BECKHOFF New Automation Technology

Documentation | EN

EP20xx and EP28xx

EtherCAT Box modules with digital outputs

2021-06-07 | Version: 3.5

Table of contents

1 Foreword

1.1 Notes on the documentation

Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement.

No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

Trademarks

Beckhoff®, TwinCAT®, TwinCAT/BSD®, TC/BSD®, EtherCAT®, EtherCAT G®, EtherCAT G10®, EtherCAT P®, Safety over EtherCAT®, TwinSAFE®, XFC®, XTS® and XPlanar® are registered trademarks of and licensed by Beckhoff Automation GmbH. Other designations used in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owners.

Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, EP1456722, EP2137893, DE102015105702 with corresponding applications or registrations in various other countries.

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Copyright

1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

Description of instructions

In this documentation the following instructions are used.
These instructions must be read carefully and followed without fail!

⚠ DANGER

Serious risk of injury!

Failure to follow this safety instruction directly endangers the life and health of persons.

⚠ WARNING

Risk of injury!

Failure to follow this safety instruction endangers the life and health of persons.

⚠ CAUTION

Personal injuries!

Failure to follow this safety instruction can lead to injuries to persons.

NOTE

Damage to environment/equipment or data loss

Failure to follow this instruction can lead to environmental damage, equipment damage or data loss.

Tip or pointer

This symbol indicates information that contributes to better understanding.

1.3 Documentation issue status

Version	Comment
3.5	• Dimensions updated • UL requirements updated
3.4	• EP2028-0032: Information on freedom from interference added • Accessories updated
3.3	• Scope of delivery added
3.2	• EP2028-0032: Imprint updated • EP2817-0008: Connection updated • Status LEDs for the supply voltages updated
3.1	• EP2809-0042: Technical data and connections updated
3.0	• Documentation separated from EP2xxx 2.9.2 • EP2809-0042 added • EP2816-0003 added

Firmware and hardware versions

This documentation refers to the firmware and hardware version that was applicable at the time the documentation was written.

The module features are continuously improved and developed further. Modules having earlier production statuses cannot have the same properties as modules with the latest status. However, existing properties are retained and are not changed, so that older modules can always be replaced with new ones.

The firmware and hardware version (delivery state) can be found in the batch number (D-number) printed on the side of the EtherCAT Box.

Syntax of the batch number (D-number)

D: WW YY FF HH	Example with D no. 29 10 02 01:
WW - week of production (calendar week) YY - year of production FF - firmware version HH - hardware version	29 - week of production 29 10 - year of production 2010 02 - firmware version 02 01 - hardware version 01

Further information on this topic: Version identification of EtherCAT devices [▶ 128].

2 EtherCAT Box - Introduction

The EtherCAT system has been extended with EtherCAT Box modules with protection class IP 67. Through the integrated EtherCAT interface the modules can be connected directly to an EtherCAT network without an additional Coupler Box. The high-performance of EtherCAT is thus maintained into each module.

The extremely low dimensions of only 126 x 30 x 26.5 mm (h x w x d) are identical to those of the Fieldbus Box extension modules. They are thus particularly suitable for use where space is at a premium. The small mass of the EtherCAT modules facilitates applications with mobile I/O interface (e.g. on a robot arm). The EtherCAT connection is established via screened M8 connectors.

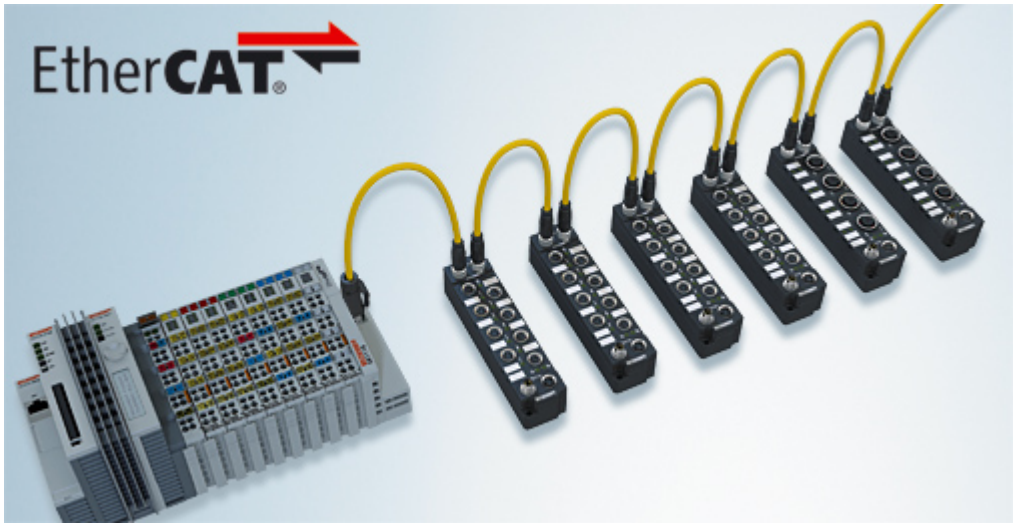


Fig. 1: EtherCAT Box Modules within an EtherCAT network

The robust design of the EtherCAT Box modules enables them to be used directly at the machine. Control cabinets and terminal boxes are now no longer required. The modules are fully sealed and therefore ideally prepared for wet, dirty or dusty conditions.

Pre-assembled cables significantly simplify EtherCAT and signal wiring. Very few wiring errors are made, so that commissioning is optimized. In addition to pre-assembled EtherCAT, power and sensor cables, field-configurable connectors and cables are available for maximum flexibility. Depending on the application, the sensors and actuators are connected through M8 or M12 connectors.

The EtherCAT modules cover the typical range of requirements for I/O signals with protection class IP67:

- digital inputs with different filters (3.0 ms or 10 µs)
- digital outputs with 0.5 or 2 A output current
- analog inputs and outputs with 16 bit resolution
- Thermocouple and RTD inputs
- Stepper motor modules

XFC (eXtreme Fast Control Technology) modules, including inputs with time stamp, are also available.

Fig. 2: EtherCAT Box with M8 connections for sensors/actuators

Fig. 3: EtherCAT Box with M12 connections for sensors/actuators

Basic EtherCAT documentation

You will find a detailed description of the EtherCAT system in the Basic System Documentation for EtherCAT, which is available for download from our website (www.beckhoff.com) under Downloads.

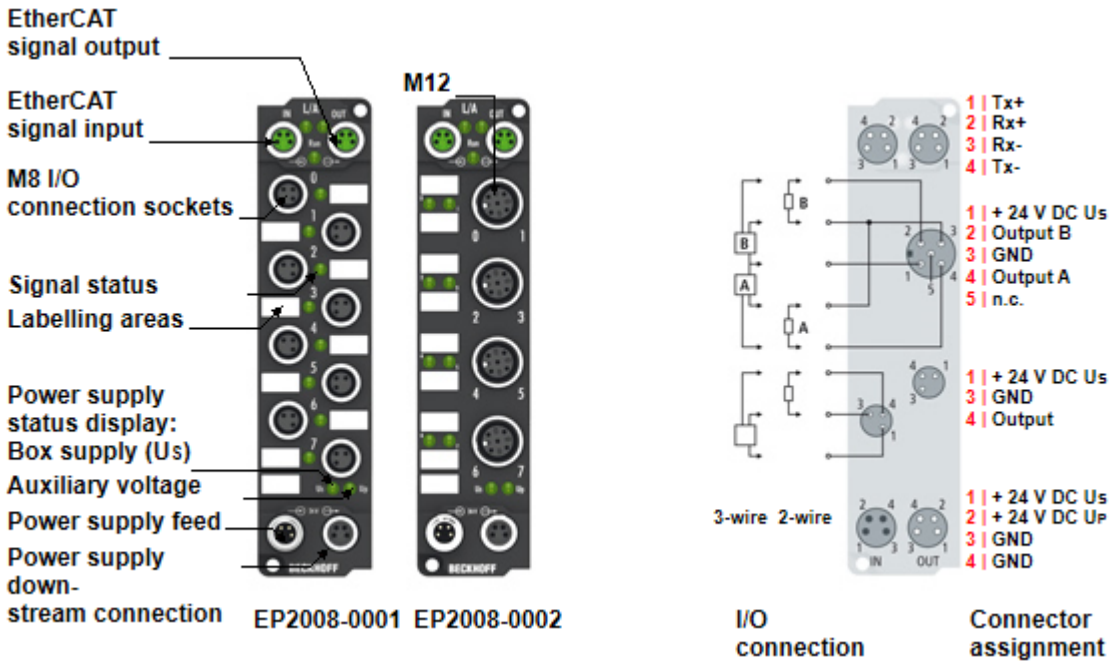
3 Product overview

3.1 EP20xx and EP28xx module overview

Module	Signal connection	Number of outputs	Output current		Special features
			per output	Sum	
EP2008-0001 [▶ 13]	8x M8	8	0.5 A	4 A	-
EP2008-0002 [▶ 13]	4x M12	8	0.5 A	4 A	-
EP2008-0022 [▶ 16]	8x M12	8	0.5 A	4 A	-
EP2028-0001 [▶ 19]	8x M8	8	2.0 A	4 A	-
EP2028-0002 [▶ 19]	4x M12	8	2.0 A	4 A	-
EP2028-0032 [▶ 22]	8x M12	8	2.8 A	16 A	-
EP2038-0001 [▶ 25]	8x M8	8	2.0 A	4 A	Diagnosis
EP2038-0002 [▶ 25]	4x M12	8	2.0 A	4 A	Diagnosis
EP2809-0021 [▶ 29]	16x M8	16	0.5 A	4 A	-
EP2809-0022 [▶ 30]	16x M12	16	0.5 A	4 A	-
EP2809-0042 [▶ 33]	8x M12	16	0.5 A	8 A	-
EP2816-0003 [▶ 37]	2x ZS2001	16	0.5 A	4 A	Diagnosis
EP2816-0004 [▶ 38]	1x M16, 19-pin	16	0.5 A	4 A	Diagnosis
EP2816-0008 [▶ 39]	1x D-sub 25	16	0.5 A	4 A	Diagnosis
EP2816-0010 [▶ 40]	2x D-sub 8	16	0.5 A	4 A	Diagnosis
EP2817-0008 [▶ 48]	1x D-sub 25	24	0.5 A	4 A	Diagnosis

3.2 EP2008-000x

3.2.1 EP2008 - Introduction



8-channel digital output 24 V_{DC}, I_{max} 0.5 A

The EP2008 EtherCAT Box with digital outputs connects binary control signals from the controller on to the actuators at the process level. The eight outputs handle load currents of up to 0.5 A and indicate their status through light emitting diodes.

The signals are optionally connected via M8 (EP2008-0001) or M12 (EP2008-0002) screw type connectors. The outputs are short-circuit proof and protected against inverse connection.

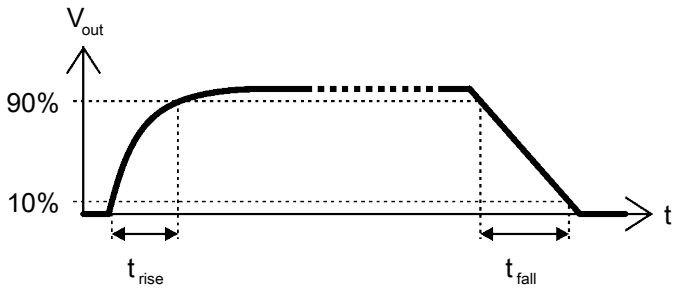
Quick links

Technical data [▶ 14]
Process image [▶ 15]
Dimensions [▶ 55]
Actuator connection [▶ 68]

3.2.2 EP2008-000x - Technical data

Technical data	EP2008-0001	EP2008-0002
Fieldbus	EtherCAT	
Fieldbus connection	2 x M8 socket (green)	
Number of outputs	8	
Output connections	8x M8 socket	4x M12 socket
Load type	ohmic, inductive, lamp load	
Nominal output voltage	24 V_{DC} (-15%/+20%)	
Output current	max. 0.5 A per channel	
Short circuit current	typically 1.5 A	
Rise time t_{rise} max. [1]	100 µs	
Fall time t_{fall} max. [1]	150 µs	
Supply of the module electronics	from the control voltage U_S	
Current consumption of the module electronics	typically 120 mA	
Output driver supply	from the load voltage U_P	
Output driver current consumption	typically 8 mA per channel	
Power supply connection	Feed: 1 x M8 plug, 4-pin Downstream connection: 1 x M8 socket, 4-pin	
Sensor supply [2]	24 V_{DC} from the control voltage U_S, max. 0.5 A total, short-circuit proof	
Electrical isolation Fieldbus GND_S / GND_P	 500 V no	
Ambient temperature during operation	-25…+60 °C -25…+55 °C conforms to cURus 0…+55 °C conforms to ATEX	
Ambient temperature during storage	-40…+85 °C	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4	
Protection class	IP65, IP66, IP67 (conforms to EN 60529)	
Mounting position	variable	
Approvals	CE, cURus [▶ 77], ATEX [▶ 78]	

[1] Electrical switching times of the output driver.
The switching times were measured without load and recorded with threshold values of 10% and 90%, as shown in the figure below.
When estimating the switching times of a system, also consider the latency time of the fieldbus.



[2] Supply voltage available at the output connections.

3.2.3 EP2008-000x - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2008-000x
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

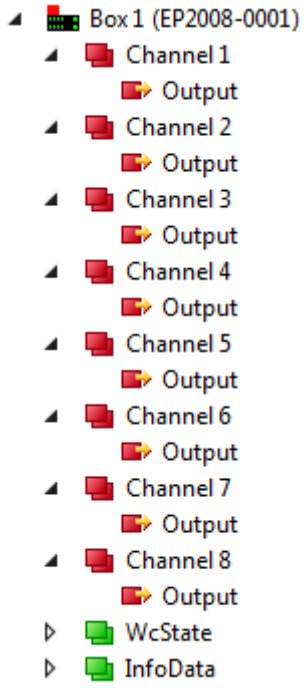
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.2.4 EP2008-000x - Process image

Channel 1 to Channel 8

Under **Channel 1** to **Channel 8** you will find the 8 digital outputs of the module (here as an example the EP2008-0001).



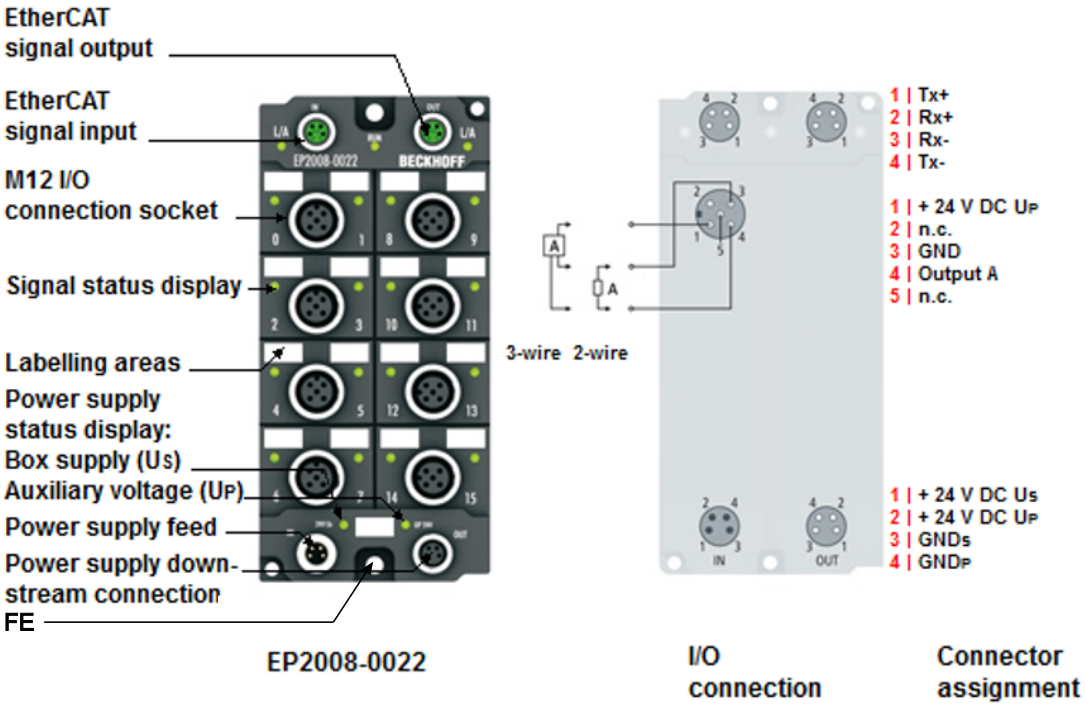
Data types

Channel n

Output: **BIT**

3.3 EP2008-0022

3.3.1 EP2008-0022 - Introduction



8-channel digital output 24 V_{DC}, I_{max} 0.5 A

The EP2008 EtherCAT Box with digital outputs connects binary control signals from the controller on to the actuators at the process level. The eight outputs handle load currents of up to 0.5 A and indicate their status through light emitting diodes.

The signals are optionally connected via M8 (EP2008-0001) or M12 (EP2008-0002) screw type connectors. The outputs are short-circuit proof and protected against inverse connection.

Quick links

Technical data [▶ 17]
Process image [▶ 18]
Dimensions [▶ 56]
Actuator connection [▶ 69]

3.3.2 EP2008-0022 - Technical data

Technical data	EP2008-0022
Fieldbus	EtherCAT
Fieldbus connection	2x M8 socket (green)
Number of outputs	8
Output connections	8x M12 socket
Load type	ohmic, inductive, lamp load
Nominal output voltage	24 V_{DC} (-15%/+20%)
Output current	max. 0.5 A per channel
Short circuit current	typically 1.5 A
Supply of the module electronics	from the control voltage Us
Current consumption of the module electronics	typically 120 mA
Output driver supply	from load voltage Up
Output driver current consumption	typically 8 mA per channel
Power supply connection	Feed: 1x M8 plug, 4-pin Downstream connection: 1x M8 socket, 4-pin
Sensor supply [1]	24 V_{DC} from the peripheral voltage U_P, max. 0.5 A total, short-circuit proof
Electrical isolation Fieldbus GND_S / GND_P	 500 V yes
Ambient temperature during operation	-25…+60 °C -25…+55 °C conforms to cURus
Ambient temperature during storage	-40…+85 °C
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP65, IP66, IP67 (conforms to EN 60529)
Protection class	variable
Approvals	CE, cURus [▶ 77]

[1] Supply voltage available at the input connections.

3.3.3 EP2008-0022 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2008-0022
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

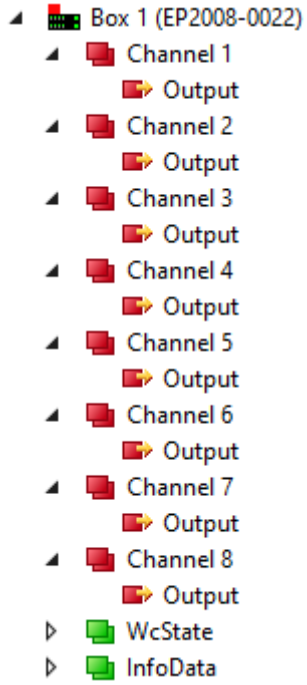
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

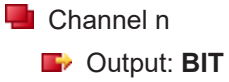
3.3.4 EP2008-0022 – Process image

Channel 1 to Channel 8

Under Channel 1 to Channel 8 you will find the digital outputs of the module.

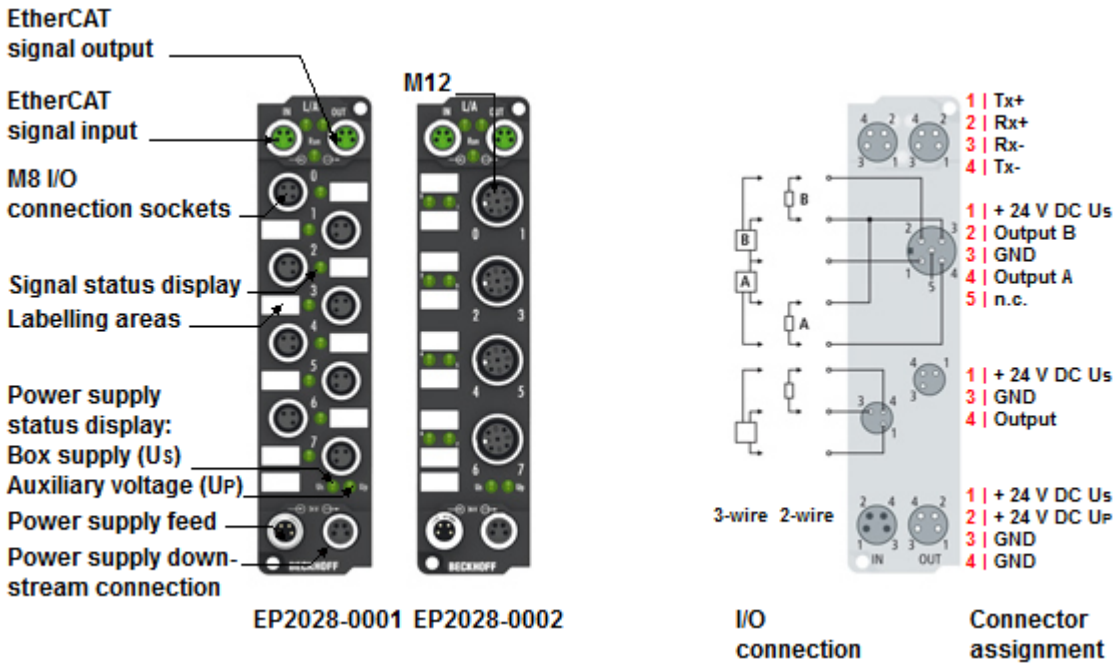


Data types



3.4 EP2028-000x

3.4.1 EP2028 - Introduction



8-channel digital output 24 V_{DC}, I_{max} 2 A (Σ 4 A)

The EP2028 EtherCAT Box with digital outputs connects binary control signals from the controller on to the actuators at the process level. The eight outputs handle load currents of up to 2 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all of the actuators draw 2 A signal current.

The signal state is indicated by means of light emitting diodes. The signals are optionally connected via M8 (EP2028-0001) or M12 (EP2028-0002) screw type connectors. The outputs are short-circuit proof and protected against inverse connection.

Quick links

Technical data [▶ 20]
Process image [▶ 21]
Dimensions [▶ 55]
Actuator connection [▶ 68]

3.4.2 EP2028-000x - Technical data

Technical data	EP2028-0001	EP2028-0002
Fieldbus	EtherCAT	
Fieldbus connection	2 x M8 socket (green)	
Number of outputs	8	
Output connections	8x M8 socket	4x M12 socket
Load type	ohmic, inductive, lamp load	
Nominal output voltage	24 V_{DC} (-15%/+20%)	
Output current	max. 2.0 A per channel, sum current of all outputs max. 4.0 A	
Short circuit current	maximum 4.0 A	
Supply of the module electronics	from the control voltage U_S	
Current consumption of the module electronics	typically 120 mA	
Output driver supply	from load voltage U_P	
Output driver current consumption	typically 8 mA per channel	
Power supply connection	Feed: 1 x M8 plug, 4-pin Downstream connection: 1 x M8 socket, 4-pin	
Sensor supply [1]	24 V_{DC} from the control voltage U_S, max. 0.5 A total, short-circuit proof	
Electrical isolation Fieldbus GND_S / GND_P	 500 V no	
Ambient temperature during operation	-25…+60 °C -25…+55 °C conforms to cURus 0…+55 °C according to ATEX	
Ambient temperature during storage	-40…+85 °C	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4	
Protection class	IP65, IP66, IP67 (conforms to EN 60529)	
Mounting position	variable	
Approvals	CE, cURus [▶ 77], ATEX [▶ 78]	

[1] Supply voltage available at the input connections.

3.4.3 EP2028-000x - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2028-000x
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

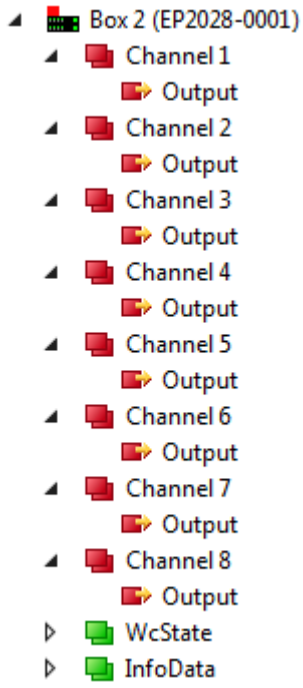
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

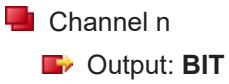
3.4.4 EP2028-000x - Process image

Channel 1 to Channel 8

Under **Channel 1** to **Channel 8** you will find the 8 digital outputs of the module (here as an example the EP2028-0001).

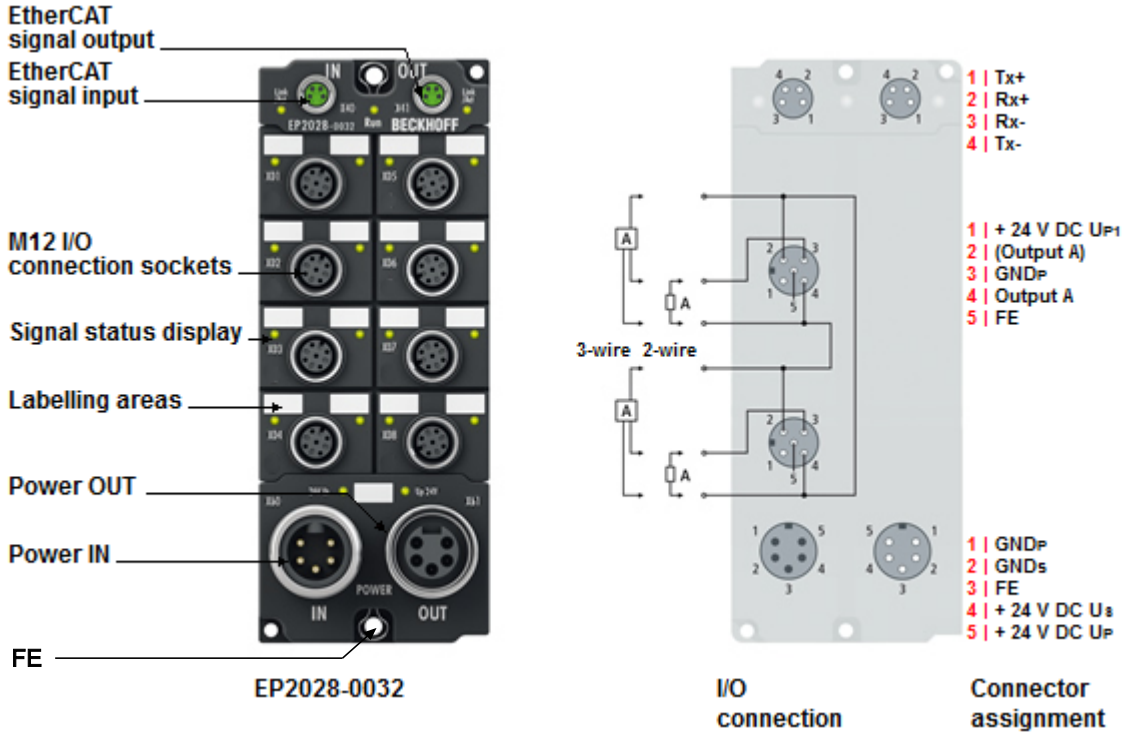


Data types



3.5 EP2028-0032

3.5.1 EP2028-0032 - Introduction



8-channel digital output 24 V_{DC}, I_{max} 2,8 A (Σ 16 A)

The EP2028-0032 EtherCAT Box with digital outputs connects the binary control signals from the controller on to the actuators at the process level.

The eight outputs handle load currents of up to 2.8 A each, although the total current is limited to 16 A. This makes these modules particularly suitable for applications in which a high simultaneity factor is required with a high equalizing current.

The signal state is indicated by means of LEDs. The signals are connected via M12 connectors. The outputs are short-circuit proof and protected against inverse connection.

Pins 2 and 4 of channels 0 and 1, channels 2 and 3, channels 4 and 5 and channels 6 and 7 are connected. This means that actuators that require two outputs can also be connected via an M12 cable.

The EP2028-0032 is interference-free. You can use the EP2028-0032 instead of an interference-free standard terminal in accordance with the following chapters of the TwinSAFE Application Guide:

- Chapter 4.1 "All-pole disconnection of a potential group with downstream interference-free standard terminals (Category 4, PL e)"
- Chapter 4.2 "Single-pole disconnection of a potential group with downstream interference-free standard terminals with fault exclusion (Category 4, PL e)"
- Chapter 4.3 "EL2911 potential group with interference-free standard terminals (Category 4, PL e)"

Quick links

Technical data [▶ 23]
Process image [▶ 24]
Dimensions [▶ 57]
Actuator connection [▶ 70]

3.5.2 EP2028-0032 - Technical data

Technical data	EP2028-0032
Fieldbus	EtherCAT
Fieldbus connection	2 x M8 socket (green)
Number of outputs	8
Output connections	8x M12 socket
Load type	ohmic, inductive, lamp load
Nominal output voltage	24 V_{DC} (-15%/+20%)
Output current	max. 2.8 A per channel, sum current of all outputs max. 16 A at 40 °C
Short circuit current	maximum 4.0 A
Supply of the module electronics	from the control voltage Us
Current consumption of the module electronics	typically 120 mA
Output driver supply	from load voltage Up
Output driver current consumption	typically 8 mA per channel
Power supply connection	Feed: 1 x 7/8" plug, 5-pin Downstream connection: 1 x 7/8" socket, 5-pin max. 16 A per pin
Sensor supply [1]	24 V_{DC} from the peripheral voltage U_P, max. 0.5 A total, short-circuit proof
Electrical isolation Fieldbus GND_S / GND_P	 500 V yes
Ambient temperature during operation	-25…+60 °C -25…+55 °C conforms to cURus
Ambient temperature during storage	-40…+85 °C
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP65, IP66, IP67 (conforms to EN 60529)
Mounting position	variable
Approvals	CE, cURus in preparation

[1] Supply voltage available at the input connections.

3.5.3 EP2028-0032 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2028-0032
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x Protective cap for supply voltage output, 7/8”, black (pre-fitted)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

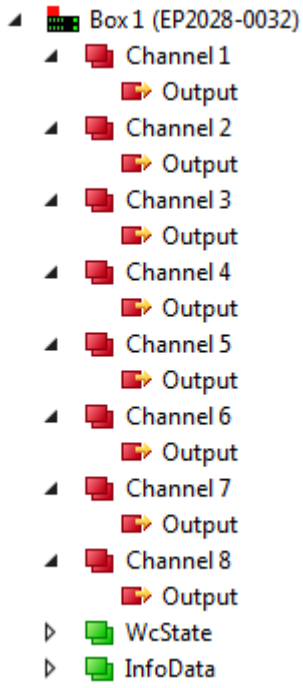
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.5.4 EP2028-0032 - Process image

Channel 1 to Channel 8

Under **Channel 1** to **Channel 8** you will find the 8 digital outputs of the module (here as an example the EP2028-0001).

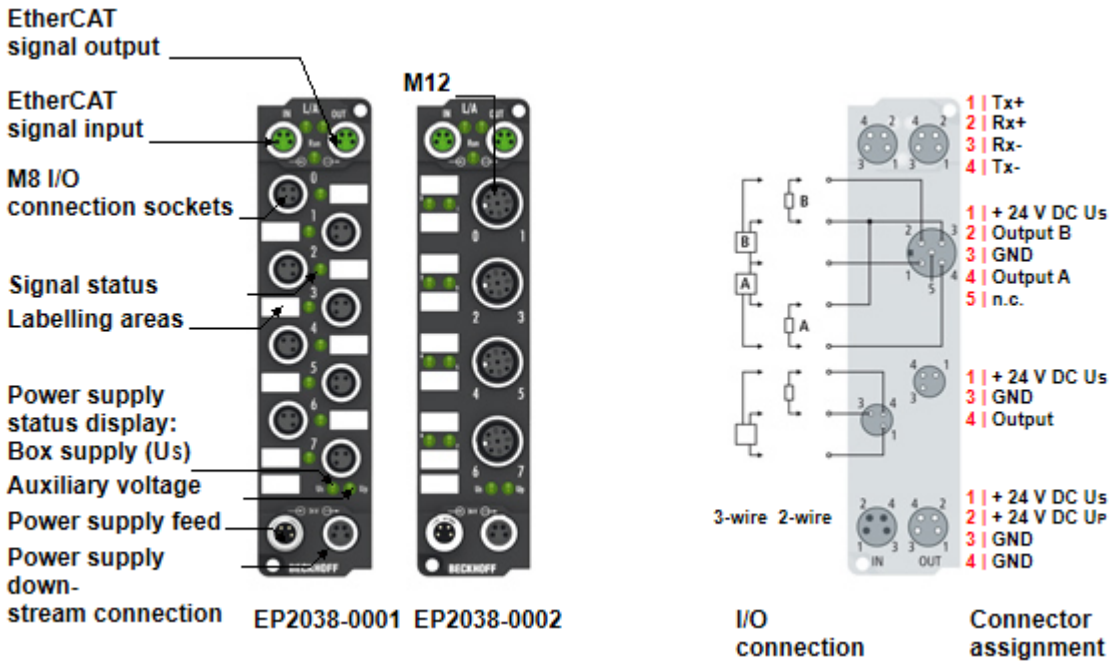


Data types

Channel n
Output: **BIT**

3.6 EP2038-000x

3.6.1 EP2038-000x – Introduction



8-channel digital output 24 V_{DC}, I_{MAX} 2 A (Σ 4 A), with diagnostics

The EP2038 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level. The eight outputs process load currents up to 2 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all actuators require signal currents of 2 A.

The signal state is indicated by status LEDs [▶ 27]. The EP2038 offers output diagnostics in the form of short circuit and open circuit detection per channel. The signals are optionally connected via M8 (EP2038-0001) or M12 (EP2038-0002) screw type connectors.

Quick links

Technical data [▶ 20]
Process image [▶ 21]
Dimensions [▶ 55]
Actuator connection [▶ 68]

3.6.2 EP2038-000x - Technical data

Technical data	EP2038-0001	EP2038-0002
Fieldbus	EtherCAT	
Fieldbus connection	2 x M8 socket (green)	
Number of outputs	8	
Output connections	8x M8 socket	4x M12 socket
Load type	ohmic, inductive, lamp load	
Nominal output voltage	24 V_{DC} (-15 % / +20 %)	
Output current	max. 2 A per channel, sum current of all outputs max. 4 A	
Minimum permitted load	typ. 20 mA + load	
Diagnostics	Short circuit, open circuit detection (min. load > 200 mA)	
Supply of the module electronics	from the control voltage Us	
Current consumption of the module electronics	typically 120 mA	
Short circuit current	max. 7 A	
Power supply connection	Feed: 1 x M8 plug, 4-pin Downstream connection: 1 x M8 socket, 4-pin	
Sensor supply [1]	24 V_{DC} from the control voltage U_S, max. 0.5 A total, short-circuit proof	
Electrical isolation Fieldbus GND_S / GND_P	 500 V no	
Distributed clocks	-	
Weight	approx. 165 g	
Ambient temperature during operation	-25…+60 °C -25…+55 °C conforms to cURus	
Ambient temperature during storage	-40…+85 °C	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4	
Protection class	IP65, IP66, IP67 (according to EN 60529)	
Mounting position	variable	
Approvals	CE, cURus [▶ 77]	

[1] Supply voltage available at the input connections.

3.6.3 EP2038-000x - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2038-000x
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.6.4 EP2038-000x - Status LEDs

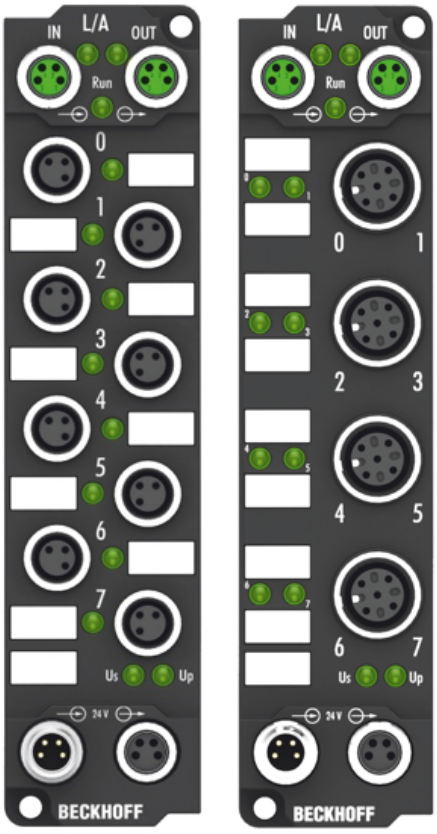


Fig. 4: EP2038-0001, EP2038-0002 - Status LEDs

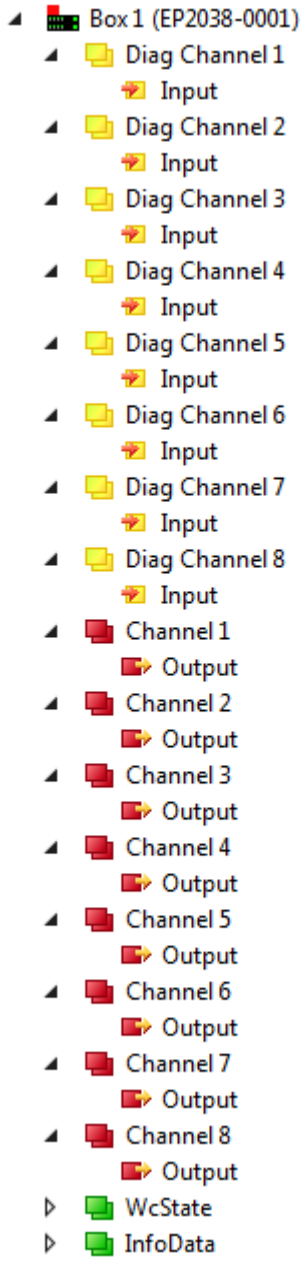
LED Displays

LED	Display	Meaning
STATUS 0-7	green illuminated	the respective output is active
	red illuminated	the respective output has an error
Us	off	The supply voltage, Us, is not present
	green illuminated	The supply voltage, Us, is present
Up	off	The supply voltage, Up, is not present
	green illuminated	The supply voltage, Up, is present

3.6.5 EP2038-000x - Process image

Channel 1 to Channel 8

Under **Diag Channel 1** to **Diag Channel 8** you will find the diagnostic inputs of the 8 digital outputs of the module. Under **Channel 1** to **Channel 8** you will find the 8 digital outputs of the module (here as an example the EP2038-0001).



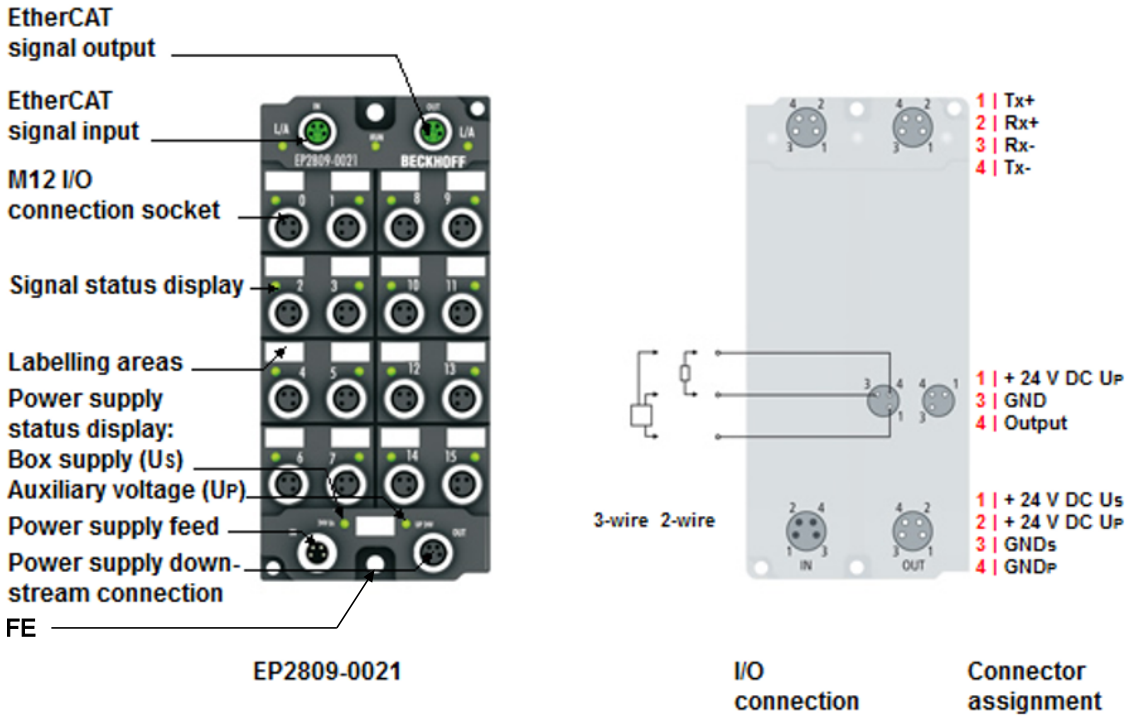
Data types

Diag Channel n
Input: **BIT**

Channel n
Output: **BIT**

3.7 EP2809-002x

3.7.1 EP2809-0021 - Introduction



16 digital outputs 24 V_{DC}, I_{max} 0.5 A (Σ 4 A)

The EP2809-0021 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level.

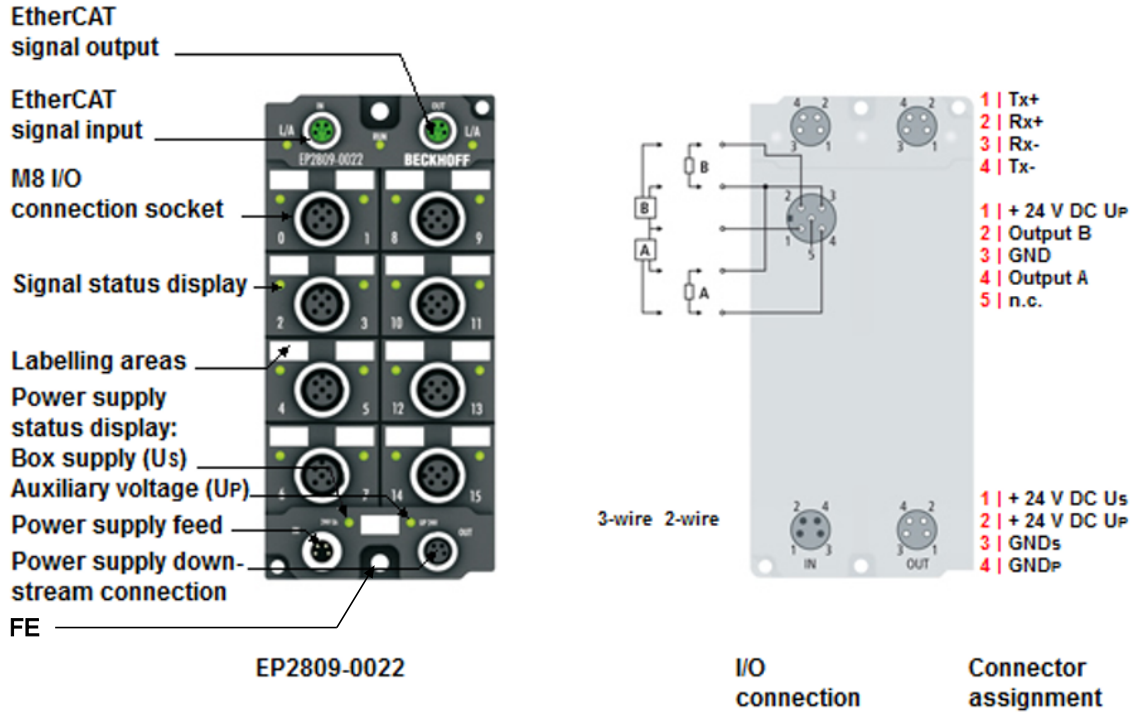
The 16 outputs process load currents up to 0.5 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all of the actuators draw 0.5 A signal current.

The signal state is indicated by means of LEDs. The signals are connected via M8 connectors All outputs are short-circuit proof and protected against inverse connection.

Quick links

Technical data [▶ 31]
Process image [▶ 32]
Dimensions [▶ 56]
Actuator connection [▶ 68]

3.7.2 EP2809-0022 - Introduction



16 digital outputs 24 V_{DC}, I_{max} 0.5 A (Σ 4 A)

The EP2809-0022 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level.

The 16 outputs process load currents up to 0.5 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all actuators require signal currents of 0.5 A.

The signal state is indicated by means of LEDs. The signals are connected via M12 connectors. All outputs are short-circuit proof and protected against inverse connection.

Quick links

Technical data [▶ 31]
Process image [▶ 32]
Dimensions [▶ 56]
Actuator connection [▶ 68]

3.7.3 EP2809-002x - Technical data

Technical data	EP2809-0021	EP2809-0022
Fieldbus	EtherCAT	
Fieldbus connection	2 x M8 socket (green)	
Number of outputs	16	
Output connections	16x M8 socket	4x M12 socket
Load type	ohmic, inductive, lamp load	
Nominal output voltage	24 V_{DC} (-15%/+20%)	
Output current	max. 0.5 A per channel, sum current of all outputs max. 4.0 A	
Short circuit current	maximum 4.0 A	
Supply of the module electronics	from the control voltage Us	
Current consumption of the module electronics	typically 120 mA	
Output driver supply	from load voltage Up	
Output driver current consumption	typically 20 mA	
Power supply connection	Feed: 1 x M8 plug, 4-pin Downstream connection: 1 x M8 socket, 4-pin	
Sensor supply [1]	24 V_{DC} from the peripheral voltage U_P, max. 0.5 A total, short-circuit proof	
Electrical isolation Fieldbus GND_S / GND_P	 500 V yes	
Ambient temperature during operation	-25 .. +60 °C -25 .. +55 °C conforms to cURus	
Ambient temperature during storage	-40 .. +85 °C	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4	
Protection class	IP65, IP66, IP67 (conforms to EN 60529)	
Mounting position	variable	
Approvals	CE, cURus [▶ 77]	

[1] Supply voltage available at the input connections.

3.7.4 EP2809-002x - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2809-002x
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

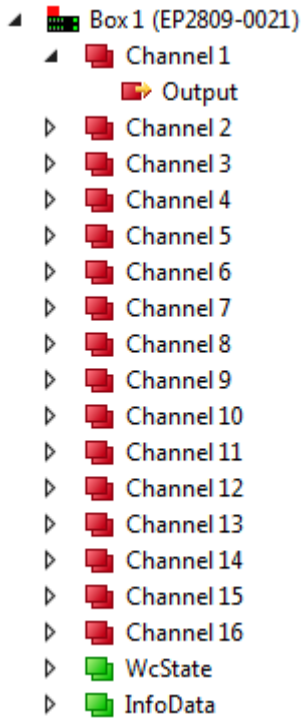
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.7.5 EP2809-002x - Process image

Channel 1 to Channel 16

Under **Channel 1** to **Channel 16** you will find the 16 digital outputs of the module (here as an example the EP2809-0021).



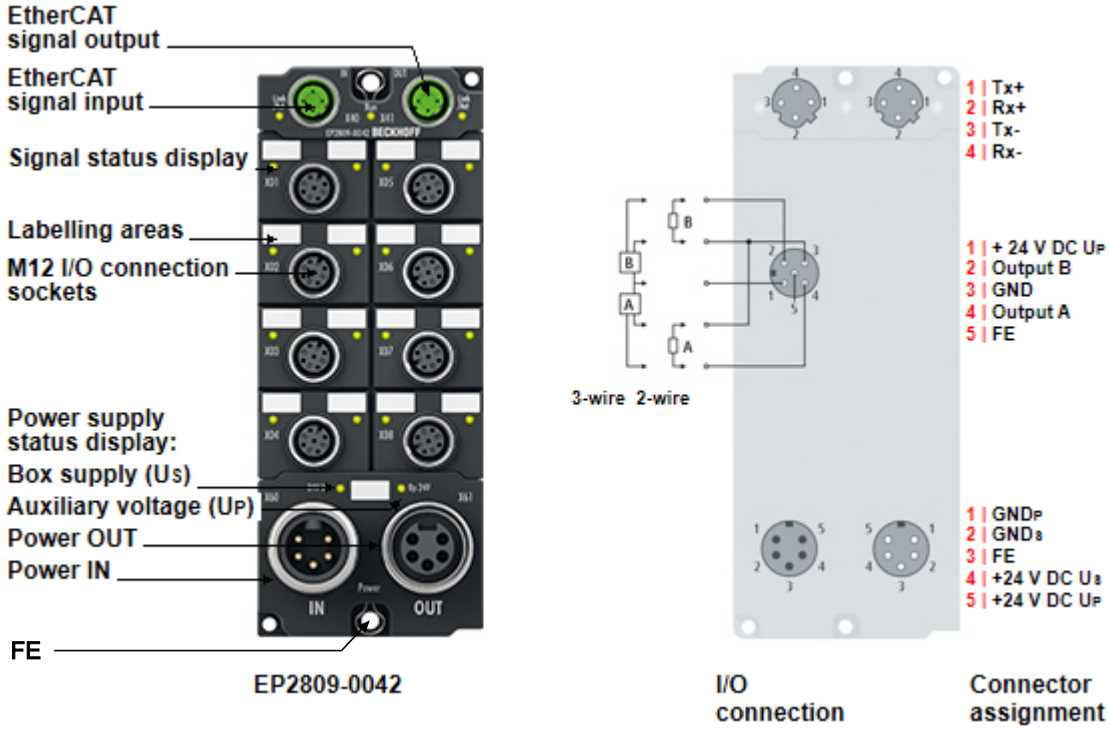
Data types

Channel n

Output: **BIT**

3.8 EP2809-0042

3.8.1 EP2809-0042 - Introduction



16-channel digital output 24 V DC, Imax = 0.5 A (∑ 16 A)

The EP2809-0042 EtherCAT Box with digital outputs connects the binary control signals from the controller on to the actuators at the process level. The 16 outputs handle load currents of up to 0.5 A each, although the total current is limited to 16 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all of the actuators draw 0.5 A current.

The signal state is indicated by means of light emitting diodes. The signals are connected via M12 screw type connectors. All outputs are short-circuit proof and protected against inverse connection.

The EP2809-0042 is interference-free. You can use the EP2809-0042 instead of an interference-free standard terminal in accordance with the following chapters of the TwinSAFE Application Guide:

- Chapter 4.1 "All-pole disconnection of a potential group with downstream interference-free standard terminals (Category 4, PL e)"
- Chapter 4.2 "Single-pole disconnection of a potential group with downstream interference-free standard terminals with fault exclusion (Category 4, PL e)"
- Chapter 4.3 "EL2911 potential group with interference-free standard terminals (Category 4, PL e)"

Quick links

Technical data [▶ 34]
Process image [▶ 36]
Dimensions [▶ 58]
Actuator connection [▶ 71]

3.8.2 EP2809-0042 - Technical data

All values are typical values over the entire temperature range, unless stated otherwise.

Technical data	EP2809-0042
Fieldbus	EtherCAT
Fieldbus connection	2x M12 socket, D-coded, 4-pin, green
Number of outputs	16
Output connections	8x M12 socket
Load type	ohmic, inductive, lamp load
Nominal output voltage	24 V_{DC} (-15%/+20%)
Output current	max. 0.5 A on each channel, individually short-circuit proof
Short circuit current	max. 1.5 A
Supply of the module electronics	from the control voltage U_S
Current consumption of the module electronics	130 mA
Output driver supply	from the peripheral voltage U_P
Output driver current consumption	typ. 20 mA + load
Power supply connection	Power supply: 1 x 7/8" plug, 5-pin Downstream connection: 1 x 7/8" socket, 5-pin max. 16 A per pin
Auxiliary voltage [1)]	24 V_{DC} from the peripheral voltage U_P, max. sum current 0.5 A, completely short-circuit proof
Electrical isolation Fieldbus GND_S / GND_P	 500 V yes
Ambient temperature during operation	-25…+60 °C -25...+55 °C according to cURus
Ambient temperature during storage	-40…+85 °C
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP65, IP66, IP67 (conforms to EN 60529)
Weight	approx. 440 g
Installation position	variable
Approvals	CE, cURus in preparation

[1)] The auxiliary voltage is an additional supply voltage that is available on pin 1 of each connector X01…X08. It is branched off from the peripheral voltage U_P and is short-circuit proof. The sum of all output currents from the auxiliary voltage must not exceed 0.5 A.

3.8.3 EP2809-0042 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2809-0042
- 2x protective cap for EtherCAT socket, M12 (pre-assembled)
- 1x Protective cap for supply voltage output, 7/8”, black (pre-fitted)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.8.4 EP2809-0042 - Process image

The process image contains a process data object for each digital output.

The name of each process data object contains the name of the socket and the pin number of the corresponding digital output.

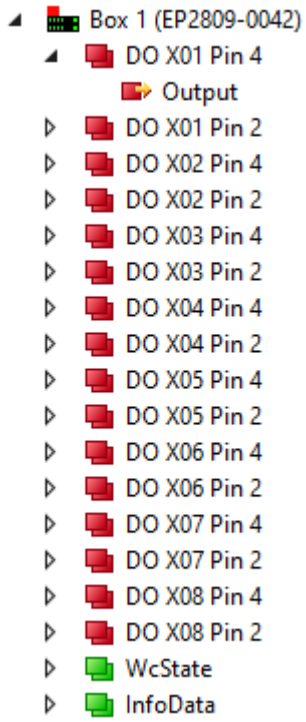
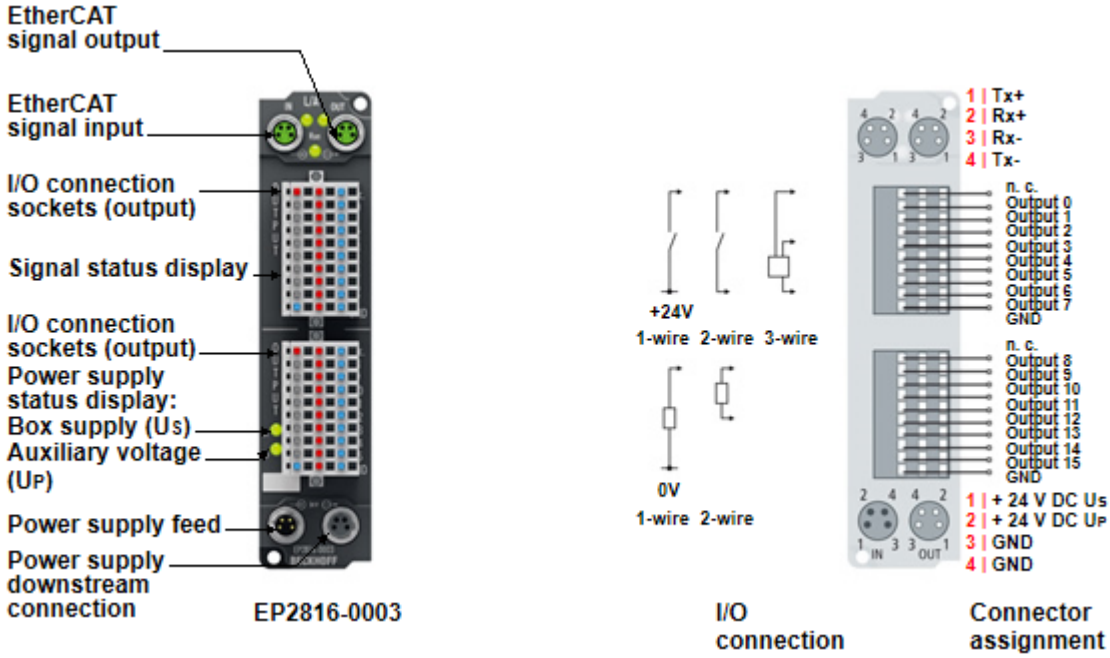


Fig. 5: EP2809-0042 Process image

3.9 EP2816-00xx

3.9.1 EP2816-0003 – Einführung



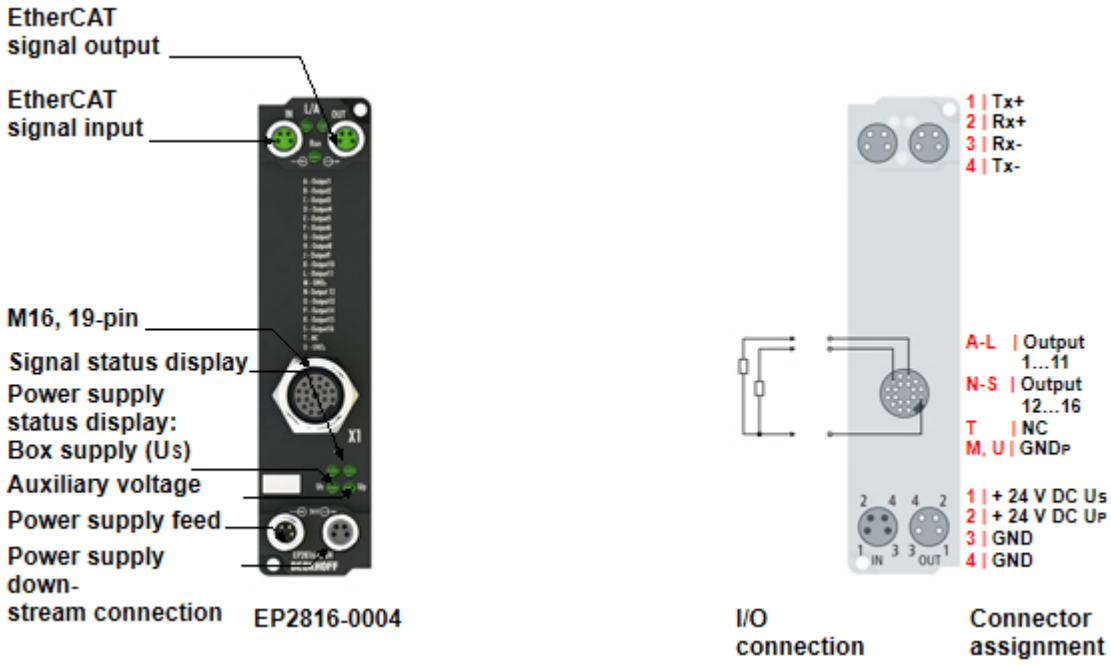
The EP2816-0003 EtherCAT Box with digital outputs connects the binary control signals from the controller on to the actuators at the process level. The sixteen outputs handle load currents of up to 0.5 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all of the actuators draw 0.5 A current. An output short circuit is recognised and passed on to the controller.

The signal state is indicated in groups by means of light emitting diodes. The signal connection is realised by connectors with a spring-loaded system. All outputs are short-circuit proof, protected against inverse connection and can be diagnosed.

Quick Links

Technical data [▶ 41]
Process image [▶ 44]
Dimensions [▶ 55]
Actuator connection [▶ 72]

3.9.2 EP2816-0004 - Introduction



16 digital outputs 24 V_{DC}, I_{MAX} 0.5 A (∑ 4 A)

The EP2816-0004 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level.

The 16 outputs process load currents up to 0.5 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all actuators require signal currents of 0.5 A.

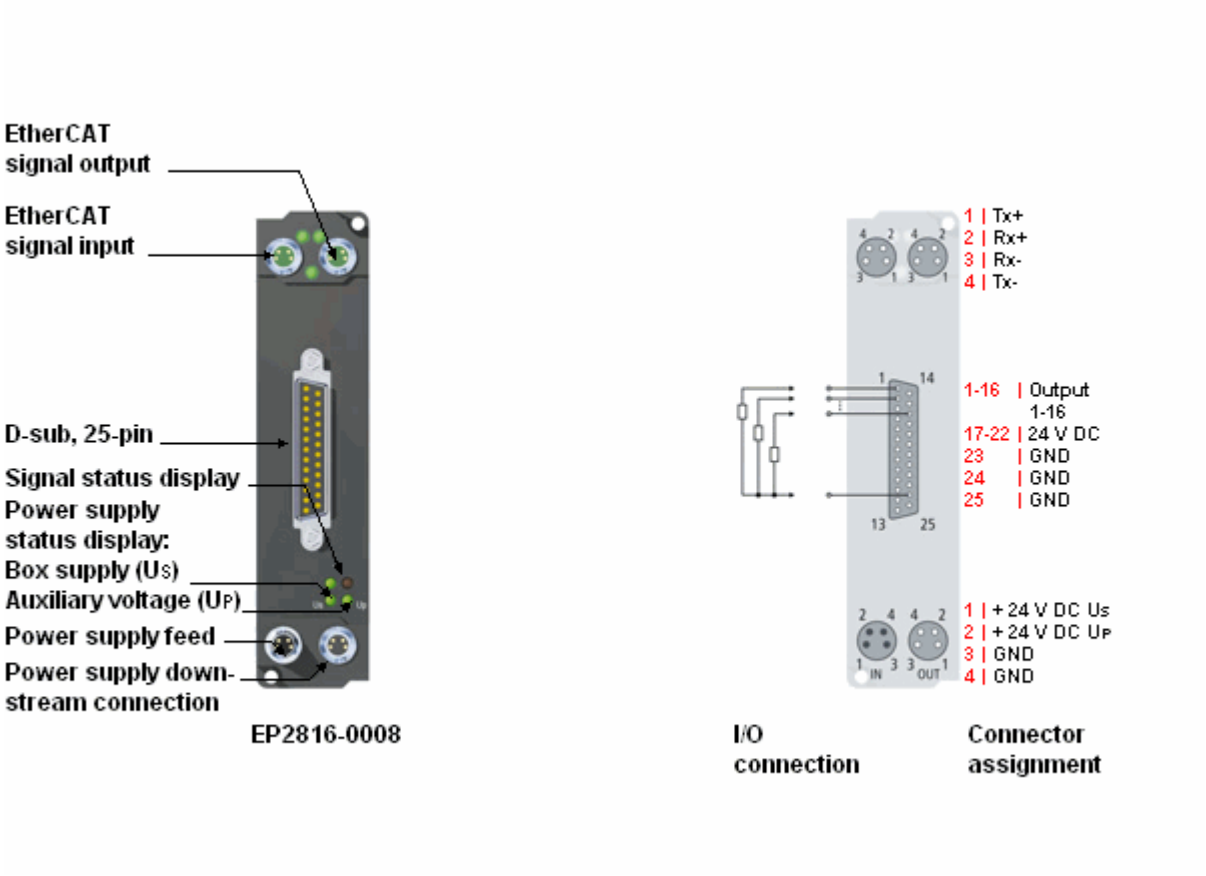
All the outputs are short-circuit proof, protected against inverse connection and have diagnostic facilities. An output short-circuit is recognized and passed on to the control level.
The status of the outputs is indicated in groups by status LEDs.

The signal connection is made via a 19-pin M16 socket and is ideally suited for valve terminals with multi-pin plug connection.

Quick links

Technical data [▶ 41]
Process image [▶ 44]
Dimensions [▶ 55]

3.9.3 EP2816-0008 - Introduction



16 digital outputs 24 V_{DC}, I_{max} 0.5 A (Σ 4 A)

The EP2816-0008 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level.

The 16 outputs process load currents up to 0.5 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all actuators require signal currents of 0.5 A.

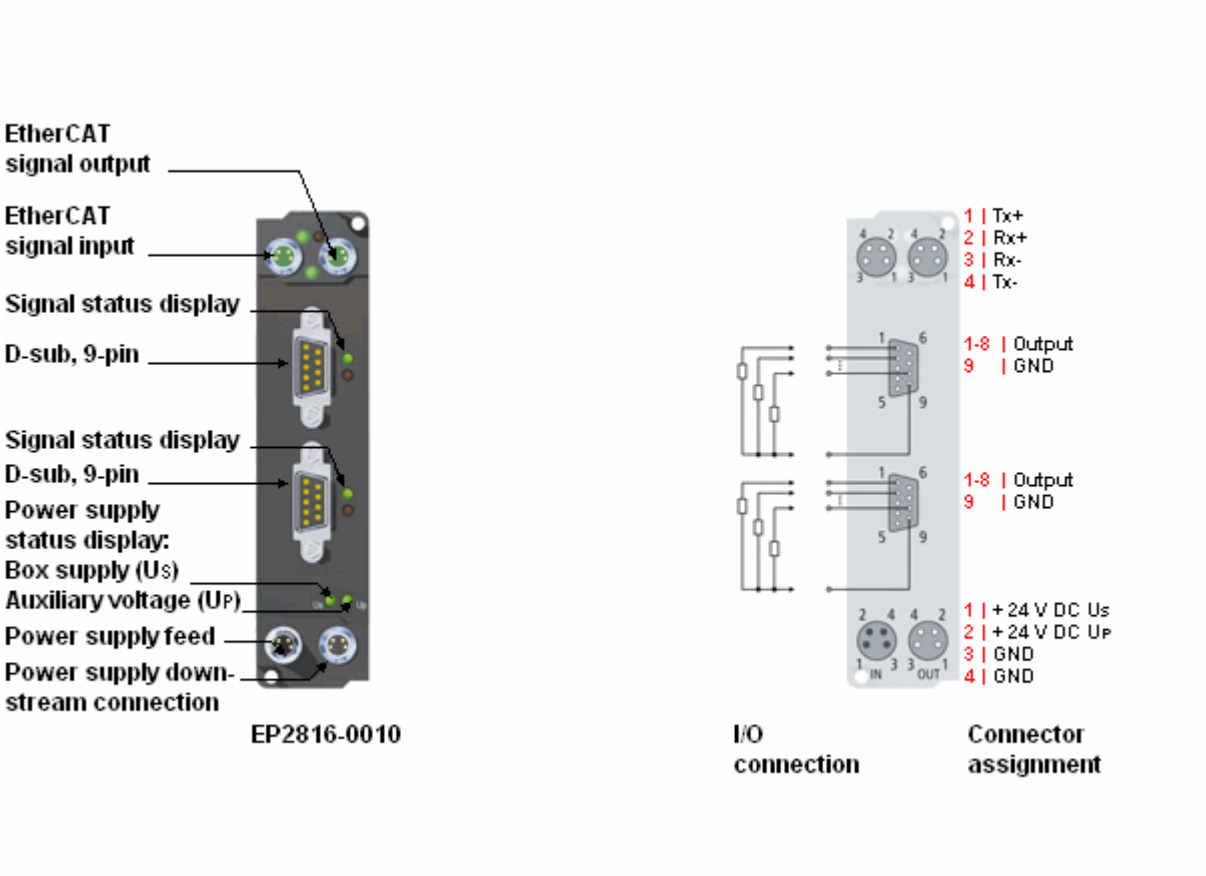
All the outputs are short-circuit proof, protected against inverse connection and have diagnostic facilities. An output short-circuit is recognized and passed on to the control level.
The status of the outputs is indicated in groups by status LEDs.

The signal connection is made through a 25-pin D-Sub socket.

Quick links

Technical data [▶ 41]
Process image [▶ 44]
Dimensions [▶ 55]
Actuator connection [▶ 74]

3.9.4 EP2816-0010 - Introduction



16 digital outputs 24 V_{DC}, I_{max} 0.5 A (Σ 4 A)

The EP2816-0010 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level.

The 16 outputs process load currents up to 0.5 A each, although the total current is limited to 4 A. This makes these modules particularly suitable for applications in which not all of the outputs are active at the same time, or in which not all actuators require signal currents of 0.5 A.

All the outputs are short-circuit proof, protected against inverse connection and have diagnostic facilities. An output short-circuit is recognized and passed on to the control level.
The status of the outputs is indicated in groups by status LEDs.

The signal connection is made through two 9-pin D-sub sockets.

Quick links

Technical data [▶ 41]
Process image [▶ 44]
Dimensions [▶ 55]
Actuator connection [▶ 76]

3.9.5 EP2816-00xx - Technical data

Technical data	EP2816-0003	EP2816-0004	EP2816-0008	EP2816-0010
Fieldbus	EtherCAT			
Fieldbus connection	2 x M8 socket (green)			
Distributed Clocks	-	yes	yes	yes
Number of outputs	16			
Output connections	2 x ZS2001	1 x M16 socket, 19-pin	1 x D-sub socket, 25-pin, thread UNC4-40	2 x D-sub socket, 9-pin
Load type	ohmic, inductive, lamp load			
Nominal output voltage	24 V_{DC} (-15%/+20%)			
Output current	max. 0.5 A on each channel, individually short-circuit proof, max. 4.0 A in total			
Short circuit current	maximum 1.5 A			
Supply of the module electronics	from the control voltage Us			
Current consumption of the module electronics	typ. 120 mA			
Output driver supply	from load voltage U_P			
Output driver current consumption	max. 30 mA + load			
Power supply connection	Power supply: 1 x M8 plug, 4-pin Downstream connection: 1 x M8 socket, 4-pin			
Electrical isolation Fieldbus GND_S / GND_P	 500 V no			
Ambient temperature during operation	-25 .. +60 °C -25 .. +55 °C conforms to cURus			
Ambient temperature during storage	-40 .. +85 °C			
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27			
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4			
Protection class	IP20	IP65, IP66, IP67 (conforms to EN 60529)		
Installation position	variable			
Approvals	CE, UL Requirements [▶ 77]			

3.9.6 EP2816-00xx - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.9.7 EP2816-0004, EP2816-0008 - Status LEDs

Fig. 6: EP2816-0004 and EP2816-0008 - Status LEDs

LED Displays

LED	Display	Meaning
STATUS 1-8	green illuminated	at least one of the outputs for channel 1-8 is set
	red illuminated	at least one of the outputs for channel 1-8 has a short-circuit
STATUS 9-16	green illuminated	at least one of the outputs for channel 9-16 is set
	red illuminated	at least one of the outputs for channel 9-16 has a short-circuit
Us	off	The supply voltage, Us, is not present
	green illuminated	The supply voltage, Us, is present
Up	off	The supply voltage, Up, is not present
	green illuminated	The supply voltage, Up, is present

3.9.8 EP2816-0010 - Status LEDs

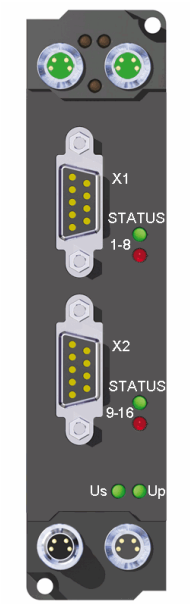


Fig. 7: EP2816-0010 - Status LEDs

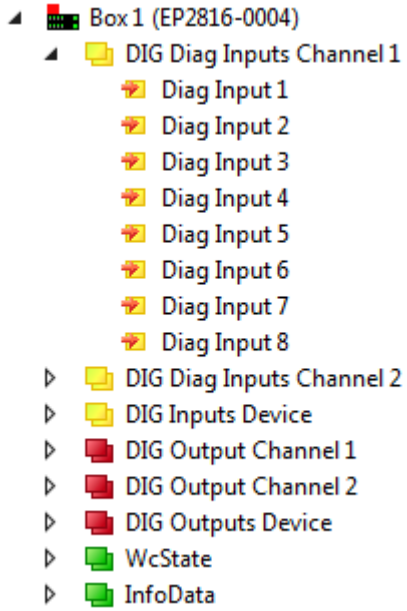
LED Displays

LED	Display	Meaning
STATUS 1-8	green illuminated	at least one of the outputs for channel 1-8 is set
	red illuminated	at least one of the outputs for channel 1-8 has a short-circuit
STATUS 9-16	green illuminated	at least one of the outputs for channel 9-16 is set
	red illuminated	at least one of the outputs for channel 9-16 has a short-circuit
Us	off	The supply voltage, Us, is not present
	green illuminated	The supply voltage, Us, is present
Up	off	The supply voltage, Up, is not present
	green illuminated	The supply voltage, Up, is present

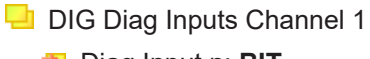
3.9.9 EP2816-00xx - Process image

DIG Diag Inputs Channel 1

You will find the diagnostic inputs for the module's first 8 digital outputs under **DIG Diag Inputs Channel 1**.



Data types

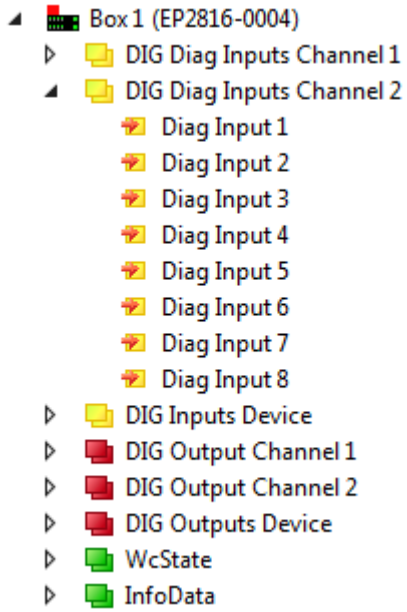


Diag Input n

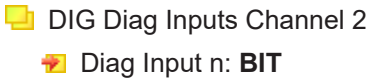
Indicates an error on Output n.

DIG Diag Inputs Channel 2

You will find the diagnostic inputs for the module's second 8 digital outputs under **DIG Diag Inputs Channel 2**.



Data types

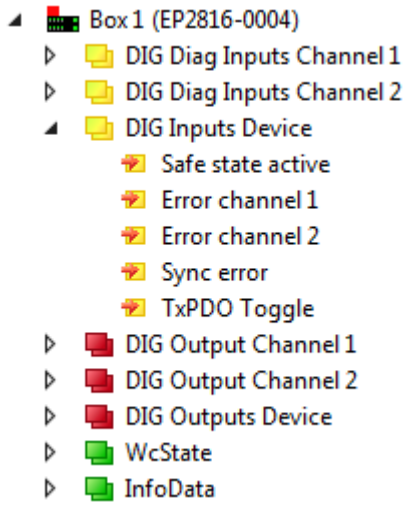


Diag Input n

Indicates an error on Output n.

DIG Inputs Device

You will find the module's status inputs under **DIG Inputs Device**.



Data types

- DIG Inputs Device
  - Safe state active: **BIT**
  - Error channel 1: **BIT**
  - Error channel 1: **BIT**
  - Sync error: **BIT**
  - TxPDO Toggle: **BIT**

Safe state active

Indicates whether the safe state has been assumed. The display only works if the network transmits process input data, i.e. in the network states Safe-Operational (Safe-OP) and Operational (OP), but not in the network state INIT.

Error channel X

Indicates an error on channel X.

Sync Error

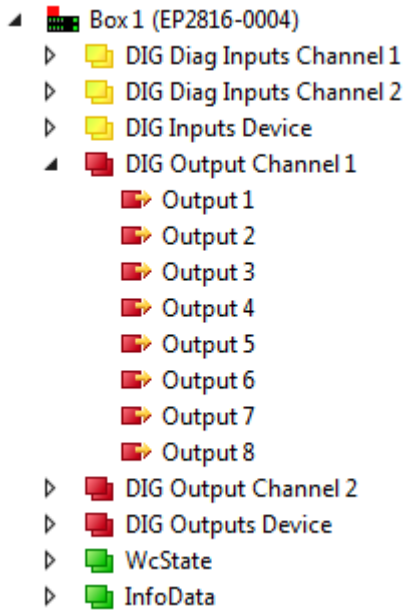
See EtherCAT system documentation on www.beckhoff.com.

TxPDO Toggle

See EtherCAT system documentation.

DIG Outputs Channel 1

You will find the first 8 digital outputs of the module under **DIG Outputs Channel 1**.

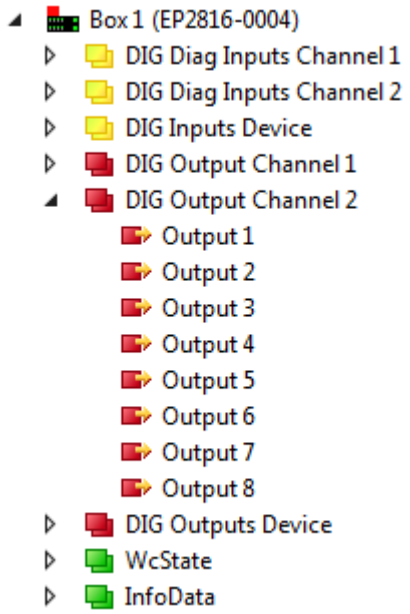


Data types

DIG Output Channel 1
Output n: **BIT**

DIG Outputs Channel 2

You will find the second 8 digital outputs of the module under **DIG Outputs Channel 2**.

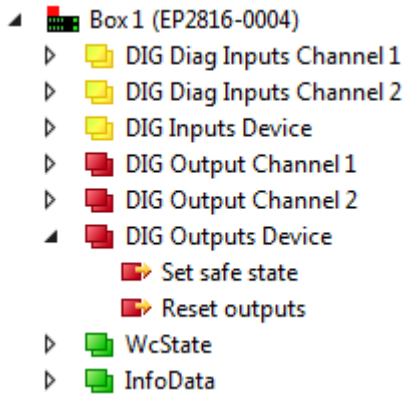


Data types

DIG Output Channel 2
Output n: **BIT**

DIG Outputs Device

You will find the module's control outputs under **DIG Outputs Device**.



Data types

- DIG Outputs Device
  - Set safe state: **BIT**
  - Reset outputs: **BIT**

Set safe state

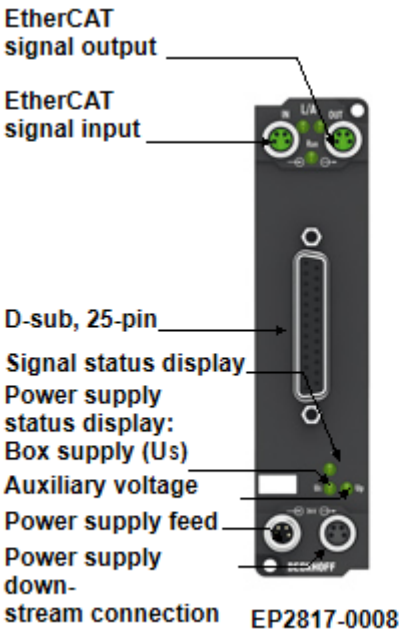
Sets the module to the safe state.

Reset outputs

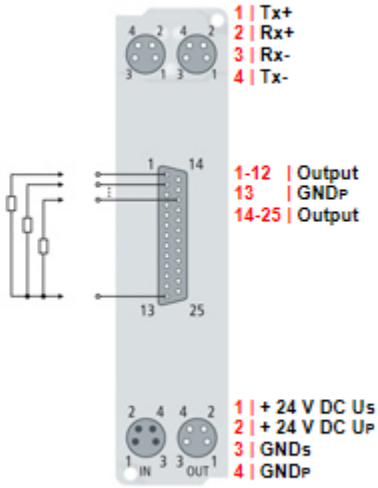
Resets the error bits "Error channel X" of the module. The outputs are reactivated.

3.10 EP2817-0008

3.10.1 EP2817-0008 - Introduction



EP2817-0008



I/O connection

Connector assignment

24 digital outputs 24 V_{DC}, I_{max} 0.5 A

The EP2817-0008 EtherCAT Box with digital outputs connects binary control signals from the controller to the actuators at the process level.

The twenty-four outputs process load currents up to 0.5 A each.

All the outputs are short-circuit proof, protected against inverse connection and have diagnostic facilities. An output short-circuit is recognized and passed on to the controller.

The signal connection is made through a 25-pin D-Sub socket.

The signal state is indicated for signal groups through status-light emitting diodes [▶ 50].

Quick links

Technical data [▶ 49]
Process image [▶ 51]
Dimensions [▶ 55]
Actuator connection [▶ 75]

3.10.2 EP2817-0008 - Technical data

Technical data	EP2817-0008
Fieldbus	EtherCAT
Fieldbus connection	2 x M8 socket (green)
Number of outputs	24
Output connections	D-sub socket, 25-pin, thread UNC4-40
Load type	ohmic, inductive, lamp load
Rated voltage outputs	24 V_{DC} (-15%/+20%)
Output current	max. 0.5 A each channel, individually short-circuit proof, sum current max. 4.0 A
Short circuit current	maximum 1.0 A
Diagnostics	Undervoltage detection <18 V_{DC} for Us and Up
Supply of the module electronics	from the control voltage Us
Current consumption of the module electronics	typically 120 mA
Output driver supply	from load voltage Up
Output driver current consumption	max. 30 mA for all channels
Power supply connection	Feed: 1 x M8 plug, 4-pin Downstream connection: 1 x M8 socket, 4-pin
Electrical isolation Fieldbus GND_S / GND_P	 500 V no
Ambient temperature during operation	-25 .. +60 °C -25 .. +55 °C conforms to cURus
Ambient temperature during storage	-40 .. +85 °C
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP65, IP66, IP67 (conforms to EN 60529)
Mounting position	variable
Approvals	CE, cURus [▶ 77]

3.10.3 EP2817-0008 - Scope of supply

Make sure that the following components are included in the scope of delivery:

- 1x EtherCAT Box EP2817-0008
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.10.4 EP2817-0008 - Status LEDs

Fig. 8: EP2817-0008 - Status LEDs

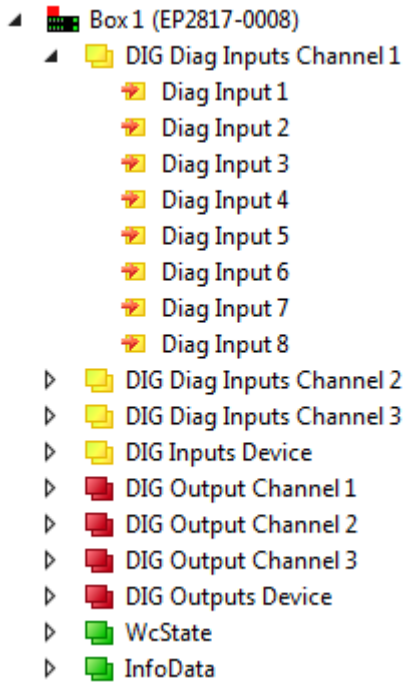
LED Displays

LED	Display	Meaning
STATUS 1-12	green illuminated	at least one of the outputs for channel 1-12 is set
	red illuminated	at least one output of channels 1-12 has an error
STATUS 13-24	green illuminated	at least one of the outputs for channel 13-24 is set
	red illuminated	at least one output of channels 13 - 24 has an error
Us	off	The supply voltage, Us, is not present
	green illuminated	The supply voltage, Us, is present
Up	off	The supply voltage, Up, is not present
	green illuminated	The supply voltage, Up, is present

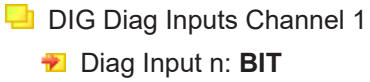
3.10.5 EP2817-0008 - Process image

DIG Diag Inputs Channel 1

Under **DIG Diag Inputs Channel 1 - 3** you will find the diagnostic inputs of the 8 digital outputs (DIG Outputs Channel 1 - 3) of the module.



Data types

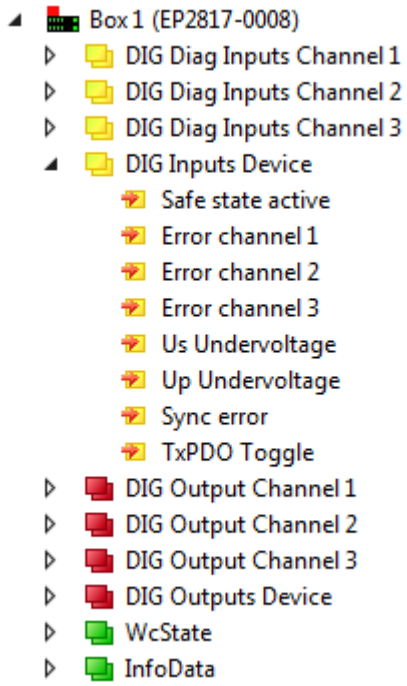


Diag Input n

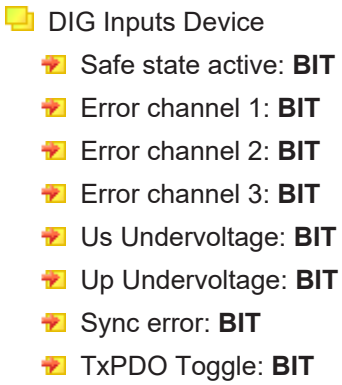
Indicates an error at output n, i.e. an output switched ON is OFF, or an output switched OFF is ON

DIG Inputs Device

You will find the module's status inputs under **DIG Inputs Device**.



Data types



Safe state active

Indicates whether the safe state has been assumed. The display only works if the network transmits process input data, i.e. in the network states Pre-Operational (PRE-OP) and Operational (OP), but not in the network state INIT.

Error channel n

Indicates an error on channel n.

Us Undervoltage

Indicates that the voltage Us < approx. 18V.

Up Undervoltage

Indicates that the voltage Up < approx. 18V.

Sync Error

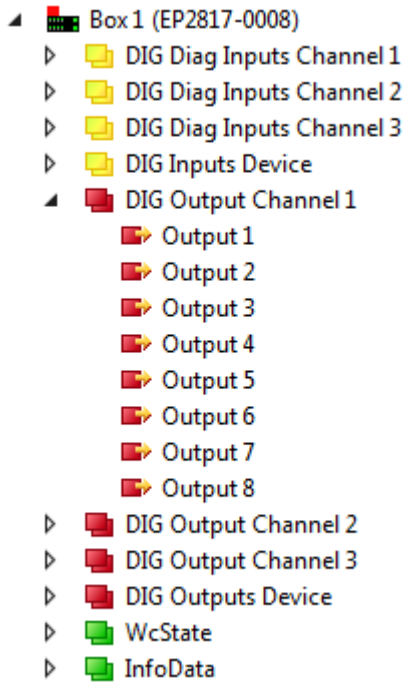
See EtherCAT system documentation on www.beckhoff.com.

TxPDO Toggle

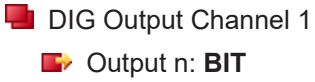
See EtherCAT system documentation.

DIG Outputs Channel n

Under **DIG Outputs Channel 1 - 3** you will find 8 digital outputs of each module.



Data types

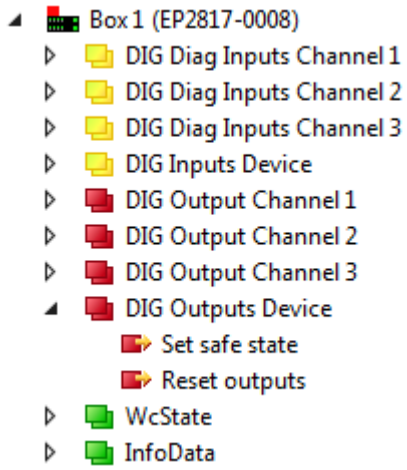


The assignment is always made in pairs on the left and right side of the D-SUB connector in order to systematically connect double-switching valves.

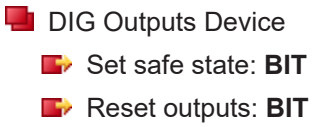
Type	Output 2	Output 4	Output 6	Output 8	Output 10	Output 12	Output 14	Output 16	Output 18	Output 20	Output 22	Output 24	
Pin	14	15	16	17	18	19	20	21	22	23	24	25	
Type	Output 1	Output 3	Output 5	Output 7	Output 9	Output 11	Output 13	Output 15	Output 17	Output 19	Output 21	Output 23	GND
Pin	1	2	3	4	5	6	7	8	9	10	11	12	13

DIG Outputs Device

You will find the module's control outputs under **DIG Outputs Device**.



Data types



Set safe state

Sets the module to the safe state.

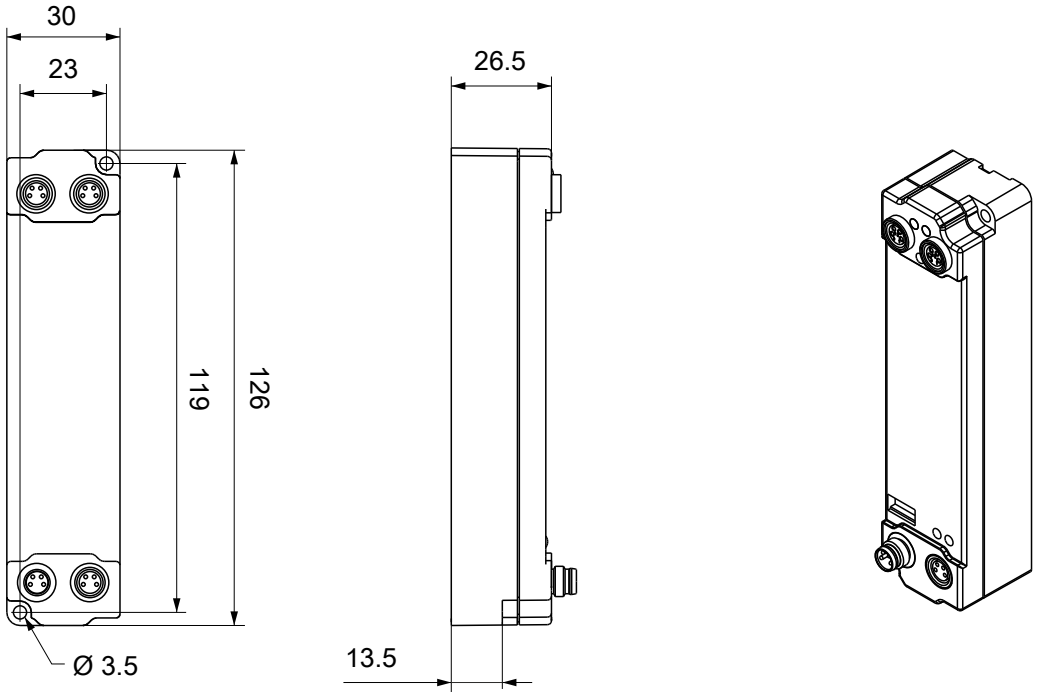
Reset outputs

Resets the error bits "Error channel X" of the module. The outputs are reactivated.

4 Mounting and connection

4.1 Mounting

4.1.1 Dimensions EPxxxx-xx0x and EPxxxx-xx1x

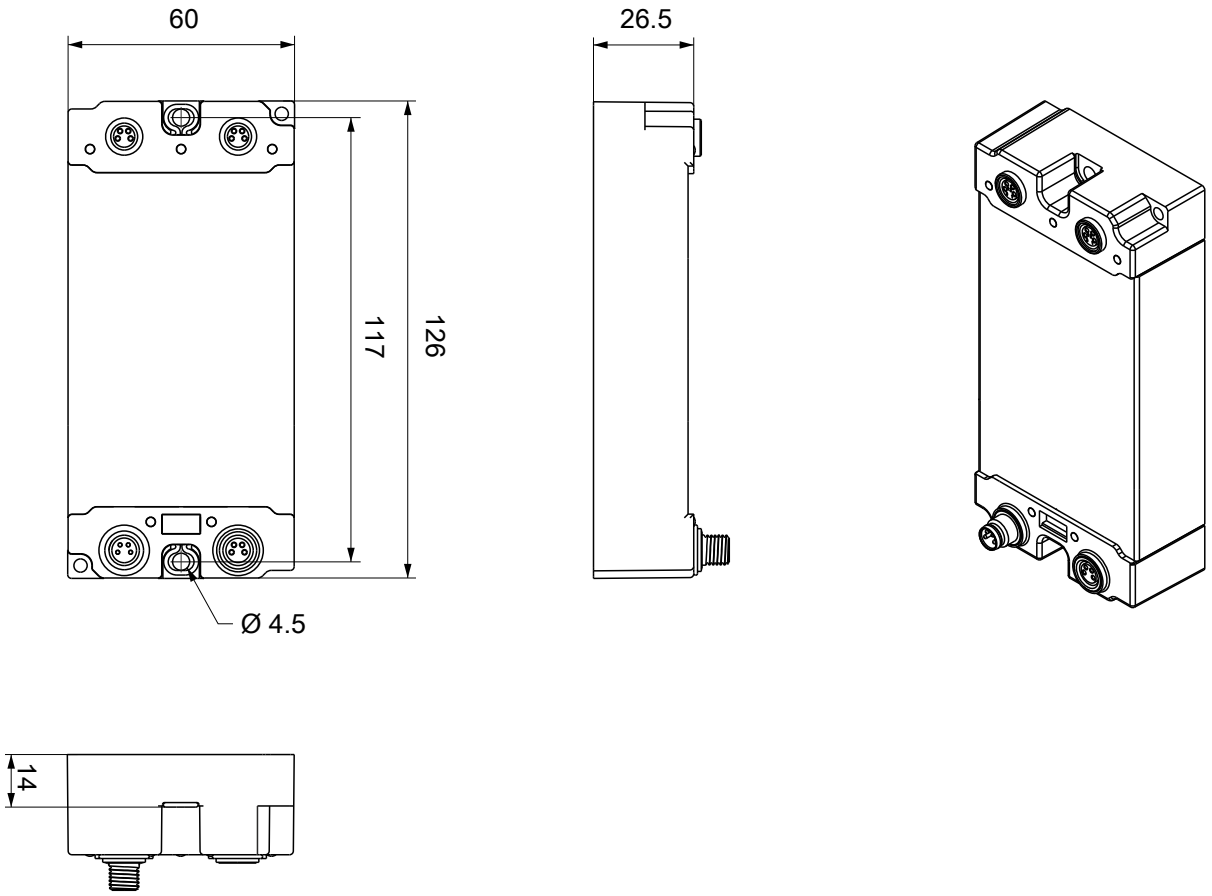


All dimensions are given in millimeters.
The drawing is not true to scale.

Housing features

Housing material	PA6 (polyamide)
Sealing compound	polyurethane
Mounting	two fastening holes Ø 3.5 mm for M3
Metal parts	brass, nickel-plated
Contacts	CuZn, gold-plated
Power feed through	max. 4 A
Installation position	variable
Protection class	IP65, IP66, IP67 (conforms to EN 60529) when screwed together
Dimensions (H x W x D)	approx. 126 x 30 x 26.5 mm (without connectors)

4.1.2 Dimensions EPxxxx-xx2x

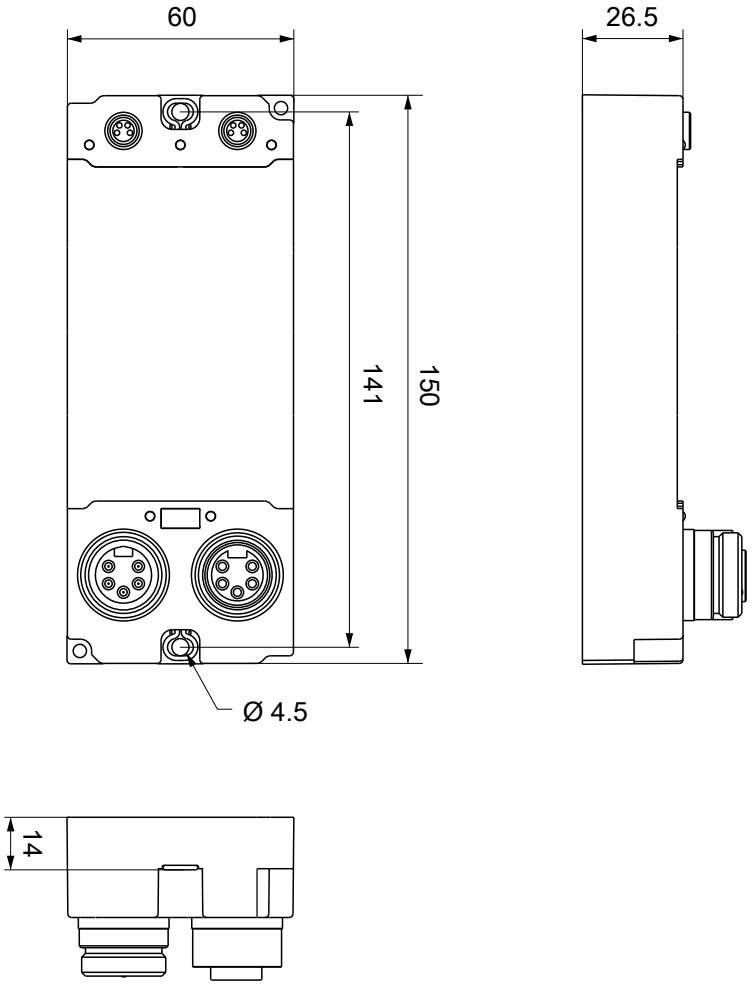


All dimensions are given in millimeters.
The drawing is not true to scale.

Housing features

Housing material	PA6 (polyamide)
Sealing compound	polyurethane
Mounting	two fastening holes Ø 4.5 mm for M4
Metal parts	brass, nickel-plated
Contacts	CuZn, gold-plated
Installation position	variable
Protection class	IP65, IP66, IP67 (conforms to EN 60529) when screwed together
Dimensions (H x W x D)	approx. 126 x 60 x 26.5 mm (without connectors)

4.1.3 EPxxxx-xx32 dimensions

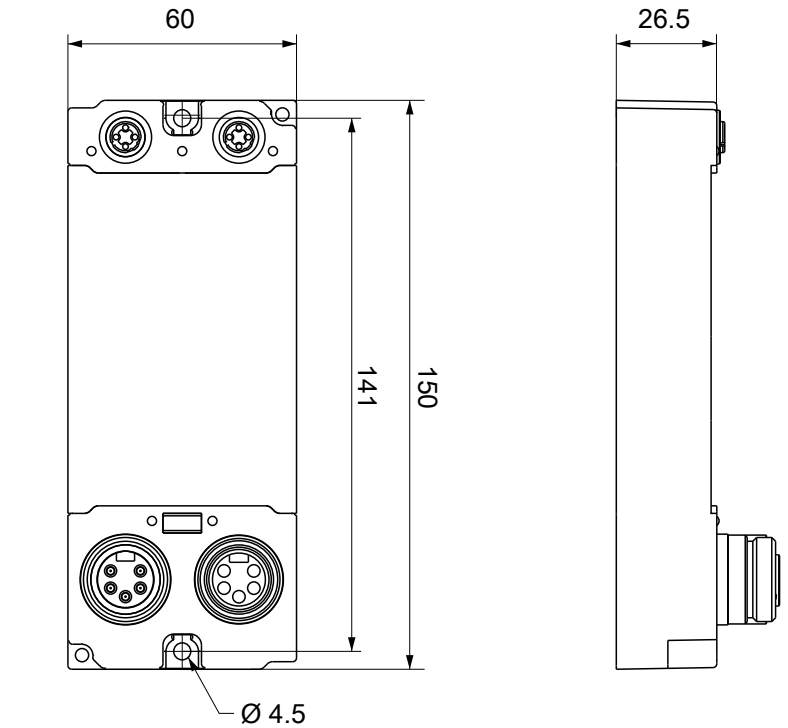


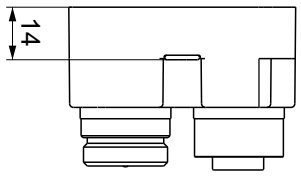
All dimensions are given in millimeters.
The drawing is not true to scale.

Housing features

Housing material	PA6 (polyamide)
Sealing compound	polyurethane
Mounting	two fastening holes Ø 4.5 mm for M4
Metal parts	brass, nickel-plated
Contacts	CuZn, gold-plated
Power feed through	max. 16 A at 40°C (according to IEC 60512-3)
Installation position	variable
Protection class	IP65, IP66, IP67 (conforms to EN 60529) when screwed together
Dimensions (H x W x D)	approx. 150 x 60 x 26.5 mm (without connectors)

4.1.4 EPxxxx-xx42 dimensions





All dimensions are given in millimeters.
The drawing is not true to scale.

Housing features

Housing material	PA6 (polyamide)
Sealing compound	polyurethane
Mounting	two fastening holes Ø 4.5 mm for M4
Metal parts	brass, nickel-plated
Contacts	CuZn, gold-plated
Power feed through	max. 16 A at 40°C (according to IEC 60512-3)
Installation position	variable
Protection class	IP65, IP66, IP67 (conforms to EN 60529) when screwed together
Dimensions (H x W x D)	approx. 150 x 60 x 26.5 mm (without connectors)

4.1.5 Fixing

Protection of connectors against contamination!

While mounting the modules, protect all connectors, especially the IP-Link, against contamination! Only with connected cables or plugs the protection class IP67 is guaranteed! Unused connectors have to be protected with the right plugs! See for plug sets in the catalogue.

Modules with narrow housing are mounted with two M3 bolts.
Modules with wide housing are mounted with two M3 bolts to the fixing holes located at the corners or mounted with two M4 bolts to the fixing holes located centrally.

The bolts must be longer than 15 mm. The fixing holes of the modules are not threaded.

When assembling, remember that the fieldbus connectors increases the overall height. See chapter accessories.

Mounting Rail ZS5300-0001

The mounting rail ZS5300-0001 (500 mm x 129 mm) allows the time saving assembly of modules.

The rail is made of stainless steel, 1.5 mm thick, with already pre-made M3 threads for the modules. The rail has got 5.3 mm slots to mount it via M5 screws to the machine.

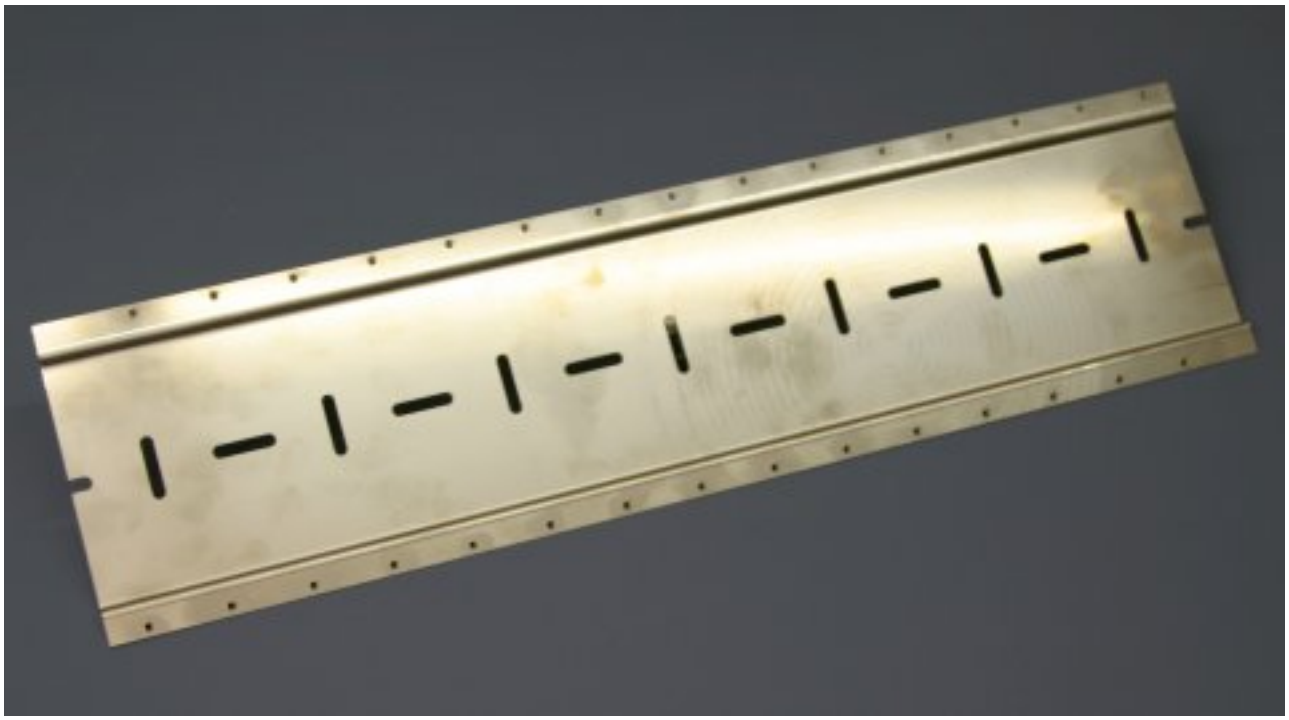


Fig. 9: Mounting Rail ZS5300-000

The mounting rail is 500 mm long, that way 15 narrow modules can be mounted with a distance of 2 mm between two modules. The rail can be cut to length for the application.

Mounting Rail ZS5300-0011

The mounting rail ZS5300-0011 (500 mm x 129 mm) has in addition to the M3 treads also pre-made M4 treads to fix 60 mm wide modules via their middle holes.

Up to 14 narrow or 7 wide modules may be mixed mounted.

4.1.6 Functional earth (FE)

EtherCAT Box modules of types EPxxxx-002x and EPxxxx-0042 must be grounded:

The fastening holes also serve as connections for the functional earth (FE).

Make sure that the box is earthed with low impedance via both fastening screws. You can achieve this, for example, by mounting the box on a grounded machine bed.

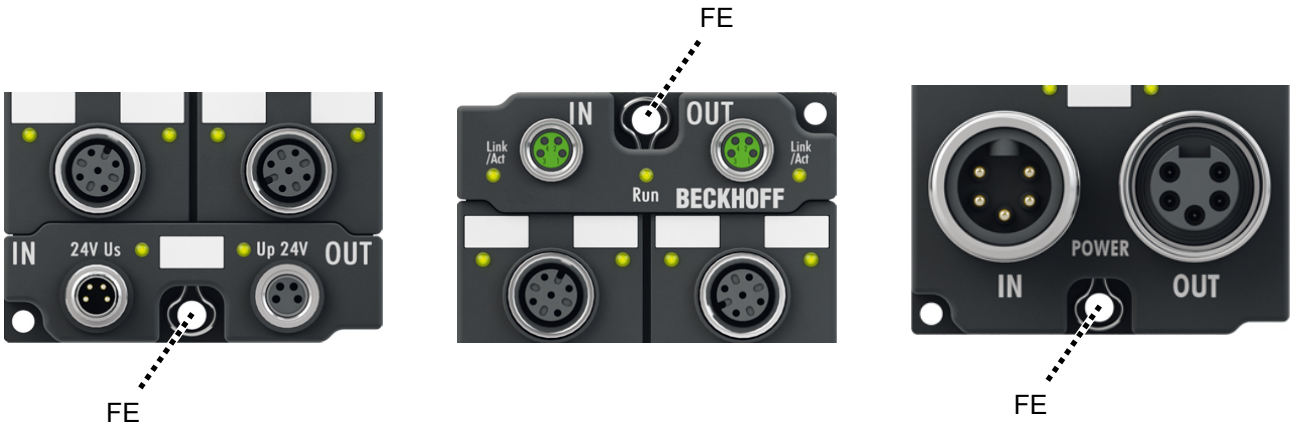


Fig. 10: Functional earth via the fastening holes

4.2 Connections

4.2.1 Tightening torques for plug connectors

Screw connectors tight with a torque wrench. (e.g. ZB8801 from Beckhoff)

Connector diameter	Tightening torque
M8	0.4 Nm
M12	0.6 Nm
7/8”	1.5 Nm

4.2.2 EtherCAT

4.2.2.1 Connectors

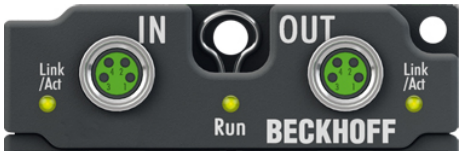
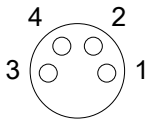
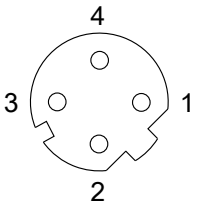
NOTE

Risk of confusion: supply voltages and EtherCAT

Defect possible through incorrect insertion.

- Observe the color coding of the connectors:
  black: Supply voltages
  green: EtherCAT

EtherCAT Box modules have two green M8 or M12 sockets for the incoming and outgoing EtherCAT connections.

M8 sockets		M12 sockets
		
		

Assignment

There are various different standards for the assignment and colors of connectors and cables for EtherCAT.

EtherCAT	Plug connector			Cable		Standard
Signal	M8	M12	RJ45[1]	ZB9010, ZB9020, ZB9030, ZB9032, ZK1090-6292, ZK1090-3xxx-xxxx	ZB9031 and old versions of ZB9030, ZB9032, ZK1090-3xxx-xxxx	TIA-568B
Tx +	Pin 1	Pin 1	Pin 1	yellow[2]	orange/white[3]	white/orange
Tx -	Pin 4	Pin 3	Pin 2	orange[2]	orange[3]	orange
Rx +	Pin 2	Pin 2	Pin 3	white[2]	blue/white[3]	white/green
Rx -	Pin 3	Pin 4	Pin 6	blue[2]	blue[3]	green
Shield	Housing		Shroud	Shield	Shield	Shield

[1]) colored markings according to EN 61918 in the four-pin RJ45 connector ZS1090-0003
[2]) wire colors according to EN 61918
[3]) wire colors

Assimilation of color coding for cable ZB9030, ZB9032 and ZK1090-3xxxx-xxxx (with M8 connectors)

For unification, the prevalent cables ZB9030, ZB9032 and ZK1090-3xxx-xxxx were changed to the colors of EN61918 (yellow, orange, white, blue). So different color coding exists. But the electrical properties are absolutely identical.

4.2.2.2 Status LEDs

L/A (Link/Act)

A green LED labelled "L/A" is located next to each EtherCAT socket. The LED indicates the communication state of the respective socket:

LED	Meaning
off	no connection to the connected EtherCAT device
lit	LINK: connection to the connected EtherCAT device
flashes	ACT: communication with the connected EtherCAT device

Run

Each EtherCAT slave has a green LED labelled "Run". The LED signals the status of the slave in the EtherCAT network:

LED	Meaning
off	Slave is in "Init" state
flashes uniformly	Slave is in "Pre-Operational“ state
flashes sporadically	Slave is in "Safe-Operational" state
lit	Slave is in "Operational" state

Description of the EtherCAT slave states

4.2.2.3 Cables

For connecting EtherCAT devices only shielded Ethernet cables that meet the requirements of at least category 5 (CAT5) according to EN 50173 or ISO/IEC 11801 should be used.

EtherCAT uses four wires for signal transmission.
Thanks to automatic line detection ("Auto MDI-X"), both symmetrical (1:1) or cross-over cables can be used between Beckhoff EtherCAT.

Detailed recommendations for the cabling of EtherCAT devices

4.2.3 Supply voltages

The EtherCAT Box is supplied with two supply voltages.

- **Control voltage U_S**
  Power is supplied to the fieldbus, the processor logic, the inputs and the sensors from the control voltage U_S.
- **Peripheral voltage U_P**
  The peripheral voltage U_P supplies the digital outputs; it can be brought in separately. Hence, if the peripheral voltage is switched off, the fieldbus function as well as the supply and function of the inputs are retained.

Redirection of the supply voltages

The power IN and OUT connections are bridged in the module. Hence, the supply voltages U_s and U_p can be passed from EtherCAT Box to EtherCAT Box in a simple manner.

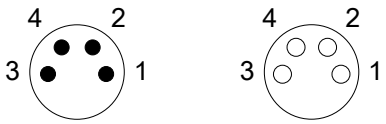
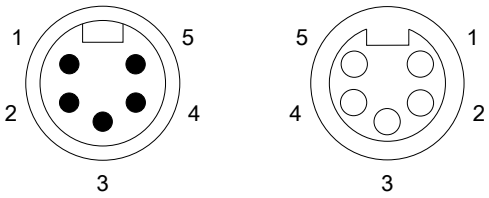
NOTE

Note the maximum current!

Ensure that the permitted current for the connectors is not exceeded when routing the supply voltages U_S and U_P:

M8 connector: max. 4 A
7/8" connector: max 16 A

4.2.3.1 Connectors

<table>
<tr><th>M8 connector</th><th>7/8" connector</th></tr>
<tr><td colspan="2"> 
</td><td> 
</td></tr>
<tr><td colspan="2"> 
</td><td> 
</td></tr>
</table>

Function	M8	7/8"	Description	Core color [1]
U_S	1	4	Control voltage	Brown
U_P	2	5	Peripheral voltage	White
GND_S	3	2	GND to U_S	Blue
GND_P	4	1	GND to U_P	Black
FE	-	3	Functional earth	Grey

[1] The core colors apply to cables of the type: Beckhoff ZK2020-xxxx-xxxx

GND_S and GND_P are linked for modules of the following types:

- EPxxxx-0001
- EPxxxx-0002
- EPxxxx-0008

NOTE

The electrical isolation between GND_S and GND_P can be removed

In some EtherCAT Box modules the ground potentials GND_S and GND_P are linked.

If several EtherCAT Box modules are supplied with the same electrically isolated voltages, check whether there is an EtherCAT Box among them in which the ground potentials are linked.

4.2.3.2 Status LEDs

Fig. 11: Status LEDs for the supply voltages

EtherCAT Box modules have two LEDs which indicate the state of the supply voltages. The LEDs are labelled with the designations of the supply voltages: Us and Up.

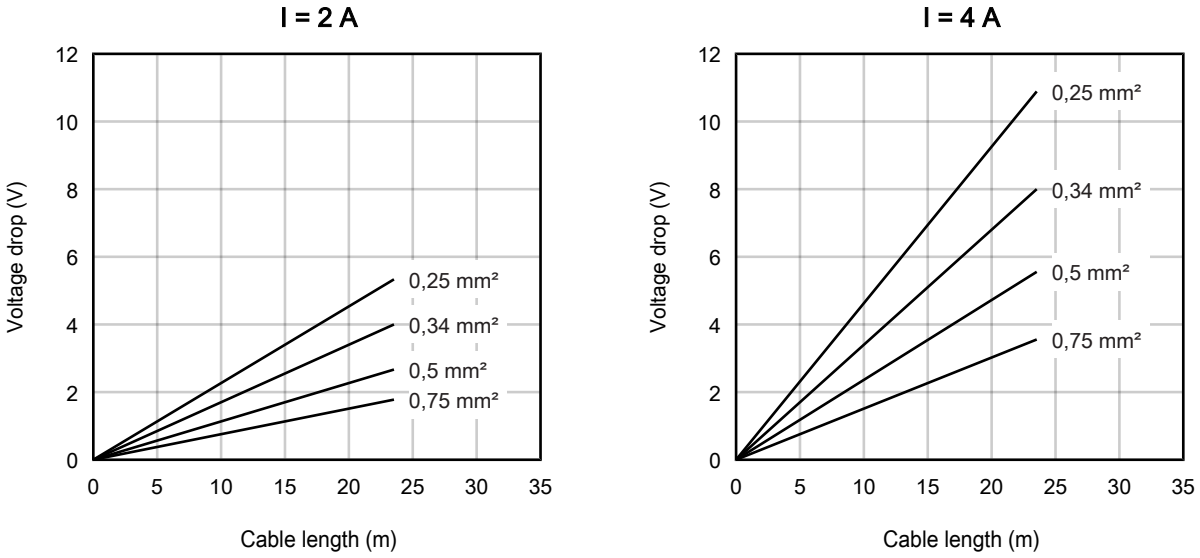
- An LED lights up green when the respective supply voltage is present.
- If an LED lights up red, the sensor supply was switched off due to overload.
  It is irrelevant which of the LEDs lights up red. The sensor supply can as well be derived from the other supply voltage. See specification „Sensor supply“ in the technical data.

4.2.3.3 Conductor losses

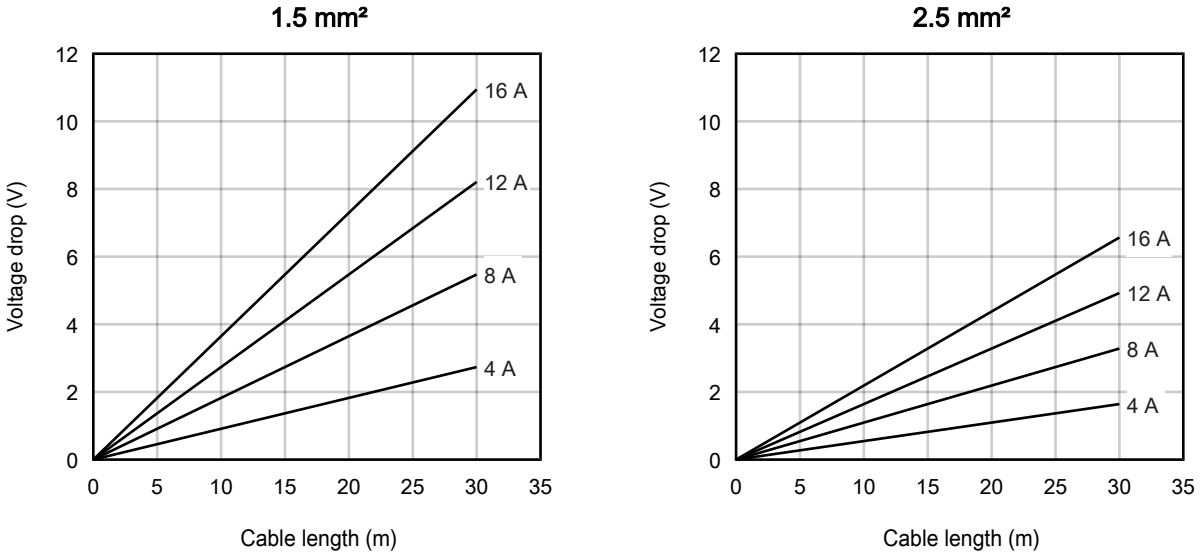
Take into account the voltage drop on the supply line when planning a system. Avoid the voltage drop being so high that the supply voltage at the box lies below the minimum nominal voltage.

Variations in the voltage of the power supply unit must also be taken into account.

Voltage drop on cables with M8 connectors



Voltage drop on cables with 7/8" connectors



4.2.4 Digital outputs

4.2.4.1 Digital outputs M8 and M12

NOTE

Different pin assignment:

EP2008-0022 [▶ 69]
EP2028-0032 [▶ 70]
EP2809-0042 [▶ 71]

The digital output modules forward the binary control signals of the automation device to the actuators at the process level.

The signals are connected via M8 connectors (EP2xxx-0001) or M12 connectors (EP2xxx-0002).

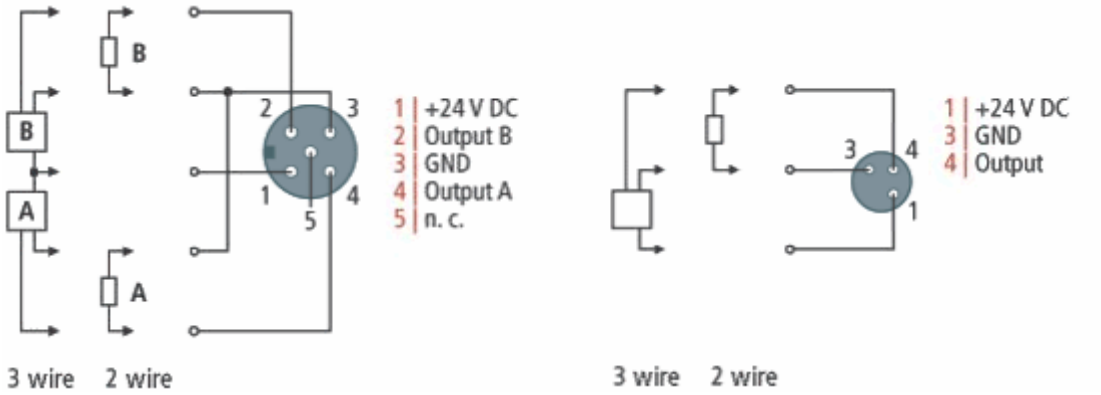


Fig. 12: Digital outputs M8 and M12

The outputs are short-circuit proof and protected against inverse connection.

LEDs indicate the signal state of the outputs.

4.2.4.2 Digital outputs M12 for EP2008-0022

The digital output modules forward the binary control signals of the automation device to the actuators at the process level.

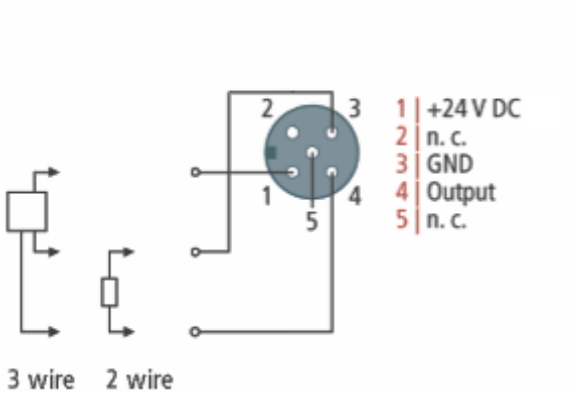


Fig. 13: Digital outputs M8 and M12

The outputs are short-circuit proof and protected against inverse connection.

LEDs indicate the signal state of the outputs.

4.2.4.3 Digital outputs M12 for EP2028-0032

The digital outputs / actuators are connected via M12 sockets.

The pins 2 and 4 of the signal sockets 0 and 1, 2 and 3, 4 and 5, 6 and 7 are internally connected.

This means that actuators that require two outputs can also be connected via an M12 cable.

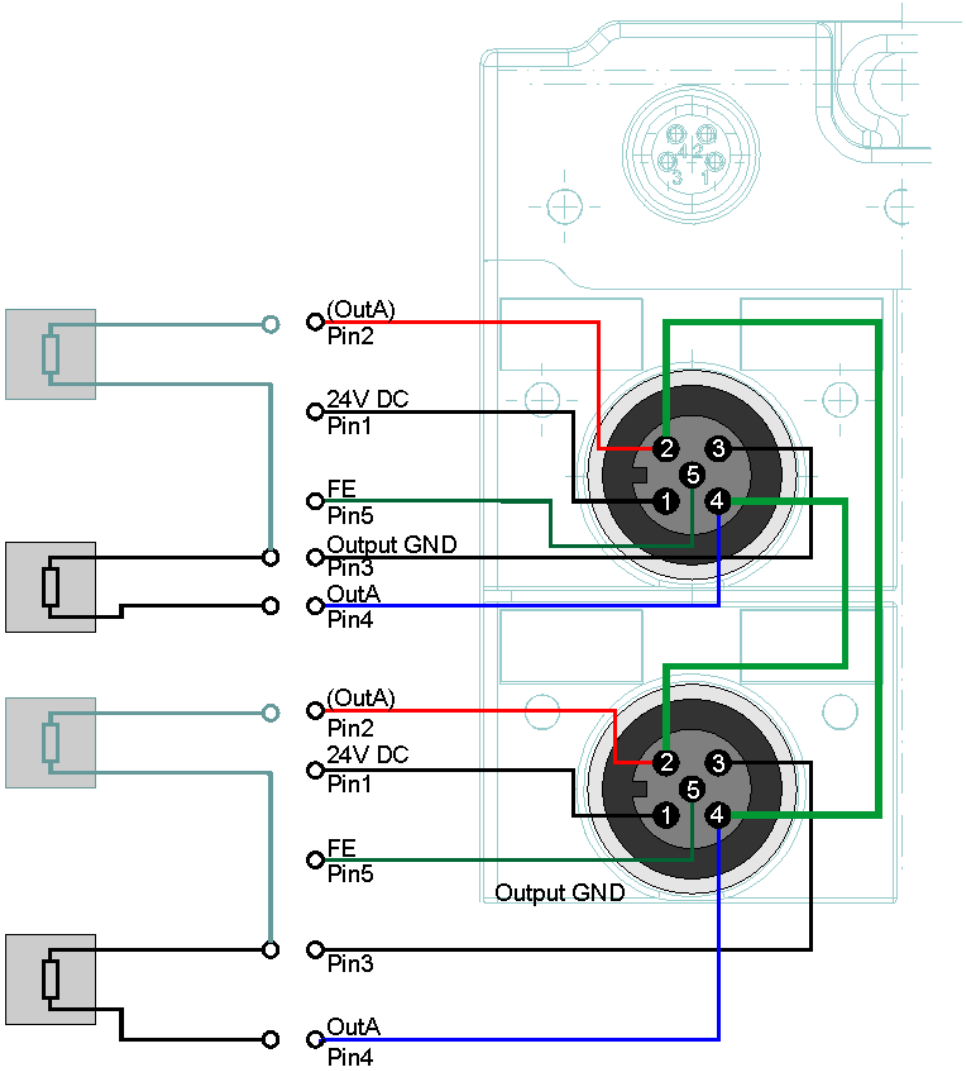


Fig. 14: Digital outputs M12 for EP2028-0032

Light emitting diodes indicate the signal state of the inputs.

4.2.4.4 Digital Outputs M12 for EP2809-0042

The digital output modules forward the binary control signals of the automation device to the actuators at the process level.

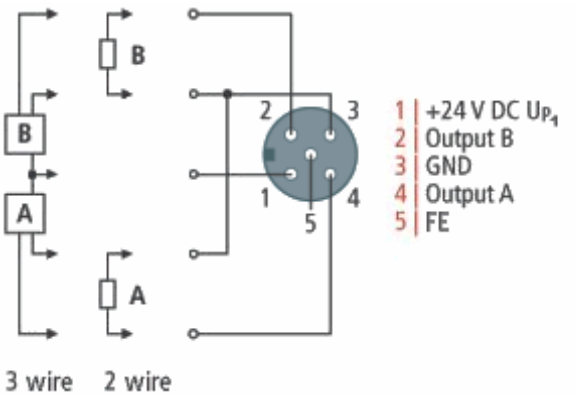


Fig. 15: Digital outputs M8 and M12

The outputs are short-circuit proof and protected against inverse connection.

LEDs indicate the signal state of the outputs.

4.2.4.5 ZS2001 digital outputs

The box has two slots, each with eight digital outputs. The slots are intended for ZS2001 connectors. The ZS2001 connectors are not included in the scope of delivery. You need two. See chapter Accessories [▶ 127].

The maximum output current per output is 0.5 A. The maximum sum current of all outputs is 4 A.

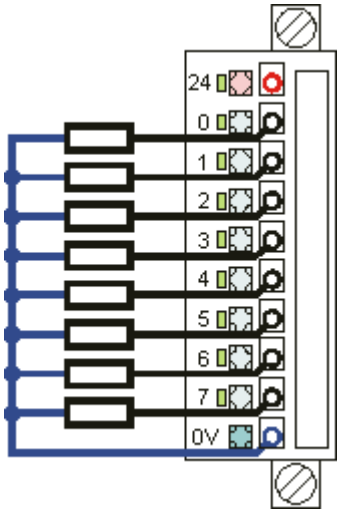


Fig. 16: ZS2001-0001, ZS2001-0002

4.2.4.5.1 Ordering information for KM plug-in connector

Fig. 17: ZS2001-0001, ZS2001-0002: KM connectors for single wire connection

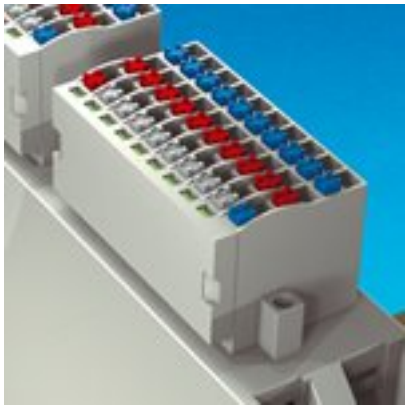


Fig. 18: ZS2001-0004: KM connectors for three-wire connection

Order designation	Signal LEDs	Connection technology		
		single-wire	two-wire	three-wire
ZS2001-0001	no	yes	no	no
ZS2001-0002	yes	yes	no	no
ZS2001-0004	yes	yes	yes	yes

4.2.4.5.2 Technical data of the KM connectors

Technical data	ZS2001-0001	ZS2001-0002	ZS2001-0004
Number of terminal points	10	10	30
Signal LEDs	no	yes	yes
Nominal voltage	50 V_{DC}	24 V_{DC}	24 V_{DC}
Nominal current	2 A		
Wire cross-section	0.5 mm^2 ... 1.5 mm^2		
Strip length	8 mm		
Dimensions (W x H x D)	approx. 42mm x 10.3mm x 26.9mm	approx. 42mm x 12.7mm x 26.9mm	approx. 42mm x 20.8mm x 26.9mm
Weight	approx. 10 g	approx. 10 g	approx. 20 g
Permissible ambient temperature range during operation	0 °C ... + 55 °C		
Permissible ambient temperature range during storage	-25 °C ... + 85 °C		
Permissible relative air humidity	95 %, no condensation		
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27		
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4		
Protection class	IP20		
Mounting position	variable		
Approval	CE		

4.2.4.6 Digital outputs D-Sub 25, 16 channels

The EP2816 digital output modules forward the binary control signals of the automation device to the actuators at the process level.

The 16 outputs supply load currents up to 0.5 A, although the total current from all the outputs must not exceed 4 A.

The signal connection is made through a 25-pin D-Sub socket.

The outputs are short-circuit proof and protected against inverse connection.

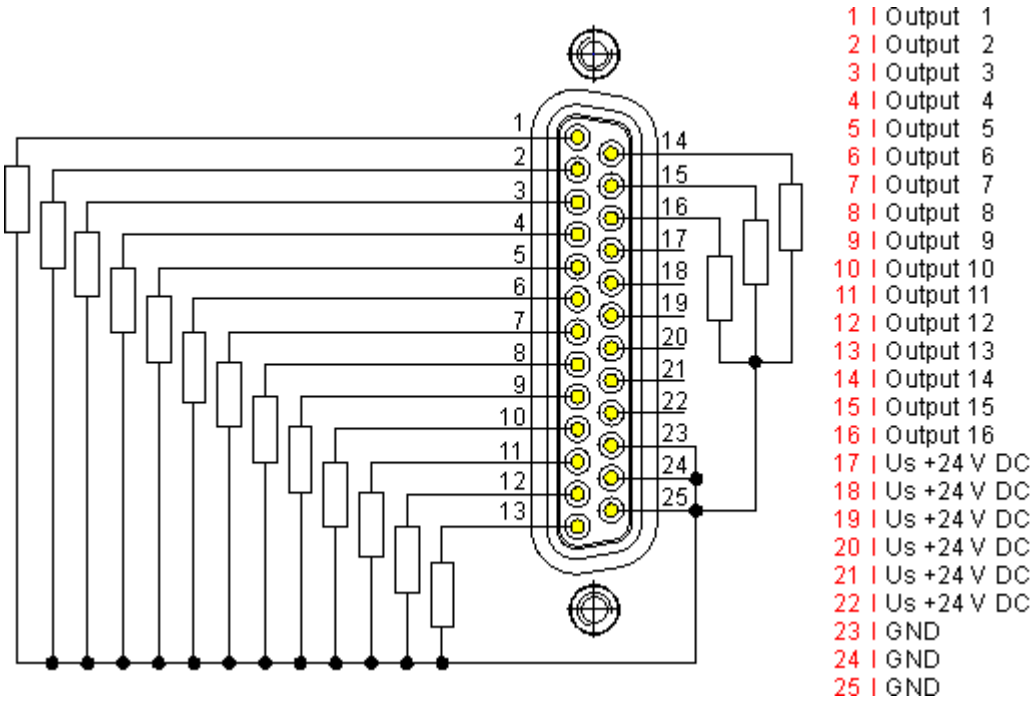


Fig. 19: Digital outputs D-Sub 25, 16 outputs

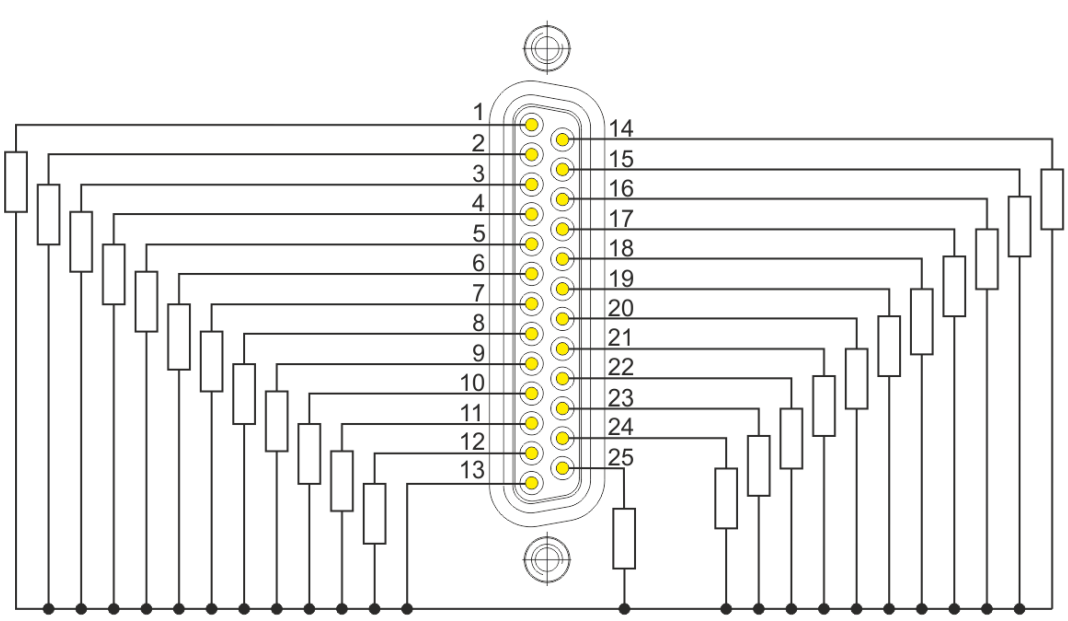
4.2.4.7 Digital outputs D-Sub 25, 24 channels

The EP2817-0008 digital output modules forward the binary control signals of the automation device to the actuators at the process level.

The 24 outputs supply load currents up to 0.5 A, although the total current from all the outputs must not exceed 4 A.

The signal connection is made through a 25-pin D-Sub socket.

The outputs are short-circuit proof and protected against inverse connection.



1 I Output 1
2 I Output 3
3 I Output 5
4 I Output 7
5 I Output 9
6 I Output 11
7 I Output 13
8 I Output 15
9 I Output 17
10 I Output 19
11 I Output 21
12 I Output 23
13 I GNDp
14 I Output 2
15 I Output 4
16 I Output 6
17 I Output 8
18 I Output 10
19 I Output 12
20 I Output 14
21 I Output 16
22 I Output 18
23 I Output 20
24 I Output 22
25 I Output 24

Fig. 20: Digital outputs D-Sub 25, 24 channels

4.2.4.8 Digital outputs D-Sub 9, 8 channels

The IE2808 digital output module transmits the binary control signals from the automation device on to the actuators at the process level.

The 8 outputs supply load currents up to 0.5 A, although the total current from all the outputs must not exceed 4 A.

The signal connection is made through two 9-pin D-sub sockets.

The outputs are short-circuit proof and protected against inverse connection.

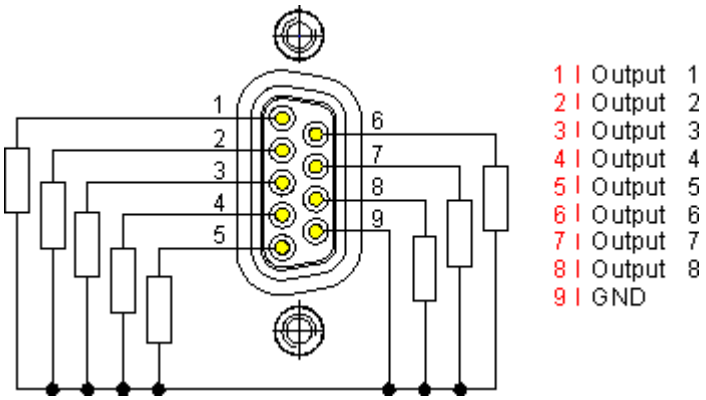


Fig. 21: Digital outputs D-Sub 9, 8 channels

4.3 UL Requirements

The installation of the EtherCAT Box Modules certified by UL has to meet the following requirements.

Supply voltage

⚠ CAUTION

CAUTION!

This UL requirements are valid for all supply voltages of all marked EtherCAT Box Modules!
For the compliance of the UL requirements the EtherCAT Box Modules should only be supplied

- by a 24 V_{DC} supply voltage, supplied by an isolating source and protected by means of a fuse (in accordance with UL248), rated maximum 4 Amp, or
- by a 24 V_{DC} power source, that has to satisfy *NEC class 2*.
  A *NEC class 2* power supply shall not be connected in series or parallel with another (class 2) power source!

⚠ CAUTION

CAUTION!

To meet the UL requirements, the EtherCAT Box Modules must not be connected to unlimited power sources!

Networks

⚠ CAUTION

CAUTION!

To meet the UL requirements, EtherCAT Box Modules must not be connected to telecommunication networks!

Ambient temperature range

⚠ CAUTION

CAUTION!

To meet the UL requirements, EtherCAT Box Modules has to be operated only at an ambient temperature range of -25 °C to +55 °C!

Marking for UL

All EtherCAT Box Modules certified by UL (Underwriters Laboratories) are marked with the following label.

Fig. 22: UL label

4.4 ATEX notes

4.4.1 ATEX - Special conditions

⚠ WARNING

Observe the special conditions for the intended use of EtherCAT Box modules in potentially explosive areas – directive 94/9/EU.

- The certified components are to be installed with a BG2000-0000 or BG2000-0010 protection enclosure [▶ 79] that guarantees a protection against mechanical hazards!
- If the temperatures during rated operation are higher than 70°C at the feed-in points of cables, lines or pipes, or higher than 80°C at the wire branching points, then cables must be selected whose temperature data correspond to the actual measured temperature values!
- Observe the permissible ambient temperature range of 0 to 55°C for the use of EtherCAT Box modules in potentially explosive areas!
- Measures must be taken to protect against the rated operating voltage being exceeded by more than 40% due to short-term interference voltages!
- The connections of the certified components may only be connected or disconnected if the supply voltage has been switched off or if a non-explosive atmosphere is ensured!

Standards

The fundamental health and safety requirements are fulfilled by compliance with the following standards:

- EN 60079-0: 2006
- EN 60079-15: 2005

Marking

The EtherCAT Box modules certified for potentially explosive areas bear the following marking:

II 3 G Ex nA II T4 DEKRA 11ATEX0080 X Ta: 0 - 55°C

or

II 3 G Ex nA nC IIC T4 DEKRA 11ATEX0080 X Ta: 0 - 55°C

Batch number (D number)

The EtherCAT Box modules bear a batch number (D number) that is structured as follows:

D: WW YY FF HH

WW - week of production (calendar week)
YY - year of production
FF - firmware version
HH - hardware version

Example with batch number 29 10 02 01:

29 - week of production 29
10 - year of production 2010
02 - firmware version 02
01 - hardware version 01

4.4.2 BG2000 - EtherCAT Box protection enclosures

⚠ WARNING

Risk of electric shock and damage of device!

Bring the EtherCAT system into a safe, powered down state before starting installation, disassembly or wiring of the modules!

ATEX

⚠ WARNING

Mount a protection enclosure!

To fulfill the special conditions according to ATEX [▶ 78], a BG2000-0000 or BG2000-0010 protection enclosure has to be mounted over the EtherCAT Box.

Installation

Put the cables for EtherCAT, power supply and sensors/actuators through the hole of the protection enclosure.

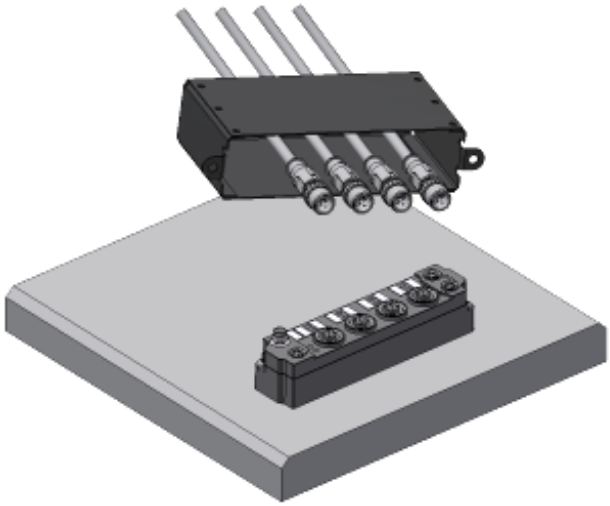


Fig. 23: BG2000 - putting the cables

Fix the wires for EtherCAT, power supply and sensors/actuators to the EtherCAT Box.

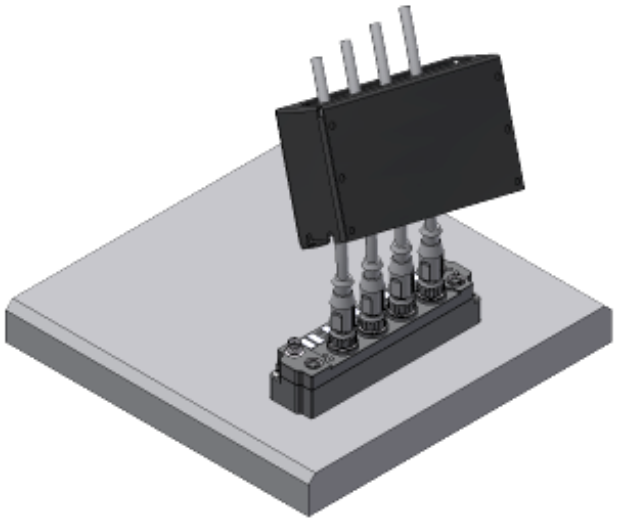


Fig. 24: BG2000 - fixing the cables

Mount the protection enclosure over the EtherCAT Box.

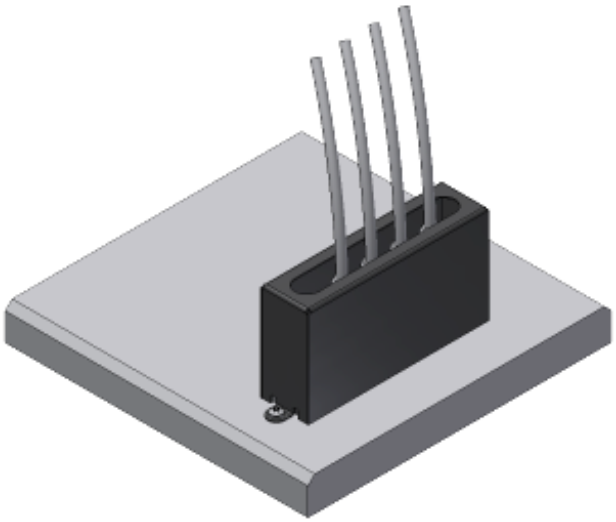


Fig. 25: BG2000 - mounting the protection enclosure

4.4.3 ATEX Documentation

Notes about operation of EtherCAT Box Modules (EPxxxx-xxxx) in potentially explosive areas (ATEX)

Pay also attention to the continuative documentationNotes about operation of EtherCAT Box Modules (EPxxxx-xxxx) in potentially explosive areas (ATEX) that is available in the download area of the Beckhoff homepage http:\\www.beckhoff.com!

5 Commissioning and configuration

5.1 Integration in TwinCAT

The procedure for integration in TwinCAT is described in this Quick start guide.

5.2 Behavior of the outputs in case of a fault (EP281x only)

EtherCAT Box modules of the type EP281x have diagnostic functions. They can detect faults and automatically react to them. The following chapters describe the configuration of the behavior in case of various types of fault.

5.2.1 Behavior in case of network failure

You can use bit 8000:0n (Safe State Active) to specify whether channel n should assume a certain value (Safe State Value) when data transmission is interrupted.

With bit 8001:0n (Safe State Value) you define this value for channel n.

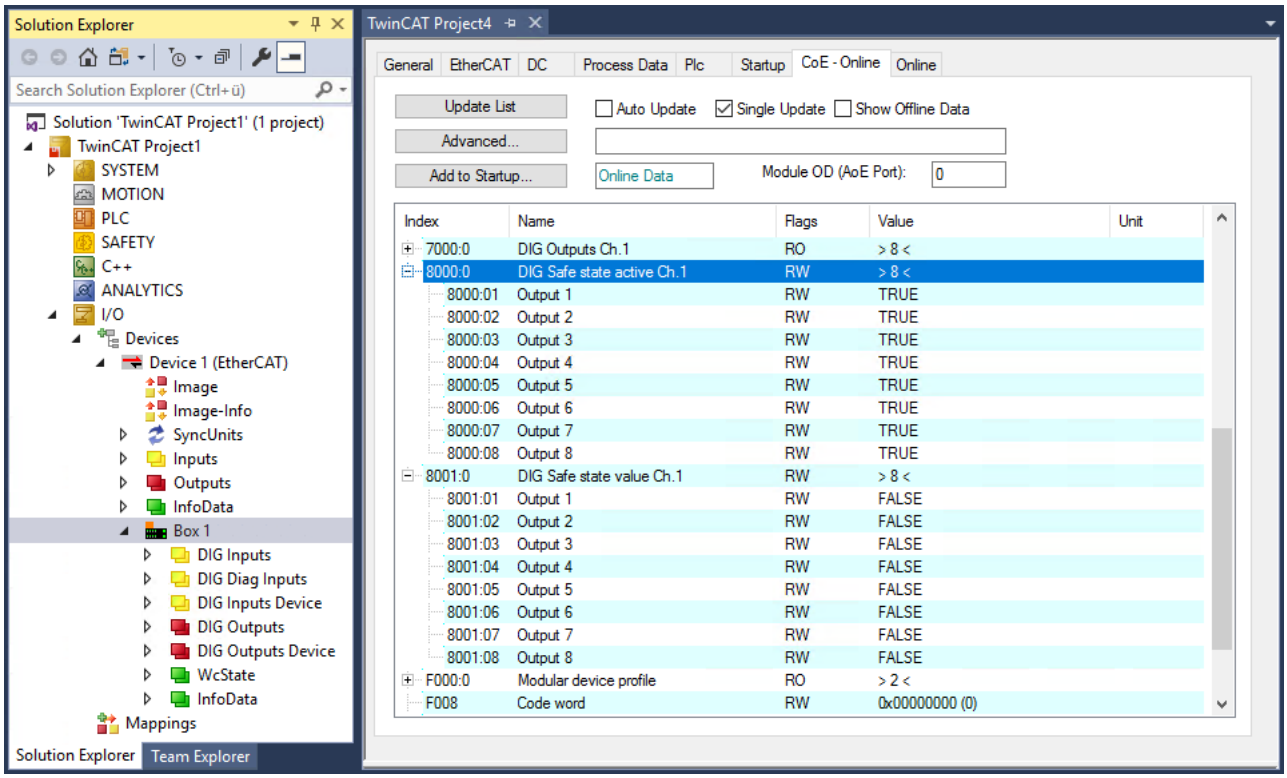
Safe State Value during network start-up

The network transmits output process data only in the network states Save-Operational (SAFE-OP) and Operational (OP). Also at the network states INIT, Pre-Operational (PRE-OP) and BOOT passed through during network start-up no output process data is transmitted. If Safe State is activated for an output, this output also adopts the specified value during network start-up.

8000:0 - DIG Safe state active Ch.1

Observe the maximum short-circuit current!

When dimensioning the power supply unit and choosing the fuses, observe that the short-circuit current is approximately 1.7 A.



8000:01 to 8000:08 - DIG Safe state active Ch.1, Output 1 to Output 8 (default: TRUE)

Specifies whether or not the outputs should adopt a safe state in the case of a network failure.

Value	Meaning
FALSE	Safe state disabled
TRUE	Safe state enabled

8001:01 to 8001:08 - DIG Safe state value Ch.1, Output 1 to Output 8 (default: FALSE)

Specifies what the safe state is.

Value	Meaning
FALSE	Output switched off
TRUE	Output switched on

5.2.2 Behavior in case of short circuit

You can set the behavior of the outputs in case of short circuit in the CoE object F800 "DO Settings".

F800:0 - DO Settings (Safe State Value)

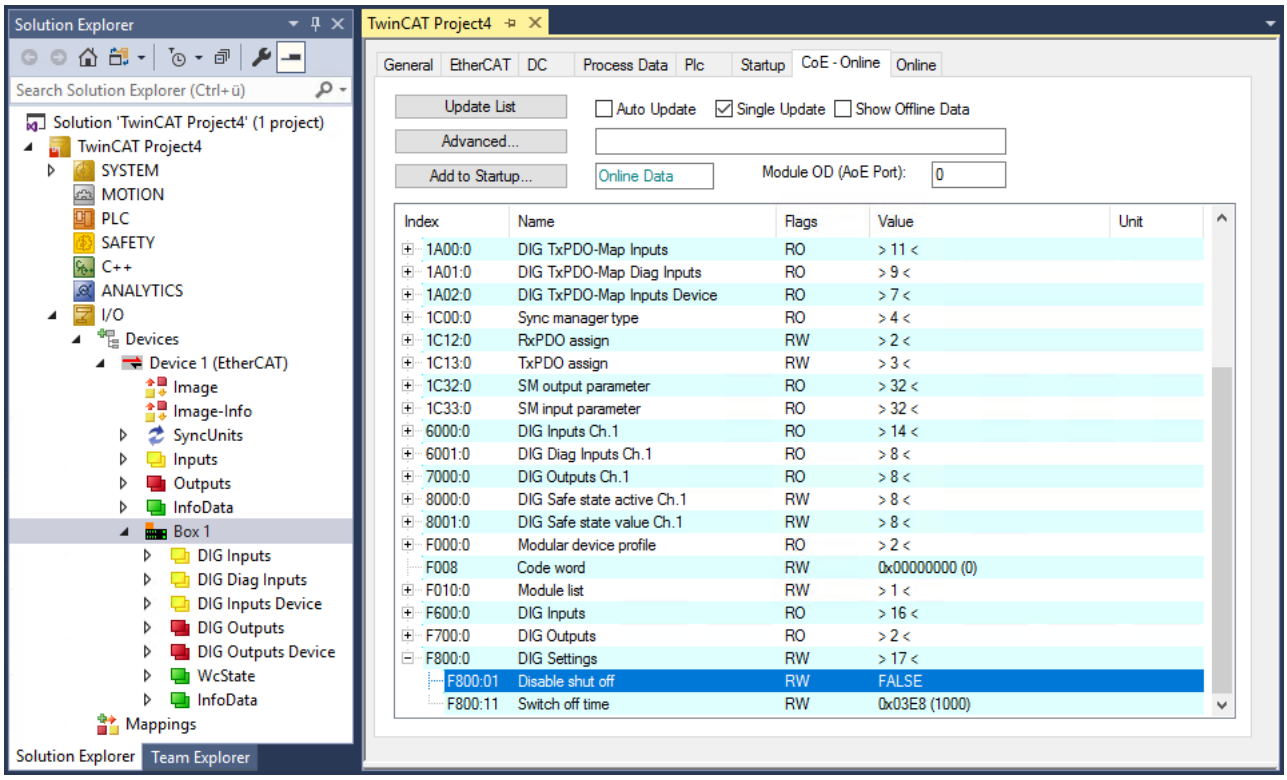


Table 1: F800:01 - Disable shut off (default: FALSE)

Value	Meaning
FALSE	In the event of a short circuit at one output, all outputs of the module are switched off. This disabling can be removed through the process data value *Reset Outputs*.
TRUE	In the event of a short circuit at an output, only this output of the module is switched off. After rectifying the short circuit, this output is automatically enabled again.

F800:11 - Switch off time (default: 0x03E8, 1000_{dec})

Here you can enter a time in milliseconds. During this time, the module checks whether the short circuit has been eliminated by switching itself on again.
Default = 1000 ms (depending on module type and internal cycle time). Errors are only displayed after this time.

5.2.3 Behavior in case of lack of supply voltage

The digital outputs are supplied from the supply voltage U_P. If the supply voltage U_P is not present, the digital outputs cannot output a high level.

If an output is set and does not output a high level, this is detected as a fault. On expiry of the fault reaction time, the fault is reported in the process data:

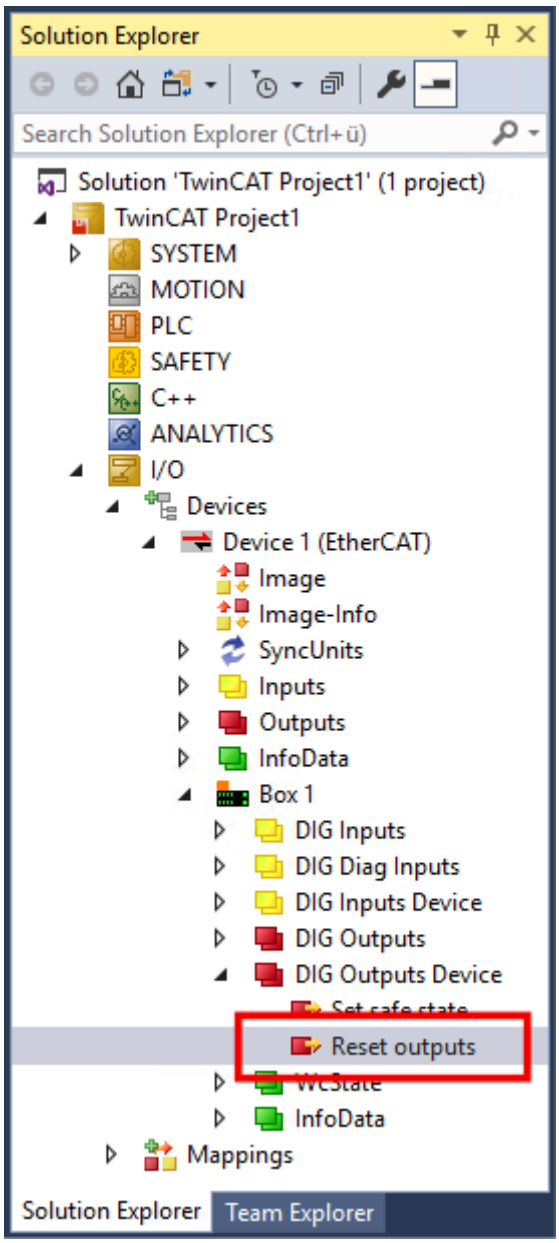
- The "Diag Input *x*" bit of the output is set to "1".
- The "Error Channel *y*" bit of the channel to which the output belongs is set to "1".

In the factory setting, all outputs of a channel in which a fault has occurred are disabled. The outputs also remain disabled when U_P is switched on again.

Re-enabling outputs

There are two ways to re-enable disabled outputs:

- Manual: Apply a positive edge to the variable "Reset outputs".



- Automatic: Set the parameter F800:01 to TRUE. All outputs will then be re-enabled as soon as U_P is switched on.
  Note: F800:01 also influences the behavior in case of short circuit [▶ 84].

5.3 Restoring the delivery state

To restore the delivery state for backup objects in ELxxxx terminals / EPxxxx- and EPPxxxx boxes, the CoE object *Restore default parameters, SubIndex 001* can be selected in the TwinCAT System Manager (Config mode).

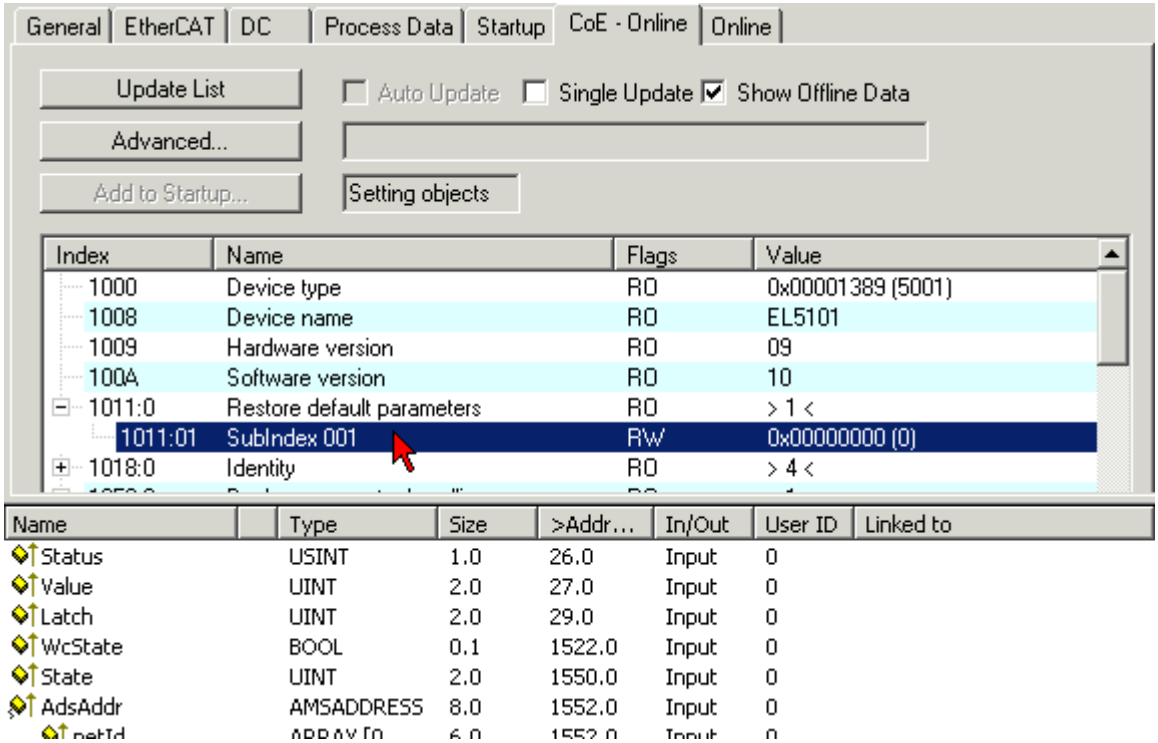


Fig. 26: Selecting the Restore default parameters PDO

Double-click on *SubIndex 001* to enter the Set Value dialog. Enter the value **1684107116** in field *Dec* or the value **0x64616F6C** in field *Hex* and confirm with OK.

All backup objects are reset to the delivery state.

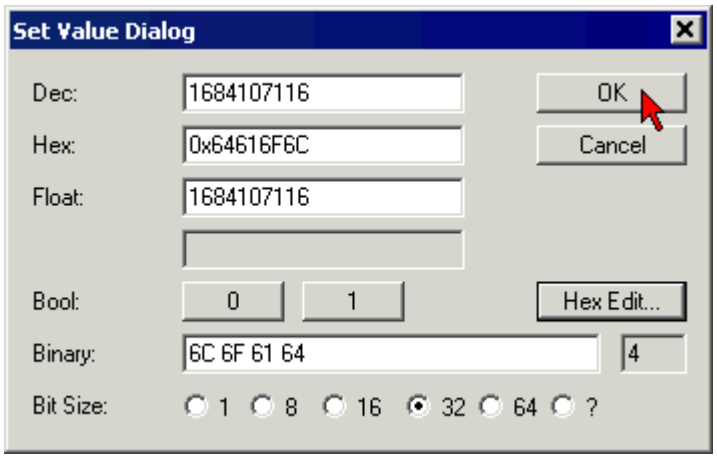


Fig. 27: Entering a restore value in the Set Value dialog

Alternative restore value

In some older terminals / boxes the backup objects can be switched with an alternative restore value:
Decimal value: 1819238756
Hexadecimal value: 0x6C6F6164

An incorrect entry for the restore value has no effect.

5.4 Decommissioning

⚠ WARNING

Risk of electric shock!

Bring the bus system into a safe, de-energized state before starting disassembly of the devices!

Disposal

In order to dispose of the device, it must be removed.

In accordance with the WEEE Directive 2012/19/EU, Beckhoff takes back old devices and accessories in Germany for proper disposal. Transport costs will be borne by the sender.

Return the old devices with the note "for disposal" to:

Beckhoff Automation GmbH & Co. KG
Service Department
Stahlstraße 31
D-33415 Verl

6 CoE parameters

6.1 EP2816-0008 - Object overview

EtherCAT XML Device Description

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area of the Beckhoff website and installing it according to installation instructions.

Index		Name	Flags	Default value
1000 [▶ 97]		Device type	RO	0x01181389 (18355081$_{dec}$)
1008 [▶ 97]		Device name	RO	EP2816-0008
1009 [▶ 97]		Hardware version	RO	02
100A [▶ 97]		Software version	RO	05
1011 [▶ 94]:0	**Subindex**	Restore default parameters	RO	0x01 (1$_{dec}$)
	1011:01	SubIndex 001	RW	0x00000000 (0$_{dec}$)
1018 [▶ 97]:0	**Subindex**	Identity	RO	0x04 (4$_{dec}$)
	1018:01	Vendor ID	RO	0x00000002 (2$_{dec}$)
	1018:02	Product code	RO	0x0B004052 (184565842$_{dec}$)
	1018:03	Revision	RO	0x00130008 (1245192$_{dec}$)
	1018:04	Serial number	RO	0x00000000 (0$_{dec}$)
10F0 [▶ 97]:0	**Subindex**	Backup parameter handling	RO	0x01 (1$_{dec}$)
	10F0:01	Checksum	RO	0x00000000 (0$_{dec}$)
1600 [▶ 98]:0	**Subindex**	DIG RxPDO-Map Outputs Ch.1	RO	0x09 (9$_{dec}$)
	1600:01	SubIndex 001	RO	0x7000:01, 1
	1600:02	SubIndex 002	RO	0x7000:02, 1
	1600:03	SubIndex 003	RO	0x7000:03, 1
	1600:04	SubIndex 004	RO	0x7000:04, 1
	1600:05	SubIndex 005	RO	0x7000:05, 1
	1600:06	SubIndex 006	RO	0x7000:06, 1
	1600:07	SubIndex 007	RO	0x7000:07, 1
	1600:08	SubIndex 008	RO	0x7000:08, 1
	1600:09	SubIndex 009	RO	0x0000:00, 8
1601 [▶ 98]:0	**Subindex**	DIG RxPDO-Map Outputs Ch.2	RO	0x09 (9$_{dec}$)
	1601:01	SubIndex 001	RO	0x7010:01, 1
	1601:02	SubIndex 002	RO	0x7010:02, 1
	1601:03	SubIndex 003	RO	0x7010:03, 1
	1601:04	SubIndex 004	RO	0x7010:04, 1
	1601:05	SubIndex 005	RO	0x7010:05, 1
	1601:06	SubIndex 006	RO	0x7010:06, 1
	1601:07	SubIndex 007	RO	0x7010:07, 1
	1601:08	SubIndex 008	RO	0x7010:08, 1
	1601:09	SubIndex 009	RO	0x0000:00, 8
1602 [▶ 98]:0	**Subindex**	DIG RxPDO-Map Outputs Device	RO	0x03 (3$_{dec}$)
	1602:01	SubIndex 001	RO	0xF700:01, 1
	1602:02	SubIndex 002	RO	0xF700:02, 1
	1602:03	SubIndex 003	RO	0x0000:00, 14
1A00 [▶ 99]:0	**Subindex**	DIG TxPDO-Map Diag Inputs Ch.1	RO	0x09 (9$_{dec}$)
	1A00:01	SubIndex 001	RO	0x6001:01, 1
	1A00:02	SubIndex 002	RO	0x6001:02, 1
	1A00:03	SubIndex 003	RO	0x6001:03, 1
	1A00:04	SubIndex 004	RO	0x6001:04, 1
	1A00:05	SubIndex 005	RO	0x6001:05, 1
	1A00:06	SubIndex 006	RO	0x6001:06, 1
	1A00:07	SubIndex 007	RO	0x6001:07, 1
	1A00:08	SubIndex 008	RO	0x6001:08, 1
	1A00:09	SubIndex 009	RO	0x0000:00, 8

Index		Name	Flags	Default value
1A01 [▶ 99]:0	**Subindex**	DIG TxPDO-Map Diag Inputs Ch.2	RO	0x09 (9_{dec})
	1A01:01	SubIndex 001	RO	0x6011:01, 1
	1A01:02	SubIndex 002	RO	0x6011:02, 1
	1A01:03	SubIndex 003	RO	0x6011:03, 1
	1A01:04	SubIndex 004	RO	0x6011:04, 1
	1A01:05	SubIndex 005	RO	0x6011:05, 1
	1A01:06	SubIndex 006	RO	0x6011:06, 1
	1A01:07	SubIndex 007	RO	0x6011:07, 1
	1A01:08	SubIndex 008	RO	0x6011:08, 1
	1A01:09	SubIndex 009	RO	0x0000:00, 8
1A02 [▶ 99]:0	**Subindex**	DIG TxPDO-Map Inputs Device	RO	0x07 (7_{dec})
	1A02:01	SubIndex 001	RO	0xF600:01, 1
	1A02:02	SubIndex 002	RO	0xF600:02, 1
	1A02:03	SubIndex 003	RO	0xF600:03, 1
	1A02:04	SubIndex 004	RO	0x0000:00, 10
	1A02:05	SubIndex 005	RO	0x1C32:20, 1
	1A02:06	SubIndex 006	RO	0x0000:00, 1
	1A02:07	SubIndex 007	RO	0x1800:09, 1
1C00 [▶ 100]:0	**Subindex**	Sync manager type	RO	0x04 (4_{dec})
	1C00:01	SubIndex 001	RO	0x01 (1_{dec})
	1C00:02	SubIndex 002	RO	0x02 (2_{dec})
	1C00:03	SubIndex 003	RO	0x03 (3_{dec})
	1C00:04	SubIndex 004	RO	0x04 (4_{dec})
1C12 [▶ 100]:0	**Subindex**	RxPDO assign	RW	0x03 (3_{dec})
	1C12:01	SubIndex 001	RW	0x1600 (5632_{dec})
	1C12:02	SubIndex 002	RW	0x1601 (5633_{dec})
	1C12:03	SubIndex 003	RW	0x1602 (5634_{dec})
1C13 [▶ 100]:0	**Subindex**	TxPDO assign	RW	0x03 (3_{dec})
	1C13:01	SubIndex 001	RW	0x1A00 (6656_{dec})
	1C13:02	SubIndex 002	RW	0x1A01 (6657_{dec})
	1C13:03	SubIndex 003	RW	0x1A02 (6658_{dec})
1C32 [▶ 101]:0	**Subindex**	SM output parameter	RO	0x20 (32_{dec})
	1C32:01	Sync mode	RW	0x0001 (1_{dec})
	1C32:02	Cycle time	RW	0x000F4240 (1000000_{dec})
	1C32:03	Shift time	RO	0x00020F58 (135000_{dec})
	1C32:04	Sync modes supported	RO	0xC007 (49159_{dec})
	1C32:05	Minimum cycle time	RO	0x00030D40 (200000_{dec})
	1C32:06	Calc and copy time	RO	0x00000000 (0_{dec})
	1C32:07	Minimum delay time	RO	0x00020F58 (135000_{dec})
	1C32:08	Command	RW	0x0000 (0_{dec})
	1C32:09	Maximum Delay time	RO	0x00020F58 (135000_{dec})
	1C32:0B	SM event missed counter	RO	0x0000 (0_{dec})
	1C32:0C	Cycle exceeded counter	RO	0x0000 (0_{dec})
	1C32:0D	Shift too short counter	RO	0x0000 (0_{dec})
	1C32:20	Sync error	RO	0x00 (0_{dec})

Index		Name	Flags	Default value
1C33 [▶ 102]:0	**Subindex**	SM input parameter	RO	0x20 (32_{dec})
	1C33:01	Sync mode	RW	0x0022 (34_{dec})
	1C33:02	Cycle time	RW	0x000F4240 (1000000_{dec})
	1C33:03	Shift time	RO	0x00000000 (0_{dec})
	1C33:04	Sync modes supported	RO	0xC007 (49159_{dec})
	1C33:05	Minimum cycle time	RO	0x00030D40 (200000_{dec})
	1C33:06	Calc and copy time	RO	0x00000000 (0_{dec})
	1C33:07	Minimum delay time	RO	0x00000000 (0_{dec})
	1C33:08	Command	RW	0x0000 (0_{dec})
	1C33:09	Maximum Delay time	RO	0x00000000 (0_{dec})
	1C33:0B	SM event missed counter	RO	0x0000 (0_{dec})
	1C33:0C	Cycle exceeded counter	RO	0x0000 (0_{dec})
	1C33:0D	Shift too short counter	RO	0x0000 (0_{dec})
	1C33:20	Sync error	RO	0x00 (0_{dec})
6001 [▶ 102]:0	**Subindex**	DIG Diag Inputs Ch.1	RO	0x08 (8_{dec})
	6001:01	Diag Input 1	RO	0x00 (0_{dec})
	6001:02	Diag Input 2	RO	0x00 (0_{dec})
	6001:03	Diag Input 3	RO	0x00 (0_{dec})
	6001:04	Diag Input 4	RO	0x00 (0_{dec})
	6001:05	Diag Input 5	RO	0x00 (0_{dec})
	6001:06	Diag Input 6	RO	0x00 (0_{dec})
	6001:07	Diag Input 7	RO	0x00 (0_{dec})
	6001:08	Diag Input 8	RO	0x00 (0_{dec})
6011 [▶ 103]:0	**Subindex**	DIG Diag Inputs Ch.2	RO	0x08 (8_{dec})
	6011:01	Diag Input 1	RO	0x00 (0_{dec})
	6011:02	Diag Input 2	RO	0x00 (0_{dec})
	6011:03	Diag Input 3	RO	0x00 (0_{dec})
	6011:04	Diag Input 4	RO	0x00 (0_{dec})
	6011:05	Diag Input 5	RO	0x00 (0_{dec})
	6011:06	Diag Input 6	RO	0x00 (0_{dec})
	6011:07	Diag Input 7	RO	0x00 (0_{dec})
	6011:08	Diag Input 8	RO	0x00 (0_{dec})
7000 [▶ 103]:0	**Subindex**	DIG Outputs Ch.1	RO	0x08 (8_{dec})
	7000:01	Output 1	RO	0x00 (0_{dec})
	7000:02	Output 2	RO	0x00 (0_{dec})
	7000:03	Output 3	RO	0x00 (0_{dec})
	7000:04	Output 4	RO	0x00 (0_{dec})
	7000:05	Output 5	RO	0x00 (0_{dec})
	7000:06	Output 6	RO	0x00 (0_{dec})
	7000:07	Output 7	RO	0x00 (0_{dec})
	7000:08	Output 8	RO	0x00 (0_{dec})

Index		Name	Flags	Default value
7010 [▶ 103]:0	**Subindex**	DIG Outputs Ch.2	RO	0x08 (8_{dec})
	7010:01	Output 1	RO	0x00 (0_{dec})
	7010:02	Output 2	RO	0x00 (0_{dec})
	7010:03	Output 3	RO	0x00 (0_{dec})
	7010:04	Output 4	RO	0x00 (0_{dec})
	7010:05	Output 5	RO	0x00 (0_{dec})
	7010:06	Output 6	RO	0x00 (0_{dec})
	7010:07	Output 7	RO	0x00 (0_{dec})
	7010:08	Output 8	RO	0x00 (0_{dec})
8000 [▶ 94]:0	**Subindex**	DIG Safe state active Ch.1	RW	0x08 (8_{dec})
	8000:01	Output 1	RW	0x01 (1_{dec})
	8000:02	Output 2	RW	0x01 (1_{dec})
	8000:03	Output 3	RW	0x01 (1_{dec})
	8000:04	Output 4	RW	0x01 (1_{dec})
	8000:05	Output 5	RW	0x01 (1_{dec})
	8000:06	Output 6	RW	0x01 (1_{dec})
	8000:07	Output 7	RW	0x01 (1_{dec})
	8000:08	Output 8	RW	0x01 (1_{dec})
8001 [▶ 95]:0	**Subindex**	DIG Safe state value Ch.1	RW	0x08 (8_{dec})
	8001:01	Output 1	RW	0x00 (0_{dec})
	8001:02	Output 2	RW	0x00 (0_{dec})
	8001:03	Output 3	RW	0x00 (0_{dec})
	8001:04	Output 4	RW	0x00 (0_{dec})
	8001:05	Output 5	RW	0x00 (0_{dec})
	8001:06	Output 6	RW	0x00 (0_{dec})
	8001:07	Output 7	RW	0x00 (0_{dec})
	8001:08	Output 8	RW	0x00 (0_{dec})
8010 [▶ 95]:0	**Subindex**	DIG Safe state active Ch.2	RW	0x08 (8_{dec})
	8010:01	Output 9	RW	0x01 (1_{dec})
	8010:02	Output 10	RW	0x01 (1_{dec})
	8010:03	Output 11	RW	0x01 (1_{dec})
	8010:04	Output 12	RW	0x01 (1_{dec})
	8010:05	Output 13	RW	0x01 (1_{dec})
	8010:06	Output 14	RW	0x01 (1_{dec})
	8010:07	Output 15	RW	0x01 (1_{dec})
	8010:08	Output 16	RW	0x01 (1_{dec})
8011 [▶ 96]:0	**Subindex**	DIG Safe state value Ch.2	RW	0x08 (8_{dec})
	8011:01	Output 9	RW	0x00 (0_{dec})
	8011:02	Output 10	RW	0x00 (0_{dec})
	8011:03	Output 11	RW	0x00 (0_{dec})
	8011:04	Output 12	RW	0x00 (0_{dec})
	8011:05	Output 13	RW	0x00 (0_{dec})
	8011:06	Output 14	RW	0x00 (0_{dec})
	8011:07	Output 15	RW	0x00 (0_{dec})
	8011:08	Output 16	RW	0x00 (0_{dec})
F000 [▶ 103]:0	**Subindex**	Modular device profile	RO	0x02 (2_{dec})
	F000:01	Module index distance	RO	0x0010 (16_{dec})
	F000:02	Maximum number of modules	RO	0x0002 (2_{dec})

Index		Name	Flags	Default value
F008 [▶ 103]		Code word	RW	0x00000000 (0_{dec})
F010 [▶ 104]:0	**Subindex**	Module list	RW	0x02 (2_{dec})
	F010:01	SubIndex 001	RW	0x00000118 (280_{dec})
	F010:02	SubIndex 002	RW	0x00000118 (280_{dec})
F600 [▶ 104]:0	**Subindex**	DIG Inputs	RO	0x10 (16_{dec})
	F600:01	Safe state active	RO	0x00 (0_{dec})
	F600:02	Error channel 1	RO	0x00 (0_{dec})
	F600:03	Error channel 2	RO	0x00 (0_{dec})
	F600:0E	Sync error	RO	0x00 (0_{dec})
	F600:10	TxPDO Toggle	RO	0x00 (0_{dec})
F700 [▶ 104]:0	**Subindex**	DIG Outputs	RO	0x02 (2_{dec})
	F700:01	Set safe state	RO	0x00 (0_{dec})
	F700:02	Reset outputs	RO	0x00 (0_{dec})
F800 [▶ 104]:0	**Subindex**	DIG Settings	RW	0x11 (17_{dec})
	F800:01	Disable shut off	RW	0x00 (0_{dec})
	F800:11	Switch off time	RW	0x03E8 (1000_{dec})

Key

Flags:
RO = Read only
RW = Read/Write

6.2 EP2816-0008 - Object description and parameterization

Parameterization

The terminal is parameterized via the CoE - Online tab (double-click on the respective object) or via the Process Data tab (assignment of PDOs).

EtherCAT XML Device Description

The display matches that of the CoE objects from the EtherCAT XML Device Description. It is strongly recommended to download the latest revision of the corresponding XML file from the Beckhoff website (http://www.beckhoff.com/english/default.htm?download/elconfg.htm) and follow the installation instructions.

Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization [▶ 94] during commissioning
- Objects intended for regular operation [▶ 96], e.g. through ADS access
- Objects for indicating internal settings [▶ 96] (may be fixed)
- Further profile-specific objects [▶ 102] indicating inputs, outputs and status information

The following section first describes the objects required for normal operation, followed by a complete overview of missing objects.

Objects to be parameterized during commissioning

Index 1011 Restore default parameters

Index	Name	Meaning	Data type	Flags	Default
1011:0	Restore default parameters	Restore default settings	UINT8	RO	0x01 (1_{dec})
1011:01	SubIndex 001	If this object is set to **"0x64616F6C"** in the Set Value Dialog, all backup objects are reset to their delivery state.	UINT32	RW	0x00000000 (0_{dec})

Index 8000 DIG Safe state active Ch.1

The outputs for which the *DIG Safe state active* bit is set are switched to the values specified in *Safe state value* in the event that the Operational (OP) status is left.
Status Operational (OP) is left if communication to the master is interrupted, for example at power breakdown at the master or cable breakage.

Index	Name	Meaning	Data type	Flags	Default
8000:0	DIG Safe state active		UINT8	RO	0x08 (8_{dec})
8000:01	Output 1	0_{bin}: DIG Safe state for output 1 is switched off 1_{bin}: DIG Safe state for output 1 is switched on	boolean	RW	1_{bin}
8000:02	Output 2	0_{bin}: DIG Safe state for output 2 is switched off 1_{bin}: DIG Safe state for output 2 is switched on	boolean	RW	1_{bin}
8000:03	Output 3	0_{bin}: DIG Safe state for output 3 is switched off 1_{bin}: DIG Safe state for output 3 is switched on	boolean	RW	1_{bin}
8000:04	Output 4	0_{bin}: DIG Safe state for output 4 is switched off 1_{bin}: DIG Safe state for output 4 is switched on	boolean	RW	1_{bin}
8000:05	Output 5	0_{bin}: DIG Safe state for output 5 is switched off 1_{bin}: DIG Safe state for output 5 is switched on	boolean	RW	1_{bin}
8000:06	Output 6	0_{bin}: DIG Safe state for output 6 is switched off 1_{bin}: DIG Safe state for output 6 is switched on	boolean	RW	1_{bin}
8000:07	Output 7	0_{bin}: DIG Safe state for output 7 is switched off 1_{bin}: DIG Safe state for output 7 is switched on	boolean	RW	1_{bin}
8000:08	Output 8	0_{bin}: DIG Safe state for output 8 is switched off 1_{bin}: DIG Safe state for output 8 is switched on	boolean	RW	1_{bin}

Index 8001 DIG Safe state value Ch.1

The values to which the outputs are switched when the status Operational (OP) is left are specified here.

Index	Name	Meaning	Data type	Flags	Default
8001:0	DIG Safe state value		UINT8	RO	0x08 (8_{dec})
8001:01	Output 1	0_{bin}: DIG Safe state value for output 1 = 0 1_{bin}: DIG Safe state value for output 1 = 1	boolean	RW	0x00 (0_{dec})
8001:02	Output 2	0_{bin}: DIG Safe state value for output 2 = 0 1_{bin}: DIG Safe state value for output 2 = 1	boolean	RW	0x00 (0_{dec})
8001:03	Output 3	0_{bin}: DIG Safe state value for output 3 = 0 1_{bin}: DIG Safe state value for output 3 = 1	boolean	RW	0x00 (0_{dec})
8001:04	Output 4	0_{bin}: DIG Safe state value for output 4 = 0 1_{bin}: DIG Safe state value for output 4 = 1	boolean	RW	0x00 (0_{dec})
8001:05	Output 5	0_{bin}: DIG Safe state value for output 5 = 0 1_{bin}: DIG Safe state value for output 5 = 1	boolean	RW	0x00 (0_{dec})
8001:06	Output 6	0_{bin}: DIG Safe state value for output 6 = 0 1_{bin}: DIG Safe state value for output 6 = 1	boolean	RW	0x00 (0_{dec})
8001:07	Output 7	0_{bin}: DIG Safe state value for output 7 = 0 1_{bin}: DIG Safe state value for output 7 = 1	boolean	RW	0x00 (0_{dec})
8001:08	Output 8	0_{bin}: DIG Safe state value for output 8 = 0 1_{bin}: DIG Safe state value for output 8 = 1	boolean	RW	0x00 (0_{dec})

Index 8010 DIG Safe state active Ch.2

The outputs for which the *DIG Safe state active* bit is set are switched to the values specified in *Safe state value* in the event that the Operational (OP) status is left.
Status Operational (OP) is left if communication to the master is interrupted, for example at power breakdown at the master or wire breakage.

Index	Name	Meaning	Data type	Flags	Default
8010:0	DIG Safe state active		UINT8	RO	0x08 (8_{dec})
8010:01	Output 9	0_{bin}: DIG Safe state for output 9 is switched off 1_{bin}: DIG Safe state for output 9 is switched on	boolean	RW	1_{bin}
8010:02	Output 10	0_{bin}: DIG Safe state for output 10 is switched off 1_{bin}: DIG Safe state for output 10 is switched on	boolean	RW	1_{bin}
8010:03	Output 11	0_{bin}: DIG Safe state for output 11 is switched off 1_{bin}: DIG Safe state for output 11 is switched on	boolean	RW	1_{bin}
8010:04	Output 12	0_{bin}: DIG Safe state for output 12 is switched off 1_{bin}: DIG Safe state for output 12 is switched on	boolean	RW	1_{bin}
8010:05	Output 13	0_{bin}: DIG Safe state for output 13 is switched off 1_{bin}: DIG Safe state for output 13 is switched on	boolean	RW	1_{bin}
8010:06	Output 14	0_{bin}: DIG Safe state for output 14 is switched off 1_{bin}: DIG Safe state for output 14 is switched on	boolean	RW	1_{bin}
8010:07	Output 15	0_{bin}: DIG Safe state for output 15 is switched off 1_{bin}: DIG Safe state for output 15 is switched on	boolean	RW	1_{bin}
8010:08	Output 16	0_{bin}: DIG Safe state for output 16 is switched off 1_{bin}: DIG Safe state for output 16 is switched on	boolean	RW	1_{bin}

Index 8011 DIG Safe state value Ch.2

The values to which the outputs are switched when the status Operational (OP) is left are specified here.

Index	Name	Meaning	Data type	Flags	Default
8011:0	DIG Safe state value		UINT8	RO	0x08 (8_{dec})
8011:01	Output 9	0_{bin}: DIG Safe state value for output 9 = 0 1_{bin}: DIG Safe state value for output 9 = 1	boolean	RW	0x00 (0_{dec})
8011:02	Output 10	0_{bin}: DIG Safe state value for output 10 = 0 1_{bin}: DIG Safe state value for output 10 = 1	boolean	RW	0x00 (0_{dec})
8011:03	Output 11	0_{bin}: DIG Safe state value for output 11 = 0 1_{bin}: DIG Safe state value for output 11 = 1	boolean	RW	0x00 (0_{dec})
8011:04	Output 12	0_{bin}: DIG Safe state value for output 12 = 0 1_{bin}: DIG Safe state value for output 12 = 1	boolean	RW	0x00 (0_{dec})
8011:05	Output 13	0_{bin}: DIG Safe state value for output 13 = 0 1_{bin}: DIG Safe state value for output 13 = 1	boolean	RW	0x00 (0_{dec})
8011:06	Output 14	0_{bin}: DIG Safe state value for output 14 = 0 1_{bin}: DIG Safe state value for output 14 = 1	boolean	RW	0x00 (0_{dec})
8011:07	Output 15	0_{bin}: DIG Safe state value for output 15 = 0 1_{bin}: DIG Safe state value for output 15 = 1	boolean	RW	0x00 (0_{dec})
8011:08	Output 16	0_{bin}: DIG Safe state value for output 16 = 0 1_{bin}: DIG Safe state value for output 16 = 1	boolean	RW	0x00 (0_{dec})

Objects for regular operation

The EP2xxx have no such objects.

Additional objects

Standard objects (0x1000-0x1FFF)

The standard objects have the same meaning for all EtherCAT slaves.

Index 1000 Device type

Index	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: The Lo-Word contains the CoE profile used (5001). The Hi-Word contains the module profile according to the modular device profile.	UINT32	RO	0x01181389 (18355081_{dec})

Index 1008 Device name

Index	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	string	RO	EP2816-0008

Index 1009 Hardware version

Index	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	string	RO	02

Index 100A Software Version

Index	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slave	string	RO	05

Index 1018 Identity

Index	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4_{dec})
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2_{dec})
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x0B004052 (184565842_{dec})
1018:03	Revision	Revision number of the EtherCAT slave; the low word (bit 0-15) indicates the special terminal number, the high word (bit 16-31) refers to the device description	UINT32	RO	0x00130008 (1245192_{dec})
1018:04	Serial number	Serial number of the EtherCAT slave; the Low Byte (bit 0-7) of the Low Word contains the year of production, the High Byte (bit 8-15) of the Low Word contains the week of production, the High Word (bit 16-31) is 0	UINT32	RO	0x00000000 (0_{dec})

Index 10F0 Backup parameter handling

Index	Name	Meaning	Data type	Flags	Default
10F0:0	Backup parameter handling	Information for standardized loading and saving of backup entries	UINT8	RO	0x01 (1_{dec})
10F0:01	Checksum	Checksum across all backup entries of the EtherCAT slave	UINT32	RO	0x00000000 (0_{dec})

Index 1600 DIG RxPDO-Map Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1600:0	DIG RxPDO-Map Outputs Ch.1	PDO Mapping RxPDO 1	UINT8	RO	0x09 (9_{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x01 (Output 1))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x02 (Output 2))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x03 (Output 3))	UINT32	RO	0x7000:03, 1
1600:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x04 (Output 4))	UINT32	RO	0x7000:04, 1
1600:05	SubIndex 005	5. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x05 (Output 5))	UINT32	RO	0x7000:05, 1
1600:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x06 (Output 6))	UINT32	RO	0x7000:06, 1
1600:07	SubIndex 007	7. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x07 (Output 7))	UINT32	RO	0x7000:07, 1
1600:08	SubIndex 008	8. PDO Mapping entry (object 0x7000 (DO Outputs Ch.1), entry 0x08 (Output 8))	UINT32	RO	0x7000:08, 1
1600:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1601 DIG RxPDO-Map Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1601:0	DIG RxPDO-Map Outputs Ch.2	PDO Mapping RxPDO 2	UINT8	RO	0x09 (9_{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x01 (Output 1))	UINT32	RO	0x7010:01, 1
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x02 (Output 2))	UINT32	RO	0x7010:02, 1
1601:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x03 (Output 3))	UINT32	RO	0x7010:03, 1
1601:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x04 (Output 4))	UINT32	RO	0x7010:04, 1
1601:05	SubIndex 005	5. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x05 (Output 5))	UINT32	RO	0x7010:05, 1
1601:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x06 (Output 6))	UINT32	RO	0x7010:06, 1
1601:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x07 (Output 7))	UINT32	RO	0x7010:07, 1
1601:08	SubIndex 008	8. PDO Mapping entry (object 0x7010 (DO Outputs Ch.2), entry 0x08 (Output 8))	UINT32	RO	0x7010:08, 1
1601:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1602 DIG RxPDO-Map Outputs Device

Index	Name	Meaning	Data type	Flags	Default
1602:0	DIG RxPDO-Map Outputs Device	PDO Mapping RxPDO 3	UINT8	RO	0x03 (3_{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0xF700 (DO Outputs), entry 0x01 (Set safe state))	UINT32	RO	0xF700:01, 1
1602:02	SubIndex 002	2. PDO Mapping entry (object 0xF700 (DO Outputs), entry 0x02 (Reset outputs))	UINT32	RO	0xF700:02, 1
1602:03	SubIndex 003	3. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14

Index 1A00 DIG TxPDO-Map Diag Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1A00:0	DIG TxPDO-Map Diag Inputs Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x09 (9_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (DI Inputs Ch.1), entry 0x01 (Input 1))	UINT32	RO	0x6001:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x02 (Input 2))	UINT32	RO	0x6001:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x03 (Input 3))	UINT32	RO	0x6001:03, 1
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x04 (Input 4))	UINT32	RO	0x6001:04, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x05 (Input 5))	UINT32	RO	0x6001:05, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x06 (Input 6))	UINT32	RO	0x6001:06, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x07 (Input 7))	UINT32	RO	0x6001:07, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (DO Inputs Ch.1), entry 0x08 (Input 8))	UINT32	RO	0x6001:08, 1
1A00:09	SubIndex 009	9. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 8

Index 1A01 DIG TxPDO-Map Diag Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1A01:0	DIG TxPDO-Map Diag Inputs Ch.2	PDO Mapping TxPDO 2	UINT8	RO	0x09 (9_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x01 (Input 1))	UINT32	RO	0x6011:01, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x02 (Input 2))	UINT32	RO	0x6011:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x03 (Input 3))	UINT32	RO	0x6011:03, 1
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x04 (Input 4))	UINT32	RO	0x6011:04, 1
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x05 (Input 5))	UINT32	RO	0x6011:05, 1
1A01:06	SubIndex 006	6. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x06 (Input 6))	UINT32	RO	0x6011:06, 1
1A01:07	SubIndex 007	7. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x07 (Input 7))	UINT32	RO	0x6011:07, 1
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (DO Inputs Ch.2), entry 0x08 (Input 8))	UINT32	RO	0x6011:08, 1
1A01:09	SubIndex 009	9. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 8

Index 1A02 DIG TxPDO-Map Inputs Device

Index	Name	Meaning	Data type	Flags	Default
1A02:0	DIG TxPDO-Map Inputs Device	PDO Mapping TxPDO 3	UINT8	RO	0x07 (7_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0xF600 (DO Inputs), entry 0x01 (Safe state active))	UINT32	RO	0xF600:01, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0xF600 (DO Inputs), entry 0x02 (Error channel 1))	UINT32	RO	0xF600:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0xF600 (DO Inputs), entry 0x03 (Error channel 2))	UINT32	RO	0xF600:03, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0xF600 (DO Inputs), entry 0x0E (Sync Error))	UINT32	RO	0x1C32:20, 1
1A02:06	SubIndex 006	6. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x1800, entry 0x09)	UINT32	RO	0x1800:09, 1

Index 1C00 Sync manager type

Index	Name	Meaning	Data type	Flags	Default
1C00:0	Sync manager type	Using the Sync Managers	UINT8	RO	0x04 (4_{dec})
1C00:01	SubIndex 001	Sync-Manager Type Channel 1: Mailbox Write	UINT8	RO	0x01 (1_{dec})
1C00:02	SubIndex 002	Sync-Manager Type Channel 2: Mailbox Read	UINT8	RO	0x02 (2_{dec})
1C00:03	SubIndex 003	Sync-Manager Type Channel 3: Process Data Write (Outputs)	UINT8	RO	0x03 (3_{dec})
1C00:04	SubIndex 004	Sync-Manager Type Channel 4: Process Data Read (Inputs)	UINT8	RO	0x04 (4_{dec})

Index 1C12 RxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x03 (3_{dec})
1C12:01	Subindex 001	1. allocated RxPDO (contains the index of the associated Rx-PDO mapping object)	UINT16	RW	0x1600 (5632_{dec})
1C12:02	Subindex 002	2. allocated RxPDO (contains the index of the associated Rx-PDO mapping object)	UINT16	RW	0x1601 (5633_{dec})
1C12:03	Subindex 003	3. allocated RxPDO (contains the index of the associated Rx-PDO mapping object)	UINT16	RW	0x1602 (5634_{dec})

Index 1C13 TxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x03 (3_{dec})
1C13:01	Subindex 001	1. allocated TxPDO (contains the index of the associated Tx-PDO mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	Subindex 002	2. allocated TxPDO (contains the index of the associated Tx-PDO mapping object)	UINT16	RW	0x1A01 (6657_{dec})
1C13:03	Subindex 003	3. allocated TxPDO (contains the index of the associated Tx-PDO mapping object)	UINT16	RW	0x1A02 (6658_{dec})

Index 1C32 SM output parameter

Index	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32_{dec})
1C32:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 2 Event • 2: DC-Mode - Synchron with SYNC0 Event • 3: DC-Mode - Synchron with SYNC1 Event	UINT16	RW	0x0001 (1_{dec})
1C32:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchron with SM 2 Event: Master cycle time • DC mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x000F4240 (1000000_{dec})
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00020F58 (135000_{dec})
1C32:04	Sync modes supported	Supported synchronization modes: • Bit 0 = 1: free run is supported • Bit 1 = 1: Synchron with SM 2 Event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output Shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 [▶ 101])	UINT16	RO	0xC007 (49159_{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x00030D40 (200000_{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0_{dec})
1C32:07	Minimum delay time		UINT32	RO	0x00020F58 (135000_{dec})
1C32:08	Command	• 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 1C32:03 [▶ 101], 1C32:05 [▶ 101], 1C32:06 [▶ 101], 1C32:09 [▶ 101], 1C33:03 [▶ 102], 1C33:06 [▶ 101], 1C33:09 [▶ 102] are updated with the maximum measured values. For a subsequent measurement the measured values are reset	UINT16	RW	0x0000 (0_{dec})
1C32:09	Maximum Delay time	Time between SYNC1 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00020F58 (135000_{dec})
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0_{dec})
1C32:0D	Shift too short counter	Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C32:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC mode only)	boolean	RO	0x00 (0_{dec})

Index 1C33 SM input parameter

Index	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32_{dec})
1C33:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 3 Event (no outputs available) • 2: DC - Synchron with SYNC0 Event • 3: DC - Synchron with SYNC1 Event • 34: Synchron with SM 2 Event (outputs available)	UINT16	RW	0x0022 (34_{dec})
1C33:02	Cycle time	as 1C32:02 [▶ 101]	UINT32	RW	0x000F4240 (1000000_{dec})
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:04	Sync modes supported	Supported synchronization modes: • Bit 0: free run is supported • Bit 1: Synchron with SM 2 Event is supported (outputs available) • Bit 1: Synchron with SM 3 Event is supported (no outputs available) • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 01: Input Shift through local event (outputs available) • Bit 4-5 = 10: Input Shift with SYNC1 event (no outputs available) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 [▶ 101] or 1C33:08 [▶ 102])	UINT16	RO	0xC007 (49159_{dec})
1C33:05	Minimum cycle time	as 1C32:05 [▶ 101]	UINT32	RO	0x00030D40 (200000_{dec})
1C33:06	Calc and copy time	Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:07	Minimum delay time		UINT32	RO	0x00000000 (0_{dec})
1C33:08	Command	as 1C32:08 [▶ 101]	UINT16	RW	0x0000 (0_{dec})
1C33:09	Maximum Delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:0B	SM event missed counter	as 1C32:11 [▶ 101]	UINT16	RO	0x0000 (0_{dec})
1C33:0C	Cycle exceeded counter	as 1C32:12 [▶ 101]	UINT16	RO	0x0000 (0_{dec})
1C33:0D	Shift too short counter	as 1C32:13 [▶ 101]	UINT16	RO	0x0000 (0_{dec})
1C33:20	Sync error	as 1C32:32 [▶ 101]	boolean	RO	0x00 (0_{dec})

Profile-specific objects (0x6000-0xFFFF)

The profile-specific objects have the same meaning for all EtherCAT slaves that support the profile 5001.

Index 6001 DIG Diag Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
6001:0	DIG Diag Inputs Ch.1		UINT8	RO	0x08 (8_{dec})
6001:01	Diag Input 1		boolean	RO	0x00 (0_{dec})
6001:02	Diag Input 2		boolean	RO	0x00 (0_{dec})
6001:03	Diag Input 3		boolean	RO	0x00 (0_{dec})
6001:04	Diag Input 4		boolean	RO	0x00 (0_{dec})
6001:05	Diag Input 5		boolean	RO	0x00 (0_{dec})
6001:06	Diag Input 6		boolean	RO	0x00 (0_{dec})
6001:07	Diag Input 7		boolean	RO	0x00 (0_{dec})
6001:08	Diag Input 8		boolean	RO	0x00 (0_{dec})

Index 6011 DIG Diag Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
6011:0	DIG Diag Inputs Ch.2		UINT8	RO	0x08 (8_{dec})
6011:01	Diag Input 1		boolean	RO	0x00 (0_{dec})
6011:02	Diag Input 2		boolean	RO	0x00 (0_{dec})
6011:03	Diag Input 3		boolean	RO	0x00 (0_{dec})
6011:04	Diag Input 4		boolean	RO	0x00 (0_{dec})
6011:05	Diag Input 5		boolean	RO	0x00 (0_{dec})
6011:06	Diag Input 6		boolean	RO	0x00 (0_{dec})
6011:07	Diag Input 7		boolean	RO	0x00 (0_{dec})
6011:08	Diag Input 8		boolean	RO	0x00 (0_{dec})

Index 7000 DIG Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
7000:0	DIG Outputs Ch.1		UINT8	RO	0x08 (8_{dec})
7000:01	Output 1		boolean	RO	0x00 (0_{dec})
7000:02	Output 2		boolean	RO	0x00 (0_{dec})
7000:03	Output 3		boolean	RO	0x00 (0_{dec})
7000:04	Output 4		boolean	RO	0x00 (0_{dec})
7000:05	Output 5		boolean	RO	0x00 (0_{dec})
7000:06	Output 6		boolean	RO	0x00 (0_{dec})
7000:07	Output 7		boolean	RO	0x00 (0_{dec})
7000:08	Output 8		boolean	RO	0x00 (0_{dec})

Index 7010 DIG Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
7010:0	DIG Outputs Ch.2		UINT8	RO	0x08 (8_{dec})
7010:01	Output 1		boolean	RO	0x00 (0_{dec})
7010:02	Output 2		boolean	RO	0x00 (0_{dec})
7010:03	Output 3		boolean	RO	0x00 (0_{dec})
7010:04	Output 4		boolean	RO	0x00 (0_{dec})
7010:05	Output 5		boolean	RO	0x00 (0_{dec})
7010:06	Output 6		boolean	RO	0x00 (0_{dec})
7010:07	Output 7		boolean	RO	0x00 (0_{dec})
7010:08	Output 8		boolean	RO	0x00 (0_{dec})

Index F000 Modular device profile

Index	Name	Meaning	Data type	Flags	Default
F000:0	Modular device profile	General information for the modular device profile	UINT8	RO	0x02 (2_{dec})
F000:01	Module index distance	Index distance of the objects of the individual channels	UINT16	RO	0x0010 (16_{dec})
F000:02	Maximum number of modules	Number of channels	UINT16	RO	0x0002 (2_{dec})

Index F008 Code word

Index	Name	Meaning	Data type	Flags	Default
F008:0	Code word		UINT32	RW	0x00000000 (0_{dec})

Index F010 Module list

Index	Name	Meaning	Data type	Flags	Default
F010:0	Module list		UINT8	RW	0x02 (2_{dec})
F010:01	SubIndex 001		UINT32	RW	0x00000118 (280_{dec})
F010:02	SubIndex 002		UINT32	RW	0x00000118 (280_{dec})

Index F600 DIG Inputs

Index	Name	Meaning	Data type	Flags	Default
F600:0	DIG Inputs		UINT8	RO	0x10 (16_{dec})
F600:01	Safe state active		boolean	RO	0x00 (0_{dec})
F600:02	Error channel 1		boolean	RO	0x00 (0_{dec})
F600:03	Error channel 2		boolean	RO	0x00 (0_{dec})
F600:0E	Sync error		boolean	RO	0x00 (0_{dec})
F600:10	TxPDO Toggle		boolean	RO	0x00 (0_{dec})

Index F700 DIG Outputs

Index	Name	Meaning	Data type	Flags	Default
F700:0	DIG Outputs		UINT8	RO	0x02 (2_{dec})
F700:01	Set safe state		boolean	RO	0x00 (0_{dec})
F700:02	Reset outputs		boolean	RO	0x00 (0_{dec})

Index F800 DIG Settings

Index	Name	Meaning	Data type	Flags	Default
F800:0	DIG Settings		UINT8	RO	0x11 (17_{dec})
F800:01	Disable shut off		boolean	RW	0x00 (0_{dec})
F800:11	Switch off time		UINT16	RW	0x03E8 (1000_{dec})

6.3 EP2817-0008 - Object overview

EtherCAT XML Device Description

The display matches that of the CoE objects from the EtherCAT XML Device Description. We recommend downloading the latest XML file from the download area of the Beckhoff website and installing it according to the installation instructions.

Index		Name	Flags	Default value
1000 [▶ 115]		Device type	RO	0x01181389 (18355081_{dec})
1008 [▶ 116]		Device name	RO	EP2817-0008
1009 [▶ 116]		Hardware version	RO	
100A [▶ 116]		Software version	RO	00
1011 [▶ 112]:0	**Subindex**	Restore default parameters	RO	0x01 (1_{dec})
	1011:01	SubIndex 001	RW	0x00000000 (0_{dec})
1018 [▶ 116]:0	**Subindex**	Identity	RO	0x04 (4_{dec})
	1018:01	Vendor ID	RO	0x00000002 (2_{dec})
	1018:02	Product code	RO	0x0B014052 (184631378_{dec})
	1018:03	Revision	RO	0x00000000 (0_{dec})
	1018:04	Serial number	RO	0x00000000 (0_{dec})
10F0 [▶ 116]:0	**Subindex**	Backup parameter handling	RO	0x01 (1_{dec})
	10F0:01	Checksum	RO	0x00000000 (0_{dec})
1600 [▶ 116]:0	**Subindex**	DIG RxPDO-Map OutputsCh.1	RO	0x09 (9_{dec})
	1600:01	SubIndex 001	RO	0x7000:01, 1
	1600:02	SubIndex 002	RO	0x7000:02, 1
	1600:03	SubIndex 003	RO	0x7000:03, 1
	1600:04	SubIndex 004	RO	0x7000:04, 1
	1600:05	SubIndex 005	RO	0x7000:05, 1
	1600:06	SubIndex 006	RO	0x7000:06, 1
	1600:07	SubIndex 007	RO	0x7000:07, 1
	1600:08	SubIndex 008	RO	0x7000:08, 1
	1600:09	SubIndex 009	RO	0x0000:00, 8
1601 [▶ 117]:0	**Subindex**	DIG RxPDO-Map OutputsCh.2	RO	0x09 (9_{dec})
	1601:01	SubIndex 001	RO	0x7010:01, 1
	1601:02	SubIndex 002	RO	0x7010:02, 1
	1601:03	SubIndex 003	RO	0x7010:03, 1
	1601:04	SubIndex 004	RO	0x7010:04, 1
	1601:05	SubIndex 005	RO	0x7010:05, 1
	1601:06	SubIndex 006	RO	0x7010:06, 1
	1601:07	SubIndex 007	RO	0x7010:07, 1
	1601:08	SubIndex 008	RO	0x7010:08, 1
	1601:09	SubIndex 009	RO	0x0000:00, 8
1602 [▶ 117]:0	**Subindex**	DIG RxPDO-Map OutputsCh.3	RO	0x09 (9_{dec})
	1602:01	SubIndex 001	RO	0x7020:01, 1
	1602:02	SubIndex 002	RO	0x7020:02, 1
	1602:03	SubIndex 003	RO	0x7020:03, 1
	1602:04	SubIndex 004	RO	0x7020:04, 1
	1602:05	SubIndex 005	RO	0x7020:05, 1
	1602:06	SubIndex 006	RO	0x7020:06, 1
	1602:07	SubIndex 007	RO	0x7020:07, 1
	1602:08	SubIndex 008	RO	0x7020:08, 1
	1602:09	SubIndex 009	RO	0x0000:00, 8
1603 [▶ 117]:0	**Subindex**	DIG RxPDO-Map Outputs Device	RO	0x03 (3_{dec})
	1603:01	SubIndex 001	RO	0xF700:01, 1
	1603:02	SubIndex 002	RO	0xF700:02, 1
	1603:03	SubIndex 003	RO	0x0000:00, 14

Index		Name	Flags	Default value
1A00 [▶ 118]:0	**Subindex**	DIG TxPDO-Map Diag Inputs Ch.1	RO	0x09 (9_{dec})
	1A00:01	SubIndex 001	RO	0x6001:01, 1
	1A00:02	SubIndex 002	RO	0x6001:02, 1
	1A00:03	SubIndex 003	RO	0x6001:03, 1
	1A00:04	SubIndex 004	RO	0x6001:04, 1
	1A00:05	SubIndex 005	RO	0x6001:05, 1
	1A00:06	SubIndex 006	RO	0x6001:06, 1
	1A00:07	SubIndex 007	RO	0x6001:07, 1
	1A00:08	SubIndex 008	RO	0x6001:08, 1
	1A00:09	SubIndex 009	RO	0x0000:00, 8
1A01 [▶ 118]:0	**Subindex**	DIG TxPDO-Map Diag Inputs Ch.2	RO	0x09 (9_{dec})
	1A01:01	SubIndex 001	RO	0x6011:01, 1
	1A01:02	SubIndex 002	RO	0x6011:02, 1
	1A01:03	SubIndex 003	RO	0x6011:03, 1
	1A01:04	SubIndex 004	RO	0x6011:04, 1
	1A01:05	SubIndex 005	RO	0x6011:05, 1
	1A01:06	SubIndex 006	RO	0x6011:06, 1
	1A01:07	SubIndex 007	RO	0x6011:07, 1
	1A01:08	SubIndex 008	RO	0x6011:08, 1
	1A01:09	SubIndex 009	RO	0x0000:00, 8
1A02 [▶ 119]:0	**Subindex**	DIG TxPDO-Map Diag Inputs Ch.3	RO	0x09 (9_{dec})
	1A02:01	SubIndex 001	RO	0x6021:01, 1
	1A02:02	SubIndex 002	RO	0x6021:02, 1
	1A02:03	SubIndex 003	RO	0x6021:03, 1
	1A02:04	SubIndex 004	RO	0x6021:04, 1
	1A02:05	SubIndex 005	RO	0x6021:05, 1
	1A02:06	SubIndex 006	RO	0x6021:06, 1
	1A02:07	SubIndex 007	RO	0x6021:07, 1
	1A02:08	SubIndex 008	RO	0x6021:08, 1
	1A02:09	SubIndex 009	RO	0x0000:00, 8
1A03 [▶ 119]:0	**Subindex**	DIG TxPDO-Map Inputs Device	RO	0x0A (10_{dec})
	1A03:01	SubIndex 001	RO	0xF600:01, 1
	1A03:02	SubIndex 002	RO	0xF600:02, 1
	1A03:03	SubIndex 003	RO	0xF600:03, 1
	1A03:04	SubIndex 004	RO	0xF600:04, 1
	1A03:05	SubIndex 005	RO	0xF600:05, 1
	1A03:06	SubIndex 006	RO	0xF600:06, 1
	1A03:07	SubIndex 007	RO	0x0000:00, 7
	1A03:08	SubIndex 008	RO	0xF600:0E, 1
	1A03:09	SubIndex 009	RO	0x0000:00, 1
	1A03:0A	SubIndex 010	RO	0xF600:10, 1
1C00 [▶ 119]:0	**Subindex**	Sync manager type	RO	0x04 (4_{dec})
	1C00:01	SubIndex 001	RO	0x01 (1_{dec})
	1C00:02	SubIndex 002	RO	0x02 (2_{dec})
	1C00:03	SubIndex 003	RO	0x03 (3_{dec})
	1C00:04	SubIndex 004	RO	0x04 (4_{dec})

Index		Name	Flags	Default value
1C12 [▶ 120]:0	**Subindex**	RxPDO assign	RW	0x04 (4_{dec})
	1C12:01	SubIndex 001	RW	0x1600 (5632_{dec})
	1C12:02	SubIndex 002	RW	0x1601 (5633_{dec})
	1C12:03	SubIndex 003	RW	0x1602 (5634_{dec})
	1C12:04	SubIndex 004	RW	0x1603 (5635_{dec})
1C13 [▶ 120]:0	**Subindex**	TxPDO assign	RW	0x04 (4_{dec})
	1C13:01	SubIndex 001	RW	0x1A00 (6656_{dec})
	1C13:02	SubIndex 002	RW	0x1A01 (6657_{dec})
	1C13:03	SubIndex 003	RW	0x1A02 (6658_{dec})
	1C13:04	SubIndex 004	RW	0x1A03 (6659_{dec})
1C32 [▶ 121]:0	**Subindex**	SM output parameter	RO	0x20 (32_{dec})
	1C32:01	Sync mode	RW	0x0001 (1_{dec})
	1C32:02	Cycle time	RW	0x003D0900 (4000000_{dec})
	1C32:03	Shift time	RO	0x00000000 (0_{dec})
	1C32:04	Sync modes supported	RO	0x000A (10_{dec})
	1C32:05	Minimum cycle time	RO	0x000493E0 (300000_{dec})
	1C32:06	Calc and copy time	RO	0x00000000 (0_{dec})
	1C32:07	Minimum delay time	RO	0x00000000 (0_{dec})
	1C32:08	Command	RW	0x0000 (0_{dec})
	1C32:09	Maximum delay time	RO	0x00000000 (0_{dec})
	1C32:0B	SM event missed counter	RO	0x0000 (0_{dec})
	1C32:0C	Cycle exceeded counter	RO	0x0000 (0_{dec})
	1C32:0D	Shift too short counter	RO	0x0000 (0_{dec})
	1C32:20	Sync error	RO	0x00 (0_{dec})
1C33 [▶ 122]:0	**Subindex**	SM input parameter	RO	0x20 (32_{dec})
	1C33:01	Sync mode	RW	0x0022 (34_{dec})
	1C33:02	Cycle time	RW	0x003D0900 (4000000_{dec})
	1C33:03	Shift time	RO	0x00000000 (0_{dec})
	1C33:04	Sync modes supported	RO	0x000A (10_{dec})
	1C33:05	Minimum cycle time	RO	0x000493E0 (300000_{dec})
	1C33:06	Calc and copy time	RO	0x00000000 (0_{dec})
	1C33:07	Minimum delay time	RO	0x00000000 (0_{dec})
	1C33:08	Command	RW	0x0000 (0_{dec})
	1C33:09	Maximum delay time	RO	0x00000000 (0_{dec})
	1C33:0B	SM event missed counter	RO	0x0000 (0_{dec})
	1C33:0C	Cycle exceeded counter	RO	0x0000 (0_{dec})
	1C33:0D	Shift too short counter	RO	0x0000 (0_{dec})
	1C33:20	Sync error	RO	0x00 (0_{dec})
6001 [▶ 123]:0	**Subindex**	DIG Diag Inputs Ch.1	RO	0x08 (8_{dec})
	6001:01	Diag Input 1	RO	0x00 (0_{dec})
	6001:02	Diag Input 2	RO	0x00 (0_{dec})
	6001:03	Diag Input 3	RO	0x00 (0_{dec})
	6001:04	Diag Input 4	RO	0x00 (0_{dec})
	6001:05	Diag Input 5	RO	0x00 (0_{dec})
	6001:06	Diag Input 6	RO	0x00 (0_{dec})
	6001:07	Diag Input 7	RO	0x00 (0_{dec})
	6001:08	Diag Input 8	RO	0x00 (0_{dec})

Index		Name	Flags	Default value
6011 [▶ 123]:0	**Subindex**	DIG Diag Inputs Ch.2	RO	0x08 (8_{dec})
	6011:01	Diag Input 1	RO	0x00 (0_{dec})
	6011:02	Diag Input 2	RO	0x00 (0_{dec})
	6011:03	Diag Input 3	RO	0x00 (0_{dec})
	6011:04	Diag Input 4	RO	0x00 (0_{dec})
	6011:05	Diag Input 5	RO	0x00 (0_{dec})
	6011:06	Diag Input 6	RO	0x00 (0_{dec})
	6011:07	Diag Input 7	RO	0x00 (0_{dec})
	6011:08	Diag Input 8	RO	0x00 (0_{dec})
6021 [▶ 123]:0	**Subindex**	DIG Diag Inputs Ch.3	RO	0x08 (8_{dec})
	6021:01	Diag Input 1	RO	0x00 (0_{dec})
	6021:02	Diag Input 2	RO	0x00 (0_{dec})
	6021:03	Diag Input 3	RO	0x00 (0_{dec})
	6021:04	Diag Input 4	RO	0x00 (0_{dec})
	6021:05	Diag Input 5	RO	0x00 (0_{dec})
	6021:06	Diag Input 6	RO	0x00 (0_{dec})
	6021:07	Diag Input 7	RO	0x00 (0_{dec})
	6021:08	Diag Input 8	RO	0x00 (0_{dec})
7000 [▶ 123]:0	**Subindex**	DIG Outputs Ch.1	RO	0x08 (8_{dec})
	7000:01	Output 1	RO	0x00 (0_{dec})
	7000:02	Output 2	RO	0x00 (0_{dec})
	7000:03	Output 3	RO	0x00 (0_{dec})
	7000:04	Output 4	RO	0x00 (0_{dec})
	7000:05	Output 5	RO	0x00 (0_{dec})
	7000:06	Output 6	RO	0x00 (0_{dec})
	7000:07	Output 7	RO	0x00 (0_{dec})
	7000:08	Output 8	RO	0x00 (0_{dec})
7010 [▶ 124]:0	**Subindex**	DIG Outputs Ch.2	RO	0x08 (8_{dec})
	7010:01	Output 1	RO	0x00 (0_{dec})
	7010:02	Output 2	RO	0x00 (0_{dec})
	7010:03	Output 3	RO	0x00 (0_{dec})
	7010:04	Output 4	RO	0x00 (0_{dec})
	7010:05	Output 5	RO	0x00 (0_{dec})
	7010:06	Output 6	RO	0x00 (0_{dec})
	7010:07	Output 7	RO	0x00 (0_{dec})
	7010:08	Output 8	RO	0x00 (0_{dec})
7020 [▶ 124]:0	**Subindex**	DIG Outputs Ch.3	RO	0x08 (8_{dec})
	7020:01	Output 1	RO	0x00 (0_{dec})
	7020:02	Output 2	RO	0x00 (0_{dec})
	7020:03	Output 3	RO	0x00 (0_{dec})
	7020:04	Output 4	RO	0x00 (0_{dec})
	7020:05	Output 5	RO	0x00 (0_{dec})
	7020:06	Output 6	RO	0x00 (0_{dec})
	7020:07	Output 7	RO	0x00 (0_{dec})
	7020:08	Output 8	RO	0x00 (0_{dec})

Index		Name	Flags	Default value
8000 [▶ 112]:0	**Subindex**	DIG Safe state active Ch.1	RW	0x08 (8_{dec})
	8000:01	Output 1	RW	0x01 (1_{dec})
	8000:02	Output 2	RW	0x01 (1_{dec})
	8000:03	Output 3	RW	0x01 (1_{dec})
	8000:04	Output 4	RW	0x01 (1_{dec})
	8000:05	Output 5	RW	0x01 (1_{dec})
	8000:06	Output 6	RW	0x01 (1_{dec})
	8000:07	Output 7	RW	0x01 (1_{dec})
	8000:08	Output 8	RW	0x01 (1_{dec})
8001 [▶ 113]:0	**Subindex**	DIG Safe state value Ch.1	RW	0x08 (8_{dec})
	8001:01	Output 1	RW	0x00 (0_{dec})
	8001:02	Output 2	RW	0x00 (0_{dec})
	8001:03	Output 3	RW	0x00 (0_{dec})
	8001:04	Output 4	RW	0x00 (0_{dec})
	8001:05	Output 5	RW	0x00 (0_{dec})
	8001:06	Output 6	RW	0x00 (0_{dec})
	8001:07	Output 7	RW	0x00 (0_{dec})
	8001:08	Output 8	RW	0x00 (0_{dec})
8010 [▶ 113]:0	**Subindex**	DIG Safe state active Ch.2	RW	0x08 (8_{dec})
	8010:01	Output 1	RW	0x01 (1_{dec})
	8010:02	Output 2	RW	0x01 (1_{dec})
	8010:03	Output 3	RW	0x01 (1_{dec})
	8010:04	Output 4	RW	0x01 (1_{dec})
	8010:05	Output 5	RW	0x01 (1_{dec})
	8010:06	Output 6	RW	0x01 (1_{dec})
	8010:07	Output 7	RW	0x01 (1_{dec})
	8010:08	Output 8	RW	0x01 (1_{dec})
8011 [▶ 114]:0	**Subindex**	DIG Safe state value Ch.2	RW	0x08 (8_{dec})
	8011:01	Output 1	RW	0x00 (0_{dec})
	8011:02	Output 2	RW	0x00 (0_{dec})
	8011:03	Output 3	RW	0x00 (0_{dec})
	8011:04	Output 4	RW	0x00 (0_{dec})
	8011:05	Output 5	RW	0x00 (0_{dec})
	8011:06	Output 6	RW	0x00 (0_{dec})
	8011:07	Output 7	RW	0x00 (0_{dec})
	8011:08	Output 8	RW	0x00 (0_{dec})
8020 [▶ 114]:0	**Subindex**	DIG Safe state active Ch.3	RW	0x08 (8_{dec})
	8020:01	Output 1	RW	0x01 (1_{dec})
	8020:02	Output 2	RW	0x01 (1_{dec})
	8020:03	Output 3	RW	0x01 (1_{dec})
	8020:04	Output 4	RW	0x01 (1_{dec})
	8020:05	Output 5	RW	0x01 (1_{dec})
	8020:06	Output 6	RW	0x01 (1_{dec})
	8020:07	Output 7	RW	0x01 (1_{dec})
	8020:08	Output 8	RW	0x01 (1_{dec})

Index		Name	Flags	Default value
8021 [▶ 115]:0	**Subindex**	DIG Safe state value Ch.3	RW	0x08 (8_{dec})
	8021:01	Output 1	RW	0x00 (0_{dec})
	8021:02	Output 2	RW	0x00 (0_{dec})
	8021:03	Output 3	RW	0x00 (0_{dec})
	8021:04	Output 4	RW	0x00 (0_{dec})
	8021:05	Output 5	RW	0x00 (0_{dec})
	8021:06	Output 6	RW	0x00 (0_{dec})
	8021:07	Output 7	RW	0x00 (0_{dec})
	8021:08	Output 8	RW	0x00 (0_{dec})
F000 [▶ 124]:0	**Subindex**	Modular device profile	RO	0x02 (2_{dec})
	F000:01	Module index distance	RO	0x0010 (16_{dec})
	F000:02	Maximum number of modules	RO	0x0003 (3_{dec})
F008 [▶ 124]		Code word	RW	0x00000000 (0_{dec})
F010 [▶ 124]:0	**Subindex**	Module list	RW	0x03 (3_{dec})
	F010:01	SubIndex 001	RW	0x00000118 (280_{dec})
	F010:02	SubIndex 002	RW	0x00000118 (280_{dec})
	F010:03	SubIndex 003	RW	0x00000118 (280_{dec})
F600 [▶ 125]:0	**Subindex**	DIG Inputs	RO	0x10 (16_{dec})
	F600:01	Safe state active	RO	0x00 (0_{dec})
	F600:02	Error channel 1	RO	0x00 (0_{dec})
	F600:03	Error channel 2	RO	0x00 (0_{dec})
	F600:04	Error channel 3	RO	0x00 (0_{dec})
	F600:05	Us Undervoltage	RO	0x00 (0_{dec})
	F600:06	Up Undervoltage	RO	0x00 (0_{dec})
	F600:0E	Sync error	RO	0x00 (0_{dec})
	F600:10	TxPDO Toggle	RO	0x00 (0_{dec})
F700 [▶ 125]:0	**Subindex**	DIG Outputs	RO	0x02 (2_{dec})
	F700:01	Set safe state	RO	0x00 (0_{dec})
	F700:02	Reset outputs	RO	0x00 (0_{dec})
F800 [▶ 125]:0	**Subindex**	DIG Settings	RW	0x11 (17_{dec})
	F800:01	Disable shut off	RW	0x00 (0_{dec})
	F800:11	Switch off time	RW	0x000A (10_{dec})

Key

Flags:
RO = Read Only
RW = Read/Write

6.4 EP2817-0008 - Object description and parameterization

Parameterization

The terminal is parameterized via the CoE - Online tab (double-click on the respective object) or via the Process Data tab (assignment of PDOs).

EtherCAT XML Device Description

The display matches that of the CoE objects from the EtherCAT XML Device Description. It is strongly recommended to download the latest revision of the corresponding XML file from the Beckhoff website (http://www.beckhoff.com/english/default.htm?download/elconfg.htm) and follow the installation instructions.

Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization [▶ 112] during commissioning
- Objects for indicating internal settings [▶ 115] (may be fixed)
- Further profile-specific objects [▶ 122] indicating inputs, outputs and status information

The following section first describes the objects required for normal operation, followed by a complete overview of missing objects.

Objects to be parameterized during commissioning

Index 1011 Restore default parameters

Index	Name	Meaning	Data type	Flags	Default
1011:0	Restore default parameters	Restore default settings	UINT8	RO	0x01 (1_{dec})
1011:01	SubIndex 001	If this object is set to **0x64616F6C** in the set value dialog, all backup objects are reset to their delivery state.	UINT32	RW	0x00000000 (0_{dec})

Index 8000 DIG Safe state active Ch.1

The outputs for which the *DIG Safe state active* bit is set are switched to the values specified in *Safe state value* in the event that the Operational (OP) status is left.
Status Operational (OP) is left if communication to the master is interrupted, for example at power breakdown at the master or cable breakage.

Index	Name	Meaning	Data type	Flags	Default
8000:0	DIG Safe state active		UINT8	RO	0x08 (8_{dec})
8000:01	Output 1	0_{bin}: DIG Safe state for output 1 is switched off 1_{bin}: DIG Safe state for output 1 is switched on	boolean	RW	1_{bin}
8000:02	Output 2	0_{bin}: DIG Safe state for output 2 is switched off 1_{bin}: DIG Safe state for output 2 is switched on	boolean	RW	1_{bin}
8000:03	Output 3	0_{bin}: DIG Safe state for output 3 is switched off 1_{bin}: DIG Safe state for output 3 is switched on	boolean	RW	1_{bin}
8000:04	Output 4	0_{bin}: DIG Safe state for output 4 is switched off 1_{bin}: DIG Safe state for output 4 is switched on	boolean	RW	1_{bin}
8000:05	Output 5	0_{bin}: DIG Safe state for output 5 is switched off 1_{bin}: DIG Safe state for output 5 is switched on	boolean	RW	1_{bin}
8000:06	Output 6	0_{bin}: DIG Safe state for output 6 is switched off 1_{bin}: DIG Safe state for output 6 is switched on	boolean	RW	1_{bin}
8000:07	Output 7	0_{bin}: DIG Safe state for output 7 is switched off 1_{bin}: DIG Safe state for output 7 is switched on	boolean	RW	1_{bin}
8000:08	Output 8	0_{bin}: DIG Safe state for output 8 is switched off 1_{bin}: DIG Safe state for output 8 is switched on	boolean	RW	1_{bin}

Index 8001 DIG Safe state value Ch.1

The values to which the outputs are switched when the status Operational (OP) is left are specified here.

Index	Name	Meaning	Data type	Flags	Default
8001:0	DIG Safe state value		UINT8	RO	0x08 (8_{dec})
8001:01	Output 1	0_{bin}: DIG Safe state value for output 1 = 0 1_{bin}: DIG Safe state value for output 1 = 1	boolean	RW	0x00 (0_{dec})
8001:02	Output 2	0_{bin}: DIG Safe state value for output 2 = 0 1_{bin}: DIG Safe state value for output 2 = 1	boolean	RW	0x00 (0_{dec})
8001:03	Output 3	0_{bin}: DIG Safe state value for output 3 = 0 1_{bin}: DIG Safe state value for output 3 = 1	boolean	RW	0x00 (0_{dec})
8001:04	Output 4	0_{bin}: DIG Safe state value for output 4 = 0 1_{bin}: DIG Safe state value for output 4 = 1	boolean	RW	0x00 (0_{dec})
8001:05	Output 5	0_{bin}: DIG Safe state value for output 5 = 0 1_{bin}: DIG Safe state value for output 5 = 1	boolean	RW	0x00 (0_{dec})
8001:06	Output 6	0_{bin}: DIG Safe state value for output 6 = 0 1_{bin}: DIG Safe state value for output 6 = 1	boolean	RW	0x00 (0_{dec})
8001:07	Output 7	0_{bin}: DIG Safe state value for output 7 = 0 1_{bin}: DIG Safe state value for output 7 = 1	boolean	RW	0x00 (0_{dec})
8001:08	Output 8	0_{bin}: DIG Safe state value for output 8 = 0 1_{bin}: DIG Safe state value for output 8 = 1	boolean	RW	0x00 (0_{dec})

Index 8010 DIG Safe state active Ch.2

The outputs for which the *DIG Safe state active* bit is set are switched to the values specified in *Safe state value* in the event that the Operational (OP) status is left.
Status Operational (OP) is left if communication to the master is interrupted, for example at power breakdown at the master or wire breakage.

Index	Name	Meaning	Data type	Flags	Default
8010:0	DIG Safe state active		UINT8	RO	0x08 (8_{dec})
8010:01	Output 9	0_{bin}: DIG Safe state for output 9 is switched off 1_{bin}: DIG Safe state for output 9 is switched on	boolean	RW	1_{bin}
8010:02	Output 10	0_{bin}: DIG Safe state for output 10 is switched off 1_{bin}: DIG Safe state for output 10 is switched on	boolean	RW	1_{bin}
8010:03	Output 11	0_{bin}: DIG Safe state for output 11 is switched off 1_{bin}: DIG Safe state for output 11 is switched on	boolean	RW	1_{bin}
8010:04	Output 12	0_{bin}: DIG Safe state for output 12 is switched off 1_{bin}: DIG Safe state for output 12 is switched on	boolean	RW	1_{bin}
8010:05	Output 13	0_{bin}: DIG Safe state for output 13 is switched off 1_{bin}: DIG Safe state for output 13 is switched on	boolean	RW	1_{bin}
8010:06	Output 14	0_{bin}: DIG Safe state for output 14 is switched off 1_{bin}: DIG Safe state for output 14 is switched on	boolean	RW	1_{bin}
8010:07	Output 15	0_{bin}: DIG Safe state for output 15 is switched off 1_{bin}: DIG Safe state for output 15 is switched on	boolean	RW	1_{bin}
8010:08	Output 16	0_{bin}: DIG Safe state for output 16 is switched off 1_{bin}: DIG Safe state for output 16 is switched on	boolean	RW	1_{bin}

Index 8011 DIG Safe state value Ch.2

The values to which the outputs are switched when the status Operational (OP) is left are specified here.

Index	Name	Meaning	Data type	Flags	Default
8011:0	DIG Safe state value		UINT8	RO	0x08 (8_{dec})
8011:01	Output 9	0_{bin}: DIG Safe state value for output 9 = 0 1_{bin}: DIG Safe state value for output 9 = 1	boolean	RW	0x00 (0_{dec})
8011:02	Output 10	0_{bin}: DIG Safe state value for output 10 = 0 1_{bin}: DIG Safe state value for output 10 = 1	boolean	RW	0x00 (0_{dec})
8011:03	Output 11	0_{bin}: DIG Safe state value for output 11 = 0 1_{bin}: DIG Safe state value for output 11 = 1	boolean	RW	0x00 (0_{dec})
8011:04	Output 12	0_{bin}: DIG Safe state value for output 12 = 0 1_{bin}: DIG Safe state value for output 12 = 1	boolean	RW	0x00 (0_{dec})
8011:05	Output 13	0_{bin}: DIG Safe state value for output 13 = 0 1_{bin}: DIG Safe state value for output 13 = 1	boolean	RW	0x00 (0_{dec})
8011:06	Output 14	0_{bin}: DIG Safe state value for output 14 = 0 1_{bin}: DIG Safe state value for output 14 = 1	boolean	RW	0x00 (0_{dec})
8011:07	Output 15	0_{bin}: DIG Safe state value for output 15 = 0 1_{bin}: DIG Safe state value for output 15 = 1	boolean	RW	0x00 (0_{dec})
8011:08	Output 16	0_{bin}: DIG Safe state value for output 16 = 0 1_{bin}: DIG Safe state value for output 16 = 1	boolean	RW	0x00 (0_{dec})

Index 8020 DIG Safe state active Ch.3

The outputs for which the *DIG Safe state active* bit is set are switched to the values specified in *Safe state value* in the event that the Operational (OP) status is left.
Status Operational (OP) is left if communication to the master is interrupted, for example at power breakdown at the master or cable breakage.

Index	Name	Meaning	Data type	Flags	Default
8020:0	DIG Safe state active		UINT8	RO	0x08 (8_{dec})
8020:01	Output 17	0_{bin}: DIG Safe state for output 17 is switched off 1_{bin}: DIG Safe state for output 17 is switched on	boolean	RW	1_{bin}
8020:02	Output 18	0_{bin}: DIG Safe state for output 18 is switched off 1_{bin}: DIG Safe state for output 18 is switched on	boolean	RW	1_{bin}
8020:03	Output 19	0_{bin}: DIG Safe state for output 19 is switched off 1_{bin}: DIG Safe state for output 19 is switched on	boolean	RW	1_{bin}
8020:04	Output 20	0_{bin}: DIG Safe state for output 20 is switched off 1_{bin}: DIG Safe state for output 20 is switched on	boolean	RW	1_{bin}
8020:05	Output 21	0_{bin}: DIG Safe state for output 21 is switched off 1_{bin}: DIG Safe state for output 21 is switched on	boolean	RW	1_{bin}
8020:06	Output 22	0_{bin}: DIG Safe state for output 22 is switched off 1_{bin}: DIG Safe state for output 22 is switched on	boolean	RW	1_{bin}
8020:07	Output 23	0_{bin}: DIG Safe state for output 23 is switched off 1_{bin}: DIG Safe state for output 23 is switched on	boolean	RW	1_{bin}
8020:08	Output 24	0_{bin}: DIG Safe state for output 24 is switched off 1_{bin}: DIG Safe state for output 24 is switched on	boolean	RW	1_{bin}

Index 8021 DIG Safe state value Ch.3

The values to which the outputs are switched when the status Operational (OP) is left are specified here.

Index	Name	Meaning	Data type	Flags	Default
8021:0	DIG Safe state value		UINT8	RO	0x08 (8_{dec})
8021:01	Output 17	0_{bin}: DIG Safe state value for output 17 = 0 1_{bin}: DIG Safe state value for output 17 = 1	boolean	RW	0_{bin}
8021:02	Output 18	0_{bin}: DIG Safe state value for output 18 = 0 1_{bin}: DIG Safe state value for output 18 = 1	boolean	RW	0_{bin}
8021:03	Output 19	0_{bin}: DIG Safe state value for output 19 = 0 1_{bin}: DIG Safe state value for output 19 = 1	boolean	RW	0_{bin}
8021:04	Output 20	0_{bin}: DIG Safe state value for output 20 = 0 1_{bin}: DIG Safe state value for output 20 = 1	boolean	RW	0_{bin}
8021:05	Output 21	0_{bin}: DIG Safe state value for output 21 = 0 1_{bin}: DIG Safe state value for output 21 = 1	boolean	RW	0_{bin}
8021:06	Output 22	0_{bin}: DIG Safe state value for output 22 = 0 1_{bin}: DIG Safe state value for output 22 = 1	boolean	RW	0_{bin}
8021:07	Output 23	0_{bin}: DIG Safe state value for output 23 = 0 1_{bin}: DIG Safe state value for output 23 = 1	boolean	RW	0_{bin}
8021:08	Output 24	0_{bin}: DIG Safe state value for output 24 = 0 1_{bin}: DIG Safe state value for output 24 = 1	boolean	RW	0_{bin}

Further objects

Standard objects (0x1000-0x1FFF)

The standard objects of all EtherCAT slaves have the same Meaning.

Index 1000 Device type

Index	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: The Lo-Word contains the supported CoE Profile (5001). The Hi-Word contains the Module Profile corresponding to the Modular Device Profile.	UINT32	RO	0x01181389 (18355081_{dec})

Index 1008 Device name

Index	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	string	RO	EP2817-0008

Index 1009 Hardware version

Index	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slaves	string	RO	

Index 100A Software version

Index	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slaves	string	RO	00

Index 1018 Identity

Index	Name	Meaning	Data type	Flags	Default
1018:0	Identity	contains information to identify the EtherCAT slave	UINT8	RO	0x04 (4_{dec})
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2_{dec})
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x0B014052 (184631378_{dec})
1018:03	Revision	Revision number of the EtherCAT-Slave, the Lo-Word (Bit 0-15) indicates the special functions terminal number; the Hi-Word (Bit 16-31) refers to the device description.	UINT32	RO	0x00000000 (0_{dec})
1018:04	Serial number	Serial number of the EtherCAT-Slave, the Lo-Byte (Bit 0-7) of the Lo-Word contains the year of manufacturing, the Hi-Byte (Bit 8-15) of the Lo-Word contains the week of manufacturing, the Hi-Word (Bit 16-31) is 0 .	UINT32	RO	0x00000000 (0_{dec})

Index 10F0 Backup parameter handling

Index	Name	Meaning	Data type	Flags	Default
10F0:0	Backup parameter handling	contains information for the standardized Upload and Download of the Backup Entries	UINT8	RO	0x01 (1_{dec})
10F0:01	Checksum	Checksum over all backup entries	UINT32	RO	0x00000000 (0_{dec})

Index 1600 DIG RxPDO-Map OutputsCh.1

Index	Name	Meaning	Data type	Flags	Default
1600:0	DIG RxPDO-Map OutputsCh.1	PDO Mapping RxPDO 1	UINT8	RO	0x09 (9_{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x01 (Output 1))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x02 (Output 2))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x03 (Output 3))	UINT32	RO	0x7000:03, 1
1600:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x04 (Output 4))	UINT32	RO	0x7000:04, 1
1600:05	SubIndex 005	5. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x05 (Output 5))	UINT32	RO	0x7000:05, 1
1600:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x06 (Output 6))	UINT32	RO	0x7000:06, 1
1600:07	SubIndex 007	7. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x07 (Output 7))	UINT32	RO	0x7000:07, 1
1600:08	SubIndex 008	8. PDO Mapping entry (object 0x7000 (DIG Outputs Ch.1), entry 0x08 (Output 8))	UINT32	RO	0x7000:08, 1
1600:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1601 DIG RxPDO-Map OutputsCh.2

Index	Name	Meaning	Data type	Flags	Default
1601:0	DIG RxPDO-Map Out-putsCh.2	PDO Mapping RxPDO 2	UINT8	RO	0x09 (9_{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x01 (Output 1))	UINT32	RO	0x7010:01, 1
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x02 (Output 2))	UINT32	RO	0x7010:02, 1
1601:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x03 (Output 3))	UINT32	RO	0x7010:03, 1
1601:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x04 (Output 4))	UINT32	RO	0x7010:04, 1
1601:05	SubIndex 005	5. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x05 (Output 5))	UINT32	RO	0x7010:05, 1
1601:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x06 (Output 6))	UINT32	RO	0x7010:06, 1
1601:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x07 (Output 7))	UINT32	RO	0x7010:07, 1
1601:08	SubIndex 008	8. PDO Mapping entry (object 0x7010 (DIG Outputs Ch.2), entry 0x08 (Output 8))	UINT32	RO	0x7010:08, 1
1601:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1602 DIG RxPDO-Map OutputsCh.3

Index	Name	Meaning	Data type	Flags	Default
1602:0	DIG RxPDO-Map Out-putsCh.3	PDO Mapping RxPDO 3	UINT8	RO	0x09 (9_{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x01 (Output 1))	UINT32	RO	0x7020:01, 1
1602:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x02 (Output 2))	UINT32	RO	0x7020:02, 1
1602:03	SubIndex 003	3. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x03 (Output 3))	UINT32	RO	0x7020:03, 1
1602:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x04 (Output 4))	UINT32	RO	0x7020:04, 1
1602:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x05 (Output 5))	UINT32	RO	0x7020:05, 1
1602:06	SubIndex 006	6. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x06 (Output 6))	UINT32	RO	0x7020:06, 1
1602:07	SubIndex 007	7. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x07 (Output 7))	UINT32	RO	0x7020:07, 1
1602:08	SubIndex 008	8. PDO Mapping entry (object 0x7020 (DIG Outputs Ch.3), entry 0x08 (Output 8))	UINT32	RO	0x7020:08, 1
1602:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1603 DIG RxPDO-Map Outputs Device

Index	Name	Meaning	Data type	Flags	Default
1603:0	DIG RxPDO-Map Outputs Device	PDO Mapping RxPDO 4	UINT8	RO	0x03 (3_{dec})
1603:01	SubIndex 001	1. PDO Mapping entry (object 0xF700 (DIG Outputs), entry 0x01 (Set safe state))	UINT32	RO	0xF700:01, 1
1603:02	SubIndex 002	2. PDO Mapping entry (object 0xF700 (DIG Outputs), entry 0x02 (Reset outputs))	UINT32	RO	0xF700:02, 1
1603:03	SubIndex 003	3. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14

Index 1A00 DIG TxPDO-Map Diag Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1A00:0	DIG TxPDO-Map Diag Inputs Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x09 (9_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x01 (Diag Input 1))	UINT32	RO	0x6001:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x02 (Diag Input 2))	UINT32	RO	0x6001:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x03 (Diag Input 3))	UINT32	RO	0x6001:03, 1
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x04 (Diag Input 4))	UINT32	RO	0x6001:04, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x05 (Diag Input 5))	UINT32	RO	0x6001:05, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x06 (Diag Input 6))	UINT32	RO	0x6001:06, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x07 (Diag Input 7))	UINT32	RO	0x6001:07, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6001 (DIG Diag Inputs Ch.1), entry 0x08 (Diag Input 8))	UINT32	RO	0x6001:08, 1
1A00:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1A01 DIG TxPDO-Map Diag Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1A01:0	DIG TxPDO-Map Diag Inputs Ch.2	PDO Mapping TxPDO 2	UINT8	RO	0x09 (9_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x01 (Diag Input 1))	UINT32	RO	0x6011:01, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x02 (Diag Input 2))	UINT32	RO	0x6011:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x03 (Diag Input 3))	UINT32	RO	0x6011:03, 1
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x04 (Diag Input 4))	UINT32	RO	0x6011:04, 1
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x05 (Diag Input 5))	UINT32	RO	0x6011:05, 1
1A01:06	SubIndex 006	6. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x06 (Diag Input 6))	UINT32	RO	0x6011:06, 1
1A01:07	SubIndex 007	7. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x07 (Diag Input 7))	UINT32	RO	0x6011:07, 1
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x6011 (DIG Diag Inputs Ch.2), entry 0x08 (Diag Input 8))	UINT32	RO	0x6011:08, 1
1A01:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1A02 DIG TxPDO-Map Diag Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1A02:0	DIG TxPDO-Map Diag Inputs Ch.3	PDO Mapping TxPDO 3	UINT8	RO	0x09 (9_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x01 (Diag Input 1))	UINT32	RO	0x6021:01, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x02 (Diag Input 2))	UINT32	RO	0x6021:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x03 (Diag Input 3))	UINT32	RO	0x6021:03, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x04 (Diag Input 4))	UINT32	RO	0x6021:04, 1
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x05 (Diag Input 5))	UINT32	RO	0x6021:05, 1
1A02:06	SubIndex 006	6. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x06 (Diag Input 6))	UINT32	RO	0x6021:06, 1
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x07 (Diag Input 7))	UINT32	RO	0x6021:07, 1
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x6021 (DIG Diag Inputs Ch.3), entry 0x08 (Diag Input 8))	UINT32	RO	0x6021:08, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8

Index 1A03 DIG TxPDO-Map Inputs Device

Index	Name	Meaning	Data type	Flags	Default
1A03:0	DIG TxPDO-Map Inputs Device	PDO Mapping TxPDO 4	UINT8	RO	0x0A (10_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x01 (Safe state active))	UINT32	RO	0xF600:01, 1
1A03:02	SubIndex 002	2. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x02 (Error channel 1))	UINT32	RO	0xF600:02, 1
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x03 (Error channel 2))	UINT32	RO	0xF600:03, 1
1A03:04	SubIndex 004	4. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x04 (Error channel 3))	UINT32	RO	0xF600:04, 1
1A03:05	SubIndex 005	5. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x05 (Us Undervoltage))	UINT32	RO	0xF600:05, 1
1A03:06	SubIndex 006	6. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x06 (Up Undervoltage))	UINT32	RO	0xF600:06, 1
1A03:07	SubIndex 007	7. PDO Mapping entry (7 bits align)	UINT32	RO	0x0000:00, 7
1A03:08	SubIndex 008	8. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x0E (Sync error))	UINT32	RO	0xF600:0E, 1
1A03:09	SubIndex 009	9. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A03:0A	SubIndex 010	10. PDO Mapping entry (object 0xF600 (DIG Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0xF600:10, 1

Index 1C00 Sync manager type

Index	Name	Meaning	Data type	Flags	Default
1C00:0	Sync manager type	Usage of the Sync Manager channels	UINT8	RO	0x04 (4_{dec})
1C00:01	SubIndex 001	Sync-Manager Type Channel 1: Mailbox Write	UINT8	RO	0x01 (1_{dec})
1C00:02	SubIndex 002	Sync-Manager Type Channel 2: Mailbox Read	UINT8	RO	0x02 (2_{dec})
1C00:03	SubIndex 003	Sync-Manager Type Channel 3: Process Data Write (Outputs)	UINT8	RO	0x03 (3_{dec})
1C00:04	SubIndex 004	Sync-Manager Type Channel 4: Process Data Read (Inputs)	UINT8	RO	0x04 (4_{dec})

Index 1C12 RxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x04 (4_{dec})
1C12:01	Subindex 001	1. assigned RxPDO (contains the index of the corresponding RxPDO Mapping object)	UINT16	RW	0x1600 (5632_{dec})
1C12:02	Subindex 002	2. assigned RxPDO (contains the index of the corresponding RxPDO Mapping object)	UINT16	RW	0x1601 (5633_{dec})
1C12:03	Subindex 003	3. assigned RxPDO (contains the index of the corresponding RxPDO Mapping object)	UINT16	RW	0x1602 (5634_{dec})
1C12:04	Subindex 004	4. assigned RxPDO (contains the index of the corresponding RxPDO Mapping object)	UINT16	RW	0x1603 (5635_{dec})

Index 1C13 TxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x04 (4_{dec})
1C13:01	Subindex 001	1. assigned TxPDO (contains the index of the corresponding TxPDO Mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	Subindex 002	2. assigned TxPDO (contains the index of the corresponding TxPDO Mapping object)	UINT16	RW	0x1A01 (6657_{dec})
1C13:03	Subindex 003	3. assigned TxPDO (contains the index of the corresponding TxPDO Mapping object)	UINT16	RW	0x1A02 (6658_{dec})
1C13:04	Subindex 004	4. assigned TxPDO (contains the index of the corresponding TxPDO Mapping object)	UINT16	RW	0x1A03 (6659_{dec})

Index 1C32SM Output parameter

Index	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameter of the outputs	UINT8	RO	0x20 (32_{dec})
1C32:01	Sync mode	actual synchronization mode: • 0: Free Run • 1: Synchronous with SM 2 Event • 2: DC-Mode - Synchronous with SYNC0 Event • 3: DC-Mode - Synchronous with SYNC1 Event	UINT16	RW	0x0001 (1_{dec})
1C32:02	Cycle time	Cycle time (in ns): • Free Run: cycle time of the local timer • Synchronous with SM 2 Event: Cycle time of the master • DC mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x003D0900 (4000000_{dec})
1C32:03	Shift time	Time between SYNC0 Event and Outputs Valid (in ns, only in DC-Mode)	UINT32	RO	0x00000000 (0_{dec})
1C32:04	Sync modes supported	Supported synchronization modes: • Bit 0 = 1: Free Run is supported • Bit 1 = 1: Synchronous with SM 2 Event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output Shift with SYNC1 Event (only DC-Mode) • Bit 14 = 1: dynamic times (could be measured by writing 1C32:08 [▶ 121])	UINT16	RO	0x000A (10_{dec})
1C32:05	Minimum cycle time	Minimum cycle time supported (in ns)	UINT32	RO	0x000493E0 (300000_{dec})
1C32:06	Calc and copy time	Minimal time between SYNC0 and SYNC1 Event (in ns, only in DC-Mode)	UINT32	RO	0x00000000 (0_{dec})
1C32:07	Minimum delay time		UINT32	RO	0x00000000 (0_{dec})
1C32:08	Command	• 0: Measurement of the times will be stopped • 1: Measurement of the times will be started The Entries 1C32:03 [▶ 121], 1C32:05 [▶ 121], 1C32:06 [▶ 121], 1C32:09 [▶ 121], 1C33:03 [▶ 122], 1C33:06 [▶ 121], 1C33:09 [▶ 122] will be updated with the maximum measured values.	UINT16	RW	0x0000 (0_{dec})
1C32:09	Maximum delay time	Time between SYNC1 Event and Outputs Valid (in ns, only in DC-Mode)	UINT32	RO	0x00000000 (0_{dec})
1C32:0B	SM event missed counter	Number of the missed SM-Events in state OPERATIONAL (only in DC Mode)	UINT16	RO	0x0000 (0_{dec})
1C32:0C	Cycle exceeded counter	Number of exceeded cycles in state OPERATIONAL	UINT16	RO	0x0000 (0_{dec})
1C32:0D	Shift too short counter	Number of inadequate distances between SYNC0 and SYNC1 events (only in DC Mode)	UINT16	RO	0x0000 (0_{dec})
1C32:20	Sync error	TRUE: In the last cycle the synchronization was not correct (only in DC Mode)	boolean	RO	0x00 (0_{dec})

Index 1C33 SM input parameter

Index	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameter of the inputs	UINT8	RO	0x20 (32_{dec})
1C33:01	Sync mode	actual synchronization mode: • 0: Free Run • 1: Synchronous with SM 3 Event (no Outputs available) • 2: DC - Synchronous with SYNC0 Event • 3: DC - Synchronous with SYNC1 Event • 34: Synchronous with SM 2 Event (Outputs available)	UINT16	RW	0x0022 (34_{dec})
1C33:02	Cycle time	same as 1C32:02 [▶ 121]	UINT32	RW	0x003D0900 (4000000_{dec})
1C33:03	Shift time	time between SYNC0-Event and Input Latch (in ns, only in DC-Mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:04	Sync modes supported	Supported synchronization modes: • Bit 0: Free Run is supported • Bit 1: Synchronous with SM 2 Event is supported (Outputs available) • Bit 1: Synchronous with SM 3 Event is supported (no Outputs available) • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 01: Input Shift with local event (Outputs available) • Bit 4-5 = 10: Input Shift with SYNC1 Event (no Outputs available) • Bit 14 = 1: dynamic times (could be measured by writing 1C32:08 [▶ 121] or 1C33:08 [▶ 122])	UINT16	RO	0x000A (10_{dec})
1C33:05	Minimum cycle time	same as 1C32:05 [▶ 121]	UINT32	RO	0x000493E0 (300000_{dec})
1C33:06	Calc and copy time	time between Input Latch and the availability of the inputs for the master (in ns, only in DC-Mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:07	Minimum delay time		UINT32	RO	0x00000000 (0_{dec})
1C33:08	Command	same as 1C32:08 [▶ 121]	UINT16	RW	0x0000 (0_{dec})
1C33:09	Maximum delay time	time between SYNC1-Event and Input Latch (in ns, only in DC-Mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:0B	SM event missed counter	same as 1C32:11 [▶ 121]	UINT16	RO	0x0000 (0_{dec})
1C33:0C	Cycle exceeded counter	same as 1C32:12 [▶ 121]	UINT16	RO	0x0000 (0_{dec})
1C33:0D	Shift too short counter	same as 1C32:13 [▶ 121]	UINT16	RO	0x0000 (0_{dec})
1C33:20	Sync error	same as 1C32:32 [▶ 121]	boolean	RO	0x00 (0_{dec})

Profile specific objects (0x6000-0xFFFF)

The profile specific objects have the same meaning for all EtherCAT Slaves which support the profile 5001.

Index 6001 DIG Diag Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
6001:0	DIG Diag Inputs Ch.1		UINT8	RO	0x08 (8_{dec})
6001:01	Diag Input 1		boolean	RO	0x00 (0_{dec})
6001:02	Diag Input 2		boolean	RO	0x00 (0_{dec})
6001:03	Diag Input 3		boolean	RO	0x00 (0_{dec})
6001:04	Diag Input 4		boolean	RO	0x00 (0_{dec})
6001:05	Diag Input 5		boolean	RO	0x00 (0_{dec})
6001:06	Diag Input 6		boolean	RO	0x00 (0_{dec})
6001:07	Diag Input 7		boolean	RO	0x00 (0_{dec})
6001:08	Diag Input 8		boolean	RO	0x00 (0_{dec})

Index 6011 DIG Diag Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
6011:0	DIG Diag Inputs Ch.2		UINT8	RO	0x08 (8_{dec})
6011:01	Diag Input 1		boolean	RO	0x00 (0_{dec})
6011:02	Diag Input 2		boolean	RO	0x00 (0_{dec})
6011:03	Diag Input 3		boolean	RO	0x00 (0_{dec})
6011:04	Diag Input 4		boolean	RO	0x00 (0_{dec})
6011:05	Diag Input 5		boolean	RO	0x00 (0_{dec})
6011:06	Diag Input 6		boolean	RO	0x00 (0_{dec})
6011:07	Diag Input 7		boolean	RO	0x00 (0_{dec})
6011:08	Diag Input 8		boolean	RO	0x00 (0_{dec})

Index 6021 DIG Diag Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
6021:0	DIG Diag Inputs Ch.3		UINT8	RO	0x08 (8_{dec})
6021:01	Diag Input 1		boolean	RO	0x00 (0_{dec})
6021:02	Diag Input 2		boolean	RO	0x00 (0_{dec})
6021:03	Diag Input 3		boolean	RO	0x00 (0_{dec})
6021:04	Diag Input 4		boolean	RO	0x00 (0_{dec})
6021:05	Diag Input 5		boolean	RO	0x00 (0_{dec})
6021:06	Diag Input 6		boolean	RO	0x00 (0_{dec})
6021:07	Diag Input 7		boolean	RO	0x00 (0_{dec})
6021:08	Diag Input 8		boolean	RO	0x00 (0_{dec})

Index 7000 DIG Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
7000:0	DIG Outputs Ch.1		UINT8	RO	0x08 (8_{dec})
7000:01	Output 1		boolean	RO	0x00 (0_{dec})
7000:02	Output 2		boolean	RO	0x00 (0_{dec})
7000:03	Output 3		boolean	RO	0x00 (0_{dec})
7000:04	Output 4		boolean	RO	0x00 (0_{dec})
7000:05	Output 5		boolean	RO	0x00 (0_{dec})
7000:06	Output 6		boolean	RO	0x00 (0_{dec})
7000:07	Output 7		boolean	RO	0x00 (0_{dec})
7000:08	Output 8		boolean	RO	0x00 (0_{dec})

Index 7010 DIG Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
7010:0	DIG Outputs Ch.2		UINT8	RO	0x08 (8_{dec})
7010:01	Output 1		boolean	RO	0x00 (0_{dec})
7010:02	Output 2		boolean	RO	0x00 (0_{dec})
7010:03	Output 3		boolean	RO	0x00 (0_{dec})
7010:04	Output 4		boolean	RO	0x00 (0_{dec})
7010:05	Output 5		boolean	RO	0x00 (0_{dec})
7010:06	Output 6		boolean	RO	0x00 (0_{dec})
7010:07	Output 7		boolean	RO	0x00 (0_{dec})
7010:08	Output 8		boolean	RO	0x00 (0_{dec})

Index 7020 DIG Outputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
7020:0	DIG Outputs Ch.3		UINT8	RO	0x08 (8_{dec})
7020:01	Output 1		boolean	RO	0x00 (0_{dec})
7020:02	Output 2		boolean	RO	0x00 (0_{dec})
7020:03	Output 3		boolean	RO	0x00 (0_{dec})
7020:04	Output 4		boolean	RO	0x00 (0_{dec})
7020:05	Output 5		boolean	RO	0x00 (0_{dec})
7020:06	Output 6		boolean	RO	0x00 (0_{dec})
7020:07	Output 7		boolean	RO	0x00 (0_{dec})
7020:08	Output 8		boolean	RO	0x00 (0_{dec})

Index F000 Modular device profile

Index	Name	Meaning	Data type	Flags	Default
F000:0	Modular device profile	general information about the Modular Device Profile	UINT8	RO	0x02 (2_{dec})
F000:01	Module index distance	Index distance between the objects of two channels	UINT16	RO	0x0010 (16_{dec})
F000:02	Maximum number of modules	number of channels	UINT16	RO	0x0003 (3_{dec})

Index F008 Code word

Index	Name	Meaning	Data type	Flags	Default
F008:0	Code word		UINT32	RW	0x00000000 (0_{dec})

Index F010 Module list

Index	Name	Meaning	Data type	Flags	Default
F010:0	Module list		UINT8	RW	0x03 (3_{dec})
F010:01	SubIndex 001		UINT32	RW	0x00000118 (280_{dec})
F010:02	SubIndex 002		UINT32	RW	0x00000118 (280_{dec})
F010:03	SubIndex 003		UINT32	RW	0x00000118 (280_{dec})

Index F600 DIG Inputs

Index	Name	Meaning	Data type	Flags	Default
F600:0	DIG Inputs		UINT8	RO	0x10 (16_{dec})
F600:01	Safe state active		boolean	RO	0x00 (0_{dec})
F600:02	Error channel 1		boolean	RO	0x00 (0_{dec})
F600:03	Error channel 2		boolean	RO	0x00 (0_{dec})
F600:04	Error channel 3		boolean	RO	0x00 (0_{dec})
F600:05	Us Undervoltage		boolean	RO	0x00 (0_{dec})
F600:06	Up Undervoltage		boolean	RO	0x00 (0_{dec})
F600:0E	Sync error		boolean	RO	0x00 (0_{dec})
F600:10	TxPDO Toggle		boolean	RO	0x00 (0_{dec})

Index F700 DIG Outputs

Index	Name	Meaning	Data type	Flags	Default
F700:0	DIG Outputs		UINT8	RO	0x02 (2_{dec})
F700:01	Set safe state		boolean	RO	0x00 (0_{dec})
F700:02	Reset outputs		boolean	RO	0x00 (0_{dec})

Index F800 DIG Settings

Index	Name	Meaning	Data type	Flags	Default
F800:0	DIG Settings		UINT8	RO	0x11 (17_{dec})
F800:01	Disable shut off		boolean	*RW*	0x00 (0_{dec})
F800:11	Switch off time		UINT16	RW	0x000A (10_{dec})

7 Appendix

7.1 General operating conditions

Protection degrees (IP-Code)

The standard IEC 60529 (DIN EN 60529) defines the degrees of protection in different classes.

1. Number: dust protection and touch guard	Definition
0	Non-protected
1	Protected against access to hazardous parts with the back of a hand. Protected against solid foreign objects of Ø 50 mm
2	Protected against access to hazardous parts with a finger. Protected against solid foreign objects of Ø 12.5 mm.
3	Protected against access to hazardous parts with a tool. Protected against solid foreign objects Ø 2.5 mm.
4	Protected against access to hazardous parts with a wire. Protected against solid foreign objects Ø 1 mm.
5	Protected against access to hazardous parts with a wire. Dust-protected. Intrusion of dust is not totally prevented, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the device or to impair safety.
6	Protected against access to hazardous parts with a wire. Dust-tight. No intrusion of dust.

2. Number: water* protection	Definition
0	Non-protected
1	Protected against water drops
2	Protected against water drops when enclosure tilted up to 15°.
3	Protected against spraying water. Water sprayed at an angle up to 60° on either side of the vertical shall have no harmful effects.
4	Protected against splashing water. Water splashed against the disclosure from any direction shall have no harmful effects
5	Protected against water jets
6	Protected against powerful water jets
7	Protected against the effects of temporary immersion in water. Intrusion of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water for 30 min. in 1 m depth.

*) These protection classes define only protection against water!

Chemical Resistance

The Resistance relates to the Housing of the IP 67 modules and the used metal parts. In the table below you will find some typical resistance.

Character	Resistance
Steam	at temperatures >100°C: not resistant
Sodium base liquor (ph-Value > 12)	at room temperature: resistant > 40°C: not resistant
Acetic acid	not resistant
Argon (technical clean)	resistant

Key

- resistant: Lifetime several months
- non inherently resistant: Lifetime several weeks
- not resistant: Lifetime several hours resp. early decomposition

7.2 Accessories

Mounting

Ordering information	Description
ZS5300-0011	Mounting rail

Cables

A complete overview of pre-assembled cables for fieldbus components can be found here.

Ordering information	Description	Link
ZK1090-3xxx-xxxx	EtherCAT cable M8, green	Website
ZK1093-3xxx-xxxx	EtherCAT cable M8, yellow	Website
ZK1090-6xxx-xxxx	EtherCAT cable M12, green	Website
ZK2000-2xxx-xxxx	Sensor cable M8, 3-pin	Website
ZK2000-6xxx-xxxx	Sensor cable M12, 4-pin	Website
ZK2000-7xxx-0xxx	Sensor cable M12, 4-pin + shield	Website
ZK2020-3xxx-xxxx	Power cable M8, 4-pin	Website
ZK203x-xxxx-xxxx	Power cable 7/8 ", 5-pin	Website

Connector

Ordering information	Description	Link
ZS2001-000x	Female header with spring connection, IP20	Website
ZS2002-0111	D-Sub plug, 25-pin	Website

Labeling material, protective caps

Ordering information	Description
ZS5000-0010	Protective cap for M8 sockets, IP67 (50 pieces)
ZS5000-0020	Protective cap for M12 sockets, IP67 (50 pcs.)
ZS5100-0000	Inscription labels, unprinted, 4 strips of 10
ZS5000-xxxx	Printed inscription labels on enquiry

Tools

Ordering information	Description
ZB8801-0000	Torque wrench for plugs, 0.4…1.0 Nm
ZB8801-0001	Torque cable key for M8 / wrench size 9 for ZB8801-0000
ZB8801-0002	Torque cable key for M12 / wrench size 13 for ZB8801-0000
ZB8801-0003	Torque cable key for M12 field assembly / wrench size 18 for ZB8801-0000

Further accessories

Further accessories can be found in the price list for fieldbus components from Beckhoff and online at https://www.beckhoff.com.

7.3 Version identification of EtherCAT devices

Designation

A Beckhoff EtherCAT device has a 14-digit designation, made up of

- family key
- type
- version
- revision

Example	Family	Type	Version	Revision
EL3314-0000-0016	EL terminal (12 mm, non-pluggable connection level)	3314 (4-channel thermocouple terminal)	0000 (basic type)	0016
ES3602-0010-0017	ES terminal (12 mm, pluggable connection level)	3602 (2-channel voltage measurement)	0010 (high-precision version)	0017
CU2008-0000-0000	CU device	2008 (8-port fast ethernet switch)	0000 (basic type)	0000

Notes

- The elements mentioned above result in the **technical designation**. EL3314-0000-0016 is used in the example below.
- EL3314-0000 is the order identifier, in the case of “-0000” usually abbreviated to EL3314. “-0016” is the EtherCAT revision.
- The **order identifier** is made up of
  - family key (EL, EP, CU, ES, KL, CX, etc.)
  - type (3314)
  - version (-0000)
- The **revision** -0016 shows the technical progress, such as the extension of features with regard to the EtherCAT communication, and is managed by Beckhoff.
  In principle, a device with a higher revision can replace a device with a lower revision, unless specified otherwise, e.g. in the documentation.
  Associated and synonymous with each revision there is usually a description (ESI, EtherCAT Slave Information) in the form of an XML file, which is available for download from the Beckhoff web site.
  From 2014/01 the revision is shown on the outside of the IP20 terminals, see Fig. *“EL5021 EL terminal, standard IP20 IO device with batch number and revision ID (since 2014/01)”*.
- The type, version and revision are read as decimal numbers, even if they are technically saved in hexadecimal.

Identification number

Beckhoff EtherCAT devices from the different lines have different kinds of identification numbers:

Production lot/batch number/serial number/date code/D number

The serial number for Beckhoff IO devices is usually the 8-digit number printed on the device or on a sticker. The serial number indicates the configuration in delivery state and therefore refers to a whole production batch, without distinguishing the individual modules of a batch.

Structure of the serial number: **KK YY FF HH**

KK - week of production (CW, calendar week)
YY - year of production
FF - firmware version
HH - hardware version

Example with
Ser. no.: 12063A02: 12 - production week 12 06 - production year 2006 3A - firmware version 3A 02 - hardware version 02

Exceptions can occur in the **IP67 area**, where the following syntax can be used (see respective device documentation):

Syntax: D ww yy x y z u

D - prefix designation
ww - calendar week
yy - year
x - firmware version of the bus PCB
y - hardware version of the bus PCB
z - firmware version of the I/O PCB
u - hardware version of the I/O PCB

Example: D.22081501 calendar week 22 of the year 2008 firmware version of bus PCB: 1 hardware version of bus PCB: 5 firmware version of I/O PCB: 0 (no firmware necessary for this PCB) hardware version of I/O PCB: 1

Unique serial number/ID, ID number

In addition, in some series each individual module has its own unique serial number.

See also the further documentation in the area

- IP67: EtherCAT Box
- Safety: TwinSafe
- Terminals with factory calibration certificate and other measuring terminals

Examples of markings

Fig. 28: EL5021 EL terminal, standard IP20 IO device with serial/ batch number and revision ID (since 2014/01)

Fig. 29: EK1100 EtherCAT coupler, standard IP20 IO device with serial/ batch number

Fig. 30: CU2016 switch with serial/ batch number

Fig. 31: EL3202-0020 with serial/ batch number 26131006 and unique ID-number 204418

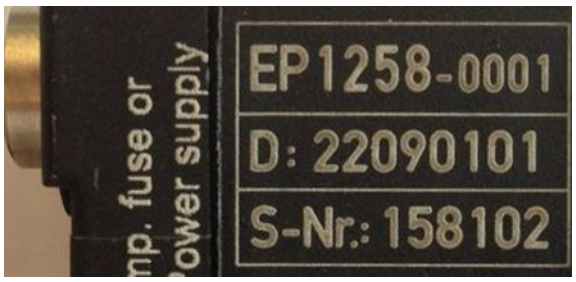


Fig. 32: EP1258-00001 IP67 EtherCAT Box with batch number/ date code 22090101 and unique serial number 158102

Fig. 33: EP1908-0002 IP67 EtherCAT Safety Box with batch number/ date code 071201FF and unique serial number 00346070

Fig. 34: EL2904 IP20 safety terminal with batch number/ date code 50110302 and unique serial number 00331701

Fig. 35: ELM3604-0002 terminal with unique ID number (QR code) 100001051 and serial/ batch number 44160201

7.3.1 Beckhoff Identification Code (BIC)

The Beckhoff Identification Code (BIC) is increasingly being applied to Beckhoff products to uniquely identify the product. The BIC is represented as a Data Matrix Code (DMC, code scheme ECC200), the content is based on the ANSI standard MH10.8.2-2016.

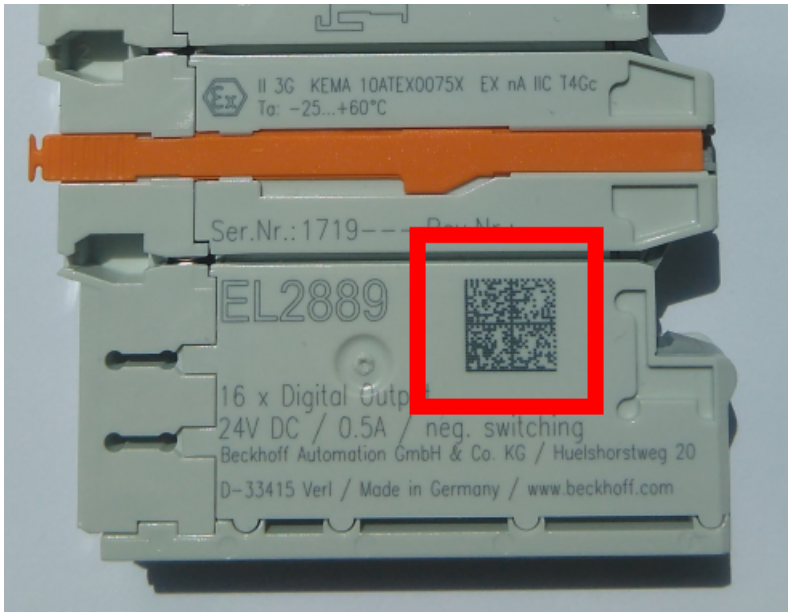


Fig. 36: BIC as data matrix code (DMC, code scheme ECC200)

The BIC will be introduced step by step across all product groups.

Depending on the product, it can be found in the following places:

- on the packaging unit
- directly on the product (if space suffices)
- on the packaging unit and the product

The BIC is machine-readable and contains information that can also be used by the customer for handling and product management.

Each piece of information can be uniquely identified using the so-called data identifier (ANSI MH10.8.2-2016). The data identifier is followed by a character string. Both together have a maximum length according to the table below. If the information is shorter, spaces are added to it. The data under positions 1 to 4 are always available.

The following information is contained:

Item no.	Type of information	Explanation	Data identifier	Number of digits incl. data identifier	Example
1	Beckhoff order number	**Beckhoff order number**	1P	8	1P072222
2	Beckhoff Traceability Number (BTN)	**Unique serial number, see note below**	S	12	SBTNk4p562d7
3	Article description	**Beckhoff article description, e.g. EL1008**	1K	32	1KEL1809
4	Quantity	**Quantity in packaging unit, e.g. 1, 10, etc.**	Q	6	Q1
5	Batch number	Optional: Year and week of production	2P	14	2P401503180016
6	ID/serial number	Optional: Present-day serial number system, e.g. with safety products or calibrated terminals	51S	12	51S678294104
7	Variant number	Optional: Product variant number on the basis of standard products	30P	32	30PF971, 2*K183
...					

Further types of information and data identifiers are used by Beckhoff and serve internal processes.

Structure of the BIC

Example of composite information from item 1 to 4 and 6. The data identifiers are marked in red for better display:

BTN

An important component of the BIC is the Beckhoff Traceability Number (BTN, item no. 2). The BTN is a unique serial number consisting of eight characters that will replace all other serial number systems at Beckhoff in the long term (e.g. batch designations on IO components, previous serial number range for safety products, etc.). The BTN will also be introduced step by step, so it may happen that the BTN is not yet coded in the BIC.

NOTE

This information has been carefully prepared. However, the procedure described is constantly being further developed. We reserve the right to revise and change procedures and documentation at any time and without prior notice. No claims for changes can be made from the information, illustrations and descriptions in this information.

7.4 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages: https://www.beckhoff.com

You will also find further documentation for Beckhoff components there.

Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

Hotline:	+49 5246 963 157
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e-mail:	support@beckhoff.com

Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

- on-site service
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- spare parts service
- hotline service

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