.



Go to the *Data logger toolbar* and click the  icon to close the currently displayed offline data record.

7.7.3.5 Deleting a data record in the project



How to delete the currently displayed offline data record:

1. Go to the *Data logger toolbar* and click the  icon.
 - You are prompted for confirmation whether you want to delete the data record.
2. Confirm the prompt with **Yes** to delete the data record.
 - The data record is closed and then deleted in the project.
 - After a data record is closed, it will not be available anymore in the **Data record** list field. The data logger changes automatically to the display of the next offline data record in the list field.
 - If the closed data record was included in the MERGE data record, its channels will be removed from the MERGE data record.
 - When all offline data records have been deleted, the data logger changes to the online data record.

7.7.3.6 Overlay function

The overlay function serves to lay several characteristics from the currently loaded data records on top of each other, e.g. to compare signal characteristics from different recordings.

- If two or more data records are loaded in the data logger, e.g. an online data record and a data record saved before in the project, a "merge" data record is automatically provided in the **Data record** list field.
- If the merge data record is selected, the desired characteristics to be overlaid or compared can be selected from the loaded data records in the **Vertical channel settings** group field.
- If an online data record is used in the merge data record, an update is carried out in the merge data record in the case of a renewed recording.
- Removing variables from an offline or online data record causes the characteristics in the merge data record to be deleted.

7.7.3.7 Copying a data record to the clipboard

For documentation purposes, it is possible to copy the measured data of a data record as a table or, alternatively, the data logger user interface as a picture, to the clipboard for use in other programs.



How to copy measured data or a picture of the user interface to the clipboard:

1. Go to the *Data logger toolbar* and click the  icon.
 - The *Clipboard* dialog box appears.
2. Select **Curve points** if the measured data are to be copied to the clipboard as a table, or select **Screenshot** if the data logger user interface is to be copied to the clipboard as a picture.
3. Press **OK**.
 - The dialog box is closed and the selected option is copied to the clipboard.

7.8 Oscilloscope

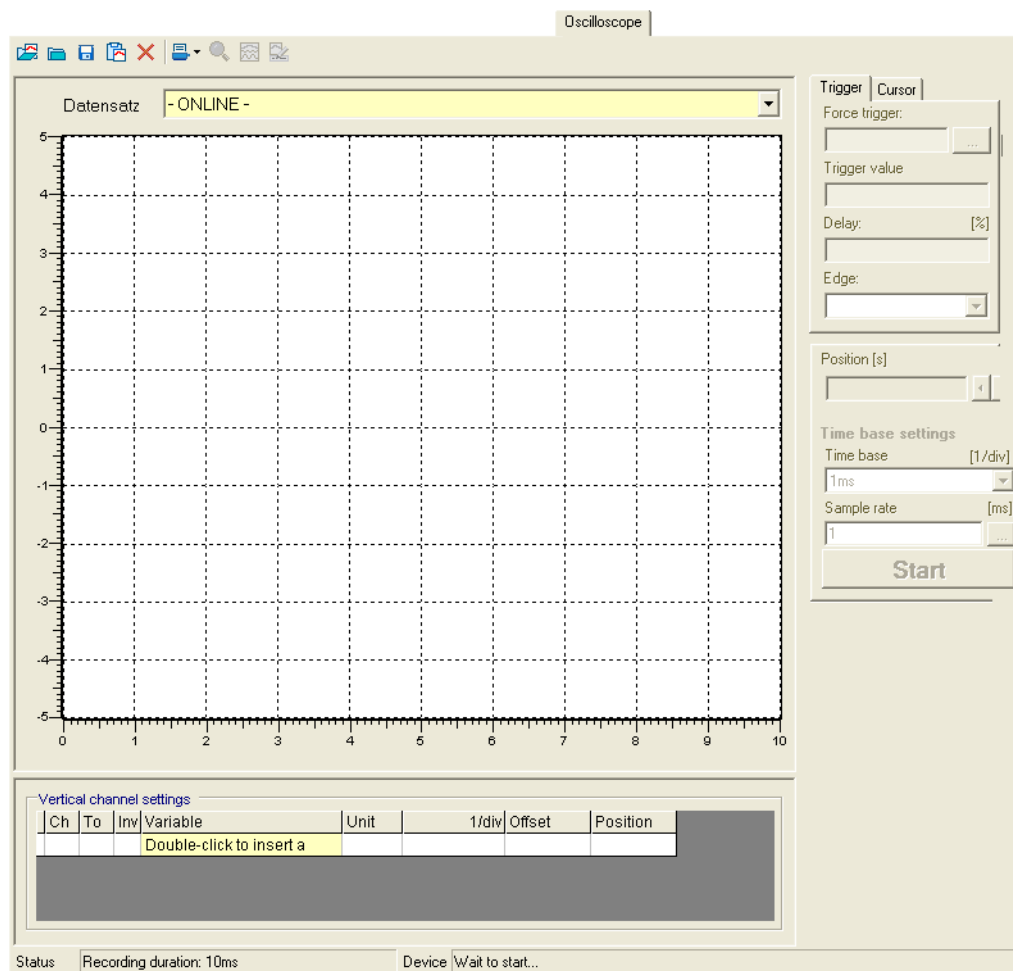
Some Lenze devices have an integrated oscilloscope function which you can use to support start-up, maintenance and troubleshooting.

- If a device is provided with this oscilloscope function, the **Oscilloscope** tab via which you can parameterise the oscilloscope function is additionally available for the device in the workspace.



Tip!

Detailed information on the oscilloscope function can be found in the online help/documentation to the corresponding device.



[7-3] Example: Oscilloscope function for 9400 HighLine

Defining the system functionality

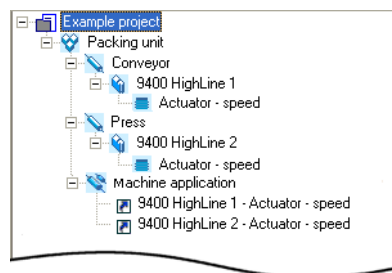
Representation in the project view

8 Defining the system functionality

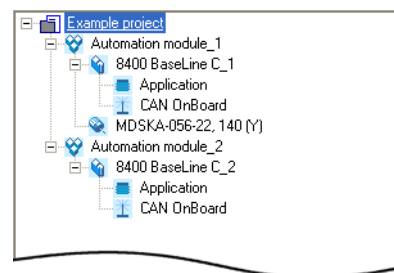
This chapter describes how to define the functions of your overall system in the »Engineer«. For this purpose you describe the information which is communicated between the devices of your system for your devices to interact in the desired way. Furthermore you define the precise function of the individual devices within your system (parameterising and configuring devices).

8.1 Representation in the project view

The *Project view* represents the correlation between the elements of the system structure consisting of system modules and axes and the logic.



Example 1: System with two 9400 HighLine drive controllers



Example 2: System with one 8400 Baseline C drive controller

- The  icon below the device represents the selected application for the device in question.
- A higher-level machine application  is required if several devices have to exchange information with each other, as applications can only be interconnected within one machine application.
- In contrast to networks, functions do not focus on network-specific settings but on contents and structure of communicated variables.



Note!

Configurations that have been carried out are **not immediately** accepted in device-specific parameter assignments (the known codes for Lenze devices)!

- The project must be updated to transfer the configuration to the device: ▶ [Build project](#) (p. 76)

8.2 Terminology used

Applications & ports

The **Application** symbolises the function of a device in the »Engineer«. An application can be viewed as a block that is mostly configurable via parameters and is provided with external connection points, so-called **Ports**:



- A device always comes with an application which may be empty (unconfigured).
- Via input ports, for instance setpoints and control commands can be transferred to the application. Via output ports an application can provide actual values and status messages.
- Examples of applications are "speed control" and "torque control".

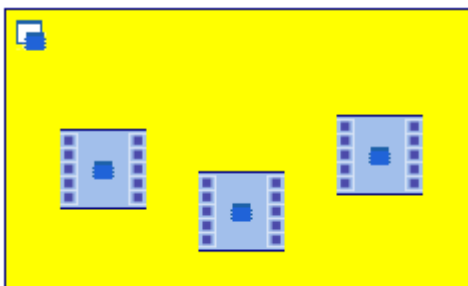
Machine application

A function of the system which is implemented by the interaction of several devices in the »Engineer« is symbolised by a **Machine application**.

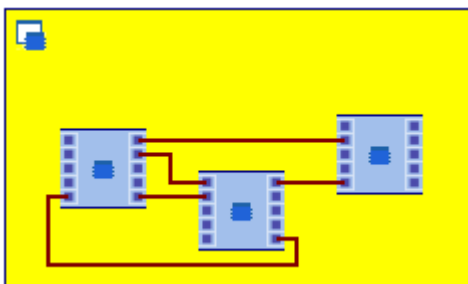


How to generate a machine application:

- A machine application is generated by defining the applications which form this machine application by allocation in a first step:



- The second step is to interconnect the ports of the applications assigned with each other and like this describe the applications between which information is exchanged:

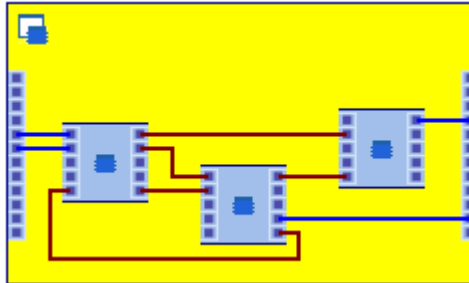


Defining the system functionality

Terminology used

Ports for machine applications

You can define **Ports** for a machine application to realise an exchange of information between different machine applications:



- In principle, not only applications but also machine applications that have already been configured can be allocated to a machine application. This makes it possible to create hierarchical application structures.
- An "electrical shaft" is an example of a machine application. ▶ [Establishing an interconnection via an electrical shaft](#) (186)

Application variables

The information to be exchanged between applications is called application variables.

- The corresponding application provides the application variable via an output port.
- A "control word" is an example of an application variable.

Element variables

An application variable consists of so-called **Element variables**.

- The corresponding application defines the application variable composition from the element variables.
- Examples of element variables:
 - Variable of the BOOL type for exchanging the "set controller inhibit" control signal.
 - Variable of the DINT type for exchanging the speed setpoint.



Note!

The definitions of the configurations which you generate within the functions are network-independent!

- At first, the following specifications are not required for the definition that two applications communicate with a specific cycle time via an application variable:
 - The process data object the application variable is to be mapped to.
 - The network the process data object must be used for communication.

Defining the system functionality

General notes with regard to the procedure

8.3 General notes with regard to the procedure

For describing the functions of the system, the following procedure is recommended:



Note!

The procedure described below uses **one** application for the project.

- To display hierarchical structures, a project may include **multiple** applications!

1. Parameterise & configure the devices

Carry out the parameter settings required for the individual devices and the applications assigned.

▶ [Parameterising & configuring the devices](#) (📖 132)

2. Generate a machine application

Generate a machine application within a system module or an axis to realise device-independent functions.

▶ [Inserting & configuring a machine application](#) (📖 173)

3. Compile the whole project

Build the project to automatically generate all relevant parameter assignments for the networks and devices contained in the project.

▶ [Build project](#) (📖 76)

Defining the system functionality

Parameterising & configuring the devices

8.4 Parameterising & configuring the devices

If you select a device in the *Project view*, different tabs are provided to you in the *Workspace*, via which you can parameterise, configure, and diagnose the device.



Note!

The tabs provided for a device and the possible settings resulting therefrom are device-specific and therefore are only explained by means of examples here!

Also read the documentation supplied with the corresponding device before you start working!

Different licence levels are available for the Engineering tools of Lenze. Depending on the licence level used, the functional range varies on the user interface. Current information can be found at: <http://www.Lenze.com>

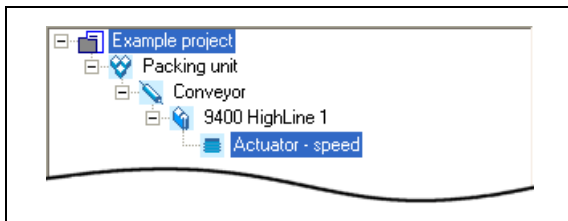
Tab	This tab serves to ...
Application parameter	... parameterise the application assigned to the corresponding device. ▶ Parameterising the application (146)
FB Editor (device-dependent available)	... reconfigure the application by means of a corresponding function block interconnection. ▶ Function block editor (FB Editor) (149)
Terminal assignment	... configure the digital and analog input/output terminals of the device. ▶ Configuring the terminal assignment (144)
Ports	... add ports to an application to enable data exchange with other applications. ▶ Port editor (ports) (155)
User menu	... create an individual parameter list with frequently used parameters. ▶ User menu (170)
Diagnostics	... carry out a diagnostics of the prevailing device when an online connection has been established. ▶ Diagnostics (110)
Data logger	... record the temporal course of parameter values. ▶ Data logger (111)
Oscilloscope (device-dependent available)	... use an integrated oscilloscope function for supporting commissioning, maintenance and troubleshooting. ▶ Oscilloscope (127)
All parameters	... display/edit all parameter settings of the device. ▶ Parameter setting in the »Engineer« (134)
Product features	... show information on the device. • The Catalogue information shows the information for the device stored in the »Engineer« catalogue. • The Physical component shows the information read from the device, which is available when an online connection has been established.
Documentation	... add notes and file attachments to the device. ▶ Documentation - Add project details (71)

Defining the system functionality

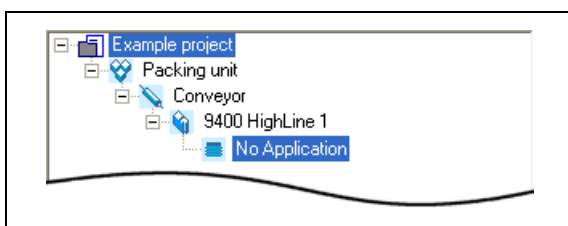
Assigning an application to the device

8.5 Assigning an application to the device

If you insert a device, you can optionally select an application available for the corresponding device after having selected the device to be inserted.



- The application selected, "Actuator - speed", is attached to the device (9400 HighLine) in the *Project tree*:



- If, during insertion, an application is not selected for the device, a so-called "empty application" is assigned to the device.

- You can replace the application assigned to the device with another application that is available for the device any time:



Note!

If an application is replaced, the present parameterisation, configuration, and the program for the device are lost!



How to replace an application:

1. Select the controller under which the application to be replaced is located in the *Project view*.
2. Select the menu command **Insert→Application**.
 - As an alternative, execute the **Insert application** command in the context menu of the drive controller.
 - The *Insert application* dialog box appears.
3. Select the new application.
4. Press **OK**.
5. Confirm safety query with **Yes** to replace the existing application with the application selected.
 - The dialog box is closed and the previous application is replaced with the application you have just chosen.

Defining the system functionality

Parameter setting in the »Engineer«

8.6 Parameter setting in the »Engineer«

Via the **All parameters** tab of a device or an application you can have the corresponding parameter settings displayed and also edited, e.g. in order to define further functional settings for the device.



Tip: Specific search for parameters

Use the text field above the parameter list in order to search for parameter names, parameter numbers or indices. The search is limited to the currently displayed parameter list.

Code	Subcode	Name	Value	Unit
2	0	Device commands	Load Lenze setting	
6	0	Select motor control	VFCplus: V/f control open loop	
18	0	Chopper frequency	8 kHz var./drive-optimised	
22	0	Maximum current	1.95	A
52	0	Motor voltage	0	V
54	0	Motor current	0.00	A
58	1	Pole position resolver	-90.0	°
58	2	Pole position encoder	0.0	°
58	3	Pole position module	0.0	°
59	0	Motor - number of pole pairs	4	
79	0	Motor - mutual inductance	88.5	mH
81	0	Rated motor power	0.25	kW
82	0	Motor - rotor resistance	0.0000	Ohm
83	0	Motor - rotor time constant	21474836.47	ms
84	0	Motor stator resistance	18.2250	Ohm
85	0	Motor stator leakage induct.	51.012	mH

- The parameters are classified in different categories which you select via the buttons in area **A**.
 - Click on the desired categories button in area **A** to show the available subcategories.
 - Click on the desired subcategory to display the parameters in the area **A**.
- Area **C** shows all parameters of the selected category / subcategory.
 - By clicking the corresponding column header, you can alter the sequence of the parameter list and change over between ascending and descending order.
 - The **Parameter list** category shows all available parameters of the corresponding device.
 - Using the **Display→Info** area command, the information area can be shown/hidden by right-clicking into a parameter value. The information area shows further information on the selected parameter below the parameter list.

8.6.1 Terminology used

Offline/online

With regard to the representation of the parameter setting, the modes "Offline" and "Online" are differentiated.

- If no online connection to the device is available, the parameter list is in the "Offline mode". In this mode the parameter list displays so-called "Offline parameters" presenting the parameter settings of the device saved within the project. ▶ [Altering a parameter offline](#) (136)

Defining the system functionality

Parameter setting in the »Engineer«

- However, if an online connection to the device is available, the parameter list is in the "Online mode". In this mode the parameter list displays so-called "Online parameters", presenting the parameter settings which are currently existing within the device. ▶ [Altering parameters online](#) (137)
- In the »Engineer« offline and online parameters are identified by a different background colour:

Colour	Example	Meaning
White		Offline parameter • The device is not connected "online" with the »Engineer«. The parameter value set in the project is displayed.
Yellow		Online parameter • The device is connected "online" with the »Engineer«. The current parameter value of the device is displayed. • The symbol  behind a parameter value indicates that the value in the device differs from the parameter value set in the project.
Red		Communication error (time-out) for an online parameter • The communication connection to the device is interrupted.



Tip!

In the information area below the parameter list the current mode (offline/online) is displayed on the right side.

In order to show the parameter values as hexadecimal values, click the **View→Show values in hex format** menu item. This function has an effect on all parameters with integral numerical values in dialogs and parameter lists.

Display parameters

"Display parameters" are parameters which are only used to show status information and actual values and which feature a read-only access.

- In the »Engineer« display parameters are also identified by a different background colour:

Colour	Example	Meaning
Light grey		Offline display parameter
Pale yellow		Online display parameter • The device is "online", i.e. connected to »Engineer«. The current parameter value of a display parameter of the device is shown.
Red		Communication error (time-out) for an online display parameter • The communication connection to the device is interrupted.

8.6.2 Working in the parameter list

On the top edge (area ) the parameter list is provided with a toolbar which enables the parameter transfer from the project into the device and vice versa.

- Click on an icon to execute the corresponding function.

Defining the system functionality

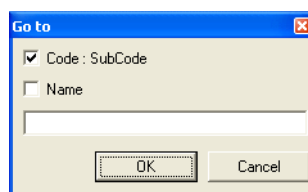
Parameter setting in the »Engineer«

Icon	Function
	▶ Accepting parameter settings in the device (139) *
	▶ Accepting the parameter settings of the device (138) *
	▶ Resetting parameters to the default setting (138)
* Function only possible when an online connection has been established.	



Tip!

Via the **Go to** command in the *Context menu* you can go quickly to a parameter in the list by entering the parameter number or name:



8.6.3 Altering a parameter offline

If you are "offline" and therefore are not connected with the device, the parameter settings for the respective device saved within the project are displayed in the direct mode in the "Value" column:

	/	C	/	S	Name	Value	Unit
	114	8			DIx terminal polarity	0	
	118	1			DOx terminal polarity	0	
	118	2			DOx terminal polarity	0	
	118	3			DOx terminal polarity	0	
	118	4			DOx terminal polarity	0	
	120	0			Mot. overload prote...	105	%
	121	0			Motor temp. warnin...	120	°C
	122	0			Heatsink temp. war...	85	°C
	123	0			Device util. warning...	90	%
	126	0			CPU temp. warning...	70	°C
DOx terminal polarity PC value: 0 Value range: 0 ... 1							

- ☐ Offline parameter
- ☐ Offline display parameter

- In the offline mode you can carry out all required parameter settings for a device, whereby the corresponding device at this time does not have to be physically available or connected to the PC.
- As a result, you can take your time in "preconfiguring" the project, for example, and you can transfer the complete parameter set to the device at a later time.
- All settings in the parameter list are saved together with the project and thus are provided again in the next »Engineer« session.

Defining the system functionality

Parameter setting in the »Engineer«



How to alter a parameter setting "offline" in the project:

1. Select the parameter to be altered from the list.
2. Enter the new value in the **Value** column, or select it from the options defined.
 - Invalid or impermissible values are "red" in the input field.
 - Values that have not been accepted yet are "blue" in the input field.
3. Press the **<Input key>** to accept the changed value.
 - You can reject the entry by pressing the **<Esc>** key.

8.6.4 Altering parameters online

If you are connected to the device "online", instead of the parameter settings saved within the project the current parameter settings of the device are displayed in the direct mode in the "Value" column:

/	C...	/	S	Name	Value	Unit
	114	5		Dlx terminal polar...	0	
	114	6		Dlx terminal polar...	0	
	114	7		Dlx terminal polar...	0	
	114	8		Dlx terminal polar...	0	
	118	1		D0x terminal pol...	0	
	118	2		D0x terminal pol...	0	
	118	3		D0x terminal pol...	0	
	118	4		D0x terminal pol...	0	
	120	0		Mot. overload pro...	105	%
	121	0		Motor temp. warn...	120	°C

D0x terminal polarity
PC value: 0
Device value: 0
Value range: 0 ... 1

- Online parameter
- Online display parameter

- The values are continuously updated in a cyclic manner.
- The symbol  behind a parameter value indicates that the value in the device differs from the parameter value set in the project.
- In the information area below the parameter list further information on the parameter selected is displayed, such as for instance the value set in the project.



Note!

If you alter a parameter value when an online connection has been established, this setting is also accepted for the corresponding device!



How to alter a parameter setting "online" in the project and the device:

1. If an online connection to the device has not yet been established:
Click the  icon in the *Toolbar* or select the menu command **Online → Go online** in order to establish an online connection to the device.
▶ [Going online](#) (p. 77)
2. Select the parameter to be altered from the list.

Defining the system functionality

Parameter setting in the »Engineer«

3. Enter the new value in the **Value** column, or select it from the options defined.
 - Invalid or impermissible values are "red" in the input field.
 - Values that have not been accepted yet are "blue" in the input field.
4. Press the **<Input key>** to accept the changed value.
 - You can reject the entry by pressing the **<Esc>** key.
 - If you leave the input field without accepting the altered value, you are asked to confirm whether the altered value is to be accepted or rejected.

8.6.4.1 Resetting parameters to the default setting



How to reset a parameter to the default setting:

1. Select the parameter to be altered from the list.
2. Click the  icon in the *Parameter toolbar* to reset the selected parameter to the default setting.

8.6.4.2 Accepting the parameter settings of the device

If you are connected to the device "online", you can accept parameter settings of the device easily in the project. ▶ [Going online](#) (📖 77)



How to accept parameter settings of the device in the project:

1. Select the parameter from the parameter list.
 - The  symbol behind a parameter value indicates that the value in the device is different to the parameter value stored in the project.
2. Click the  icon in the *Parameter toolbar* to accept the selected parameter setting of the device in the project.

8.6.5 Accepting parameter settings in the device

If you are connected to the device "online", you can accept the parameter settings stored in the project to the device.

► [Going online](#) (□ 77)



How to accept parameter settings of the project in the device:

1. Select the parameter from the parameter list.
 - The  symbol behind a parameter value indicates that the value in the device is different to the parameter value stored in the project.
2. Click the  icon in the *Parameter toolbar* to accept the selected parameter setting of the project in the device.

8.6.6 Comparing parameter sets

This function serves to compare the parameter set of a device (parameter set A) to a parameter set B.

The following parameter sets can be compared:

- Online parameters of the device with offline parameter settings of the »Engineer« project
- Online parameters of the device with the predefined default settings
- Offline parameters of two devices.

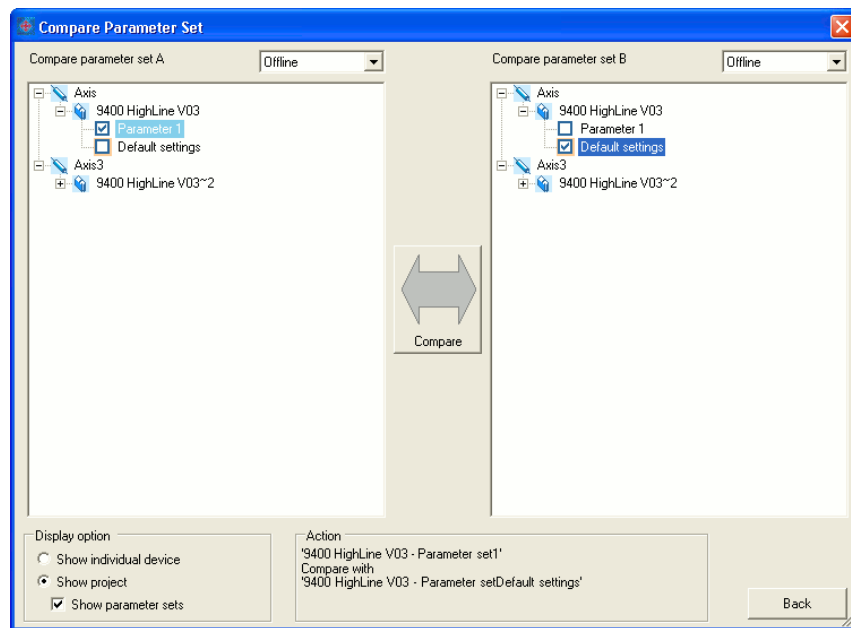


How to carry out a parameter comparison:

1. Go to the *Project view* and select the device the parameter settings of which are to be compared.
2. Select the **Application data → Compare parameter sets** menu command or execute the **Compare parameter sets...** menu command via the context menu of the device.
3. Go to the *Compare Parameter Set* dialog box and select the parameter sets to be compared (*Compare parameter set A* and *Compare parameter set B*).

Defining the system functionality

Parameter setting in the »Engineer«



[8-1] Compare parameter set: Example EL 870

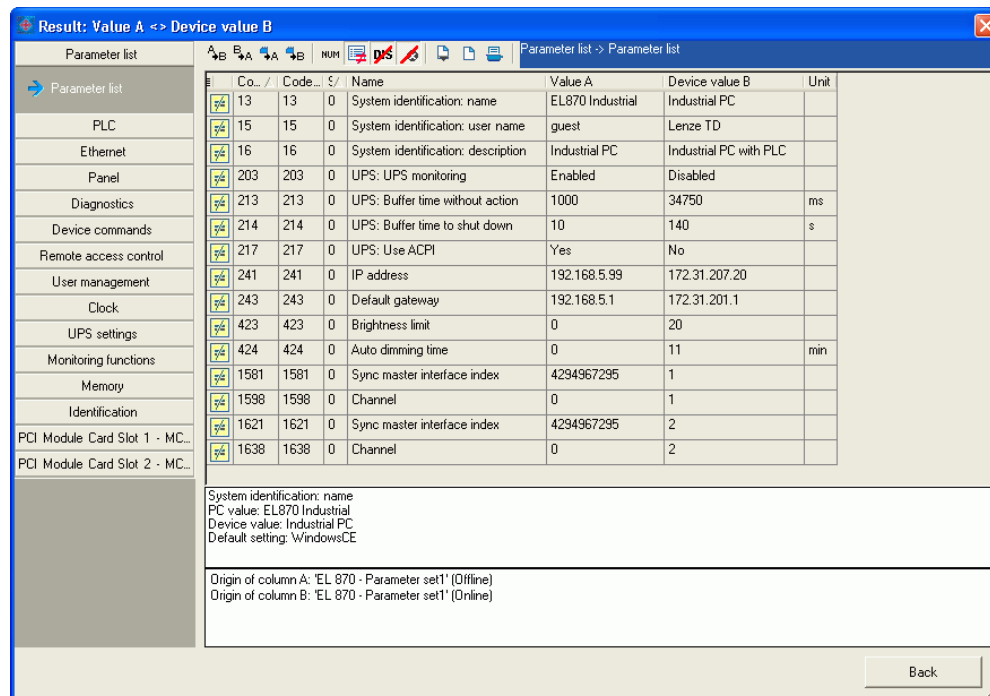
- In order to execute a comparison with the parameter set of an online-connected device, select "Online" in one of the upper list fields.
 - The *Display option* area serves to filter the project view and show only specific parameters.
4. Click the **Compare** button:
- The parameter settings of the device are read out and the process of the data transmission is displayed in the *Transfer* dialog box.
 - After the data transmission has been completed, the result of the comparison is displayed in the form of a parameter list in the *Compare parameters* dialog box.
 - In the default setting, the parameter list only specifies the parameters the value of which in the device differs from the parameter value saved in the project.

Defining the system functionality

Parameter setting in the »Engineer«

Structure of the comparison list

After a successful data transmission, the comparison result is shown in a parameter list. The parameters are arranged in different categories and subcategories which can be selected via the buttons on the left:



[8-2] Example for a comparison list of two parameter sets

- In the parameter list on the right all parameters of the category/subcategory are shown.
- By clicking the corresponding column header, you can alter the sequence of the parameter list and change over between ascending and descending order.
- The **Parameter list** category shows all available parameters of the corresponding device.
- The icon in front of a parameter in the comparison list indicates that the values in column A differ from value B.

The *Result: Value A <-> Device value B* dialog box is provided with a toolbar in the upper position.

- Click an icon to execute the corresponding function.



Tip!

By using the **<Shift>** and **<Ctrl>** keys you can select several parameters at the same time.

Icon	Function
	Copy selected parameters from column A to column B.
	Copy selected parameters from column B to column A.
	Copy default setting of a selected parameter to column A.
	Copy default setting of a selected parameter to column B.

Defining the system functionality

Parameter setting in the »Engineer«

Icon	Function
	Show parameters numerically.
	Only show parameters the comparison values of which are different in column A and column B.
	Mask out all parameters featuring a read only access.
	Mask out all parameters which are available either in column A or in column B (added or omitted).
	Export current parameter view to a file. • File formats: • *.csv (Comma-Separated Values") • *.gdc (Lenze »Global Drive Control« (GDC)
	Show print view of the parameter view
	Print parameter view

The following information is visible below the parameter list:

Information	Meaning
Parameter: Value	Parameter name (code) with the stored value, Example: <i>Identify system: User name</i>
PC value	Value in the »Engineer« project, example: <i>PC value: User</i>
Value in the device	Value which is stored in the device, example: <i>Device value: Lenze</i>
Default setting	Preset default setting, example: <i>Default setting: Guest</i>

Defining the system functionality

Copying parameter sets

8.7 Copying parameter sets

This function serves to copy a parameter set to a device.

The following parameter sets can be copied:

- Offline parameter set of an »Engineer« project,
- Default setting of a device.



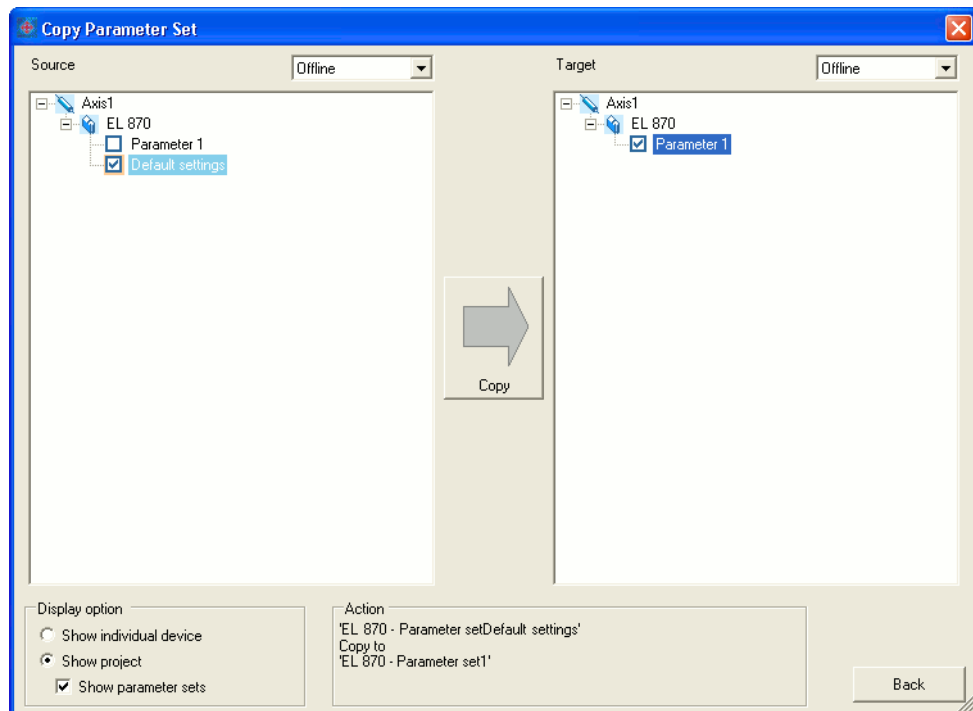
Note!

- Identical parameter sets cannot be copied to each other.
- Source and target parameter set must not overlap.
- Only offline parameter sets can be copied.



How to copy the parameter sets of a device:

1. Go to the *Project* view and select the device the parameter sets of which are to be copied.
2. Select the **Application data → Copy parameter sets** menu command or execute the **Copy parameter sets...** menu command via the context menu of the device.
3. Got to the *Copy parameter set* dialog box and select the parameter sets to be compared (*Source* and *Target*):



[8-3] Copy parameter set: Example EL 870

- The *Display option* area serves to filter the project view and show only specific parameters.
4. Click the **Copy** button.

8.8 Configuring the terminal assignment

You can configure the digital and analog input and output terminals of a device by means of the **Terminal assignment** tab for the device. With the **Control terminals** selection field, you can change between the digital and analog terminals.



Note!

The display of the **Terminal assignment** tab and the possible settings specified are device-dependent!

Also read the documentation supplied with the corresponding device before you start working!

8.8.1 Changing the terminal assignment

Depending on the device application assigned to the device and on the default setting of the device, terminals can already be linked to internal signals. This assignment, however, can be changed if required.



Click the corresponding buttons in the **Application** group field to alter the I/O configuration for the associated terminal.

Level		Application output signals
←		Drive is ready for operation
←		Speed follower enabled
←		Speed follower in limitation
←		Fault is active

8.8.2 Setting the gain & offset of the analog terminals



Click the button to parameterise the gain and offset for the associated analog terminal.

Defining the system functionality

Configuring the terminal assignment

8.8.3 Setting the active level of the digital terminals

For each digital terminal the set active level is displayed:

Icon	Meaning
	Digital terminal is "High active"
	Digital terminal is "Low active"

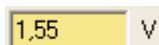
 Click on the  or  button to alter the active level for the associated digital terminal from "high-active" to "low-active" or from "low-active" to "high-active".

8.8.4 Displaying the actual status of the terminals

If an online connection to the device is available, the **Terminal assignment** tab displays the actual state of the terminals.

Analog inputs/outputs

For the analog inputs/outputs the corresponding actual value is displayed as voltage value:



- The actual values for the analog inputs are displayed in accordance with the selected form of signal adaptation (offset & gain) in each case.

Digital inputs/outputs

For the digital inputs the current status is visualised by an "LED":

Icon	Meaning
	Off
	On

- The status display for the digital inputs considers the selected form of terminal polarity.

Defining the system functionality

Parameterising the application

8.9 Parameterising the application

Use the **Application parameters** tab to parameterise the application assigned to the device and to parameterise other components (e.g. motor, brake, gearbox) connected to the device.

8.9.1 Working in the "Application parameters" tab



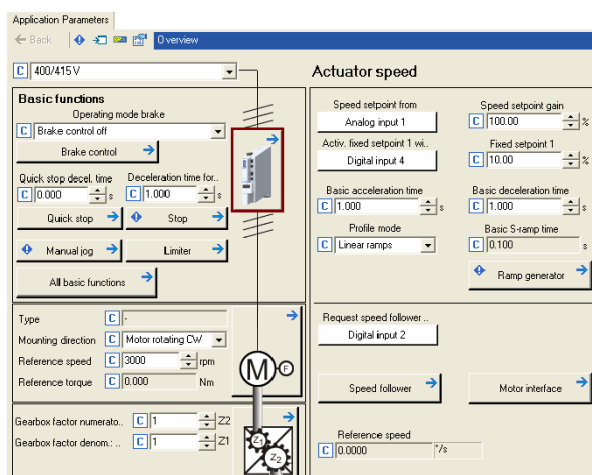
Note!

The display of the **Application parameters** tab and the possible settings specified are device-dependent!

Also read the documentation supplied with the corresponding device before you start working!

The **Application parameters** tab contains several levels of parameter dialogs.

- The top "Overview" level shows all the device functions that can be parameterised and also shows the device components that can be parameterised in the form of buttons (➔ symbol):



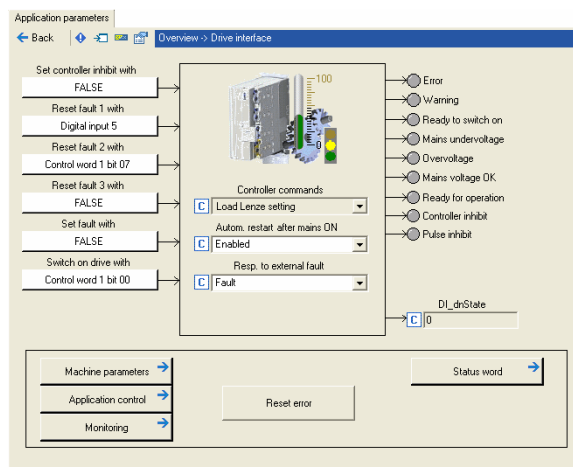
[8-4] "Application parameters" tab for a drive controller, e.g. 9400 HighLine

- If you click a button marked with the ➔ symbol, you move one level lower in the corresponding parameter dialog.

Defining the system functionality

Parameterising the application

- In this example, the button framed in red has been clicked:



- Some pictographs are marked with the symbol , which is intended to tell you that some settings still have to be made in the associated parameter dialog.
 - If you click such a pictograph in order to change over to the associated parameter dialog, the marker is automatically reset (removed).
- If you click somewhere in the white input field of a parameter with the right-hand mouse button, you can transfer the value to the monitor with the **Accept in monitor window** command.

Toolbar

The **Application parameters** tab is provided with an individual toolbar in the upper position, which in the following text is called "Application parameters toolbar".

- Click on an icon to execute the corresponding function.

Icon	Function
	Back to the previously displayed parameter dialog.
	Set flag for the current parameter dialog. • The marker symbol on a pictograph is intended to tell you that some settings still have to be made or checked in the associated parameter dialog.
	► Going directly to a parameter dialog (p. 148)
	Display online values of the inputs. • The actual state of the inputs is displayed directly on the buttons.
	Add note • You can add a note to each parameter dialog.



Tip!

The header shows the parameter dialog level you are currently in:

Overview -> Net

8.9.1.1 Going directly to a parameter dialog

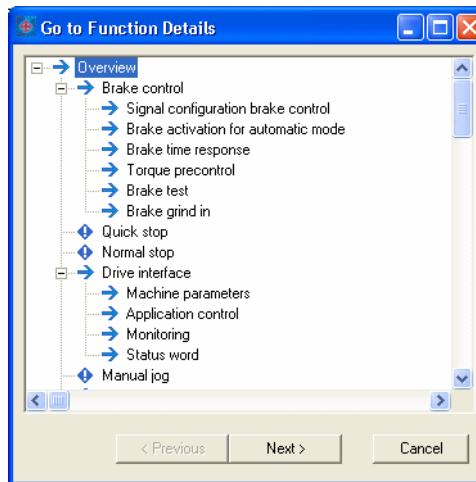
If you want to change to a parameter dialog which is not directly one level higher or lower, you can use the function "Go directly to the dialog...".

- You can also use this function to have all parameter dialogs for the application displayed in a hierarchical tree topology.



How to go directly to a parameter dialog:

1. Click the  icon in the *Application parameters toolbar*.
 - The *Go to the function detail* dialog box is displayed:



Tip!

Simultaneously to the display of this dialog box you can carry out further settings on the **Application parameters** tab and change to other parameter dialog levels. The accentuation of the current parameter dialog level in the tree topology also is updated when the changeover is effected.

2. Select the parameter dialog to be displayed from the hierarchical structure or navigate through the structure via the **Back** or **Next** button.
 - The parameter dialog selected in each case is displayed immediately in the **Application parameters** tab.
 - The dialog box entitled *Go to the function detail* remains open until the **Cancel** button is clicked.

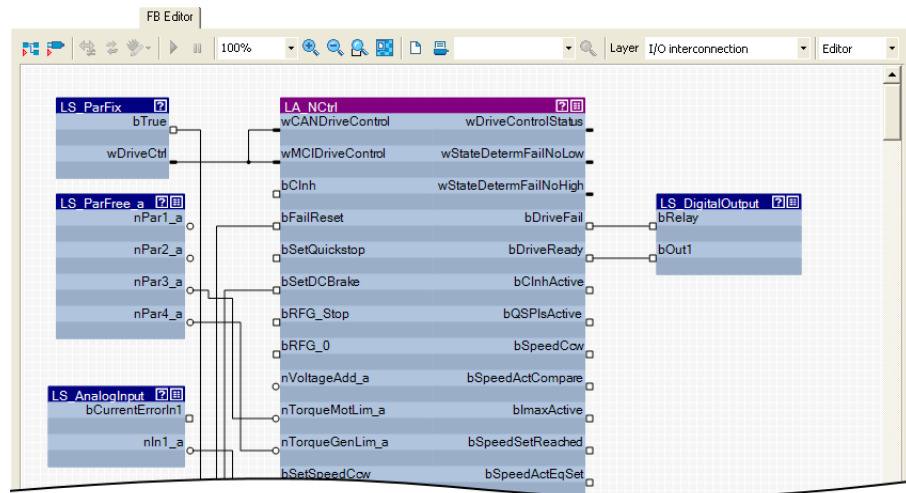
Defining the system functionality

Function block editor (FB Editor)

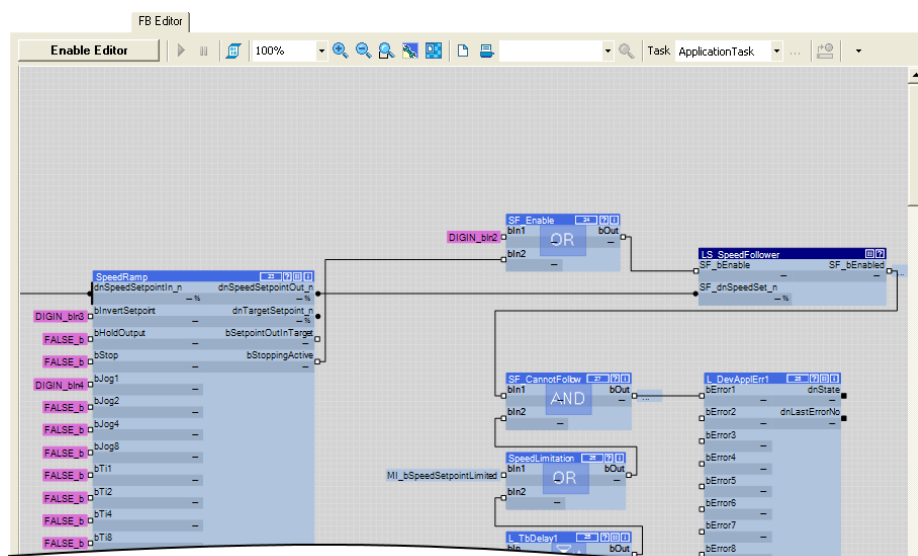
8.10 Function block editor (FB Editor)

The applications of devices of the Inverter Drives 8400 and Servo Drives 9400 series (from runtime software licence Motion Control HighLevel) cannot only be parameterised, but the underlying function block interconnection can be reconfigured and extended by individual functions (e.g. process controllers, arithmetic functions, logic modules as well as ramp generators and integrators).

For this purpose, the *Workspace* provides the **FB Editor** tab with the function block editor (FB Editor) for the 8400 and 9400 device series:



[8-5] FB Editor for 8400 Stateline C



[8-6] FB Editor for 9400 HighLine (here in the "Viewer" mode)



Note!

The functionality and the basic image of the FB Editor are different for both device series (e.g. L-force Servo Drives 9400 and L-force Inverter Drives 8400).

Detailed information on the respective FB Editor can be found in the documentation of the function library for the corresponding device series.

Defining the system functionality

Function block editor (FB Editor)

Tips for representation



Tip!

By means of the magnifier function of the FB Editor the visible area of the interconnection can be zoomed in/zoomed out. For this, click on the magnifier icons or use the desired percentage value from the selection list.



Tip!

Select **Overview** from the selection list in the menu bar of the FB Editor in order to tabulate the function blocks. The order in the overview corresponds to the processing order.

- For further use, the entries of the overview can be copied to the clipboard by means of the context menu.

Defining the system functionality

Function block editor (FB Editor)

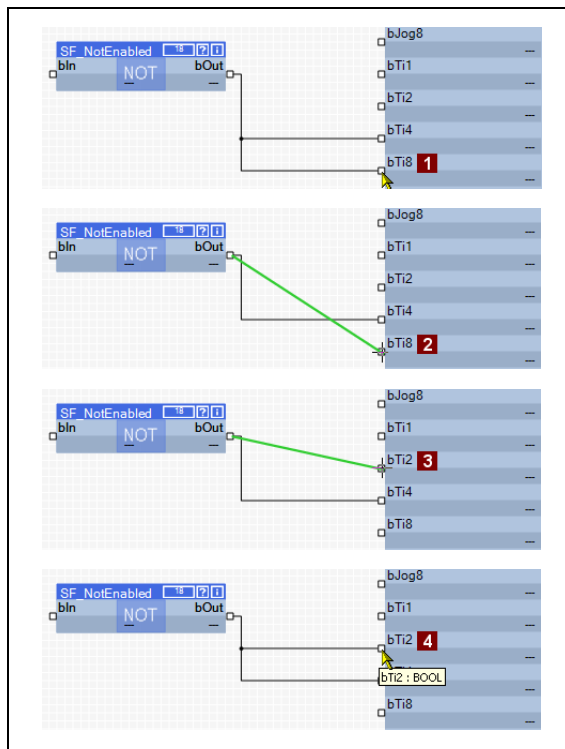
8.10.1 Connecting FBs

Detailed information on the device-specific properties of the FB Editor can be found in the corresponding online help of the controller in the section **Working with the FB Editor**.

Tips for connecting function blocks

The FB Editor enables you to...

- ...move an existing connection to another input/output:
 - A click on the point of connection of an assigned block input disconnects the existing line which can then be moved to another input. The same works for flag connections (representation as flag).
 - A click on the point of connection of an assigned block output disconnects the existing line which can then be moved to another output. Before moving, mark the desired line, otherwise a new one will be drawn. Connections shown as flags must be converted into lines before (representation as line).



[8-7] Example for moving a connection end point in the FB Editor (representation: Connection as line)

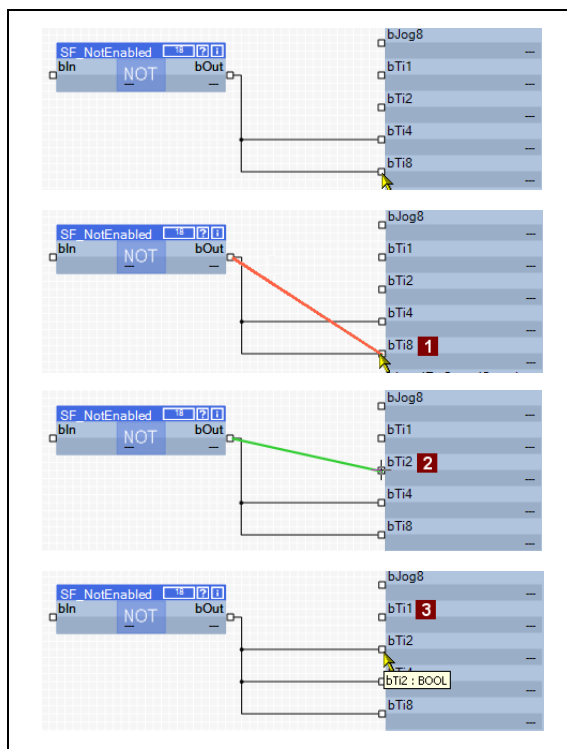
Scenario: The existing connection (line) between *bOut* and *bTi8* is to be moved.

- Click the end point of the connection **1**
 - The connection is enabled (green connection line)
- Move the end point of the connection line to the desired FB input.
 - In the example of *bTi8* **2** to *bTi2* **3**).
- Click the desired FB input to define the new end point of the connection.
 - In the example of *bTi2* **4**
- The connection has been moved from the *bTi8* input to the *bTi2* input.

- Connections shown as flags can be moved the same manner.
- ... assign several inputs with the same signal:
 - A click on the connection point of an assigned block input with simultaneously pressed <Ctrl> key (**Left mouse button + <Ctrl>**) causes another line with the same starting point as the existing line.
 - Connections shown as flags can be extended the same manner.

Defining the system functionality

Function block editor (FB Editor)



[8-8] Example for adding an additional connection in the FB Editor (representation: Connection as line)

Scenario: The existing connections (line) are to be extended.

- Mouse-click + <Ctrl> on the desired end point of the connection.
- Move the copied end point of the connection line to the desired FB input.
 - In the example of *bTi8* **1** to *bTi2* **2**).
- Click the desired FB input to add the new connection.
 - In the example of *bTi2* **3**
- An additional connection has been added to the *bTi2* by the *bOut* FB output.

- The procedure of extending the connection is independent of the representation format in the FB Editor (valid for line/flag).

8.10.2 Navigating within the FB Editor

Navigation by means of the mouse

By pressing (and releasing) the middle mouse button (press scroll wheel), you can navigate through the FB Editor by means of mouse movements.

- Press the middle mouse button again to exit.

This function is activated by default. If you are using an alternative software for controlling the mouse, this function may not be available.

Panning function

- Keep the left-hand mouse button pressed in an empty area of the FB Editor to activate the panning function.



Tip!

- The  icon symbolises that the navigation function with the mouse is activated.
- The  icon symbolises that the panning function is activated.

Navigation by means of the keyboard

Via the following key combinations you can systematically navigate through the FB Editor:

Shortcut	Function
<Ctrl> + <i>	Navigate upwards in the FB Editor
<Ctrl> + <k>	Navigate downwards in the FB Editor
<Ctrl> + <j>	Navigate to the right in the FB Editor
<Ctrl> + <l>	Navigate to the left in the FB Editor

8.10.3 Printing the function block interconnection

By means of the **Print** command you can print the function block interconnection. Alternatively you can print a detailed report for which you can select further information.



How to print the function block interconnection:

1. If required, mark the desired partial area of the interconnection to not print the complete function block interconnection.
2. Execute the **Print** command in the context menu of the FB Editor.
 - Alternatively: Press the icon  in the menu bar of the FB Editor
3. Select the desired option the submenu.

Option	Function
Print interconnection	• Select the desired scaling for the output format • Print current function block interconnection
Print report	Print detailed FB report with further information • Select options which the report is to include: • Contents • Processing table • Options for displaying the POU's
Preview	Show print view for the function block interconnection to select a suitable scaling for the output format

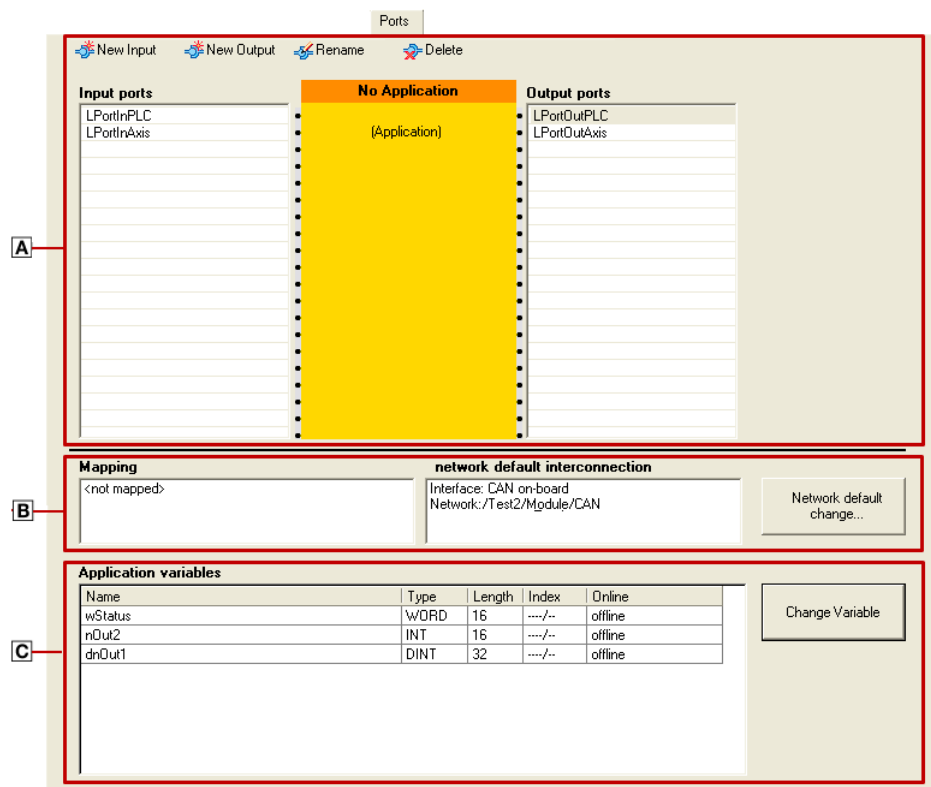
Defining the system functionality

Port editor (ports)

8.11 Port editor (ports)

The port editor (tab *Ports*) serves to create and visualise ports.

- A port is an interface which sends and receives data at runtime via an application. The data transferred via port represent a group of inseparable pieces of information which are sent and received in one piece.
- Most applications have ports which are already fixedly predefined.
- The port editor can both be called for an application on a device and for a comprehensive application (machine application) via the **Ports** tab.



A Port definition

B Communication/mapping

C Variable definition

Port definition

Display of all input and output ports of an application/ machine application.

- Mapped ports are printed in **bold**.
- The icons serve to create new ports and process available ports:

Icon	Function
	Add input or output port. ▶ Adding a port (162)
	Rename port selected. ▶ Renaming a port (169)
	Delete port selected. ▶ Deleting a port (169)

Mapping

Display of the process data object on which a port is currently mapped.

- A port can be mapped on no, one, or several process data objects.

Defining the system functionality

Port editor (ports)

- Example:
 <CAN on board/>: <TPDO1 : 0>
 <Node/process data object>: <Num>
 <Num> - indicates the byte offset in the process data object.

Network specification for interconnection

For the automatic interconnection the user can specify an interface and therefore implicitly a network for the break-up of a logic connection here.

- The interface and the network connected are both shown.
- The specification can be edited by clicking the **Change network specification** button. Only interfaces/networks are shown via which interconnection for each machine application is possible.

Variable definition

Display of the variable definition for a port selected.

8.11.1 Overview: Variable types for ports

A port of an application consists of variables. The »Engineer« summarises these variables again to "Simple", "Record" or "Array" variable types:

Variable type	Info
Simple	This type only contains one variable of a basic data type like INT, WORD, etc. • Use this type if it is not known how the devices are comprehensively interconnected. A data consistency between the variables is not required.
Record	This type contains one or several variables of a basic data type like INT, WORD, etc. • Use this type e.g in an interconnection of controllers with a ready-made application and the same data structure.
Array	This type contains one or several variables of the same basic data type like INT, WORD, etc. • Use this type with simple binary systems (e.g. I/O terminals).



Note!

The identifiers of ports and the associated variables have to be definite.

The identifiers of the »Engineer« must not be identical with the IEC 61131-5 identifiers.



Tip!

In general, the variable type to be used depends on the application. The criteria given in the following subchapters can help you to find a suitable variable type.

- ▶ ["Simple" variable type](#) (📖 157)
- ▶ ["Record" variable type](#) (📖 159)
- ▶ ["Array" variable type](#) (📖 159)

Defining the system functionality

Port editor (ports)

8.11.1.1 "Simple" variable type

Highest flexibility

The table shows four devices with four input and output ports each of the *Simple* variable type.

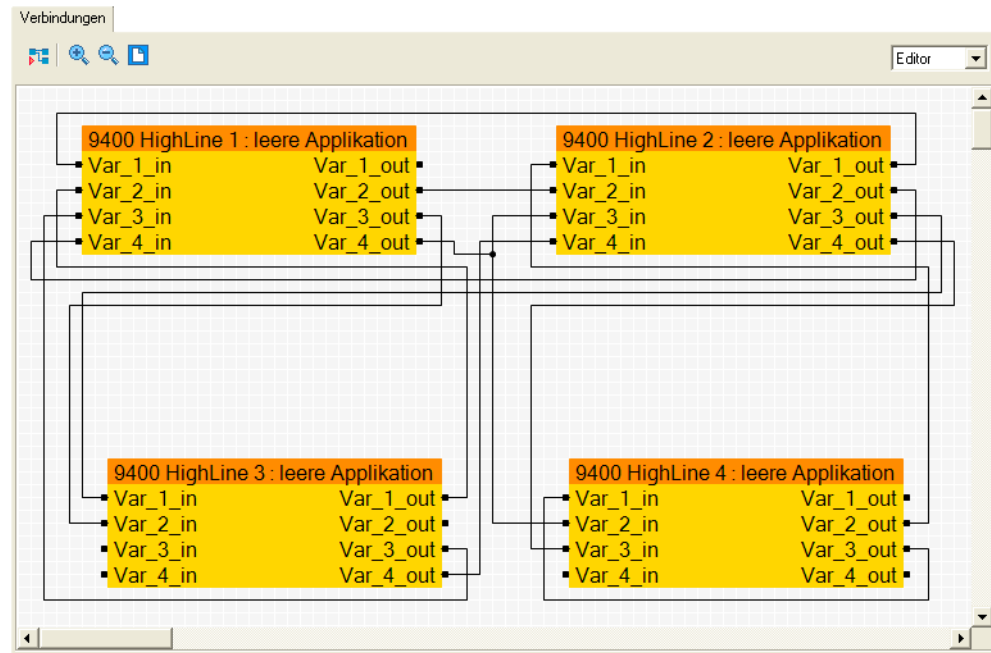
- The vertically arranged variables are the output variables and the horizontally arranged ones are the input variables.
- The crosses represent the connections between the inputs and outputs.

Devices		Device A				Device B				Device C				Device D			
	Variable	Var 01	Var 02	Var 03	Var 04	Var 05	Var 06	Var 07	Var 08	Var 09	Var 10	Var 11	Var 12	Var 13	Var 14	Var 15	Var 16
Device A	Var 01																
	Var 02						×										
	Var 03										×						
	Var 04							×							×		
Device B	Var 05	×															
	Var 06				×												
	Var 07									×							
	Var 08															×	
Device C	Var 09		×														
	Var 10																
	Var 11			×													
	Var 12								×								
Device D	Var 13																
	Var 14					×											
	Var 15													×			
	Var 16																

Defining the system functionality

Port editor (ports)

A flexible connection in the machine application can be as follows:



The connections can be changed subsequently here without changing the application. In the case of the "Record" variable type, the changes can only be made on the application level.

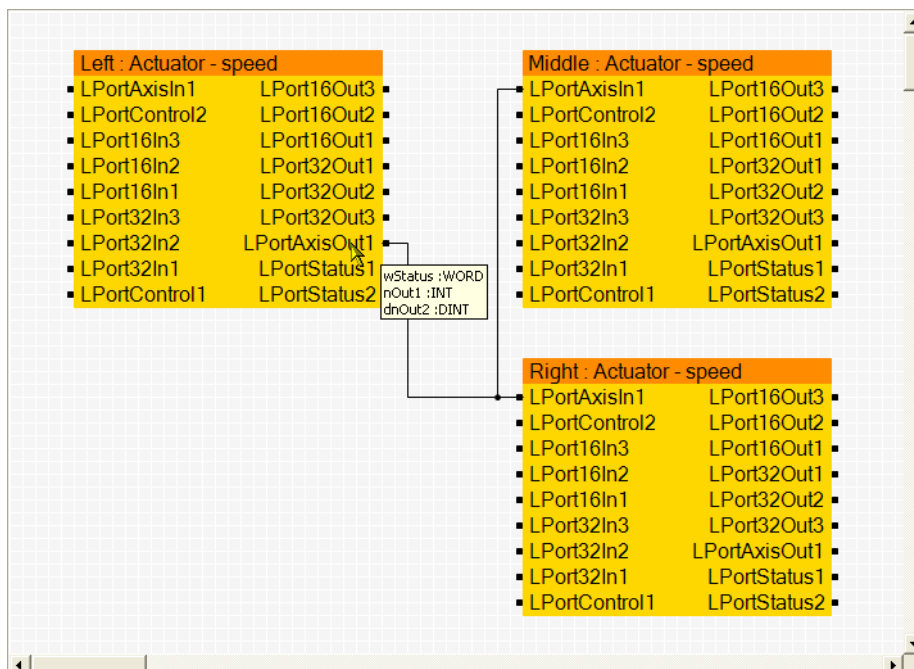
Defining the system functionality

Port editor (ports)

8.11.1.2 "Record" variable type

This type contains one or several variables of a basic data type like INT, WORD, etc. as data structure.

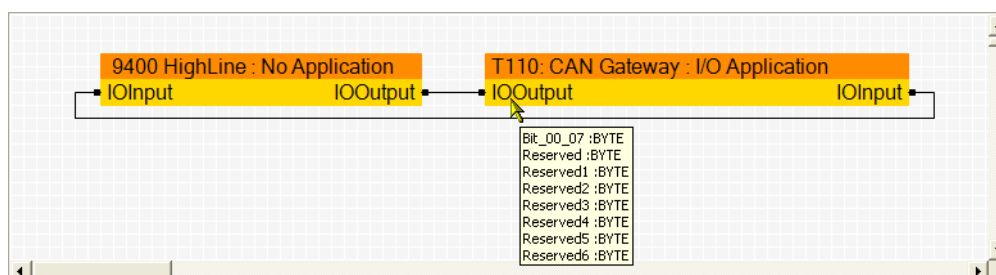
- Use this type e.g in an interconnection of controllers with a ready-made application and the same data structure.



8.11.1.3 "Array" variable type

This type contains one or several variables of the same basic data type (in the example "BYTE").

- Use this type with simple binary systems (e.g. I/O terminals).



Defining the system functionality

Port editor (ports)

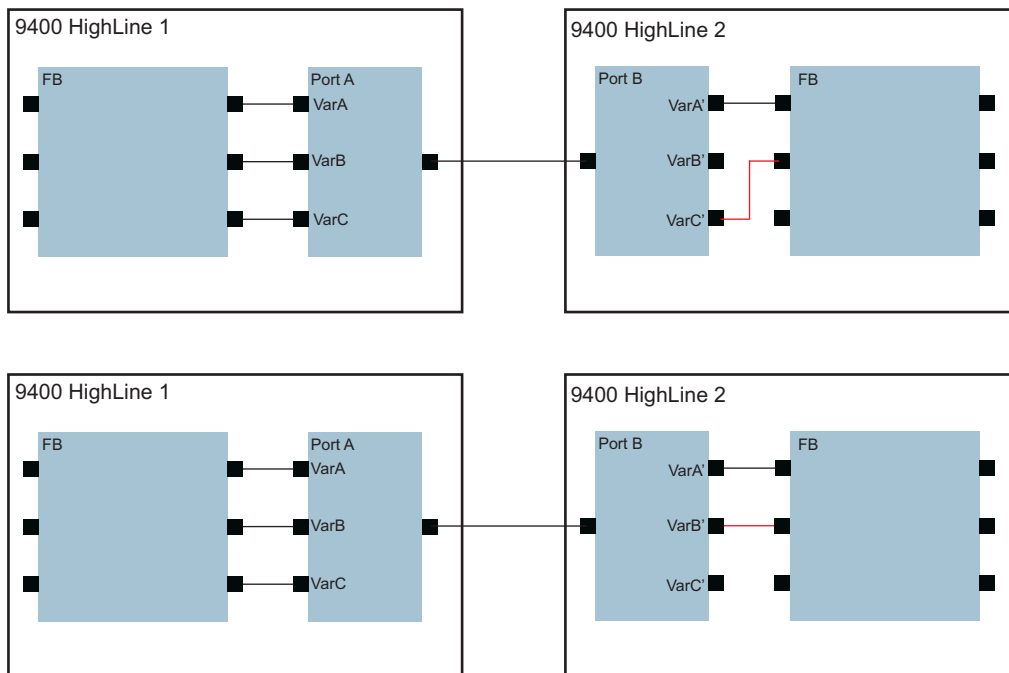
8.11.1.4 Record or Simple?

The following task displays the variable types "Simple" and "Record":

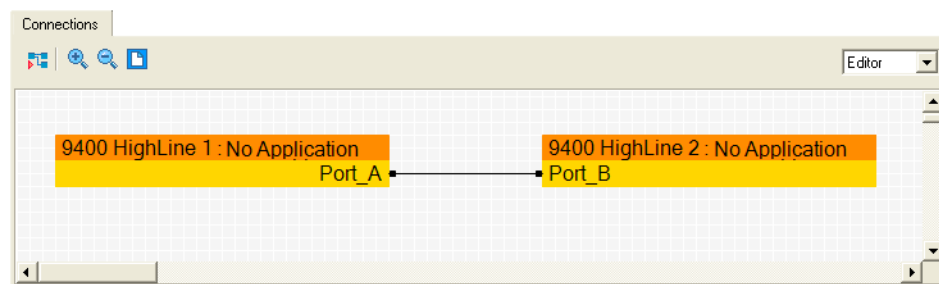
- Three variables are to be transferred from one (network) node to another. Via the port connection, the variables are transferred 1:1 from source port to target port.

Record

For changing the interconnection, you have to switch to the application level. If the interconnection is to be changed, the applications have to be adapted accordingly.



In the machine application, the connections cannot be changed.

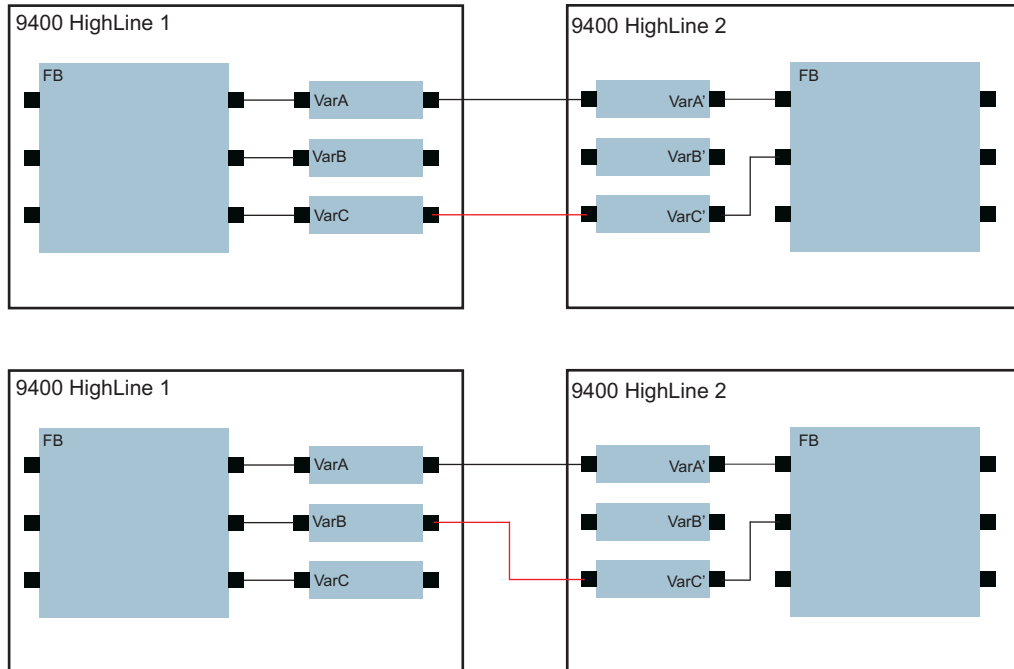


Defining the system functionality

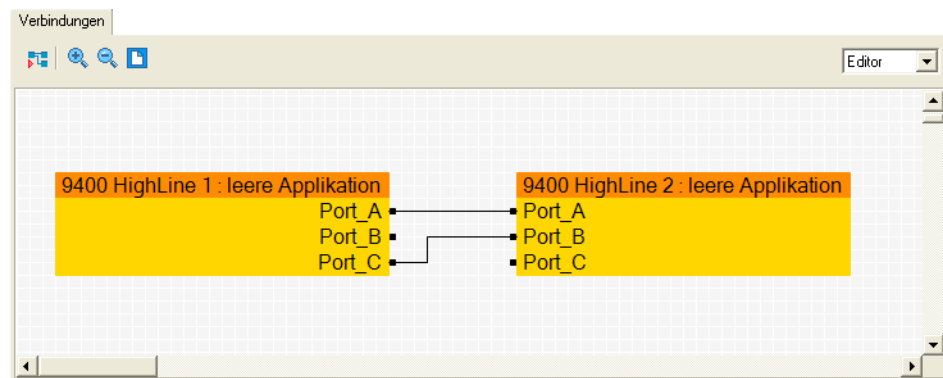
Port editor (ports)

Simple

It is more reasonable to select all variables as individual ports by using the Simple variable type. In this case, the applications need not be recompiled if the interconnection is to be changed.



In the machine application, the connections can be changed quickly.



8.11.2 Adding a port



How to add a port:

1. In the *Ports toolbar*, click the  icon with the option **New input** or **New output** in order to add an input port or output port.

The wizard for adding a port then appears.

Step 1 - Port designation

2. Enter a designation for the port in the **Name** input field.
 - The identifiers of ports and the corresponding variables must be non-ambiguous. They must not be identical with the IEC 61131-5 identifiers.
3. Click the **Next** button to proceed with the next dialog step.

Step 2 - Variable type

4. Select the required variable type ("Simple", "Record" or "Array") in the **Variable type** selection field.

Defining the system functionality

Port editor (ports)

Further proceeding depends on the selected variable type:

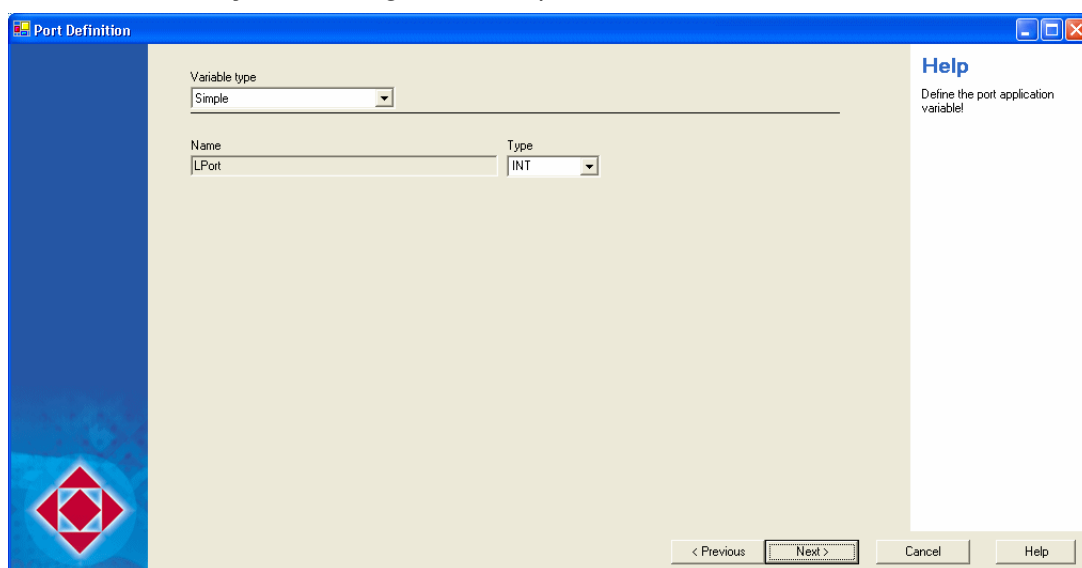
- ▶ [Defining port with "Simple" variable type](#)
- ▶ [Defining a port with "Record" variable type](#) (163)
- ▶ [Define a port with "Array" variable type](#) (165)

8.11.2.1 Defining port with "Simple" variable type



How to define a port with the "Simple" variable type:

1. Carry out the steps as described in the instructions in the chapter "[Adding a port](#) (162)".
2. Go to the **Variable type** selection field and select the "Simple" entry.
 - The *Port definition* dialog box is then presented as follows:



3. Select the required data type in the **Type** selection field.
4. Click the **Next** button.
5. [Defining the interface and process data object](#) (168)
6. Click the **Complete** button to complete the port definition.

8.11.2.2 Defining a port with "Record" variable type



How to define a port with the "Record" variable type:

1. Carry out the steps as described in the instructions in the chapter "[Adding a port](#) (162)".
2. Go to the **Variable type** selection field and select the "Record" entry.

Port editor (ports)

-
- The screenshot shows the "Port Definition" window. On the left is a blue sidebar with a red diamond logo at the bottom. The main area has a title bar "Port Definition". Below it, "Variable type" is set to "Record" in a dropdown menu. A table lists variables with columns "Name", "Type", "Length", and "Index". The first row contains "LElementVariable", "INT", "16", and "--/--". To the right of the table are buttons: "New", "Edit", "Delete", up/down arrows, and "Optimise". On the far right, a "Help" section says "Define the port application variable!". At the bottom are navigation buttons: "< Previous", "Next >", "Cancel", and "Help".

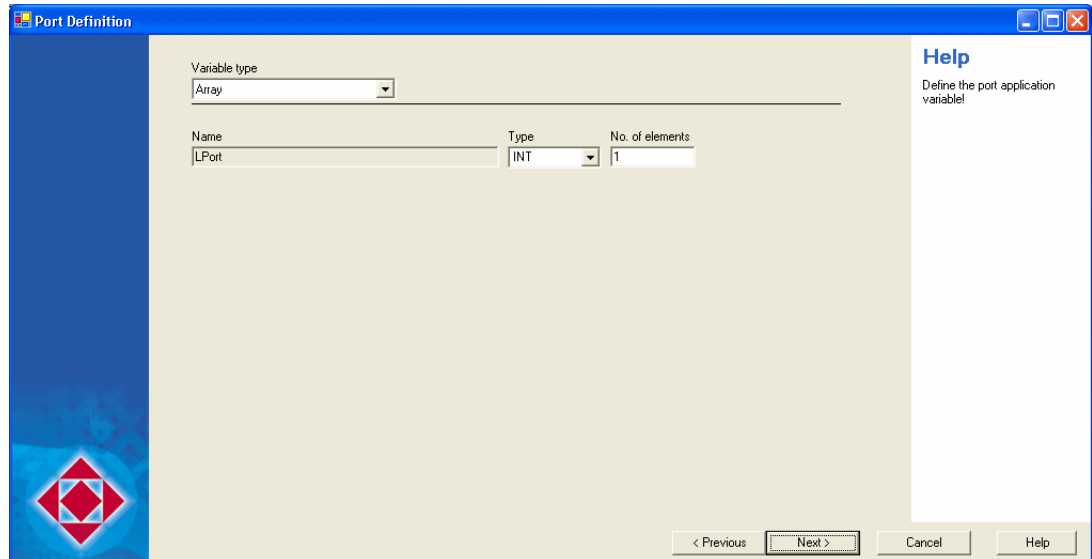
- 164

8.11.2.3 Define a port with "Array" variable type



How to define a port with the "Array" variable type:

1. Carry out the steps as described in the instructions in the chapter "[Adding a port](#) (162)".
2. Go to the **Variable type** selection field and select the "Array" entry.
 - The *Port definition* dialog box is then presented as follows.



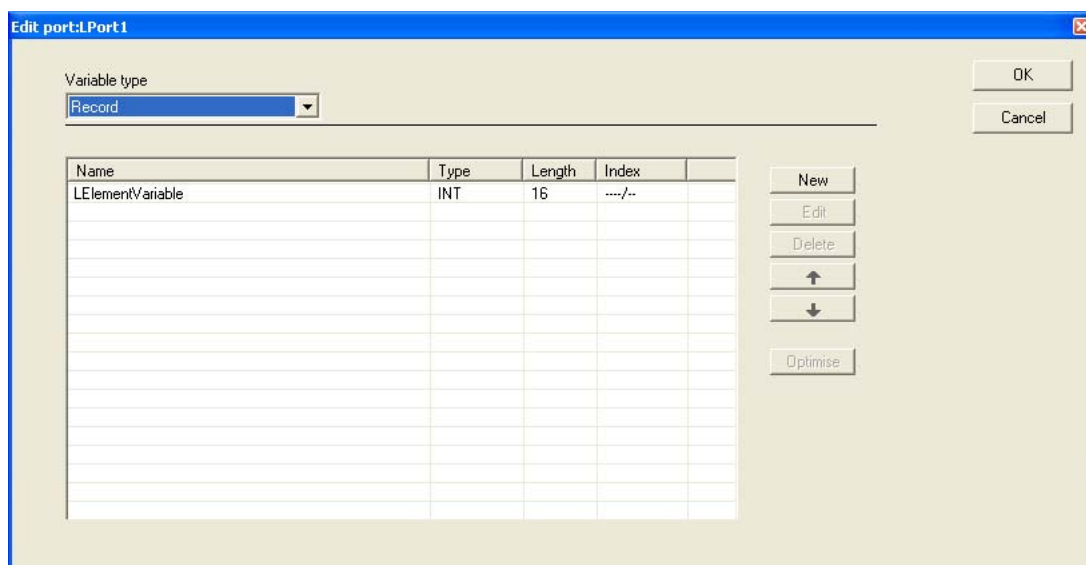
3. Select the required data type in the **Type** selection field.
4. Enter the required number in the **No. of elements** input field.
5. Click the **Next** button.
6. [Defining the interface and process data object](#) (168)
7. Click the **Complete** button to complete the port definition.

Port editor (ports)

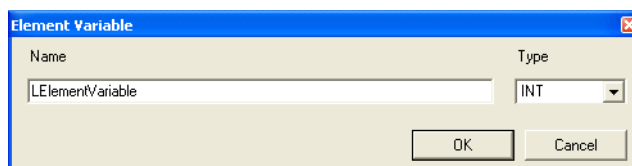
The element variables of a port of the "Record" variable type can be changed/supplemented subsequently any time via the *Edit port* dialog box if required.



1. Select the port for the associated structure of which a new element variable is to be generated in the **Ports** tab.
2. Click the **Edit port...** button.
 - The *Edit port* dialog box appears:



- Click the **New** button.
 - The *Element variable* dialog box appears:



4. Enter a name for the element variable to be generated.
5. Select the data type for the element variable from the **Type** list field.
 - In accordance with IEC 61131-3 integer data types can be selected.
6. Press **OK**.
 - The dialog box is closed and the element variable is generated.

Changing/deleting existing element variables

You can, of course, change the settings of already existing element variables at any time and you can also remove element variables from the list and therefore from the structure.



How to change an element variable:

1. Select the element variable to be changed from the *Edit port* dialog box in the list field.
2. Click the **Change** button.
 - The *Element variable* dialog box appears.
3. Carry out the desired changes in the *Element variable* dialog box.
4. Press **OK**.
 - The dialog box is closed and the changes are accepted.



How to delete an element variable:

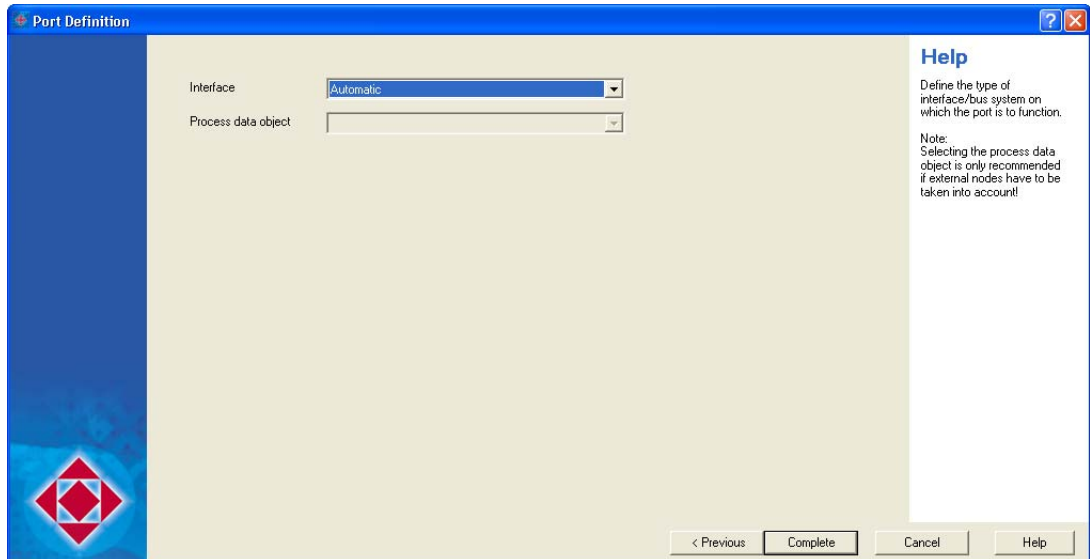
1. Select the element variable to be deleted from the *Edit port* dialog box in the list field.
2. Click the **Delete** button to delete the element variable selected.

Defining the system functionality

Port editor (ports)

8.11.2.5 Defining the interface and process data object

In the last step of the port definition, specify the interface and, if required, the process data object to be used:



- In the **Interface** selection field, only the communication interfaces that exist on the device are offered.
- When "Automatic" has been selected, the interface and thus the process data object are selected automatically by the system in the case of an interconnection.
- When an interface has been defined and the selection for the process data object is "Automatic", the process data object is defined by the system.
- A process data object can serve as a container for several ports. This means that several ports can be transferred by a process data object.
- The interface can be changed subsequently any time.



Note!

Ports can be assigned to process data objects automatically or manually. If you define a port up to the process data object level, the flexibility for automatic connection of interconnections will be reduced. ▶ [Defining the type of connection](#) (179)

When the ports are assigned to the process data objects, the data width and existing mapping entries will not be checked. This will only be done when the project is updated with the **Tools→Build project** menu command. In the case of errors, error messages will be indicated and the compilation process will be cancelled.



Click the **Complete** button to complete the port definition.

Defining the system functionality

Port editor (ports)

8.11.3 Renaming a port

Existing ports can be renamed at any time, in order to facilitate the identification of the ports within an application.



How to rename a port:

1. Select the port to be renamed in the **Ports** tab.
2. Click the  icon in the *Ports toolbar*.
 - Then you can change the name of the port:

CAN-IN1
CAN-IN2
CAN-IN3
Port

3. Press the **<input key>** to accept the new name.

8.11.4 Deleting a port



How to delete a port:

1. Select the port to be deleted in the **Ports** tab.
2. In the *Ports toolbar*, click the  icon to delete the selected port.

8.12 User menu

When a system is set up, parameters must be changed again and again until the system operates satisfactorily. In the *User menu* of a device, you can arrange a selection of frequently used parameters in order to be able to quickly access and change these parameters.



Note!

The *User menu* is available for controllers of the 8400 and 9400 device series!



How to show the user menu:

Select the **User menu** tab at the bottom of the application window to show the *User menu*:

C	S	Name	Value	Unit
51	0	MCTRL: Actual speed value	0	rpm
53	0	DC-bus voltage	0	V
54	0	Motor current	0.00	A
61	0	Heatsink temperature	0	°C
137	0	Device state	Init	
11	0	Appl.: Reference speed	1500	rpm
39	1	Fixed setpoint 1	40.00	%
39	2	Fixed setpoint 2	60.00	%
12	0	Acceleration time main setpoint	2.000	s
13	0	Deceleration time main setpoint	2.000	s

- The pre-assignment of the *User menu* depends on the selected device (here: 8400 StateLine C).
- In the case of the Servo Drives 9400 series the *User menu* is empty at first.



Tip!

The *User menu* can also be displayed in the *Workspace* by changing to the **User menu** tab:

C	S	Name	Value	Unit
51	0	MCTRL: Actual speed value	0	rpm
53	0	DC-bus voltage	0	V
54	0	Motor current	0.00	A
61	0	Heatsink temperature	0	°C
137	0	Device state	Init	
11	0	Appl.: Reference speed	1500	rpm

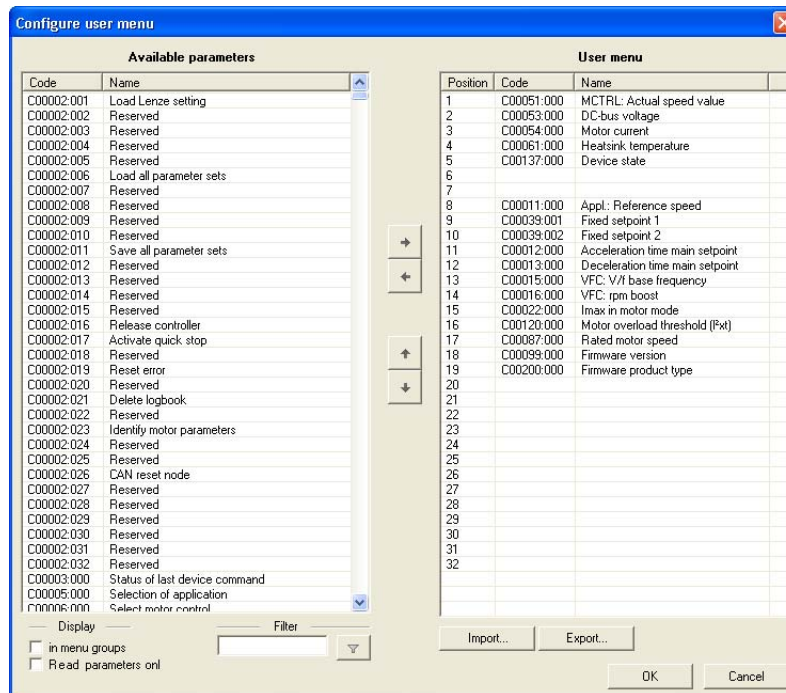
The buttons of this tab serve to configure the *User menu* and transfer the parameter selection to other controllers.

8.12.1 Configuring the user menu



How to configure the user menu:

1. Change to the **User menu** tab in the *Workspace*.
2. Click the **Change user menu** button.



3. In area **B** select the parameters to be exported by using the arrow key /undoing the selection by using the arrow key . In order to remove all parameters from the monitor window, use the double arrow key .

As an alternative, press the  button to open a GDC file which includes the required parameter selection.

- In order that only certain parameters are visible in the area **A**, activate the corresponding filter options
 - Activate the **in menu groups** control field to arrange the parameters according to menu groups.
 - Multi-selection of parameters shown one above the other:
Hold down the **<SHIFT>** key and highlight the parameters.
 - Multi-selection of individual parameters:
Hold down the **<CTRL>** key and highlight the desired parameters individually.
 - Area **C** shows the parameters selected to be transferred to the user menu.
4. A configured *user menu* can be saved as a file in the **D** field using the **Export** button (*.epc) file to import the parameter selection into another »Engineer« project.
 5. Click the **OK** button to accept the configuration and close the dialog window.



Tip!

For a cross-project reuse of a configured *User menu*, the *Configure user menu* dialog box provides the **Export** and **Import** buttons.

8.12.2 Transferring the parameter selection to other controllers (in-project)

The **Store selection** and **Restore selection** buttons on the **User menu** tab serve to transfer the existing parameter selection to the *User menu* of another controller within the project.



How to transfer the parameter selection for other controllers in the project:

1. Go to the **User menu** tab of the controller the *User menu* of which is to be transferred and click the **Store selection**.
2. Change to the **User menu** of the controller that is to accept the memorised parameter selection in its *User menu* and click the **Restore selection** button.
 - The *User menus* of both controllers then have the same parameter selection.

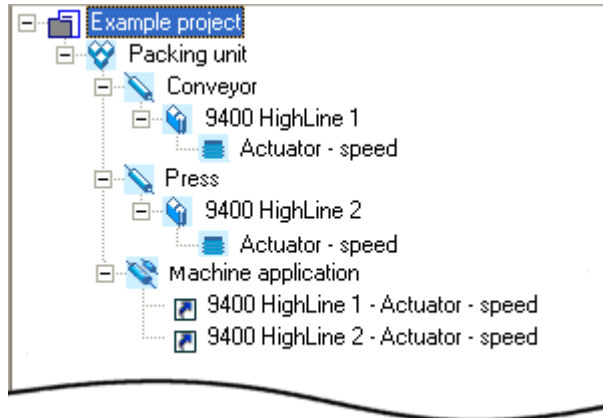
Defining the system functionality

Inserting & configuring a machine application

8.13 Inserting & configuring a machine application

The machine application serves as a structuring means for the generation of system modules which already contain a predesigned interconnection.

In the *Project view* the existing system modules, axes and devices, as well as the applications subordinate to the devices, and possibly available machine applications are displayed:



- The  symbols below the devices represent the respective application.
- A machine application  always is required if several devices have to exchange information among each other, as the applications assigned to the devices can only be interconnected within a machine application. In the illustration this is represented by 9400 HighLine 1 and 9400 HighLine 2.
- In principle, not only applications but also machine applications that have already been configured can be allocated to a machine application. This makes it possible to create hierarchical application structures.
- A project can also contain several machine applications.

If you select a machine application in the *Project view*, different tabs are provided to you in the *Workspace* via which you can configure the machine application.

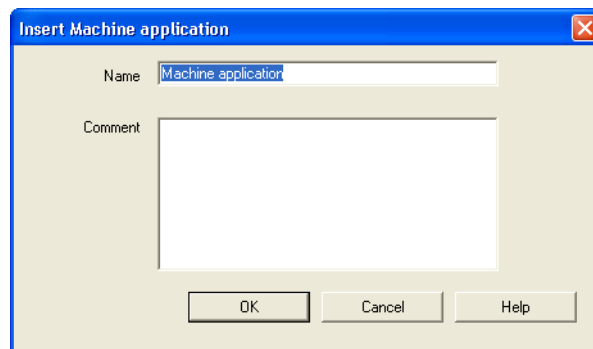
Tab	Info
Device applications	Via the Device applications tab you assign the respective applications to the machine application. ▶ Assigning applications (📖 175)
Connections	Via the Connections tab you define the applications exchanging information and the ports via which this information is exchanged within the machine application. ▶ Connecting ports within the machine application (📖 177)
Ports	Via the Ports tab you can add ports to the machine application to exchange information with other machine applications via these ports. ▶ Adding ports as an external interface (📖 179)
Product features	Via the Properties tab you can change the name of the application and add a comment to the application.
Documentation	Via the Documentation tab you can add notes and documents in electronic form to the application. ▶ Documentation - Add project details (📖 71)

8.13.1 Inserting a machine application with a port interconnection



How to insert a machine application with port interconnection:

1. In the *Project view*, select the  or  axis into which the machine application is to be inserted.
2. Click the  icon to insert a machine application.
 - The *Machine application* dialog box appears:
3. Select the "port connection" in the *Machine application* dialog box.
4. Confirm selection with OK.
 - The *Insert machine application* dialog box appears:



5. Enter a name for the application in the **Name** input field.
6. Optionally you can enter a comment on the application in the **Comment** input field.
7. Click the OK button.
 - The dialog box is closed and the machine application is inserted into the highlighted element.

Next worksteps

- If necessary, add ports to the machine application, which serve as an external interface and enable the exchange of information with other functions (device applications). ▶ [Adding ports as an external interface](#) (179)
- Interconnect the ports of the assigned device applications and those of the machine application to each other to describe the applications between which information is to be exchanged within the machine application and what information is to be communicated to the outside.
▶ [Connecting ports within the machine application](#) (177)
- Port interconnection
 - Connect the ports of the assigned applications and the ports of the machine application to each other in order to specify the applications (within the machine application) between which information is to be exchanged and what information is to be communicated to the outside.
▶ [Port interconnection](#) (175)

Defining the system functionality

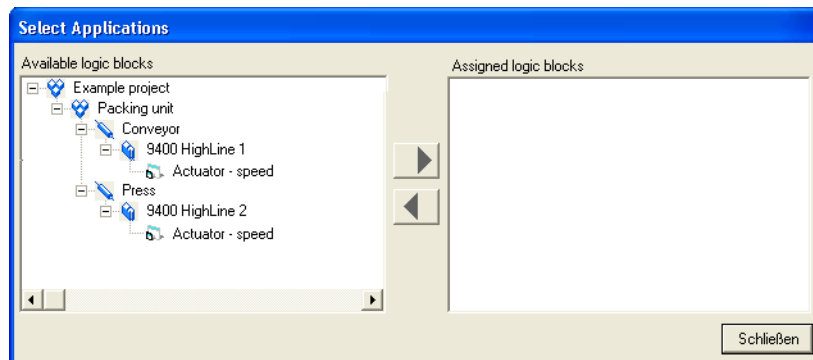
Inserting & configuring a machine application

8.13.2 Port interconnection

Assigning applications

Via the **Connections** tab of a machine application you define, by means of assignment, which applications are to exchange information within the machine application.

- Click  in the **Connections** tab to display the following dialog:



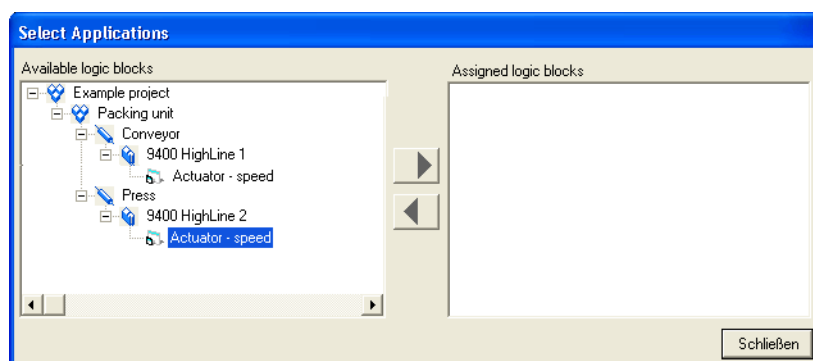
- Each device already brings along an application which can be assigned to the machine application, even if the respective application has not been fully defined.
- Not all applications of a project have to be assigned to the same machine application necessarily.
- Apart from applications, also preconfigured machine applications can be assigned to a machine application in order to set up hierarchical application structures like this.

8.13.2.1 Carrying out assignments



How to assign logic modules to an application:

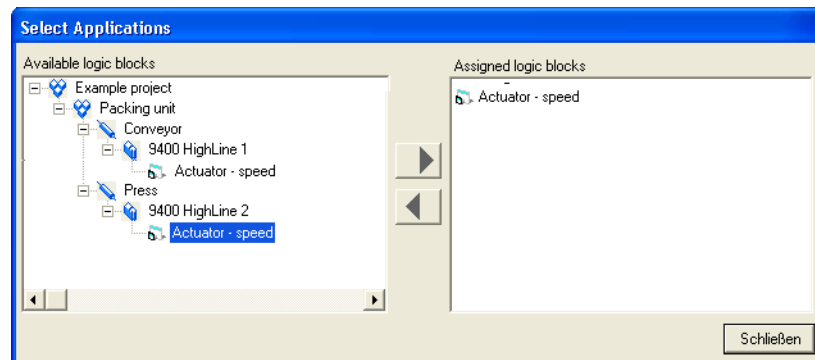
1. In the field on the left entitled **Available applications & machine applications**, select the application (or already existing machine application) that is to be assigned to the machine application:



Defining the system functionality

Inserting & configuring a machine application

2. Click the ► button to enter the selected application in the field on the right entitled **Selected applications & machine applications**:



- By clicking the ◀ button, you can remove the application selected in the field entitled **Selected applications & machine applications** and thus cancel the assignment to the machine application.
 - Already assigned logic modules are shown in grey in the field on the left entitled **Available applications & machine applications** and cannot be assigned again.
3. Repeat the first two steps to assign further applications to the machine application.

8.13.2.2 Cancelling assignments



How to cancel an assignment:

1. Select the corresponding application (or machine application) in the field on the right entitled **Selected applications & machine applications**.
2. Click the ◀ button.
 - The selected application is then removed from the field entitled **Selected applications & machine applications** and is thus no longer assigned to the machine application.

Defining the system functionality

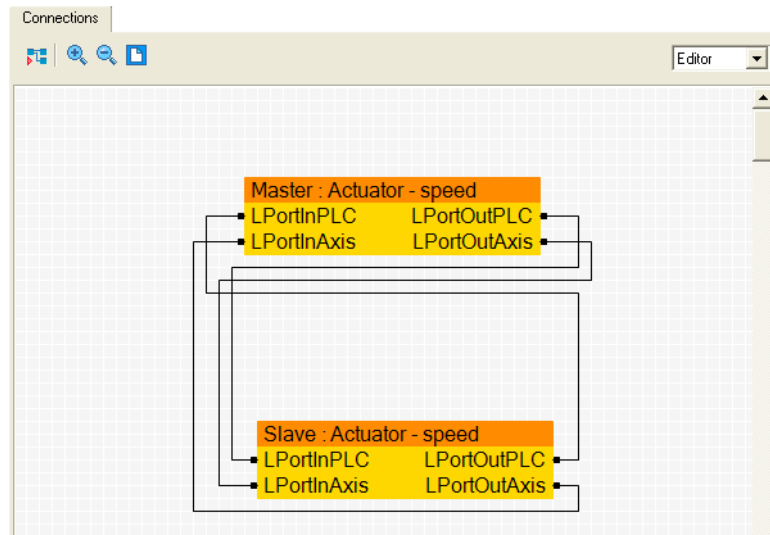
Inserting & configuring a machine application

8.13.3 Connecting ports within the machine application

Interconnection of ports

You can interconnect ports of different devices to each other. Connections are only possible between ports that can be interconnected. If a connection between two ports is not possible, you cannot set a connection line.

Via the **Connections** tab of a machine application you define which applications are to exchange information via which ports within the machine application.



- If you click an application with the right-hand mouse button, you can select the **Go to ports** command to change directly to the Port editor.
- If you connect an output port of an application to an input port of another application, you express that the element variables of the output port of the first application are to be communicated to the input port of the second application.
- A connection always has a direction and therefore always has a source and a target.
- Several connections may lead from one port, but only one connection can end in a port.



Tip!

You can also add **Ports** to a machine application to enable the exchange of information between different machine applications.

► [Adding ports as an external interface](#) (179)

Afterwards you can also interconnect these ports, in order to define what information is to be communicated to the outside.

Defining the system functionality

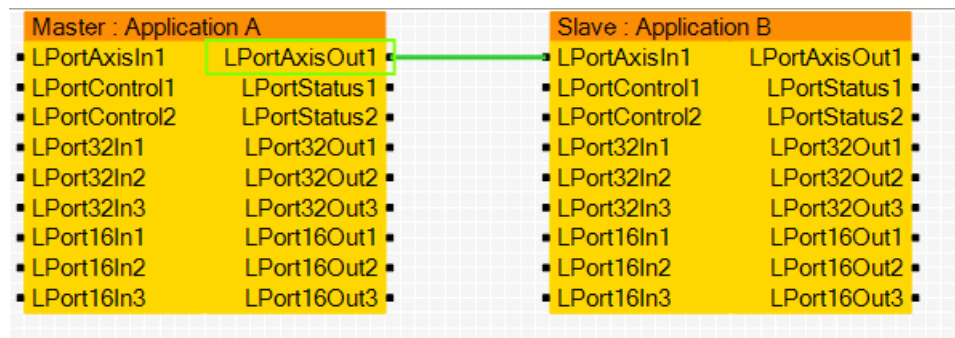
Inserting & configuring a machine application

Examples of possible connection combinations

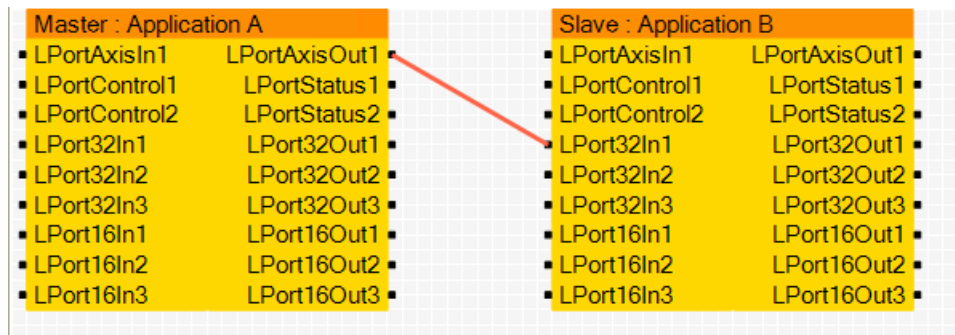
For connecting two ports of different applications, the applications must have been assigned to the same machine application.

Note: Connections are only possible if the length and the type of the application data types of the ports match each other.

- An output port of an application is connected to an input port of another application. When the ports are connected, a green line indicates that the connection is possible.
 - Example: The output port `LPortAxisOut1` (data types: WORD, INT, DINT) of *Master: Application A* is connected to the input port `LPortAxisIn1` (data types WORD, INT, DINT) of *Slave: Application B*.



- If the application data types of two ports are not the same, the ports cannot be connected to each other. A red line indicates that the connection is not possible.
 - Example: A connection between the output port `LPortAxisOut1` (data types: WORD, INT, DINT) of *Master: Application A* and the input port `LPort32In1` (data type INT) of *Slave: Application B* is not possible:



- A black line indicates connections set between two ports.

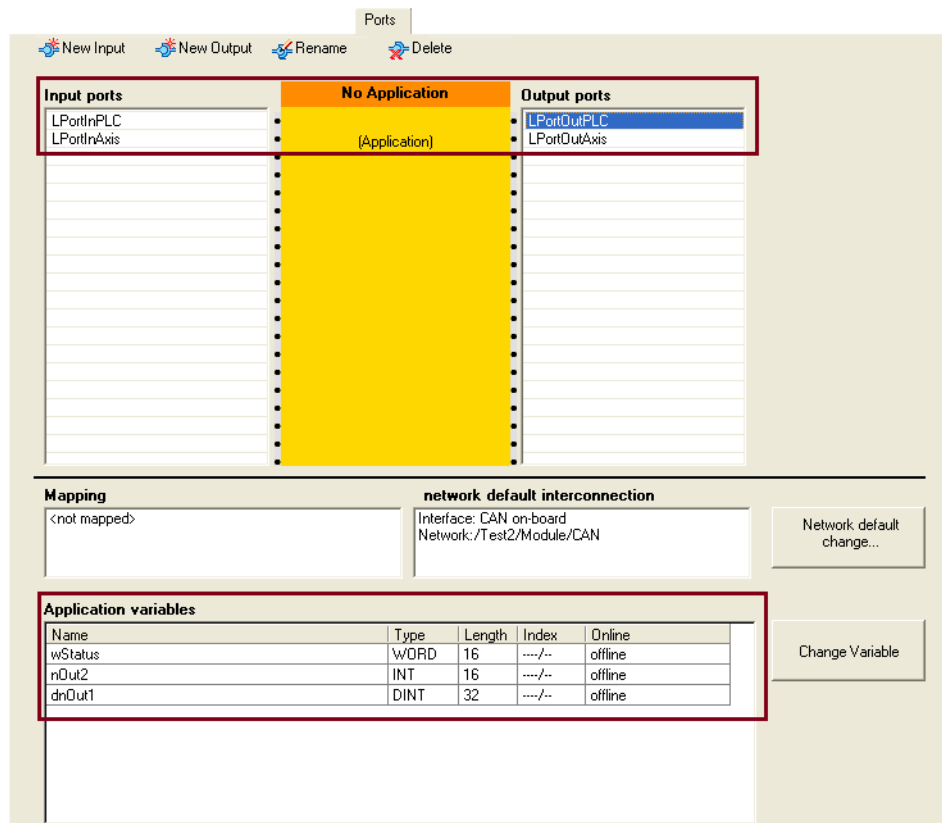
Defining the system functionality

Inserting & configuring a machine application

8.13.4 Adding ports as an external interface

You can also add ports to an application to realise an exchange of information between different applications like this.

Via the **Ports** tab of an application you receive an overview of the ports which are defined for this application:



Adding input/output ports

Adding ports to a device application is identical to adding ports to a machine application. [▶ Port editor \(ports\)](#) (📖 155)

8.13.5 Defining the type of connection

There are basically three types of data communication between two ports via the network.

- ▶ [Automatic connection](#) (📖 180)
- ▶ [Manual connection](#) (📖 180)
- ▶ [Specifying the procedure for assigning the COB-IDs](#) (📖 181)

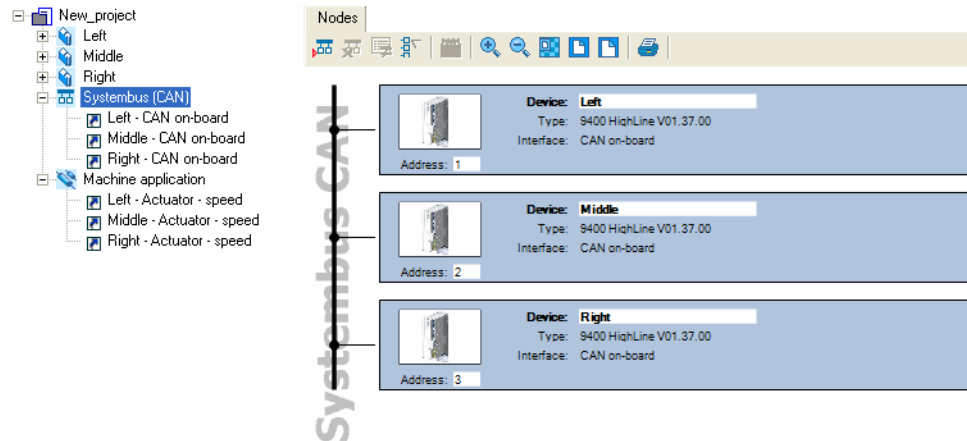
Defining the system functionality

Inserting & configuring a machine application

8.13.5.1 Automatic connection

For this purpose, a network object in the »Engineer« and a machine application are required.

- The nodes that are to communicate with each other have to be assigned to the network.
- The applications must be assigned to the machine application.



- It is not necessary to assign an interface or a process data object to the ports. If you nevertheless do this, your selections will be taken into account.
- The ports are packed together in process data objects for every interconnection that has a start and at least one end point as the port of an application.
- It is checked whether the end points match with regard to the data size and memory mapping.

With the specification for the creation of the individual ports and the information from the interconnection in the machine applications and the formation of networks, an attempt is made during the compilation (menu command **Tools→Build project**) to convert the information into communication objects.

- It is tried to provide for a bus load as low as possible.
- Several ports are assigned to a process data object.
- Automatic connection is supported for "CAN" and "ETHERNET Powerlink" networks.
- If a connection can be established via both "CAN" and "ETHERNET Powerlink", "ETHERNET Powerlink" is preferred due to the greater band width.
- If one of the interconnection end points (ports) has already been defined to an interface, this connection is represented via the network assigned. If interfaces are not connected via an identical network, an error message is output.
- If a port has been assigned to a process data object, this port is only available to this process data object. No other ports are assigned to this process data object automatically.

8.13.5.2 Manual connection

The manual connection can be effected without a network object in the »Engineer« and without a machine application.

- Directly assign the ports to the process data objects and set the communication parameters yourself like COB-ID for CAN.

This procedure is useful for external devices without »Engineer« catalogues and for bus systems if a network is not provided in »Engineer«.

Defining the system functionality

Inserting & configuring a machine application



Tip!

Make sure that the transmit and receive process data objects, the data structure and the communication parameters match each other.

8.13.5.3 Specifying the procedure for assigning the COB-IDs

Option	Function										
On the basis of port interconnection and CAN network	For this CAN interface the »Engineer« assigns the COB-IDs in accordance with the settings of the port interconnection and network. • CAN interfaces that are not connected to a CAN network remain untouched.										
In compliance with the "PreDefined Connection Set" according to CANopen CiA301	Note: This option activates the automatic allocation for all PDOs of the interface by the »Engineer«! If the Pre-Defined Connection Set control field has been selected, the COB-IDs of the CAN process data objects are derived from the node address: <table><thead><tr><th>Process data object</th><th>COB-ID</th></tr></thead><tbody><tr><td>PDO1 PDO_RX1 PDO_TX1</td><td>0x200 + node address 0x180 + node address</td></tr><tr><td>PDO2 PDO_RX2 PDO_TX2</td><td>0x300 + node address 0x280 + node address</td></tr><tr><td>PDO3 PDO_RX3 PDO_TX3</td><td>0x400 + node address 0x380 + node address</td></tr><tr><td>PDO4 PDO_RX4 PDO_TX4</td><td>0x500 + node address 0x480 + node address</td></tr></tbody></table>	Process data object	COB-ID	PDO1 PDO_RX1 PDO_TX1	0x200 + node address 0x180 + node address	PDO2 PDO_RX2 PDO_TX2	0x300 + node address 0x280 + node address	PDO3 PDO_RX3 PDO_TX3	0x400 + node address 0x380 + node address	PDO4 PDO_RX4 PDO_TX4	0x500 + node address 0x480 + node address
Process data object	COB-ID										
PDO1 PDO_RX1 PDO_TX1	0x200 + node address 0x180 + node address										
PDO2 PDO_RX2 PDO_TX2	0x300 + node address 0x280 + node address										
PDO3 PDO_RX3 PDO_TX3	0x400 + node address 0x380 + node address										
PDO4 PDO_RX4 PDO_TX4	0x500 + node address 0x480 + node address										
Deactivate objects	The »Engineer« deactivates all PDOs of this CAN interface. • PDOs with a deactivated automatic allocation remain untouched.										
Do not change	All PDOs of this CAN interface remain unchanged during an update.										



Tip!

Make sure that the transmit and receive process data objects, the data structure and the communication parameters match each other.

Defining the system functionality

Creating an interconnection via the electrical shaft

8.13.5.4 Mixed connection

A mixed form of the connections "Automatic connection" and "Manual connection" is possible. A mixed form of the connection "Predefined connection set connection" and another one is not possible.

- ▶ [Automatic connection](#) (📖 180)
- ▶ [Manual connection](#) (📖 180)
- ▶ [Specifying the procedure for assigning the COB-IDs](#) (📖 181)

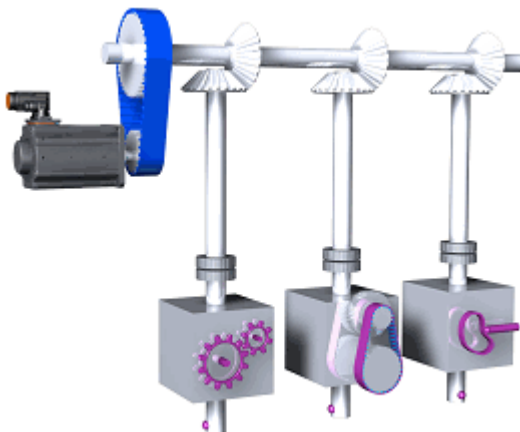
8.14 Creating an interconnection via the electrical shaft



Note!

Only controllers with a cam functionality (e.g. 9400 HighLine) can be assigned to an electrical shaft.

The master value/master angle between the drives in the interconnection is transferred by means of the so-called "electrical shaft", which is based on the principle of the mechanical shaft ("line shaft"):



Here, a fundamental distinction is made between two ways of using cam technology:

- Fixed synchronisation of the tools with regard to each other
- Synchronisation of the tools with a material



Tip!

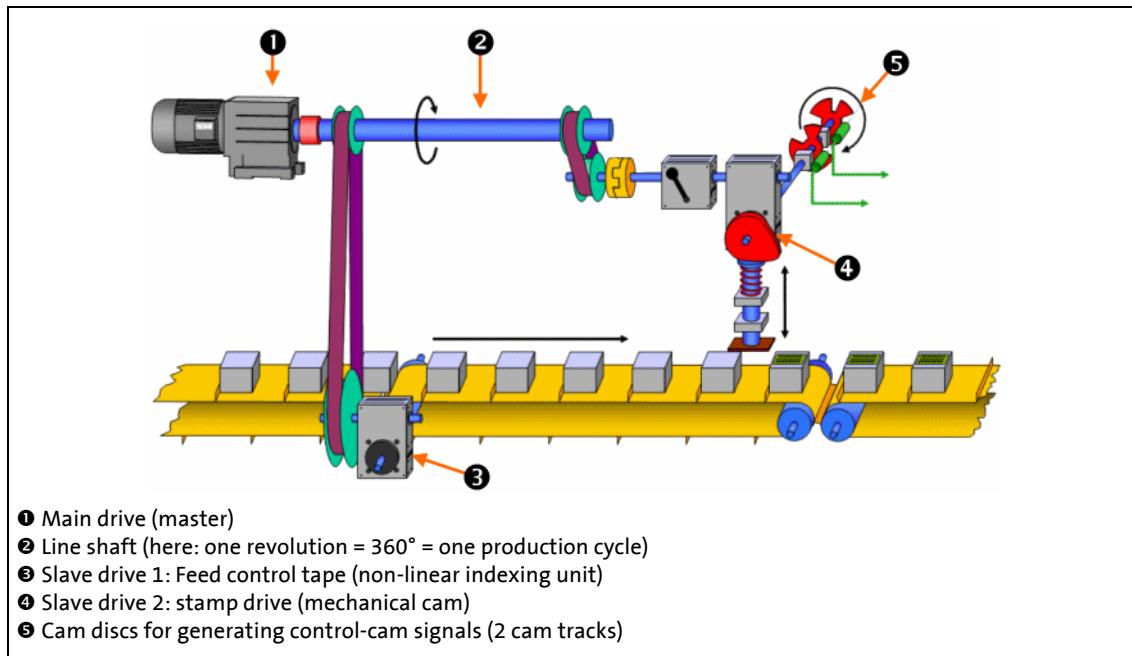
It is not absolutely necessary that all axes of a machine belong to the electrical shaft.

Defining the system functionality

Creating an interconnection via the electrical shaft

8.14.1 Fixed synchronisation of the tools with regard to each other

By the absolute coupling of the drives via one master angle, the assignment of the (tool) positions to each other is "hard" as in the case of a mechanical shaft:



[8-9] Principle of the mechanical shaft: fixed synchronisation of the tools with regard to each other

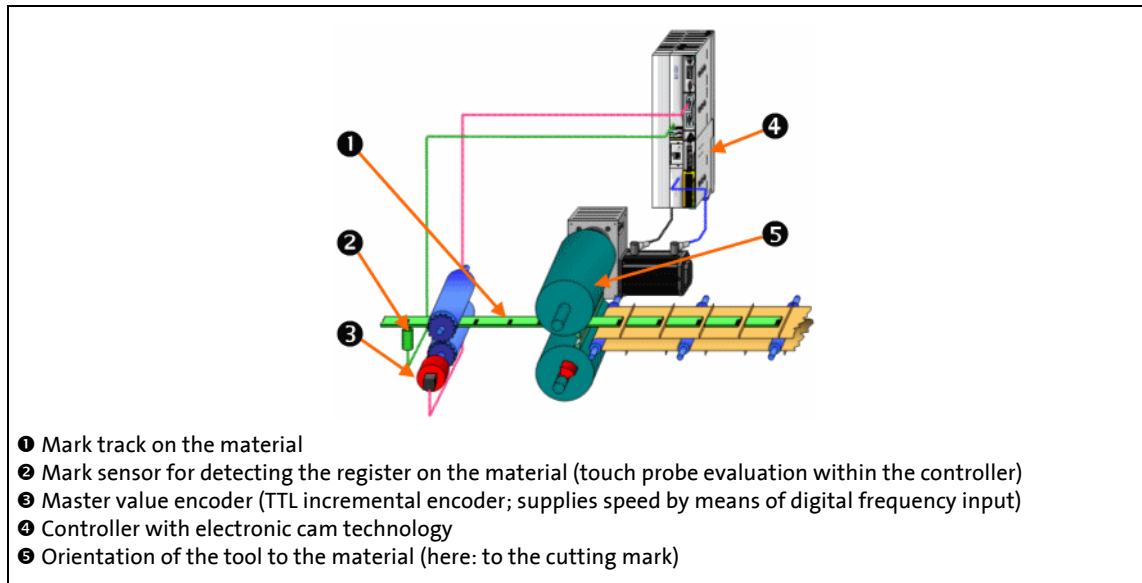
- A drive with a virtual master or a real master (encoder) can generate the master angle and transfer it to the other drives, which then comply with this master angle.
- The master angle/machine cycle is usually shown "modulo" with a cycle of 0 to 360° . All movements are exactly synchronised with this master angle.
- The tools can feature an optional measuring system ("limited", "unlimited", or "modulo" traversing range).
- For the interconnected drives, the busbar structure is used almost exclusively.

Defining the system functionality

Creating an interconnection via the electrical shaft

8.14.2 Synchronisation of the tools with a material

In the case of this relative coupling, the tools are not synchronised with each other but with the material path (e.g. by means of a touch probe sensor). Therefore in such applications, a master speed is needed.



[8-10] Principle: mark-controlled synchronisation of the tool to the material

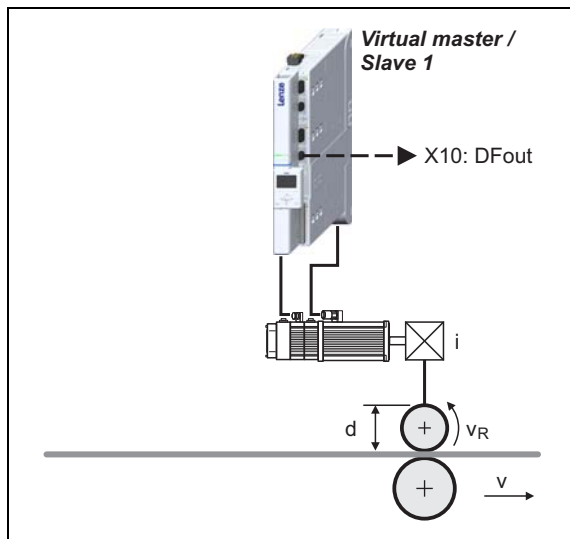
- The master speed is either taken from the material path via an encoder or is stipulated in advance by the drive that determines the speed (virtual master).
- The tools rotate and are therefore modulo with a fixed modulo cycle.
- The material is modulo with a variable cycle (is measured if necessary, e.g. in the case of foil).
 - The curves are created for a nominal cycle/register.
 - Adaptation to the measured cycle is carried out individually for each tool in the drive by means of its own sensors during the runtime.

Defining the system functionality

Creating an interconnection via the electrical shaft

8.14.3 Virtual master/real master

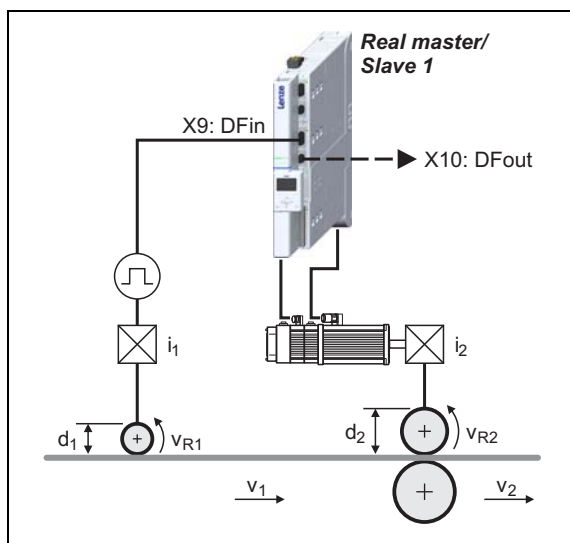
Virtual master



- A drive in the interconnection performs the tasks of the (virtual) master and is simultaneously the first slave drive.
- The master value formed by the "virtual master" function within the part the plant is transferred to the other slave drives via a bus system or the digital frequency output.

[8-11] Example of a "virtual master" (with transfer of master value via extension module master frequency)

Real master



- The master value is defined for a slave drive in the interconnection by a real master (e.g. external encoder).
- This can be done e.g. via the digital frequency input of the extension module or via a bus system.
- The master value (within the technology application; if necessary, edited) is transferred to the other slave drives via a bus system or the digital frequency output.

[8-12] Example of a "real master" (with master value transfer via extension module master frequency)

8.14.4 Establishing an interconnection via an electrical shaft

In »Engineer« the interconnection is created by means of an electrical shaft with the help of a wizard, which makes all the necessary entries step by step:

1. The specification of a definite designation.
 - As several electrical shafts can be implemented within a machine.
2. The assignment of axes to the electrical shaft.
 - Because not all axes of a machine necessarily have to be operated from the electrical shaft.
 - You can also assign non-cam-capable axes to the electrical shaft so that an interconnection can for instance be configured from a following axis and several cam axes with different device series.
3. The assignment of the measuring systems for the corresponding axis and the master value according to the x/y axis in the worksheet of the »Cam editor«.



Tip!

So-called "wildcards" can also be added to the electrical shaft. A wildcard can be used to delete real axes from the electrical shaft without the cam data and the measuring systems being lost.

- ▶ [Adding placeholders to the interconnection](#) (190)
- ▶ [Assigning an axis to a placeholder](#) (191)
- ▶ [Cancelling existing assignments](#) (193)



How to insert an electrical shaft in the project view:

1. In the *Project view*, either select
 - the project element , or
 -  select an already existing system module, into which the electrical shaft is to be inserted.
2. Click the  icon to insert a machine application.
3. Select the "electrical shaft" in the *Machine application* dialog box.
4. Confirm selection with **OK**.
 - A wizard is then started which makes all the necessary entries step by step.

Defining the system functionality

Creating an interconnection via the electrical shaft

Step 1 – Adding an interconnection

The dialog box 'Interconnected Electrical Shaft' has a blue title bar and a sidebar on the left with 'Add interconnection' selected. The main area contains a 'Name' text field with 'Electrical shaft' entered and a 'Comment' text area. A 'Help' panel on the right says 'Please add the interconnected electrical shaft to the project'. At the bottom are buttons for '< Previous', 'Next >', 'Cancel', and 'Help'.

5. Enter a name for the electrical shaft in the **Name** text field.
 - Optionally you can enter a comment on the electrical shaft in the **Comment** text field.
6. Click the **Next** button.

Step 2 – Creating an interconnection

Necessary because all axes of a machine do not necessarily have to be operated from the electrical shaft.

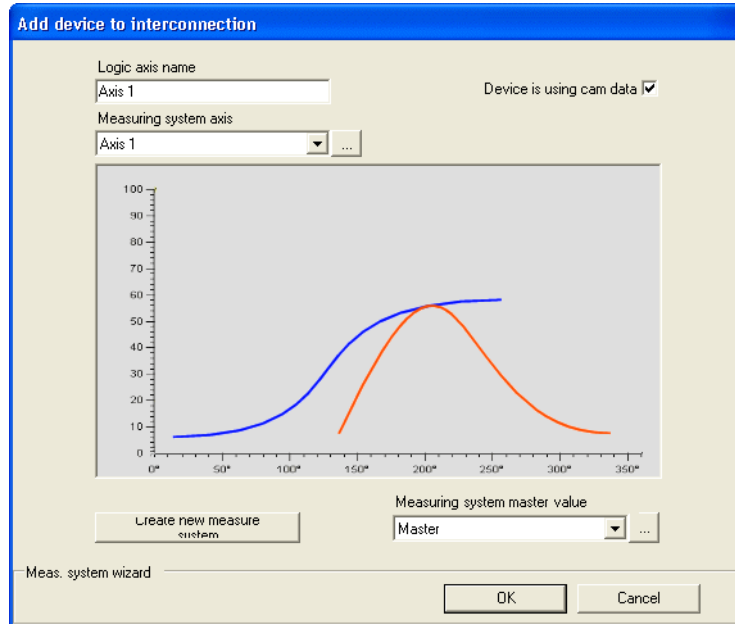
The dialog box 'Interconnected Electrical Shaft' now shows 'Create interconnection' selected in the sidebar. It features two main panes: 'Available axes' on the left and 'Assigned axes' on the right. The 'Available axes' pane shows a tree structure with 'Project' containing 'Axis 1' (with '9400 HighLine 1' and 'Cam application' sub-items) and 'Axis 2' (with '9400 HighLine 2' and 'Cam application' sub-items). The 'Assigned axes' pane has a table with columns 'Cam data', 'Wildcard', and 'Axis'. Between the panes are right and left arrow buttons. An 'Add placeholder' button is at the bottom right of the panes. The bottom navigation bar includes '< Previous', 'Complete', 'Cancel', and 'Help' buttons.

Defining the system functionality

Creating an interconnection via the electrical shaft

7. In the field on the left entitled **Available axes**, select the axis that is to be assigned to the interconnected (electrical shaft) system and click the ► button to assign the selected axis to the interconnection.

The *Add device to interconnection* dialog box displays the assignment of the measuring system for the master value:



- By clicking the **Create new measuring system** button, you can also create a new measuring system if necessary in order to subsequently assign it to the master value.
8. Select a measuring system for the master value in the list field entitled **Measuring system master value**.
 - This measuring system is used as default setting for the x axis in the worksheet of the »Cam editor«.
 9. Click the **Next** button to accept the settings and to close the dialog box entitled *Add device to interconnection*.
 10. Repeat steps 7 to 9 for the other axes that are to belong to the interconnection via the electrical shaft.
 11. Click the **Complete** button to accept the settings and close the wizard.

After inserting the electrical shaft...

... it is shown in the *Project view* with the assigned axes:



Interconnection, Measuring systems, Cam Manager & Connections

If you select an electrical shaft in the *Project view*, the *Workspace* contains the **Interconnection**, **Measuring systems**, **Cam Manager** and **Connections** tabs.

Defining the system functionality

Creating an interconnection via the electrical shaft

- In the **Interconnection** tab, all the axes that have been assigned to the electrical shaft are shown. In the **Interconnection** tab, you can:
 - Assign additional axes to the interconnection.
 - [Adding placeholders to the interconnection](#) (📖 190)
 - [Assigning an axis to a placeholder](#) (📖 191)
 - [Cancelling existing assignments](#) (📖 193)
- In the **Measuring systems** tab all measuring systems available are shown. In the **Measuring systems** tab you can:
 - [Creating/editing/deleting measuring systems](#) (📖 199)
- In the **Cam Manager** tab, you can:
 - [Managing cam data with the »Cam Manager«](#) (📖 272)
 - [Creating cam data with the »Cam Editor«](#) (📖 279)
- In the **Connections** tab, the connections of the ports which are relevant for the electrical shaft and via which the master value/master angle is transferred are shown.

Defining the system functionality

Creating an interconnection via the electrical shaft

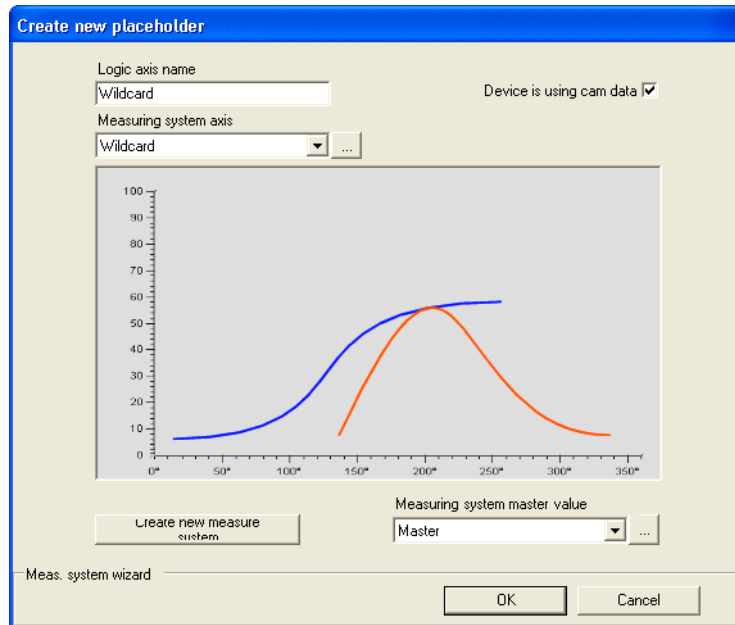
8.14.4.1 Adding placeholders to the interconnection

So-called "placeholders" can be added to the interconnection via the electrical shaft. These placeholders can be used to delete real axes from the electrical shaft without the cam data and measuring systems being lost.



How to add a placeholder to the interconnection:

1. In the **Interconnection** tab, click the **Add placeholder** button.
 - The *Create new placeholder* dialog box is displayed:



2. If necessary, change the pre-assigned name of the placeholder in the text field **Logical axis name**.
3. If it is not a placeholder for a cam axis, deactivate the option "Device uses cam data".
 - As a result, devices without cam-capability can also be assigned to the placeholder.
4. Select a measuring system for the axis in the **Measuring system axis** list field.
 - This measuring system is permanently assigned to the axis or the placeholder ("axis-related measuring system") and, especially in the case of the 9400 HighLine, is mapped onto device parameters. As an alternative to the proposed measuring system, an already existing, free measuring system can be made into the axis-related measuring system if necessary.
 - The measuring system selected is used as default setting for the y axis in the worksheet of the »Cam editor«.
5. Select a measuring system for the master value in the list field entitled **Measuring system master value**.
 - This measuring system is used as default setting for the x axis in the worksheet of the »Cam editor«.
6. Click the **Next** button to add the placeholder to the interconnection and close the *Create new placeholder* dialog box.

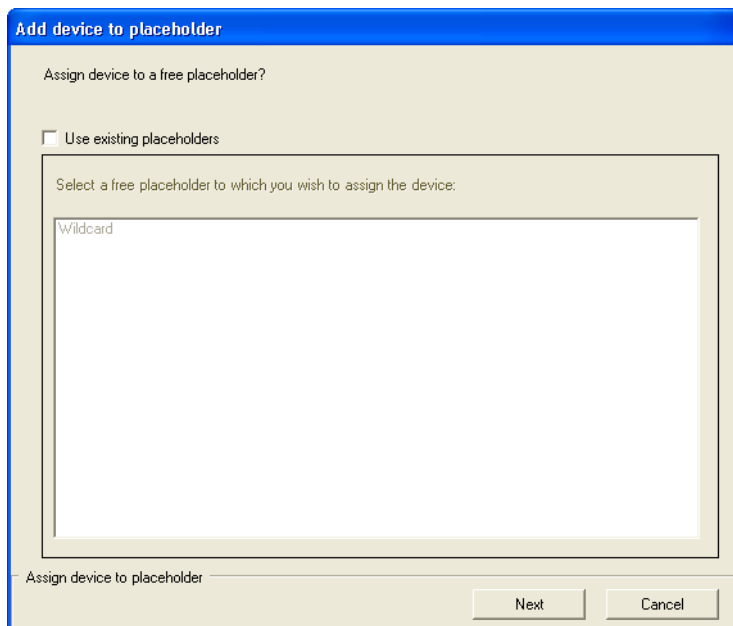
8.14.4.2 Assigning an axis to a placeholder

You can assign a real axis to an existing placeholder at any time later on.



How to assign an axis to an already existing placeholder:

1. In the **Interconnection** tab, select the axis in the field on the left entitled **Available axes** and click the ► button.
 - If there is at least one placeholder to which an axis has not yet been assigned, the dialog box entitled *Add device to placeholder* is shown:

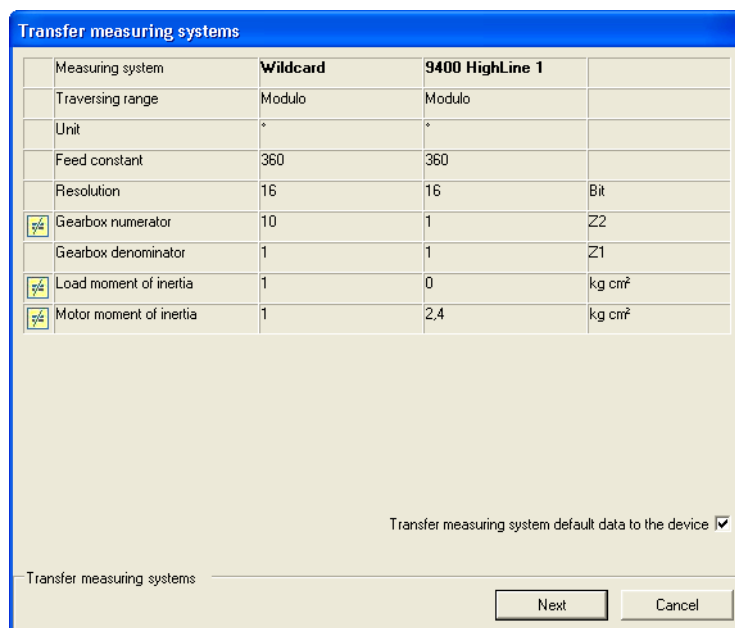


2. Activate the **Use existing placeholders** control field.
3. In the list field, select the placeholder to which the axis is to be assigned.
4. Click the **Next** button.

Defining the system functionality

Creating an interconnection via the electrical shaft

- The dialog box entitled *Accept measuring systems* with a comparison of the two measuring systems (placeholder and device) is then shown:



The dialog box titled "Transfer measuring systems" compares parameters for "Wildcard" and "9400 HighLine 1".

Measuring system	Wildcard	9400 HighLine 1	
Traversing range	Modulo	Modulo	
Unit	°	°	
Feed constant	360	360	
Resolution	16	16	Bit
☒ Gearbox numerator	10	1	Z2
☒ Gearbox denominator	1	1	Z1
☒ Load moment of inertia	1	0	kg cm ²
☒ Motor moment of inertia	1	2.4	kg cm ²

Transfer measuring system default data to the device ☒

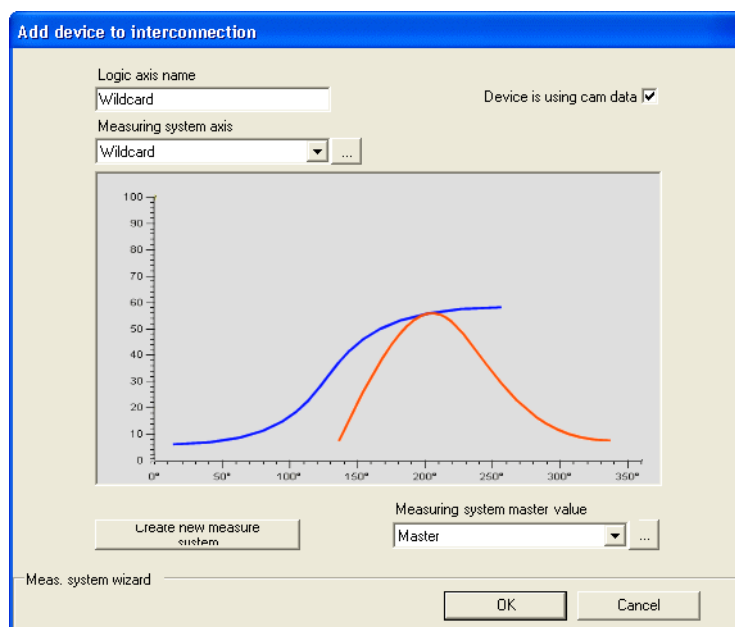
Transfer measuring systems

Next Cancel

Note: If the two measuring systems have different settings, the control field **Integrate stipulated measuring system data into the device** is already activated. With this setting, the measuring system of the placeholder is integrated into the device.

5. Click the **Next** button.

- The *Add device to interconnection* dialog box known already is displayed for selecting the measuring systems:



The dialog box titled "Add device to interconnection" shows the following fields and options:

Logic axis name: Wildcard

Device is using cam data ☒

Measuring system axis: Wildcard

Measuring system master value: Master

Meas. system wizard

OK Cancel

The dialog also features a graph showing two curves (blue and orange) on a coordinate system with angles from 0° to 360° on the x-axis and values from 0 to 100 on the y-axis. The blue curve starts at 0 and rises to about 60 at 250°. The orange curve starts at 150°, peaks at 60 at 200°, and falls back to 0 at 360°.

6. Click the **Next** button to assign the axis to the placeholder and close the dialog box entitled *Add device to interconnection*.

Defining the system functionality

Creating an interconnection via the electrical shaft

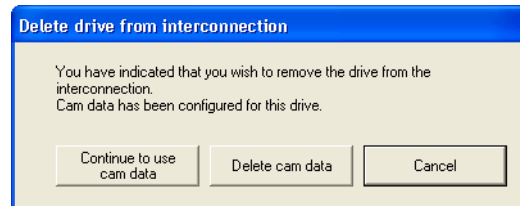
8.14.4.3 Cancelling existing assignments

You can delete an axis from the interconnection at any time without the cam data and measuring systems being lost.



How to delete an axis from the interconnection:

1. In the **Interconnection** tab, select the axis in the field on the right entitled **Assigned axes** and then click the  button.
 - The *Delete drive from interconnection* dialog box is displayed:



2. Make the desired selection:
 - **Release device from the placeholder:** The axis is deleted from the interconnection. The placeholder as well as the cam data (profile data, cam data and position data) and measuring systems, however, are retained. If an axis is assigned to the placeholder again at a later time, the necessary cam file for this axis can be re-created on the basis of the existing cam data.
 - **Remove placeholder:** The placeholder and the axis are completely deleted from the interconnection.

8.14.4.4 Reusing the "Electrical shaft" object

An "electrical shaft" object that is shown in the Project view can be removed from an automation module and reused in another automation module by means of the **Copy** and **Insert** commands. Only the axes have to be reassigned to the placeholders in the copy that is created.

The same applies when the entire automation module including an electrical shaft contained therein is copied: After copying the automation module, you have to reassign an axis to each placeholder in the copy. The cam data (profile data, cam data, and position data) and measuring systems remain unchanged.

This allows you for instance to easily create variants of electrical shafts and to quickly exchange them.

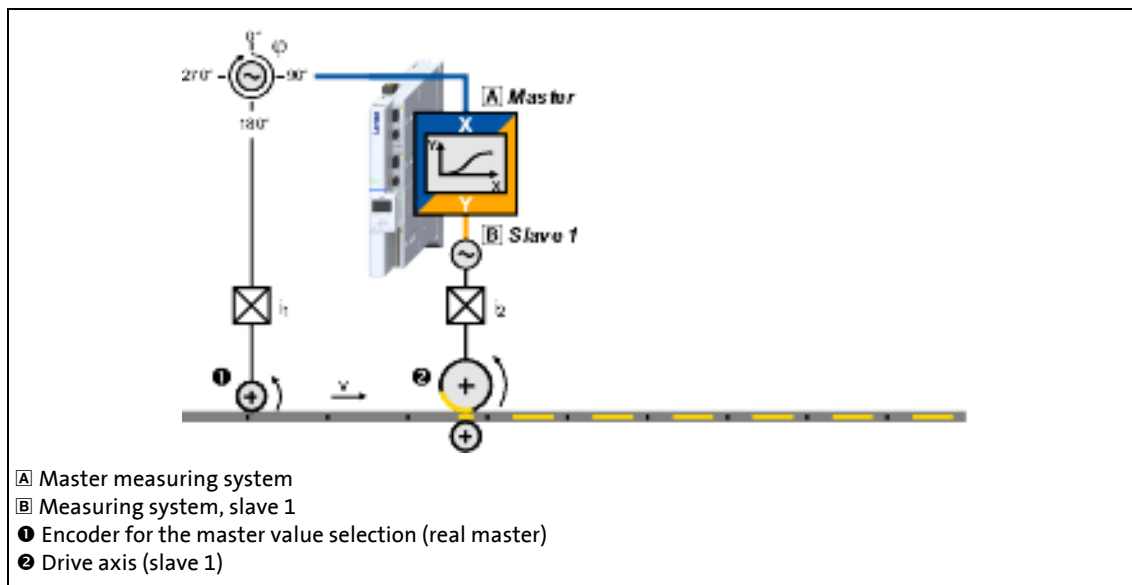
Defining the system functionality

Creating an interconnection via the electrical shaft

8.14.5 Measuring systems

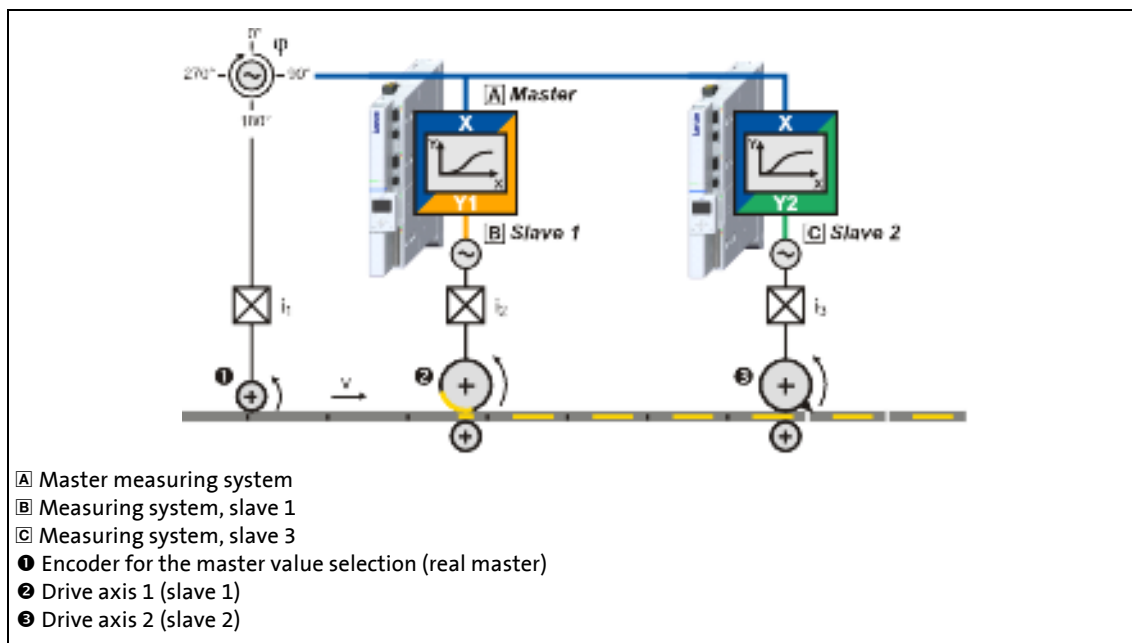
In a drive controller with a cam function, there are always at least two measuring systems: the measuring system for stipulation of the master values (master) and the measuring system for the drive axis (slave).

- The two measuring systems are merged with each other by means of the motion profile (curve), with account being taken of the mechanical data (machine parameters).



[8-13] Example: Controller with cam function and two different measuring systems

- If several drive controllers are interconnected, other measuring systems are added in accordance with the number of drive axes:

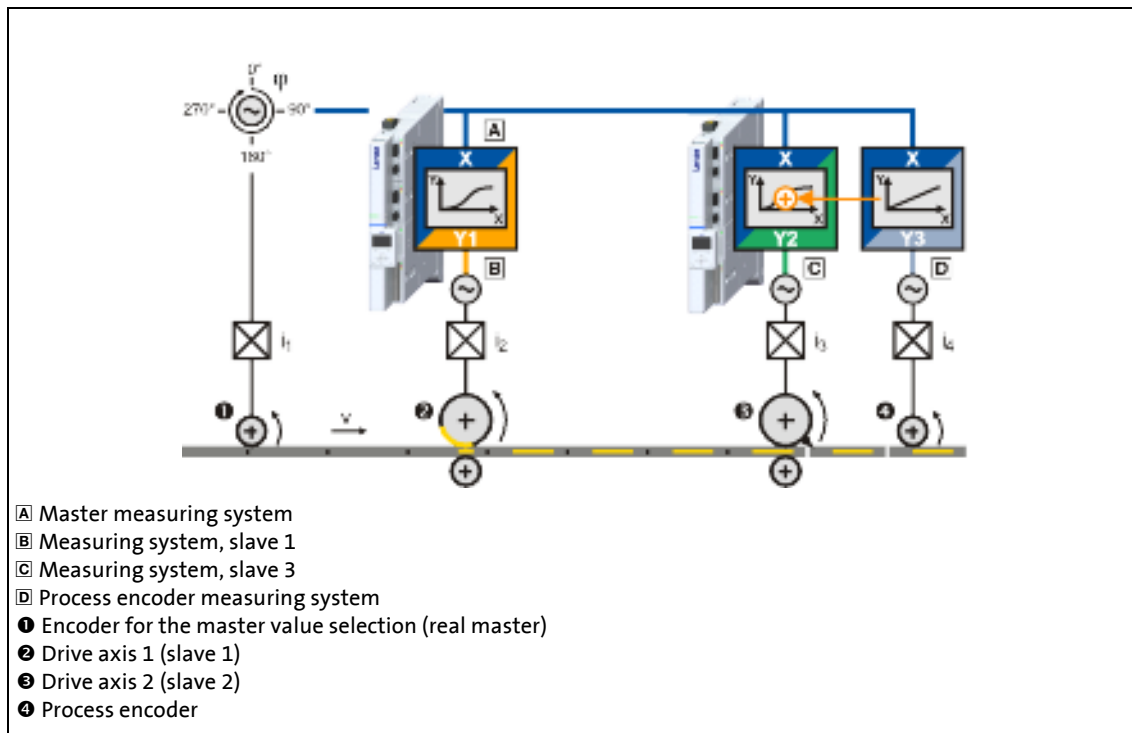


[8-14] Example: Controller interconnection with cam function and three different measuring systems

Defining the system functionality

Creating an interconnection via the electrical shaft

- Additional process encoders and characteristics also feature individual measuring systems:



[8-15] Example: Controller interconnection with cam function and four different measuring systems



Note!

It is important to use the correct measuring system for the interconnection of devices. The measuring systems do not represent the encoder but the tool or material. This means that rotating tools are usually represented in a modulo system, for example, whereas continuous material is represented in an unlimited measuring system.

Defining the system functionality

Creating an interconnection via the electrical shaft

8.14.5.1 Unlimited/limited/modulo traversing range

Motion profiles can only be described in close connection with the machine parameters. In particular, the nature of the traversing range and, in some cases, the cycle have a significant influence on the shape of the motion profile.

In principle, the different traversing ranges can be combined in any way in a motion profile but not all combinations are useful.



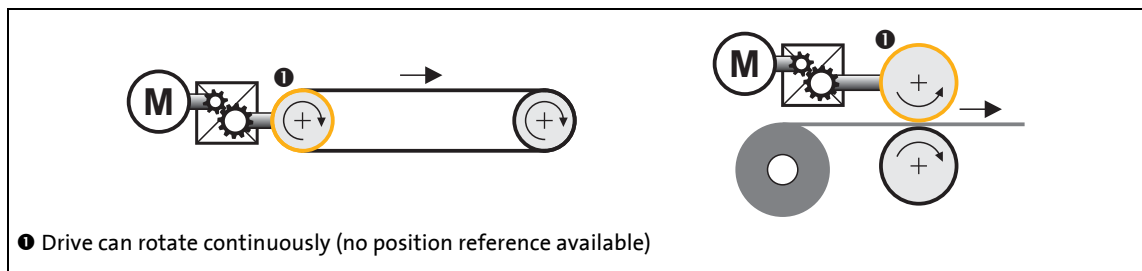
Note!

If you create a motion profile for the drive axis with the »Cam editor«, use the "Modulo" traversing range for the x axis in the »Cam editor«, as otherwise the master value/master angle is not closed by a cycle return and therefore cannot rotate.

The use of the "Unlimited" or "Limited" traversing ranges for the x axis in the »Cam editor« is only reasonable for a characteristic.

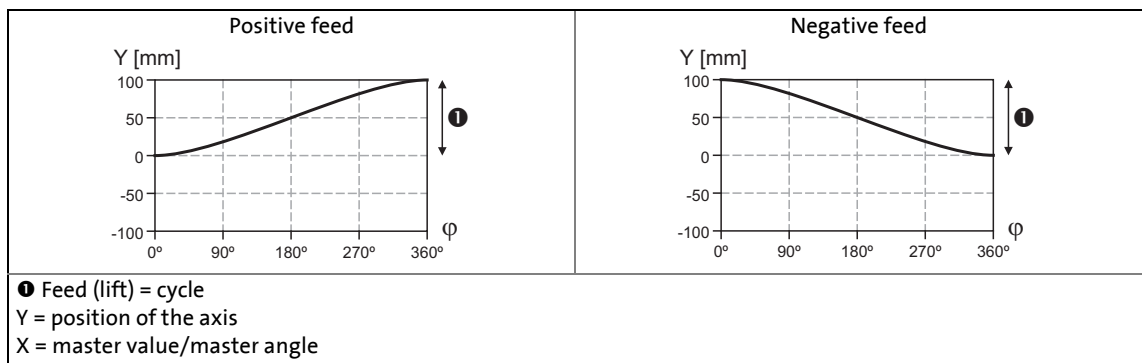
Unlimited traversing range

- The drive can rotate continuously in one direction.
- The tool to be driven is not divided (example: feed control tape).



[8-16] Examples of an unlimited traversing range

- Typical curves for the unlimited traversing range:



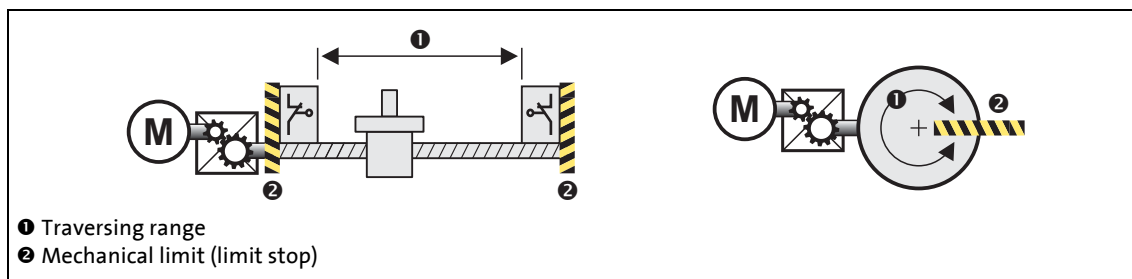
[8-17] Example: Feed profiles

Defining the system functionality

Creating an interconnection via the electrical shaft

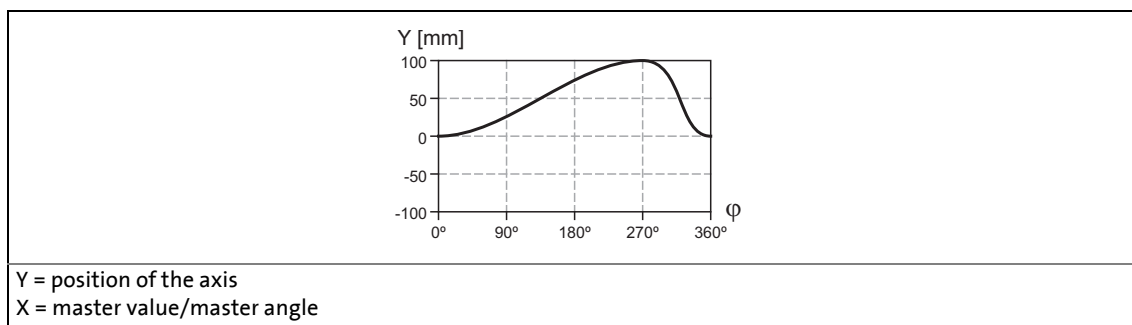
Limited traversing range

- The traversing range is limited by positive and negative position limits (mechanical limits/travel range limit switches/software limit positions).
- After a defined distance, traversing must take place in the opposite direction again (example: spindle drive/linear axis).

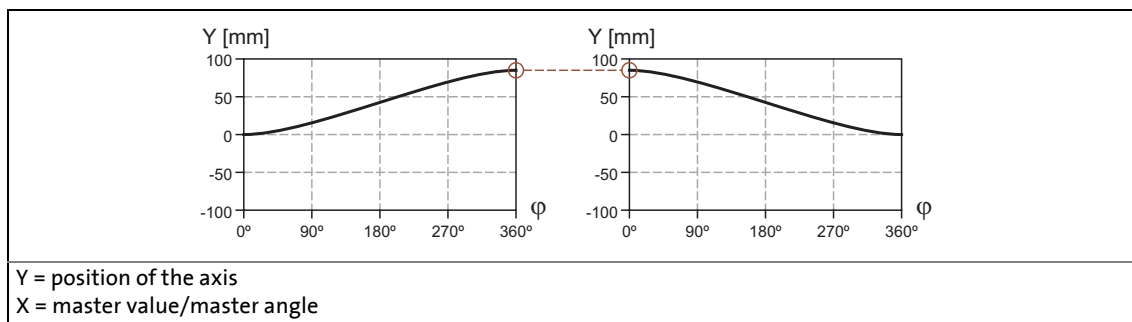


[8-18] Examples of a limited traversing range

- Typical curves for the limited traversing range:



[8-19] Example 1: Closed curve trace (forward-back profile)



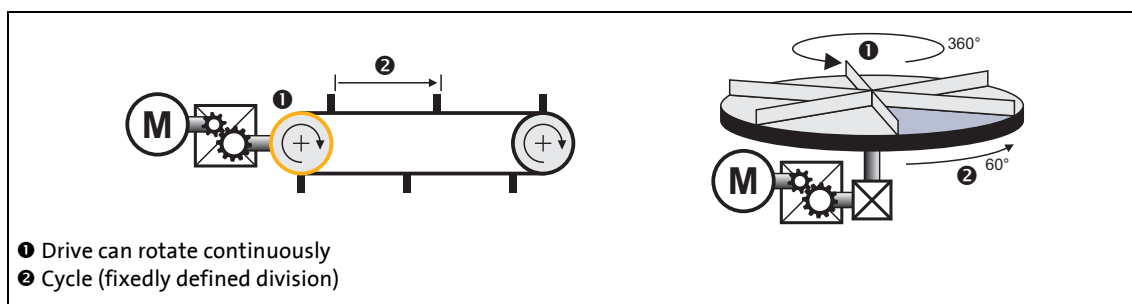
[8-20] Example 2: Closed curve trace (forward-back profile) as a sequence by means of two machine cycles ("weaving loom" principle)

Defining the system functionality

Creating an interconnection via the electrical shaft

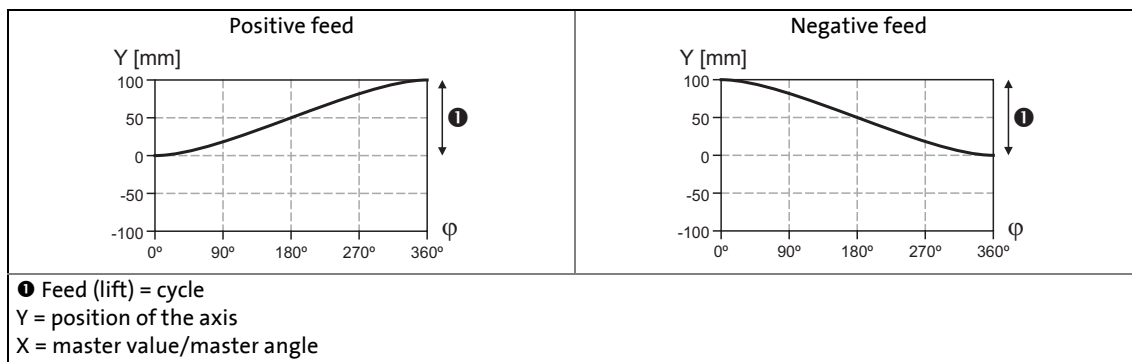
Modulo traversing range

- The drive can rotate continuously in one direction.
- If the set cycle is exceeded, a defined overshoot takes place, i.e. the value range repeats itself periodically (example: rotary table).
 - In a rotating system, the cycle corresponds to a typical rotation (360°) or a distance between tools.
 - Depending on the branch of industry, the cycle is also called "register", "register length", "arc length", "arc size", "format cut length", etc.
- Absolute targets can be approached by exceeding the measuring system limit, e. g. from 10° to 350° .



[8-21] Examples of a "modulo" traversing range

- Typical curves for a modulo traversing range



[8-22] Example 1: Feed profiles



Note!

In the modulo traversing range the feed (lift) defined by the motion profile has to correspond to the cycle, i. e. the curve has to be completed with the cycle end!

Defining the system functionality

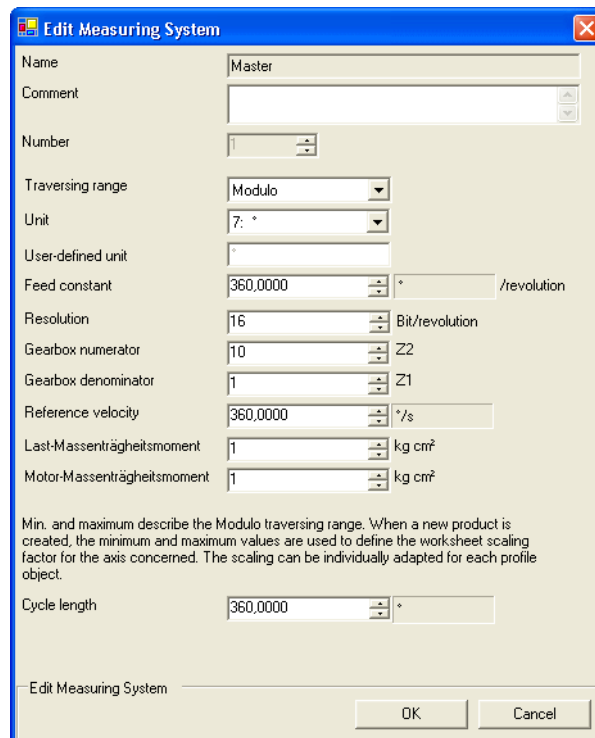
Creating an interconnection via the electrical shaft

8.14.5.2 Creating/editing/deleting measuring systems

If you open the *Project view* and select an already existing electrical shaft , the *Workspace* contains the **Measuring systems** tab in which all the existing measuring systems are shown:

Measuring systems									
Name	Number	Mode	Referenc...	Unit	Minimum	Maximum	Nomi...	Deno...	Feed const.
Inkmente	10			Inkr.	-32768,00...	32767,0000			
Prozent	11			%	-200,0000	200,0000			
Master	1	Modulo	360,0000	*	0,0000	360,0000	10	1	360,0000
Slave	2	Modulo	1,0000	*	0,0000	360,0000	10	1	360,0000
Sticking	103	Unlimi...	23700,0000	*	0,0000	360,0000	1	1	360,0000
Slicing	104	Unlimi...	23700,0000	*	0,0000	360,0000	1	1	360,0000

- In the list field all measuring systems that have already been created are shown.
- By clicking the **New** button, you can, if necessary, create additional measuring systems that cannot be directly assigned to a drive (e.g. for additional correction-value encoders in the machine).
- You can delete a measuring system that is no longer needed by selecting a measuring system in the list field and clicking the **Delete** button.
- By selecting a measuring system in the list field and clicking the **Edit** button (or simply by double-clicking the measuring system in the list field), you open the *Measuring system* dialog box in which the data of the corresponding measuring system are shown and can also be edited:



The dialog box titled "Edit Measuring System" contains the following fields and controls:

- Name: Master
- Comment: (empty text box)
- Number: 1 (spin box)
- Traversing range: Modulo (dropdown menu)
- Unit: 7: * (dropdown menu)
- User-defined unit: * (text box)
- Feed constant: 360,0000 (spin box) * /revolution
- Resolution: 16 (spin box) Bit/revolution
- Gearbox numerator: 10 (spin box) Z2
- Gearbox denominator: 1 (spin box) Z1
- Reference velocity: 360,0000 (spin box) */s
- Last-Massenträgheitsmoment: 1 (spin box) kg cm²
- Motor-Massenträgheitsmoment: 1 (spin box) kg cm²
- Min. and maximum describe the Modulo traversing range. When a new product is created, the minimum and maximum values are used to define the worksheet scaling factor for the axis concerned. The scaling can be individually adapted for each profile object.
- Cycle length: 360,0000 (spin box) *
- Buttons: OK, Cancel

Defining the system functionality

Creating an interconnection via the electrical shaft

- If it is an axis-related measuring system, the global machine constants ("machine parameters") are shown in the *Edit measuring system* dialog box:

Edit Measuring System

Name: Sticking

Comment:

Number: 103

Traversing range: [C] Unlimited

Unit: [C] *

User-defined unit: [C] *

Feed constant: [C] 360.0000 /revolution

Resol. of an encoder revoluti.: [C] 16

Gearbox factor numerator: M.: [C] 1 Z2

Gearbox factor denom.: Motor [C] 1 Z1

Reference velocity: 23700 °/s

Load moment of inertia: [C] 0.00 kg cm²

Motor moment of inertia: [C] 2.40 kg cm²

Motor reference speed: [C] 3950 rpm

Min. and maximum describe the possible traversing range. When a new product is created, the minimum and maximum values are used to define the worksheet scaling factor for the axis concerned. The scaling can be individually adapted for each profile object.

Maximum: 360.0000

Minimum: 0.0000

Edit Measuring System

OK Cancel



Note!

If you click the **Accept** button in the case of an axis-related measuring system, the changes made have a direct effect on the corresponding machine parameters of the drive interface.

Input field	Info
Name	Optional text • The first 16 characters are represented by the parameters of the function blocks in the drive.
Description	Optional text • The description entered is only provided in »Engineer«.
Number	Consecutive number that is automatically allocated by »Engineer« and is used for assigning an address to the measuring system in the drive. • If an FB (e.g. the "L_CamGetAxisData" FB) of this measuring system is to be used, the number shown in this field is to be transferred to the FB via its <i>dnAxisNumber</i> input.
Traversing range	Selection of the traversing range in accordance with the desired mechanics. • If you want to use this measuring system for the x axis in the »Cam editor«, set "Modulo" as traversing range!
Unit	Selection of the unit • With the help of the user-defined unit, informative production units such as "bottles" can be set. Select the "User-defined" entry as the unit and then enter the desired user-defined unit in the User-defined unit input field.

Defining the system functionality

Creating an interconnection via the electrical shaft

Input field	Info
Feed constant	Information indicating how many units are traversed with a revolution at the gear-output end (e.g. 360°, 500 mm, ...). • The same applies if you have several panels on a tool within this revolution.
Resolution	Resolution of an encoder revolution (shift factor) • Higher values usually lead to greater positioning accuracy and a higher dynamic performance but limit the traversing range that can be shown. • If possible, consult Lenze if you want to use a resolution different to the default setting.
Gearbox numerator/denominator	The gearbox ratio is to be stipulated in the form of two gearbox factors (numerator/denominator) and indicates the number of motor-axis revolutions during which exactly one revolution around the load axis (e.g. spindle or drive roll) takes place. • You can obtain the necessary data from the Technical Data of the gearbox. For exact stipulation of the gearbox ratio, you should use the resulting teeth numbers indicated on the data sheet or in the catalogue instead of the information on the nameplate.
Reference speed	Indication of maximum speed at which the axis is traversed. • All acceleration and deceleration ramps, among other things, of the FBs that use this measuring system make reference to this value.
Load moment of inertia	This optional information is used to calculate the precontrol variables and usually leads to a better dynamic performance and a greater precision.
Motor moment of inertia	
Minimum / maximum	Specification of the unlimited/limited traversing range • Example 1: 0,0000 mm (minimum) to 500,0000 mm (maximum) in the "Unlimited" traversing range. • Example 2: -10,0000 mm (minimum) to -100,0000 mm (maximum) in the "Limited" traversing range. PLEASE NOTE: Changes in the Minimum and Maximum input fields have an effect on the worksheet in the »Cam editor«. By this, motion profiles, cams, or position marks already entered may be deleted.
Cycle	Specification of the cycle for the "Modulo" traversing range. • Example: Cycle 180,0000° for a double use. PLEASE NOTE: Changes in the Cycle input field have an effect on the worksheet in the »Cam editor«. By this, motion profiles, cams, or position marks already entered may be deleted.

9 Inserting & configuring a network

In this part of the project creation you add networks to the project, define the communication nodes and configure the networks inserted and the nodes assigned. It is the objective to enable the exchange of information between the devices of the system.

- The basis of all worksteps is a logical view to networks.
- Physical connections, topologies, bus connections, and also contents and the structure of the variables communicated within a network are not important here.
- The *Project view* only presents the assignment between the system structure consisting of system modules and axes, and the networks integrated.
- If you select a network in the *Project view*, the *Workspace* shows you various tabs that you can use to configure the corresponding network. The setting possibilities depend on the type of network and are described in more detail in the section of this document relevant to the network in question.



Note!

- Configurations that have been carried out are **not immediately** accepted (online) in device-specific parameter assignments (codes)!
 - The acceptance of changes is started by the compilation process (menu command **Tools→Build project** or <F11>) for the whole project after you have defined the interconnections.
 - During the compilation process the »Engineer« generates the required parameter assignments and applications.
 - Afterwards transfer the parameter set to the corresponding device. (Menu command **Online→Download parameter set** or <F5>).
- The »Engineer« provides for the establishment and the configuration of a network (CAN and ETHERNET Powerlink).
- A project can contain several networks of the same or of a different type. In each case, the devices of a project can communicate with each other in different networks!

Inserting & configuring a network

Separation of the application and the network

9.1 Separation of the application and the network

In the »Engineer«, communication between the controllers can be effected via the application level or the network level.

- The [Application level](#) enables the interfaces/ports of the devices to be defined and interconnected for the respective application.
- In the [Network level](#), transfer-specific parameters can be defined. This includes the creation of networks, the addition of nodes to networks, and the parameter setting of the process data objects. ([📖 205](#))
- By separating the two levels you can generate an application and decide later on via which communication medium the information is to be exchanged during the runtime.
- »Engineer« enables you to concentrate on the application.
- The creation of process data objects and the assignment of interfaces (ports) are carried out by the »Engineer«.
- If you have created an application, you may have to make some minimum settings. This is referred to in another part of the documentation.

9.1.1 Application level

In the application level, the interfaces of an application, the ports, are defined. The application can be a program or a permanent application.

- The application can send process data to the outside or receive them from the outside via the ports.
- The ports are defined in the port editor. ▶ [Port editor \(ports\)](#) ([📖 155](#))
- The port editor can be called for both an application on a device and for a cross-machine application, the "machine application".



Tip!

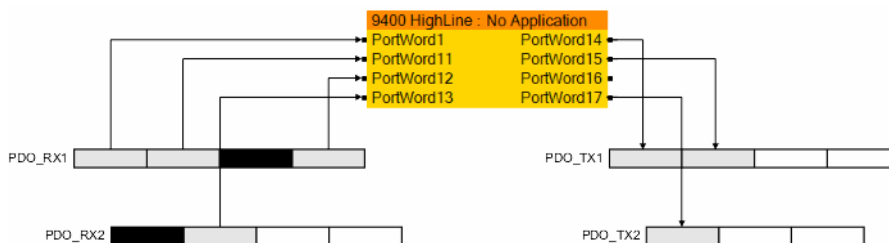
The machine application serves as a structuring means for the generation of system modules which already contain a predesigned interconnection.

Inserting & configuring a network

Separation of the application and the network

Process data objects (PDOs)

In order to transfer the data of the port via a communication medium such as CAN, they must be assigned to a process data object.



- The assignment of the interface/process data object via which a date is sent or received can be made automatically or manually. The assignment is defined in the port editor when the port is created.
- A process data object can serve as a container for several ports. Several ports can thus be transferred by a process data object.
- The **Process data objects** tab serves to create and parameterise process data objects (PDOs).
 - ▶ [Process data objects](#) (📖 226)

Further topics:

- ▶ [Defining the system functionality](#) (📖 128)
- ▶ [Parameterising & configuring the devices](#) (📖 132)
- ▶ [Inserting & configuring a machine application](#) (📖 173)

Inserting & configuring a network

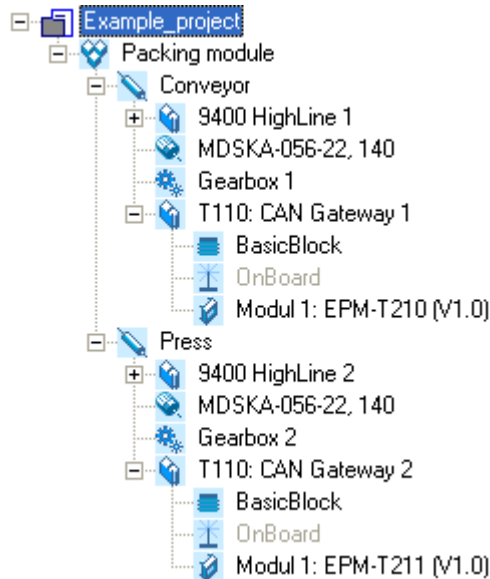
Separation of the application and the network

9.1.2 Network level

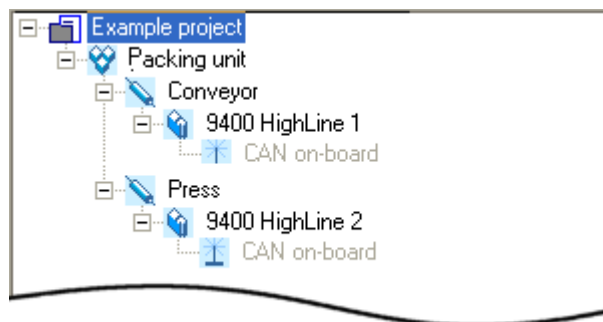
On the network level, you can assign a network to the nodes created and parameterise it. If a network object such as CAN has been selected in the project tree, the tabs displayed can be used to make general settings.

Layout of the communication structure

If you create a new project, in the first step you describe the system structure by means of system modules and axes and then add the corresponding devices to these structuring elements:



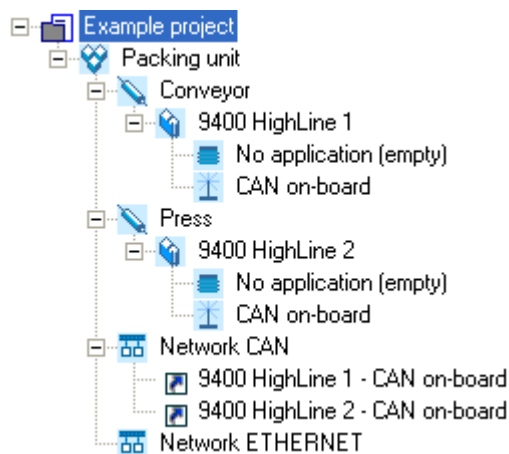
If you then change to the "Network" project view, only the existing structuring elements (system modules and axes) as well as the included network-relevant components are shown in the *Project view*:



Inserting & configuring a network

Separation of the application and the network

Starting from this situation, you can now add a communication structure to the project by adding the networks in the system at a corresponding position:



▶ [Inserting a network](#) (📖 207)

More information about the network

▶ [ETHERNET Powerlink network](#) (📖 210)

▶ [CAN network](#) (📖 216)

Next steps

If you have added all networks to your project and have defined and parameterised the associated nodes, the project is completely established from the view of the networks.

- define the functions of your overall system now.
- You can change to other areas of the »Engineer« any time to view certain settings or to alter settings.

Inserting & configuring a network

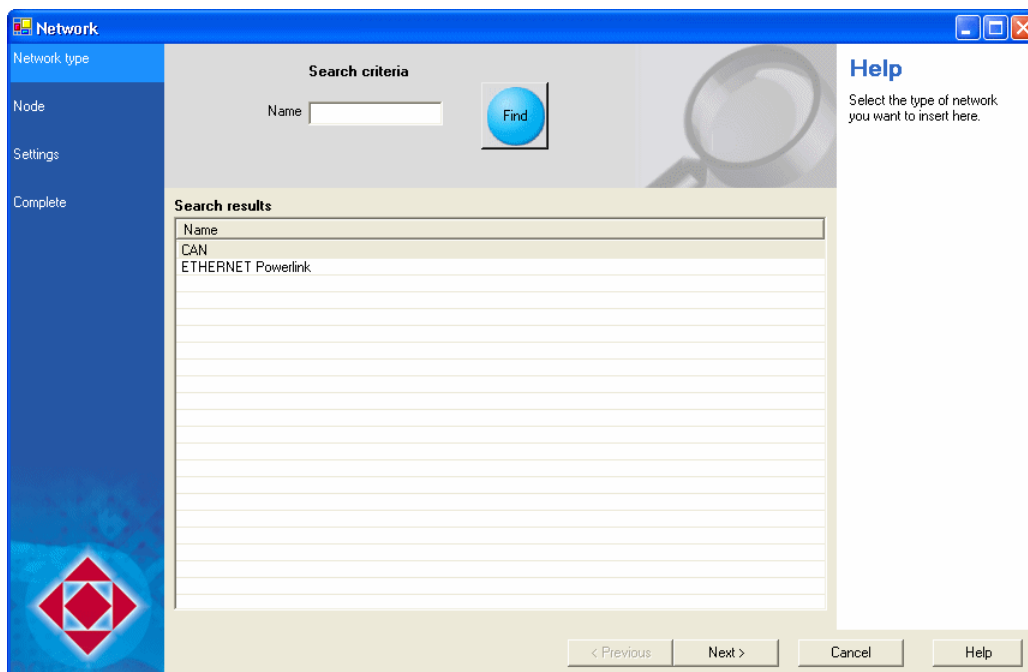
Inserting a network

9.2 Inserting a network



How to insert a network:

1. Select the system module  or the axis  which a network is to be inserted in from the *Project view*.
2. Click the  icon.
 - The *Network* dialog box appears:



Step 1 - Network type

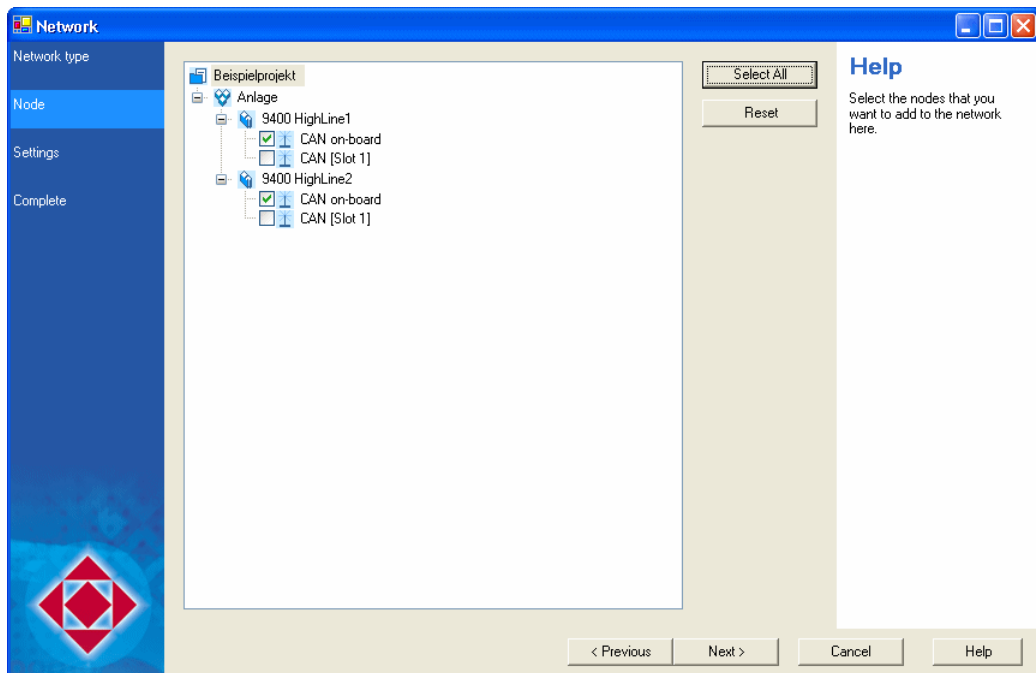
- All networks available are displayed in the **Search results** list field.
 - The »Engineer« supports "CAN" and "ETHERNET Powerlink" by Lenze.
3. Select the network to be inserted in the **Search results** list field.

Inserting & configuring a network

Inserting a network

- Click the **Next** button.

Step 2 - Nodes



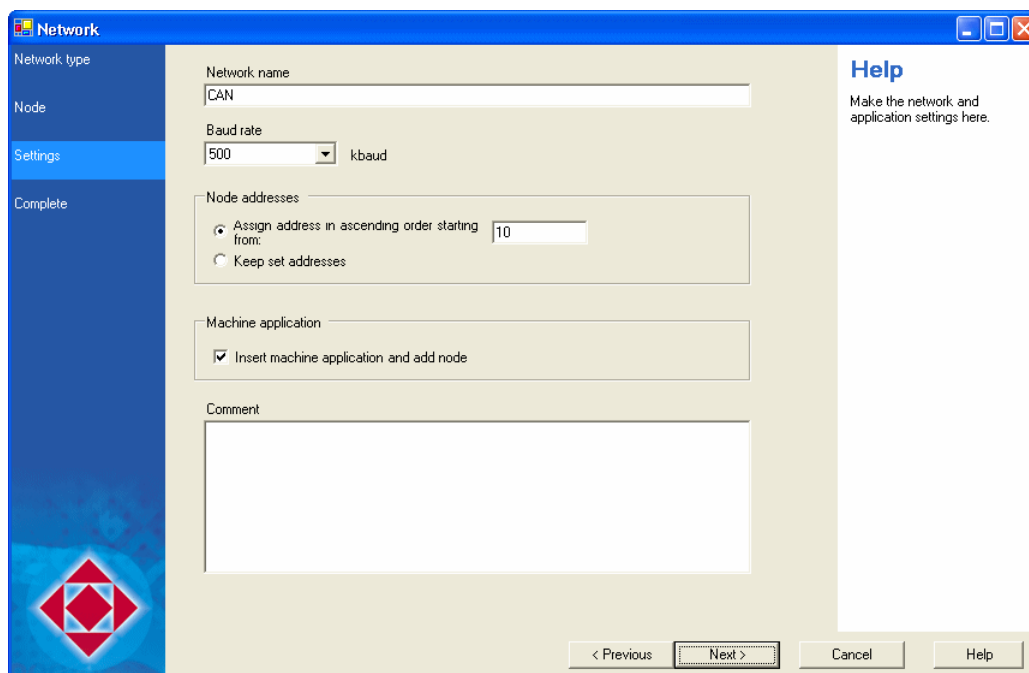
- Highlight the corresponding nodes.
 - The nodes that are not connected are displayed.
 - If you click the **Select all** and **Reset** buttons, all the control fields are highlighted or the highlighting is removed.
- Click the **Next** button.

Inserting & configuring a network

Inserting a network

Step 3 - Settings

In the case of an ETHERNET Powerlink network, the **Baud rate** selection field is not available.



7. Highlight the control field entitled **Insert machine application and add nodes** if all existing devices are to be automatically added to the network as nodes.
 - If the control field has been highlighted, a machine application that is shown in the project tree is also added to the project. The selected applications are already integrated in the machine application.
 - The indicated default values for Lenze devices do not need to be changed in the settings area.
 - All compatible network nodes which are below the network system module are added to the network. If a device has several node interfaces of the same type, a selection dialog appears.
 - All assigned network nodes are pre-assigned addresses in ascending order. In the case of CAN, the minimum address is taken from the settings.
8. Click the **Next** button.
 - An information text appears.
You can either alter the node addresses in the »Engineer« project or at the hardware switches.
9. Press **Complete**.
 - The selected network is inserted into the highlighted element.

9.3 ETHERNET Powerlink network

If you select a network of the type "ETHERNET Powerlink" in the *Project view*, various tabs are shown in the *Workspace* and you can use them to configure the inserted network.



Tip!

You can find detailed information on the subject of the "ETHERNET Powerlink" in the communication manual of the same name "ETHERNET Powerlink".

Tab	Description
Nodes	... add nodes to the network ... remove existing nodes from the network ▶ Nodes (📖 216)
Settings	... make settings that affect the entire network ▶ Settings (📖 221)
Product features	... change the name of the network ... leave a comment regarding the network
Diagnostics	... read out the network status via the specified parameters. ▶ Diagnostics (📖 215)
Documentation	Optionally, notes regarding the device module and file attachments can be added.



Tip!

It is recommended to first define and configure all nodes of a network via the **Nodes** tab and only afterwards carry out the global settings of the network via the **Settings** tab.

9.3.1 Nodes

On the **Nodes** tab of the "ETHERNET Powerlink", you set up nodes that are to communicate with each other via the network.

- You can build a network out of nodes that you have inserted into the project by means of the *Insert device module* dialog box.



Tip!

If during inserting the network in the *Insert network* dialog box the control field entitled **Insert machine application and add nodes** was highlighted, all existing devices have automatically been inserted into the network as nodes.

Inserting & configuring a network

ETHERNET Powerlink network

Working in the network view

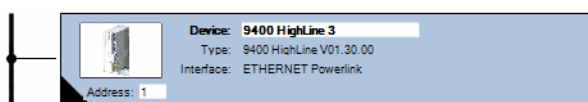
In the upper position, the network view is provided with an individual toolbar.

- Click on an icon to execute the corresponding function.

Icon	Menu command	Function
	Network→Insert node	Inserting nodes (📖 218)
	Network→Remove node	Removing nodes (📖 220)
	Network→Node settings	Node settings (📖 219)
	-	Sort the nodes according to address
	Network→Zoom in view	Increase the size of the information shown in the Nodes tab
	Network→Zoom out view	Reduce the size of the information shown in the Nodes tab
	Network→Overview	Show overview window
	Network→Whole worksheet	Adapt the information shown to the whole worksheet
	Network→Page width	Adapt view to the width of the worksheet
	Network→Print	Print worksheet

Context menu in the network view

The *Network* view furthermore provides you with a *Context menu* for each node, featuring the following commands:

Command	Function
Removing nodes	Remove the selected node from the network.
Set master (MN)	Define node as Managing Node (MN). • The master initialises the Ethernet Powerlink and carries out the associated change of status from <i>Pre-Operational</i> to <i>Operational</i>. • The node taking over the role of the Managing Node (MN) in the network view is identified by a black triangle in the left corner at the bottom: 

9.3.1.1 Inserting nodes



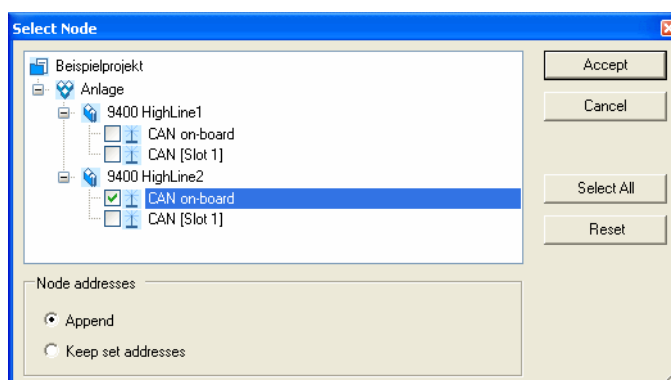
Tip!

Instead of manually inserting nodes into the network, you can insert the network in the *Insert network* dialog box and at the same time highlight the control field entitled **Insert machine application and add nodes** in order to automatically insert all existing devices into the network as nodes.

▶  [Inserting a network](#) (207)

In the *node selection* dialog box, the nodes can be selected manually. All communication-capable devices (e.g. controllers with CAN interface) of the system structure are shown in a tree topology.

In the Node selection dialog box only those nodes are available that have not yet been inserted.



- You can construct a network only out of nodes that also exist in your project as devices capable of communication.
- The  element below a communication-capable device in this connection represents an individual, independently configurable node interface (not to confuse with the physical bus connection).
- If a device is provided with several node interfaces which can be configured independently from each other, it can appear in several networks or in the same network as a multiple node.



Note!

In the tree view in the *Node selection* dialog box, only those devices are shown that can be inserted into the network as nodes.

Inserting & configuring a network

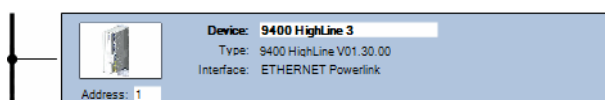
ETHERNET Powerlink network



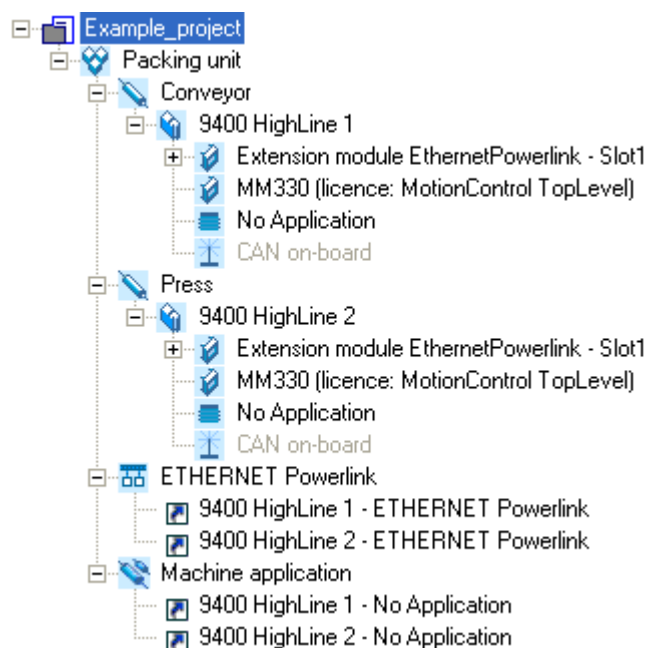
How to insert a node into the network:

1. In the *Network toolbar*, click the  icon.
 - The *Node selection* dialog box is shown.
2. Select the node interface  in the tree structure, the higher-level device of which is to be inserted in the network as node.
 - Devices containing only one node interface can be selected without opening them further to the node interface in the tree structure.
3. Press **OK**.
4. The dialog box then closes and the selection is accepted.

- The node inserted is then displayed in the *Network view* as follows:



- In the *Project view* additionally all nodes of the network are listed as a "linkage" below the network element:



- Repeat the  **Add node** command if you want to insert further nodes into the network.

9.3.1.2 Node settings

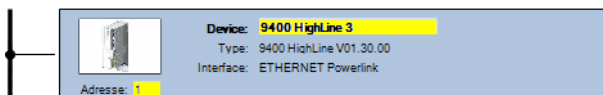
Configuration options in the network view

You can change the address of a node, its name and the designation of the device directly in the *Network view*.



How to change a setting in the network view:

1. Click into the corresponding text field to change the respective setting:



2. Press <Input key> to accept the change.

Further configuration options

Further settings with regard to a node can be carried out via the **Properties**, **Settings** and **Diagnostics** tabs.



How to define the further settings of a node:

1. Select the node to be configured in the *Network view*.
 - In the network view a selected node is highlighted by a green frame.
2. In the *Network toolbar*, click the  icon.
 - The »Engineer« switches to the network view
3. Carry out the corresponding node settings in the **Settings**, **Properties**, **Monitoring**, **Diagnostics** and **Process data objects** tabs.
 - The information can be found in the "ETHERNET Powerlink" Communication Manual.
 - Via the  icon in the *Toolbar* you can go back to the settings of the network.

9.3.1.3 Removing nodes



Click the  icon in the *Network toolbar* to remove the selected node from the network.

9.3.2 Settings

In the **Settings** tab, you specify the global settings that are applicable to the whole network. You specify the EPL cycle time and check the level of EPL cycle utilisation. With additional settings, you can optimise the network.

9.3.3 Product features

You can enter a designation for the system module in the **Designation** text field.

Optionally you can enter a comment on the system module in the **Comment** text field.

The Version and Protocol fields cannot be edited.

9.3.4 Diagnostics

In the **Diagnostics** tab you can check the quality state of the network.

9.4 CAN network

If you select a network of the type "CAN" in the *Project view*, the *Workspace* provides you with various tabs that you can use to configure the network.



Tip!

Detailed information about the topic "CAN" can be found in the "CAN" communication manual.

Tab	Description
Nodes	... add nodes to the network ... remove existing nodes from the network ▶ Nodes (📖 216)
Settings	... make settings that affect the entire network ▶ Settings (📖 221)
Synchronisation	... make settings that affect the synchronisation of the nodes. ▶ Synchronisation (📖 223)
CAN objects	... overview of the CAN process data objects to be transferred to this network which were created during the transmission process. ▶ CAN objects (📖 225)
Product features	... change the name of the network ... leave a comment regarding the network



Tip!

It is recommended to first define and configure all nodes of a network via the **Nodes** tab and only afterwards carry out the global settings of the network via the **Settings** tab.

9.4.1 Nodes

In the **Nodes** tab you establish nodes which are to communicate with each other via the network.

- In the **Nodes** tab the nodes are represented in the form of a network.
- You can construct a network only from nodes that you have also inserted into the project as devices.



Tip!

If during inserting a network in the Network dialog box the control field entitled **Insert machine application and add nodes** was highlighted, all existing devices have already been inserted automatically into the network as nodes.

Inserting & configuring a network

CAN network

Working in the network view

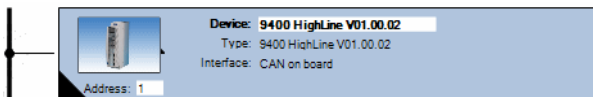
In the upper position, the network view is provided with an individual toolbar.

- Click on an icon to execute the corresponding function.

Icon	Menu command	Function
	Network→Insert node	Inserting nodes (📖 218)
	Network→Remove node	Removing nodes (📖 220)
	Network→Node settings	Node settings (📖 219)
	-	Sort the nodes according to address
	Network→Zoom in view	Increase the size of the information shown in the Nodes tab
	Network→Zoom out view	Reduce the size of the information shown in the Nodes tab
	Network→Overview	Show overview window
	Network→Whole worksheet	Adapt the information shown to the whole worksheet
	Network→Page width	Adapt view to the width of the worksheet
	Network→Print	Print worksheet

Context menu in the network view

The *Network* view furthermore provides you with a *Context menu* for each node, featuring the following commands:

Command	Function
Removing nodes	Remove node from the network.
Reset node	Changes to the node are accepted
Set NMT master/slave	Define node as master or slave. • The master initialises the CAN and carries out the associated change of status from <i>Pre-Operational</i> to <i>Operational</i>. • The node taking over the role of the master in the network view is identified by a black triangle in the left corner at the bottom: 

9.4.1.1 Inserting nodes



Tip!

Instead of manually inserting nodes into the network, you can insert a network in the Network dialog box and, at the same time, highlight the control field entitled **Insert machine application and add nodes** in order to insert all the existing devices into the network as nodes automatically.

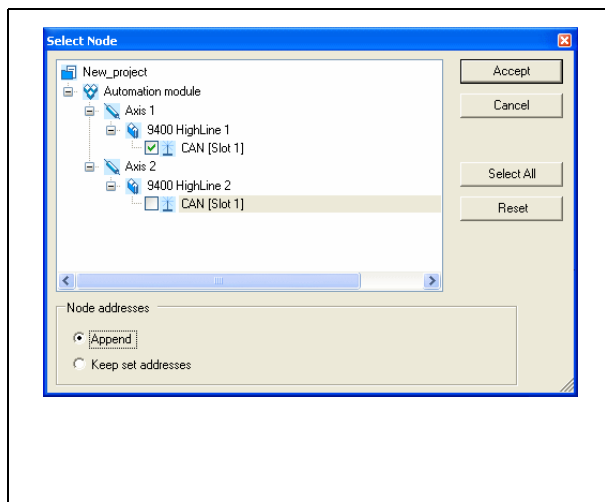
▶  [Inserting a network](#) (p. 207)

In the *node selection* dialog box, the nodes can be selected manually. All communication-capable devices (e.g. controllers with CAN interface) of the system structure are shown in a tree topology.



Note!

The tree structure in the *Node selection* dialog box only includes those devices which have not yet been inserted into the network.



- You can construct a network only out of nodes that also exist in your project as devices capable of communication.
- The  element below a communication-capable device in this connection represents an individual, independently configurable node interface (not to confuse with the physical bus connection).
- If a device is provided with several node interfaces which can be configured independently from each other, it can appear in several networks or in the same network as a multiple node.



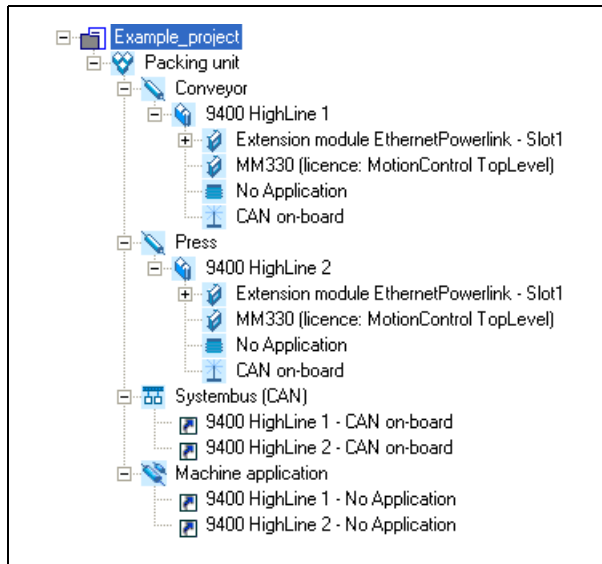
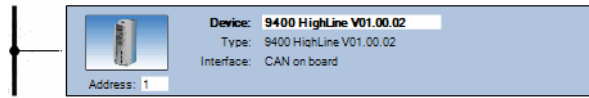
How to insert a node into the network:

1. In the *Network toolbar*, click the  icon.
 - The *Node selection* dialog box is shown.
2. Select the node interface  in the tree structure, the higher-level device of which is to be inserted in the network as node.
 - Devices containing only one node interface can be selected without opening them further to the node interface in the tree structure.
3. Press **OK**.
4. The dialog box then closes and the selection is accepted.

Inserting & configuring a network

CAN network

- The inserted node will then be represented in the *Network view*:



- In addition, the *Project tree* shows all nodes of the network as a link below the network element.

- Repeat the  **Add node** command if you want to insert further nodes into the network.

9.4.1.2 Node settings

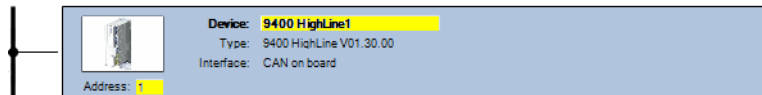
Configuration options in the network view

You can change the address of a node, its name and the designation of the device directly in the *Network view*.



How to change a setting in the network view:

1. Click into the corresponding text field to change the respective setting:



2. Press **<Input key>** to accept the change.

Further configuration options

Further settings with regard to a node can be carried out via the **Properties**, **Settings** and **Monitoring** tabs.



Further information about the CAN bus connection is provided in the documentation for the respective controller.



How to define the further settings of a node:

1. Select the node to be configured in the *Network view*.
 - In the network view a selected node is highlighted by a green frame.
2. In the *Network toolbar*, click the  icon.

Inserting & configuring a network

CAN network

-
3. Carry out the corresponding node settings in the **Properties**, **Settings** and **Monitoring** tabs.
 - Via the  icon in the *Toolbar* you can go back to the settings of the network.

9.4.1.3 Removing nodes



Click the  icon in the *Network toolbar* to remove the selected node from the network.

9.4.2 Settings

In the **Settings** tab you define the global settings applying for the entire network.

Settings

General

Baudrate
500 kBaud

Assign identifier automatically

from
385

to
896

Default

Address range

Minimum possible node address
1

Maximum possible node address
63

Maximum possible number of nod..
63

Default

General

In order to enable communication via CAN, all nodes must use the same data transfer rate.

- Via the **Baud rate** list field you can centrally define the data transfer rate for the entire network:

Possible settings	Info
20 kbps	• If you change the baud rate setting for a node, you must then execute the command Reset node to make the change effective. • Lenze devices are preset with a data transfer rate of 500 kbps.
50 kbps	
125 kbps	
250 kbps	
500 kbps	
1000 kbps	

Automatic allocation of identifiers

Process data objects have a definite identifier.

- You can use the **from** / **to** input fields to specify a range for the automatic allocation of identifiers for all process data objects parameterised within »Engineer«.



Tip!

Specifying such a range can be useful if process data objects are also to be communicated within the actual network in your plant and their identifiers cannot be determined with the help of »Engineer«. This situation exists when there are external devices in a system that cannot be configured within »Engineer« but can nevertheless participate actively in communication.

- In such a case, you can separately determine these external devices and the identifiers of the process data objects sent by these devices.
- In »Engineer«, you then set the permissible range to ensure that identifiers which have already been allocated externally are not used or allocated again.

Inserting & configuring a network

CAN network

Address range

Every node within the CAN network must be assigned a node address (node ID) as a clear means of identification.

- For the nodes, node addresses in the range of 1 ... 63 can be allocated.
- Via the input fields **Minimum node address** and **Maximum node address** you can narrow this range further.
- Via the input field **Maximum number of nodes** you can narrow the maximum number of the possible nodes.

Restoring standard settings

By pressing **Standard** you restore the standard settings for the identifier range or the address range.

Inserting & configuring a network

CAN network

9.4.3 Synchronisation

You can use the **Synchronisation** tab to configure the necessary parameters in order to synchronise the internal time base of selectable network nodes with the arrival of a so-called SYNC telegram. You can also specify the node that is to send a SYNC object. The nodes that are to adapt their internal control cycle to the sync object.

By this, the internal calculation processes (e. g. control-oriented processes) of a node can be synchronised with the calculation processes of other nodes which can also process the SYNC telegram.

SYNC source

Setting	Info
Nodes	Selection of the node that cyclically sends the SYNC telegram.
Sync telegram identifier	Transmit identifier of the SYNC telegram. - Setting range: 1 ... 256 - Default setting: 128
Sync cycle time	Transmission cycle for the SYNC telegram - Setting range: 0 ... 65000 ms - Default setting: 0 ms (= Off)

SYNC receiver

In this list field select the nodes which are to synchronise to the SYNC telegram in the first column by clicking the corresponding control fields.

- In the **SYNC source** group field the SYNC source with COB-ID and time interval is determined.
- In the **SYNC receiver** group field all nodes of the network are displayed in tabular form.
 - The **Appl. (*1)** column indicates if, on the corresponding device, the process is to be synchronised to the SYNC object. If no process can be synchronised to the SYNC object on the device, the respective cell will be inhibited.
 - The **PDO (*2)** column indicates if the "Synchronised" transfer mode is available for a process data object of this node.

Inserting & configuring a network

CAN network

- In the **SYNC application parameters for:** group field, further parameters of the SYNC receivers selected are shown. These parameters are device-specific and, except for the SYNC source, are not set automatically.
- Exception
 - If the parameter that indicates SYNC source C1120/0 has been set for a 9400 field device and if the **Appl. (*1)** control field has been highlighted for a node in the SYNC receiver table, C1120 is set to CAN on board or CAN Module.

The screenshot displays the SYNC configuration window, divided into three main sections: SYNC source, SYNC receiver, and SYNC application parameters for.

SYNC source

Node: 9400 HighLine V03 - CAN on board

SYNC telegram identifier: 128

1 ms

SYNC receiver

Appl. (*1)	PDO (*2)	Node
☒	None	9400 HighLine V03 - CAN on board
☐	None	9400 HighLine V03 - CAN [Slot 1]
☐	None	9400 HighLine V03~1 - CAN on board
☐	None	9400 HighLine V03~1 - CAN [Slot 2]

SYNC application parameters for:

9400 HighLine 1 - CAN on-board

Sync source: OFF

SYNC cycle time: 1000 μs

Sync phase position: 400 μs

Sync tolerance: 0 μs

Sync-PLL increment: 109 ns

Inserting & configuring a network

CAN network

9.4.4 CAN objects

This tab shows you a list of the CAN process data objects (PDOs) to be transferred on the network, which have been generated in the course of the compilation process.

Objects that have been created by means of a general circuit interconnection of devices, and objects that have been constrained through deselection of the **Automatic allocation** control field are displayed.

CAN objects				
Node	Process data object	Identifier	Transfer mode	Time [ms]
T831: 16xDig. I/O Compact (1-wire)	TransmitPDO	0x0	TimeEvent	100
Left - CAN on-board	PDO_TX1	0x181	Time	1
▶ Left - CAN on-board	PDO_TX2	0x281	Time	1
Middle - CAN on-board	PDO_TX1	0x181	Time	1
Right - CAN on-board	PDO_TX1	0x181	Time	1

The list provides information about the process data objects which are transmitted via the selected network:

Column	Info
Nodes	Objects of the interconnected circuit.
Process data objects	Application for which the CAN process data object has been created.
Identifier	COD-IDs allocated to the CAN process data object. • This setting can also be altered in the list.
Transfer mode	Transfer mode which is used for sending the CAN process data object.
Time [ms]	The time is set to 100 ms by default. Note: To ensure that an electrical shaft functions optimally, the transmission time of the send objects (TPDOs) must have been set to 1 ms . • You can find further details on the processing of transmission parameters in the following section: ▶ Process data objects (□ 226)



Note!

The **CAN objects** tab cannot be edited.

- The information displayed is only valid for a completely updated project. ▶ [Build project](#) (□ 76)

Click the **Linking of send and receive objects...** button to open a dialog box that displays the linkage of the sent and received process data objects in the tree structure. For purposes of a better orientation, the transmission process data objects are sorted according to nodes.



Further information about the CAN bus connection is provided in the documentation for the respective controller.

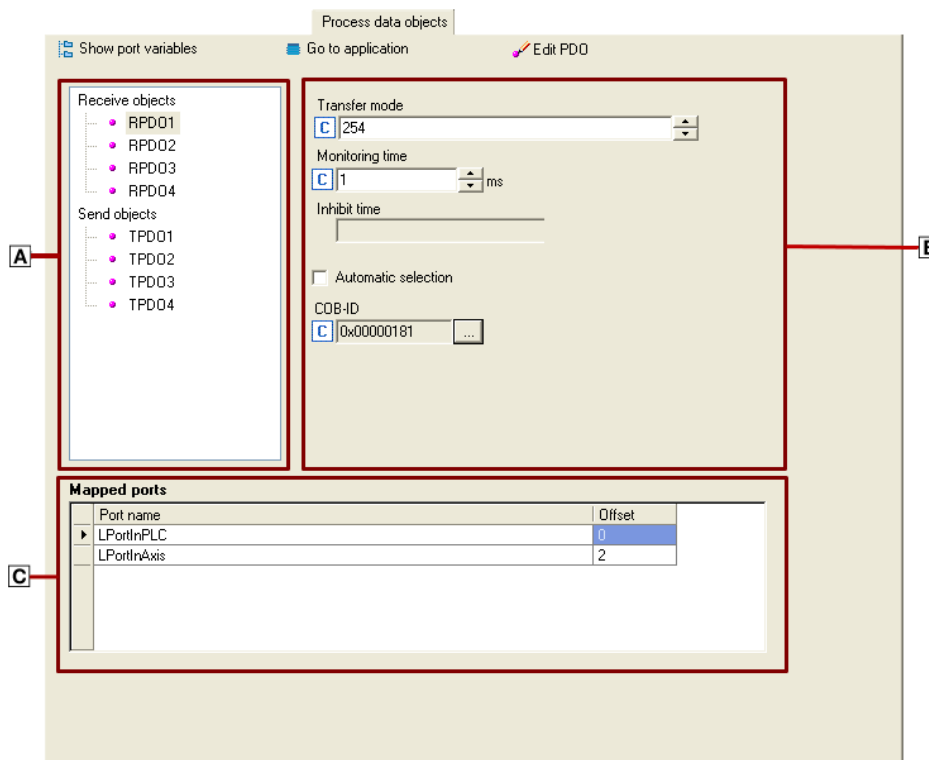
9.4.5 Product features

You can enter a designation for the system module in the **Designation** text field.

Optionally you can enter a comment on the system module in the **Comment** text field.

9.5 Process data objects

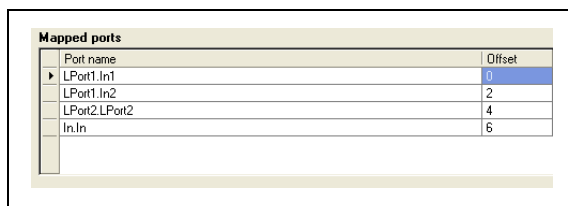
The **Process data objects** tab shows the current available process data objects for a node.



Area	Info
A Process data objects	Display of all process data objects for the node selected, divided into send and receive process data objects. The number and name of each process data object depends on the device in question. If a process data object has been marked as "manual", a lock is shown in the icon next to the corresponding process data object. Manual or automatic is indicated by means of the Automatic allocation control field in the Transfer parameters area. The network generator is only available for establishing a connection if the Automatic allocation control field has been highlighted ✓.
B Transfer parameters	Depending on the process data object selected, the associated transfer parameters are displayed here. The selection and editing of the fields depends on the send and receive process data objects as well as on the support for this function provided by the node itself. COB-ID selection field Normally, the COB-ID for an interconnection is allocated by means of a generation run Tools→Build project. If a process data object is required for an interconnection, a valid COB-ID is entered for the sender and all receivers. If a process data object is not used, it can be inhibited by setting bit[31]. Automatic allocation selection field If you want to force sending or receiving of a process data object, you can do so by deselecting the Automatic allocation control field and specifying the desired COB-ID.
C Mapped ports	Here all mapped ports are shown. The Offset column reflects the byte offset within the process data object.

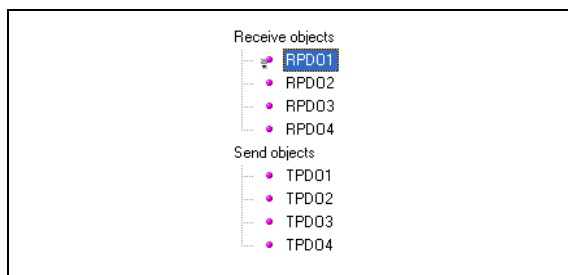
Inserting & configuring a network

Process data objects

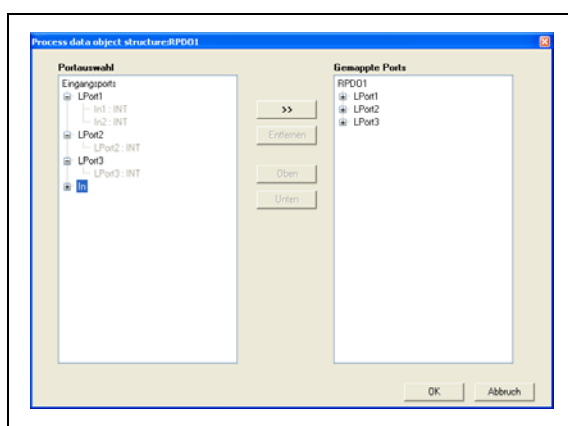


Port name	Offset
LPort1.In1	0
LPort1.In2	2
LPort2.LPort2	4
In.In	6

- If you click the **Display port variables** button, the variables of the ports are displayed in the **Mapped ports** area.



- Click the **Edit PDO** button to open the *Process data object structure* dialog box of the selected process data object.



- In this dialog box the process data structure (mapping) can be changed.
- The dialog box is device- and interface-dependent.



Note!

You are responsible for the correct setting and effects on the system!

9.5.1 Packing ports into process data objects

The mechanism for packing ports into process data objects works in the same way for all networks. The **Network** button in the *Project view bar* in »Engineer« enables a filtered view of the network configuration.

If the **Automatic allocation** control field in the **Process data objects** tab has been highlighted ✓, implementation of the mapping information relating to device-specific information is adopted by the device-specific generators.

The aim is to send as few process data objects as possible via the bus system.

10 Application examples

In this chapter some examples are used to illustrate the cooperation between applications and network in the »Engineer«. The examples focus on the connection between process data objects and ports.

- The examples can be reproduced in offline operation.

10.1 Interconnection of an I/O terminal with a 9400 HighLine

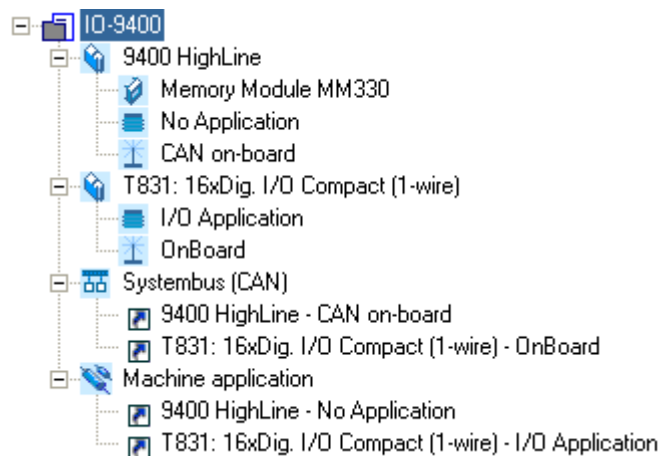
A terminal **16xdig. I/O compact (single-wire conductor)** is interconnected to a **9400 HighLine**.

- In the *FB Editor* of the **9400 HighLine** the inputs and outputs of the I/O module are provided.

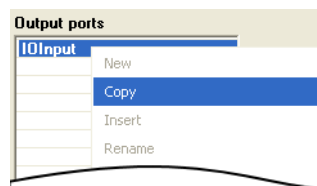


How to interconnect an I/O terminal with the 9400 HighLine:

1. Create the following project tree in the project view:



2. In the *Project tree*, select the project element **T831: 16xdig. I/O compact (single-wire conductor)** and change to the **Ports** tab.
3. Open the context menu (left-hand mouse button) and use it to copy the output port of the terminal:

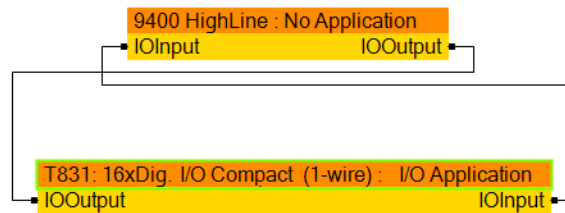


4. Insert the copied output port as the input port into the port editor (**Ports**) tab of the **9400 HighLine**.
5. In the same way, insert the input port of the terminal as the output port into the port editor of the **9400 HighLine**.
6. Select the project element **Machine application** in the project tree and change to the **Connections** tab.

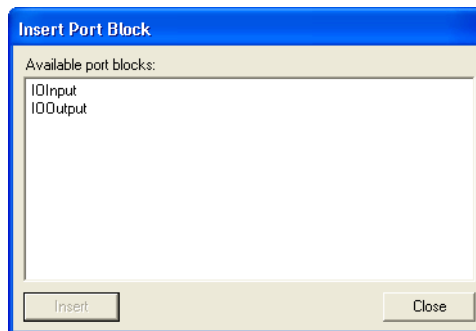
Application examples

Interconnection of an I/O terminal with a 9400 HighLine

- Interconnect the two ports as follows:



- Select the project element **9400 Highline** in the project tree and change to the **FB Editor** tab.
- Click the  icon to insert the two ports into the FB Editor and connect them to other function blocks:



- Mark the uppermost project element in the project tree and execute the menu command **Tools→Build project**.

Result

Two CAN Tx process data objects are created.

10.2 PROFIBUS nodes

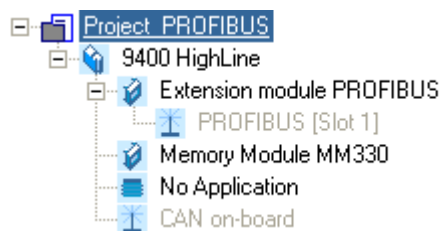
Four data words are to be received from a PLC and processed in the FB Editor.

- Data structure:
 - PW 0: Setpoint
 - PW 2: Status
 - PW 4: Max. value
 - PW 6: Min. value
 - Station address: 3



How to process the received data words in the FB editor:

1. Create the following project tree in the project view:



2. Select the **9400 HighLine** project element in the project tree, change to the **Ports** tab and create a "PROFIBUSPort" input port of the type "Record".
 - Click the **New** button in the Port Definition to create the following element variables.

Name	Type	Length	Index
Desired_Value	WORD	16	/..
Status	WORD	16	/..
Minvalue	WORD	16	/..
Maxvalue	WORD	16	/..

3. Select the following interface and process data object for the port definition.

4. Select the project element **PROFIBUS [Slot 1]** in the project tree and change to the **Settings** tab.
5. Select **Station address 3** from the selection field.
6. Select 9400 HighLine in the project tree and execute the menu command **Tools→Build project**.

Application examples

PROFIBUS nodes

Result

The PROFIBUS data sent for station 3 are copied into the process image and are available as a "PROFIBUSPort" in the FB editor.

Catalogue management in the »Engineer«

General information about catalogues

11 Catalogue management in the »Engineer«

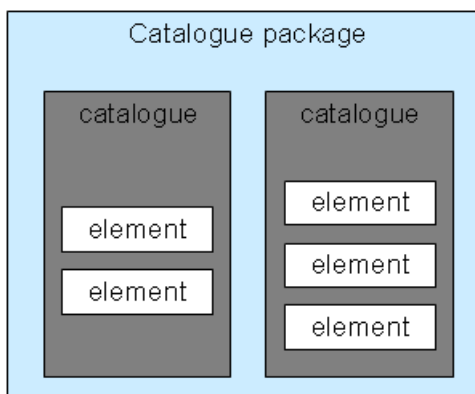
11.1 General information about catalogues

»Engineer« catalogues contain information about all types of elements for setting up »Engineer« projects. The »Engineer« uses different catalogues which provide the types of information listed in the below table.

Catalogue type	Information contained
Device catalogue	Descriptive information for the device types. A device catalogue defines the standard device parameters with their respective permissible value range for every device type (example: <i>9400 HighLine V04</i>). The device catalogue can also be used to store rules for module equipment, data on existing on-board communication interfaces and additional information about the respective device type.
Device module catalogue	Descriptive information for types of device module (example: <i>communication module PROFIBUS 1.00</i>). A device module catalogue defines the module parameters with their permissible value range for active device modules. A device module catalogue can also contain details about communication interfaces and additional functions of the respective device module type.
Application catalogue	Technology applications (example: <i>Speed actuating drive 3.0.3</i>). Technology applications can be integrated into »Engineer« projects and used as a basis for own applications. Depending on the device series the application catalogue is made for, the application catalogue may include prepared programs, function block interconnections or initial values for standard device parameters.
Function block (FB) catalogue	Descriptive information about the function block types used in the FB Editor. The function block catalogues are the basis for insertions into the FB interconnections of the Servo Drives 9400 device series.
Lenze motor catalogue	Descriptive information for the motor types produced by Lenze. The Lenze motor catalogue defines the initial values to be set in the parameters of the different controller types for the operation of the respective motor type.
User motor catalogue	The user motor catalogue contains information similar to that of the Lenze motor catalogue. The contents, however, can be defined individually by the user. Therefore the handling of this catalogues differs in some points from the handling of the other catalogues. For further information, please see the following section: ▶ User motors (□ 293)
Further catalogues	Further catalogues contain information about networks, axes and additional basic elements upon which the above-mentioned catalogues are based and/or which can be used in »Engineer« projects.

11.2 Catalogue packages

A catalogue package combines several catalogues and thus unites them for the distribution, installation and use of catalogues. The catalogue package contains several catalogues which each contain several elements.



[11-1] Schematic structure of a catalogue package

Examples of catalogue packages available in »Engineer« are the *Engineer* and *EngineerFB* catalogue packages.

- The *Engineer* catalogue package comprises:
 - all basic catalogues of the »Engineer«,
 - all device and device module catalogues.
- The *EngineerFB* catalogue package comprises:
 - Catalogs with function blocks (FBs) and technology applications for the Servo Drives 9400 device series.

11.3 Installation of catalogues

»Engineer« catalogues can only be installed by executing an installation program:

Installation	Installable catalogues (The availability of the catalogues depends on the respective installation.)
»Engineer« full version	• Addition of a catalogue package
»Engineer« upgrade/update »Engineer« service pack »Engineer« device data update	• Addition of a catalogue package • Replacement of a catalogue package • Addition of a further catalogue package version • Addition of individual catalogues to an existing catalogue package • Replacement of individual catalogues in an existing catalogue package

If several »Engineer« versions are installed on your computer, each »Engineer« installation provides its own catalogues. To find out which catalogues are provided by the installed »Engineer«, select the menu command **Tools→Catalogues**.

11.4 Use of catalogues in projects

11.4.1 Relationship between project and catalogues

Every project element is based on one or more catalogue elements.

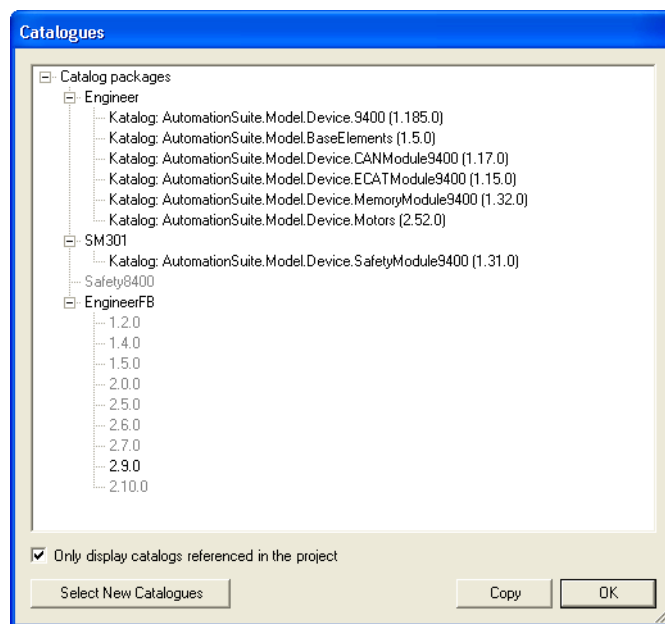
Catalogue management in the »Engineer«

Use of catalogues in projects

Application examples:

1. You want to integrate a controller into a project in the offline mode. The corresponding insertion dialog offers a selection list made up from the installed device catalogues.
2. You select the required device type from the list. When clicking the **Complete** button, a device permanently based on the device type in the catalogue is added to the project tree.
3. You would like to insert a device detected online. For this purpose, the »Engineer« identifies the device by reading out an online type coding and selecting the corresponding device type from the device catalogue. A device is inserted into the project tree which is sustainably based on the device type given in the catalogue. The »Engineer« project will sustainably depend on the catalogues the elements were selected from.

An »Engineer« project always uses just one version of a catalogue package. The menu command **Tools→Catalogues** can be used to display the catalogue packages and catalogues:



[11-2] Catalogues dialog box

The *Catalogues* dialog box displays the catalogue packages in hierarchical order. Like this you can see which catalogues are contained in which catalogue package.



Tip!

If the *Only display catalogues referenced in the project* checkbox is unticked, all installed catalogue packages and catalogues are displayed.

11.4.2 Characteristics of the elements

When a project is opened in an installation environment where the required catalogues are missing, the »Engineer« cannot display the project elements referring to these missing catalogues. Due to this, the corresponding elements cannot be edited.

Display of the elements

The elements are represented as damaged. For the damaged elements, a *Profile* tab is visible displaying the original information and indicating which catalogue is missing.

Catalogue management in the »Engineer«

Use of catalogues in projects

If a project is opened which contains damaged elements, a reference dialog box will pop up: *"The following project elements cannot be opened because the required catalogues have not been installed:..."*

After you have clicked the **Details** button for the corresponding project element, the *Element profile* tab appears. ▶ [Properties tab](#) (📖 236)

Button	Function
Next	Open project: Changes to the project: Damaged elements are removed from the project. Instead, damaged elements are displayed for which only the Properties dialog boxes are visible. References to damaged elements existing in other project elements are also removed. If a damaged element is, for instance, a device, this device now no longer is a node in the network. The application of the node is removed from the machine application.
Cancel	Cancel the opening of the project The saved project is not changed. You can install the missing catalogue subsequently and open the project again without losing information.



Note!

Damaged elements are permanently removed from the project. To avoid unintended information loss, you can save the project subsequently via the menu command **File→Save as**.

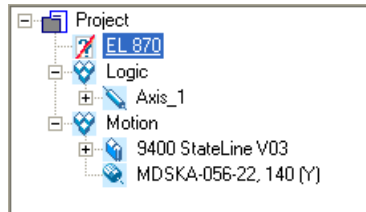
If you install the missing catalogues later, you can then reopen the original project.

- Damaged elements appear with a  symbol and the original designation in the project tree.
- Damaged elements cannot be opened in the project view.

Catalogue management in the »Engineer«

Management of catalogue versions

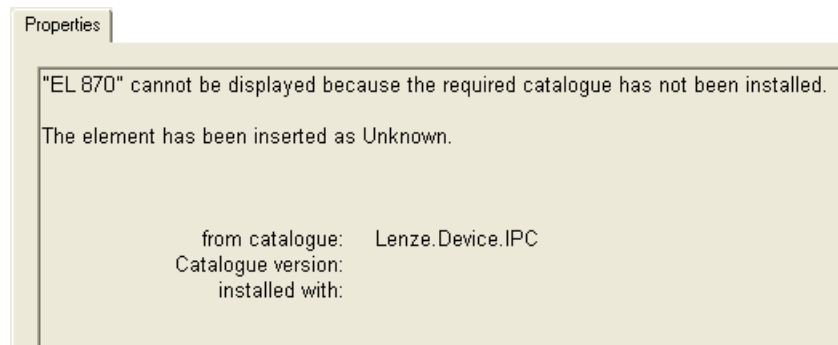
- Damaged elements can be deleted in the same way as regular elements:
 - Select the element, delete it with **<Del>** or execute the **Delete** command via the context menu.



[11-3] Damaged element

Properties tab

The properties of a damaged element are indicated in the *Properties* tab:



[11-4] Information about a damaged element

11.5 Management of catalogue versions

11.5.1 Objects of versioning

The contents of the »Engineer« catalogues are provided by Lenze in a maintained and versioned manner. Versioning takes place on three levels:

1. Each element contained in a catalogue has a version. The version of a catalogue element is displayed in the insertion dialog and - for existing project elements - in the *Properties* tab.
2. Every catalogue provided has a version. A catalogue contains several elements each of which has a certain version. The unchanged version of an element can be contained in several successive catalogue versions. The versions of the existing / used catalogues are displayed in the **Tools→Catalogues** dialog.
3. Every catalogue package has a version. A catalogue package contains several catalogues each of which has a certain version. The unchanged version of a catalogue can be contained in several successive catalogue packages.

11.5.2 Procedure for the provision of new versions

There are two procedures for the provision of new element versions. The difference is that if multiple catalogue versions exist, you must select the catalogue you want to use.

Catalogue management in the »Engineer«

Particularities of the user motor catalogue

Element version	Function
Single-existing catalogues	• In the case of single-existing catalogues, each catalogue version supplied contains all element versions. Thus, the latest catalogue version can be used. • The catalogue version remains downwards compatible to existing projects and devices. • Catalogue packages which contain these type of catalogues are only installed in one version. • This procedure is used for device and device module catalogues.
Multiple-existing catalogues	• In the case of multiple-existing catalogues each catalogue version supplied only contains the latest element versions. In order to ensure compatibility to existing projects, catalogue packages which contain such catalogues, are installed in parallel in several versions. Multiple-existing catalogues are used for application and function block catalogues. Such catalogues affect existing »Engineer« projects if you change them to a new catalogue version. ► Updating projects while opening them: Adapting project file from previous version (📖 39)

11.6 Particularities of the user motor catalogue

The contents of the user motor catalogue can be defined individually. The user motor catalogue can be compared with an empty folder in which self-defined motor types can be saved. These self-defined motor types are suitable for **cross-project** purposes.

When a user motor is integrated in the »Engineer« project, a complete copy of the catalogue element is created. Therefore, the project is not dependent on the user motor catalogue. If the project is passed on to another user, this user can open it without the necessity of passing on the user motor from the user motor catalogue as well.

Versioning

The user motor catalogue is not versioned.

The user motor catalogue is only available once on the computer. If several »Engineer« versions are installed in parallel on the computer, the user motor catalogue can be used by all users.



Note!

In the case of an »Engineer« deinstallation, the user motor catalogue is not deinstalled.

For further information, please see the following section:

► [User motors](#) (📖 293)

12 Error messages

This chapter describes the generators and their error messages that are called during the "Create" process ([Build project](#)). The error messages are visible in the [Create](#) tab and are divided into different categories: *Error, warning, information*.

- ▶ [Application Connection Generator](#) (📖 238)
- ▶ [PortLogic generator](#) (📖 241)
- ▶ [CAN generator](#) (📖 243)
- ▶ [Communication entity generator](#) (📖 249)

12.1 Application Connection Generator

Checking the connection between the port and the process data object

Dynamic creation of a PDO [AC0001]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
A port has not been specified by the user but has been interconnected with another device. An attempt is made to create a dynamic PDO for this port.	Check transfer parameters with the settings in the application. ▶ Process data objects (📖 226)

Dynamic PDO for a port cannot be created [AC0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Communication entity not found A port has not been specified but has been interconnected with another device. An attempt is made to create a dynamic PDO for this port. However, this attempt fails because the device has no or several communication interfaces.	Apply the port to a specific interface in the port editor. ▶ Port editor (ports) (📖 155)

Dynamic ProcessDataObject for port cannot be created [AC0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Communication entity not found A port has not been specified but has been interconnected with another device. An attempt is made to create a dynamic PDO for this port. However, this attempt fails because the device has no or several communication interfaces.	Device is not provided with an interface enabling the dynamic creation of a PDO, or the supply is used up. • Apply port to a fixed PDO (8200 and 9300), or • convert unused, unconnected ports to automatic ports.

Error messages

Application Connection Generator

Assignment of port to ProcessDataObject is missing [AC0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Internal error There is no connection between a port and a PDO.	

Definition of the network by means of port has failed [AC0005]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Internal error For an interconnected port, an attempt is made to find a network by means of which the connection can be established.	

Connection beyond network limits cannot be closed [AC0006]

Response (Lenze setting printed in bold)	
☐ Error ☐ Warning ☒ Information	
Cause	Remedy
An attempt is made to interconnect ports of various devices that are not in a network. For this purpose a gateway function is required, which is not supported at present.	Add the nodes to be interconnected to a network.

Connection cannot be closed [AC0007]

Response (Lenze setting printed in bold)	
☐ Error ☐ Warning ☒ Information	
Cause	Remedy
Node is not connected to the network. An attempt is made to interconnect ports of various devices that are not in a network. A gateway function is necessary for this but is not supported at the moment.	Add the nodes to be interconnected to a network.

Data width of the target port differs from the source port [AC0008]

Response (Lenze setting printed in bold)	
☐ Error ☐ Warning ☒ Information	
Cause	Remedy
Ports of a different data width are tried to be connected.	Adapt the sum of the element variable data widths of the source and target ports in the port editor. Only the unequivocal source port is indicated. The target ports must be taken from the Port editor (application interconnection editor). ▶ Port editor (ports) (155)

Error messages

Application Connection Generator

Storage arrangement of the target port differs from the source port [AC0009]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
Ports with a different storage layout are tried to be connected. Example Source: WORD, DWORD (6 bytes) Target: BYTE, DWORD (6 bytes) Only a differentiation with regard to the data width of the element variable is made, but not with regard to the type itself (sign/no sign or ANY_BIT types).	Check whether the connection of ports is intended. Observe other data types in the application.

Connection cannot be closed [AC0010]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Node is not connected to the network. An attempt is made to interconnect ports of various devices that are not in a network.	Add all nodes to be interconnected to the same network.

Port variable size exceeds PDO data width. [AC0011]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The variable size of the port specified exceeds the permissible data width for a CAN PDO.	Remove element variables from the port to reduce the resulting data width of the port. ▶ Defining element variables for "Record" variable type (166)

No process data object available. [AC0012]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The interface used for connecting the node to the network has an insufficiently high number of PDOs. It cannot accept the port. Either the setting of the PDOs does not allow for automatic PDO configuration or the total number of PDOs is too small.	Depending on the situation: • ... Switch on automatic allocation for PDOs • ... Perform manual PDO mapping • ... Project additional interface

12.2 PortLogic generator

Checking the ports created

Direction of transfer is not supported {0} [PL0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Direction of transfer for the indicated port is invalid.	► Port editor (ports) (155)

Data length exceeds CAN-PDO length of 64 bits [PL0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The data width of the port specified exceeds the permissible data width for a CAN PDO.	Reduce the data width of the element variables of the port to a maximum of 8 bytes. ► Defining element variables for "Record" variable type (166)

Port name not definite [PL0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The ports of an application have to differ with regard to their display names.	Allocate definite port names in the PortEditor. Among other things, port names are used in IEC 61131 programs for enabling the access to ports via IEC 61131 variables. Adding a port (162)

Invalid task context: task {0} on runtime system not available [PL0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
An attempt is made to assign a port to a task that is not available on the device or in the PLC Designer project.	• Open the port editor for the device application specified. • Select the task button down on the right in the application variable field for the port specified. • A list with available tasks is displayed. • Select a task from the selection list • Close the dialog with OK. If no task is defined in the task configuration of a 9400 PLC Designer program, the operating system automatically generates a task with the designation "DefaultTask".

Error messages

PortLogic generator

Invalid task context: port is associated with task {0} [PL0005]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
An attempt is made to assign a port to a task that is not available on the device or in the PLC Designer project. Due to the fact that the FB Editor has been activated/ enabled for the associated application, the ports are automatically assigned to the user task and this warning is output.	

Error messages

CAN generator

12.3 CAN generator

- [Addresses](#) (📖 243)
- [Baud rate and MMT master](#) (📖 244)
- [Synchronisation](#) (📖 245)
- [COB-ID](#) (📖 246)
- [Ports and PDO](#) (📖 248)

12.3.1 Addresses

Invalid value range for addresses (min and max inverted?) [NWCAN0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
In the CAN network, Settings tab, the minimum and maximum addresses of the possible address range have been inverted.	Accordingly alter the range, so that the minimum address is smaller than the maximum address.

Number of nodes for the network exceeded [NWCAN0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
More nodes than permitted in the "Settings" tab of the CAN network are assigned to the CAN network.	• Remove nodes that are not required from the network - or • Increase the maximum permissible number of nodes in the "Network/settings" tab.

Node address for nodes beyond the value range [NWCAN0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
An invalid node address has been entered for the node specified.	Change the node address so that it is within the permissible value range.

Node address for node already exists [NWCAN0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
An already existing node address has been entered for the node specified.	Change the node address so that a number is selected that has not been allocated before.

Error messages

CAN generator

Error during reading the address of nodes [NWCAN0005]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy

12.3.2 Baud rate and MMT master

Error during reading of node addresses [NWCAN0006]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
A baud rate which is not supported has been set for the node defined.	Set a different baud rate in the "Settings" tab of the associated network.

Error during processing baud rate of object {0} [NWCAN0007]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The access to the baud rate parameter has failed.	

No NMT master defined in the network! [NWCAN0008]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
In the indicated network no NMT master which transfers the nodes to the <i>Operational Mode</i> has been defined.	Ignore warning if an external device takes over this function.

More than one NMT master defined in the network! [NWCAN0009]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
In the indicated network, several nodes have been defined as NMT master. They switch the nodes to Operational mode.	Ignore warning if this function is desired.

Error messages

CAN generator

Error during reading of the NMT master settings [NWCAN0010]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The access to the NMT master settings has failed.	

12.3.3 Synchronisation

SYNC master not defined [NWCAN0011]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
In the specified network either process data objects or processes (tasks) are connected to the synchronisation object. However, no synchronisation object generator is defined.	• Change to the Synchronisation tab of the network specified. • Under SYNC source, select the node the synchronisation object is to send cyclically.

SYNC transmission identifier {0} is not supported by node [NWCAN0012]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The indicated SYNC source does not support the indicated COB-ID.	Select a COB-ID under SYNC source in the Synchronisation tab of the network specified which supports all nodes. (E. g: 128).

SYNC transmission cycle time {0} ms is not supported by node [NWCAN0013]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The indicated SYNC source does not support the specified cycle time for sending the synchronisation object.	Select a cycle time under SYNC source in the Synchronisation tab of the network specified which supports all nodes.

SYNC reception identifier {0} is not supported by the nodes [NWCAN0014]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The SYNC receiver specified does not support the defined COB-ID.	Select a COB-ID under SYNC source in the Synchronisation tab of the network specified which supports all nodes. (E. g: 128).

Error messages

CAN generator

Node does not support any SYNC slave functions [NWCAN0015]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Node does not support a sync slave function.	

Node does not support any SYNC master function [NWCAN0016]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Node does not support a <i>SYNC master</i> function.	

Node is SYNC sender and receiver at the same time [NWCAN0017]

Response (Lenze setting printed in bold)	
☐ Error ☐ Warning ☒ Information	
Cause	Remedy
Reserved	

Object cannot be transferred. Node not a SYNC slave [NWCAN0026]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The node specified either operates with synchronised process data objects or processes (tasks). However, the node has not been declared as synchronisation object receiver.	Make the following choice for the node in the Synchronisation tab of the indicated network under SYNC receivers: • Transfer/receive synchronised process data objects • Synchronise processes (tasks)

12.3.4 COB-ID

Stock of CAN IDs exhausted [NWCAN0018]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Too many communication objects are transferred in the indicated network. Available COB-IDs are no longer provided.	• Reduce number of port connections • Extend the COB-ID identifier range in the Settings tab of the network specified. Caution: The default range is designed in a manner that also enables old Lenze devices like 9300 and 8200 to operate with it.

Error messages

CAN generator

Invalid value range for COB-ID (min and max inverted?) [NWCAN0019]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The data for the automatically allocated COB-ID range are incorrect.	• Change to the Settings tab of the network specified. • Set a range in the Automatically allocate identifier group field supporting all devices connected to the network. • Set from < to.

COB-ID beyond the limits. Generate new COB-ID for PDO [NWCAN0020]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
During checking the COB-IDs it was observed that the COB-ID of the process data object specified (associated port) is beyond the COB-ID range defined under the network settings. A new COB-ID is generated for the process data object specified.	Ignore warning. In the case of time-critical processes, however, the COB-IDs allocated in the CAN objects tab of the network should be checked and possibly adjusted.

COB-ID is used more than once [NWCAN0021]

Response (Lenze setting printed in bold)	
☐ Error ☒ Warning ☐ Information	
Cause	Remedy
Generate new COB-ID for PDO During checking the COB-IDs it was observed that the COB-ID of the process data object specified (associated port) has already been allocated. A new COB-ID is generated for the process data object specified.	Ignore warning. In the case of time-critical processes, however, the COB-IDs allocated in the CAN objects tab of the network should be checked and possibly adjusted.

COB-ID {0} outside the value range [NWCAN0028]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
An attempt is made to transfer the COB-ID of the sender to the receiver of project data objects. When this was done, an error occurred. It is possible that the COB-ID is outside the valid value range.	Check value range of the COB-ID.

12.3.5 Ports and PDO

Error in the analysis of the port interconnection [NWCAN0022]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Port-PDO assignment is missing There is no connection between a port and a process data object.	

Data width for port exceeded [NWCAN0023]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Maximum 64 bits possible The data width of the port specified exceeds the permissible data width for a CAN PDO.	Reduce data width of the element variables of the port to a maximum of 8 bytes.

Catalogue of templates for CAN communication object not found [NWCAN0024]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Catalogue not recorded?	

Error during creation of CAN communication object [NWCAN0025]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy

Assignment of port to PDO is missing [NWCAN0027]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
No connection between a port and a process data object.	

Error messages

Communication entity generator

12.4 Communication entity generator

- ▶ [Standard \(9300 servo + 9300 ServoPLC\)](#) (📖 249)
- ▶ [Compact \(8200\)](#) (📖 252)
- ▶ [9400 On board](#) (📖 253)
- ▶ [I/O system IP20 \(modular and compact\)](#) (📖 255)
- ▶ [9400 PROFIBUS module](#) (📖 255)

12.4.1 Standard (9300 servo + 9300 ServoPLC)

Unexpected error [CESTD0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy

Baud rate of {0}k is not supported by the nodes [CESTD0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The baud rate cannot be transferred to the associated code.	

COB-ID {0} is assigned to several nodes [CESTD0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
It is not permissible for a 9300 to assign the same COB-ID several times to fixed process data objects.	Ensure that no ports of a 9300 device are connected to each other in the function block editor. By this, the ports receive the same COB-IDs.

Error during writing on object [CESTD0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Object could not be written.	

Error during writing of parameter value {0} [CESTD0005]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Parameter value could not be written to the code.	

Error messages

Communication entity generator

Transfer mode {0} is not supported [CESTD0006]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The indicated transfer mode is not supported.	

Error during writing of the SYNC master settings [CESTD0007]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The sync master settings could not be transferred to the associated codes.	

Error during writing of the SYNC slave settings [CESTD0008]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The sync slave settings could not be transferred to the associated codes.	

PlugIn could not be found {0}[CEPLC0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
A plug-in (PlugIn_DrivePlcDeveloperStudio) is needed for generation of program code. This plug-in has probably not been registered or there are version conflicts in respect of catalogues and plug-in.	Install PlugIn.

PlugIn method could not be found {0} [CEPLC0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
A plug-in (PlugIn_Drive PLC Developer Studio) is needed for the generation of program code. This plug-in evidently does not have the necessary method. There are clearly version conflicts in respect of catalogues and plug-in.	Install PlugIn.

Error messages

Communication entity generator

PlugIn method not executable {0} [CEPLC0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
A plug-in (PlugIn_Drive PLC Developer Studio) is needed for the generation of program code. The necessary method cannot be executed at the present time.	Close all DDS or PLC Designer processes on the PC.

PlugIn method, error in execution {0} [CEPLC0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
A plug-in (PlugIn_DrivePlcDeveloperStudio) is needed for the generation of program code. An error has occurred during execution of the indicated method.	

Error messages

Communication entity generator

12.4.2 Compact (8200)

Unexpected error [CECOMP0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy

Different transfer modes for CAN1 IN/OUT [CECOMP0002]

Response (Lenze setting printed in bold)		
☒ Error ☐ Warning ☐ Information		
Cause	Remedy	
The transfer modes have been coupled for the CAN1 objects of the controller.	CAN1-IN and CAN1-OUT have to be transferred in a synchronised manner or asynchronously. The following combinations are permissible:	
	CAN1-IN	CAN1-OUT
	Synchronous	Synchronous
	Asynchronous	Time or event

COB-ID {0} has been assigned several times for nodes [CECOMP0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Assigning the same COB-ID several times for fixed process data objects is not allowed for a 9300.	Ensure that no ports of a 9300 device are connected to each other in the function block editor. By this, the ports would receive the same COB-IDs.

Baud rate of {0}k is not supported by node [CECOMP0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The baud rate cannot be transferred to the associated code.	

Error during writing on object [CECOMP0005]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Object could not be written.	

Error messages

Communication entity generator

Error during writing of parameter value {0} [CECOMP0006]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Parameter value could not be written to the code.	

Transfer mode {0} is not supported [CECOMP0007]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The indicated transfer mode is not supported.	

Direction of transfer is not supported [CECOMP0008]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The indicated direction of transfer (input, output) is not supported.	

12.4.3 9400 On board

Node cannot be SYNC source and receiver at the same time [CE94CAN0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Reserved	

Deviating target version - This can bring about problems with regard to the compilation and the download (expected: {0}) [CE94CAN0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The target version stored in the PLC Designer project of the device specified does not comply with the version expected by the generator. This can bring about problems in particular if older PLC Designer projects are imported. This error message only is output in developer mode.	Change to the PLC programming tab and open the PLC Designer project. In PLC Designer, choose and purge the target system and compile the project again. The project must be saved before exiting PLC Designer.

Error messages

Communication entity generator

Error during writing of parameter value {0} [CE94CAN0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Parameter value could not be written to the code.	

Node with SYNC source property must be NMT master [CE94CAN0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
A special feature of the 9400 is that, when it is to send a synchronisation object, it must be the NMT master at the same time.	• Go to the network which is assigned to the device. • Highlight the corresponding node in the Node tab. • The node is enclosed in green. • Select Set NMT master from the context menu of the right mouse button. • The master node has a black triangle in the right corner at the bottom. Nodes (📖 216)

Predefined connection set active [CE94CAN0005]

Response (Lenze setting printed in bold)	
☐ Error ☐ Warning ☒ Information	
Cause	Remedy
Node is not connected to a CAN network. In the Settings tab of the node, the control field Use Predefined Connection Set was selected. During the compilation, the settings for COB-IDs, SYNC, etc. were assigned in accordance with CANopen. This message is information for the user.	

Error messages

Communication entity generator

12.4.4 I/O system IP20 (modular and compact)

Unexpected error [CEPMT0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy

Error during writing of parameter value {0} [CEPMT0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Parameter value could not be written to the code.	

Transfer mode {0} is not supported [CEPMT0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
The indicated transfer mode is not supported.	

12.4.5 9400 PROFIBUS module

EXTENSION_BOARD_SLOT could not be entered in the control configuration [CE94PRF0001]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
For the indicated PROFIBUS module, a control configuration module cannot be entered in the control configuration.	

Error during creation of the EXTENSION_BOARD_SLOT Mappings/Code [CE94PRF0002]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
No mapping code can be generated for the PROFIBUS module between the control configuration module and the port variables.	

Error messages

Communication entity generator

Error during creation of the EXTENSION_BOARD_SLOT Mappings/Task Context [CE94PRF0003]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
For the indicated PROFIBUS module, the mapping code between the control configuration module and the port variables cannot be entered in the task configuration.	

Error during creation of the EXTENSION_BOARD_SLOT Mappings. Task {0} does not exist on runtime system [CE94PRF0004]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Internal error. For the indicated PROFIBUS module, the mapping code between the control configuration module and the port variables cannot be entered in the task configuration because the task indicated for the port does not exist on the runtime system.	

Invalid data width [CE94PRF0005]

Response (Lenze setting printed in bold)	
☒ Error ☐ Warning ☐ Information	
Cause	Remedy
Internal error. The data type of an element variable is not supported for the indicated port.	

13 Menu reference - Overview of the menu commands

In this chapter you'll find a list of all menu commands with references to further information.

Overview

What would you like to do?	Related commands can be found in...
Create/open a project Open a compressed project/archive Import/export data Print	▶ "File" menu (📖 258)
Edit devices/elements in the project tree	▶ "Edit" menu (📖 259)
Inserting devices/elements into the project	▶ "Insert" menu (📖 260)
Change the view of the user interface	▶ "View" menu (📖 260) ▶ Options for the representation/project memory location (📖 29)
Establish an online connection to a device Transfer application/data to a device Configure device settings online	▶ "Online" menu (📖 260) More commands can be found under: Extras → Options (📖 99)
Manage parameter sets of devices Manage function block interconnections	▶ "Application data" menu (📖 262)
Change the language of the user interface Manage »Engineer«-catalogues	▶ "Tools" menu (📖 263) More commands can be found under: Extras → Options for the representation/project memory location (📖 29)
Show online help topics Obtain information about Lenze Contact Lenze • internet access required	▶ "?" menu (📖 263)

Menu reference - Overview of the menu commands

"File" menu

13.1 "File" menu

Icon	Command	Shortcut	Info
Creating/opening project			
	New	<Ctrl>+<N>	► Updating projects while opening them: Adapting project file from previous version (📘 39)
	Open	<Ctrl>+<O>	► Opening the project file (📘 38)
	Save as	-	► Save a project (📘 42)
	Save	<Ctrl>+<S>	
	Close		Close a project that is open at present • If the project still contains unsaved settings, a dialog window appears to save the changes.
Opening/saving a compressed project/archive			
	Open an archive	-	► Open an archive (📘 44)
	Saving an archive	-	► Saving an archive (📘 43)
Importing/exporting data			
The menu command is available if a device is selected in the project tree.			
	Function block interconnection		Import/export function block interconnection (XML file) • This function is available depending on the device. ► Function block editor (FB Editor) (📘 149)
	Monitor window view		Import/export user-specific view of parameters in the <i>Monitor</i> field (EPC file) ► Adapt monitor window: Show parameters graphically (instruments) (📘 25)
	User menu		Import/export user-specific compilation of parameters (EPC file) ► Configuring the user menu (📘 171)
	Device parameters parameter values		Import/export parameter set for the selected device (Lenze GDC file). • Import Lenze »Global Drive Control« (GDC) into the project. ► Export the parameter values of a single device (📘 269)
Export the data of <u>all</u> devices with selected Project root			
	Device parameters	-	Export device data from the project: - Export parameter set of the selected device to a file. ► Export parameter values of the devices (📘 269)
<u>Device-dependent</u> commands are available with selected device:			
	EDS-/DCF file	-	Export the parameters of the selected project element to an EDS/DCF file. • * EDS is a file format of the Servo Drives 9400 device series.
	Error texts	-	Export error texts of the device selected into a text file (*.txt)

Menu reference - Overview of the menu commands

"Edit" menu

Icon	Command	Shortcut	Info
	Device description package	-	Export Lenze package file (*.lpk) for the »EASY Package Manager« (available depending on the device). • Output format: Package file (*.lpk) • The application parameters of a Servo Drive 9400 created in the »Engineer« can thus be displayed in the »EASY Starter«. ▶ Export device description to a Lenze package (LPK file) (📖 268)
	Application package		Export Lenze package file (*.lpk) for the »EASY Package Manager« (available depending on the device). • Output format: Package file (*.lpk) • The application created in the »Engineer« of an Inverter Drive 8400 can thus be reused in the »Engineer«. ▶ Export applications to a Lenze package (LPK file) (📖 267)
	L-force Loader file	-	▶ Export parameters to a »L-force Loader« (LFL) file (📖 269)
Selecting print/information to be printed			
	Page setup	-	Define output format for printing the parameter list.
	Print preview	-	Select contents for printing the parameter list
	Print	<Ctrl>+<P>	Print the parameter list with the following information (can be selected separately): • Project properties • Parameter values of the individual projected devices.
	Close	<Alt>+<F4>	Close the »Engineer«. • If the project is still opened, a dialog window appears to save the changes. • This serves to save unsaved changes in the respective device with mains failure protection.

13.2 "Edit" menu

Icon	Command	Shortcut	Info
Editing devices/elements in the project tree			
	Cut	<Ctrl>+<X>	▶ General editing functions in the project view (📖 19)
	Copy	<Ctrl>+<C>	
	Insertion	<Ctrl>+<V>	
	Remove	<Del>	
	Rename	<F2>	

Menu reference - Overview of the menu commands

"Insert" menu

13.3 "Insert" menu

Icon	Command	Shortcut	Info
Inserting devices/elements into the project			
	Insert device detected online	-	Insert a device detected online into the project. ▶ Creating a new project (starting the search for devices connected) (📘 34)
	Insert from referential project	-	Insert axis or component from an existing project.
	System module	-	▶ Inserting system modules (📘 47)
	Axis	-	▶ Inserting an axis (📘 48)
	Component	-	▶ Inserting components (📘 51)
	Gearboxes	-	▶ Inserting a gearbox (📘 67)
	Device module	-	▶ Inserting device modules (📘 57)
	Application	-	▶ Inserting application (📘 55)
	Network	-	▶ Inserting a network (📘 207)
	Machine application	-	▶ Inserting a machine application with a port interconnection (📘 174)

13.4 "View" menu

Icon	Command	Shortcut	Info
Inserting devices/elements into the project			
	Clear message window	-	▶ Monitor: Monitoring parameters (📘 24)
	Zoom in <i>Workspace</i>	-	Minimise view list to enlarge the <i>Workspace</i>
	Represent values in the hex format	<Ctrl>+<H>	Display code values as hexadecimal values

13.5 "Online" menu

Icon	Command	Shortcut	Info
	Set communication path and go online	-	▶ Going online (📘 77)
	Going online	<F4>	

Menu reference - Overview of the menu commands

"Online" menu

Icon	Command	Shortcut	Info
	Going offline	<Shift>+<F4>	► Going offline (109) - If changes are not saved yet, a dialog window appears to save the changes. - This serves to save unsaved changes in the respective device with mains failure protection.
	Optical tracking (only available if the respective device supports this function!)		Device search function for the specific identification by triggering the device LEDs. ► Optical tracking - device identification within the machine (107)
	Manual control	<F12>	Manual control (available depending on the device) Can only be activated if one device is selected and the device supports this function. ► Manual control of the motor direction of rotation: Rotating the axes manually (109)
Managing password protection (available depending on the device)			
	Set/check/delete password		Define settings for protecting the device parameters by means of a password. - From Engineer V2.14 onwards, a password can be set online in the 8400 device. - Some 8400 device types support the assignment of a password to protect the access to device parameters. If the password is active, various functions and interface elements are hidden or deactivated. - The status of the password protection is visible in the status line of the <i>Workspace</i>.
Managing controller functions (available if the device is selected)			
	Enable controller (observe controller inhibit via terminal)	<F8>	► Enable controller (100) (Observe controller inhibit via terminal!)
	 ► Safety instructions (12)		
	Inhibit controller	<F9>	► Inhibit controller (101)
	Start application	-	► Start application (101)
	 ► Safety instructions (12)		
	Stop application	-	► Stop application (101)
	Download program	-	► Download program to device (103)
	Download parameter set	<F5>	► Download parameter set to device (105)
	Upload parameter set	<F7>	► Upload parameter set (106)
	Store parameter set	-	► Save parameter set (107)
	System bus configurator	-	Start system bus configurator ► System bus configurator (96)

Menu reference - Overview of the menu commands

"Application data" menu

Icon	Command	Shortcut	Info
	IP address configurator: • PROFINET • EtherNet/IP		Display/change IP settings: PROFINET nodes at the local Ethernet segment ▶ PROFINET address configurator (📖 97) Ethernet nodes ▶ EtherNet / IP addresses configurator (📖 97)
	Status of the diagnostic adapters		Display operating status of the diagnostic adapters that are connected via the USB interface. ▶ Diagnostic adapter

13.6 "Application data" menu

Icon	Command	Shortcut	Info
Manage parameter sets			
	Comparing parameter sets	-	▶ Comparing parameter sets (📖 139)
	Copying parameter sets	-	▶ Copying parameter sets (📖 143)
Managing function block interconnections ▶ Function block editor (FB Editor) (📖 149)			
	Function block interconnection ... • ... compare • ... copy • ... insert	-	Detailed information on the FB Editor for the Inverter Drives 8400 and Servo Drives 9400 series can be found in the documentation of the function library for the corresponding device series.
	Export/import function block interconnection	-	Import/export function block interconnection (XML file) • This function is available depending on the device.
	Compare ENP parameters • This function is only available when a controller of the Servo Drives 9400 series has been inserted into the project.	-	Export the parameters of the selected project element to an EDS / DCF file. EDS is a file format of the Servo Drives 9400 device series.

Menu reference - Overview of the menu commands

"Tools" menu

13.7 "Tools" menu

Icon	Command	Shortcut	Info
	Options	-	Optional settings: • <i>Online</i> • <i>Connections</i> • <i>Environment</i> ► Options for the representation/project memory location (📖 29) ► Options (📖 99)
	Languages	-	Select the <i>User interface language</i> of the dialog boxes. Note: Changing the language only has an effect on the texts of the dialog boxes. Texts that can be manually edited by the user remain in the respective language when a project is opened.
	Catalogues	-	Displays the catalogue packages available and the catalogues included therein. • <i>Only display the catalogues used in the project:</i> Only the catalogues used in the respective project will be listed when the control field is activated.
	User motor catalogue	-	User motors • Delete • Export • Import ► User motors (📖 293)
	Build project	<F11>	Starts the generation of data in the format that can be transferred to the devices. ► Build project (📖 76)

13.8 "?" menu

Icon	Command	Shortcut	Info
	Help	<F1>	Display online help
	Support in the web (AKB)	-	Reference to the Lenze Application Knowledge Base (AKB) • internet access required
	Search in the AKB	-	Search for specific topics in the Lenze Application Knowledge Base (AKB) • internet access required
	Subscribe to newsletter	-	Register for the newsletter to obtain Lenze information • internet access required
	Software download	-	Download of Lenze software in the Lenze Application Knowledge Base (AKB) • internet access required
	Lenze in the web	-	Reference to the Lenze internet presence • internet access required

Menu reference - Overview of the menu commands

"?" menu

Icon	Command	Shortcut	Info
	Generate Engineer service report	-	Call diagnostic program which generates a report file. The file can then be sent as an attachment via e-mail.
	Send feedback and requests to Lenze		Call online survey on the Engineer. • internet access required
	Info	-	Show information on the »Engineer« • Mail: Use this button to create an e-mail and send it to the Lenze service address. • System configuration: Use this button to display details on the system configuration.

Menu reference - Overview of the menu commands

"Project tree/project element" context menu

13.9 "Project tree/project element" context menu

The commands described in this section are available depending on the project and device status.

Icon	Command	Shortcut	Info
	Library management	-	Open library management: • Show the libraries used by a device and their versioning • Update libraries that are out-of-date (if available)
	Replace component	-	► Replace component (📖 71)
	Insert electrical shaft	-	► Establishing an interconnection via an electrical shaft (📖 186)
	Create user motor	-	► Creating user motors from controller settings (📖 293)

14 Appendix

14.1 Export data

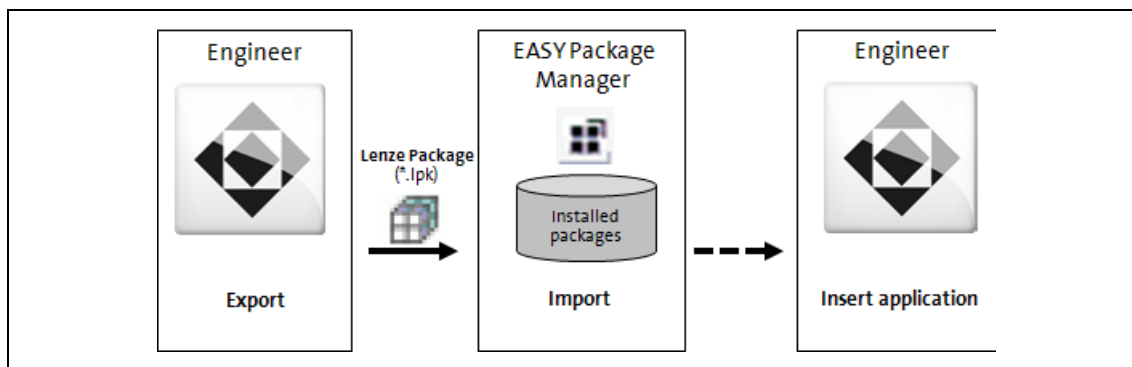
Depending on the device, various data can be exported. If the selected device supports the corresponding export function, the suitable command can be executed via right-click.

Applications and the parameters of a device can be exported in the following file formats:

- ▶ [Export applications to a Lenze package \(LPK file\)](#) (📖 267)
- ▶ [Export device description to a Lenze package \(LPK file\)](#) (📖 268)
- ▶ [Export parameters to a »L-force Loader« \(LFL\) file](#) (📖 269)
- ▶ [Export parameter values of the devices](#) (📖 269)

14.1.1 Export applications to a Lenze package (LPK file)

This function serves to export the application of an Inverter Drive 8400 to a Lenze package file.



[14-1] Export/import application data packet (Inverter Drives 8400)

- After the package file has been imported to the »EASY Package Manager«, the application can be selected in the »Engineer« in the **Insert application** dialog box.
- An application exported as LPK file can be made available to another user so that he can use the application.



How to export an application for Inverter Drives 8400:

1. Highlight the desired controller in the project tree.
2. Execute the **Export→Application package** command via right-click (available depending on the device).
 - Activate the "Install in the Package Manager" option to automatically install the exported package in the »EASY Package Manager« on your computer.
 - If the "Install in the Package Manager" option is deactivated, import the desired package afterwards manually in the »EASY Package Manager«.
3. Select file name/memory location, **save** file.

Reuse application data packet in the »Engineer«

The exported LPK file can then be imported into the »EASY Package Manager« (button: **Import package**), in order to use the application contained in the »Engineer«.



Tip!

- The »EASY Package Manager« can be found in the Windows info area (next to the task bar) and under:

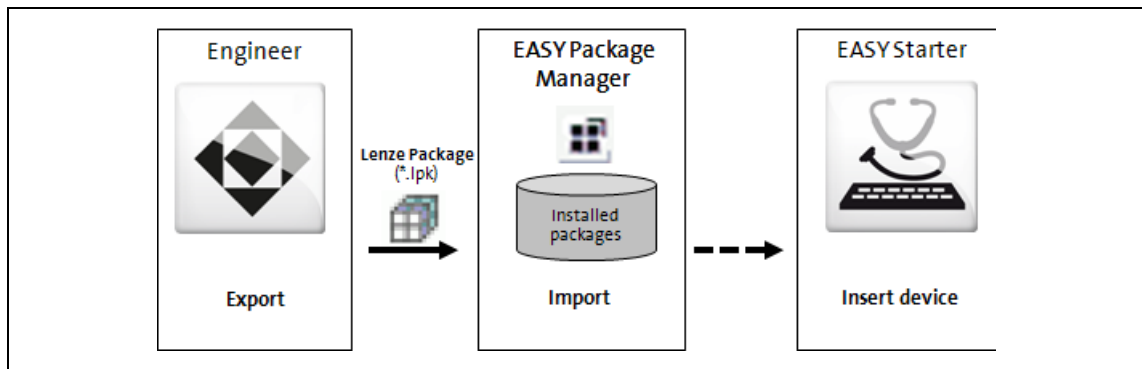


→Programs→Lenze

14.1.2 Export device description to a Lenze package (LPK file)

This function serves to export the device description of a Servo Drive 9400 to a Lenze package file.

- After the package file has been imported to the »EASY Package Manager«, the device description can be used, for instance, in the »EASY Starter«.
- A device description exported as LPK file can be made available to another user so that he can use the device description.



[14-2] Export/import device description data package (9400 Servo Drives)



How to export a device description from the »Engineer«:

1. If required: [Build project](#)
2. Option: [Download parameter set to device](#)
3. Select the desired Servo Drive 9400 in the project tree.
4. Execute the **Export→Device description package** command (available depending on the device).
 - Activate the "Install in the Package Manager" option to automatically install the package in the »EASY Package Manager« on your computer.
 - If the "Install in the Package Manager" option is deactivated, import the desired package afterwards manually in the »EASY Package Manager«.
5. Select file name/memory location, **save** file.

Reuse the device description in the »EASY Starter«

The exported LPK file can then be imported into the »EASY Package Manager« (button: **Import package**), in order to use the application parameters contained in the »EASY Starter«.



Tip!

- The  »EASY Package Manager« can be found in the Windows info area (next to the task bar) and under:

 → Programs → Lenze

14.1.3 Export parameters to a »L-force Loader« (LFL) file

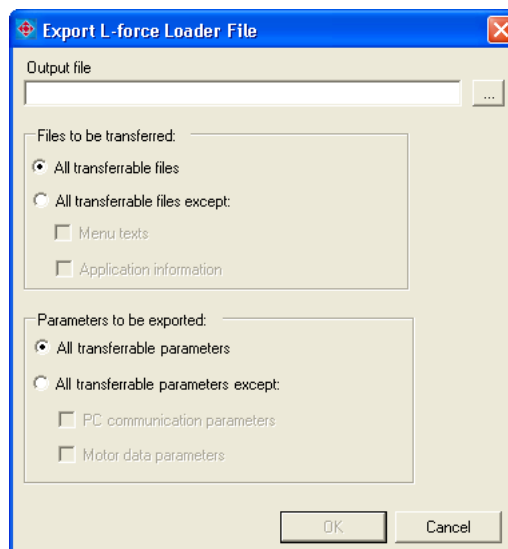
The »Engineer« makes it possible to export the parameters of a controller to a file for use in the »L-force Loader«.

- The export function is available for controllers of the Servo Drives 9400 and the Inverter Drives 8400 device series.



How to export parameters to an »L-force Loader« file:

1. Select the required controller in the *Project view*.
2. Execute the *Export L-force Loader file* command in the *Context menu* of the controller.
 - The »Engineer« checks whether the project is up to date. If not, a note appears. Here you can cancel the export and update the project before you recall the export function.
▶ [Build project](#) (📘 76)
3. Specify the following options in the *Export L-force Loader file* dialog box:
 - Output file and memory location
 - Files to be transferred
 - Parameters to be exported



The parameters exported include the same data as in the transfer of a parameter set and an application download.

▶ [Download parameter set to device](#) (📘 105)

▶ [Download program to device](#) (📘 103)

The »L-force Loader« export writes all application data to an *.lfl file. This file includes all data of an application transfer the »Engineer« will write to the respective device.

14.1.4 Export parameter values of the devices

The parameters can be exported in the following file formats:

- »Global Drive Control«: *.gdc
- "Comma-Separated Values": *.csv
- Text/Unicode (UTF-8): *.txt



Note!

In order to be able to export the parameters of a device, the device has to be "offline".



Tip!

The parameters of a single device can be directly exported to the desired device via right-click, command: **Export→Parameter values**

It is possible to copy a device parameter via right-click in the CSV format to the clipboard. This option is also available if there is an online connection to the device, command: **Copy parameter in the CSV format**

14.1.4.1 Export all device parameters /Export individual parameters across devices

This command serves to export device parameters to a file for a single or several devices at the same time. **Result:** A file with multi-device parameters or all parameters from all inserted devices.

For this purpose, select the desired parameters of the single devices or all parameters from all devices in the following dialog box.



How to export the single parameters of several devices/all parameters of the devices of a project:

1. Select project root
2. Call the **Export→Device parameters** command via right-click. Alternative call:
File→Export→Device parameters
 - Select single parameter: Mark the desired parameter/use the arrow keys to transfer them to the selection.
 - Activate the **All parameters** control field to export the parameters from all devices entered in the project tree to a file.
3. Select memory location/file format
4. Click **OK** to save the file.

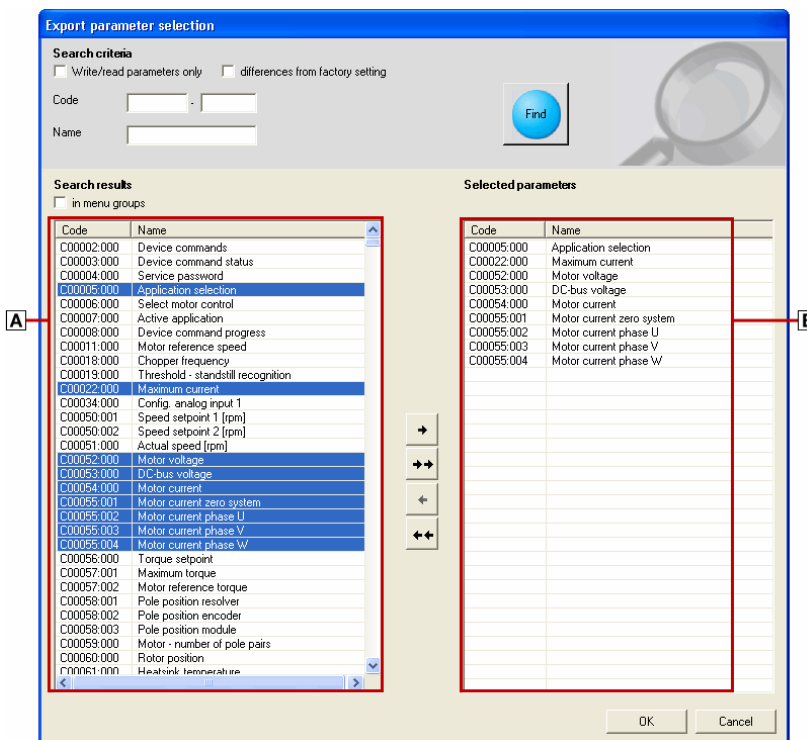
14.1.4.2 Export the parameter values of a single device

This command serves to export single or all parameters for a certain device to a file. **Result:** A file containing previously selected parameters of one device.



How to export the parameters:

1. Mark the desired device in the project tree
2. Execute the **Export→Parameter values** command via right-click. Alternative call: Menu command **File→Export→Export parameters**
 - Select the desired parameters in field **A**:



3. Go to **B** area and select the parameters to be exported by clicking the arrow key  /undo the selection by arrow key .

- Select/Undo all visible parameters using the double arrow keys  / .
- Multi-selection of parameters shown one above the other:
Hold down the **<SHIFT>** key and highlight the parameters.
- Multi-selection of individual parameters:
Hold down the **<CTRL>** key and highlight the desired parameters individually.

As an alternative, press the  button to open a GDC file which includes the required parameter selection.

- Field **B** displays the parameters selected for export.

4. Click **OK**.
 - Select memory location/file format
 - Save file

14.2 Managing cam data with the »Cam Manager«

In an interconnection via the electrical shaft, a large number of CAM data is necessary. These data are easy to manage with the »CAM Manager«.

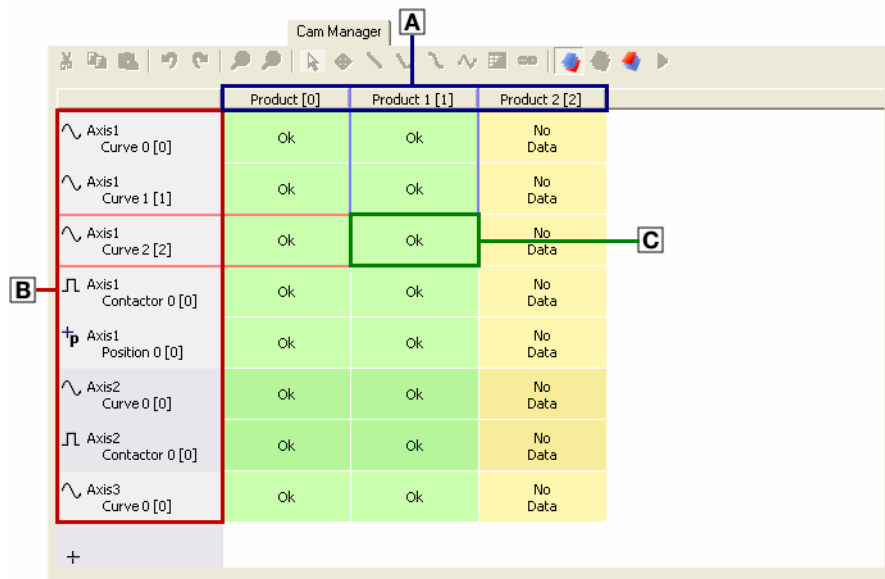


Tip!

You can find detailed information on the electrical shaft in the chapter

► [Creating an interconnection via the electrical shaft](#) (182)

If you go to the *Project view* and select an electrical shaft , the *Workspace* provides the **Cam Manager** tab where all available cam data (profile data, cam data, and position data) are shown in the form of a product/track matrix for purposes of clarity:



	Product [0]	Product 1 [1]	Product 2 [2]
Axis1 Curve 0 [0]	Ok	Ok	No Data
Axis1 Curve 1 [1]	Ok	Ok	No Data
Axis1 Curve 2 [2]	Ok	Ok	No Data
Axis1 Contactor 0 [0]	Ok	Ok	No Data
Axis1 Position 0 [0]	Ok	Ok	No Data
Axis2 Curve 0 [0]	Ok	Ok	No Data
Axis2 Contactor 0 [0]	Ok	Ok	No Data
Axis3 Curve 0 [0]	Ok	Ok	No Data

A Products **B** Tracks **C** Data (profile data, cam data, or position data)

- Each column represents a different product to be manufactured.
- The lines of the matrix can be assigned with optional tracks:
 - Curve tracks for motion profiles or characteristics
 - Cam tracks for cams
 - Position tracks for position markers
- Each track has been assigned to a particular axis in the interconnection.
- The cam data displayed can be edited in a product-oriented/track-oriented manner, or individually using the »Cam Editor«:

Processing of cam data	Required action
Product-oriented	Simple click on the corresponding product (A).
Track-oriented	Double-click on the corresponding track (B).
Individual data field	Double-click on the corresponding data field (C).

Appendix

Managing cam data with the »Cam Manager«



Tip!

Before the cam data are created, consideration of the following factors and aspects has proven to be useful:

Motion profiles:

- Number of interpolation points for each motion profile
- Cycle for each motion profile ([in preparation](#))

Cams:

- Type of cam track
- Number of cams per track (maximally 16 cams)
- Parameters of each cam

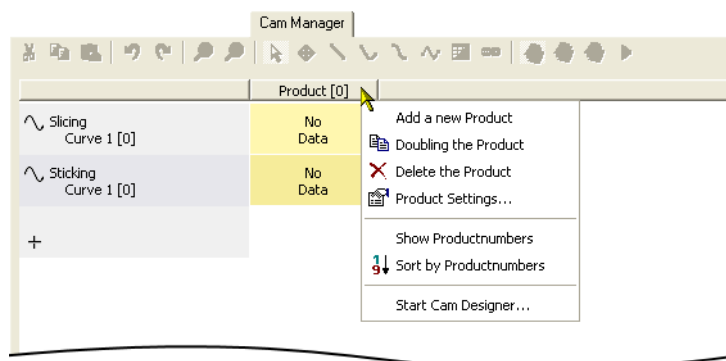
Position markers:

- Number of position tracks
- Number of position markers per track (maximally eight position markers)

14.2.1 Adding/editing/deleting products

After inserting an electrical shaft into the *Project view* there is only one product [0] in the »Cam Manager« initially.

If you right-click on a product in the »Cam Manager«, a *Context menu* appears, by means of which you can add further products, among other things, and delete existing products or edit their properties:



Tip!

You can use the  button next to the *Product* column to insert further products.

Appendix

Managing cam data with the »Cam Manager«

Altering properties of a product

With the command **Properties of the product**, you can open the *Properties* dialog box, in which the properties of the product can be displayed and edited:

Characteristic	Info
Name	Name of the product
Product number	Definite product number • Is shown in the »Cam Manager« in the squared brackets after the product name. • For a global product changeover, this number is to be transferred to the LS_CamInterface SB in the application via the input <i>CAM_dnProductNumber</i> and this is to be carried out synchronously for all drives in the interconnection.
Cycle	Cycle of the master measuring system • Defines the scaling of the x axis in the <i>Worksheet</i> of the »Cam Editor«. • Default setting: 0° 360°

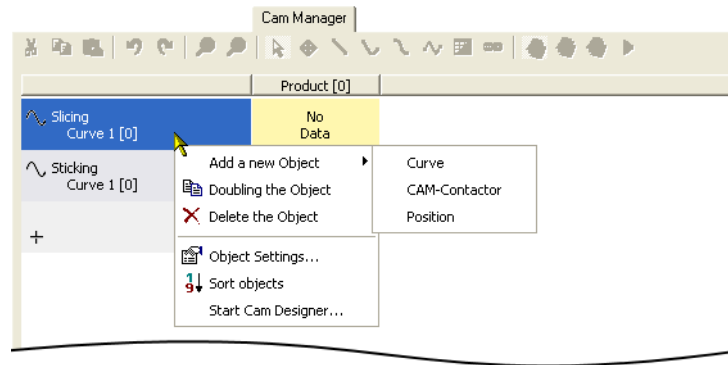
Appendix

Managing cam data with the »Cam Manager«

14.2.2 Adding/editing/deleting tracks

After inserting an electrical shaft in the *Project view*, the »Cam Manager« contains a curve track with the track number [0] for each axis in the interconnection.

If you right-click on a track in the »Cam Manager«, a *Context menu* opens by means of which you can add further curve tracks, cam tracks and position tracks, etc., and delete existing tracks or edit their properties:



Tip!

By clicking the  button under the Tracks column, you can insert further curves, cams and positions.

Changing properties of a track

The  **Object settings ...** command (in the context menu of the object in question) opens the *Properties* dialog box which serves to display and also edit the properties of the track:

Characteristic	Info
Axis	Selection of the axis in the interconnection for the track
Name	Name of the track
Number	Definite track number - Is shown in the »Cam Manager« in the squared brackets after the track name. - This number is to be transferred to the corresponding cam FB (L_CamProfiler, L_CamContactor or L_CamPosMarker) in the application via the input <i>dnTrackNumber</i> so that the FB uses the corresponding cam data.
Default measuring system X	Specification of the measuring system for the x axis in the <i>Worksheet</i> of the »Cam Editor«
Default measuring system Y	Specification of the measuring system for the y axis in the <i>Worksheet</i> of the »Cam Editor« Does not exist in the case of one cam track.



Tip!

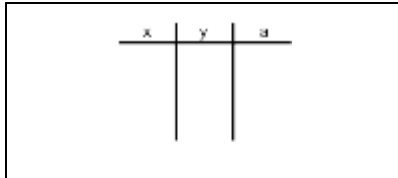
Several tracks for an axis can be used if:

- several motion profiles, cams or position markers are to be processed at the same time in the application.
- a change of the cam data is individually required at a cam FB (triggered by the product changeover).

14.2.3 Import data

You can import already existing grid-point data into a data field in the »Cam Manager«, such data having been created with a CAD system or other software, for example.

To do this, the data to be imported must exist in the form of an ASCII file with grid-point tables in accordance with VDI guideline VDI 2143 "Motion rules for cam mechanisms":



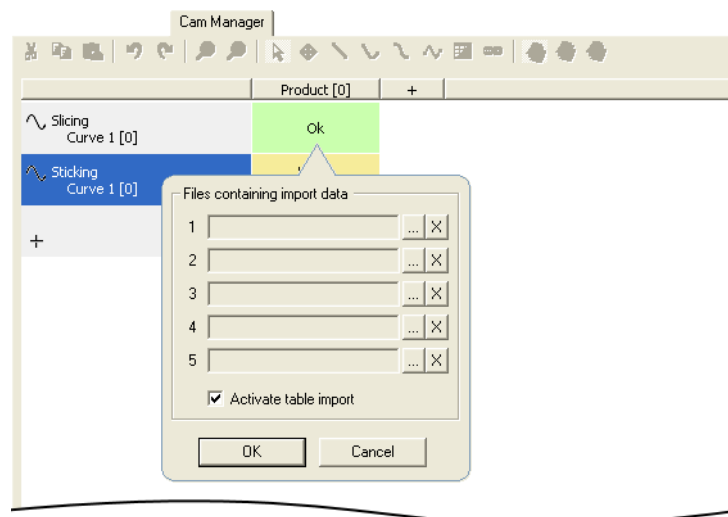
x = x position of the interpolation point
y = y position of the interpolation point
a = acceleration (optional)

If the acceleration information is missing, the acceleration track is formed from the derivations of the motion profile.



How to import existing data into a data field:

1. In the *Context menu* (right click) belonging to the data field, select the command **Import interpolation point table...** in order to open the dialog box entitled *Files with import data*.
2. In the dialog box entitled *Files with import data*, select the option **Activate table import**.
 - Once this option has been selected, you can click the respective buttons ... on the right to select up to five files with import data:



- If more than one profile is chosen, these profiles are appended to each other. The sequence depends on the numbering of the imports.
3. Click the **OK** button in order to close the dialog box and accept the settings.



Tip!

You can import a file that was created with the Lenze »Global Drive Control« (GDC).

- Select the **Import of a GDC file** from the context menu of the desired object.
- The select a file path and the import curve.

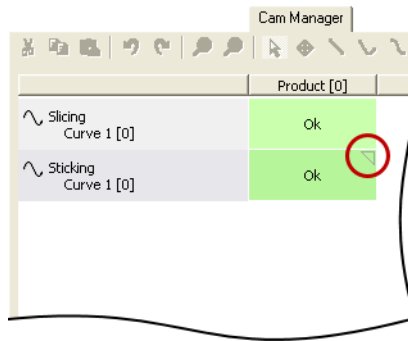
After the import

If the data were imported correctly, the data field displays the status "Ok".

Appendix

Managing cam data with the »Cam Manager«

- A small triangle shows that the data field contains import data:



Tip!

By double-clicking the data field, you can cause the imported curve to be shown in the »Cam Editor« where you can edit it (for example, expanding, compressing, or applying an offset).

- Without processing by the »Cam Editor«, »Engineer« transfers the imported grid-point table to the drive controller without carrying out changes.

14.2.4 DSD export

The interpolation point data can be exported from a data field in the »Cam Manager« for further use in the Lenze »Drive Solution Designer« (DSD).



How to export data for further use in the DSD:

1. In the *context menu* (right mouse button) of the data field, select the **DSD export** command.
2. Select the desired values and output formats.
3. Click the **Optimise** button to export the data for further use in the DSD.

After a successful export, the following information is visible:

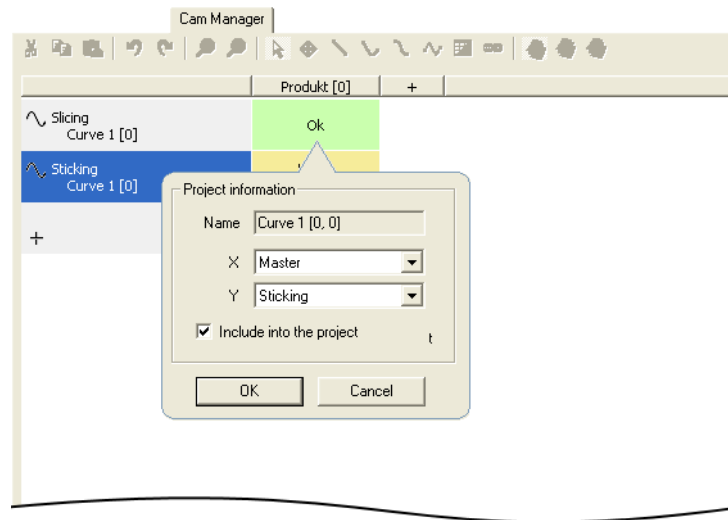
- File path and name of the exported file.
- The error rate in [%] and the number of points in the curve.

14.2.5 Displaying project information



How to display information on a project:

1. In the *Context menu* (right click) belonging to the data field, select the command **Properties...** in order to open the dialog box entitled *Project information* :



- In this dialog box you can assign measuring systems to the curve, the cams or the position markers.
- If the option *Include in project editing* is deactivated, this matrix element cannot be edited. Therefore there is no check for correctness. The curves, cams or position markers are not transferred to the drive during download.



It makes sense to deactivate the option *Include in project editing* if you want to transfer the data to the drive even though the curve still has to be optimised.

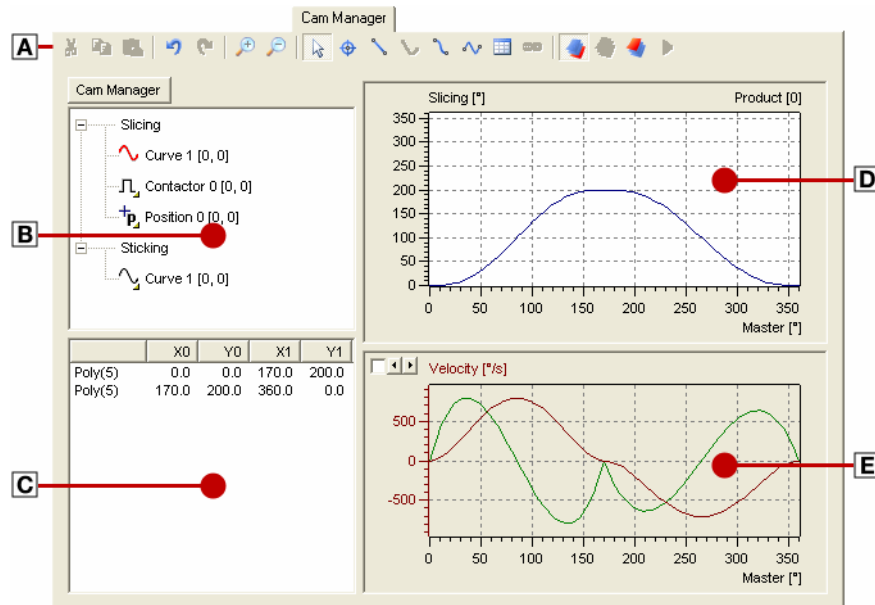
14.3 Creating cam data with the »Cam Editor«

With the »Cam Editor« you can create curves (motion profiles or characteristics) with the help of graphic objects (point, line, polynomial) as well as cams and position markers for drive controllers with cam functionality.

- The »Cam Editor« is a standard component of the »Engineer« HighLevel and provides basic curve functions.
- The optionally available »Cam Designer 3« provides additional functions for more extensive applications:
 - Additional possible curve object types that can be inserted in the curve sheet.
 - Curve components (sub-curves) can be edited.
 - The function "Trigger automatic connection of segments" has been activated.
 - The technology wizard for cross cutter solutions has been activated.
- The upgrade from the »Cam Editor« to »Cam Designer 3« and thus the activation of the full functional range will be carried out along with the installation of a licence key via a separate setup which can be purchased from Lenze.

14.3.1 User interface

A change from the »Cam Manager« to the »Cam Editor« results in the latter being displayed in the **Cam Manager** tab:



- A. Using the icons in the »Cam Editor« *Toolbar* is the simplest way to execute some of the most frequently used menu commands of the »Cam Editor«, omitting the need to click the *Menu bar* first.
- B. In the *Project tree*, the existing tracks are shown.
 - The *Project tree* is necessary in addition to the known »Engineer« *Project view* because not all drives of an electrical shaft have to have a cam function.
- C. The *Object list* is a list of all objects in active mode.
 - Each line in the list contains the object type and the coordinates of the object.
 - The lines are sorted according to the X values (master). This is a standard setting. A different sorting sequence can be achieved by clicking the fields in the header.
- D. The *Worksheet* is the drawing area for entering and editing graphic objects for the track selected in the *Project tree*.
- E. Under the *Worksheet*, the *Time derivations* of the objects (speed, acceleration and jerk) are shown.

Appendix

Creating cam data with the »Cam Editor«

Short overview of the toolbar

- The icons available in the toolbar depend on the mode selected and the program context which you are currently in.
- Click an icon to execute the corresponding function:

Icon	Menu command	Function
	-	Change back to the »Cam Manager«.
	Edit→Cut	Cut out marked object (to the clipboard).
	Edit→Copy	Copy highlighted object (into clipboard).
	Edit→Insert	Insert object copied or cut.
	Edit→Undo	Reset last workstep.
	Edit→Redo	Redo workstep that has been reset.
	View→Zoom in view	Enlarge view of the worksheet.
	View→General view	Reset view of the worksheet to standard size.
	Draw→Selection	Highlight drawing objects.
	Draw→Point	Draw a point. • Function is only available with »Cam Designer 3« licence upgrade.
	Draw→Line	Draw a line.
	Draw→Polynomial(2)	Draw second order polynomial. • Function is only available with »Cam Designer 3« licence upgrade.
	Draw→Polynomial(5)	Draw fifth order polynomial.
	Draw→Point table (polygon)	Import points from a text file (*.txt).
	Draw→Typify connection	Specify a specific connection type for individual, automatically generated curve segments. • Function is only available with »Cam Designer 3« licence upgrade.
	View→Object input mode	Change to the object input mode for entering graphical motion objects.
	View→Curve mode	Change to the curve mode. • Function is only available with »Cam Designer 3« licence upgrade. • In this mode the individual graphical objects from the input mode are automatically connected to a closed cam.

Appendix

Creating cam data with the »Cam Editor«

Icon	Menu command	Function
	View→Interpolation mode	Change to the interpolation mode. - Starting from an ideal, complete cam that was calculated in connection mode, table interpolation is carried out. The table contains the interpolation points of a linear interpolation. Note: The button is only active in the <i>Expert mode</i> of the »Cam Editor«! - If the <i>Expert mode</i> has been deactivated, all the necessary steps automatically take place when the buttons Curve mode and/or Interpolation mode are clicked.
	Edit→Start calculation...	Calculate cam in the connection or interpolation mode and arrange interpolation points optimally. Note: The button is only active in the <i>Expert mode</i> of the »Cam Editor«! - If the <i>Expert mode</i> has been deactivated, all the necessary steps automatically take place when the buttons Curve mode and/or Interpolation mode are clicked.

14.3.2 Creating curves



Note!

When creating curves or characteristics in the »Cam Designer«, the following technological restriction is to be observed:

- If linear sections are created in a curve and these sections encompass more than half the maximum value range (i.e. more than 200 %), they must be represented with at least three interpolation points.
- In practice, this means that, in the case of linear sections that exceed the zero line, an interpolation point must be at the zero crossing or in the middle of the segment. In cases of doubt, the linear progression should be entered manually with two sections.

For position curves in the Modulo measuring system, this restriction is not relevant because, in this case, the permissible value range is adhered to automatically.

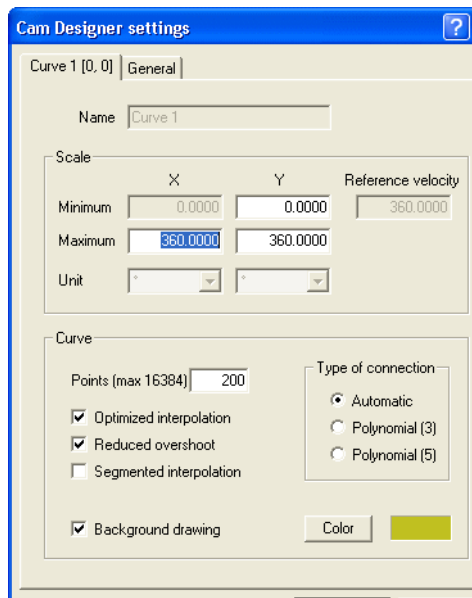
14.3.2.1 Step 1: Basic settings

You can adapt the basic settings for the curve to be created (the motion profile or the characteristic). This is done in the dialog box entitled *Cam Designer settings*.



How to proceed:

1. Right-click the desired  curve in the *Project tree*.
2. Execute the **Edit** →  **Object Settings ...** command to open the *Cam Designer Settings* dialog box.



Appendix

Creating cam data with the »Cam Editor«

For each curve available in the *Project tree* of the »Cam Editor« the dialog box contains an individual tab within which the settings for the corresponding curve can be adapted.

Characteristic	Info
Name	Name of the curve • Specifications by the »Cam Manager«.
Scaling	
Minimum / maximum Unit	Value range of the X and Y axes and their units in the <i>Worksheet</i> .
Curve	
Number of points	Number of interpolation points for table interpolation
Optimised interpolation	If this option is selected, an optimum distribution of points is calculated with the help of a neuronal network (artificial intelligence). This means that sections that are only slightly curved (e.g. lines) are represented only by a few interpolation points. In sharply curved sections, in contrast, many interpolation points are located. As a result, the curve is of a higher quality. • Option only activated with »Cam Designer 3« licence upgrade.
Reduced overshoot	If this option is selected, the curve objects are replaced with straight lines, if necessary. As a result, overshooting can be avoided. • Option only activated with »Cam Designer 3« licence upgrade.
Segmented interpolation	If this option is selected, the area for the interpolation is divided into segments with a definable number of points.
Background layout	If this option is selected, the curve remains visible in the chosen colour when you edit another curve. It is therefore easier for you to keep an eye on dependencies that may exist between the movements.

General settings

Menu command	Dialog box / function
File→Project information	Project properties • Summary: optional information (person in charge, topic ...) • Statistics: filing statistics (date, last amended ...)
File→Cam Designer Settings	Cam Designer Settings Activate desired options by setting checkmarks (☑). • Options • Attraction between points • Graphical output to clipboard

14.3.2.2 Step 2: Entering curves

You describe the motion profile or the characteristic by entering graphic objects in the *Worksheet*.



Note!

The »Cam Editor« needs a closed curve in order to be able to create cam data in the curve mode.

The »Cam Designer« only requires the entry of the basic conditions. The segments can then be joined automatically by the »Cam Designer«.

► [Step 3: Triggering automatic connection of segments](#) (287)



Tip!

When using the »Cam Designer«:

Only define the basic conditions that are absolutely necessary. Limit the length of the stop positions to the minimum possible length.

The more degrees of freedom the »Cam Designer« has during the automatic generation, the smoother the resulting curves will be. If required, also line segments are added to the polynomials.

At the beginning, start with a minimum number of basic conditions. Then trigger automatic connection of the segments in the curve mode. After this, add further basic conditions, if necessary, in the object entry mode.



How to enter graphic objects in the worksheet:

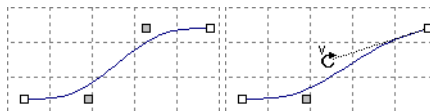
1.  Change to the object input mode.
2. Select graphic object in the *Toolbar* or in the **Draw** menu.
3. Draw selected object in the worksheet.

Drawing a **point**:

- Move the mouse pointer to the desired coordinates.
- Press the left-hand mouse button.

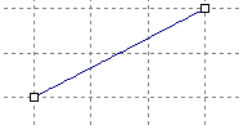
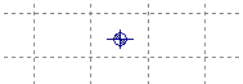
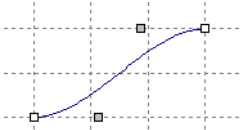
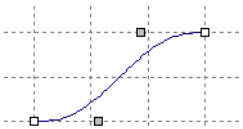
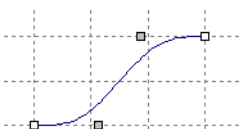
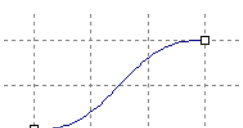
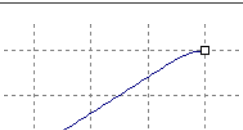
Drawing **other objects** (line, polynomial, etc.):

- Move the mouse pointer to the desired starting point.
- Draw mouse pointer to the desired end point while keeping the left mouse button pressed.
- At the light grey square, you can then alter the speed at a boundary value.



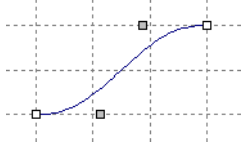
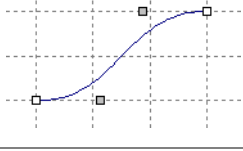
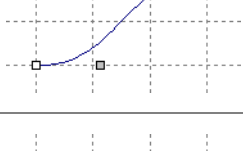
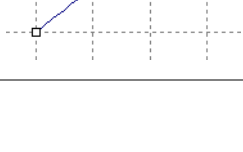
The shape and position of an object can still be altered later by dragging it with the mouse.

Overview of graphical objects

Icon	Object	Example
	Line The base elements stop (S) and speed (V) are defined with a line.	
	Point Function is only available with »Cam Designer 3« licence upgrade. The base elements reversal (R) and motion (M) are defined with a point. • In the default setting, the boundary value speed has been set to "0" for the point. This corresponds to the more frequent case of reversal (R). • In the default setting, the boundary value acceleration is calculated automatically in curve mode. • If necessary, the two boundary values can be adapted to the point in the <i>Properties</i> dialog box.	
-	Polynomial(2) Function is only available with »Cam Designer 3« licence upgrade. Second order polynomial $y = A2 \cdot x^2 + A1 \cdot x + A0$	
-	Polynomial(3) Function is only available with »Cam Designer 3« licence upgrade. Third order polynomial $y = A3 \cdot x^3 + A2 \cdot x^2 + A1 \cdot x + A0$	
	Polynomial(5) Fifth order polynomial $y = A5 \cdot x^5 + A4 \cdot x^4 + A3 \cdot x^3 + A2 \cdot x^2 + A1 \cdot x + A0$	
	Polynomial(7) Function is only available with »Cam Designer 3« licence upgrade. Seventh order polynomial $y = A7 \cdot x^7 + A6 \cdot x^6 + A5 \cdot x^5 + A4 \cdot x^4 + A3 \cdot x^3 + A2 \cdot x^2 + A1 \cdot x + A0$	
-	Sloped sine line (Bestehorn) Especially suitable for S-S (stop-stop) motion. $y = A3 \cdot x - \frac{A2}{2\pi} \cdot \sin(2\pi \cdot A1 \cdot x + A0)$ In the standard case, the coefficients have the following values: $A3 = 1, A2 = 1, A1 = 1, A0 = 0$	
-	Sine-straight line combination Function is only available with »Cam Designer 3« licence upgrade. Suitable for R-R (reversal-reversal) motion. Inflection point & parameter C can be set in the <i>Properties</i> dialog box. • The parameter C determines the ratio of the sine parts to the middle part. • At a value of 1, the middle part is equal to 0. • The standard value is 0.5.	

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Creating cam data with the »Cam Editor«

Icon	Object	Example
-	Modified sine curve Function is only available with »Cam Designer 3« licence upgrade. Suitable for the following movements: • R-V (reversal-speed) (is also called "harmonic combination") • V-V (speed-speed) Turning point & curve type can be set in the <i>Properties</i> dialog box.	
-	Acceleration trapezium Suitable for the following movements: • R-V (reversal-speed) (is also called "harmonic combination") • V-V (speed-speed) Turning point & curve type can be set in the <i>Properties</i> dialog box.	
-	Modified acceleration trapezium Function is only available with »Cam Designer 3« licence upgrade. Suitable for the following movements: • R-S (reversal-stop) • S-S (stop-stop) Turning point & curve type can be set in the <i>Properties</i> dialog box.	
-	Simple sine curve Function is only available with »Cam Designer 3« licence upgrade. Suitable for a circular motion of two orthogonal axes. • Suitable for jerk-free motion but only with restrictions. The angles on the left and right can be set in the <i>Properties</i> dialog box in the range of 90° to +90°.	
	Point table (polygons) Importing a point table in the ASCII format	

14.3.2.3 Step 3: Triggering automatic connection of segments

This function is only available after installing the »Cam Designer 3« licence upgrade.

After entering the technological basic conditions by means of graphical objects the segments available can be connected automatically by the »Cam Designer«.

- The »Cam Designer« calculates the connections automatically (when a changeover to curve mode is made). Manual starting of the connection calculation is only possible if the *Expert mode* has been activated.



How to have the connections calculated:

-  Change to the curve mode.
 - The objects from the entry mode are still visible (colour: "orange") but cannot be edited.
-  Start calculation of the connections.
 - The calculation of the connections starts automatically when the **Curve mode** button is clicked.

The connections are generated in such a way that impact-free and jerk-free motion is enabled in accordance with the laws of physics. In addition, a check is made to see whether a transition from one movement to another is possible without inflection points. This is possible precisely when only

positive or only negative acceleration values are acceptable. If necessary, the polynomials are replaced with lines.

For the base elements reversal (R) and motion (M), the acceleration values are also pre-assigned in such a way that the resulting jerk is kept to a minimum.

Under the *Worksheet*, the speed, acceleration and jerk variations of the resulting motion profile are displayed.



Tip!

You can change back to the object input mode  anytime to add further basic conditions. Afterwards you simply change back to the curve mode and have the connections recalculated.

14.3.2.4 Step 4: Adapting acceleration for points

With regard to the calculation of the connections in the curve mode, the values for the acceleration are set automatically for all point objects for which the **Self-adjusting acceleration** option in the *Properties* dialog box has been selected (default setting).

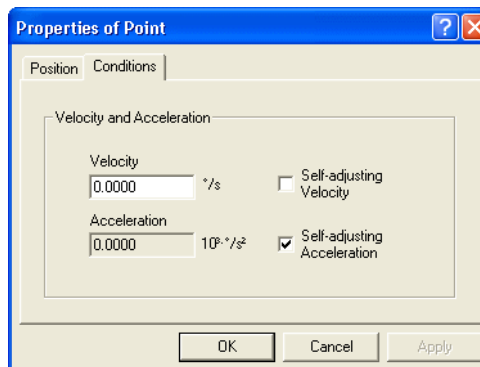
The acceleration for these point objects is set to a value that connects the adjacent connection objects (e.g. polynomial 5th degree) to form an optimum motion profile.

There are cases where the use of algorithms does not lead to an optimum curve. Overshooting at the connections can occur, especially in the case of highly asymmetrical relationships.



How to carry out a manual correction of the acceleration:

1. In the *Context menu* (right-hand mouse button) belonging to the point in question, select the **Properties...** command in order to open the dialog box *Properties of point*:



2. In the **Boundary values** tab, deselect the option **Self-adjusting acceleration**.
3. Enter the desired acceleration in the **Acceleration** input field.
4. Click the **OK** button in order to close the dialog box and accept the settings.
5. The connections are calculated automatically.
 - If *Expert mode* has been activated, calculation is to be started by clicking the  button.

14.3.2.5 Step 5: Generating an interpolation point table

The actual development of the motion profile has now been completed. However, the »Cam Manager« (and also the drive controller) needs the motion profile in the form of an interpolation point table.



How to generate the interpolation point table:

1.  Change to the interpolation mode.
 - Generation starts automatically when you click the **Interpolation mode** button.

After the interpolation point table has been generated successfully, you can change back to the »Cam Manager« to transfer the cam data to the controller.

Optimised linear interpolation of the interpolation points

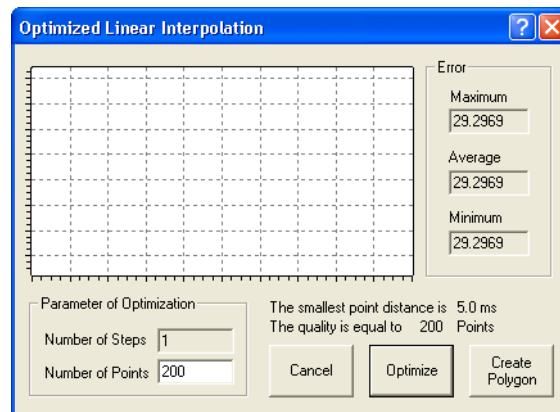


Note!

The **Optimised linear interpolation** dialog box is only visible in the »Cam Designer« if *Expert mode* has been activated.

- The *Expert mode* in the »Engineer« can be activated in the *General* tab in the menu **File→Cam Designer settings**.

If, in the *Cam Designer Settings* dialog box, the option **Optimised interpolation** has been selected for the curve, the *Optimised linear interpolation* dialog box is initially shown after the calculation has started:



- If you click the **Optimize** button, an optimum distribution of points is calculated with the help of a neuronal network (artificial intelligence). This means that sections with little curve (e.g. lines) are represented with only a few interpolation points. In sharply curved sections, in contrast, there are many interpolation points.
- Click **Create polygon** to insert the optimised interpolation point table into the object list.



How to generate the interpolation point table with Expert mode activated:

1.  Change to the interpolation mode.

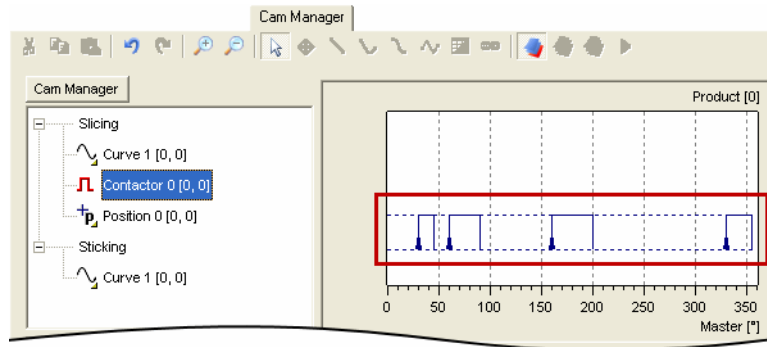
Appendix

Creating cam data with the »Cam Editor«

2.  Start calculation of the connections.
 - The calculation of the connections starts automatically when the **Curve mode** button is clicked.

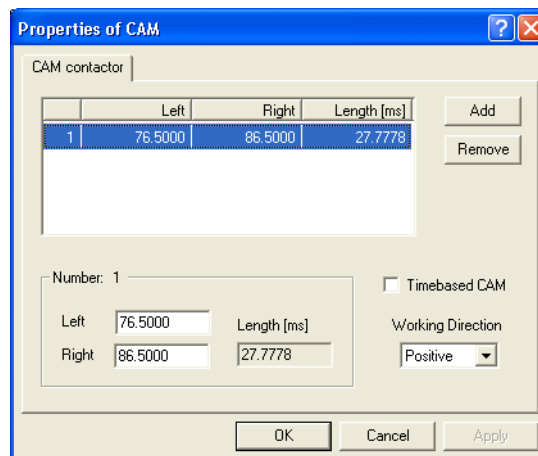
14.3.2.6 Creating cams

A cam track (A) can contain up to 16 cams of the same type (position or time cam):



How to add cams to a cam track:

1. Select the cam track to be edited in the *Project tree* of the »Cam Editor«.
2. Move the mouse pointer in the *Worksheet* to the (approximate) cam position.
 - We will define the exact cam position/duration (of a time cam) in a later step.
3. In the *Context menu* (right-hand mouse button), select the **Add cam** command.
 - The cam is inserted at the position of the mouse pointer.
4. Double click on the cam in order to open the *Properties* dialog box:



- In the *Properties*, dialog box, the properties of all (max. four) cams of the track are shown.
5. Set the cam type (position or time cam) and the effective direction for all cams of the track.
 6. Set the exact position/time period of the cam selected in the list field.
 7. Click **Accept** in order to accept the settings for the cam selected.

Appendix

Creating cam data with the »Cam Editor«

8. Optional: Adding additional cams.

- To do this, enter the position/duration of the cam and then click the **Add** button.

Example: Four position cams with a positive effective direction:

	Left	Right	Length [ms]
1	30.0000	45.0000	41.6667
2	60.0000	90.0000	83.3333
3	160.0000	200.0000	111.1111
4	330.0000	355.0000	69.4444

Number: 1

Left: 30.0000 Right: 45.0000 Length [ms]: 41.6667

Working Direction: Positive

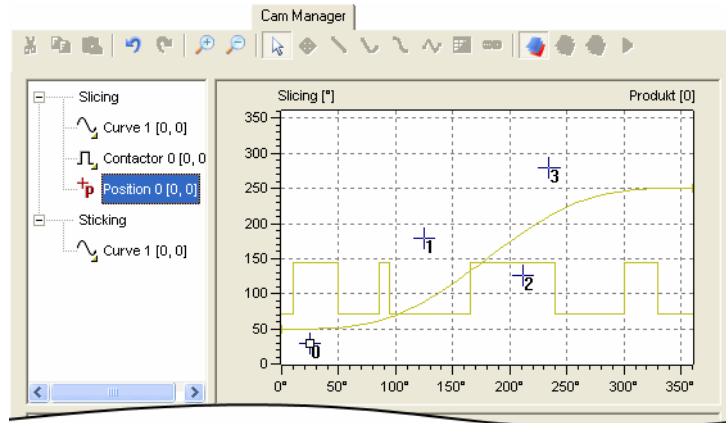
9. Click **OK** in order to accept the settings and close the dialog box.

Cam types

Representation	Meaning
	Position cam with a positive effective direction • Switch-on and switch-off positions are specified in advance by means of positions. • The cam switches if the direction of movement is positive (positive speed).
	Position cam with a negative effective direction • Switch-on and switch-off positions are specified in advance by means of positions. • The cam switches if the direction of movement is negative (negative speed).
	Position cam with a bipolar effective direction • Switch-on and switch-off positions are specified in advance by means of positions. • The cam switches if the direction of movement is positive or negative.
	Position-time cam with a positive effective direction • The cam switches at the switch-on position if the direction of movement is positive (positive speed). • After the time defined the cam switches off again.
	Position-time cam with a negative effective direction • The cam switches on at the switch-on position if the direction of movement is negative (negative speed). • After the time defined the cam switches off again.

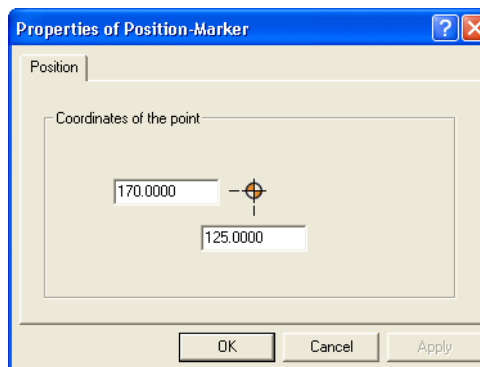
14.3.2.7 Creating position markers

A position track can contain up to eight position markers, which do not necessarily have to rest on the curve. Each position marker is identified with the number of the respective function block output:



How to add position markers to a position track:

1. Select the cam position to be edited in the *Project tree* of the »Cam Editor«.
2. Select the command **Draw → Position marker**.
3. Move the mouse pointer in the *Worksheet* to the desired coordinates and press the left mouse button.
 - The position marker is inserted at the position of the mouse pointer.
4. Double-click on the position marker in order to open the *Properties* dialog box:



5. Set the exact coordinates of the position marker.
6. Click **OK** in order to accept the settings and close the dialog box.

14.4 User motors

This function is available from »Engineer« HighLevel V2.7!

A user motor saves default values for Lenze controller parameters relevant for the motor. A user motor can be created in your »Engineer« project (on the basis of the current controller settings of a controller).

User motors can be saved to a user motor catalogue and can be reused within the same project (or in other projects).

14.4.1 Creating user motors from controller settings

- Optimise the parameters of a Lenze controller in the »Engineer« project until correct control of the motor is performed.
- A new user motor can be created from the current settings on the same project tree level.
- The new user motor can e.g. be copied within the project or saved to a user motor catalogue to be reused in other »Engineer« projects.



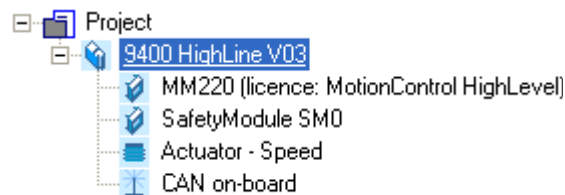
Note!

- If the selected drive controller is **online**, the **online values of the respective code** are read in to determine the nameplate data and the default values of the new user motor.
- If the selected drive controller is **offline**, the **offline values of the code in question** are used to determine the nameplate data and the default values of the new user motor.



How to create a motor from controller settings:

1. Select a controller in an »Engineer« project.
 - A Lenze 9400 HighLine is used as an example:



2. Select **Create user motor** via the context menu of the controller.
 - The *Create user motor from controller settings* dialog box opens.

Create user motor from controller settings

Create user motor from control settings from: 9400 HighLine Master

Identifying features

Product name: UserMotor-20080508-094352

Order number:

Manufacturer:

Device family:

Product family:

Product info text:

Product number:

Comment:

Nameplate data

Motor type (please define manually)

☒ Synchronous servo motor

☐ Asynchronous servo motor

☐ Standard asynchronous motor

☐ Geared motor

Circuit (please define manually)

☒ Star ☐ Delta

Motor parameter

Rated power: 1.2 kW

Rated speed: 3750 rpm

Rated current: 2.5 A

Rated frequency: 250 Hz

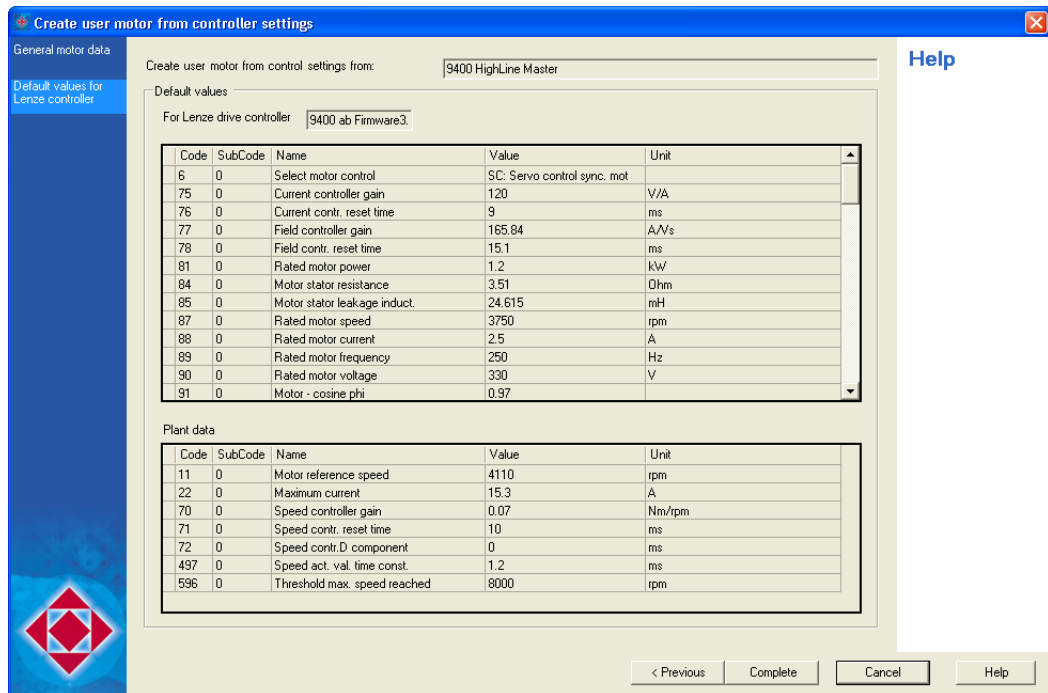
Rated voltage: 330 V

Cosine phi: 0.97

< Previous Next > Cancel Help

3. Enter the data required in the dialog box.
 - The nameplate data (general data such as rated power and rated frequency) of the new user motor are calculated from the codes of the controller previously selected if possible.
 - If some pieces of nameplate data cannot be calculated from the code values of a specific controller (example: the rated motor power cannot be calculated from the parameters of an 8200vector), the respective input field in the *Create user motor from controller settings* dialog box remains empty. The values can be entered manually.
4. Click **Next**.

- The dialog box shows the default values which are determined from the code values of the previously selected controller and are transferred to the new user motor. The parameter list below shows the so-called *Plant data*.



Create user motor from controller settings

General motor data

Default values for Lenz controller

Create user motor from control settings from:

Default values

For Lenz drive controller:

Code	SubCode	Name	Value	Unit
6	0	Select motor control	SC: Servo control sync. mot	
75	0	Current controller gain	120	V/A
76	0	Current contr. reset time	9	ms
77	0	Field controller gain	165.84	A/Vs
78	0	Field contr. reset time	15.1	ms
81	0	Rated motor power	1.2	kW
84	0	Motor stator resistance	3.51	Ohm
85	0	Motor stator leakage induct.	24.615	mH
87	0	Rated motor speed	3750	rpm
88	0	Rated motor current	2.5	A
89	0	Rated motor frequency	250	Hz
90	0	Rated motor voltage	330	V
91	0	Motor - cosine phi	0.97	

Plant data

Code	SubCode	Name	Value	Unit
11	0	Motor reference speed	4110	rpm
22	0	Maximum current	15.3	A
70	0	Speed controller gain	0.07	Nm/rpm
71	0	Speed contr. reset time	10	ms
72	0	Speed contr.D component	0	ms
497	0	Speed act. val. time const.	1.2	ms
596	0	Threshold max. speed reached	8000	rpm

< Previous Complete Cancel Help

5. Click the **Complete** button to create the user motor.

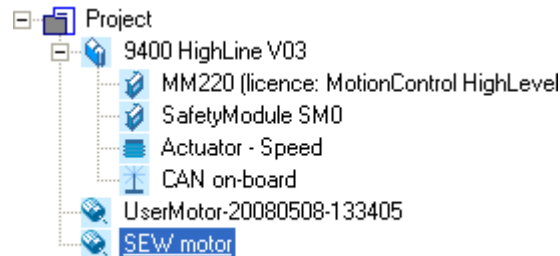
14.4.2 Saving a user motor to the user motor catalogue

A user motor can be saved to a user motor catalogue to be reused in other »Engineer« projects.



How to save a user motor:

1. Select a user motor in the »Engineer« project that has been created.



2. Right-click the user motor: Select the **Save motor to catalogue** command.
 - The *Save user motor in catalogue* dialog box shows the identification features/properties and nameplate data of the user motor.
 - The parameters can be changed any time later on.
3. Click **Next**.
 - The default values for the controller selected are displayed.
 - If there already is a motor of the same name in the user motor catalogue, you will be asked whether you would like to save the motor under another name or whether you would like to replace the motor that has been saved under that name so far. Alternatively, certain default value sets can be transferred to the user motor already saved in the catalogue.
4. Click **Complete**.
 - **Note:** A user motor already saved in the user motor catalogue can be extended by additional data. Default values for 8400 controllers e.g. can be added to a motor which only contains default values for 9400 controllers so far.

14.4.3 Inserting the user motor into the project



Tip!

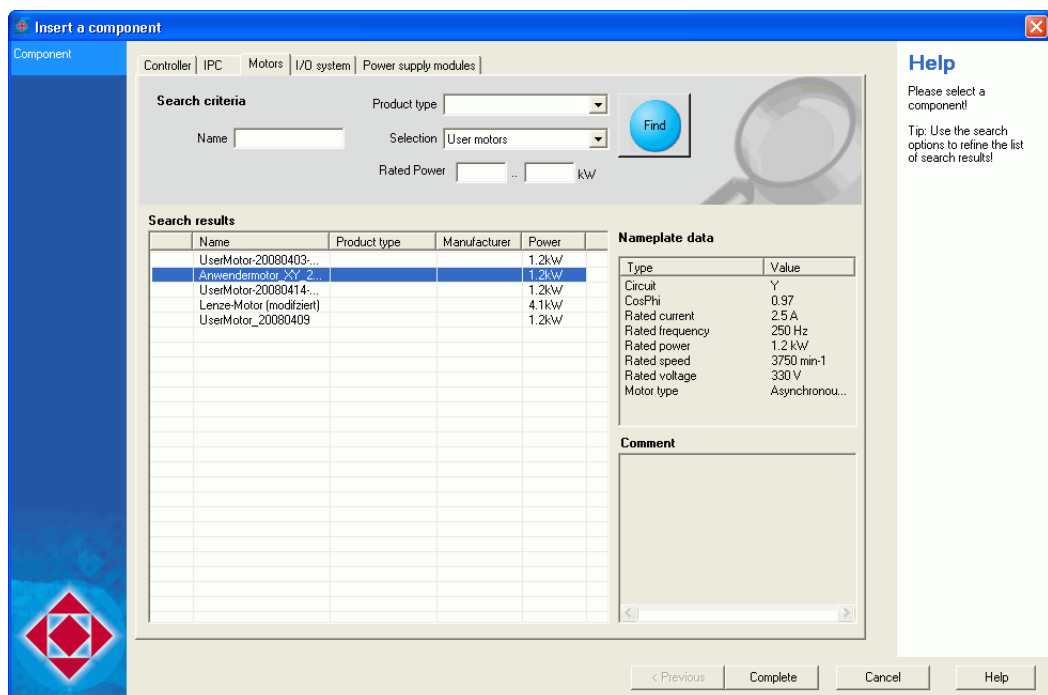
The motor and other components can be selected when inserting an axis by activating the **Insert individual components into axis control** field. ▶ [Inserting an axis](#) (48)

The user motor needs to be saved to the system's user motor catalogue before it can be inserted.



How to insert a user motor:

1. Open the *Project view* and select the system module  or the axis  into which the motor is to be inserted.
2. Click the  icon to open the wizard for adding a component.
 - **Tip:** As an alternative, the wizard can be called by clicking **Insert → Component** in the main menu or **Insert component** in the context menu.
3. Select the **Motors** tab.
4. In the **Selection** list field, select *User motors*.
 - The **Search results** area lists the user motors to be selected:



The screenshot shows the 'Insert a component' dialog box with the 'Motors' tab selected. The 'Search criteria' section includes fields for 'Name', 'Product type', 'Selection' (set to 'User motors'), and 'Rated Power'. A 'Find' button is present. The 'Search results' table lists several user motors. The 'Nameplate data' section on the right displays technical specifications for the selected motor.

Name	Product type	Manufacturer	Power
UserMotor-20080403-...			1.2kW
Anwendungsmotor XY_2...			1.2kW
UserMotor-20080414-...			1.2kW
Lenze-Motor (modifiziert)			4.1kW
UserMotor_20080409			1.2kW

Type	Value
Circuit	Y
cosPhi	0.97
Rated current	2.5 A
Rated frequency	250 Hz
Rated power	1.2 kW
Rated speed	3750 min-1
Rated voltage	330 V
Motor type	Asynchronou...

5. Select the user motor to be inserted in the **Search results** list field.
 - On the right, technical data of the motor selected is displayed.
6. Insert the selected user motor as component into the project by clicking **Complete**.
7. The user motor to be inserted provides default values for transfer into the corresponding codes of the controller. The following default values can be selected:
 - Type of motor control,
 - Motor parameters,
 - Plant parameters for load-free operation.

As standard setting, all default values of the motor are selected for transfer to the

controller.

Vorgabewerte des Motors übernehmen

Antriebsregler: 9400 HighLine V03 [9400 HighLine V03]

Motor: UserMotor-20090309-134738

Motorparameter

☒ Auswahl der Motorregelung in C0006 übernehmen: SC: Servo control async. motor

☒ Folgende Werte in den Antriebsregler übernehmen:

Code	Subcode	Bezeichnung	Wert	Einheit
0075	000	Current controller gain	70	V/A
0076	000	Current contr. reset time	1.5	ms
0077	000	Field controller gain	121.95	A/Vs
0078	000	Field contr. reset time	21.7	ms
0081	000	Rated motor power	0.8	kW
0084	000	Motor stator resistance	6.345	Ohm
0085	000	Motor stator leakage induct.	9.8	mH
0087	000	Rated motor speed	3950	rpm
0088	000	Rated motor current	2.4	A
0089	000	Rated motor frequency	140	Hz

Streckenparameter für lastfreien Betrieb

☒ Folgende Werte in den Antriebsregler übernehmen:

Code	Subcode	Bezeichnung	Wert	Einheit
0011	000	Motor reference speed	3950	rpm
0022	000	Maximum current	3.6	A
0070	000	Speed controller gain	0.007	Nm/rpm
0071	000	Speed contr. reset time	10	ms
0072	000	Speed contr.D component	0	ms
0497	000	Speed act. val. time const.	0.4	ms
0596	000	Threshold max. speed reached	7900	rpm

Ok

Note: The default values of the user motor will overwrite the controller settings!

- Insert the user motor as component into the project by clicking **Ok**.

Note: If there already is a motor on the level intended for the user motor, you will be asked in a dialog box whether you would like to delete the other motors.

- The dialog box then closes and the selected motor is inserted into the highlighted element.

14.4.4 Modifying/supplementing motor default values

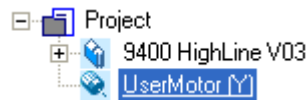
If a controller has already been connected to a user motor in your project, the default values saved in the user motor can be modified by overwriting those values with the current code values of the controller.

If the user motor has not previously been provided with default values for the controller group in question, the default values are supplemented by the new data.



How to modify motor default values:

1. Create an »Engineer« project including a user motor.
2. Highlight the user motor.



3. Click the **Modify/supplement motor default values** button in the *Motor parameter* tab.

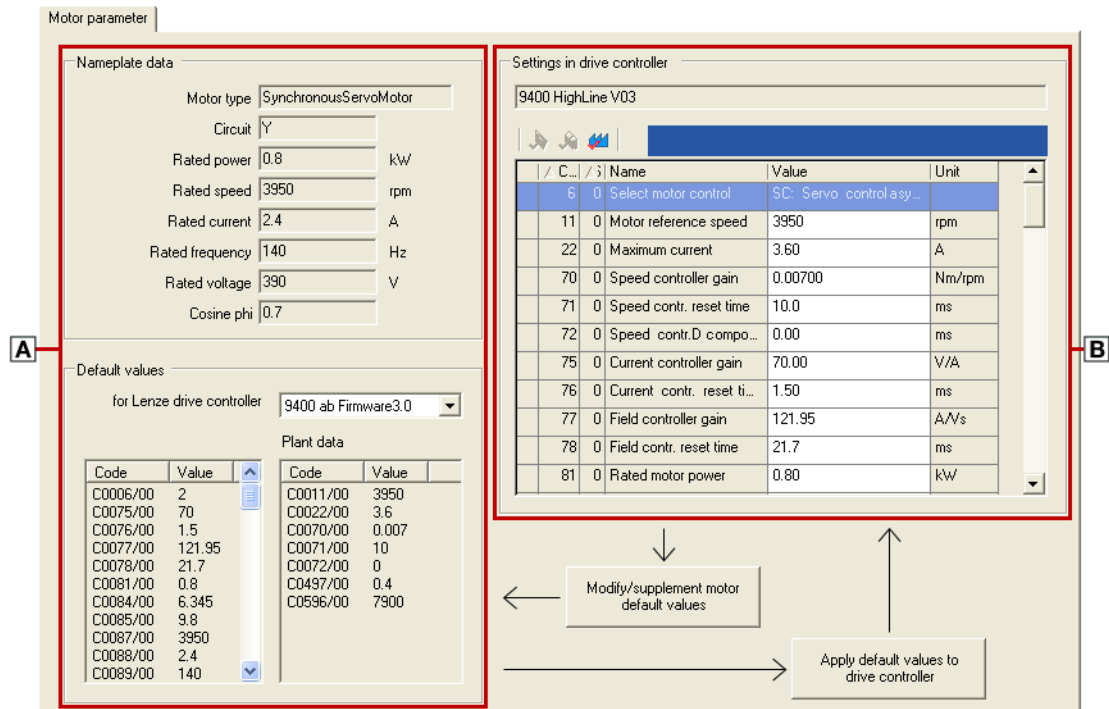
Note: The controller settings will overwrite the default values of the user motor!

- Confirm the query by clicking the **Yes** button to overwrite the default values of the user motor.

14.4.5 Transferring default values to the controller

If a controller has already been connected to a user motor in your project, the default values saved in the motor can be transferred once again to the controller. This will reset settings that might have been changed to the default values.

For this purpose, use the "Motor parameter" tab of the respective user motor.



Area	Functions
A	Data and default values of the user motor
B	Parameters of the controller connected



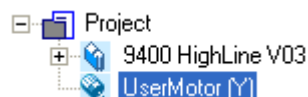
Note!

- The button for transferring the default values is only activated if the controller group suitable for the controller connected has been selected in the control field of the tab.
- If the drive controller is online at this point in time, the default values are transferred to the offline and online values of the relevant codes of the drive controller.
- If the controller is in offline mode, the default values will be transferred to the offline values of the controller codes in question.



How to transfer the default values to the controller:

1. Create an »Engineer« project including a user motor.
2. Highlight the user motor.



3. In the *Motor parameter* tab, click the **Apply default values to drive controller** button.

Note: The default values will overwrite the controller settings!

- Confirm the query by clicking the **Yes** button to apply the default values to the drive controller.



Tip!

If the default values of a user motor have been changed in the project, the motor can be saved once again to the user motor catalogue. Replace the user motor already saved in the user motor catalogue or save the modified user motor under another name.

14.4.6 Deleting/exporting/importing user motors

The user motor catalogue provides the possibility of creating and managing user motors according to individual requirements. All user motors saved can be selected for the user motor catalogue to be edited.

User motors can be deleted, imported or exported from your motor catalogue according to your individual requirements:

- ▶ [Deleting user motors](#) (302)
- ▶ [Exporting user motors](#) (302)
- ▶ [Importing user motors](#) (304)

Deleting user motors

Select **Tools**→**User motor catalogue** to delete a user motor.

In the *User motors* dialog box, select **Delete user motors**,

Confirm your selection by clicking the **Next** button.

User motors

Action

Delete user motors

Search criteria

Name

Product type

Rated Power .. kW

Find

Search results

Name	Product type	Manufacturer	Power
UserMotor-20080403-1...			1.2 kW
Anwendungsmotor_XY_20...			1.2 kW
UserMotor-20080414-1...			4.1 kW
Lenze-Motor (modifiziert)			1.2 kW
UserMotor_20080409			1.2 kW
UserMotor-20080508-1...			4.1 kW

Nameplate data

Type	Value
Circuit	Y
cosPhi	0.97
Rated current	2.5 A
Rated frequency	250 Hz
Rated power	1.2 kW
Rated speed	3750 min-1
Rated voltage	330 V
Motor type	SynchronousSe...

Add to selection

Selection of the user motors to be deleted

Name	Type	Manufacturer	Power

Delete from list

< Previous Complete Cancel Help

The dialog box will display the user motors available in the list of search results above.



How to delete a user motor:

1. Highlight the desired user motor in the list of *Search results*.
2. Transfer the user motor highlighted to *Selection of the user motors to be deleted* via the **Add to selection** button.
3. If the **Complete** button is clicked, the selection of the user motors to be deleted will be removed from the catalogue.

Exporting user motors

Select **Extras**→**User motor catalogue** to export the desired user motors to a user motor catalogue.

In the *User motors* dialog box, select **Export user motors**,
Confirm your selection by clicking the **Next** button.

User motors

Action

Export user motors

Search criteria

Product type

Name

Rated Power .. kW

Find

Search results

Name	Product type	Manufacturer	Power
UserMotor-20080403-1...			1.2kW
ArwenderMotor-217-50			1.2kW
UserMotor-20080414-1...			1.2kW
Lenze-Motor (modifiziert)			4.1kW
UserMotor_20080409			1.2kW
UserMotor-20080508-1...			4.1kW

Nameplate data

Type	Value
Circuit	Y
CosPhi	0.97
Rated current	2.5 A
Rated frequency	250 Hz
Rated power	1.2 kW
Rated speed	3750 min-1
Rated voltage	330 V
Motor type	AsynchronousS...

Add to selection

Motor selection

Name	Type	Manufacturer	Power
------	------	--------------	-------

Delete from list

Export to...

d:\Documents and Settings\Struebig\My Documents\Engineer Projekte\UserMotors.xml

Change

< Previous Complete Cancel Help



How to export a user motor:

1. Highlight the desired user motor in the list of *Search results*.
2. Transfer the user motor highlighted to *Motor selection* via the **Add to selection** button.
3. Specify a storage location for the user motors exported in the *Export to...* input field.
4. Click the **Complete** button to export the user motors inserted in *Motor selection*.

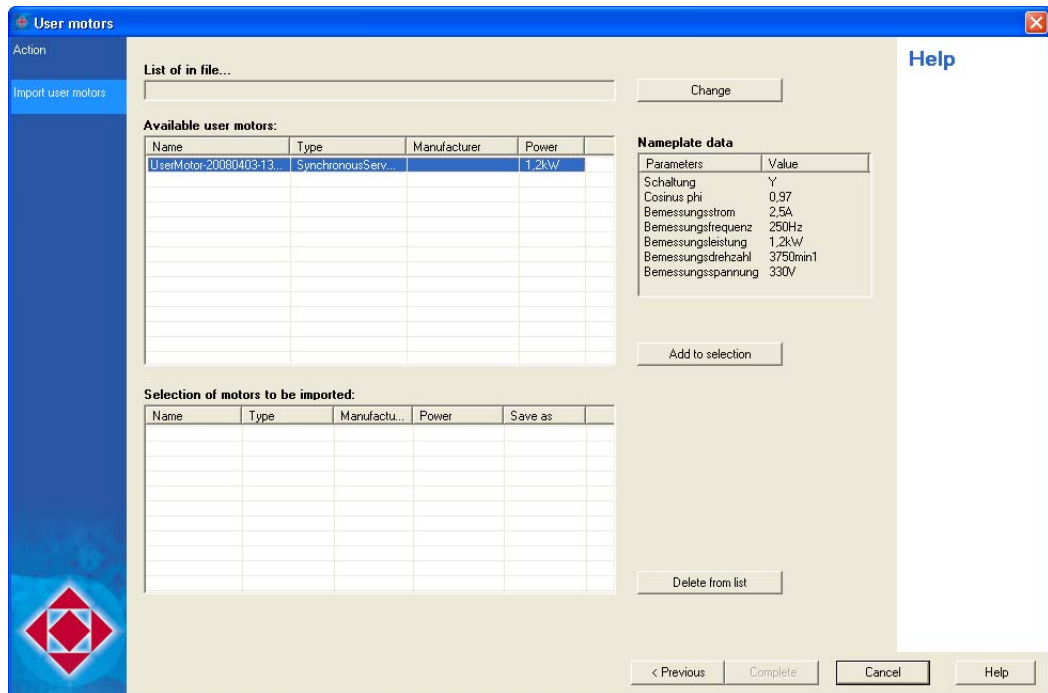
Importing user motors

The basic condition for the import of user motors is that the user motors should be described in the XML file format used in the »Engineer«.

Select **Tools → User motor catalogue** to import user motors.

In the *User motors* dialog box, select **Import user motors**,

Confirm your selection by clicking **Next**.



How to import a user motor:

1. Select the source directory for the user motors to be imported via the **Change** button.
2. Highlight the desired user motor in the list of *Available user motors*.
3. Transfer the user motor highlighted to *Selection of motors to be imported* via the **Add to selection** button.
4. Click **Complete** to import the user motors inserted into the *Motor selection*.

15 Glossary

A

Axis	An axis is a special type of system module and generally contains at least one drive controller and a motor but, depending on the application, can contain further devices such as gearboxes and encoders.
AIF	Abbreviation for "AutomationInterface". Lenze-specific interface on the controller for plugging on a communication module. ▶ Communication module
System module	Generic term for a mechatronic unit which can generally include several devices, one or several networks, information on parameter values, program logic and documentation. A system module provides a specific technological function. It interacts with its environment and can be generally reused in another environment or system. The interfaces of a system module are provided by the interfaces of its components.
Controller	Generic term for Lenze frequency inverters, servo inverters and PLCs.
Application	Implementation of a concrete drive solution (e.g. speed control) on an individual device.
Application variable	Structure of element variables which is communicated via network(s) using a specific transfer mode. The definition of an application variable is completely independent of a specific type of network. ▶ Element variable

B

Bus server	Fieldbus-specific OPC server according to DRIVECOM specification. ▶ DRIVECOM
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C

CAL	Abbreviation for "CAN Application Layer". Communication standard (CiA DS 201-207) which provides the objects, protocols and services for the event or polling-controlled transfer of CAN messages and the transfer of greater data areas between CAN nodes. Furthermore, CAL offers powerful processes for an automatic assignment of message identifiers, the initialisation of network nodes and the assignment of an individual identification to network nodes.
CAN	Abbreviation for "Controller Area Network". Serial, message-oriented (not node-oriented) bus system for max. 63 nodes.
CANopen	Communication profile (CiADS301, version 4.01), which has been created under the umbrella association of the CiA ("CAN in Automation") in conformance with the CAL ("CAN Application Layer").
CiA	Abbreviation for "CAN in Automation (e. V.)": International manufacturer and user organisation with the target to worldwide distribute the knowledge of the internationally standardised CAN bus system (ISO 11898) and promote its technical further development. ▶ Internet: http://www.can-cia.org/
COM	Abbreviation for "Component Object Model": Architecture developed by Microsoft ® for the co-operation of individual executable software components (objects) which communicate with each other in a similar manner and are not connected until the program is running.
Controller	A Lenze Controller is the central control unit of the "Controller-based Automation" automation system. This enables the machines to be centrally controlled and/or visualised. The "Controller-based Automation" is Lenze's central control technology.

D

DCOM	Abbreviation for "Distributed Component Object Model": COM where the executable objects are distributed to different computers within one local area network. ▶ COM
DRIVECOM	"DRIVECOM User Group e.V.": International organisation of manufacturers of drive technology, universities and institutes with the target to develop an easy integration of drives into open automation structures. ▶ Internet: http://www.drivecom.org/
DriveServer	Lenze software which provides an easy integration of drives into open automation structures based on OPC ("OLE for Process Control").
E	
Element variable	Variable which is used in an application to implement a specific function of the respective device. ▶ Application
F	
FIF	Abbreviation for "FunktionsInterface". Lenze-specific interface on the controller for plugging on a function module. ▶ Function module
Function module	Device extension for the FIF interface which can neither fulfil a function nor is able to communicate without a device. ▶ FIF
K	
Catalogue	A catalogue contains descriptive information on all element types that form an »Engineer« project. The »Engineer« uses various catalogue types, e.g. for devices, device modules, technology applications, function blocks, and motors. Each catalogue is labelled by versioning.
Catalogue package	A catalogue package consists of several related catalogues and is named and versioned. Multiple versions of a catalogue package can be added to an »Engineer« installation. Every »Engineer« project can use an optional number of catalogue packages. Each catalogue package can be used in exactly one version.
Communication unit	Generic term for Lenze function modules and communication modules. ▶ Function module ▶ Communication module
Communication module	Device extension which for instance extends a controller by a communication interface and which can neither fulfil a function nor is able to communicate without a device.
M	
Machine application	Implementation of a function which is generated by the interaction of several communication-capable devices. A machine application is defined by the (device) applications involved and the exchange of application variables between them.

N

NMT

Abbreviation for "Network Management": Services and protocols for initialisation, configuration, management and network monitoring within one CAN network according to the master/slave principle.

▶ [CAN](#)

O

OLE

Abbreviation for "Object Linking and Embedding": Insertion of functional objects into other applications, e.g. a Microsoft® Excel table into a Microsoft® Word document.

OPC

Defines an interface based on the Microsoft® Windows® technologies OLE, COM and DCOM which is enabled via a data exchange between different automation devices and PC programs without considering driver and interface problems.

The OPC server provides the data and the OPC client receives the data.

▶ [COM](#)

▶ [DCOM](#)

OPC tunnel

OPC server and OPC client can be on different PCs networked via Ethernet. Communication between the PCs requires a special DCOM configuration. For OPC communication from several computers, Lenze uses an OPC tunnel that does not require any configuration.

P

PLC Designer

Lenze engineering tool for programming the PLC according to IEC 61131.

Port

Connection point or interface of an application or machine application. Input ports serve to transfer it e.g. setpoints and control commands to an application, output ports serve to, for instance, provide actual values and status messages.

▶ [Application](#)

▶ [Machine application](#)

Project root

The topmost element (root element) in the *project tree* with the global project properties.

R

Reset node

Function for Lenze devices with a CAN interface, by which the device can be reinitialised if a change with regard to the data transfer rate, node address, or identifiers is effected. NMT-

▶ [NMT](#)

▶ [CAN](#)

▶ [NMT](#)

S

PLC

Abbreviation for "Programmable Logic Controller."

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Your Lenze documentation team



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