

# SmartWire-DT modules IP6x



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### **Original operating manual**

The German-language edition of this document is the original operating manual.

### **Translation of the original operating manual**

All editions of this document other than those in German language are translations of the original operating manual.

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## **Danger!** **Dangerous electrical voltage!**

---

### **Before commencing the installation**

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Earth and short circuit.
- Cover or enclose neighbouring units that are live.
- Follow the engineering instructions (AWA/IL) of the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE) must be connected to the protective earth (PE) or to the potential equalisation. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automation functions.
- Install automation devices and related operating elements in such a way that they are well protected against unintentional operation.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that a line or wire breakage on the signal side does not result in undefined states in the automation devices.
- Ensure a reliable electrical isolation of the low voltage for the 24 volt supply. Only use power supply units complying with IEC 60364-4-41 (VDE 0100 Part 410) or HD 384.4.41 S2.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specifications, otherwise this may cause malfunction and dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes of the automation devices. Unlatching the emergency-stop devices must not cause restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been installed with the housing closed. Desktop or portable units must only be operated and controlled in enclosed housings.
- Measures should be taken to ensure the proper restart of programs interrupted after a voltage dip or failure. This should not cause dangerous operating states even for a short time. If necessary, emergency-stop devices should be implemented.
- Wherever faults in the automation system may cause damage to persons or property, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (for example, by means of separate limit switches, mechanical interlocks etc.).



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## 0 About this manual

This manual contains information on the SmartWire-DT (or SWD for short) I/O modules with higher degree of protection (hereafter referred to as "I/O Modules IP6x" for short) that can be used to connect digital and analog input/output signals.

- EU1E-SWD...
- EU2E-SWD...
- EU6E-SWD...
- EU8E-SWD...
- EU1H-SWD...

### 0.1 Target group

This manual is intended for engineers, electricians, and automation technicians. Electrical engineering and physics-related knowledge and skills, as well as advanced familiarity with the field bus being used, will be required in order to be able to commission the corresponding devices. In addition, readers must be familiar with how to use the SmartWire-DT communication system.

**CAUTION**

Installation requires qualified electrician

### 0.2 Exclusion of liability

All information in this operator manual was provided by us to the best of our knowledge and belief and in accordance with the current state-of-the-art. However, this does not exclude the possibility of inaccuracies so that we cannot accept any liability for the accuracy and completeness of the information. This information in particular does not contain any guarantee for the provision of specific properties.

The devices described must only be installed and operated in accordance with the content of this operator manual and the installation instructions provided with the device. Installation, commissioning, operation, maintenance and refitting of the devices must only be carried out by qualified persons. The devices must only be used in the areas recommended and only in conjunction with third-party devices and components that have been approved by us. Their use is allowed fundamentally only in technically faultless condition. Fault-free and safe operation of the system requires proper transport, storage, mounting and commissioning as well as careful operation and maintenance. If the following safety instructions are not observed, particularly with regard to commissioning and maintenance of the devices by insufficiently qualified personnel and/or in the event of improper use of the devices, any hazards caused by the devices cannot be excluded. We cannot accept any liability for any resulting injury or damage.

## 0 About this manual

### 0.3 List of revisions

### 0.3 List of revisions

The following table only lists major modifications.

<b>Edition date</b>	<b>Page</b>	<b>Subject</b>	<b>New</b>	<b>Modification</b>	<b>Omitted</b>
05/10		New edition	✓		
09/15		EU2E-SWD-4DD-1 added	✓		
		Appendix, technical data expanded		✓	
	61 ff	EU2E-SWD-2PT,EU1E-SWD-1CX		✓	
04/16		EU1E-SWD-1XD			✓
		Chapter 1.4: Pin assignment added	✓		
	ff	Chapter 1.7: List of SmartWire-DT coordinators expanded	✓		
	ffIP65	Diagnostics expanded	✓		
		EU2E-SWD-2PT parameter byte 2, channel		✓	
		EU1E-SWD-1CX programming		✓	
		EU1E-SWD-2DX, EU2E-SWD-2DD technical data		✓	
05/17	ff	EU6E-SWD-... and EU8E-SWD-... added	✓		
08/18	ff	EU1H-SWD-... added	✓		
12/18	164 204,212	EU1H-SWD-... Fusing the power supply added, Techn. Data to Current consumption		✓	

## 0.4 Additional documents dealing with SmartWire-DT

More information on the topic SmartWire-DT can be found

in the following manual:

- MN05006002Z, SmartWire-DT The System
- MN05006001Z, SmartWire-DT Modules (IP20)
- MN05013002Z SmartWire-DT Gateways
- MN05002002Z signal modules (chapter „Diagnostics of the Profibus-DP slaves“)

in the Installation instructions:

- IL04716001Z, SWD4...: Wiring material and accessories
- IL050001Z, cable adapter ("SWD4-FFR-PF1-1, SWD4-FFR-ST1-1")
- IL05006001Z SWD gateways and power feeder module ("EU5C-SWD-PF...")
- IL05006002Z SWD input/output modules IP20 („EU5E-SWD-...“)
- IL0120005Z, SWD input/output modules IP69K („EU1E-SWD-..., EU2E-SWD-..., EU1S-SWD-..., EU2A-SWD-...“)
- IL0120006ZU SWD input/output modules IP69K („EU6E-SWD..., EU8E-SWD-...“)
- IL120007ZU SWD Valve control interface modules IP65 („EU1H-SWD...“)



The aforementioned documents, as well as the manual you are reading right now, can also be downloaded free of charge from the Internet in PDF format at:

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Enter the document number ("05006001" or "120006", for example) or "SWD" into the **Quick Search** text field.

## 0.5 Writing conventions

Symbols used in this manual have the following meanings:

- ▶ Indicates instructions to be followed.

### 0.5.1 Hazard warnings of material damages

#### *NOTICE*

Warns about the possibility of material damage.

### 0.5.2 Hazard warnings of personal injury



#### **CAUTION**

Warns of the possibility of hazardous situations that may possibly cause slight injury.



#### **WARNING**

Warns of the possibility of hazardous situations that could result in serious injury or even death.



#### **DANGER**

Warns of hazardous situations that result in serious injury or death.

### 0.5.3 Tips



Indicates useful tips.

# 1 Inputs/outputs module IP6x

## 1.1 Introduction

SmartWire-DT I/O modules with an higher degree of protection (hereafter referred to as "I/O Modules IP6x" for short) are used to connect additional sensors and actuators outside of control panels and directly on machines or in systems. These sensors and actuators may include, for instance, units that do not feature integrated SmartWire-DT capabilities

A range of I/O Modules IP6x models with digital or analog inputs and/or outputs are available with various designs.

- **T-Connectors**  
EU1E-SWD... and EU2E-SWD...  
for connecting up to four digital and analog input/output signals with IP69K
- **Block Modules**  
EU6E-SWD... and EU8E-SWD...  
for connecting up to sixteen digital input/output signals with IP69K  
**Block Modules with external power supply unit**  
EU6E-SWD...-1, EU6E-SWD...-2 and/or EU8E-SWD...-1  
for connecting up to sixteen digital input/output signals, with IP69K
- **Valve control interface modules**  
EU1H-SWD...  
for connecting SWD to standard hydraulic valves, with IP65

Following is a description of the I/O Modules IP6x general characteristics and information on their use.

For additional specific information, please refer to the descriptions for the individual I/O Modules IP6x that start in chapter 2.

# 1 Inputs/outputs module IP6x

## 1.2 Surface mounting

### 1.2 Surface mounting

Depending on the specific product model, there will be – in addition to the SWD communication interface – up to eight M12 sockets for connecting up to 16 inputs/outputs.

Block Modules with outputs are also available with a separate power supply unit.

#### 1.2.1 T-Connectors

##### EU1E-SWD...

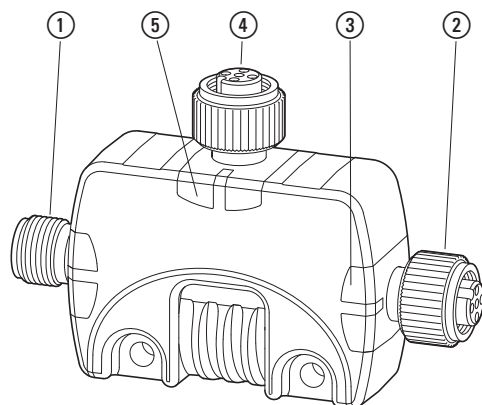


Figure 1: EU1E-SWD... connections

- ① SmartWire-DT connection SWD IN
- ② SmartWire-DT connection SWD OUT
- ③ SmartWire-DT diagnostics LED
- ④ Connection X1
- ⑤ I/O status indicators

##### EU2E-SWD...

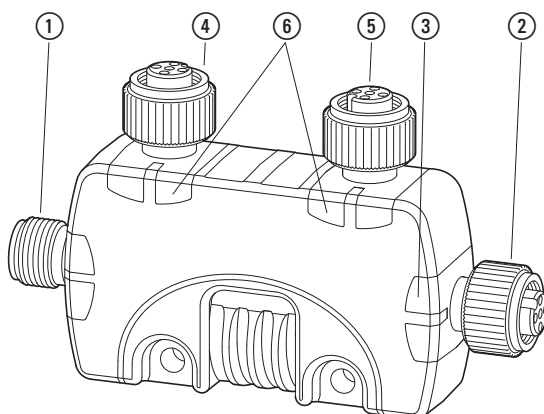


Figure 2: EU2E-SWD... connections

- ① SmartWire-DT connection SWD IN
- ② SmartWire-DT connection SWD OUT
- ③ SmartWire-DT diagnostics LED
- ④ Connection X1
- ⑤ Connection X2
- ⑥ I/O status indicators



## 1.2.2 Block Modules

### EU6E-SWD...

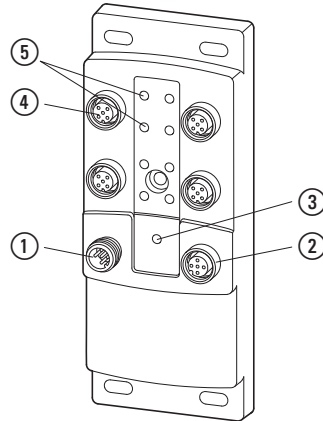


Figure 3: EU6E-SWD... connections

- ① SmartWire-DT connection SWD IN
- ② SmartWire-DT connection SWD OUT
- ③ SmartWire-DT diagnostics LED
- ④ Connection X1...X4
- ⑤ I/O status indicators

### EU6E-SWD...-1, EU6E-SWD...-2

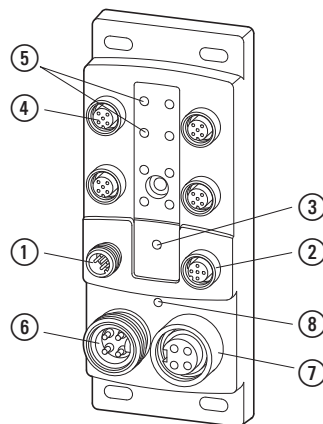


Figure 4: Connections for EU6E-SWD...-1 and EU6E-SWD...-2 with external power supply unit

- ① SmartWire-DT connection SWD IN
- ② SmartWire-DT connection SWD OUT
- ③ SmartWire-DT diagnostics LED
- ④ Connection X1...X4
- ⑤ I/O status indicators
- ⑥ PWR IN used to feed power from external power supply
- ⑦ PWR OUT used to forward the power from external power supply
- ⑧ Status indicator for external power supply

# 1 Inputs/outputs module IP6x

## 1.2 Surface mounting

### EU8E-SWD...

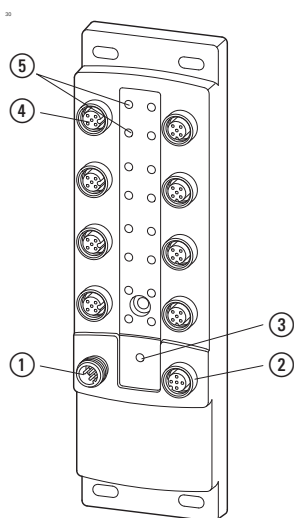


Figure 5: EU8E-SWD... connections

- ① SmartWire-DT connection SWD IN
- ② SmartWire-DT connection SWD OUT
- ③ SmartWire-DT diagnostics LED
- ④ Connection X1...X8
- ⑤ I/O status indicators

### EU8E-SWD...-1

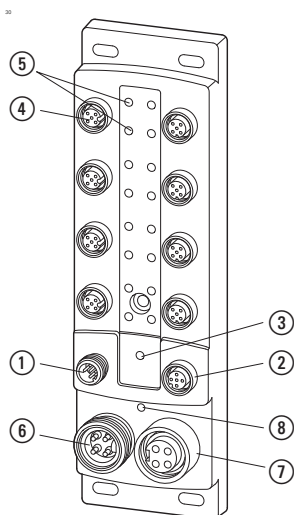


Figure 6: Connections for EU8E-SWD...-1 with external power supply unit

- ① SmartWire-DT connection SWD IN
- ② SmartWire-DT connection SWD OUT
- ③ SmartWire-DT diagnostics LED
- ④ Connection X1...X8
- ⑤ I/O status indicators
- ⑥ PWR IN used to feed power from external power supply
- ⑦ PWR OUT used to forward the power from external power supply
- ⑧ Status indicator for external power supply

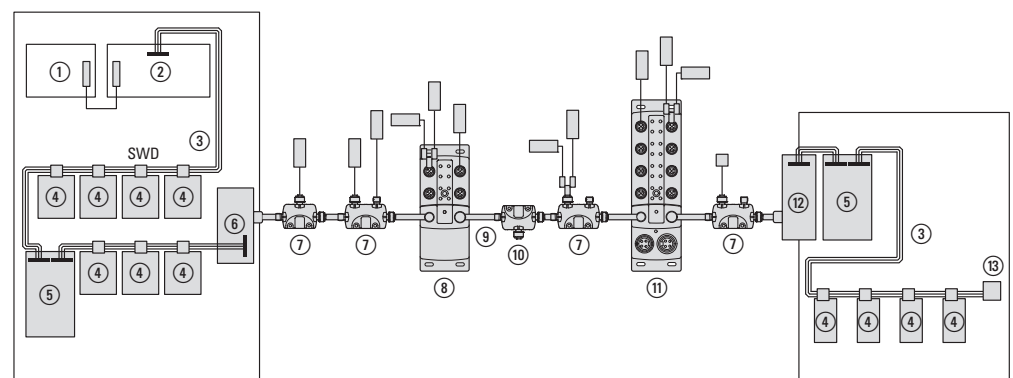
## 1.3 Engineering

The I/O Modules IP6x are meant for connecting additional sensors and actuators that do not feature integrated SmartWire-DT capabilities. They make it possible to directly connect sensors and actuators outside of control panels by using standardized M12 cables (e.g., SWD4-..LR5-1-2S). As for the connection to the SmartWire-DT communication system, it is made using an SWD4-..LR5-2S five-conductor round cable with M12 plug connectors that supply a 24-V supply voltage with a maximum current of 4 A.

Meanwhile, the Block Modules with an external power supply unit are used whenever a large number of actuators with high current consumption levels need to be connected to the I/O Modules IP6x.

The Block Modules can be combined as necessary with other SWD modules such as T-Connectors. Moreover, it is also possible to transition between SWD modules in a control panel (SmartWire-DT ribbon cable) and modules outside a control panel by using the appropriate SWD4-SFL8-5 or SWD4-SML8-5 cable adapter.

Finally, an SWD4-RC8-10 (ribbon cable) or SWD4-RC5-10 (round cable) bus termination resistor needs to be connected in order to terminate the SmartWire-DT network.



- ① PLC with field bus
- ② SmartWire-DT coordinator as field bus slave (gateway)
- ③ SmartWire-DT ribbon cable with IP20 degree of protection inside control panel
- ④ SWD module inside control panel
- ⑤ Power feeder module in control panel
- ⑥ The control panel gland ribbon cable – SWD round cable
- ⑦ IP69K SWD I/O modules T-Connector with sensor/actuator
- ⑧ IP69K SWD I/O modules Block module with sensors/actuators
- ⑨ SWD round cable M12 with IP67 degree of protection
- ⑩ Power feeder module in distributed environment
- ⑪ IP69K SWD I/O modules Block module with external power supply unit with sensors/actuators
- ⑫ SmartWire-DT round-cable-to-ribbon-cable control panel cable gland
- ⑬ Bus terminator for control panel

Figure 7: Flexible network architecture with IP20 (control panel) and IP6x (field) degrees of protection  
Sample configuration with SWD modules used to connect sensors and actuators

# 1 Inputs/outputs module IP6x

## 1.3 Engineering

### 1.3.1 Current consumption

M12 cables are approved for a current consumption level of up to 4 A. In this case, the total current consumption level is equal to the sum of the SWD modules' current consumption level and the connected sensors'/actuators' current consumption level.

The I/O Modules IP6x draw power for their communication electronics and for the connected sensors and actuators from the SmartWire-DT 24 V network supply.



For specifications regarding the I/O Modules IP6x current consumption levels, please refer to the table in the appendix on page 213.

A voltage of 24 VDC is supplied at the M12 I/O connectors as well in order to power any connected sensors.

**NOTICE**

If the I/O Modules IP6x and the connected sensors'/actuators' current consumption exceeds 4 A, make sure to add an additional EU1S-SWD-PF1-1 module.

**Notes on block modules with an external power supply unit  
EU6E-SWD...-1, EU6E-SWD...-2 and/or EU8E-SWD...-1**

		SWD4...LR4P-S, SWD4...LR4P-R			
		PWR OUT		PWR IN	
IEC 60757		PIN		PIN	
BN	Brown	1		3	
WH	White	2		4	24 V
BU	Blue	3		1	0 V
BK	Black	4		2	

Table 1: Pinout for SWD4..LR4P-S power supply cable at PWR IN power supply connector  
The contacts for the PWR IN, PWR OUT connectors each have a current-carrying capacity of 10 A.

Two connections are used together for the power supply in order to ensure that the maximum current consumption of 16 A can be accommodated.

- ▶ Connect the appropriate conductors to the power supply unit (black, blue to +0 V; brown, white to 24 V)

**Fusing the external power supply unit**

Miniature circuit-breaker as per DIN VDE 0641 Part 11, IEC/EN 60898 or cable protection for AWG 70°C cable as per UL 2238

Miniature circuit-breaker 24 V DC rated operational current: 16 A; trip type B

Fuse 16 A, utilization category gL/gG

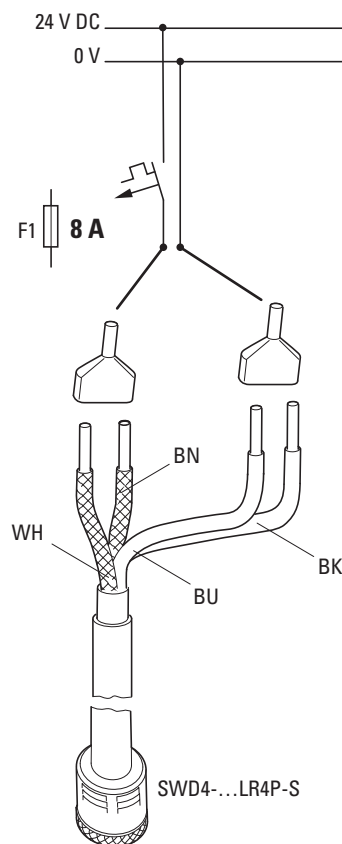


Figure 8: Connection and fusing for **SWD4...LR4P-S** SWD line

### Supply voltage for sensors and actuators

Each M12 socket not only makes it possible to connect sensors/actuators (connection to pins 2 and 4), but is also used to provide a 24-V supply voltage (connection to pins 1 and 3).

The max. permissible current draw from the 24-V supply for each M12 socket is 70 mA.

The power supply is short-circuit proof. If the module in question features outputs (digital or analog), these outputs will also be short-circuit proof and protected against overload.

In both cases, if there is an overload situation, the module will automatically switch back on once the overload situation is eliminated. Moreover, the PLC program will be notified of the overload situation via separate diagnostic messages.

In modules EU6E-SWD...-1, EU6E-SWD...-2 and/or EU8E-SWD...-1, the connected actuators are powered with the external supply voltage. In all other I/O Modules IP6x, including the connected sensors, inputs/outputs are powered via the 5-conductor SmartWire-DT round cable.

## 1 Inputs/outputs module IP6x

### 1.3 Engineering

#### Sensor current monitoring

One of the options provided by the I/O Modules IP6x parameters in the PLC configuration is monitoring the sensor power supply's current consumption level. This feature can be used in a couple of ways:



Proper termination of open I/O connectors with accessory SWD4-ACAP-10

This monitoring cap will draw a small amount of current from the 24 V sensor supply. If the cap is not screwed in place and the sensor current monitoring feature is enabled, a diagnostic message will be generated.

If a connector is configured as an output, it will only be possible to use this function as long as the output is not being driven by the user program.



Monitoring the current consumption of connected sensors/actuators

If sensors with a constant current consumption level  $> 0.5$  mA are connected, a diagnostic message will be generated for the relevant I/O connector in the event of a fault (current consumption  $< 0.5$  mA).

This message can also be used to indicate malfunctioning sensors and actuators in the user program when the current consumption level is too low.



For additional engineering information regarding the power supply, please refer to the SmartWire-DT - The System manual  
→ Page 8

and to the SWD-Assist planning and ordering software program

#### Valve control interface modules

M12 cables are approved for a current requirement of up to 4 A.

The total current requirement is calculated from the current requirement of the SmartWire-DT devices as well as the current demand of the connected sensors / actuators.



The I / O modules receive their energy for communication electronics from the 24 V SWD network supply.

The actuators / valves are supplied via the external power supply.



For specifications regarding the I/O Modules IP6x current consumption levels, please refer to the table in the appendix on page 213.

## 1.3.2 Interoperability requirements

### 1.3.2.1 SWD coordinators

The modules' interoperability is guaranteed for the following SmartWire-DT coordinator versions and higher:

Class	SWD coordinator	Baud rates of up to 250 kB		Configuration
		Firmware version	Device version	
Gateway	EU5C-SWD-CAN	1.30	03	EDS device description file
	EU5C-SWD-DP	1.30	04	GSD device description file
	EU5C-SWD-EIP-MODTCP	1.10	03	SWD Assist V2.40 or higher
	EU5C-SWD-PROFINET	1.4.4.0	–	GSDML EDS device description file
	EU5C-SWD-POWERLINK	1.0.12.0	–	SWD Assist V2.40 or higher
	EU5C-SWD-ETHERCAT	1.01	–	ESI device description file
	EU5C-SWD-SERCOS	1.03	–	SDDML device description file
control relays	EASY802-DC-SWD EASY806-DC-SWD	1.00	02	
PLC	XC-152	1.0	01	GSD device description file
HMI-PLC	XV-102,XV-152	1.0	01	GSD device description file
	XV-3x3-.....-E-...-1C	All	All	GSD device description file



If necessary, please download the latest documentation for the SmartWire-DT coordinator as a PDF document from the Download Center at <http://www.eaton.eu/doc>

### 1.3.2.2 Device description files

Depending on the specific SmartWire-DT coordinator being used, a device description file (e.g., GSD file for PROFIBUS DP, EDS file for CANopen) may be required in order to configure the SmartWire-DT network on the programming system being used.



If necessary, please download the latest device description file from the Download Center.

To find it quickly, visit

<http://www.eaton.eu> → **Customer Support** → **Download Center – Documentation** and enter the product name for the SmartWire-DT coordinator as a search term into the **Quick Search** field.

## 1 Inputs/outputs module IP6x

### 1.3 Engineering

#### 1.3.2.3 SWD-Assist

The SmartWire-DT planning and ordering program (SWD-Assist) can be extremely useful when planning and configuring a SmartWire-DT network in terms of hardware and software.

SWD Assist provides support in selecting and configuring the various SWD components and the SWD network.

The SWD-Assist planning program has the current consumption specifications for all SmartWire-DT modules. During planning, it will automatically calculate and display the corresponding system's current consumption.

The latest version, which features all currently supported SWD modules, can be downloaded by using the integrated update function in SWD-Assist or directly from the Eaton Download Center:



SWD-Assist runs on the following operating systems: Windows Vista (32 Bit), Windows 7, Windows 8 and Windows 10.



The **SWD Assist software** is available free of charge **for download** on the Eaton website at:  
They can be quickly located at

<http://www.eaton.eu> → **Customer Support** → **Download Center – Documentation** by entering "SWD-Assist" as a search term into the **Quick Search** field.

T-Connectors are supported in SWD-Assist Version V2.20 and higher; Block Modules are supported in Version V2.40 and higher.



## 1.4 Installation

### 1.4.1 mounting

#### T-Connectors

The I/O Modules IP6x EU1E-SWD... and EU2E-SWD... can be installed in a variety of ways:

- Resting in place – e.g., inside cable ducts
- With screw fixing – use 2 x M4 screws and a tightening torque < 1 Nm,
- Mounted on a DIN-rail
- Mounted on profiled busbars
- Mounted with an IEC20 (M20) installation clip

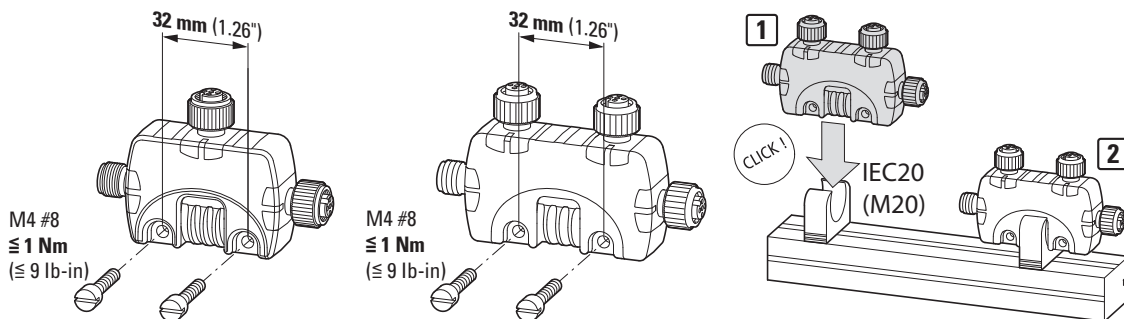


Figure 9: Mounting options

#### Block Modules

EU6E-SWD... and EU8E-SWD... I/O Modules IP6x need to be installed on an appropriate base.

- For screw fixing – use four (4) M4 screws and a tightening torque < 1.5 - 2 Nm (13-18 in-lbs)

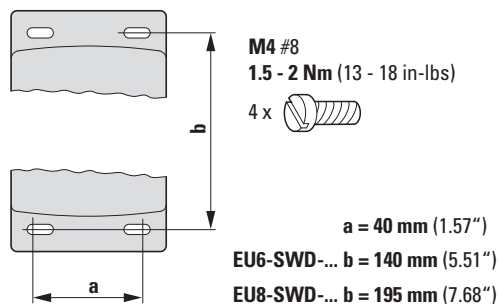


Figure 10: EU6E-SWD... and EU8E-SWD... mounting

# 1 Inputs/outputs module IP6x

## 1.4 Installation

### 1.4.2 Connection

#### SmartWire-DT connection SWD IN, SWD OUT

- ▶ Connect the five-conductor SWD round cables to the SWD IN and SWD OUT connectors. Use SWD4-...LR5-2S cables for this purpose.

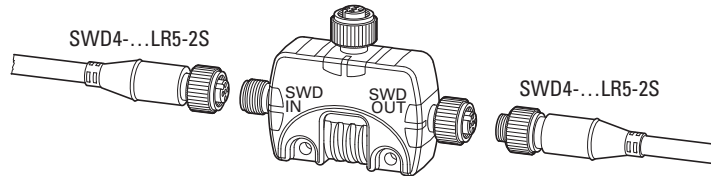


Figure 11: Connecting T-Connectors to SWD round cables

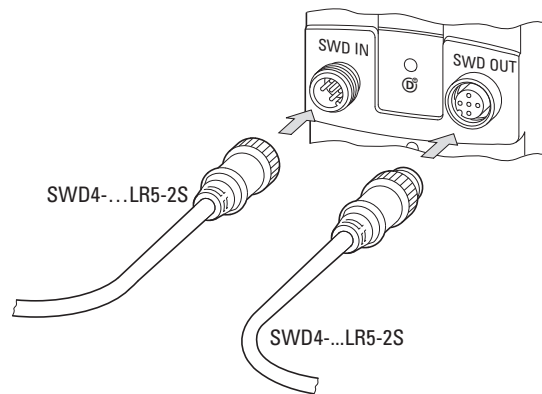
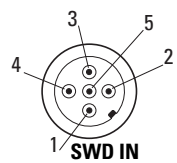
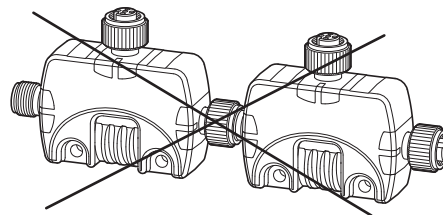
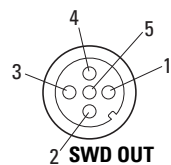


Figure 12: Connecting Block Modules to SWD round cables

Do not connect I/O Modules IP6x directly to each other. Make sure to always use the required SWD connection cables instead.



	SWD IN				
	1	2	3	4	5
EU1...-SWD-...	24 V	A	0 V	B	SEI
EU2...-SWD-...	24 V	A	0 V	B	SEI



	SWD OUT				
	1	2	3	4	5
EU1...-SWD-...	24 V	A	0 V	B	SEI
EU2...-SWD-...	24 V	A	0 V	B	SEI

Figure 13: Pin assignment SWD IN, SWD OUT

**External power supply PWR IN, PWR OUT**

When using EU6E-SWD...-1, EU6E-SWD...-2 and/or EU8E-SWD...-1 Block Modules with a separate power supply unit, you will need to connect them with four-conductor supply cables.

- ▶ Remove the caps (SWD4-PCAPP-F, SWD4-PCAPP-M).
- ▶ Connect the external power supply unit to the PWR IN connectors. To do so, use the SWD4-..LR4P-S (one (1) straight 7/8" socket and one unterminated cable end) or SWD4-..LR4P-R (one (1) angled 7/8" socket and one unterminated cable end) connection cable from the range of SmartWire-DT accessories.

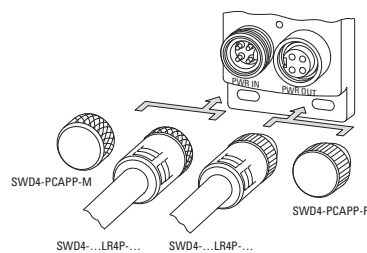


Figure 14: Connection to external power supply unit

PWR IN		SWD4-..LR4P-S IEC 60757				
	1	24 V	BN	Brown	1	
	2		WH	White	2	
	3	0 V	BU	Blue	3	
	4		BK	Black	4	

The PWR OUT connector can be used to route the power directly to the next block module.

- ▶ If you are using additional Block Modules with an external power supply unit, connect them using the PWR IN and PWR OUT connectors. To do so, use SWD4-..LR4P-2S (one (1) straight 7/8" plug and one (1) straight 7/8" socket) or SWD4-..LR4P-2R (one (1) angled 7/8" plug and one (1) angled 7/8" socket) supply cables from the range of SmartWire-DT accessories.
- ▶ If you have any unused PWR OUT or PWR IN connectors, use SWD4-PCAPP-F caps for sockets and/or SWD4-PCAPP-M caps for plugs in order to seal them off.

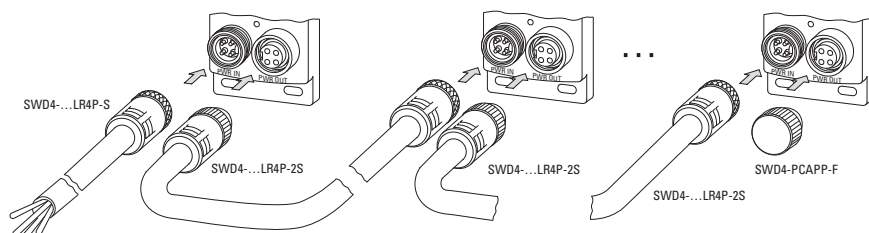


Figure 15: Connecting Block Modules with a separate power supply unit

# 1 Inputs/outputs module IP6x

## 1.4 Installation

### Sensor/actuator connection X1...Xn

- ▶ Connect the sensors/actuators by connecting the five-conductor SWD M12 round cable to connectors X1 to Xn. To do so, use prefabricated SWD4-...LR5-..-1-2S (one (1) M12 plug, one (1) M12 socket) cables or prefabricated-on-one-side SWD4-..LR5-S (one (1) M12 plug and one unterminated cable end) cables to connect the sensors/actuators directly. If you will be connecting two sensors/actuators to a single Xn connector, use an appropriate SWD4-SP-... splitter.

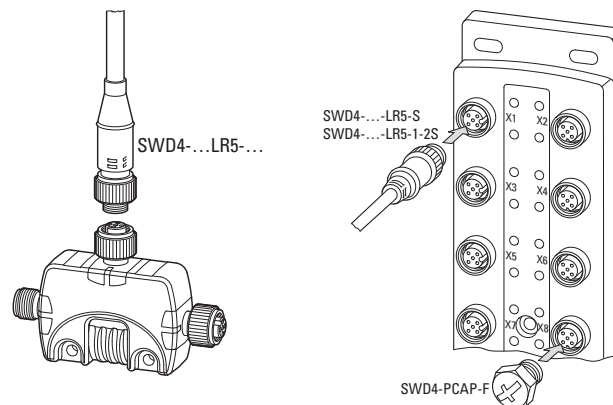


Figure 16: Sensor/actuator connection X1...Xn

- ▶ Do not seal off the connectors you are using with SWD4-PCAP-F caps in order to ensure that there is an IP69K.

### Pinout

Plug and socket	PIN	color
	1	Brown
	2	White
	3	blue
	4	black
	5	gray



The pinout for the individual I/O Modules IP6x is described in greater detail starting from chapter 2

## 1.5 Parameter definition

The SmartWire-DT I/O Modules IP6x can be configured flexibly, with the available configuration options depending on the specific part no. being used. The type of parameter configuration will vary depending on the selected SWD coordinator (gateway, PLC, etc.).

The following parameters can be used for all I/O Modules IP6x:

Table 2: Generally applicable parameters

parameter	Meaning	Default
Device must be present (Device must be present)	<p><b>Device must be present (1)</b> The SWD module must be present when the system starts and during operation. A missing SWD module causes following:</p> <ul style="list-style-type: none"> <li>• PRSNT diagnostic bit to be set to "0".</li> <li>• DIAG diagnostic bit to be set to "1".</li> <li>• The SWD line will not start running or will be stopped, as the case may be.</li> </ul> <p>Note: This device parameter will only take effect if the coordinator's "All slaves optional" device parameter is disabled, i.e., if it has a value of "Defined for each slave".</p> <p><b>Device must be present (0)</b> The SWD line will keep running even if the SWD module is missing or defective.</p>	SWD module must be present
Can be replaced with universal module (Replacement by universal module)	<p>If this setting is selected, it will be possible to replace the planned module with an EU1M-SWD-NOP universal module. For descriptions of additional device-specific parameters, please refer to the "Programming" chapter → Chapter 6, "Universal module", Page 171</p>	No



The module-specific parameters (e.g., sensor current monitoring activation) for the individual I/O Modules IP6x are described in greater detail starting from chapter 2.



For special instructions for the CANopen and EtherCAT protocols, please refer to the descriptions for the individual I/O Modules IP6x.

When using these gateways, the configuration is set up by entering the appropriate parameter values in the PLC configurator being used.

For general information on the EtherCAT fieldbus system, please refer to → Chapter 9, "Using with the EtherCAT field bus", Page 179.

## 1 Inputs/outputs module IP6x

### 1.6 Programming, diagnosis

#### 1.6 Programming, diagnosis

The input/output data available will depend on the specific module being used. To a certain extent, the available data can also be configured by selecting the appropriate data profiles.

All I/O Modules IP6x deliver a specific scope of diagnostic information. This information is found in the first input byte, at bit positions 4, 5, 7, and delivers basic information regarding the validity of the data (bit 6) or the presence of diagnostic data (bit 4). This data can then be read in detail in an additional step.

Table 3: Basic diagnostics for all modules

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present



The structure of the input/output data and the diagnostics for the individual I/O Modules IP6x are described in greater detail starting in chapter 2.

## 1.7 Commissioning

Once the power supply on the SmartWire-DT coordinator is switched on, the green SmartWire-DT diagnostic LED on the SWD modules will start flashing. Once the network has been configured successfully, the LED will show a solid light instead. The inputs' status can be checked directly on the module by looking at the corresponding status indicators. EU6E-SWD...-1, EU6E-SWD...-2 and/or EU8E-SWD...-1 Block Modules with an external power supply unit will signal the supply voltage status with the external power supply status indicator (EXT PWR LED).



For more information on how SmartWire-DT networks are configured, please refer to the "Commissioning" chapter (saving the target configuration) in the "SmartWire-DT – The System" manual and to the specific manuals for the SWD coordinators.

### 1.7.1 Exchange of modules

After replacing the I/O Modules IP6x and turning on the voltage, the target configuration in the SmartWire-DT coordinator needs to be created again.



For more information on how SmartWire-DT networks are configured, please refer to the "Commissioning" chapter (saving the target configuration) in the "SmartWire-DT – The System" manual and to the specific manuals for the SWD coordinators.

### 1.7.2 Device status

The individual SWD modules will indicate their device status with the help of the green diagnostic LED (name: SWD).

Table 4: Messages conveyed with the "SWD" SmartWire-DT diagnostic LED

Colour	State	Message
green	Continuous light	Device is operating error-free.
	flashing (1 Hz)	<ul style="list-style-type: none"> <li>• addressing process in progress               <ul style="list-style-type: none"> <li>◦ after gateway power On</li> <li>◦ after actuation of the configuration button on the gateway</li> </ul> </li> <li>• Module not in current configuration.</li> <li>• invalid type</li> </ul>
	flashing (3 Hz)	Device reports a diagnosis. (see section "Programming", subsection "Diagnostics").

# 1 Inputs/outputs module IP6x

## 1.8 Detailed descriptions

### 1.8 Detailed descriptions

The individual I/O Modules IP6x, as well as the required accessories, are described in greater detail starting in chapter 2:

Module			page
<b>Digital modules</b>			
T-Connectors	EU1E-SWD-1DX	1 digital input	→ 31
	EU1E-SWD-2DX	2 digital inputs	→ 34
	EU1E-SWD-2DD	2 configurable, digital inputs/outputs	→ 37
	EU2E-SWD-2DX	2 digital inputs	→ 42
	EU2E-SWD-4DX	4 digital inputs	→ 46
	EU2E-SWD-2DD	2 configurable, digital inputs/outputs	→ 50
	EU2E-SWD-4DD, EU2E-SWD-4DD-1	4 configurable, digital inputs/outputs	→ 55
<b>Block Modules</b>			
	EU6E-SWD-4DX	4 digital inputs	→ 61
	EU6E-SWD-8DX	8 digital inputs	→ 65
	EU6E-SWD-8DD	8 configurable digital inputs/outputs	→ 69
	EU8E-SWD-16DX	16 digital inputs	→ 99
	EU8E-SWD-16DD	16 configurable digital inputs/outputs	→ 104
	with external power supply		
	EU6E-SWD-2D2D-1, EU6E-SWD-2D2D-2	2 digital inputs / 2 digital outputs	→ 77
	EU6E-SWD-4D4D-1	4 digital inputs / 4 digital outputs 0.5A	→ 83
	EU6E-SWD-4D4D-2	4 digital inputs / 4 digital outputs 2A	
	EU6E-SWD-4XD-1	4 digital outputs 0.5A	→ 94
	EU6E-SWD-4XD-2	4 digital outputs 2A	
	EU6E-SWD-8XD-1	8 digital outputs 0.5A	→ 89
	EU8E-SWD-4D4D-1	4 digital inputs / 4 digital outputs 0.5A	→ 112
	EU8E-SWD-8XD-1	8 digital outputs 0.5A	→ 89
	EU8E-SWD-8D8D-1	8 digital inputs / 4 digital outputs 0.5A	→ 129
	EU8E-SWD-16XD-1	16 digital outputs 0.5A	→ 123
<b>Analog module</b>			
	EU1E-SWD-1AX-1	1 analog input 0-10 V	→ 135
	EU1E-SWD-1AX-2	1 analog input 0-20 mA	→ 139
	EU1E-SWD-1XA-1	1 analog output 0-10 V	→ 143
	EU1E-SWD-1XA-2	1 analog output 0-20 mA	→ 146
	EU2E-SWD-2PT	2 temperature inputs PT100, PT1000, NI1000	→ 149



# 1 Inputs/outputs module IP6x

## 1.8 Detailed descriptions

<b>Module</b>	<b>page</b>
<b>Digital modules</b>	
<b>Counter module</b>	
EU1E-SWD-1CX-1      1 counter input 30 kHz	→ 155
<b>Valve control interface modules</b>	
EU1H-SWD-1XD-1      1 valve input	→ 163
EU1H-SWD-2XD-1      2 valve input	→ 163
<b>Universal module</b>	
EU1M-SWD-NOP	→ 171
<b>Power Supply</b>	
EU1S-SWD-PF1-2      Power supplies 24V, 4 A	→ 173
<b>Accessories</b>	
EU2A-SWD-PBWN      Local SmartWire-DT branch	→ 175

## 1 Inputs/outputs module IP6x

### 1.8 Detailed descriptions

## 2 Digital modules

### 2.1 T-Connector EU1E-SWD-1DX

#### 2.1.1 Introduction

SmartWire-DT module EU1E-SWD-1DX features one digital input at Connection X1 that can be used to integrate sensors into a SmartWire-DT network. This Connection X1 also provides 24 VDC power for connected devices. The input's status is indicated with the help of an LED. Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

#### 2.1.2 Surface mounting

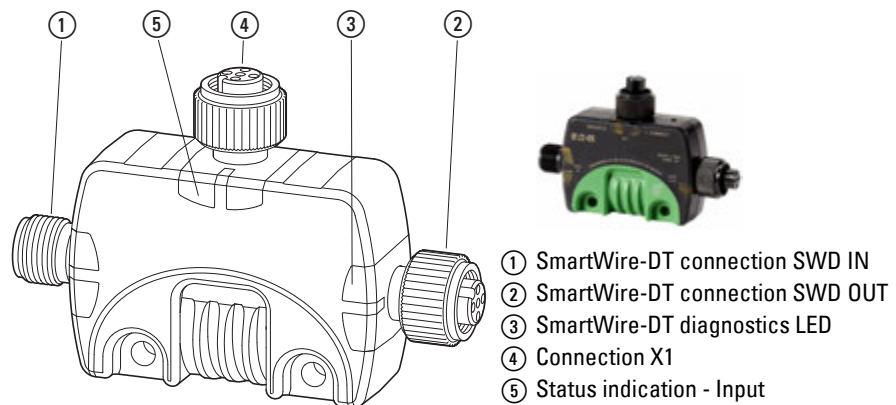


Figure 17: Connections of the module EU1E-SWD-1DX

#### 2.1.3 Engineering

##### 2.1.3.1 Plug configuration - connection X1

PIN	Configuration
1	24V
2	Not used
3	0V
4	IO
5	Not used

Technical data → Chapter 10, "Appendix", Page 185

## 2 Digital modules

### 2.1 T-Connector EU1E-SWD-1DX

#### 2.1.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at Connection X1 in order to power connected sensors.

The maximum current consumption at Connection X1 is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### 2.1.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

##### 2.1.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
Default	0	0	0	0	0	0	0	0

##### EtherCAT field bus

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
Default	0	0	0	0	0	0	0	0

## 2.1.5 Programming

### 2.1.5.1 Inputs/outputs

The module has one input byte.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	IO

Bit	designation	Meaning
0	IO	Status input 0
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

### 2.1.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Sensor power supply overload, short-circuit at Connection X1
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"

## 2 Digital modules

### 2.2 T-Connector EU1E-SWD-2DX

## 2.2 T-Connector EU1E-SWD-2DX

### 2.2.1 Introduction

SmartWire-DT module EU1E-SWD-2DX features two digital inputs at Connection X1 that can be used to integrate various sensors into a SmartWire-DT network.

This X1 connector also provides 24 VDC power for connected devices.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.2.2 Surface mounting

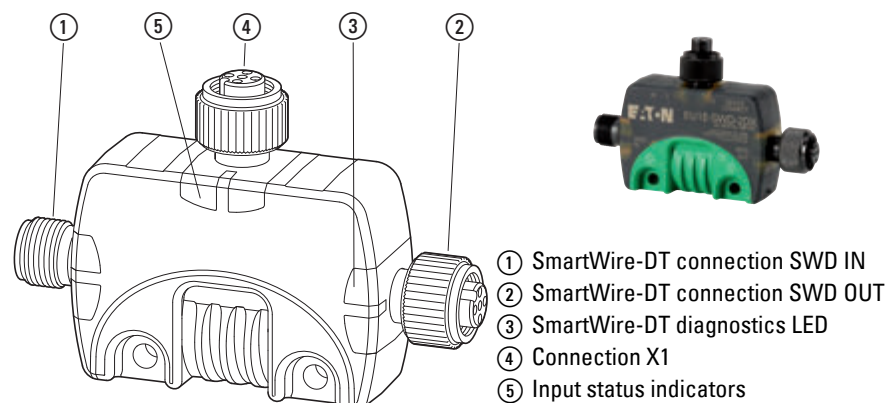


Figure 18: Connections of the module EU1E-SWD-2DX

### 2.2.3 Engineering

#### 2.2.3.1 Plug configuration - connection X1

PIN	Configuration
1	24V
2	I1
3	0V
4	I0
5	Not used

A circular diagram of the X1 connector shows five pins arranged in a circle. The pins are numbered 1 through 5. Pin 1 is at the top, pin 2 is at the top-right, pin 3 is at the bottom-right, pin 4 is at the bottom-left, and pin 5 is at the top-left.

Technical data → Chapter 10, "Appendix", Page 185

### 2.2.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at Connection X1 in order to power connected sensors.  
The maximum current is 70 mA.  
The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

### 2.2.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

#### 2.2.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
Default	0	0	0	0	0	0	0	0

##### EtherCAT field bus

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
Default	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.2 T-Connector EU1E-SWD-2DX

## 2.2.5 Programming

### 2.2.5.1 Inputs/outputs

The module has one input byte.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	I1	I0

Bit	designation	Meaning
0	I0	Status input 0
1	I1	Status input 1
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

### 2.2.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Sensor power supply overload, short-circuit at Connection X1
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"



## 2.3 T-Connector EU1E-SWD-2DD

### 2.3.1 Introduction

SmartWire-DT module EU1E-SWD-2DD features two configurable digital inputs/outputs that can be used to integrate various sensors/actuators into a SmartWire-DT network.

This Connection X1 also provides optional 24 VDC power.

The inputs'/outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.3.2 Surface mounting

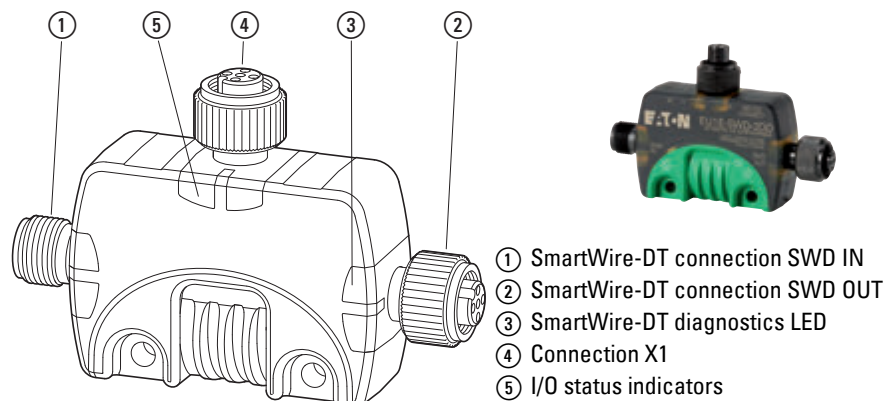


Figure 19: Connections of the module EU1E-SWD-2DD

### 2.3.3 Engineering

#### 2.3.3.1 Plug configuration - connection X1

PIN	Configuration
1	24V
2	I1/Q1
3	0V
4	I0/Q0
5	Not used

Technical data → Chapter 10, "Appendix", Page 185

## 2 Digital modules

### 2.3 T-Connector EU1E-SWD-2DD

#### 2.3.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at Connection X1 in order to power connected sensors/actuators.

The maximum current is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### 2.3.4 Data profiles, parameter configuration

The module features two data profiles that provide a varying amount of information in the cyclical data depending on the application in question.

##### Data profile selection

Profile	Input byte 0	Output byte 0	Default
Profile 1	X	–	–
Profile 2	X	X	X

If profile 2 is selected, the number of outputs and the way they are assigned to the Connection X1 can be defined in an additional step. Depending on the coordinator being used, the profile will need to be selected in the programming system or in the SWD-Assist planning and commissioning program.

Profile	Connection X1	
	PIN 4	PIN 2
Profile 1	I0	I1
Profile 2	I0	I1
The appropriate parameters need to be configured in order to define whether each pin will function as an input or output	I0	Q1
	Q0	I1
	Q0	Q1

Other device-specific parameters:

Parameter	Meaning	Default
Current monitoring at X1 connection	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Input/output configuration (profile 2 only)	–	–
Channel 1: Input 1 is an output.	Used to configure input 1 (connector X1, PIN 4) as an input or output	Input
Channel 2: Input 2 is an output.	Used to configure input 2 (connector X1, PIN 2) as an input or output	Input

### 2.3.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

#### Field bus CANopen

Profile selection: SDO object 2102subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Data profile	Value [hex]
Profile 1	0x0010
Profile 2 (default setting)	0x0030

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	Sensor current monitoring X1 0: Off 1: On	–	–	0: I/Q1 = I1 1: IQ1 = Q1	0: I/Q0 = I0 1: IQ0 = Q0
<b>Default</b>	0	0	0	0	0	0	0	0

#### EtherCAT field bus

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Sensor current monitoring, I/O selection: Device index: sub-index 22

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	Sensor current monitoring X1 0: Off 1: On	–	–	0: I/Q1 = I1 1: IQ1 = Q1	0: I/Q0 = I0 1: IQ0 = Q0
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.3 T-Connector EU1E-SWD-2DD

#### 2.3.5 Programming

##### 2.3.5.1 Inputs/outputs

The module has one input byte and one output byte.

The availability and evaluation of the inputs/outputs will depend on the data profile and the parameter configuration being used.

##### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	I1	I0

Bit	designation	Meaning
0	I0	Input 0 status (if configured as an input; otherwise 0)
1	I1	Input 1 status (if configured as an input; otherwise 0)
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

## Outputs

Byte 0 (profile 2 only):

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	–	–	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Not used	–
3	Not used	–
4	Not used	–
5	Not used	–
6	Not used	–
7	Not used	–

### 2.3.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"

## 2 Digital modules

### 2.4 T-Connector EU2E-SWD-2DX

#### 2.4 T-Connector EU2E-SWD-2DX

##### 2.4.1 Introduction

SmartWire-DT module EU2E-SWD-2DX features two digital inputs that can be used to integrate various sensors into a SmartWire-DT network. Each connector (X1 and X2) also provides 24 VDC power for connected devices.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

##### 2.4.2 Surface mounting

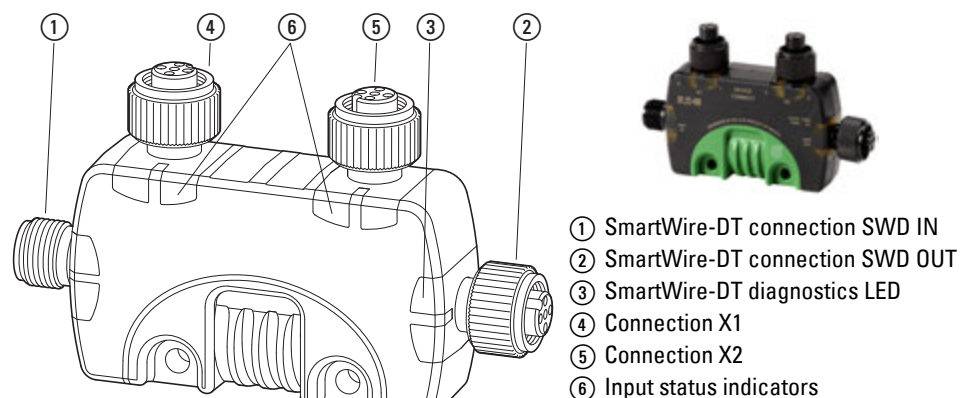


Figure 20: Connections of the module EU2E-SWD-2DX

##### 2.4.3 Engineering

###### 2.4.3.1 Pinout for connectors X1 and X2

PIN	Pinout for connector X1	Pinout for connector X2
1	24V	24V
2	Not used	Not used
3	0V	0V
4	I0	I1
5	Not used	Not used

Technical data → Chapter 10, "Appendix", Page 188

### 2.4.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

### 2.4.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Current monitoring on Connection X2	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

#### 2.4.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
Default	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.4 T-Connector EU2E-SWD-2DX

#### EtherCAT field bus

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.4.5 Programming

### 2.4.5.1 Inputs/outputs

The module has one input byte.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	I1	I0

Bit	designation	Meaning
0	I0	Status input 0
1	I1	Status input 1
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present



### 2.4.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Sensor power supply overload, short-circuit at Connection X1
0x24	Sensor power supply overload, short-circuit at Connection X2
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on"

## 2 Digital modules

### 2.5 T-Connector EU2E-SWD-4DX

## 2.5 T-Connector EU2E-SWD-4DX

### 2.5.1 Introduction

SmartWire-DT module EU2E-SWD-4DX features four digital inputs that can be used to integrate various sensors into a SmartWire-DT network. Each connector (X1 and X2) also provides 24 VDC power for connected devices.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.5.2 Surface mounting

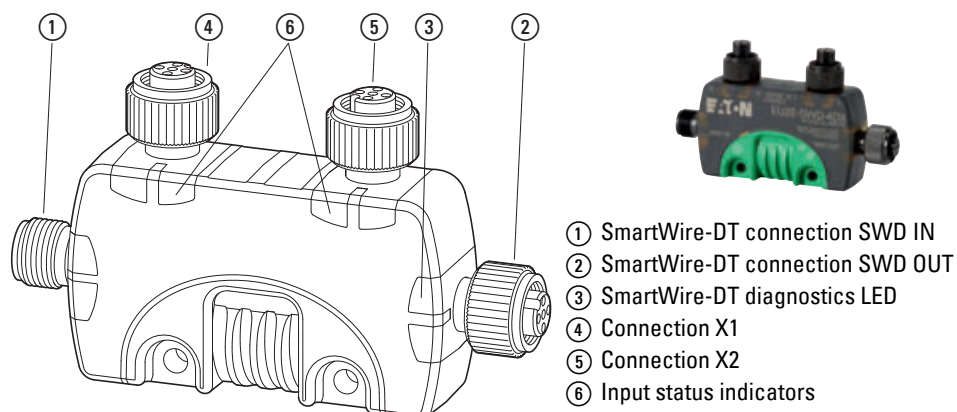


Figure 21: Connections of the module EU2E-SWD-4DX

### 2.5.3 Engineering

#### 2.5.3.1 Pinout for connectors X1 and X2

PIN	Configuration Connection X1	Configuration Connection X2
1	24V	24V
2	I1	I3
3	0V	0V
4	I0	I2
5	Not used	Not used

Technical data → Chapter 10, "Appendix", Page 188

### 2.5.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

### 2.5.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Current monitoring on Connection X2	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

#### 2.5.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
Default	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.5 T-Connector EU2E-SWD-4DX

#### EtherCAT field bus

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On	–	–	–	–
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.5.5 Programming

### 2.5.5.1 Inputs/outputs

The module has one input byte.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input 0
1	I1	Status input 1
2	I2	Status input 2
3	I3	Status input 3
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

### 2.5.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Sensor power supply overload, short-circuit at Connection X1
0x24	Sensor power supply overload, short-circuit at Connection X2
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on"

## 2 Digital modules

### 2.6 T-Connector EU2E-SWD-2DD

## 2.6 T-Connector EU2E-SWD-2DD

### 2.6.1 Introduction

SmartWire-DT module EU2E-SWD-2DD features two digital inputs/outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network. There is a separate connector available for each input/output. Each connector (X1 and X2) also provides 24 VDC power for connected devices.

The inputs'/outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.6.2 Surface mounting

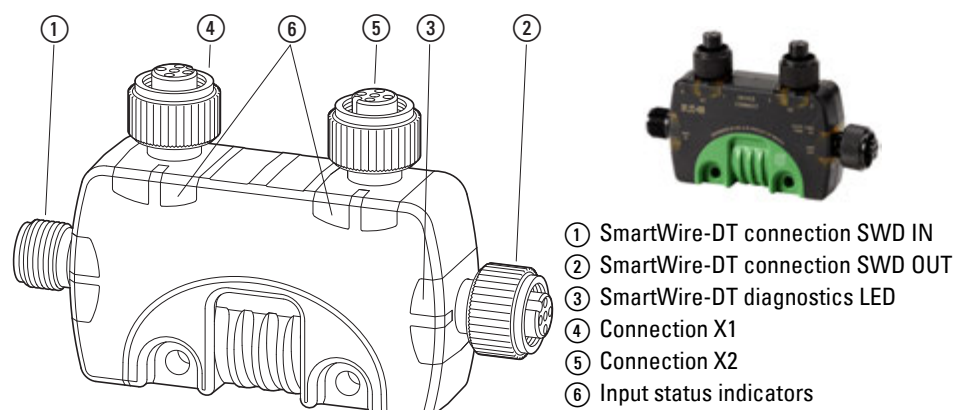


Figure 22: Connections of the module EU2E-SWD-2DD

### 2.6.3 Engineering

#### 2.6.3.1 Pinout for connectors X1 and X2

PIN	Pinout for connector X1	Pinout for connector X2
1	24V	24V
2	Not used	Not used
3	0V	0V
4	I0, Q0	I1, Q1
5	Not used	Not used

Technical data → Chapter 10, "Appendix", Page 188

### 2.6.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

### 2.6.4 Data profiles, parameter configuration

#### Data profile selection

Profile	Input byte 0	Output byte 0	Default
Profile 1	X	–	–
Profile 2	X	X	X

If data profile 2 is selected, the number of outputs and the way they are assigned to the connector can be defined in an additional step. Depending on the coordinator being used, the profile will need to be selected in the programming system or in the SWD-Assist planning and commissioning program.

Profile	Connection X1		Connection X2	
	PIN 4	PIN 2	PIN 4	PIN 2
Profile 1	I0	–	I1	–
Profile 2 (The appropriate parameters need to be configured in order to define whether each pin will function as an input or output.)	I0	–	I1	–
	I0	–	Q1	–
	Q0	–	I1	–
	Q0	–	Q1	–

Additional device-specific parameters:

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Current monitoring on Connection X2	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Channel 1: Input 1 is an output Default setting: Input	Used to configure input 1 (connector X1, PIN 4) as an input or output	Input
Channel 2: Input 2 is an output Default setting: Input	Used to configure input 2 (connector X2, PIN 4) as an input or output	Input

## 2 Digital modules

### 2.6 T-Connector EU2E-SWD-2DD

#### 2.6.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Profile selection: SDO object 2102subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Data profile	Value [hex]
Profile 1	0x0010
Profile 2 (default setting)	0x0030

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	Sensor current monitoring X1  0: Off 1: On	–	–	0: I/Q1 = I1 1: IQ1 = Q1	0: I/Q0 = I0 1: IQ0 = Q0
Default	0	0	0	0	0	0	0	0

##### EtherCAT field bus

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	Sensor current monitoring X1  0: Off 1: On	–	–	0: I/Q1 = I1 1: IQ1 = Q1	0: I/Q0 = I0 1: IQ0 = Q0
Default	0	0	0	0	0	0	0	0



## 2.6.5 Programming

### 2.6.5.1 Inputs/outputs

The module has one input byte and one output byte.  
The availability and evaluation of the inputs/outputs will depend on the data profile and the parameter configuration being used.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	I1	I0

Bit	designation	Meaning
0	I0	Input 0 status (if configured as an input; otherwise 0)
1	I1	Input 1 status (if configured as an input; otherwise 0)
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

#### Outputs

Byte 0 (profile 2 only):

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	–	–	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Not used	–
3	Not used	–
4	Not used	–
5	Not used	–
6	Not used	–
7	Not used	–

## 2 Digital modules

### 2.6 T-Connector EU2E-SWD-2DD

#### 2.6.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2



#### Diagnostic alarm 0x23, 0x24

If outputs have been configured, they will all be switched off.

Value [hex]	Meaning
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on"



#### Diagnostic alarm 0x1B, 0x1C

Using this function when outputs have been configured only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2.7 T-Connectors EU2E-SWD-4DD and EU2E-SWD-4DD-1

### 2.7.1 Introduction

SmartWire-DT modules EU2E-SWD-4DD and EU2E-SWD-4DD-1 feature four digital inputs/outputs that can be used to integrate various sensors into a SmartWire-DT network.

Each connector (X1 and X2) also provides 24 VDC power for connected devices.

The two modules are different from each other in terms of the pinouts for Connection X1 and Connection X2.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.7.2 Surface mounting

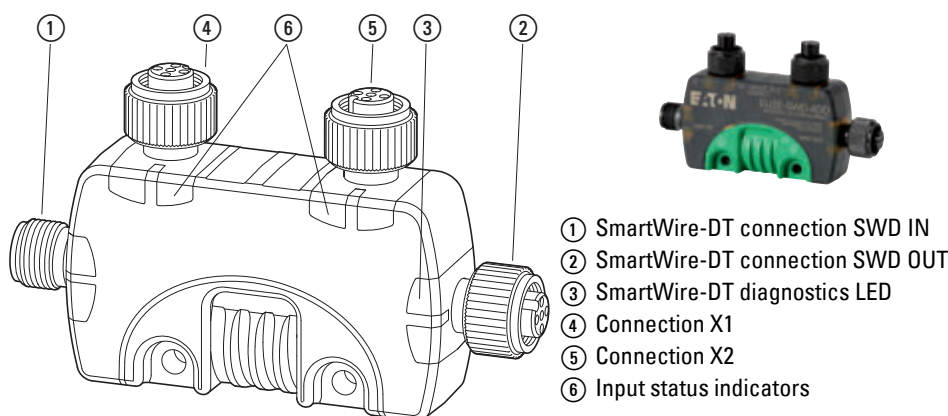


Figure 23: EU2E-SWD-4DD and EU2E-SWD-4DD-1 module connectors

### 2.7.3 Engineering

#### 2.7.3.1 Pinout for connectors X1 and X2

PIN	EU2E-SWD-4DD		EU2E-SWD-4DD-1	
	Configuration Connection X1	Configuration Connection X2	Configuration Connection X1	Configuration Connection X2
1	24V	24V	24V	24v
2	I1, Q1	I3, Q3	Not used	I3, Q3
3	0V	0V	0V	0V
4	I0, Q0	I2, Q2	I0, Q0	I2, Q2
5	Not used	Not used	Not used	I1, Q1

Technical data → Chapter 10, "Appendix", Page 188

## 2 Digital modules

### 2.7 T-Connectors EU2E-SWD-4DD and EU2E-SWD-4DD-1

#### 2.7.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### 2.7.4 Data profiles, parameter configuration

##### Data profile selection

Profile	Input byte 0	Output byte 0	Default
Profile 1	X	–	–
Profile 2	X	X	X

If data profile 2 is selected, the number of outputs and the way they are assigned to the connector can be defined in an additional step. Depending on the coordinator being used, the profile will need to be selected in the programming system or in the SWD-Assist planning and commissioning program.

##### EU2E-SWD-4DD

Profile	Connection X11		Connection X2	
	PIN 4	PIN 2	PIN 4	PIN 2
Profile 1	I0	I1	I2	I3
Profile 2 (The appropriate parameters need to be configured in order to define whether each pin will function as an input or output.)	I0	I1	I2	I3
	I0	I1	I2	Q3
	I0	I1	Q2	I3
	I0	I1	Q2	Q3
	I0	Q1	I2	I3
	I0	Q1	I2	Q3
	I0	Q1	Q2	I3
	I0	Q1	Q2	Q3
	Q0	I1	I2	I3
	Q0	I1	I2	Q3
	Q0	I1	Q2	I3
	Q0	I1	Q2	Q3
	Q0	Q1	I2	I3
	Q0	Q1	I2	Q3
	Q0	Q1	Q2	I3
	Q0	Q1	Q2	Q3

**EU2E-SWD-4DD-1**

Profile	Connection X1	Connection X2		
	PIN 4	PIN 5	PIN 4	PIN 2
Profile 1	I0	I1	I2	I3
Profile 2 (The appropriate parameters need to be configured in order to define whether each pin will function as an input or output.)	I0	I1	I2	I3
	I0	I1	I2	Q3
	I0	I1	Q2	I3
	I0	I1	Q2	Q3
	I0	Q1	I2	I3
	I0	Q1	I2	Q3
	I0	Q1	Q2	I3
	I0	Q1	Q2	Q3
	Q0	I1	I2	I3
	Q0	I1	I2	Q3
	Q0	I1	Q2	I3
	Q0	I1	Q2	Q3
	Q0	Q1	I2	I3
	Q0	Q1	I2	Q3
	Q0	Q1	Q2	I3
	Q0	Q1	Q2	Q3

Other device-specific parameters:

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Current monitoring on Connection X2	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off
Channel 1: Input 1 is an output.	Used to configure input 1 (connector X1, PIN 4) as an input or output	Input
Channel 2: Input 2 is an output.	Used to configure input 2 (connector X1, PIN 2 or X2, PIN 5) as an input or output	Input
Channel 3: Input 3 is an output.	Used to configure input 3 (connector X2, PIN 4) as an input or output	Input
Channel 4: Input 4 is an output.	Used to configure input 4 (connector X2, PIN 2) as an input or output	Input

## 2 Digital modules

### 2.7 T-Connectors EU2E-SWD-4DD and EU2E-SWD-4DD-1

#### 2.7.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Profile selection: SDO object 2102subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Data profile	Value [hex]
Profile 1	0x0010
Profile 2 (default setting)	0x0030

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On	0: I/Q3 = I3 1: IQ3 = Q3	0: I/Q2 = I2 1: IQ2 = Q2	0: I/Q1 = I1 1: IQ1 = Q1	0: I/Q0 = I0 1: IQ0 = Q0
<b>Default</b>	0	0	0	0	0	0	0	0

##### EtherCAT field bus

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On	0: I/Q3 = I3 1: IQ3 = Q3	0: I/Q2 = I2 1: IQ2 = Q2	0: I/Q1 = I1 1: IQ1 = Q1	0: I/Q0 = I0 1: IQ0 = Q0
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.7.5 Programming

### 2.7.5.1 Inputs/outputs

The module has one input byte and one output byte.

The availability and evaluation of the inputs/outputs will depend on the data profile and the parameter configuration being used.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Input 0 status (if configured as an input; otherwise 0)
1	I1	Input 1 status (if configured as an input; otherwise 0)
2	I2	Input 2 status (if configured as an input; otherwise 0)
3	I3	Input 3 status (if configured as an input; otherwise 0)
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

#### Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	Q3	Q2	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	Not used	–
5	Not used	–
6	Not used	–
7	Not used	–

## 2 Digital modules

### 2.7 T-Connectors EU2E-SWD-4DD and EU2E-SWD-4DD-1

#### 2.7.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2

Value [hex]	Meaning
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on"



#### **Diagnostic alarm 0x23, 0x24**

If outputs have been configured, they will all be switched off.



#### **Diagnostic alarm 0x1B, 0x1C**

Using this function when outputs have been configured only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.



## 2.8 Block module EU6E-SWD-4DX

### 2.8.1 Introduction

SmartWire-DT module EU6E-SWD-4DX features four digital inputs that can be used to integrate various sensors into a SmartWire-DT network. Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.8.2 Surface mounting

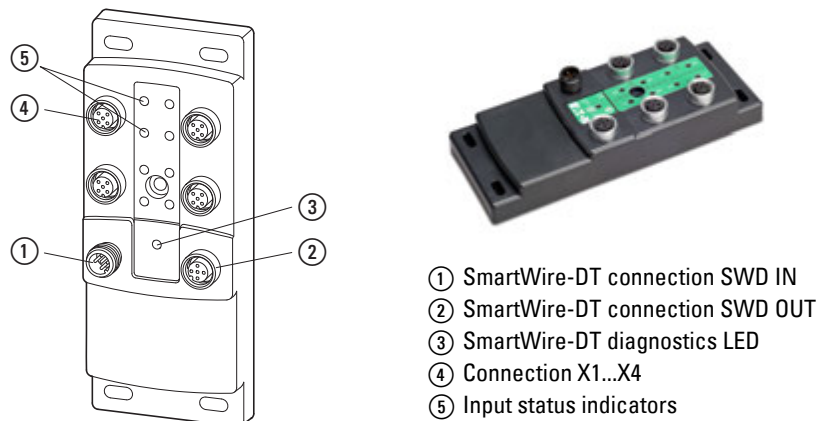


Figure 24: Connections of the module EU6E-SWD-4DX

### 2.8.3 Projection

#### 2.8.3.1 Plug configuration for connectors X1 ... X4

PIN	Configuration Connection X1	Configuration Connection X2	Pinout for connector X3	Pinout for connector X4
1	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
2	Not used	Not used	Not used	Not used
3	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
4	I0	I1	I2	I3
5	Not used	Not used	Not used	Not used

Technical data → Chapter 10, "Appendix", Page 193

## 2 Digital modules

### 2.8 Block module EU6E-SWD-4DX

#### 2.8.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

Power is drawn from the SmartWire-DT round cable.

#### 2.8.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.8.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

The parameter data structure is described below.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
Default	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.8.5 Programming

### 2.8.5.1 Inputs/outputs

The module has two input bytes at its disposal.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

## 2 Digital modules

### 2.8 Block module EU6E-SWD-4DX

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation					I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	–	
5	–	
6	–	
7	–	

#### 2.8.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4

## 2.9 Block module EU6E-SWD-8DX

### 2.9.1 Introduction

SmartWire-DT module EU6E-SWD-8DX features eight digital inputs that can be used to integrate various sensors into a SmartWire-DT network. Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.9.2 Surface mounting

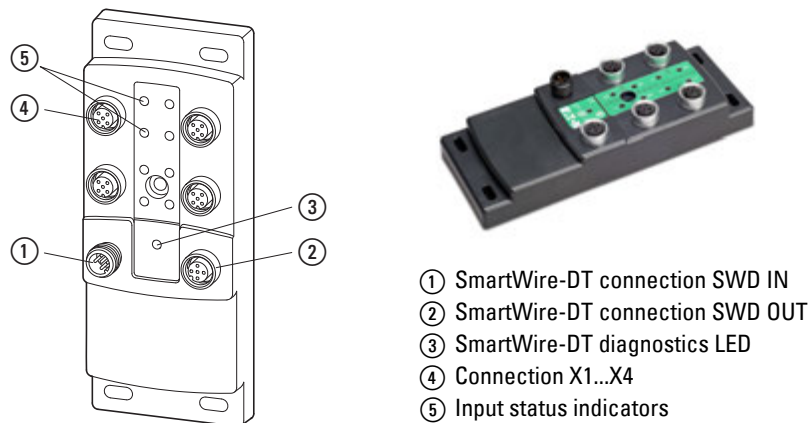


Figure 25: Connections of the module EU6E-SWD-8DX

### 2.9.3 Projection

#### 2.9.3.1 Plug configuration for connectors X1 ... X4

PIN	Configuration Connection X1	Configuration Connection X2	Configuration Connection X3	Configuration Connection X4
1	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
2	I1	I3	I5	I7
3	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
4	I0	I2	I4	I6
5	Not used	Not used	Not used	Not used

Technical data → Chapter 10, "Appendix", Page 193

## 2 Digital modules

### 2.9 Block module EU6E-SWD-8DX

#### 2.9.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

Power is drawn from the SmartWire-DT round cable.

#### 2.9.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.9.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

The parameter data structure is described below.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1:Sensor current monitoringg

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
Default	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.9.5 Programming

### 2.9.5.1 Inputs/outputs

The module has two input bytes at its disposal.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

## 2 Digital modules

### 2.9 Block module EU6E-SWD-8DX

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	I7	I6	I5	I4	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	I4	Status input I4
5	I5	Status input I5
6	I6	Status input I6
7	I7	Status input I7

#### 2.9.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on"
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on"
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on"
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4



## 2.10 Block module EU6E-SWD-8DD

### 2.10.1 Introduction

SmartWire-DT module EU6E-SWD-8DD features eight configurable digital inputs/outputs that can be used to integrate various sensors into a SmartWire-DT network.

Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The inputs'/outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.10.2 Surface mounting

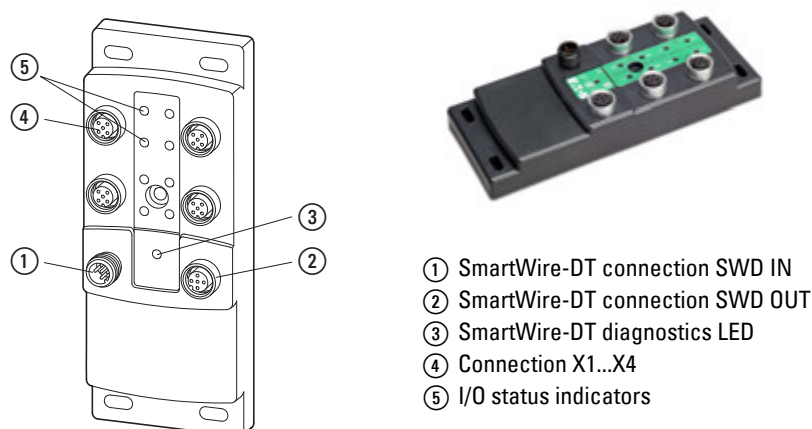


Figure 26: Connections of the module EU6E-SWD-8DD

### 2.10.3 Projection

#### 2.10.3.1 Plug configuration for connectors X1 ... X4

PIN		Configuration Connection X1	Configuration Connection X2	Configuration Connection X3	Pinout for connector X4
	1	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
	2	I1/Q1	I3/Q3	I5/Q5	I7/Q7
	3	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
	4	I0/Q0	I2/Q2	I4/Q4	I6/Q6
	5	Not used	Not used	Not used	Not used

Technical data → Chapter 10, "Appendix", Page 193

## 2 Digital modules

### 2.10 Block module EU6E-SWD-8DD

#### 2.10.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

Power is drawn from the SmartWire-DT round cable.

#### 2.10.4 Data profiles, parameter configuration

##### Data profile selection

The provided input/output information can be adjusted in line with current needs by selecting an appropriate data profile. The following overview shows the options available:

Profile	Input byte 0 (status)	Input byte 1 (I0-I7)	Output byte 0 (O0-O7)	Notes
Profile 1	X	X	–	Inputs only
Profile 2	X	–	X	If this profile is selected, all inputs must be configured as outputs
Profile 3 (Default)	X	X	X	If this profile is selected, the function (input / output) can be configured as necessary

### Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off
Channel 1: Input 1 is an output	Used to configure input 1 (connector X1, PIN 4) as an input or output	input
Channel 2: Input 2 is an output	Used to configure input 2 (connector X1, PIN 2) as an input or output	input
Channel 3: Input 3 is an output	Used to configure input 3 (connector X2, PIN 4) as an input or output	input
Channel 4: Input 4 is an output	Used to configure input 4 (connector X2, PIN 2) as an input or output	input
Channel 5: Input 5 is an output	Used to configure input 5 (connector X3, PIN 4) as an input or output	input
Channel 6: Input 6 is an output	Used to configure input 6 (connector X3, PIN 2) as an input or output	input
Channel 7: Input 7 is an output	Used to configure input 7 (connector X4, PIN 4) as an input or output	input
Channel 8: Input 8 is an output	Used to configure input 8 (connector X4, PIN 2) as an input or output	input

## 2 Digital modules

### 2.10 Block module EU6E-SWD-8DD

#### 2.10.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Profile selection: SDO object 2102subx (x = parameter index)  
(x = position of module within the SmartWire-DT network, with the range being 1 - 99)

Data profile	Value [hex]
Profile 1	0x00000091
Profile 2	0x00000030
Profile 3 (default setting)	0x00002091

SDO object 2110subx (x = parameter index)

Parameter byte 1: Input/output configuration

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	0: I7 1: Q7	0: I6 1: Q6	0: I5 1: Q5	0: I4 1: Q4	0: I3 1: Q3	0: I2 1: Q2	0: I1 1: Q1	0: I0 1: Q0
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 2: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Input/output configuration

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	0: I7 1: Q7	0: I6 1: Q6	0: I5 1: Q5	0: I4 1: Q4	0: I3 1: Q3	0: I2 1: Q2	0: I1 1: Q1	0: I0 1: Q0
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 2: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.10 Block module EU6E-SWD-8DD

#### 2.10.5 Programming

##### 2.10.5.1 Inputs/outputs

Depending on the selected profile, the configurable module will feature up to two input bytes and one output byte.

##### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Byte 1: Data profile 1 and 3

Bit	7	6	5	4	3	2	1	0
designation	I7	I6	I5	I4	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Input I0 status (if configured as an input, otherwise 0)
1	I1	Input I1 status (if configured as an input, otherwise 0)
2	I2	Input I2 status (if configured as an input, otherwise 0)
3	I3	Input I3 status (if configured as an input, otherwise 0)
4	I4	Input I4 status (if configured as an input, otherwise 0)
5	I5	Input I5 status (if configured as an input, otherwise 0)
6	I6	Input I6 status (if configured as an input, otherwise 0)
7	I7	Input I7 status (if configured as an input, otherwise 0)

## Outputs

Byte 0: Data profile 2 and 3

Bit	7	6	5	4	3	2	1	0
designation	Q7	Q6	Q5	Q4	Q3	Q2	Q 1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0 (if configured as output)
1	Q 1	Actuation output Q1 (if configured as output)
2	Q2	Actuation output Q2 (if configured as output)
3	Q3	Actuation output Q3 (if configured as output)
4	Q4	Actuation output Q4 (if configured as output)
5	Q5	Actuation output Q5 (if configured as output)
6	Q6	Actuation output Q6 (if configured as output)
7	Q7	Actuation output Q7 (if configured as output)

## 2 Digital modules

### 2.10 Block module EU6E-SWD-8DD

#### 2.10.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on"
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on"
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on"
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26**

If outputs have been configured, they will all be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E**

Using this function when outputs have been configured only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.



### 2.1.1 Block module EU6E-SWD-2D2D-1 and EU6E-SWD-2D2D-2

SmartWire-DT modules EU6E-SWD-2D2D-1 and EU6E-SWD-2D2D-2 feature two digital inputs and two digital outputs that can be used to integrate various sensors into a SmartWire-DT network.

Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The two modules are different from each other in terms of the outputs' current carrying capacity:

- EU6E-SWD-2D2D-1 to 0.5A per output
- EU6E-SWD-2D2D-2 to 2A per output

The inputs'/outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

#### 2.1.1.1 Surface mounting

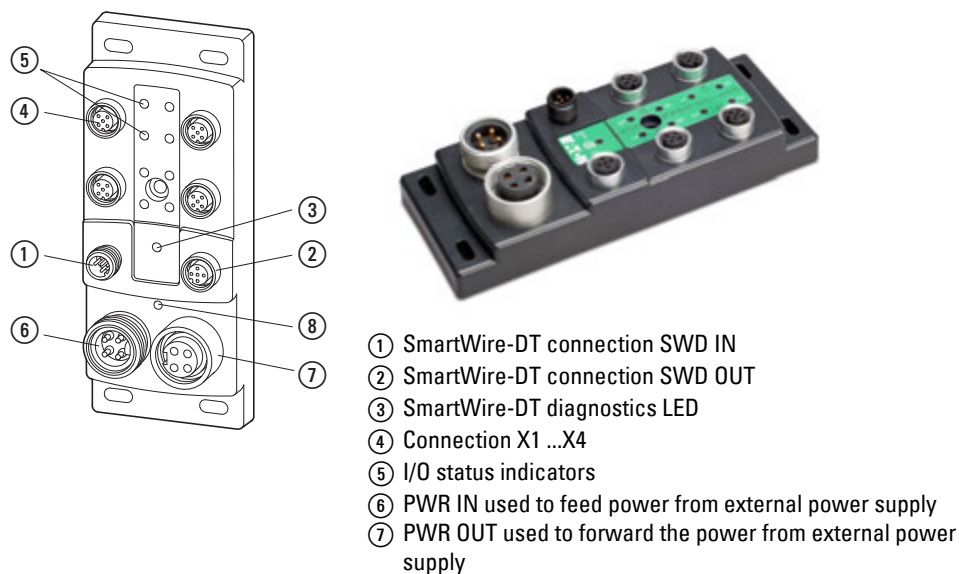


Figure 27: Connectors of modules EU6E-SWD-2D2D-1 and EU6E-SWD-2D2D-2 with an external power supply unit

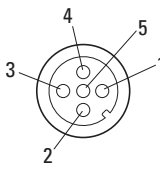
## 2 Digital modules

### 2.1.1 Block module EU6E-SWD-2D2D-1 and EU6E-SWD-2D2D-2

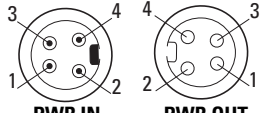
## 2.11.2 Projection

### 2.11.2.1 Connector assignment

#### Connections X1 ... X4

PIN		Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4
	1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
	2	Not used	Not used	Not used	Not used
	3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
	4	Q0	Q 1	I0	I1
	5	Not used	Not used	Not used	Not used

#### Connections PWR IN, PWR OUT

PIN		Pinout Connector PWR IN, PWR OUT
	1	24V <sub>ext</sub>
	2	24V <sub>ext</sub>
	3	0V <sub>ext</sub>
	4	0V <sub>ext</sub>

EU6E-SWD-2D2D-1

Technical data → Chapter 10, "Appendix", Page 195

EU6E-SWD-2D2D-2

Technical data → Chapter 10, "Appendix", Page 195

### 2.11.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each X<sub>n</sub> connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### Connector X3 and X4 digital inputs

Power is drawn from the SmartWire-DT round cable.

#### Connector X1 and X2 digital outputs

Power is drawn from the PWR IN external power supply.



If the external power at PWR IN is switched off, the digital inputs will continue to work, since they are powered via the SmartWire-DT power supply.

### 2.11.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.11.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.1.1 Block module EU6E-SWD-2D2D-1 and EU6E-SWD-2D2D-2

## 2.11.4 Programming

### 2.11.4.1 Inputs/outputs

The module has two input bytes and one output byte at its disposal.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	–	–	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	–	
3	–	
4	–	
5	–	
6	–	
7	–	

**Outputs**

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	–	–	Q 1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q 1	Actuation output Q1
2	–	
3	–	
4	–	
5	–	
6	–	
7	–	

## 2 Digital modules

### 2.1.1 Block module EU6E-SWD-2D2D-1 and EU6E-SWD-2D2D-2

#### 2.11.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

### 2.12 Block modules EU6E-SWD-4D4D-1 and EU6E-SWD-4D4D-2

SmartWire-DT modules EU6E-SWD-4D4D-1 and EU6E-SWD-4D4D-2 feature four digital inputs and four digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The two modules are different from each other in terms of the outputs' current carrying capacity:

- EU6E-SWD-4D4D-1 to 0.5A per output
- EU6E-SWD-4D4D-2 to 2A per output

The inputs'/outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

#### 2.12.1 Surface mounting

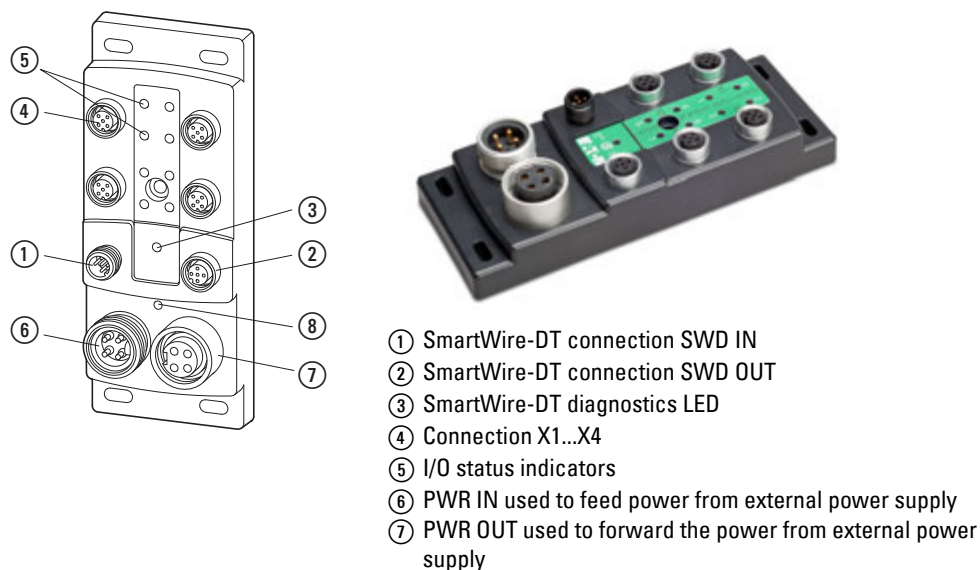


Figure 28: Connectors of modules EU6E-SWD-4D4D-1 and EU6E-SWD-4D4D-2 with an external power supply unit

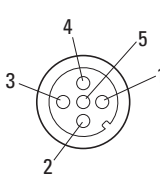
## 2 Digital modules

### 2.12 Block modules EU6E-SWD-4D4D-1 and EU6E-SWD-4D4D-2

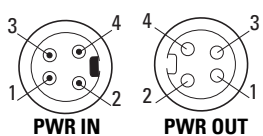
## 2.12.2 Projection

### 2.12.2.1 Connector assignment

#### Connections X1 ... X4

PIN		Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4
	1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
	2	Q 1	Q3	I1	I3
	3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
	4	Q0	Q2	I0	I2
	5	Not used	Not used	Not used	Not used

#### Connections PWR IN, PWR OUT

PIN		Pinout Connector PWR IN, PWR OUT
	1	24V <sub>ext</sub>
	2	24V <sub>ext</sub>
	3	0V <sub>ext</sub>
	4	0V <sub>ext</sub>

EU6E-SWD-4D4D-1

Technical data → Chapter 10, "Appendix", Page 195

EU6E-SWD-4D4D-2

Technical data → Chapter 10, "Appendix", Page 197

### 2.12.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each X<sub>n</sub> connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### Connector X3 and X4 digital inputs

Power is drawn from the SmartWire-DT round cable.

#### Connector X1 and X2 digital outputs

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.





If the external power at PWR IN is switched off, the digital inputs will continue to work, since they are powered via the SmartWire-DT power supply.

### 2.12.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.12.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.12 Block modules EU6E-SWD-4D4D-1 and EU6E-SWD-4D4D-2

#### 2.12.4 Programming

##### 2.12.4.1 Inputs/outputs

The module has two input bytes and one output byte at its disposal.

##### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	–	
5	–	
6	–	
7	–	

**Outputs**

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	Q3	Q2	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	–	
5	–	
6	–	
7	–	

## 2 Digital modules

### 2.12 Block modules EU6E-SWD-4D4D-1 and EU6E-SWD-4D4D-2

#### 2.12.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 monitoring covering cap is not connected.

### 2.13 Block module EU6E-SWD-8XD-1

SmartWire-DT module EU6E-SWD-8XD-1 features eight digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

#### 2.13.1 Surface mounting

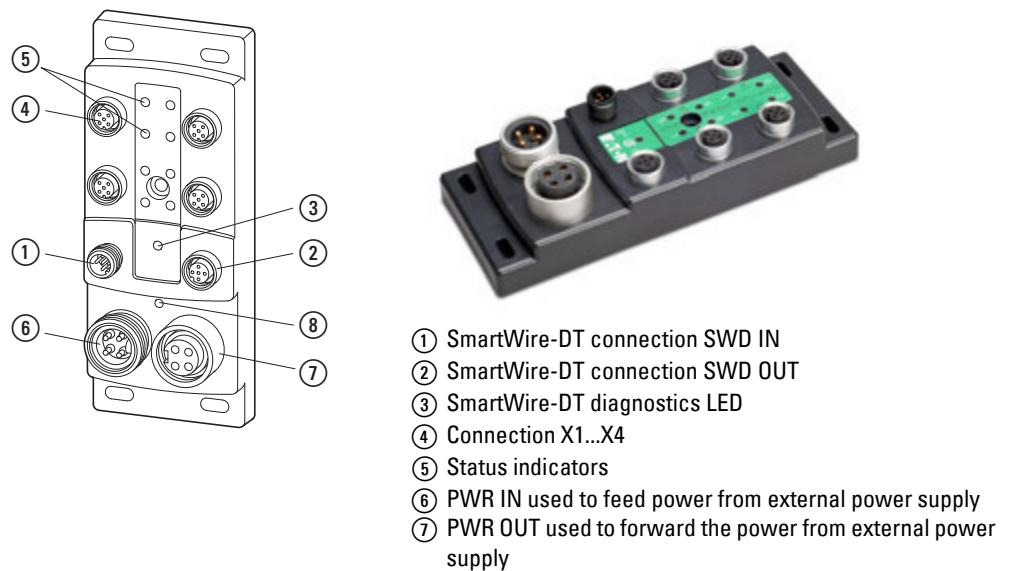


Figure 29: Connectors of module EU6E-SWD-8XD-1 with an external power supply unit

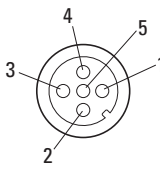
## 2 Digital modules

### 2.13 Block module EU6E-SWD-8XD-1

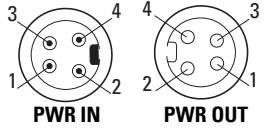
## 2.13.2 Projection

### 2.13.2.1 Connector assignment

#### Connections X1 ... X4

PIN		Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4
	1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>
	2	Q 1	Q3	Q5	Q7
	3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>
	4	Q0	Q2	Q4	Q6
	5	Not used	Not used	Not used	Not used

#### Connections PWR IN, PWR OUT

PIN		Pinout Connector PWR IN, PWR OUT
	1	24V <sub>ext</sub>
	2	24V <sub>ext</sub>
	3	0V <sub>ext</sub>
	4	0V <sub>ext</sub>

Technical data → Chapter 10, "Appendix", Page 199

### 2.13.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each X<sub>n</sub> connector in order to power connected actuators.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### Connector X1 to X4 digital outputs

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.

### 2.13.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.13.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.13 Block module EU6E-SWD-8XD-1

#### 2.13.4 Programming

##### 2.13.4.1 Inputs/outputs

The module has one input byte and one output byte.

###### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

###### Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	Q7	Q6	Q5	Q4	Q3	Q2	Q 1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q 1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	Q4	Actuation output Q4
5	Q5	Actuation output Q5
6	Q6	Actuation output Q6
7	Q7	Actuation output Q7



### 2.13.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2 Digital modules

### 2.14 Block modules EU6E-SWD-4XD-1 and EU6E-SWD-4XD-2

#### 2.14 Block modules EU6E-SWD-4XD-1 and EU6E-SWD-4XD-2

SmartWire-DT modules EU6E-SWD-4XD-1 and EU6E-SWD-4XD-2 feature four digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X4) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The two modules are different from each other in terms of the outputs' current carrying capacity:

- EU6E-SWD-4XD-1 to 0.5A per output
- EU6E-SWD-4XD-2 to 2A per output

The outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

#### 2.14.1 Surface mounting

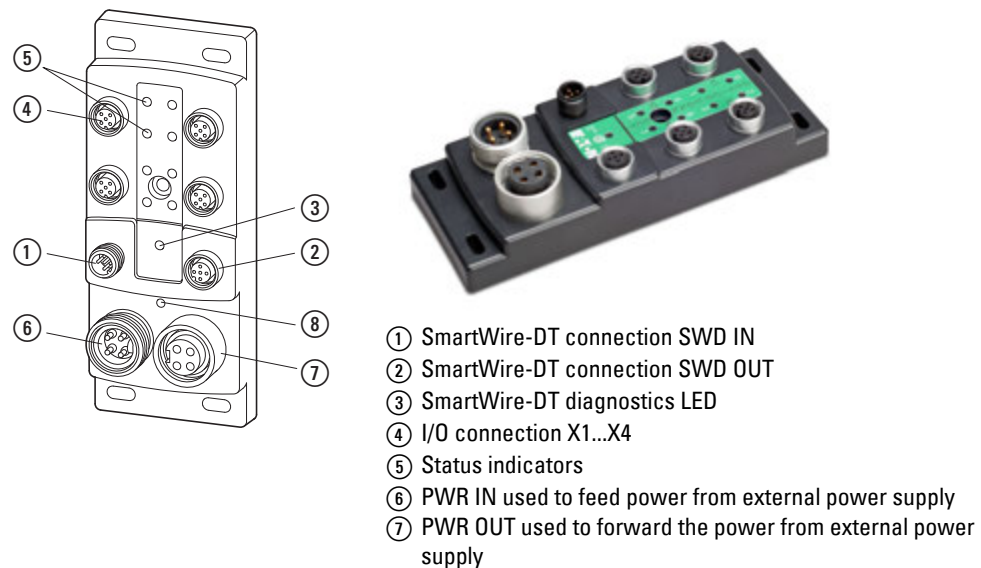
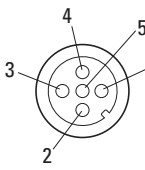


Figure 30: Connectors of modules EU6E-SWD-4XD-1 and EU6E-SWD-4XD-2 with an external power supply unit

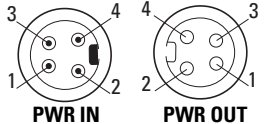
## 2.14.2 Projection

### 2.14.2.1 Connector assignment

#### Connections X1 ... X4

PIN		Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4
	1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>
	2	Not used	Not used	Not used	Not used
	3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>
	4	Q0	Q1	Q2	Q3
	5	Not used	Not used	Not used	Not used

#### Connections PWR IN, PWR OUT

PIN		Pinout Connector PWR IN, PWR OUT
	1	24V <sub>ext</sub>
	2	24V <sub>ext</sub>
	3	0V <sub>ext</sub>
	4	0V <sub>ext</sub>

EU6E-SWD-4XD-1

Technical data → Chapter 10, "Appendix", Page 195

EU6E-SWD-4XD-2

Technical data → Chapter 10, "Appendix", Page 197

### 2.14.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each X<sub>n</sub> connector in order to power connected actuators.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### Connector X1 to X4 digital outputs

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.

## 2 Digital modules

### 2.14 Block modules EU6E-SWD-4XD-1 and EU6E-SWD-4XD-2

#### 2.14.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.14.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
Default	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
Meaning	–	–	–	–	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
Default	0	0	0	0	0	0	0	0

## 2.14.4 Programming

### 2.14.4.1 Inputs/outputs

The module has one input byte and one output byte.

**Input points**

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

**Outputs**

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	Q3	Q2	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	–	
5	–	
6	–	
7	–	

**2.14.4.2 Diagnostics**

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

## 2 Digital modules

### 2.14 Block modules EU6E-SWD-4XD-1 and EU6E-SWD-4XD-2

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2.15 Block module EU8E-SWD-16DX

### 2.15.1 Introduction

SmartWire-DT module EU8E-SWD-16DX features sixteen digital inputs that can be used to integrate various sensors into a SmartWire-DT network. Each connector (X1 to X8) also provides 24 VDC power for connected devices.

The inputs' status is indicated with the help of LEDs. Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.15.2 Surface mounting

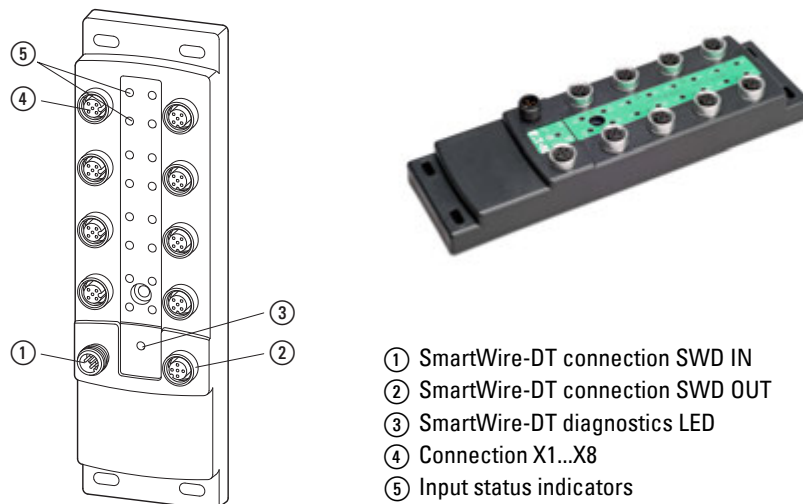
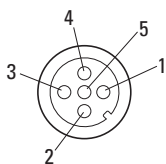


Figure 31: Connections of the module EU8E-SWD-16DX

### 2.15.3 Projection

#### 2.15.3.1 Plug configuration for connectors X1 ... X8

PIN	Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4	Pinout for connector X5	Pinout for connector X6	Pinout for connector X7	Pinout for connector X8
1	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
2	I1	I3	I5	I7	I9	I11	I13	I15
3	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
4	I0	I2	I4	I6	I8	I10	I12	I14
5	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used



Technical data → Chapter 10, "Appendix", Page 199

## 2 Digital modules

### 2.15 Block module EU8E-SWD-16DX

#### 2.15.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

Power is drawn from the SmartWire-DT round cable.

#### 2.15.4 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

#### 2.15.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8 0: Off 1: On	Sensor current monitoring X7 0: Off 1: On	Sensor current monitoring X6 0: Off 1: On	Sensor current monitoring X5 0: Off 1: On	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0



### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8	Sensor current monitoring X7	Sensor current monitoring X6	Sensor current monitoring X5	Sensor current monitoring X4	Sensor current monitoring X3	Sensor current monitoring X2	Sensor current monitoring X1
	0: Off 1: On	0: Off 1: On	0: Off 1: On	0: Off 1: On	0: Off 1: On	0: Off 1: On	0: Off 1: On	0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.15.5 Programming

### 2.15.5.1 Inputs/outputs

The module has three input bytes at its disposal.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

## 2 Digital modules

### 2.15 Block module EU8E-SWD-16DX

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	I7	I6	I5	I4	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	I4	Status input I4
5	I5	Status input I5
6	I6	Status input I6
7	I7	Status input I7

Byte 2:

Bit	7	6	5	4	3	2	1	0
designation	I15	I14	I13	I12	I11	I10	I9	I8

Bit	designation	Meaning
0	I8	Status input I8
1	I9	Status input I9
2	I10	Status input I10
3	I11	Status input I11
4	I12	Status input I12
5	I13	Status input I13
6	I14	Status input I14
7	I15	Status input I15

### 2.15.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x1F	Message from Sensor current monitoring: No sensor/actuator detected at Connection X5 → Message only if parameter: Current monitoring is set to "on".
0x20	Message from Sensor current monitoring: No sensor/actuator detected at Connection X6 → Message only if parameter: Current monitoring is set to "on".
0x21	Message from Sensor current monitoring: No sensor/actuator detected at Connection X7 → Message only if parameter: Current monitoring is set to "on".
0x22	Message from Sensor current monitoring: No sensor/actuator detected at Connection X8 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x27	Sensor/actuator power supply overload, short-circuit at Connection X5
0x28	Sensor/actuator power supply overload, short-circuit at Connection X6
0x29	Sensor/actuator power supply overload, short-circuit at Connection X7
0x2A	Sensor/actuator power supply overload, short-circuit at Connection X8

## 2 Digital modules

### 2.16 Block module EU8E-SWD-16DD

## 2.16 Block module EU8E-SWD-16DD

### 2.16.1 Introduction

SmartWire-DT module EU8E-SWD-16DD features sixteen configurable digital inputs/outputs that can be used to integrate various sensors into a SmartWire-DT network.

Each connector (X1 to X8) also provides 24 VDC power for connected devices.

The inputs'/outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 2.16.2 Surface mounting

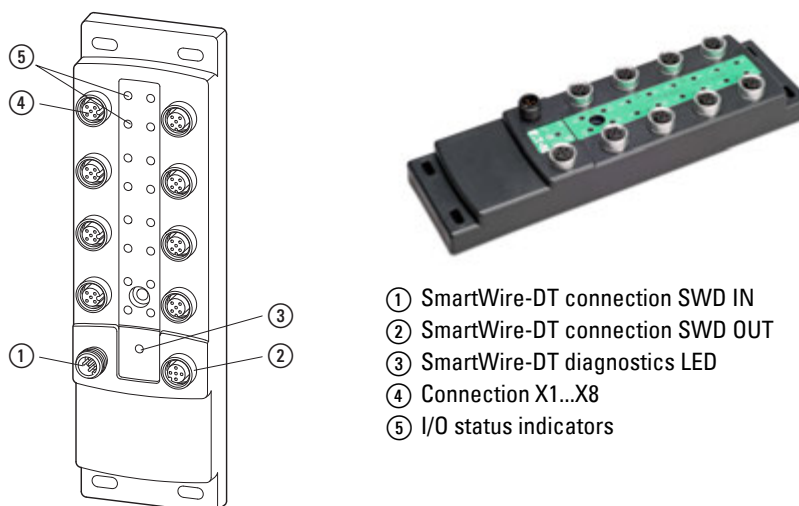
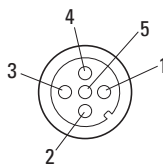


Figure 32: Connections of the module EU8E-SWD-16DD

### 2.16.3 Projection

#### 2.16.3.1 Plug configuration for connectors X1 ... X8

PIN	Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4	Pinout for connector X5	Pinout for connector X6	Pinout for connector X7	Pinout for connector X8
1	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
2	I1/Q1	I3/Q3	I5/Q5	I7/Q7	I9/Q9	I11/Q11	I13/Q13	I15/Q15
3	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
4	I0/Q0	I2/Q2	I4/Q4	I6/Q6	I8/Q8	I10/Q10	I12/Q12	I14/Q14
5	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used



Technical data → Chapter 10, "Appendix", Page 199

### 2.16.3.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current per Xn connector is 70 mA.

The power supply is short-circuit proof and protected against overload.

Power is drawn from the SmartWire-DT round cable.

### 2.16.4 Data profiles, parameter configuration

#### Data profile selection

The provided input/output information can be adjusted in line with current needs by selecting an appropriate data profile. The following overview shows the options available:

Profile	Input byte 0 (status)	Input byte 1 (I0-I7)	Input byte 1 (I8-I15)	Output byte 0 (O0-O7)	Output byte 0 (O8-O15)	Notes
Profile 1	X	X	X	–	–	Inputs only
Profile 2	X	–	–	X	X	If this profile is selected, all inputs must be configured as outputs
Profile 3	X	X	X	X	–	If this profile is selected, the function (input / output) can be configured as necessary
Profile 4	X	X	–	X	X	
Profile 5	X	X	X	X	X	

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off
Channel 1: Input 1 is an output	Used to configure input 1 (Connection X1, PIN 4) as an input or output	input
Channel 2: Input 2 is an output	Used to configure input 2 (Connection X1, PIN 2) as an input or output	input
Channel 3: Input 3 is an output	Used to configure input 3 (Connection X2, PIN 4) as an input or output	input
Channel 4: Input 4 is an output	Used to configure input 4 (Connection X2, PIN 2) as an input or output	input
Channel 5: Input 5 is an output	Used to configure input 5 (Connection X3, PIN 4) as an input or output	input
Channel 6: Input 6 is an output	Used to configure input 6 (Connection X3, PIN 2) as an input or output	input

## 2 Digital modules

### 2.16 Block module EU8E-SWD-16DD

<b>parameter</b>	<b>Meaning</b>	<b>Default</b>
Channel 7: Input 7 is an output	Used to configure input 7 (Connection X4, PIN 4) as an input or output	input
Channel 8: Input 8 is an output	Used to configure input 8 (Connection X4, PIN 2) as an input or output	input
Channel 9: Input 9 is an output	Used to configure input 9 (Connection X5, PIN 4) as an input or output	input
Channel 10: Input 10 is an output	Used to configure input 10 (Connection X5, PIN 2) as an input or output	input
Channel 11: Input 11 is an output	Used to configure input 11 (Connection X6, PIN 4) as an input or output	input
Channel 12: Input 12 is an output	Used to configure input 12 (Connection X6, PIN 2) as an input or output	input
Channel 13: Input 13 is an output	Used to configure input 13 (Connection X7, PIN 4) as an input or output	input
Channel 14: Input 14 is an output	Used to configure input 14 (Connection X7, PIN 2) as an input or output	input
Channel 15: Input 15 is an output	Used to configure input 15 (Connection X8, PIN 4) as an input or output	input
Channel 16: Input 16 is an output	Used to configure input 16 (Connection X8, PIN 2) as an input or output	input

### 2.16.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

#### Field bus CANopen

Profile selection: SDO object 2102subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Data profile	Value [hex]
Profile 1	0x00000092
Profile 2	0x0000A110
Profile 3	0x00002092
Profile 4	0x0000A191
Profile 5 (default setting)	0x0000A192

SDO object 2110subx (x = parameter index)

Parameter byte 1: Input/output configuration

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	0: I7 1: Q7	0: I6 1: Q6	0: I5 1: Q5	0: I4 1: Q4	0: I3 1: Q3	0: I2 1: Q2	0: I1 1: Q1	0: I0 1: Q0
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 2: Input/output configuration

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	0: I15 1: Q15	0: I14 1: Q14	0: I13 1: Q13	0: I12 1: Q12	0: I11 1: Q11	0: I10 1: Q10	0: I9 1: Q9	0: I8 1: Q8
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 3: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8  0: Off 1: On	Sensor current monitoring X7  0: Off 1: On	Sensor current monitoring X6  0: Off 1: On	Sensor current monitoring X5  0: Off 1: On	Sensor current monitoring X4  0: Off 1: On	Sensor current monitoring X3  0: Off 1: On	Sensor current monitoring X2  0: Off 1: On	Sensor current monitoring X1  0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.16 Block module EU8E-SWD-16DD

#### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: Input/output configuration

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	0: I7 1: Q7	0: I6 1: Q6	0: I5 1: Q5	0: I4 1: Q4	0: I3 1: Q3	0: I2 1: Q2	0: I1 1: Q1	0: I0 1: Q0
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 2: Input/output configuration

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	0: I15 1: Q15	0: I14 1: Q14	0: I13 1: Q13	0: I12 1: Q12	0: I11 1: Q11	0: I10 1: Q10	0: I9 1: Q9	0: I8 1: Q8
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 3: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8  0: Off 1: On	Sensor current monitoring X7  0: Off 1: On	Sensor current monitoring X6  0: Off 1: On	Sensor current monitoring X5  0: Off 1: On	Sensor current monitoring X4  0: Off 1: On	Sensor current monitoring X3  0: Off 1: On	Sensor current monitoring X2  0: Off 1: On	Sensor current monitoring X1  0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.16.5 Programming

### 2.16.5.1 Inputs/outputs

The module has three input bytes at its disposal.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–



Bit	designation	Meaning
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	I7	I6	I5	I4	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	I4	Status input I4
5	I5	Status input I5
6	I6	Status input I6
7	I7	Status input I7

Byte 2:

Bit	7	6	5	4	3	2	1	0
designation	I15	I14	I13	I12	I11	I10	I9	I8

Bit	designation	Meaning
0	I8	Status input I8
1	I9	Status input I9
2	I10	Status input I10
3	I11	Status input I11
4	I12	Status input I12
5	I13	Status input I13
6	I14	Status input I14
7	I15	Status input I15

## Outputs

Byte 0:

## 2 Digital modules

### 2.16 Block module EU8E-SWD-16DD

Bit	7	6	5	4	3	2	1	0
designation	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	Q4	Actuation output Q4
5	Q5	Actuation output Q5
6	Q6	Actuation output Q6
7	Q7	Actuation output Q7

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	Q15	Q14	Q13	Q12	Q11	Q10	Q9	Q8

Bit	designation	Meaning
0	Q8	Actuation output Q8
1	Q9	Actuation output Q9
2	Q10	Actuation output Q10
3	Q11	Actuation output Q11
4	Q12	Actuation output Q12
5	Q13	Actuation output Q13
6	Q14	Actuation output Q14
7	Q15	Actuation output Q15

### 2.16.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x1F	Message from Sensor current monitoring: No sensor/actuator detected at Connection X5 → Message only if parameter: Current monitoring is set to "on".
0x20	Message from Sensor current monitoring: No sensor/actuator detected at Connection X6 → Message only if parameter: Current monitoring is set to "on".
0x21	Message from Sensor current monitoring: No sensor/actuator detected at Connection X7 → Message only if parameter: Current monitoring is set to "on".
0x22	Message from Sensor current monitoring: No sensor/actuator detected at Connection X8 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x27	Sensor/actuator power supply overload, short-circuit at Connection X5
0x28	Sensor/actuator power supply overload, short-circuit at Connection X6
0x29	Sensor/actuator power supply overload, short-circuit at Connection X7
0x2A	Sensor/actuator power supply overload, short-circuit at Connection X8



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26, 0x27, 0x28, 0x29, 0x2A**

If outputs have been configured, they will all be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E, 0x1F, 0x20, 0x21, 0x22**

Using this function when outputs have been configured only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2 Digital modules

### 2.17 Block module EU8E-SWD-4D4D-1

#### 2.17 Block module EU8E-SWD-4D4D-1

SmartWire-DT module EU8E-SWD-4D4D-1 features four digital inputs and four digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X8) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

#### 2.17.1 Surface mounting

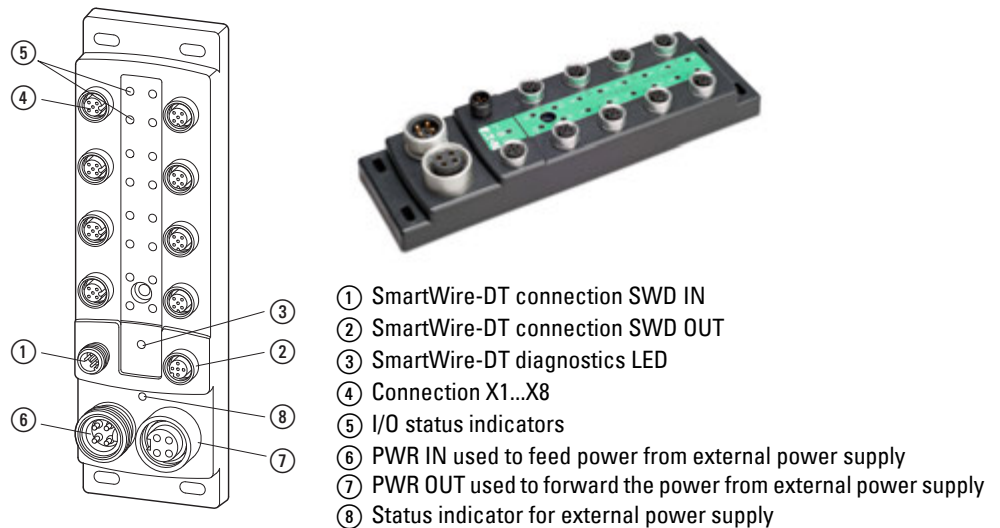


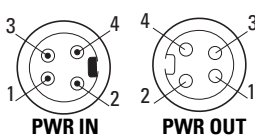
Figure 33: Connectors of module EU8E-SWD-4D4D-1 with an external power supply unit

#### 2.17.2 Projection

##### 2.17.2.1 Plug configuration for connectors X1 ... X8

PIN		Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4	Pinout for connector X5	Pinout for connector X6	Pinout for connector X7	Pinout for connector X8
	1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
	2	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used
	3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
	4	Q0	Q1	Q2	Q3	I0	I1	I2	I3
	5	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used

### Connections PWR IN, PWR OUT

PIN	Pinout Connector PWR IN, PWR OUT
	1
	2
	3
	4
	24V <sub>ext</sub>
	24V <sub>ext</sub>
	0V <sub>ext</sub>
	0V <sub>ext</sub>

Technical data → Chapter 10, "Appendix", Page 195

### 2.17.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### Digital outputs Connection X1... X4

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.



If the external power at PWR IN is switched off, the digital inputs will continue to work, since they are powered via the SmartWire-DT power supply.

#### Digital inputs Connection X5 ... X8

Power is drawn from the SmartWire-DT round cable.

### 2.17.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

## 2 Digital modules

### 2.17 Block module EU8E-SWD-4D4D-1

#### 2.17.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8 0: Off 1: On	Sensor current monitoring X7 0: Off 1: On	Sensor current monitoring X6 0: Off 1: On	Sensor current monitoring X5 0: Off 1: On	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8 0: Off 1: On	Sensor current monitoring X7 0: Off 1: On	Sensor current monitoring X6 0: Off 1: On	Sensor current monitoring X5 0: Off 1: On	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.17.4 Programming

### 2.17.4.1 Inputs/outputs

The module has two input bytes and one output byte at its disposal.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	I3	I2	I1	I0

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	–	
5	–	
6	–	
7	–	

## 2 Digital modules

### 2.17 Block module EU8E-SWD-4D4D-1

#### Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	–	–	–	–	Q3	Q2	Q 1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q 1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	–	
5	–	
6	–	
7	–	



### 2.17.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x1F	Message from Sensor current monitoring: No sensor/actuator detected at Connection X5 → Message only if parameter: Current monitoring is set to "on".
0x20	Message from Sensor current monitoring: No sensor/actuator detected at Connection X6 → Message only if parameter: Current monitoring is set to "on".
0x21	Message from Sensor current monitoring: No sensor/actuator detected at Connection X7 → Message only if parameter: Current monitoring is set to "on".
0x22	Message from Sensor current monitoring: No sensor/actuator detected at Connection X8 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x27	Sensor/actuator power supply overload, short-circuit at Connection X5
0x28	Sensor/actuator power supply overload, short-circuit at Connection X6
0x29	Sensor/actuator power supply overload, short-circuit at Connection X7
0x2A	Sensor/actuator power supply overload, short-circuit at Connection X8
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2 Digital modules

### 2.18 Block module EU8E-SWD-8XD-1

#### 2.18 Block module EU8E-SWD-8XD-1

SmartWire-DT module EU8E-SWD-8XD-1 features eight digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X8) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

#### 2.18.1 Surface mounting

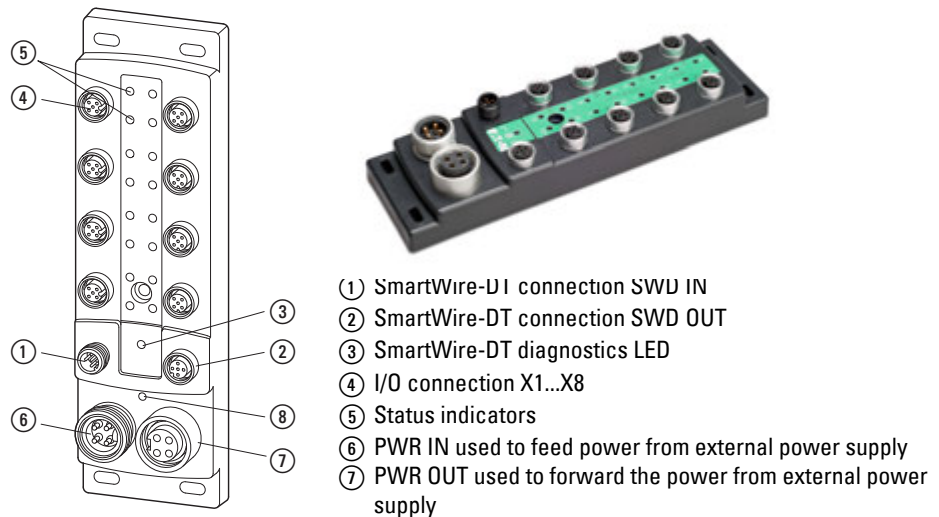


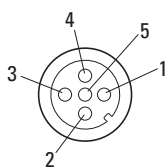
Figure 34: Connectors of module EU8E-SWD-8XD-1 with an external power supply unit

#### 2.18.2 Projection

##### 2.18.2.1 Connector assignment

###### Connections X1 ... X8

PIN	Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4	Pinout for connector X5	Pinout for connector X6	Pinout for connector X7	Pinout for connector X8
1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>
2	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used
3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>
4	Q0	Q1	Q2	Q3	Q4	Q5	Q6	Q7
5	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used



### Connections PWR IN, PWR OUT

PIN	Pinout Connector PWR IN, PWR OUT	
	1	24V <sub>ext</sub>
	2	24V <sub>ext</sub>
	3	0V <sub>ext</sub>
	4	0V <sub>ext</sub>

Technical data → Chapter 10, "Appendix", Page 195

#### 2.18.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected actuators.

The maximum current per Xn connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### X1 to X8 connector digital outputs

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.

#### 2.18.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn)	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

## 2 Digital modules

### 2.18 Block module EU8E-SWD-8XD-1

#### 2.18.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8 0: Off 1: On	Sensor current monitoring X7 0: Off 1: On	Sensor current monitoring X6 0: Off 1: On	Sensor current monitoring X5 0: Off 1: On	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8 0: Off 1: On	Sensor current monitoring X7 0: Off 1: On	Sensor current monitoring X6 0: Off 1: On	Sensor current monitoring X5 0: Off 1: On	Sensor current monitoring X4 0: Off 1: On	Sensor current monitoring X3 0: Off 1: On	Sensor current monitoring X2 0: Off 1: On	Sensor current monitoring X1 0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2.18.4 Programming

### 2.18.4.1 Inputs/outputs

The module has one input byte and one output byte.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

#### Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	Q7	Q6	Q5	Q4	Q3	Q2	Q 1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q 1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	Q4	Actuation output Q4
5	Q5	Actuation output Q5
6	Q6	Actuation output Q6
7	Q7	Actuation output Q7

## 2 Digital modules

### 2.18 Block module EU8E-SWD-8XD-1

#### 2.18.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x1F	Message from Sensor current monitoring: No sensor/actuator detected at Connection X5 → Message only if parameter: Current monitoring is set to "on".
0x20	Message from Sensor current monitoring: No sensor/actuator detected at Connection X6 → Message only if parameter: Current monitoring is set to "on".
0x21	Message from Sensor current monitoring: No sensor/actuator detected at Connection X7 → Message only if parameter: Current monitoring is set to "on".
0x22	Message from Sensor current monitoring: No sensor/actuator detected at Connection X8 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x27	Sensor/actuator power supply overload, short-circuit at Connection X5
0x28	Sensor/actuator power supply overload, short-circuit at Connection X6
0x29	Sensor/actuator power supply overload, short-circuit at Connection X7
0x2A	Sensor/actuator power supply overload, short-circuit at Connection X8
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26, 0x27, 0x28, 0x29, 0x2A**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E, 0x1F, 0x20, 0x21, 0x22**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2.19 Block module EU8E-SWD-16XD-1

SmartWire-DT module EU8E-SWD-16XD-1 features sixteen digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X8) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The outputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external power voltage.

### 2.19.1 Surface mounting

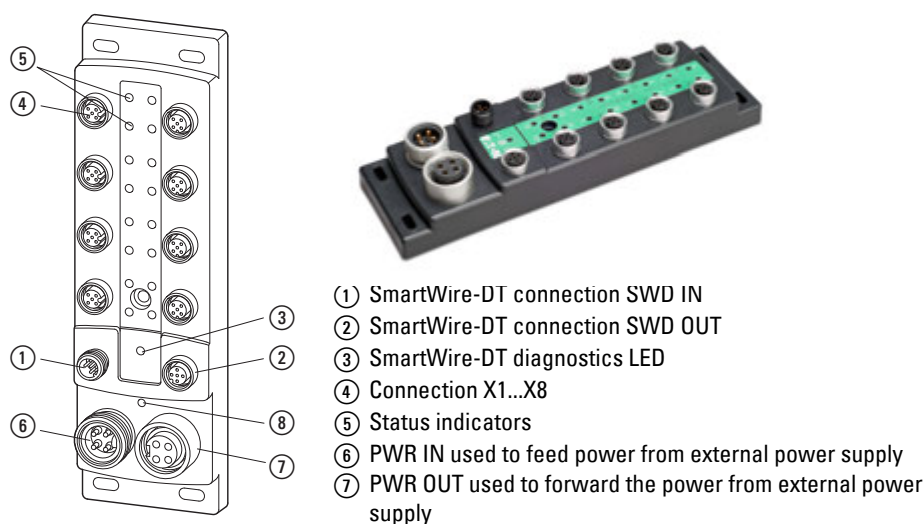


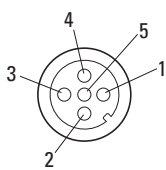
Figure 35: Connectors of module EU8E-SWD-16XD-1 with an external power supply unit

### 2.19.2 Projection

#### 2.19.2.1 Connector assignment

##### Connections X1 ... X8

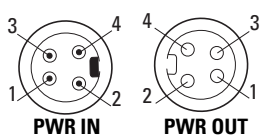
PIN	Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4	Pinout for connector X5	Pinout for connector X6	Pinout for connector X7	Pinout for connector X8
1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>
2	Q 1	Q3	Q5	Q7	Q9	Q11	Q13	Q15
3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>
4	Q0	Q2	Q4	Q6	Q8	Q10	Q12	Q14
5	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used



## 2 Digital modules

### 2.19 Block module EU8E-SWD-16XD-1

#### Connections PWR IN, PWR OUT

PIN	Pinout Connector PWR IN, PWR OUT
	1
	2
	3
	4
	24V <sub>ext</sub>
	24V <sub>ext</sub>
	0V <sub>ext</sub>
	0V <sub>ext</sub>

Technical data → Chapter 10, “Appendix”, Page 199

#### 2.19.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each Xn connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### X1 to X8 connector digital outputs

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.

#### 2.19.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection Xn	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off



### 2.19.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

#### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8  0: Off 1: On	Sensor current monitoring X7  0: Off 1: On	Sensor current monitoring X6  0: Off 1: On	Sensor current monitoring X5  0: Off 1: On	Sensor current monitoring X4  0: Off 1: On	Sensor current monitoring X3  0: Off 1: On	Sensor current monitoring X2  0: Off 1: On	Sensor current monitoring X1  0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

#### Fieldbus EtherCAT

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8  0: Off 1: On	Sensor current monitoring X7  0: Off 1: On	Sensor current monitoring X6  0: Off 1: On	Sensor current monitoring X5  0: Off 1: On	Sensor current monitoring X4  0: Off 1: On	Sensor current monitoring X3  0: Off 1: On	Sensor current monitoring X2  0: Off 1: On	Sensor current monitoring X1  0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.19 Block module EU8E-SWD-16XD-1

#### 2.19.4 Programming

##### 2.19.4.1 Inputs/outputs

The module has one input byte and two output bytes.

##### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

## Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	Q4	Actuation output Q4
5	Q5	Actuation output Q5
6	Q6	Actuation output Q6
7	Q7	Actuation output Q7

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	Q15	Q14	Q13	Q12	Q11	Q10	Q9	Q8

Bit	designation	Meaning
0	Q8	Actuation output Q8
1	Q9	Actuation output Q9
2	Q10	Actuation output Q10
3	Q11	Actuation output Q11
4	Q12	Actuation output Q12
5	Q13	Actuation output Q13
6	Q14	Actuation output Q14
7	Q15	Actuation output Q15

## 2 Digital modules

### 2.19 Block module EU8E-SWD-16XD-1

#### 2.19.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x1F	Message from Sensor current monitoring: No sensor/actuator detected at Connection X5 → Message only if parameter: Current monitoring is set to "on".
0x20	Message from Sensor current monitoring: No sensor/actuator detected at Connection X6 → Message only if parameter: Current monitoring is set to "on".
0x21	Message from Sensor current monitoring: No sensor/actuator detected at Connection X7 → Message only if parameter: Current monitoring is set to "on".
0x22	Message from Sensor current monitoring: No sensor/actuator detected at Connection X8 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x27	Sensor/actuator power supply overload, short-circuit at Connection X5
0x28	Sensor/actuator power supply overload, short-circuit at Connection X6
0x29	Sensor/actuator power supply overload, short-circuit at Connection X7
0x2A	Sensor/actuator power supply overload, short-circuit at Connection X8
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26, 0x27, 0x28, 0x29, 0x2A**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E, 0x1F, 0x20, 0x21, 0x22**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 2.20 Block module EU8E-SWD-8D8D-1

SmartWire-DT module EU8E-SWD-8D8D-1 features eight digital inputs and eight digital outputs that can be used to integrate various sensors and actuators into a SmartWire-DT network.

Each connector (X1 to X8) also provides 24 VDC power for connected devices.

The outputs are operated via a separate power supply unit.

The inputs' status is indicated with the help of LEDs.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status, while the external power supply status indicator is used to signal the status of the applied external supply voltage.

### 2.20.1 Surface mounting

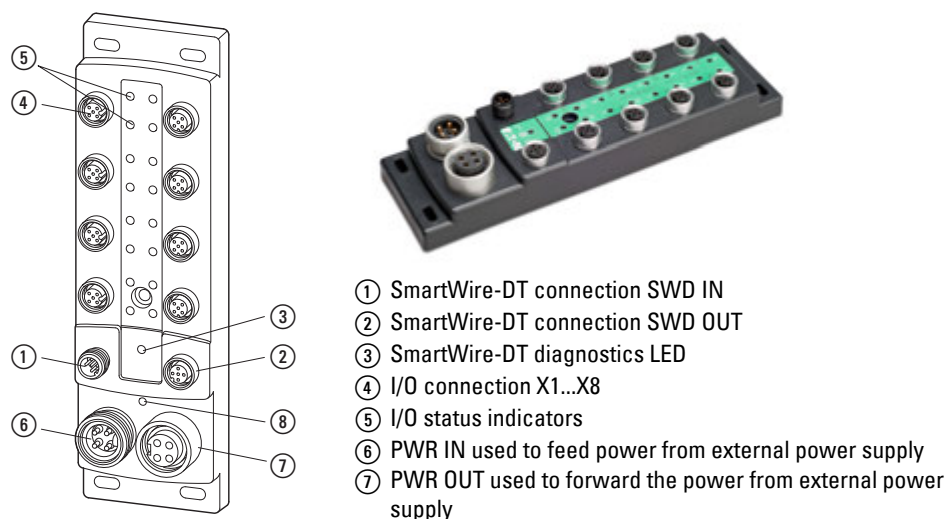
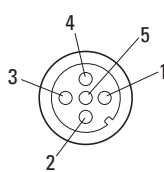


Figure 36: Connectors of module EU8E-SWD-8D8D-1 with an external power supply unit

### 2.20.2 Projection

#### 2.20.2.1 Plug configuration for connectors X1 ... X8

PIN	Pinout for connector X1	Pinout for connector X2	Pinout for connector X3	Pinout for connector X4	Pinout for connector X5	Pinout for connector X6	Pinout for connector X7	Pinout for connector X8
1	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>ext</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>	24V <sub>SWD</sub>
2	Q 1	Q3	Q5	Q7	I1	I3	I5	I7
3	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>ext</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>	0V <sub>SWD</sub>
4	Q0	Q2	Q4	Q6	I0	I2	I4	I6
5	Not used	Not used	Not used	Not used	Not used	Not used	Not used	Not used



## 2 Digital modules

### 2.20 Block module EU8E-SWD-8D8D-1

#### Connections PWR IN, PWR OUT

PIN	Pinout Connector PWR IN, PWR OUT
	1
	2
	3
	4
	24V <sub>ext</sub>
	24V <sub>ext</sub>
	0V <sub>ext</sub>
	0V <sub>ext</sub>

Technical data → Chapter 10, “Appendix”, Page 199

#### 2.20.2.2 Power supply

The module provides 24 V<sub>DC</sub> at pins 1 and 3 at each X<sub>n</sub> connector in order to power connected sensors.

The maximum current consumption per connector is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

##### Connector X1 to X4 digital outputs

Power is drawn from the PWR IN external power supply.

This external PWR IN power supply also powers the digital outputs.



If the external power at PWR IN is switched off, the digital inputs will continue to work, since they are powered via the SmartWire-DT power supply.

##### X5 to X8 connector digital inputs

Power is drawn from the SmartWire-DT round cable.

#### 2.20.3 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

parameter	Meaning	Default
Current monitoring at Connection X <sub>n</sub>	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	Off

### 2.20.3.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

#### Field bus CANopen

SDO object 2110subx (x = parameter index)

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8  0: Off 1: On	Sensor current monitoring X7  0: Off 1: On	Sensor current monitoring X6  0: Off 1: On	Sensor current monitoring X5  0: Off 1: On	Sensor current monitoring X4  0: Off 1: On	Sensor current monitoring X3  0: Off 1: On	Sensor current monitoring X2  0: Off 1: On	Sensor current monitoring X1  0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

#### Fieldbus EtherCAT

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Device index: sub-index 22

Parameter byte 1: Sensor current monitoring

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X8  0: Off 1: On	Sensor current monitoring X7  0: Off 1: On	Sensor current monitoring X6  0: Off 1: On	Sensor current monitoring X5  0: Off 1: On	Sensor current monitoring X4  0: Off 1: On	Sensor current monitoring X3  0: Off 1: On	Sensor current monitoring X2  0: Off 1: On	Sensor current monitoring X1  0: Off 1: On
<b>Default</b>	0	0	0	0	0	0	0	0

## 2 Digital modules

### 2.20 Block module EU8E-SWD-8D8D-1

#### 2.20.4 Programming

##### 2.20.4.1 Inputs/outputs

The module has two input bytes and one output byte at its disposal.

##### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Byte 1:

Bit	7	6	5	4	3	2	1	0
designation	I7	I6	I5	I4	I3	I2	I1	I0

Bit	designation	Meaning
0	I0	Status input I0
1	I1	Status input I1
2	I2	Status input I2
3	I3	Status input I3
4	I4	Status input I4
5	I5	Status input I5
6	I6	Status input I6
7	I7	Status input I7



## Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q1	Actuation output Q1
2	Q2	Actuation output Q2
3	Q3	Actuation output Q3
4	Q4	Actuation output Q4
5	Q5	Actuation output Q5
6	Q6	Actuation output Q6
7	Q7	Actuation output Q7

## 2 Digital modules

### 2.20 Block module EU8E-SWD-8D8D-1

#### 2.20.4.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit on at least one output
0x1B	Message from Sensor current monitoring: No sensor/actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x1C	Message from Sensor current monitoring: No sensor/actuator detected at Connection X2 → Message only if parameter: Current monitoring is set to "on".
0x1D	Message from Sensor current monitoring: No sensor/actuator detected at Connection X3 → Message only if parameter: Current monitoring is set to "on".
0x1E	Message from Sensor current monitoring: No sensor/actuator detected at Connection X4 → Message only if parameter: Current monitoring is set to "on".
0x1F	Message from Sensor current monitoring: No sensor/actuator detected at Connection X5 → Message only if parameter: Current monitoring is set to "on".
0x20	Message from Sensor current monitoring: No sensor/actuator detected at Connection X6 → Message only if parameter: Current monitoring is set to "on".
0x21	Message from Sensor current monitoring: No sensor/actuator detected at Connection X7 → Message only if parameter: Current monitoring is set to "on".
0x22	Message from Sensor current monitoring: No sensor/actuator detected at Connection X8 → Message only if parameter: Current monitoring is set to "on".
0x23	Sensor/actuator power supply overload, short-circuit at Connection X1
0x24	Sensor/actuator power supply overload, short-circuit at Connection X2
0x25	Sensor/actuator power supply overload, short-circuit at Connection X3
0x26	Sensor/actuator power supply overload, short-circuit at Connection X4
0x27	Sensor/actuator power supply overload, short-circuit at Connection X5
0x28	Sensor/actuator power supply overload, short-circuit at Connection X6
0x29	Sensor/actuator power supply overload, short-circuit at Connection X7
0x2A	Sensor/actuator power supply overload, short-circuit at Connection X8
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24, 0x25, 0x26**

If this message is output, the corresponding outputs will be switched off.



#### **Diagnostic alarm 0x1B, 0x1C, 0x1D, 0x1E**

Using this function only makes sense if outputs have not been set from the user program. The reason for this is that setting an output in the user program will already cause the diagnostic alarm to be reset even if a sensor/actuator or an SWD4-ACAP-10 covering cap is not connected.

## 3 Analog module

### 3.1 T-Connector EU1E-SWD-1AX-1

#### 3.1.1 Introduction

SmartWire-DT module EU1E-SWD-1AX-1 features one analog input that can be used to integrate analog sensors with a 0–10 V voltage input into a SmartWire-DT network.

This Connection X1 also provides 24 VDC power for connected devices. Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

#### 3.1.2 Surface mounting

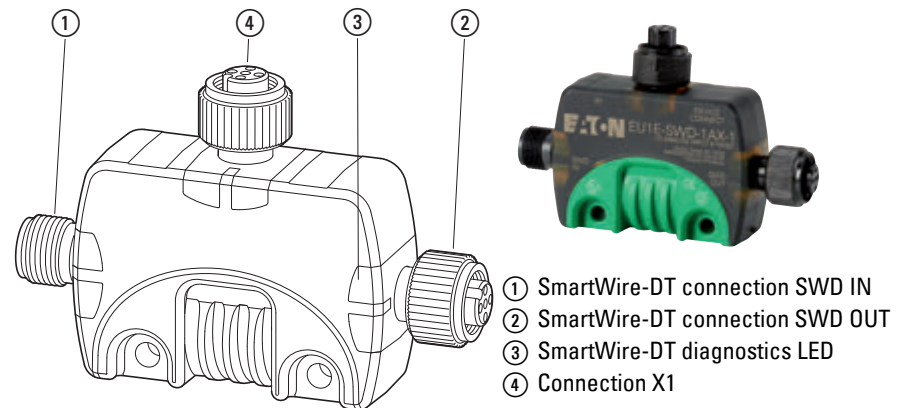


Figure 37: Connections of the module EU1E-SWD-1AX-1

#### 3.1.3 Engineering

##### 3.1.3.1 Plug configuration - connection X1

Pin	Configuration
1	24V
2	0V
3	0V
4	IA0
5	Not used

Technical data → Chapter 10, "Appendix", Page 190

## 3 Analog module

### 3.1 T-Connector EU1E-SWD-1AX-1

#### 3.1.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at connector X1 in order to power connected sensors.

The maximum current consumption at connector X1 is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### 3.1.4 Parameter definition

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

In addition, the module makes it possible to set up an averaging function and to adjust the rate at which the analog value reading sent from the module to the SmartWire-DT network will be refreshed.

Parameter	Meaning		Default
Averaging	On/Off	Averaging over n measuring cycles if averaging is configured	On
Reading refresh rate	20 ms	4 measurement cycles	100 ms
	100 ms	20	
	200 ms	40	
	500 ms	100	

#### 3.1.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Sensor current monitoring, measuring settings: SDO object 2110subx (x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X1  0: Off 1: On	Averaging  0: Off 1: On	Reading refresh rate  00: 20 ms 01: 100 ms 10: 200 ms 11: 500 ms		Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Sensor current monitoring, measuring settings: device index: sub-index 22

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X1  0: Off 1: On	Averaging  0: Off 1: On	Reading refresh rate  00: 20 ms 01: 100 ms 10: 200 ms 11: 500 ms		Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

## 3.1.5 Programming

### 3.1.5.1 Inputs/outputs

The module has one input byte for the network/module status and one input word for the sensor's analog value.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

The analog input has a resolution of 12 bits. The analog value will be transmitted as an unsigned 16-bit value. The exact addressing used for the data will depend on the selected programming system.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>IWO</b>	–	–	–	–	X	X	X	X	X	X	X	X	X	X	X	X

## 3 Analog module

### 3.1 T-Connector EU1E-SWD-1AX-1

#### 3.1.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Sensor power supply overload, short-circuit at Connection X1
0x1B	Message from Sensor current monitoring: No sensor detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x14	Internal device fault

## 3.2 T-Connector EU1E-SWD-1AX-2

### 3.2.1 Introduction

SmartWire-DT module EU1E-SWD-1AX-2 features one analog input that can be used to integrate analog sensors with a 0–20 mA current input into a SmartWire-DT network.

This X1 connector also provides optional 24 VDC power.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 3.2.2 Surface mounting

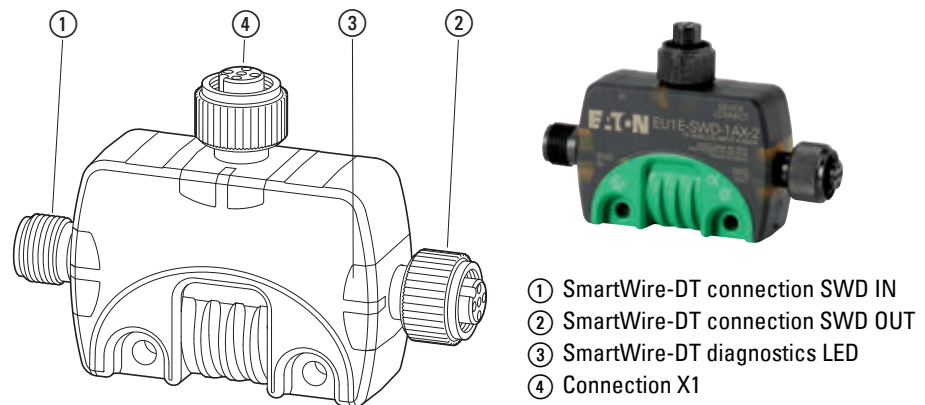
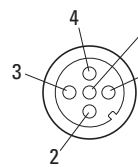


Figure 38: Connections of the module EU1E-SWD-1AX-2

### 3.2.3 Engineering

#### 3.2.3.1 Plug configuration - connection X1

Pin	Configuration
1	24V
2	0V
3	0V
4	QA0
5	Not used



#### 3.2.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at connector X1 in order to power connected sensors.

The maximum current consumption at connector X1 is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

### 3 Analog module

#### 3.2 T-Connector EU1E-SWD-1AX-2

#### 3.2.4 Parameter definition

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

In addition, the module makes it possible to set up an averaging function and to adjust the rate at which the analog value reading sent from the module to the SmartWire-DT network will be refreshed.

Parameter	Meaning	Default
Averaging	On/Off Averaging over n measuring cycles if averaging is configured	On
Reading refresh rate	20 ms 4 measurement cycles	100 ms
	100 ms 20	
	200 ms 40	
	500 ms 100	

#### 3.2.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

#### Field bus CANopen

Sensor current monitoring, measuring settings: SDO object 2110subx (x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X1 0: Off 1: On	Averaging 0: Off 1: On	Reading refresh rate 00: 20 ms 01: 100 ms 10: 200 ms 11: 500 ms		Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0



### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Sensor current monitoring, Measuring settings: Device index: sub-index 22

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X1  0: Off 1: On	Averaging  0: Off 1: On	Reading refresh rate  00: 20 ms 01: 100 ms 10: 200 ms 11: 500 ms		Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

## 3.2.5 Programming

### 3.2.5.1 Inputs/outputs

The module has one input byte for the network/module status and one input word for the sensor's analog value.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

The analog input has a resolution of 12 bits. The analog value will be transmitted as an unsigned 16-bit value. The exact addressing used for the data will depend on the selected programming system.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
<b>IWO</b>	–	–	–	–	X	X	X	X	X	X	X	X	X	X	X	X

## 3 Analog module

### 3.2 T-Connector EU1E-SWD-1AX-2

#### 3.2.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Current input overload ( $I > 23$ mA)
0x23	Sensor power supply overload, short-circuit at Connection X1
0x1B	Message from Sensor current monitoring: No sensor detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".
0x14	Internal device fault

### 3.3 T-Connector EU1E-SWD-1XA-1

#### 3.3.1 Introduction

SmartWire-DT module EU1E-SWD-1XA-1 features one analog output that can be used to integrate actuators with a 0–10 V voltage output into a SmartWire-DT network.

This X1 connector also provides 24 VDC power for connected devices.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

#### 3.3.2 Surface mounting

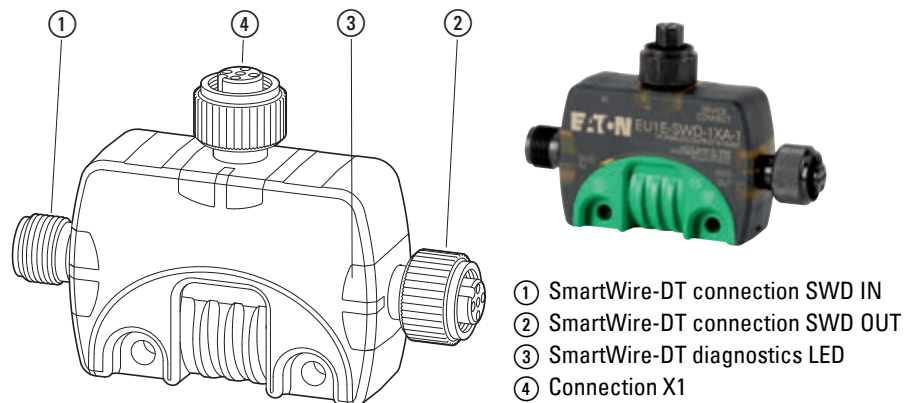


Figure 39: Connections of the module EU1E-SWD-1XA-1

#### 3.3.3 Engineering

##### 3.3.3.1 Plug configuration - connection X1

Pin	Configuration
1	24V
2	0V
3	0V
4	0A0
5	Not used

##### 3.3.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at connector X1 in order to power connected actuators.

The maximum current consumption at connector X1 is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

## 3 Analog module

### 3.3 T-Connector EU1E-SWD-1XA-1

#### 3.3.4 Parameter definition

Parameter	Meaning	Default
Current monitoring on Connection X1	Actuator-Current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

##### 3.3.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Actuator Current monitoring: SDO object 2110subx

(x =Position of module within the SmartWire-DT network, with the range being 1 - 99)

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Current monitoring X1  0: Off 1: On	Not used	Not used	Not used	Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Actuator-Current monitoring: Device index: sub-index 22

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Current monitoring X1  0: Off 1: On	Not used	Not used	Not used	Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

### 3.3.5 Programming

#### 3.3.5.1 Inputs/outputs

The module has one input byte for the network/module status and one output word for the actuator's analog value.

##### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

##### Outputs

The analog output has a resolution of 12 bits. The analog value will be transmitted as an unsigned 16-bit value. The exact addressing used for the data will depend on the selected programming system.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
QW0	–	–	–	–	X	X	X	X	X	X	X	X	X	X	X	X

#### 3.3.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x13	Overload, short-circuit at analog output
0x23	Actuator power supply overload, short-circuit at Connection X1
0x1B	Signal from actuator Current monitoring: No actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".

### 3 Analog module

#### 3.4 T-Connector EU1E-SWD-1XA-2

### 3.4 T-Connector EU1E-SWD-1XA-2

#### 3.4.1 Introduction

SmartWire-DT module EU1E-SWD-1XA-2 features one analog output that can be used to integrate actuators with a 0–20 mA current output into a SmartWire-DT network.

This X1 connector also provides 24 VDC power for connected devices.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

#### 3.4.2 Surface mounting

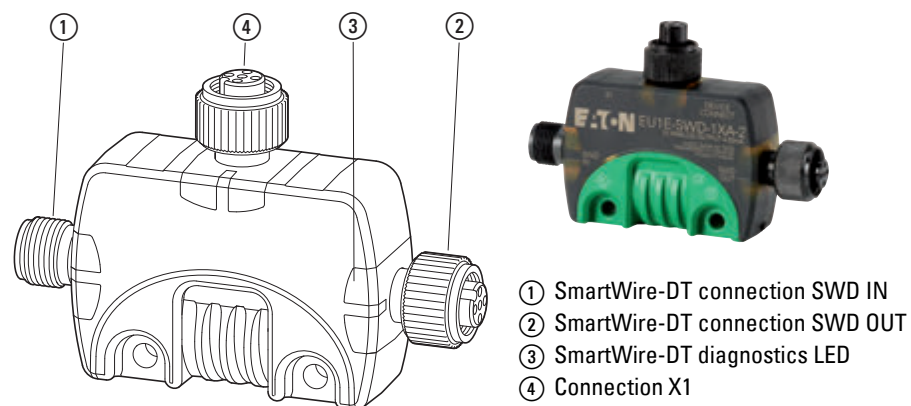


Figure 40: Connections of the module EU1E-SWD-1XA-2

#### 3.4.3 Engineering

##### 3.4.3.1 Plug configuration - connection X1

Pin	Configuration
1	24V
2	0V
3	0V
4	0A0
5	Not used

The diagram shows a circular 5-pin connector with pins numbered 1 to 5. Pin 1 is at the top, pin 2 is at the bottom, pin 3 is on the left, pin 4 is at the top-left, and pin 5 is at the top-right.

##### 3.4.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at connector X1 in order to power connected actuators.

The maximum current consumption at connector X1 is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

### 3.4.4 Parameter definition

Parameter	Meaning	Default
Current monitoring on Connection X1	Actuator-Current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

#### 3.4.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Actuator Current monitoring: SDO object 2110subx  
(x =Position of module within the SmartWire-DT network, with the range being 1 - 99)

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Actuator-Current monitoring X1  0: Off 1: On	Not used	Not used	Not used	Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

##### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Actuator-Current monitoring: Device index: sub-index 22

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Actuator-Current monitoring X1  0: Off 1: On	Not used	Not used	Not used	Not used	Not used	Not used	Not used
<b>Default</b>	0	0	0	0	0	0	0	0

## 3 Analog module

### 3.4 T-Connector EU1E-SWD-1XA-2

#### 3.4.5 Programming

##### 3.4.5.1 Inputs/outputs

The module has one input byte for the network/module status and one output word for the actuator's analog value.

##### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

##### Outputs

The analog output has a resolution of 12 bits. The analog value will be transmitted as an unsigned 16-bit value. The exact addressing used for the data will depend on the selected programming system.

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
QW0	–	–	–	–	X	X	X	X	X	X	X	X	X	X	X	X

##### 3.4.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Actuator power supply overload, short-circuit at Connection X1
0x1B	Signal from actuator Current monitoring: No actuator detected at Connection X1 → Message only if parameter: Current monitoring is set to "on".



## 3.5 EU2E-SWD-2PT

### 3.5.1 Introduction

SmartWire-DT module EU2E-SWD-2PT features two analog inputs that can be used to integrate Pt100, Pt1000, or Ni1000 temperature sensors into a SmartWire-DT network.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

### 3.5.2 Surface mounting

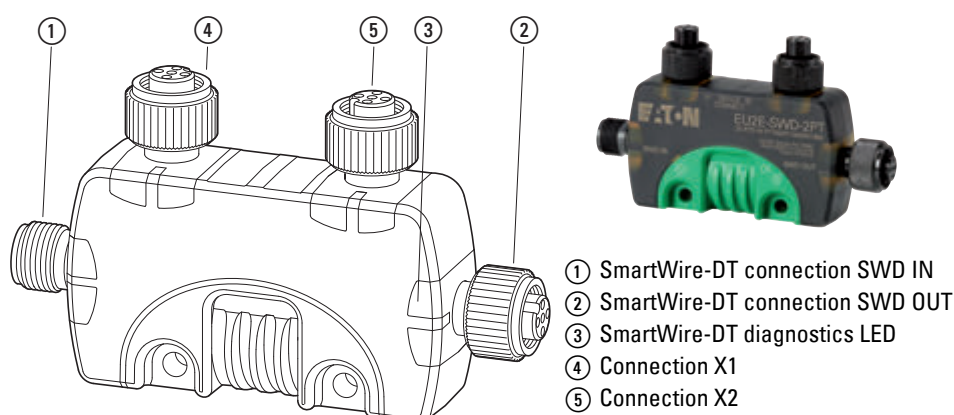


Figure 41: Connections of the module EU2E-SWD-2PT

### 3.5.3 Engineering

#### 3.5.3.1 Pinout for connectors X1 and X2

Pin	Pinout for connector X1	Pinout for connector X2
1	Pin for protective cap SWD4-ACAP-10	Pin for protective cap SWD4-ACAP-10
2	a0	a1
3	0V	0V
4	A0	A1
5	B0	b1


When using 2-wire sensors, pins ax, Ax (x = 0..1) need to be connected to each other.

### 3 Analog module

#### 3.5 EU2E-SWD-2PT

#### 3.5.3.2 Power supply

None.

#### 3.5.4 Parameter definition

With the programming system's control configurator, you can define the sensor model, measured value refresh rate and analog input representation. Select the desired model, and the reading representation and refresh rate. Unused temperature channels must remain set according to the following table.

Parameter	Meaning	Default
Protective cap monitoring on connector X1	Protective cap monitoring ON/OFF (→ Section 1.3, „Engineering“, page15)	off
Protective cap monitoring on connector X2	Protective cap monitoring ON/OFF (→ Section 1.3, „Engineering“, page15)	off
Sensor type at connector X1	Not used Pt100 Pt1000 Ni1000 (6180 ppm/K)	Not used
Sensor type at connector X2	Not used Pt100 Pt1000 Ni1000 (6180 ppm/K)	Not used
Measuring range	Pt100, Pt1000: -50 °C - +200 °C Ni1000: -50 °C - +150 °C Pt100, Pt1000: -100 °C - +400 °C Ni1000: -50 °C - +200 °C	Pt100, Pt1000: -50 °C - +200 °C Ni1000: -50 °C - +150 °C
Measurement display	0.1 °C 0.1 °F Binary value 0 - 4095	0.1 °C
Reading refresh rate	0.25 s 1 s 2.5 s 10 s	0.25 s

### 3.5.4.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

#### Field bus CANopen

Sensor current monitoring: SDO object 2110subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Parameter byte 1: Sensor selection

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Not used	Not used	Not used	Not used	Sensor selection for input 2  00: not used 01: Pt100 10: Pt1000 11: Ni1000		Sensor selection for input 1  00: not used 01: Pt100 10: Pt1000 11: Ni1000	
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 2: Sensor current monitoring, reading options

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Not used	Protective cap monitoring on connector X2  0: Off 1: On	Protective cap monitoring on connector X1  0: Off 1: On	Temperature range  0: Pt100, Pt1000: -50 °C - +200 °C Ni1000: -50 °C - +150 °C  1: Pt100, Pt1000: -100 °C - +400 °C Ni1000: -50 °C - +200 °C	Reading refresh rate  00: 0.25 s 01: 1 s 10: 2.5 s 11: 10 s		Measurement display  00: 0.1 °C 01: 0.1 °F 10: Binary value 11: not used	
<b>Default</b>	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, "Using with the EtherCAT field bus"

Sensor current monitoring: device index: sub-index 22

Parameter byte 1: Sensor selection

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Not used	Not used	Not used	Not used	Sensor selection for input 2 00: not used 01: Pt100 10: Pt1000 11: Ni1000		Sensor selection for input 1 00: not used 01: Pt100 10: Pt1000 11: Ni1000	
<b>Default</b>	0	0	0	0	0	0	0	0

Parameter byte 2: Sensor current monitoring, reading options

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Not used	Protective cap monitoring on connector X2 0: Off 1: On	Protective cap monitoring on connector X1 0: Off 1: On	Temperature range 1: Pt100, Pt1000: -50 °C - +200 °C Ni1000: -50 °C - +150 °C 2: Pt100, Pt1000: -100 °C - +400 °C Ni1000: -50 °C - +200 °C	Reading refresh rate 00: 0.25 s 01: 1 s 10: 2.5 s 11: 10 s		Measurement display 00: 0.1 °C 01: 0.1 °F 10: Binary value 11: not used	
<b>Default</b>	0	0	0	0	0	0	0	0

## 3.5.5 Programming

### 3.5.5.1 Inputs/outputs

The module has one input byte for the network/module status and two input words for the temperature sensors' analog values.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IW0	–	–	–	–	X	X	X	X	X	X	X	X	X	X	X	X
IW1	–	–	–	–	X	X	X	X	X	X	X	X	X	X	X	X

The temperature value has a resolution of 12 bits. The content of inputs IW0 and IW1 will depend on the value selected for the **Format** parameter. If the selected format is **°C** (degrees Celsius) or **°F** (degrees Fahrenheit), the value will be represented as a signed decimal value with a resolution of 0.1 degrees. If **Binary value** is selected, the temperature sensor's raw scale value will be transmitted.

Data addressing depends on the chosen programming system.

Temperature range	Sensor type	Temperature	Indicated value at selected representation		
		°C	°C	°F	Binary value
1	Pt100/Pt1000	-50 - +200	-500 - +2000	-580 - +3920	0 - 4095

### 3 Analog module

#### 3.5 EU2E-SWD-2PT

Temperature range	Sensor type	Temperature	Indicated value at selected representation		
		°C	°C	°F	Binary value
2	Pt100/Pt1000	-100 - +400	-1000 - +4000	-1480 - +7520	0 - 4095
1	Ni1000	-50 - +150	-500 - +1500	-580 - +3020	0 - 4095
2	Ni1000	-50 - +200	-500 - +2000	-580 - +3920	0 - 4095

#### 3.5.5.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x14	Internal device fault
0x17	Out-of-range high reading on at least one temperature input
0x18	Out-of-range low reading on at least one temperature input
0x1B	No protective cap connected to connector X1
0x1C	No protective cap connected to connector X2

## 4 Counter module

### 4.1 EU1E-SWD-1CX

#### 4.1.1 Introduction

SmartWire-DT module EU1E-SWD-1CX features one counter input that can be used to integrate a simple counter, an up/down counter, or an incremental encoder into a SmartWire-DT network.

This Connection X1 provides optional 24 VDC power for the connected device.

Finally, the SmartWire-DT diagnostic LED is used to signal the network's/module's status.

#### 4.1.2 Surface mounting

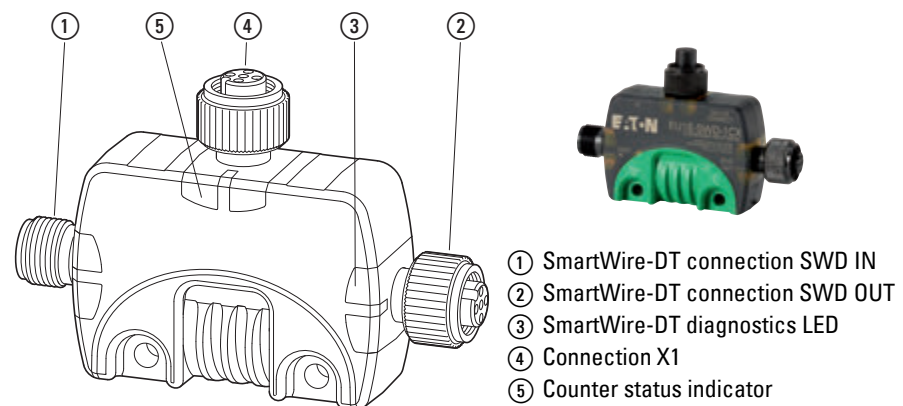


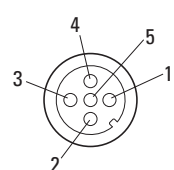
Figure 42: Connections of the EU1E-SWD-1CX module

#### 4.1.3 Engineering

##### 4.1.3.1 Plug configuration - connection X1

Connection X1 can be used to connect a unipolar 24 V incremental encoder or a 24 V universal counter.

PIN	Pinout for incremental encoder connection	Configuration for simple / up/down counter connection
1	24V	24V
2	Encoder signal B	Direction
3	0V	0V
4	Encoder signal A	Count pulse
5	Reference	Reference



Technical data → Chapter 10, "Appendix", Page 201

## 4 Counter module

### 4.1 EU1E-SWD-1CX

#### 4.1.3.2 Power supply

The module provides 24 VDC at pins 1 and 3 at Connection X1 in order to power a connected counter.

The maximum current is 70 mA.

The power supply is short-circuit proof and protected against overload and features diagnostic capabilities.

#### 4.1.4 Data profiles, parameter configuration

The counter module features three data profiles that provide a varying amount of information in the cyclical data depending on the application in question. Data not found in the cyclical data can also be accessed using acyclical data communications. The desired data profile needs to be selected in the PLC configuration.

Profile	IB0 Status	IW0, IW1 Counter value (actual value)	IW2 Frequency [Hz]	QB0 Counter control	QW0, QW1 Initial counter value	Default
1	X	X	–	X	–	X
2	X	X	X	X	–	–
3	X	X	X	X	X	–

#### 4.1.4.1 Parameter definition

Depending on the coordinator being used, the module's parameters will need to be configured in the programming system or in the SWD-Assist planning and commissioning program.

Parameter	Meaning	Default
Current monitoring on Connection X1	Sensor current monitoring on/off (→ Section 1.3, „Engineering“, page15)	off

In addition, the counter's operating mode can be pre-selected as well.

Parameter	Meaning	Default	
Counter operating mode	Incremental encoder	Scan, simple	Incremental encoder, simple scan
		Scan, double	
		scan, four-way	
	Meter	Scan, simple	
		Scan, double	



Parameter	Meaning	Default	
Frequency measurement	no frequency measurement	no frequency measurement	
	Frequency measurement		Gate time 100 ms
			Gate time 200 ms
			Gate time 500 ms
			Gate time 1000 ms

#### 4.1.4.2 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

Profile selection: SDO object 2102subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Data profile	Value [hex]
Profile 1	0X00a0D190
Profile 2	0X00A0D290
Profile 3	0XE1A0D290

Sensor current monitoring, counter options: SDO object 2110subx

(x = Position of module within the SmartWire-DT network, with the range being 1 - 99)

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X1 0: Off 1: On	–	Frequency measurement 000: no frequency measurement 001: Frequency measurement, gate time: 100 ms 010: Frequency measurement, gate time: 200 ms 011: Frequency measurement, gate time: 500 ms 100: Frequency measurement, gate time: 1,000 ms			Counter operating mode 000: Incremental encoder, simple scan 001: Incremental encoder, double scan 010: Incremental encoder, four-way scan 011: Counter, simple scan 100: Counter, double scan		
<b>Default</b>	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Sensor current monitoring, counter options

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	Sensor current monitoring X1  0: Off 1: On	–	Frequency measurement  000: no frequency measurement 001: Frequency measurement, gate time: 100 ms 010: Frequency measurement, gate time: 200 ms 011: Frequency measurement, gate time: 500 ms 100: Frequency measurement, gate time: 1,000 ms			Counter operating mode  000: Incremental encoder, simple scan 001: Incremental encoder, double scan 010: Incremental encoder, four-way scan 011: Counter, simple scan 100: Counter, double scan		
<b>Default</b>	0	0	0	0	0	0	0	0

## 4.1.5 Programming

### 4.1.5.1 Inputs/outputs

The module has one input byte for the network/module status, up to two input words for the counter value, and, optionally, two output words for an initial counter value. The referencing functionality is implemented the exact same way for both incremental encoders and simple counters. In other words, counter resetting can be implemented with an external sensor.

#### Inputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning	Applies to operating mode	
			Incremental encoder	Simple, up/down counter
0	AcRef	0: – 1: Referencing active	X	X
1	Ref	Reference status (can be reset) 0: Not referenced 1: Referenced	X	X
2	RS	Reference signal 0: Counter not at reference mark 1: Counter at reference mark	X	X

3	ZC	Zero crossing; can be reset with ZCA in output byte 0 0: Counter value ≠ 0 1: Counter value = 0	X	X
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm	X	X
5	Not used	–	–	–
6	PRSNT	0: Module not available 1: Module available	X	X
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present	X	X



After a reset, as well as after a successful referencing operation, reference status REF (bit 1) will be set

The counter value will be transmitted as a 32-bit value.

Address	Bit															
IW0	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
IW1	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

### Frequency measurement

If the "frequency measurement" function is selected when configuring the counter operating mode, the measured frequency (number of counter pulses per measuring period) will be output based on the selected measuring period. The frequency value will be output as a 16-bit value in Hz in the cyclical process data. To use this option, make sure to select data profile 2 or higher.

Address	Bit															
IW2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

### Outputs

The module has one output byte that contains control information for the referencing process and for resetting the counter. Optionally, the counter's initial value can also be set.

### Control byte QB0

Bit	designation	Meaning	Applies to operating mode	
			Incremental encoder	Simple, up/down counter
0	Hold	Stops the counting process 0: Counter enable 1: Interrupt counting	X	X
1	ActRef	Starts the referencing process 0: Referencing inactive 1: Start referencing process Setting this bit will directly result in the <b>ActRef</b> bit in status byte IB0 being set as well.	X	X
2	RefMode	Referencing operating mode 0: once The first time the reference mark is crossed, the counter will be set to its initial value. 1: permanent The counter will be set to its initial value every time the reference mark is crossed.	X	X
3	Reset	If there is a 0 → 1 transition, the counter will be set to its initial value.	X	X
4	ZCA	Zero crossing reset 0: If there is a 0 → 1 transition, bit <b>ZC</b> in status byte 0 will be cleared. 1: Clears bit <b>ZC</b> in status byte IB0	X	X
5	Not used	–	–	–
6	Not used	–	–	–
7	Not used	–	–	–



Setting the Hold bit will prevent additional counter pulses from being counted. However, it will not prevent the counter from being reset to its initial value during a referencing operation or if the Reset command is issued.

### Initial value

Normally, the counter will be set to its initial value when the reference mark is reached during referencing. The default initial value is 0, but it can be changed by the user. In order to change it, the new 32-bit initial value needs to be written to output words QW0 and QW1. These words will be available in the cyclical data only if data profile 3 is selected.

Address	Bit															
<b>QW0</b>	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
<b>QW1</b>	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Data addressing depends on the chosen programming system.

### 4.1.5.2 Acyclical programming

In addition to cyclical input and output bytes, the following acyclical objects can also be used for data access purposes. The address for each object is defined by the "ID" and "Index" parameters. Within this context, the "ID" parameter is used to specify the SmartWire-DT module's module address (= position). Meanwhile, the "Index" parameter specifies the address of the actual object. The type of acyclical data communication used will depend on the field bus and programming system being used. For more information, please refer to the documentation for the programming system you are using.

The module has three acyclical data objects available:

Index	Meaning	Length (in byte)	Access
1	Counter value	4	Read
2	Operation Frequency	2	Read
3	Initial value	4	Read/Write

Write access to the initial value (Index3) will only be permitted if data profile 1 or 2 has been selected, i.e., if presetting the initial value with cyclical output data is not possible.

### 4.1.5.3 Function

#### Referencing

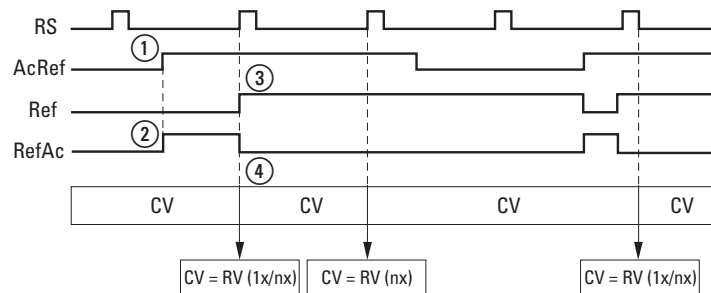


Figure 43: Referencing

Table 5: Meaning of the signals

Signal	Description
RS	Reference encoder signal
AcRef	Activate Referencing
Ref	Referenced
RefAc	Referencing activated

## 4 Counter module

### 4.1 EU1E-SWD-1CX

Signal	Description
CV	Counter value
RV	Reference value
CV = RV	The reference value overwrites the count value when setting (1x/nx): once (1x) or permanent (nx) (nx): permanent

Referencing can be carried out once or repeatedly. Generally speaking, the **Activate Referencing (AcRef)** output bit must be set in order to detect the reference signal (1). The module will then respond by setting the **Referencing Activated (RefAc)** input bit (2). This bit can be read.

If a reference pulse (3) occurs, input bit **RefAc** will be set to the 0 signal and the counter's value will be overwritten with the initial value (4). If another reference pulse occurs afterwards, the counter's value will be overwritten with the initial value only if the **RefMod** parameter (bit 2) has been set to 1.

#### X1, X2, X4 edge evaluation of counter pulses

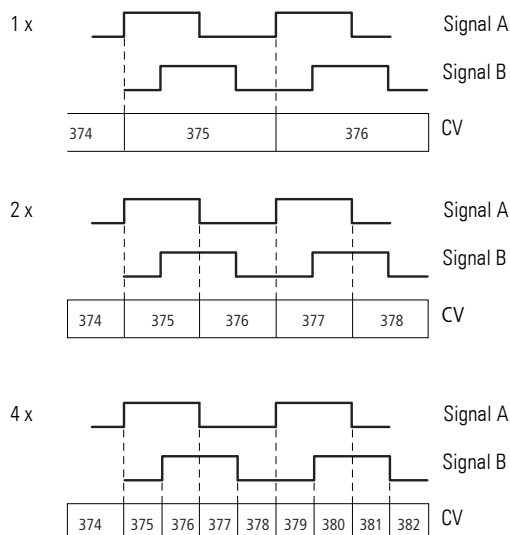


Figure 44: Edge evaluation  
CV = Counter value  
1 x = simple, 2 x = double, 4 x = four-way

#### 4.1.5.4 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Significance
0x23	Sensor power supply overload, short-circuit at Connection X1
0x1B	Message from Sensor current monitoring: No sensor detected at Connection X1 → Message only if parameter: Current monitoring is set to "on"

## 5 Valve control interface modules

### 5.1 EU1H-SWD-1XD-1 and EU1H-SWD-2XD-1

#### 5.1.1 Introduction

SmartWire-DT modules EU1H-SWD-1XD-1 and EU1H-SWD-2XD-1 can be used to directly control digital hydraulic valves with a connector conforming to DIN EN 175301-803.

#### 5.1.2 Surface mounting

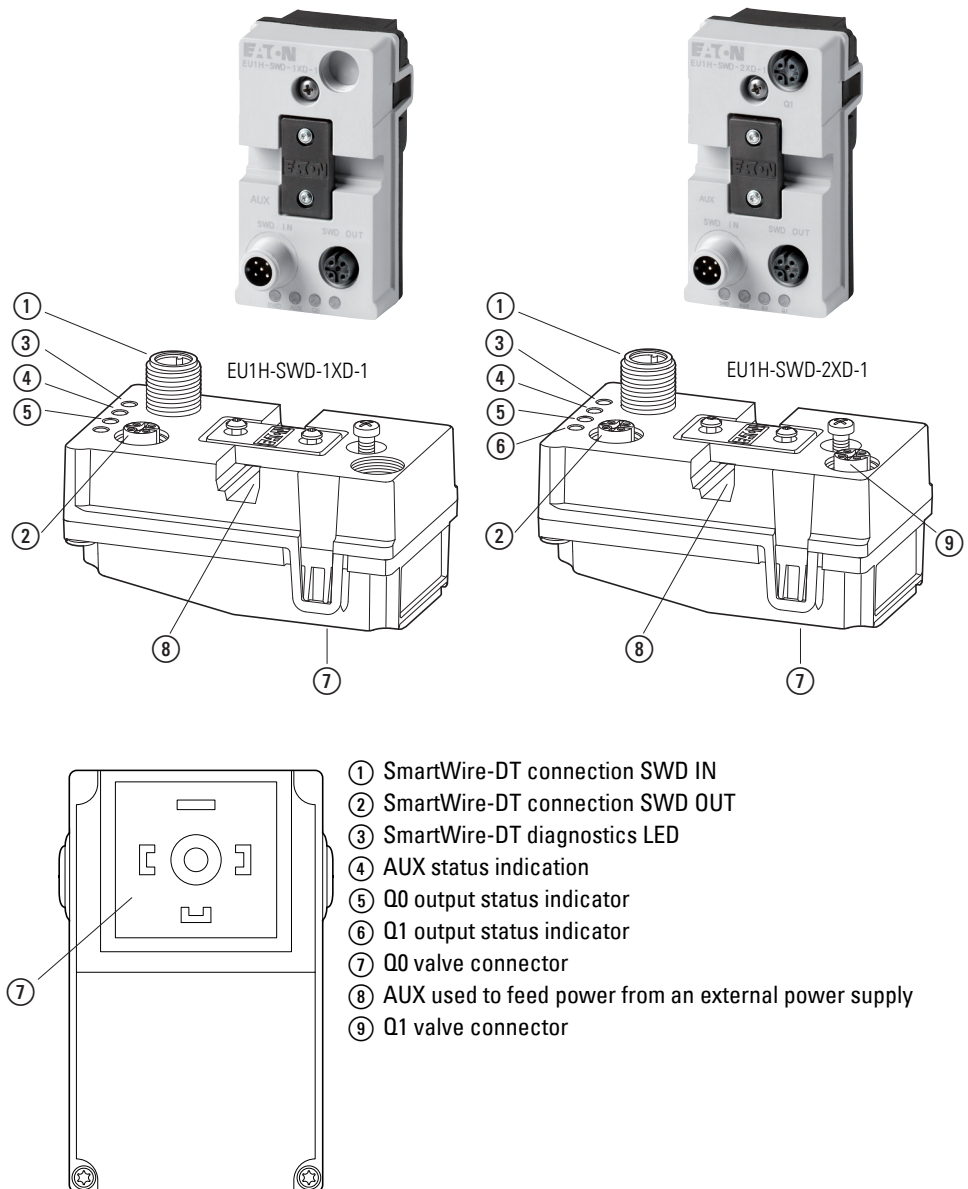


Figure 45: EU1H-SWD-... connections

## 5 Valve control interface modules

### 5.1 EU1H-SWD-1XD-1 and EU1H-SWD-2XD-1

#### 5.1.3 Projection

These SmartWire-DT modules are intended to be connected to standard hydraulic valves featuring a DIN-A connector. There are two modules available:

- EU1H-SWD-1XD-1 for a single 2-way hydraulic valve  
One digital 24 V 1.6 A output for connecting to switching valves
- and
- EU1H-SWD-2XD-1 for a single 3-way hydraulic valve  
Two digital 1.6 A outputs for connecting to two switching valves or one single 3-way valve.



When using multiple EU1H-SWD-2XD-1 SWD modules for valve control purposes, make sure not to exceed the maximum permissible cable length of 3 m between the individual modules.

Technical data → Chapter 10, "Appendix", Page 203

#### 5.1.4 Power supply

The connection to the SmartWire-DT communication system is made using an SWD4-..LR5-2S five-conductor round cable with M12 plug connectors. In addition to the required communication wires, this cable also carries the power for the modules' electronics.

The outputs are powered via the separate AUX connector used to feed power from an external power supply. An AS-Interface power cable with a current-carrying capacity of up to 16 A is used for the connection.

For UL applications a temperature stability of the power line for at least 85 °C (185 °F) is required.

Please note that this power supply must be galvanically isolated from the SmartWire-DT power supply.

The AUX status indicator will show when there is power.



Please note that if you use the self-tapping screws in the AS-Interface retainer multiple times (approx. five times) in the housing, they will no longer reliably ensure a proper connection to the AS-Interface power cable.

##### 5.1.4.1 Fusing the power supply

The following applies when fusing the  $U_{AUX}$  power supply:

###### Fusing the $U_{AUX}$ power supply

- Line protection in accordance with DIN VDE 0641 Part 11, IEC/EN 60898:
  - Miniature circuit-breaker 24 V DC rated operational current 16 A; trip type B
  - Fuse 16 A, utilization category gL/gG



- Cable protection in accordance with UL 508 and CSA-22.2 no. 14:
  - Miniature circuit-breaker 24 V DC rated operational current 10 A; trip type B
  - Fuse 10 A

### 5.1.5 Valve connections

The module's outputs can handle a maximum load of 1.6 A and are short-circuit proof and protected against overload.

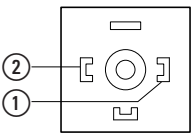
Please keep derating in mind - the permissible current as a function of ambient temperature.

Ambient temperature	max. operating frequency	max. amperage
60 °C	1 Hz	1.6 A
70 °C	1 Hz	1.3 A

#### 5.1.5.1 Primary valve connector Q0

The SmartWire-DT module is intended to be installed directly on a valve featuring a DIN-A connector. The electrical connection is made by screwing the SmartWire-DT module onto the valve.

PIN	Configuration
1	Q0
2	0V



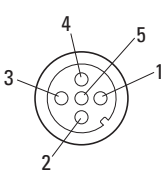
#### 5.1.5.2 Second valve connector Q1 (EU1H-SWD-2XD-1)

When using an EU1H-SWD-2XD-1, the second valve coil needs to be connected with the Q1 connector.

In this case, a standard connection cable featuring

M12 connectors and a DIN-A connector can be used to control the second valve coil.

PIN	Configuration
1	Not used
2	Not used
3	0V
4	Q 1
5	Not used



## 5 Valve control interface modules

### 5.2 Installation

#### 5.1.6 Switching valve / 3-way valve operating mode

The EU1H-SWD-2XD-1 module can be used to control one 3-way valve or two switching valves.

For the latter, the connector for output Q1 (M12 cable with connected DIN-A adapter) needs to be connected to the second switching valve. The corresponding parameters are used to configure the control configuration.

parameter	Function
3-way valve	Outputs Q0 / Q1 can only be driven alternately
Switching valve	Outputs Q0 / Q1 can also be driven simultaneously

### 5.2 Installation



Installation instruction IL120007ZU  
SWD input/output modules "EU1HE-SWD..."

- ▶ 1. Mount the EU1H-SWD... module on the valve.  
To do so, use the enclosed gasket and fixing screw (PH1 screwdriver).

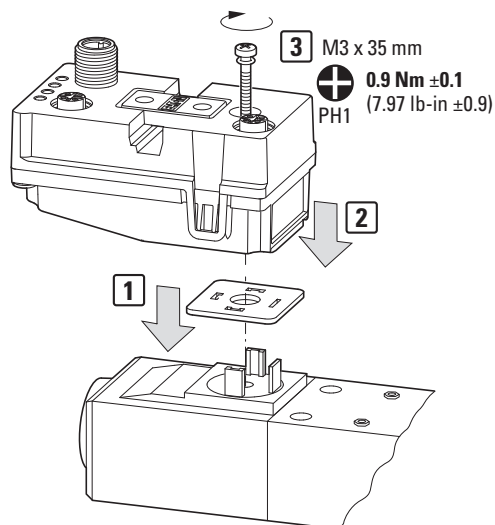


Figure 46: Mounting EU1H-SWD...

- ▶ 2. Connect the power supply.  
To do so, remove the AS-Interface retainer on the AUX connector and insert the black AS-Interface power cable into the module.  
Then use the self-tapping Torx screws (T6 screwdriver) to secure the AS-Interface power cable in the housing.



Please note that if you use the self-tapping screws in the AS-Interface retainer multiple times (approx. five times) in the housing, they will no longer reliably ensure a proper connection to the AS-Interface power cable.

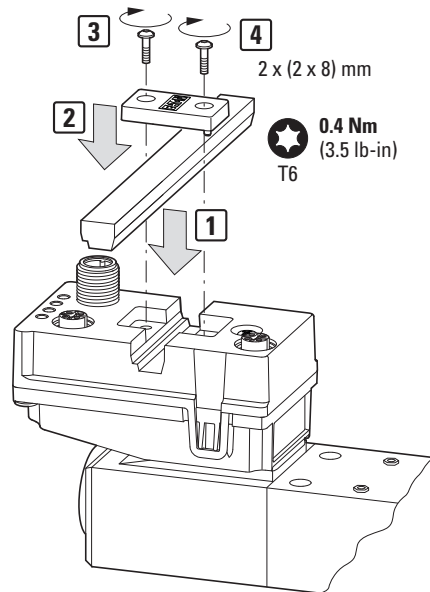


Figure 47: Connecting the AS-Interface power cable

- ▶3. SmartWire-DT SWD IN, SWD OUT connectors  
 Connect the five-conductor SWD round cables to the SWD IN and SWD OUT connectors.  
 Use the SWD4-...LR5-2S cables for this purpose.



The SmartWire-DT communication network must be in a de-energized state when making the connection!

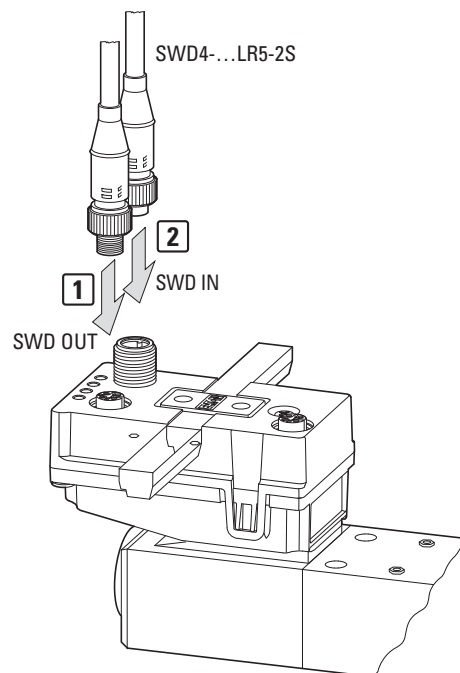


Figure 48: Connecting to SWD IN, SWD OUT

## 5 Valve control interface modules

### 5.3 Parameterization

#### ►4. EU1H-SWD-2XD-1 only

The EU1H-SWD-2XD-1 module can be used to control two switching valves or one single 3-way valve.

To make the connection to the 4-pin Q1 M12 connector, use a standard connection cable with M12 plug connectors with a DIN-A connector.

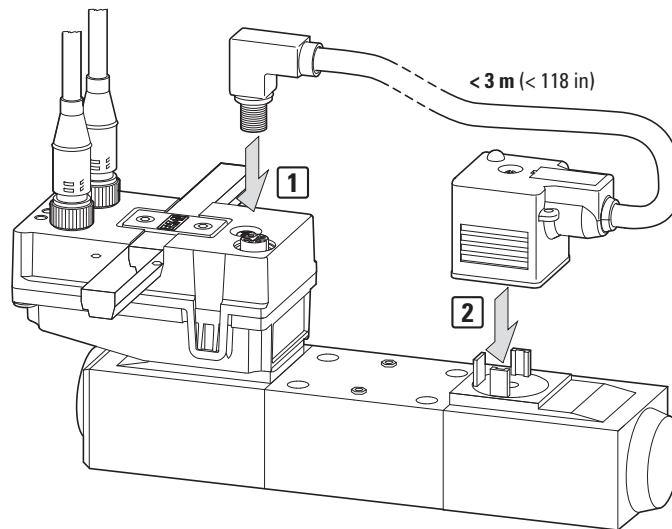


Figure 49: Connecting the second valve to the EU1H-SWD-2XD-1

### 5.3 Parameterization

The PLC configurator in the programming system can be used to set the operating mode for the EU1H-SWD-2XD-1 module.

parameter	Meaning	Default
Operating mode	3-way valve: Outputs Q0 and Q1 can only be activated alternately  Two 2-way valves: Outputs Q0 and Q1 can be activated simultaneously	3-way valve

#### 5.3.0.1 Fieldbus-specific characteristics

When using programming systems with a PLC configurator that does not provide parameter configuration support, the user will need to enter the required values of parameters.

##### Field bus CANopen

SDO object 2110subx (x =parameter byte number)

Parameter byte 1: operating mode

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	–	–	–	Operating mode 0: 3-way valve 1: 2x2-way valve
<b>Default</b>	0	0	0	0	0	0	0	0

### Fieldbus EtherCAT

Option byte: → Chapter 9, “Using with the EtherCAT field bus”

Device index: sub-index 22

Parameter byte 1: operating mode

Bit	7	6	5	4	3	2	1	0
<b>Meaning</b>	–	–	–	–	–	–	–	Operating mode 0: 3-way valve 1: 2x2-way valve
<b>Default</b>	0	0	0	0	0	0	0	0

## 5.3.1 Programming

### 5.3.1.1 Inputs/outputs

The modules have one input byte and one output byte.

#### Input points

Byte 0:

Bit	7	6	5	4	3	2	1	0
<b>designation</b>	SUBST	PRSNT	–	DIAG	–	–	–	–

Bit	designation	Meaning
0	Not used	–
1	Not used	–
2	Not used	–
3	Not used	–
4	DIAG	0: no diagnostic alarm 1: Diagnostic alarm
5	Not used	–
6	PRSNT	0: Module not available 1: Module available
7	SUBST	0: Configured module present 1: universal module EU1M-SWD-NOP present

## 5 Valve control interface modules

### 5.3 Parameterization

#### Outputs

Byte 0:

Bit	7	6	5	4	3	2	1	0
designation	-	-	-	-	-	-	Q 1	Q0

Bit	designation	Meaning
0	Q0	Actuation output Q0
1	Q 1	EU1H-SWD-2XD-1 only: output Q1 activation
2	Not used	
3	Not used	
4	Not used	
5	Not used	
6	Not used	
7	Not used	

#### 5.3.1.2 Diagnostics

In the event of a diagnosis the module reports the following error causes (0 is set for bit 4 in the input byte):

Value [hex]	Meaning
0x23	Overload, short-circuit at Connection Q0
0x24	EU1H-SWD-2XD-1 only: overload, short-circuit at Connection Q1
0x30	External power supply missing



#### **Diagnostic alarm 0x23, 0x24**

If this message is output, the corresponding outputs will be switched off.

## 6 Universal module

### 6.1 EU1M-SWD-NOP

#### 6.1.1 Introduction

Universal module EU1M-SWD-NOP can be installed as a placeholder for IP69K modules that have been configured in a system but that have not yet been installed or will only be installed in the system if the latter is expanded. The goal is to make it possible to configure and program a full system or system expansion in the corresponding PLC user program without having to physically install the required hardware right away so that modules can be easily added later on.

#### 6.1.2 Surface mounting

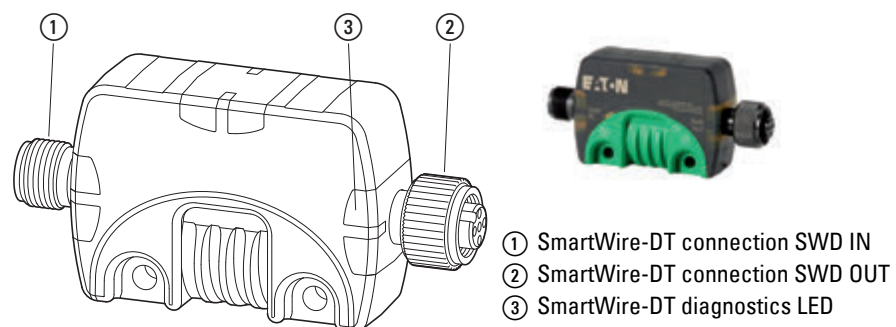


Figure 50: Connections of the EU1M-SWD-NOP module

#### 6.1.3 Engineering

Universal modules are used as placeholders in systems. This means that the SmartWire-DT modules that will later take their place are the ones that actually need to be configured in the PLC configurator. When this is done, all the corresponding input/output information will be available and the PLC program will be able to process it. The user program can detect the presence of a universal module being used as a placeholder for the module that is actually set up in the PLC configuration (bit 4 and bit 7 in the first input byte's input table). At a later date the universal modules can be replaced with the intended device to extend system functionality without having to alter program or hardware configuration. To facilitate this functionality, the PLC's user software and control configuration must fulfil a number of prerequisites.

##### Procedure:

- ▶ In the PLC's control configuration, program the SmartWire-DT modules that will be required at a later date in addition to the ones that will be installed and used immediately. In addition, the "Can be replaced with universal module" parameter needs to be enabled for the modules that will be required at a later date.

## 6 Universal module

### 6.1 EU1M-SWD-NOP

- ▶ In the user program, query whether the originally configured SmartWire-DT module is installed or whether a universal module is installed (the SUBST bit in status byte IB0 will have a value of 1 if there is a universal module installed). The program flow must be controlled according to this information.
- ▶ Install the universal module instead of the planned module in the hardware configuration. If the universal module is later replaced with the originally planned SmartWire-DT module, press the **Config.** button on the gateway in order to incorporate the new module into the SmartWire-DT network.

Technical data → Chapter 10, "Appendix", Page 205

#### 6.1.4 Programming

Universal modules do not have any input/output data of their own. The user program will instead show the data corresponding to the configured module. the SUBST bit (bit 7) in status byte IB0 (SUBST = Substitute) will be set in order to let the PLC know that there is a universal module instead of the module configured in the PLC.

##### 6.1.4.1 Diagnostics

If the universal module is plugged in, the module will not send any diagnostic messages.



## 7 Power supply

### 7.1 EU1S-SWD-PF1-2

#### 7.1.1 Introduction

SmartWire-DT module EU1S-SWD-PF1-2 can be used as an additional feeder module for feeding the 24 VDC supply voltage required for the SmartWire-DT network. This voltage is used to power both SmartWire-DT modules and connected sensors and actuators.

#### 7.1.2 Surface mounting

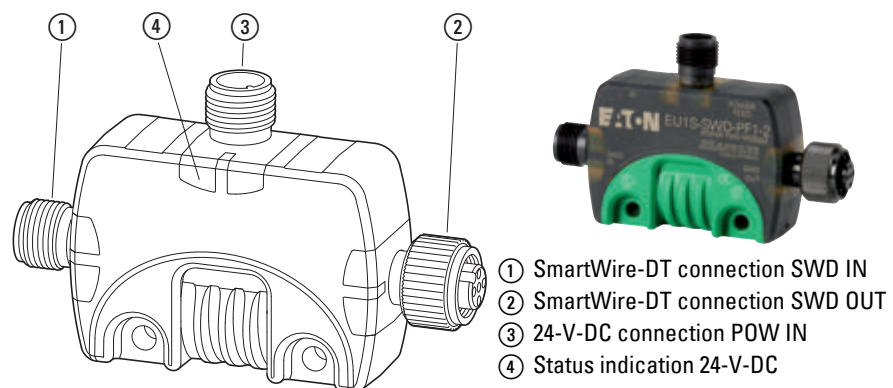


Figure 51: Connections of the EU1S-SWD-PF1-2 module

#### 7.1.3 Engineering

##### Supply

The supply voltage is fed at the POW IN M12 plug connector. The 24 VDC voltage being fed must be galvanically isolated from other feeder modules in the relevant SmartWire-DT network.

##### cable protection

The M12 cables are sized for a maximum current load of 4 A. To fuse the 24 VDC supply at the connector for POW IN, use the following in accordance with DIN VDE 0641 Part 11, IEC/EN 60898 or UL 508 and CSA-22.2 No. 14:

- Miniature circuit-breaker 24 V DC rated operational current 4 A; trip type B or
- Fuse 4 A, utilization category gL/gG

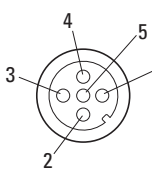
If there will be a transition from the M12 cable to the SWD ribbon cable later on, the fuse's specifications must be adjusted accordingly, as the SWD ribbon cable has a reduced ampacity of 3 A (CE) / 2 A (UL).



Please refer to the hardware engineering chapter in the "SmartWire-DT - The System" manual.

### 7.1.3.1 Plug configuration - connection X1

PIN	Configuration
1	24 V DC
2	Not used
3	0V
4	Not used
5	Not used



Technical data → Chapter 10, "Appendix", Page 207

## 8 Accessories

### 8.1 Local SmartWire-DT branch EU2A-SWD-PBWN

#### 8.1.1 Introduction

SmartWire-DT module EU2A-SWD-PBWN can be used to set up a local SmartWire-DT network.

#### 8.1.2 Surface mounting

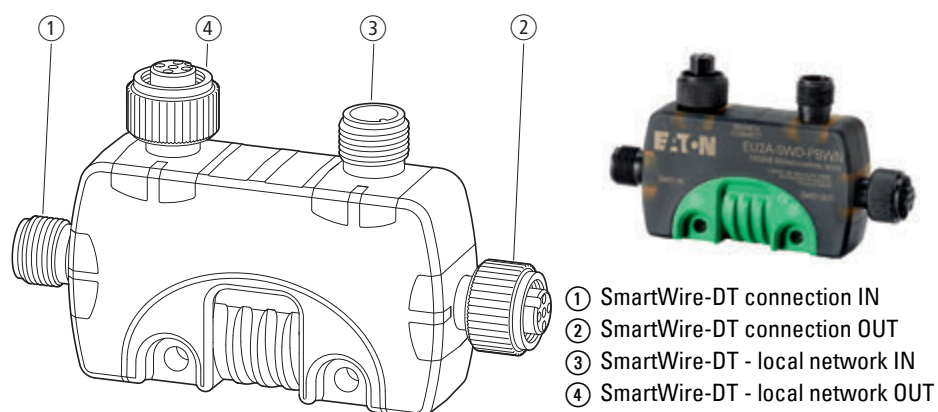


Figure 52: Connections of the EU2A-SWD-PBWN module

## 8 Accessories

### 8.1 Local SmartWire-DT branch EU2A-SWD-PBWN

#### 8.1.3 Engineering

Module EU2A-SWD-PBWN can be used to connect SmartWire-DT modules if a SmartWire-DT network deviates from the usual line topology. The length of the resulting local network must not exceed 10 m.

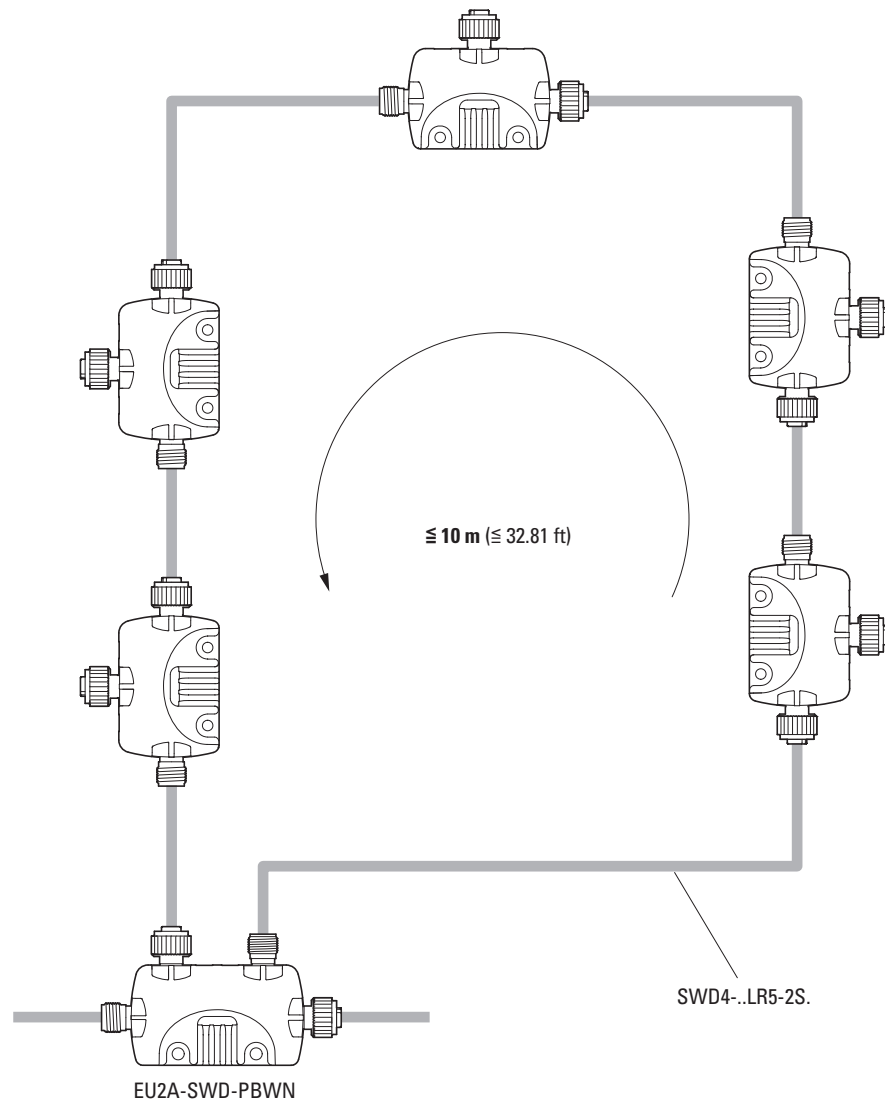


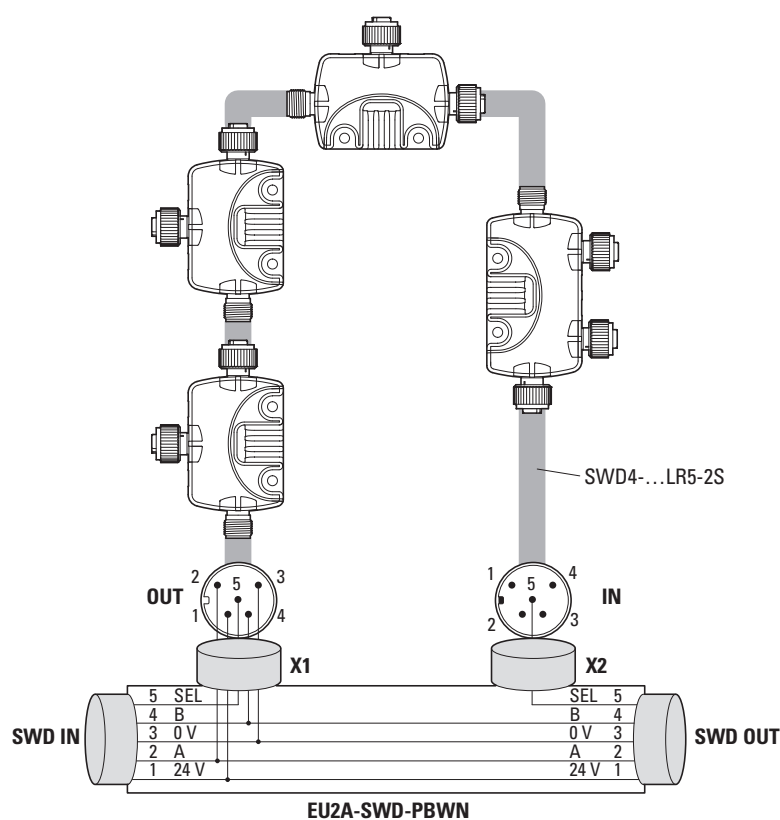
Figure 53: Local network

Please use SWD4-...LR5-2S SmartWire-DT cables to connect the modules in a local network.

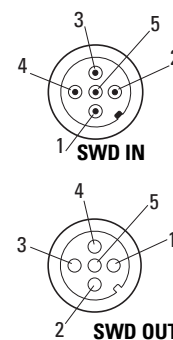
**NOTICE**

The addressing cable is split in module EU2A-SWD-PBWN and is then routed through the local network.

If there is a module missing from the local network (or if a plug on the EU2A-SWD-PBWN module is disconnected), only the modules up to the point where the cable's continuity is interrupted will be detected when reading a new configuration (when the configuration button on the SmartWire-DT coordinator is pressed).

**8.1.3.1 Plug configuration - connection OUT, IN**

PIN	Configuration OUT	Configuration IN
1	24 V DC	Not used
2	Communication cable A	Not used
3	0V	Not used
4	Communication cable B	Not used
5	Addressing cable SEL OUT	Addressing cable SEL IN



Technical data → Chapter 10, "Appendix", Page 209

## 8 Accessories

### 8.1 Local SmartWire-DT branch EU2A-SWD-PBWN

## 9 Using with the EtherCAT field bus

The EtherCAT PLC configurator needs device description files in XML format (ESI files, where ESI = EtherCAT Slave Information) for configuration purposes (for selecting and configuring SWD modules). In addition to process data information, these ESI files also contain a series of elements for each SmartWire-DT module, such as a module ID (Product Code), configuration data (CFG), device options (Options), and additional device parameters (Parameters).

If a SmartWire-DT module is installed, the configuration software (e.g., Twin-CAT; → see also below) will assign these data sets to each module as follows (all values in hexadecimal format):

Module 1: Index 0x8000 (example)

- Module ID (Product Code): Sub-index 06
- Configuration data (CFG): Sub-index 20
- Device options (Options): Sub-index 21
- Device parameters (Parameters): Sub-index 22

The gateway needs the module ID (Product Code) in sub-index 06 and the configuration data (CFG) in sub-index 20 for identification and configuration purposes. **Do not modify** this data!

In contrast, the device options (Options) in sub-index 21 and the device parameters (Parameters) in sub-index 22 can be modified if necessary.

### Device options

The device options (Options) in sub-index 21 are identical for all SWD modules. They contain two pieces of information that can be modified:

Bit 1: Module is optional/not optional

Bit 4: Module can be replaced/cannot be replaced with a universal module

The corresponding option byte contains additional information that should not be modified.

Table 6: Option byte

Bit	Meaning	Note
0	Module features extended parameters	Do not change this bit's value!
1	Module is optional	FALSE (0): Data communications on the SmartWire-DT network will continue even if the module is missing. TRUE (1): No data communications on the SmartWire-DT network if the module is missing (default setting).
2	CRC8 checksum	Do not change this bit's value!
3	Data format	Do not change this bit's value!
4	Can be replaced with universal module	FALSE (0): It is not permitted for the device to be replaced with a universal module (default setting). TRUE (1): It is permitted for the device to be replaced with a universal module.

## 9 Using with the EtherCAT field bus

Bit	Meaning	Note
5	reserved	Do not change this bit's value!
6	Module features data profiles	Do not change this bit's value!
7	Module supports acyclical data communications	Do not change this bit's value!

Since the EtherCAT configurator only allows for whole bytes to be written, the required value needs to be determined individually and the corresponding option byte must then be overwritten.

### Example

Analog module EU5E-SWD-2A2A has the following entries:

PS	CoE	0x8000.06	0x01060504 (17171716)	Product code EU5E-SWD-2A2A
PS	CoE	0x8000.20	0x00E1D110 (14799120)	CFG EU5E-SWD-2A2A
PS	CoE	0x8000.21	0x83 (131)	Options EU5E-SWD-2A2A
PS	CoE	0x8000.22	0x5002 (20482)	Parameters EU5E-SWD-2A2A

Option byte receives a value of 0x83.

Bit	Meaning	Note	Default	New
0	Module features extended parameters	Do not change this bit's value!	1	1
1	Module is optional	FALSE (0): Data communications on the SmartWire-DT network will continue even if the module is missing. TRUE (1): No data communications on the SmartWire-DT network if the module is missing (default setting).	1	0
2	CRC8 checksum	Do not change this bit's value!	0	0
3	Data format	Do not change this bit's value!	0	0
4	Can be replaced with universal module	FALSE (0): It is not permitted for the device to be replaced with a universal module (default setting). TRUE (1): It is permitted for the device to be replaced with a universal module.	0	0
5	reserved	Do not change this bit's value!	0	0
6	Module features data profiles	Do not change this bit's value!	0	0
7	Module supports acyclical data communications	Do not change this bit's value!	1	1

If you wanted data communications on the SmartWire-DT network to continue even when the module is not present, bit 1 would need to be set to 0. The option byte's new value would then be 0x81.



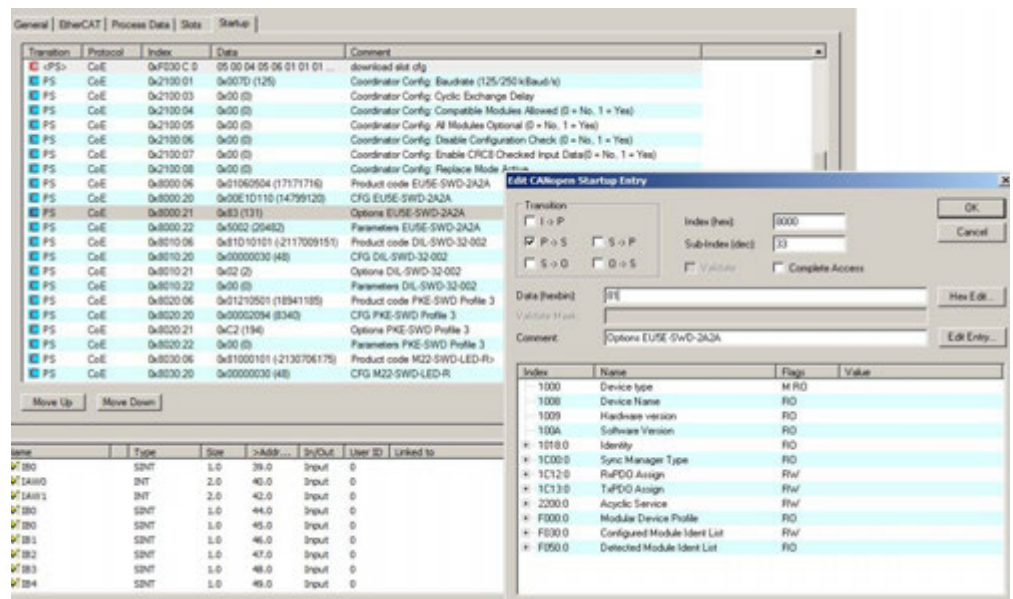


Figure 54: Changing the value of the option byte for module EU5E-SWD-2A2A

### Device parameter

Device parameters are module-specific and make it possible to individually modify module properties. For example, they can be used to select the type of sensor (Pt100, Pt100, Ni1000) and the temperature range in temperature modules. These parameters, together with their corresponding values, are described in the documentation for the individual modules. The values need to be entered the same way as previously with the option byte.

What needs to be considered here is that a length byte, which defines the total length of the parameter data including the length bytes, always precedes the parameter bytes. The presentation of the parameter data depends on the programming system used, and also, in part, on the structure of the parameter data.

### Programming system TwinCAT

If the modules have 1, 2 or 4 bytes including the length bytes, they are shown in the overview as a hexadecimal value, otherwise in ascending order.

### Example 1: EU5E-SWD-2A2A analog module



The module has a parameter byte and also a length byte.

The **low byte** contains the length value 0 x 02 (1 parameter length byte + 1 parameter byte).

➔ Do not change this value!

The **high byte** contains the parameter value 0x 50 (all 0 - 10 V, average value generation for the analog inputs switched on at 100 ms)

### Example 2: EU5E-SWD-4PT temperature acquisition module



The module has two parameter bytes and one length byte as well, so a total of three bytes. In this case, no hexadecimal values is shown in TwinCat Manager, but instead the values are output in the byte series, so the exact opposite of the hexadecimal presentation.

The length byte is 3, the two parameter bytes 0, which means that no temperature sensor has been defined (pre-setting)

### Changing parameter values

The parameters are changed the same way that option bytes as changed. Press on the **Edit** button to open the dialog where you can change the parameter values. Here, irrespective of the number of parameter data, the values in the hexadecimal presentation are output in ascending order; so

Length byte

Parameter byte 1:

Parameter byte 2

...

For the two examples above, this means:

- EU5E-SWD-2A2A module:
  - Length byte: 2
  - Parameter byte 1: 50
- EU5E-SWD-4PT module:
  - Length byte: 3
  - Parameter byte 1: 00
  - Parameter byte 2: 00

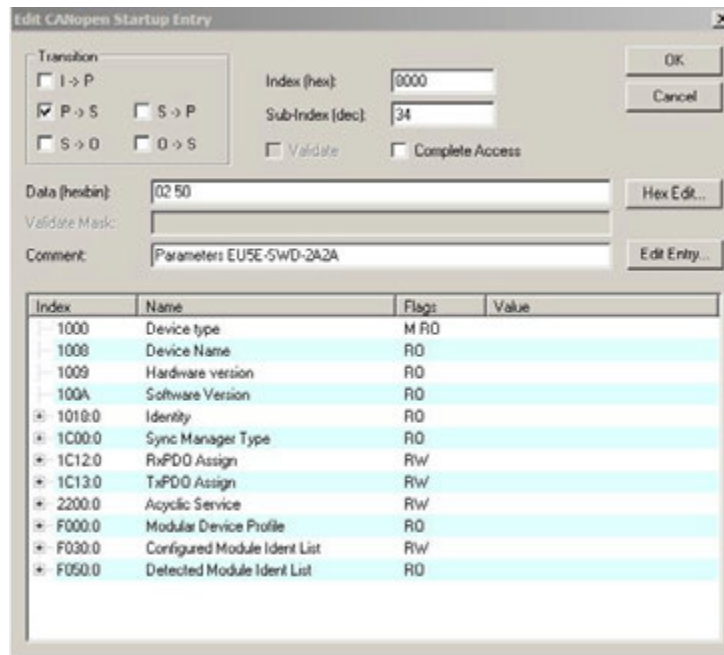


Figure 55: Dialog window in which parameter values are entered or changed

## 9 Using with the EtherCAT field bus

## 10 Appendix

### 10.1 Technical Data T-Connectors

#### 10.1.1 I/O modules, digital EU1E-SWD-...

	EU1E-SWD-1DX	EU1E-SWD-2DX	EU1E-SWD-2DD
	174710	174711	174715
<b>General</b>			
Standards	IEC/EN 61131-2		
Dimensions (W x H x D)	85.6 mm x 56.9 mm x 20.1 mm		
Weight	0.07 kg		
Mounting	DIN-rail, screw fixing (M4), mounting section (Clip M20)		
Mounting position	Any		
<b>Ambient climatic conditions</b>			
Climatic proofing	Dry heat according to IEC 60068-2-2 damp heat according to EN 60068-2-3		
Air pressure (in operation)	795 - 1080 hPa		
Operating ambient temperature (IEC 60068-2)	- 25 - + 70 °C		
Storage / Transport	- 40 + 70 °C		
<b>Ambient mechanical conditions</b>			
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K		
Vibrations (IEC/EN 61131-2:2008)			
constant amplitude 3.5 mm	5 - 8.4 Hz		
Constant acceleration, 1 g	8.4 - 150 Hz		
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 Impact resistances		
Drop (IEC/EN 60068-2-31) drop height	50 mm		
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m		

## 10 Appendix

### 10.1 Technical Data T-Connectors

	EU1E-SWD-1DX 174710	EU1E-SWD-2DX 174711	EU1E-SWD-2DD 174715
<b>Electromagnetic compatibility (EMC)</b>			
Overvoltage category	II		
Degree of pollution	3		
Electrostatic discharge (IEC/EN 61131-2:2008)			
Air discharge (Level 3)	8 kV		
Contact discharge (Level 2)	4 kV		
Electromagnetic fields (IEC/EN 61131-2:2008)			
80 - 1000 MHz	10V/m		
1.4 - 2 GHz	3V/m		
2 - 2.7 GHz	1 V/m		
Radio interference suppression	EN 55011 Class A		
Burst (IEC/EN 61131-2:2008, Level 3)			
Supply cable	2 kV		
Signal cables	1 kV		
SmartWire-DT cables	1 kV		
Surge (IEC/EN 61131-2:2008, Level 1)			
Surge supply cables	0.5 kV		
Surge I/O cables	1 kV		
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V		
<b>SmartWire-DT network</b>			
Module type	SmartWire-DT module (slave)		
Setting the baud rate	Automatic		
Baud rate (data transfer speed)	max. 2000 kbps		
Status SmartWire-DT LED	green		
<b>Connection</b>			
SWD-IN	M12 plug (A-keyed), 5-pin		
SWD-OUT	M12 socket (A-keyed), 5-pin		
Current consumption (24V, without sensor and without I/O supply)	50 mA	55 mA	55 mA
Sensor supply			
Max. current consumption per M12 I/O plug	70 mA		
- Overload and short-circuit proof	yes, with diagnostics		

## 10 Appendix

### 10.1 Technical Data T-Connectors

	EU1E-SWD-1DX 174710	EU1E-SWD-2DX 174711	EU1E-SWD-2DD 174715
<b>Digital inputs</b>			
Number of digital inputs/outputs	-	2	2, configurable as input or output
Quantity	-	-	$\leq 2$
Input current	-	-	normally 4 mA at 24 V DC
Voltage level to IEC/EN 61131-2	-	-	-
Limit value type 1	-	-	Low < 5 V DC; High > 15 V DC
Input delay	-	-	High->Low < 0.2 ms Low->High < 0.2 ms
Status indication inputs LED	-	-	yellow
<b>Digital semi-conductor outputs</b>			
Quantity	-	-	$\leq 2$
Output current	-	-	0.5 A
Short-circuit tripping current	-	-	max. 1.2 A over 3 ms
Lamp load $R_{LL}$	-	-	$\leq 3W$
Overload proof	-	-	yes, with diagnostics
Switching capacity	-	-	EN 60947-5-1 utilization category DC-13
Status indication outputs LED	-	-	yellow
<b>Potential isolation</b>			
Output to output	-	-	no
Output to input	-	-	no
Inputs for SmartWire-DT	-	-	no
Outputs to SmartWire-DT	-	-	no
Input to input	-	-	no

## 10 Appendix

### 10.1 Technical Data T-Connectors

#### 10.1.2 I/O modules, digital EU2E-SWD-...

	EU2E-SWD-2DX 174725	EU2E-SWD-4DX 174726	EU2E-SWD-2DD 174730	EU2E-SWD-4DD 174732	EU2E-SWD-4DD-1 180406
<b>General</b>					
Standards	IEC/EN 61131-2				
Dimensions (W x H x D)	98.0 mm x 56.9 mm x 20.1 mm				
Weight	0.09 kg				
Mounting	DIN-rail, screw fixing (M4), mounting section (Clip M20)				
Mounting position	Any				
<b>Ambient climatic conditions</b>					
Climatic proofing	Dry heat according to IEC 60068-2-2 damp heat according to EN 60068-2-3				
Air pressure (in operation)	795 - 1080 hPa				
Operating ambient temperature (IEC 60068-2)	- 25 - + 70 °C				
Storage / Transport	- 40 + 70 °C				
<b>Ambient mechanical conditions</b>					
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K				
Vibrations (IEC/EN 61131-2:2008)					
constant amplitude 3.5 mm	5 - 8.4 Hz				
Constant acceleration, 1 g	8.4 - 150 Hz				
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 Impact resistances				
Drop (IEC/EN 60068-2-31) drop height	50 mm				
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m				
<b>Electromagnetic compatibility (EMC)</b>					
Overvoltage category	II				
Degree of pollution	3				
Electrostatic discharge (IEC/EN 61131-2:2008)					
Air discharge (Level 3)	8 kV				
Contact discharge (Level 2)	4 kV				
Electromagnetic fields (IEC/EN 61131-2:2008)					
80 - 1000 MHz	10 V/m				
1.4 - 2 GHz	3 V/m				
2 - 2.7 GHz	1 V/m				
Radio interference suppression	EN 55011 Class A				
Burst (IEC/EN 61131-2:2008, Level 3)					
Supply cable	2 kV				
Signal cables	1 kV				
SmartWire-DT cables	1 kV				
Surge (IEC/EN 61131-2:2008, Level 1)					
Surge supply cables	0.5 kV				
Surge I/O cables	1 kV				
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V				



## 10 Appendix

### 10.1 Technical Data T-Connectors

	<b>EU2E-SWD-2DX</b> 174725	<b>EU2E-SWD-4DX</b> 174726	<b>EU2E-SWD-2DD</b> 174730	<b>EU2E-SWD-4DD</b> 174732	<b>EU2E-SWD-4DD-1</b> 180406
<b>SmartWire-DT network</b>					
Module type	SmartWire-DT module (slave)				
Setting the baud rate	Automatic				
Baud rate (data transfer speed)	max. 2000 kbps				
Status SmartWire-DT LED	green				
<b>Connection</b>					
SWD-IN	M12 plug (A-keyed), 5-pin				
SWD-OUT	M12 socket (A-keyed), 5-pin				
Current consumption (24V, without sensor and without I/O supply) $I_e$	64 mA	72 mA	58 mA	75 mA	75 mA
Sensor supply					
Max. current consumption per M12 I/O plug	70 mA				
- Overload and short-circuit proof	yes, with diagnostics				
<b>Digital inputs</b>					
Number of digital inputs/outputs	2	4	2, configurable as input or output	4, configurable as input or output	4, configurable as input or output
Number	2	4	2	4	4
Input current	normally 4 mA at 24 V DC				
Voltage level to IEC/EN 61131-2	-				
Limit value type 1	Low < 5 V DC; High > 15 V DC				
Input delay	High->Low < 0.2 ms Low->High < 0.2 ms				
Status indication inputs LED	yellow				
<b>Digital semi-conductor outputs</b>					
Quantity	-	-	2	4	4
Output current	-	-	0.5 A	0.5 A	0.5 A
Short-circuit tripping current	-	-	max. 1.2 over 3 ms	max. 1.2 over 3 ms	max. 1.2 over 3 ms
Lamp load $R_{LL}$	-	-	-	-	$\leq 3$ W
Overload proof	-	-	yes, with diagnostics	yes, with diagnostics	yes, with diagnostics
Switching capacity	-	-	EN 60947-5-1 utilization category DC-13	EN 60947-5-1 utilization category DC-13	EN 60947-5-1 utilization category DC-13
Status indication outputs LED	-	-	yellow	yellow	yellow
<b>Potential isolation</b>					
Output to output	-	-	no	no	no
Output to input	no	-	no	no	no
Inputs for SmartWire-DT	no	no	no	no	no
Outputs to SmartWire-DT	no	-	no	no	no
Input to input	-	no	no	no	no

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### 10.1 Technical Data T-Connectors

#### 10.1.3 I/O modules, analog EU1E-SWD-..., EU2E-SWD-...

	EU1E-SWD-1AX-1 174717	EU1E-SWD-1AX-2 174718	EU1E-SWD-1XA-1 174719	EU1E-SWD-1XA-2 174720	EU2E-SWD-2PT 174733
<b>General</b>					
Standards	IEC/EN 61131-2				
Dimensions (W x H x D) mm	85.6 x 56.9 x 20.1	85.6 x 56.9 x 20.1	85.6 x 56.9 x 20.1	85.6 x 56.9 x 20.1	98.0 x 56.9 x 20.1
Weight	0.07 kg	0.07 kg	0.07 kg	0.07 kg	0.09 kg
Mounting	DIN-rail, screw fixing (M4), mounting section (Clip M20)				
Mounting position	Any				
<b>Ambient climatic conditions</b>					
Climatic proofing	Dry heat according to IEC 60068-2-2 damp heat according to EN 60068-2-3				
Air pressure (in operation)	795 - 1080 hPa				
Operating ambient temperature (IEC 60068-2)	- 25 - + 70 °C				
Storage / Transport	- 40 - + 70 °C				
<b>Ambient mechanical conditions</b>					
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K				
Vibrations (IEC/EN 61131-2:2008)					
constant amplitude 3.5 mm	5 - 8.4 Hz				
Constant acceleration, 1 g	8.4 - 150 Hz				
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 Impact resistances				
Drop to IEC/EN 60068-2-31	50 mm				
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m				
<b>Electromagnetic compatibility (EMC)</b>					
Overvoltage category	II				
Degree of pollution	3				
Electrostatic discharge (IEC/EN 61131-2:2008)					
Air discharge (Level 3)	8 kV				
Contact discharge (Level 2)	4 kV				
Electromagnetic fields (IEC/EN 61131-2:2008)					
80 - 1000 MHz	10 V/m				
1.4 - 2 GHz	3 V/m				
2 - 2.7 GHz	1 V/m				
Radio interference suppression	EN 55011 Class A				
Burst (IEC/EN 61131-2:2008, Level 3)					
Supply cable	2 kV				
Signal cables	1 kV				
SmartWire-DT cables	1 kV				
Surge (IEC/EN 61131-2:2008, Level 1)					
Surge supply cables	0.5 kV				
Surge I/O cables	1 kV				
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V				

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### 10.1 Technical Data T-Connectors

	EU1E-SWD-1AX-1 174717	EU1E-SWD-1AX-2 174718	EU1E-SWD-1XA-1 174719	EU1E-SWD-1XA-2 174720	EU2E-SWD-2PT 174733
<b>SmartWire-DT network</b>					
Module type	SmartWire-DT module (slave)				
Setting the baud rate	Automatic				
Baud rate (data transfer speed)	max. 2000 kbps				
Status SmartWire-DT LED	green				
<b>Connection</b>					
SWD-IN	M12 plug (A-keyed), 5-pin				
SWD-OUT	M12 socket (A-keyed), 5-pin				
Current consumption (24V, without sensor and without I/O supply) I <sub>e</sub>	30 mA	30 mA	40 mA	50 mA	35 mA
<b>SmartWire-DT network</b>					
Sensor supply					
Max. current consumption per M12 I/O plug	70 mA	70 mA	70 mA	70 mA	-
-- Overload and short-circuit proof	yes, with diagnostics	yes, with diagnostics	yes, with diagnostics	yes, with diagnostics	-
<b>Analog inputs</b>					
Number	1 (2-wire connection, screened, length < 10 m)		-	-	-
Parameter definition					
Type	Voltage	Current	-	-	-
Averaging	adjustable	adjustable	-	-	-
Voltage					
Input voltage	0 - 10 V	-	-	-	-
Input resistance	13.3 kΩ	-	-	-	-
Current					
Input current	-	0 - 20 mA	-	-	-
Input resistance	-	< 250 Ω	-	-	-
Resolution	12 Bit	12 bits	-	-	-
Conversion time	20 ms	20 ms	-	-	-
Cumulative error	± 1 %	± 1 %	-	-	-
Repetition accuracy	± 0.5 %	± 0.5 %	-	-	-
Electric strength	± 30 V	± 30 V	-	-	-
<b>Analog outputs</b>					
Number	-	-	1 (2-wire connection, screened)		-
Parameter definition					
Type	-	-	Voltage	Current	-
Voltage					
Output voltage	-	-	0 - 10 V	-	-
Max. output current	-	-	10 mA	-	-
Current					
Output current	-	-	-	0 - 20 mA	-
Load resistance	-	-	-	< 500 Ω	-
-- Overload and short-circuit proof	-	-	yes	yes	-
Resolution	-	-	12 bits	12 bits	-
Conversion time	-	-	20 ms	20 ms	-
Cumulative error	-	-	± 1 %	± 1 %	-
Repetition accuracy	-	-	± 0.5	± 0.5	-

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### 10.1 Technical Data T-Connectors

	EU1E-SWD-1AX-1 174717	EU1E-SWD-1AX-2 174718	EU1E-SWD-1XA-1 174719	EU1E-SWD-1XA-2 174720	EU2E-SWD-2PT 174733
<b>Temperature inputs</b>					
Number	-	-	-	-	2 (two-, three-wire connection, screened, length < 10 m)
Parameter definition					
Averaging	-	-	-	-	adjustable
Temperature sensor	-	-	-	-	PT100, PT1000, Ni1000
Temperature range	-	-	-	-	PT100, PT1000: -100°C - +400°C Ni1000: -50°C - +200°C
Resolution	-	-	-	-	0.1 °C
Conversion time	-	-	-	-	250 ms
Representation	-	-	-	-	°C, °F, nonlinear
Cumulative error	-	-	-	-	± 1 %
Repetition accuracy	-	-	-	-	± 0.5 %
<b>Potential isolation</b>					
Output to output	-	-	-	-	-
Output to input	-	-	-	-	-
Inputs for SmartWire-DT	no	no	-	-	no
Outputs to SmartWire-DT	-	-	no	no	-
Input to input	no	no	-	-	no

## 10.2 Technical data Block Modules

### 10.2.1 I/O modules, digital EU6E-SWD-...

	EU6E-SWD-4DX	EU6E-SWD-8DX	EU6E-SWD-8DD
	174735	174736	174742
<b>General</b>			
Standards	IEC/EN 61131-2		
Dimensions (W x H x D)	60 mm x 157 mm x 34 mm		
Weight	0.25 kg		
Mounting	Screw fixing (M4)		
Mounting position	Any		
<b>Ambient climatic conditions</b>			
Climatic proofing	Dry heat according to IEC 60068-2-2, damp heat according to EN 60068-2-3		
Air pressure (in operation)	795 - 1080 hPa		
Operating ambient temperature (IEC 60068-2)	- 25 - + 55 °C		
Storage / Transport	- 40 - + 70 °C		
<b>Ambient mechanical conditions</b>			
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K		
Vibrations (IEC/EN 61131-2:2008)			
constant amplitude 3.5 mm	5 - 8.4 Hz		
Constant acceleration, 1 g	8.4 - 150 Hz		
Mechanical shock resistance (IEC/EN 60068-2-27), half sine shock: 30 g/11 ms	9 Impact resistances		
Drop to IEC/EN 60068-2-31	50 mm		
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m		
<b>Electromagnetic compatibility (EMC)</b>			
Overvoltage category	II		
Degree of pollution	3		
Electrostatic discharge (IEC/EN 61131-2:2008)			
Air discharge (Level 3)	8 kV		
Contact discharge (Level 2)	4 kV		
Electromagnetic fields (IEC/EN 61131-2:2008)			
80 - 1000 MHz	10 V/m		
1.4 - 2 GHz	3 V/m		
2 - 2.7 GHz	1 V/m		
Radio interference suppression	EN 55011 Class A		
Burst (IEC/EN 61131-2:2008, Level 3)			
Supply cable	2 kV		
Signal cables	1 kV		
SmartWire-DT cables	1 kV		
Surge (IEC/EN 61131-2:2008, Level 1)			

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### 10.2 Technical data Block Modules

	<b>EU6E-SWD-4DX</b>	<b>EU6E-SWD-8DX</b>	<b>EU6E-SWD-8DD</b>
	174735	174736	174742
Surge supply cables	0.5 kV		
Surge I/O cables	1 kV		
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V		
<b>SmartWire-DT network</b>			
Module type	SmartWire-DT module (slave)		
Setting the baud rate	Automatic		
Baud rate (data transfer speed)	max. 2000 kbps		
Status SmartWire-DT LED	green		
<b>Connection</b>	-		
SWD-IN	M12 plug (A-keyed), 5-pin		
SWD-OUT	M12 socket (A-keyed), 5-pin		
Current consumption (24 V SWD supply)			
Current consumption	62 mA	90 mA	106 mA
Sensor supply			
Max. current consumption per M12 I/O plug	70 mA		
- Overload and short-circuit proof	yes, with diagnostics		
<b>Digital inputs</b>			
Number of digital inputs/outputs	-	-	8, configurable as input or output
Quantity	4	8	4
Input current	normally 4 mA at 24 V DC		
Voltage level to IEC/EN 61131-2	-	-	-
Limit value type 1	Low < 5V DC; High > 15V DC		
Input delay	High->Low < 0.2 ms Low->High < 0.2 ms		
Status indication inputs LED	yellow		
<b>Digital semiconductor outputs</b>			
Quantity	-	-	4
Output current	-	-	0.5 A
Short-circuit tripping current	-	-	max. 1.2 A over 3 ms
lamp load	-	-	≤ 3 W
Overload proof	-	-	yes, with diagnostics
Switching capacity	-	-	EN 60947-5-1 utilization category DC-13
Status indication outputs LED	-	-	yellow
<b>Potential isolation</b>			
Output to output	-	-	No
Output to input	-	-	No
Inputs for SmartWire-DT	No	No	No
Outputs to SmartWire-DT	-	-	No
Input to input	No	No	No

### 10.2.2 I/O modules, digital EU6E-SWD-...-1

	EU6E-SWD-2D2D-1 183264	EU6E-SWD-4D4D-1 183266	EU6E-SWD-4XD-1 183268	EU6E-SWD-8XD-1 183270
<b>General</b>				
Standards	IEC/EN 61131-2			
Dimensions (W x H x D)	60 mm x 157 mm x 34 mm			
Weight	0.25			
Mounting	Screw fixing (M4)			
Mounting position	Any			
<b>Ambient climatic conditions</b>				
Climatic proofing	Dry heat according to IEC 60068-2-2 damp heat according to EN 60068-2-3			
Air pressure (in operation)	795 - 1080			
Operating ambient temperature (IEC 60068-2)	- 25 - + 55 °C			
Storage / Transport	- 40 - + 70 °C			
<b>Ambient mechanical conditions</b>				
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K			
Vibrations (IEC/EN 61131-2:2008)				
constant amplitude 3.5 mm	5 - 8.4 Hz			
constant acceleration 1 g	8.4 - 150 Hz			
Mechanical shock resistance (IEC/EN 60068-2-27), half sine shock: 30 g/11 ms	9 Impact resistances			
Drop (IEC/EN 60068-2-31) drop height	50 mm			
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m			
<b>Electromagnetic compatibility (EMC)</b>				
Overvoltage category	II			
Degree of pollution	3			
Electrostatic discharge (IEC/EN 61131-2:2008)				
Air discharge (Level 3)	8			
Contact discharge (Level 2)	4			
Electromagnetic fields (IEC/EN 61131-2:2008)				
80 - 1000 MHz	10			
1.4 - 2 GHz	3			
2 - 2.7 GHz	1			
Radio interference suppression	EN 55011 Class A			
Burst (IEC/EN 61131-2:2008, Level 3)				
Supply cable	2			
Signal cables	1			
SmartWire-DT cables	1			
Surge (IEC/EN 61131-2:2008, Level 1)				
Surge supply cables	0.5			
Surge I/O cables	1			
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10			

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### 10.2 Technical data Block Modules

	EU6E-SWD-2D2D-1 183264	EU6E-SWD-4D4D-1 183266	EU6E-SWD-4XD-1 183268	EU6E-SWD-8XD-1 183270
<b>SmartWire-DT network</b>				
Module type	SmartWire-DT module (slave)			
Setting the baud rate	Automatic			
Baud rate (data transfer speed)	max. 2000 kbps			
Status SmartWire-DT LED	green			
<b>Connection</b>				
SWD-IN	M12 plug (A-keyed), 5-pin			
SWD-OUT	M12 socket (A-keyed), 5-pin			
Current consumption (24V, without sensor and without I/O supply) $I_e$	50	66	54	74
Sensor supply				
Max. current consumption per M12 I/O plug	70	70	70	70
- Overload and short-circuit proof	yes, with diagnostics			
<b>Digital inputs</b>				
Number of digital inputs/outputs	4	8	4	8
Quantity	2	4	-	-
Input current	normally 4 mA at 24 V DC	normally 4 mA at 24 V DC	-	-
Voltage level to IEC/EN 61131-2	-	-	-	-
Limit value type 1	Low < 5 V DC; High > 15 V DC	Low < 5 V DC; High > 15 V DC	-	-
Input delay	High Low typ. < 0.2 ms Low High typ. < 0.2 ms	High Low typ. < 0.2 ms Low High typ. < 0.2 ms	-	-
Status indication inputs	yellow	yellow	-	-
<b>Digital semiconductor outputs</b>				
Quantity	2	4	4	8
Output current	0.5			
Short-circuit tripping current	max. 1.2 mA over 3 ms			
lamp load	≤ 3 W			
Overload proof	yes, with diagnostics			
Switching capacity	EN 60947-5-1 utilization category DC-13			
Status indication outputs	-			
<b>Potential isolation</b>				
Output to output	-	-	-	-
Output to input	-	-	-	-
Inputs for SmartWire-DT	-	-	-	-
Outputs to SmartWire-DT	-	-	-	-
Input to input	-	-	-	-



### 10.2.3 I/O modules, digital EU6E-SWD-...-2

	EU6E-SWD-2D2D-2 183265	EU6E-SWD-4D4D-2 183267	EU6E-SWD-4XD-2 183269
<b>General</b>			
Standards	IEC/EN 61131-2		
Dimensions (W x H x D)	60 mm x 157 mm x 34 mm		
Weight	0.25		
Mounting	Screw fixing (M4)		
Mounting position	Any		
<b>Ambient climatic conditions</b>			
Climatic proofing	Dry heat according to IEC 60068-2-2, damp heat according to EN 60068-2-3		
Air pressure (in operation)	795 - 1080	795 - 1080	795 - 1080
Operating ambient temperature (IEC 60068-2)	- 25 - + 50 °C		
Storage / Transport	- 40 - + 70 °C		
<b>Ambient mechanical conditions</b>			
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K		
Vibrations (IEC/EN 61131-2:2008)			
constant amplitude 3.5 mm	5 - 8.4 Hz		
constant acceleration 1 g	8.4 - 150 Hz		
Mechanical shock resistance (IEC/EN 60068-2-27), half sine shock: 30 g/11 ms	9 impact resistances		
Drop (IEC/EN 60068-2-31) drop height	50 mm		
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m		
<b>Electromagnetic compatibility (EMC)</b>			
Overvoltage category	II		
Degree of pollution	3		
Electrostatic discharge (IEC/EN 61131-2:2008)			
Air discharge (Level 3)	8 kV		
Contact discharge (Level 2)	4 kV		
Electromagnetic fields (IEC/EN 61131-2:2008)			
80 - 1000 MHz	10 V/m		
1.4 - 2 GHz	3 V/m		
2 - 2.7 GHz	1 V/m		
Radio interference suppression	EN 55011 Class A		
Burst (IEC/EN 61131-2:2008, Level 3)			
Supply cable	2 kV		
Signal cables	1 kV		
SmartWire-DT cables	1 kV		
Surge (IEC/EN 61131-2:2008, Level 1)			
Surge supply cables	0.5 kV		
Surge I/O cables	1 kV		
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 kV		
<b>SmartWire-DT network</b>			
Module type	SmartWire-DT module (slave)		
Setting the baud rate	Automatic		
Baud rate (data transfer speed)	max. 2000 kbps		
Status SmartWire-DT LED	green		
<b>Connection</b>			
SWD-IN	M12 plug (A-keyed), 5-pin		
SWD-OUT	M12 socket (A-keyed), 5-pin		
Current consumption (24V, without sensor and without I/O supply) I <sub>a</sub>	50 mA	66 mA	54 mA
Sensor supply			
Max. current consumption per M12 I/O plug	70 mA		
--Overload and short-circuit proof	yes, with diagnostics		

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### 10.2 Technical data Block Modules

	EU6E-SWD-2D2D-2 183265	EU6E-SWD-4D4D-2 183267	EU6E-SWD-4XD-2 183269
<b>Digital inputs</b>			
Number of digital inputs/outputs	2	8	4
Quantity	2	4	-
Input current	normally 4 mA at 24 V DC	normally 4 mA at 24 V DC	-
Voltage level to IEC/EN 61131-2	-	-	-
Limit value type 1	Low < 5 V DC; High > 15 V DC	Low < 5 V DC; High > 15 V DC	-
Input delay	High Low typ. < 0.2 ms Low High typ. < 0.2 ms	High Low typ. < 0.2 ms Low High typ. < 0.2 ms	-
Status indication inputs LED	yellow	yellow	-
<b>Digital semiconductor outputs</b>			
Quantity	2	4	8
Output current	2 A	2 A	2 A
Short-circuit tripping current	max. 1.2 A over 3 ms		
lamp load	≤ 3 W		
Overload proof	yes, with diagnostics		
Switching capacity			
Status indication outputs	-	-	-
<b>Potential isolation</b>			
Output to output	-	-	-
Output to input	-	-	-
Inputs for SmartWire-DT	-	-	-
Outputs to SmartWire-DT	-	-	-
Input to input	-	-	-

### 10.2.4 I/O modules, digital EU8E-SWD-...

	EU8E-SWD-16DX 174744	EU8E-SWD-16DD 174750	EU8E-SWD-4D4D-1 183272	EU8E-SWD-8D8D-1 183273	EU8E-SWD-8XD-1 183274	EU8E-SWD-16XD-1 183271
<b>General</b>						
Standards	IEC/EN 61131-2					
Dimensions (W x H x D)	60 mm x 210.3 mm x 34 mm					
Weight	0.3 kg					
Mounting	Screw fixing (M4)					
Mounting position	Any					
<b>Ambient climatic conditions</b>						
Climatic proofing	Dry heat according to IEC 60068-2-2 damp heat according to EN 60068-2-3					
Air pressure (in operation)	795 - 1080 hPa					
Operating ambient temperature (IEC 60068-2)	- 25 - + 55 °C					
Storage / Transport	- 40 - + 70 °C					
<b>Ambient mechanical conditions</b>						
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K					
Vibrations (IEC/EN 61131-2:2008)						
constant amplitude 3.5 mm	5 - 8.4 Hz					
constant acceleration 1 g	8.4 - 150 Hz					
Mechanical shock resistance (IEC/EN 60068-2-27), half sine shock: 30 g/11 ms	9 impact resistances					
Drop (IEC/EN 60068-2-31) drop height	50 mm					
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m					
<b>Electromagnetic compatibility (EMC)</b>						
overvoltage category	II					
Degree of pollution	3					
Electrostatic discharge (IEC/EN 61131-2:2008)						
Air discharge (Level 3)	8 kV					
Contact discharge (Level 2)	4 kV					
Electromagnetic fields (IEC/EN 61131-2:2008)						
80 - 1000 MHz	10 V/m					
1.4 - 2 GHz	3 V/m					
2 - 2.7 GHz	1 V/m					
Radio interference suppression	EN 55011 Class A					
Burst (IEC/EN 61131-2:2008, Level 3)						
Supply cable	2 kV					
Signal cables	1 kV					
SmartWire-DT cables	1 kV					
Surge (IEC/EN 61131-2:2008, Level 1)						
Surge supply cables	0.5 kV					
Surge I/O cables	1 kV					
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V					

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### 10.2 Technical data Block Modules

	<b>EU8E-SWD-16DX</b> 174744	<b>EU8E-SWD-16DD</b> 174750	<b>EU8E-SWD-4D4D-1</b> 183272	<b>EU8E-SWD-8D8D-1</b> 183273	<b>EU8E-SWD-8XD-1</b> 183274	<b>EU8E-SWD-16XD-1</b> 183271
<b>SmartWire-DT network</b>						
Module type	SmartWire-DT module (slave)					
Setting the baud rate	Automatic					
Baud rate (data transfer speed)	max. 2000 kbps					
Status SmartWire-DT LED	green					
Connection						
SWD-IN	M12 plug (A-keyed), 5-pin					
SWD-OUT	M12 socket (A-keyed), 5-pin					
Current consumption (24V, without sensor and without I/O supply)						
Current consumption (24 V SWD supply)						
Current consumption	215 mA	215 mA	75 mA	111 mA	71 mA	103 mA
Sensor supply						
Max. current consumption per M12 I/O plug	70 mA	70 mA	70 mA	70 mA	70 mA	70 mA
- Overload and short-circuit proof	yes, with diagnostics					
<b>Digital inputs</b>						
Number of digital inputs/outputs	-	16, configurable as input or output	8	16	8	16
Quantity	16	16	4	8	-	-
Input current	normally 4 mA at 24 V DC					
Voltage level to IEC/EN 61131-2	-	-	-	-	-	-
Limit value type 1	Low < 5V DC; High > 15V DC					
Input delay	High->Low < 0.2 ms Low->High < 0.2 ms					
Status indication inputs LED	yellow					
<b>Digital semiconductor outputs</b>						
Quantity	-	6	4	8	8	16
Output current	-	0.5 A	0.5 A	0.5 A	0.5 A	0.5 A
Short-circuit tripping current	-	max. 1.2 A over 3 ms	max. 1.2 over 3 ms	max. 1.2 over 3 ms	max. 1.2 over 3 ms	max. 1.2 over 3 ms
Lamp load R <sub>LL</sub>	-	≤ 3 W	≤ 3 W	≤ 3 W	≤ 3 W	≤ 3 W
Overload proof	-	yes, with diagnostics				
Switching capacity	-	EN 60947-5-1 utilization category DC-13				
Status indication outputs LED	-	yellow	yellow	yellow	yellow	yellow
<b>Potential isolation</b>						
Output to output	-	-	-	No	No	No
Output to input	-	No	yes	yes	-	-
Inputs for SmartWire-DT	No	No	No	No	-	-
Outputs to SmartWire-DT	-	No	Yes	Yes	Yes	Yes
Input to input	No	No	No	No	-	-

## 10.3 Technical data Accessories

### 10.3.1 EU1E-SWD-1CX counter module

	<b>EU1E-SWD-1CX</b> 174721
<b>General</b>	
Standards	IEC/EN 61131-2
Dimensions (W x H x D)	85.6 mm x 56.9 mm x 20.1 mm
Weight	0.07 kg
Mounting	
Mounting position	Any
<b>Ambient climatic conditions</b>	
Climatic proofing	
Air pressure (in operation)	795 - 1080 hPa
Operating ambient temperature (IEC 60068-2)	-25 - +70 °C
Storage / Transport	-40 - +70 °C
<b>Ambient mechanical conditions</b>	
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP69K
Vibrations (IEC/EN 61131-2:2008)	
constant amplitude 3.5 mm	5 - 8.4 Hz
constant acceleration 1 g	8.4 - 150 Hz
Mechanical shock resistance (IEC/EN 60068-2-27), half sine shock: 30 g/11 ms	9 Impact resistances
Drop (IEC/EN 60068-2-31) drop height	50 mm
Free fall, packaged (IEC/EN 60068-2-32)	0.3
<b>Electromagnetic compatibility (EMC)</b>	
Overvoltage category	II
Degree of pollution	3
Electrostatic discharge (IEC/EN 61131-2:2008)	
Air discharge (Level 3)	8 kV
Contact discharge (Level 2)	4 kV
Electromagnetic fields (IEC/EN 61131-2:2008)	
80 - 1000 MHz	10 V/m
1.4 - 2 GHz	3 V/m
2 - 2.7 GHz	1 V/m
Radio interference suppression	EN 55011 Class A
Burst (IEC/EN 61131-2:2008, Level 3)	
Supply cable	2 kV
Signal cables	1 kV
SmartWire-DT cables	1 kV
Surge (IEC/EN 61131-2:2008, Level 1)	
Surge supply cables	0.5 kV

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### 10.3 Technical data Accessories

	<b>EU1E-SWD-1CX</b>
	174721
Surge I/O cables	1 kV
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V
<b>SmartWire-DT network</b>	
Module type	
Setting the baud rate	Automatic
Baud rate (data transfer speed)	max. 2000 kbps
Status SmartWire-DT LED	green
<b>Connection</b>	
SWD-IN	-
SWD-OUT	
Current consumption (24V, without sensor and without I/O supply)	57 mA
Sensor supply	
Max. current consumption per M12 I/O plug	70 mA
- Overload and short-circuit proof	yes, with diagnostics
<b>Counter inputs</b>	
Quantity	1
Input rated voltage	24 V DC
Counter input frequency	max. 30 kHz
Counter value	32 Bit
Incremental encoder function	
Encoder inputs	A,B,reference
Encoding	X1, X2, X4
Frequency measurement	0–65535 Hz
Simple counter function	
Counter inputs	Counter pulse, direction, reference mark
Encoding	1.2-way
Frequency measurement	0–65535 Hz
Counter status indicator LED	yellow
<b>Potential isolation</b>	
Output to output	-
Output to input	-
Inputs for SmartWire-DT	No
Outputs to SmartWire-DT	-
Input to input	-

### 10.3.2 EU1H-SWD-... valve modules

	EU1H-SWD-1XD-1 191089	EU1H-SWD-2XD-1 191090
<b>General</b>		
Standards	IEC/EN 61131-2	
Dimensions (W x H x D)	44.7 mm x 77.4 mm x 51.7 mm	
Weight	0.08 kg	0.09 kg
Mounting	Can be screwed onto valve connector in conformity with DIN EN 175301-803	
Mounting position	Any	
<b>Ambient climatic conditions</b>		
Climatic proofing	Dry heat according to IEC 60068-2-2, damp heat according to EN 60068-2-3	
Air pressure (in operation)	795 - 1080 hPa	
Operating ambient temperature (IEC 60068-2)	- 25 - + 70 °C (observe derating!)	
Storage / Transport	- 40 - + 85 °C	
Relative humidity		
condensation	permissible	
Relative humidity, no condensation (IEC/EN 60068-2-30)	5 - 95%	
<b>Ambient mechanical conditions</b>		
Degree of protection (IEC/EN 60529, EN50178, VBG 4)	IP65	
Vibrations (IEC/EN 61131-2:2008)		
constant amplitude 3.5 mm	5 - 8.4 Hz	
constant acceleration 1 g	8.4 - 150 Hz	
Mechanical shock resistance (IEC/EN 60068-2-27), half sine shock: 30 g/11 ms	9 impact resistances	
Drop (IEC/EN 60068-2-31) drop height	50 mm	
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m	
<b>Electromagnetic compatibility (EMC)</b>		
Overvoltage category	II	
Degree of pollution	3	
Electrostatic discharge (IEC/EN 61131-2:2008)		
Air discharge (Level 3)	8 kV	
Contact discharge (Level 2)	4 kV	
Electromagnetic fields (IEC/EN 61131-2:2008)		
80 - 1000 MHz	10 V/m	
1.4 - 2 GHz	3 V/m	
2 - 2.7 GHz	V-M1	
Radio interference suppression	EN 55011 Class A	
Burst (IEC/EN 61131-2:2008, Level 3)		
Supply cable	2 kV	
SmartWire-DT cables	1 kV	
Surge (IEC/EN 61131-2:2008, Level 1)		

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### 10.3 Technical data Accessories

	<b>EU1H-SWD-1XD-1</b> 191089	<b>EU1H-SWD-2XD-1</b> 191090
Surge supply cables	1 kV	
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V	
<b>SmartWire-DT network</b>		
Module type	SmartWire-DT module (slave)	
Setting the baud rate	Automatic	
Baud rate (data transfer speed)	125/250/500/1000/2000 kBd	
Status SmartWire-DT LED	green	
<b>Connection</b>		
SWD-IN	M12 plug (A-keyed), 5-pin	
SWD-OUT	M12 socket (A-keyed), 5-pin	
Current consumption (24 V SWD supply)		
Current consumption	65mA	70 mA
<b>Digital semi-conductor outputs</b>		
Quantity	1	2
Output current	1.6 A (at 60°C), 1.3 A (at 70°C)	
Overload proof	yes, with diagnostics	
Maximum switching frequency	1 Hz	
Status indication outputs LED	yellow	
<b>Supply voltage U<sub>Aux</sub></b>		
Rated operating voltage	24 V DC (-15/+20%)	
Permissible range	20.4 - 28.8 VDC	
Protection against polarity reversal	Yes	
Short-circuit rating	Not relevant	
Heat dissipation	CO	
Potential isolation	Galvanically isolated from the SmartWire-DT network	
<b>Potential isolation</b>		
Inputs for SmartWire-DT	Yes	Yes



### 10.3.3 Universal module EU1M-SWD-NOP

	<b>EU1M-SWD-NOP</b>
	174716
<b>General</b>	
Standards	IEC/EN 61131-2, EN 50178
Dimensions (W x H x D)	85.6 mm x 56.9 mm x 20.1 mm
Weight	0.07 kg
Mounting	DIN-rail, screw fixing (M4), mounting section (Clip M20)
Mounting position	Any
<b>Ambient conditions</b>	
Degree of protection (IEC/EN 60529)	IP69K
Vibrations (IEC/EN 61131-2:2008)	
constant amplitude 3.5 mm	5 - 8.4 Hz
constant acceleration 1 g	8.4 - 150 Hz
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 impact resistances
Drop (IEC/EN 60068-2-31) drop height	50 mm
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m
<b>Electromagnetic compatibility (EMC)</b>	
Overvoltage category	II
Degree of pollution	3
Electrostatic discharge (IEC/EN 61131-2:2008)	
Air discharge (Level 3)	8 kV
Contact discharge (Level 2)	4 kV
Electromagnetic fields (IEC/EN 61131-2:2008)	
80 - 1000 MHz	10 V/m
1.4 - 2 GHz	3 V/m
2 - 2.7 GHz	1 V/m
Radio interference suppression (SmartWire-DT) EN55011	Class A
Burst (IEC/EN 61131-2:2008, Level 3)	
Supply cables	2 kV
Signal cables	1 kV
SmartWire-DT cables	1 kV
Surge (IEC/EN 61131-2:2008, Level 1)	
Supply cables	0.5 kV
I/O cables	1 kV
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V
<b>Climatic conditions</b>	
Operating ambient temperature (IEC 60068-2)	-25 - +70 °C
Condensation	permissible
Storage	-40 - +70 °C

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### 10.3 Technical data Accessories

	<b>EU1M-SWD-NOP</b>
	174716
<b>SmartWire-DT interface</b>	
Module type	SWD station (slave)
Baud rate setting	Automatic
Status indication SmartWire-DT LED	green
Connection	
SWD IN	M12 plug, 5 pole
SWD OUT	M12 Socket, 5-pole
Current consumption (24V, without sensor and without I/O supply)	45 mA

### 10.3.4 Power supply EU1S-SWD-PF1-2

	<b>EU1S-SWD-PF1-2</b> 174724
<b>General</b>	
Standards	IEC/EN 61131-2, EN 50178
Dimensions (W x H x D)	85.6 mm x 20.1 mm x 56.9 mm
Weight	0.1 kg
Mounting	DIN-rail, screw fixing (M4), mounting section (Clip M20)
Mounting position	Any
<b>Ambient mechanical conditions</b>	
Degree of protection (IEC/EN 60529)	IP69K
Vibrations (IEC/EN 61131-2:2008)	
constant amplitude 3.5 mm	5 - 8.4 Hz
constant acceleration 1 g	8.4 - 150 Hz
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 impact resistances
Drop to IEC/EN 60068-2-31	50 mm drop height
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m
<b>Electromagnetic compatibility (EMC)</b>	
Overvoltage category	II
Degree of pollution	3
Electrostatic discharge (IEC/EN 61131-2:2008)	
Air discharge (Level 3)	8 kV
Contact discharge (Level 2)	4 kV
Electromagnetic fields (IEC/EN 61131-2:2008)	
80 - 1000 MHz	10 V/m
1.4 - 2 GHz	3 V/m
2 - 2.7 GHz	1 V/m
Radio interference suppression (SmartWire-DT) EN55011	Class A
Burst (IEC/EN 61131-2:2008, Level 3)	
Supply cables	2 kV
SmartWire-DT cables	1 kV
Surge (IEC/EN 61131-2:2008, Level 1)	
Supply cables	0.5 kV
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V
<b>Ambient climatic conditions</b>	
Operating ambient temperature (IEC 60068-2)	-25 - +70 °C
Condensation	permissible
Storage	-40 - +70 °C

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### 10.3 Technical data Accessories

	<b>EU1S-SWD-PF1-2</b>
	174724
<b>SmartWire-DT interface</b>	
Connection	
SWD IN	M12 plug, 5 pole
SWD OUT	M12 socket, 5 pin
Current consumption (24 V SWD supply)	-
Supply $U_{POW IN}$	
Connection	M12 plug, 5 pole
Supply voltage $U_{Pow in}$	24 V DC -15 % - +20 %
Supply voltage residual ripple	$\leq 5 \%$
Protection against polarity reversal	Yes
max. current	4 A
Short-circuit rating	no, external fuse
Heat dissipation	Normally 1 W
Potential isolation	No
IP6x slave rated operating voltage	$U_{POWIN} - 0.2 V$

### 10.3.5 Local SWD branch EU2A-SWD-PBWN

	<b>EU2A-SWD-PBWN</b>
	174734
<b>General</b>	
Standards	IEC/EN 61131-2, EN 50178
Dimensions (W x H x D)	98.0 mm x 56.9 mm x 20.1 mm
Weight	0.09 kg
Mounting	DIN-rail, screw fixing (M4), mounting section (Clip M20)
Mounting position	Any
<b>Ambient conditions</b>	
Degree of protection (IEC/EN 60529)	IP69K
Vibrations (IEC/EN 61131-2:2008)	
constant amplitude 3.5 mm	5 - 8.4 Hz
constant acceleration 1 g	8.4 - 150 Hz
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 impact resistances
Drop to IEC/EN 60068-2-31	50 mm drop height
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m
<b>Electromagnetic compatibility (EMC)</b>	
Overvoltage category	II
Degree of pollution	3
Electrostatic discharge (IEC/EN 61131-2:2008)	
Air discharge (Level 3)	8 kV
Contact discharge (Level 2)	4 kV
Electromagnetic fields (IEC/EN 61131-2:2008)	
80 - 1000 MHz	10 V/m
1.4 - 2 GHz	3 V/m
2 - 2.7 GHz	1 V/m
Radio interference suppression (SmartWire-DT) EN 55011	Class A
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V
<b>Climatic conditions</b>	
Operating ambient temperature (IEC 60068-2)	-25 - +70 °C
Condensation	permissible
Storage	-40 - +70 °C
<b>SmartWire-DT interface</b>	
SWD IN	M12 plug, 5 pole
SWD OUT	M12 socket, 5 pin

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### 10.3 Technical data Accessories

	<b>EU2A-SWD-PBWN</b>
	174734
<b>Connection SmartWire-DT branch</b>	
OUT	M12 socket, 5 pin
IN	M12 plug, 5 pole

### 10.3.6 Enclosure and control panel cable gland, bus termination resistor

	<b>SWD4-SFL8-12</b> 174756	<b>SWD4-SML8-12</b> 174755	<b>SWD4-RC5-10</b> 174754
<b>General</b>			
Standards	IEC/EN 61131-2, EN 50178	IEC/EN 61131-2, EN 50178	IEC/EN 61131-2, EN 50178
Dimensions (W x H x D)	35 mm x 83 mm x 40 mm	35 mm x 83 mm x 40 mm	
Weight	0.06 kg	0.06 kg	0.02 kg
Mounting position	Any	Any	Any
<b>Ambient conditions</b>			
Degree of protection (IEC/EN 60529)	IP20	IP20	IP69K
Vibrations (IEC/EN 61131-2:2008)			
constant amplitude 3.5 mm	5 - 8.4 Hz	5 - 8.4 Hz	5 - 8.4 Hz
Constant acceleration, 1 g	8.4 - 150 Hz	8.4 - 150 Hz	8.4 - 150 Hz
Mechanical shock resistance (IEC/EN 60068-2-27) semi-sinusoidal 30 g/11 ms	9 impact resistances	9 impact resistances	9 impact resistances
Drop to IEC/EN 60068-2-31	50 mm drop height	50 mm drop height	50 mm drop height
Free fall, packaged (IEC/EN 60068-2-32)	0.3 m	0.3 m	0.3 m
<b>Electromagnetic compatibility (EMC)</b>			
Overvoltage category	II	II	III
Degree of pollution	2	2	3
Electrostatic discharge (IEC/EN 61131-2:2008)			
Air discharge (Level 3)	8 kV	8 kV	8 kV
Contact discharge (Level 2)	4 kV	4 kV	4 kV
Electromagnetic fields (IEC/EN 61131-2:2008)			
80 - 1000 MHz	10 V/m	10 V/m	10 V/m
1.4 - 2 GHz	3 V/m	3 V/m	3 V/m
2 - 2.7 GHz	1 V/m	1 V/m	1 V/m
Radio interference suppression (SmartWire-DT) EN 55011	Class A	Class A	Class A
Burst (IEC/EN 61131-2:2008, Level 3)			
Supply cables	2 kV	2 kV	2 kV
SmartWire-DT cables	1 kV	1 kV	1 kV
Surge (IEC/EN 61131-2:2008, Level 1)			
Supply cables	0.5 kV	0.5 kV	0.5 kV
Radiated RFI (IEC/EN 61131-2:2008, Level 3)	10 V	10 V	10 V
<b>Climatic conditions</b>			
Operating ambient temperature (IEC 60068-2)	-25 - +70 °C	-25 - +70 °C	-25 - +70 °C
Condensation	not permissible	not permissible	permissible
Storage	-40 - +70 °C	-40 - +70 °C	-40 - +70 °C
relative humidity (non-condensing)	5 - 95 %	5 - 95 %	5 - 95 %

## 10 Appendix

### 10.3 Technical data Accessories

	<b>SWD4-SFL8-12</b>	<b>SWD4-SML8-12</b>	<b>SWD4-RC5-10</b>
	174756	174755	174754
<b>SmartWire-DT interface</b>			
<b>Connection</b>			
SWD IN	Plug, 8-pole	M12 plug, 5 pole	M12 plug, 5 pole
Insertion cycles	≥ 200	≥ 100	≥ 100
SWD OUT	M12 socket, 5 pin	Plug, 8-pole	
Insertion cycles	≥ 100	≥ 200	
Current consumption (24 V SWD supply)	–	–	17 mA
<b>Connection supply</b>			
Connection type	Push in terminals	Push in terminals	
solid	0.2 - 1.5 (AWG24-16)	0.2 - 1.5 (AWG24-16)	
Stranded with ferrule (minimum section length 8 mm)	0.25 - 1.5 (AWG24-16)	0.25 - 1.5 (AWG24-16)	
Protection against polarity reversal DC-IN	Yes	–	–



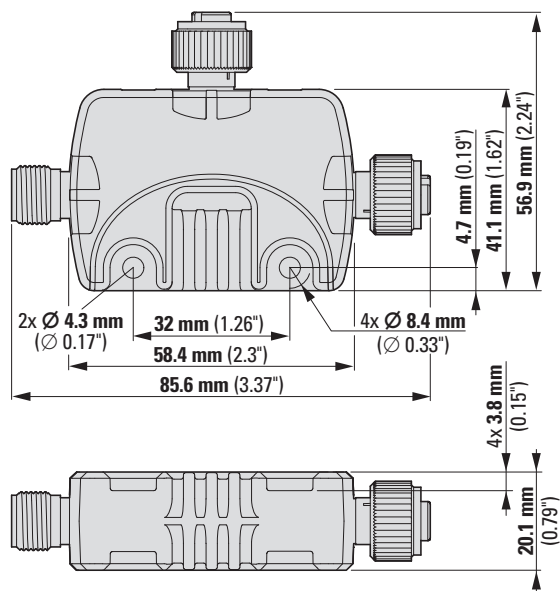
## 10.4 Current consumption

Table 7: Current consumption (24V, without sensor and without I/O supply)

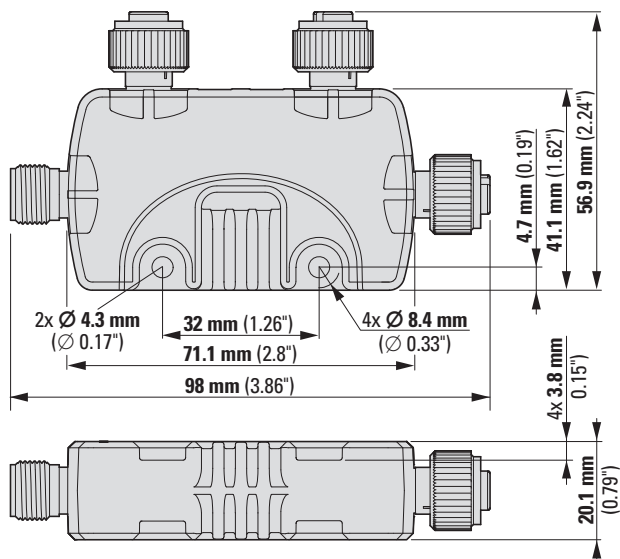
Device	Current consumption [mA]	Device	Current consumption [mA]
EU1E-SWD-1DX	50	EU6E-SWD-4DX	66
EU1E-SWD-2DX	55	EU6E-SWD-8DX	98
EU1E-SWD-2DD	55	EU6E-SWD-8DD	114
		EU6E-SWD-2D2D-1	50
EU1E-SWD-1AX-1	46	EU6E-SWD-2D2D-2	50
EU1E-SWD-1AX-2	46	EU6E-SWD-4D4D-1	66
EU1E-SWD-1XA-1	52	EU6E-SWD-4D4D-2	66
EU1E-SWD-1XA-2	67	EU6E-SWD-4XD-1	54
		EU6E-SWD-4XD-2	54
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EU2E-SWD-4DX	72		
EU2E-SWD-2DD	58		
EU2E-SWD-4DD	75	EU8E-SWD-16DD	231
EU2E-SWD-4DD-1	75	EU8E-SWD-16DX	231
		EU8E-SWD-16XD-1	119
EU2E-SWD-2PT	37	EU8E-SWD-4D4D-1	79
		EU8E-SWD-8D8D-1	119
EU1E-SWD-1CX	57	EU8E-SWD-8XD-1	79
EU1M-SWD-NOP	45		
EU1S-SWD-PF1-2	-	EU1H-SWD-1XD-1	65
		EU1H-SWD-2XD-1	70
EU2A-SWD-PBWN	-		

### 10.5 Dimensions

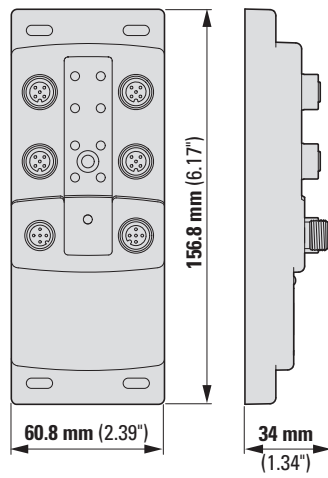
#### 10.5.1 EU1E-SWD-...



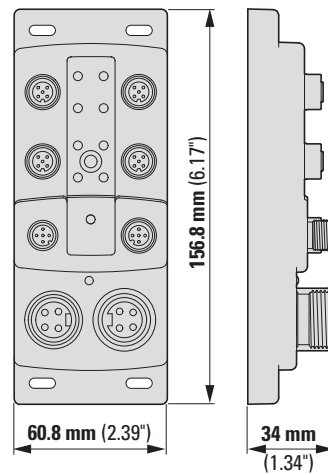
#### 10.5.2 EU2E-SWD-...



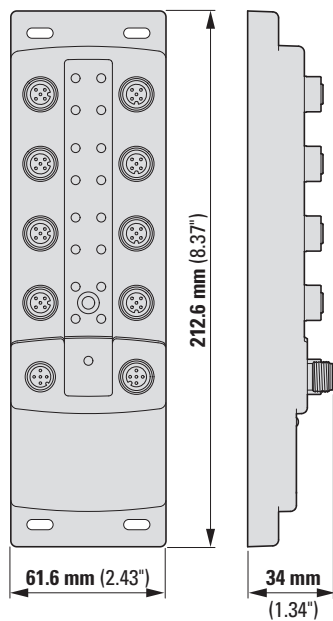
10.5.3 EU6E-SWD-...



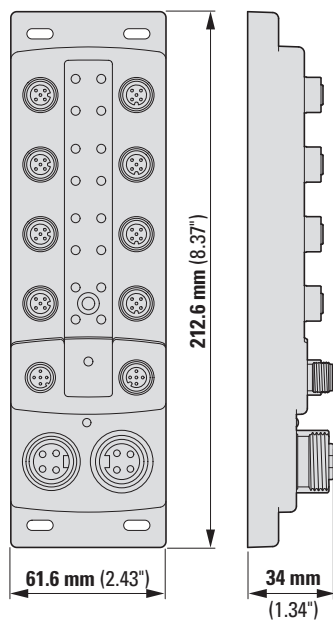
with external power supply  
EU6E-SWD-...-1 and EU6E-SWD-...-2



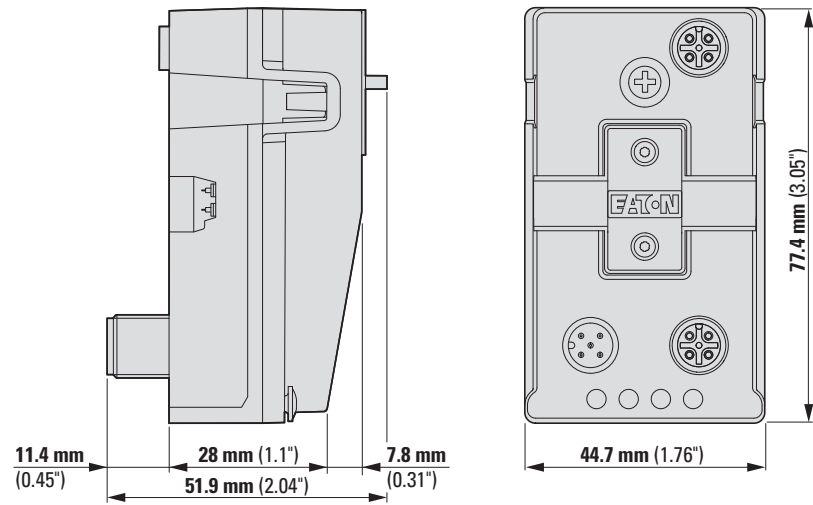
**10.5.4 EU8E-SWD-...**



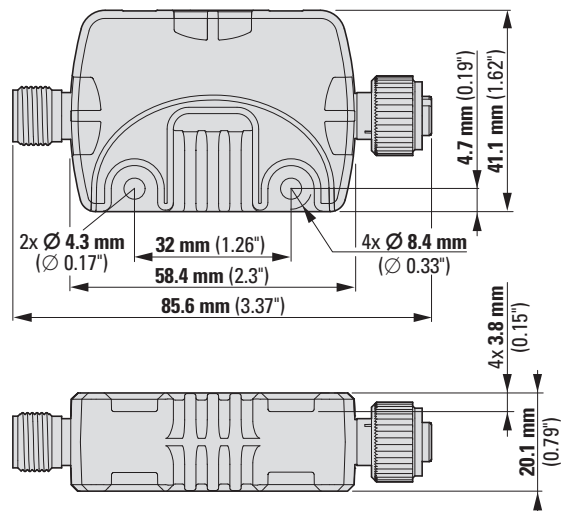
with external power supply  
EU8E-SWD-...-1



10.5.5 EU1H-SWD-...



10.5.6 EU1M-SWD-NOP



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