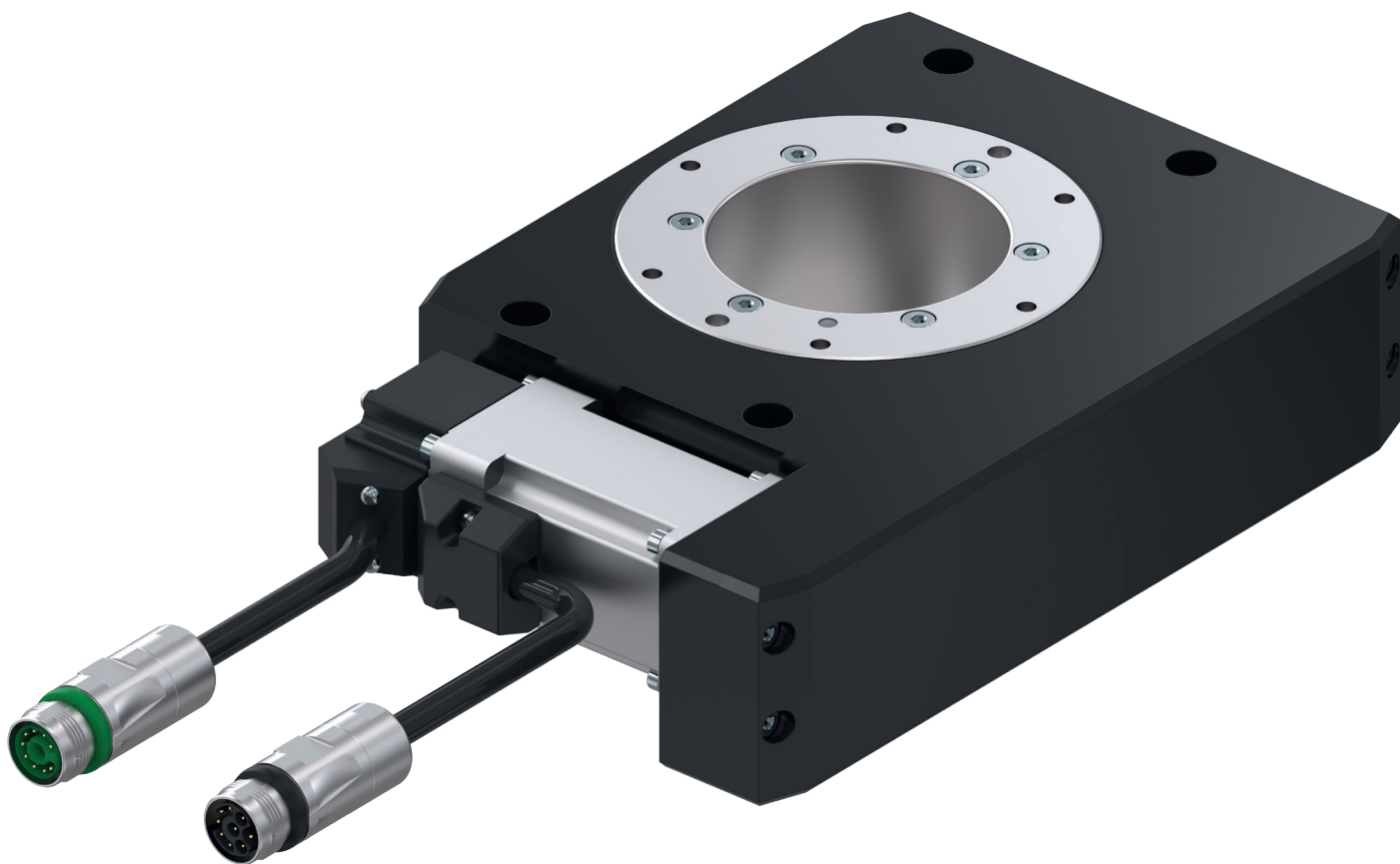




## INSTALLATION AND OPERATING INSTRUCTIONS

Flat swivel unit  
DES

DDOC00192

THE KNOW-HOW FACTORY

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# 1 Introduction

## 1.1 Supporting documents

### NOTICE



Read through the instructions before installing or working with the product.

The instructions contain important notes for your personal safety. They must be read and understood by all persons who work with or handle the product during any phase of the product lifetime.



The documents listed below are available for download on our website [www.zimmer-group.com](http://www.zimmer-group.com).

- Installation and operating instructions
  - Catalogs, drawings, CAD data, performance data
  - Information on accessories
  - Technical data sheets
  - General Terms and Conditions, including warranty information.
- ⇒ Only those documents currently available on the website are valid.

In these instructions, "product" refers to the product designation on the title page!

## 1.2 Notices and graphics in the instructions

### DANGER



This notice warns of an imminent danger to the life and health of people. Ignoring these notices can lead to serious injury or even death.

- ▶ You absolutely must comply with the described measures for avoiding these dangers!
- ⇒ The warning symbols are assigned according to the type of danger.

### WARNING



This notice warns of a situation that is potentially hazardous to personal health. Ignoring these notices can cause serious injury or damage to health.

- ▶ You absolutely must comply with the described measures for avoiding these dangers!
- ⇒ The warning symbols are assigned according to the type of danger.

### CAUTION



This notice warns of a situation that is potentially hazardous to persons. Ignoring these notices can cause minor, reversible injuries.

- ▶ You absolutely must comply with the described measures for avoiding these dangers!
- ⇒ The warning symbols are assigned according to the type of danger.

### NOTICE



This notice warns of possible material and environmental damage. Ignoring these notices can result in damage to the product or the environment.

- ▶ You absolutely must comply with the described measures for avoiding these dangers!
- ⇒ The warning symbols are assigned according to the type of danger.

### INFORMATION



This category contains useful tips for handling the product efficiently. Failure to observe these tips will not result in damage to the product. This information does not include any information relevant to health or workplace safety.



## 2 Safety notices

### CAUTION



#### Risk of injury and material damage in case of non-compliance

The product is state-of-the-art.

The following are examples of situations in which the product may cause a hazard:

- The product is not properly installed, used or maintained.
- The product is not used for its designated purpose.
- The locally applicable regulations, laws, directives or guidelines are not observed.
- ▶ The product may only be used in accordance with these instructions and the product's technical data. Any changes or additions to the intended use of the product, as well as modifications to the product, such as those in the following examples, require the written permission of the manufacturer:
  - Use of the product under extreme conditions, such as aggressive fluids or abrasive dusts
  - Additional drilled holes or threads
- ⇒ Zimmer Group GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.
- ▶ Make sure that the power supply is disconnected before you mount, adjust, modify, maintain or repair the product.
- ▶ Whenever work is carried out on the product, make sure that the product cannot be actuated by mistake.
- ▶ Perform maintenance tasks, renovation work or attachment work outside of the machine's danger zone when possible.
- ▶ Do not reach into the operational range of the product.
- ▶ Observe the specified maintenance intervals and specifications regarding the quality of the operating material.
- ▶ When using the product under extreme conditions, adjust the maintenance interval according to the degree of contamination.

### CAUTION



#### Notes and handling regulations for electrostatically sensitive components

Electrostatically sensitive components are individual components, integrated circuits or assemblies that can be damaged by electrostatic fields or electrostatic discharge.

- ▶ When handling electrostatic components, make sure that persons, the work area and packaging are all fully grounded.
- ▶ Touch electronic components only in appropriately identified areas with conductive flooring and only if:
  - You are grounded by means of special bracelets.
  - You wear shoes that are suitable and approved for the discharge of electrostatic charges.
- ▶ Do not bring electronic assemblies into contact with plastics and parts of clothing that have plastic content.
- ▶ Store electronic assemblies on conductive underlays only.
- ▶ Do not install electronic assemblies in the vicinity of data back-up devices or monitors (monitor distance > 100 mm).
- ▶ Perform measurements on electronic assemblies only if:
  - The measuring instrument is grounded (e.g. via a ground conductor).
  - The measuring head is momentarily discharged before measuring with a floating measuring instrument.

### 3 Proper use

#### NOTICE



#### Material damage and malfunction in case of non-compliance

The product is only to be used in its original state with its original accessories, with no unauthorized changes and within the stipulated parameter limits and operating conditions.

Any other or secondary use is deemed improper.

- ▶ Operate the product only in compliance with the associated instructions.
  - ▶ Operate the product only when it is in a technical condition that corresponds to the guaranteed parameters and operating conditions.
- ⇒ Zimmer Group GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

- The product is designed exclusively for electric operation using a 110 - 230 V AC power supply.
- The product must always be mounted on materials that dissipate heat.
- The product is used in accordance with proper use in closed rooms for rotating with position accuracy.
- The product is not suitable for rotating workpieces during a machining process.
- Direct contact with perishable goods/food is not permitted.

### 4 Personnel qualification

#### WARNING



#### Inadequate qualification can cause injury and material damage

If inadequately qualified personnel perform work on the product, this can cause serious injuries and significant material damage.

- ▶ All work on the product must be performed by qualified personnel.
- ▶ Before working with the product, read the document in its entirety and make sure that you have understood everything.
- ▶ Observe country-specific accident prevention regulations and the general safety notices.

The following qualifications are a prerequisite for performing various work on the product.

#### 4.1 Electricians

Electricians are able to perform work on electrical systems, can recognize and avoid possible dangers and know the relevant standards and provisions due to their technical training, knowledge and experience.

#### 4.2 Specialists

Specialists are able to perform the assigned work, can recognize and avoid possible dangers and know the relevant standards and provisions due to their technical training, knowledge and experience.

#### 4.3 Instructed personnel

Instructed personnel have been trained by the operating company on the tasks and possible dangers of improper behavior.

#### 4.4 Service personnel

Service personnel are able to perform the assigned work and can recognize and avoid possible dangers due to their technical training, knowledge and experience.

#### 4.5 Additional qualifications

Persons who work with the product must be familiar with the valid safety regulations and laws as well as the standards, guidelines and laws listed in this document.

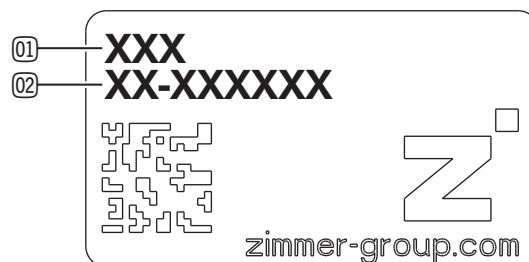
Personnel who work with the product must have facility-issued authorization to commission, program, configure, operate, maintain and also decommission this product.

## 5 Product description

### 5.1 Type plate

A type plate is attached to the product.

- 01 Article number
- 02 Confirmation number



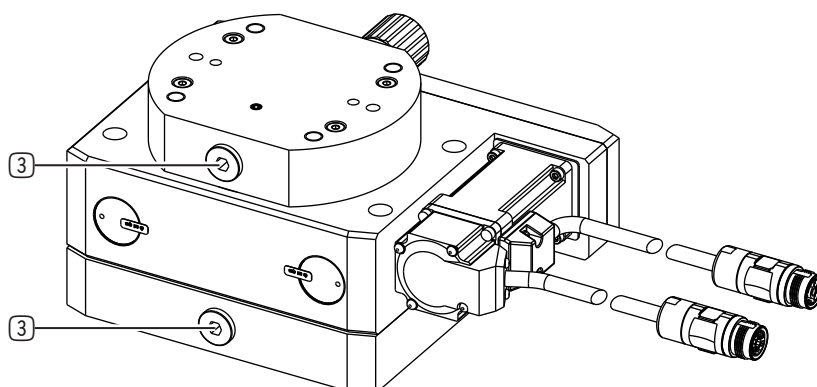
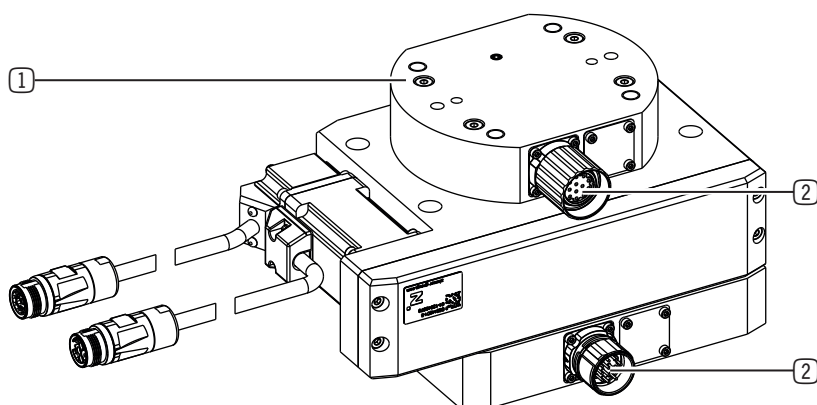
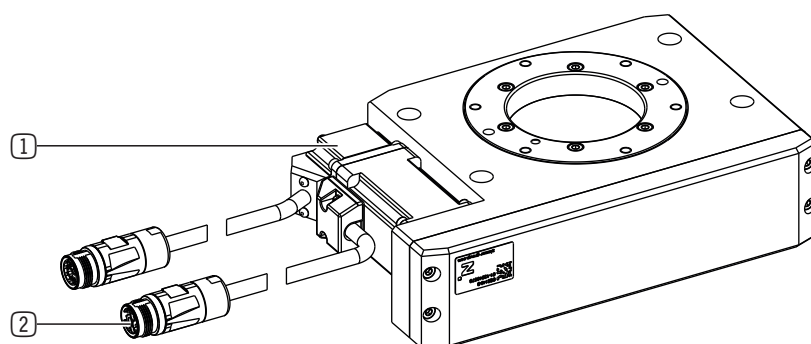
## 6 Functional description

The product is designed for the electrically controlled rotating, lifting or cycling of tools, machine elements or other mounting pieces.

The product has a mechanical self-locking mechanism to ensure that the workpiece remains held in the event of a power supply loss.

- 1 Drive
- 2 Power supply

The DESxxxD1 installation size has a media carrier. This is used to prevent cable breaks and undefined interference contours through power supply lines.



- 1 Media carrier
- 2 Electrical connection
- 3 Pneumatic connection

## 6.1 Position measuring system

The drive of the product has a motor with single-turn absolute encoder with 20-bit resolution.

The single-turn absolute encoder is used for absolute indirect position measurement within a motor revolution.

### INFORMATION



When this single-turn absolute encoder variant is used, the absolute axis position is lost after the voltage is shut off.

To use this absolute encoder as a 20-bit multiturn absolute encoder, we recommend using the battery box contained in the scope of delivery of the converter.

### INFORMATION



When this multiturn absolute encoder variant is used, the absolute axis position is maintained with the battery buffer even after the voltage is shut off.

The multiturn absolute encoder is used for absolute indirect position measurement within 66,536 motor revolutions. If the motor is disconnected from the battery box, the information about the absolute axis position is lost after about one minute. The multiturn absolute encoder replaces a separate absolute value at the motor.

### INFORMATION



Using the multiturn absolute encoder requires buffer storage via an external battery. The following accessories must be used for this:

- Battery box SUP-E02-MSM-BATTERYBOX-xxx

## 7 Technical data

### NOTICE



#### **Non-compliance may result in material damage.**

The values for jaw speed in positioning mode and positioning delay specified in the technical data correspond to the maximum values.

- ▶ Adjust the values depending on the load.
- ▶ Adjust the parameters of the drive control system in critical applications.

### INFORMATION



For DES140(D1)-B and DES190(D1)-B, the rated torque is available for max. 360°. For swivel angles greater than 360°, the rated torque is reduced to 45%.

### INFORMATION



- ▶ You can find the information in the technical data sheet on our website.
- This data varies within the series, depending on the specific design.

## 8 Accessories/scope of delivery

### INFORMATION



If any accessories not sold or authorized by Zimmer Group GmbH are used, the function of the product cannot be guaranteed. Zimmer Group GmbH accessories are specifically tailored to the individual products.

- ▶ For optional accessories and those included in the scope of delivery, refer to our website.

## 9 Transportation/storage/preservation

- ▶ Transport and storage of the product must be done only with the original packaging.
- ▶ If the product has already been installed on the superordinate machine unit, care must be taken during transport to ensure that no unexpected movements can occur.
  - ▶ Before commissioning the product and after transport, check all power and communication connections as well as all mechanical connections.
- ▶ If the product is stored for an extended period, the following points are to be observed:
  - ▶ Keep the storage location as dust-free and dry as possible.
  - ▶ Avoid temperature fluctuations.
  - ▶ Avoid wind/drafts/water condensation formation.
  - ▶ Pack the product and do not expose it to direct sunlight during storage.
- ▶ Clean all components. There must be no soiling left on the components.
- ▶ Visually inspect all components.
- ▶ Remove all foreign substances.
- ▶ Properly remove potential corrosion spots.
- ▶ Close electrical connections using suitable covers.

## 10 Installation

### WARNING



#### Risk of injury due to uncontrolled movements

Risk of injury in case of unexpected movement of the machine or system into which the product is to be installed.

- ▶ Switch off the energy supply of the machine before any work.
- ▶ Secure the power supply against being switched on unintentionally.
- ▶ Check the machine for any residual energy that may be present.

### CAUTION



#### Risk of injury due to uncontrolled movements

Risk of injury in the event of uncontrolled movement of the product when the power supply is connected.

- ▶ Switch off the power supply to the machine before carrying out any work.
- ▶ Secure the power supply against being switched on unintentionally.
- ▶ Check the machine for any residual energy that may be present.

### INFORMATION



Further installation information:

- The mounting screws are not included in the scope of delivery.

#### Assembly requirements

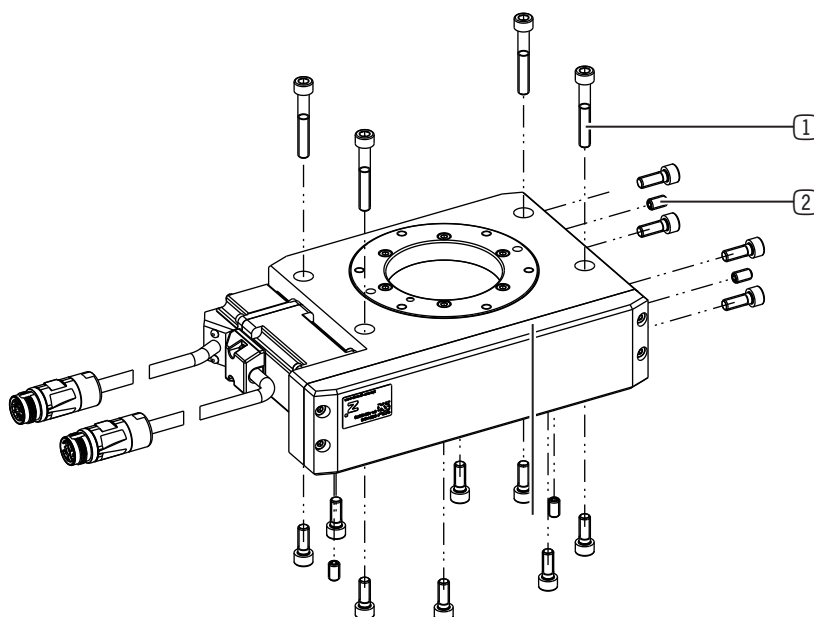
|                                       |      |
|---------------------------------------|------|
| Permissible flatness tolerance [mm]   | 0,03 |
| Strength class of the mounting screws | 8.8  |

- ▶ Install the product on an appropriate mounting surface in accordance with the flatness specifications.
- ▶ Make sure that the mounting piece is sufficiently rigid.
- ▶ Ensure the cleanliness of the connection surfaces.
- ▶ Please note the permitted tightening torques of the mounting screws at [www.zimmer-group.com/en/td](http://www.zimmer-group.com/en/td).

### 10.1 Installing the product

The product can be installed from multiple sides.

- ▶ Insert the straight pins into the designated fits on the product.
- ▶ Position the product on the mounting piece with the straight pins.
- ▶ Mount the product on the mounting piece using the appropriate mounting screws.



① Mounting screw

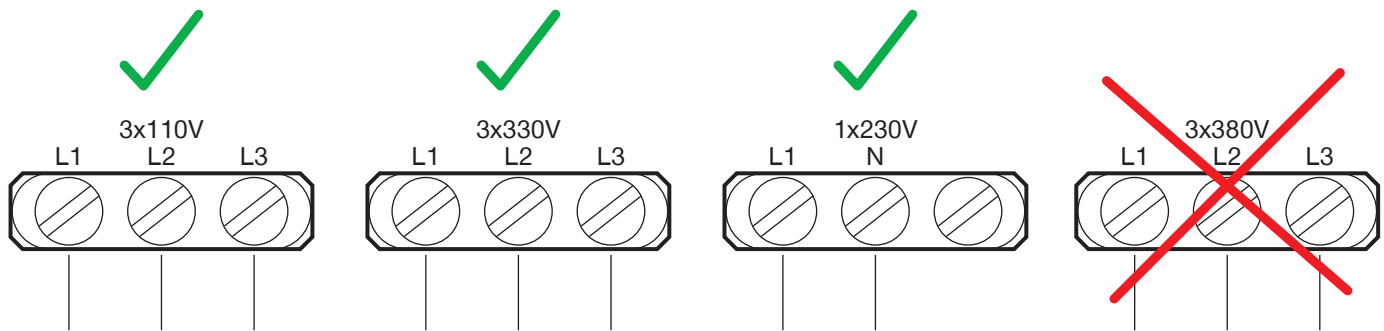
② Straight pins

## 10.2 Installing the connection terminal

### INFORMATION



- It is mandatory to comply with the clamping variants illustrated in the figures.
- ⇒ Zimmer Group GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.
- For more information about the drive control system connection assignment, refer to the documentation of the manufacturer:
  - Bosch Rexroth HCS01 series



## 10.3 Installing the energy supply

### NOTICE

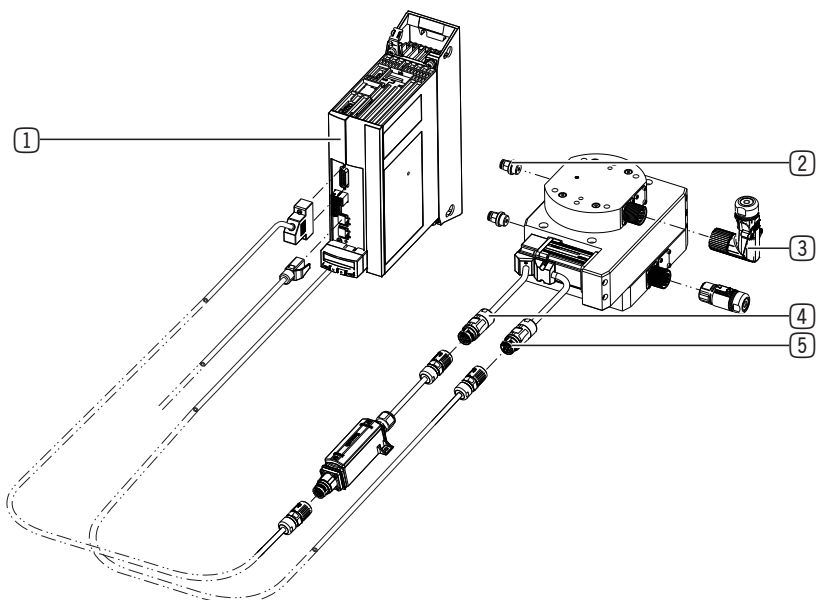


#### Material damage and malfunction in case of non-compliance

The cable mounted on the product can be subjected to a torsional angle of +50°.

- Do not route the cable so that it is strained.
- You must meet the minimum bending radius of 10x the outer diameter.
- Secure free-hanging cables to prevent excessive motion loads or pinching.
- The contacts of the energy supply must be dry, clean and undamaged at all times.

- Connect downstream cables for connection to a drive control system to the product using screw couplings.
- Mount the screw fittings in the provided connections for installation size DESxxxD1.
- Insert the round plugs into the provided connections for installation size DESxxxD1.



- ① Drive control system
- ② Pneumatic fitting
- ③ Round plug
- ④ Rotary encoder cable
- ⑤ Motor cable

### 10.3.1 Connecting the battery box

#### INFORMATION



The delivery of the battery box includes a battery.

The battery box is delivered ready to operate.

The battery box *SUP-E02-MSM-BATTERYBOX* is an accessory set for operating MSM motors with absolute encoder (M5) and is used for buffering encoder data when the voltage is shut off.

#### INFORMATION

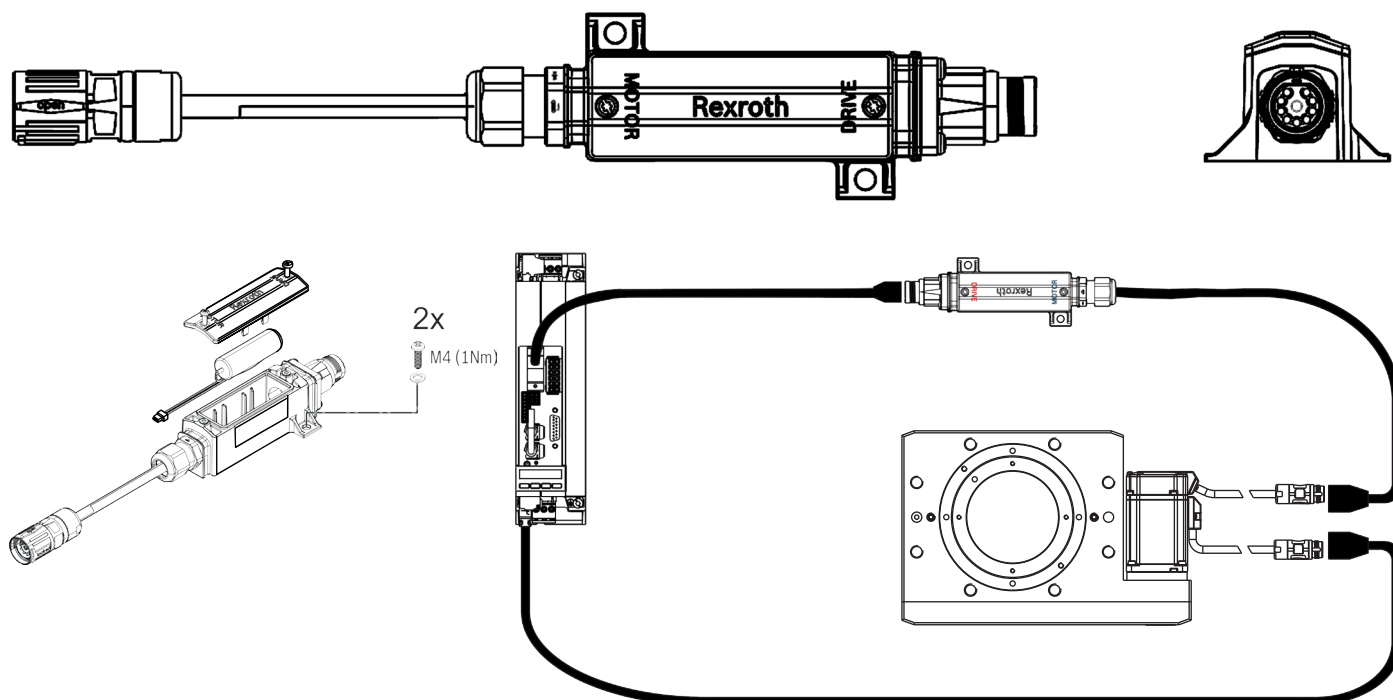


► Do not replace the battery when the control voltage is shut off.

⇒ Otherwise, the absolute encoder position and thus the position reference of the axis will be lost.

#### Technical data

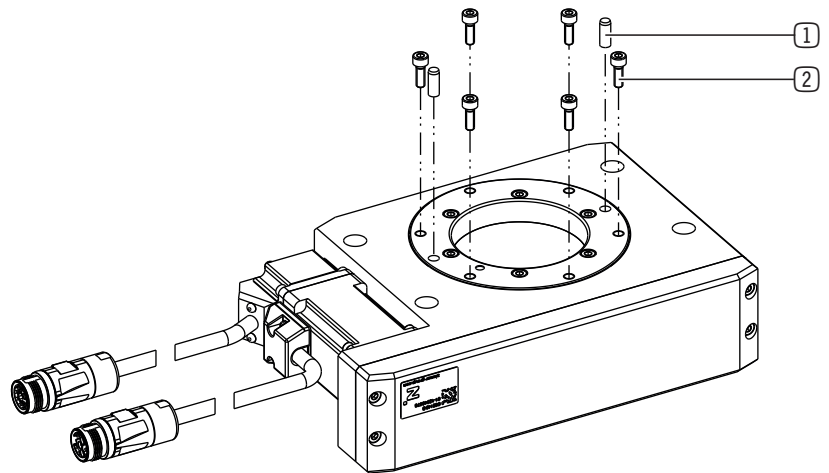
|               |                                                               |
|---------------|---------------------------------------------------------------|
| Version       | PRM1-03V6-2600C-D2-LITH-ZNR-50                                |
| Voltage [V]   | 3.6                                                           |
| Output [mAh]  | 2600                                                          |
| Service life  | Up to 10 years, depending on the load and ambient temperature |
| Spare battery | R911369925 (SUP-E02-MSM-BATTERY)                              |





#### 10.4 Installing the customer-specific application

- ▶ Center the adapter plate or application on the product by using the straight pins.
- ▶ Install the adapter plate or application onto the product by using the mounting screws.



- ① Straight pins
- ② Mounting screw

#### 10.5 Heat dissipation

##### NOTICE



##### **Material damage from overheating of the product**

If the product is operated under a very high ambient temperature or with fast clock cycles on an ongoing basis, this can reduce its service life.

- ▶ If the product is exposed to high ambient temperatures, always install it on heat-conducting materials.
- ▶ Reduce the load with increasing temperature.

#### 10.6 Installing accessories

##### NOTICE



##### **Non-compliance may result in material damage.**

- ▶ Before installing an accessory, make sure it is suitable for use with the selected variant.
- ▶ You can find information on our website.
- ▶ Please contact Customer Service if you have any questions.

## 11 Commissioning

### WARNING



#### Suspended loads can cause injury

Falling loads can cause severe injuries.

- ▶ Always keep an adequate safety distance from suspended loads.
- ▶ Do not stand or walk underneath suspended loads.

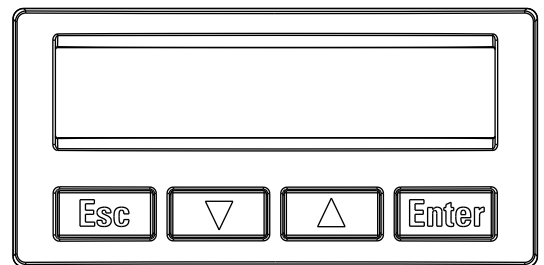
### 11.1 Checking operational readiness

- ▶ Check that all components and connections are installed correctly.
- ▶ Check the energy supply.
- ▶ Check all mounting screws for the prescribed tightening torque.

### 11.2 Easy Startup

#### 11.2.1 Setting the IP address

- ▶ Define the IP address for the drive control system.
  - Standard: 192.168.0.1
- ▶ Enable the IP range on your computer for the entry of the IP address in the drive control system via the control panel.
- ▶ Press the *Enter* button.
- ▶ Navigate by pressing the ▼▲ buttons.
- ▶ Navigate to the *Ethernet* entry.
- ▶ Press the *Enter* button.
- ⇒ The selection has been confirmed.
- ▶ Press the *Enter* button.
- ⇒ The *IP-Addr* entry is shown.
- ▶ Set the IP address by pressing the ▼▲ button.
- ▶ Press the *Enter* button.
- ⇒ The input has been confirmed.
- ▶ Restart the drive control system.



### INFORMATION

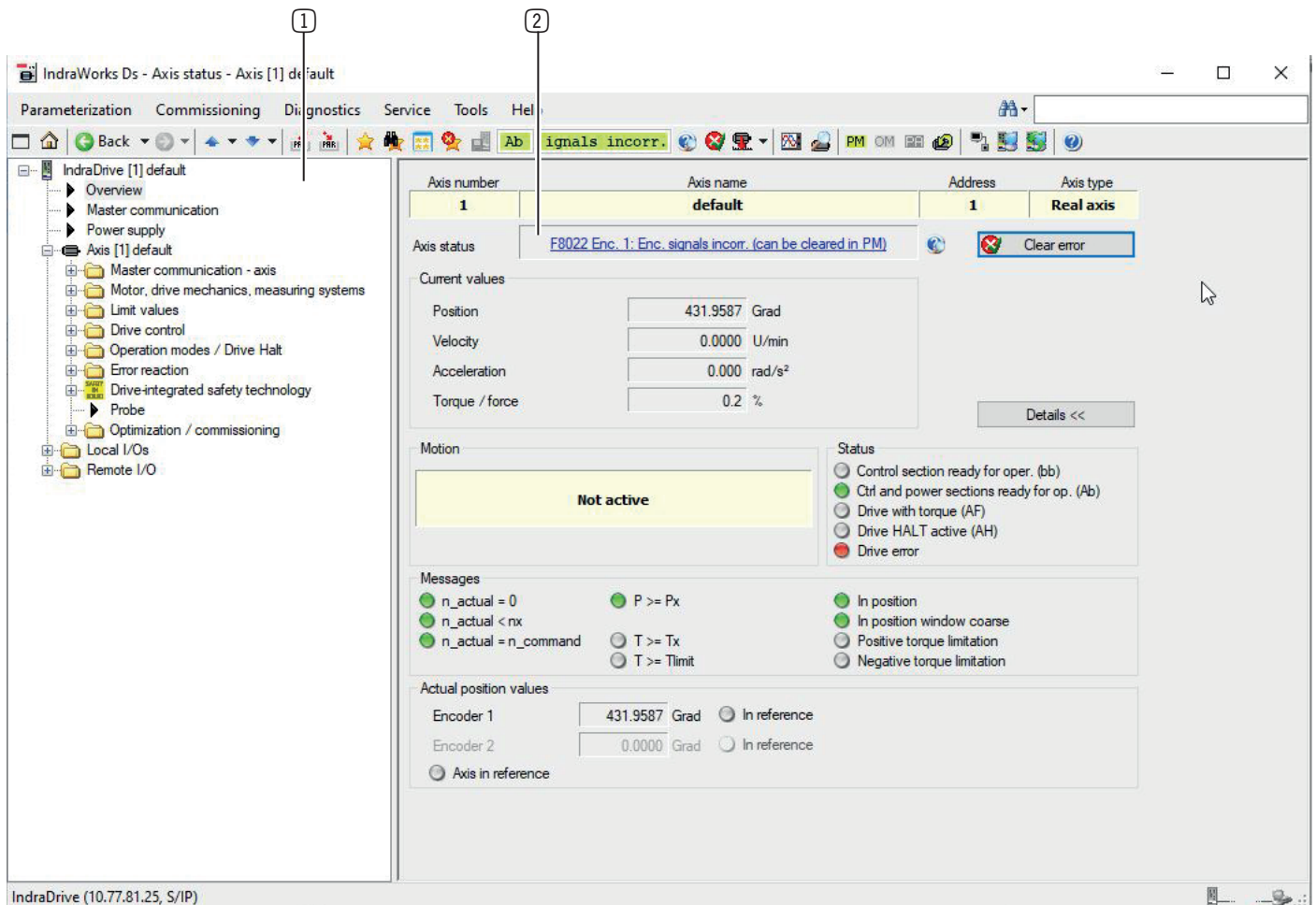
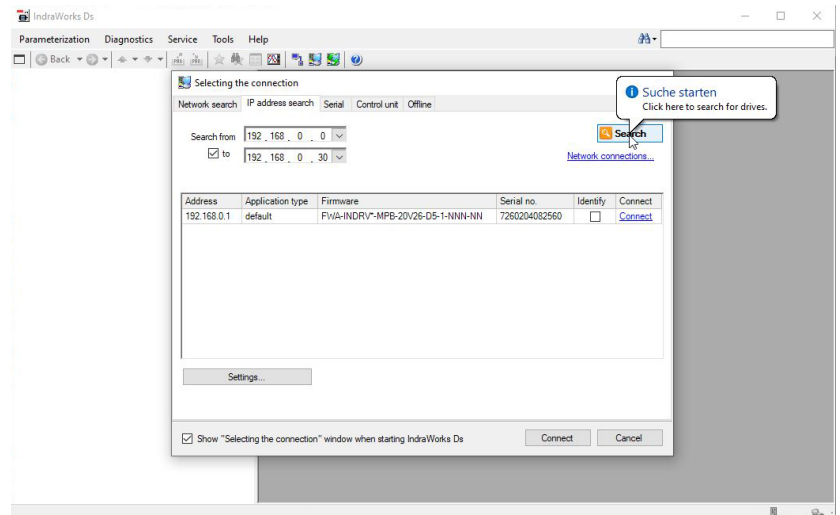


The software *IndraWorks Ds* or *IndraWorks Engineering* is required for initial commissioning.

This setting can vary in other software versions.

- ▶ Please consult the software manufacturer to learn how to use the software version available to you.
- ⇒ Zimmer Group GmbH shall accept no liability for any damage caused by improper use. The operator bears sole responsibility.

- ▶ Start the *IndraWorks Ds* software.
- ▶ Enter the IP address in the *IndraWorks Ds* software and the computer.
- ▶ Click the *Search* button.
- ⇒ Found drive control system are shown in the *Connection Selection* window.
- ▶ In the *Connect* column, enable the checkbox of the desired drive control system.
  - ▶ Please note that the IP address of the drive control system must match.
- ▶ Click the *OK* button.
- ⇒ The connection to the drive control system is established.
- ⇒ The main window of the *IndraWorks Ds* software opens after successful connection.



- ① Navigation pane for displaying and editing various functions
- ② Error messages are shown in the *Axis Status* area

### 11.2.2 Reading out the firmware status

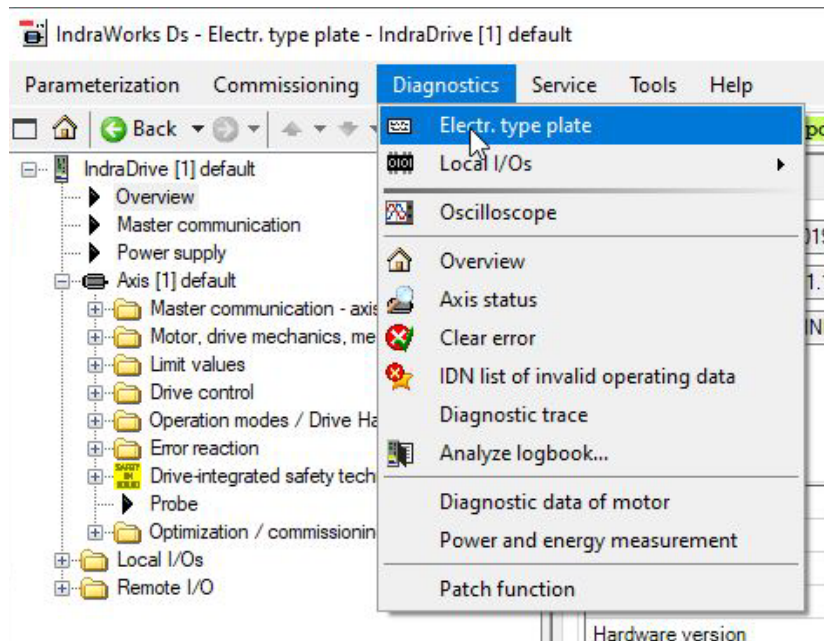
#### INFORMATION



The firmware of the drive control system and the parameter set must match.

- In the *Diagnostics* menu, click *Electr. Type Plate*.

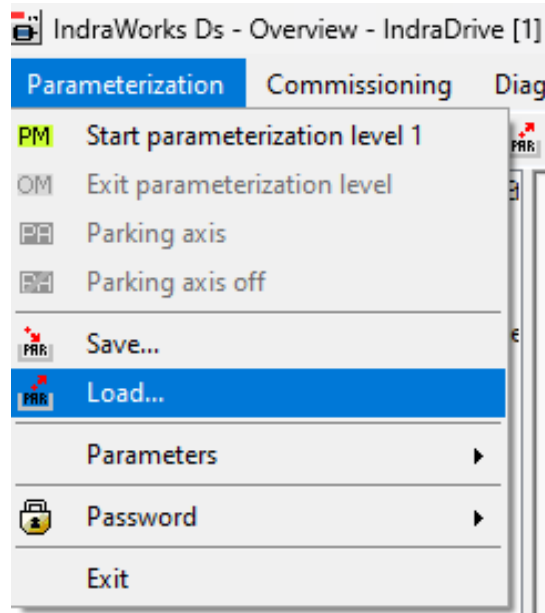
⇒ The firmware status is displayed.



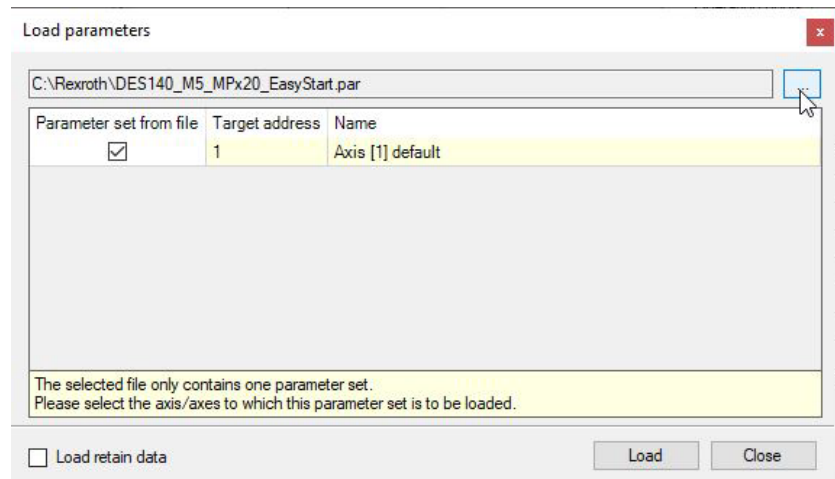
### 11.2.3 Loading axis-specific parameter sets

- In the *Configuration* menu, click *Load*.

⇒ The *Load Parameters* window opens.



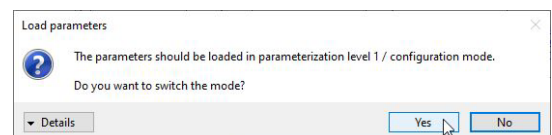
- Enable the checkbox of the desired parameter set.
- Click the *Load* button.
- ⇒ The *Load Parameters* window closes.



The software notifies you before transmitting that the drive control s must be in configuration mode.

If the drive control system is already in configuration mode, this message will not appear.

- Follow the instructions in the message.
- Click the *Yes* button.
- ⇒ The transfer of the parameter set to the drive control system starts.

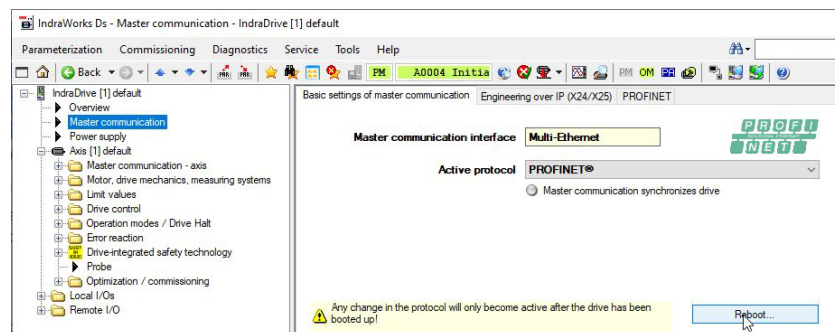


## INFORMATION

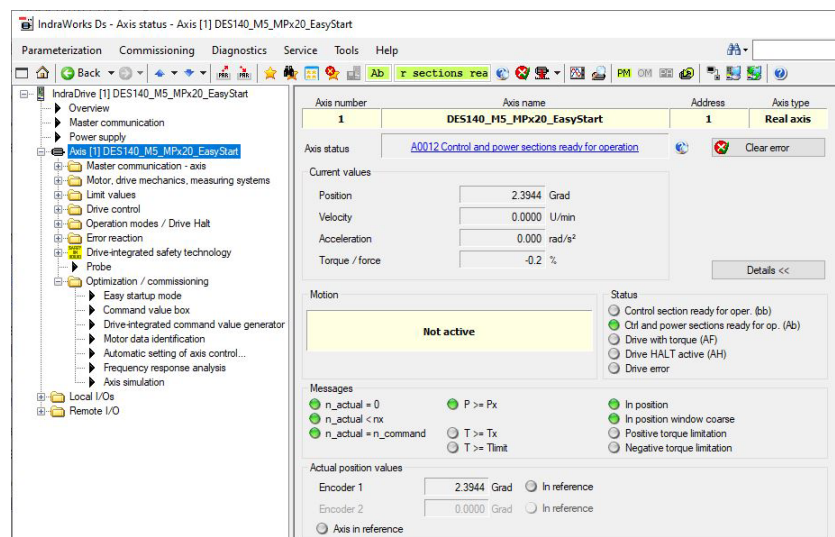


After the parameter set has been successfully transmitted to the drive control system, it must be restarted. To do this, you can either briefly disconnect the drive control system's power supply or use the *IndraWorks Ds* software to reboot.

- In the navigation pane, click *Master Communication*.
- ⇒ The *Master Communication Basic Settings* tab is displayed in the window.
- Click the *Reboot* button.
- ⇒ The reboot of the drive control system starts.



- ⇒ The name of the parameter set is displayed in the navigation pane after the parameter set has been transmitted successfully.
- Eliminate all errors so that the product can be moved.
- In the *Diagnostics* menu, click *Axis status*.
- ⇒ Status messages are displayed in the window.
- Click the *Clear Error* button to acknowledge the error messages.

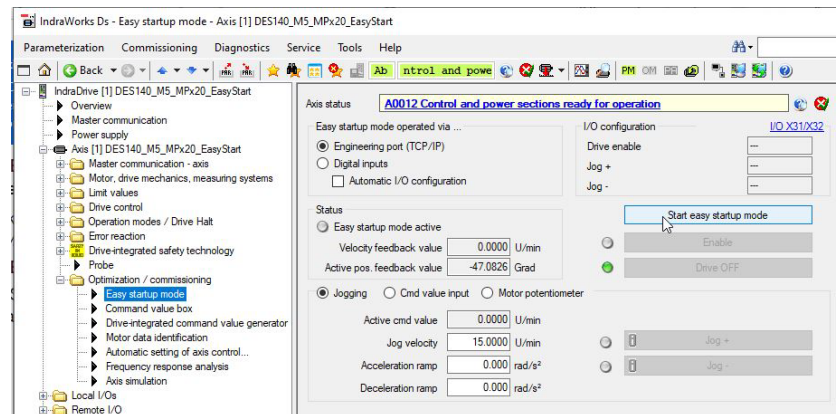


### 11.2.4 Moving the product in Easy Startup mode

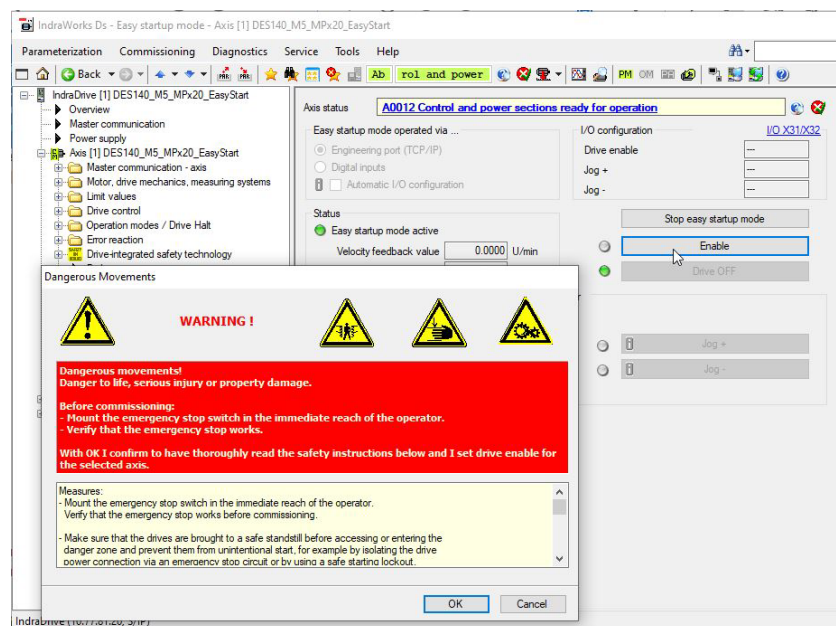
The product can be moved in Easy Startup mode as soon as it is ready to be operated.



- In the navigation pane, click *Optimization/Commissioning*.
- Click *Easy Startup Mode*.
- ⇒ The *Easy Startup Mode* area is displayed.
- Click the *Start Easy Startup Mode* button.
- ⇒ Easy Startup mode has been started.
- ⇒ The status pane of Easy Startup mode is enabled.



- Click the *Enable* button.
- ⇒ The window with warning notices is displayed.
- Please read all notices carefully and follow each of these notices.



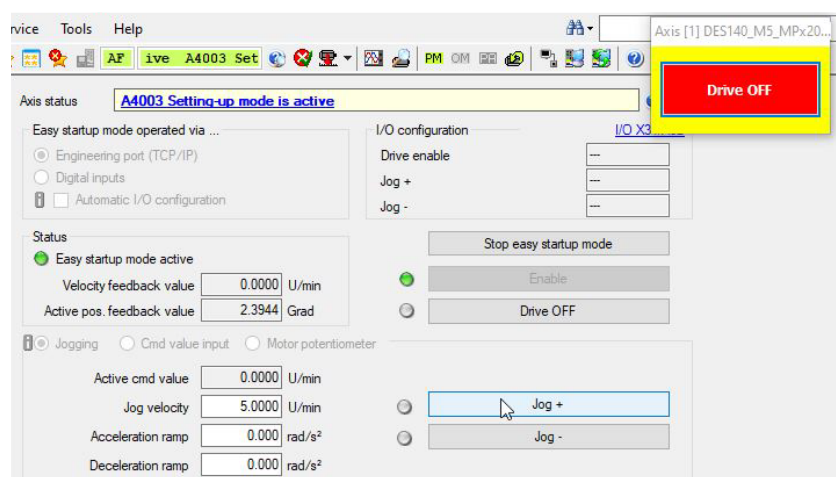
## DANGER



### Risk of death and material damage in case of non-compliance

- Always comply with the notices displayed by the software.
  - You can reach all notices by scrolling.
- ⇒ Zimmer Group GmbH shall accept no liability for any damage caused by failure to observe these notices. The operator bears sole responsibility.

- Click the *OK* button.
- ⇒ The window with the notices closes.
- ⇒ The *Jog +* and *Jog -* buttons for manual movement of the product are displayed.
- ⇒ The window with the *Drive OFF* button for disabling the drive control system is displayed.
- ⇒ The drive comes to a standstill when the drive control system disables the release.



**NOTICE**



**Non-compliance may result in material damage.**

At initial commissioning, an actual speed value of 2 to 5 [rpm] is recommended.

This ensures adequate speed for being able to detect a movement and rule out any danger.

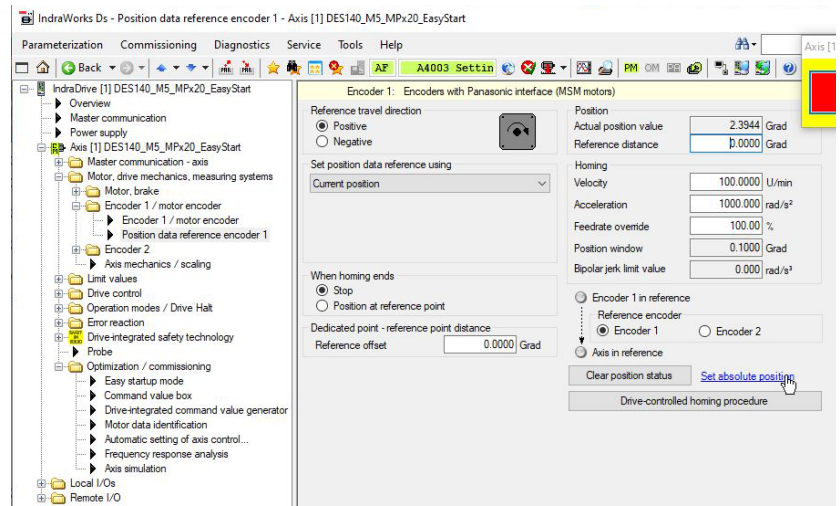
### 11.2.5 Referencing the motor encoder

#### INFORMATION

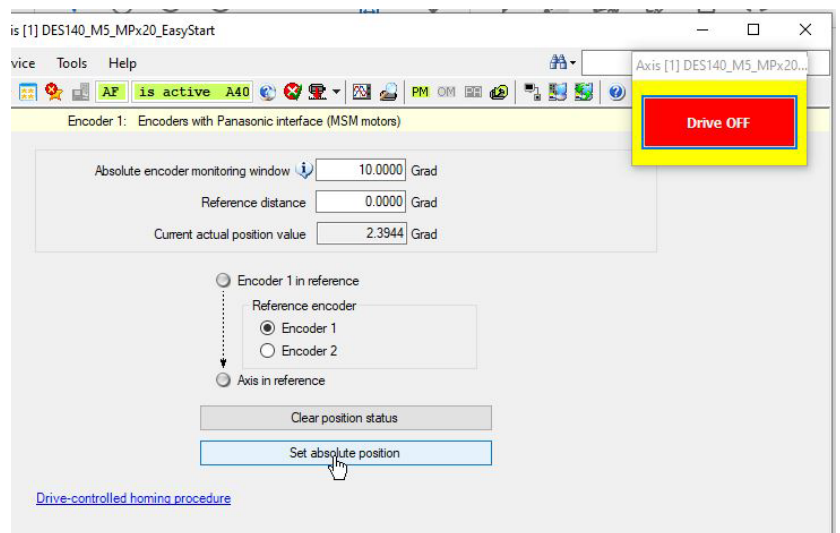


While in the *Module* operation mode, the product has a continuous travel range.  
The travel range can be limited in degrees via the *IndraWorks Ds* software.

- In the navigation pane, click *Motor, Brake, Measurement Systems*.
- Click *Motor encoder*.
- Click *Motor Encoder Position reference*.
- Enter the reference measurement in the *Reference measurement* field.



- Disable the release for the drive control system.
- Click the *Set Absolute Position* button.
- ⇒ The product references itself to the entered reference measurement.
- Move the product in Easy Startup mode after the reference position has been adopted.





### 11.3 EtherCAT

#### INFORMATION

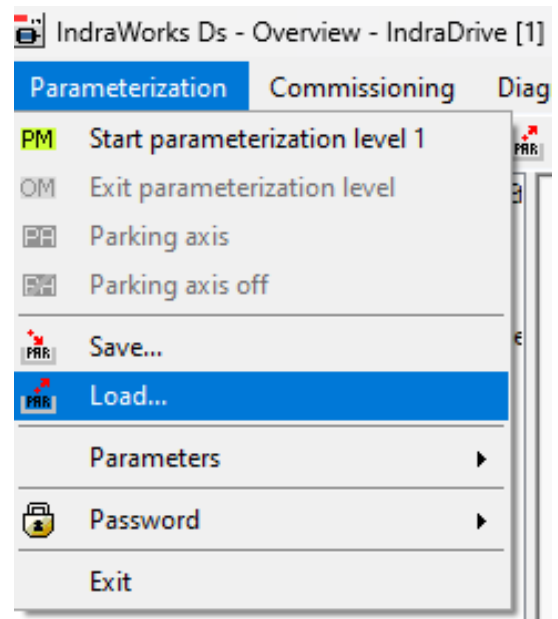


Commissioning the product depends on the configuration of the drive control system and can therefore vary. This section uses the commissioning of the product of the DES190 installation size as an example.

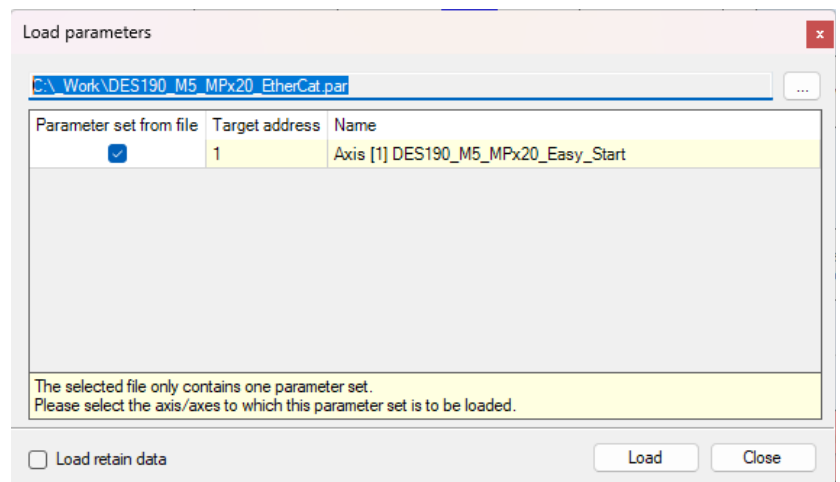
- Do not use the example as a programming template.
- For more information, refer to the "Function of the function block" section.

#### 11.3.1 Configuring the drive control system

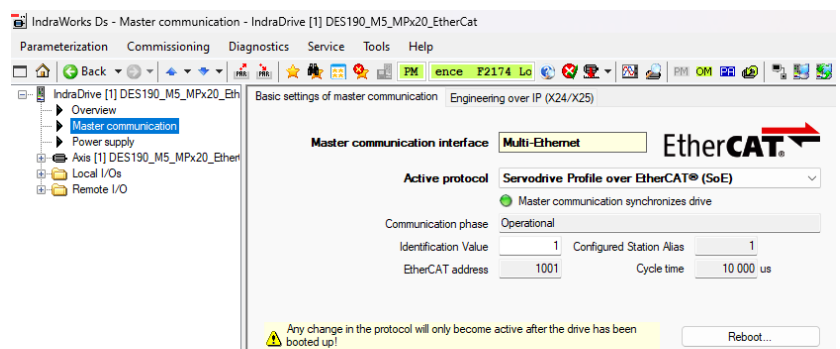
- Connect the drive control system to the computer using its network interface.
  - Use the *IndraWorks Ds* software to search for the appropriate drive control system (see chapter "Setting the IP address").
  - In the *Configuration* menu, click *Load*.
- ⇒ The *Load Parameters* window opens.



- Enable the checkbox of the desired parameter set.
  - Click the *Load* button.
- ⇒ The *Load Parameters* window closes.



- In the navigation pane, click *Master Communication*.
- ⇒ The *Master Communication Basic Settings* tab is displayed in the window.
- In the *Active Protocol* drop-down menu, select the communication type for the control system.



**INFORMATION**

After an EtherCAT protocol is activated, the direct IP connection to the drive control system is no longer possible.

**INFORMATION**

Zimmer Group GmbH recommends setting up the listed configuration in its entirety and configuring it in the EtherCAT PLC.

All parameters can be loaded to the drive control system using the attached parameter set and re-enabled via a restart.

- ▶ For more information refer to the “Transferring axis output parameters to PLC” section.
- ▶ For more information, refer to the product-specific instructions from Bosch Rexroth.

**11.3.2 Installing the device description**

The EtherCAT master needs the device description files of the devices being used in order to create the configuration in online and offline mode. These device descriptions are the XML files with EtherCAT Slave Information (ESI). One XML file can contain multiple device descriptions. The XML files can be requested from the respective manufacturer and/or are available for download.

**INFORMATION**

For the Bosch Rexroth IndraDrive Cs in the example project *HCS01.1E-W0009-A-02-B-ET-EC-NN-L4\_NN-FW*, the device description *BoschRexroth\_IndraDrive\_ECAC\_SoE\_01V27.xml* is required.

- ▶ Store the device description files in the installation directory of TwinCAT.
  - Standard: *C:\TwinCAT\3.1\Config\Io\EtherCAT*
- ▶ Start TwinCAT.
- ▶ In the *TWINCAT* menu, click *EtherCATDevices*.
- ▶ Click *Update Device Description (via ETG Website)*.

### 11.3.3 Establishing a connection to the drive control system

For configuration and monitoring with active EtherCAT master communication using the *IndraDrive Ds* software, you have several options for connecting the drive control system directly:

- ADS interface
- PC network card as EtherCAT master
- EoE

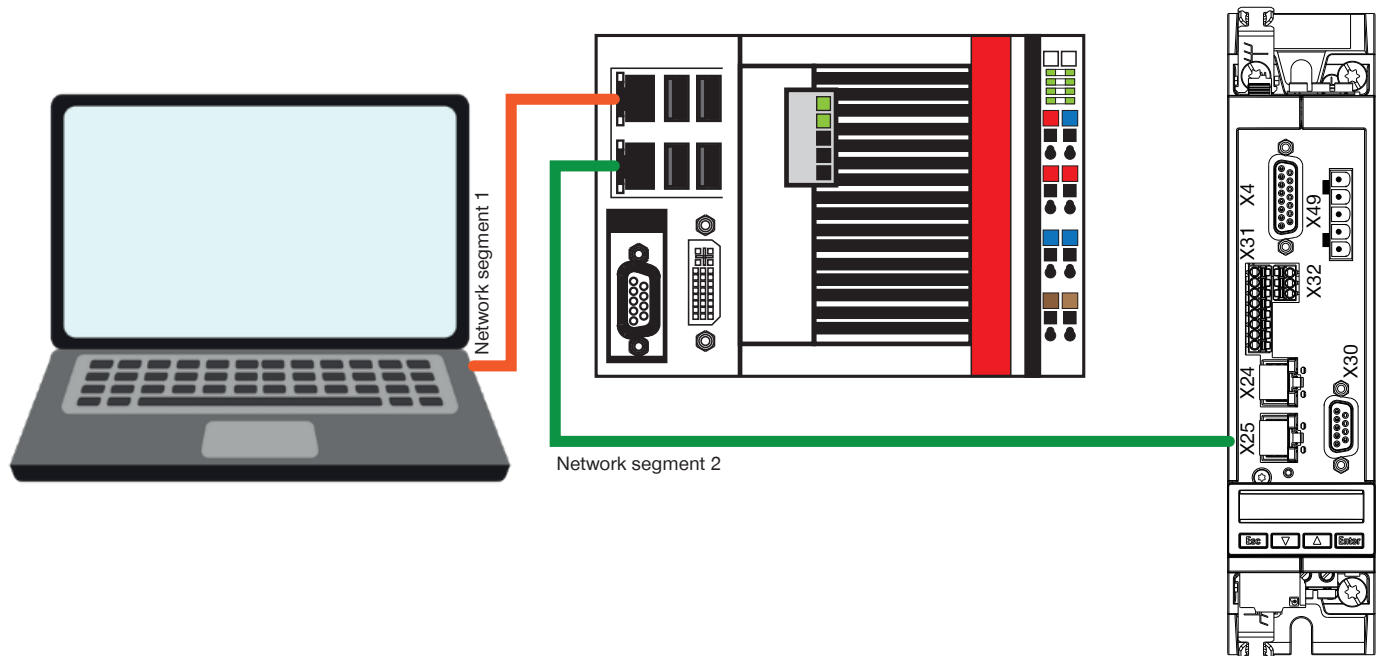
#### INFORMATION



- For more information about connecting the drive control system, refer to the product-specific instructions of the manufacturer.
- Bosch Rexroth: *DE\_Indradrive\_EtherCAT\_TwinCAT\_Inbetriebnahmeanleitung\_V04*

#### 11.3.3.1 Establishing an EoE connection

Example representation of establishing a connection via EoE to the drive control system:



|                   |                      |                      |                      |
|-------------------|----------------------|----------------------|----------------------|
| Computer          | Beckhoff CX-5130     | Beckhoff CX-5130     | IndraDrive HSC01- 1E |
| Network port      | Port X000 - Ethernet | Port X001 - EtherCAT | X25 P1               |
| IP: 192.168.0.125 | IP: 192.168.0.101    | IP: 192.168.9.3      | IP: 192.168.9.5      |
| SNM 255.255.255.0 | SNM 255.255.255.0    | SNM 255.255.0.0      | SNM 255.255.255.0    |

- Check the following points before establishing the connection for the first time:
  - The IP address of the CX control system and the computer are in the same network segment.
  - The IP addresses of the drives are in a separate network segment.
  - The EtherCAT port of the CX control system is in the same network segment as the drives will be later.
  - The subnet masks of the CX control system are set to 255.255.0.0.
- Set the IP addresses of both ports of the CX control system and the computer.
- Set an IP address in the computer in the range of network segment 1.

To start the setup, you need a started PLC project on the CX control system.

► Open the included TwinCAT project.

⇒ The project opens in *Microsoft Visual Studio*.

► Click the example project in the *Solution Explorer*.

► Click *PLC*.

► Click *DES190*.

► Click *DES190 Project*.

► Right-click *References*.

► In the context menu, click *Add Library*.

⇒ The *Add Library* window opens.

► Click *System*.

► Click *SysLibs*.

► Click the *Tc2\_Uilities.Lib* library.

- The *Tc2\_Uilities.Lib* library is required for the function *WORD\_TO\_HEXSTR()*.

► Click the *OK* button.

⇒ The *Add Library* window closes.

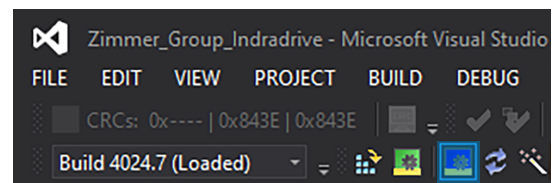
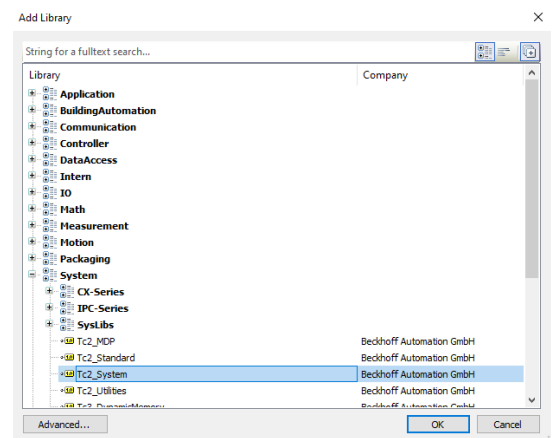
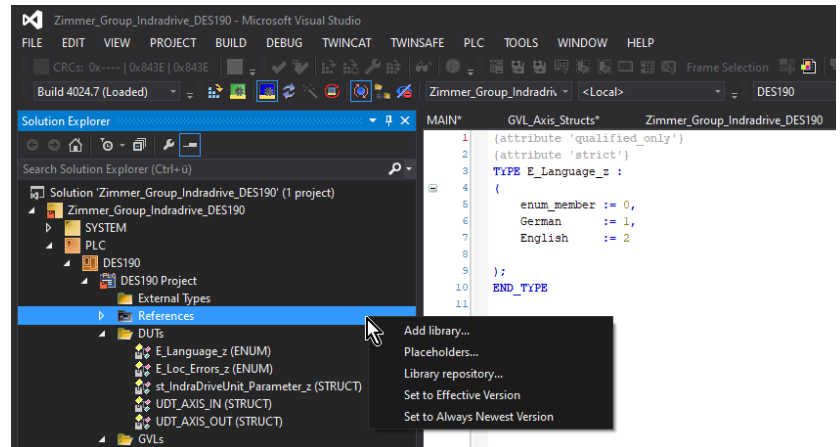
⇒ The *Tc2\_Uilities.Lib* library has been installed.

► Switch to configuration mode to find the currently connected hardware.

► Click the *OK* button.

⇒ The message closes.

⇒ TwinCAT is started in configuration mode.



Microsoft Visual Studio

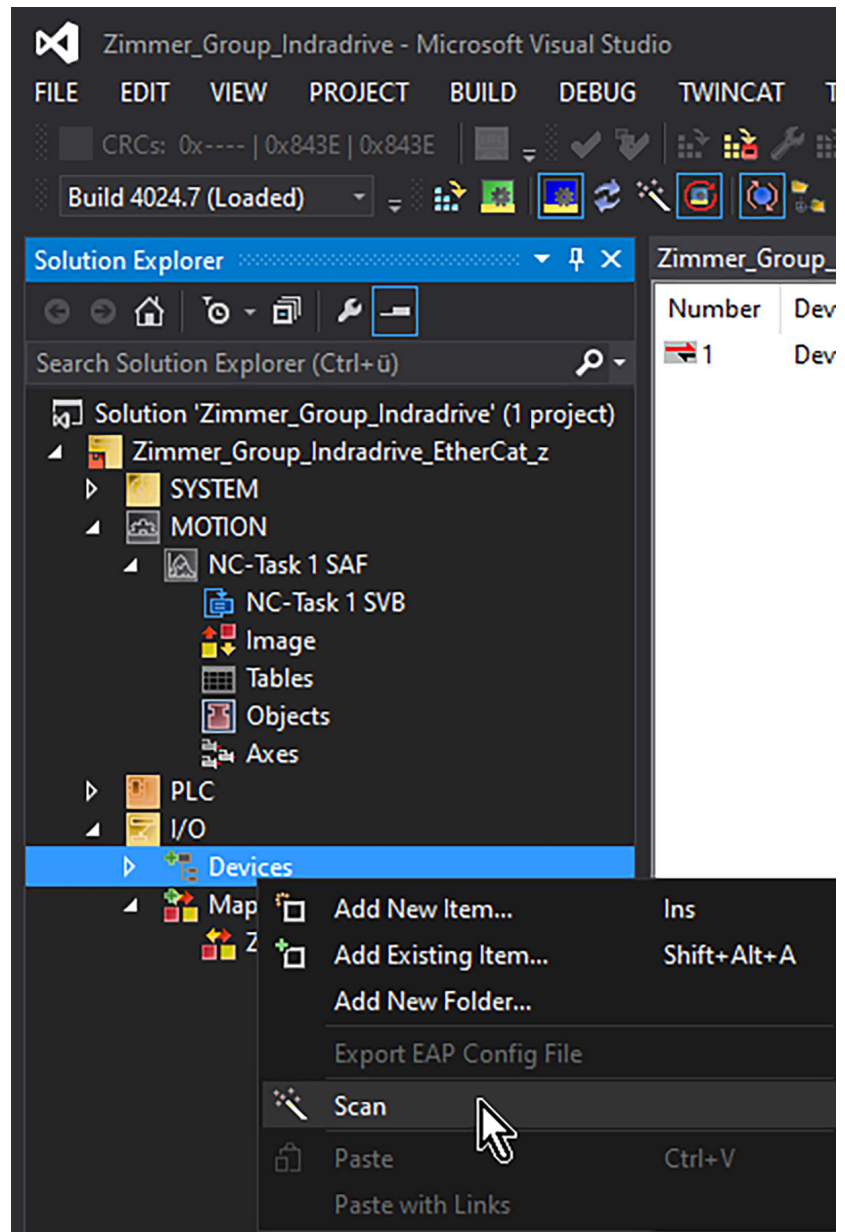


Restart TwinCAT System in Config Mode

OK

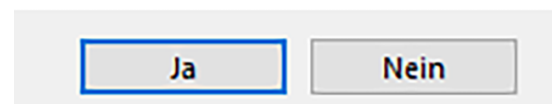
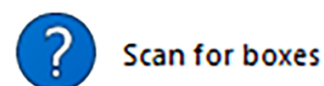
Abbrechen

- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click the *Zimmer\_Group\_Indradrive\_EtherCat\_z* project.
- ▶ Click *I/O*.
- ▶ Right-click *Devices*.
- ▶ In the context menu, click *Scan*.



- ⇒ A message opens.
- ▶ Click the *Yes* button.
- ⇒ The message closes.
- ⇒ Drive control systems are scanned for in *Devices*.
- ⇒ After the drive control system has been detected, TwinCAT creates a new axis automatically.

Microsoft Visual Studio

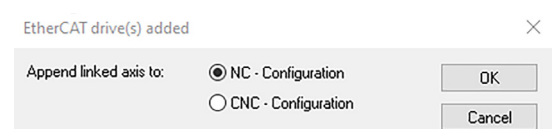


## INFORMATION



In the example, the target value positioning takes place in the drive control system, which means that neither an NC nor a CNC axis is needed in TwinCAT motion.

- ⇒ The *EtherCAT drive(s) added* window opens.
- ▶ Click the *Cancel* button.



- ⇒ A message opens.
- ▶ Click the Yes button.
- ⇒ The message closes.
- ⇒ The configuration mode with Free Run has been activated.

Microsoft Visual Studio



Activate Free Run

Ja

Nein

- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click the *Zimmer\_Group\_Indradrive\_EtherCat\_z* project.
- ▶ Click *I/O*.
- ▶ Click *Devices*.
- ▶ Click *Device 5 (EtherCAT)*.
- ⇒ The window of the example project opens.
- ▶ Click the *EtherCAT* tab.
- ▶ Click the *Advanced Settings* button.
- ⇒ The *Advanced Settings* window opens.

| Frame | Cmd  | Addr          | Len | WC | Sync Unit | Cycle (ms) | Utilize |
|-------|------|---------------|-----|----|-----------|------------|---------|
| 0     | NOP  | 0x0000 0x0900 | 4   |    |           | 4.000      |         |
| 0     | ARMW | 0x0000 0x0910 | 4   |    |           | 4.000      |         |
| 0     | LRD  | 0x09000000    | 1   |    |           | 4.000      |         |
| 0     | LRW  | 0x01000000    | 6   | 3  | <default> | 4.000      |         |
| 0     | BRD  | 0x0000 0x0130 | 2   | 1  |           | 4.000      | 0.23    |

- ▶ Click *EOE Support*.
- ▶ Activate the *Enable* checkbox.
- ▶ Activate the *IP Enable Router* checkbox.

**EoE Support**

**Virtual Ethernet Switch**

- ☒ Enable
- Max Ports: 2
- Max Frames: 120
- Max MAC Ids: 100

**Windows Network**

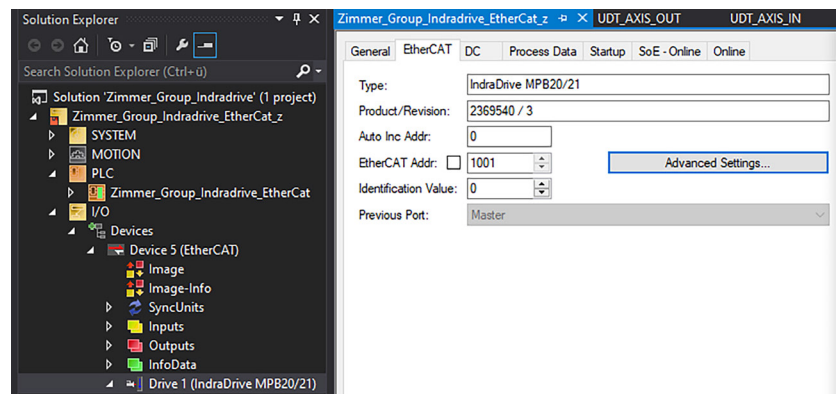
- ☒ Connect to TCP/IP Stack
- Windows IP Routing**
  - ☒ IP Enable Router
  - Changes require system reboot!

**EtherCAT Mailbox Gateway**

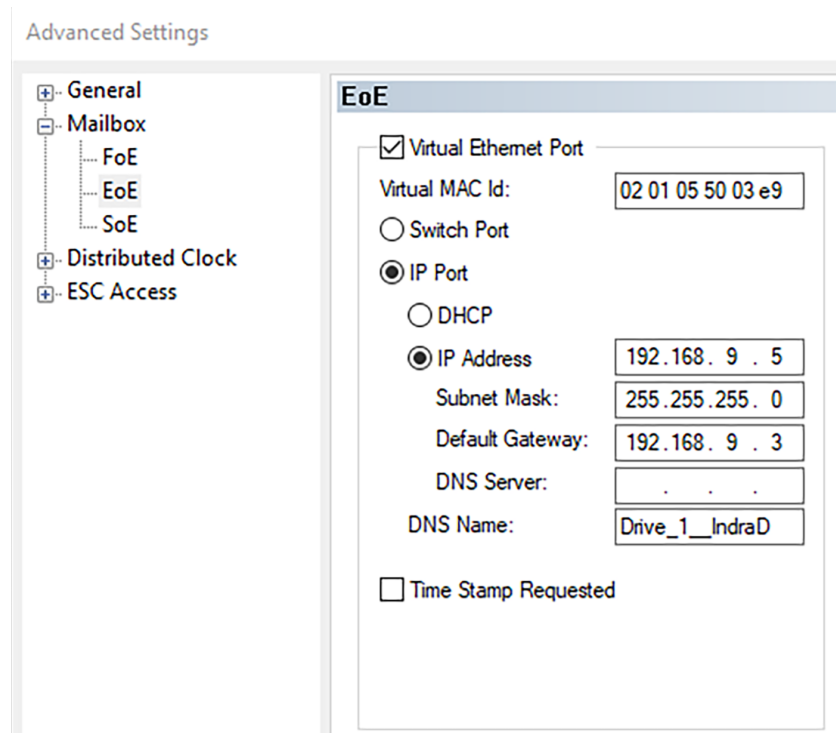
- ☐ Enable
- Connections: 0
- Virtual MAC: 00 00 00 00 00 00

### 11.3.3.2 Setting the drive control system

- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click *I/O*.
- ▶ Click *Devices*.
- ▶ Click *Device 5 (EtherCAT)*.
- ▶ Click *Device 1 (IndraDrive)*.
- ⇒ The window of the example project opens.
- ▶ Click the *EtherCAT* tab.
- ▶ Click the *Advanced Settings* button.
- ⇒ The *Advanced Settings* window opens.



- ▶ Click *Mailbox*.
- ▶ Click *EOE*.
- ▶ Activate the *Virtual Ethernet Port* checkbox.
- ▶ Activate the *IP Address* option field.
- ▶ Enter the desired IP address in the *IP Address* field.
- ▶ Enter the desired subnet mask in the *Subnet Mask* field.
  - Example: 255.255.255.0
- ▶ Enter the IP address of the EtherCAT master in the *Default Gateway* field.
- ▶ Enter the desired DNS name in the *DNS Name* field.
  - The DNS name can be selected as desired.

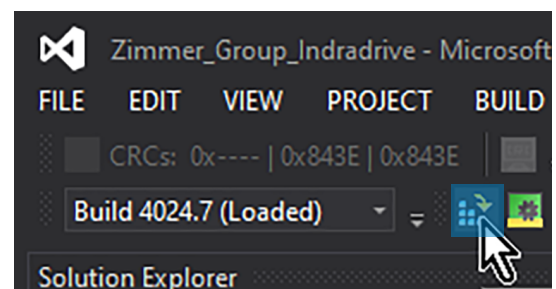


#### INFORMATION



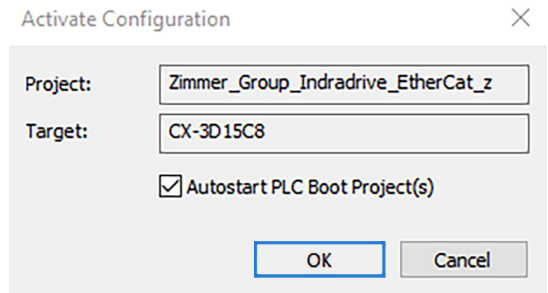
In the example, the network card of Port X001 of the CX control system is entered under Windows.

- ▶ Start and activate the project.

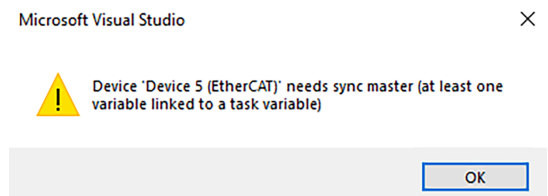




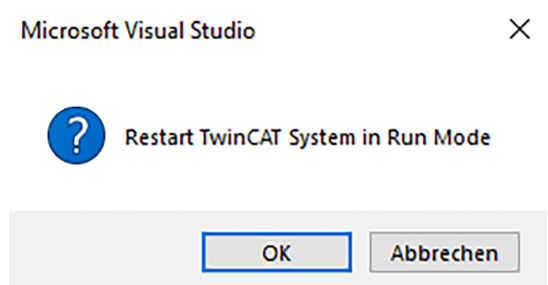
- ⇒ The *Activate Configuration* window opens.
- ▶ Activate the *Autostart PLC Boot Project(s)* checkbox.
- ▶ Click the *OK* button.
- ⇒ The *Activate Configuration* window closes.



- ⇒ A message opens if there are still no variables linked between the drive control system and the PLC.
- ▶ Click the *OK* button.
- ⇒ The message closes.

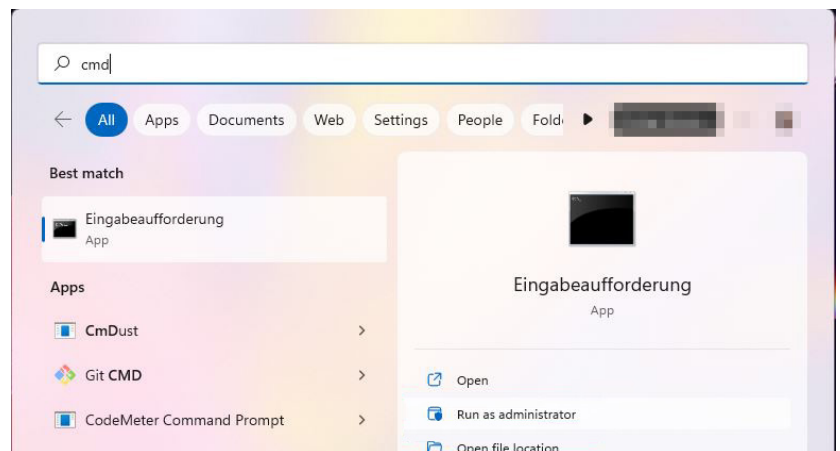


- ⇒ After the activation, the CX control system is set to Run Mode.
- ⇒ A message opens.
- ▶ Click the *OK* button.
- ⇒ The message closes.
- ⇒ TwinCAT is restarted.



### 11.3.3.3 Establishing an Ethernet connection

- ▶ Run the command prompt on the computer as administrator.



#### INFORMATION



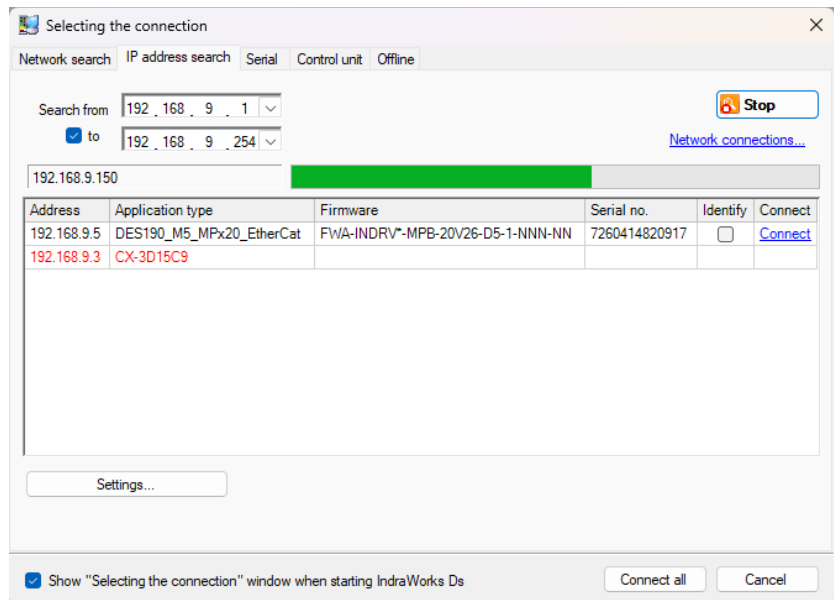
The *route PRINT* command shows you the newly configured route.

- Create a route from Port X000 to Port X001 of the CX control system with the command:
    - route -p ADD 192.168.9.0 MASK 255.255.255.0 192.168.0.101
    - Target network (PortX001 of the CX end number = 0 )/mask/gateway(PortX001 of the CX control system)
  - Restart the drive control system.
- ⇒ The new IP address is adopted from the TwinCAT project.
- Use the *Ping 192.168.9.5* command to check whether an Ethernet connection to the drive control system is possible.

IPv4 Route Table

```
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          192.168.178.1    192.168.178.78    25
127.0.0.0                  255.0.0.0        On-link          127.0.0.1         331
127.0.0.1                  255.255.255.255 On-link          127.0.0.1         331
127.255.255.255            255.255.255.255 On-link          127.0.0.1         331
169.254.0.0                255.255.0.0      On-link          192.168.178.78    26
169.254.255.255            255.255.255.255 On-link          192.168.178.78    281
192.168.9.0                255.255.255.0    192.168.0.101    192.168.178.78    26
192.168.178.0              255.255.255.0    On-link          192.168.178.78    281
192.168.178.78              255.255.255.255 On-link          192.168.178.78    281
192.168.178.255            255.255.255.255 On-link          192.168.178.78    281
224.0.0.0                  240.0.0.0        On-link          127.0.0.1         331
224.0.0.0                  240.0.0.0        On-link          192.168.178.78    281
255.255.255.255            255.255.255.255 On-link          127.0.0.1         331
255.255.255.255            255.255.255.255 On-link          192.168.178.78    281
=====
Persistent Routes:
Network Address            Netmask          Gateway Address    Metric
169.254.0.0                255.255.0.0      172.16.10.16       1
169.254.0.0                255.255.0.0      192.168.178.78     1
192.168.9.0                255.255.255.0    192.168.0.101      1
=====
```

- Start the *IndraWorks Ds* software.
  - Enter the IP address in the *IndraWorks Ds* software and the computer.
  - Click the *Search* button.
- ⇒ Found drive control system are shown in the *Connection Selection* window.
- In the *Connect* column, enable the checkbox of the desired drive control system.
    - Please note that the IP address of the drive control system must match.
  - Click the *Link All* button.



Selecting the connection

Network search IP address search Serial Control unit Offline

Search from 192.168.9.1 to 192.168.9.254

192.168.9.150

| Address     | Application type         | Firmware                         | Serial no.    | Identify                 | Connect                 |
|-------------|--------------------------|----------------------------------|---------------|--------------------------|-------------------------|
| 192.168.9.5 | DES190_M5_MPx20_EtherCat | FwA-INDRV*-MPB-20V26-D5-1-NNN-NN | 7260414820917 | <input type="checkbox"/> | <a href="#">Connect</a> |
| 192.168.9.3 | CX-3D15C9                |                                  |               |                          |                         |

Settings...

☒ Show "Selecting the connection" window when starting IndraWorks Ds

[Connect all](#) [Cancel](#)

### 11.3.4 Configuring the interface from TwinCAT 3

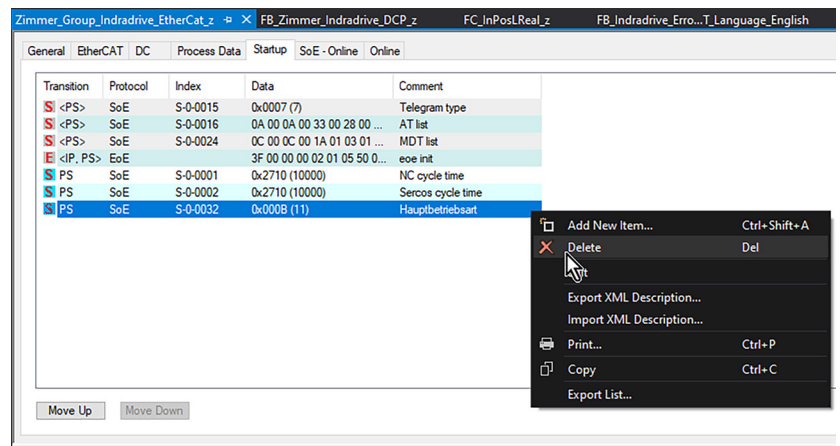
When connecting the drive control system via EtherCAT, the interface configuration takes place on the EtherCAT side, e.g. TwinCAT 3.

- ▶ Activate the TwinCAT project.
- ▶ Restart the drive control system.
- ⇒ The interface parameters are adopted from the drive control system.
- ▶ Check the interface parameters using *IndraDrive Ds* software.

#### 11.3.4.1 Checking the startup parameters

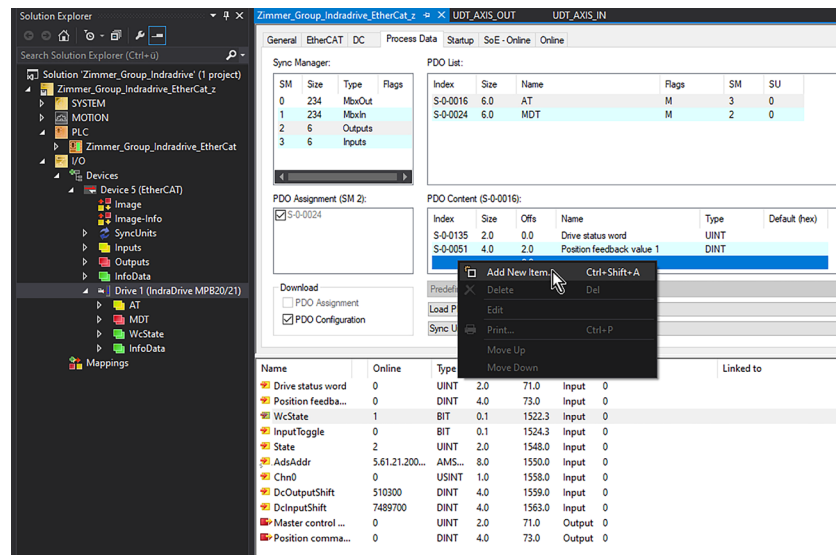
The default parameters that TwinCAT 3 reads from the XML file describe the *main operating mode S-0-0032* during startup.

- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click I/O.
- ▶ Click *Devices*.
- ▶ Click *Device 5 (EtherCAT)*.
- ▶ Click *Device 1 (IndraDrive)*.
- ⇒ The window of the example project opens.
- ▶ Click the *Startup* tab.
- ▶ Right-click the main operating mode that you want to delete from the parameter set.
- ▶ In the context menu, click *Delete*.



#### 11.3.4.2 Transferring axis output parameters in PLC

- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click I/O.
- ▶ Click *Devices*.
- ▶ Click *Device 5 (EtherCAT)*.
- ▶ Click *Device 1 (IndraDrive)*.
- ⇒ The window of the example project opens.
- ▶ Click the *Process Data* tab.
- ▶ Right-click the *PDO Content* area.
- ▶ In the context menu, click *Add New Item*.
- ⇒ The *Edit PDO Entry* window opens.



- ▶ Select the output parameter in the parameter category *S-0-0016 AT*.
  - The output parameter *S-0-0135 Drive status word* is already preset in the predefinition.
  - The output parameter *S-0-0051 Position feedback value 1* is already preset in the predefinition.
- ▶ Click the desired parameters.
- ▶ Click the OK button.
- ⇒ The *Edit PDO Entry* window closes.
- ⇒ The selected parameters have been added.

**Edit PDO Entry**

Name:

Index (hex):

Sub Index:

Data Type:

Bit Length:

From Dictionary:

- S-0-0000 - Dummy-Parameter
- S-0-0011 - Zustandsklasse 1
- S-0-0012 - Zustandsklasse 2
- S-0-0013 - Zustandsklasse 3
- S-0-0029 - Fehlerzähler MDT
- S-0-0037 - Geschwindigkeits-Sollwert additiv
- S-0-0040 - Geschwindigkeitswert Geber 1
- S-0-0041 - Referenzfahr-Geschwindigkeit
- S-0-0047 - Lage-Sollwert
- S-0-0052 - Referenzmaß Geber 1
- S-0-0053 - Lageistwert Geber 2
- S-0-0054 - Referenzmaß Geber 2
- S-0-0057 - Positionierfenster
- S-0-0060 - Referenzmaß Geber 1

### 11.3.4.3 Transmitting PLC input parameters to axis

- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click I/O.
- ▶ Click *Devices*.
- ▶ Click *Device 5 (EtherCAT)*.
- ▶ Click *Device 1 (IndraDrive)*.
- ⇒ The window of the example project opens.
- ▶ Click the *Process Data* tab.
- ▶ Right-click the *PDO Content* area.
- ▶ In the context menu, click *Add New Item*.
- ⇒ The *Edit PDO Entry* window opens.

**Solution Explorer**

- Solution Explorer (Ctrl+U)
- Zimmer\_Group\_IndraDrive\_EtherCat\_1 (1 project)
  - SYSTEM
  - MOTION
  - PLC
  - I/O
    - Devices
      - Device 5 (EtherCAT)
        - Image
        - Image-Info
        - SyncUnits
        - Inputs
        - Outputs
        - InfoData
      - Drive 1 (IndraDrive MPB20/21)

**Edit PDO Entry**

Name:

Index (hex):

Sub Index:

Data Type:

Bit Length:

From Dictionary:

- S-0-0000 - Dummy-Parameter
- S-0-0011 - Zustandsklasse 1
- S-0-0012 - Zustandsklasse 2
- S-0-0013 - Zustandsklasse 3
- S-0-0029 - Fehlerzähler MDT
- S-0-0037 - Geschwindigkeits-Sollwert additiv
- S-0-0040 - Geschwindigkeitswert Geber 1
- S-0-0041 - Referenzfahr-Geschwindigkeit
- S-0-0047 - Lage-Sollwert
- S-0-0052 - Referenzmaß Geber 1
- S-0-0053 - Lageistwert Geber 2
- S-0-0054 - Referenzmaß Geber 2
- S-0-0057 - Positionierfenster
- S-0-0060 - Referenzmaß Geber 1

- ▶ Select the input parameter in the parameter category *S-0-0024 AT*.
  - The input parameter *S-0-0134 Master control word* is already present in the predefinition.
  - The input parameter *S-0-0047 Position Command Value* is already preset in the predefinition.
- ▶ Delete the parameter *S-0-0047 Position Command Value*.
- ▶ Select the parameter *S-0-0082 Positioning Target Value*.
- ▶ Click the desired parameters.
- ▶ Click the OK button.
- ⇒ The *Edit PDO Entry* window closes.
- ⇒ The selected parameters have been added.

**Edit PDO Entry**

Name:

Index (hex):

Sub Index:

Data Type:

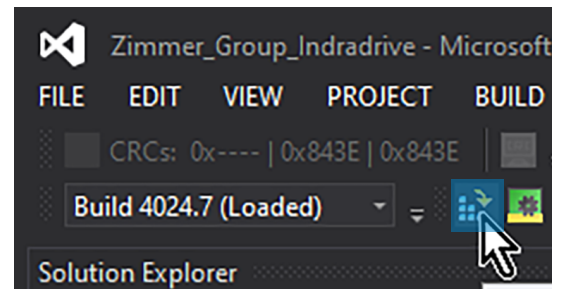
Bit Length:

From Dictionary:

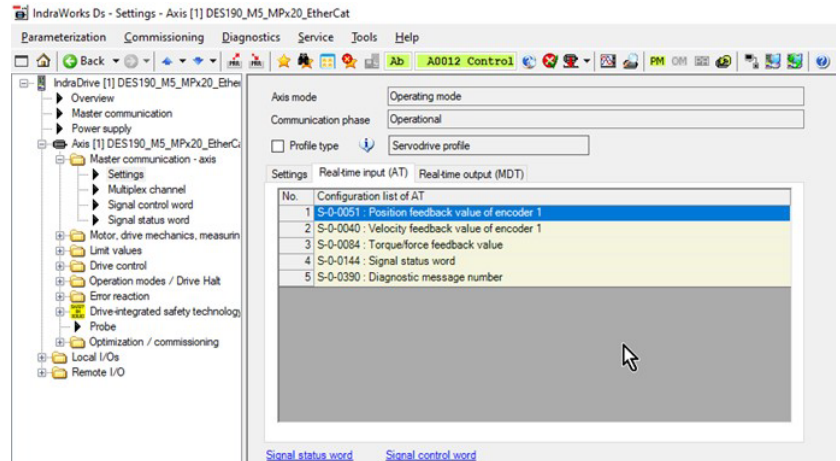
- S-0-0000 - Dummy-Parameter
- S-0-0011 - Zustandsklasse 1
- S-0-0012 - Zustandsklasse 2
- S-0-0013 - Zustandsklasse 3
- S-0-0029 - Fehlerzähler MDT
- S-0-0037 - Geschwindigkeits-Sollwert additiv
- S-0-0040 - Geschwindigkeitswert Geber 1
- S-0-0041 - Referenzfahr-Geschwindigkeit
- S-0-0047 - Lage-Sollwert
- S-0-0052 - Referenzmaß Geber 1
- S-0-0053 - Lageistwert Geber 2
- S-0-0054 - Referenzmaß Geber 2
- S-0-0057 - Positionierfenster
- S-0-0060 - Referenzmaß Geber 1



- ▶ Activate the example project.
- ⇒ The changed parameters have been applied to the drive control system.
- ⇒ The connection between the *IndraWorks Ds* software and the drive control system is canceled.



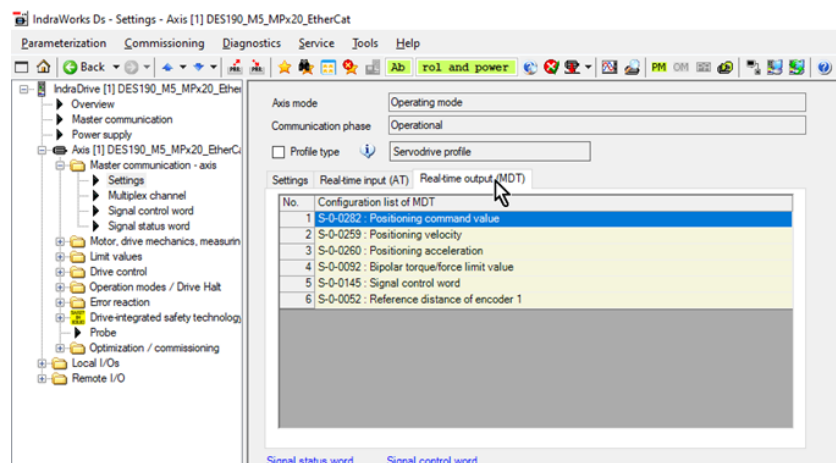
- ▶ Start the *IndraWorks Ds* software.
- ▶ In the navigation pane, click *Axis [1]*.
- ▶ Click *Master Communication Axis [1]*.
- ▶ Click *Settings*.
- ▶ Click the *Process Data In (AT)* tab.
- ⇒ The input parameters are displayed in the *Process Data In (AT)* tab.
- ▶ Check the input parameters by clicking the links *Signal Status Word* and *Signal Control Word*.



The default bits *signal status word* and *signal control word* are already stored in the included parameter set.

| Status  | Target parameter                                                  | Bit number |
|---------|-------------------------------------------------------------------|------------|
| Bit 0:  | S-0-0346: Positioning control word                                | 0          |
| Bit 1:  | S-0-0000: <empty>                                                 | 0          |
| Bit 2:  | S-0-0447: C0300 Set absolute position procedure command           | 0          |
| Bit 3:  | S-0-0346: Positioning control word                                | 3          |
| Bit 4:  | S-0-0346: Positioning control word                                | 5          |
| Bit 5:  | S-0-0099: C0500 Reset class 1 diagnostics                         | 0          |
| Bit 6:  | S-0-0346: Positioning control word                                | 1          |
| Bit 7:  | S-0-0346: Positioning control word                                | 2          |
| Bit 8:  | S-0-0420: C0400 Activate parameterization level procedure command | 0          |
| Bit 9:  | S-0-0422: C0200 Exit parameterization level procedure command     | 0          |
| Bit 10: | S-0-0000: <empty>                                                 | 0          |
| Bit 11: | S-0-0000: <empty>                                                 | 0          |
| Bit 12: | S-0-0000: <empty>                                                 | 0          |
| Bit 13: | S-0-0000: <empty>                                                 | 0          |
| Bit 14: | S-0-0000: <empty>                                                 | 0          |
| Bit 15: | S-0-0000: <empty>                                                 | 0          |

- ▶ Click the *Process Data Out (AT)* tab.
- ⇒ The output parameters are displayed in the *Process Data Out (AT)* tab.
- ▶ Check the input parameters by clicking the links *Signal Status Word* and *Signal Control Word*.



The default bits *signal status word* and *signal control word* are already stored in the included parameter set.

|         | Status                           | Source parameter                          | Bit number |                                                                                     |
|---------|----------------------------------|-------------------------------------------|------------|-------------------------------------------------------------------------------------|
| Bit 0:  | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 1:  | <input type="radio"/>            | S-0-0424: Status parameterization level   | 0          |  |
| Bit 2:  | <input checked="" type="radio"/> | S-0-0403: Position feedback value status  | 0          |  |
| Bit 3:  | <input checked="" type="radio"/> | S-0-0331: Status "n_feedback = 0"         | 0          |  |
| Bit 4:  | <input type="radio"/>            | P-0-0115: Device control: Status word     | 12         |  |
| Bit 5:  | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 6:  | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 7:  | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 8:  | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 9:  | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 10: | <input type="radio"/>            | S-0-0419: Positioning command acknowledge | 0          |  |
| Bit 11: | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 12: | <input type="radio"/>            | S-0-0407: Homing enable                   | 0          |  |
| Bit 13: | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 14: | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |
| Bit 15: | <input type="radio"/>            | S-0-0000: <no signal>                     | 0          |  |

### 11.3.4.4 Linking the interface with PLC

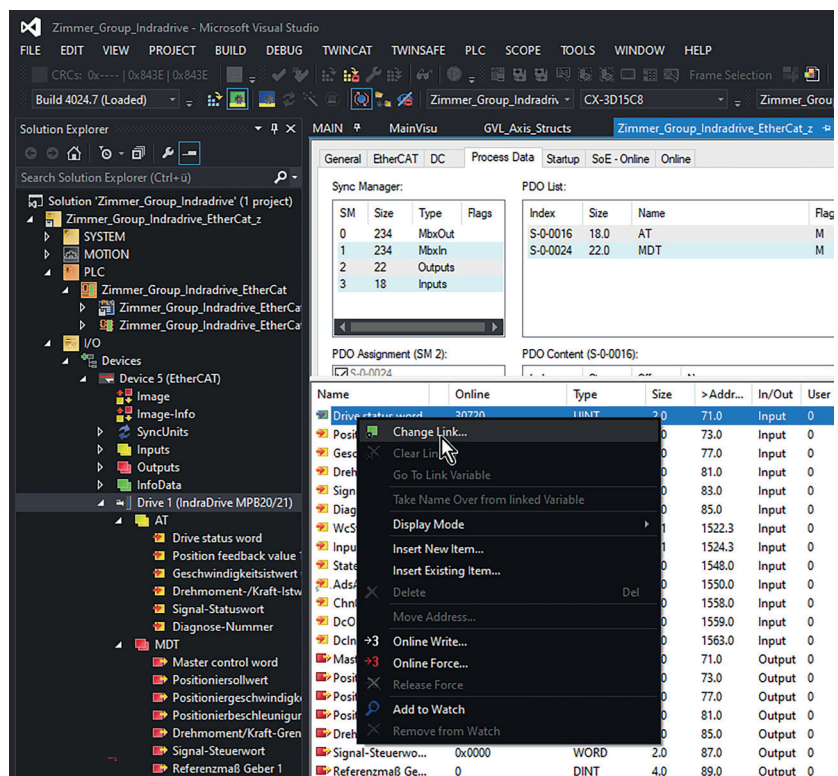
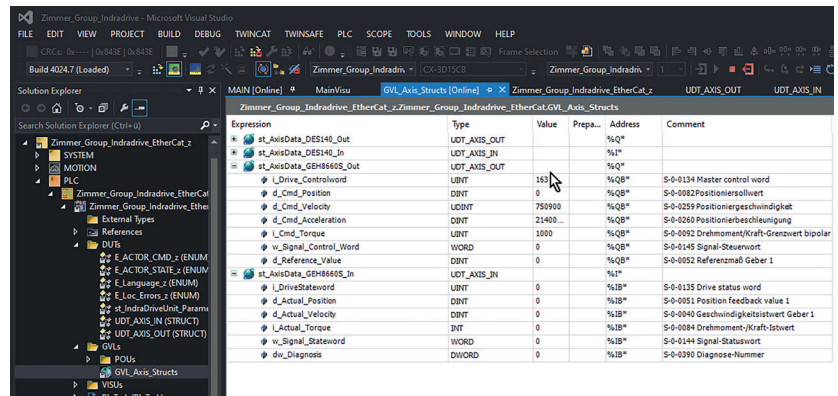
In `GVL_Axis_Structs` there is an input structure `st_AxisData_DES190_In` and an output structure `st_AxisData_DES190_Out` available for the product.

- ▶ Link the interface variables with the `GVL_Axis_Structs` of the example project.
- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click *PLC*.
- ▶ Click `Zimmer_Group_Inndrive_EtherCat`.
- ▶ Click `Zimmer_Group_Inndrive_EtherCat-Project`.
- ▶ Click *GVLs*.
- ▶ Click `GVL_Axis_Structs`.

⇒ The `GVL_Axis_Structs [Online]` window opens.

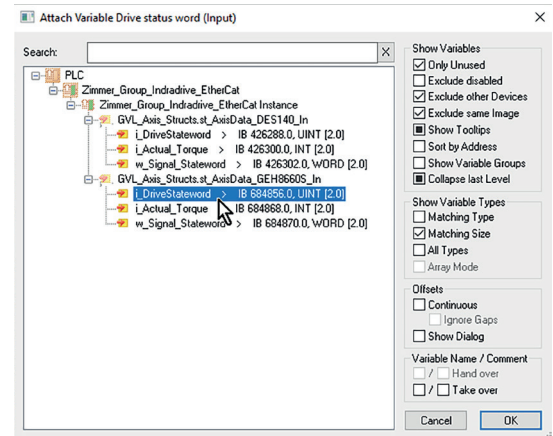
- ▶ Click the example project in the *Solution Explorer*.
- ▶ Click *I/O*.
- ▶ Click *Devices*.
- ▶ Click *Device 5 (EtherCAT)*.
- ▶ Click *Device 1 (IndraDrive)*.
- ⇒ The window of the example project opens.
- ▶ Click the *Process Data* tab.
- ▶ Right-click *Drive status word*.
- ▶ In the context menu, click *Change Link*.

⇒ The *Attach Variable Drive status word (Input)* window opens.





- Right-click the instances.
  - Link the input structure to *GVL\_Axis\_Structs*.
  - Link the output structure to *GVL\_Axis\_Structs*.
  - Click the *OK* button.
- ⇒ The *Attach Variable Drive status word (Input)* window closes.



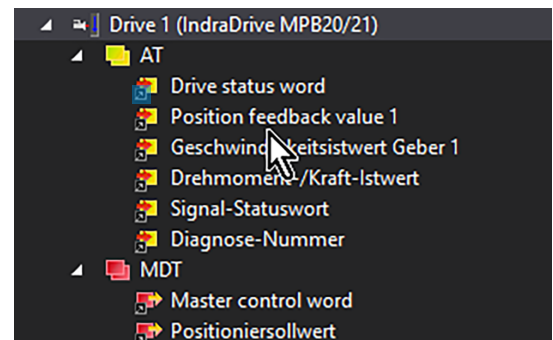
```

TYPE UDI_AXIS_OUT :
STRUCT
    i_Drive_Controlword : UINT; // S-0-0134 Master control word
    d_Cmd_Position : DINT; // S-0-0082 Positioniersollwert
    d_Cmd_Velocity : UDINT; // S-0-0259 Positioniergeschwindigkeit
    d_Cmd_Acceleration : DINT; // S-0-0260 Positionierbeschleunigung
    i_Cmd_Torque : UINT; // S-0-0082 Drehmoment-/Kraft-Grenzwert bipolar
    w_Signal_Control_Word : WORD; // S-0-0145 Signal-Steuervort
    d_Reference_Value : DINT; // S-0-0082 Referenzmaß Geber 1
END_STRUCT
END_TYPE

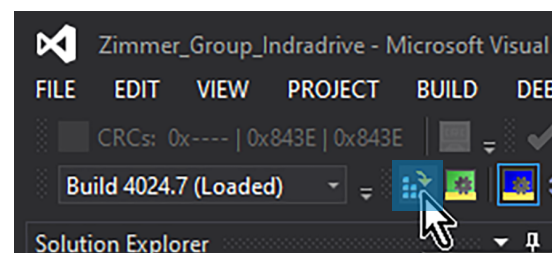
TYPE UDI_AXIS_IN :
STRUCT
    i_DriveStateword : UINT; // S-0-0135 Drive status word
    d_Actual_Position : DINT; // S-0-0081 Position feedback value 1
    d_Actual_Velocity : DINT; // S-0-0040 Geschwindigkeitswert Geber 1
    i_Actual_Torque : INT; // S-0-0084 Drehmoment-/Kraft-Istwert
    w_Signal_Stateword : WORD; // S-0-0144 Signal-Statuswort
    dw_Diagnosis : DWORD; // S-0-0390 Diagnose-Nummer
END_STRUCT
END_TYPE

```

- ⇒ The arrow at the bottom in the icon tells you that variable linking was successful.



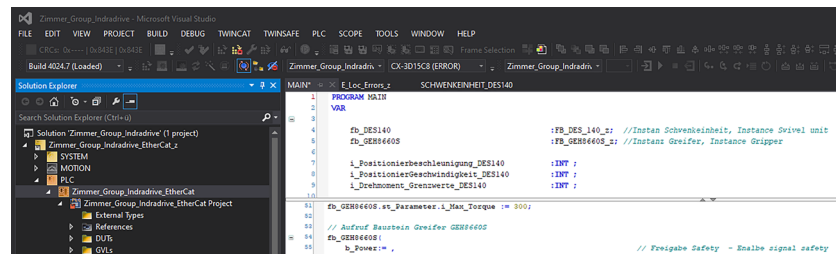
- Activate the PLC.
  - Restart the drive control system.
- ⇒ The changed parameters have been applied to the drive control system.



### 11.3.5 Integrating function blocks

- Click the example project in the *Solution Explorer*.
- Click *PLC*.
- Click *Zimmer\_Group\_Indradrive\_EtherCat*.
- Click *Zimmer\_Group\_Indradrive\_EtherCat-Project*.
- Click *POUs*.
- Click *MAIN (PRG)*.

⇒ The *MAIN* window opens.



The variable declaration includes the instantiation of the function block *FB\_DES190\_z*. The program section includes the call-up of the instance *fb\_DES190*.

- Link the hardware to the instance *fb\_DES190*.
- Connect the input and output structures from *GVL\_Axis\_Structs* to instance *fb\_DES190*.

```
// Aufruf Baustein Schwenkeinheit
fb_DES190(
    b_Power:= ,
    b_Automatic:= ,
    b_MoveToWorkPos:= ,
    b_MoveToWorkPos_2:= ,
    b_MoveToBasePos:= ,
    b_SetReferencePos:= ,
    b_Halt:= ,
    b_Reset:= Fehler_Reset,
    b_JogPlus:= ,
    b_JogMinus:= ,
    st_AxisData_In:= GVL_Axis_Structs.st_AxisData_DES190_In,
    st_Parameter:= ,
    i_Velocity:= i_PositionierGeschwindigkeit_DES190,
    i_AccDec:= i_Positionierbeschleunigung_DES190 ,
    i_Torque:= i_Drehmoment_Grenzwerte_DES190 ,
    b_StandStill=> ,
    b_Enabled=> ,
    b_BasePosition=> ,
    b_WorkPosition=> ,
    b_WorkPosition_2=> ,
    b_Homed=> ,
    b_Error=> ,
    f_ActPos=> ,
    f_ActVel=> ,
    f_ActTorque=> ,
    s_AxisInfo=> ,
    st_AxisData_Out:= GVL_Axis_Structs.st_AxisData_DES190_Out);

// Freigabe Safety - Enable signal safety
// Betriebsart Automatik (0= Manuell 1= Automatik), OpMode Auto (0= manual 1= automatic)
// Arbeitsstellung anfahren, move to Work Position
// Alternative Arbeitsstellung anfahren, move to alternativ Work Position
// Grundstellung anfahren, move to Base Position
// Referenzieren, get new reference Position
// Achse in Halt setzen 0 = Run 1= Halt , set axis to Halt 0 = Run 1= Halt
// Störung quittieren, Reset Error
// Tippen vorwaerts, Jog forward
// Tippen rueckwaerts, Jog backward
// Eingangsdaten, input data
// Parameterstruktur, Struct of parameters
// Geschwindigkeit(%), velocity(%)
// Beschleunigung/Verzögerung(%), Acceleration/Deceleration(%)
// Drehmoment in(%),Torque(%)
// Dreheinheit in Stillstand, rotating unit not moving
// Dreheinheit bereit für Verfahrbefehle (AF), rotating unit ready for motion commands (AF)
// Dreheinheit in Grundstellung, rotating unit in base position
// Dreheinheit in Arbeitsstellung, rotating unit in work position
// Dreheinheit in alternativer Arbeitsstellung, rotating unit in alternativ work position
// Referenziert, In Reference
// Achsfehler , Axis Error
// Aktuelle Position, actual position(%)
// Aktuelle Geschwindigkeit, actual velocity
// Aktuelles Drehmoment, actual torque// Aktuelle Position, actual position(%)
// Fehler Klartext, Error Description// Aktuelle Geschwindigkeit, actual velocity
// Ausgangsdaten , output data// Aktuelles Drehmoment, actual torque
```

## 11.4 TIA Portal

### INFORMATION



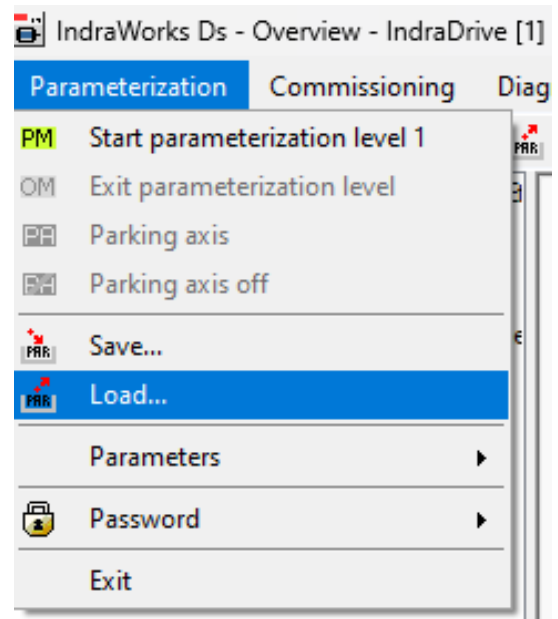
This section uses the commissioning of the product of the DES190 installation size as an example project. This example project can be transferred to the DES140 installation size.

The example project is intended as an aid and must not be used as a programming template.

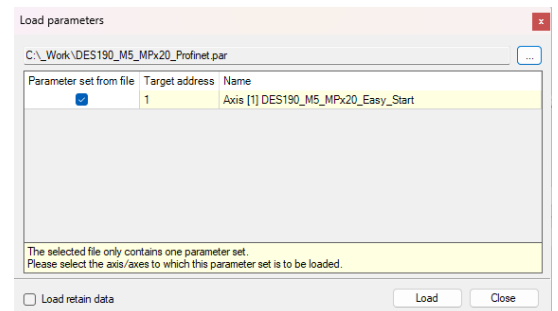
Commissioning the product depends on the configuration of the drive control system and can therefore vary.

#### 11.4.1 Configuring the drive control system

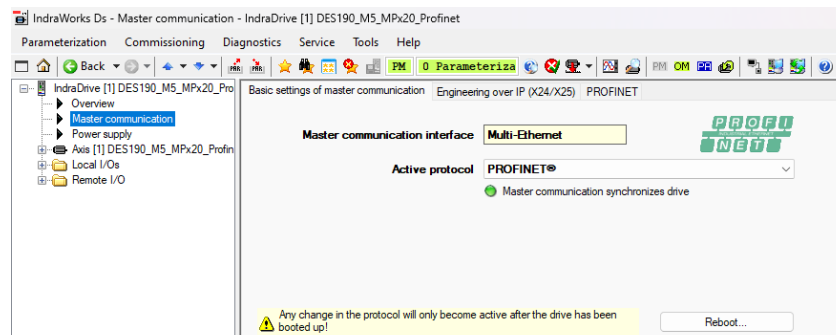
- ▶ Connect the drive control system to the computer using its network interface.
- ▶ Use the *IndraWorks Ds* software to search for the appropriate drive control system (see chapter "Setting the IP address").
- ⇒ The connection to the drive control system is established.
- ▶ In the *Configuration* menu, click *Load*.
- ⇒ The *Load Parameters* window opens.



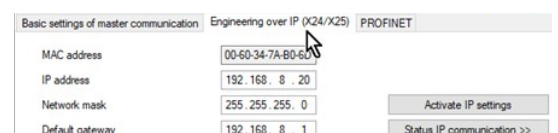
- ▶ Enable the checkbox of the desired parameter set.
- ▶ Click the *Load* button.
- ⇒ The *Load Parameters* window closes.



- ▶ In the navigation pane, click *Master Communication*.
- ⇒ The *Master Communication Basic Settings* tab is displayed in the window.
- ▶ In the *Active Protocol* drop-down menu, select the communication type for the control system.



- ▶ Click the *Engineering via IP (X24/X25)* tab.
- ▶ Enter the IP address for configuring the drive control system.



## INFORMATION



The Profinet interface needs its own network address.

A network connection therefore has two separate IP addresses that can be addressed in different ways.

- Click the *PROFINET* tab.
- Enter the IP address of the Profinet interface on the Profinet tab.

- In the navigation pane, click *Axis [1]*.
- Click *Master Communication Axis [1]*.
- Click *Settings*.
- Click the *Process Data In (AT)* tab.
- In the drop-down menus of the fields, select the desired files for communication between the PLC and the drive control system.
- ⇒ The actual value data channel is comprised of the following parameters on the *Process Data In (AT)* tab.
- ⇒ The target value data channel is comprised of the following parameters on the *Process Data Out (MDT)* tab.

For successful communication between the PLC and the drive control system, it is important that the data length of the process input map and process output map be configured correctly.

In this example project, 18-byte inputs (actual value data channel) and 22-byte outputs (target value data channel) are needed. This data length is generated automatically from the previously configured settings.

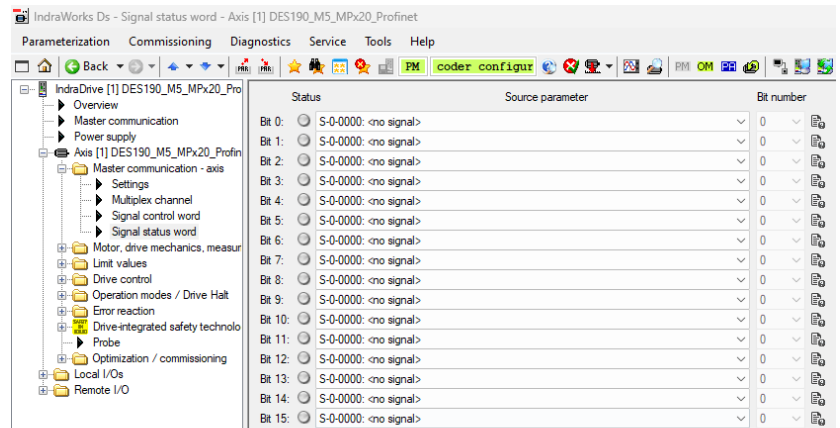
The *IndraWorks Ds* software specifies the data length in bytes, the hardware configuration from Siemens specifies the data length in words.

- Click the *Data Channel* tab.

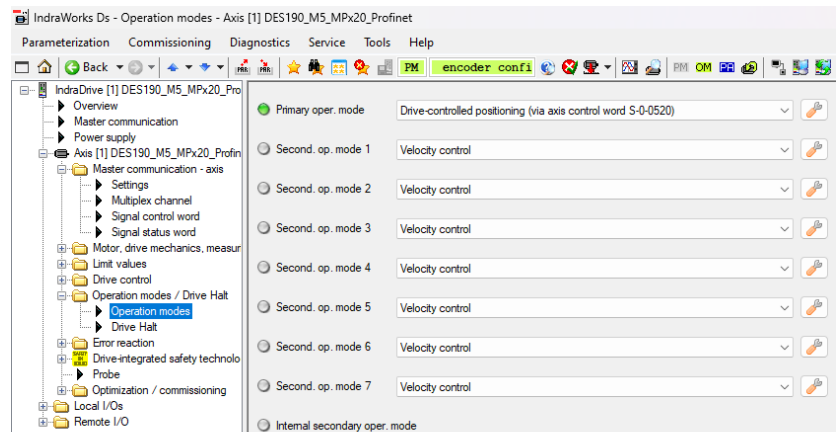
- In the navigation pane, click *Axis [1]*.
- Click *Master Communication Axis [1]*.
- Click *Signal Control Word*.
- In the drop-down menus, select the target parameters for the individual bits.
- ⇒ The switching enables communication between the PLC and the drive control system.

| Bit     | Target parameter                                        | Bit number |
|---------|---------------------------------------------------------|------------|
| Bit 0:  | S-0-0000: <empty>                                       | 0          |
| Bit 1:  | S-0-0000: <empty>                                       | 0          |
| Bit 2:  | S-0-0447: C0300 Set absolute position procedure command | 0          |
| Bit 3:  | S-0-0000: <empty>                                       | 0          |
| Bit 4:  | S-0-0000: <empty>                                       | 0          |
| Bit 5:  | S-0-0000: <empty>                                       | 0          |
| Bit 6:  | S-0-0000: <empty>                                       | 0          |
| Bit 7:  | S-0-0000: <empty>                                       | 0          |
| Bit 8:  | S-0-0000: <empty>                                       | 0          |
| Bit 9:  | S-0-0000: <empty>                                       | 0          |
| Bit 10: | S-0-0000: <empty>                                       | 0          |
| Bit 11: | S-0-0000: <empty>                                       | 0          |
| Bit 12: | S-0-0000: <empty>                                       | 0          |
| Bit 13: | S-0-0000: <empty>                                       | 0          |
| Bit 14: | S-0-0000: <empty>                                       | 0          |
| Bit 15: | S-0-0000: <empty>                                       | 0          |

- In the navigation pane, click *Axis [1]*.
- Click *Master Communication Axis [1]*.
- Click *Signal Status Word*.
- In the drop-down menus, select the source parameters for the individual bits.
- ⇒ The switching enables communication between the PLC and the drive control system.



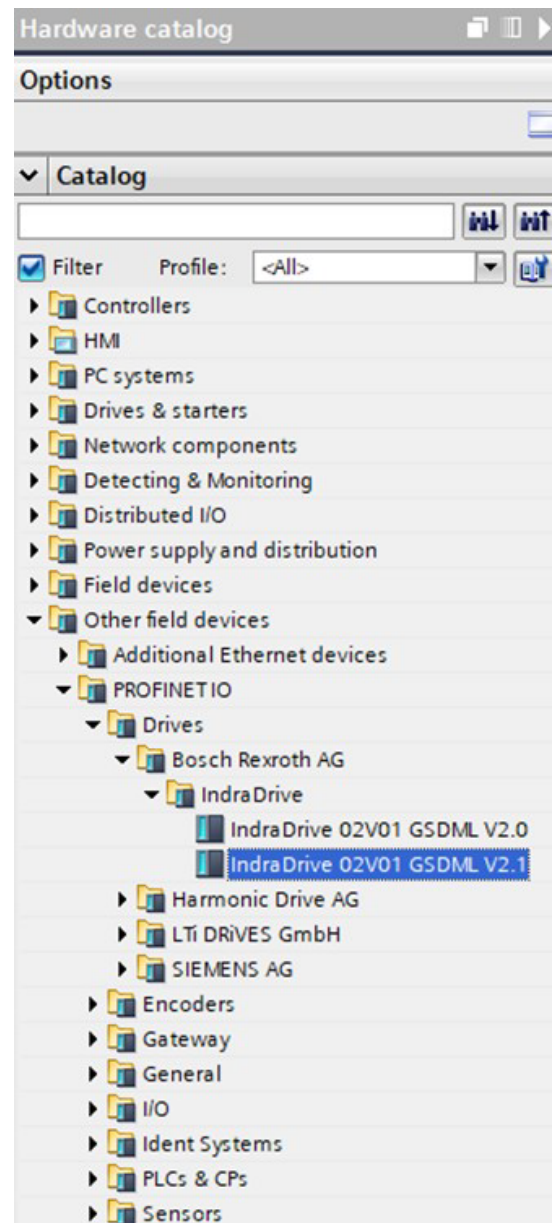
- In the navigation pane, click *Axis [1]*.
- Click *Operating Modes/Drive Stop*.
- Click *Operating Modes*.
- In the drop-down menus, select the operating modes.
  - In the drop-down menu *Main Operating Mode*, select the *Drive-controlled positioning (via axis controller word S-0-0520)* option.
- The example project uses only one operation mode because this is sufficient for all functions (jog, positioning and referencing).





### 11.4.2 Configuring the hardware

- Select the drive control system being used in the hardware catalog.

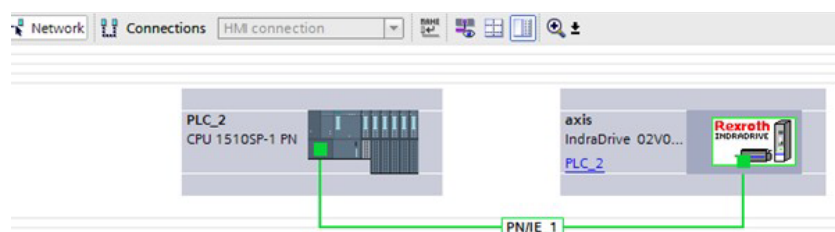


#### INFORMATION



The axis *IndraDrive 02V01 GSDML V2.1* is required for the example project: *Other Field Devices > PROFINET IO > Bosch Rexroth AG > IndraDrive > Top Module*

- Connect the drive control system to the PLC.
- Assign the drive control system the IP address from the configuration.
  - To do this, use the provided GSDML files or download the current Bosch Rexroth version.



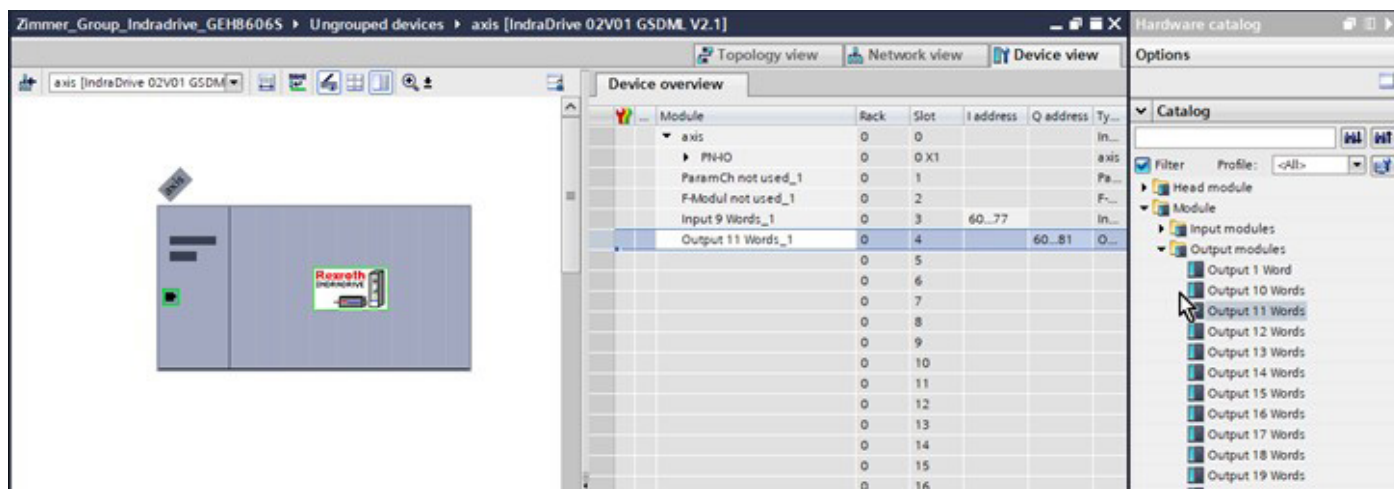
#### INFORMATION



In the example project in the *Module* tab in the hardware catalog, the modules *Input 9 Words\_1* and *Output 11 Word\_1* are moved to the configuration.

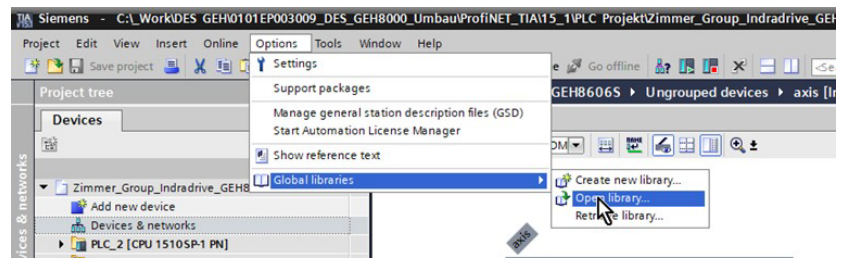


- Configure the data length set in the drive control system configuration.
- Delete the input and output words entered by default.
- After successful transmission and transfer of the configuration, there is a connection between the drive control system and the PLC.

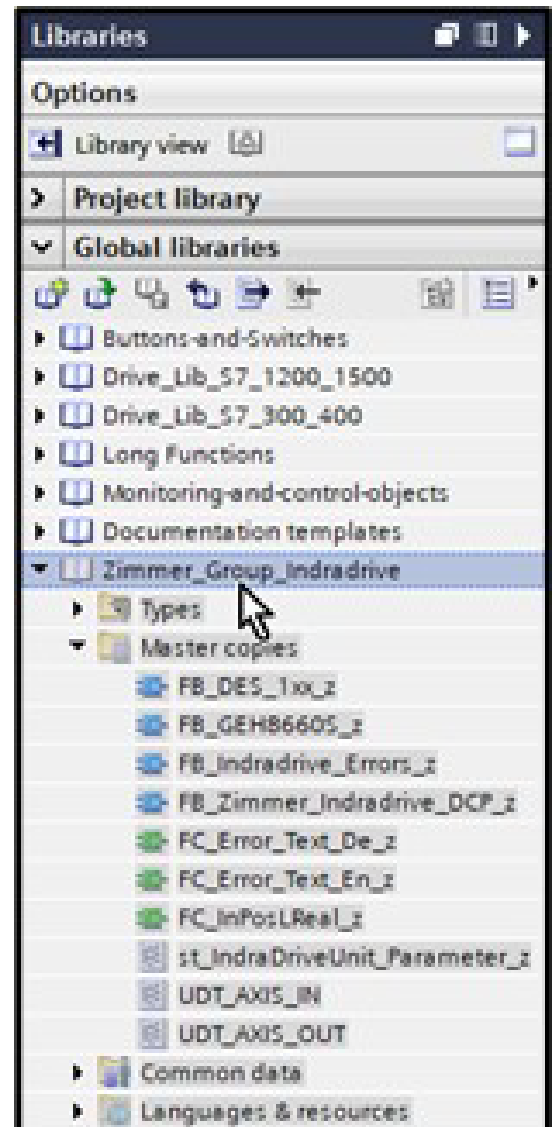


### 11.4.3 Integrating the library

- In the *Options* menu, click *Global Libraries*.
- Click *Open Library*.
- ⇒ The *Libraries* window opens.

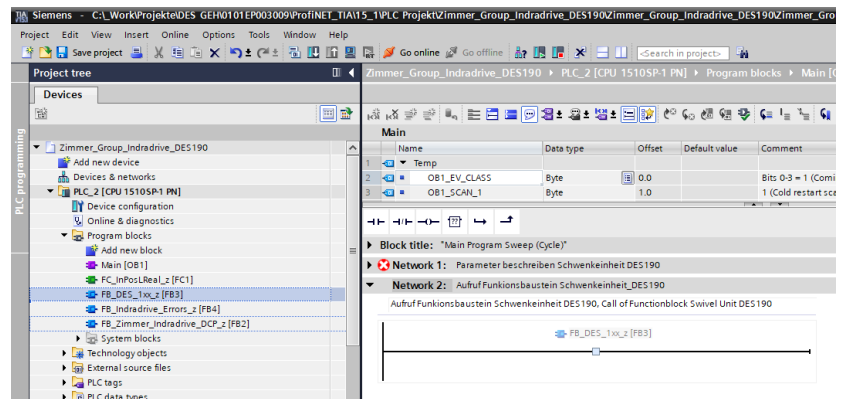


- Click the *Zimmer\_Group\_Indradrive* global library.
- Click the *Templates* folder.
- Go to the *Templates* folder and copy the data types *UDT\_AXIS\_IN*, *UDT\_AXIS\_OUT* and the variable *st\_IndraDriveUnit\_Parameter\_z*.
- In *Project navigation* in the *Devices* tab, click *PLC\_2*.
- Click the *PLC Data Types* folder.
- Paste the copied data types and variable to the *PLC Data Types* folder.
- Go to the *Templates* folder and copy the function blocks *FB\_DES\_1xx\_z*, *FB\_Zimmer\_Indradrive\_DCP\_z* and *FC\_InPosReal\_z*.
- Click the *Program Modules* folder.
- Paste the copied function blocks to the *Program Modules* folder.
- ⇒ The function blocks are required for activation.
- Using drag & drop with the mouse, move the function block file *FB\_IndraDrive\_Errors\_z* from the *Errorhandling English* or *Errorhandling German* folder to the PLC project depending on the desired language to be used.

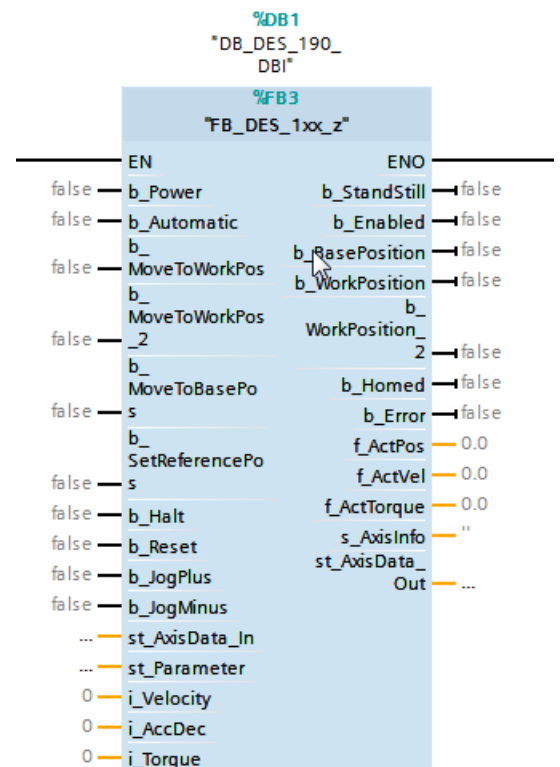


#### 11.4.4 MAIN

- In *Project navigation* in the *Devices* tab, click *PLC\_2*.
  - Click the *Program Modules* folder.
  - Click the *MAIN* organization block.
  - Using drag & drop with the mouse, move the function block *FB\_DES\_1xx\_z* from the *Program Modules* folder to *Network 2*.
- ⇒ *Network 1* is used to describe the parameters of the function block.



- ⇒ The call options open when a single instance is generated.
- Edit the name of the instance so that it is recognized as an instance data block.
    - Variables with the suffix *b\_* are binary command inputs/outputs. These can be controlled with a button, for example, and used for further signal processing.
  - Create a suitable structure at the inputs *st\_AxisData\_In* and *st\_Parameter*.
  - Create a suitable structure at the outputs *st\_AxisData\_Out*.



#### INFORMATION



- The defaults for speed, acceleration and torque are created as integer variables.
- The outputs are created as floating point numbers (real).
- Current statuses, messages or errors of the axis are output via *s\_AxisInfo*.

### 11.4.5 Variables

Direct links to the product are created in the *PLC Variables* folder.

► In *Project navigation* in the *Devices* tab, click *PLC\_2*.

► Click the *PLC Variables* folder.

► Click *Standard Variable Table*.

⇒ The standard variable table opens.

|    | Name                   | Data type     | Address | Retain                   | Acces...                            | Writa...                            | Visibl...                           |
|----|------------------------|---------------|---------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| 1  | st_AxisData_DES190_Out | *UDT_AXIS_... | %Q60.0  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 2  | st_AxisData_DES190_In  | *UDT_AXIS_IN  | %I60.0  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 3  | b_Power                | Bool          | %M112.0 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4  | b_Automatic            | Bool          | %M112.1 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5  | b_MoveToWorkPos        | Bool          | %M112.3 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 6  | b_MoveToWorkPos_2      | Bool          | %M112.4 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 7  | b_MoveToBasePos        | Bool          | %M112.5 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 8  | b_SetReferencePos      | Bool          | %M112.6 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 9  | b_Reset                | Bool          | %M112.7 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10 | b_JogPlus              | Bool          | %M113.0 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11 | b_JogMinus             | Bool          | %M113.1 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 12 | i_Velocity             | Int           | %MW114  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 13 | i_Acceleration         | Int           | %MW116  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| 14 | i_Torque               | Int           | %MW118  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

► In the standard variable table, declare the two variables of the data type *UDT\_AXIS\_IN* and *UDT\_AXIS\_OUT*.

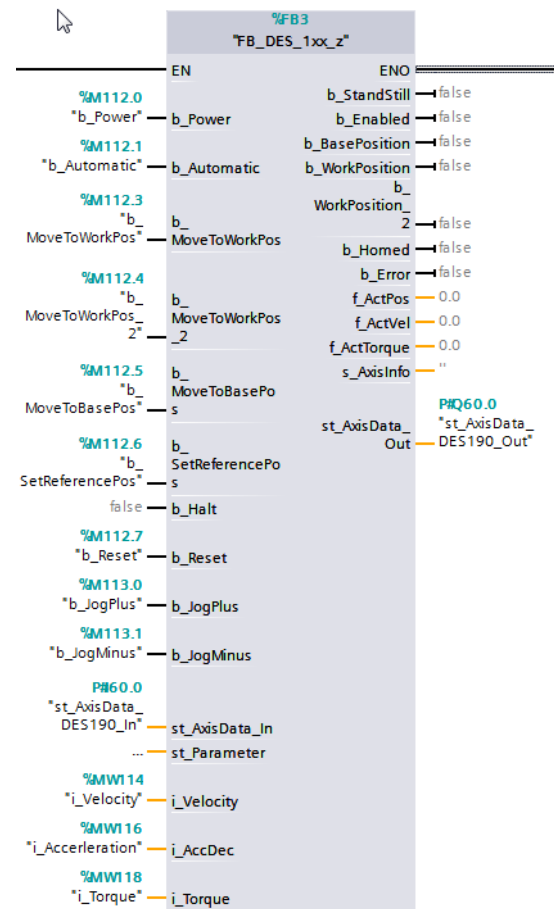
#### INFORMATION



- Make sure that the respective IP address is correct in the *Address* field.
    - The IP address was assigned previously during the hardware configuration.
  - Enter only the first IP address.
- ⇒ The subsequent IP addresses are generated and assigned automatically.

### 11.4.6 Using the function block

- ▶ On the function block added, switch multiple inputs and outputs.
  - ▶ Connect the input structure *st\_AxisData\_In* found in the function block to the corresponding variable *st\_AxisData\_DES190\_In*.
  - ▶ Connect the output structure *st\_AxisData\_Out* found in the function block to the corresponding variable *st\_AxisData\_DES190\_Out*.
- ⇒ The function block reads out the individual statuses and positions of the drive control system and processes them.
- ⇒ The drive control system can be configured by connecting outputs.
- ▶ Transfer the required data so that the drive control system can activate the motor.



#### INFORMATION



In the example project, these standard values are stored in flag ranges and thus can be connected flexibly.

- ▶ These values can be found in the "Input values" section.

- ▶ Transfer the settings to the PLC control system.
  - ▶ Complete the steps necessary for Siemens:
    - Save/transmit
    - Load into the device

## 11.5 Functions of the function block

Depending on the switching of the function block, the following functions are carried out.

### 11.5.1 b\_Power

If the variable is set to *true*, the drive control system receives drive enable (AF) and the drive is permitted to move.

If the variable is set to *false*, the drive is shut down.

### 11.5.2 b\_Automatic

Limits the automatic approach to the predefined positions.

If the variable is not set and *b\_Power* is *true*, the product can be jogged continuously in the respective direction using *b\_JogPlus* and *b\_JogMinus*.

The operation mode in the drive control system is not toggled for this. This bit only affects the logic of the instance *fb\_DES190*.

### 11.5.3 b\_MoveToWorkPos

A positive edge at this input causes the product to move to the work position *st\_Parameter.f\_WorkPos*.

The prerequisite for this is that *b\_Power*, *b\_Automatic* and *b\_Enabled* (AF) are set to *true* and the function block is not currently processing any other commands.

### 11.5.4 b\_MoveToWorkPos\_2

A positive edge at this input causes the product to move to the alternative work position *st\_Parameter.f\_WorkPos\_2*.

The prerequisite for this is that *b\_Power*, *b\_Automatic* and *b\_Enabled* (AF) are set to *true* and the function block is not currently processing any other commands.

### 11.5.5 b\_MoveToBasePos

A positive edge at this input causes the product to move to the home position *st\_Parameter.f\_BasePos*.

The prerequisite for this is that *b\_Power*, *b\_Automatic* and *b\_Enabled* (AF) are set to *true* and the function block is not currently processing any other commands.

### 11.5.6 b\_SetReferencePos

A positive edge at this input causes the product to move to the reference position *st\_Parameter.f\_HomePos*.

The prerequisite for this is that *b\_Power*, *b\_Automatic* and *b\_Enabled* (AF) are set to *true* and the function block is not currently processing any other commands.

### 11.5.7 b\_Halt

If this signal is set to *true* while the drive control system is in drive enable (AF), the drive is stopped immediately (AH).

If the variable is set to *false*, the drive control system again has drive enable (AF).

### 11.5.8 b\_Fehler\_Reset

Acknowledge all pending errors. If the error persists, it cannot be acknowledged.



### 11.5.9 b\_JogPlus

The product moves in the positive direction as long as this input is set.

The prerequisite for this is that *b\_Power*, *b\_Automatic* and *b\_Enabled* (AF) are set to *true* and *b\_Automatic* is set to *false* and the function block is not currently processing any other commands.

### 11.5.10 b\_JogMinus

The product moves in the negative direction as long as this input is set.

The prerequisite for this is that *b\_Power*, *b\_Automatic* and *b\_Enabled* (AF) are set to *true* and *b\_Automatic* is set to *false* and the function block is not currently processing any other commands.

## INFORMATION



The parameters *i\_Velocity*, *i\_AccDec* and *i\_Torque* are equal to 0 when starting the project.

The drive control system triggers an error, if e.g. *i\_Torque* = 0.

► Allocate values to the parameters *i\_Velocity*, *i\_AccDec* and *i\_Torque*.

### 11.5.11 i\_Velocity

The desired speed can be entered for *i\_Velocity*. The value can be 0 - 100% of the maximum permitted speed of the product.

### 11.5.12 i\_AccDec

The desired acceleration/deceleration of the product can be entered for *i\_AccDec*. The value can be 0 - 100% of the maximum permitted acceleration/deceleration of the product.

### 11.5.13 i\_Torque

The desired torque of the drive can be entered for *i\_Torque*. The value can be 0 - 300% of the maximum permitted torque of the product.

### 11.5.14 st\_Parameter

The positions and basic settings are compiled in the variable *st\_IndraDriveUnit\_Parameter\_z*. These can be changed during runtime.

In the example, the parameters are partially defined in *Main(PRG)*.

```

TYPE st_IndraDriveUnit_Parameter_z :
STRUCT

    f_BasePos          :LREAL ;           // Grundstellung, base position
    f_WorkPos          :LREAL ;           // Arbeitsstellung, work position
    f_WorkPos_2        :LREAL ;           // Alternative Arbeitsstellung, alternativ work position
    f_TeachPos         :LREAL ;           // Teachstellung, teach position
    f_HomePos          :LREAL ;           // Referenz-Position, Reference position
    f_PositionDeviation :LREAL := 3.0;    // Positions Abweichung, position deviation
    f_Deviation_Teachpos :LREAL := 3.0;   // Positions Abweichung Teachposition, position deviation teachpos
    i_Max_Torque       :INT  := 300;      // Maximales Moment in %,
                                         // Maximum torque in %,

    t_MotionTimeout    :TIME := T#3S;    // Zeit für Timeout während Bewegung, Time for timeout during movement
    t_HomingTimeout    :TIME := T#7S;    // Zeit für Timeout während der Referenzierung, time for Timeout during referencing

    e_Language         :E_Language_z;    // Sprache für Fehlerauswertung
    s_Type             :STRING;          // Bauteilbezeichnung wird zur Unterscheidung des Typs verwendet,
                                         // Component designation is used to differentiate the type

END_STRUCT
END_TYPE

```

### 11.5.15 st\_Parameter (TIA)

The positions and basic settings are compiled in the variable `st_IndraDriveUnit_Parameter_z`. These can be changed during runtime.

Zimmer\_Group\_Indradrive\_DES190 ▸ PLC\_2 [CPU 1510SP-1 PN] ▸ PLC data types ▸ st\_IndraDriveUnit\_Parameter\_z

|    | Name                 | Data type | Default value | Accessible f...                     | Writa...                            | Visible in ...                      | Setpoint                 | Comment                                                   |
|----|----------------------|-----------|---------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-----------------------------------------------------------|
| 1  | f_BasePos            | Real      | 0.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Grundstellung, base position                              |
| 2  | f_WorkPos            | Real      | 0.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Arbeitsstellung, work position                            |
| 3  | f_WorkPos_2          | Real      | 0.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Alternative Arbeitsstellung, alternativ work position     |
| 4  | f_TeachPos           | Real      | 0.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Teachstellung, teach position                             |
| 5  | f_HomePos            | Real      | 0.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Referenz-Position, Reference position                     |
| 6  | f_PositionDeviation  | Real      | 3.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Positions Abweichung, position deviation                  |
| 7  | f_Deviation_Teachpos | Real      | 3.0           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Positions Abweichung Teachposition, position deviati...   |
| 8  | i_Max_Torque         | Int       | 300           | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Maximales Moment in %, // Maximum torque in %,            |
| 9  | t_MotionTimeout      | Time      | T#3s          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Zeit für Timeout während Bewegung, Time for timeo...      |
| 10 | t_HomingTimeout      | Time      | T#7s          | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Zeit für Timeout während der Referenzierung, time for ... |
| 11 | i_Language           | Int       | 1             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | ID Sprache für Fehlerauswertung                           |
| 12 | s_Type               | String    | "             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Bauteilbezeichnung wird zur Unterscheidung des Typ...     |

In the example, the parameters are partially defined in *Main (OB1) Network 1*.

#### Network 1: Parameter beschreiben Schwenkeinheit DES190

Beispielparameter für DEMO-Anwendung DES190 , Example parameters for DEMO-Application DES190

```

1 "DB_DES_190_DBI".st_Parameter.f_BasePos := 0.0;           // Grundstellung (Offen), base position(opened)
2 "DB_DES_190_DBI".st_Parameter.f_WorkPos := 180.0;         // Arbeitsstellung(Geschlossen), work position(closed)
3 "DB_DES_190_DBI".st_Parameter.f_PositionDeviation := 3.0; // Positionsabweichung , position deviation
4 "DB_DES_190_DBI".st_Parameter.f_HomePos := 0;             // Referenz-Position, Reference position
5 "DB_DES_190_DBI".st_Parameter.i_Max_Torque := 200;        // Maximales Moment in %, Maximum torque in %,
6                                                             //
7 "DB_DES_190_DBI".st_Parameter.s_Type := 'DES190';         // Name der Einheit, Name of Unit

```

### 11.6 Input values

An entry of 0 -100% is possible for speed and acceleration. Entering 0 corresponds to the minimum value and 100 to the maximum value.

An entry of 0 - 300% for the torque is possible like in the drive control system.

DES140 (gear ratio 1:96 | 50 rpm of the flat swivel unit | at 4800 rpm on the motor)

| Variable       | Value range | Input value | Corresponding value    |
|----------------|-------------|-------------|------------------------|
| i_Velocity     | 0 to 500    | 75          | 37.5 rpm               |
| i_Acceleration | 0 to 2500   | 50          | 1250 mm/s <sup>2</sup> |
| i_Torque       | 0 to 300    | 200         | 200 %                  |

DES190 (gear ratio 1:193.75 | 25 rpm of the flat swivel unit | at 4844 rpm on the motor)

| Variable       | Value range | Input value | Corresponding value    |
|----------------|-------------|-------------|------------------------|
| i_Velocity     | 0 to 500    | 75          | 18.75 rpm              |
| i_Acceleration | 0 to 2500   | 50          | 1250 mm/s <sup>2</sup> |
| i_Torque       | 0 to 300    | 200         | 200 %                  |

## 12 Maintenance

### NOTICE

**Material damage resulting from blowing out with compressed air**

Blowing out the product with compressed air can cause malfunctions.

- ▶ Never purge the product with compressed air.

### NOTICE

**Material damage caused by unsuitable cleaning materials**

Liquid and solvent-based cleaning agents can cause malfunctions.

- ▶ Do not clean the product with any cleaning agents that are liquid or contain solvents.

Maintenance-free operation of the product is guaranteed for up to **5 million cycles**.

- ▶ Note that the product could become damaged under the following circumstances:

- Dirty environment
- Improper use and use that does not comply with the performance data
- Permissible temperature range not observed

- ▶ Even though the product is maintenance-free as mentioned above, perform a regular visual inspection to check for any damage or contamination.

- ▶ Have maintenance work that requires disassembly of the product performed by customer service only.

- ⇒ Dismantling and reassembling the product without authorization may result in complications, as special installation equipment is required in some cases. Zimmer Group GmbH accepts no liability for any resulting malfunctions or damage.

## 13 Decommissioning/disposal

### INFORMATION



When the product reaches the end of its operational phase, it can be completely disassembled and disposed of.

- ▶ Disconnect the product completely from the power supply.
- ▶ Dispose of the components properly according to the material groups.
- ▶ Comply with the locally applicable environmental and disposal regulations.

## 14 RoHS declaration

in terms of the EU Regulation 2011/65/EU

### Name and address of the manufacturer:

Zimmer Group GmbH



Am Glockenloch 2

77866 Rheinau, Germany



+49 7844 9138 0



[info@zimmer-group.com](mailto:info@zimmer-group.com)



[www.zimmer-group.com](http://www.zimmer-group.com)

We hereby declare that the incomplete machine described below

**Product designation:** Flat swivel unit

**Type designation:** DES

conforms to the requirements of the directive in its design and the version we put on the market.

Michael Hoch

Authorized representative for the  
compilation of relevant technical  
documents

Rheinau, Germany, 2020-09-20

(Place and date of issuance)

Martin Zimmer  
(Legally binding signature)  
Managing Partner

## 15 Declaration of Incorporation

In terms of the EU Machinery Directive 2006/42/EC (Annex II 1 B)

### Name and address of the manufacturer:

**Zimmer Group GmbH**

📍 Am Glockenloch 2  
77866 Rheinau, Germany

☎ +49 7844 9138 0

✉ [info@zimmer-group.com](mailto:info@zimmer-group.com)

🌐 [www.zimmer-group.com](http://www.zimmer-group.com)

We hereby declare that the incomplete machine described below

**Product designation:** Flat swivel unit

**Type designation:** DES

conforms to the requirements of the Machinery Directive, 2006/42/EC, Article 2g, Annex VII, b – Annex II, b, in its design and the version we put on the market.

We hereby confirm that all the relevant basic health and safety requirements for the product have been observed and implemented.

A full list of applied standards can be obtained from the manufacturer.

We also declare that the specific technical documents were produced in accordance with Annex VII Part B of this Directive. We undertake to provide the market supervisory bodies with electronic versions of special documents for the incomplete machine through our documentation department, should they have reason to request them.

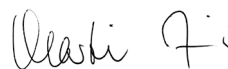
**The incomplete machine may only be commissioned if it has been ascertained, if applicable, that the machine or system in which the incomplete machine is to be installed satisfies the requirements of Directive 2006/42/EC on Machinery and an EC Declaration of Conformity has been drawn up in accordance with Annex II 1 A.**

Kurt Ross

Authorized representative for the  
compilation of relevant technical  
documents

Rheinau, Germany, 2020-09-20

(Place and date of issuance)



Martin Zimmer  
(Legally binding signature)  
Managing Partner

## 16 Declaration of Conformity

As defined by the EC Directive 2014/30/EU on electromagnetic compatibility

### Name and address of the manufacturer:

Zimmer Group GmbH



Am Glockenloch 2

77866 Rheinau, Germany



+49 7844 9138 0



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[www.zimmer-group.com](http://www.zimmer-group.com)

We hereby declare that the product described below

**Product designation:** Flat swivel unit

**Type designation:** DES

conforms to the requirements of the 2006/42/EC directive in its design and the version we put on the market.

The following harmonized standards have been used:

|                  |                                                                                          |
|------------------|------------------------------------------------------------------------------------------|
| DIN EN ISO 12100 | Safety of machinery - General principles for design - Risk assessment and risk reduction |
| DIN EN 61000-6-3 | EMC Generic standard, Emission standard for residential, commercial and light-industrial |
| DIN EN 61000-6-2 | EMC Generic standard, Emission standard for industrial environments                      |
| DIN EN 61000-6-4 | EMC Generic standard, Immunity for industrial environments                               |

A full list of applied standards can be obtained from the manufacturer.

Kurt Ross

Authorized representative for the  
compilation of relevant technical  
documents

Rheinau, Germany, 2020-09-20

(Place and date of issuance)

Martin Zimmer  
(Legally binding signature)  
Managing Partner