

# Assembly and operating manual

## ECM

### Regulator for SCHUNK gripper

Firmware 2.x, 3.x



## Imprint

### Copyright:

This manual is protected by copyright. The author is SCHUNK GmbH & Co. KG. All rights reserved. Any reproduction, processing, distribution (making available to third parties), translation or other usage - even excerpts - of the manual is especially prohibited and requires our written approval.

### Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

**Document number:** 1378373

**Version:** 01.00 | 19/11/2018 | en

© SCHUNK GmbH & Co. KG

All rights reserved.

Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

SCHUNK GmbH & Co. KG  
Spann- und Greiftechnik

Bahnhofstr. 106 – 134  
D-74348 Lauffen/Neckar

Tel. +49-7133-103-0  
Fax +49-7133-103-2399

info@de.schunk.com  
schunk.com

## Table of contents

<b>1</b>	<b>General.....</b>	<b>5</b>
1.1	About this manual .....	5
1.1.1	Presentation of Warning Labels .....	5
1.1.2	Definition of Terms .....	5
1.1.3	Applicable documents .....	6
1.1.4	Variants.....	6
1.2	Warranty .....	6
1.3	The scope of delivery includes .....	6
1.4	Accessories .....	6
<b>2</b>	<b>Basic safety notes .....</b>	<b>7</b>
2.1	Appropriate use.....	7
2.2	Inappropriate use .....	7
2.3	Constructional changes .....	7
2.4	Spare parts .....	7
2.5	Ambient conditions and operating conditions .....	7
2.5.1	Electromagnetic compatibility.....	8
2.5.2	Environmental conditions.....	9
2.6	Personnel qualification.....	11
2.7	Personal protective equipment.....	11
2.8	Notes on safe operation .....	12
2.9	Transport .....	12
2.10	Malfunctions.....	12
2.11	Disposal .....	13
2.12	Fundamental dangers.....	13
2.12.1	Protection during handling and assembly .....	13
2.12.2	Protection during commissioning and operation .....	14
2.12.3	Protection against dangerous movements.....	14
2.12.4	Protection against electric shock.....	15
2.12.5	Protection against magnetic and electromagnetic fields .....	16
2.13	Notes on particular risks.....	17
<b>3</b>	<b>Technical data.....</b>	<b>18</b>
3.1	Type key.....	18
3.2	Basic data .....	18
3.3	Digital input and output variants.....	20
3.4	Housing dimensions .....	20
<b>4</b>	<b>Design and description.....</b>	<b>21</b>
4.1	Design .....	21
4.2	Description .....	24
4.3	Interfaces.....	24

4.3.1	CAN bus and PROFIBUS .....	24
4.3.2	PROFINET .....	25
4.3.3	Digital inputs and outputs .....	27
4.4	LED display.....	29
4.5	DIP switch .....	30
<b>5</b>	<b>Assembly and settings .....</b>	<b>32</b>
5.1	Installing and connecting.....	32
5.2	Connections.....	33
5.2.1	Mechanical assembly.....	33
5.2.2	Electrical connection .....	34
5.3	Setting the Baud rate.....	49
5.4	Setting the fieldbus address .....	49
5.5	Updating firmware .....	51
5.5.1	Update via USB Mini AB (device).....	51
5.5.2	Update via USB (host).....	51
5.6	Establishing the factory settings.....	52
5.7	Resetting the PROFINET interface .....	53
<b>6</b>	<b>Start-up .....</b>	<b>54</b>
6.1	Commissioning with CAN or PROFIBUS interface.....	54
6.2	PROFINET .....	55
6.2.1	Types of communication of PROFINET .....	55
6.2.2	Regulator operating behaviour with a connected module.....	56
6.2.3	Commissioning with PROFINET interface .....	56
6.2.4	Projecting of the regulator .....	57
<b>7</b>	<b>Troubleshooting .....</b>	<b>66</b>
<b>8</b>	<b>EU-Declaration of Conformity .....</b>	<b>67</b>
<b>9</b>	<b>Annex to Declaration of Conformity.....</b>	<b>68</b>

## 1 General

### 1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under [Applicable documents](#) [► 6] are applicable.

#### 1.1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.



#### **⚠ DANGER**

##### **Danger for persons!**

Non-observance will inevitably cause irreversible injury or death.



#### **⚠ WARNING**

##### **Dangers for persons!**

Non-observance can lead to irreversible injury and even death.



#### **⚠ CAUTION**

##### **Dangers for persons!**

Non-observance can cause minor injuries.

#### **NOTICE**

##### **Material damage!**

Information about avoiding material damage.

#### 1.1.2 Definition of Terms

The term "product" replaces the product name on the title page in this manual.

### 1.1.3 Applicable documents

- General terms of business\*
- Catalog data sheet of the purchased product \*
- Assembly and operating manuals of the accessories \*
- "SCHUNK Motion Tool (MTS)" software manual \*
- "SCHUNK Motion Protocol (SMP)" software manual \*
- "SCHUNK Drive Protocol (SDP)" software manual \*

The documents marked with an asterisk (\*) can be downloaded on our homepage **schunk.com**

### 1.1.4 Variants

This operating manual applies to the following variations:

- ECM with CAN bus
- ECM with PROFIBUS
- ECM with PROFINET
- ECM with CAN bus or PROFIBUS or PROFINET and digital inputs and outputs

## 1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the ambient conditions and operating conditions, [Ambient conditions and operating conditions](#) [► 7]

## 1.3 The scope of delivery includes

The scope of delivery includes

- Controller for SCHUNK gripper ECM in the version ordered
- Commissioning DVD
- USB 2.0 cable with a type A and a USB mini connection
- Mounting material

## 1.4 Accessories

The following accessories are required for the regulator and must be ordered separately:

- A termination resistor , if the regulator is the last device in the bus system.
  - Optional PROFIBUS or CAN bus

## 2 Basic safety notes

### 2.1 Appropriate use

The product is used to control and regulate the EGN and EZN grippers.

- The product is designed to be built into a control cabinet. The applicable guidelines must be observed and complied with.
- The product may only be used within the scope of its technical data, [Technical data](#) [► 18].
- The product is intended for industrial use.
- Appropriate use of the product includes compliance with all instructions in this manual.

### 2.2 Inappropriate use

It is considered improper use if the product is used to actuate or control products that are not from SCHUNK GmbH & Co. KG.

- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

### 2.3 Constructional changes

#### Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.

### 2.4 Spare parts

#### Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts or spares authorized by SCHUNK.

### 2.5 Ambient conditions and operating conditions

#### Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, [Technical data](#) [► 18].

### 2.5.1 Electromagnetic compatibility

The product meets the requirements of the EMC act of the inner-European market, among other requirements. The product has passed the EMC test as per the following standards:

Standard	Title
EN 61000-6-2 (2006)	EMC: Generic standard – Immunity for industrial environments
EN 61000-6-3 (2011)	EMC: Generic standard – Emission standard for residential and light-industrial environments
EN 61800-3 (2012)	EMV: Product standard – Adjustable speed power drive systems
EN 55011 (2009)	EMV: Generic standard – Emission

The product must be installed using interference-free cables and in a way that meets EMC requirements in order to ensure interference-free operation.

#### Interference variables:

The electromagnetic compatibility with pulse-shaped interference variables has been verified and confirmed according to the following standards:

Standard	Title
EN 61000-4-2 (2008)	Test and measurement procedures - Testing the interference immunity to discharging of static electricity
EN 61000-4-4 (2008)	Test and measurements procedures - Testing the interference immunity to fast transient electric interference variables/burst
EN 61000-4-5 (2014)	Test and measurement procedures - Testing the interference immunity to surge voltages

#### Sinusoidal interference variables:

The electromagnetic compatibility with sinusoidal interference variables has been verified and confirmed according to the following standards:

Standard	Title
EN 61000-4-3 (2011)	Test and measurement procedures - Testing the interference immunity to electromagnetic high frequency fields
EN 61000-4-6 (2014)	Test and measurement procedures - interference immunity to conducted interference variables induced by high frequency fields



**Emission of radio interference**

The emission of radio interference has been verified and confirmed according to the following standards:

Standard	Title
EN 61000-6-3 (2011)	EMC: Generic standards - emitted interference for living area, business and commercial areas and small businesses

The emitted interference of electromagnetic fields (limit class A, group 1, measured with 10 m distance) has been tested according to the following standards:

Standard	Title
EN 55011 (2009)	Industrial, scientific and medical devices - radio interference - limits and measurement procedures

## 2.5.2 Environmental conditions

**Requirements for transport and storage**

The following information applies if the product is transported and stored in the original package.

**Mechanical Environmental Conditions** Standard: IEC 60721-3-2 (1997-02) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 2: Transportation. Class 2M3 applies.

**Climatic Environmental Conditions** Standard: IEC 60721-3-2 (version 1997-02) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 2: Transportation. Class 2K4 applies.

The aforementioned standards result in the following parameters for the essential environmental conditions:

Standard	Title
EN 60068-2-1	Tests - Test A: Cold
EN 60068-2-2	Tests - Test B: Dry heat
EN 60068-2-13	Tests - Test M: Low air pressure
EN 60068-2-14	Tests - Test N: Change of temperature
IEC 60068-2-32	Tests - Test Ed: Free fall

**Requirements during operation**

The following overview shows the permissible environmental conditions for the product.

**Mechanical Environmental Conditions** Standard: IEC 60721-3-3 (1995-09) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 3: Stationary use at weather-protected locations. Class 3M7 applies.

**Climatic Environmental Conditions** Standard: IEC 60721-3-3 (1995-09) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 3: Stationary use at weather-protected locations. Class 3K3 applies

The product has been tested for the essential environmental conditions according to the following standards:

Standard	Title
EN 60068-2-1	Test procedure - test A: cold
EN 60068-2-2	Test procedure - test B: dry heat
EN 60068-2-30	Test procedure - test Db: humid heat, cyclical (12 + 12 hours)

The product may only be used in the following locations if additional measures are taken:

- In locations with a high level of ionizing radiation
- In locations with difficult operating conditions, e.g., due to caustic fumes, gases, oils or chemicals
- In facilities requiring special monitoring, e.g., in particularly at-risk areas

The product must also not be used in potentially explosive zones. If the product is subjected to unacceptably large impacts or vibrations, suitable measures must be taken to reduce the amplitude or acceleration of such disturbances. Vibration-damping or vibration-absorbing systems are to be used in such cases.

#### Tests with regard to ambient conditions

#### Tests with regard to mechanical environmental conditions

The electronics integrated in the product has been tested with respect to mechanical environmental conditions according to the following standards:

Standard	Title
EN 60068-2-6 (2008-10)	Test procedure - test Fc: swinging (sinusoidal)
EN 60068-2-27 (2010-02)	Test procedure - test Ea and guideline: shocking

## 2.6 Personnel qualification

### Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:

<b>Trained electrician</b>	Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.
<b>Qualified personnel</b>	Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.
<b>Instructed person</b>	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
<b>Service personnel of the manufacturer</b>	Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

## 2.7 Personal protective equipment

### Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

## **2.8 Notes on safe operation**

### **Incorrect handling of the personnel**

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

## **2.9 Transport**

### **Handling during transport**

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

## **2.10 Malfunctions**

### **Behavior in case of malfunctions**

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

## 2.11 Disposal

### Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

## 2.12 Fundamental dangers

### General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

### 2.12.1 Protection during handling and assembly

#### Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

#### Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

### **2.12.2 Protection during commissioning and operation**

#### **Falling or violently ejected components**

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

### **2.12.3 Protection against dangerous movements**

#### **Unexpected movements**

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- The faulty actuation of connected drives may cause dangerous movements.
- Operating mistakes, faulty parameterization during commissioning or software errors may trigger dangerous movements.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

#### 2.12.4 Protection against electric shock

##### Work on electrical equipment

Touching live parts may result in death.

- Work on the electrical equipment may only be carried out by qualified electricians in accordance with the electrical engineering regulations.
- Lay electrical cables properly, e. g. in a cable duct or a cable bridge. Observe standards.
- Before connecting or disconnecting electrical cables, switch off the power supply and check that the cables are free of voltage. Secure the power supply against being switched on again.
- Before switching on the product, check that the protective earth conductor is correctly attached to all electrical components according to the wiring diagram.
- Check whether covers and protective devices are fitted to prevent contact with live components.
- Do not touch the product's terminals when the power supply is switched on.

##### Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

### **2.12.5 Protection against magnetic and electromagnetic fields**

#### **Work in areas with magnetic and electromagnetic fields**

Magnetic and electromagnetic fields can lead to serious injuries.

- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which components of the electric drive and control systems are mounted, started up, and operated.
- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which magnetic grippers or motor parts with permanent magnets are stored, repaired, or assembled.
- Do not operate high-frequency or radio devices in the proximity of electric components of the drive system and their feed lines.

If the use of such devices is necessary:

When starting up the electric drive and control system, check the machine or automated system for possible failures when such systems are used at different intervals and in different states of the control system. A special additional EMC test may be necessary if the system has a high risk potential.



## 2.13 Notes on particular risks



### **⚠ DANGER**

#### **Danger from electric voltage!**

Touching live parts may result in death.

- Switch off the power supply before any assembly, adjustment or maintenance work and secure against being switched on again.
- Only qualified electricians may perform electrical installations.
- Check if de-energized, ground it and hot-wire.
- Cover live parts.



### **⚠ DANGER**

#### **Risk of fatal injury from suspended loads!**

Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.



### **⚠ WARNING**

#### **Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause cuts.

- Use suitable protective equipment.



### **⚠ WARNING**

#### **Risk of burns through contact with hot surfaces!**

The product can heat up considerably during operation. Touching hot surfaces can cause burns.

- Do not touch hot surfaces.
- Let them cool down before working on the product.
- Wear appropriate safety equipment.

### 3 Technical data

#### 3.1 Type key

		ECM - EGN - PB - N
<b>Module type</b>		
EGN 080, EGN 100, EGN 160 EZN 064, EZN 100		
<b>Communication type</b>		
PB = Profibus CN = CAN bus PN = Profinet		
<b>Additional I/O card</b>		
N = not allocated I = 4 inputs / 4 outputs		

Type key

#### 3.2 Basic data

Designation	Value
Measurements (without option cards) [g]	1800
height x width x depth [mm]	310 x 98 x 144
Ambient temperature [°C]	+ 5 up to + 55
Rel. air humidity	5 - 85 %, non condensing
IP rating	20
Logic voltage [VDC] (stabilized and smoothed, internal reverse polarity protection)	24 ± 10 %
Max. logic current input [mA]	500
Supply power [VDC]	24 ± 10 %
<b>Max. power output</b>	
Block commutation [VA]	324 ± 10 %
Sine commutation [VA]	286 ± 10 %
<b>Max. output voltage</b>	
Block commutation [V]	17 ± 10 %
Sine commutation [V]	15 ± 10 %
Max. output current [A]	11

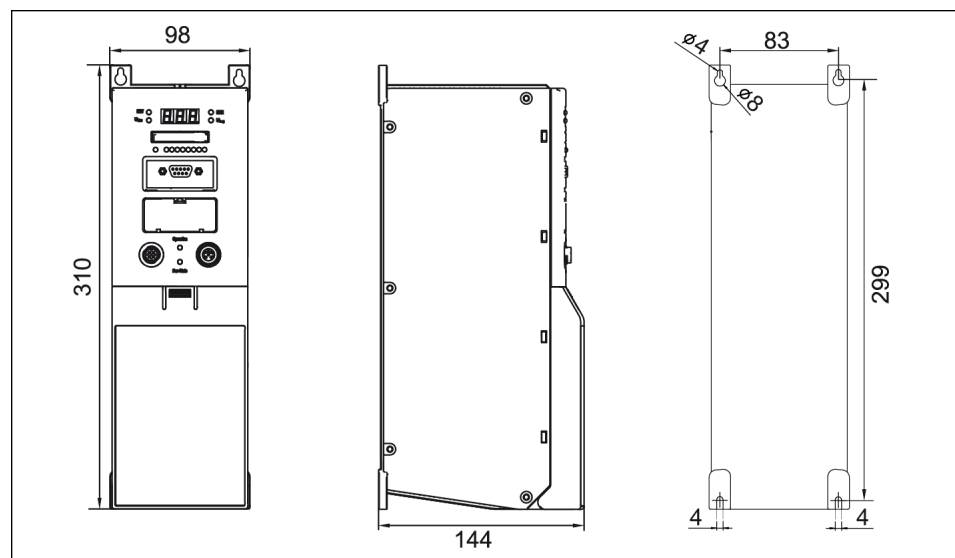
Designation	Value
Max. motor current input	See the Assembly and Operating Manual for the relevant module.
Max. apparent power	none
<b>Interfaces *</b>	
PROFIBUS (12 MBit/s)	X
CAN bus (up to 1 MBit/s)	X
PROFINET (100 Mbit/s)	X
USB	X
Digital inputs and outputs (optional)	X
<b>Supported encoder systems</b>	
Resolver	X
Encoder	X
<b>Brake connection (brakes engage when energized)</b>	
Nominal power current [A]	0.5
Peak current [A]	0.6

\* The regulator is delivered either with PROFIBUS or CAN bus or PROFINET. It is not possible to combine the PROFIBUS, CAN bus and PROFINET. The USB interface is always available and additional digital inputs and outputs can be chosen as an option.

### 3.3 Digital input and output variants

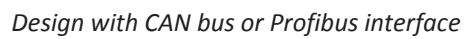
Designation	Value
Supply voltage $V_{in}$ [VDC]	+24 ±10%
Cable length max. [m]	30
<b>Output</b>	
Current per output max. [mA]	250
Max. switching frequency [Hz]	500
Output voltage [VDC]	$V_{in} - 0.3 \text{ V}$
Short-circuit-proof	Yes
Reverse polarity protection	Yes
<b>Input</b>	
Max. input voltage	$V_{in} + 10\%$
Input resistance [kOhm]	8
Max. frequency [kHz]	1
Turn-on threshold at 20°C [V]	17.3 ±0.3 V
Turn-off threshold at 20°C [V]	5.6 ±0.3 V
Reverse polarity protection	Yes
Overcurrent protection	Yes
Surge protection up to max. [V]	48

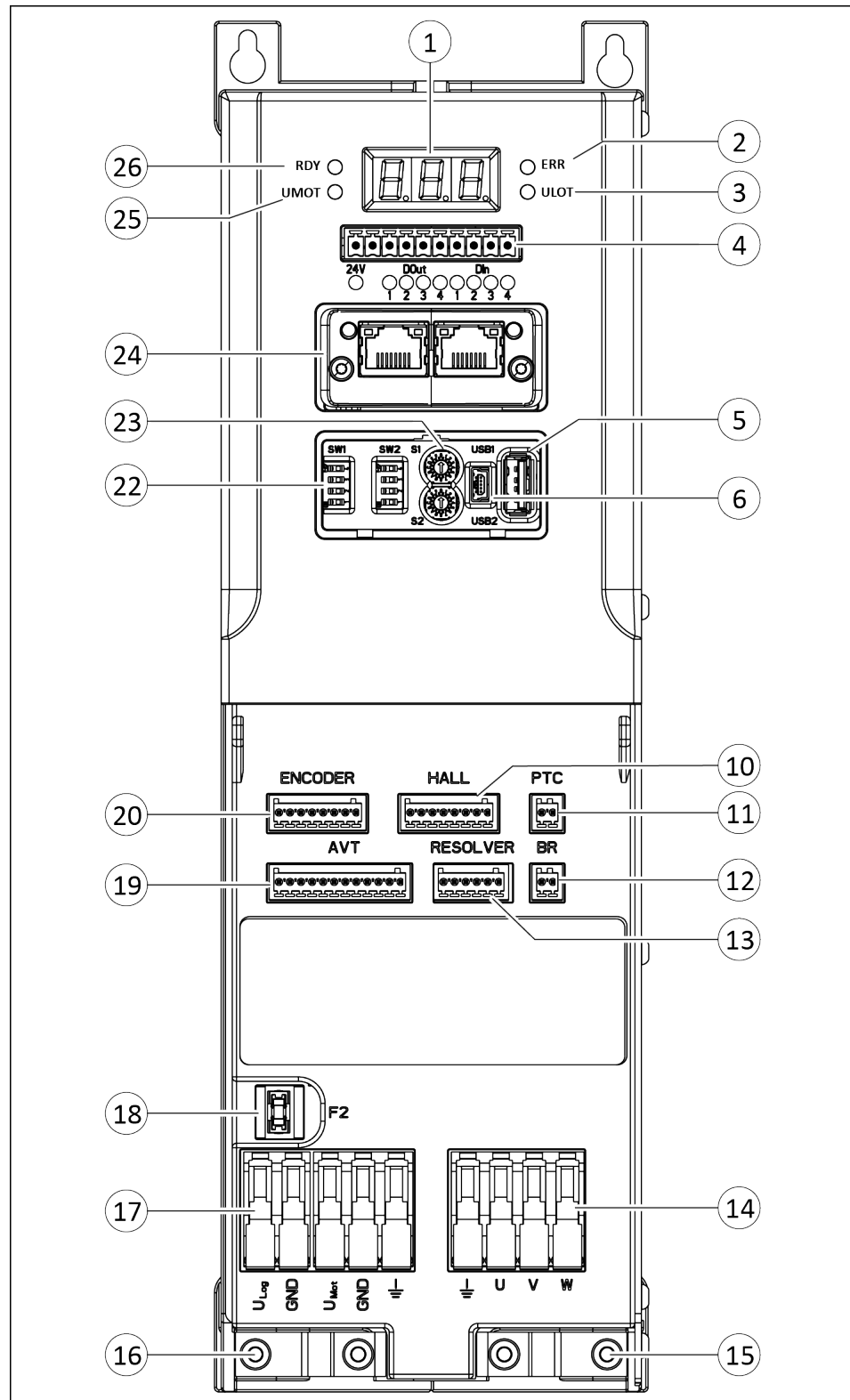
### 3.4 Housing dimensions



Housing dimensions (mm)

## 4.1 Design





Design with PROFINET interface

Item	Designation	Function
1	Seven-segment display	Status and error display in HEX format, see software manual ""SCHUNK Motion Protocol (SMP)" software manual" or ""SCHUNK Drive Protocol (SDP)" software manual"
2	LED "ERR"	Malfunction display
3	LED "ULOG"	Lights up green when logic voltage is connected at +24V
4	Digital inputs/outputs	Digital I/O interface (optional)
5	USB2	USB HOST interface for the following tasks: <ul style="list-style-type: none"> <li>• Load firmware update from a storage medium (USB stick)</li> <li>• Write EEPROM parameters (onto ECM from USB stick)</li> <li>• Read EEPROM parameters (onto USB stick from ECM)</li> </ul>
6	USB1	USB device interface for the following tasks: <ul style="list-style-type: none"> <li>• Load firmware update from a PC</li> <li>• Write EEPROM parameters (onto ECM from a PC)</li> <li>• Read EEPROM parameters (onto a PC from ECM)</li> </ul>
7	LED "Operation"	Operating display
8	Profibus or CAN bus output	Connection for bus output cable or for termination resistor
9	LED "Bus state"	Bus status display
10	HALL terminal strip	Hall-effect sensor connection
11	PTC terminal strip	Connection for motor temperature monitoring
12	BR terminal strip	Connection for motor brake
13	RESOLVER terminal strip	Resolver connection
14	Motor terminal strip	Connection for motor cable (see Assembly and Operating Manual for the selected module)
15	Cable clamp for tension relief and shield connection	Fastening of the motor cable and connection of the motor cable shield (large surface). Connecting the encoder cable shield (large surface).
16	Cable clamp for tension relief and shield connection	Mounting feed line and sensor cable. Connecting the encoder cable shield (large surface).
17	Supply voltage terminal strip	Logic voltage connection and motor voltage
18	Fuse F2	Logic voltage fuse
19	AVT terminal strip	Connection for absolute-value transducer
20	ENCODER terminal strip	Encoder connection
21	PROFIBUS or CAN bus input	Connection for bus input line

Item	Designation	Function
22	DIP switch	For start-up function and firmware update
23	Rotary encoder switch	Adjusting the bus address
24	PROFINET	\PROFINET interface
25	LED "UMOG"	Display for motor voltage
26	LED "RDY"	Ready for operation display

## 4.2 Description

This product is an electric controller for actuating and regulating the EGN and EZN grippers.

Depending on the version, the product is equipped with an interface for CAN bus, PROFIBUS or PROFINET.

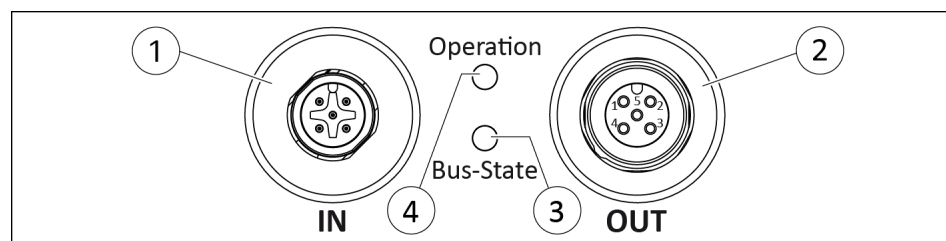
Depending on the bus system, various address ranges and communication protocols are available:

	Address range	Communication protocol
PROFINET	is assigned by SPS	SDP
PROFIBUS	0-127	SDP* / SMP
CAN bus	0-255	SMP

\*) recommended by SCHUNK

## 4.3 Interfaces

### 4.3.1 CAN bus and PROFIBUS



CAN bus and PROFIBUS interface

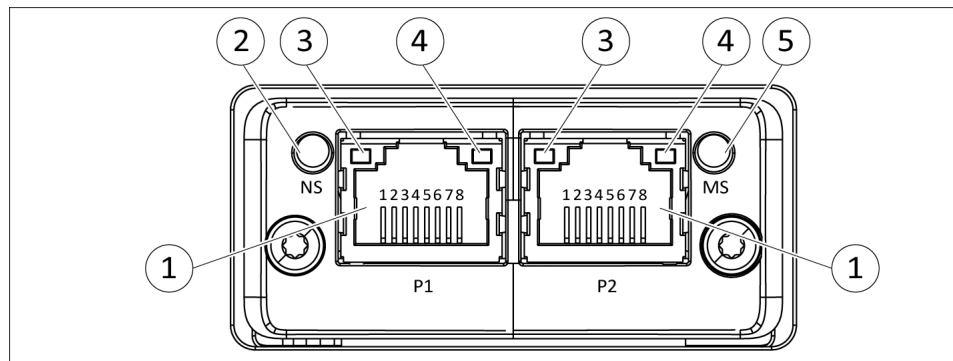
1	M12 input connector	3	LED "Bus State"
2	M12 output connector	4	LED "Operation"

#### LED

LED	Color	Function
Operation	Yellow	Indicates whether there is communication.
Bus State	Green	Displays the existing connection.



### 4.3.2 PROFINET



PROFINET interface

1	RJ45 Ethernet connector	4	"Activity" LED
2	"Network Status" LED	5	"Module Status" LED
3	"Link" LED		

#### LED

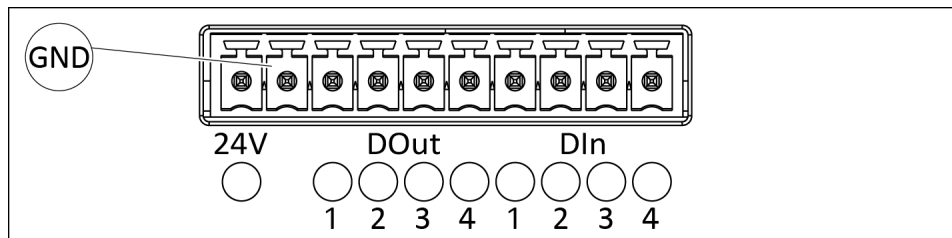
LED	Color	Function
Link	Green	Displays the existing connection.
Activity	Yellow	Displays the data traffic.
Network status	Green /Red	<p>Displays the current network status.</p> <ul style="list-style-type: none"> <li>• <b>Does not light up</b> if no power supply is connected to the product.</li> <li>• <b>Does not light up</b> if there is no connection to the PROFINET control.</li> <li>• <b>Lights up green</b> if there is a connection to a PROFINET control system and it is in "Run" mode.</li> <li>• <b>Flashes green once and goes out</b> if there is a connection to a PROFINET control system and it is in "Stop" mode.</li> <li>• <b>Flashes green once and goes out</b> if the IRT synchronization is not yet finished.</li> <li>• <b>Flashes green</b> if the product is in identification mode.</li> <li>• <b>Flashes red</b> if there is a serious network error.</li> <li>• <b>Flashes red once and goes out</b> if the station name is unknown.</li> <li>• <b>Flashes red twice and goes out</b> if the IP address is unknown.</li> <li>• <b>Flashes red three times and goes out</b> if there are configuration errors.</li> </ul>

LED	Color	Function
Module status	Green /Red	Displays the current status of the product.
		<ul style="list-style-type: none"><li>• <b>Does not light up</b> if no power supply is connected to the product.</li><li>• <b>Does not light up</b> if the product is in setup mode or in the NW Init-status.</li></ul>
		<ul style="list-style-type: none"><li>• <b>Lights up green</b> if the product is in normal operating mode.</li><li>• <b>Flashes green once and goes out</b> if diagnosis data is being processed.</li></ul>
		<ul style="list-style-type: none"><li>• <b>Flashes red</b> if there is a serious fault with the product.</li><li>• <b>Flashes red</b> if the product is not ready for operation.</li></ul>
		<ul style="list-style-type: none"><li>• <b>Flashes green/red alternately</b> if a firmware update is being carried out.</li></ul>

### 4.3.3 Digital inputs and outputs

SCHUNK recommends the following connectors from the company Phoenix Contact for the customer connection:

- Screw connection
  - MC 1.5/10-STZ4-3.81  
plug part, 8A, 160V, 10 pole, green, with pull tab
  - MC1.5/10-ST-3.81  
plug part, 8A, 160V, 10 pole, green
  - FRONT-MC1.5/10-ST-3.81  
plug part, 8A, 160V, 10 pole, green
- Crimp connection
  - MCC1/10-STZ-3.81  
plug part, 8A, 160V, 10 pole, green

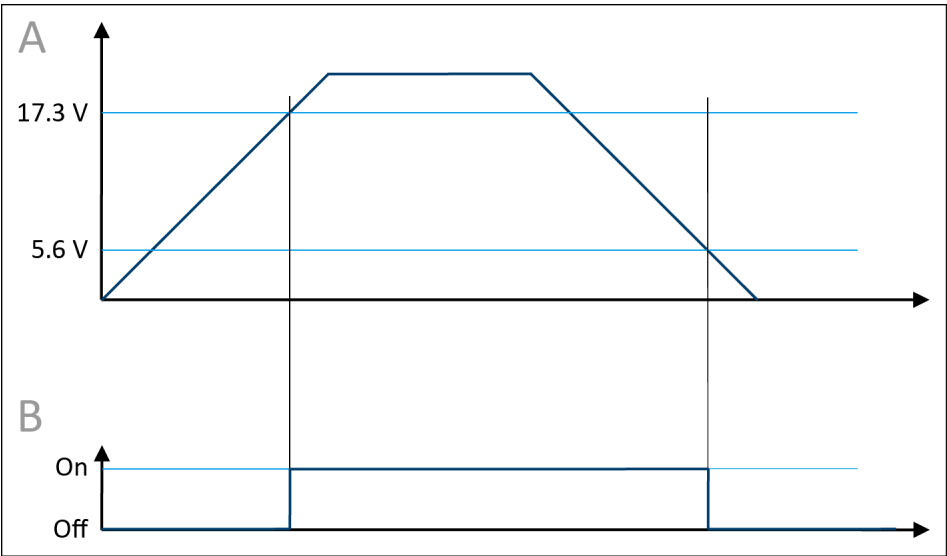


*Digital inputs and outputs*

LED	Function
24V	<b>Lights up</b> , when the option card is supplied with power.
DOUT	<b>Lights up</b> , when the outlet emits a signal. <b>NOTICE! When 24 V is placed at the output externally, the LED also lights up and can potentially cause confusion with an input.</b>
DIN	<b>Lights up</b> , when the input voltage is detected as On or Off.

### Switching threshold

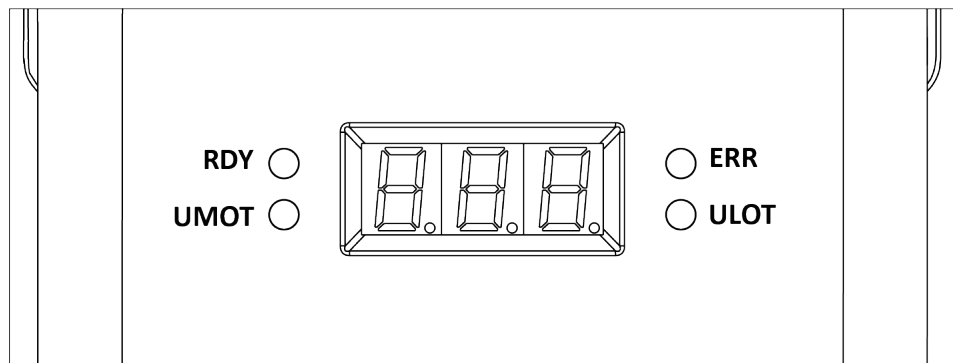
The following diagram shows the switching threshold in relation to the input voltage of a digital input.



Switching threshold diagram

A	Input voltage	B	Status of the input
---	---------------	---	---------------------

#### 4.4 LED display



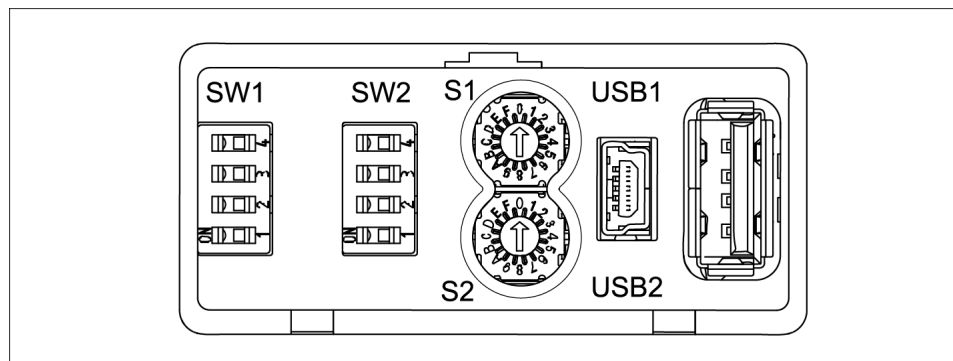
LED "RDY" and LED "ERR"

The LED "RDY" and the LED "ERR" light up for various events in different operating modes. The meaning of the LEDs are given in the following table.

LED "RDY" and LED "ERR"

Operating Mode	Event	LED "RDY"	LED "ERR"
Control mode	Ready for operation	On	Off
	Error	Off	On
	Warning	Off	Flashing (approx. 1 Hz)
	Info message pending	On	Flashes briefly (approx. 5 times on/off in 1-Hz cycle)
Firmware update	Ready for data reception	On	On
	Data is being transmitted	On	Flashing in cycle of data transmission
	Data transmission complete	On	Off
Miscellaneous	Hardware is not recognized	Flashing alternately with LED "ERR" (on, when LED "ERR" is off)	Flashing alternately with LED "RDY" (on, when LED "RDY" is off)
	Software in undefined condition	Flashing alternately with LED "ERR" (on, when LED "ERR" is off)	Flashing alternately with LED "RDY" (on, when LED "RDY" is off)

## 4.5 DIP switch



*DIP switch*

The SW1 and SW2 DIP switches are used to perform adjustments and software transmissions on the regulator. The following table shows the functions and their switch positions.

*DIP switch*

DIP switch	Switch	Function	Note
SW1	1	Setting the regulator to factory settings	<a href="#">Establishing the factory settings</a> [► 52]
		Resetting the PROFINET interface	<a href="#">Resetting the PROFINET interface</a> [► 53]
	2	PTA6.x flash mode	For SCHUNK service personnel
	3	If the logic voltage supply is switched on when setting the switch and switch 3 is also set on SW2 DIP switch: –HOST enable	<a href="#">Updating firmware</a> [► 51]
		Only when the logic voltage is switched on after setting the switch: –Flash mode ARM	For SCHUNK service personnel
	4	-	For SCHUNK service personnel

DIP switch	Switch	Function	Note
SW2	1	Setting the CAN BUS Baud rate	<a href="#">Setting the Baud rate</a> [► 49]
	2	Setting the CAN BUS Baud rate	<a href="#">Setting the Baud rate</a> [► 49]
	3	Quick test	see following table
		When HOST enable is active (SW1 switch 3 set): Flash mode complete	<a href="#">Updating firm-ware</a> [► 51]
	4	Quick test	see following table

### Quick test

DIP switch	Switch		Function	Note
	3	4		
SW2	0	0	Complete quick test	-
	1	0	CMD ACK	see "Schunk Motion Tool" software manual
	0	1	Relative travel	see "Schunk Motion Tool" software manual
	1	1	CMD REFERENCE	see "Schunk Motion Tool" software manual

## 5 Assembly and settings

### 5.1 Installing and connecting



#### **⚠ DANGER**

##### **Risk of fatal injury due to electric current!**

Touching live parts possess an immediate risk of fatal injury by electrocution.

- Prior to commencing work, restore the regulator to a de-energized state.
  - ✓ Disconnect the logic and motor voltages.
- Wait until the intermediate circuit voltage has dropped to a residual voltage of less than 10 V.
  - ✓ LED "UMOT" goes out.
  - ✓ Check "supply voltage" between  $U_{Mot}$  and GND on the terminal strip.



#### **⚠ DANGER**

##### **Risk of fatal injury due to electric current!**

Touching live parts poses an immediate risk of fatal injury by electrocution.

- Only allow a qualified electrician to perform work on electrical components.
- Prior to commencing work on electric components, restore to a de-energized state.
- In case of damage to the insulation, switch off the power supply immediately and arrange for a repair.
- Keep humidity away from live parts.

- Ensure that the C rail is grounded.
- Mount the regulator vertically in the control cabinet on the C rail, [Mechanical assembly](#) [► 33].
- Connect all electric cables, [Electrical connection](#) [► 34].
  - ✓ Power supply cable
  - ✓ Logic voltage cable
  - ✓ Motor cable
  - ✓ Sensor cable
  - ✓ Brake cable if necessary
  - ✓ Temperature sensor cable if necessary
- Secure external power circuit, [External fusing](#) [► 34].
- Connect plug for fieldbus.



- CAN bus/PROFIBUS:  
When the regulator is the last device in the bus system, insert termination resistor .

## 5.2 Connections

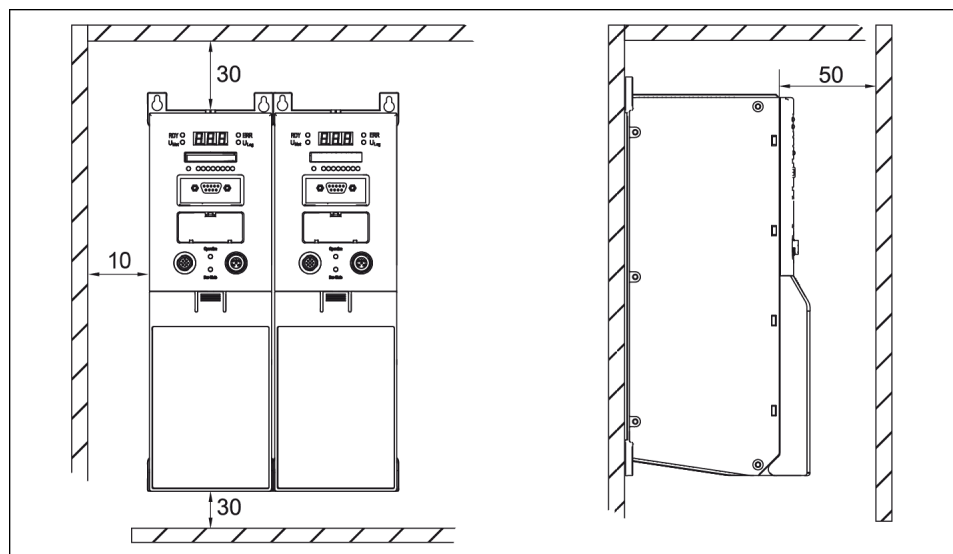
### 5.2.1 Mechanical assembly

#### NOTICE

##### Material damage due to improper assembly!

Splash water, vapors, contamination, overheating and EMC impact may cause damage to the controller.

- Install the controller in a control cabinet that meets at least the requirements of protection class IP54.
- Mount the controller horizontally.
- Protect the controller from foreign bodies.
- Observe assembly distances.
- Do not cover the louvers located on the side between the printed circuit board carrier and protection cover.



Assembly distances in the control cabinet (mm)

## 5.2.2 Electrical connection



### ⚠ WARNING

#### **Danger due to incorrect connection!**

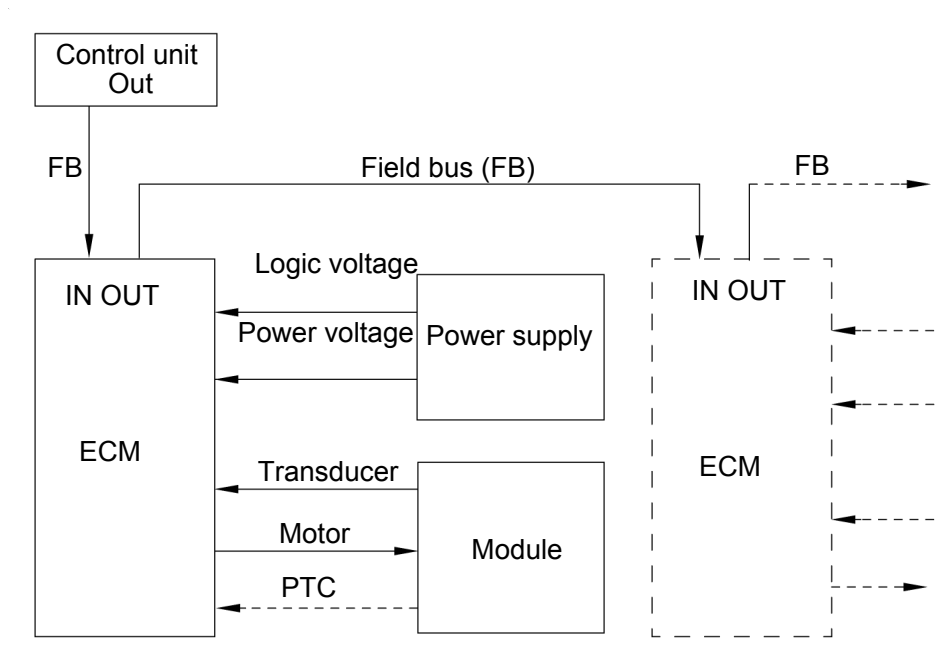
A "PELV" type network must be incorporated for the power and logic supply network.

- Observe the pin assignment of the connecting terminals.
- Make sure that all components are grounded correctly.

### NOTE

Observe the cable dimensions for the cables, sensors and transducers of the connected product. The required information can be found in the Assembly and Operating Manual for the product in question.

#### 5.2.2.1 Connection diagram



Connection diagram

#### 5.2.2.2 External fusing

The power circuit of the ECM must be protected by the customer. The trip value is to be determined from the relevant Assembly and Operating Manual of the ECM product connected.

### 5.2.2.3 Supply voltage

#### NOTE

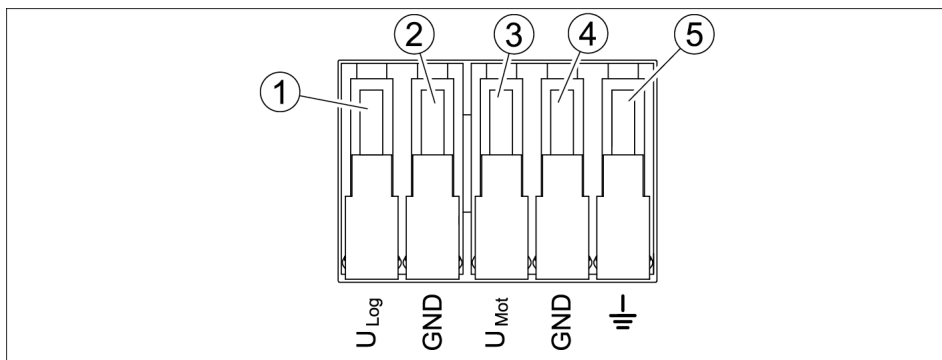
The terminals can be opened and closed manually, without the use of tools.

Stripped length: 12 mm

Conductor cross-section: 1,5 to 6 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.

Connect the cable for the power supply on the supply voltage terminal strip



Supply voltage terminal strip

Connection assignment

Terminal	Function
U <sub>Log</sub>	Logic voltage +24V
GND	Logic voltage and motor voltage GND
U <sub>Mot</sub>	Supply voltage +24 V
GND	Logic voltage and supply voltage GND
⏏	Functional ground

5.2.2.4 Motor

NOTE

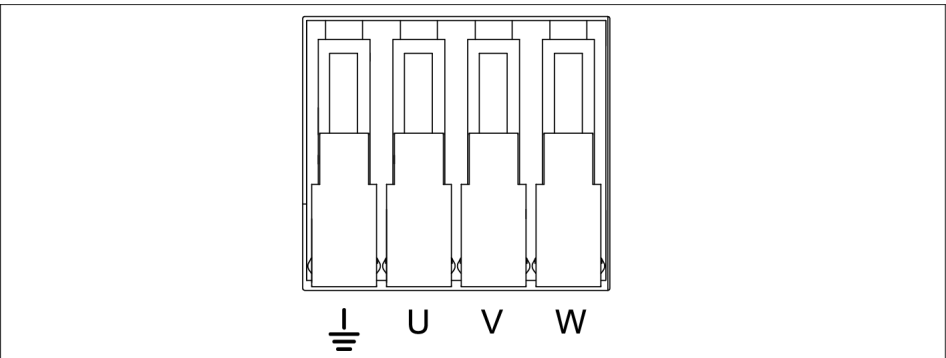
The terminals can be opened and closed manually, without the use of tools.

Stripped length: 12 mm

Conductor cross-section: 1,5 to 6 mm<sup>2</sup>


Connection of the external component is shown in the circuit diagram.

Attach the motor cable to the motor terminal strip.

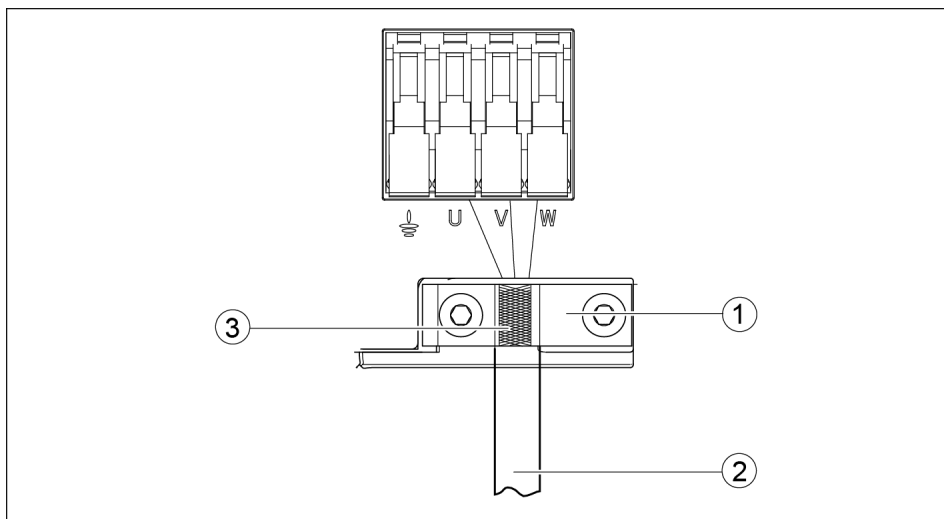


Motor terminal strip

Connection assignment

Terminal	Cable color (EGN/EZN gripper)	Function
		Functional ground
U	Black	Motor phase U
V	Red	Motor phase V
W	White	Motor phase W

Motor cable shield connection is achieved via the cable clamp below the motor terminal strip.



Cable clamp

1	Cable clamp	3	Motor cable shield
2	Motor cable		

#### 5.2.2.5 Transducer

##### NOTE

Connect the encoder to the respective transducer terminal, depending on the connected module.

#### Encoder

Encoders are connected to terminal ENCODER.

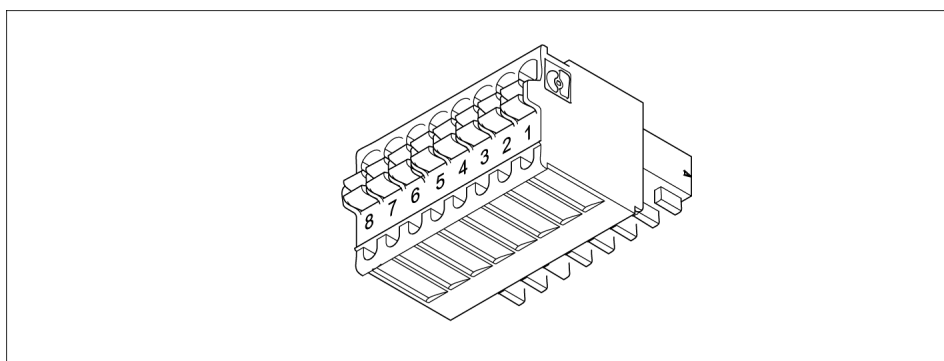
##### NOTE

Required tool: preferably micro screw driver, slotted, size 0.4 x 2.0 x 60 mm

Stripped length: 8 mm

Conductor cross-section: 0.14 to 0.5 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.



ENCODER terminal strip

### Connection assignment

Pin	Function	Color
1	CHADiff	Green
2	XCHADiff	Yellow
3	CHBDiff	Brown
4	XCHBDiff	White
5	CHCDiff	Red
6	XCHCDiff	Blue
7	+5 V (UB)	Pink
8	GND	Grey

### Hall-effect sensor

Hall-effect sensors are connected to HALL terminal strip

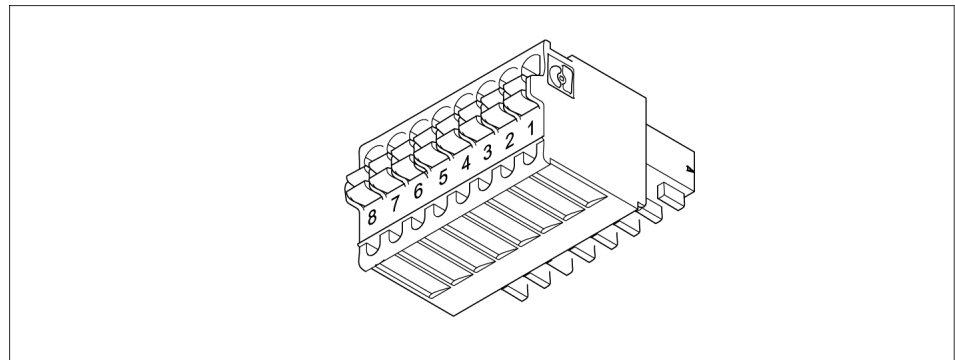
#### NOTE

Required tool: preferably micro screw driver, slotted,  
size 0.4 x 2.0 x 60 mm

Stripped length: 8 mm

Conductor cross-section: 0.14 to 0.5 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.



### HALL terminal strip

#### Connection assignment

Pin	Function
1	+5 V
2	GND
3	HALL1
4	XHALL1
5	HALL2
6	XHALL2
7	HALL3
8	XHALL3

## NOTE

For future extension. The inputs of the connection plug are currently not needed for the connection of a SCHUNK product.

## Absolute measuring system

An absolute-value transducer is connected to AVT terminal strip.

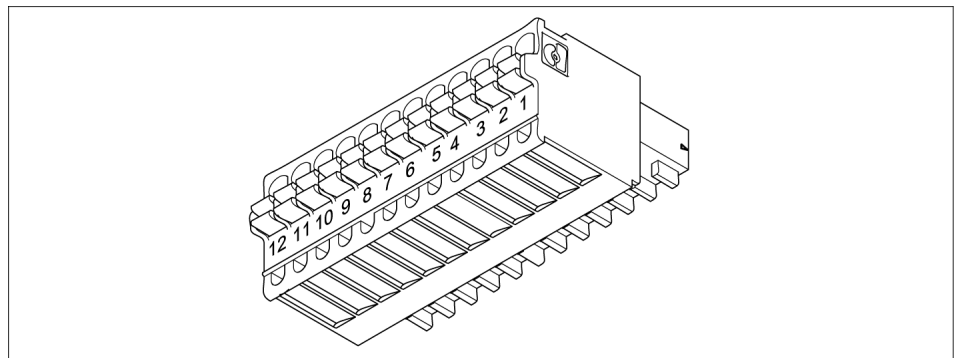
## NOTE

Required tool: preferably micro screw driver, slotted, size 0.4 x 2.0 x 60 mm

Stripped length: 8 mm

Conductor cross-section: 0.14 to 0.5 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.



AVT terminal strip

Connection assignment

Pin	Function
1	CHA
2	XCHA
3	CHB
4	XCHB
5	CLK
6	XCLK
7	Data
8	XData
9	+5V Enable (for activating the absolute-value transducer)
10	Enable (bridges between Pin9 and Pin10 activate the absolute-value transducer)
11	+5V (UB) supply voltage for the connected encoder)
12	GND

**NOTE**

For future extension. The inputs of the connection plug are currently not needed for the connection of a SCHUNK product.

**Resolver**

A resolver is connected to a RESOLVER terminal strip.

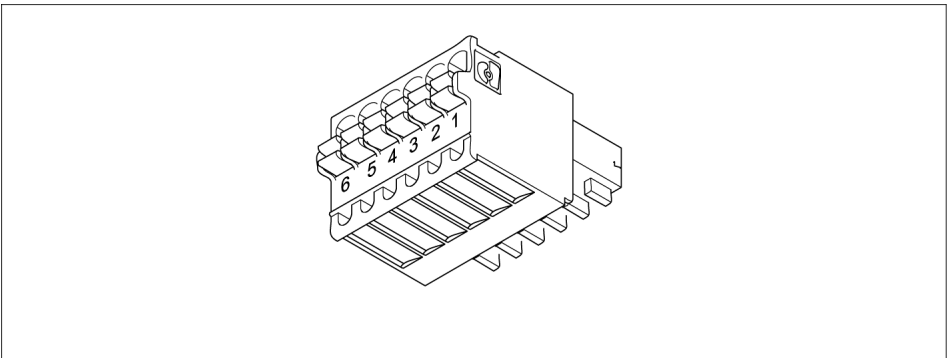
**NOTE**

Required tool: preferably micro screw driver, slotted, size 0.4 x 2.0 x 60 mm

Stripped length: 8 mm

Conductor cross-section: 0.14 to 0.5 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.



*RESOLVER terminal strip*

*Connection assignment*

Pin	Function	Color
1	Sin+	Yellow
2	Sin-	Blue
3	Cos+	Black
4	Cos-	Red
5	Osz+	White/Red
6	GND	White/Yellow

**NOTE**

For functional shielding, connect the shield of the resolver on the cable clamp with shield connection over a large surface.

**5.2.2.6 Brake**

If the module has a brake, it has to be connected to terminal strip BR.



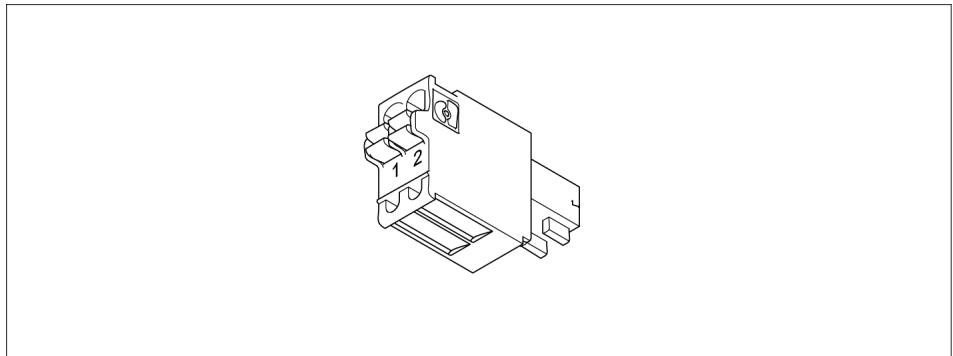
**NOTE**

Required tool: preferably micro screw driver, slotted,  
size 0.4 x 2.0 x 60 mm

Stripped length: 8 mm

Conductor cross-section: 0.14 to 0.5 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.



*Terminal strip BR*

*Connection assignment*

Pin	Function
1	Brake (+)
2	Brake (-)

**5.2.2.7 Temperature sensor**

If the module has a temperature sensor, it has to be connected to terminal strip PTC.

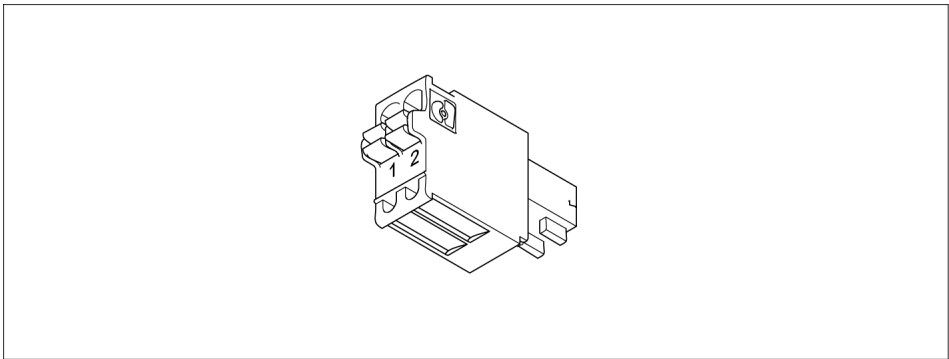
**NOTE**

Required tool: preferably micro screw driver, slotted,  
size 0.4 x 2.0 x 60 mm

Stripped length: 8 mm

Conductor cross-section: 0.14 to 0.5 mm<sup>2</sup>

Connection of the external component is shown in the circuit diagram.



Terminal strip PTC

Connection assignment

Pin	Function	Color
1	T1	Red
2	T2	Blue

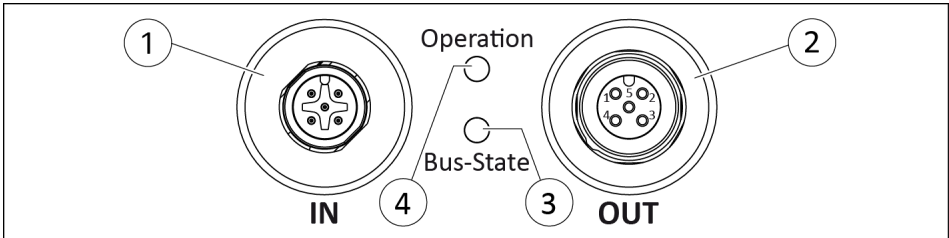
**NOTE**

Not all modules have an motor temperature sensor.  
Short circuit or cable break of the temperature sensor is not monitored.

**5.2.2.8 Fieldbus**

The regulator is available with a PROFIBUS or CAN bus or PROFINET interface depending on the version.

**CAN bus and PROFIBUS interfaces**



Fieldbus connections

1	Fieldbus supply M12 input socket
2	Fieldbus rerouting or fieldbus termination resistor , M12 output connector

- Connect the fieldbus feed lines to fieldbus M12 input plug (1).
- Fieldbus rerouting or fieldbus termination resistor , connect to fieldbus M12 output connector

## PROFIBUS



*PROFIBUS interface*

*Connection assignment*

Pin	Signal	Function
1	Advantaged products	+5 V feeding for bus termination
2	RxD/TxD-N	Data line Minus (A-conductor)
3	DGND	Data mass
4	RxD/TxD-P	Data line Plus (B-conductor)
5	--	Not assigned
Thread	Shield	FE connection

## CAN bus



*CAN bus interface*

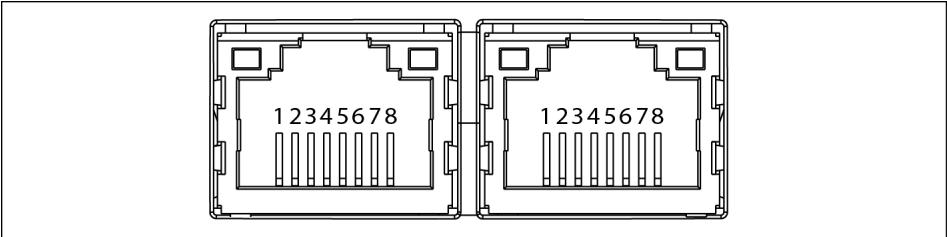
*Connection assignment*

Pin	Signal	Function
1	Shield	FE connection
2	Reserved	--
3	CAN GND	CAN reference potential
4	CAN High	Data line
5	CAN Low	Data line
Thread	Shield	FE connection

### NOTE

A termination resistor must be connected to the last bus device (120  $\Omega$  for CAN bus, 150  $\Omega$  for Profibus).

PROFINET

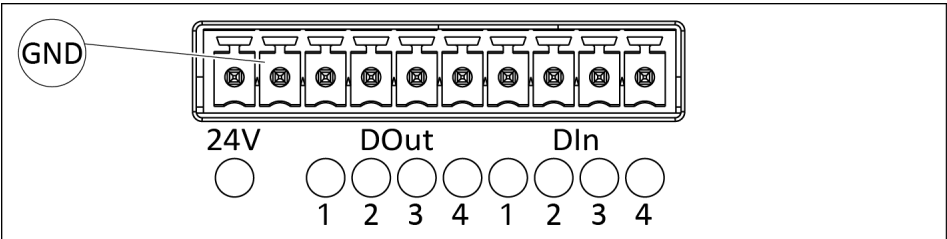


PROFINET interface

Connection assignment

Pin	Signal	Function
1, 2, 4, 5	GND	
3	RD-	Receive minus
6	RD+	Receive plus
7	TD-	Transmit minus
8	TD+	Transmit plus

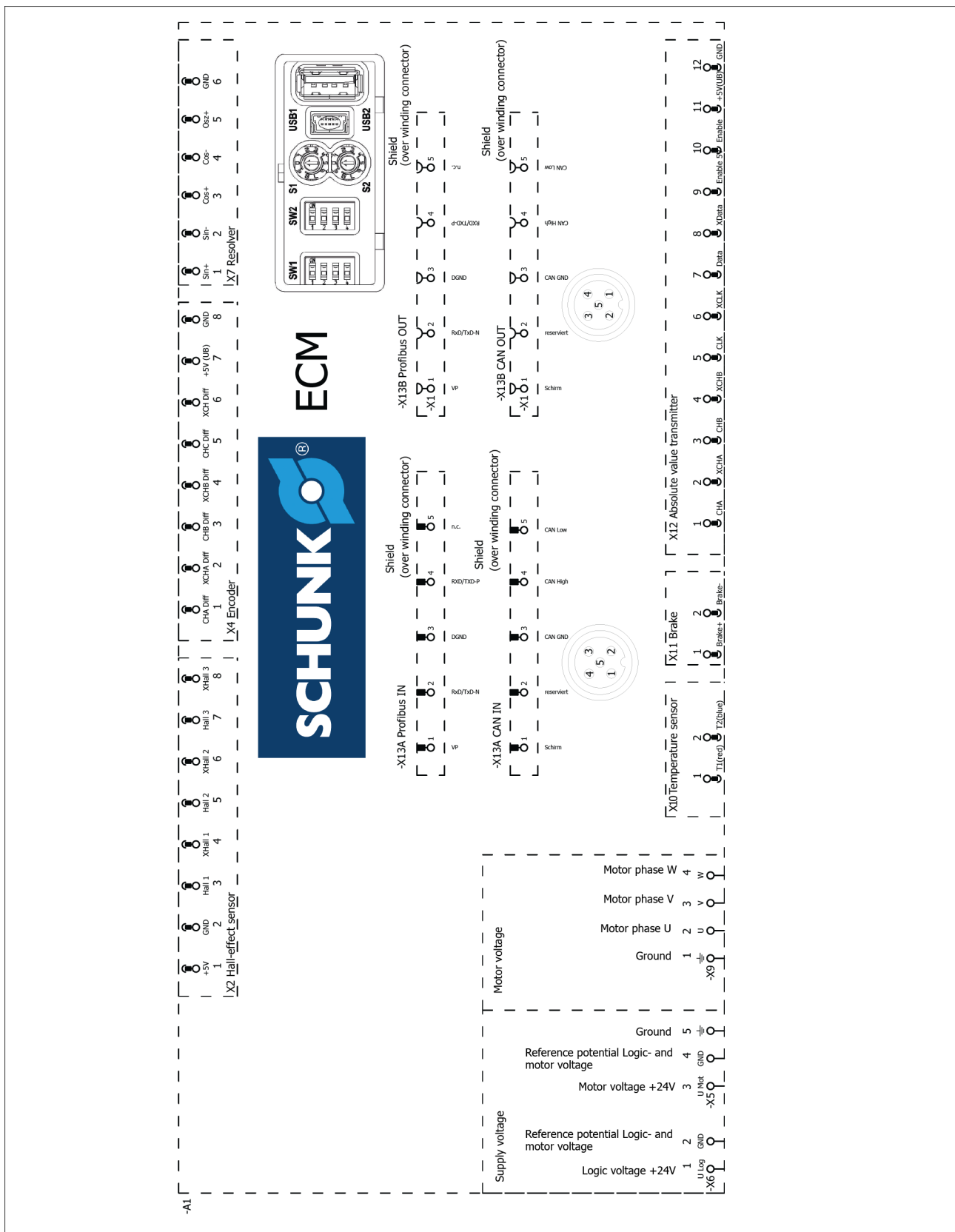
5.2.2.9 Digital input and output variants



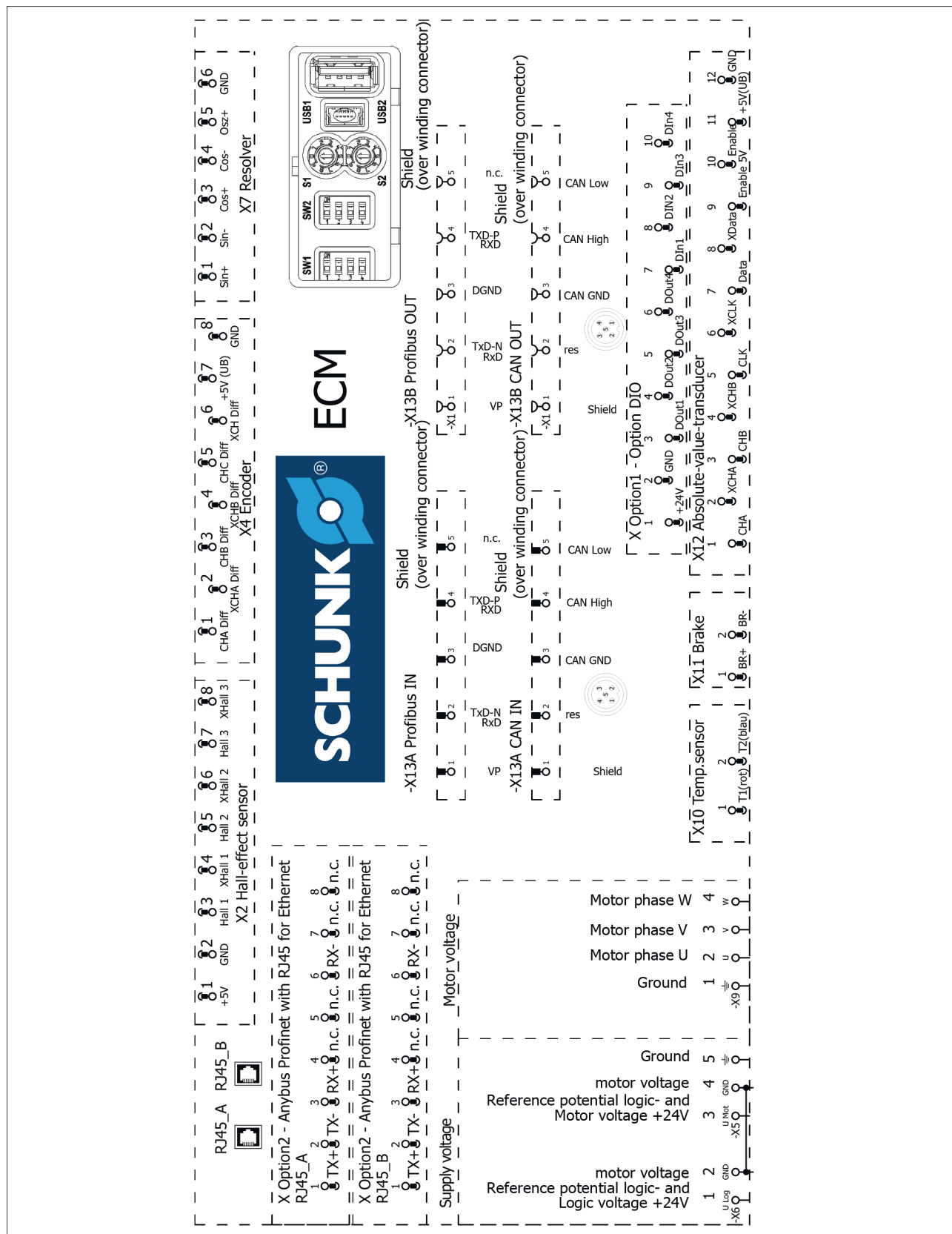
Digital inputs and outputs

PIN	Signal	Description
1	+24 V	Power supply
2	GND	
3	D <sub>out</sub> 1	Digital outputs
4	D <sub>out</sub> 2	
5	D <sub>out</sub> 3	
6	D <sub>out</sub> 4	
7	D <sub>in</sub> 1	Digital Inputs
8	D <sub>in</sub> 2	
9	D <sub>in</sub> 3	
10	D <sub>in</sub> 4	

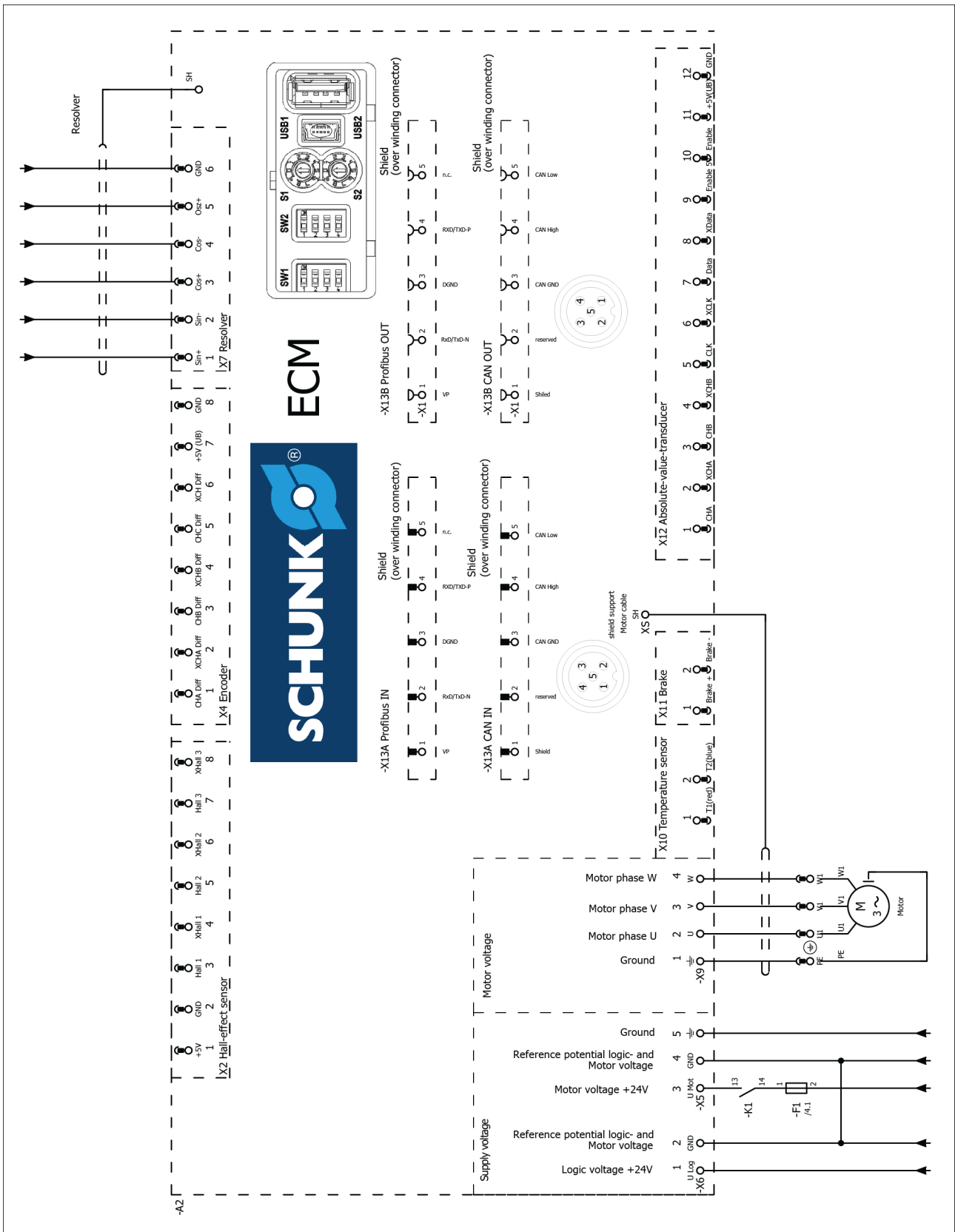
#### 5.2.2.10 Wiring diagram



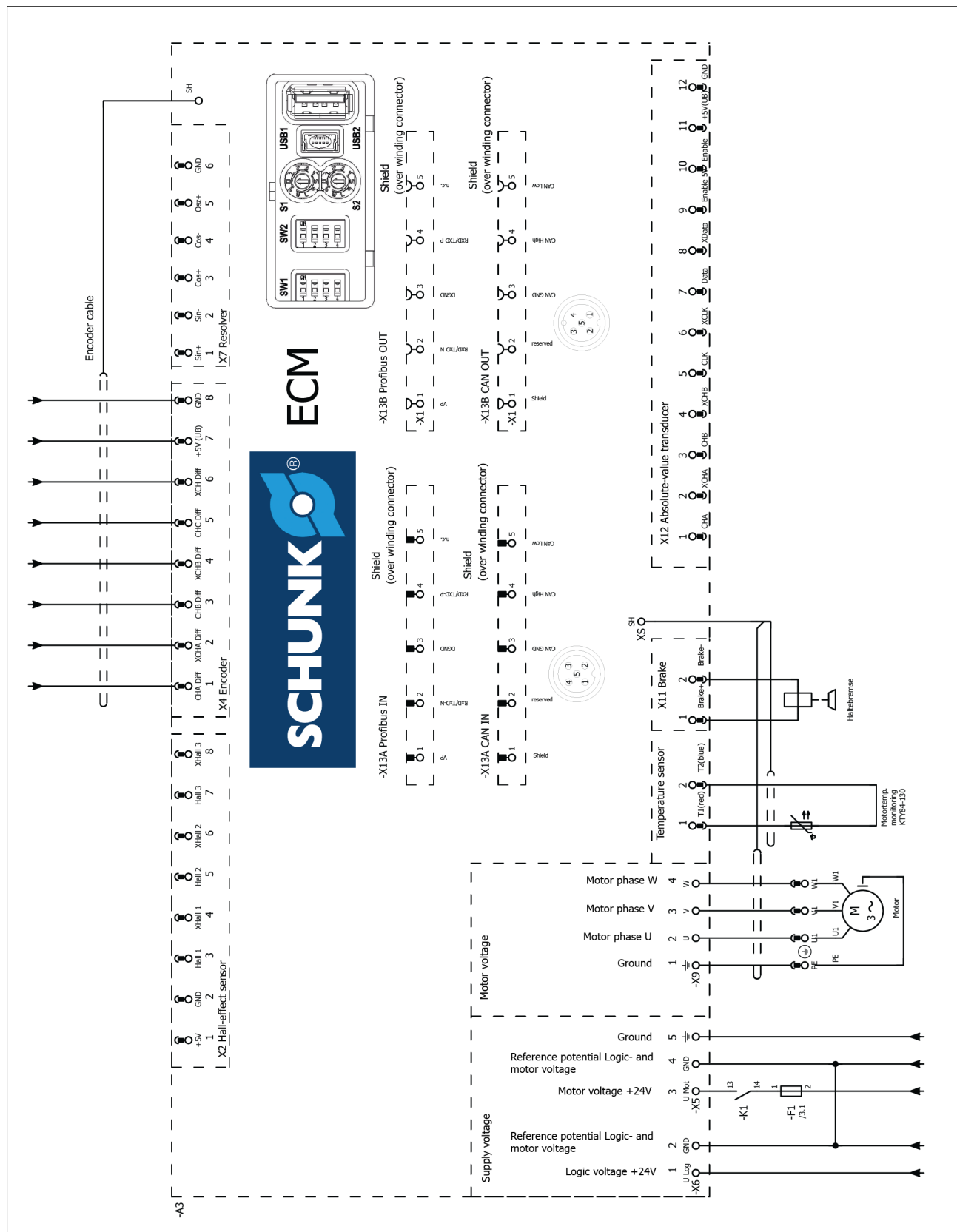
## ECM wiring diagram - Overview



ECM wiring diagram - with PROFINET and digital input/outputs



## ECM wiring diagram with EGN / EZN



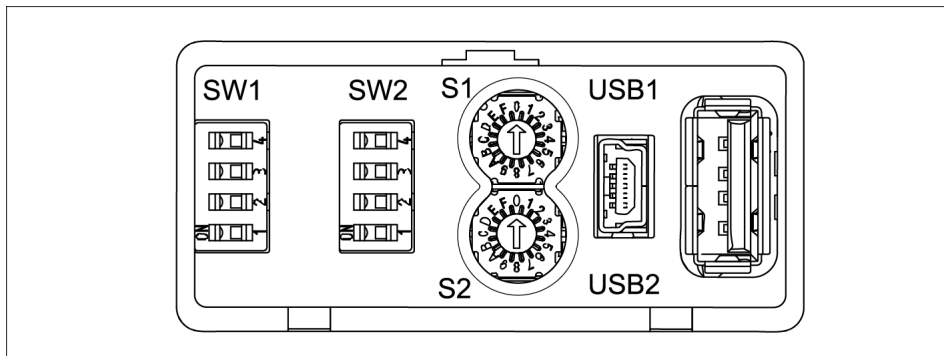
## ECM wiring diagram



### 5.3 Setting the Baud rate

#### NOTE

The Baud rate can only be set for regulators with a CAN bus interface.



Set Baud rate

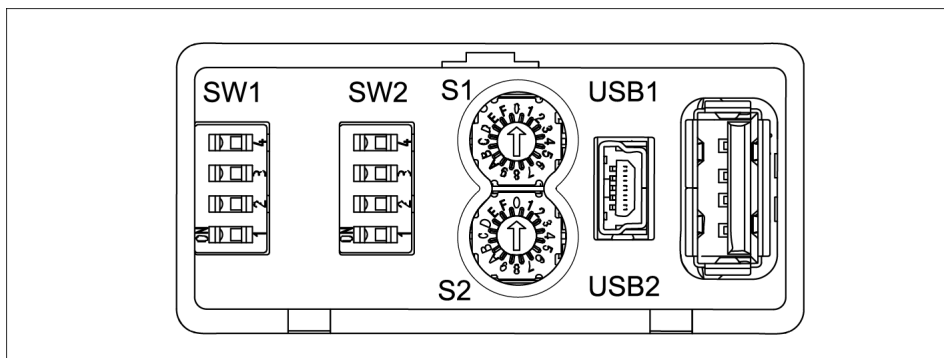
- Switch off the logic voltage.
- Set Baud rate. To do so, move switches 1 and 2 on SW2 DIP switch to the position of the desired Baud rate.

SW2 DIP switch

Baud rate in kBaud	Switch 1	Switch 2
125	OFF	OFF
250	ON	OFF
500	OFF	ON
1000	ON	ON

- Switch on the logic voltage.
  - ✓ The Baud rate that has been set can be read off on the seven-segment display.

### 5.4 Setting the fieldbus address



Set the fieldbus address

- Switch off the logic voltage.

- Set the desired fieldbus address by turning the S1 and S2 rotary encoder switches. When doing so, ensure that the rotary encoding switch engages into the desired position.
- The fieldbus address that has been set can be read off on the seven-segment display (decimal notation) when the regulator is operating.

### NOTE

The fieldbus address is set in the hexadecimal code. S1 is used to set the first byte, and S2 to set the second byte.

#### *Setting fieldbus address*

Rotary encoder switch S1	Rotary encoder switch S2	Decimal address
0	0	0
1	0	1
...	0	...
F	0	15
0	1	16
...	1	...
F	1	31
0	2	32
...	...	...
F	F	255

Example: When S1 is set to "F" and S2 to "1", this corresponds to the bus address "31" (decimal).

When the regulator is operating, the fieldbus address that has been set can be read off on the seven-segment display.

#### *Fieldbus address range*

Fieldbus	Decimal address range	Hexadecimal address range
PROFIBUS	0-125	7D
CAN bus	0-255	FF

## 5.5 Updating firmware

### NOTE

- Update the firmware only after consultation with SCHUNK service via the USB Mini AB (device) or the USB AB (host).
- The firmware has the file extension \*.bin.

### 5.5.1 Update via USB Mini AB (device)

The firmware can be updated via a Windows computer using the "Firmware Updater" tool:

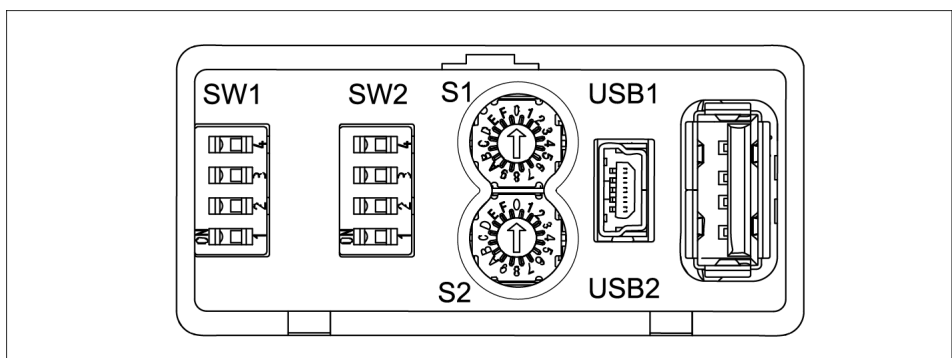
- Insert the DVD supplied in the scope of delivery into the computer.
- Open the "FirmwareUpdater.exe" file and follow the instructions.

### 5.5.2 Update via USB (host)

### NOTE

Updating the firmware from **2.x** to **3.x** with the USB stick is **not** allowed.

Updating the firmware with the "Firmware Updater" tool, [Update via USB Mini AB \(device\)](#) [▶ 51].



*Input firmware update*

### NOTE

The data for a firmware update is entered using a USB stick.

The USB stick must be formatted in the FAT16 or FAT32 file systems.

- Insert USB stick into USB host (USB2) interface with an applied logic voltage supply.
- When logic voltage supply is provided, turn switch 3 to "ON" on the SW1 DIP switch (HOST enable).
  - ✓ The seven-segment display briefly indicates "GET" and then "HOS". The EEPROM record is automatically saved on the USB stick.

### Prepare data transmission

### Start data transmission

- When the USB stick has been inserted and logic voltage supply is provided, turn switch 3 to "ON" on the SW2 DIP switch.
- ✓ The seven-segment display briefly indicates "FLA" and then "UPD". After 20 to 30 seconds, data transmission is complete. If the firmware was successfully transmitted, the seven-segment display indicates "END".

### Complete data transmission

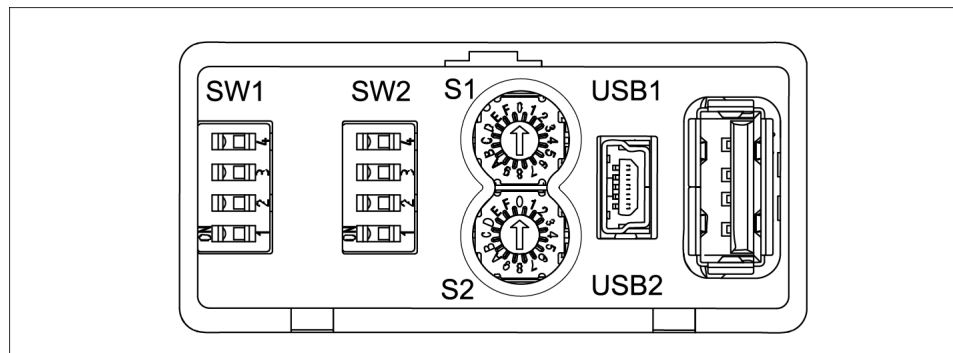
- Remove USB stick.
- On the SW2 DIP switch, turn switch 3 to "OFF".
- On the SW1 DIP switch, turn switch 3 to "OFF".
- Restart the regulator. To do so, switch off logic voltage, wait approx. 20 second and then switch it back on again.

### NOTE

The following information is indicated successively on the seven-segment display:

- Bus type
- Address of the controller
- Baud rate

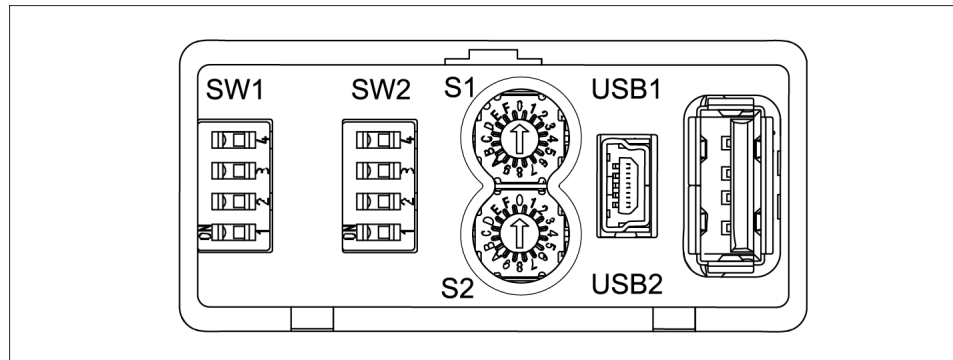
## 5.6 Establishing the factory settings



*Establish factory settings*

- Switch off the logic voltage.
- On the SW1 DIP switch, turn switch 1 to "ON".
- Switch on the logic voltage.
- On the SW1 DIP switch, turn switch 1 to "OFF".

## 5.7 Resetting the PROFINET interface



*Resetting the PROFINET interface*

### NOTE

The power supply must remain switched on in order to reset the PROFINET interface.

- On the SW1 DIP switch, turn switch 1 to "ON".
- Remove the connection plug, both ports must be idle.
  - ✓ The PROFINET interface is reset.
- Insert the connection plug
- On the SW1 DIP switch, turn switch 1 to "OFF".

## 6 Start-up



### **⚠ WARNING**

**Risk of injury due to unexpected movement of the machine/system!**

- Ensure that the danger zone is enclosed by protective fencing during operation.
- Wear suitable protective clothing.

### **NOTE**

The regulator is parameterized for the module that is to be connected upon delivery.

For more information about parameterization, see the following software manuals:

- SCHUNK Drive Protocol (SDP)
- SCHUNK Motion Protocol (SMP)
- Motion Tool SCHUNK (MTS)

### **6.1 Commissioning with CAN or PROFIBUS interface**

- Set the baud rate, [Setting the Baud rate](#) [► 49].
- Set the fieldbus address, [Setting the fieldbus address](#) [► 49].
- Switch on the logic voltage.
- Check if the logic voltage is present.
  - ✓ LED "ULOG" lights up green.
- Switch on the motor voltage.
- Check if the motor voltage is present.
  - ✓ LED "UMOT" lights up green.
- Check if an error message is present.
  - ✓ LED "ERR" does not flash and no error message is indicated in HEX format on the seven-segment display. The regulator is ready for operation.
  - ✓ LED "ERR" flashes and the information for the bus system and the Baud rate is displayed first followed by the error message in HEX format on the seven-segment display. An error message is pending and the regulator is not ready for operation.
- If an error message is pending, eliminate the error [Troubleshooting](#) [► 66].

- Check if the bus system and Baud rate are correctly displayed on the seven-segment display. The values are displayed alternately.
- ✓ Bus system (for PROFIBUS "PB" is indicated, and for CAN bus "CAN")
- ✓ Set Baud rate (if communication has successfully been established with a master, otherwise dashes ("- -") are displayed on the seven-segment display for PROFIBUS)

## 6.2 PROFINET

### 6.2.1 Types of communication of PROFINET

PROFINET differentiates between the following three communication classes:

- TCP/IP
  - Open Ethernet TCP/IP communication without real time requirements
- RT (Real Time)
  - IO data exchange between automation devices in real time (> 1 ms).
- IRT (Isochronous Real Time)
  - Isochronous real time communication for synchronized data exchange.

PROFINET IO differentiates between the following three device types:

- IO Controller
  - The IO Controller assumes the master function for cyclic data exchange with the decentralized field devices. The IO Controller is usually implemented as a communication interface of a control unit and is comparable to a PROFIBUS Master Class 1. Several IO Controllers can be integrated into a PROFINET IO system.
- IO Device
  - All PROFINET IO field devices controlled by an IO Controller are referred to as IO Devices. They are comparable to a PROFIBUS DP Slave.
- IO Supervisor
  - Programming devices with the relevant engineering or diagnostic tools are known as IO Supervisors. IO Supervisors have access to process data, parameters, alarm data and diagnostic data.

### 6.2.2 Regulator operating behaviour with a connected module

If a module is connected to the regulator, the following operating behavior is displayed:

- **Behavior when switching on the voltage supply on the regulator**
  - After switching on the voltage supply, the module connected to the regulator does not perform any movement.  
The connected module will only perform movements if the regulator is driven by the superordinate control.
- **Behavior when the connection between the superordinate control and the regulator is lost**
  - If the connection is lost, the regulator performs a fast stop and the connected module does not perform any movement.  
An error is displayed on the seven-segment display of the regulator.
- **Behavior with IOPS=BAD**
  - In the cyclic data sent from the superordinate control to the regulator, a data qualifier is located at the end of the data frame, which provides information on the validity of the output data.  
If this data qualifier is set to "BAD", the regulator performs a fast stop and the connected module does not perform any movement.

### 6.2.3 Commissioning with PROFINET interface

- Configure the hardware.
- Assign an IP address and device name.
- Configure the software.
- Switch on the logic voltage.
- Check if the logic voltage is present.
  - ✓ LED "ULOG" lights up green.
- Switch on the motor voltage.
- Check if the motor voltage is present.
  - ✓ LED "UMOT" lights up green.
- Check if an error message is present.
  - ✓ LED "ERR" does not flash and no error message is indicated on the seven-segment display. The regulator is ready for operation.
  - ✓ LED "ERR" flashes and the information for the bus system and the baud rate is displayed first followed by the error message on the seven-segment display. An error message is pending and the regulator is not ready for operation.
- If an error message is pending, eliminate the error:  
[Troubleshooting](#) [► 66].



- Check if the IP address, baud rate and fieldbus address are correctly displayed on the seven-segment display. The values are displayed alternating in the following order.
  - ✓ Set IP address (only the last byte is displayed)
  - ✓ Set baud rate (if communication has successfully been established with a master, otherwise dashes ("- -") are displayed on the seven-segment display for PROFINET)
  - ✓ Bus system (for PROFINET, "IrT" is displayed)
- Project the regulator, [PROFINET](#) [► 55].

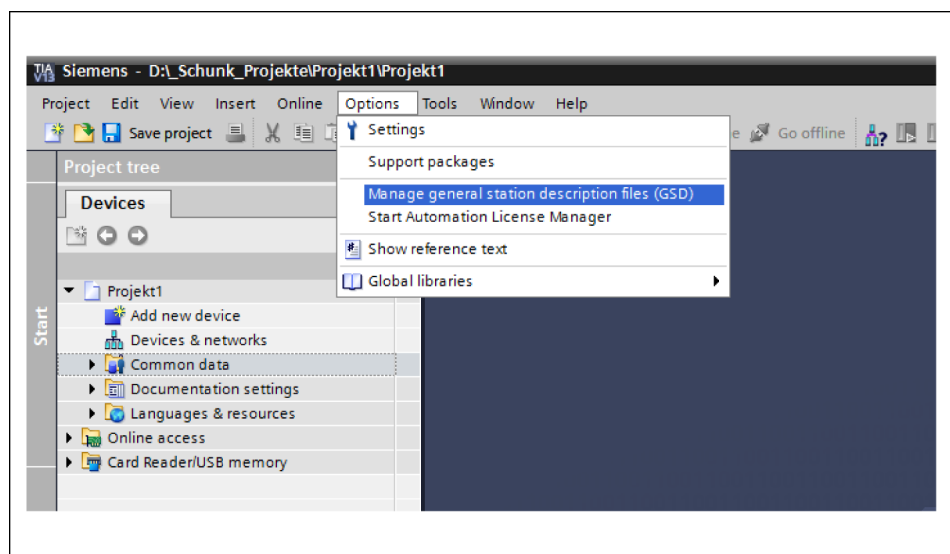
## 6.2.4 Projecting of the regulator

### NOTE

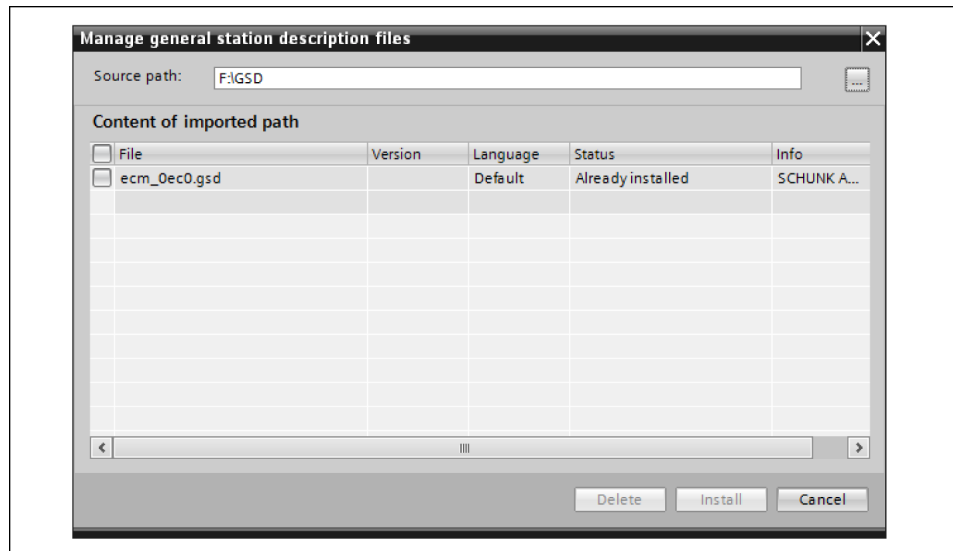
Projecting of the product is described with the projecting software *Siemens TIA-Portal V13*, for example.

### 6.2.4.1 Installing GSDML file

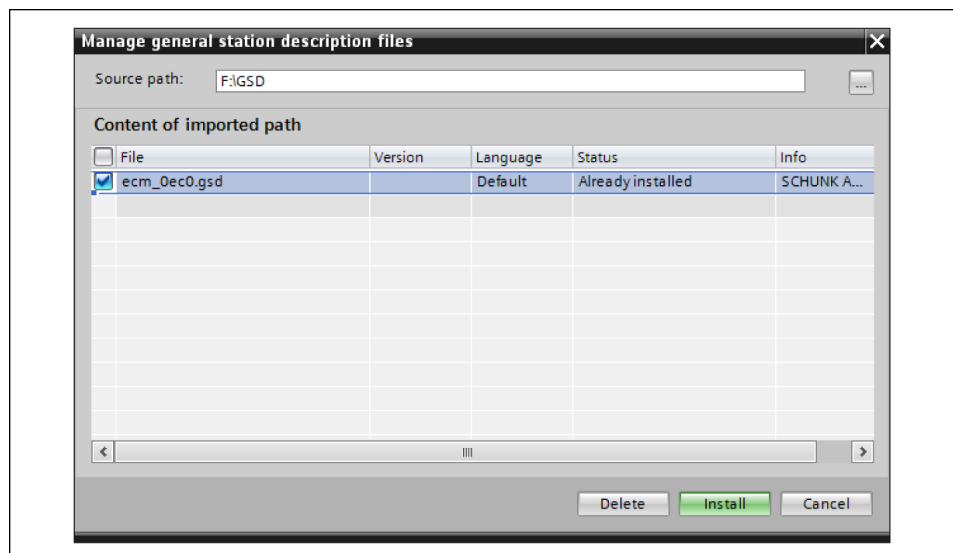
- The current GSDML file is available (contained on the supplied DVD, or download under [schunk.com](http://schunk.com)).
- The software has started.



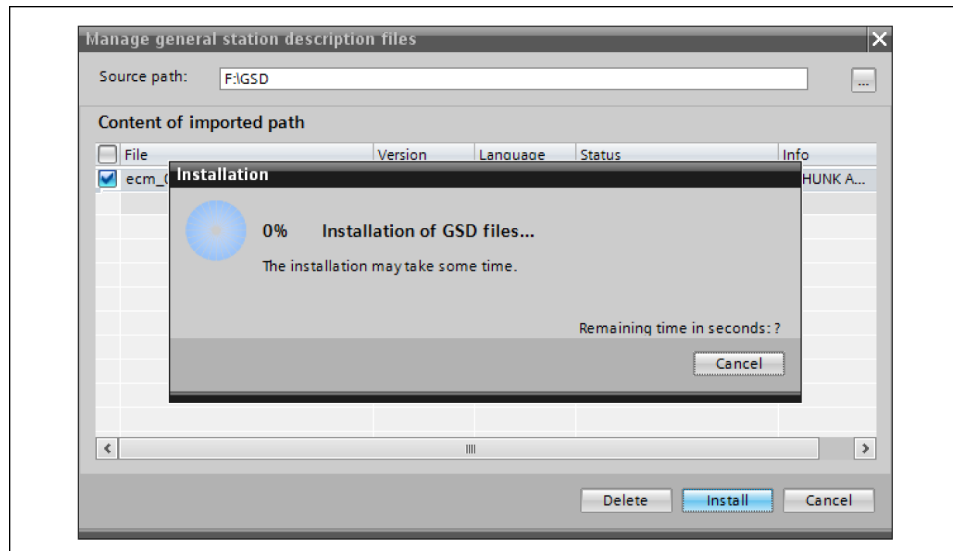
- Under *Extras*, choose the option *Manage device description file (GSD)*.
  - ✓ The *Manage device description file* window will be displayed.



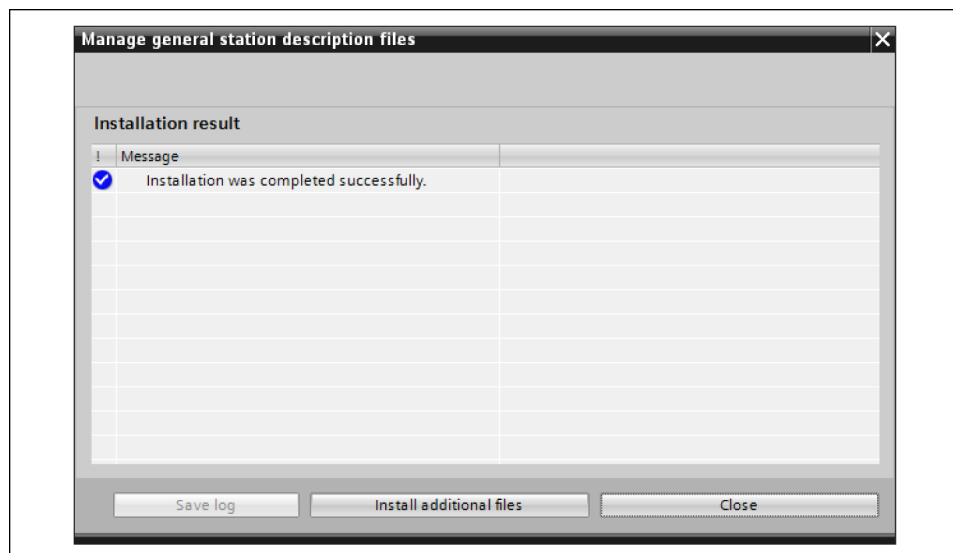
- Under *Source path*, load the GSDML file.
- ✓ The GSDML file is imported.



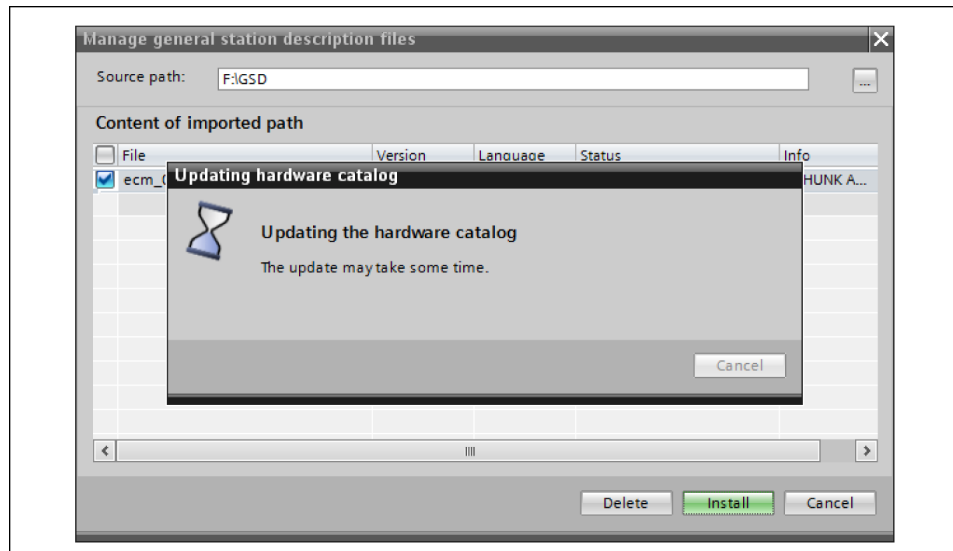
- Click the check mark at set GSDML file and press *Install*.
- ✓ The *Installation* window is displayed.



- The *Installation* window shows the installation steps for the GSDML file.
- ✓ The *Manage device description file* window will be displayed.



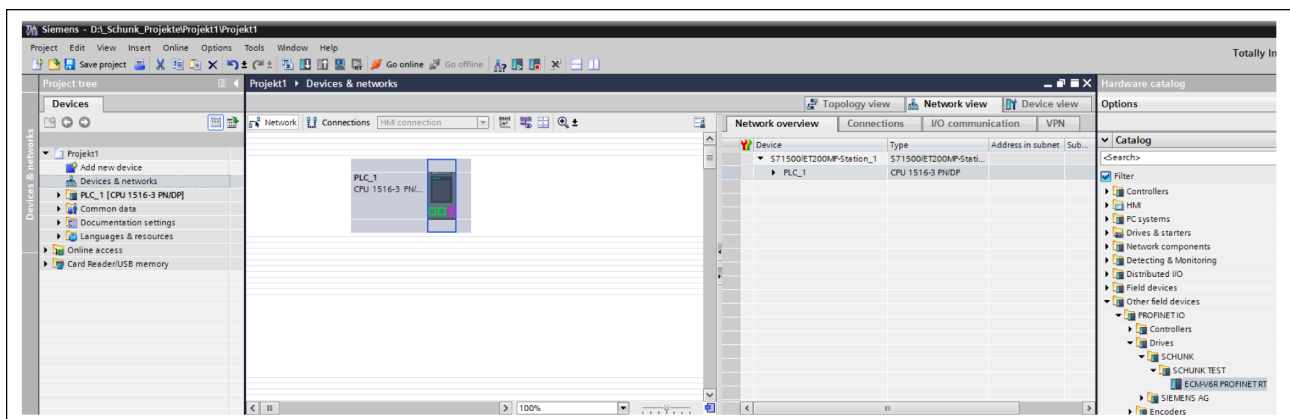
- Complete the installation with the *Close* button.
- ✓ The *Update catalog firmware* window is displayed.



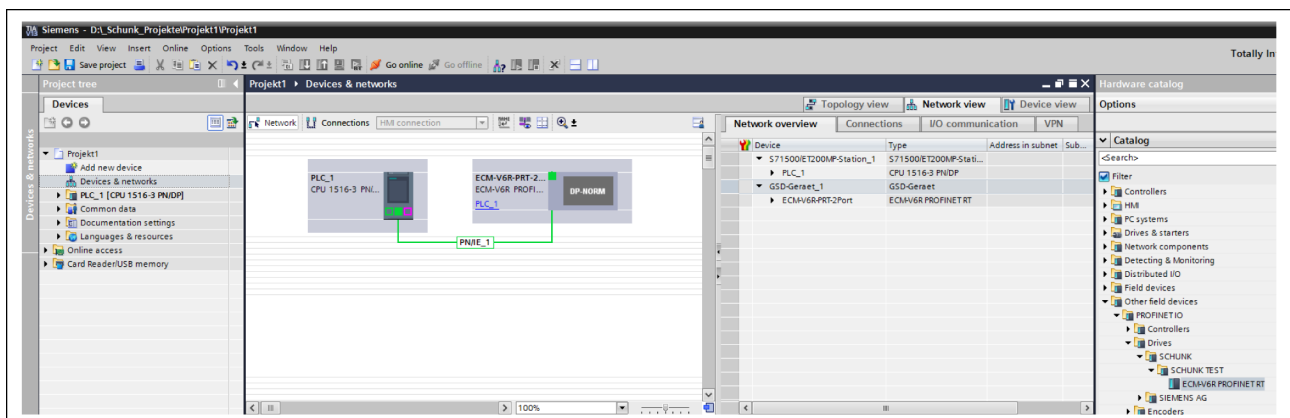
- After a successful installation, the hardware catalog will automatically be updated.

### 6.2.4.2 Projecting the hardware

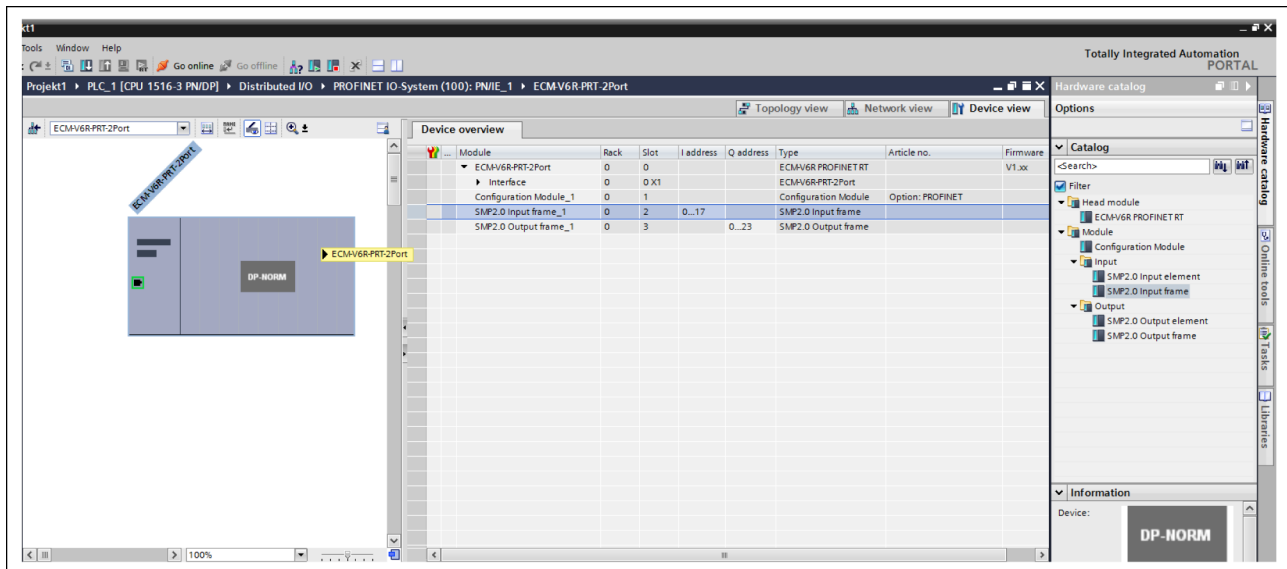
- The GSDML file is installed.



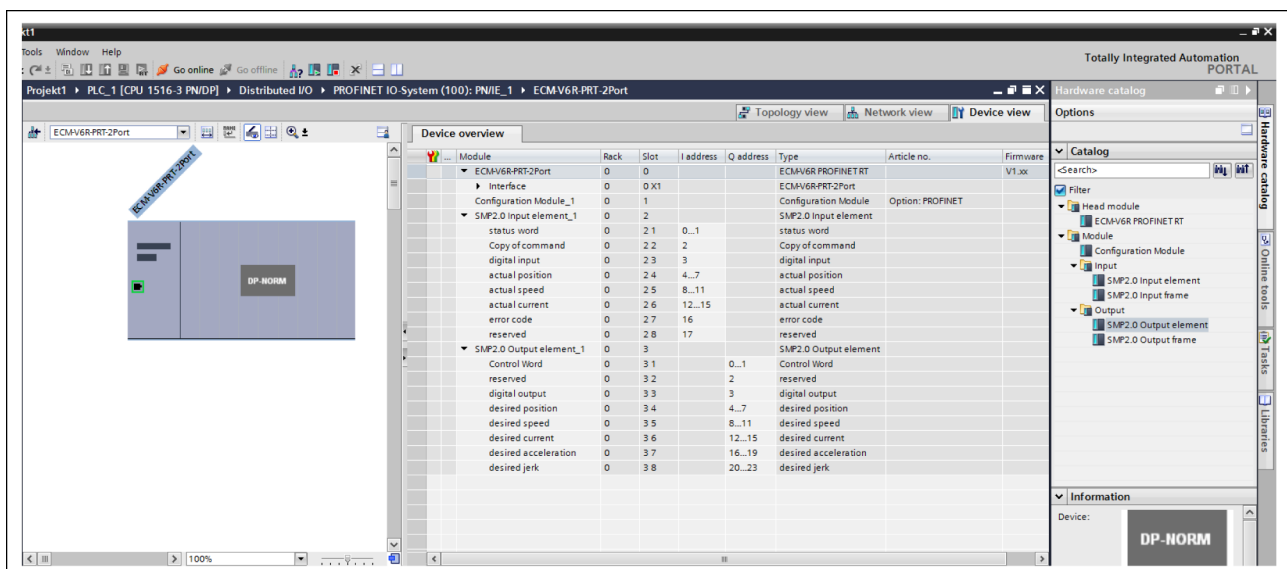
- Get the CPU for the superordinate controller from the hardware catalog in the *Network view*.
- Get the product from the hardware katalog in the *Network view*.



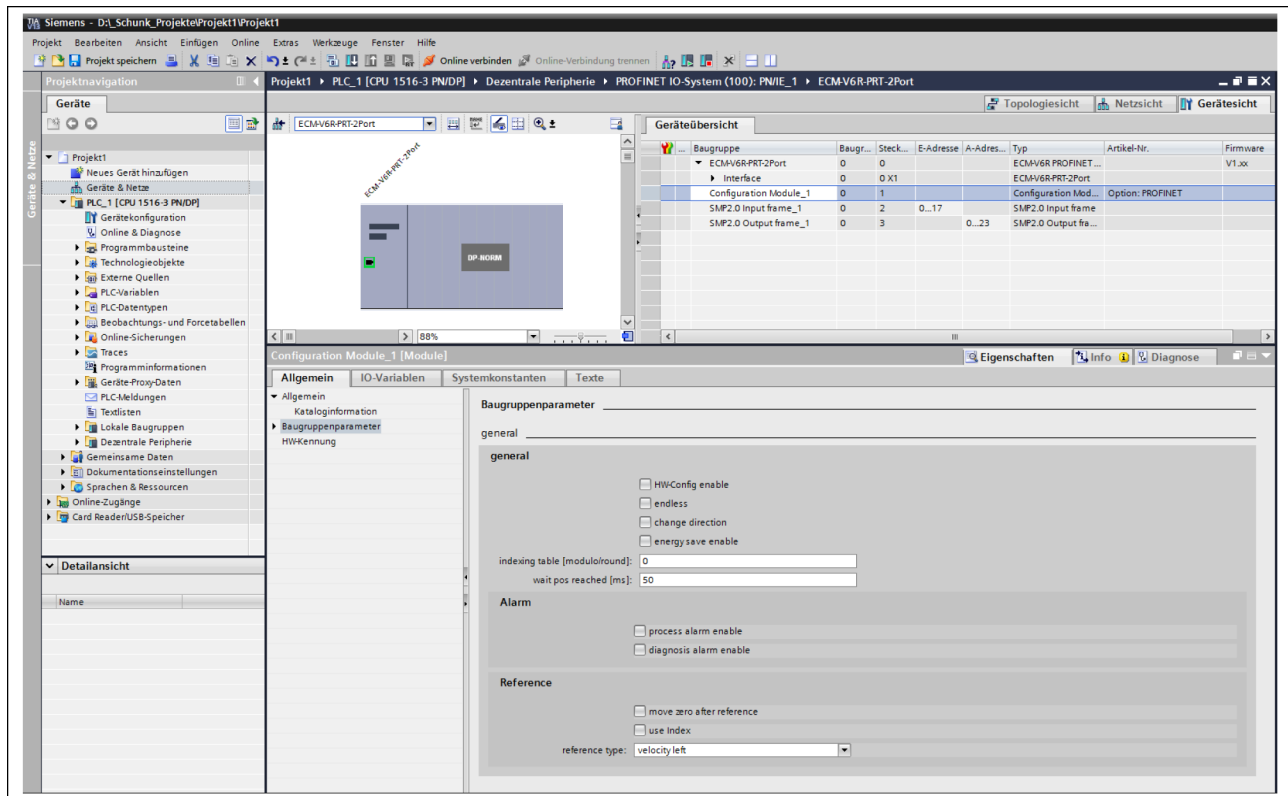
- Perform networking by connecting the product connection point with the CPU connection point of the superordinate controller.
- Mark the product and select the *Device view* tab.
- Specify the addresses of the inputs and outputs with the *Input/Output Frame* option or the *Input/Output Element* option.  
**NOTICE!** Make sure that the settings "Frame" or "Element" in the GSDML file are identical to the settings in the device. The factory setting is "Frame".



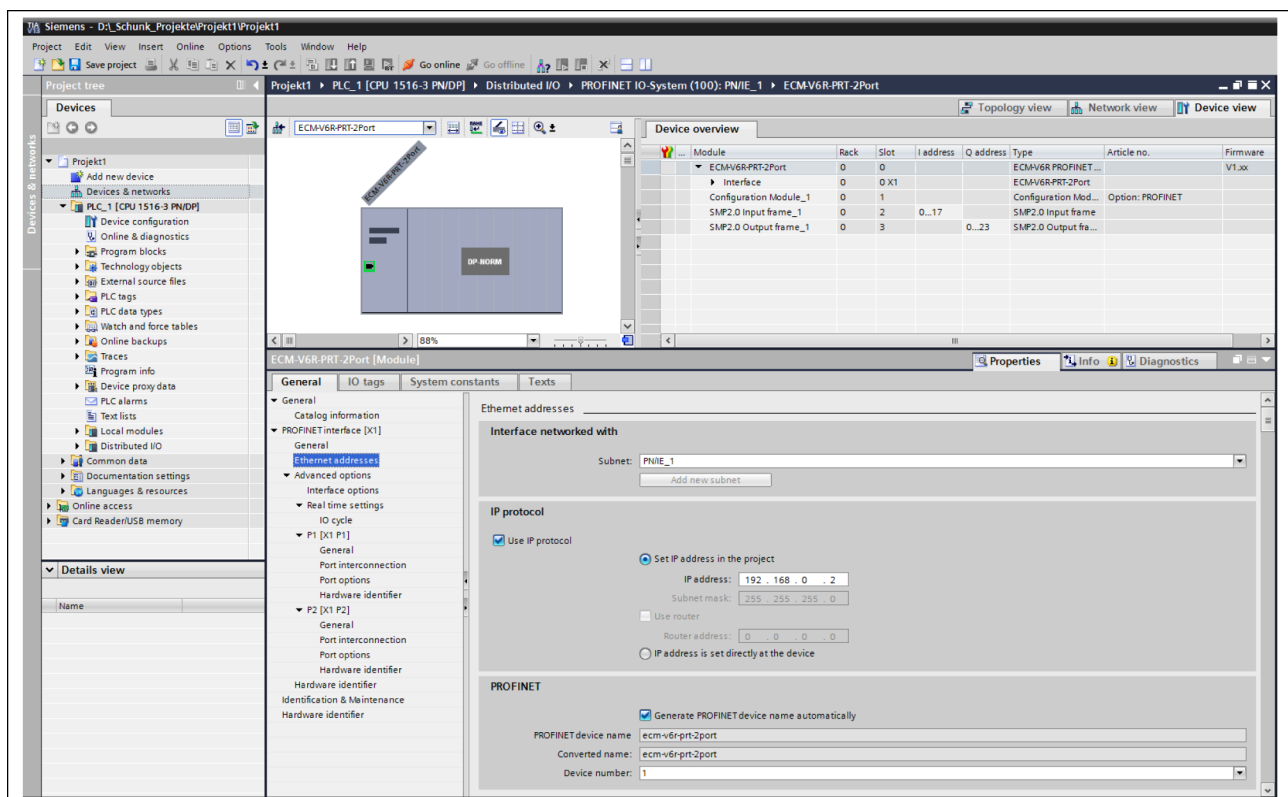
- ✓ With the *Input/Output Frame* option, the complete range is displayed, the addresses are preset. When customizing, the address of the frame is changed.



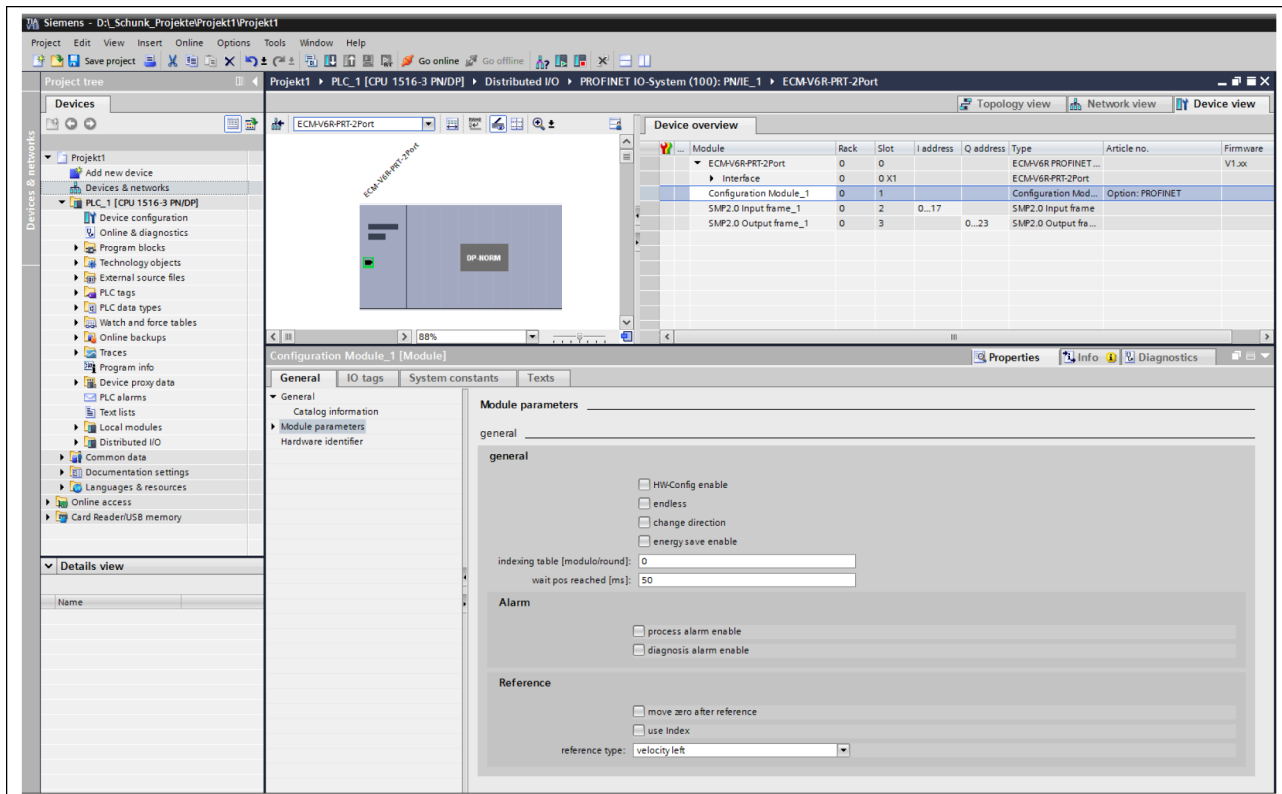
- ✓ With the *Input/Output Element* option, the individual elements of the range are displayed, the addresses are preset. When customizing, the addresses of the individual elements are changed.



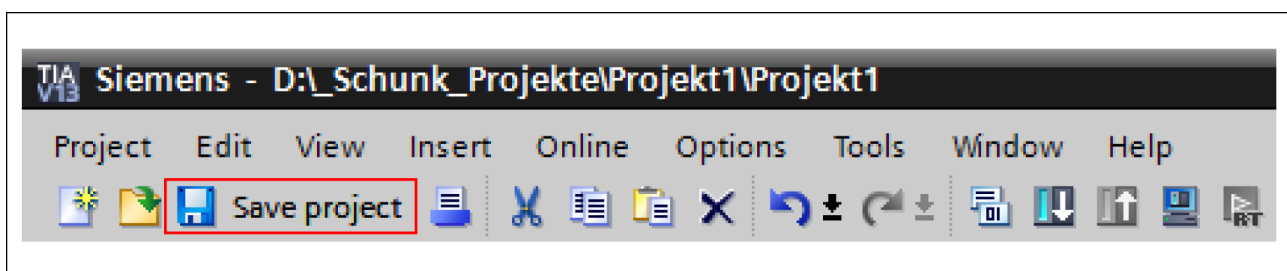
- In the *Properties – General* tab, it is possible to change the names of the product.



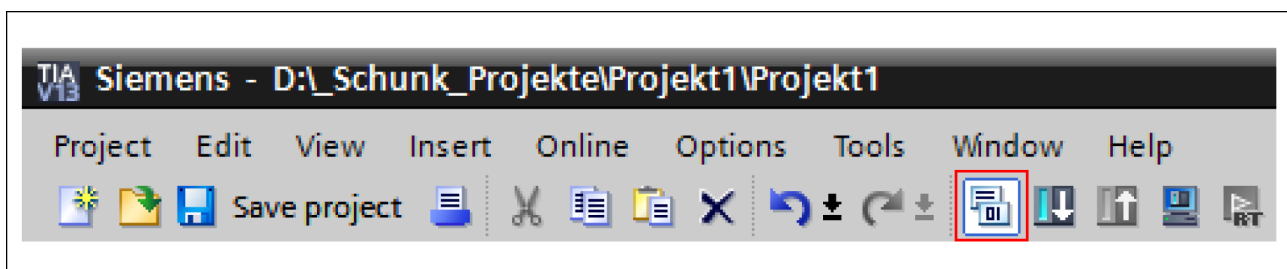
- In the *Properties – PROFINET interface [X1] – Ethernet-Adresses* tab, it is possible to change the IP addresses.



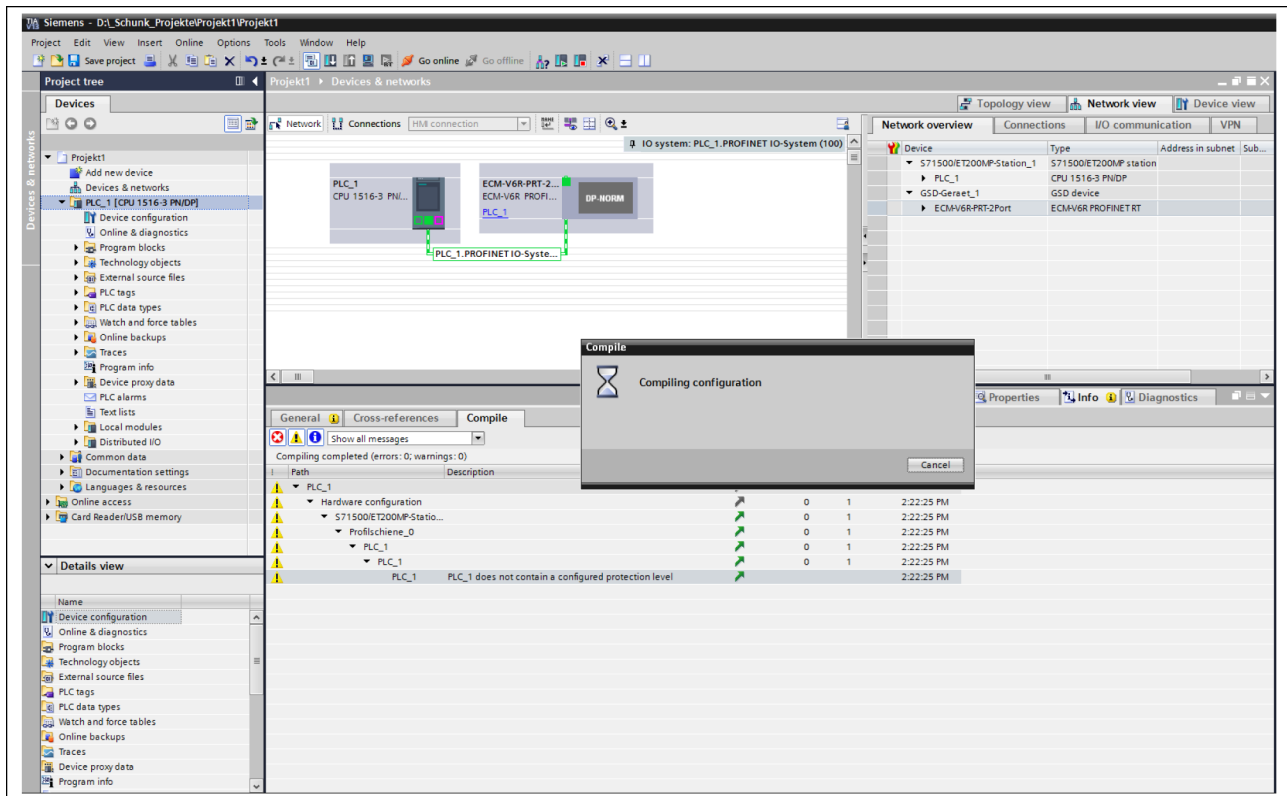
- In *Device view*, select the *Configuration Module* and in the *Properties – Module parameters* tab, set the parameters.



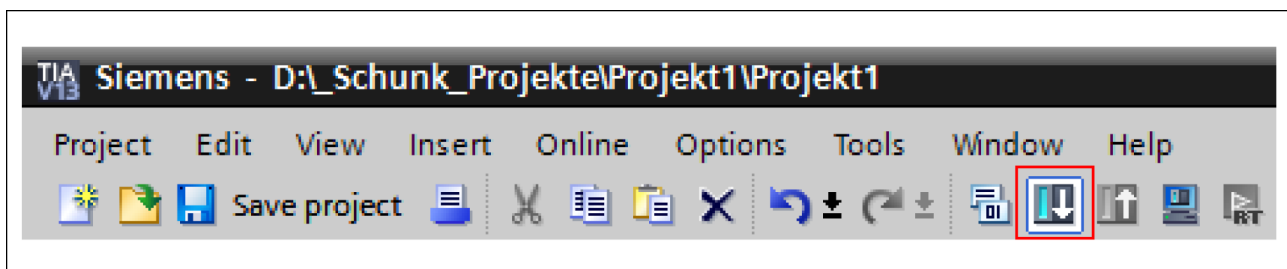
- Press the *Save project* button to save the properties.



- Press the *Translate* button to check the accuracy of the projecting. If an error or a warning is displayed, remove it and press the *Translate* button again.
- ✓ The *Translate* button is displayed.

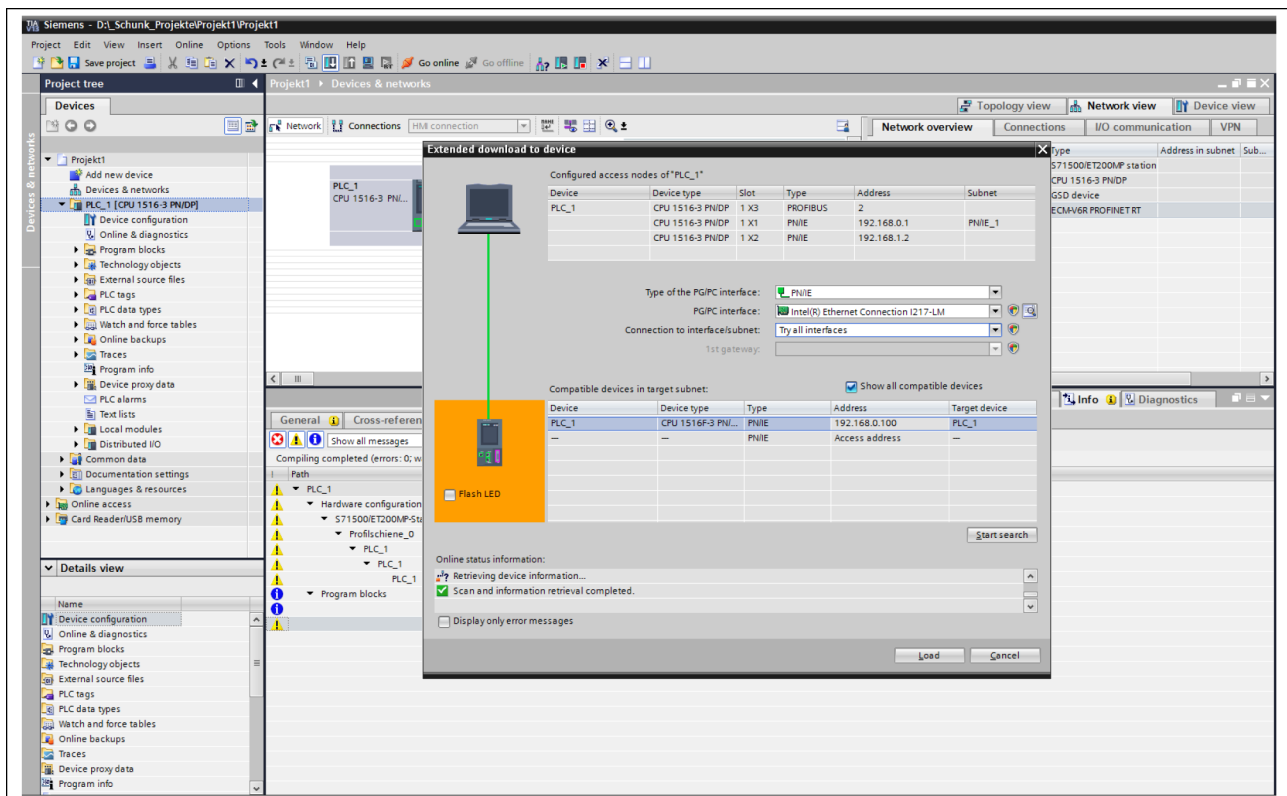


- ✓ After a successful check, the *Translate* window will close automatically.



- Mark the CPU of the superordinate controller in the project and press the *Load in Device* button.
- ✓ The *Enhanced Load* window is shown.





- Apply the following settings:
  - ✓ Field bus interface
  - ✓ PC interface
  - ✓ Superordinate control unit interface
  - ✓ Click the check mark at *Display all compatible devices*
- Click the *Start search* button.
  - ✓ In the results list *Compatible devices in the destination subnet*, the CPU of the superordinate controller is displayed.
- Select the CPU of the superordinate controller and press the *Load* button.
  - ✓ The data will be transferred.

## 7 Troubleshooting

Identified errors are shown as hexadecimal code on the seven-segment display.

For information on the error codes, see the *Schunk Drive Protocol (SDP)* or *Schunk Motion Protocol (SMP)* software manuals.

## 8 EU-Declaration of Conformity

Manufacturer/  
Distributor                      SCHUNK GmbH & Co. KG Spann- und Greiftechnik  
Bahnhofstr. 106 – 134  
D-74348 Lauffen/Neckar

Product designation:              Controller for SCHUNK gripper ECM  
ID number                          according to the enclosed list

We hereby declare on our sole authority that the product meets the requirements of the following directive at the time of declaration.

The declaration is rendered invalid if modifications are made to the product.

- **EMC Directive 2014/30/EU**

Directive of the European Parliament and the Council of February 26, 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility

Applied harmonized standards, especially:

EN 61000-6-2 (2005)      Electromagnetic compatibility (EMC) - Part 6-2: Generic standards -Immunity for industrial environments  
IEC 61000-6-2: 2005

EN 61000-6-4:2007 +      Electromagnetic compatibility (EMC) - Part 6-4: Generic standards  
A1:2011                      - Emission standard for industrial environments  
(IEC 61000-6-4:2006 + A1:2010);

Signed for and on behalf of: SCHUNK GmbH & Co. KG

*Signature: see original declaration*

Prof. Dr.-Ing. Markus Glück,  
Managing Director Research & Development

Lauffen/Neckar, November 2018

## 9 Annex to Declaration of Conformity

Product designation	Controller for SCHUNK gripper
Type designation	ECM

### Firmware 2.x :

Ident number	Designation	Ident number	Designation
0315005	ECM-EGN080-PB-N	0315045	ECM-EGN080-CN-N
0315006	ECM-EGN100-PB-N	0315046	ECM-EGN100-CN-N
0315007	ECM-EGN160-PB-N	0315047	ECM-EGN160-CN-N
0315008	ECM-EZN064-PB-N	0315048	ECM-EZN064-CN-N
0315009	ECM-EZN100-PB-N	0315049	ECM-EZN100-CN-N

### Firmware 3.x :

Ident number	Designation	Ident number	Designation
0315015	ECM-EGN080-PB-I	0315091	ECM-EGN080-PN-I
0315016	ECM-EGN100-PB-I	0315092	ECM-EGN100-PN-I
0315017	ECM-EGN160-PB-I	0315093	ECM-EGN160-PN-I
0315018	ECM-EZN064-PB-I	0315094	ECM-EZN064-PN-I
0315019	ECM-EZN100-PB-I	0315095	ECM-EZN100-PN-I
0315055	ECM-EGN080-CN-I	1325323	ECM-EGN080-PB-N
0315056	ECM-EGN100-CN-I	1325327	ECM-EGN100-PB-N
0315057	ECM-EGN160-CN-I	1325329	ECM-EGN160-PB-N
0315058	ECM-EZN064-CN-I	1325331	ECM-EZN064-PB-N
0315059	ECM-EZN100-CN-I	1325334	ECM-EZN100-PB-N
0315083	ECM-EGN080-PN-N	1325341	ECM-EGN080-CN-N
0315084	ECM-EGN100-PN-N	1325342	ECM-EGN100-CN-N
0315085	ECM-EGN160-PN-N	1325344	ECM-EGN160-CN-N
0315086	ECM-EZN064-PN-N	1325347	ECM-EZN064-CN-N
0315087	ECM-EZN100-PN-N	1325349	ECM-EZN100-CN-N