BECKHOFF New Automation Technology

Documentation | EN

EP31xx

EtherCAT Box modules with analog inputs

2023-07-17 | Version: 2.11

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.

Signal words

The signal words used in the documentation are classified below. In order to prevent injury and damage to persons and property, read and follow the safety and warning notices.

Personal injury warnings

⚠ DANGER
Hazard with high risk of death or serious injury.

⚠ WARNING
Hazard with medium risk of death or serious injury.

⚠ CAUTION
There is a low-risk hazard that could result in medium or minor injury.

Warning of damage to property or environment

NOTICE
The environment, equipment, or data may be damaged.

Information on handling the product

This information includes, for example:
recommendations for action, assistance or further information on the product.

1.3 Documentation issue status

Version	Comment
2.11	• Technical data updated • Signal interfaces updated
2.10	• Chapter "Measuring ranges" updated
2.9	• Chapter "Settings and operation modes" updated • Structure update
2.8	• Technical data updated • Signal connection updated
2.7	• EP3184-0002: Signal connection updated • Dimensions updated • UL requirements updated
2.6	• Front page updated
2.5	• EP3174-0092: Technical data updated • Structural update
2.4	• EP3184-x002 - Introduction: graphics corrected • Structural update
2.3.0	• Nut torques for connectors updated • EP3174-0092 added • Chapter *Mounting* updated • Chapter *Operation modes* updated • Structural update
2.2.0	• EP3162-0002 - M12 analog voltage inputs updated • EP3162-0002 - M12 analog current inputs updated • EP3162-0002 - Electrical isolation of the channels updated • Notes on the analog specification added • Cabling updated
2.1.0	• EP3162-0002 added • EP31x4 - Object description and parameterization updated • EP31x2 - Object description and parameterization added • EP31x4 - Object overview updated • EP31x2 - Object overview added • Nut torques for connectors updated • Power supply added
2.0.0	• Migration
1.5.0	• Connection description for analog current inputs (M12) revised • Chapter "Settings and operation modes" updated
1.4.0	• Signal settings amended • Connection of the sensors updated
1.3.0	• Object description updated
1.2.0	• Technical data updated • Overview of EtherCAT cables extended • Mounting and Cabling updated
1.1.0	• Description of the Power LEDs expanded • Object description extended • Technical data updated
1.0.1	• Object description corrected

Version	Comment
1.0.0	• Description of the Status LEDs revised
0.6	• EP3182-1002 added • Accessories added • Tightening torque for connectors added • Object description corrected
0.5	• First preliminary version

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)	29 - week of production 29
YY - year of production	10 - year of production 2010
FF - firmware version	02 - firmware version 02
HH - hardware version	01 - hardware version 01

Further information on this topic: Version identification of EtherCAT devices [▶ 131].

2 EtherCAT Box - Introduction

The EtherCAT system has been extended with EtherCAT Box modules with protection class IP67. 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.

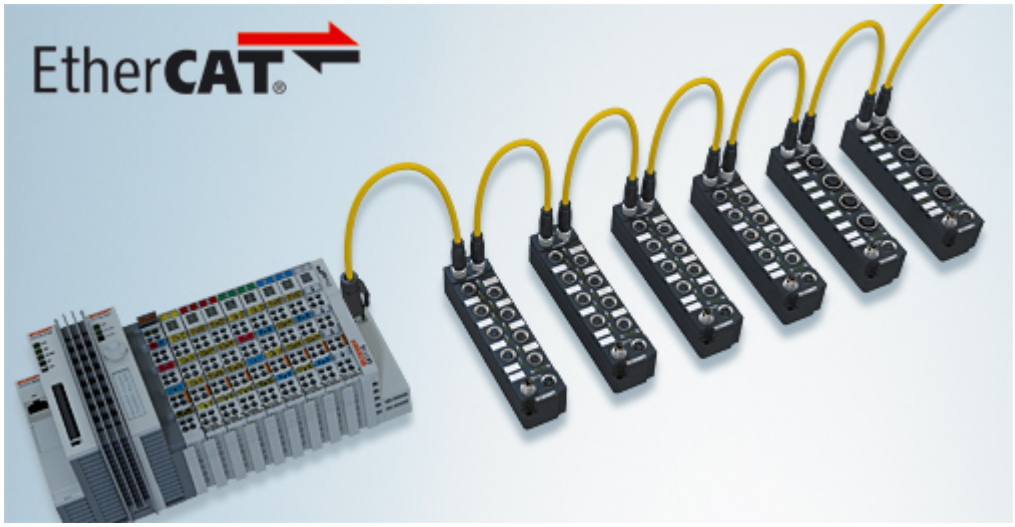


Fig. 1: EtherCAT Box Modules within an EtherCAT network

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.

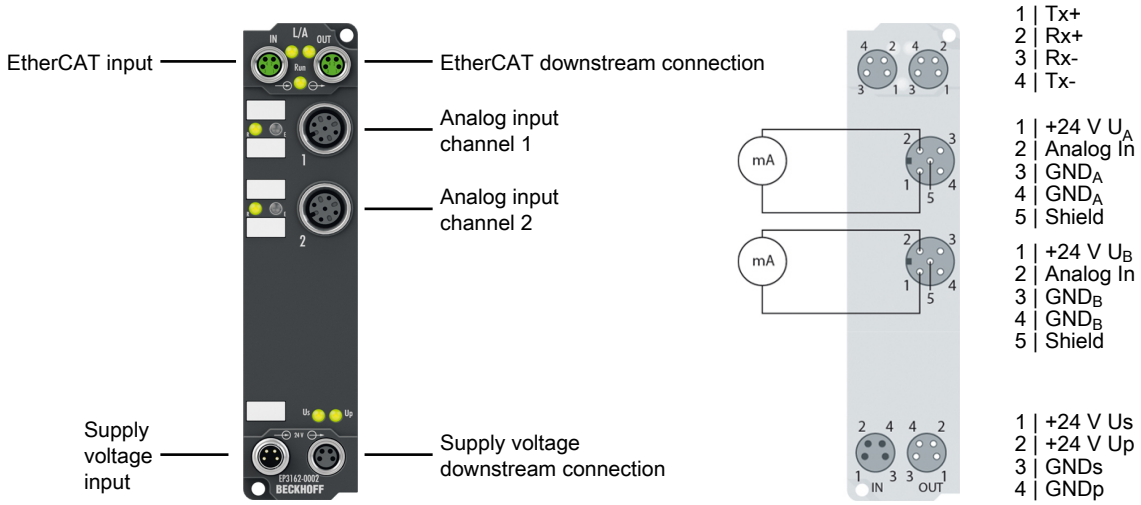
3 Product overview

The following table shows the products described in this documentation and the main distinguishing features.

Product	Number of analog inputs	Number of digital outputs	Signal connection	Comment
EP3162-0002 [▶ 13]	2	0	2 x M12 socket	Single-ended inputs
EP3174-0002 [▶ 17]	4	0	4 x M12 socket	Differential inputs
EP3174-0092 [▶ 18]	4	0	4 x M12 socket	Differential inputs, TwinSAFE Single Channel
EP3182-1002 [▶ 26]	2	2	2 x M12 socket	Single-ended inputs, digital outputs
EP3184-0002 [▶ 19]	4	0	4 x M12 socket	Single-ended inputs
EP3184-1002 [▶ 20]	4	0	2 x M12 socket	Single-ended inputs, two inputs per connection

3.1 EP3162

3.1.1 EP3162 - Introduction



2-channel analog input ± 10 V or 0/4...20 mA, electrically isolated, single-ended, 16-bit

The EP3162 EtherCAT Box has two analog inputs that can be individually parameterized to process signals either in the range from -10 V to +10 V or from 0/4 mA to 20 mA. The voltage or input current is digitized with a resolution of 16 bits, and is transmitted (electrically isolated) to the higher-level automation device.

The two input channels are electrically isolated from each other. The input filter and therefore the conversion times are configurable in a wide range. The inputs can, if required, be scaled differently, and automatic limit value monitoring is also available. EtherCAT is used for parameterization purposes. The parameters are stored in the module.

Quick links

Technical data [▶ 14]
Process image [▶ 16]
Dimensions [▶ 30]
Electrical isolation of the channels [▶ 40]
Signal connection [▶ 37]
Configuration [▶ 54]

3.1.2 EP3162 - Technical data

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

EtherCAT	
Connection	2 x M8 socket, 4-pin, green
Electrical isolation	500 V
Distributed Clocks	yes

Supply voltages	
Connection	Input: M8 connector, 4-pin Downstream connection: M8 socket, 4-pin, black
U_S nominal voltage	24 V_{DC} (-15 % / +20 %)
U_S sum current: $I_{S,sum}$	max. 4 A
Current consumption from U_S	120 mA + sensor supply
Rated voltage U_P	24 V_{DC} (-15 % / +20 %)
U_P sum current: $I_{P,sum}$	max. 4 A
Current consumption from U_P	None. U_P is only forwarded.
Electrical isolation GND_S / GND_P	yes

Analog inputs	
Number	2
Connection	2x M12 socket, 5-pin
Cable length	max. 30 m
Input type	Single-ended
Signal range	Adjustable: • -10 … +10 V (default) • 0 … 10 V • 0 … 20 mA • 4 … 20 mA • -20 … +20 mA
Digital resolution	16-bit, including sign
Measuring error	max 0.3 %, relative to the full scale value. See chapter Measurement error/measurement deviation/ measurement uncertainty, output uncertainty.
Input resistance	Voltage measurement: min. 200 kΩ Current measurement: 85 Ω + diode voltage
Dielectric strength	max. 30 V
Electrical isolation	300 V between the input channels. Each analog input channel is electrically isolated from all other potentials in the box.
Conversion time	approx. 100 µs
Input filter limit frequency	5 kHz
Input filter characteristic	Adjustable [▶ 60]
Sensor supply voltage U_A	24 V_{DC} Output current per channel: max. 50 mA continuous current max. 100 mA peak current

Housing data	
Dimensions W x H x D	30 mm x 126 mm x 26.5 mm (without connectors)
Weight	approx. 165 g
Installation position	variable
Material	PA6 (polyamide)

Environmental conditions	
Ambient temperature during operation	-25 … +60 °C -25 … +55 °C according to cURus
Ambient temperature during storage	-40 … +85 °C
Vibration resistance, shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27 Additional tests [▶ 15]
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP65, IP66, IP67 (conforms to EN 60529)

Approvals/markings	
Approvals/markings *)	CE, cURus [▶ 49]

*) Real applicable approvals/markings see type plate on the side (product marking).

Additional tests

The devices have undergone the following additional tests:

Test	Explanation
Vibration	10 frequency sweeps in 3 axes
	5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude
	60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude
Shocks	1000 shocks in each direction, in 3 axes
	35 g, 11 ms

3.1.3 EP3162 - Scope of supply

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

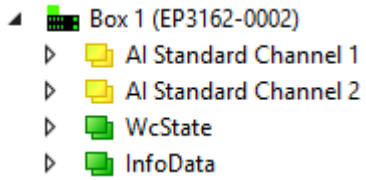
- 1x EtherCAT Box EP3162-0002
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

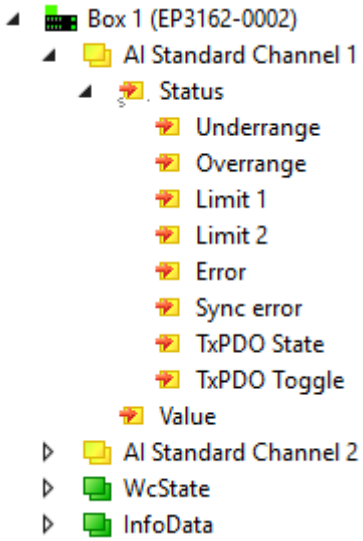
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

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

3.1.4 EP3162 - Process image



AI Standard Channel 1 and 2

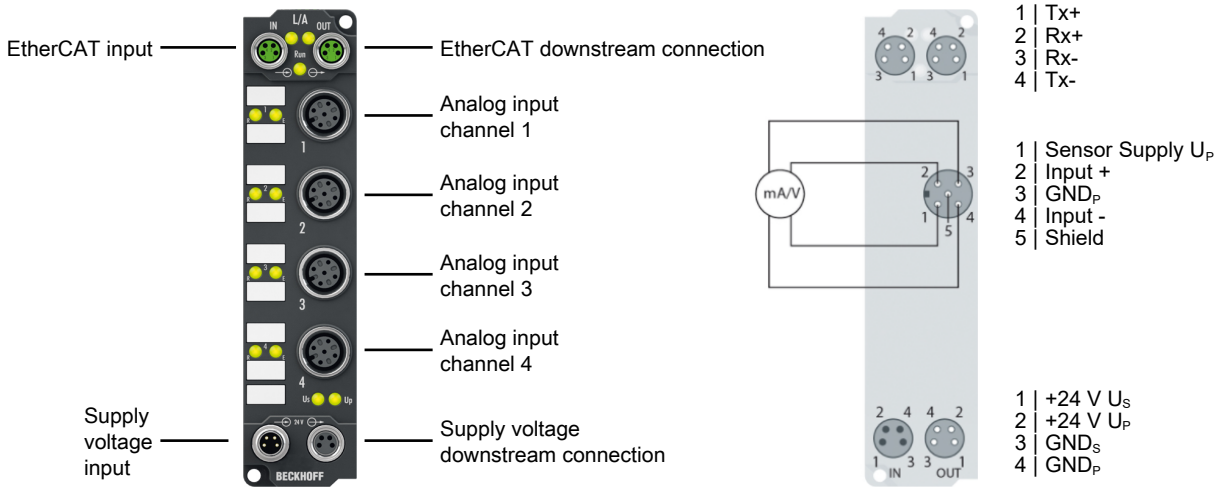


You will find the process data of the first analog channel under "AI Standard Channel 1".

The process data of the second channel have the same structure as those of the first channel.

3.2 EP31x4

3.2.1 EP3174-0002 - Introduction



4-channel analog input ±10 V or 0/4...20 mA, parameterizable, differential input, 16-bit

The EP3174-0002 EtherCAT Box has four analog inputs which can be individually parameterized, so that they process signals either in the -10 V to +10 V range or the 0/4 mA…20 mA range.

The voltage or input current is digitized with a resolution of 16 bits, and is transmitted (electrically isolated) to the higher-level automation device.

The four input channels have differential inputs and possess a common, internal ground potential. The input filter and therefore the conversion times are configurable in a wide range.

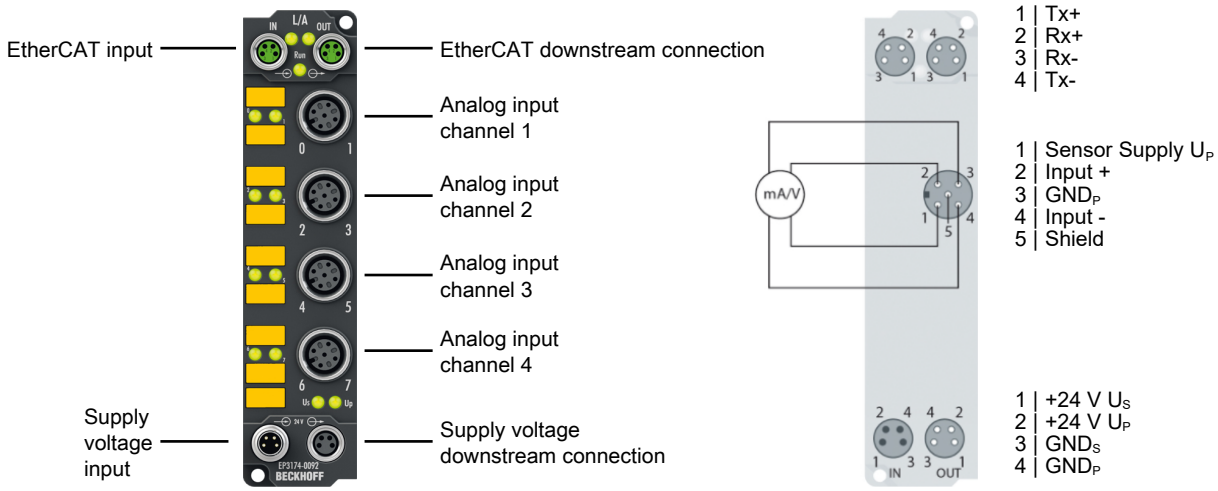
The inputs can, if required, be scaled differently, and automatic limit value monitoring is also available. EtherCAT is used for parameterization purposes. The parameters are stored in the module.

The connected sensors are supplied with power via U_P. This can be fed to the supply voltage input to match the sensor and is passed on unfiltered to the signal M12 connectors.

Quick links

Technical data [▶ 21]
Process image [▶ 23]
Dimensions [▶ 30]
Signal connection [▶ 41]
Configuration [▶ 54]

3.2.2 EP3174-0092 - Introduction



4-channel analog input ±10 V or 0/4...20 mA, differential input, 16-bit, TwinSAFE Single Channel

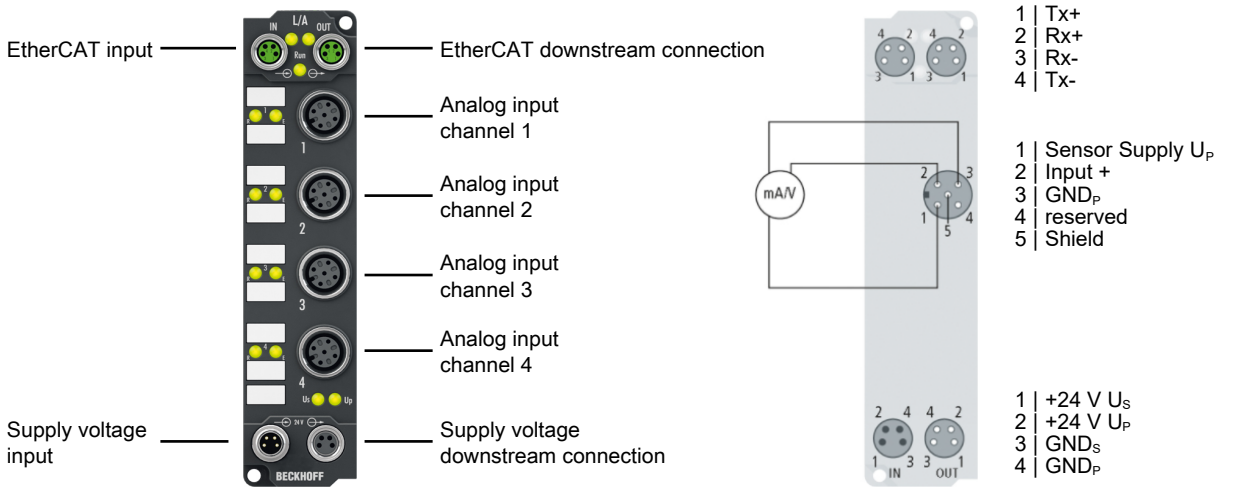
In addition to the full range of functions of the EP3174-0002, the EP3174-0092 supports the TwinSAFE SC technology (TwinSAFE Single Channel). This enables the use of standard signals for safety tasks in any networks of fieldbuses.

The connected sensors are supplied with power via U_P. This can be fed to the supply voltage input to match the sensor and is passed on unfiltered to the signal M12 connectors.

Quick links

Technical data [▶ 21]
Process image [▶ 24]
Dimensions [▶ 30]
Signal connection [▶ 41]
Configuration [▶ 54]
Object description and parameterization [▶ 112]
Objects TwinSAFE Single Channel [▶ 72]
TwinSAFE SC process data [▶ 72]

3.2.3 EP3184-0002 - Introduction



4-channel analog input ±10 V or 0/4...20 mA, parameterizable, single-ended, 16-bit

The EP3184-0002 EtherCAT Box has four analog inputs which can be individually parameterized, so that they process signals either in the -10 V to +10 V range or the 0/4 mA…20 mA range.

The voltage or input current is digitized with a resolution of 16 bits, and is transmitted (electrically isolated) to the higher-level automation device.

The four input channels are single-ended and share a common internal ground potential. The input filter and therefore the conversion times are configurable in a wide range.

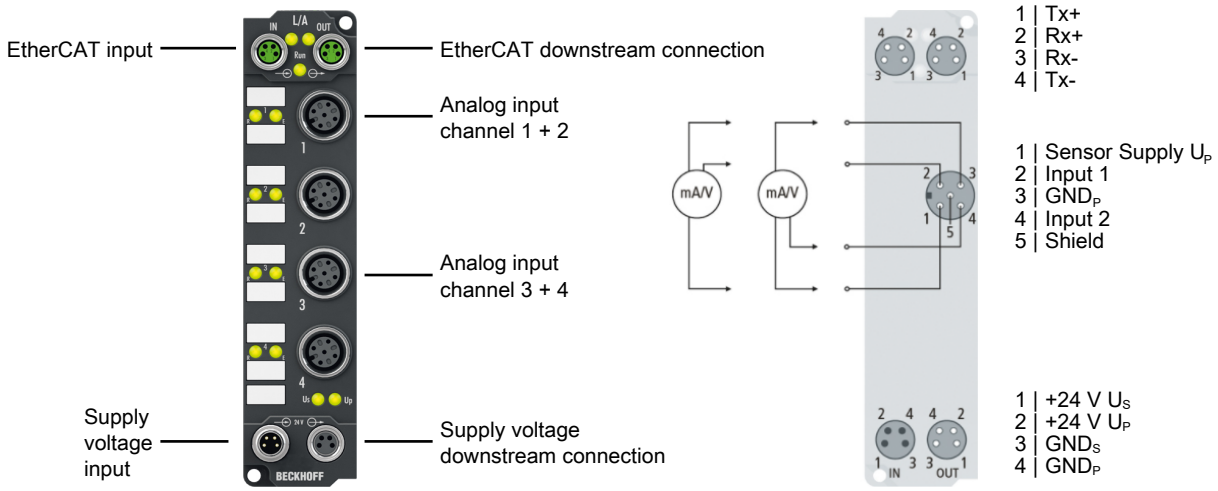
The inputs can, if required, be scaled differently, and automatic limit value monitoring is also available. EtherCAT is used for parameterization purposes. The parameters are stored in the module.

The connected sensors are supplied with power via U_P. This can be fed to the supply voltage input to match the sensor and is passed on unfiltered to the signal M12 connectors.

Quick links

Technical data [▶ 21]
Process image [▶ 23]
Dimensions [▶ 30]
Signal connection [▶ 45]
Configuration [▶ 54]

3.2.4 EP3184-1002 - Introduction



4-channel analog input ±10 V or 0/4...20 mA, parameterizable, single-ended, 16-bit

The EP3184-1002 EtherCAT Box has four analog inputs which can be individually parameterized, so that they process signals either in the -10 V to +10 V range or the 0/4 mA…20 mA range.

Two inputs are combined in each case on sockets 1 and 3. Sockets 2 and 4 have no function.

The voltage or input current is digitized with a resolution of 16 bits, and is transmitted (electrically isolated) to the higher-level automation device.

The four input channels are single-ended and share a common internal ground potential. The input filter and therefore the conversion times are configurable in a wide range.

The inputs can, if required, be scaled differently, and automatic limit value monitoring is also available. EtherCAT is used for parameterization purposes. The parameters are stored in the module.

The connected sensors are supplied with power via U_P. This can be fed to the supply voltage input to match the sensor and is passed on unfiltered to the signal M12 connectors.

Quick links

Technical data [▶ 21]
Process image [▶ 23]
Dimensions [▶ 30]
Signal connection [▶ 47]
Configuration [▶ 54]

3.2.5 EP31x4 - Technical data

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

MTBF	EP3174-0002	EP3174-0092	EP3184-0002	EP3184-1002
MTBF (55 °C)	-	> 600,000 h	-	-

EtherCAT	
Connection	2 x M8 socket, 4-pin, green
Electrical isolation	500 V
Distributed Clocks	yes

Supply voltages	
Connection	Input: M8 connector, 4-pin Downstream connection: M8 socket, 4-pin, black
U_S nominal voltage	24 V_{DC} (-15 % / +20 %)
U_S sum current: $I_{S,sum}$	max. 4 A
Current consumption from U_S	120 mA
U_P voltage range	0…30 V_{DC}
U_P sum current: $I_{P,sum}$	max. 4 A
Current consumption from U_P	= Current consumption of connected sensors.
Electrical isolation GND_S / GND_P	yes

Analog inputs	EP3174-0002	EP3174-0092	EP3184-0002	EP3184-1002
Number	4			
Connection	4x M12 socket, 5-pin			2x M12 socket, 5-pin
Cable length	max. 30 m			
Input type	Differential		Single-ended	
Signal range	Adjustable: • -10 … +10 V (default) • 0 … 10 V • 0 … 20 mA • 4 … 20 mA			
Digital resolution	16-bit, including sign			
Measurement uncertainty	max 0.3 %, relative to the full scale value. See chapter Measurement error/measurement deviation/ measurement uncertainty, output uncertainty.			
Input resistance	Voltage measurement: min. 200 kΩ Current measurement: 85 Ω + diode voltage			
Common-mode voltage U_{CM}	max. 35 V		-	
Dielectric strength	max. 35 V		max. 30 V	
Electrical isolation	The analog inputs have a common ground potential: GND_P. GND_P is galvanically isolated from GND_S.			
Conversion time	approx. 100 µs			
Input filter limit frequency	5 kHz			
Input filter characteristic	Adjustable [▶ 60]			
Sensor supply voltage	0 ... 30 V_{DC} from supply voltage U_P, not short-circuit proof			

Housing data	
Dimensions W x H x D	30 mm x 126 mm x 26.5 mm (without connectors)
Weight	approx. 165 g
Installation position	variable
Material	PA6 (polyamide)

Environmental conditions	
Ambient temperature during operation	-25 … +60 °C -25 … +55 °C according to cURus 0 … +55 °C according to ATEX
Ambient temperature during storage	-40 … +85 °C
Vibration resistance, shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27 Additional tests [▶ 15]
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating	IP65, IP66, IP67 (according to EN 60529)

Approvals / markings	
Approvals / markings *)	ATEX [▶ 50], CE, cURus [▶ 49]

*) Real applicable approvals/markings see type plate on the side (product marking).

3.2.6 EP31x4 - Scope of supply

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

- 1x EtherCAT Box EP3174-0002 / EP3174-0092 / EP3184-0002 / EP3184-1002
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 10x labels, blank (1 strip of 10)

Pre-assembled protective caps do not ensure IP67 protection

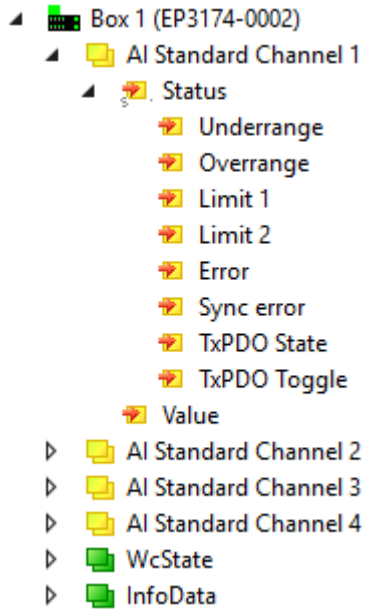
Protective caps are pre-assembled at the factory to protect connectors during transport. They may not be tight enough to ensure IP67 protection.

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

3.2.7 EP31x4 - Process image

The process data of the EP3174-0002, EP3174-0092, EP3184-0002 and EP3184-1002 modules are identical in the default setting and are illustrated here taking the EP3174-0002 as an example.

AI Standard Channel 1



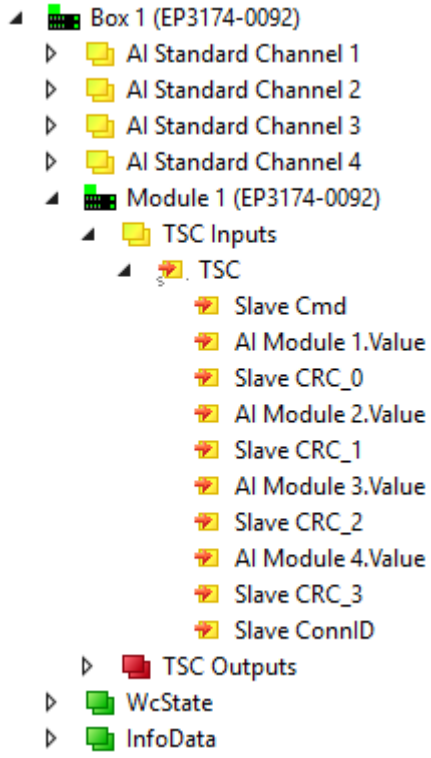
You will find the data of the 1st analog channel under **AI Standard Channel 1**.

AI Standard Channel 2 to 4

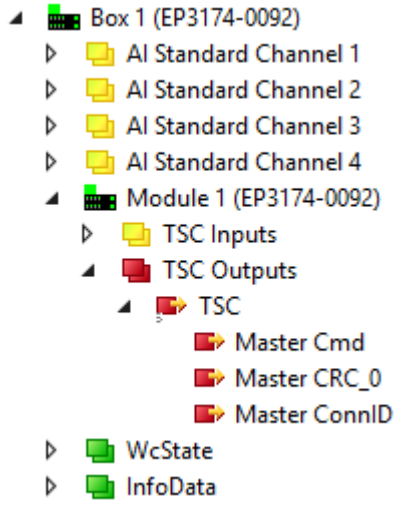
The data of analog channels 2 to 4 have the same structure as those of the 1st channel.

3.2.8 EP3174-0092 - Process image (with TwinSAFE SC modules)

In the following figure the process data are shown after inserting the TwinSAFE SC module as described in the chapter TwinSAFE SC configuration.

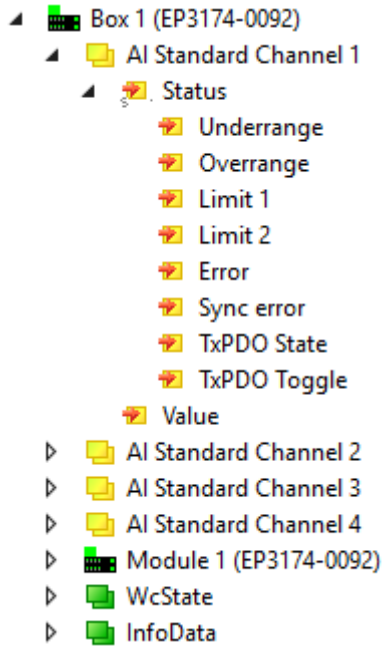


At "Module 1 (EP3174-0092)" > "TSC Inputs" you will find the TSC input data.



At "Module 1 (EP3174-0092)" > "TSC Outputs" you will find the TSC output data.

Analog inputs

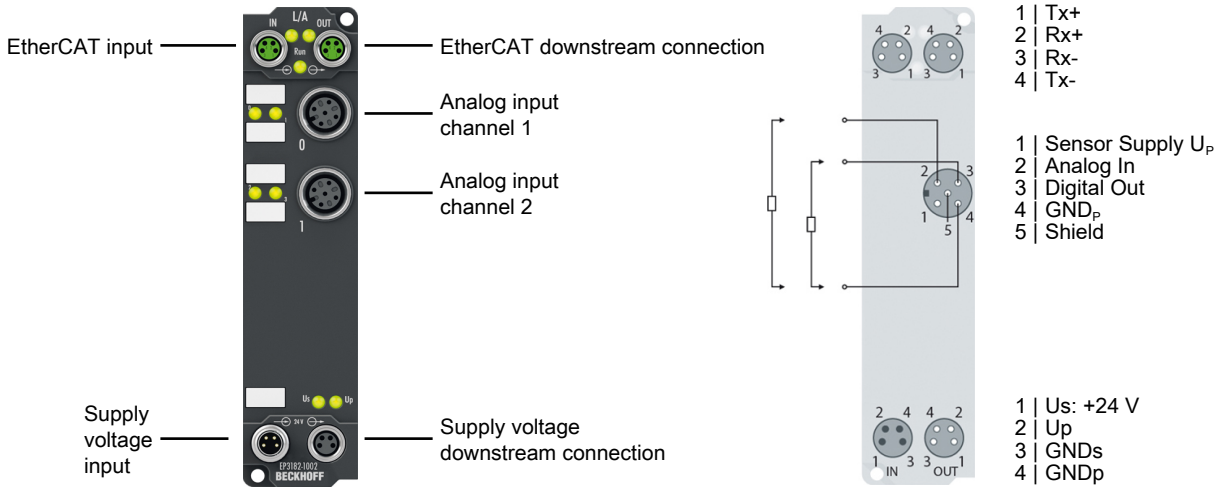


You will find the process data of the first analog channel under "AI Standard Channel 1".

The process data of the second to fourth channel have the same structure as those of the first channel.

3.3 EP3182

3.3.1 EP3182 - Introduction



2-channel analog input ±10 V or 0/4...20 mA, parameterizable, single-ended, 16-bit, 2 digital control outputs 24 V_{DC}, short-circuit proof

Analog inputs (single-ended)

The EP3182-1002 EtherCAT Box has two analog inputs which can be individually parameterized, so that they process signals either in the -10 V to +10 V range or the 0/4 mA…20 mA range. The voltage or input current is digitized with a resolution of 16 bits, and is transmitted (electrically isolated) to the higher-level automation device.

The input filter and therefore the conversion times are configurable in a wide range. The inputs can, if required, be scaled differently, and automatic limit value monitoring is also available. EtherCAT is used for parameterization purposes. The parameters are stored in the module.

The connected sensors are supplied with power via U_P. This can be fed to the supply voltage input to match the sensor and is passed on unfiltered to the signal M12 connectors.

Digital outputs

In addition, the EP3182-1002 EtherCAT Box has two digital outputs via which it forwards the binary control signals from the controller to the actuators at the process level.

These two outputs (sink/source type) are intended for the switching of logic inputs or outputs with a minimum impedance of 10 kOhm (e.g. reset inputs of digital sensors) and can process currents up to 2 mA. They indicate their signal state by LEDs and are short-circuit proof.

The signals are also connected via the two M12 connectors.

Quick links

Technical data [▶ 27]
Installation [▶ 30]
Signal connection [▶ 43]
Configuration [▶ 54]

3.3.2 EP3182 - Technical data

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

EtherCAT	
Connection	2 x M8 socket, 4-pin, green
Electrical isolation	500 V

Supply voltages	
Connection	Input: M8 connector, 4-pin Downstream connection: M8 socket, 4-pin, black
U_S nominal voltage	24 V_{DC} (-15 % / +20 %)
U_S sum current: $I_{S,sum}$	max. 4 A
Current consumption from U_S	120 mA
U_P voltage range	0…30 V_{DC}
U_P sum current: $I_{P,sum}$	max. 4 A
Current consumption from U_P	= Current consumption of connected sensors.
Electrical isolation GND_S / GND_P	yes

Analog inputs	
Number	2
Connection	2x M12 socket, 5-pin
Cable length	max. 30 m
Input type	Single-ended
Measuring range	Adjustable: • -10 … +10 V (default) • 0 … 10 V • 0 … 20 mA • 4 … 20 mA
Digital resolution	16 bits, including sign
Measuring error	max 0.3 %, relative to the full scale value. See chapter Measurement error/measurement deviation/ measurement uncertainty, output uncertainty.
Input resistance	Voltage measurement: min. 200 kΩ Current measurement: 85 Ω + diode voltage
Dielectric strength	max. 30 V
Electrical isolation	The analog inputs have a common ground potential: GND_P. GND_P is electrically isolated from GND_S.
Conversion time	approx. 100 µs
Input filter limit frequency	5 kHz
Input filter characteristic	Adjustable [▶ 60]
Sensor supply voltage	0 … 30 V_{DC} from U_P, not short-circuit proof.

Digital outputs	
Number	2
Cable length	max. 30 m
Type	Sink / Source
Nominal output voltage	24 V_{DC}
Output current	2 mA (short-circuit proof) per channel
Reference ground	GND_P

Housing data	
Dimensions W x H x D	30 mm x 126 mm x 26.5 mm (without connectors)
Weight	approx. 165 g
Installation position	variable
Material	PA6 (polyamide)

Environmental conditions	
Ambient temperature during operation	-25 … +60 °C -25 … +55 °C according to cURus
Ambient temperature during storage	-40 … +85 °C
Vibration resistance, shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27 Additional tests [▶ 28]
EMC immunity / emission	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP65, IP66, IP67 (conforms to EN 60529)

Approvals/markings	
Approvals/markings *)	CE, cURus [▶ 49]

*) Real applicable approvals/markings see type plate on the side (product marking).

Additional tests

The devices have undergone the following additional tests:

Test	Explanation
Vibration	10 frequency sweeps in 3 axes
	5 Hz < f < 60 Hz displacement 0.35 mm, constant amplitude
	60.1 Hz < f < 500 Hz acceleration 5 g, constant amplitude
Shocks	1000 shocks in each direction, in 3 axes
	35 g, 11 ms

3.3.3 EP3182 - Scope of supply

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

- 1x EtherCAT Box EP3182-1002
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 10x labels, blank (1 strip of 10)

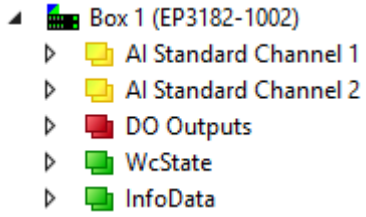
Pre-assembled protective caps do not ensure IP67 protection

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

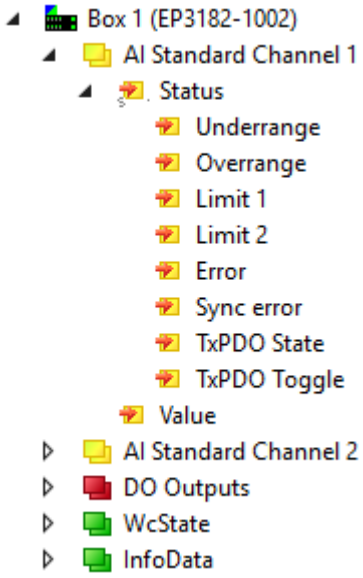
Ensure that the protective caps are correctly seated to ensure IP67 protection.

3.3.4 EP3182 - Process image

TwinCAT displays the process image in a tree structure.



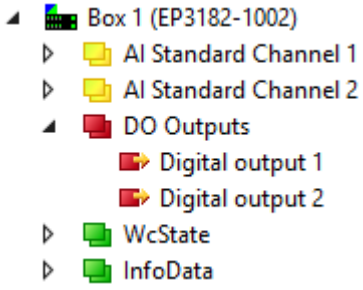
Analog inputs



You will find the process data of the first analog channel under "AI Standard Channel 1**"**.

The process data of the second channel have the same structure as those of the first channel.

Digital outputs

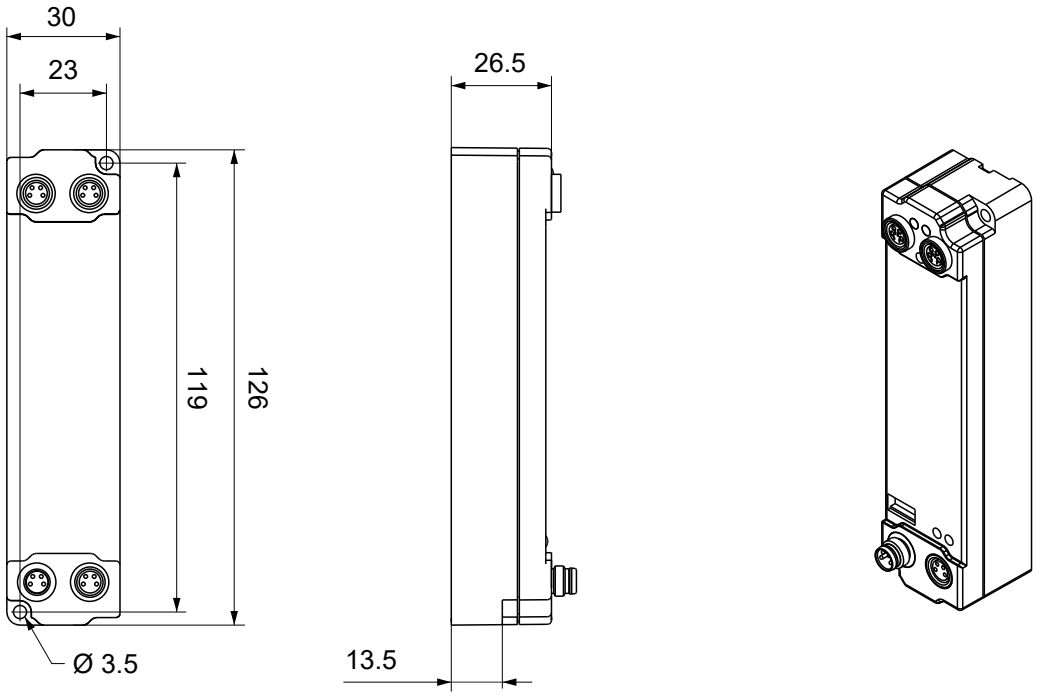


The process data of the digital outputs can be found under "DO Outputs".

4 Mounting and cabling

4.1 Mounting

4.1.1 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 mounting 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 Fixing

NOTICE

Dirt during assembly

Dirty connectors can lead to malfunctions. Protection class IP67 can only be guaranteed if all cables and connectors are connected.

- Protect the plug connectors against dirt during the assembly.

Mount the module with two M3 screws on the mounting holes in the corners of the module. The mounting holes have no thread.

4.1.3 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

4.2 EtherCAT

4.2.1 Connectors

NOTICE

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 sockets for the incoming and downstream EtherCAT connections.

Connection

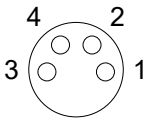


Fig. 4: M8 socket

EtherCAT	M8 connector	Core colors		
Signal	**Contact**	**ZB9010, ZB9020, ZB9030, ZB9032, ZK1090-6292, ZK1090-3xxx-xxxx**	**ZB9031 and old versions of ZB9030, ZB9032, ZK1090-3xxx-xxxx**	**TIA-568B**
Tx +	1	yellow[1)]	orange/white	white/orange
Tx -	4	orange[1)]	orange	orange
Rx +	2	white[1)]	blue/white	white/green
Rx -	3	blue[1)]	blue	green
Shield	Housing	Shield	Shield	Shield

[1)] Core colors according to EN 61918

Adaptation of core colors for cables ZB9030, ZB9032 and ZK1090-3xxxx-xxxx

For standardization, the core colors of the ZB9030, ZB9032 and ZK1090-3xxx-xxxx cables have been changed to the EN61918 core colors: yellow, orange, white, blue. So there are different color codes in circulation. The electrical properties of the cables have been retained when the core colors were changed.

4.2.2 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

4.2.3 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

4.3 Supply voltages

⚠ WARNING

Power supply from SELV/PELV power supply unit!

SELV/PELV circuits (Safety Extra Low Voltage, Protective Extra Low Voltage) according to IEC 61010-2-201 must be used to supply this device.

Notes:

- SELV/PELV circuits may give rise to further requirements from standards such as IEC 60204-1 et al, for example with regard to cable spacing and insulation.
- A SELV (Safety Extra Low Voltage) supply provides safe electrical isolation and limitation of the voltage without a connection to the protective conductor,
  a PELV (Protective Extra Low Voltage) supply also requires a safe connection to the protective conductor.

⚠ CAUTION

Observe the UL requirements

- When operating under UL conditions, observe the warnings in the chapter UL Requirements [▶ 49].

The EtherCAT Box has one input for two supply voltages:

- **Control voltage U_S**
  The following sub-functions are supplied from the control voltage U_S:
  - the fieldbus
  - the processor logic
  - typically the inputs and the sensors if the EtherCAT Box has inputs.
- **Peripheral voltage U_P**
  For EtherCAT Box modules with digital outputs the digital outputs are typically supplied from the peripheral voltage U_P. U_P can be supplied separately. If U_P is switched off, the fieldbus function, the function of the inputs and the supply of the sensors are maintained.

The exact assignment of U_S and U_P can be found in the pin assignment of the I/O connections.

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.

NOTICE

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

NOTICE

Unintentional cancellation of the electrical isolation of GND_S and GND_P possible.

In some types of EtherCAT Box modules the ground potentials GND_S and GND_P are connected.

- 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 connected.

4.3.1 Connectors

NOTICE

Risk of confusion: supply voltages and EtherCAT

Defect possible through incorrect insertion.

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

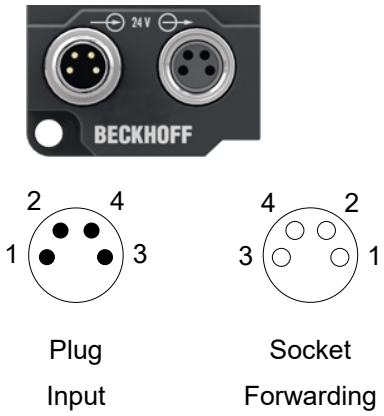


Fig. 5: M8 connector

Contact	Function	Description	Core color [1)]
1	U_S	Control voltage	Brown
2	U_P	Peripheral voltage	White
3	GND_S	GND to U_S	Blue
4	GND_P	GND to U_P	Black

[1)] The core colors apply to cables of the type: Beckhoff ZK2020-3xxx-xxxx

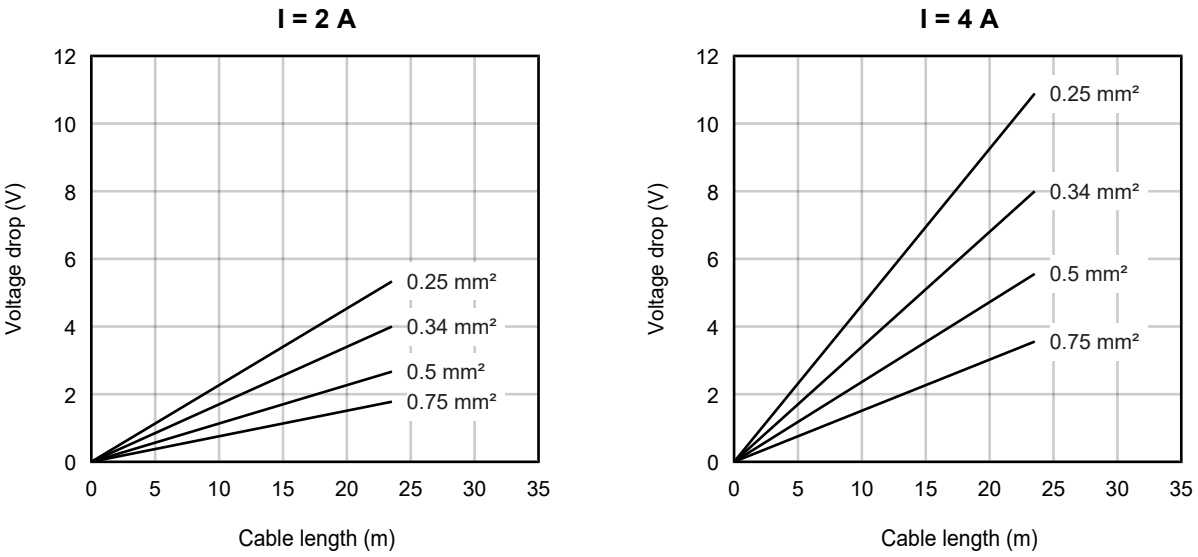
4.3.2 Status LEDs

LED	Display	Meaning
U_S (control voltage)	off	The supply voltage U_S is not available.
	green illuminated	The supply voltage U_S is available.
U_P (peripheral voltage)	off	The supply voltage U_P is not available.
	green illuminated	The supply voltage U_P is available.

4.3.3 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 the supply line



4.4 Signal interface

4.4.1 EP3162-0002

The EP3162-0002 has one M12 socket per channel.

Electrical isolation

- The channels are electrically isolated from one another.
- Each channel is electrically isolated from all other potentials in the box.

See chapter Electrical isolation of the channels [▶ 40].

Supply voltage for sensors

An isolated voltage 24 V_{DC} is output at pin 1. You can use this voltage as supply voltage for active sensors.

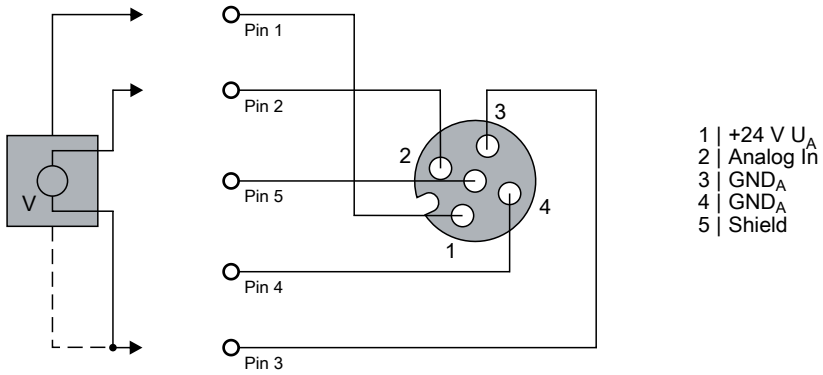
EMC shield clamp

Depending on the application it may be necessary to additionally attach the shield of the sensor cables at the signal inputs of the box with shield clamps ZB8513-0002.

See Chapter: "Accessories", section "Cables" [▶ 129].

4.4.1.1 Voltage measurement, single-ended

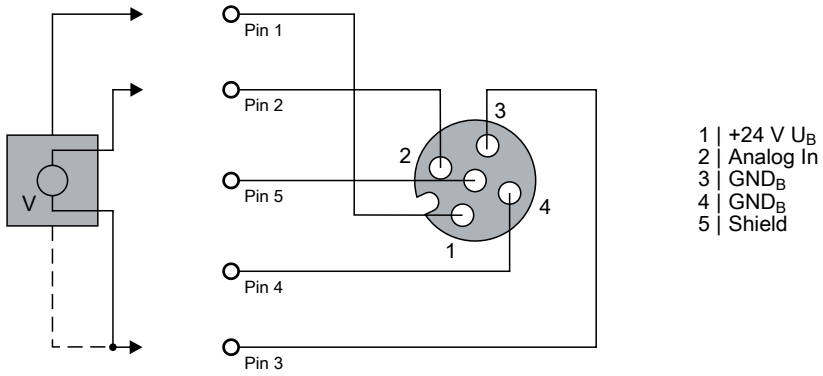
Channel 1



1 | +24 V U_A
2 | Analog In
3 | GND_A
4 | GND_A
5 | Shield

3-wire

Channel 2

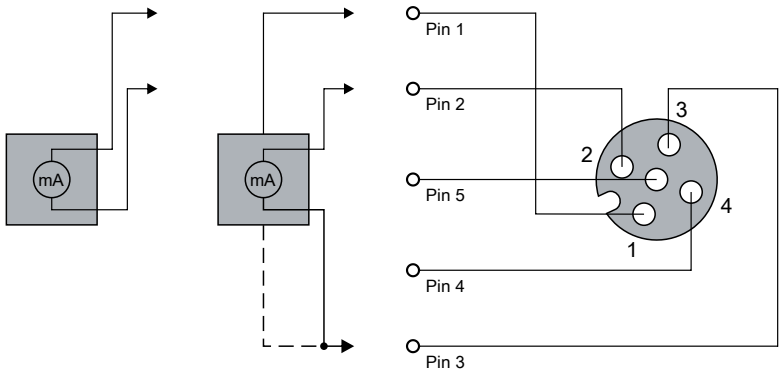


1 | +24 V U_B
2 | Analog In
3 | GND_B
4 | GND_B
5 | Shield

3-wire

4.4.1.2 Current measurement, single-ended

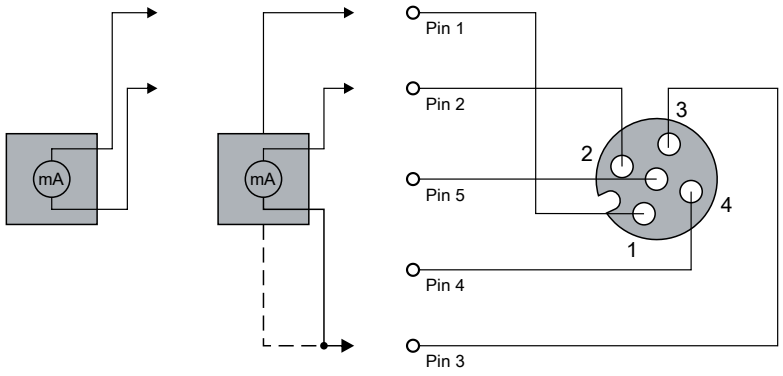
Channel 1



2-wire 3-wire

1 | +24 V U_A
2 | Analog In
3 | GND_A
4 | GND_A
5 | Shield

Channel 2



2-wire 3-wire

1 | +24 V U_B
2 | Analog In
3 | GND_B
4 | GND_B
5 | Shield

4.4.1.3 Status LEDs at the M12 connections

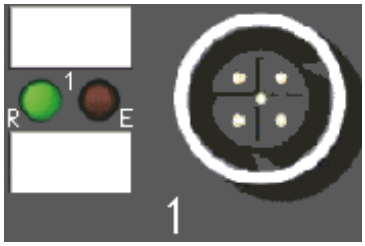


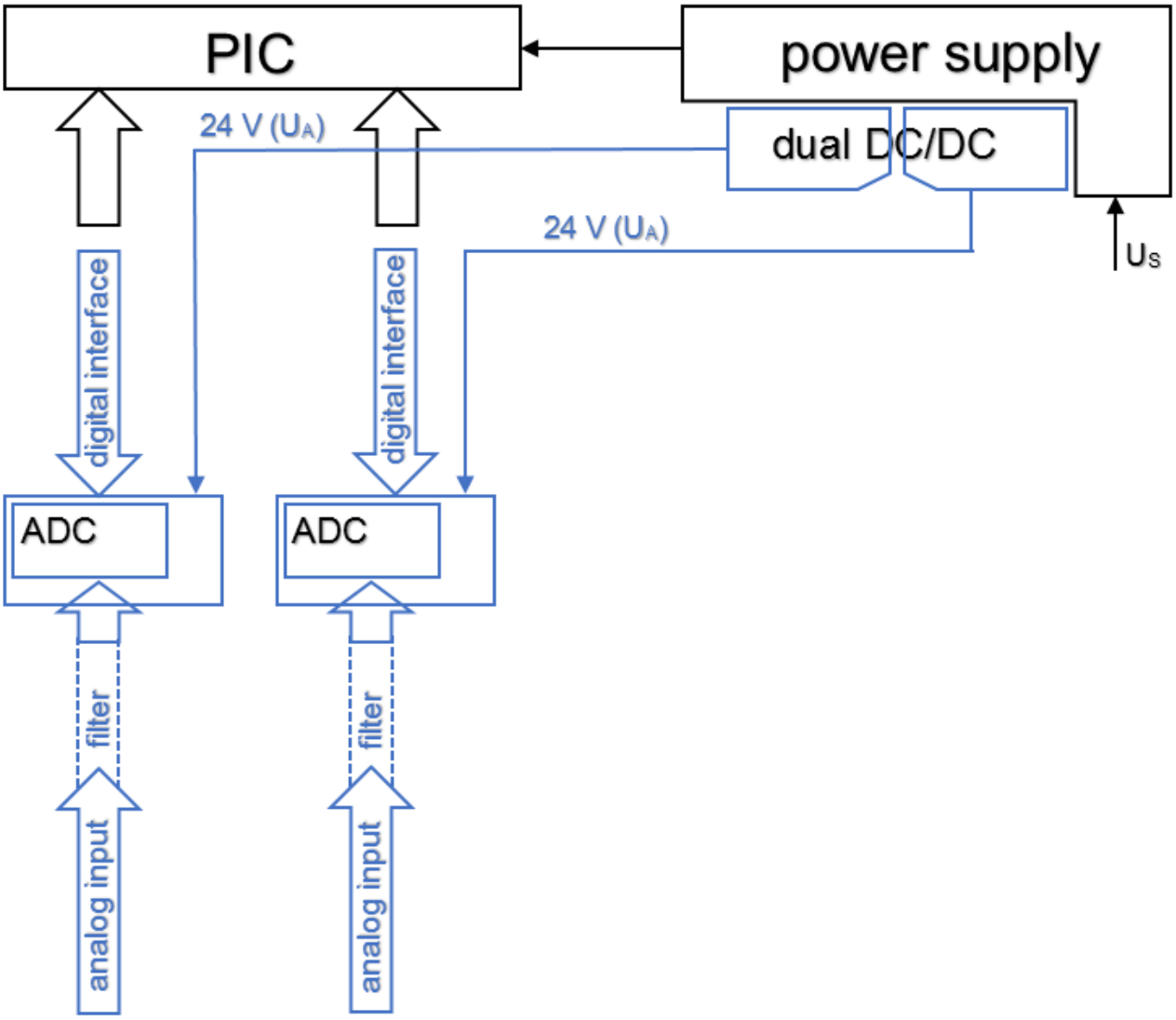
Fig. 6: Status LEDs at the M12 connections

Connection	LED	Display	Meaning
M12 socket no. 0-1	R	off	No data transfer to the A/D converter
	left	green	Data transfer to A/D converter
	E	off	Function OK
	right	red	Error: Broken wire or measured value outside the measuring range

Correct function is indicated if the green "RUN" LED is on and the red "Error" LED is off.

4.4.1.4 Electrical isolation of the channels

The following block diagram shows the principle of electrical isolation of the two channels.



Electrical isolation of GND

The ground potentials of channel 1 (GND_A) and channel 2 (GND_B) are electrically isolated from each other.

4.4.2 EP3174-00x2

The EP3174-00x2 have one M12 socket per channel.

Electrical isolation

The analog inputs have a common ground potential: GND_P. GND_P is electrically isolated from GND_S.

Supply voltage for sensors

The voltage U_P that you apply to the supply voltage input [▶ 34] is distributed unchanged to all signal connections. You can tap U_P at every signal connection at pin 1 to supply active sensors with it.

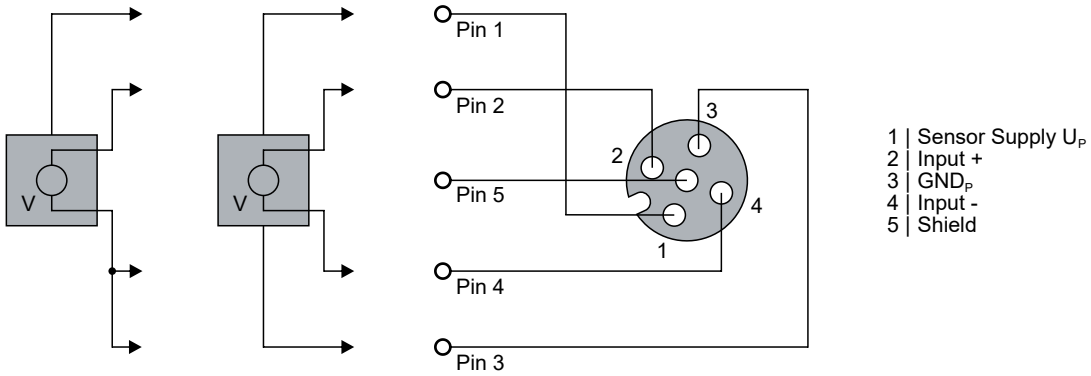
The permissible voltage range for U_P is 0…30 V_{DC}.

EMC shield clamp

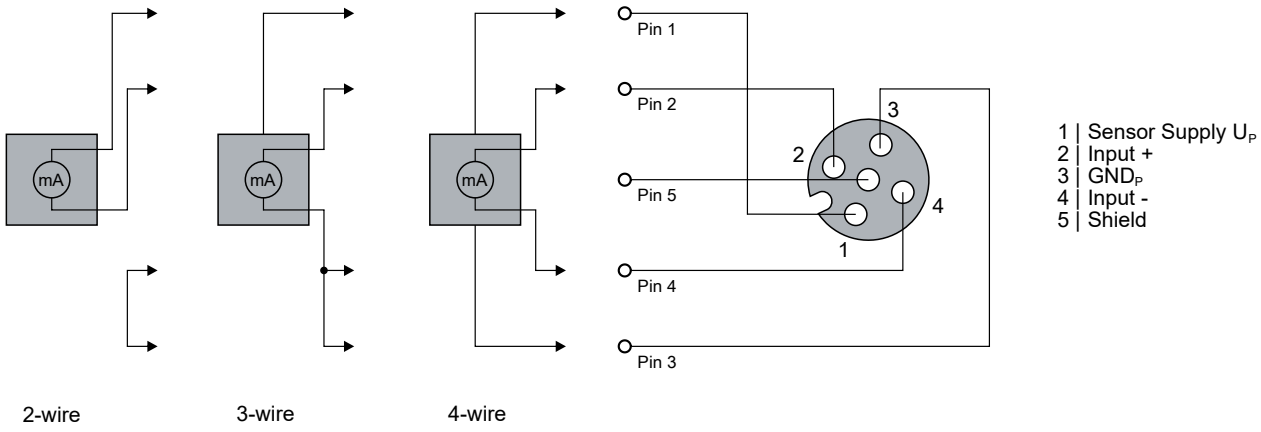
Depending on the application it may be necessary to additionally attach the shield of the sensor cables at the signal inputs of the box with shield clamps ZB8513-0002.

See Chapter: "Accessories", section "Cables" [▶ 129].

4.4.2.1 Voltage measurement, differential



4.4.2.2 Current measurement, differential



4.4.2.3 Status LEDs at the M12 connections

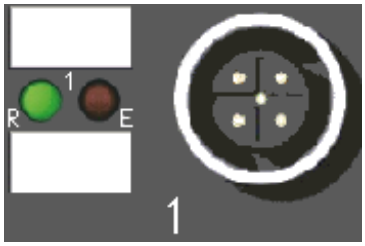


Fig. 7: Status LEDs at the M12 connections

Connection	LED	Display	Meaning
M12 socket no. 1-4	R	off	No data transfer to the A/D converter
	left	green	Data transfer to A/D converter
	E	off	Function OK
	right	red	Error: Broken wire or measured value outside the measuring range

Correct function is indicated if the green "RUN" LED is on and the red "Error" LED is off.

4.4.3 EP3182-1002

The EP3182-1002 has one M12 socket per channel. There is also a digital output on each M12 socket.

Electrical isolation

The analog inputs have a common ground potential: GND_P. GND_P is electrically isolated from GND_S.

Supply voltage for sensors

The voltage U_P that you apply to the supply voltage input [▶ 34] is distributed unchanged to all signal connections. You can tap U_P at every signal connection at pin 1 to supply active sensors with it.

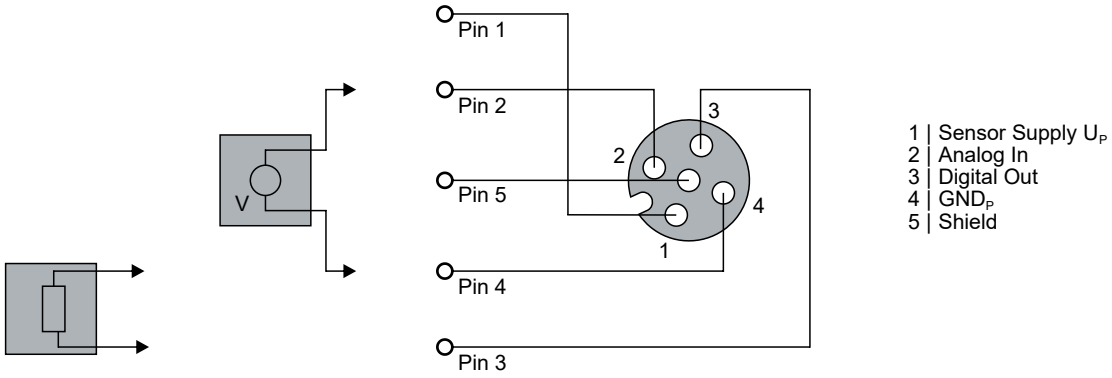
The permissible voltage range for U_P is 0…30 V_{DC}.

EMC shield clamp

Depending on the application it may be necessary to additionally attach the shield of the sensor cables at the signal inputs of the box with shield clamps ZB8513-0002.

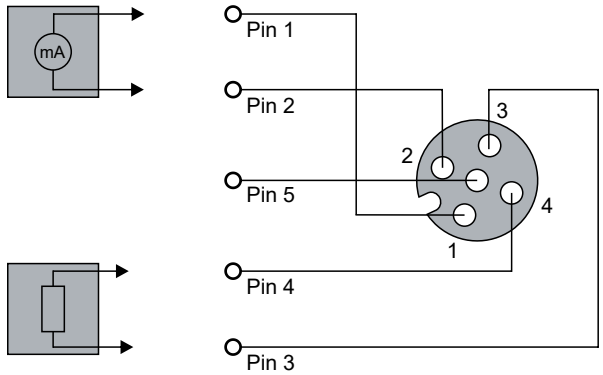
See Chapter: "Accessories", section "Cables" [▶ 129].

4.4.3.1 Voltage measurement, single-ended



1 | Sensor Supply U_P
2 | Analog In
3 | Digital Out
4 | GND_P
5 | Shield

4.4.3.2 Current measurement, single-ended



1 | Sensor Supply U_P
2 | Analog In
3 | Digital Out
4 | GND_P
5 | Shield

4.4.3.3 Status LEDs at the M12 connections

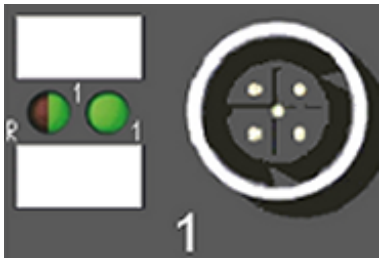


Fig. 8: Status LEDs at the M12 connections

Connection	LED	Display	Meaning
M12 socket no. 1-2	R left	off	Analog input: No data transfer to the A/D converter
		green	Analog input: Data transfer to A/D converter
		red	Error at the analog input: Broken wire or measured value outside the measuring range
	1 right	off	Digital output switched off
		green	Digital output switched on

Function is without error if the left-hand LED is green.

4.4.4 EP3184-0002

The EP3184-0002 has one M12 socket per channel.

Electrical isolation

The analog inputs have a common ground potential: GND_P. GND_P is electrically isolated from GND_S.

Supply voltage for sensors

The voltage U_P that you apply to the supply voltage input [▶ 34] is distributed unchanged to all signal connections. You can tap U_P at every signal connection at pin 1 to supply active sensors with it.

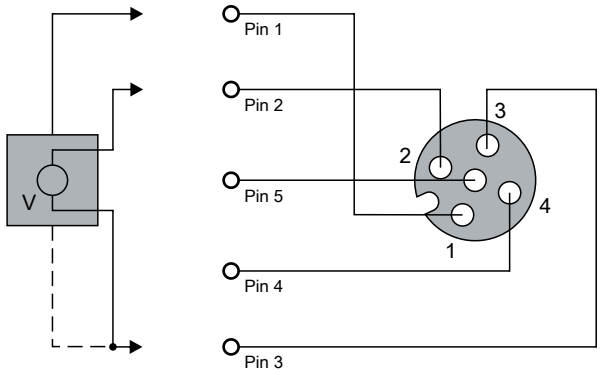
The permissible voltage range for U_P is 0…30 V_{DC}.

EMC shield clamp

Depending on the application it may be necessary to additionally attach the shield of the sensor cables at the signal inputs of the box with shield clamps ZB8513-0002.

See Chapter: "Accessories", section "Cables" [▶ 129].

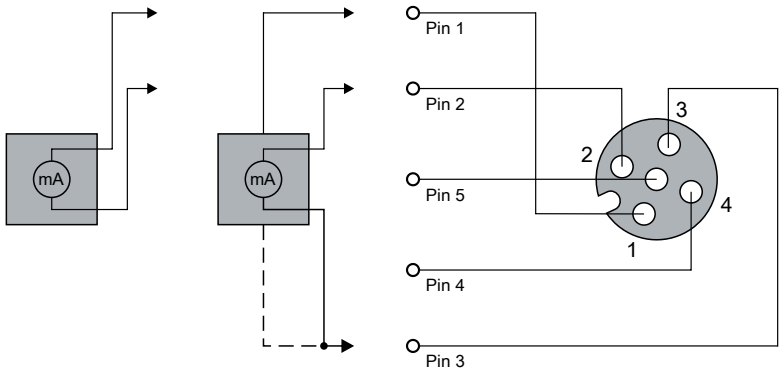
4.4.4.1 Voltage measurement, single-ended



1 | Sensor Supply U_P
2 | Input +
3 | GND_P
4 | reserved
5 | Shield

3-wire

4.4.4.2 Current measurement, single-ended



1 | Sensor Supply U_P
2 | Input +
3 | GND_P
4 | reserved
5 | Shield

2-wire 3-wire

4.4.4.3 Status LEDs at the M12 connections

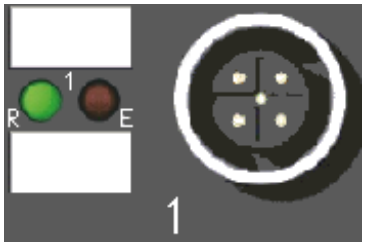


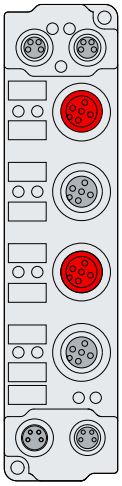
Fig. 9: Status LEDs at the M12 connections

Connection	LED	Display	Meaning
M12 socket no. 1-4	R	off	No data transfer to the A/D converter
	left	green	Data transfer to A/D converter
	E	off	Function OK
	right	red	Error: Broken wire or measured value outside the measuring range

Correct function is indicated if the green "RUN" LED is on and the red "Error" LED is off.

4.4.5 EP3184-1002

Two analog inputs are located at each of the M12 sockets 1 and 3.



Electrical isolation

The analog inputs have a common ground potential: GND_P. GND_P is electrically isolated from GND_S.

Supply voltage for sensors

The voltage U_P that you apply to the supply voltage input [▶ 34] is distributed unchanged to all signal connections. You can tap U_P at every signal connection at pin 1 to supply active sensors with it.

The permissible voltage range for U_P is 0…30 V_{DC}.

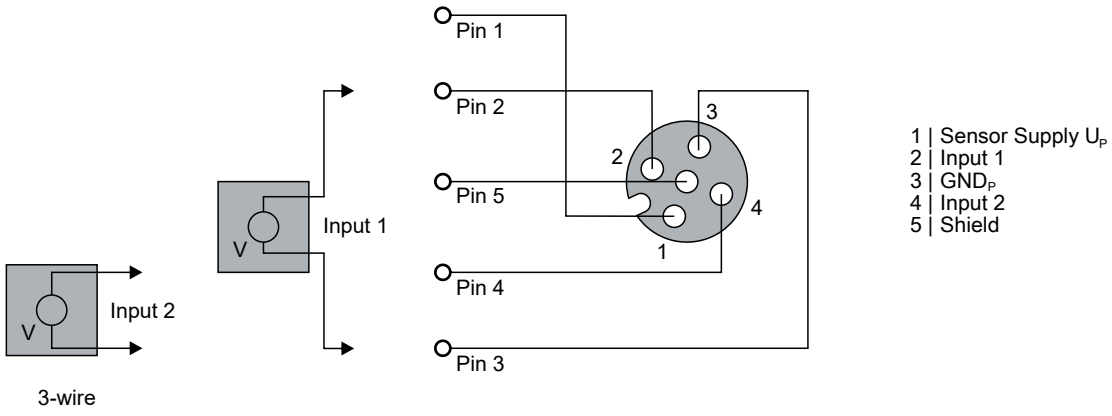
EMC shield clamp

Depending on the application it may be necessary to additionally attach the shield of the sensor cables at the signal inputs of the box with shield clamps ZB8513-0002.

See Chapter: "Accessories", section "Cables" [▶ 129].

4.4.5.1 Voltage measurement, single-ended

There are two analog inputs on each M12 socket.

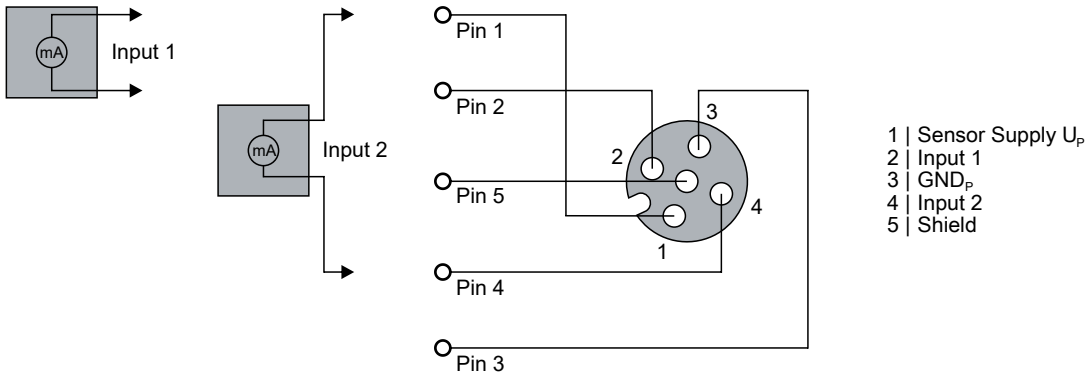


GND connections

If several sensors are connected to a box whose GND connections are not electrically isolated, GND must be connected to GNDp.

4.4.5.2 Current measurement, single-ended

There are two analog inputs on each M12 socket.



GND connections

If several sensors are connected to a box whose GND connections are not electrically isolated, GND must be connected to GNDp.

4.4.5.3 Status LEDs at the M12 connections

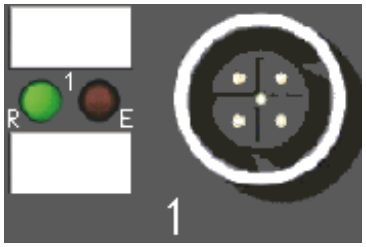


Fig. 10: Status LEDs at the M12 connections

Connection	LED	Display	Meaning
M12 socket no. 1, 3 Sockets 2 and 4 are not used.	R left	off	No data transfer to the A/D converter
		green	Data transfer to A/D converter
	E right	off	Function OK
		red	Error: Broken wire or measured value outside the measuring range

Correct function is indicated if the green "RUN" LED is on and the red "Error" LED is off.

4.5 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. 11: UL label

4.6 ATEX notes

4.6.1 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 [▶ 51] 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

4.6.2 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 [▶ 50], 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.

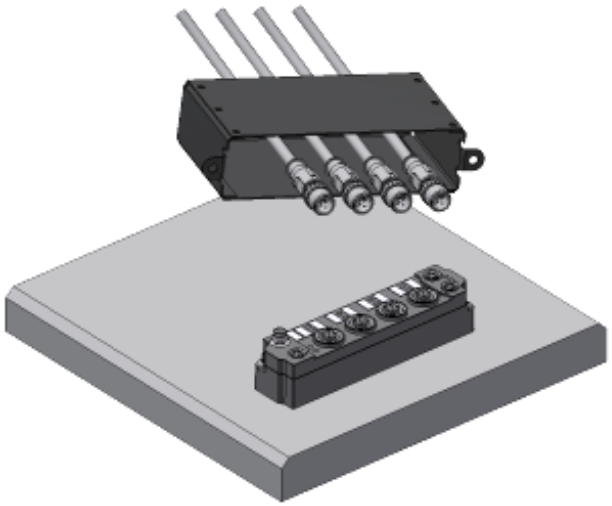


Fig. 12: BG2000 - putting the cables

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

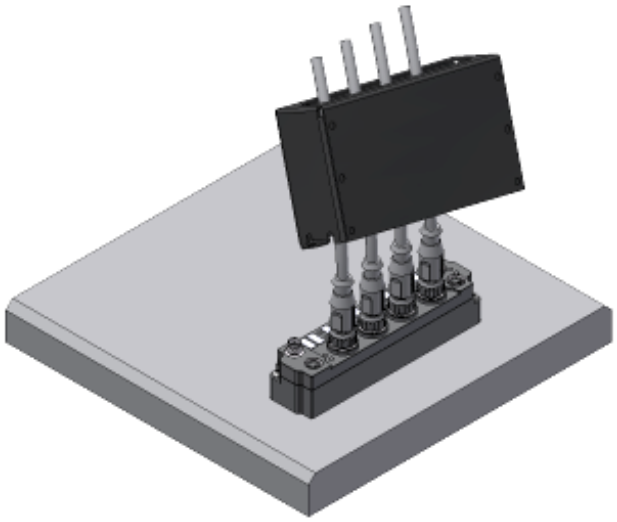


Fig. 13: BG2000 - fixing the cables

Mount the protection enclosure over the EtherCAT Box.

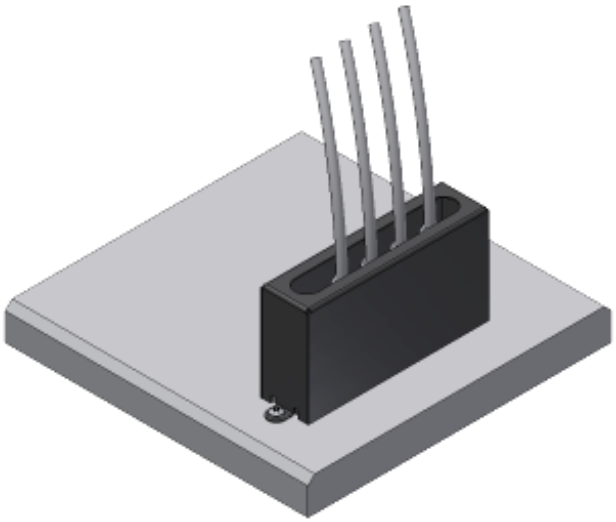


Fig. 14: BG2000 - mounting the protection enclosure

4.6.3 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!

4.7 Disposal

Products marked with a crossed-out wheeled bin shall not be discarded with the normal waste stream. The device is considered as waste electrical and electronic equipment. The national regulations for the disposal of waste electrical and electronic equipment must be observed.

5 Configuration

5.1 Integrating into a TwinCAT project

The procedure for integration in a TwinCAT project is described in these Quick start guide.

5.2 Settings and operating modes

5.2.1 Settings

Table of contents

Selection of the analog signal type, index 0xF800:0n [▶ 116]

In delivery state, all channels of the EP31xx are set for analog voltage measurement (-10 V …+10 V).

NOTICE

Setting the correct signal type before connecting the sensors

Set the correct signal type before connecting the sensors!

This setting can be made individually for each channel in the CoE object 0xF800:0n [▶ 116]. Changes are immediately effective.

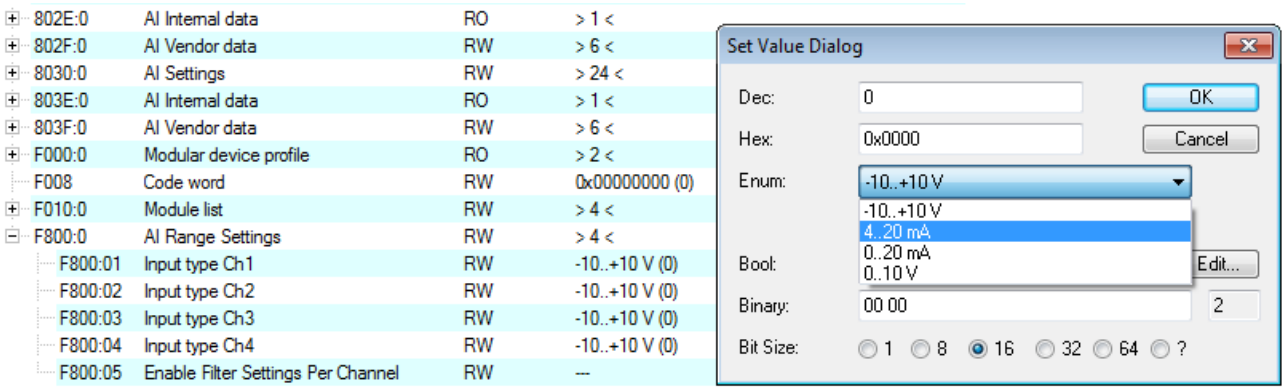


Fig. 15: EP31x4-0002: Selection of the signal type

In the case of the EP31x2 the signal type -20 mA to +20 mA can additionally be selected (see illustration below).

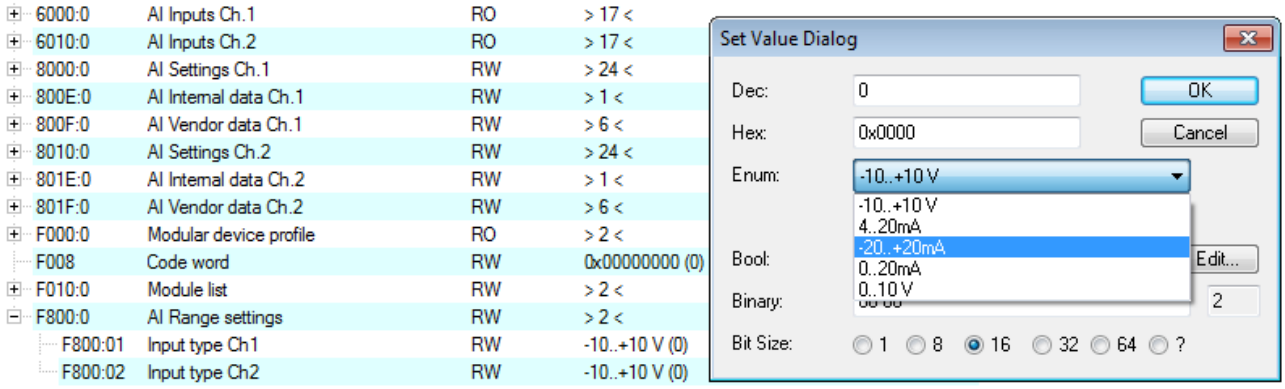


Fig. 16: EP31x2: Selection of the signal type

Presentation, index 0x80n0:02 [▶ 113]

The measured value output is set in factory to two's complement representation (signed integer).
Index 0x80n0:02 [▶ 113] offers the possibility to change the method of representation of the measured value.

- **Signed integer representation**

The negative output value is represented in two's complement (negated + 1).
Maximum representation range with 16-bit = -32768 .. $+32767_{dec}$

Input signal				Value	
+/- 10 V	**0...20 mA**	**4...20 mA**	**0...10 V**	**decimal**	**hexadecimal**
10 V	20 mA	20 mA	10 V	32767	0x7FFF
5 V	10 mA	12 mA	5 V	16383	0x3FFF
0 V	0 mA	4 mA	0 V	0	0x0000
-5 V	-	-	-	-16383	0xC001
-10 V	-	-	-	-32767	0x8000

Overview of further representations

- **Unsigned integer representation**

The output value is represented with 15-bit resolution without sign, therefore polarity detection is no longer possible.
Maximum representation range with 16-bit = 0 .. $+32767_{dec}$

- **Absolute value with MSB as sign - representation**

The output value is displayed in magnitude-sign format: MSB=1 (highest bit) in the case of negative values.
Maximum representation range with 16-bit = -32768 .. $+32767_{dec}$

Input values (+/- 10 V)	Representation (values dec. / values hex.)	
	unsigned integer	**Absolute value with MSB as sign**
10	32767 / 0x7FFF	32767 / 0x7FFF
5 V	16383 / 0x3FFF	16383 / 0x3FFF
0 V	0 / 0x0000	0 / 0x0000
-5	16384 / 0x4000	[-16384] / 0xC000
-10	32767 / 0x7FFF	[-32767] / 0xFFFF

Presentation types

The presentation types Unsigned integer and Absolute value with MSB as sign have no function for unipolar modules. There is no change in the presentation in the positive range.

Siemens bits, index 0x80n0:05 [▶ 113]

If this bit is set, status displays are superimposed on the lowest three bits. In the error case "overrange" or "underrange", bit 0 is set.

Underrange and overrange, index 0x60n00:01, 0x60n00:02 [▶ 124]

Underrange and overrange is indicated as follows:

- The bits "Underrange", "Overrange" and "Error" in the process data are set.
- The "Error" LED of the affected channel lights up red.

The threshold values for the mentioned bits and the LED can be found in chapter Measuring ranges [▶ 63].

Limit 1 ad Limit 2, index 0x80n0:13, index 0x80n0:14 [▶ 113]

If the limits of the values that can be entered in indices 0x80n0:13 [▶ 113] and 0x80n0:14 [▶ 113] are violated, the bits in indices 0x60n0:03 [▶ 124] and 0x60n0:05 [▶ 124] are set accordingly (see sample below). The indices 0x80n0:07 [▶ 113] or 0x80n0:08 [▶ 113] serve to activate the limit value monitoring.

Output limit n (2-bit):

- 0: not active
- 1: Value < limit value
- 2: Value > limit value
- 3: Value = limit value

Limit evaluation

The limit evaluation assumes a signed representation. The conversion to the desired representation (index 0x80n0:02) only takes place after the limit evaluation.

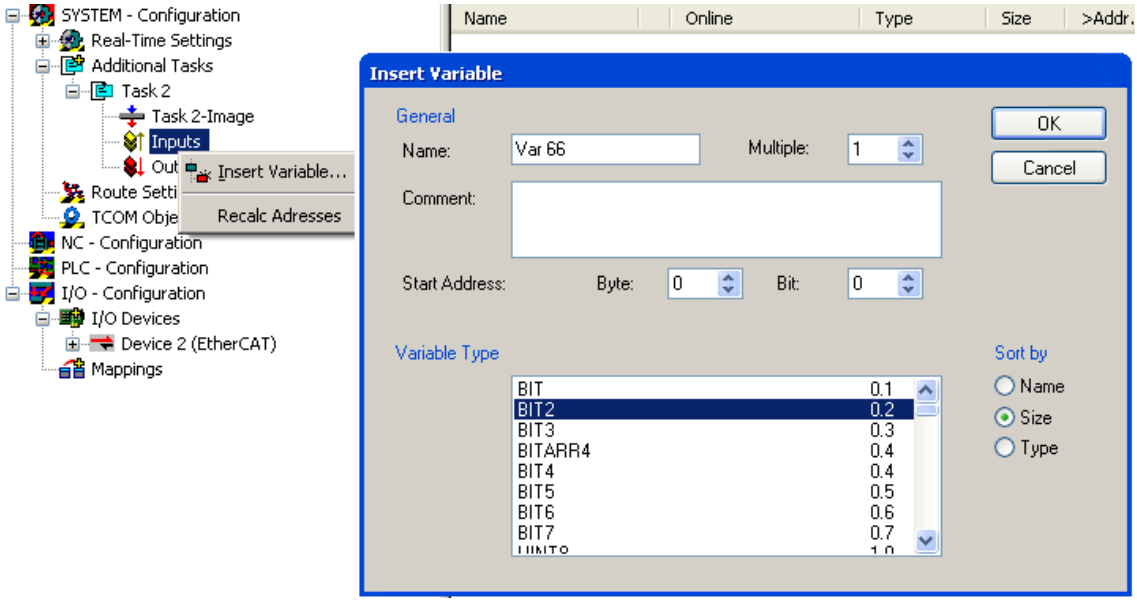
Linking in the PLC with 2-bit values

- PLC:
  IEC61131-PLC contains no 2-bit data type that can be linked with this process data directly. In order to transmit the limit information, therefore, define an input byte, e.g.

```
VAR
    byLimit1 AT %I*:BYTE;
END_VAR
```

  and link the limit to the *VariableSizeMismatch* dialog as described in the chapter Process data.

- Additional task
  2-bit variables can be created in the System Manager.



Linking of 2-bit variable to additional task

Sample

Channel 1; Limit 1 and Limit 2 enabled, Limit 1 = 2.8 V, Limit 2 = 7.4 V, representation: signed integer

Entry in index (Limit 1): 0x8000:13 [▶ 113]
(2.8 V / 10 V) x 2^{16} / 2 - 1 = **9,174**$_{dec}$

Entry in index (Limit 2): 0x8000:14 [▶ 113]
(7.4 V / 10 V) x 2^{16} / 2 - 1 = **24,247**$_{dec}$

Output:

Input channel 1	Index 0x6000:03 [▶ 124]	Index 60x6000:05 [▶ 124]
1.8 V	0x01$_{hex}$, (Limit 1, limit value undershot)	0x01$_{hex}$, (Limit 2, limit value undershot)
2.8 V	0x03$_{hex}$, (Limit 1, limit value reached)	0x01$_{hex}$, (Limit 2, limit value undershot)
4.2 V	0x02$_{hex}$, (Limit 1, limit value exceeded)	0x01$_{hex}$, (Limit 2, limit value undershot)
8.5 V	0x02$_{hex}$, (Limit 1, limit value exceeded)	0x02$_{hex}$, (Limit 2, limit value exceeded)

Swap Limit index 0x80n0:0E

The limit function can be inverted by *SwapLimitBits* in index 0x80n0:0E.

Output Limit n (2-bit):

SwapLimitBits setting	Value
FALSE (default setting)	• 0: not active • 1: value < limit value • 2: value > limit value • 3: Value is equal to the limit value
TRUE	• 0: not active • 1: value > limit value • 2: value < limit value • 3: Value is equal to the limit value

The Swap Limit function is available according to the table below

EtherCAT Box	Swap Limit function from rev.
EP3162-0002	-0016
EP3174-0002	-0018
EP3174-0092	-0016
EP3182-1002	-0017
EP3184-0002	-0017
EP3184-1002	-0018

5.2.2 Operation modes

The EP31xx supports three different operation modes:

- Freerun [▶ 60] (filter on, timer interrupt)
- Synchronous [▶ 59] (filter off, SyncManager interrupt) and
- DC (DC-Sync-Interrupt) [▶ 59]

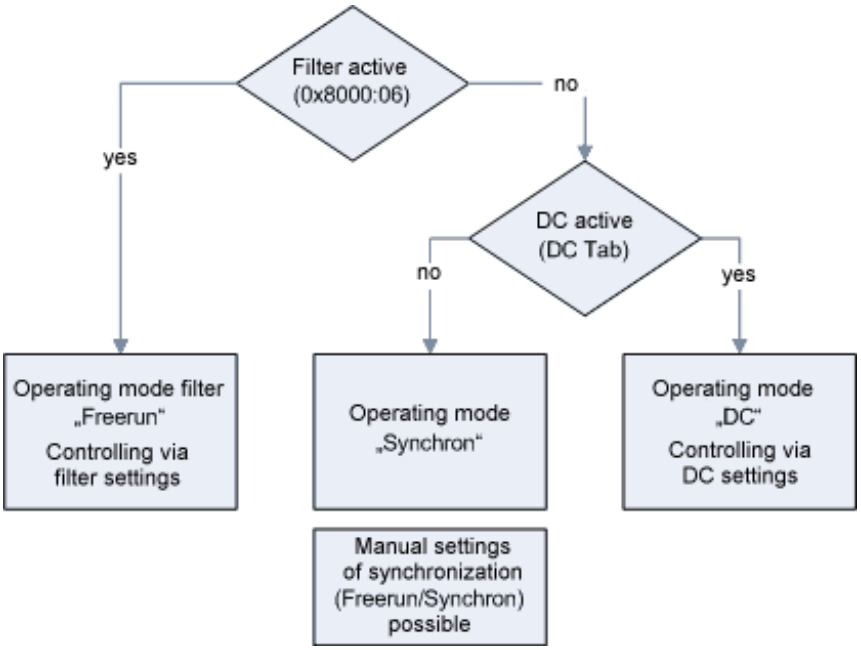


Fig. 3: Relationship of operation modes

The module switches between the Freerun (filter on) and Synchron modes by activating/deactivating the filter via the index. This takes place while the module is in OP mode. The changeover may result in longer sampling times and step changes in the process data until the filters have assumed a steady state.

DC mode can only be used when the filters are switched off. Likewise, it is not possible to switch the filters on in DC mode. The DC mode is parameterized via the DC tab in the TwinCAT System Manager.

Synchron mode

In synchronous operation process data are generated frame-triggered, so that a new value is available with each PLC cycle. Synchronous mode is used automatically with the EP31xx modules (filter off, no DC). The minimum cycle times are 80 µs (EL31x1/EL31x2), and 120 µs (EL31x4) for standard IPCs.

DC operation

In DC mode the analog sampling is triggered by DC-interrupt. As a result, the temporal jitter between two frames is no longer important and the sampling point is the same across the entire system.

The "input-based" mode shifts the sync-interrupt in such a way that the process data are ready for collection shortly before the current process data cycle.

If the frame jitter is too large, it is possible that data may be collected twice or there may be interruptions in the transmission. In that case the jitter is to be reduced through TwinCAT system measures or a slower cycle time is to be chosen.

5.2.3 Filter

Filters influence the EtherCAT synchronization mode

If one or more filters are activated, the device will automatically run in “Free Run” synchronization mode.

Filter operation (FIR and IIR), index 0x80n0:06, 0x80n0:15 [▶ 113]

The EP31xx modules incorporate a digital filter which, depending on its settings, can adopt the characteristics of a *F*inite *I*mpulse *R*esponse filter (an *FIR filter*), or an *I*nfinite *I*mpulse *R*esponse filter (an *IIR filter*). The filter is deactivated by default. Please observe the following note regarding activation with index 0x8000:06 [▶ 113].

Activation of the filter (index 0x8000: 06), setting of the filter properties (index 0x8000:15)

The filter frequencies are set centrally for all channels of the EP3xxx modules via index 0x8000:15 (channel 1). The corresponding indices 0x80n0:15 of the other channels have no parameterization function.

FIR filter

The filter is a non-recursive notch filter. You can set the filter via the CoE parameter 0x8000:15. The following filter frequencies are available:

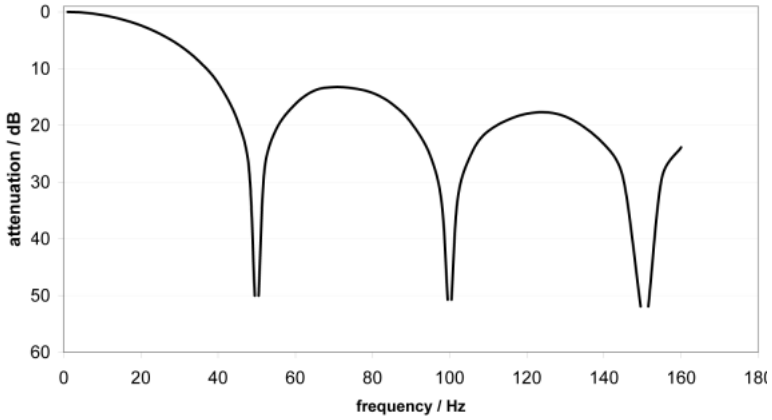
- 50 Hz
- 60 Hz

The filter determines the cycle time of the EtherCAT Box in synchronization mode "Free Run":

EtherCAT Box	Cycle time with activated FIR filter	
	50 Hz	60 Hz
EP3162-0002	625 µs	521 µs
EP3182-1002	615 µs	512 µs
EP31x4	615 µs	512 µs

A notch filter has zeros (notches) in its frequency response at the filter frequency and multiples of the filter frequency. These frequencies are therefore attenuated in amplitude.

Typical attenuation curve of a notch filter with 50 Hz filter frequency



Filter	Attenuation	Limit frequency (-3 dB)
50 Hz FIR	> 50 dB	22 Hz
60 Hz FIR	> 45 dB	26 Hz

IIR filter

The filter with IIR characteristic is a time-discrete, linear, time invariant filter. It can be adjusted in 8 levels:

- IIR 1 = weak recursive filter
- …
- IIR 8 = strong recursive filter

An IIR filter can be understood to be a sliding mean value calculation after a low pass.

If the IIR filter is activated, the EtherCAT Box runs in synchronization mode "Free Run" with the following cycle time:

EtherCAT Box	Cycle time with activated IIR filter
EP3162-0002	1 ms
EP3182-1002	180 µs
EP31x4	500 µs

The cycle time is independent of the number of activated measuring channels when the IIR filter is activated. You cannot shorten it by disabling channels.

Filter characteristics for IIR filters

IIR filter	-3 dB cut-off frequency with 500 µs sampling time
IIR 1	400 Hz
IIR 2	220 Hz
IIR 3	100 Hz
IIR 4	50 Hz
IIR 5	24 Hz
IIR 6	12 Hz
IIR 7	6.2 Hz
IIR 8	3.0 Hz

5.3 Data stream

The following flow chart illustrates the data stream of the EPI31xx (processing of raw data).

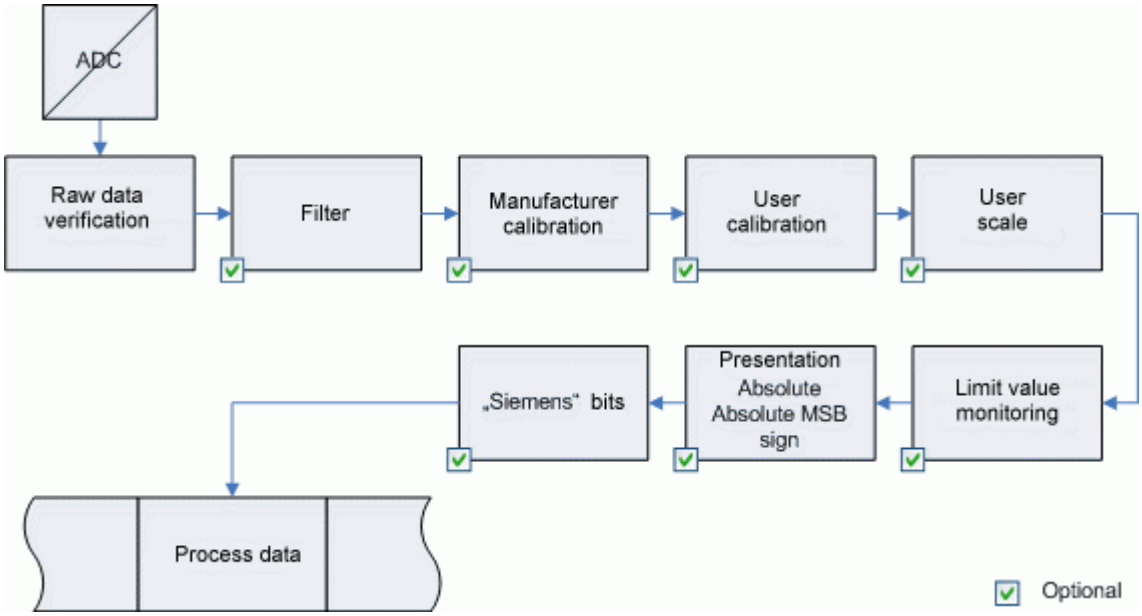


Fig. 17: Diagram showing the data stream in the EP31xx

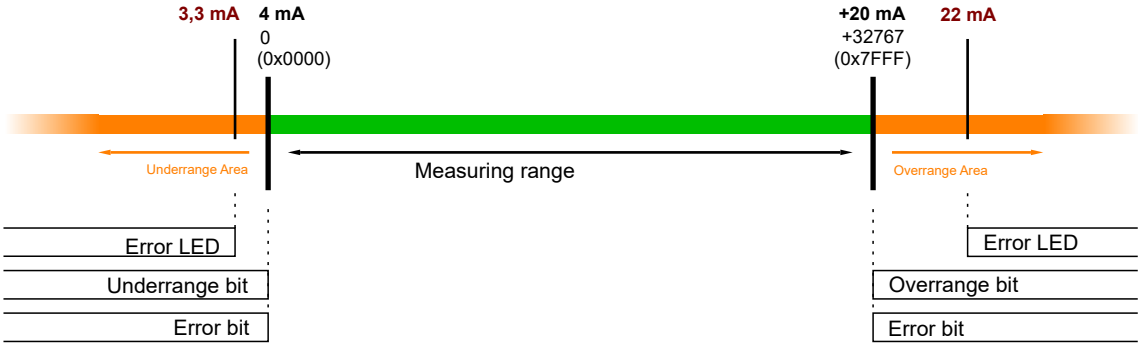
5.4 Measuring ranges

The following diagrams show the output values of the measuring ranges as well as the behavior when the limit ranges are exceeded.

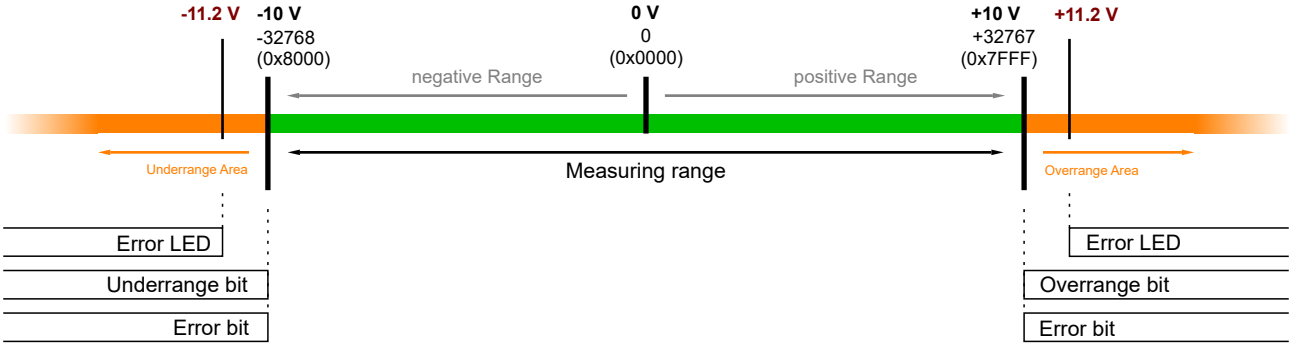
5.4.1 EP31x4, EP3182

0 … 20 mA

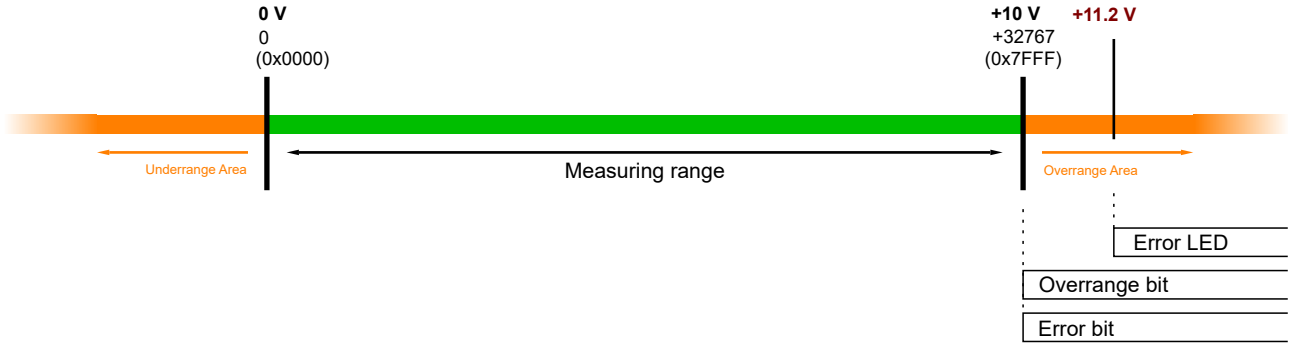
4 … 20 mA



-10 … +10 V

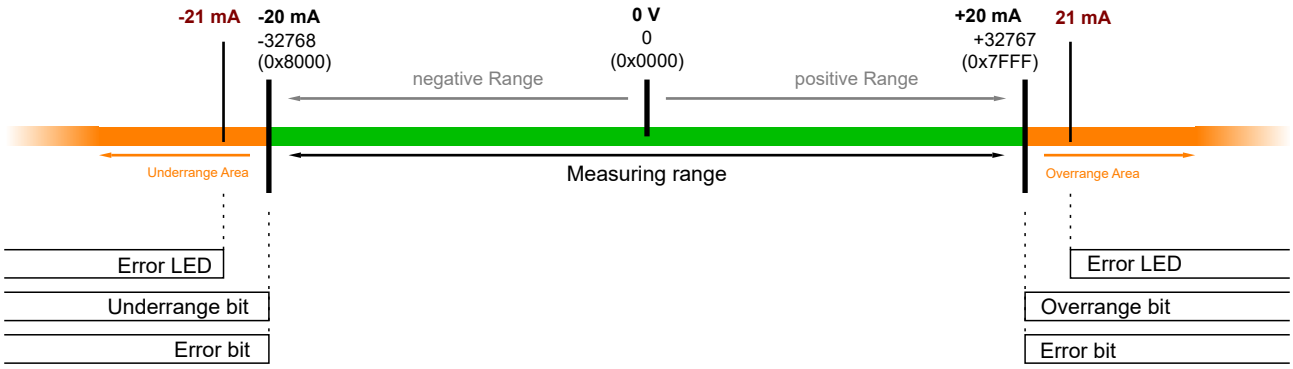


0 … 10 V

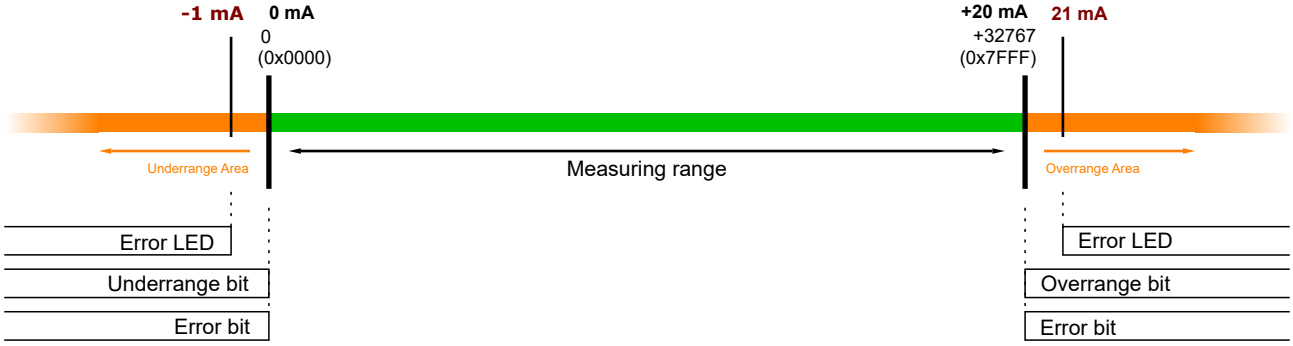

0 V
0
(0x0000)
+10 V
+32767
(0x7FFF)
+11.2 V
Underrange Area
Measuring range
Overrange Area
Error LED
Overrange bit
Error bit

5.4.2 EP3162-0002

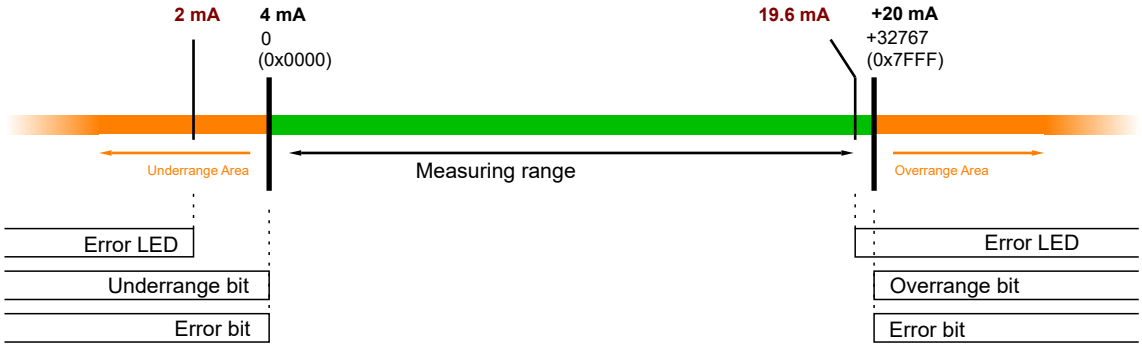
-20 … +20 mA



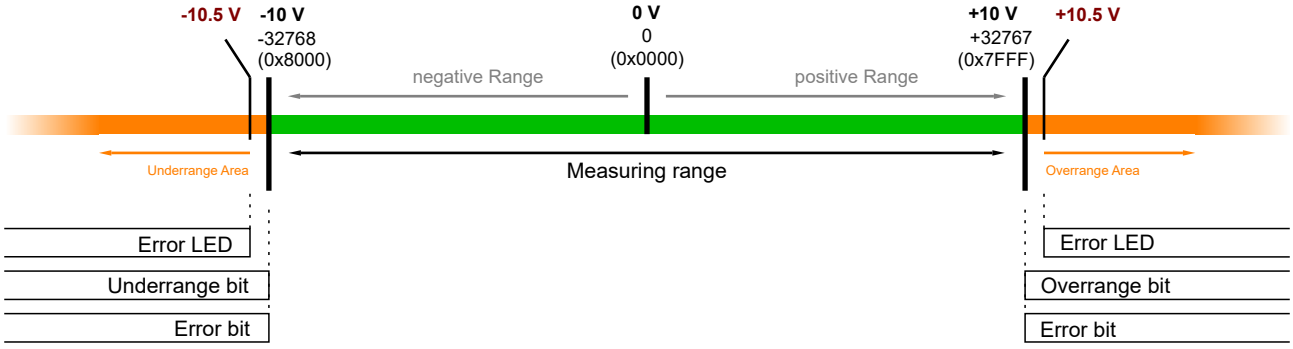
0 … 20 mA



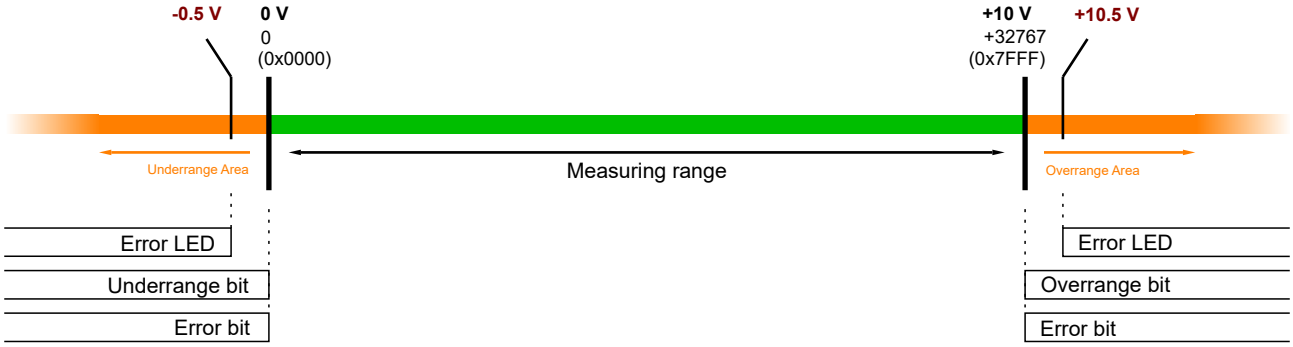
4 … 20 mA



-10 … +10 V



0 … 10 V


-0.5 V
0 V
0
(0x0000)
+10 V
+32767
(0x7FFF)
+10.5 V
Underrange Area
Measuring range
Overrange Area
Error LED
Underrange bit
Error bit
Error LED
Overrange bit
Error bit

5.5 Calibration

The concept "calibration", which has historical roots at Beckhoff, is used here even if it has nothing to do with the deviation statements of a calibration certificate.

- **Vendor calibration, index 0x80n0:0B**
  The vendor calibration is enabled via index 0x80n0:0B. The parameterization takes place via the indices:
  - 0x80nF:01 vendor calibration: Offset
  - 0x80nF:02 vendor calibration: Gain
- **User calibration, index 0x80n0:0A**
  The user calibration is enabled via index 0x80n0:0A. The parameterization takes place via the indices:
  - 0x80n0:17 User calibration: Offset
  - 0x80n0:18 User calibration: Gain
- **User scaling, index 0x80n0:01**
  The user scaling is enabled via index 0x80n0:01. The parameterization takes place via the indices:
  - 0x80n0:11 User scaling: Offset
  - 0x80n0:12 User scaling: Gain

Vendor calibration

The vendor reserves the right to carry out the basic calibration of the terminal/box modules. Therefore, the vendor calibration cannot be changed.

5.6 Calculation of process data

The terminal/box constantly records measured values and saves the raw values from its A/D converter in the ADC raw value object 0x80nE:01. The calculation of the correction with the vendor calibration values takes place after each acquisition of the analog signal. This is followed (optionally) by user scaling:

$Y_H = (X_{ADC} - B_H) * A_H$ measured value after vendor calibration (corresponds to X_{ADC} if index 0x80n0:0B inactive)

$Y_A = (Y_H - B_A) * A_A$ measured value after user calibration (corresponds to Y_H if index 0x80n0:0A inactive)

YS= YA * AS * 22-16 + BS measured value after user scaling (corresponds to Y_A if index 0x80n0:01 is inactive)

Key

Name	Name	Index
X_{ADC}	Output value of the A/D converter	0x80nE:01
B_H	Vendor calibration offset (can only be changed if the object Producer codeword 0xF008 is set)	0x80nF:01
A_H	Vendor calibration gain (can only be changed if the object Producer codeword 0xF008 is set)	0x80nF:02
Y_H	Measured value after vendor calibration	-
B_A	User calibration offset	0x80n0:11
A_A	User calibration gain	0x80n0:12
Y_S	Measured value after user calibration	-
B_S	User scaling offset (can be activated via index 0x80x0:0A)	0x80n0:17
A_S	User scaling gain (can be activated via index 0x80x0:0A)	0x80n0:18
Y_S	Process data for control, measured value after user scaling	-

5.7 TwinSAFE SC (only EP3174-0092)

5.7.1 TwinSAFE SC - operating principle

The TwinSAFE SC (Single Channel) technology enables the use of standard signals for safety tasks in any networks of fieldbuses. To do this, EtherCAT Terminals from the areas of analog input, angle/displacement measurement or communication (4…20 mA, incremental encoder, IO-Link, etc.) are extended by the TwinSAFE SC function. The typical signal characteristics and standard functionalities of the I/O components are retained. TwinSAFE SC I/Os have a yellow strip at the front of the housing to distinguish them from standard I/Os.

The TwinSAFE SC technology enables communication via a TwinSAFE protocol. These connections can be distinguished from the usual safe communication via Safety over EtherCAT.

The data of the TwinSAFE SC components are transferred via a TwinSAFE protocol to the TwinSAFE logic, where they can be used in the context of safety-relevant applications. Detailed examples for the correct application of the TwinSAFE SC components and the respective normative classification, which were confirmed/calculated by TÜV SÜD, can be found in the TwinSAFE application manual.

5.7.2 TwinSAFE SC - configuration

The TwinSAFE SC technology enables communication with standard EtherCAT terminals via the Safety over EtherCAT protocol. These connections use another checksum, in order to be able to distinguish between TwinSAFE SC and TwinSAFE. Eight fixed CRCs can be selected, or a free CRC can be entered by the user.

By default the TwinSAFE SC communication channel of the respective TwinSAFE SC component is not enabled. In order to be able to use the data transfer, the corresponding TwinSAFE SC module must first be added under the Slots tab. Only then is it possible to link to a corresponding alias device.

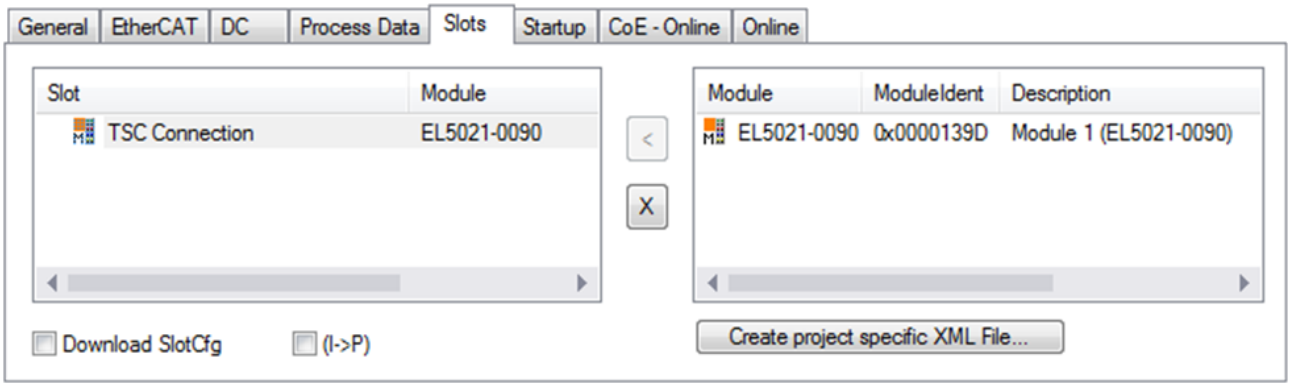


Fig. 18: Adding the TwinSAFE SC process data under the component, e.g. EL5021-0090

Additional process data with the ID TSC Inputs, TSC Outputs are generated (TSC - TwinSAFE Single Channel).

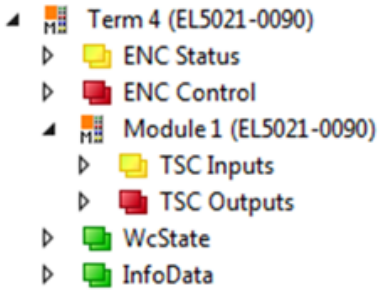


Fig. 19: TwinSAFE SC component process data, example EL5021-0090

A TwinSAFE SC connection is added by adding an alias devices in the safety project and selecting TSC (*TwinSAFE Single Channel*)

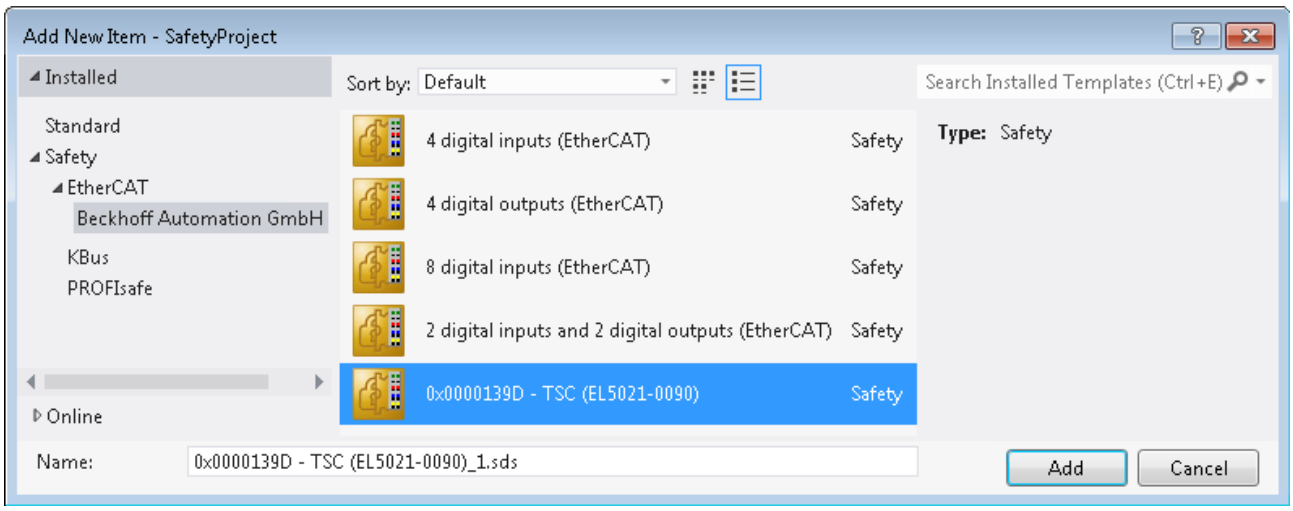


Fig. 20: Adding a TwinSAFE SC connection

After opening the alias device by double-clicking, select the Link button  next to *Physical Device,* in order to create the link to a TwinSAFE SC terminal. Only suitable TwinSAFE SC terminals are offered in the selection dialog.

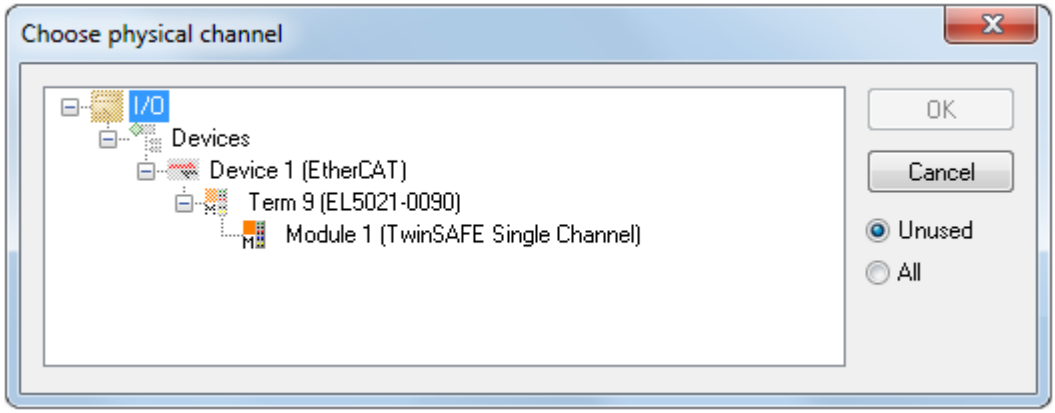


Fig. 21: Creating a link to TwinSAFE SC terminal

The CRC to be used can be selected or a free CRC can be entered under the Connection tab of the alias device.

Entry Mode	Used CRCs
TwinSAFE SC CRC 1 master	0x17B0F
TwinSAFE SC CRC 2 master	0x1571F
TwinSAFE SC CRC 3 master	0x11F95
TwinSAFE SC CRC 4 master	0x153F1
TwinSAFE SC CRC 5 master	0x1F1D5
TwinSAFE SC CRC 6 master	0x1663B
TwinSAFE SC CRC 7 master	0x1B8CD
TwinSAFE SC CRC 8 master	0x1E1BD

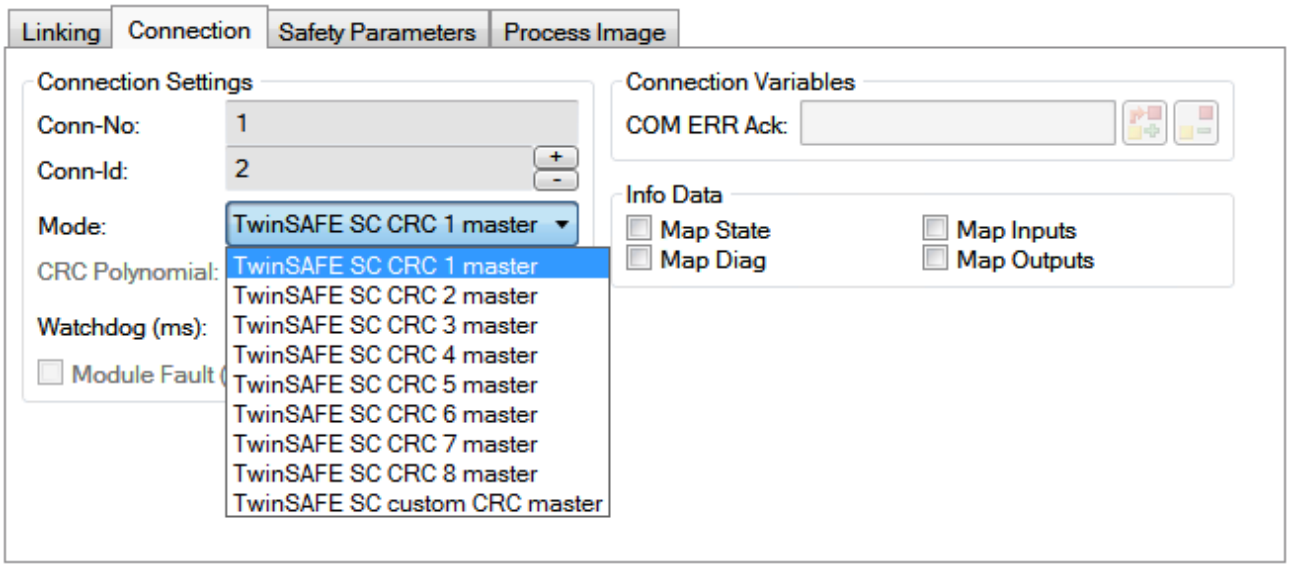


Fig. 22: Selecting a free CRC

These settings must match the settings in the CoE objects of the TwinSAFE SC component.
The TwinSAFE SC component initially makes all available process data available. The *Safety Parameters* tab typically contains no parameters. The process data size and the process data themselves can be selected under the *Process Image* tab.

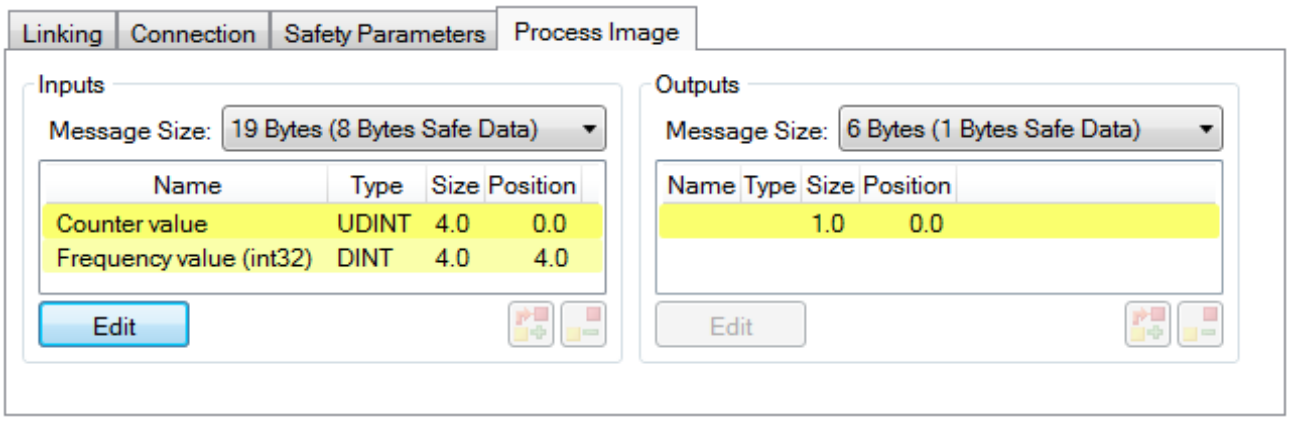


Fig. 23: Selecting the process data size and the process data

The process data (defined in the ESI file) can be adjusted to user requirements by selecting the *Edit* button in the dialog *Configure I/O element(s)*.

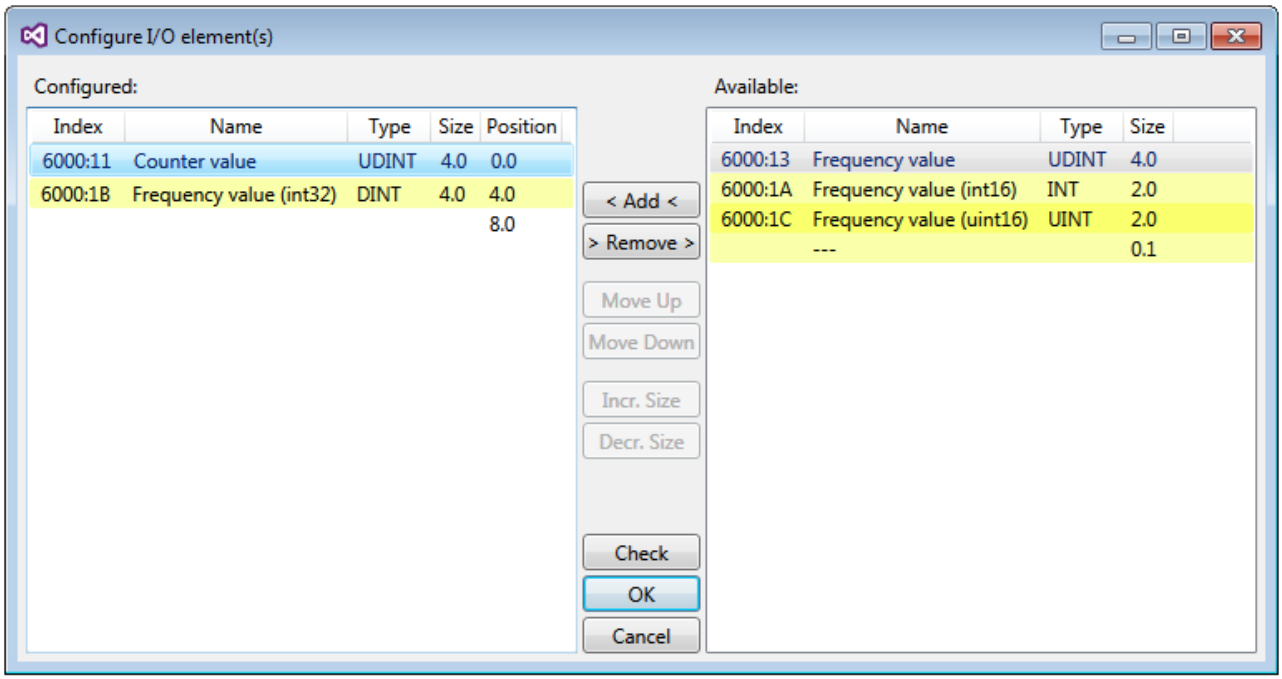


Fig. 24: Selection of the process data

The safety address together with the CRC must be entered on the TwinSAFE SC slave side. This is done via the CoE objects under *TSC settings* of the corresponding TwinSAFE SC component (here, for example, EL5021-0090, 0x8010: 01 and 0x8010: 02). The address set here must also be set in the *alias device* as *FSoE* address under the *Linking* tab.

Under the object 0x80n0:02 Connection Mode the CRC to be used is selected or a free CRC is entered. A total of 8 CRCs are available. A free CRC must start with 0x00ff in the high word.

8010:0	TSC Settings	RW	> 2 <
8010:01	Address	RW	0x0000 (0)
8010:02	Connection Mode	RW	TwinSAFE SC CRC1 master (97039)

Fig. 25: CoE objects 0x8010:01 and 0x8010:02

Object *TSC Settings*

Depending on the terminal, the index designation of the configuration object *TSC Settings* can vary.
Example:
- EL3214-0090 and EL3314-0090, TSC Settings, Index 8040
- EL5021-0090, TSC Settings, Index 8010
- EL6224-0090, TSC Settings, Index 800F

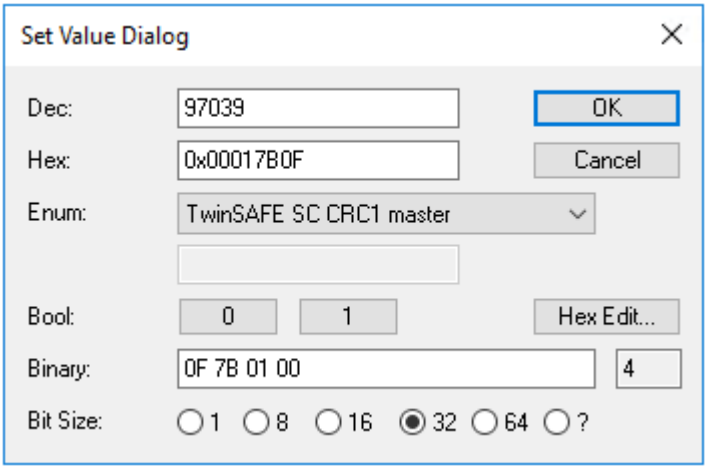


Fig. 26: Entering the safety address and the CRC

TwinSAFE SC connections

If several TwinSAFE SC connections are used within a configuration, a different CRC must be selected for each TwinSAFE SC connection.

5.7.3 EP3174-0092 - TwinSAFE SC process data

The EP3174-0092 transmits the following process data to the TwinSAFE logic:

Index (hex)	Name	Type	Size
6000:11	AI Module 1.Value	INT	2.0
6010:11	AI Module 2.Value	INT	2.0
6020:11	AI Module 3.Value	INT	2.0
6030:11	AI Module 4.Value	INT	2.0

The process data of all four channels are initially transmitted. Individual channels can be completely deselected on the "Process Image" tab in the Safety Editor.

Depending on the TwinCAT 3.1 version, process data can be automatically renamed when linking to the Safety Editor.

5.7.4 Objects TwinSAFE Single Channel (EP3174-0092)

Index 1610 TSC RxPDO-Map Master Message

Index (hex)	Name	Meaning	Data type	Flags	Default
1610:0	TSC RxPDO-Map Master Message	PDO Mapping RxPDO	UINT8	RO	0x04 (4_{dec})
1610:01	SubIndex 001	1. PDO Mapping entry (object 0x7040 (TSC Master Frame Elements), entry 0x01 (TSC___Master Cmd))	UINT32	RO	0x7040:01, 8
1610:02	SubIndex 002	2. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1610:03	SubIndex 003	3. PDO Mapping entry (object 0x7040 (TSC Master Frame Elements), entry 0x03 (TSC__Master CRC_0))	UINT32	RO	0x7040:03, 16
1610:04	SubIndex 004	4. PDO Mapping entry (object 0x7040 (TSC Master Frame Elements), entry 0x02 (TSC__Master ConnID))	UINT32	RO	0x7040:02, 16

Index 1A10 TSC TxPDO-Map Slave Message

Index (hex)	Name	Meaning	Data type	Flags	Default
1A10:0	TSC TxPDO-Map Slave Message	PDO Mapping TxPDO	UINT8	RW	0x0A (10_{dec})
1A10:01	SubIndex 001	1. PDO Mapping entry (object 0x6040 (TSC Slave Frame Elements), entry 0x01 (TSC___Slave Cmd))	UINT32	RW	0x6040:01, 8
1A10:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x11 (Value))	UINT32	RW	0x6000:11, 16
1A10:03	SubIndex 003	3. PDO Mapping entry (object 0x6040 (TSC Slave Frame Elements), entry 0x03 (TSC__Slave CRC_0))	UINT32	RW	0x6040:03, 16
1A10:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x11 (Value))	UINT32	RW	0x6010:11, 16
1A10:05	SubIndex 005	5. PDO Mapping entry (object 0x6040 (TSC Slave Frame Elements), entry 0x04 (TSC__Slave CRC_1))	UINT32	RW	0x6040:04, 16
1A10:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x11 (Value))	UINT32	RW	0x6020:11, 16
1A10:07	SubIndex 007	7. PDO Mapping entry (object 0x6040 (TSC Slave Frame Elements), entry 0x05 (TSC__Slave CRC_2))	UINT32	RW	0x6040:05, 16
1A10:08	SubIndex 008	8. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x11 (Value))	UINT32	RW	0x6030:11, 16
1A10:09	SubIndex 009	9. PDO Mapping entry (object 0x6040 (TSC Slave Frame Elements), entry 0x06 (TSC__Slave CRC_3))	UINT32	RW	0x6040:06, 16
1A10:0A	SubIndex 010	10. PDO Mapping entry (object 0x6040 (TSC Slave Frame Elements), entry 0x02 (TSC__Slave ConnID))	UINT32	RW	0x6040:02, 16

Index 6040 TSC Slave Frame Elements

Index (hex)	Name	Meaning	Data type	Flags	Default
6040:0	TSC Slave Frame Elements	Max. Subindex	UINT8	RO	0x06 (6_{dec})
6040:01	TSC__Slave Cmd	reserved	UINT8	RO	0x00 (0_{dec})
6040:02	TSC__Slave ConnID	reserved	UINT16	RO	0x0000 (0_{dec})
6040:03	TSC__Slave CRC_0	reserved	UINT16	RO	0x0000 (0_{dec})
6040:04	TSC__Slave CRC_1	reserved	UINT16	RO	0x0000 (0_{dec})
6040:05	TSC__Slave CRC_2	reserved	UINT16	RO	0x0000 (0_{dec})
6040:06	TSC__Slave CRC_3	reserved	UINT16	RO	0x0000 (0_{dec})

Index 7040 TSC Master Frame Elements

Index (hex)	Name	Meaning	Data type	Flags	Default
7040:0	TSC Master Frame Elements	Max. Subindex	UINT8	RO	0x03 (3_{dec})
7040:01	TSC__Master Cmd	reserved	UINT8	RO	0x00 (0_{dec})
7040:02	TSC__Master ConnID	reserved	UINT16	RO	0x0000 (0_{dec})
7040:03	TSC__Master CRC_0	reserved	UINT16	RO	0x0000 (0_{dec})

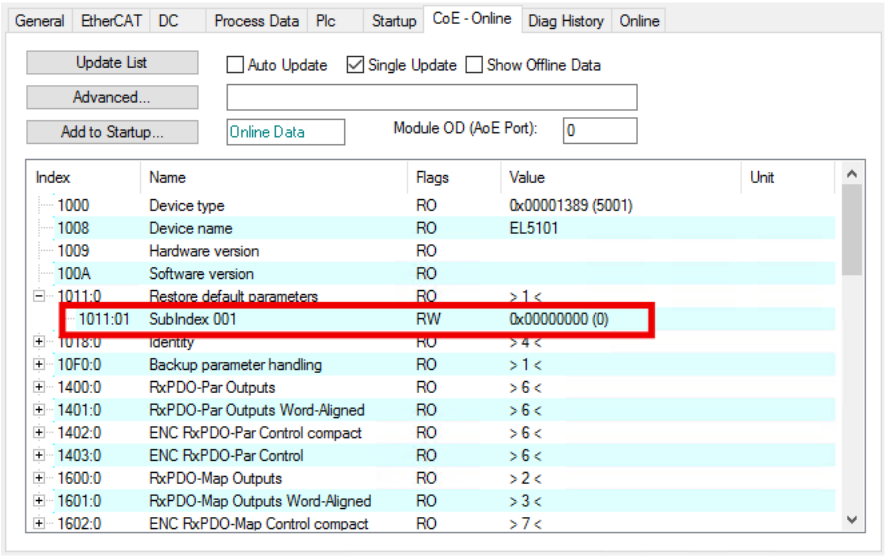
Index 8040 TSC Settings

Index (hex)	Name	Meaning	Data type	Flags	Default
8040:0	TSC Settings	Max. Subindex	UINT8	RO	0x02 (2_{dec})
8040:01	Address	TwinSAFE SC Address	UINT16	RO	0x0000 (0_{dec})
8040:02	Connection Mode	Selection of the TwinSAFE SC CRC	UINT32	RO	0x00000000 (0_{dec})

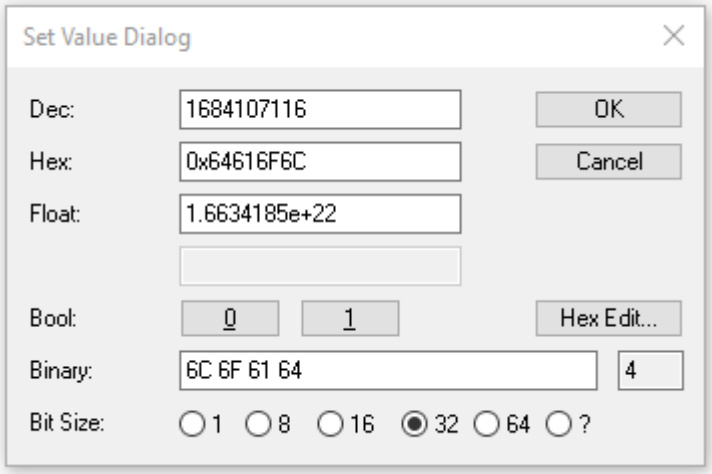
5.8 Restore the delivery state

You can restore the delivery state of the backup objects as follows:

1. Ensure that TwinCAT is running in Config mode.
2. In CoE object 1011:0 "Restore default parameters" select parameter 1011:01 "Subindex 001".



3. Double-click on "Subindex 001".
   ⇨ The "Set Value Dialog" dialog box opens.
4. Enter the value 1684107116 in the "Dec" field.
   Alternatively: enter the value 0x64616F6C in the "Hex" field.



5. Confirm with "OK".

⇨ All backup objects are reset to the delivery state.

Alternative restore value

With some older modules the backup objects can be changed with an alternative restore value:
Decimal value: 1819238756
Hexadecimal value: 0x6C6F6164

An incorrect entry for the restore value has no effect.

5.9 Decommissioning

⚠ WARNING

Risk of electric shock!

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

6 CoE parameters

6.1 EP3162-0002 - Object overview

EtherCAT XML Device Description

The presentation matches that of the EtherCAT XML Device Description.
Recommendation: download the latest XML file from https://www.beckhoff.com/ and install it according to the installation instructions.

Index (hex)		Name	Flags	Default value
1000 [▶ 88]		Device type	RO	0x012C1389 (19665801$_{dec}$)
1008 [▶ 88]		Device name	RO	EP3162-0002
1009 [▶ 88]		Hardware version	RO	01
100A [▶ 88]		Software version	RO	01
1011:0 [▶ 85]	**Subindex**	Restore default parameters	RO	0x01 (1$_{dec}$)
	1011:01	SubIndex 001	RW	0x00000000 (0$_{dec}$)
1018:0 [▶ 88]	**Subindex**	Identity	RO	0x04 (4$_{dec}$)
	1018:01	Vendor ID	RO	0x00000002 (2$_{dec}$)
	1018:02	Product code	RO	0x0C5A4052 (207241298$_{dec}$)
	1018:03	Revision	RO	0x00100002 (1048578$_{dec}$)
	1018:04	Serial number	RO	0x00000000 (0$_{dec}$)
10F0:0 [▶ 88]	**Subindex**	Backup parameter handling	RO	0x01 (1$_{dec}$)
	10F00:01	Checksum	RO	0x00000000 (0$_{dec}$)
1A00:0 [▶ 88]	**Subindex**	AI TxPDO-Map Standard Ch.1	RO	0x11 (11$_{dec}$)
	1A00:01	Subindex 001	RO	0x6000:01, 1
	1A00:02	Subindex 002	RO	0x6000:02, 1
	1A00:03	Subindex 003	RO	0x6000:03, 2
	1A00:04	Subindex 004	RO	0x6000:05, 2
	1A00:05	Subindex 005	RO	0x6000:07, 1
	1A00:06	Subindex 006	RO	0x0000:00, 1
	1A00:07	Subindex 007	RO	0x0000:00, 5
	1A00:08	Subindex 008	RO	0x6000:0E, 1
	1A00:09	Subindex 009	RO	0x6000:0F, 1
	1A00:0A	Subindex 010	RO	0x6000:10, 1
	1A00:0B	Subindex 011	RO	0x6000:11, 16
1A01:0 [▶ 90]	**Subindex**	AI TxPDO-Map Standard Ch.2	RO	0x11 (11$_{dec}$)
	1A01:01	SubIndex 001	RO	0x6010:01, 1
	1A01:02	SubIndex 002	RO	0x6010:02, 1
	1A01:03	SubIndex 003	RO	0x6010:03, 2
	1A01:04	SubIndex 004	RO	0x6010:05, 2
	1A01:05	SubIndex 005	RO	0x6010:07, 1
	1A01:06	SubIndex 006	RO	0x0000:00, 1
	1A01:07	SubIndex 007	RO	0x0000:00, 5
	1A01:08	SubIndex 008	RO	0x6010:0E, 1
	1A01:09	SubIndex 009	RO	0x6010:0F, 1
	1A01:0A	SubIndex 010	RO	0x6010:10, 1
	1A01:0B	Subindex011	RO	0x6010:11, 16
1C00:0 [▶ 91]	**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$_{dec}$)
1C12:0 [▶ 91]	**Subindex**	RxPDO assign	RW	0x00 (0$_{dec}$)
	1C12:01	SubIndex 001	RW	-
	1C12:02	SubIndex 002	RW	-
1C13:0 [▶ 91]	**Subindex**	TxPDO assign	RW	0x02 (2$_{dec}$)
	1C13:01	SubIndex 001	RW	0x1A00 (6656$_{dec}$)
	1C13:02	SubIndex 002	RW	0x1A01 (6657$_{dec}$)
	1C13:03	SubIndex 003	RW	-
	1C13:04	SubIndex 004	RW	-
Index (hex)		Name	Flags	Default value
1C32:0 [▶ 92]	**Subindex**	SM output parameter	RO	0x20 (32$_{dec}$)
	1C32:01	Sync mode	RW	0x0000 (0$_{dec}$)
	1C32:02	Cycle time	RW	0x000F4240 (1000000$_{dec}$)
	1C32:03	Shift time	RO	0x00000000 (0$_{dec}$)
	1C32:04	Sync modes supported	RO	0xC009 (49161$_{dec}$)
	1C32:05	Minimum cycle time	RO	0x00055730 (350000$_{dec}$)

Index (hex)		Name	Flags	Default value
	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})
1C33:0 [▶ 94]	**Subindex**	SM input parameter	RO	0x20 (32_{dec})
	1C33:01	Sync mode	RW	0x0000 (0_{dec})
	1C33:02	Cycle time	RW	0x000F4240 (1000000_{dec})
	1C33:03	Shift time	RO	0x00001388 (5000_{dec})
	1C33:04	Sync modes supported	RO	0xC009 (49161_{dec})
	1C33:05	Minimum cycle time	RO	0x00055730 (350000_{dec})
	1C33:06	Calc and copy time	RO	0x00000000 (0_{dec})
	1C33:07	Minimum delay time	RO	0x00001388 (5000_{dec})
	1C33:08	Command	RW	0x0000 (0_{dec})
	1C33:09	Maximum Delay time	RO	0x00001388 (5000_{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	0x0000 (0_{dec})
6000:0 [▶ 96]	**Subindex**	AI Inputs Ch. 1	RO	0x11 (17_{dec})
	6000:01	Underrange	RO	0x00 (0_{dec})
	6000:02	Overrange	RO	0x00 (0_{dec})
	6000:03	Limit 1	RO	0x00 (0_{dec})
	6000:05	Limit 2	RO	0x00 (0_{dec})
	6000:07	Error	RO	0x00 (0_{dec})
	6000:0E	Sync Error	RO	0x00 (0_{dec})
	6000:0F	TxPDO State	RO	0x00 (0_{dec})
	6000:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6000:11	Value	RO	0x0000 (0_{dec})
6010:0 [▶ 96]	**Subindex**	AI Inputs Ch. 2	RO	0x11 (17_{dec})
	6010:01	Underrange	RO	0x00 (0_{dec})
	6010:02	Overrange	RO	0x00 (0_{dec})
	6010:03	Limit 1	RO	0x00 (0_{dec})
	6010:05	Limit 2	RO	0x00 (0_{dec})
	6010:07	Error	RO	0x00 (0_{dec})
	6010:0E	Sync error	RO	0x00 (0_{dec})
	6010:0F	TxPDO State	RO	0x00 (0_{dec})
	6010:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6010:11	Value	RO	0x0000 (0_{dec})
8000:0 [▶ 86]	**Subindex**	AI Settings Ch. 1	RW	0x18 (24_{dec})
	8000:01	Enable user scale	RW	0x00 (0_{dec})
	8000:02	Presentation	RW	0x00 (0_{dec})
	8000:06	Enable filter	RW	0x01 (1_{dec})
	8000:07	Enable limit 1	RW	0x00 (0_{dec})
	8000:08	Enable limit 2	RW	0x00 (0_{dec})
	8000:0A	Enable user calibration	RW	0x00 (0_{dec})
	8000:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8000:0E	Swap limit bits	RW	0x00 (0_{dec})
	8000:11	User scale offset	RW	0x0000 (0_{dec})
	8000:12	User scale gain	RW	0x00010000 (65536_{dec})
	8000:13	Limit 1	RW	0x0000 (0_{dec})
	8000:14	Limit 2	RW	0x0000 (0_{dec})
	8000:15	Filter settings	RW	0x0000 (0_{dec})
	8000:17	User calibration offset	RW	0x0000 (0_{dec})
	8000:18	User calibration gain	RW	0x4000 (16384_{dec})

Index (hex)		Name	Flags	Default value
800E:0 [▶ 97]	**Subindex**	AI Internal data Ch. 1	RW	0x01 (1_{dec})
	800E:01	ADC raw value	RW	0x0000 (0_{dec})
800F:0 [▶ 97]	**Subindex**	AI Vendor data Ch. 1	RW	0x06 (6_{dec})
	800F:01	offset U	RW	0x0000 (0_{dec})
	800F:02	gain U	RW	0x4000 (16384_{dec})
	800F:03	offset I	RW	0x0000 (0_{dec})
	800F:04	gain I	RW	0x4000 (16384_{dec})
	800F:05	offset I4	RW	0x0000 (0_{dec})
	800F:06	gain I4	RW	0x4000 (16384_{dec})
8010:0 [▶ 87]	**Subindex**	AI Settings Ch. 2	RW	0x18 (24_{dec})
	8010:01	Enable user scale	RW	0x00 (0_{dec})
	8010:02	Presentation	RW	0x00 (0_{dec})
	8010:06	Enable filter	RW	0x00 (0_{dec})
	8010:07	Enable limit 1	RW	0x00 (0_{dec})
	8010:08	Enable limit 2	RW	0x00 (0_{dec})
	8010:0A	Enable user calibration	RW	0x00 (0_{dec})
	8010:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8010:0E	Swap limit bits	RW	0x00 (0_{dec})
	8010:11	User scale offset	RW	0x0000 (0_{dec})
	8010:12	User scale gain	RW	0x00010000 (65536_{dec})
	8010:13	Limit 1	RW	0x0000 (0_{dec})
	8010:14	Limit 2	RW	0x0000 (0_{dec})
	8010:15	Filter settings	RW	0x0000 (0_{dec})
	8010:17	User calibration offset	RW	0x0000 (0_{dec})
	8010:18	User calibration gain	RW	0x4000 (16384_{dec})
801E:0 [▶ 97]	**Subindex**	AI Internal data Ch. 2	RW	0x01 (1_{dec})
	801E:01	ADC raw value	RW	0x0000 (0_{dec})
801F:0 [▶ 97]	**Subindex**	AI Vendor data Ch. 2	RW	0x06 (6_{dec})
	801F:01	offset U	RW	0x0000 (0_{dec})
	801F:02	gain U	RW	0x4000 (16384_{dec})
	801F:03	offset I	RW	0x0000 (0_{dec})
	801F:04	gain I	RW	0x4000 (16384_{dec})
	801F:05	offset I4	RW	0x0000 (0_{dec})
	801F:06	gain I4	RW	0x4000 (16384_{dec})
F000:0 [▶ 97]	**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})
F008 [▶ 97]		Code word	RW	0x0000 (0_{dec})
F010:0 [▶ 97]	**Subindex**	Module list	RW	0x02 (2_{dec})
	F010:01	SubIndex 001	RW	0x0000012C (300_{dec})
	F010:02	SubIndex 002	RW	0x0000012C (300_{dec})
F800:0 [▶ 87]	**Subindex**	AI Range Settings	RW	0x02 (2_{dec})
	F800:01	Input type Ch1	RW	0x0000 (0_{dec})
	F800:02	Input type Ch2	RW	0x0000 (0_{dec})

Legend

Flags:

RO (Read Only): this object can be read only

RW (Read/Write): this object can be read and written to

6.2 EP3182-1002 - Object overview

EtherCAT XML Device Description

The presentation matches that of the EtherCAT XML Device Description.
Recommendation: download the latest XML file from https://www.beckhoff.com/ and install it according to the installation instructions.

Index (hex)		Name	Flags	Default value
1000 [▶ 88]		Device type	RO	0x00001389 (5001$_{dec}$)
1008 [▶ 88]		Device name	RO	EP3182-1002
1009 [▶ 88]		Hardware version	RO	01
100A [▶ 88]		Software version	RO	01
1011:0 [▶ 85]	**Subindex**	Restore default parameters	RO	0x01 (1$_{dec}$)
	1011:01	SubIndex 001	RW	0x00000000 (0$_{dec}$)
1018:0 [▶ 88]	**Subindex**	Identity	RO	0x04 (4$_{dec}$)
	1018:01	Vendor ID	RO	0x00000002 (2$_{dec}$)
	1018:02	Product code	RO	0x0C6E4052 (208552018$_{dec}$)
	1018:03	Revision	RO	0x001403EA (1311722$_{dec}$)
	1018:04	Serial number	RO	0x00000000 (0$_{dec}$)
10F0:0 [▶ 88]	**Subindex**	Backup parameter handling	RO	0x01 (1$_{dec}$)
	10F00:01	Checksum	RO	0x00000000 (0$_{dec}$)
1600:0 [▶ 88]	**Subindex**	DO RxPDO-Map Outputs	RO	0x03 (3$_{dec}$)
	1600:01	Subindex 001	RO	0x7020:01, 1
	1600:02	Subindex 002	RO	0x7020:02, 1
	1600:03	Subindex 003	RO	0x0000:0,14
1800:0 [▶ 89]	**Subindex**	AI TxPDO-Par Standard Ch.1	RO	0x06 (6$_{dec}$)
	1800:06	Exclude TxPDOs	RO	01 1A
1801:0 [▶ 89]	**Subindex**	AI TxPDO-Par Compact Ch.1	RO	0x06 (6$_{dec}$)
	1801:06	Exclude TxPDOs	RO	00 1A
1802:0 [▶ 89]	**Subindex**	AI TxPDO-Par Standard Ch.2	RO	0x06 (6$_{dec}$)
	1802:06	Exclude TxPDOs	RO	03 1A
1803:0 [▶ 89]	**Subindex**	AI TxPDO-Par Compact Ch.2	RO	0x06 (6$_{dec}$)
	1801:06	Exclude TxPDOs	RO	02 1A
1A00:0 [▶ 88]	**Subindex**	AI TxPDO-Map Standard Ch.1	RO	0x11 (11$_{dec}$)
	1A00:01	Subindex 001	RO	0x6000:01, 1
	1A00:02	Subindex 002	RO	0x6000:02, 1
	1A00:03	Subindex 003	RO	0x6000:03, 2
	1A00:04	Subindex 004	RO	0x6000:05, 2
	1A00:05	Subindex 005	RO	0x6000:07, 1
	1A00:06	Subindex 006	RO	0x0000:00, 1
	1A00:07	Subindex 007	RO	0x0000:00, 5
	1A00:08	Subindex 008	RO	0x6000:0E, 1
	1A00:09	Subindex 009	RO	0x6000:0F, 1
	1A00:0A	Subindex 010	RO	0x6000:10, 1
	1A00:0B	Subindex 011	RO	0x6000:11, 16
1A01:0 [▶ 90]	**Subindex**	AI TxPDO-Map Compact Ch.1	RO	0x01 (1$_{dec}$)
	1A01:01	SubIndex 001	RO	0x6000:11, 16
1A02:0 [▶ 90]	**Subindex**	AI TxPDO-Map Standard Ch.2	RO	0x11 (11$_{dec}$)
	1A02:01	SubIndex 001	RO	0x6010:01, 1
	1A02:02	SubIndex 002	RO	0x6010:02, 1
	1A02:03	SubIndex 003	RO	0x6010:03, 2
	1A02:04	SubIndex 004	RO	0x6010:05, 2
	1A02:05	SubIndex 005	RO	0x6010:07, 1
	1A02:06	SubIndex 006	RO	0x0000:00, 1
	1A02:07	SubIndex 007	RO	0x0000:00, 5
	1A02:08	SubIndex 008	RO	0x6010:0E, 1
	1A02:09	SubIndex 009	RO	0x6010:0F, 1
Index (hex)		Name	Flags	Default value
1A02:0 [▶ 90]	1A02:0A	SubIndex 010	RO	0x6010:10, 1
	1A02:0B	Subindex011	RO	0x6010:11, 16
1A03:0 [▶ 90]	**Subindex**	AI TxPDO-Map Compact Ch.2	RO	0x01 (1$_{dec}$)
	1A03:01	SubIndex 001	RO	0x6010:11, 16
1C00:0 [▶ 91]	**Subindex**	Sync manager type	RO	0x04 (4$_{dec}$)
	1C00:01	SubIndex 001	RO	0x01 (1$_{dec}$)
	1C00:02	SubIndex 002	RO	0x02 (2$_{dec}$)

Index (hex)		Name	Flags	Default value
	1C00:03	SubIndex 003	RO	0x03 (3_{dec})
	1C00:04	SubIndex 004	RO	0x04 (4_{dec})
1C12:0 [▶ 91]	**Subindex**	RxPDO assign	RW	0x01 (1_{dec})
	1C12:01	SubIndex 001	RW	0x1600 (5632)
1C13:0 [▶ 91]	**Subindex**	TxPDO assign	RW	0x02 (2_{dec})
	1C13:01	SubIndex 001	RW	0x1A00 (6656_{dec})
	1C13:02	SubIndex 002	RW	0x1A02 (6658_{dec})
1C32:0 [▶ 93]	**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	0x00001388 (5000_{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	0x00001388 (5000_{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})
1C33:0 [▶ 95]	**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	0x00001388 (5000_{dec})
	1C33:04	Sync modes supported	RO	0xC007 (49159_{dec})
	1C33:05	Minimum cycle time	RO	0x00001388 (5000_{dec})
	1C33:06	Calc and copy time	RO	0x00002710 (10000_{dec})
	1C33:07	Minimum delay time	RO	0x00001388 (5000_{dec})
	1C33:08	Command	RW	0x0000 (0_{dec})
	1C33:09	Maximum Delay time	RO	0x00001388 (5000_{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})
6000:0 [▶ 96]	**Subindex**	AI Inputs Ch. 1	RO	0x11 (17_{dec})
	6000:01	Underrange	RO	0x00 (0_{dec})
	6000:02	Overrange	RO	0x00 (0_{dec})
	6000:03	Limit 1	RO	0x00 (0_{dec})
	6000:05	Limit 2	RO	0x00 (0_{dec})
	6000:07	Error	RO	0x00 (0_{dec})
	6000:0E	Sync Error	RO	0x00 (0_{dec})
	6000:0F	TxPDO State	RO	0x00 (0_{dec})
	6000:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6000:11	Value	RO	0x0000 (0_{dec})
6010:0 [▶ 96]	**Subindex**	AI Inputs Ch. 2	RO	0x11 (17_{dec})
	6010:01	Underrange	RO	0x00 (0_{dec})
	6010:02	Overrange	RO	0x00 (0_{dec})
	6010:03	Limit 1	RO	0x00 (0_{dec})
	6010:05	Limit 2	RO	0x00 (0_{dec})
	6010:07	Error	RO	0x00 (0_{dec})
	6010:0E	Sync error	RO	0x00 (0_{dec})
	6010:0F	TxPDO State	RO	0x00 (0_{dec})
	6010:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6010:11	Value	RO	0x0000 (0_{dec})
7020:0 [▶ 96]	**Subindex**	DO Outputs	RO	0x02 (2_{dec})
	7020:01	Digital Output 1	RO	0x00 (0_{dec})
	7020:02	Digital Output 2	RO	0x00 (0_{dec})

Index (hex)		Name	Flags	Default value
8000:0 [▶ 86]	**Subindex**	AI Settings Ch. 1	RW	0x18 (24_{dec})
	8000:01	Enable user scale	RW	0x00 (0_{dec})
	8000:02	Presentation	RW	0x00 (0_{dec})
	8000:06	Enable filter	RW	0x01 (1_{dec})
	8000:07	Enable limit 1	RW	0x00 (0_{dec})
	8000:08	Enable limit 2	RW	0x00 (0_{dec})
	8000:0A	Enable user calibration	RW	0x00 (0_{dec})
	8000:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8000:0E	Swap limit bits	RW	0x00 (0_{dec})
	8000:11	User scale offset	RW	0x0000 (0_{dec})
	8000:12	User scale gain	RW	0x00010000 (65536_{dec})
	8000:13	Limit 1	RW	0x0000 (0_{dec})
	8000:14	Limit 2	RW	0x0000 (0_{dec})
	8000:15	Filter settings	RW	0x0000 (0_{dec})
	8000:17	User calibration offset	RW	0x0000 (0_{dec})
	8000:18	User calibration gain	RW	0x4000 (16384_{dec})
800E:0 [▶ 97]	**Subindex**	AI Internal data Ch. 1	RW	0x01 (1_{dec})
	800E:01	ADC raw value	RW	0x0000 (0_{dec})
800F:0 [▶ 97]	**Subindex**	AI Vendor data Ch. 1	RW	0x06 (6_{dec})
	800F:01	offset U	RW	0x0000 (0_{dec})
	800F:02	gain U	RW	0x4000 (16384_{dec})
	800F:03	offset I	RW	0x0000 (0_{dec})
	800F:04	gain I	RW	0x4000 (16384_{dec})
	800F:05	offset I4	RW	0x0000 (0_{dec})
	800F:06	gain I4	RW	0x4000 (16384_{dec})
8010:0 [▶ 87]	**Subindex**	AI Settings Ch. 2	RW	0x18 (24_{dec})
	8010:01	Enable user scale	RW	0x00 (0_{dec})
	8010:02	Presentation	RW	0x00 (0_{dec})
	8010:06	Enable filter	RW	0x00 (0_{dec})
	8010:07	Enable limit 1	RW	0x00 (0_{dec})
	8010:08	Enable limit 2	RW	0x00 (0_{dec})
	8010:0A	Enable user calibration	RW	0x00 (0_{dec})
	8010:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8010:0E	Swap limit bits	RW	0x00 (0_{dec})
	8010:11	User scale offset	RW	0x0000 (0_{dec})
	8010:12	User scale gain	RW	0x00010000 (65536_{dec})
	8010:13	Limit 1	RW	0x0000 (0_{dec})
	8010:14	Limit 2	RW	0x0000 (0_{dec})
	8010:15	Filter settings	RW	0x0000 (0_{dec})
	8010:17	User calibration offset	RW	0x0000 (0_{dec})
	8010:18	User calibration gain	RW	0x4000 (16384_{dec})
801E:0 [▶ 97]	**Subindex**	AI Internal data Ch. 2	RW	0x01 (1_{dec})
	801E:01	ADC raw value	RW	0x0000 (0_{dec})
801F:0 [▶ 97]	**Subindex**	AI Vendor data Ch. 2	RW	0x06 (6_{dec})
	801F:01	offset U	RW	0x0000 (0_{dec})
	801F:02	gain U	RW	0x4000 (16384_{dec})
	801F:03	offset I	RW	0x0000 (0_{dec})
	801F:04	gain I	RW	0x4000 (16384_{dec})
	801F:05	offset I4	RW	0x0000 (0_{dec})
	801F:06	gain I4	RW	0x4000 (16384_{dec})
F000:0 [▶ 97]	**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 [▶ 97]		Code word	RW	0x0000 (0_{dec})
F010:0 [▶ 98]	**Subindex**	Module list	RW	0x02 (2_{dec})
	F010:01	SubIndex 001	RW	0x0000012C (300_{dec})
	F010:02	SubIndex 002	RW	0x0000012C (300_{dec})
	F010:03	SubIndex 003	RW	0x000000C8 (200_{dec})

Index (hex)		Name	Flags	Default value
F800:0 [▶ 87]	**Subindex**	AI Range Settings	RW	0x02 (2_{dec})
	F800:01	Input type Ch1	RW	0x0000 (0_{dec})
	F800:02	Input type Ch2	RW	0x0000 (0_{dec})

Legend

Flags:

RO (Read Only): this object can be read only

RW (Read/Write): this object can be read and written to

6.3 EP31x2 - Object description and parameterization

Parameterization

You can parameterize the box via the "CoE - Online" tab in TwinCAT.

EtherCAT XML Device Description

The presentation matches that of the EtherCAT XML Device Description.
Recommendation: download the latest XML file from https://www.beckhoff.com/ and install it according to the installation instructions.

Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization [▶ 85] during commissioning
- Objects for indicating internal settings [▶ 87] (may be fixed)
- Further profile-specific objects [▶ 95] 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 (hex)	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 AI settings Ch.1 (parameterization of channel 1)

Index (hex)	Name	Meaning		Data type	Flags	Default
8000:0	AI Settings Ch.1	Maximum subindex		UINT8	RO	0x18 (24_{dec})
8000:01	Enable user scale	1	User scale is active.	BOOLEAN	RW	0x00 (0_{dec})
8000:02	Presentation	0	Signed presentation	BIT3	RW	0x00 (0_{dec})
		1	Unsigned presentation			
		2	Absolute value with MSB as sign (signed amount representation)			
8000:05 EP3182-1002 only	Siemens bits	The S5 bits are displayed in the three low-order bits		BOOLEAN	RW	0x00 (0_{dec})
8000:06	Enable filter	1	Enable filter, which makes PLC-cycle-synchronous data exchange unnecessary	BOOLEAN	RW	0x00 (0_{dec})
8000:07	Enable limit 1	1	Limit 1 enabled	BOOLEAN	RW	0x00 (0_{dec})
8000:08	Enable limit 2	1	Limit 2 enabled	BOOLEAN	RW	0x00 (0_{dec})
8000:0A	Enable user calibration	1	Enabling of the user calibration	BOOLEAN	RW	0x00 (0_{dec})
8000:0B	Enable vendor calibration	1	Enabling of the vendor calibration	BOOLEAN	RW	0x01 (1_{dec})
8000:0E	Swap limit bits	1	Swaps the two limit bits, in order to achieve compatibility with older hardware versions.	BOOLEAN	RW	0x00 (0_{dec})
8000:11	User scale offset	User scale offset		INT16	RW	0x0000 (0_{dec})
8000:12	User scale gain	User scale gain. The gain is represented in fixed-point format, with the factor 2^{-16}. The value 1 corresponds to 65535_{dec} ($0x00010000_{hex}$) and is limited to +/- 0x7FFFF		INT32	RW	0x00010000 (65536_{dec})
8000:13	Limit 1	First limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8000:14	Limit 2	Second limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8000:15	Filter settings	This object determines the digital filter settings **for all channels of the module**, if it is activated via Enable filter (index 0x80n0:06 [▶ 86]). The possible settings are sequentially numbered.		UINT16	RW	0x0000 (0_{dec})
		0	50 Hz FIR			
		1	60 Hz FIR			
		2	IIR 1			
		3	IIR 2			
		4	IIR 3			
		5	IIR 4			
		6	IIR 5			
		7	IIR 6			
		8	IIR 7			
		9	IIR 8			
8000:17	User calibration offset	User calibration: Offset		INT16	RW	0x0000 (0_{dec})
8000:18	User calibration gain	User calibration: Gain		INT16	RW	0x4000 (16384_{dec})

Index 8010 AI Settings (parameterization of channel 2)

Index (hex)	Name	Meaning		Data type	Flags	Default
8010:0	AI Settings	Maximum subindex		UINT8	RO	0x18 (24_{dec})
8010:01	Enable user scale	1	User scale is active.	BOOLEAN	RW	0x00 (0_{dec})
8010:02	Presentation	0	Signed presentation	BIT3	RW	0x00 (0_{dec})
		1	Unsigned presentation			
		2	Absolute value with MSB as sign (signed amount representation)			
8000:05 EP3182-1002 only	Siemens bits	The S5 bits are displayed in the three low-order bits		BOOLEAN	RW	0x00 (0_{dec})
8010:06	Enable filter	1	Enable filter, which makes PLC-cycle-synchronous data exchange unnecessary	BOOLEAN	RW	0x01 (1_{dec})
8010:07	Enable limit 1	1	Limit 1 enabled	BOOLEAN	RW	0x00 (0_{dec})
8010:08	Enable limit 2	1	Limit 2 enabled	BOOLEAN	RW	0x00 (0_{dec})
8010:0A	Enable user calibration	1	Enables user calibration	BOOLEAN	RW	0x00 (0_{dec})
8010:0B	Enable vendor calibration	1	Enable vendor calibration	BOOLEAN	RW	0x01 (1_{dec})
8010:0E	Swap limit bits	1	Swaps the two limit bits, in order to achieve compatibility with older hardware versions.	BOOLEAN	RW	0x00 (0_{dec})
8010:11	User scale offset	User scale offset		INT16	RW	0x0000 (0_{dec})
8010:12	User scale gain	User scale gain. The gain is represented in fixed-point format, with the factor 2^{-16}. The value 1 corresponds to 65535_{dec} ($0x00010000_{hex}$) and is limited to +/- 0x7FFFF		INT32	RW	0x00010000 (65536_{dec})
8010:13	Limit 1	First limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8010:14	Limit 2	Second limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8010:15	Filter settings	This object shows the digital filter settings. The filter settings can only be read here. They are set via channel 1 [▶ 86] for all channels of the module.		UINT16	RW	0x0000 (0_{dec})
		0	50 Hz FIR			
		1	60 Hz FIR			
		2	IIR 1			
		3	IIR 2			
		4	IIR 3			
		5	IIR 4			
		6	IIR 5			
		7	IIR 6			
		8	IIR 7			
		9	IIR 8			
8010:17	User calibration offset	User calibration: Offset		INT16	RW	0x0000 (0_{dec})
8010:18	User calibration gain	User calibration: Gain		INT16	RW	0x4000 (16384_{dec})

Index F800 AI Range Settings (EP3174/EP3184 from firmware version 04 as well as all EP3182)

Index (hex)	Name	Meaning		Data type	Flags	Default
F800:0	AI Range Settings	Maximum subindex		UINT8	RO	0x02 (2_{dec})
F800:01	Input type Ch1	Input signal range for channel 1		UINT16	RW	0x0000 (0_{dec})
		0	-10 V...+10 V			
		1	0 mA...20 mA			
		2	4 mA...20 mA			
		4	-20 mA…20 mA			
		6	0 V...10 V			
F800:02	Input type Ch2	Input signal range for channel 2 (values see channel 1)		UINT16	RW	0x0000 (0_{dec})

Additional objects

Standard objects (0x1000-0x1FFF)

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

Index 1000 Device type

Index (hex)	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	EP3162-0001: 0x012C1389 (19665801_{dec}) EP3182-1002: 0x00001389 (5001_{dec})

Index 1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EP3162-0002 EP3182-1002

Index 1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	STRING	RO	01

Index 100A Software Version

Index (hex)	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slave	STRING	RO	01

Index 1018 Identity

Index (hex)	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	EP3162.0002: 0x0C5A4052 (207241298_{dec}) EP3182-1002: 0x0C6E4052 (208552018_{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	0x00000000 (0_{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 (hex)	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 DO RxPDO-Map Outputs (EP3182-1002 only)

Index (hex)	Name	Meaning	Data type	Flags	Default
1600:0	DO RxPDO-Map Outputs	PDO Mapping TxPDO 1	UINT8	RO	0x0B (11_{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (DO Outputs), entry 0x01 (Digital output 1))	UINT32	RO	0x7020:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (DO Outputs), entry 0x02 (Digital output 2))	UINT32	RO	0x7020:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14

Index 1800 AI TxPDO-Par Standard Ch.1 (EP3182-1002 only)

Index (hex)	Name	Meaning	Data type	Flags	Default
1800:0	AI TxPDO-Par Standard Ch.1	PDO parameter TxPDO 1	UINT8	RO	0x06 (6_{dec})
1800:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 1	OCTET-STRING[2]	RO	01 1A

Index 1801 AI TxPDO-Par Compact Ch.1 (EP3182-1002 only)

Index (hex)	Name	Meaning	Data type	Flags	Default
1801:0	AI TxPDO-Par Compact Ch.1	PDO parameter TxPDO 2	UINT8	RO	0x06 (6_{dec})
1801:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 2	OCTET-STRING[2]	RO	00 1A

Index 1802 AI TxPDO-Par Standard Ch.2 (EP3182-1002 only)

Index (hex)	Name	Meaning	Data type	Flags	Default
1802:0	AI TxPDO-Par Standard Ch.2	PDO parameter TxPDO 3	UINT8	RO	0x06 (6_{dec})
1802:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 3	OCTET-STRING[2]	RO	03 1A

Index 1803 AI TxPDO-Par Compact Ch.2 (EP3182-1002 only)

Index (hex)	Name	Meaning	Data type	Flags	Default
1803:0	AI TxPDO-Par Compact Ch.2	PDO parameter TxPDO 4	UINT8	RO	0x06 (6_{dec})
1803:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 4	OCTET-STRING[2]	RO	02 1A

Index 1A00 AI TxPDO-Map Standard Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	AI TxPDO-Map Standard Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x0B (11_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6000:03, 2
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6000:05, 2
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6000:07, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (AI Inputs, entry 0x0E (Sync error))	UINT32	RO	0x6000:0E, 1
1A00:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x0F (TxPDO State))	UINT32	RO	0x6000:0F, 1
1A00:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1
1A00:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x16 (TxPDO Toggle))	UINT32	RO	0x6000:11, 16

Index 1A01 AI TxPDO-Map Standard Ch.2 (EP3162-0002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	AI TxPDO-Map Standard Ch.2	PDO Mapping TxPDO 3	UINT8	RO	0x0B (11_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6010:01, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6010:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6010:03, 2
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6010:05, 2
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6010:07, 1
1A01:06	SubIndex 006	6. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A01:07	SubIndex 007	7. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 6
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x1C32, entry 0x20)	UINT32	RO	0x1802:07, 1
1A01:09	SubIndex 009	9. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x07 (TxPDO State))	UINT32	RO	0x1802:09, 1
1A01:0A	SubIndex 010	10. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1
1A01:0B	SubIndex 011	11. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6010:11, 16

Index 1A01 AI TxPDO-Map Compact Ch.1 (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	AI TxPDO-Map Compact Ch.1	PDO Mapping TxPDO 2	UINT8	RO	0x01 (1_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x11 (Value))	UINT32	RO	0x6000:11, 16

Index 1A02 AI TxPDO-Map Standard Ch.2 (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	AI TxPDO-Map Standard Ch.2	PDO Mapping TxPDO 3	UINT8	RO	0x0B (11_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6010:01, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6010:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6010:03, 2
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6010:05, 2
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6010:07, 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 (5 bits align)	UINT32	RO	0x0000:00, 6
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (AI Inputs, entry 0x0E (Sync error))	UINT32	RO	0x6010:0E, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (AI inputs), entry 0x0F (TxPDO State))	UINT32	RO	0x6010:0F, 1
1A02:0A	SubIndex 010	10. PDO Mapping entry (object 0x60102 (AI inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1
1A02:0B	SubIndex 011	11. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6010:11, 16

Index 1A03 AI TxPDO-Map Compact Ch.2 (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	AI TxPDO-Map Compact Ch.2	PDO Mapping TxPDO 4	UINT8	RO	0x01 (1_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x11 (Value))	UINT32	RO	0x6010:11, 16

Index 1C00 Sync manager type

Index (hex)	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 (EP3162-0002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x00 (0_{dec})
1C12:01	SubIndex 001		UINT8	RW	-
1C12:02	SubIndex 002		UINT8	RW	-

Index 1C12 RxPDO assign (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x01 (1_{dec})
1C12:01	SubIndex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT8	RW	0x1600 (5632_{dec})

Index 1C13 TxPDO assign (EP3162-0002)

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

Index 1C13 TxPDO assign (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x04 (4_{dec})
1C13:01	Subindex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	Subindex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A02 (6657_{dec})

Index 1C32 SM output parameter (EP3162-0002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32_{dec})
1C32:01	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	0x0000 (0_{dec})
1C32:02	Cycle time		UINT32	RW	0x000F4240 (1000000_{dec})
1C32:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C32:04	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 0x1C33:08 [▶ 94])	UINT16	RO	0xC009 (49161_{dec})
1C32:05	Minimum cycle time		UINT32	RO	0x00055730 (350000_{dec})
1C32:06	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})
1C32:07	Minimum delay time		UINT32	RO	0x00000000 (0_{dec})
1C32:08	Command		UINT16	RW	0x0000 (0_{dec})
1C32:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C32:0B	SM event missed counter		UINT16	RO	0x0000 (0_{dec})
1C32:0C	Cycle exceeded counter		UINT16	RO	0x0000 (0_{dec})
1C32:0D	Shift too short counter		UINT16	RO	0x0000 (0_{dec})
1C32:20	Sync error		BOOLEAN	RO	0x00 (0_{dec})

Index 1C32 SM output parameter (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32_{dec})
1C32:01	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	0x0001 (0_{dec})
1C32:02	Cycle time		UINT32	RW	0x000F4240 (1000000_{dec})
1C32:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00001388 (5000_{dec})
1C32:04	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 0x1C33:08 [▶ 95])	UINT16	RO	0xC007 (49159_{dec})
1C32:05	Minimum cycle time		UINT32	RO	0x00030D40 (200000_{dec})
1C32:06	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	0x00001388 (5000_{dec})
1C32:07	Minimum delay time		UINT32	RO	0x00000000 (0_{dec})
1C32:08	Command		UINT16	RW	0x0000 (0_{dec})
1C32:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C32:0B	SM event missed counter		UINT16	RO	0x0000 (0_{dec})
1C32:0C	Cycle exceeded counter		UINT16	RO	0x0000 (0_{dec})
1C32:0D	Shift too short counter		UINT16	RO	0x0000 (0_{dec})
1C32:20	Sync error		BOOLEAN	RO	0x00 (0_{dec})

Index 1C33 SM output parameter (EP3162-0002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C33:0	SM output 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	0x0000 (0_{dec})
1C33:02	Cycle time		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	0x00001388 (5000_{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 0x1C33:08)	UINT16	RO	0xC009 (49161_{dec})
1C33:05	Minimum cycle time		UINT32	RO	0x00055730 (350000_{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	0x00001388 (5000_{dec})
1C33:08	Command		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	0x00001388 (5000_{dec})
1C33:0B	SM event missed counter		UINT16	RO	0x0000 (0_{dec})
1C33:0C	Cycle exceeded counter		UINT16	RO	0x0000 (0_{dec})
1C33:0D	Shift too short counter		UINT16	RO	0x0000 (0_{dec})
1C33:20	Sync error		BOOLEAN	RO	0x00 (0_{dec})

Index 1C33 SM input parameter (EP3182-1002)

Index (hex)	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		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	0x00001388 (5000_{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 0x1C33:08)	UINT16	RO	0xC007 (49159_{dec})
1C33:05	Minimum cycle time		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	0x00002710 (10000_{dec})
1C33:07	Minimum delay time		UINT32	RO	0x00001388 (5000_{dec})
1C33:08	Command		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	0x00001388 (5000_{dec})
1C33:0B	SM event missed counter		UINT16	RO	0x0000 (0_{dec})
1C33:0C	Cycle exceeded counter		UINT16	RO	0x0000 (0_{dec})
1C33:0D	Shift too short counter		UINT16	RO	0x0000 (0_{dec})
1C33:20	Sync error		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 6000 AI Inputs Ch. 1

Index (hex)	Name	Meaning	Data type	Flags	Default
6000:0	AI Inputs Ch. 1	Maximum subindex	UINT8	RO	0x11 (17_{dec})
6000:01	Underrange	Is set if the value falls below the operating range of the sensor or the process data contains the lowest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6000:02	Overrange	Is set if the value exceeds the operating range of the sensor or the process data contains the highest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6000:03	Limit 1	Only when limit check is active	BIT2	RO	-
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6000:05	Limit 2	Only when limit check is active	BIT2	RO	-
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6000:07	Error	The error bit is set if the process data is invalid (wire breakage, overrange, underrange).	BOOLEAN	RO	0x00 (0_{dec})
6000:0E	Sync error		BOOLEAN	RO	0x00 (0_{dec})
6000:0F	TxPDO State	Validity of the data of the associated TxPDO	BOOLEAN	RO	0x00 (0_{dec})
		0 valid			
		1 invalid			
6000:10	TxPDO Toggle	TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6000:11	Value	Analog input date	INT16	RO	0x0000 (0_{dec})

Index 6010 AI Inputs Ch. 2

Index (hex)	Name	Meaning	Data type	Flags	Default
6010:0	AI Inputs Ch. 2	Maximum subindex	UINT8	RO	0x11 (17_{dec})
6010:01	Underrange	Is set if the value falls below the operating range of the sensor or the process data contains the lowest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6010:02	Overrange	Is set if the value exceeds the operating range of the sensor or the process data contains the highest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6010:03	Limit 1	Only when limit check is active	BIT2	RO	-
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6010:05	Limit 2	Only when limit check is active	BIT2	RO	-
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6010:07	Error	The error bit is set if the process data is invalid (wire breakage, overrange, underrange).	BOOLEAN	RO	0x00 (0_{dec})
6010:0E	Sync error		BOOLEAN	RO	0x00 (0_{dec})
6010:0F	TxPDO State	Validity of the data of the associated TxPDO	BOOLEAN	RO	0x00 (0_{dec})
		0 valid			
		1 invalid			
6010:10	TxPDO Toggle	TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6010:11	Value	Analog input date	INT16	RO	0x0000 (0_{dec})

Index 7020 DO Outputs (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
7020:0	DO Outputs	Maximum subindex	UINT8	RO	0x02 (2_{dec})
7020:01	Digital output 1		BOOLEAN	RO	0x00 (0_{dec})
7020:02	Digital output 2		BOOLEAN	RO	0x00 (0_{dec})

Index 800E AI Internal data Ch. 1

Index (hex)	Name	Meaning	Data type	Flags	Default
800E:0	AI internal data	Maximum subindex	UINT8	RO	0x01 (1_{dec})
800E:01	ADC raw value	Raw value of the analog/digital converter	INT16	RO	0x0000 (0_{dec})

Index 800F AI Vendor data Ch. 1

Index (hex)	Name	Meaning	Data type	Flags	Default
800F:0	AI vendor data	Maximum subindex	UINT8	RO	0x06 (6_{dec})
800F:01	offsetU	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
800F:02	gainU	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
800F:03	offsetI	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
800F:04	gainI	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
800F:05	offsetI4	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
800F:06	gainI4	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})

Index 801E AI Internal data Ch. 2

Index (hex)	Name	Meaning	Data type	Flags	Default
801E:0	AI Internal data Ch. 2	Maximum subindex	UINT8	RO	0x01 (1_{dec})
801E:01	ADC raw value	Raw value of the analog/digital converter	INT16	RO	0x0000 (0_{dec})

Index 801F AI Vendor data Ch. 2

Index (hex)	Name	Meaning	Data type	Flags	Default
801F:0	AI vendor data	Maximum subindex	UINT8	RO	0x06 (6_{dec})
801F:01	offsetU	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
801F:02	gainU	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
801F:03	offsetI	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
801F:04	gainI	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
801F:05	offsetI4	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
801F:06	gainI4	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})

Index F000 Modular device profile

Index (hex)	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	EP3162-0002: 0x0002 (2_{dec}) EP3182-1002: 0x0003 (3_{dec})

Index F008 Code word

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

Index F010 Module list (EP3162-0002)

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	Maximum subindex	UINT8	RW	0x02 (2_{dec})
F010:01	SubIndex 001		UINT32	RW	0x0000012C (300_{dec})
F010:02	SubIndex 002		UINT32	RW	0x0000012C (300_{dec})

Index F010 Module list (EP3182-1002)

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	Maximum subindex	UINT8	RW	0x03 (3_{dec})
F010:01	SubIndex 001		UINT32	RW	0x0000012C (300_{dec})
F010:02	SubIndex 002		UINT32	RW	0x0000012C (300_{dec})
F010:03	SubIndex 003		UINT32	RW	0x000000C8 (200_{dec})

6.4 EP31x4-x002 - Object overview

EtherCAT XML Device Description

The presentation matches that of the EtherCAT XML Device Description.
Recommendation: download the latest XML file from https://www.beckhoff.com/ and install it according to the installation instructions.

Index (hex)		Name	Flags	Default value
1000 [▶ 117]		Device type	RO	0x012C1389 (19665801$_{dec}$)
1008 [▶ 117]		Device name	RO	EP3174-0002
1009 [▶ 117]		Hardware version	RO	-
100A [▶ 117]		Software version	RO	-
1011:0 [▶ 85]	**Subindex**	Restore default parameters	RO	0x01 (1$_{dec}$)
	1011:01	SubIndex 001	RW	0x00000000 (0$_{dec}$)
1018:0 [▶ 117]	**Subindex**	Identity	RO	0x04 (4$_{dec}$)
	1018:01	Vendor ID	RO	0x00000002 (2$_{dec}$)
	1018:02	Product code	RO	0x0C664052 (208027730$_{dec}$)
	1018:03	Revision	RO	0x00000000 (0$_{dec}$)
	1018:04	Serial number	RO	0x00000000 (0$_{dec}$)
10F0:0 [▶ 117]	**Subindex**	Backup parameter handling	RO	0x01 (1$_{dec}$)
	10F00:01	Checksum	RO	0x00000000 (0$_{dec}$)
1800:0 [▶ 117]	**Subindex**	AI TxPDO-Par Standard Ch. 1	RO	0x06 (6$_{dec}$)
	1800:06	Exclude TxPDOs	RO	01 1A
1801:0 [▶ 118]	**Subindex**	AI TxPDO-Par-Compact Ch.1	RO	0x06 (6$_{dec}$)
	1801:06	Exclude TxPDOs	RO	00 1A
1802:0 [▶ 118]	**Subindex**	AI TxPDO-Par Standard Ch.2	RO	0x06 (6$_{dec}$)
	1802:06	Exclude TxPDOs	RO	03 1A
1803:0 [▶ 118]	**Subindex**	AI TxPDO-Par Compact Ch.2	RO	0x06 (6$_{dec}$)
	1803:06	Exclude TxPDOs	RO	02 1A
1804:0 [▶ 118]	**Subindex**	AI TxPDO-Par Standard Ch.3	RO	0x06 (6$_{dec}$)
	1804:06	Exclude TxPDOs	RO	05 1A
1805:0 [▶ 118]	**Subindex**	AI TxPDO-Par Compact Ch.3	RO	0x06 (6$_{dec}$)
	1805:06	Exclude TxPDOs	RO	04 1A
1806:0 [▶ 118]	**Subindex**	AI TxPDO-Par Standard Ch.4	RO	0x06 (6$_{dec}$)
	1806:06	Exclude TxPDOs	RO	07 1A
1807:0 [▶ 118]	**Subindex**	AI TxPDO-Par Compact Ch.4	RO	0x06 (6$_{dec}$)
	1807:06	Exclude TxPDOs	RO	06 1A
Index (hex)		Name	Flags	Default value
1A00:0 [▶ 119]	**Subindex**	AI TxPDO-Map Standard Ch.1	RO	0x0B (11$_{dec}$)
	1A00:01	Subindex 001	RO	0x6000:01, 1
	1A00:02	Subindex 002	RO	0x6000:02, 1
	1A00:03	Subindex 003	RO	0x6000:03, 2
	1A00:04	Subindex 004	RO	0x6000:05, 2
	1A00:05	Subindex 005	RO	0x6000:07, 1
	1A00:06	Subindex 006	RO	0x0000:00, 1
	1A00:07	Subindex 007	RO	0x0000:00, 5
	1A00:08	Subindex 008	RO	0x6000:0E, 1
	1A00:09	Subindex 009	RO	0x6000:0F, 1
	1A00:0A	Subindex 010	RO	0x6000:10, 1
	1A00:0B	Subindex 011	RO	0x6000:11, 16
1A01:0 [▶ 119]	**Subindex**	AI TxPDO-Map Compact Ch.1	RO	0x01 (1$_{dec}$)
	1A01:01	SubIndex 001	RO	0x6000:11, 16
1A02:0 [▶ 119]	**Subindex**	AI TxPDO-Map Standard Ch.2	RO	0x0B (11$_{dec}$)
	1A02:01	SubIndex 001	RO	0x6010:01, 1
	1A02:02	SubIndex 002	RO	0x6010:02, 1
	1A02:03	SubIndex 003	RO	0x6010:03, 2
	1A02:04	SubIndex 004	RO	0x6010:05, 2
	1A02:05	SubIndex 005	RO	0x6010:07, 1
	1A02:06	SubIndex 006	RO	0x0000:00, 1
	1A02:07	SubIndex 007	RO	0x0000:00, 6
	1A02:08	SubIndex 008	RO	0x1802:07, 1
	1A02:09	SubIndex 009	RO	0x1802:09, 1
	1A02:0A	SubIndex 010	RO	0x6010:10, 1
	1A02:0B	SubIndex 011	RO	0x6010:11, 16
1A03:0 [▶ 119]	**Subindex**	AI TxPDO-Map Compact Ch.2	RO	0x01 (1$_{dec}$)

Index (hex)		Name	Flags	Default value
	1A03:01	SubIndex 001	RO	0x6010:11, 16
1A04:0 [▶ 120]	**Subindex**	AI TxPDO-Map Standard Ch.3	RO	0x0B (11_{dec})
	1A04:01	SubIndex 001	RO	0x6020:01, 1
	1A04:02	SubIndex 002	RO	0x6020:02, 1
	1A04:03	SubIndex 003	RO	0x6020:03, 2
	1A04:04	SubIndex 004	RO	0x6020:05, 2
	1A04:05	SubIndex 005	RO	0x6020:07, 1
	1A04:06	SubIndex 006	RO	0x0000:00, 1
	1A04:07	SubIndex 007	RO	0x0000:00, 5
	1A04:08	SubIndex 008	RO	0x6020:0E, 1
	1A04:09	SubIndex 009	RO	0x6020:0F, 1
	1A04:0A	SubIndex 010	RO	0x6020:10, 1
	1A04:0B	SubIndex 011	RO	0x6020:11, 16
1A05:0 [▶ 120]	**Subindex**	AI TxPDO-Map Compact Ch.3	RO	0x01 (1_{dec})
	1A05:01	SubIndex 001	RO	0x6020:11, 16
1A06:0 [▶ 120]	**Subindex**	AI TxPDO-Map Standard Ch.4	RO	0x0B (11_{dec})
	1A06:01	SubIndex 001	RO	0x6030:01, 1
	1A06:02	SubIndex 002	RO	0x6030:02, 1
	1A06:03	SubIndex 003	RO	0x6030:03, 2
	1A06:04	SubIndex 004	RO	0x6030:05, 2
	1A06:05	SubIndex 005	RO	0x6030:07, 1
	1A06:06	SubIndex 006	RO	0x0000:00, 1
	1A06:07	SubIndex 007	RO	0x0000:00, 5
	1A06:08	SubIndex 008	RO	0x6030:0E, 1
	1A06:09	SubIndex 009	RO	0x6030:0F, 1
	1A06:0A	SubIndex 010	RO	0x6030:10, 1
	1A06:0B	SubIndex 011	RO	0x6030:11, 16
1A07:0 [▶ 120]	**Subindex**	AI TxPDO-Map Compact Ch.4	RO	0x01 (1_{dec})
	1A07:01	SubIndex 001	RO	0x6030:11, 16
1C00:0 [▶ 121]	**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})
1C12:0 [▶ 121]	**Subindex**	RxPDO assign	RW	0x00 (0_{dec})
1C13:0 [▶ 121]	**Subindex**	TxPDO assign	RW	0x04 (4_{dec})
	1C13:01	SubIndex 001	RW	0x1A00 (6656_{dec})
	1C13:02	SubIndex 002	RW	0x1A02 (6658_{dec})
	1C13:03	SubIndex 003	RW	0x1A04 (6660_{dec})
	1C13:04	SubIndex 004	RW	0x1A06 (6662_{dec})
1C33:0 [▶ 123]	**Subindex**	SM output 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	0x00001388 (5000_{dec})
	1C33:04	Sync modes supported	RO	0xC00B (49163_{dec})
	1C33:05	Minimum cycle time	RO	0x0003D090 (250000_{dec})
	1C33:06	Calc and copy time	RO	0x00001388 (5000_{dec})
	1C33:07	Minimum delay time	RO	0x00000000 (0_{dec})
	1C33:08	Command	RW	0x0000 (0_{dec})
	1C33:09	Maximum Delay time	RO	0x00001388 (5000_{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})
6000:0 [▶ 124]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6000:01	Underrange	RO	0x00 (0_{dec})
	6000:02	Overrange	RO	0x00 (0_{dec})
	6000:03	Limit 1	RO	-

Index (hex)		Name	Flags	Default value
	6000:05	Limit 2	RO	-
	6000:07	Error	RO	0x00 (0_{dec})
	6000:0E	Sync error	RO	0x00 (0_{dec})
	6000:0F	TxPDO State	RO	0x00 (0_{dec})
	6000:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6000:11	Value	RO	0x0000 (0_{dec})
6010:0 [▶ 124]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6010:01	Underrange	RO	0x00 (0_{dec})
	6010:02	Overrange	RO	0x00 (0_{dec})
	6010:03	Limit 1	RO	-
	6010:05	Limit 2	RO	-
	6010:07	Error	RO	0x00 (0_{dec})
	6010:0F	TxPDO State	RO	0x00 (0_{dec})
	6010:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6010:11	Value	RO	0x0000 (0_{dec})
6020:0 [▶ 125]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6020:01	Underrange	RO	0x00 (0_{dec})
	6020:02	Overrange	RO	0x00 (0_{dec})
	6020:03	Limit 1	RO	-
	6020:05	Limit 2	RO	-
	6020:07	Error	RO	0x00 (0_{dec})
	6020:0E	Sync error	RO	0x00 (0_{dec})
	6020:0F	TxPDO State	RO	0x00 (0_{dec})
	6020:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6020:11	Value	RO	0x0000 (0_{dec})
6030:0 [▶ 125]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6030:01	Underrange	RO	0x00 (0_{dec})
	6030:02	Overrange	RO	0x00 (0_{dec})
	6030:03	Limit 1	RO	-
	6030:05	Limit 2	RO	-
	6030:07	Error	RO	0x00 (0_{dec})
	6030:0E	Sync error	RO	0x00 (0_{dec})
	6030:0F	TxPDO State	RO	0x00 (0_{dec})
	6030:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6030:11	Value	RO	0x0000 (0_{dec})
8000:0 [▶ 113]	**Subindex**	AI Settings	RW	0x18 (24_{dec})
	8000:01	Enable user scale	RW	0x00 (0_{dec})
	8000:02	Presentation	RW	0x00 (0_{dec})
	8000:05	Siemens bits	RW	0x00 (0_{dec})
	8000:06	Enable filter	RW	0x01 (1_{dec})
	8000:07	Enable limit 1	RW	0x00 (0_{dec})
	8000:08	Enable limit 2	RW	0x00 (0_{dec})
	8000:0A	Enable user calibration	RW	0x00 (0_{dec})
	8000:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8000:0E	Swap limit bits	RW	0x00 (0_{dec})
	8000:11	User scale offset	RW	0x0000 (0_{dec})
	8000:12	User scale gain	RW	0x00010000 (65536_{dec})
	8000:13	Limit 1	RW	0x0000 (0_{dec})
	8000:14	Limit 2	RW	0x0000 (0_{dec})
	8000:15	Filter settings	RW	0x0000 (0_{dec})
	8000:17	User calibration offset	RW	0x0000 (0_{dec})
	8000:18	User calibration gain	RW	0x4000 (16384_{dec})
800E:0 [▶ 125]	**Subindex**	AI Internal data	RO	0x01 (1_{dec})
	800E:01	ADC raw value	RO	0x0000 (0_{dec})
800F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6_{dec})
	800F:01	R0 offset	RW	0x0000 (0_{dec})
	800F:02	R0 gain	RW	0x4000 (16384_{dec})
	800F:03	R1 offset	RW	0x0000 (0_{dec})

Index (hex)		Name	Flags	Default value
	800F:04	R1 gain	RW	0x4000 (16384$_{dec}$)
	800F:05	R2 offset	RW	0x0000 (0$_{dec}$)
	800F:06	R2 gain	RW	0x4000 (16384$_{dec}$)
8010:0 [▶ 114]	**Subindex**	AI Settings	RW	0x18 (24$_{dec}$)
	8010:01	Enable user scale	RW	0x00 (0$_{dec}$)
	8010:02	Presentation	RW	0x00 (0$_{dec}$)
	8010:05	Siemens bits	RW	0x00 (0$_{dec}$)
	8010:06	Enable filter	RW	0x00 (0$_{dec}$)
	8010:07	Enable limit 1	RW	0x00 (0$_{dec}$)
	8010:08	Enable limit 2	RW	0x00 (0$_{dec}$)
	8010:0A	Enable user calibration	RW	0x00 (0$_{dec}$)
	8010:0B	Enable vendor calibration	RW	0x01 (1$_{dec}$)
	8010:0E	Swap limit bits	RW	0x00 (0$_{dec}$)
	8010:11	User scale offset	RW	0x0000 (0$_{dec}$)
	8010:12	User scale gain	RW	0x00010000 (65536$_{dec}$)
	8010:13	Limit 1	RW	0x0000 (0$_{dec}$)
	8010:14	Limit 2	RW	0x0000 (0$_{dec}$)
	8010:15	Filter settings	RW	0x0000 (0$_{dec}$)
	8010:17	User calibration offset	RW	0x0000 (0$_{dec}$)
	8010:18	User calibration gain	RW	0x4000 (16384$_{dec}$)
801E:0 [▶ 126]	**Subindex**	AI Internal data	RO	0x01 (1$_{dec}$)
	801E:01	ADC raw value	RO	0x0000 (0$_{dec}$)
801F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6$_{dec}$)
	801F:01	R0 offset	RW	0x0000 (0$_{dec}$)
	801F:02	R0 gain	RW	0x4000 (16384$_{dec}$)
	801F:03	R1 offset	RW	0x0000 (0$_{dec}$)
	801F:04	R1 gain	RW	0x4000 (16384$_{dec}$)
	801F:05	R2 offset	RW	0x0000 (0$_{dec}$)
	801F:06	R2 gain	RW	0x4000 (16384$_{dec}$)
8020:0 [▶ 115]	**Subindex**	AI Settings	RW	0x18 (24$_{dec}$)
	8020:01	Enable user scale	RW	0x00 (0$_{dec}$)
	8020:02	Presentation	RW	0x00 (0$_{dec}$)
	8020:05	Siemens bits	RW	0x00 (0$_{dec}$)
	8020:06	Enable filter	RW	0x01 (1$_{dec}$)
	8020:07	Enable limit 1	RW	0x00 (0$_{dec}$)
	8020:08	Enable limit 2	RW	0x00 (0$_{dec}$)
	8020:0A	Enable user calibration	RW	0x00 (0$_{dec}$)
	8020:0B	Enable vendor calibration	RW	0x01 (1$_{dec}$)
	8020:0E	Swap limit bits	RW	0x00 (0$_{dec}$)
	8020:11	User scale offset	RW	0x0000 (0$_{dec}$)
	8020:12	User scale gain	RW	0x00010000 (65536$_{dec}$)
	8020:13	Limit 1	RW	0x0000 (0$_{dec}$)
	8020:14	Limit 2	RW	0x0000 (0$_{dec}$)
	8020:15	Filter settings	RW	0x0000 (0$_{dec}$)
	8020:17	User calibration offset	RW	0x0000 (0$_{dec}$)
	8020:18	User calibration gain	RW	0x4000 (16384$_{dec}$)
802E:0 [▶ 126]	**Subindex**	AI Internal data	RO	0x01 (1$_{dec}$)
	802E:01	ADC raw value	RO	0x0000 (0$_{dec}$)
802F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6$_{dec}$)
	802F:01	R0 offset	RW	0x0000 (0$_{dec}$)
	802F:02	R0 gain	RW	0x4000 (16384$_{dec}$)
	802F:03	R1 offset	RW	0x0000 (0$_{dec}$)
	802F:04	R1 gain	RW	0x4000 (16384$_{dec}$)
	802F:05	R2 offset	RW	0x0000 (0$_{dec}$)
	802F:06	R2 gain	RW	0x4000 (16384$_{dec}$)
8030:0 [▶ 116]	**Subindex**	AI Settings	RW	0x18 (24$_{dec}$)
	8030:01	Enable user scale	RW	0x00 (0$_{dec}$)
	8030:02	Presentation	RW	0x00 (0$_{dec}$)

Index (hex)		Name	Flags	Default value
	8030:05	Siemens bits	RW	0x00 (0_{dec})
	8030:06	Enable filter	RW	0x01 (1_{dec})
	8030:07	Enable limit 1	RW	0x00 (0_{dec})
	8030:08	Enable limit 2	RW	0x00 (0_{dec})
	8030:0A	Enable user calibration	RW	0x00 (0_{dec})
	8030:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8030:0E	Swap limit bits	RW	0x00 (0_{dec})
	8030:11	User scale offset	RW	0x0000 (0_{dec})
	8030:12	User scale gain	RW	0x00010000 (65536_{dec})
	8030:13	Limit 1	RW	0x0000 (0_{dec})
	8030:14	Limit 2	RW	0x0000 (0_{dec})
	8030:15	Filter settings	RW	0x0000 (0_{dec})
	8030:17	User calibration offset	RW	0x0000 (0_{dec})
	8030:18	User calibration gain	RW	0x4000 (16384_{dec})
803E:0 [▶ 126]	**Subindex**	AI Internal data	RO	0x01 (1_{dec})
	803E:01	ADC raw value	RO	0x0000 (0_{dec})
803F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6_{dec})
	803F:01	R0 offset	RW	0x0000 (0_{dec})
	803F:02	R0 gain	RW	0x4000 (16384_{dec})
	803F:03	R1 offset	RW	0x0000 (0_{dec})
	803F:04	R1 gain	RW	0x4000 (16384_{dec})
	803F:05	R2 offset	RW	0x0000 (0_{dec})
	803F:06	R2 gain	RW	0x4000 (16384_{dec})
F000:0 [▶ 127]	**Subindex**	Modular device profile	RO	0x02 (2_{dec})
	F000:01	Module index distance	RO	0x0010 (16_{dec})
	F000:02	Maximum number of modules	RO	0x0004 (4_{dec})
F008 [▶ 127]		Code word	RW	0x00000000 (0_{dec})
F010:0 [▶ 127]	**Subindex**	Module list	RW	0x04 (4_{dec})
	F010:01	SubIndex 001	RW	0x0000012C (300_{dec})
	F010:02	SubIndex 002	RW	0x0000012C (300_{dec})
	F010:03	SubIndex 003	RW	0x0000012C (300_{dec})
	F010:04	SubIndex 004	RW	0x0000012C (300_{dec})
F800:0 [▶ 116]	**Subindex**	AI Range Settings (new modules)	RW	0x04 (4_{dec})
	F800:01	Input type Ch1	RW	0x0000 (0_{dec})
	F800:02	Input type Ch2	RW	0x0000 (0_{dec})
	F800:03	Input type Ch3	RW	0x0000 (0_{dec})
	F800:04	Input type Ch4	RW	0x0000 (0_{dec})
	F800:05	Enable Filter Settings Per Channel	RW	-

Legend

Flags:
RO (Read Only): this object can only be read
RW (Read/Write): this object can be read and written to

6.5 EP3174-0092 - Object overview

EtherCAT XML Device Description

The presentation matches that of the EtherCAT XML Device Description.
Recommendation: download the latest XML file from https://www.beckhoff.com/ and install it according to the installation instructions.

Index (hex)		Name	Flags	Default value
1000 [▶ 117]		Device type	RO	0x012C1389 (19665801$_{dec}$)
1008 [▶ 117]		Device name	RO	EP3174-0092
1009 [▶ 117]		Hardware version	RO	-
100A [▶ 117]		Software version	RO	-
1011:0 [▶ 85]	**Subindex**	Restore default parameters	RO	0x01 (1$_{dec}$)
	1011:01	SubIndex 001	RW	0x00000000 (0$_{dec}$)
1018:0 [▶ 117]	**Subindex**	Identity	RO	0x04 (4$_{dec}$)
	1018:01	Vendor ID	RO	0x00000002 (2$_{dec}$)
	1018:02	Product code	RO	0x0C664052 (208027730$_{dec}$)
	1018:03	Revision	RO	0x00000000 (0$_{dec}$)
	1018:04	Serial number	RO	0x00000000 (0$_{dec}$)
10F0:0 [▶ 117]	**Subindex**	Backup parameter handling	RO	0x01 (1$_{dec}$)
	10F00:01	Checksum	RO	0x00000000 (0$_{dec}$)
1610:0 [▶ 72]	**Subindex**	TSC RxPDO-Map Master Message	RW	0x04 (4$_{dec}$)
	1610:01	Subindex 001	RW	0x7040:01, 8
	1610:02	Subindex 002	RW	0x0000:00, 8
	1610:03	Subindex 003	RW	0x7040:03, 16
	1610:04	Subindex 004	RW	0x7040:02, 16
1800:0 [▶ 117]	**Subindex**	AI TxPDO-Par Standard Ch. 1	RO	0x06 (6$_{dec}$)
	1800:06	Exclude TxPDOs	RO	01 1A
1801:0 [▶ 118]	**Subindex**	AI TxPDO-Par-Compact Ch.1	RO	0x06 (6$_{dec}$)
	1801:06	Exclude TxPDOs	RO	00 1A
1802:0 [▶ 118]	**Subindex**	AI TxPDO-Par Standard Ch.2	RO	0x06 (6$_{dec}$)
	1802:06	Exclude TxPDOs	RO	03 1A
1803:0 [▶ 118]	**Subindex**	AI TxPDO-Par Compact Ch.2	RO	0x06 (6$_{dec}$)
	1803:06	Exclude TxPDOs	RO	02 1A
1804:0 [▶ 118]	**Subindex**	AI TxPDO-Par Standard Ch.3	RO	0x06 (6$_{dec}$)
	1804:06	Exclude TxPDOs	RO	05 1A
1805:0 [▶ 118]	**Subindex**	AI TxPDO-Par Compact Ch.3	RO	0x06 (6$_{dec}$)
	1805:06	Exclude TxPDOs	RO	04 1A
1806:0 [▶ 118]	**Subindex**	AI TxPDO-Par Standard Ch.4	RO	0x06 (6$_{dec}$)
	1806:06	Exclude TxPDOs	RO	07 1A
1807:0 [▶ 118]	**Subindex**	AI TxPDO-Par Compact Ch.4	RO	0x06 (6$_{dec}$)
	1807:06	Exclude TxPDOs	RO	06 1A
1A00:0 [▶ 119]	**Subindex**	AI TxPDO-Map Standard Ch.1	RO	0x0B (11$_{dec}$)
	1A00:01	Subindex 001	RO	0x6000:01, 1
	1A00:02	Subindex 002	RO	0x6000:02, 1
	1A00:03	Subindex 003	RO	0x6000:03, 2
	1A00:04	Subindex 004	RO	0x6000:05, 2
	1A00:05	Subindex 005	RO	0x6000:07, 1
	1A00:06	Subindex 006	RO	0x0000:00, 1
	1A00:07	Subindex 007	RO	0x0000:00, 5
	1A00:08	Subindex 008	RO	0x6000:0E, 1
	1A00:09	Subindex 009	RO	0x6000:0F, 1
	1A00:0A	Subindex 010	RO	0x6000:10, 1
	1A00:0B	Subindex 011	RO	0x6000:11, 16
1A01:0 [▶ 119]	**Subindex**	AI TxPDO-Map Compact Ch.1	RO	0x01 (1$_{dec}$)
	1A01:01	SubIndex 001	RO	0x6000:11, 16
Index (hex)		Name	Flags	Default value
1A02:0 [▶ 119]	**Subindex**	AI TxPDO-Map Standard Ch.2	RO	0x0B (11$_{dec}$)
	1A02:01	SubIndex 001	RO	0x6010:01, 1
	1A02:02	SubIndex 002	RO	0x6010:02, 1
	1A02:03	SubIndex 003	RO	0x6010:03, 2
	1A02:04	SubIndex 004	RO	0x6010:05, 2
	1A02:05	SubIndex 005	RO	0x6010:07, 1
	1A02:06	SubIndex 006	RO	0x0000:00, 1
	1A02:07	SubIndex 007	RO	0x0000:00, 6

Index (hex)		Name	Flags	Default value
	1A02:08	SubIndex 008	RO	0x1802:07, 1
	1A02:09	SubIndex 009	RO	0x1802:09, 1
	1A02:0A	SubIndex 010	RO	0x6010:10, 1
	1A02:0B	SubIndex 011	RO	0x6010:11, 16
1A03:0 [▶ 119]	**Subindex**	AI TxPDO-Map Compact Ch.2	RO	0x01 (1_{dec})
	1A03:01	SubIndex 001	RO	0x6010:11, 16
1A04:0 [▶ 120]	**Subindex**	AI TxPDO-Map Standard Ch.3	RO	0x0B (11_{dec})
	1A04:01	SubIndex 001	RO	0x6020:01, 1
	1A04:02	SubIndex 002	RO	0x6020:02, 1
	1A04:03	SubIndex 003	RO	0x6020:03, 2
	1A04:04	SubIndex 004	RO	0x6020:05, 2
	1A04:05	SubIndex 005	RO	0x6020:07, 1
	1A04:06	SubIndex 006	RO	0x0000:00, 1
	1A04:07	SubIndex 007	RO	0x0000:00, 5
	1A04:08	SubIndex 008	RO	0x6020:0E, 1
	1A04:09	SubIndex 009	RO	0x6020:0F, 1
	1A04:0A	SubIndex 010	RO	0x6020:10, 1
	1A04:0B	SubIndex 011	RO	0x6020:11, 16
1A05:0 [▶ 120]	**Subindex**	AI TxPDO-Map Compact Ch.3	RO	0x01 (1_{dec})
	1A05:01	SubIndex 001	RO	0x6020:11, 16
1A06:0 [▶ 120]	**Subindex**	AI TxPDO-Map Standard Ch.4	RO	0x0B (11_{dec})
	1A06:01	SubIndex 001	RO	0x6030:01, 1
	1A06:02	SubIndex 002	RO	0x6030:02, 1
	1A06:03	SubIndex 003	RO	0x6030:03, 2
	1A06:04	SubIndex 004	RO	0x6030:05, 2
	1A06:05	SubIndex 005	RO	0x6030:07, 1
	1A06:06	SubIndex 006	RO	0x0000:00, 1
	1A06:07	SubIndex 007	RO	0x0000:00, 5
	1A06:08	SubIndex 008	RO	0x6030:0E, 1
	1A06:09	SubIndex 009	RO	0x6030:0F, 1
	1A06:0A	SubIndex 010	RO	0x6030:10, 1
	1A06:0B	SubIndex 011	RO	0x6030:11, 16
1A07:0 [▶ 120]	**Subindex**	AI TxPDO-Map Compact Ch.4	RO	0x01 (1_{dec})
	1A07:01	SubIndex 001	RO	0x6030:11, 16
1A10:0 [▶ 72]	**Subindex**	TSC TxPDO-Map Slave Message	RO	0x0A (10_{dec})
	1A10:01	SubIndex 001	RO	0x6040:01, 8
	1A10:02	SubIndex 002	RO	0x6000:11, 16
	1A10:03	SubIndex 003	RO	0x6040:03, 16
	1A10:04	SubIndex 004	RO	0x6010:11, 16
	1A10:05	SubIndex 005	RO	0x6040:04, 16
	1A10:06	SubIndex 006	RO	0x6020:11, 16
	1A10:07	SubIndex 007	RO	0x6040:05, 16
	1A10:08	SubIndex 008	RO	0x6030:11, 16
	1A10:09	SubIndex 009	RO	0x6040:06, 16
	1A10:0A	SubIndex 010	RO	0x6040:02, 16
1C00:0 [▶ 121]	**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})
1C12:0 [▶ 121]	**Subindex**	RxPDO assign	RW	0x00 (0_{dec})
	1C12:00	SubIndex 001	RW	0x1610 (5648_{dec})
1C13:0 [▶ 121]	**Subindex**	TxPDO assign	RW	0x05 (5_{dec})
	1C13:01	SubIndex 001	RW	0x1A00 (6656_{dec})
	1C13:02	SubIndex 002	RW	0x1A02 (6658_{dec})
	1C13:03	SubIndex 003	RW	0x1A04 (6660_{dec})
	1C13:04	SubIndex 004	RW	0x1A06 (6662_{dec})
	1C13:05	SubIndex 005	RW	0x1A10 (6672_{dec})

Index (hex)		Name	Flags	Default value
1C32:0 [▶ 122]	**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	0x000448E0 (280800_{dec})
	1C32:04	Sync modes supported	RO	0xC00B (49163_{dec})
	1C32:05	Minimum cycle time	RO	0x00041EB0 (270000_{dec})
	1C32:06	Calc and copy time	RO	0x000087F0 (34800_{dec})
	1C32:07	Minimum delay time	RO	0x0003C0F0 (246000_{dec})
	1C32:08	Command	RW	0x0000 (0_{dec})
	1C32:09	Maximum Delay time	RO	0x0003C0F0 (246000_{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})
1C33:0 [▶ 123]	**Subindex**	SM output 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	0x0002FC10 (195600_{dec})
	1C33:04	Sync modes supported	RO	0xC00B (49163_{dec})
	1C33:05	Minimum cycle time	RO	0x00041EB0 (270000_{dec})
	1C33:06	Calc and copy time	RO	0x00000708 (1800_{dec})
	1C33:07	Minimum delay time	RO	0x0002FC10 (195600_{dec})
	1C33:08	Command	RW	0x0000 (0_{dec})
	1C33:09	Maximum Delay time	RO	0x0002FC10 (195600_{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})
6000:0 [▶ 124]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6000:01	Underrange	RO	0x00 (0_{dec})
	6000:02	Overrange	RO	0x00 (0_{dec})
	6000:03	Limit 1	RO	-
	6000:05	Limit 2	RO	-
	6000:07	Error	RO	0x00 (0_{dec})
	6000:0E	Sync error	RO	0x00 (0_{dec})
	6000:0F	TxPDO State	RO	0x00 (0_{dec})
	6000:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6000:11	Value	RO	0x0000 (0_{dec})
6010:0 [▶ 124]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6010:01	Underrange	RO	0x00 (0_{dec})
	6010:02	Overrange	RO	0x00 (0_{dec})
	6010:03	Limit 1	RO	-
	6010:05	Limit 2	RO	-
	6010:07	Error	RO	0x00 (0_{dec})
	6010:0F	TxPDO State	RO	0x00 (0_{dec})
	6010:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6010:11	Value	RO	0x0000 (0_{dec})
6020:0 [▶ 125]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})
	6020:01	Underrange	RO	0x00 (0_{dec})
	6020:02	Overrange	RO	0x00 (0_{dec})
	6020:03	Limit 1	RO	-
	6020:05	Limit 2	RO	-
	6020:07	Error	RO	0x00 (0_{dec})
	6020:0E	Sync error	RO	0x00 (0_{dec})
	6020:0F	TxPDO State	RO	0x00 (0_{dec})
	6020:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6020:11	Value	RO	0x0000 (0_{dec})
6030:0 [▶ 125]	**Subindex**	AI Inputs	RO	0x11 (17_{dec})

Index (hex)		Name	Flags	Default value
	6030:01	Underrange	RO	0x00 (0_{dec})
	6030:02	Overrange	RO	0x00 (0_{dec})
	6030:03	Limit 1	RO	-
	6030:05	Limit 2	RO	-
	6030:07	Error	RO	0x00 (0_{dec})
	6030:0E	Sync error	RO	0x00 (0_{dec})
	6030:0F	TxPDO State	RO	0x00 (0_{dec})
	6030:10	TxPDO Toggle	RO	0x00 (0_{dec})
	6030:11	Value	RO	0x0000 (0_{dec})
6040:0 [▶ 73]	**Subindex**	TSC Slave Frame Elements	RO	0x06 (6_{dec})
	6040:01	TSC__Slave Cmd	RO	0x00 (0_{dec})
	6040:02	TSC__Slave ConnID	RO	0x0000 (0_{dec})
	6040:03	TSC__Slave CRC_0	RO	0x0000 (0_{dec})
	6040:04	TSC__Slave CRC_1	RO	0x0000 (0_{dec})
	6040:05	TSC__Slave CRC_2	RO	0x0000 (0_{dec})
	6040:06	TSC__Slave CRC_3	RO	0x0000 (0_{dec})
7040:0 [▶ 73]	**Subindex**	TSC Master Frame Elements	RO	0x03 (3_{dec})
	7040:01	TSC__Master Cmd	RO	0x00 (0_{dec})
	7040:02	TSC__Master ConnID	RO	0x0000 (0_{dec})
	7040:03	TSC__Master CRC_0	RO	0x0000 (0_{dec})
8000:0 [▶ 113]	**Subindex**	AI Settings	RW	0x18 (24_{dec})
	8000:01	Enable user scale	RW	0x00 (0_{dec})
	8000:02	Presentation	RW	0x00 (0_{dec})
	8000:05	Siemens bits	RW	0x00 (0_{dec})
	8000:06	Enable filter	RW	0x01 (1_{dec})
	8000:07	Enable limit 1	RW	0x00 (0_{dec})
	8000:08	Enable limit 2	RW	0x00 (0_{dec})
	8000:0A	Enable user calibration	RW	0x00 (0_{dec})
	8000:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8000:0E	Swap limit bits	RW	0x00 (0_{dec})
	8000:11	User scale offset	RW	0x0000 (0_{dec})
	8000:12	User scale gain	RW	0x00010000 (65536_{dec})
	8000:13	Limit 1	RW	0x0000 (0_{dec})
	8000:14	Limit 2	RW	0x0000 (0_{dec})
	8000:15	Filter settings	RW	0x0000 (0_{dec})
	8000:17	User calibration offset	RW	0x0000 (0_{dec})
	8000:18	User calibration gain	RW	0x0000 (0_{dec})
800E:0 [▶ 125]	**Subindex**	AI Internal data	RO	0x01 (1_{dec})
	800E:01	ADC raw value	RO	0x0000 (0_{dec})
800F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6_{dec})
	800F:01	R0 offset	RW	0x0000 (0_{dec})
	800F:02	R0 gain	RW	0x0000 (0_{dec})
	800F:03	R1 offset	RW	0x0000 (0_{dec})
	800F:04	R1 gain	RW	0x0000 (0_{dec})
	800F:05	R2 offset	RW	0x0000 (0_{dec})
	800F:06	R2 gain	RW	0x0000 (0_{dec})
8010:0 [▶ 114]	**Subindex**	AI Settings	RW	0x18 (24_{dec})
	8010:01	Enable user scale	RW	0x00 (0_{dec})
	8010:02	Presentation	RW	0x00 (0_{dec})
	8010:05	Siemens bits	RW	0x00 (0_{dec})
	8010:06	Enable filter	RW	0x00 (0_{dec})
	8010:07	Enable limit 1	RW	0x00 (0_{dec})
	8010:08	Enable limit 2	RW	0x00 (0_{dec})
	8010:0A	Enable user calibration	RW	0x00 (0_{dec})
	8010:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8010:0E	Swap limit bits	RW	0x00 (0_{dec})
	8010:11	User scale offset	RW	0x0000 (0_{dec})
	8010:12	User scale gain	RW	0x00010000 (65536_{dec})

Index (hex)		Name	Flags	Default value
	8010:13	Limit 1	RW	0x0000 (0_{dec})
	8010:14	Limit 2	RW	0x0000 (0_{dec})
	8010:15	Filter settings	RW	0x0000 (0_{dec})
	8010:17	User calibration offset	RW	0x0000 (0_{dec})
	8010:18	User calibration gain	RW	0x4000 (16384_{dec})
801E:0 [▶ 126]	**Subindex**	AI Internal data	RO	0x01 (1_{dec})
	801E:01	ADC raw value	RO	0x0000 (0_{dec})
801F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6_{dec})
	801F:01	R0 offset	RW	0x0000 (0_{dec})
	801F:02	R0 gain	RW	0x0000 (0_{dec})
	801F:03	R1 offset	RW	0x0000 (0_{dec})
	801F:04	R1 gain	RW	0x0000 (0_{dec})
	801F:05	R2 offset	RW	0x0000 (0_{dec})
	801F:06	R2 gain	RW	0x4000 (16384_{dec})
8020:0 [▶ 115]	**Subindex**	AI Settings	RW	0x18 (24_{dec})
	8020:01	Enable user scale	RW	0x00 (0_{dec})
	8020:02	Presentation	RW	0x00 (0_{dec})
	8020:05	Siemens bits	RW	0x00 (0_{dec})
	8020:06	Enable filter	RW	0x01 (1_{dec})
	8020:07	Enable limit 1	RW	0x00 (0_{dec})
	8020:08	Enable limit 2	RW	0x00 (0_{dec})
	8020:0A	Enable user calibration	RW	0x00 (0_{dec})
	8020:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8020:0E	Swap limit bits	RW	0x00 (0_{dec})
	8020:11	User scale offset	RW	0x0000 (0_{dec})
	8020:12	User scale gain	RW	0x00010000 (65536_{dec})
	8020:13	Limit 1	RW	0x0000 (0_{dec})
	8020:14	Limit 2	RW	0x0000 (0_{dec})
	8020:15	Filter settings	RW	0x0000 (0_{dec})
	8020:17	User calibration offset	RW	0x0000 (0_{dec})
	8020:18	User calibration gain	RW	0x0000 (0_{dec})
802E:0 [▶ 126]	**Subindex**	AI Internal data	RO	0x01 (1_{dec})
	802E:01	ADC raw value	RO	0x0000 (0_{dec})
802F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6_{dec})
	802F:01	R0 offset	RW	0x0000 (0_{dec})
	802F:02	R0 gain	RW	0x0000 (0_{dec})
	802F:03	R1 offset	RW	0x0000 (0_{dec})
	802F:04	R1 gain	RW	0x0000 (0_{dec})
	802F:05	R2 offset	RW	0x0000 (0_{dec})
	802F:06	R2 gain	RW	0x0000 (0_{dec})
8030:0 [▶ 116]	**Subindex**	AI Settings	RW	0x18 (24_{dec})
	8030:01	Enable user scale	RW	0x00 (0_{dec})
	8030:02	Presentation	RW	0x00 (0_{dec})
	8030:05	Siemens bits	RW	0x00 (0_{dec})
	8030:06	Enable filter	RW	0x01 (1_{dec})
	8030:07	Enable limit 1	RW	0x00 (0_{dec})
	8030:08	Enable limit 2	RW	0x00 (0_{dec})
	8030:0A	Enable user calibration	RW	0x00 (0_{dec})
	8030:0B	Enable vendor calibration	RW	0x01 (1_{dec})
	8030:0E	Swap limit bits	RW	0x00 (0_{dec})
	8030:11	User scale offset	RW	0x0000 (0_{dec})
	8030:12	User scale gain	RW	0x00010000 (65536_{dec})
	8030:13	Limit 1	RW	0x0000 (0_{dec})
	8030:14	Limit 2	RW	0x0000 (0_{dec})
	8030:15	Filter settings	RW	0x0000 (0_{dec})
	8030:17	User calibration offset	RW	0x0000 (0_{dec})
	8030:18	User calibration gain	RW	0x0000 (0_{dec})
803E:0 [▶ 126]	**Subindex**	AI Internal data	RO	0x01 (1_{dec})

Index (hex)		Name	Flags	Default value
	803E:01	ADC raw value	RO	0x0000 (0_{dec})
803F:0 [▶ 126]	**Subindex**	AI Vendor data	RW	0x06 (6_{dec})
	803F:01	R0 offset	RW	0x0000 (0_{dec})
	803F:02	R0 gain	RW	0x0000 (0_{dec})
	803F:03	R1 offset	RW	0x0000 (0_{dec})
	803F:04	R1 gain	RW	0x0000 (0_{dec})
	803F:05	R2 offset	RW	0x0000 (0_{dec})
	803F:06	R2 gain	RW	0x0000 (0_{dec})
8040:0 [▶ 73]	8040:0	TSC Settings	RW	0x02 (2_{dec})
	8040:01	Address	RW	0x0000 (0_{dec})
	8040:02	Connection Mode	RW	0x00000000 (0_{dec})
F000:0 [▶ 127]	**Subindex**	Modular device profile	RO	0x02 (2_{dec})
	F000:01	Module index distance	RO	0x0010 (16_{dec})
	F000:02	Maximum number of modules	RO	0x0004 (4_{dec})
F008 [▶ 127]		Code word	RW	0x00000000 (0_{dec})
F010:0 [▶ 127]	**Subindex**	Module list	RW	0x04 (4_{dec})
	F010:01	SubIndex 001	RW	0x0000012C (300_{dec})
	F010:02	SubIndex 002	RW	0x0000012C (300_{dec})
	F010:03	SubIndex 003	RW	0x0000012C (300_{dec})
	F010:04	SubIndex 004	RW	0x0000012C (300_{dec})
F800:0 [▶ 116]	**Subindex**	AI Range Settings (new modules)	RW	0x04 (4_{dec})
	F800:01	Input type Ch1	RW	0x0000 (0_{dec})
	F800:02	Input type Ch2	RW	0x0000 (0_{dec})
	F800:03	Input type Ch3	RW	0x0000 (0_{dec})
	F800:04	Input type Ch4	RW	0x0000 (0_{dec})
	F800:05	Enable Filter Settings Per Channel	RW	0x000003B6 (950_{dec})

Legend

Flags:
RO (Read Only): this object can only be read
RW (Read/Write): this object can be read and written to

6.6 EP31x4 - Object description and parameterization

Parameterization

You can parameterize the box via the "CoE - Online" tab in TwinCAT.

EtherCAT XML Device Description

The presentation matches that of the EtherCAT XML Device Description.
Recommendation: download the latest XML file from https://www.beckhoff.com/ and install it according to the installation instructions.

Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization [▶ 112] during commissioning
- Objects intended for regular operation, e.g. through ADS access
- Objects for indicating internal settings (may be fixed)
- Further profile-specific objects [▶ 124] 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 (hex)	Name	Meaning	Data type	Flags	Default
1011:0	Restore default parameters	Restore default parameters	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 AI Settings (parameterization of channel 1)

Index (hex)	Name	Meaning		Data type	Flags	Default
8000:0	AI Settings	Maximum subindex		UINT8	RO	0x18 (24_{dec})
8000:01	Enable user scale	1	User scale is active.	BOOLEAN	RW	0x00 (0_{dec})
8000:02	Presentation	0	Signed presentation	BIT3	RW	0x00 (0_{dec})
		1	Unsigned presentation			
		2	Absolute value with MSB as sign (signed amount representation)			
8000:05	Siemens bits	1	Status indicators are displayed on the lowest 3 bits in the status word.	BOOLEAN	RW	0x00 (0_{dec})
8000:06	Enable filter	1	Enable filter, which makes PLC-cycle-synchronous data exchange unnecessary	BOOLEAN	RW	0x01 (1_{dec})
8000:07	Enable limit 1	1	Limit 1 enabled	BOOLEAN	RW	0x00 (0_{dec})
8000:08	Enable limit 2	1	Limit 2 enabled	BOOLEAN	RW	0x00 (0_{dec})
8000:0A	Enable user calibration	1	Enabling of the user calibration	BOOLEAN	RW	0x00 (0_{dec})
8000:0B	Enable vendor calibration	1	Enabling of the vendor calibration	BOOLEAN	RW	0x01 (1_{dec})
8000:0E	Swap limit bits	1	Swaps the two limit bits, in order to achieve compatibility with older hardware versions.	BOOLEAN	RW	0x00 (0_{dec})
8000:11	User scale offset	User scale offset		INT16	RW	0x0000 (0_{dec})
8000:12	User scale gain	User scale gain. The gain is represented in fixed-point format, with the factor 2^{-16}. The value 1 corresponds to 65535_{dec} ($0x00010000_{hex}$) and is limited to +/- 0x7FFFF		INT32	RW	0x00010000 (65536_{dec})
8000:13	Limit 1	First limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8000:14	Limit 2	Second limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8000:15	Filter settings	This object determines the digital filter settings **for all channels of the module**, if it is activated via Enable filter (index 0x80n0:06 [▶ 113]). The possible settings are sequentially numbered.		UINT16	RW	0x0000 (0_{dec})
		0	50 Hz FIR			
		1	60 Hz FIR			
		2	IIR 1			
		3	IIR 2			
		4	IIR 3			
		5	IIR 4			
		6	IIR 5			
		7	IIR 6			
		8	IIR 7			
		9	IIR 8			
8000:17	User calibration offset	User calibration: Offset		INT16	RW	0x0000 (0_{dec})
8000:18	User calibration gain	User calibration: Gain		INT16	RW	0x0000 (0_{dec})

Index 8010 AI Settings (parameterization of channel 2)

Index (hex)	Name	Meaning		Data type	Flags	Default
8010:0	AI Settings	Maximum subindex		UINT8	RO	0x18 (24_{dec})
8010:01	Enable user scale	1	User scale is active.	BOOLEAN	RW	0x00 (0_{dec})
8010:02	Presentation	0	Signed presentation	BIT3	RW	0x00 (0_{dec})
		1	Unsigned presentation			
		2	Absolute value with MSB as sign (signed amount representation)			
8010:05	Siemens bits	1	Status indicators are displayed on the lowest 3 bits in the status word.	BOOLEAN	RW	0x00 (0_{dec})
8010:06	Enable filter	1	Enable filter, which makes PLC-cycle-synchronous data exchange unnecessary	BOOLEAN	RW	0x01 (1_{dec})
8010:07	Enable limit 1	1	Limit 1 enabled	BOOLEAN	RW	0x00 (0_{dec})
8010:08	Enable limit 2	1	Limit 2 enabled	BOOLEAN	RW	0x00 (0_{dec})
8010:0A	Enable user calibration	1	Enables user calibration	BOOLEAN	RW	0x00 (0_{dec})
8010:0B	Enable vendor calibration	1	Enable vendor calibration	BOOLEAN	RW	0x01 (1_{dec})
8010:0E	Swap limit bits	1	Swaps the two limit bits, in order to achieve compatibility with older hardware versions.	BOOLEAN	RW	0x00 (0_{dec})
8010:11	User scale offset	User scale offset		INT16	RW	0x0000 (0_{dec})
8010:12	User scale gain	User scale gain. The gain is represented in fixed-point format, with the factor 2^{-16}. The value 1 corresponds to 65535_{dec} ($0x00010000_{hex}$) and is limited to +/- 0x7FFFF		INT32	RW	0x00010000 (65536_{dec})
8010:13	Limit 1	First limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8010:14	Limit 2	Second limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8010:15	Filter settings	This object shows the digital filter settings. The filter settings can only be read here. They are set via channel 1 [▶ 113] for all channels of the module.		UINT16	RW	0x0000 (0_{dec})
		0	50 Hz FIR			
		1	60 Hz FIR			
		2	IIR 1			
		3	IIR 2			
		4	IIR 3			
		5	IIR 4			
		6	IIR 5			
		7	IIR 6			
		8	IIR 7			
		9	IIR 8			
8010:17	User calibration offset	User calibration: Offset		INT16	RW	0x0000 (0_{dec})
8010:18	User calibration gain	User calibration: Gain		INT16	RW	0x0000 (0_{dec})

Index 8020 AI Settings (parameterization of channel 3)

Index (hex)	Name	Meaning		Data type	Flags	Default
8020:0	AI Settings	Maximum subindex		UINT8	RO	0x18 (24_{dec})
8020:01	Enable user scale	1	User scale is active.	BOOLEAN	RW	0x00 (0_{dec})
8020:02	Presentation	0	Signed presentation	BIT3	RW	0x00 (0_{dec})
		1	Unsigned presentation			
		2	Absolute value with MSB as sign (signed amount representation)			
8020:05	Siemens bits	1	Status indicators are displayed on the lowest 3 bits in the status word.	BOOLEAN	RW	0x00 (0_{dec})
8020:06	Enable filter	1	Enable filter, which makes PLC-cycle-synchronous data exchange unnecessary	BOOLEAN	RW	0x01 (1_{dec})
8020:07	Enable limit 1	1	Limit 1 enabled	BOOLEAN	RW	0x00 (0_{dec})
8020:08	Enable limit 2	1	Limit 2 enabled	BOOLEAN	RW	0x00 (0_{dec})
8020:0A	Enable user calibration	1	Enables user calibration	BOOLEAN	RW	0x00 (0_{dec})
8020:0B	Enable vendor calibration	1	Enable vendor calibration	BOOLEAN	RW	0x01 (1_{dec})
8020:0E	Swap limit bits	1	Swaps the two limit bits, in order to achieve compatibility with older hardware versions.	BOOLEAN	RW	0x00 (0_{dec})
8020:11	User scale offset	User scale offset		INT16	RW	0x0000 (0_{dec})
8020:12	User scale gain	User scale gain. The gain is represented in fixed-point format, with the factor 2^{-16}. The value 1 corresponds to 65535_{dec} ($0x00010000_{hex}$) and is limited to +/- 0x7FFFF		INT32	RW	0x00010000 (65536_{dec})
8020:13	Limit 1	First limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8020:14	Limit 2	Second limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8020:15	Filter settings	This object shows the digital filter settings. The filter settings can only be read here. They are set via channel 1 [▶ 113] for all channels of the module.		UINT16	RW	0x0000 (0_{dec})
		0	50 Hz FIR			
		1	60 Hz FIR			
		2	IIR 1			
		3	IIR 2			
		4	IIR 3			
		5	IIR 4			
		6	IIR 5			
		7	IIR 6			
		8	IIR 7			
		9	IIR 8			
8020:17	User calibration offset	User calibration: Offset		INT16	RW	0x0000 (0_{dec})
8020:18	User calibration gain	User calibration: Gain		INT16	RW	0x0000 (0_{dec})

Index 8030 AI Settings (parameterization of channel 4)

Index (hex)	Name	Meaning		Data type	Flags	Default
8030:0	AI Settings	Maximum subindex		UINT8	RO	0x18 (24_{dec})
8030:01	Enable user scale	1	User scale is active.	BOOLEAN	RW	0x00 (0_{dec})
8030:02	Presentation	0	Signed presentation	BIT3	RW	0x00 (0_{dec})
		1	Unsigned presentation			
		2	Absolute value with MSB as sign (signed amount representation)			
8030:05	Siemens bits	1	Status indicators are displayed on the lowest 3 bits in the status word.	BOOLEAN	RW	0x00 (0_{dec})
8030:06	Enable filter	1	Enable filter, which makes PLC-cycle-synchronous data exchange unnecessary	BOOLEAN	RW	0x01 (1_{dec})
8030:07	Enable limit 1	1	Limit 1 enabled	BOOLEAN	RW	0x00 (0_{dec})
8030:08	Enable limit 2	1	Limit 2 enabled	BOOLEAN	RW	0x00 (0_{dec})
8030:0A	Enable user calibration	1	Enables user calibration	BOOLEAN	RW	0x00 (0_{dec})
8030:0B	Enable vendor calibration	1	Enable vendor calibration	BOOLEAN	RW	0x01 (1_{dec})
8030:0E	Swap limit bits	1	Swaps the two limit bits, in order to achieve compatibility with older hardware versions.	BOOLEAN	RW	0x00 (0_{dec})
8030:11	User scale offset	User scale offset		INT16	RW	0x0000 (0_{dec})
8030:12	User scale gain	User scale gain. The gain is represented in fixed-point format, with the factor 2^{-16}. The value 1 corresponds to 65535_{dec} ($0x00010000_{hex}$) and is limited to +/- 0x7FFFF		INT32	RW	0x00010000 (65536_{dec})
8030:13	Limit 1	First limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8030:14	Limit 2	Second limit value for setting the status bits		INT16	RW	0x0000 (0_{dec})
8030:15	Filter settings	This object shows the digital filter settings. The filter settings can only be read here. They are set via channel 1 [▶ 113] for all channels of the module.		UINT16	RW	0x0000 (0_{dec})
		0	50 Hz FIR			
		1	60 Hz FIR			
		2	IIR 1			
		3	IIR 2			
		4	IIR 3			
		5	IIR 4			
		6	IIR 5			
		7	IIR 6			
		8	IIR 7			
		9	IIR 8			
8030:17	User calibration offset	User calibration: Offset		INT16	RW	0x0000 (0_{dec})
8030:18	User calibration gain	User calibration: Gain		INT16	RW	0x0000 (0_{dec})

Index F800 AI Range Settings (EP3174/EP3184 from firmware version 04)

Index (hex)	Name	Meaning		Data type	Flags	Default
F800:0	AI Range Settings	Maximum subindex		UINT8	RO	0x04 (4_{dec})
F800:01	Input type Ch1	Input signal range for channel 1		UINT16	RW	0x0000 (0_{dec})
		0	-10 V...+10 V			
		1	0 mA...20 mA			
		2	4 mA...20 mA			
		6	0 V...10 V			
F800:02	Input type Ch2	Input signal range for channel 2 (values see channel 1)		UINT16	RW	0x0000 (0_{dec})
F800:03*	Input type Ch3	Input signal range for channel 3 (values see channel 1)		UINT16	RW	0x0000 (0_{dec})
F800:04*	Input type Ch4	Input signal range for channel 4 (values see channel 1)		UINT16	RW	0x0000 (0_{dec})
F800:05	Enable Filter Settings Per Channel			BOOLEAN	RW	-

Standard objects (0x1000-0x1FFF)

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

Index 1000 Device type

Index (hex)	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	0x00001389 (5001_{dec})

Index 1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EP3174-0002, EP3174-0092, EP3184-0002, EP3184-1002

Index 1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	STRING	RO	01

Index 100A Software Version

Index (hex)	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slave	STRING	RO	01

Index 1018 Identity

Index (hex)	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	0x0C664052 (208027730_{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	0x00000000 (0_{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 (hex)	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 1800 AI TxPDO-Par Standard Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1800:0	AI TxPDO-Par Standard Ch.1	PDO parameter TxPDO 1	UINT8	RO	0x06 (6_{dec})
1800:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 1	OCTET-STRING[2]	RO	01 1A

Index 1801 AI TxPDO-Par Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1801:0	AI TxPDO-Par Compact Ch.1	PDO parameter TxPDO 2	UINT8	RO	0x06 (6_{dec})
1801:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 2	OCTET-STRING[2]	RO	00 1A

Index 1802 AI TxPDO-Par Standard Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1802:0	AI TxPDO-Par Standard Ch.2	PDO parameter TxPDO 3	UINT8	RO	0x06 (6_{dec})
1802:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 3	OCTET-STRING[2]	RO	03 1A

Index 1803 AI TxPDO-Par Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1803:0	AI TxPDO-Par Compact Ch.2	PDO parameter TxPDO 4	UINT8	RO	0x06 (6_{dec})
1803:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 4	OCTET-STRING[2]	RO	02 1A

Index 1804 AI TxPDO-Par Standard Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1804:0	AI TxPDO-Par Standard Ch.3	PDO parameter TxPDO 5	UINT8	RO	0x06 (6_{dec})
1804:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 5	OCTET-STRING[2]	RO	05 1A

Index 1805 AI TxPDO-Par Compact Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1805:0	AI TxPDO-Par Compact Ch.3	PDO parameter TxPDO 6	UINT8	RO	0x06 (6_{dec})
1805:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 6	OCTET-STRING[2]	RO	04 1A

Index 1806 AI TxPDO-Par Standard Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1806:0	AI TxPDO-Par Standard Ch.4	PDO parameter TxPDO 7	UINT8	RO	0x06 (6_{dec})
1806:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 7	OCTET-STRING[2]	RO	07 1A

Index 1807 AI TxPDO-Par Compact Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1807:0	AI TxPDO-Par Compact Ch.4	PDO parameter TxPDO 8	UINT8	RO	0x06 (6_{dec})
1807:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 8	OCTET-STRING[2]	RO	06 1A

Index 1A00 AI TxPDO-Map Standard Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	AI TxPDO-Map Standard Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x0B (11_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6000:03, 2
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6000:05, 2
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6000:07, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x1C32, entry 0x20)	UINT32	RO	0x6000:0E, 1
1A00:09	SubIndex 009	9. PDO Mapping entry (object 0x1800 (AI TxPDO-Par Standard Ch.1), entry 0x07 (TxPDO State))	UINT32	RO	0x6000:0F, 1
1A00:0A	SubIndex 010	10. PDO Mapping entry (object 0x1800 (AI TxPDO-Par Standard Ch.1), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1
1A00:0B	SubIndex 011	11. PDO Mapping entry (object 0x1800 (AI TxPDO-Par Standard Ch.1), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6000:11, 16

Index 1A01 AI TxPDO-Map Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	AI TxPDO-Map Compact Ch.1	PDO Mapping TxPDO 2	UINT8	RO	0x01 (1_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (AI Inputs), entry 0x11 (Value))	UINT32	RO	0x6000:11, 16

Index 1A02 AI TxPDO-Map Standard Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	AI TxPDO-Map Standard Ch.2	PDO Mapping TxPDO 3	UINT8	RO	0x0B (11_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6010:01, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6010:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6010:03, 2
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6010:05, 2
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6010:07, 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 (5 bits align)	UINT32	RO	0x0000:00, 6
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x1C32, entry 0x20)	UINT32	RO	0x1802:07, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x07 (TxPDO State))	UINT32	RO	0x1802:09, 1
1A02:0A	SubIndex 010	10. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1
1A02:0B	SubIndex 011	11. PDO Mapping entry (object 0x1802 (AI TxPDO-Par Standard Ch.2), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6010:11, 16

Index 1A03 AI TxPDO-Map Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	AI TxPDO-Map Compact Ch.2	PDO Mapping TxPDO 4	UINT8	RO	0x01 (1_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (AI Inputs), entry 0x11 (Value))	UINT32	RO	0x6010:11, 16

Index 1A04 AI TxPDO-Map Standard Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	AI TxPDO-Map Standard Ch.3	PDO Mapping TxPDO 5	UINT8	RO	0x0B (11_{dec})
1A04:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6020:01, 1
1A04:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6020:02, 1
1A04:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6020:03, 2
1A04:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6020:05, 2
1A04:05	SubIndex 005	5. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6020:07, 1
1A04:06	SubIndex 006	6. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A04:07	SubIndex 007	7. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1A04:08	SubIndex 008	8. PDO Mapping entry (object 0x1C32, entry 0x20)	UINT32	RO	0x6020:0E, 1
1A04:09	SubIndex 009	9. PDO Mapping entry (object 0x1804 (AI TxPDO-Par Standard Ch.3), entry 0x07 (TxPDO State))	UINT32	RO	0x6020:0F, 1
1A04:0A	SubIndex 010	10. PDO Mapping entry (object 0x1804 (AI TxPDO-Par Standard Ch.3), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6020:10, 1
1A04:0B	SubIndex 011	11. PDO Mapping entry (object 0x1804 (AI TxPDO-Par Standard Ch.3), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6020:11, 16

Index 1A05 AI TxPDO-Map Compact Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A05:0	AI TxPDO-Map Compact Ch.3	PDO Mapping TxPDO 6	UINT8	RO	0x01 (1_{dec})
1A05:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (AI Inputs), entry 0x11 (Value))	UINT32	RO	0x6020:11, 16

Index 1A06 AI TxPDO-Map Standard Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A06:0	AI TxPDO-Map Standard Ch.4	PDO Mapping TxPDO 7	UINT8	RO	0x0B (11_{dec})
1A06:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x01 (Underrange))	UINT32	RO	0x6030:01, 1
1A06:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x02 (Overrange))	UINT32	RO	0x6030:02, 1
1A06:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x03 (Limit 1))	UINT32	RO	0x6030:03, 2
1A06:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x05 (Limit 2))	UINT32	RO	0x6030:05, 2
1A06:05	SubIndex 005	5. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x07 (Error))	UINT32	RO	0x6030:07, 1
1A06:06	SubIndex 006	6. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A06:07	SubIndex 007	7. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1A06:08	SubIndex 008	8. PDO Mapping entry (object 0x1C32, entry 0x20)	UINT32	RO	0x6030:0E, 1
1A06:09	SubIndex 009	9. PDO Mapping entry (object 0x1806 (AI TxPDO-Par Standard Ch.4), entry 0x07 (TxPDO State))	UINT32	RO	0x6030:0F, 1
1A06:0A	SubIndex 010	10. PDO Mapping entry (object 0x1806 (AI TxPDO-Par Standard Ch.4), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6030:10, 1
1A06:0B	SubIndex 011	11. PDO Mapping entry (object 0x1806 (AI TxPDO-Par Standard Ch.4), entry 0x09 (TxPDO Toggle))	UINT32	RO	0x6030:11, 16

Index 1A07 AI TxPDO-Map Compact Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A07:0	AI TxPDO-Map Compact Ch.4	PDO Mapping TxPDO 8	UINT8	RO	0x01 (1_{dec})
1A07:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (AI Inputs), entry 0x11 (Value))	UINT32	RO	0x6030:11, 16

Index 1C00 Sync manager type

Index (hex)	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 (EP31x4-x002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x00 (0_{dec})

Index 1C12 RxPDO assign (EP3174-0092)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x01 (1_{dec})
1C12:01	SubIndex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1610 (5648_{dec})

Index 1C13 TxPDO assign (EP31x4-x002)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x05 (5_{dec})
1C13:01	Subindex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	Subindex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A02 (6658_{dec})
1C13:03	Subindex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A04 (6660_{dec})
1C13:04	Subindex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A06 (6662_{dec})

Index 1C13 TxPDO assign (EP3174-0092)

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x04 (4_{dec})
1C13:01	Subindex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	Subindex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A02 (6658_{dec})
1C13:03	Subindex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A04 (6660_{dec})
1C13:04	Subindex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A06 (6662_{dec})
1C13:05	Subindex 005	5. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A10 (6672_{dec})

Index 1C32 SM output parameter (EP3174-0092)

Index (hex)	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: Synchronous with SM 2 event • 2: DC - Synchron with SYNC0 Event • 3: DC - 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	0x000448E0 (280800_{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 3:2 = 10: DC mode is supported • Bit 5:4 = 01: Output Shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 0x1C32:08)	UINT16	RO	0xC00B (49159_{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x00041EB0 (270000_{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x000087F0 (34800_{dec})
1C32:07	Minimum delay time		UINT32	RO	0x0003C0F0 (246000_{dec})
1C32:08	Command		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	0x0003C0F0 (246000_{dec})
1C32:0B	SM event missed counter	Time between SYNC1 event and output of the outputs (in ns, 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 (hex)	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		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	EP31x4-x002: 0x00001388 (5000_{dec}) EP3174-0092: 0x0002FC10 (195600_{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 0x1C33:08)	UINT16	RO	0xC00B (49163_{dec})
1C33:05	Minimum cycle time		UINT32	RO	EP31x4-x002: 0x0003D090 (250000_{dec}) EP3174-0092: 0x00041EB0 (270000_{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	EP31x4-x002: 0x00002710 (10000_{dec}) EP3174-0092: 0x00000708 (1800_{dec})
1C33:07	Minimum delay time		UINT32	RO	EP31x4-x002: 0x00001388 (5000_{dec}) EP3174-0092: 0x0002FC10 (195600_{dec})
1C33:08	Command		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	EP31x4-x002: 0x00001388 (5000_{dec}) EP3174-0092: 0x0002FC10 (195600_{dec})
1C33:0B	SM event missed counter		UINT16	RO	0x0000 (0_{dec})
1C33:0C	Cycle exceeded counter		UINT16	RO	0x0000 (0_{dec})
1C33:0D	Shift too short counter		UINT16	RO	0x0000 (0_{dec})
1C33:20	Sync error		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 6000 AI Inputs

Index (hex)	Name	Meaning		Data type	Flags	Default
6000:0	AI inputs	Maximum subindex		UINT8	RO	0x11 (17_{dec})
6000:01	Underrange	Is set if the value falls below the operating range of the sensor or the process data contains the lowest possible value.		BOOLEAN	RO	0x00 (0_{dec})
6000:02	Overrange	Is set if the value exceeds the operating range of the sensor or the process data contains the highest possible value.		BOOLEAN	RO	0x00 (0_{dec})
6000:03	Limit 1	Only when limit check is active		BIT2	RO	0x00 (0_{dec})
		1	Value below set limit			
		2	Set limit exceeded			
		3	Set limit reached			
6000:05	Limit 2	Only when limit check is active		BIT2	RO	0x00 (0_{dec})
		1	Value below set limit			
		2	Set limit exceeded			
		3	Set limit reached			
6000:07	Error	The error bit is set if the process data is invalid (wire breakage, overrange, underrange).		BOOLEAN	RO	0x00 (0_{dec})
6000:0E	Sync error			BOOLEAN	RO	0x00 (0_{dec})
6000:0F	TxPDO State	Validity of the data of the associated TxPDO		BOOLEAN	RO	0x00 (0_{dec})
		0	valid			
		1	invalid			
6000:10	TxPDO Toggle	TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.		BOOLEAN	RO	0x00 (0_{dec})
6000:11	Value	Analog input date		INT16	RO	0x0000 (0_{dec})

Index 6010 AI Inputs

Index (hex)	Name	Meaning		Data type	Flags	Default
6010:0	AI inputs	Maximum subindex		UINT8	RO	0x11 (17_{dec})
6010:01	Underrange	Is set if the value falls below the operating range of the sensor or the process data contains the lowest possible value.		BOOLEAN	RO	0x00 (0_{dec})
6010:02	Overrange	Is set if the value exceeds the operating range of the sensor or the process data contains the highest possible value.		BOOLEAN	RO	0x00 (0_{dec})
6010:03	Limit 1	Only when limit check is active		BIT2	RO	0x00 (0_{dec})
		1	Value below set limit			
		2	Set limit exceeded			
		3	Set limit reached			
6010:05	Limit 2	Only when limit check is active		BIT2	RO	0x00 (0_{dec})
		1	Value below set limit			
		2	Set limit exceeded			
		3	Set limit reached			
6010:07	Error	The error bit is set if the process data is invalid (wire breakage, overrange, underrange).		BOOLEAN	RO	0x00 (0_{dec})
6010:0E	Sync error			BOOLEAN	RO	0x00 (0_{dec})
6010:0F	TxPDO State	Validity of the data of the associated TxPDO		BOOLEAN	RO	0x00 (0_{dec})
		0	valid			
		1	invalid			
6010:10	TxPDO Toggle	TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.		BOOLEAN	RO	0x00 (0_{dec})
6010:11	Value	Analog input date		INT16	RO	0x0000 (0_{dec})

Index 6020 AI Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6020:0	AI inputs	Maximum subindex	UINT8	RO	0x11 (17_{dec})
6020:01	Underrange	Is set if the value falls below the operating range of the sensor or the process data contains the lowest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6020:02	Overrange	Is set if the value exceeds the operating range of the sensor or the process data contains the highest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6020:03	Limit 1	Only when limit check is active	BIT2	RO	0x00 (0_{dec})
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6020:05	Limit 2	Only when limit check is active	BIT2	RO	0x00 (0_{dec})
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6020:07	Error	The error bit is set if the process data is invalid (wire breakage, overrange, underrange).	BOOLEAN	RO	0x00 (0_{dec})
6020:0E	Sync error		BOOLEAN	RO	0x00 (0_{dec})
6020:0F	TxPDO State	Validity of the data of the associated TxPDO	BOOLEAN	RO	0x00 (0_{dec})
		0 valid			
		1 invalid			
6020:10	TxPDO Toggle	TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6020:11	Value	Analog input date	INT16	RO	0x0000 (0_{dec})

Index 6030 AI Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6030:0	AI inputs	Maximum subindex	UINT8	RO	0x11 (17_{dec})
6030:01	Underrange	Is set if the value falls below the operating range of the sensor or the process data contains the lowest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6030:02	Overrange	Is set if the value exceeds the operating range of the sensor or the process data contains the highest possible value.	BOOLEAN	RO	0x00 (0_{dec})
6030:03	Limit 1	Only when limit check is active	BIT2	RO	0x00 (0_{dec})
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6030:05	Limit 2	Only when limit check is active	BIT2	RO	0x00 (0_{dec})
		1 Value below set limit			
		2 Set limit exceeded			
		3 Set limit reached			
6030:07	Error	The error bit is set if the process data is invalid (wire breakage, overrange, underrange).	BOOLEAN	RO	0x00 (0_{dec})
6030:0E	Sync error		BOOLEAN	RO	0x00 (0_{dec})
6030:0F	TxPDO State	Validity of the data of the associated TxPDO	BOOLEAN	RO	0x00 (0_{dec})
		0 valid			
		1 invalid			
6030:10	TxPDO Toggle	TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6030:11	Value	Analog input date	INT16	RO	0x0000 (0_{dec})

Index 800E AI Internal data

Index (hex)	Name	Meaning	Data type	Flags	Default
800E:0	AI internal data	Maximum subindex	UINT8	RO	0x01 (1_{dec})
800E:01	ADC raw value	Raw value of the analog/digital converter	INT16	RO	0x0000 (0_{dec})

Index 800F AI Vendor data

Index (hex)	Name	Meaning	Data type	Flags	Default
800F:0	AI vendor data	Maximum subindex	UINT8	RO	0x06 (6_{dec})
800F:01	R0 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
800F:02	R0 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
800F:03	R1 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
800F:04	R1 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
800F:05	R2 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
800F:06	R2 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})

Index 801E AI Internal data

Index (hex)	Name	Meaning	Data type	Flags	Default
801E:0	AI internal data	Maximum subindex	UINT8	RO	0x01 (1_{dec})
801E:01	ADC raw value	Raw value of the analog/digital converter	INT16	RO	0x0000 (0_{dec})

Index 801F AI Vendor data

Index (hex)	Name	Meaning	Data type	Flags	Default
801F:0	AI vendor data	Maximum subindex	UINT8	RO	0x06 (6_{dec})
801F:01	R0 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
801F:02	R0 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
801F:03	R1 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
801F:04	R1 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
801F:05	R2 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
801F:06	R2 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})

Index 802E AI Internal data

Index (hex)	Name	Meaning	Data type	Flags	Default
802E:0	AI internal data	Maximum subindex	UINT8	RO	0x01 (1_{dec})
802E:01	ADC raw value	Raw value of the analog/digital converter	INT16	RO	0x0000 (0_{dec})

Index 802F AI Vendor data

Index (hex)	Name	Meaning	Data type	Flags	Default
802F:0	AI vendor data	Maximum subindex	UINT8	RO	0x06 (6_{dec})
802F:01	R0 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
802F:02	R0 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
802F:03	R1 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
802F:04	R1 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
802F:05	R2 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
802F:06	R2 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})

Index 803E AI Internal data

Index (hex)	Name	Meaning	Data type	Flags	Default
803E:0	AI internal data	Maximum subindex	UINT8	RO	0x01 (1_{dec})
803E:01	ADC raw value	Raw value of the analog/digital converter	INT16	RO	0x0000 (0_{dec})

Index 803F AI Vendor data

Index (hex)	Name	Meaning	Data type	Flags	Default
803F:0	AI vendor data	Maximum subindex	UINT8	RO	0x06 (6_{dec})
803F:01	R0 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
803F:02	R0 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
803F:03	R1 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
803F:04	R1 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})
803F:05	R2 Offset	Offset (vendor calibration)	INT16	RW	0x0000 (0_{dec})
803F:06	R2 Gain	Gain (vendor calibration)	INT16	RW	0x4000 (16384_{dec})

Index F000 Modular device profile

Index (hex)	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	EP31x4-x002: 0x0004 (4_{dec}) EP3174-092: 0x0005 (5_{dec})

Index F008 Code word

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

Index F010 Module list

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	Maximum subindex	UINT8	RW	0x05 (5_{dec})
F010:01	SubIndex 001		UINT32	RW	0x0000012C (300_{dec})
F010:02	SubIndex 002		UINT32	RW	0x0000012C (300_{dec})
F010:03	SubIndex 003		UINT32	RW	0x0000012C (300_{dec})
F010:04	SubIndex 004		UINT32	RW	0x0000012C (300_{dec})
F010:05*	SubIndex 005		UINT32	RW	0x000003B6 (950_{dec})

*) EP3174-0092 only

7 Appendix

7.1 General operating conditions

Protection rating according to IP code

The degrees of protection are defined and divided into different classes in the IEC 60529 standard (EN 60529). Degrees of protection are designated by the letters "IP" and two numerals: **IPxy**

- Numeral x: Dust protection and contact protection
- Numeral y: Protection against water

x	Meaning
0	Not protected
1	Protected against access to dangerous parts with the back of the hand. Protected against solid foreign objects of 50 mm Ø
2	Protected against access to dangerous parts with a finger. Protected against solid foreign objects of 12.5 mm Ø
3	Protected against access to dangerous parts with a tool. Protected against solid foreign objects of 2.5 mm Ø
4	Protected against access to dangerous parts with a wire. Protected against solid foreign objects of 1 mm Ø
5	Protection against access to dangerous parts with a wire. Dust-protected. Ingress of dust is not prevented completely, although the quantity of dust able to penetrate is limited to such an extent that the proper function of the device and safety are not impaired
6	Protection against access to dangerous parts with a wire. Dust-tight. No ingress of dust

y	Meaning
0	Not protected
1	Protection against vertically falling water drops
2	Protection against vertically falling water drops when enclosure tilted up to 15°
3	Protection against spraying water. Water sprayed at an angle of up to 60° on either side of the vertical shall have no harmful effects
4	Protection against splashing water. Water splashed against the enclosure from any direction shall have no harmful effects
5	Protection against water jets.
6	Protection against powerful water jets.
7	Protected against the effects of temporary immersion in water. Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is immersed in water at a depth of 1 m for 30 minutes

Chemical resistance

The resistance refers to the housing of the IP67 modules and the metal parts used. In the table below you will find some typical resistances.

Type	Resistance
Water vapor	unstable at temperatures > 100 °C
Sodium hydroxide solution (ph value > 12)	stable at room temperature unstable > 40 °C
Acetic acid	unstable
Argon (technically pure)	stable

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	Link
ZS5300-0011	Mounting rail	Website

Cables

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

Ordering information	Description	Link
ZB8513-0002	EMC shield clamp for M12 connectors	Data sheet
ZK1090-3xxx-xxxx	EtherCAT cable M8, green	Website
ZK1093-3xxx-xxxx	EtherCAT cable M8, yellow	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

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 Continuative documentation for I/O components with analog in and outputs

NOTICE	
	**Continuative documentation for I/O components with analog in and outputs** Pay also attention to the continuative documentation **I/O Analog Manual** Notes on I/O components with analog inputs and outputs, which is available in the Beckhoff Information-System and for download on the Beckhoff homepage www.beckhoff.com on the respective product pages! It explains the basics of sensor technology and contains notes on analog measured values.

7.4 Version identification of EtherCAT devices

7.4.1 General notes on marking

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.

7.4.2 Version identification of IP67 modules

The serial number/ data code 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**	Example with serial number 12 06 3A 02:
KK - week of production (CW, calendar week)	12 - production week 12
YY - year of production	06 - production year 2006
FF - firmware version	3A - firmware version 3A
HH - hardware version	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

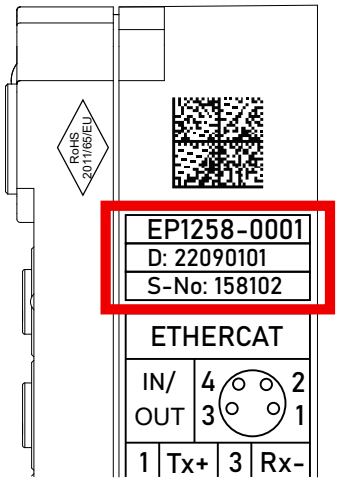


Fig. 27: EP1258-00001 IP67 EtherCAT Box with batch number/DateCode 22090101 and unique serial number 158102

7.4.3 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.

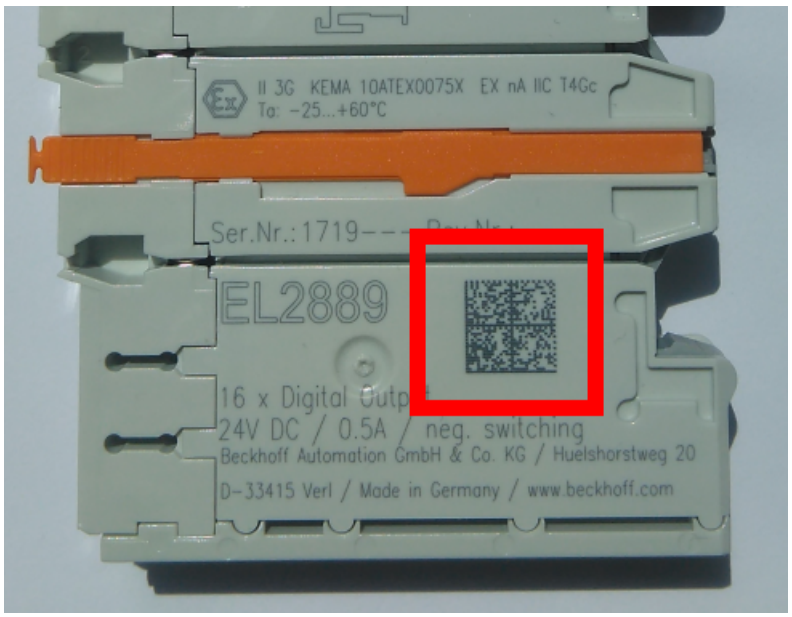


Fig. 28: BIC as data matrix code (DMC, code scheme ECC200)

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.

Following information is possible, positions 1 to 4 are always present, the other according to need of production:

Position	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**	SBTN	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	51S	12	51S678294
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 positions 1 to 4 and with the above given example value on position 6. The data identifiers are highlighted in bold font:

1P072222**S**BTNk4p562d7**1K**EL1809 **Q**1 **51S**678294

Accordingly as DMC:

Fig. 29: Example DMC **1P**072222**S**BTNk4p562d7**1K**EL1809 **Q**1 **51S**678294

BTN

An important component of the BIC is the Beckhoff Traceability Number (BTN, position 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.

NOTICE

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.

7.4.4 Electronic access to the BIC (eBIC)

Electronic BIC (eBIC)

The Beckhoff Identification Code (BIC) is applied to the outside of Beckhoff products in a visible place. If possible, it should also be electronically readable.

Decisive for the electronic readout is the interface via which the product can be electronically addressed.

K-bus devices (IP20, IP67)

Currently, no electronic storage and readout is planned for these devices.

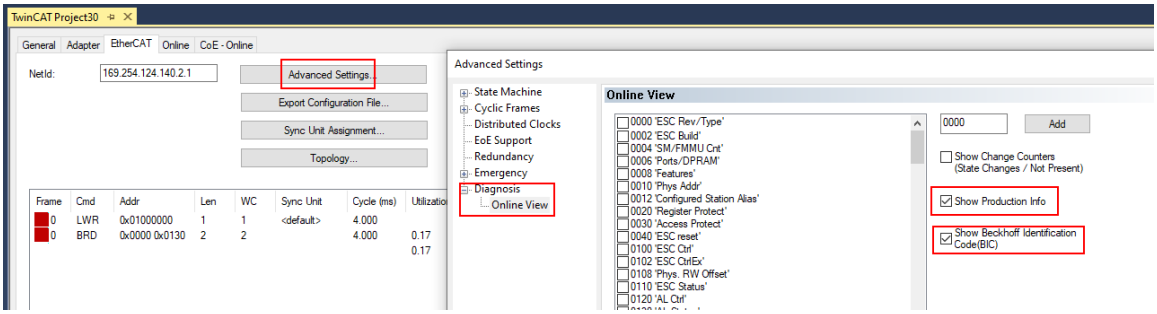
EtherCAT devices (IP20, IP67)

All Beckhoff EtherCAT devices have a so-called ESI-EEPROM, which contains the EtherCAT identity with the revision number. Stored in it is the EtherCAT slave information, also colloquially known as ESI/XML configuration file for the EtherCAT master. See the corresponding chapter in the EtherCAT system manual (Link) for the relationships.

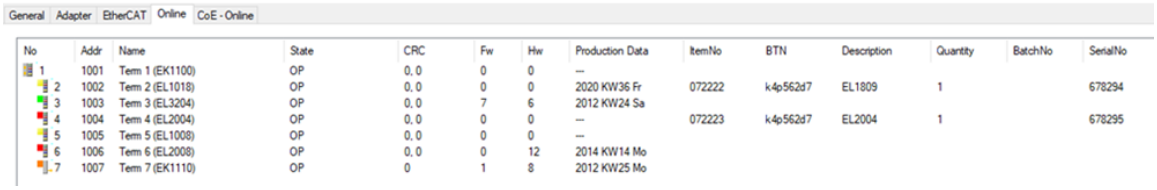
The eBIC is also stored in the ESI-EEPROM. The eBIC was introduced into the Beckhoff I/O production (terminals, box modules) from 2020; widespread implementation is expected in 2021.

The user can electronically access the eBIC (if existent) as follows:

- With all EtherCAT devices, the EtherCAT master (TwinCAT) can read the eBIC from the ESI-EEPROM
  - From TwinCAT 3.1 build 4024.11, the eBIC can be displayed in the online view.
  - To do this,
    check the checkbox "Show Beckhoff Identification Code (BIC)" under
    EtherCAT → Advanced Settings → Diagnostics:



  - The BTN and its contents are then displayed:



  - Note: as can be seen in the illustration, the production data HW version, FW version and production date, which have been programmed since 2012, can also be displayed with "Show Production Info".
  - Access from the PLC: From TwinCAT 3.1. build 4024.24 the functions *FB_EcReadBIC* and *FB_EcReadBTN* are available in the Tc2_EtherCAT Library from v3.3.19.0 for reading into the PLC..
- In the case of EtherCAT devices with CoE directory, the object 0x10E2:01 can additionally by used to display the device's own eBIC; the PLC can also simply access the information here:

- The device must be in PREOP/SAFEOP/OP for access:

Index	Name	Flags	Value		
1000	Device type	RO	0x015E1389 (22942601)		
1008	Device name	RO	ELM3704-0000		
1009	Hardware version	RO	00		
100A	Software version	RO	01		
100B	Bootloader version	RO	J0.1.27.0		
1011:0	Restore default parameters	RO	> 1 <		
1018:0	Identity	RO	> 4 <		
10E2:0	Manufacturer-specific Identification C...	RO	> 1 <		
10E2:01	SubIndex 001	RO	1P158442SBTN0008jekp1KELM3704	Q1	2P482001000016
10F0:0	Backup parameter handling	RO	> 1 <		
10F3:0	Diagnosis History	RO	> 21 <		
10F8	Actual Time Stamp	RO	0x170bfb277e		

- The object 0x10E2 will be introduced into stock products in the course of a necessary firmware revision.
- From TwinCAT 3.1. build 4024.24 the functions *FB_EcCoEReadBIC* and *FB_EcCoEReadBTN* are available in the Tc2_EtherCAT Library from v3.3.19.0 for reading into the PLC.

- For processing the BIC/BTN data in the PLC, the following auxiliary functions are available in *Tc2_Utilities* from TwinCAT 3.1 build 4024.24 onwards
  - F_SplitBIC: The function splits the Beckhoff Identification Code (BIC) sBICValue into its components based on known identifiers and returns the recognized partial strings in a structure ST_SplitBIC as return value.
  - BIC_TO_BTN: The function extracts the BTN from the BIC and returns it as a value.
- Note: in the case of electronic further processing, the BTN is to be handled as a string(8); the identifier "SBTN" is not part of the BTN.
- Technical background
  The new BIC information is additionally written as a category in the ESI-EEPROM during the device production. The structure of the ESI content is largely dictated by the ETG specifications, therefore the additional vendor-specific content is stored with the help of a category according to ETG.2010. ID 03 indicates to all EtherCAT masters that they must not overwrite these data in case of an update or restore the data after an ESI update.
  The structure follows the content of the BIC, see there. This results in a memory requirement of approx. 50..200 bytes in the EEPROM.
- Special cases
  - If multiple, hierarchically arranged ESCs are installed in a device, only the top-level ESC carries the eBIC Information.
  - If multiple, non-hierarchically arranged ESCs are installed in a device, all ESCs carry the eBIC Information.
  - If the device consists of several sub-devices with their own identity, but only the top-level device is accessible via EtherCAT, the eBIC of the top-level device is located in the CoE object directory 0x10E2:01 and the eBICs of the sub-devices follow in 0x10E2:nn.

PROFIBUS, PROFINET, DeviceNet devices etc.

Currently, no electronic storage and readout is planned for these devices.

7.5 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: www.beckhoff.com

You will also find further documentation for Beckhoff components there.

Support

The Beckhoff 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
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- and extensive training program for Beckhoff system components

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