

# SIEMENS

## Startdrive

## Startdrive Getting Started SINAMICS S120 in Startdrive




### Getting Started

<u>Introduction</u>	<b>1</b>
<u>Configuring the hardware in the offline mode</u>	<b>2</b>
<u>Connecting the drive unit with the PC and going online</u>	<b>3</b>
<u>Using the drive control panel</u>	<b>4</b>
<u>Parameterizing the drive</u>	<b>5</b>
<u>Diagnostics and troubleshooting</u>	<b>6</b>

## Legal information

### Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
indicates that property damage can result if proper precautions are not taken.


If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

### Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

### Proper use of Siemens products

Note the following:

 <b>WARNING</b>
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

### Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

### Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

# Table of contents

<b>1</b>	<b>Introduction</b> .....	<b>5</b>
1.1	Startdrive – commissioning drives .....	5
1.2	Startdrive user interface.....	6
1.3	Adapting the user interface.....	7
<b>2</b>	<b>Configuring the hardware in the offline mode</b> .....	<b>9</b>
2.1	Structure of the drive lineup.....	9
2.2	Creating a new project.....	10
2.3	Inserting a SINAMICS S120 drive unit.....	11
2.4	Inserting a Line Module (infeed) .....	12
2.5	Specifying placeholder components .....	14
2.5.1	Specifying placeholder components .....	14
2.5.2	Filtering products .....	15
2.6	Inserting a Motor Module .....	16
2.7	Inserting a motor .....	18
2.8	Inserting a measuring system.....	19
2.9	Changing DRIVE-CLiQ connections.....	20
<b>3</b>	<b>Connecting the drive unit with the PC and going online</b> .....	<b>23</b>
3.1	Going online .....	23
3.2	Ethernet connection via X127 .....	23
3.3	Display accessible devices .....	24
3.4	Go online via Ethernet IE (X127) .....	25
<b>4</b>	<b>Using the drive control panel</b> .....	<b>27</b>
4.1	Traversing the motor from the drive control panel.....	27
<b>5</b>	<b>Parameterizing the drive</b> .....	<b>29</b>
5.1	Function and parameter views.....	29
5.2	Assigning parameters in the function view .....	30
5.3	Online function view.....	31
5.4	Parameterizing in the parameter view .....	32
5.5	Online parameter view .....	33
<b>6</b>	<b>Diagnostics and troubleshooting</b> .....	<b>35</b>
6.1	Diagnostics overview .....	35
6.2	Device diagnostics.....	35

6.3      Diagnostics topology error ..... 37

# Introduction

## 1.1 Startdrive – commissioning drives

### Startdrive Getting Started SINAMICS S120

You will be given a brief overview of how you can work with Startdrive in this Getting Started. The different steps for creating a project and the configuration and commissioning are shown briefly using a typical example. Once you have worked through all of the steps, you will be able to configure a SINAMICS S120 with Startdrive, load the project to the drive and test its correct functioning.

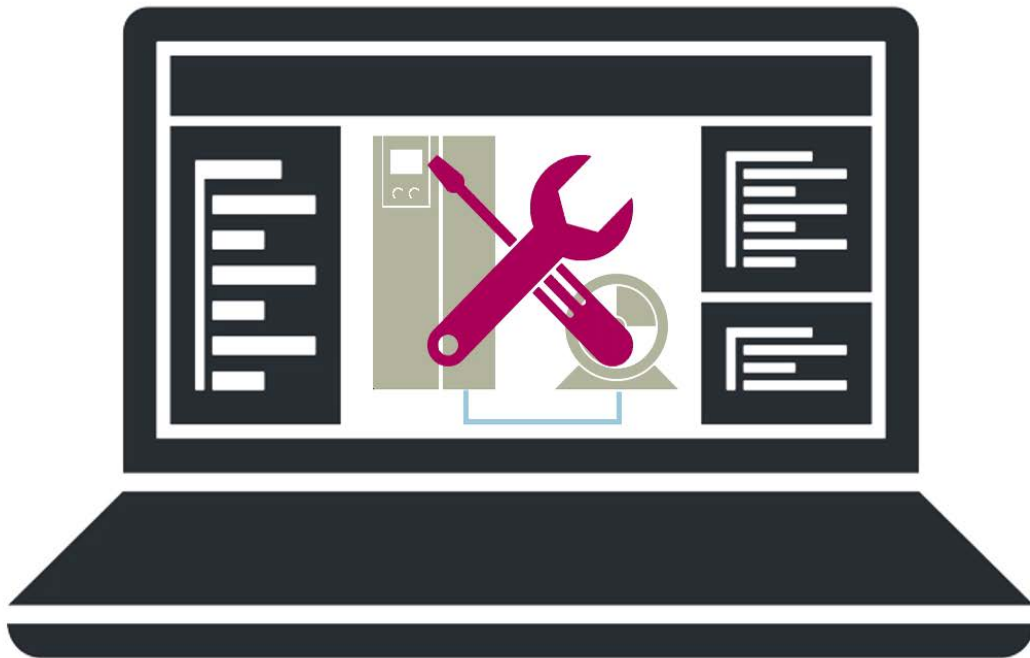


Figure 1-1 Startdrive

## 1.2 Startdrive user interface

### Description

In a first step, we will present the user interface of Startdrive in the TIA Portal. Startdrive offers you various views and areas to execute the various tasks in the project. The Project view is the most important view.

### User interface of the project view

The project view is a structured view of all components of the project. In this view, you will carry out almost all tasks in this Getting Started. The project view is split up into several subareas.

- **Project tree**  
Through the Project tree you can access all components and project data. With a single click you open the sublevel – and with a double-click you open the corresponding window in the work area.
- **Work area**  
The objects and components that you wish to process are opened in the work area. These include editors and views, for example.
- **Inspector window**  
The inspector window displays additional information on a selected object or on an executed action.
- **Task cards**  
Depending on the selected object, task cards that allow you to perform additional actions are available. The hardware catalog is the most important task card, as this allows you to configure your project hardware.

In the next step, you adapt the user interface to address your particular task.

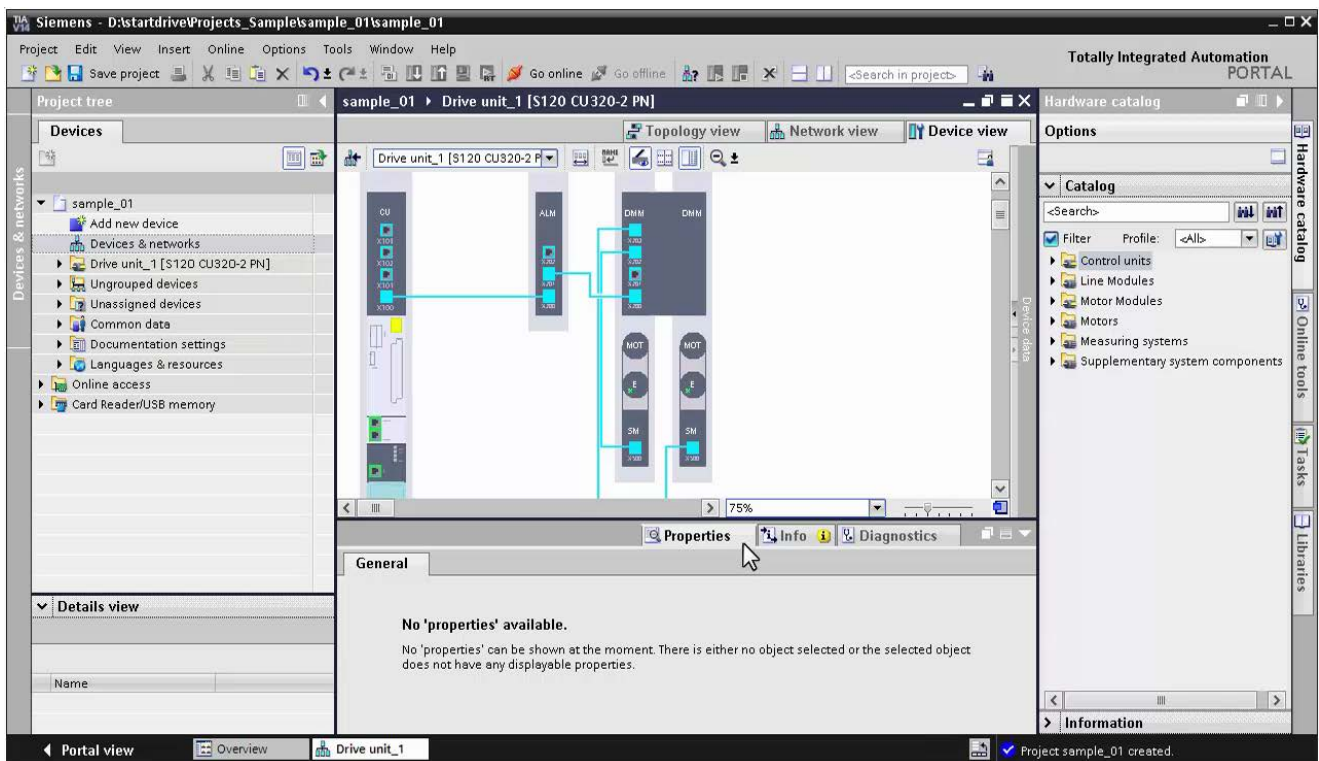


Figure 1-2 01-02-user interface-startdrive

## 1.3 Adapting the user interface

### Description

You can adapt the project view user interface corresponding to your particular task; for example, to hide certain areas that you presently do not require. We will briefly present the most important functions.

### This is how you adapt the user interface

- **Adapt window size**  
You adapt the size of the individual areas and window using the mouse pointer. Using the mouse pointer, navigate to the edge of the area. The mouse pointer changes its symbol. Press the left mouse button, and move the area separator to the desired position.
- **Reduce/extend area**  
Reduce the areas that you do not require so that you can fully concentrate on what you specifically have to do. Click on the right arrow in the title bar of the particular area. The area is reduced. The area is extended again by clicking on the arrow symbol again.

- **Replace/embed areas**  
Click on the "Replace" symbol in the title bar the particular area. The area is displayed as a separate window. Click on "Embed" to integrate the area back into the view.
- **Expand/collapse area**  
Click on the arrow symbols, in order to display e.g. task cards or additional information. Extended areas are collapsed again by again clicking on the arrow keys

**Note**

You can find additional information on the user interface and the layout in the online help of the TIA Portals.

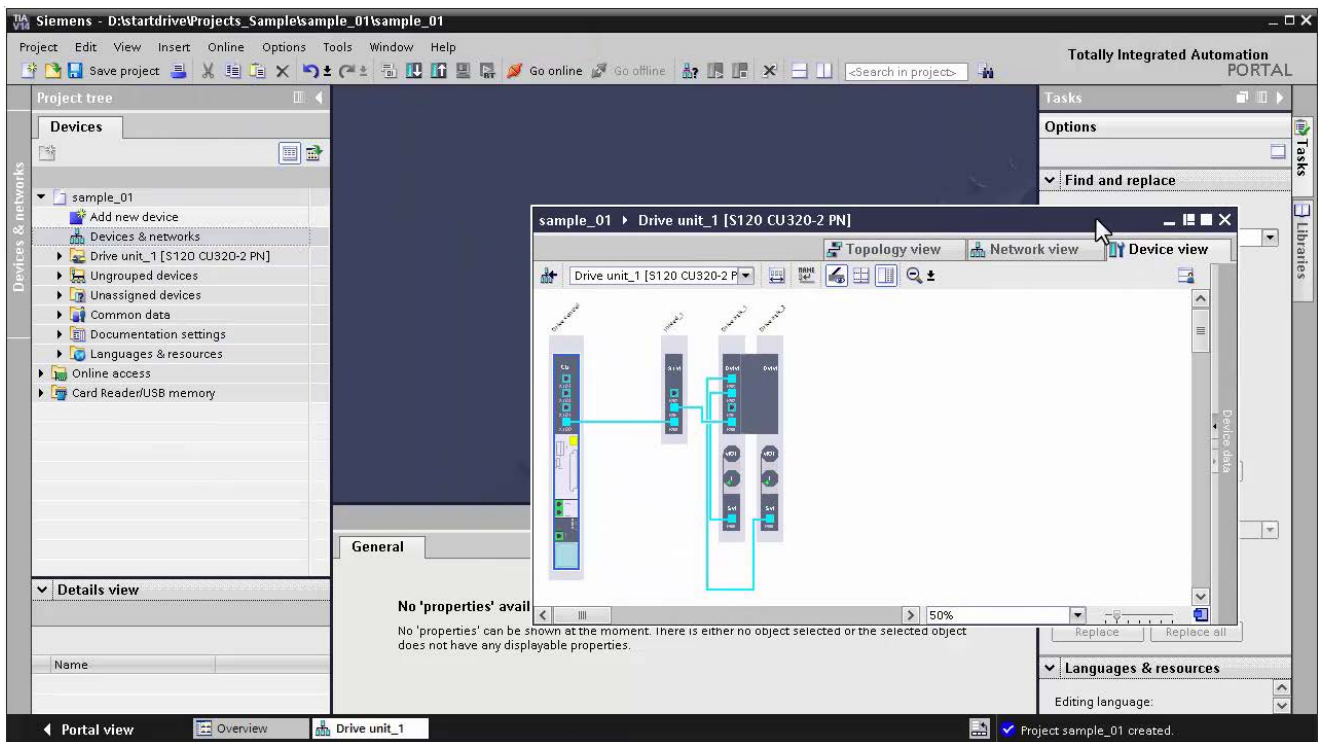


Figure 1-3 01-03-adapt-user-interface



# Configuring the hardware in the offline mode

## 2.1 Structure of the drive lineup

### Description

Before the drive can be configured in Startdrive, install the hardware and wire the components.

**A typical configuration example comprises the following components:**

- Drive unit, SINAMICS S120 CU320-2 PN Control Unit
- Line Module (infeed)
- Motor Module (single or double)
- Motors and measuring systems (encoders)

Typical DRIVE-CLiQ wiring to connect the components is shown in the configuration example. The PG/PC with Startdrive is connected to the Control Unit via Ethernet. You can use interfaces X127 or X150 to establish the connection.

In the next step, in Startdrive you create a new project and configure the hardware.

### Video, configuration example for SINAMICS S120 CU320-2 PN

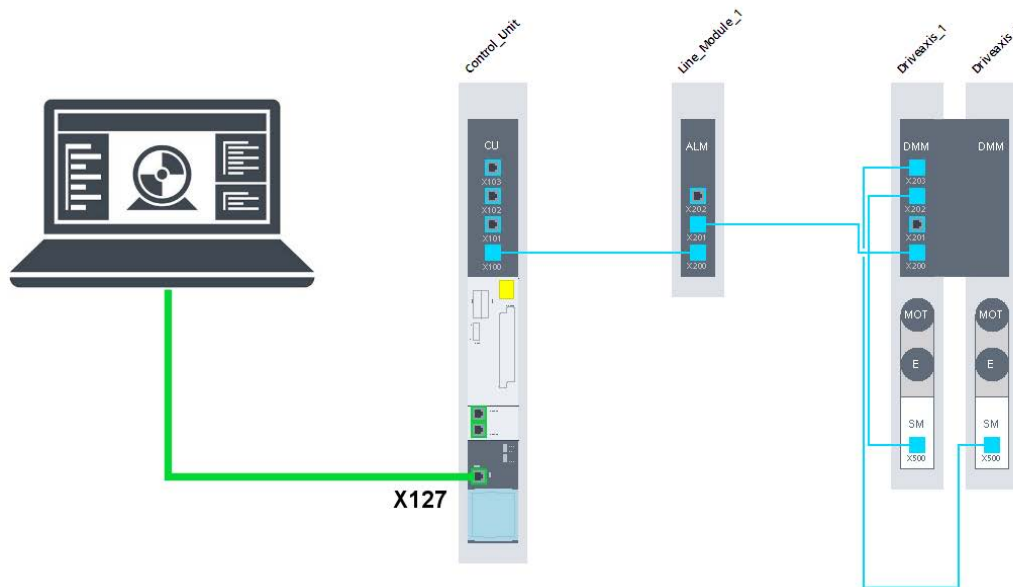


Figure 2-1 Configuration example for SINAMICS S120 with Startdrive via X127

## 2.2 Creating a new project

### Portal and project view

After opening Startdrive, you will be in the portal view of the TIA Portal. The portal view offers a task-oriented view of the tools, and provides the basic functions for the individual task areas. The project view is another view. This provides a complete view of all components of the project, e.g. hardware and programs, and is used for all project tasks.

### This is how you create a new project in the portal view

1. Open Startdrive in the portal view
2. Click "Create new project".
3. Enter a name under "Project name" and select the "path" for saving the project.
4. Enter additional project information under "Author" and "Comment".
5. Confirm with "Create". The project is created.
6. Click on "Project view" to change from the portal view to the project view.

In the project view you carry out additional steps for configuring and commissioning.

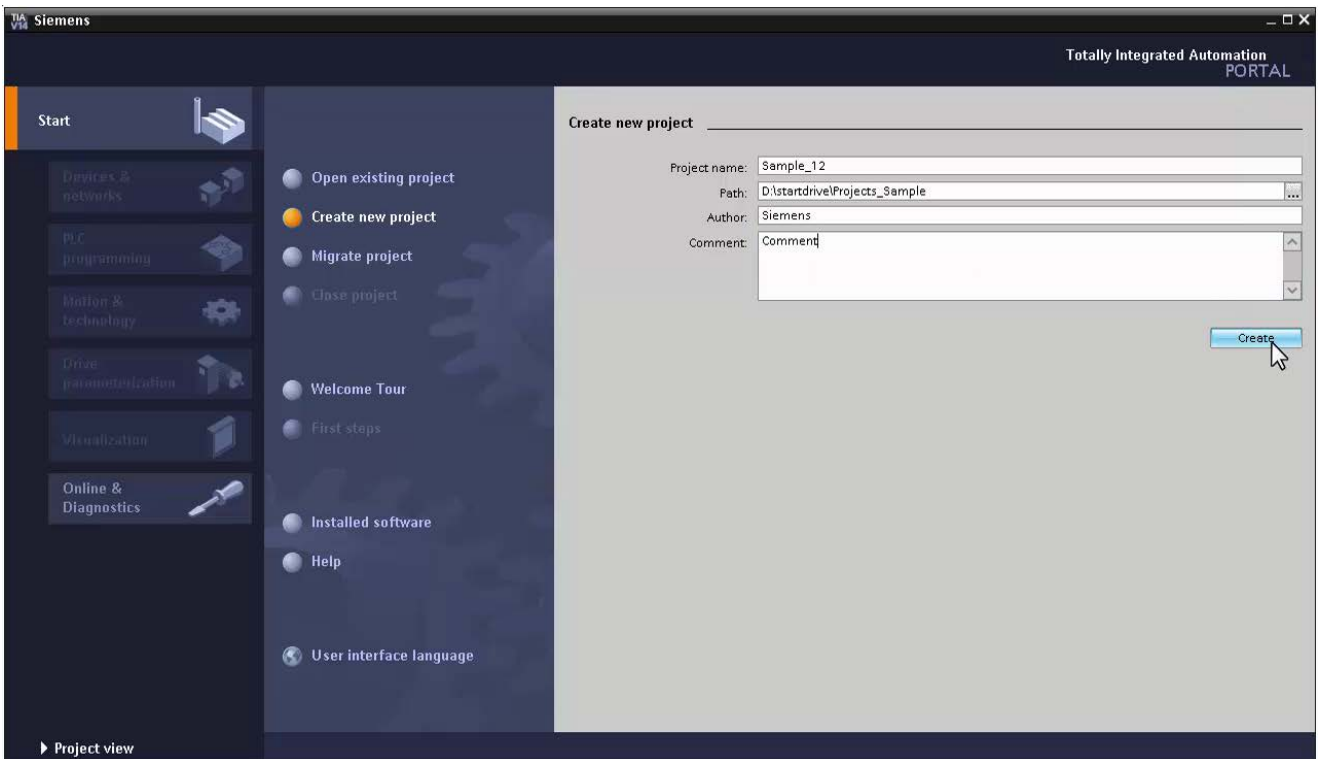


Figure 2-2 02-02-create-new-project-out

## 2.3 Inserting a SINAMICS S120 drive unit

### Description

You now insert the hardware in the project that has been created and configure it. The drive unit must first be inserted. To do this you can use two versions.

#### This is how you insert the drive unit into the project view

1. Double-click "Add new device" in the project tree.
2. In the dialog that is displayed, click on "Drives" – and select the SINAMICS S120 CU320-2 PN drive.
3. The drive is inserted, and the "Device view" tab is displayed.

In this view, you insert additional components using drag & drop from the hardware catalog.

#### This is how you insert the drive unit into the network view

1. Double-click on "Devices & networks" in the project tree.
2. Change to the "Network view".

3. You can insert the drive from the hardware catalog. Drag the SINAMICS S120 CU320-2 PN and drop into the network view.
4. A plus symbol is displayed at the mouse pointer if the component can be inserted at the actual position.
5. A forbidden sign signals that this component cannot be inserted in this position.
6. The drive is inserted.

In the "Device view" you insert additional components using drag & drop from the hardware catalog.

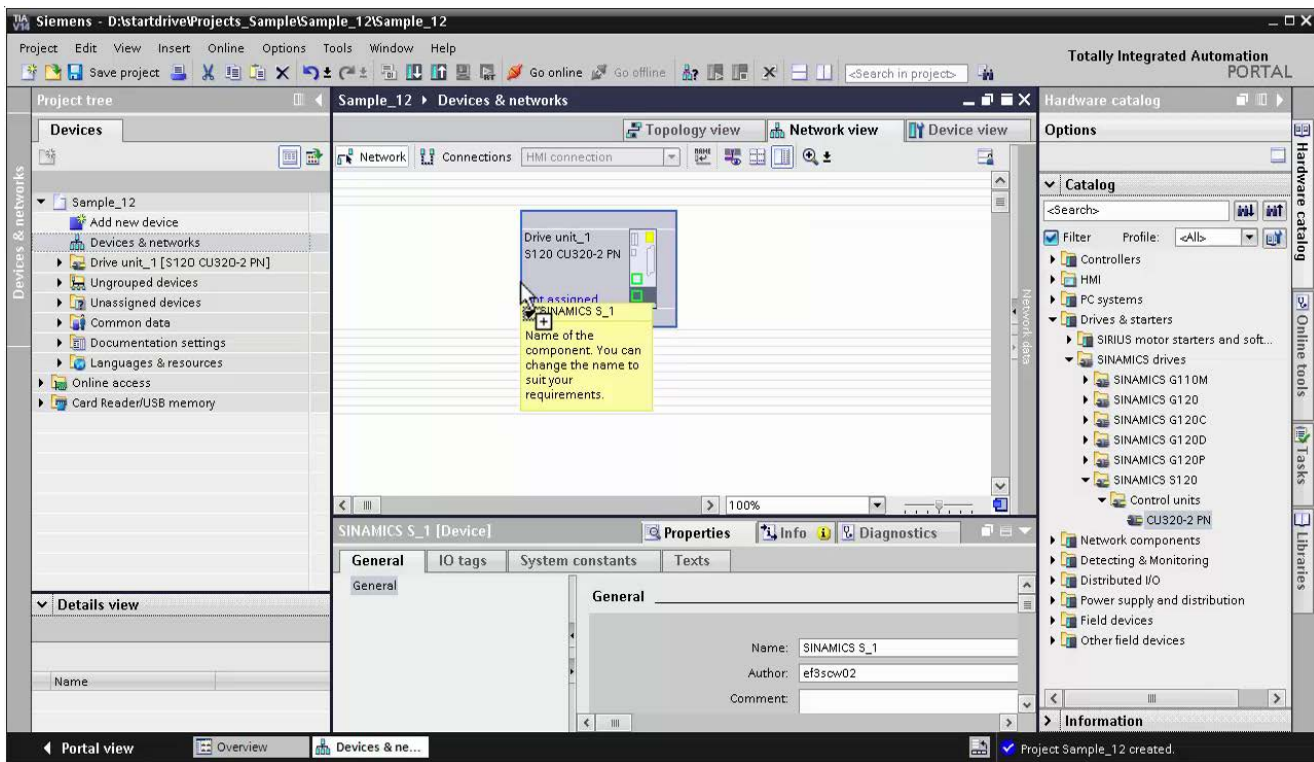


Figure 2-3 02-06-drive-device-insert

## 2.4 Inserting a Line Module (infeed)

### Description

After the Control Unit (Drive) you insert a Line Module. Only the three basic types – Active, Basic and Smart Line Modules – are listed in the hardware catalog. These are first specified in an additional step.

## This is how you insert a Line Module and specify it

1. In the hardware catalog, open the "Line Modules" folder.
2. Click on the Line Module, e.g. "Active Line Modules", and drag-and-drop to the device view.

The Line Module is inserted as unspecified component, and shown with a white background.

### Note

#### Specifying components

The placeholder components must first be specified. The procedure is described in Section Specifying placeholder components (Page 14).

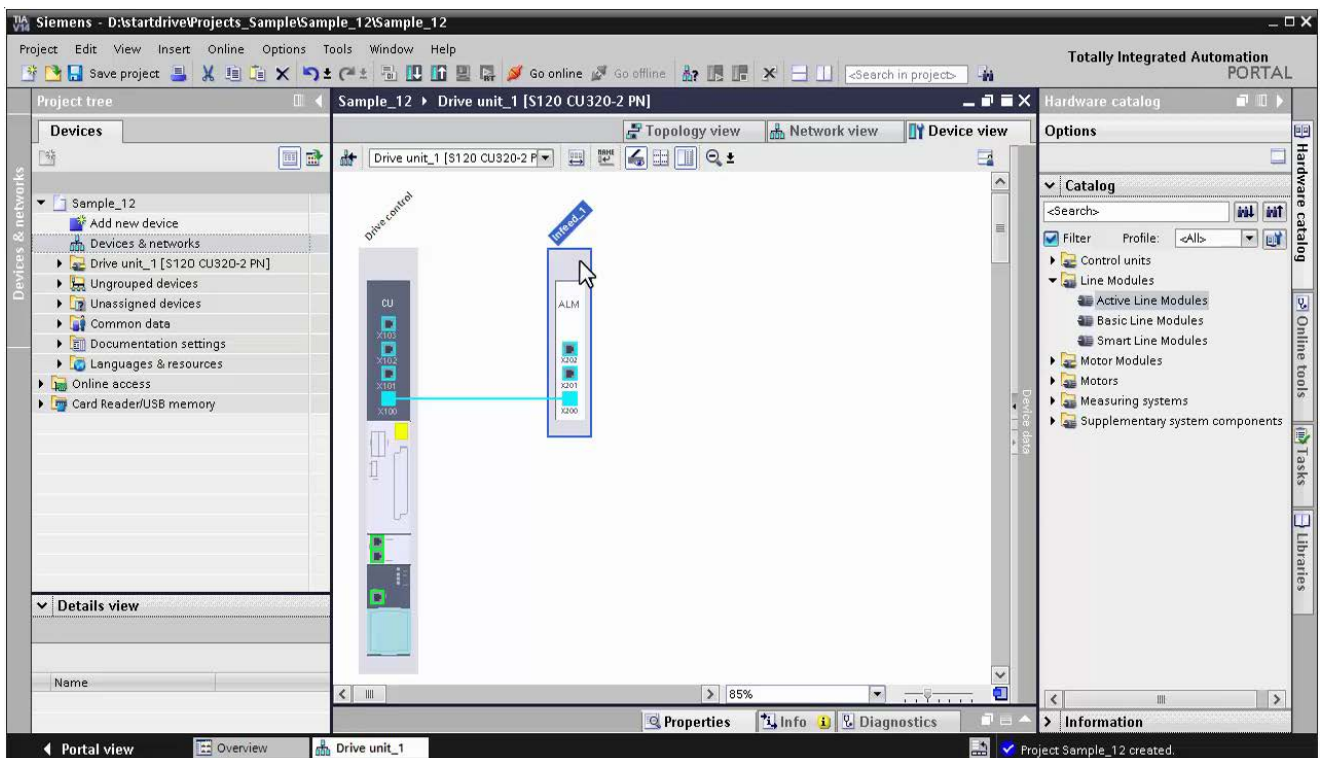


Figure 2-4 02-07-insert-line-modules

## 2.5 Specifying placeholder components

### 2.5.1 Specifying placeholder components

#### Description

Only non-specified components are listed in the hardware catalog. After being inserted in the device view, these are only placeholders; a specific product for the component must be specified in a second step.

#### Placeholder components are:

- Line Modules
- Motor Modules
- Motors
- Measuring systems

#### This is how you specify a placeholder component using a Line Module as example

1. Click in the component on the white surface. This white color indicates that the component has still not been specified. The selected area is marked and has a blue border.
2. The selection of a possible product for the marked component is displayed in the "Inspector window" in "Properties > General".
3. Based on the article number, select a product by clicking on this product in the "Selection" column.
4. The surface that was previously white changes to dark gray, indicating that the product has been assigned to the placeholder.

---

#### Note

##### Filtering products

You can display a reduced selection of products in the "Inspector window" by using the filter function. Section "Filtering products (Page 15)" describes how you can filter products.

---

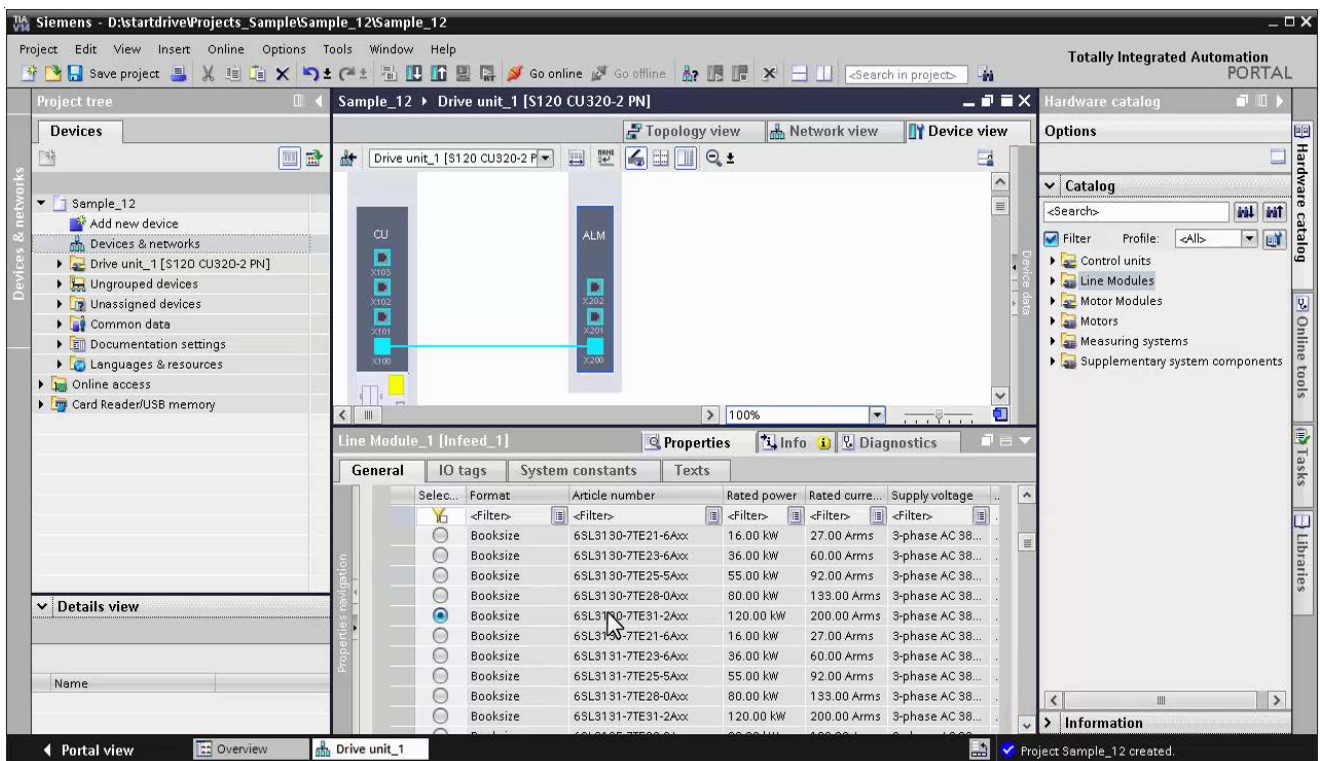


Figure 2-5 02-04-specifying-components

## 2.5.2 Filtering products

### Description

You can display a reduced selection of products in the "Inspector window" by using the filter function. For example, you can filter for parts of an article number – or specific technical features of the products.

### This is how you filter products according to technical features

1. In the column that you wish to filter, click on the symbol next to <Filter>. In the selection that is displayed, select the filter value, e.g. the rated current.
2. Click on the filter symbol in the first column. The filter is selected, and only products are displayed that correspond to the filter criteria.

### This is how you filter products using a search text

1. In the text field <Filter>, double-click on the required column. Enter a search text, e.g. parts of an article number. A list of hits is displayed.
2. Click on one of these products ("hits") – or click in the first column on the filter symbol in order to display all products that correspond to the filter criteria.

This is how you delete the filter

1. In the "Selection" column, click on the filter symbol. The active filter is deleted, and all of the available products displayed.

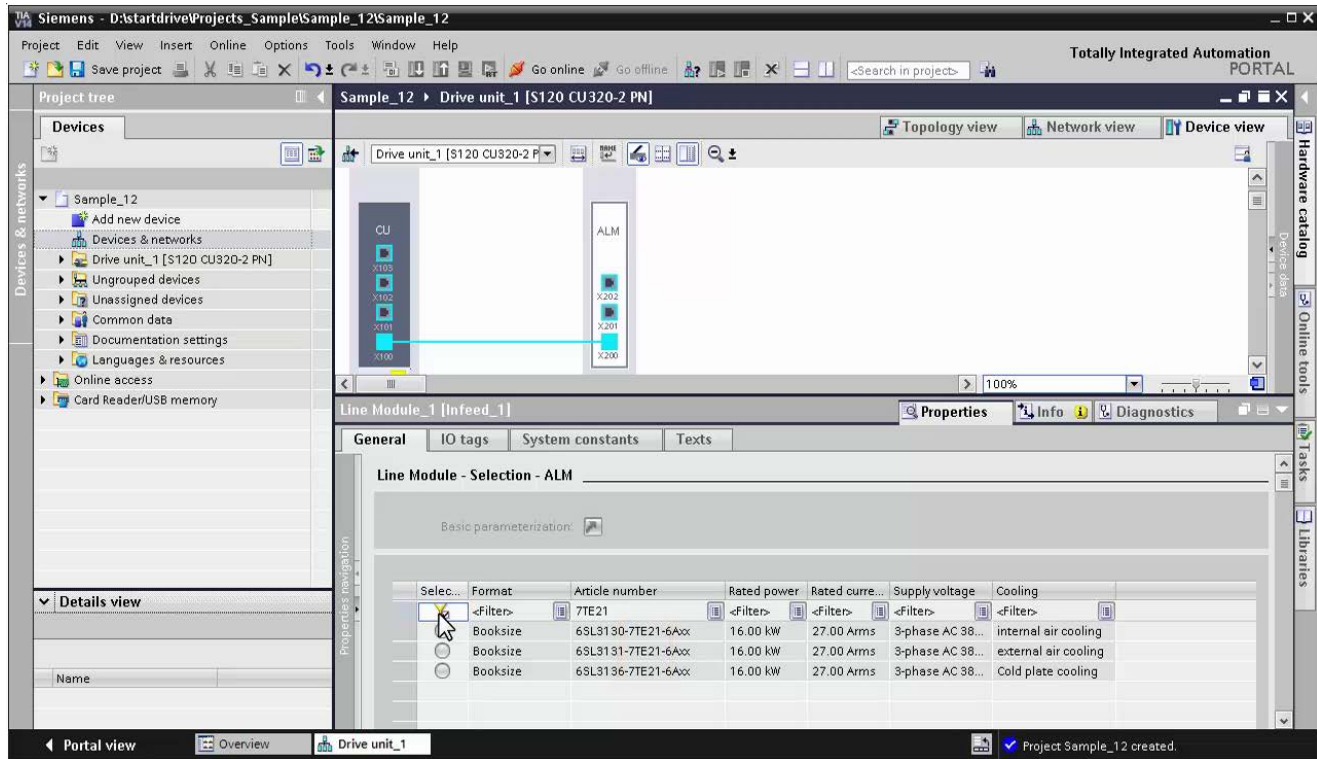


Figure 2-6 02-05-filtering-products

## 2.6 Inserting a Motor Module

### Description

You insert Motor Modules from the hardware catalog as non-specified component.



## This is how you insert a Motor Module and specify it

1. In the hardware catalog, open the "Motor Modules" folder.
2. Click on the Motor Module, e.g. "Double Motor Module", and drag & drop to the device view.

The Motor Module is inserted as unspecified component, and shown with a white background.

3. Specify the Motor Module. Select the appropriate product based on the article number under the "Properties > General" tab of the inspector window.

### Note

#### Specifying components

The placeholder components must first be specified. The procedure is described in Section "Specifying placeholder components (Page 14)".

You insert the motor in the next step.

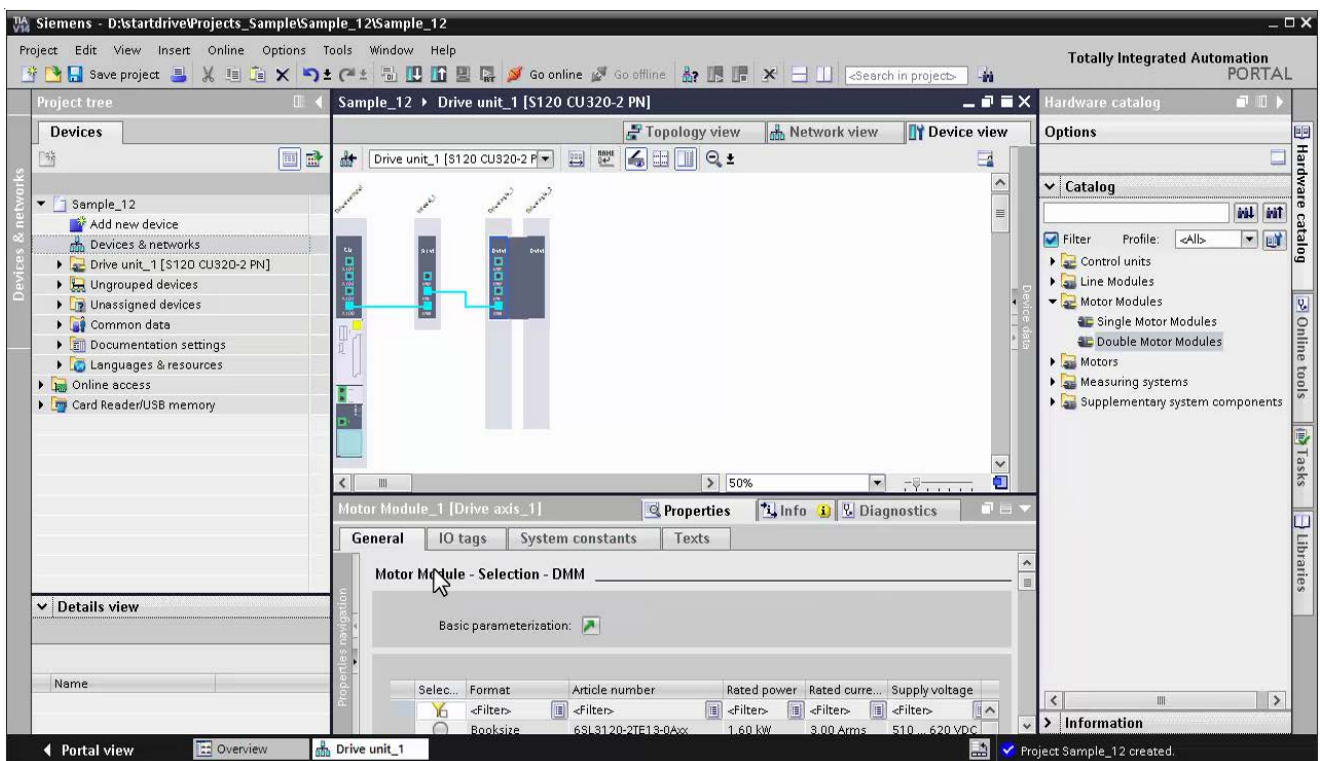


Figure 2-7 02-08-insert-motor-module

## 2.7 Inserting a motor

### Description

You insert motors from the hardware catalog as non-specified component. Depending on the motor, an encoder and encoder evaluation are also automatically inserted.

### This is how you insert a motor and specify it

1. In the hardware catalog, open the "Motor" folder. You can insert DRIVE-CLiQ, synchronous and induction motors.
2. Click on a motor, e.g. "1PH7 induction motors", and using drag & drop place this in the lower section of Motor Modules. "MOT" is inserted as placeholder.  
The motor is inserted as unspecified component, and shown with a white background.
3. Specify the motor. Select the appropriate product based on the article number under the "Properties > General" tab of the inspector window. Depending on the motor type, encoder and encoder evaluation are inserted. In this particular example, this is only the motor.

---

#### Note

##### Specifying components

The placeholder components must first be specified. The procedure is described in Section "Specifying placeholder components (Page 14)".

---

In the next step you will insert an encoder and the encoder evaluation.

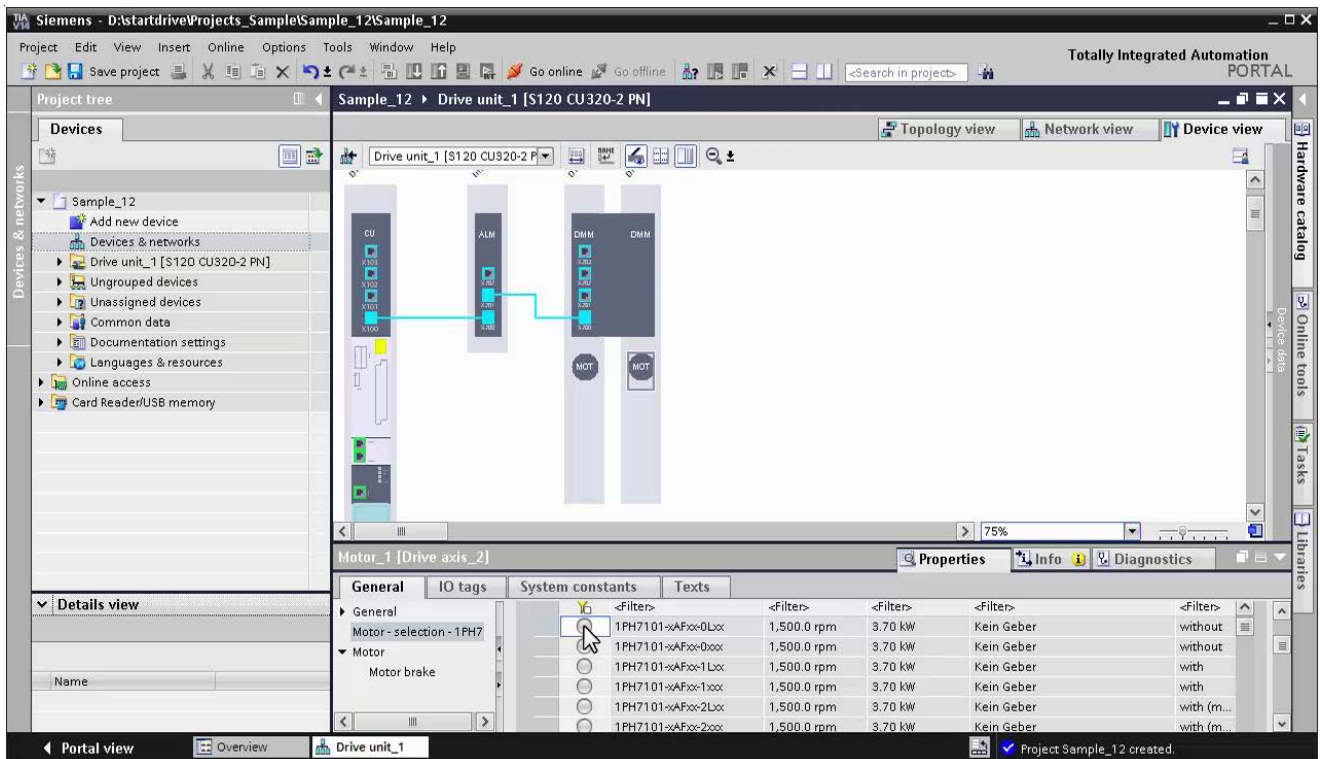


Figure 2-8 02-09-insert-motor

## 2.8 Inserting a measuring system

### Description

For several motors, encoder and encoder evaluation of the measuring system are already defined, and are inserted as default. For motors without encoder, you must still insert an encoder and encoder evaluation.

### This is how you insert an encoder and encoder evaluation

1. In the hardware catalog, open the "Measuring systems" folder.
2. Click on an encoder, e.g. "SSI encoder", and using drag & drop place this in the section below the motor. The placeholder for an encoder (E) and the encoder evaluation (SM) are inserted as non-specified components.

3. Specify the encoder and encoder evaluation based on the article number in the "Encoder data selection" or "Encoder evaluation" in the "Inspector window".

**Note**

**Specifying components**

The placeholder components must first be specified. The procedure is described in Section "Specifying placeholder components (Page 14)".

4. If you wish to configure a second encoder, then repeat the previous steps.

This step completes the hardware configuration. You can configure optional system components, such as terminal boards and terminal modules. When doing this, refer to the Startdrive online help.

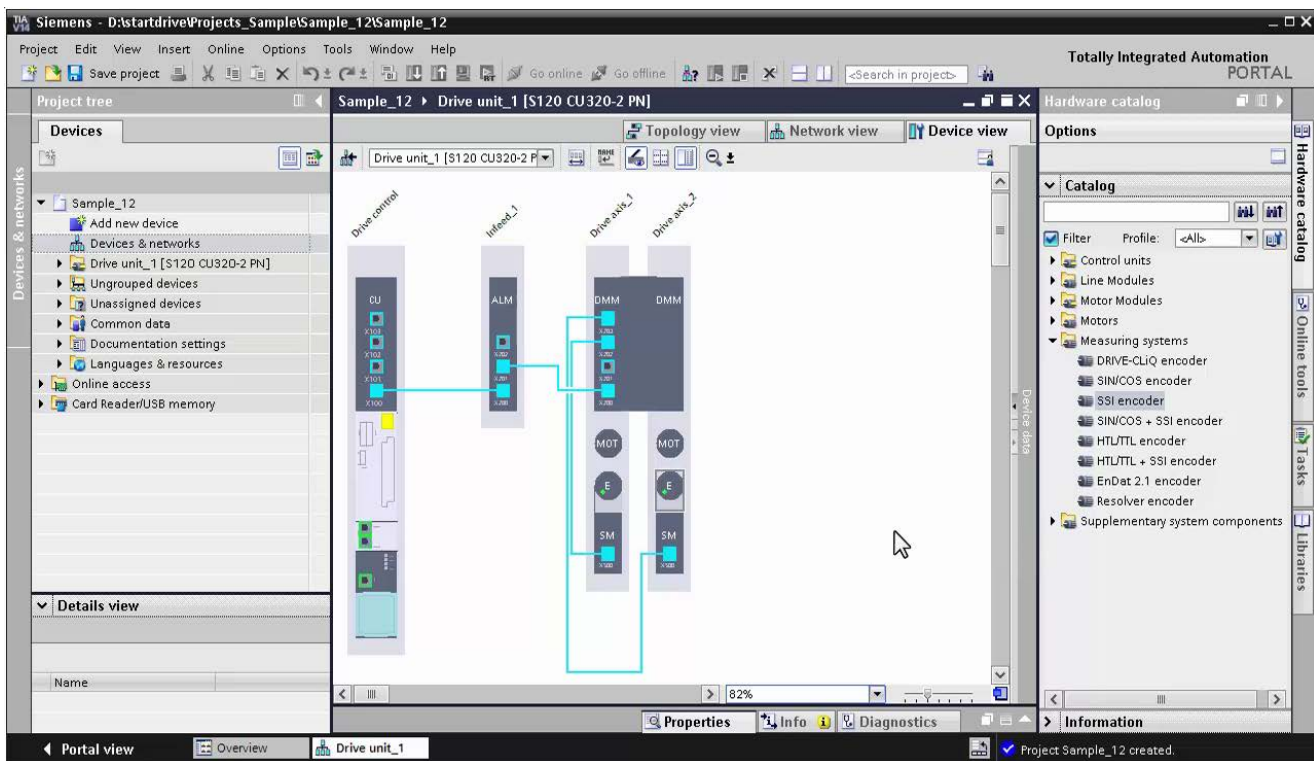


Figure 2-9 02-08-insert-measuring-system

## 2.9 Changing DRIVE-CLiQ connections

### Description

Configure the drive line-up in the "Device view". You drag & drop the components from the hardware catalog and edit the DRIVE-CLiQ connections.

**This is how you insert the components and change the DRIVE-CLiQ connection**

1. Drag & drop the components into the device view.
2. A DRIVE-CLiQ connection is automatically established after inserting. You can delete the standard connection. With the left-hand mouse key pressed, you can establish your own DRIVE-CLiQ connection between the DRIVE-CLiQ ports.

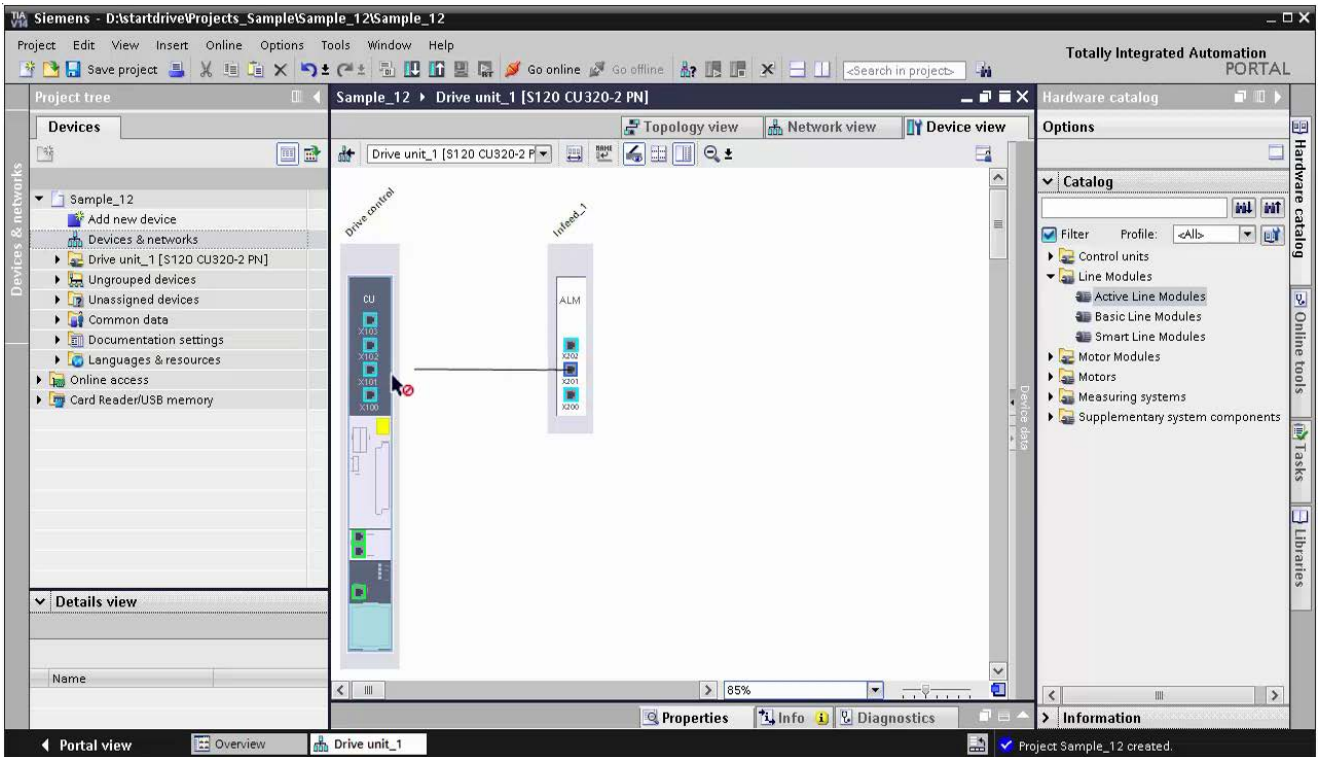


Figure 2-10 02-03-insert-components



# Connecting the drive unit with the PC and going online

# 3

## 3.1 Going online

### Description

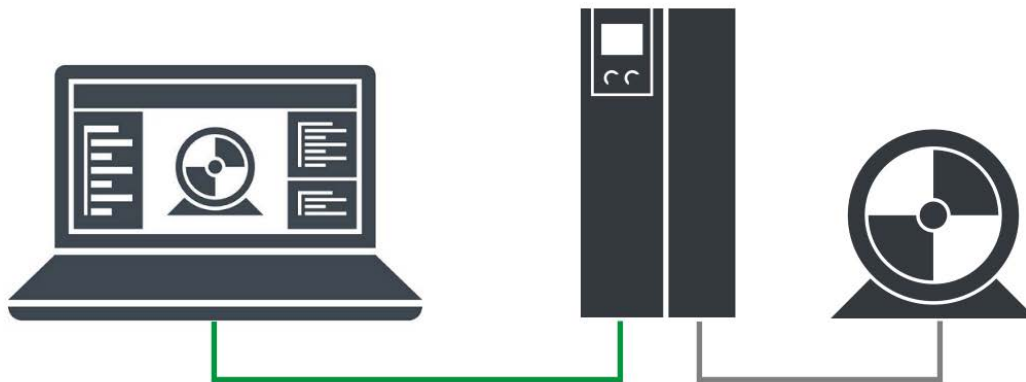


Figure 3-1 Overview – Startdrive online connection to the drive unit

Using the "Accessible devices" function, Startdrive provides the option of going online to the drive. The drive unit can either be connected to the PC via Ethernet (X127) or via PROFINET (X150).

In the following you will learn how to connect the drive unit to the PG/PC, identify it using "Accessible devices" and go online.

## 3.2 Ethernet connection via X127

### Description

Using the programming device (PG/PC), the Control Unit can be commissioned via the integrated Ethernet interface X127. This interface is only intended for commissioning and service, and not for operationally controlling the drive.

#### **This is how you connect SINAMICS S120 using Startdrive**

- Connect the Ethernet interface of the PG/PC with the commissioning interface X127 of the Control Unit.

The IP address of the X127 interface is assigned as follows when first supplied:

- IP address: 169.254.11.22
- Subnet: 255.255.0.0

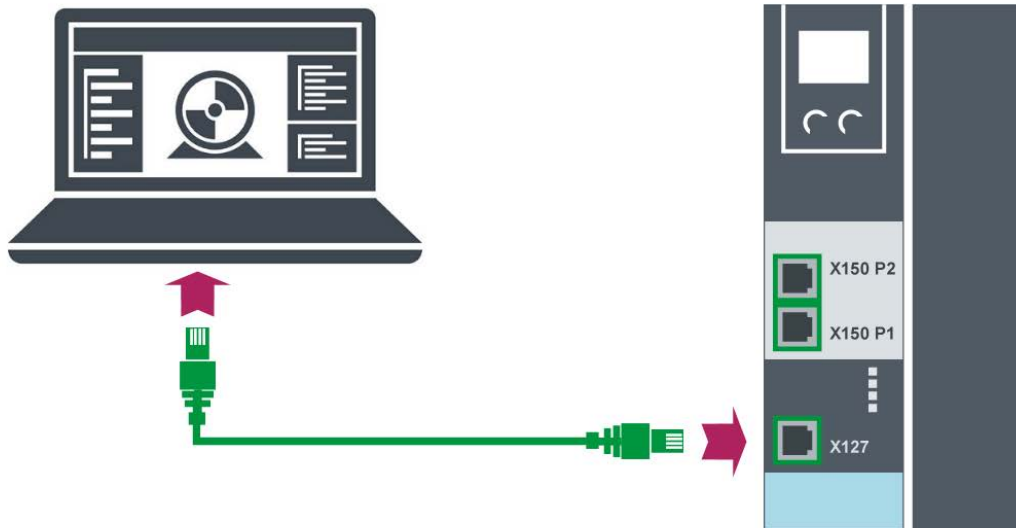


Figure 3-2 PG/PC connected via X127 to SINAMICS S120 CU320-2 PN

### 3.3 Display accessible devices

#### Description

Using accessible devices, you can display all connected and interfaced drive units, which are connected with a PG/PC interface. In "Online access" under the required interface, search for accessible devices to obtain a first overview and to test the cabling/wiring. The drive unit is displayed with the corresponding IP address if the connection has been correctly established to the drive unit.

#### This is how you display connected drives via accessible devices

1. Open the "Online access" folder in the project tree.
2. Open the folder of the interface to which the drive unit is connected.
3. Double-click "Update accessible devices" below the interface.

The interface is scanned for connected devices. All network devices that are accessible via the selected interface are displayed with name and IP address.

4. Double-click "Online & diagnostics" below the drive unit that has been found. A new window is shown in the working area.

Details about the drive unit, such as IP address, device name etc., are displayed in the window. You can change these or restore the drive unit to the factory settings.



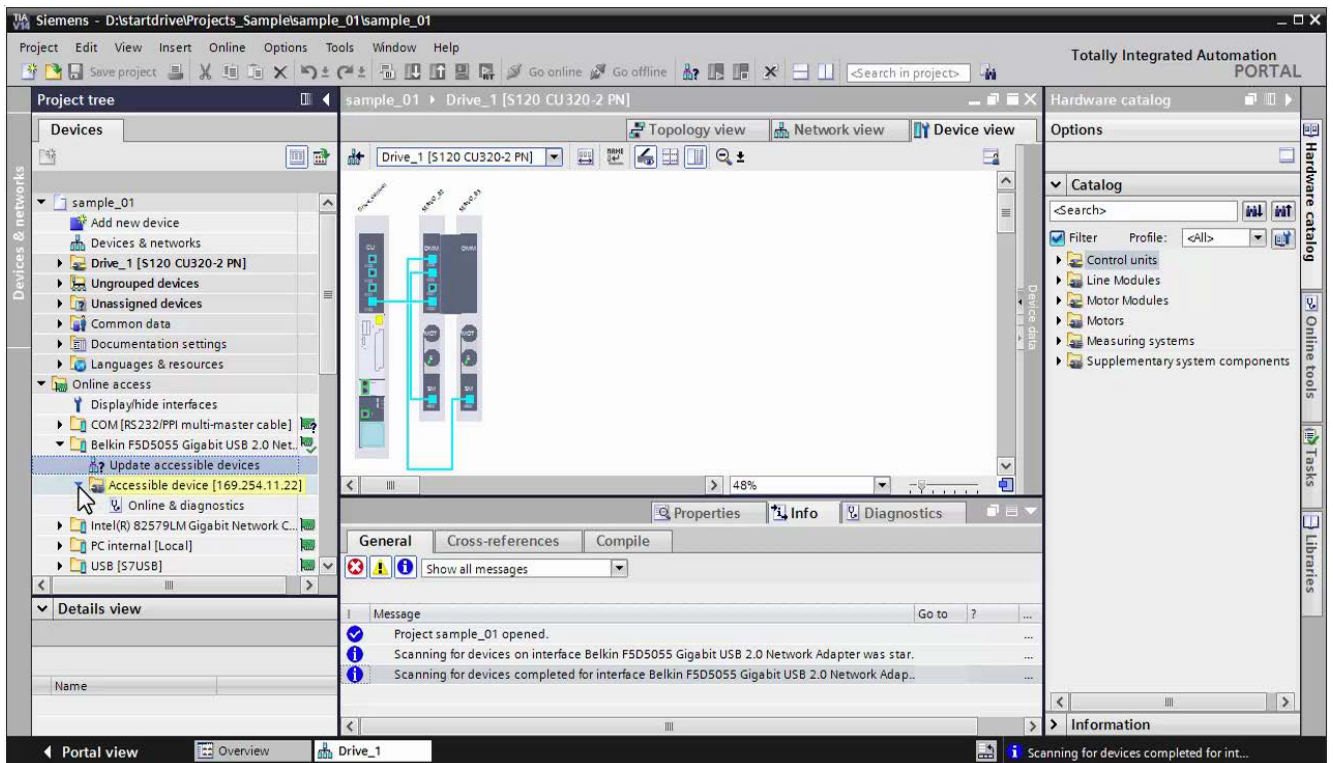


Figure 3-3 03-03 accessible-device

## 3.4 Go online via Ethernet IE (X127)

### Description

You can connect to the drive unit online via commissioning interface X127. In the TIA Portal, you have already configured the hardware, and the drive unit is connected via Ethernet interface X127. Prior to this, you must have already checked whether the drive is identified using the "Accessible devices" function.

### This is how you go online via Ethernet interface 127

1. Click on the drive unit in the project tree or the device view. The "Go online" button is activated.
2. Click on "Go online". A dialog opens.
3. Select the type of the PG/PC interface. In the example, "PN/IE".
4. Select the PG/PC interface of your PC.
5. Define the "Connection to interface/subnet". This is the X127 of the CU320-2 PN for Ethernet/IE.

3.4 Go online via Ethernet IE (X127)

6. Click "Start search" to search for the drive units connected to the selected interface.

The drive units that are found are displayed in the overview.

7. Select the drive unit and click on "Connect".

The connection to the drive unit is established. In the online mode, the title bar of the device view turns orange. There is no error if all of the components are displayed with a green checkbox.

The next time that you go online, the settings made are automatically applied – and the "Go online" dialog is no longer displayed.

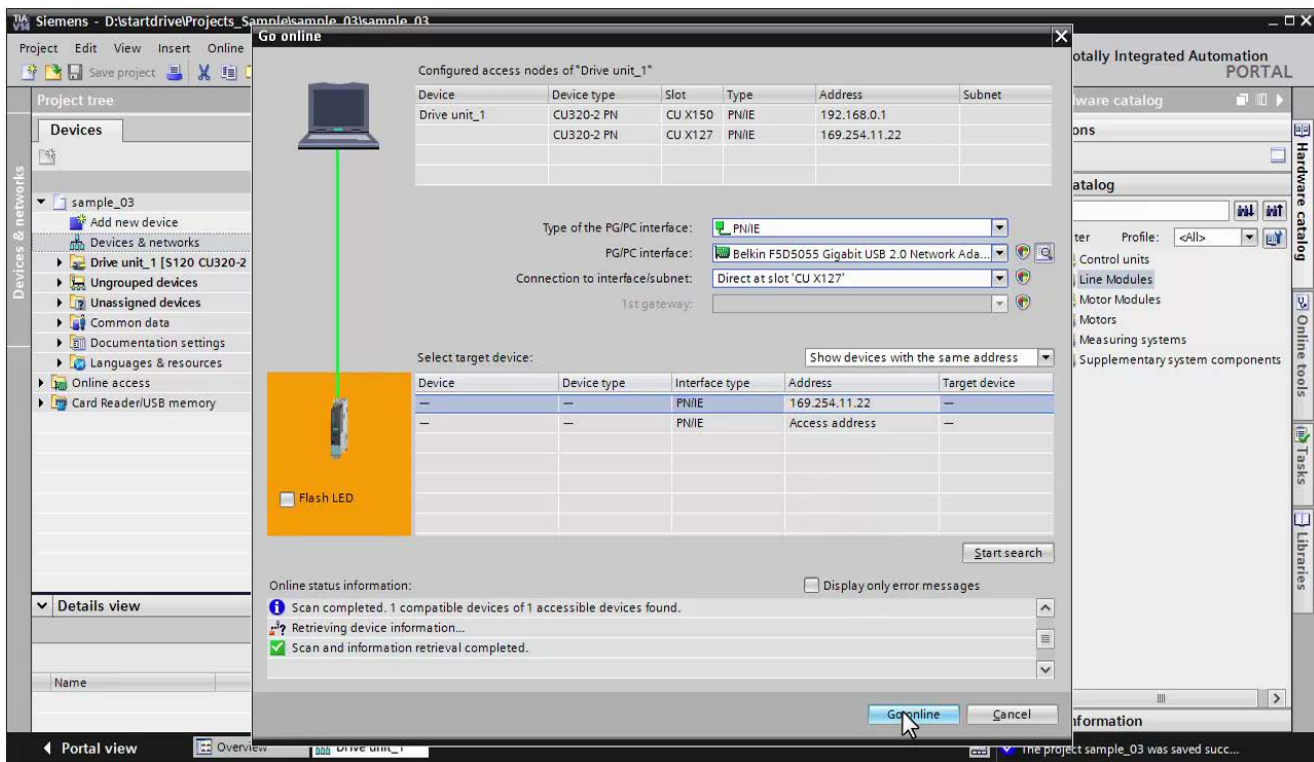


Figure 3-4 03-04-go-online-via Ethernet-X127

## Using the drive control panel

### 4.1 Traversing the motor from the drive control panel

#### Description

Using the drive control panel, you can carry out the first function test of the drive and control and monitor individual drives. You control the drive by entering values. Depending on the particular operating mode, these include speed setpoints, for example.

To do this, Startdrive must be connected online with the drive.

#### This is how you control the drive from the control panel

1. In the project tree, click on "Commissioning" below the drive that you wish to control. The window is opened in the work area.
2. In the secondary navigation of the commissioning, open the "Control panel" entry. If there is no online connection, then Startdrive attempts to establish a connection. When an online connection has been established, the bar in the header area is shown in color. The control elements are grayed-out, with the exception of the "Activate" button. The remaining control elements only become active after you have activated the control panel and set the enables.
3. At the control panel, activate master control and the infeed and set the drive enables and the operating mode.

Depending on the configuration, the enables can already be assigned – as is the case in this example. The motor is ready and is operated in the closed-loop speed control mode.

<b>NOTICE</b>
<b>The motor rotates</b>
Observe the safety instructions in the manual before you make the motor rotate.

4. Switch the motor on.
5. Enter a value for the speed.
6. By clicking the "Forward" or "Backward" buttons you can make the motor rotate. The motor accelerates to the specified speed. The actual values are displayed.
7. Click "Stop" to stop the drive, switch off the motor, reset the drive enables and relinquish master control.

Using the drive control panel

4.1 Traversing the motor from the drive control panel

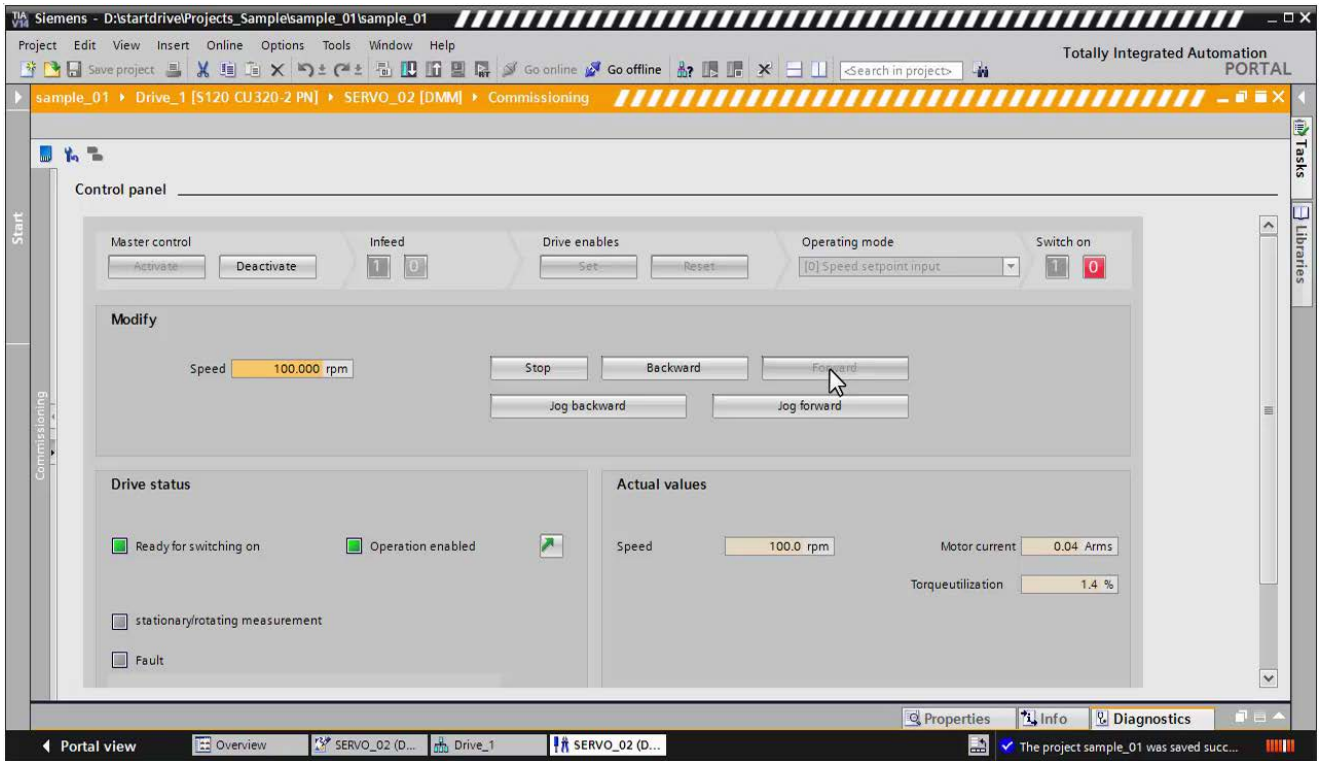


Figure 4-1 04-01-traverse-motor-with-drive-control-panel

# Parameterizing the drive

## 5.1 Function and parameter views

### Description

A parameterization editor with a function and a parameter view is available to parameterize the drive. They are described in more detail in this section. You parameterize the drive using screen forms with a graphic user interface in the function view. The parameter view shows a tabular overview of the parameters available for the device. You can change the parameter values.

### Offline and online

The function and parameter view are available offline and online. In the offline mode, you parameterize the drives in the project and the values are also saved in the project. In the online mode, you change the parameters directly in the drive – and the values are saved in the drive.

You must use the "Load to device" function to save the offline project in the device. You must use the "Load to device" function to transfer the online values into the project.

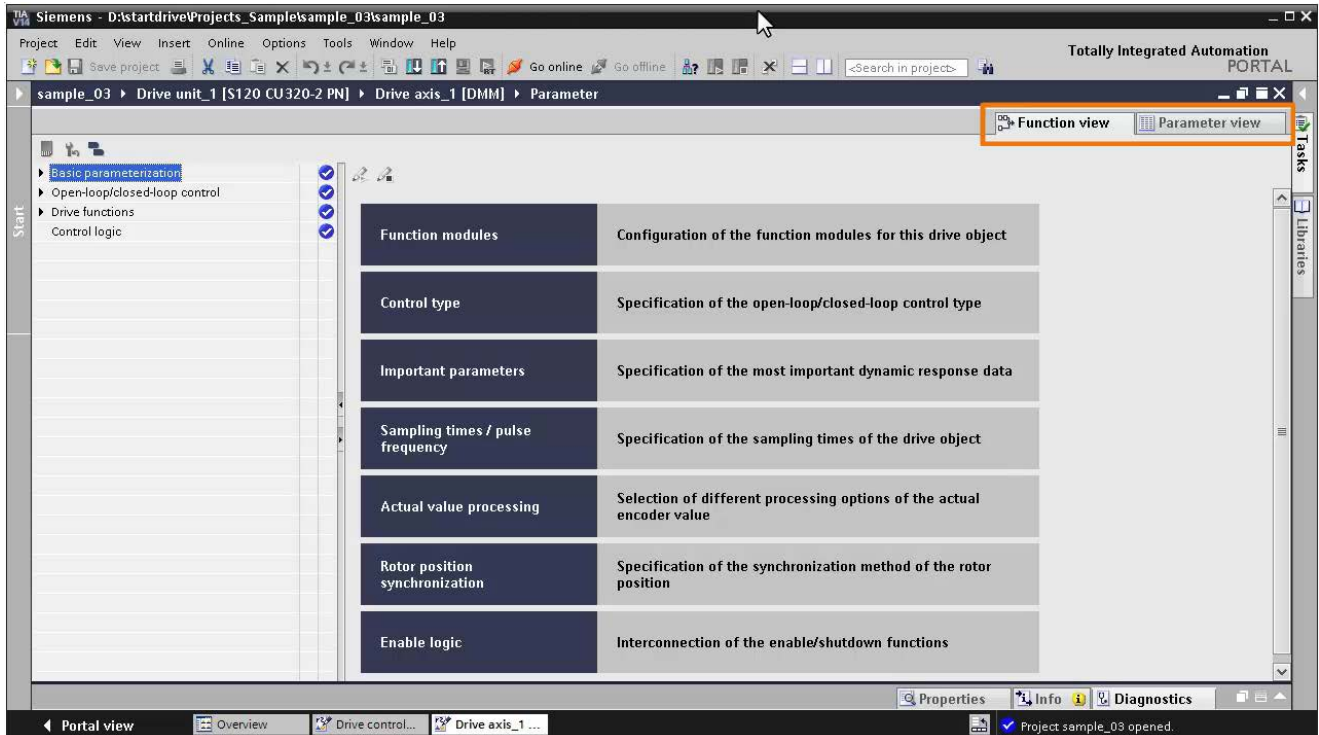


Figure 5-1 05-01-function-and-parameter view

## 5.2 Assigning parameters in the function view

### Description

You edit the most important parameters in a clearly organized, graphical user interface in the function view. The screen forms are based on function diagrams that map the functions in signal flow diagrams. The signal flow is from left to right.

### This is how you work with the function view

1. In the project tree, double-click on "Parameters" below the drive or the Control Unit.
2. In the work area, click on the "Function view" tab.  
The secondary navigation for calling the function-oriented screen forms is in the left-hand area of the function view.
3. Assign the signals for the inputs/outputs similar to the real terminal connections. Simply select the terminal signal from the displayed list.
4. You can parameterize the functions in the screen forms with the aid of a graphic support.
5. In addition to the secondary navigation, you can toggle between the individual screen forms of the function view using buttons.
6. You are supported by help screens when entering values.

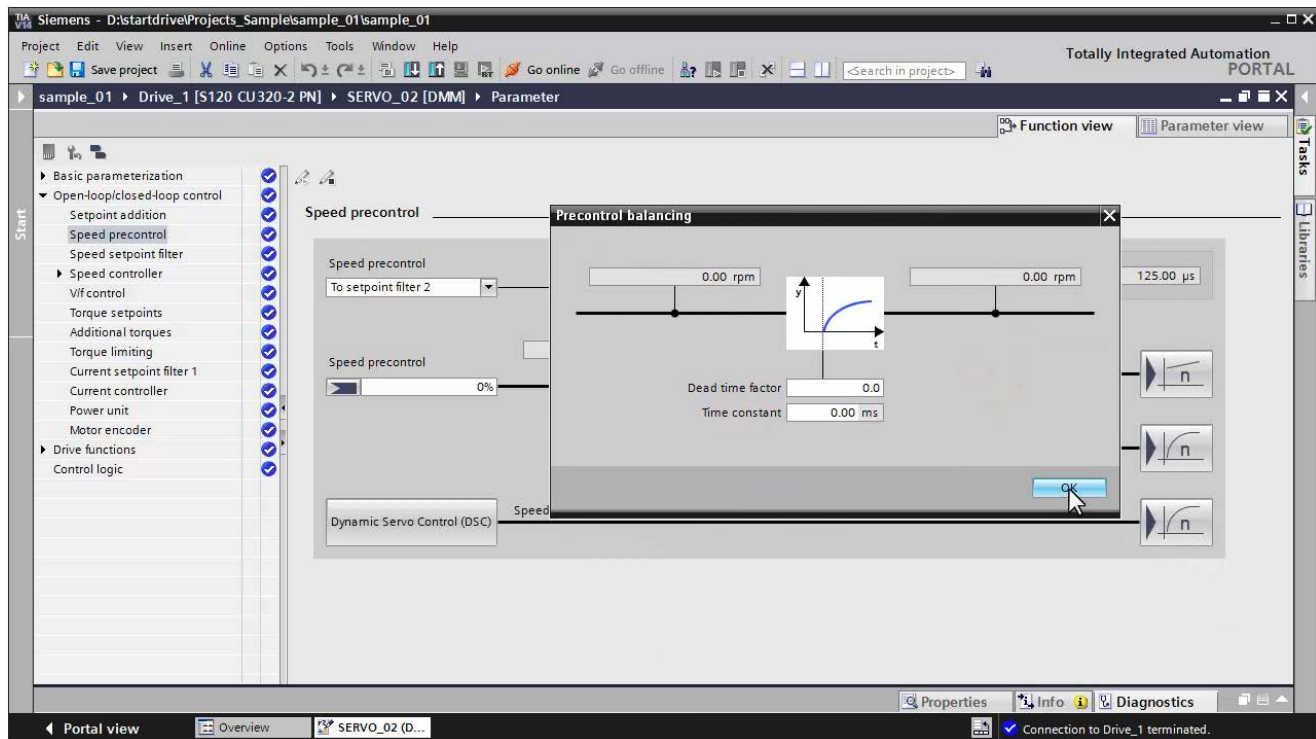


Figure 5-2 05-02-parameterizing-function-view



## 5.3 Online function view

### Description

If you are connected online with the drive, then in the function view you can change parameter values directly in the drive. The input fields of the parameters that you can change online are displayed in orange.

### How to go online with the function view

1. Connect Startdrive online with the drive. The input fields that can be changed are displayed in orange.
2. Parameter changes in the online view are only effective in the drive itself.
3. To permanently save the data in the drive unit, click the "Permanently save data for all drive units" button. The data is saved on the memory card.
4. If you want to transfer the changes to the offline project, you must first disconnect the online connection, and then upload the changes to the project.

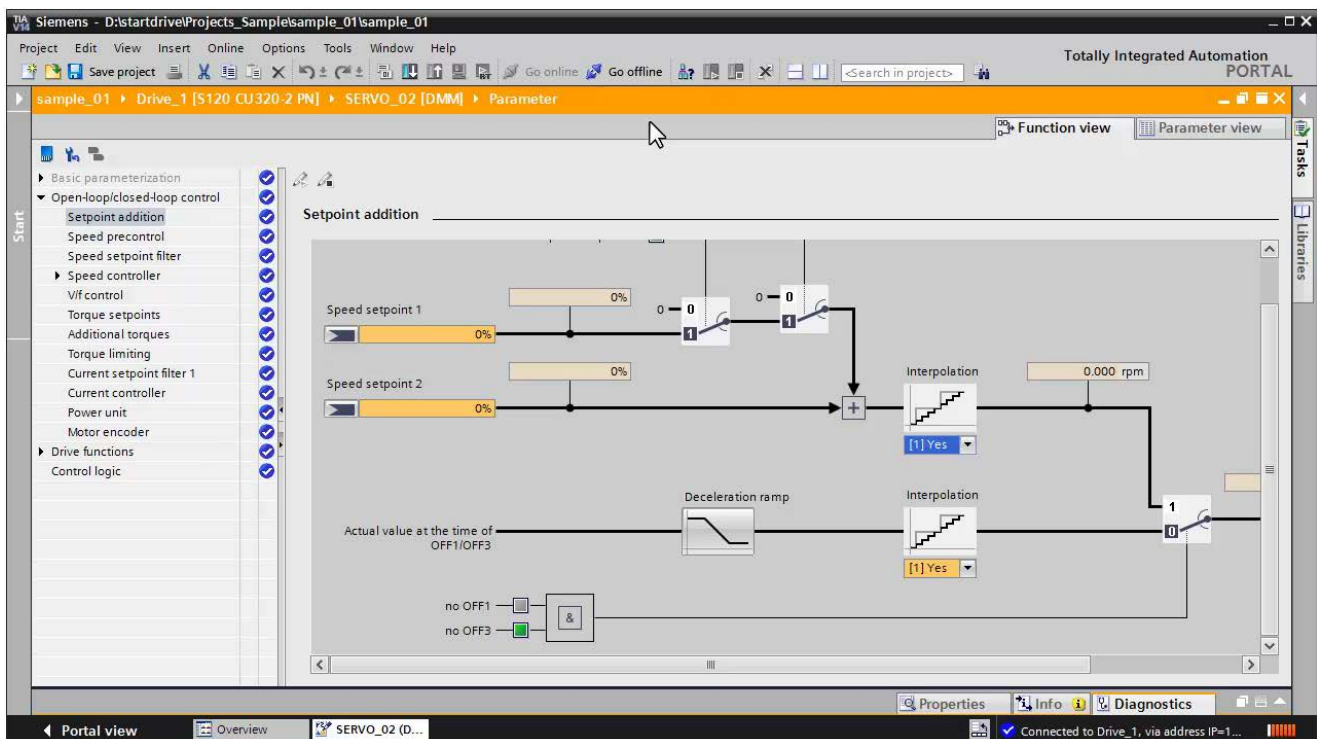


Figure 5-3 05-03-function-view-online

## 5.4 Parameterizing in the parameter view

### Description

The parameter view transparently shows the parameters available for the device. Parameters are sorted according to specific topics so that it is easy to find them. Parameters that can be changed have a light gray background.

### This is how you work with the parameter list

1. Click on the "Parameter view" tab in the work area.
2. From the drop-down list define which parameters should be displayed with which access level, e.g. standard for typical parameters.
3. Click the parameter in the "Value" column that you wish to change.
4. Select a value from the list or enter a value and confirm it with the enter key.
5. To display the online help, click the parameter and open the online help for the parameter using the tooltip that is displayed.

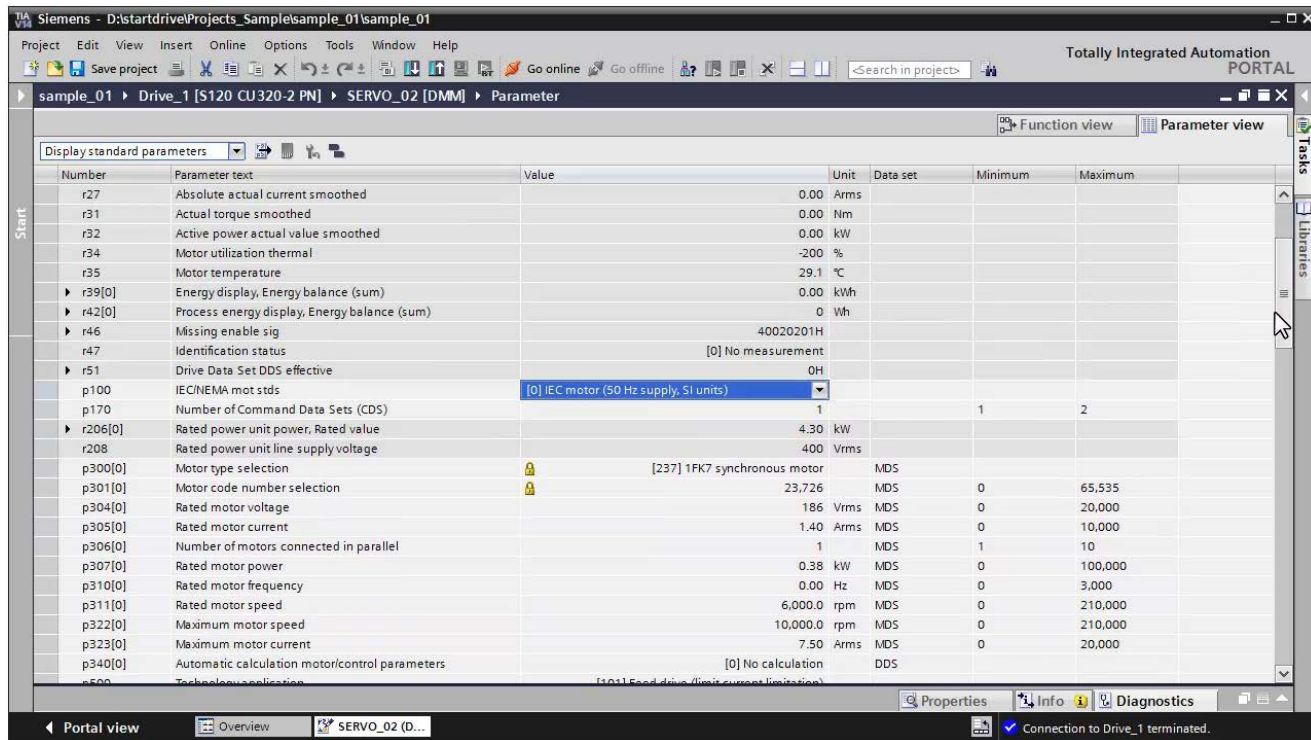


Figure 5-4 05-04-parameterizing-parameter-view



## 5.5 Online parameter view

### Description

If you are connected online with the drive, then in the parameter view you can change parameter values directly in the drive. The input fields of the parameters that you can change online are displayed in orange.

### This is how you go online with the parameter view

1. Switch to online mode in the parameter view. The input fields that can be changed are displayed in orange.
2. Parameter changes in the online view are only effective in the drive itself.
3. To permanently save the data in the drive unit, click the "Permanently save data for all drive units" button. The data is saved on the memory card.
4. If you want to transfer the changes to the offline project, you must first disconnect the online connection, and then upload the changes to the project.

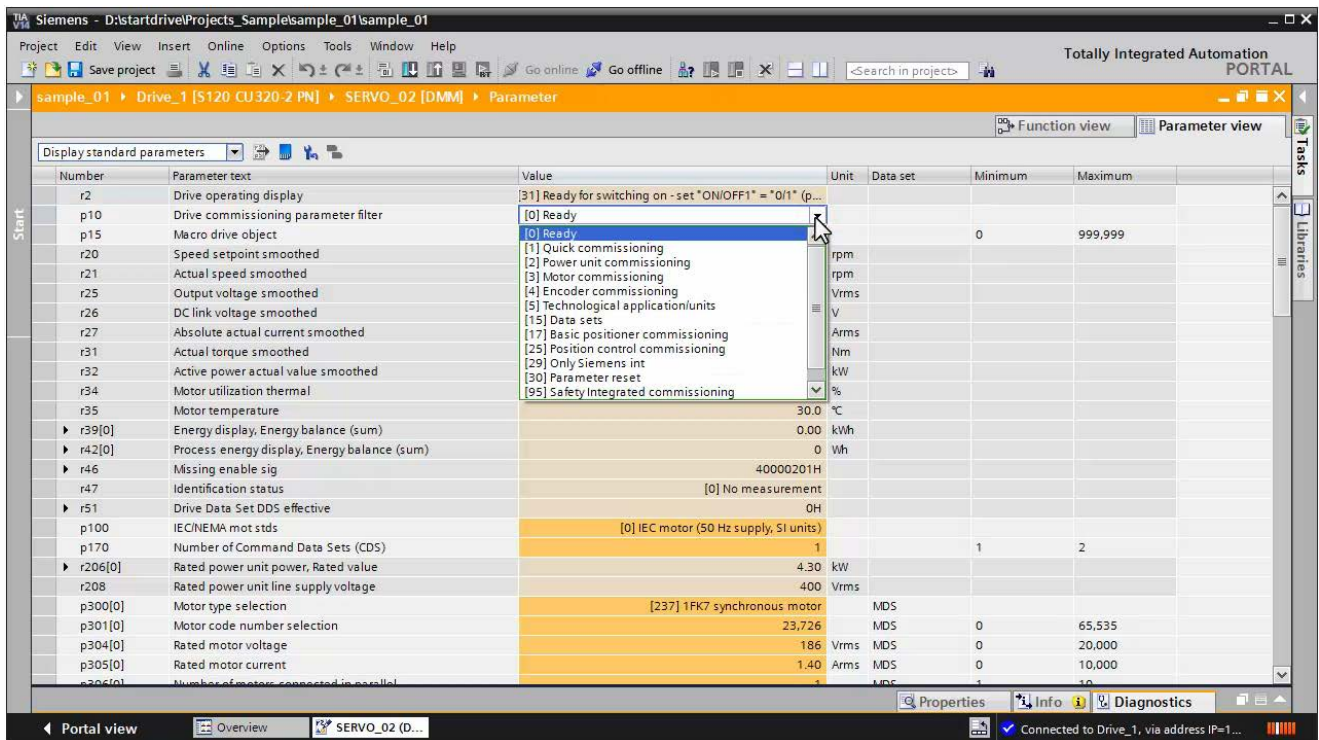


Figure 5-5 05-05-parameter-view-online

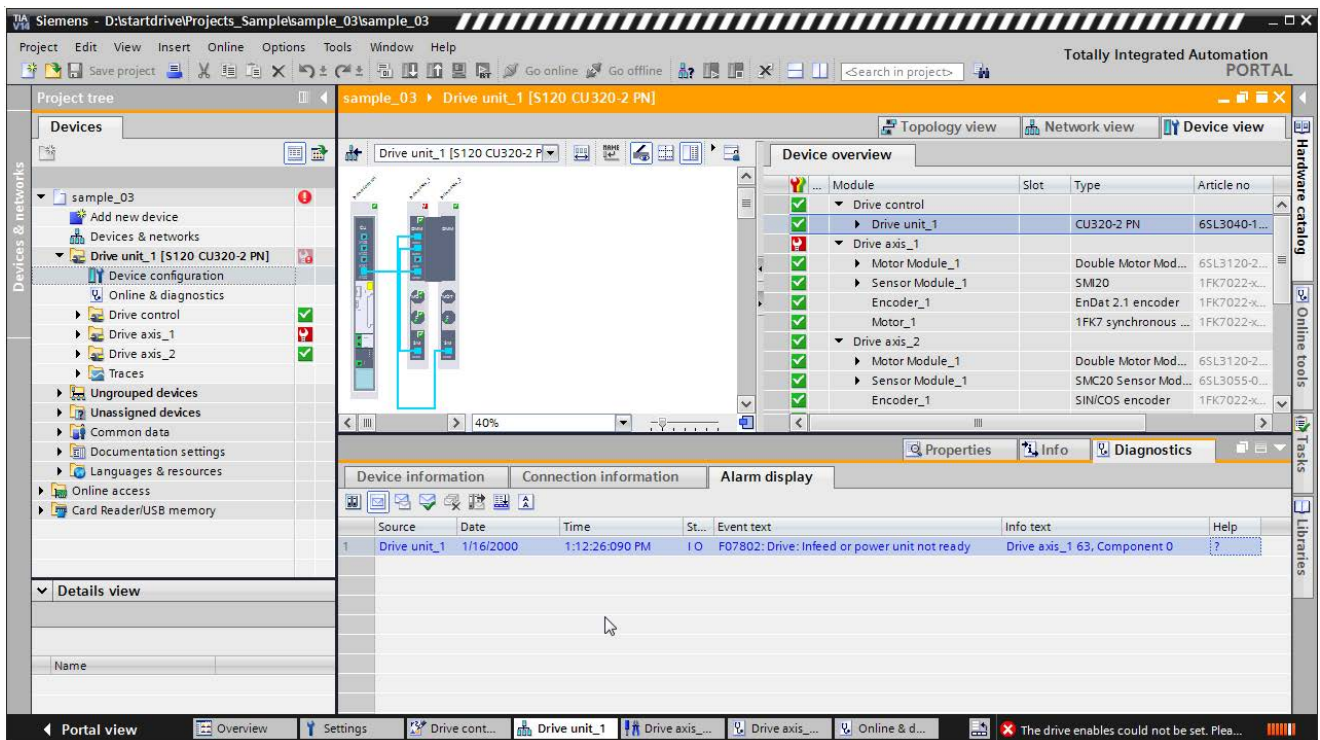


# Diagnostics and troubleshooting

## 6.1 Diagnostics overview

### Description

The TIA Portal with integrated Startdrive offers a range of diagnostic options. You can identify the drive and see the most important data using general diagnostics. In the event of an error, faults and alarms are displayed with proposed solutions. For targeted diagnostics you can record signal sequences with the trace function and analyze them. A brief overview of the diagnostic functions is provided in the following.



## 6.2 Device diagnostics

### Description

A series of diagnostic options are available to you in the online mode.

This is how you work with the device diagnostics

1. Go online with the drive unit. Unique symbols for the diagnostic status are displayed in the TIA Portal. You can find these in the project tree, in the device view and in the device overview, for example. The diagnostics status is transferred to higher-level objects, e.g. drive units or control systems. As a consequence, a motor fault is also displayed at the Control Unit. Errors are shown in red.
2. You can obtain more information about the significance of the individual symbols in the online help – this will then allow you to localize faults.
3. Faults, disturbances, alarms and messages are displayed in the "Inspector window" under the "Diagnostics" tab.
4. The online help with counter-measures is displayed by clicking on the question mark for the particular message.
5. After the fault has been resolved, you can acknowledge messages that are still active using the acknowledge button. The acknowledge messages are deleted from the overview.

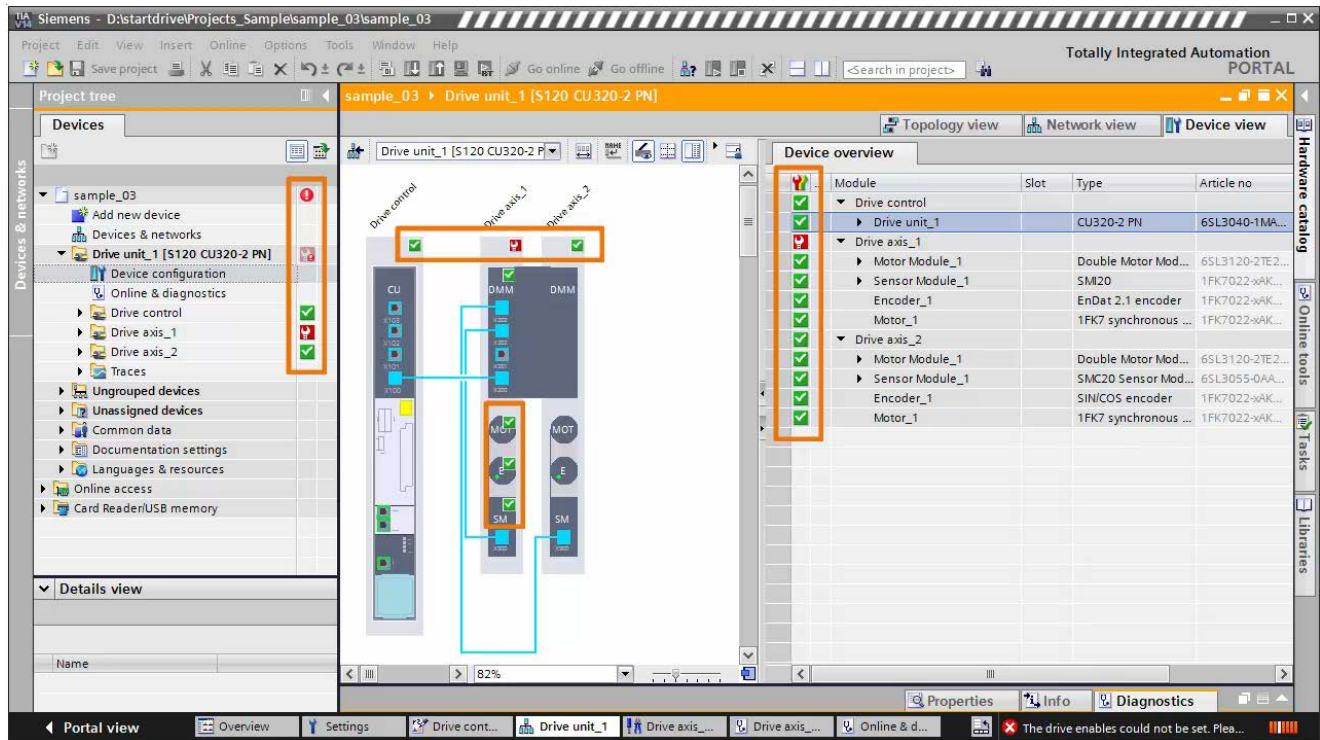


Figure 6-1 06-02-device-diagnostics

## 6.3 Diagnostics topology error

### Description

All DRIVE-CLiQ components of the drive line-up are shown in the device view. If the DRIVE-CLiQ wiring of the offline configuration is different to the actual wiring, then these errors are displayed in the device view. You obtain a brief description of the error at the tooltip. A target-actual alignment of the DRIVE-CLiQ wiring is performed online.

### This is how you diagnose typical topology errors

After going online, the drive objects (DO) that are ready are displayed with a green checkmark in the device view. However, topology errors, which are designated with red at the DRIVE-CLiQ connection, can also be present. You can find three typical error scenarios in the following.

#### First error scenario: DRIVE-CLiQ connection not inserted at a port of a drive object

1. Click on the port marked in red at the first drive object (in this particular case, the Control Unit) and show the tooltip. The tooltip shows the target connection in comparison to the currently available connection – and provides a brief error description. In the example, there is no connection between port X103 of the Control Unit and port X500 of the TM31.
2. Display the tooltip of the partner port marked in red at the TM31. The error describes that there is no connection at port X500 of the TM31.

---

#### Note

If several ports are marked in red, starting from the left and moving to the right, check all error descriptions using the tooltip.

---

3. Check the DRIVE-CLiQ wiring at the real hardware. Insert the connection according to the target topology.
4. Acknowledge the active errors in the message view.

The ports in the device view are shown in blue if the actual and target topology match after the error has been resolved and the message acknowledged.

**Second error scenario: Two ports involved in a DRIVE-CLiQ connection interchanged**

1. Check the port marked in red at the first drive object.  
Typically, it is displayed that no connection should be inserted. However, in the actual topology, there is a connection to another port. In the example, a connection exists from X101 to X200 of the Line Module, which is not configured.
2. Check the partner port of the other drive object, marked in red – in this case, the Line Module.  
It is displayed that a connection should exist to X100 – however it goes to X101. When connecting up, both ports were interchanged.
3. Change over the connection at the first drive object from X101 to X100. This means that the actual and target topology are identical, and the ports are shown in blue.

---

**Note**

When switching over connections in the online mode, more errors can be briefly displayed, as certain objects can no longer be accessed. You only see the updated view without any errors once the target topology has been completely wired and is accessible.

---

**Third error scenario: A DRIVE-CLiQ connection inserted at the port of an incorrect drive object**

If more complex topology errors are active, resolve them step-by-step – and observe the subsequent changes in the device view. As a result of the error combination, not all errors can be directly analyzed and displayed.

1. Check the port at the first drive object that is red, in the example, the Single Motor Module.  
The tooltip displays that a connection, which is not configured, is inserted at port X201.
2. Withdraw the connection from port X201. The port is displayed as being error-free after the device view has been updated. In addition, faults are displayed at the Double Motor Module and at the Sensor Module.

---

**Note**

If the device view is not automatically updated after changing the wiring, simply change briefly to the network view.

---

3. Check the red ports at the Motor Module and at the Sensor Module.  
The tooltip displays that the Sensor Module is not inserted at the Double Motor Module.
4. Insert the connection and acknowledge active messages.  
The topology is displayed as being error-free.

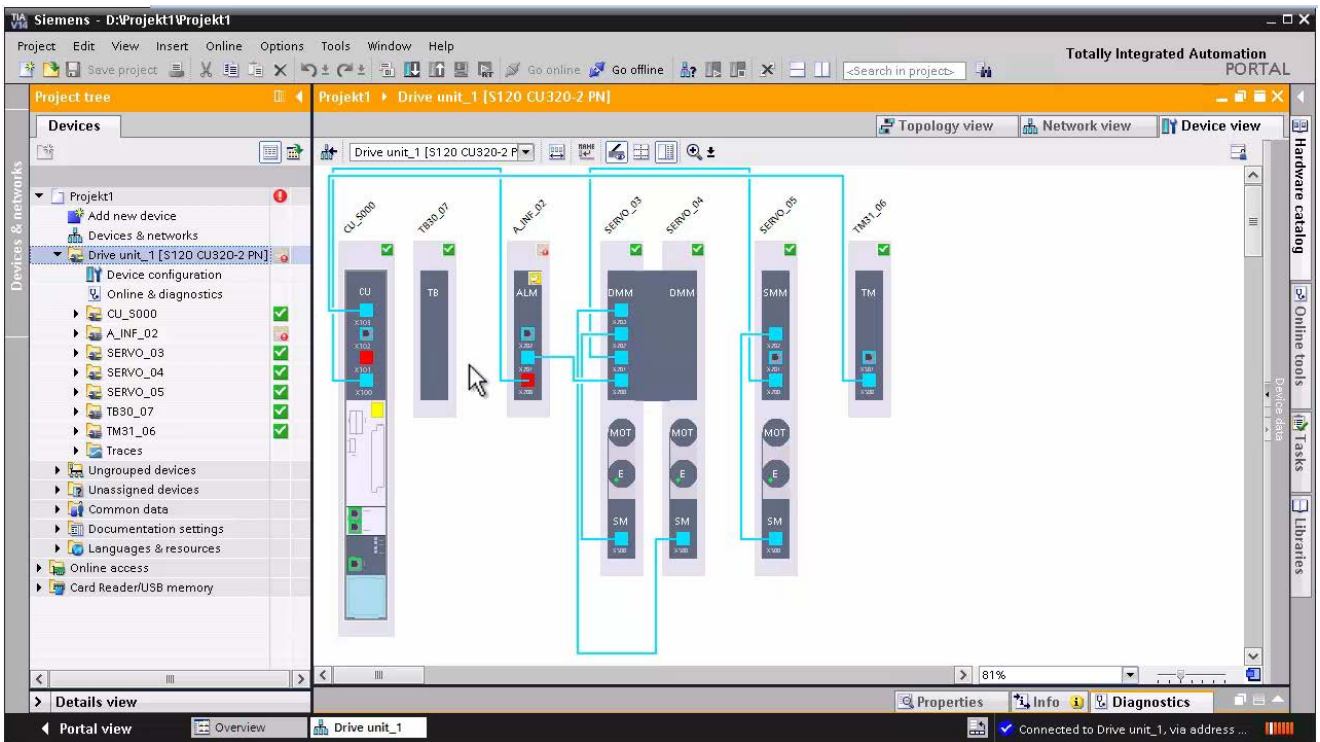


Figure 6-2 06-03-diagnostics-topology-error

