BECKHOFF New Automation Technology

Documentation | EN

EP3048-0002

8-channel analog input, current, ±20 mA, 16 bit, single-ended, 2 ksps, M12

2025-09-16 | Version: 1.0

Table of contents

1 Foreword

1.1 Notes on the documentation

This description is intended exclusively for trained specialists in control and automation technology who are familiar with the applicable national standards.
The documentation and the following notes and explanations must be complied with when installing and commissioning the components.
The trained specialists must always use the current valid documentation.

The trained specialists must ensure that the application and use of the products described is in line with all safety requirements, including all relevant laws, regulations, guidelines, and standards.

Disclaimer

The documentation has been compiled 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 notice.
Claims to modify products that have already been supplied may not be made on the basis of the data, diagrams, and descriptions in this documentation.

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1.2 For your safety

Safety regulations

Read the following explanations for your safety.
Always observe and follow product-specific safety instructions, which you may find at the appropriate places in this document.

Exclusion of liability

All the components are supplied in particular hardware and software configurations which are 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 technology 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
1.0	• First release

Firmware and hardware versions

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

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

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

Syntax of the batch number (D-number)

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

Further information on this topic: Version identification of EtherCAT devices [▶ 87].

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.

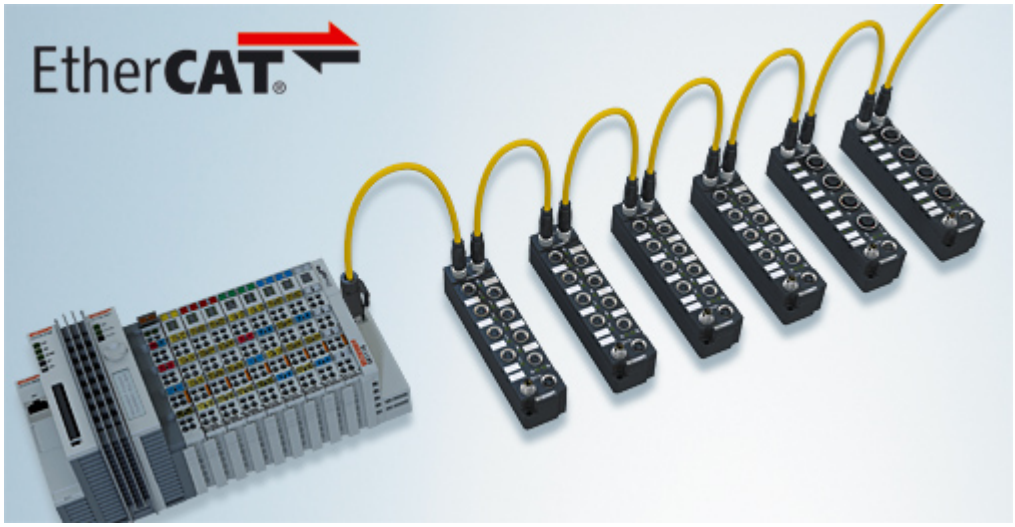


Fig. 1: EtherCAT Box Modules within an EtherCAT network

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

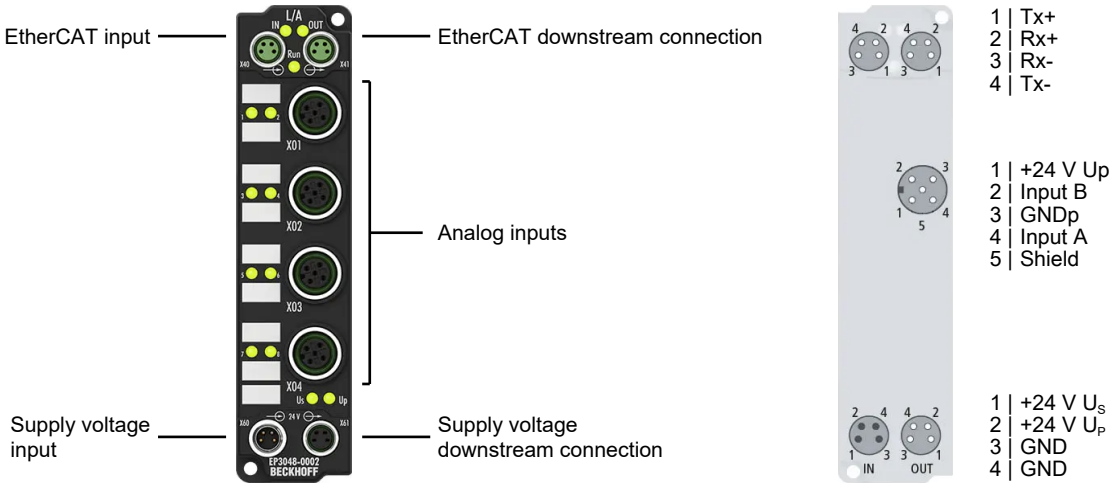
Fig. 3: EtherCAT Box with M12 connections for sensors/actuators

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

3.1 Introduction



The EP3048-0002 EtherCAT Box has 8 channels and processes 20 mA standard signals with 16-bit resolution and up to 2000 measured values per second. Each channel can be parameterized individually via the controller/TwinCAT; signals in the range of -20…+20 mA , 0…+20 mA and 4…+20 mA can be processed by each channel. The current inputs are designed as single-ended.

With a technical measuring range of ±107% of the nominal range, the module also supports commissioning with sensor values in the limit range and evaluation according to NAMUR NE43. Two channels are connected via an M12 socket.

Quick links

Technical data [▶ 11]
Process image [▶ 13]
Signal connection [▶ 23]
Commissioning [▶ 26]

3.2 Technical data

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

EtherCAT	
Connection	2 x M8 socket, 4-pin, A-coded, shielded
Electrical isolation	500 V

Supply voltages	
Connection	Input: M8 connector, 4-pin, A-coded Downstream connection: M8 socket, 4-pin, A-coded
U_S nominal voltage	24 V_{DC} (-15 % / +20 %)
U_S sum current: $I_{S,sum}$	max. 4 A
Current consumption from U_S	80 mA
U_P voltage range	12…30 V_{DC}
U_P sum current: $I_{P,sum}$	max. 4 A
Current consumption from U_P	= Sensor power supply

Analog inputs	
Number	8
Connection	4 x M12 socket, 5-pin Two inputs per M12 socket.
Cable length	max. 30 m
Wiring	2-wire
Ground reference	Single-ended
Measuring range, nominal (FSV_{nom})	Adjustable: • -20…+20 mA (default) • 0…20 mA • 4…20 mA
Measuring range, technical (FSV_{techn})	-21.47 mA…+21.47 mA
Resolution	16 bit (including sign)
Sampling rate	max. 2 ksps (min. 500 µs) per channel
Sampling type	Multiplex, approx. 60 µs delay between channels
Input resistance	100 Ω
Input filter limit frequency	1.2 kHz (-3 dB)
Input filter characteristic	First-order low-pass filter
Settling time	3 ms typ. (0…90 %)
Dielectric strength	30 V permanent
Overcurrent protection	50 mA
Electrical isolation	No electrical isolation between the channels. The channels are set to U_P/GND_P potential.
Conversion method	SAR
Measuring error, measurement uncertainty	max 0.3 %, relative to the full scale value.
Largest short-term deviation during a specified electrical interference test	±1 $\%_{FSV}$ typ.
Sensor power supply	12…30 V_{DC} from the supply voltage U_P. max. 0.5 A in total, short-circuit proof in total.

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 [▶ 12]
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 [▶ 25]

*) 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 Scope of supply

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

- 1x EP3048-0002 EtherCAT Box
- 2x protective cap for EtherCAT socket, M8, green (pre-assembled)
- 1x protective cap for supply voltage input, M8, transparent (pre-assembled)
- 1x protective cap for supply voltage output, M8, black (pre-assembled)
- 10x labels, blank (1 strip of 10)

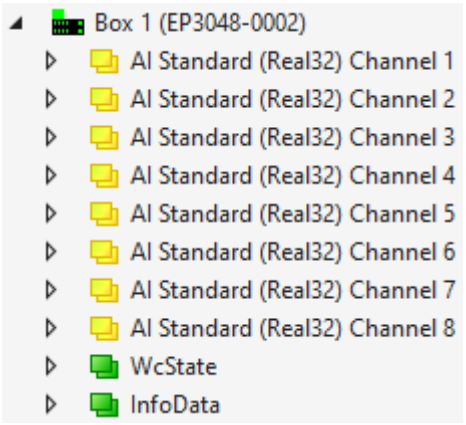
Pre-assembled protective caps do not ensure IP67 protection

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

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

3.4 Process image

The process image in the factory setting:

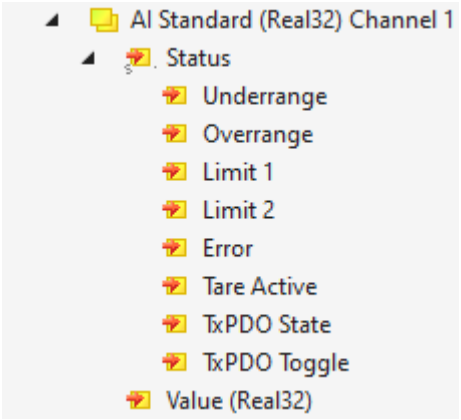


3.4.1 Process data objects

In the following sections, the letter *n* serves as a placeholder for the channel number.

Screenshots showing process data objects of channel 1 are used as examples for both channels.

AI Standard (Real32) Channel n



Underrange
Value below measuring range.

Overrange
Measuring range exceeded.

Limit 1
Indicates whether the current measured value is above or below the user-defined limit value 1.

Limit 2
Indicates whether the current measured value is above or below the user-defined limit value 2.

Error
Error.

Tare Active
Indicates that the measured value "Value" is currently offset by the tare function.

TxPDO State
This bit is 1 if the current measured value is invalid due to an error.

TxPDO Toggle
This bit is inverted each time the measured value is updated.

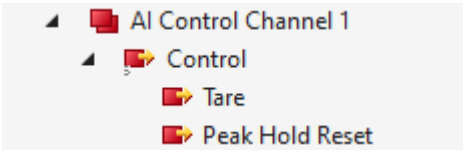
Value (Real32)
The current measured value in [A], data type REAL.

3.4.2 Optional process data objects

The following process data objects are disabled in the factory settings. You can enable them in TwinCAT via the "Process Data" tab.

AI Control Channel n

PDO indices 0x1600, 0x1602, 0x1604, ...

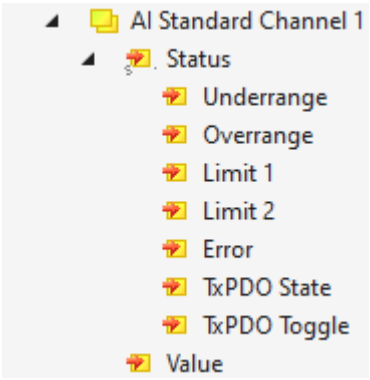


Tare
Set the current measured value as the tare value.

Peak Hold Reset
Reset the drag indicator of the "Peak Hold" functional unit to zero.

AI Standard Channel n

PDO indices 0x1A00, 0x1A02, 0x1A04, ...



Underrange
Value below measuring range.

Overrange
Measuring range exceeded.

Limit 1
Indicates whether the current measured value is above or below the user-defined limit value 1.

Limit 2
Indicates whether the current measured value is above or below the user-defined limit value 2.

Error
Error.

Tare Active
Indicates that the measured value "Value" is currently offset by the tare function.

TxPDO State
This bit is 1 if the current measured value is invalid due to an error.

TxPDO Toggle
This bit is inverted each time the measured value is updated.

Value
The current measured value as data type INT. For the interpretation of the measured value, see the following chapters:

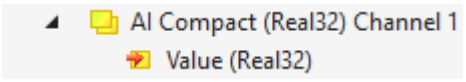
- Integer scaler (only when using PDO SINT16) [▶ 45]
- Presentation (only when using SINT16-PDO) [▶ 48].

AI Compact Channel n

PDO indices 0x1A01, 0x1A03, 0x1A05, ...

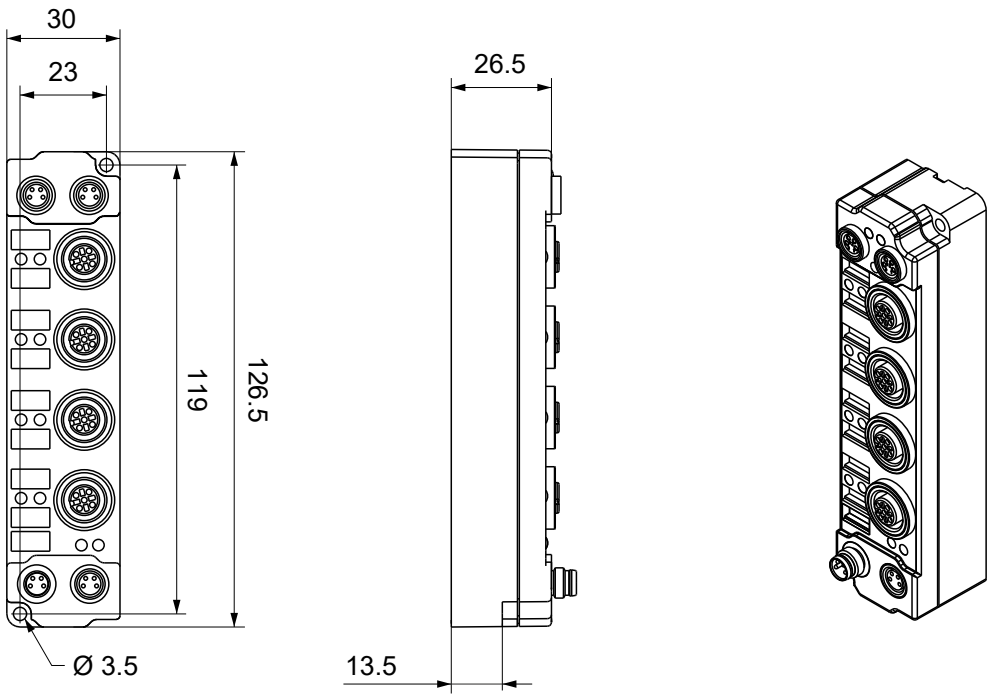
AI Compact (Real32) Channel n

PDO indices 0x1A11, 0x1A13, 0x1A15, ...



4 Mounting and connection

4.1 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
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)

4.2 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.

4.3 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

4.4 EtherCAT

4.4.1 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

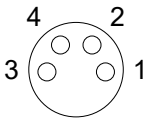


Fig. 4: M8 socket

EtherCAT	M8 socket	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.

4.4.2 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

4.4.3 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

4.5 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 supply provides safe electrical isolation and limitation of the voltage without a connection to the protective conductor, a PELV 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 [▶ 25].

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 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.

4.5.1 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

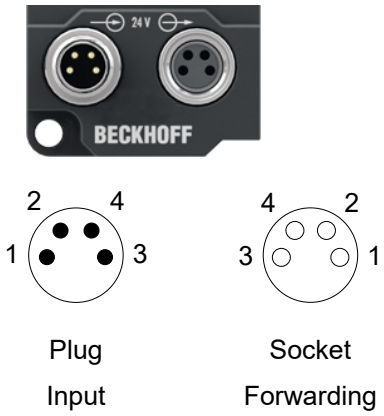


Fig. 5: M8 connector

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

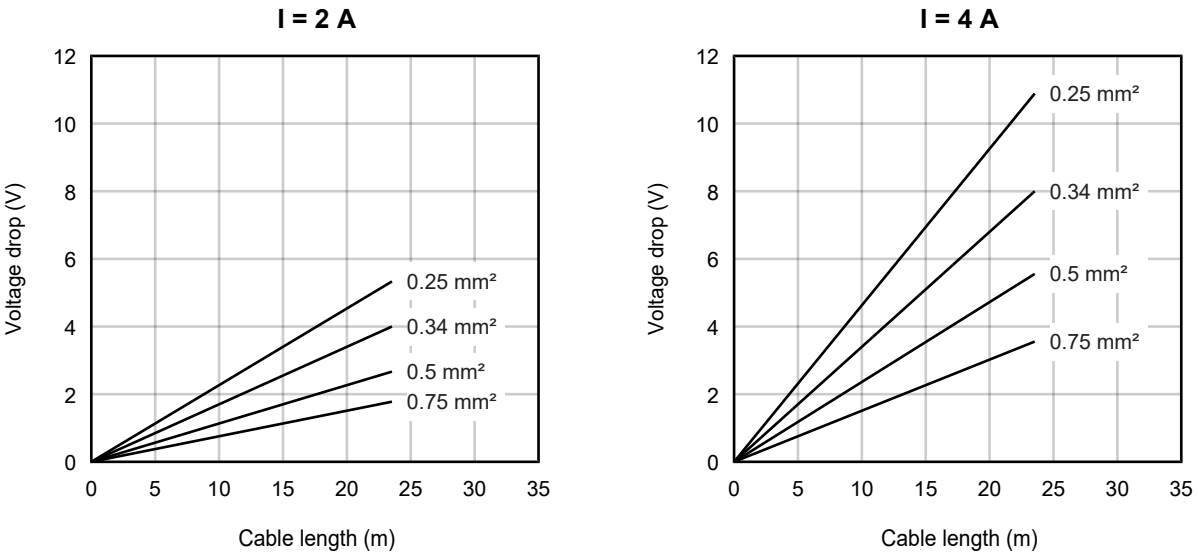
4.5.2 Status LEDs

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.

4.5.3 Conductor losses

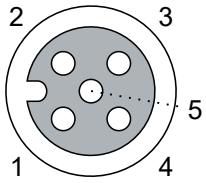
Take into account the voltage drop on the supply line when planning a system. Avoid the voltage drop being so high that the supply voltage at the box lies below the minimum nominal voltage.
Variations in the voltage of the power supply unit must also be taken into account.

Voltage drop on the supply line



4.6 Analog inputs

The eight analog inputs are distributed across four 5-pin, A-coded M12 sockets. There are two analog inputs on each M12 socket.



Pin	Symbol	Function
1	+24 V Up	Sensor power supply: +24 V_{DC} from U_P
2	Input B	Analog input B
3	GNDp	GND_P
4	Input A	Analog input A
5	Shield	Shield

The sensor power supply on pin 1 is short-circuit proof. A short circuit in one of the sensor power supply connections causes the sensor power supply at all four connections to switch off for the duration of the short circuit.

EMC shield clamp

Depending on the application, it may be necessary to connect the shield of the sensor cables to the signal inputs of the box using ZB8513-0002 shield clamps.

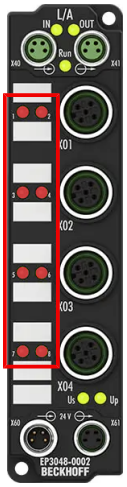
See chapter: ZB8513-0002 | EMC shield clamp on earthing tapes [▶ 85].

Channel assignment

The analog inputs are designated as channels 1 to 8 in the process data. The following table shows the assignment of the channel numbers to the corresponding connection pins.

Channel	Connection	Pin
1	X01	4
2	X01	2
3	X02	4
4	X02	2
5	X03	4
6	X03	2
7	X04	4
8	X04	2

4.6.1 Status LEDs



Next to each M12 socket, there are two status LEDs labeled with the channel numbers. They signal the error state of the channels.

Display	Meaning
Off	No error
Lights up red	Error

4.7 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. 6: UL label

5 Commissioning

5.1 Integrating into a TwinCAT project

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

5.2 Fast commissioning

The measuring ranges of the analog inputs are set to -20...+20 mA ex factory. The measured value output in the process data is a floating-point number (Real32) in the unit [A].

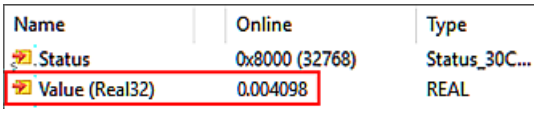
You can display the current measured value in TwinCAT as follows:

1. Scan

(alternatively, add manually to the configuration; pay attention to the EtherCAT revision)

2. Reload Devices

⇨ The measured value is displayed and can be linked to a PLC variable.



In this example, the measured value of the first channel is 4.098 mA.

5.3 Commissioning the analog inputs

5.3.1 Signal flow

The signal acquisition and data processing of the analog input of this device is as follows:

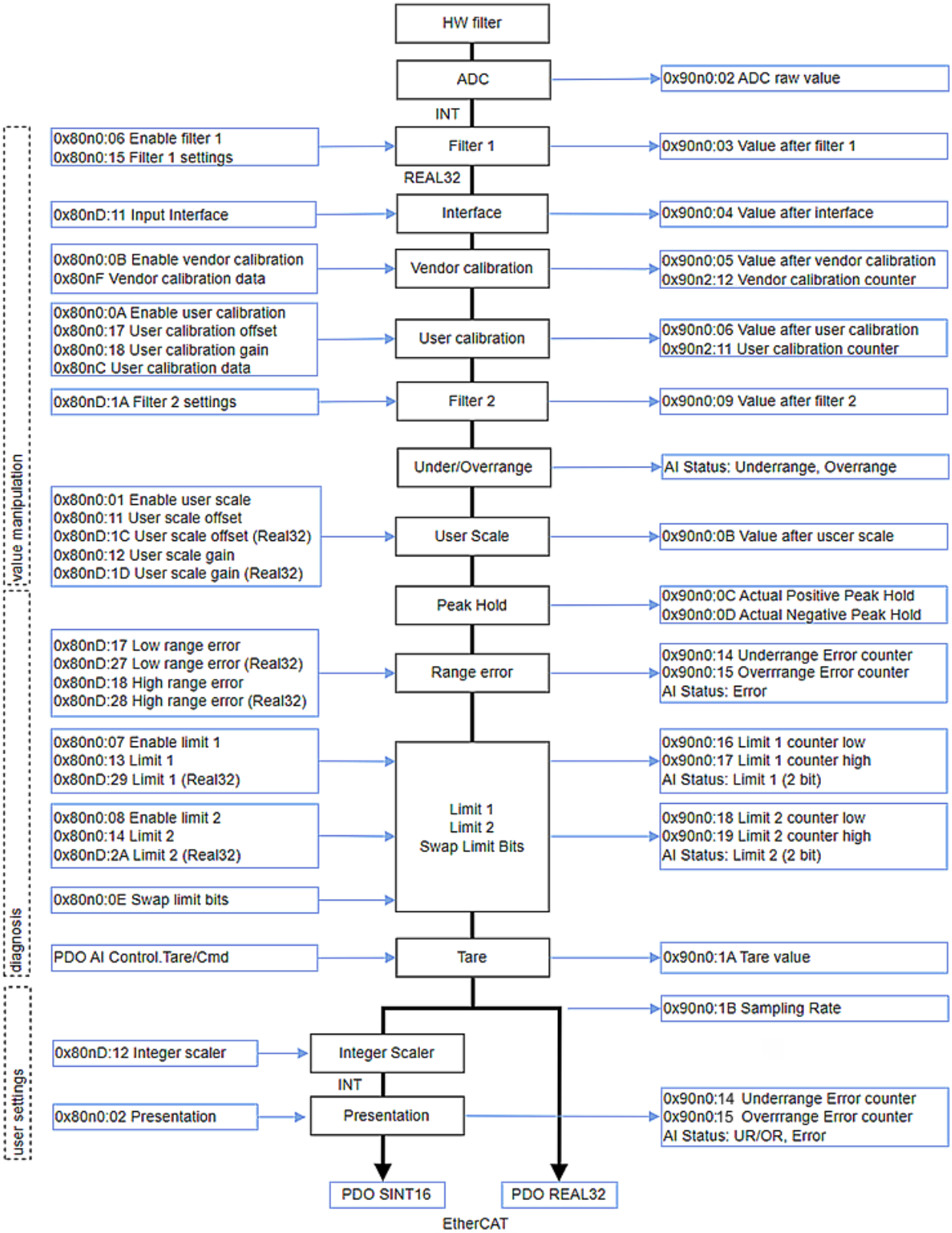


Fig. 7: Data flow of the analog input

Data flow diagram legend

Left column:	**Middle column:**	**Right column:**
Changeable parameters (CoE settings or status PDO) that influence processing	Functional units	Intermediate values and results, displayed in the CoE or status PDO

This device only uses floating-point calculations internally, as shown in the data flow. This considerably simplifies and shortens the commissioning of the analog channel, which minimizes errors in understanding. In addition, intermediate values along the data calculation can be easily displayed in the CoE.

The Real32 and INT16 values are defined in the CoE without units. However, the unit is determined by the context and should, wherever possible, be regarded as an SI unit. For example, the voltage is measured in V, the current in A (even with 20 mA input!), the resistance in ohms and the ratio in V/V....

Note: Individual functional units (see data flow) have already been introduced in earlier analog devices based on INT16 (integer) and are controlled by these INT-based parameters. Such INT parameters are still supported for compatibility reasons. For example, existing code in the controller should access the CoE via ADS. This means that parameters of functional units are either

- only available as REAL32 types in the CoE if the functional unit was newly introduced with the FloatingPoint data flow, or
- are present in the CoE both as INT type and as REAL32 type with the same meaning, recognizable by the name suffix "(Real32)". The values are automatically mirrored by the firmware when they are changed or taken into account one after the other.

When re-implementing the analog function, it is recommended to use the Real32 parameters.

Commissioning of the analog input in TwinCAT should follow this data flow and is described below.

5.3.2 Filter 1 (low-pass)

A digital filter with predefined properties is available in the analog channel. Depending on the setting, it can take on the characteristics of a filter with finite impulse response (FIR filter) or with infinite impulse response (IIR filter).

The filter properties of all input channels are set via the 1st channel, the filter settings of the other input channels have no function.

This filter still works on the integer values and is therefore independent of the interface.

In CoE 0x90n0:1B “Sampling Rate” the current conversion rate is displayed in [Hz], depending on the filter setting

9000:1B	Sampling Rate	RO	1600.000000 (1.600000e+03)	Hz

Fig. 8: Index 0x9000:1B, Sampling Rate

Parameter:

- Filter activation: CoE Index 0x80n0:06

The filter is enabled by default in this analog channel, see below for properties. Channel properties with disabled filter:

Conversion time	Sampling rate
500 µs	2000 sps

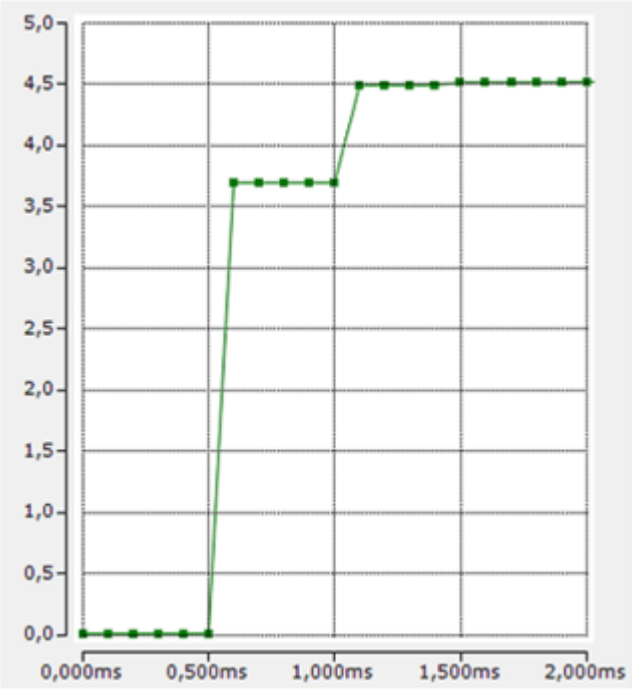


Fig. 9: Example square wave signal 0->4.52 V on channel 1, filter disabled, EtherCAT cycle time 100 µs

- Filter type: CoE Index 0x80n0:15

The available options are:

Filter type	Designation
FIR	50 Hz FIR
FIR	60 Hz FIR
IIR	IIR 1
IIR	IIR 2
IIR	IIR 3
IIR	IIR 4
IIR	IIR 5
IIR	IIR 6
IIR	IIR 7
IIR	IIR 8

- FIR filter

  The filter performs a notch filter function and determines the conversion time of the terminal. The higher the filter frequency, the faster the conversion time. A 50 Hz and a 60 Hz filter are available. Notch filter means that the filter has zeros (notches) in the frequency response at the filter frequency and multiples thereof, i.e. it attenuates the amplitude at these frequencies. The FIR filter operates as a non-recursive filter.

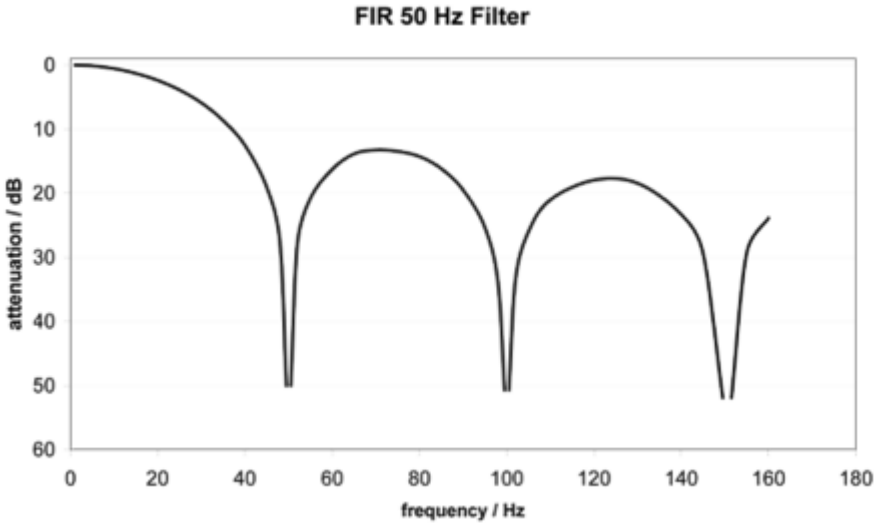


Fig. 10: FIR 50 Hz filter

Filter data FIR:

Filter	Attenuation	Cut-off frequency (-3 dB)	Conversion time	Sampling rate
50 Hz FIR	>50 dB	22 Hz	625 µs	1600 sps
60 Hz FIR	>45 dB	26 Hz	521 µs	1920 sps

- IIR filter

  The filter with IIR characteristic is a time-discrete, linear, time-invariant 1st order low-pass filter (-20 dB/decade), which can be set in 8 levels, i.e. cut-off frequencies (level 1 = weak recursive filter, up to level 8 = strong recursive filter) The IIR can be understood to be a sliding average value calculation after a low-pass filter.

IIR filter	Cut-off frequency (-3 dB)
IIR 1	1 kHz
IIR 2	500 Hz
IIR 3	285 Hz
IIR 4	142 Hz
IIR 5	66 Hz
IIR 6	33 Hz
IIR 7	17 Hz
IIR 8	8.2 Hz

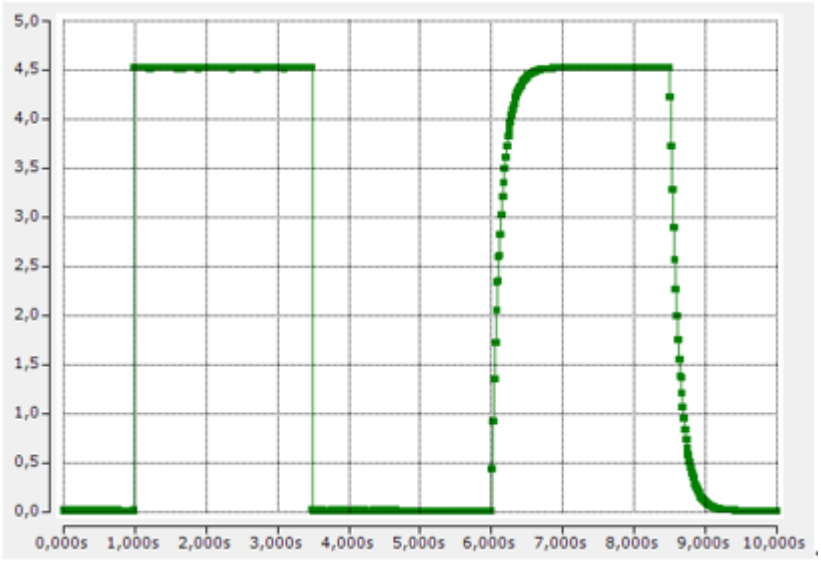


Fig. 11: Comparison of square wave signal 0.2 Hz/4.5 V, EtherCAT cycle time 100 µs, left filter disabled, right IIR8

5.3.3 Interface

The interface setting is fundamental for operation as an electrical measurement input.
Setting: CoE Index x80nD:11 "Input Interface"

Setting	Measuring range
None	-
I	±20 mA
I	0-20 mA
I	4-20 mA
I	4-20 mA NAMUR

Note: When the interface is changed, the following CoE parameters of UserScale, Range Error, Limit 1/2 are reset to the default setting.

The intermediate value after this functional unit can be viewed in index 90n0:03 "Value after interface".

5.3.4 Measured value processing

The electrical measured value recorded and digitized by the ADC must or can be changed in the device in order to

- compensate for hardware dependency (keyword: calibration)
- or to reinterpret the measured value on the application side (e.g. to convert the electrical 0..10 V signal of a pressure sensor into a pressure value).

Note: This CoE uses the term "calibration", which is historically used at Beckhoff, although it has nothing to do with deviation statements of a calibration certificate. The vendor or customer calibration data/adjustment data that the device uses during operation in order to maintain the guaranteed analog accuracy is described here.

The measured value can be changed in 3 functional units, all three can be active at the same time:

- Vendor Calibration

The electrical channel is calibrated by Beckhoff in the "Vendor Calibration" functional unit for compliance with the specified uncertainty (see Technical data, previously: Measuring error). The vendor calibration data from Beckhoff is available in this area.

Parameter:

Index (hex)	Name	Data type	Meaning
80n0:0B	Enable vendor calibration	BOOL	enabled by default, the data is taken into account.
80nF	Vendor calibration data	-	not intended for user modification

The intermediate value after this functional unit can be viewed in index 0x90n0:05 under "Vendor Calibration".

The number of setting changes in this functional unit is counted up in index 0x90n2:11 as "Vendor Calibration Counter" and cannot be deleted.

If any parameter in the data area is changed, the counter is incremented. Further changes in the data area within the next 30 seconds are not taken into account for the counter. After this time has elapsed, a parameter change will increment the counter again.

- User Calibration

The "User calibration" functional unit can be used by the user if alternative, system-dependent correction values are to be used permanently.

The gain/offset coefficients are available both in Real32 format for convenient operation and alternatively (but with the same mathematical effect) in INT16 format for compatibility with any existing code. Processing in "User Calibration" (if "Enable User calibration" = 1) is as follows:

- for setpoint >= 0: "Value after User calibration" = S0 + "Value after Vendor calibration" * S1 + ("Value after Vendor calibration")² * S2
- for setpoint < 0: "Value after User calibration" = S0 + "Value after Vendor calibration" * S1n +("Value after Vendor calibration")² * S2

Parameter:

Index (hex)	Name	Data type	Meaning
80n0:0A	Enable User Calibration	BOOL	disabled by default, calculation only takes place if TRUE
80n0:17	User Calibration Offset	SINT16	1 Bit = $FSV_{norm.}$/32767, default: 0
80n0:18	User Calibration Gain	UINT16	1 bit corresponds to 2^{-16}, so "1" corresponds to $0x7FFF/32767_{dec}$
80nC:01	User Calibration Data	BYTE4	4 bytes of free memory space; here it is possible to store the calibration date in the form of 8 CHAR, for example
80nC:03… 0D	User Scale Gain (Real32)	REAL32	Real32 coefficients S0/S1/S2/S3/S1n of the calculation polynomial

The intermediate value after this functional unit can be viewed in index 0x90n0:06 "Value after User Calibration".

The number of setting changes in this functional unit is counted up in index 0x90n2:12 "User Calibration Counter" (cannot be deleted).
Procedure: the counter is incremented the first time any parameter in the data area index 0x80nC or index 0x80n0:17/18 is changed; further changes in the data area in the following 30 seconds are not taken into account for the counter. After this time has elapsed, a parameter change will increment the counter again.

- User Scale

The “User Scale” functional unit is intended for reinterpretations/transformations of the measured value, so “10 V” can become “50 kg” with Gain = 5. It is implemented as a linear transformation with gain/offset.

The gain/offset coefficients are available both in Real32 format for convenient operation and alternatively (but with the same mathematical effect) in INT16 format for compatibility with any existing code.

Processing in "User Scale" (if "Enable User Scale" = 1) is as follows:

"Value after User scale" = Offset + value of filter 2 * Gain

Parameter:

Index (hex)	Name	Data type	Meaning
80n0:01	Enable User Scale	BOOL	disabled by default, calculation only takes place if TRUE
80n0:11	User Scale Offset	SINT16	is added directly in digits.
80n0:12	User Scale Gain	UINT16	1 bit corresponds to 2^{-16}, so "1" corresponds to $0x7FFF/32767_{dec}$
80nD:1C	User Scale Offset (Real32)	REAL32	-
80nD:1D	User Scale Gain (Real32)	REAL32	-

The intermediate value after this functional unit can be viewed in index 0x90n0:0B "Value After User Scale".

Changing the interface

When the interface is changed, the gain and offset are reset to 1 and 0 respectively!

Password protection for user data

Some user data are protected against unwanted or inadvertent writing by an additional password to be entered in CoE 0xF009:

- CoE write accesses by the user, PLC or startup entries in *Single* or *CompleteAccess* mode
- Overwrite the values by *RestoreDefaultParameter* Access to 0x80n0 (or 0x80nD, if available)

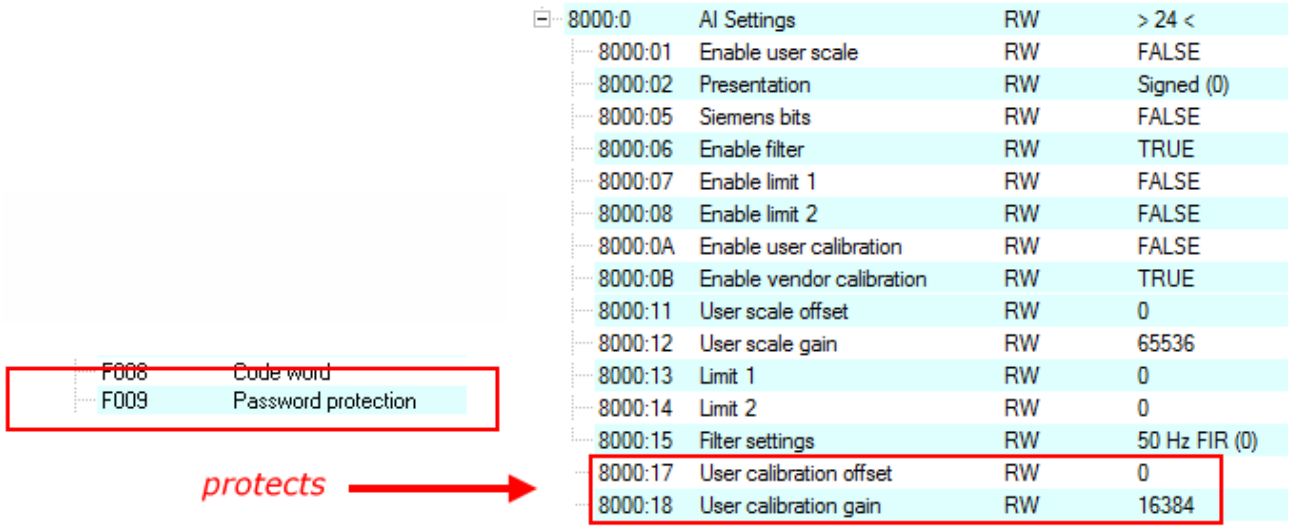


Fig. 12: Password protection for the 0x8000:17 and 0x8000:18 entries (example)

Use of CoE 0xF009

- Entering 0x12345678 enables the password protection → Object shows "1" (enabled)
  Protected objects can now no longer be changed, no error message occurs during a write access!
- Entering 0x11223344 disables password protection → Object displays "0" (disabled)

Password protection takes effect with the following AI settings:

Index (hex)	Designation
80n0:0A	Enable User calibration
80n0:0B	Enable Vendor calibration
80n0:17	User calibration offset
80n0:18	User calibration gain
80nC	User calibration Data
80nD:17	Low Range Error
80nD:18	High Range Error
80nD:27	Low Range Error (REAL32)
80nD:28	High Range Error (REAL32)

5.3.5 Filter 2 (high-pass)

CoE Index 0x80nD:1A "Filter 2 Settings" provides another digital filter with predefined properties for processing the signal. A digital high-pass filter is available here, for example, to eliminate the DC component of the input signal so that only the AC component of the signal is processed. However, it should be noted that the absolute signal remains within the technical measuring range, i.e. any positive DC component (offset) reduces the remaining measurable positive range by the same amount.

Parameter: "Filter 2 Settings" (Index 0x80nD:1A) [ENUM]

Filter type	Name
None	OFF (default)
IIR high-pass	HP 10 Hz
IIR high-pass	HP 1 Hz
IIR high-pass	HP 0.1 Hz
IIR high-pass	HP 0.01 Hz
IIR high-pass	HP 0.001 Hz (-3-dB cut-off frequencies of the high-pass filter)

The high-pass filter is of type IIR 1st order and therefore has a slope of +20 dB/dec.
Depending on the set cut-off frequency, the following actions lead to a settling time

- Change of the DC component (rapid change of the DC bias voltage).
- Change the setting in *Filter 2* from “Off” to a filter cut-off frequency.

Example: A 10 Hz, ±1 V sine wave is applied simultaneously to Ch1 + Ch2 of an EL4374 using a signal generator.
Setting: Ch1 without filter treatment, Ch2 with filter 2 Settings = "HP 1 Hz". With (A) an electrical offset of +1 V is added, the filter eliminates this within approx. 3 s. With (B) the electrical offset is removed again.

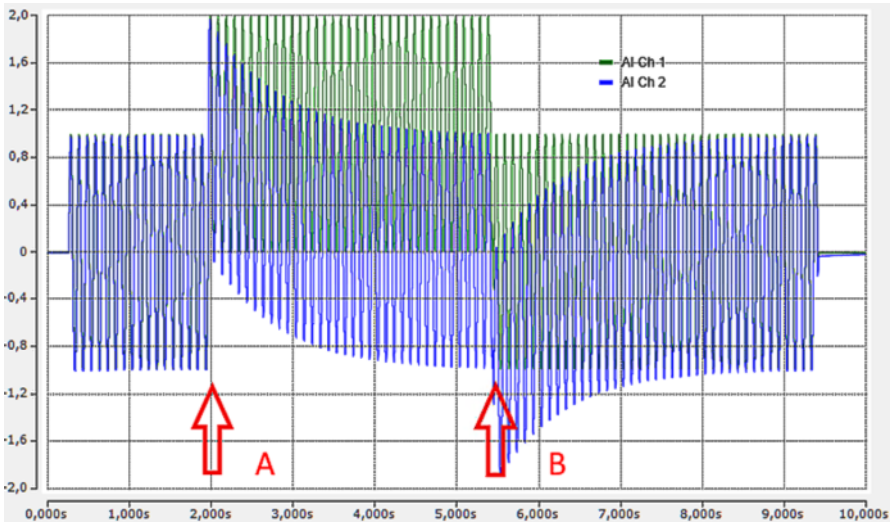


Fig. 13: Example signal generator, sine Ch.1 + 2

Effect of rapid temperature changes on the filter

Both firmware and hardware are involved in this high-pass filter. The controller compensates the DC component in the output signal. Since hardware is involved, the filter has a slight temperature coefficient, i.e. rapid temperature changes can lead to offset shifts in the output signal. In this case, the high-pass filter has to settle again, which takes a relatively long time, especially at the lowest cut-off frequencies. Continuous operation at a constant ambient temperature is therefore advantageous.

5.3.6 Peak hold

This functional unit is a drag indicator function. It continuously monitors the measured value and saves extremes, which can be used to diagnose sensor overloads.

Index	Designation
90n0:0C	Actual Positive Peak Hold
90n0:0D	Actual Negative Peak Hold

The reset is carried out by

- an interface change
- or de-energizing [(Re-)Power-Cycle]
- or 0->1 in the PDO "AI Control.Peak Hold Reset"
- or the command x301n to index FB00:01 (channel 1: n=0, channel 2: n=1, ...).
  During execution, "Status" 255 "busy" is displayed in index FB00:02, "0" means "successfully completed"
- and the command x3001 "Reset all counters"

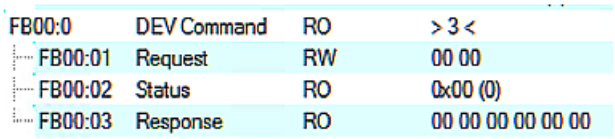


Fig. 14: CoE Index FB00, DEV Command

During command execution, "Status" 255 "busy" is displayed in index FB00:02, "0" means "successfully completed".

The firmware responds to an unknown command with

'Term 5 (EL4374)' (1002): CoE ('InitDown' 0xfb00:01) - SDO Abort ('General parameter incompatibility reason.', 0x06040043).

Fig. 15: General parameter incompatibility reason, 0x06040043

5.3.7 Range error

Overrange/Underrange

This functional unit monitors the measured value for exceeding or falling below the nom. FSV, for example in the measuring range "I +/-20mA" to -20 mA and +20 mA.

Parameterization is not possible. The measured value is not limited.

Result	
PDO AI Status	Overrange-Bit Underrange-Bit

Range Error

The *Range Error* functional unit monitors the measured value according to 2 limit values (min. and max.), counts overrange/underrange and reports this as an error (error bit in the status). There is no limitation of measured values.
In the default setting, the RangeError limit values are set to negative and positive technical FSV, e.g. in the "I +/-20mA" measuring range to LowRangeError = -21,474 mA and HighRangeError = +21,474 mA, exceeding the limit is then output as an error in the PDO status and LED.
Note: The limit values according to 0x80nD can be changed in the operation modes "Integer PDO, Extended Range" and "Real32 PDO"; in the operation mode "Integer PDO, Legacy Range", the limit values cannot be changed and are 0x7FFF / 32767 or -32768; the limit values according to 0x80nD are not taken into account.

Index [data type]	Name
80nD:17 [DINT]	Low Range Error
80nD:27 [REAL32]	Low Range Error (REAL32)
80nD:18 [DINT]	High Range Error
80nD:28 [REAL32]	High Range Error (REAL32)

NOTICE

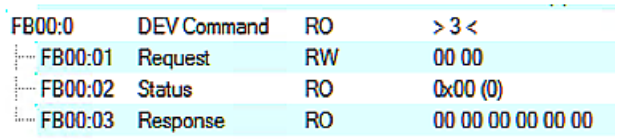
Changing the interface or IntegerScaler 0x80nD:12

When changing the interface or IntegerScaler 0x80nD:12 (Extended/Legacy Range), the limit values are reset to the default setting according to the interface!

Result	
PDO AI Status	Error bit
90n0:14	Underrange Error Counter
90n0:15	Overrange Error Counter

Resetting to the default setting according to the interface is done by

- an interface change
- or a de-energized setting [(re-)power cycle]
- or the command x302n to index FB00:01 (channel 1: n=0, channel 2: n=1, ...).
  During execution, "Status" 255 "busy" is displayed in index FB00:02, "0" means "successfully completed"
- and the command x3001 "Reset all counters"



FB00:0	DEV Command	RO	> 3 <
FB00:01	Request	RW	00 00
FB00:02	Status	RO	0x00 (0)
FB00:03	Response	RO	00 00 00 00 00 00

Fig. 16: CoE Index FB00, DEV Command

During command execution, "Status" 255 "busy" is displayed in index FB00:02, "0" means "successfully completed".

The firmware responds to an unknown command with

'Term 5 (EL4374)' (1002): CoE ('InitDown' 0xfb00:01) - SDO Abort ('General parameter incompatibility reason.', 0x06040043).

Fig. 17: General parameter incompatibility reason, 0x06040043

5.3.8 Limit function

Limit value detection

Limit 1 and 2 are two identical, simultaneously usable functions for optional analysis of the analog value, function referred to below as "Limit n". The measured value is not limited. The function is therefore similar to *Range Error*, except that there is no error output (bit, LED).

Parameter:

Limit 1	
Index [data type]	**Designation**
80n0:07 [BOOL], disabled by default	Enable Limit 1
80n0:13 [SINT16]	Value Limit 1
80nD:29 [REAL32]	Value Limit 1 (Real32)

Limit 2	
Index [data type]	**Designation**
80n0:08 [BOOL], disabled by default	Enable Limit 2
80n0:14 [SINT16]	Value Limit 2
80nD:2A [REAL32]	Value Limit 2(Real32)

If the measured value exceeds/falls below the set limit, this is

- **displayed in the PDO status, output “Limit n” (2 bits):**
  - 0: not active, limit function disabled
  - 1: Measured value < limit value
  - 2: Measured value > limit value
  - 3: Measured value = limit value

Linking in the PLC with 2-bit values

The limit information consists of 2 bits. “Limit n” can be linked to the PLC or a task in the System Manager.

Note on the PLC: In the IEC61131 PLC, there is no 2-bit data type that can be linked directly to this process data. An input byte %I* must therefore be defined to transmit the limit information and the limit value (limit) must be linked to the VariableSizeMismatch dialog if the status word in the PLC is not interpreted bit by bit (recommended method).

- **counted informatively in the CoE**

Index	Designation	Meaning
90n0:16 or 90n0:18	Limit 1/2 counter low	Value has fallen below the limit value (edge detection)
90n0:17 or 90n0:19	Limit 1/2 counter high	Value has exceeded the limit value (edge detection)

The counters are reset by

- an interface change
- or de-energizing [(Re-)Power-Cycle]
- or the command x303n to index 0xFB00:01 (channel1: n=0, channel 2: n=1, ...).
  During execution, Status 255 "busy" is displayed in index 0xFB00:02, "0" means "successfully completed"
- and the command x3001 "Reset all counters"

FB00:0	DEV Command	RO	> 3 <
FB00:01	Request	RW	00 00
FB00:02	Status	RO	0x00 (0)
FB00:03	Response	RO	00 00 00 00 00 00

Fig. 18: CoE Index FB00, DEV Command

During command execution, "Status" 255 "busy" is displayed in index 0xFB00:02, "0" means "successfully completed".

The firmware responds to an unknown command with

'Term 5 (EL4374)' (1002): CoE ('InitDown' 0xfb00:01) - SDO Abort ('General parameter incompatibility reason.', 0x06040043).

Fig. 19: General parameter incompatibility reason, 0x06040043

- **Swap Limit Bits**

The limit function can be inverted using "SwapLimitBits" in index 0x80n0:0E in order to create compatibility with different application-side code.

Output “Limit n” (2 bits)

***SwapLimitBits* setting**	**Value**
FALSE (default)	• 0: not active • 1: value < limit value • 2: value > limit value • 3: value = limit value
TRUE	• 0: not active • 1: value > limit value • 2: value < limit value • 3: value = limit value

5.3.9 Tare

In the application, it can be helpful to set the display value to zero with an unloaded sensor. In weighing technology, this is known as the tare process or "relative measurement". This means that the offset component of the unloaded sensor (in this case a scale) is already subtracted from the measuring device. Note: When using tare, the value output in the channel is shifted, which leads to a restriction of the dynamic range in the positive or negative direction. If the channel can measure 0..10 V electrically, for example, and is tared (zeroed) at 8 V, only +2/-8 V measuring range remains.

To avoid reaching the INT16 limits, the use of Real32 PDO is strongly recommended when using Tare.

The Tare function works as follows:

1. Tare start

Tare can be triggered in the same way by

- PDO: Tare bit in the "AI.Control" PDO

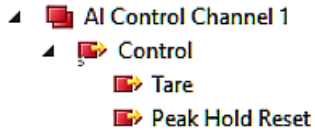


Fig. 20: PDO "AI Control"

then the tare bit from the control can trigger the tare via 0 → 1.

- or via CoE command "Save tare" Request = 0x313n to index 0xFB00: 01 (channel 1: n=0, channel 2: n=1, ...)

FB00:0	DEV Command	RO	> 3 <
FB00:01	Request	RW	00 00
FB00:02	Status	RO	0x00 (0)
FB00:03	Response	RO	00 00 00 00 00 00

Fig. 21: CoE Index FB00, DEV Command

During command execution, "Status" 255 "busy" is displayed in index 0xFB00:02, "0" means "successfully completed".

The firmware responds to an unknown command with

'Term 5 (EL4374)' (1002): CoE ('InitDown' 0xfb00:01) - SDO Abort ('General parameter incompatibility reason.', 0x06040043).

Fig. 22: General parameter incompatibility reason, 0x06040043

2. Measurement

The device now calculates an average value over 400 measured values; the duration of the process therefore depends on the conversion rate of the channel (see filter setting). During these approx. 250 ms, the electrical sensor signal should be stable. In some cases, it is recommended to support the tare process with a strongly attenuating low-pass filter (see chapter Filter1 [▶ 29]). After the tare process, the filter can be opened again.

During this time, PDO "AI Status.Tare Active" = FALSE

3. Calculation

Then

- the tare value is subtracted from the measured value and the measured value jumps once at this point.
- the determined tare value is displayed in CoE 0x90n0:1A.
- PDO "AI Status.Tare Active" = TRUE indicates that a tare value is being calculated

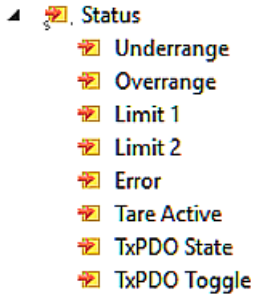


Fig. 23: "Tare active" in status word

The tare value is temporarily held in the channel, it is not secured against power failure. If it is to be saved permanently and thus secured against power failure, the request 0x318n must be sent to index 0xFB00:01 (channel 1: n=0, channel 2: n=1, ...).

FB00:0	DEV Command	RO	> 3 <
FB00:01	Request	RW	00 00
FB00:02	Status	RO	0x00 (0)
FB00:03	Response	RO	00 00 00 00 00 00

Fig. 24: CoE Index FB00, DEV Command

4. Reset

Tare is reset ("zeroed")

- by an interface change
- or de-energizing [(Re-)Power-Cycle], if not stored in fail-safe mode, see above.
- or the EtherCAT status BOOTSTRAP
- or the CoE command "Tare Reset" request = 0x314n to index 0xFB00: 01 (channel 1: n=0, channel 2: n=1, ...)

FB00:0	DEV Command	RO	> 3 <
FB00:01	Request	RW	00 00
FB00:02	Status	RO	0x00 (0)
FB00:03	Response	RO	00 00 00 00 00 00

Fig. 25: CoE Index FB00, DEV Command

During command execution, "Status" 255 "busy" is displayed in index 0xFB00:02, "0" means "successfully completed".

The firmware responds to an unknown command with

'Term 5 (EL4374)' (1002): CoE ('InitDown' 0xfb00:01) - SDO Abort ('General parameter incompatibility reason.', 0x06040043).

Fig. 26: General parameter incompatibility reason, 0x06040043

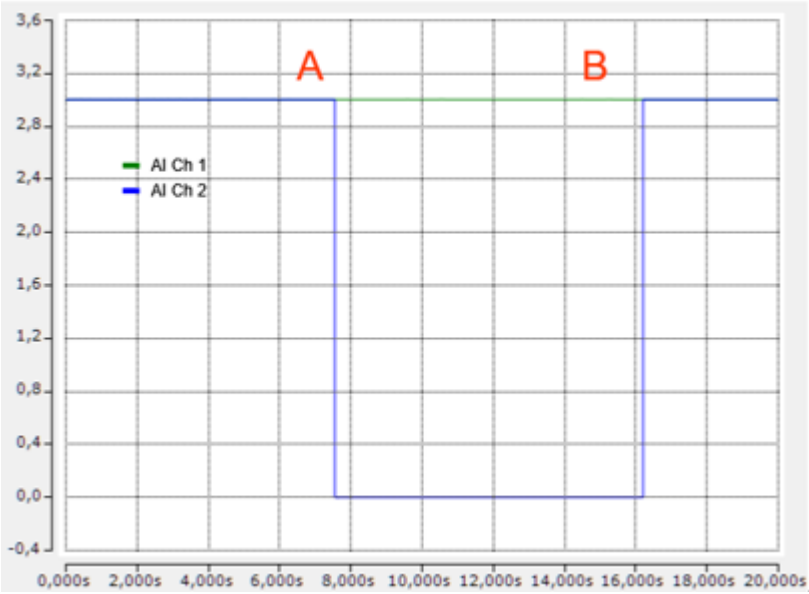


Fig. 27: Example: 3 V are electrically connected to Ch1+2 of an EL4374 at the same time, Filter1 = IIR8

At (A), Control.Tare = 1 is set on channel 2 (and the bit is then reset), the tare value is displayed in the CoE:

Tare Value	RO	3.003933 (3.003933e+00)

Fig. 28: Tare Value

As expected, the measured value goes to ~0.
At (B), tare is deleted again by command. Channel 1 runs without tare for comparison.

5.3.10 Integer scaler (only when using PDO SINT16)

The optional extended range "107%" has been introduced for Beckhoff analog channels in order to be able to measure slightly above the nominal full scale value (FSV_{nom}) of e.g. 20 mA for commissioning and diagnostic purposes (support depends on the device). Then the channel actually measures up to a defined *technical* full scale value FSV_{techn} which is slightly higher than the *nominal* full scale value FSV_{nom}.

The definition for 16 bits is as follows:

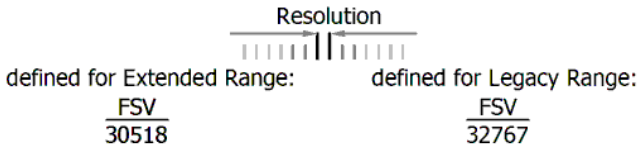


Fig. 29: Defined resolution, 16-bit

Setting:

- Index 80nD:12 = Extended Range Range (default Einstellung)
  The channel measures up to the technical measuring range, which is approximately 107% of the nominal measuring range.
  For the extended range with 16-bit SINT PDO (16 bits + sign), the PDO value ±30518 (0x7736) has been defined as the nom. FSV = 100%. Accordingly, the displayable measuring range now extends to 0x7FFF = 32767 ~ 107.37% of the nominal measuring range.
- Index 80nD:12 = Legacy Range
  The channel measures up to 100% of the nominal measuring range.
  Accordingly, 0x7FFF = 32767 should be interpreted as 100% of the nominal FSV.

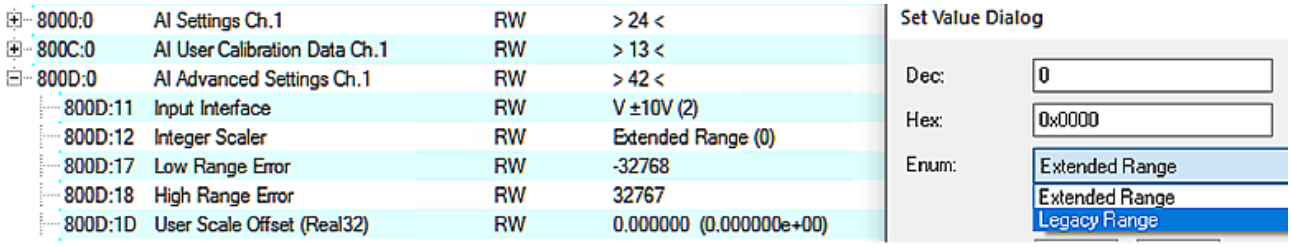


Fig. 30: Setting Index 80nD:12, Legacy Range, Extended Range

Depending on the interface, this then means SINT16 -> Real32 for the conversion in the controller (if the over/underrange PDO is set to the default setting):

Measuring range ±20 mA (bipolar)

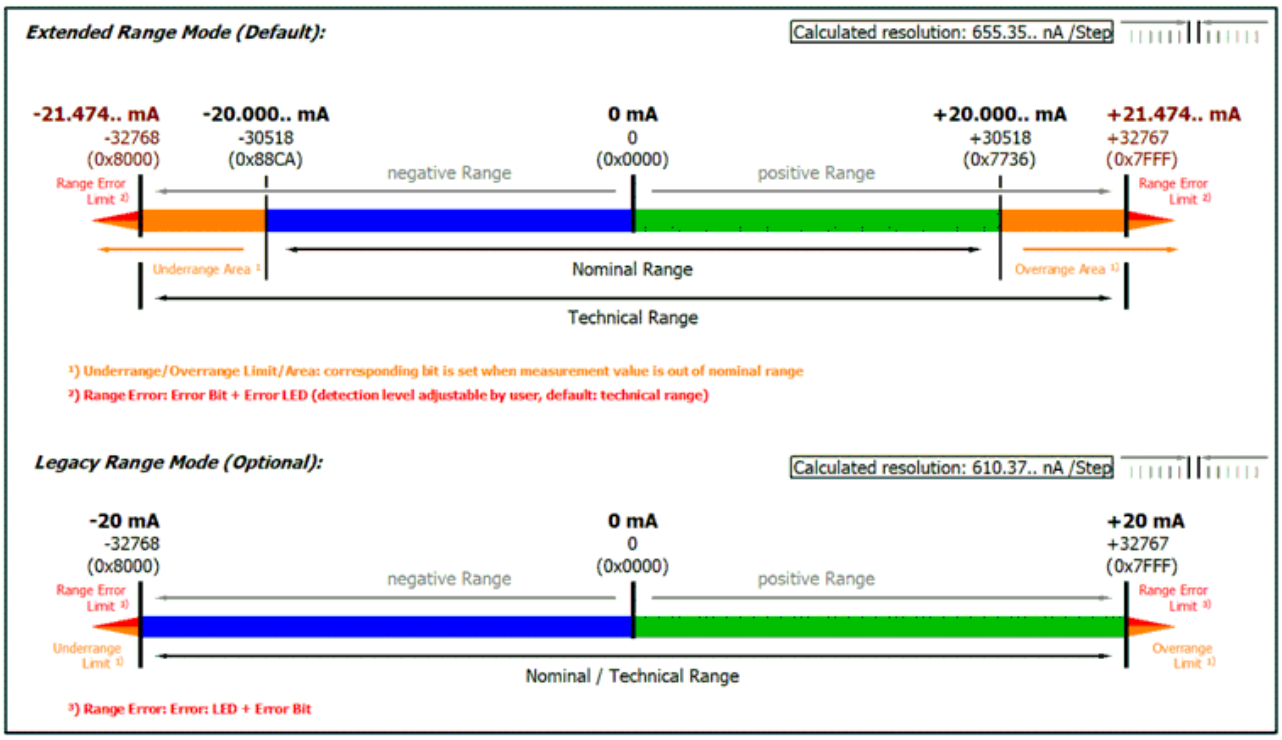
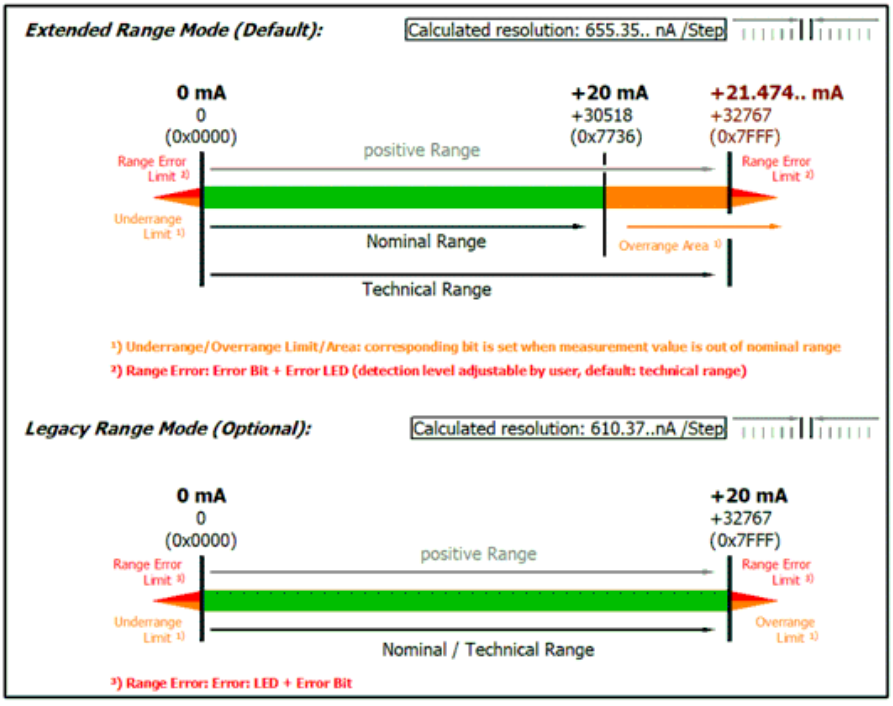


Fig. 31: Measuring range ±20 mA (bipolar)

Measuring range 0...20 mA (current loop)



Technical note: The detection level for underrange and range error of 0 value area is located at -0.2 mA (-1% of the full scale value). This has been configured to prevent a misleading setting of the error bit. The process data value don't undercuts 0x0000 then.

Fig. 32: Measuring range 0...20 mA (current loop)

Measuring range 4...20 mA (current loop)

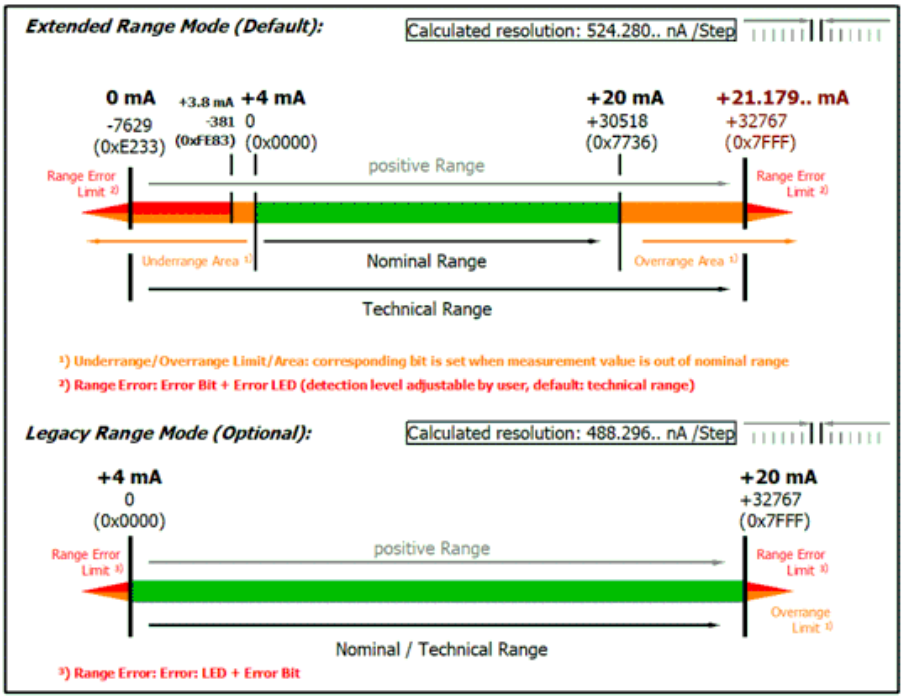


Fig. 33: Measuring range 4...20 mA (current loop)

Measuring range 4...20 mA, NAMUR NE43 (current loop)

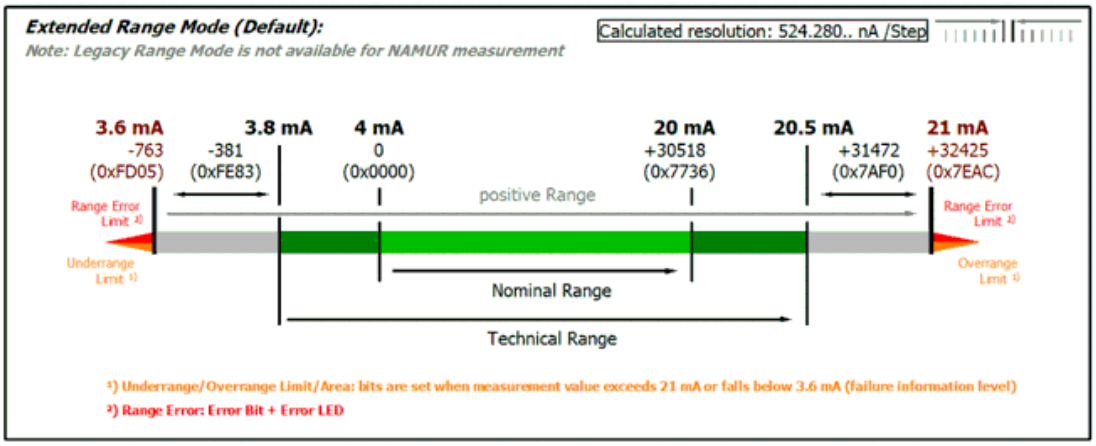


Fig. 34: Measuring range 4...20 mA, NAMUR NE43 (current loop)

5.3.11 Presentation (only when using SINT16-PDO)

For historical reasons, there are various formats in which the 16 bits of the SINT PDO (Signed Integer Process Data Object) can be interpreted.
The format can be set in the index 0x80n0:02 .

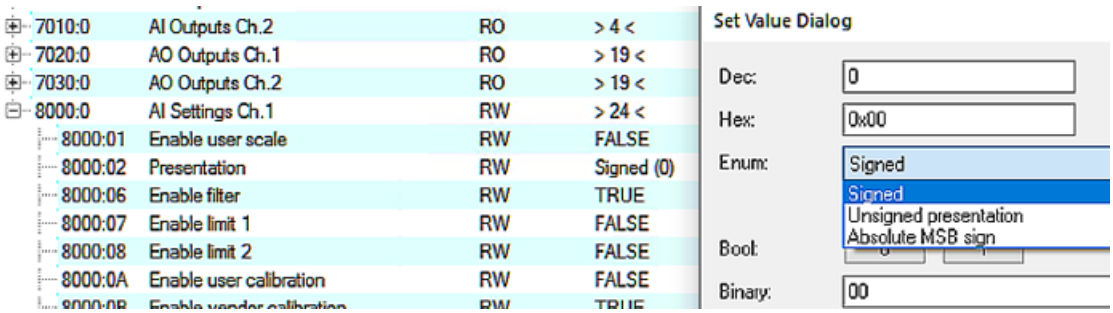


Fig. 35: PDO 0x80n0:02, "Presentation"

This analog channel supports:

- "Signed" (default): top/highest/0. Bit is sign, negative number in 2's complement in bit 1..15
- "Unsigned": all 16 bits are used for the amount of the analog value, resulting in double resolution for positive analog values. No transmission of negative values possible.
- "Absolute Value with sign": top/highest/0. Bit is sign, bits 1..15 carry the amount of the analog value
- "Absolute Value": the sign of the analog value is ignored, only the (positive) amount in bit 1..15 is transmitted

Legacy Range	Extended Range	Representation (values dec. / values hex.)			
		unsigned integer		Abs. value w. MSB as sign	
		Dec	Hex	Dec	Hex
100 %	107.37 %	32767	0x7FFF	32767	0x7FFF
-	100 %	30518	0x7736	30518	0x7736
0 %	0 %	0	0x0000	0	0x0000
-	-100 %	30518	0x7736	[-30518]	0xF736
-100 %	-107.37 %	32767	0x7FFF	[-32767]	0xFFFF

Presentation types

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

Possible errors (Error) and underrange/overrange are also set and displayed in this functional unit.

If the measured value exceeds or falls below the 16 bit value limits due to the previous tare process, the value is limited to -32768/32767.

Please note: This cannot happen when using REAL32-PDO, as the FloatingPoint value is basically unlimited.

The analog measured value is now transmitted via EtherCAT.

6 Diagnostics

For diagnostic purposes, you can read various internal information from the CoE directory. See chapter Information objects [▶ 58].

Interpretation of the values in object 0xF915 "LED Status"

The status of the optical displays (LEDs) in the device can be read out electronically in CoE 0xF915 LED Status, e.g. for simultaneous LED display in the visualization.

These are four bytes that describe the RGB value and the light status:

```
0x 12 34 56 78
   |  |  |  \---- Red
   |  |  \------- Green
   |  \---------- Blue
   \------------- Blink
```

- Byte 1 (from left to right): Flashing/lighting code
  - 0x00: Off/ not available
  - 0x01…0x14: 1..20 Hz
  - 0x80: EtherCAT PreOp
  - 0x81: EtherCAT SafeOp
  - 0x82: EtherCAT Boot
  - 0xFF: On/ available
- Byte 2..4:
  - 0x00: Off
  - 0xFF: On

Examples:

- 0x 00 00 00 00: LED not present
- 0x FF 00 00 00 : LED is on, RGB =0, i.e. not illuminated, meaning: LED is present

```
0x 00 00 00 FF : LED off (Red)
0x 00 00 FF 00 : LED off (Green)
0x 00 FF 00 00 : LED off (Blue)
0x 00 00 FF FF : LED off (Yellow)
0x 00 FF FF FF : LED off (White)
```

```
0x FF 00 00 FF : LED on  (Red)
0x FF 00 FF 00 : LED on  (Green)
0x FF FF 00 00 : LED on  (Blue)
0x FF 00 FF FF : LED on  (Yellow)
0x FF FF FF FF : LED on  (White)
```

Fig. 36: Examples LED status

7 CoE objects

Index (hex)	Name
1000	Device type [▶ 60]
1008	Device name [▶ 60]
1009	Hardware version [▶ 60]
100A	Software version [▶ 60]
100B	Bootloader version [▶ 60]
1011	Restore default parameters [▶ 60]
1018	Identity [▶ 60]
10E2	Manufacturer-specific Identification Code [▶ 60]
10F0	Backup parameter handling [▶ 60]
1600	AI RxPDO-Map Control Ch.1 [▶ 61]
1602	AI RxPDO-Map Control Ch.2 [▶ 61]
1604	AI RxPDO-Map Control Ch.3 [▶ 61]
1606	AI RxPDO-Map Control Ch.4 [▶ 61]
1608	AI RxPDO-Map Control Ch.5 [▶ 61]
160 A	AI RxPDO-Map Control Ch.6 [▶ 61]
160C	AI RxPDO-Map Control Ch.7 [▶ 62]
160E	AI RxPDO-Map Control Ch.8 [▶ 62]
1800	AI TxPDO-Par Standard Ch.1 [▶ 62]
1801	AI TxPDO-Par Compact Ch.1 [▶ 62]
1802	AI TxPDO-Par Standard Ch.2 [▶ 62]
1803	AI TxPDO-Par Compact Ch.2 [▶ 62]
1804	AI TxPDO-Par Standard Ch.3 [▶ 62]
1805	AI TxPDO-Par Compact Ch.3 [▶ 63]
1806	AI TxPDO-Par Standard Ch.4 [▶ 63]
1807	AI TxPDO-Par Compact Ch.4 [▶ 63]
1808	AI TxPDO-Par Standard Ch.5 [▶ 63]
1809	AI TxPDO-Par Compact Ch.5 [▶ 63]
180 A	AI TxPDO-Par Standard Ch.6 [▶ 63]
180B	AI TxPDO-Par Compact Ch.6 [▶ 63]
180C	AI TxPDO-Par Standard Ch.7 [▶ 64]
180D	AI TxPDO-Par Compact Ch.7 [▶ 64]
180E	AI TxPDO-Par Standard Ch.8 [▶ 64]
180F	AI TxPDO-Par Compact Ch.8 [▶ 64]
1810	AI TxPDO-Par Standard (Real32) Ch.1 [▶ 64]
1811	AI TxPDO-Par Compact (Real32) Ch.1 [▶ 64]
1812	AI TxPDO-Par Standard (Real32) Ch.2 [▶ 64]
1813	AI TxPDO-Par Compact (Real32) Ch.2 [▶ 65]
1814	AI TxPDO-Par Standard (Real32) Ch.3 [▶ 65]
1815	AI TxPDO-Par Compact (Real32) Ch.3 [▶ 65]
1816	AI TxPDO-Par Standard (Real32) Ch.4 [▶ 65]
1817	AI TxPDO-Par Compact (Real32) Ch.4 [▶ 65]
1818	AI TxPDO-Par Standard (Real32) Ch.5 [▶ 65]
1819	AI TxPDO-Par Compact (Real32) Ch.5 [▶ 65]
181A	AI TxPDO-Par Standard (Real32) Ch.6 [▶ 66]
181B	AI TxPDO-Par Compact (Real32) Ch.6 [▶ 66]
181C	AI TxPDO-Par Standard (Real32) Ch.7 [▶ 66]
181D	AI TxPDO-Par Compact (Real32) Ch.7 [▶ 66]
181E	AI TxPDO-Par Standard (Real32) Ch.8 [▶ 66]
181F	AI TxPDO-Par Compact (Real32) Ch.8 [▶ 66]

Index (hex)	Name
1A00	AI TxPDO-Map Standard Ch.1 [▶ 67]
1A01	AI TxPDO-Map Compact Ch.1 [▶ 67]
1A02	AI TxPDO-Map Standard Ch.2 [▶ 67]
1A03	AI TxPDO-Map Compact Ch.2 [▶ 67]
1A04	AI TxPDO-Map Standard Ch.3 [▶ 67]
1A05	AI TxPDO-Map Compact Ch.3 [▶ 68]
1A06	AI TxPDO-Map Standard Ch.4 [▶ 68]
1A07	AI TxPDO-Map Compact Ch.4 [▶ 68]
1A08	AI TxPDO-Map Standard Ch.5 [▶ 68]
1A09	AI TxPDO-Map Compact Ch.5 [▶ 68]
1A0A	AI TxPDO-Map Standard Ch.6 [▶ 69]
1A0B	AI TxPDO-Map Compact Ch.6 [▶ 69]
1A0C	AI TxPDO-Map Standard Ch.7 [▶ 69]
1A0D	AI TxPDO-Map Compact Ch.7 [▶ 69]
1A0E	AI TxPDO-Map Standard Ch.8 [▶ 69]
1A0F	AI TxPDO-Map Compact Ch.8 [▶ 70]
1A10	AI TxPDO-Map Standard (Real32) Ch.1 [▶ 70]
1A11	AI TxPDO-Map Compact (Real32) Ch.1 [▶ 70]
1A12	AI TxPDO-Map Standard (Real32) Ch.2 [▶ 70]
1A13	AI TxPDO-Map Compact (Real32) Ch.2 [▶ 70]
1A14	AI TxPDO-Map Standard (Real32) Ch.3 [▶ 71]
1A15	AI TxPDO-Map Compact (Real32) Ch.3 [▶ 71]
1A16	AI TxPDO-Map Standard (Real32) Ch.4 [▶ 71]
1A17	AI TxPDO-Map Compact (Real32) Ch.4 [▶ 71]
1A18	AI TxPDO-Map Standard (Real32) Ch.5 [▶ 72]
1A19	AI TxPDO-Map Compact (Real32) Ch.5 [▶ 72]
1A1A	AI TxPDO-Map Standard (Real32) Ch.6 [▶ 72]
1A1B	AI TxPDO-Map Compact (Real32) Ch.6 [▶ 72]
1A1C	AI TxPDO-Map Standard (Real32) Ch.7 [▶ 73]
1A1D	AI TxPDO-Map Compact (Real32) Ch.7 [▶ 73]
1A1E	AI TxPDO-Map Standard (Real32) Ch.8 [▶ 73]
1A1F	AI TxPDO-Map Compact (Real32) Ch.8 [▶ 73]
1A20	AI TxPDO-Map Cycle Counter Ch.1 [▶ 73]
1A22	AI TxPDO-Map Cycle Counter Ch.2 [▶ 74]
1A24	AI TxPDO-Map Cycle Counter Ch.3 [▶ 74]
1A26	AI TxPDO-Map Cycle Counter Ch.4 [▶ 74]
1A28	AI TxPDO-Map Cycle Counter Ch.5 [▶ 74]
1A2A	AI TxPDO-Map Cycle Counter Ch.6 [▶ 74]
1A2C	AI TxPDO-Map Cycle Counter Ch.7 [▶ 74]
1A2E	AI TxPDO-Map Cycle Counter Ch.8 [▶ 74]
1C00	Sync manager type [▶ 74]
1C12	RxPDO assign [▶ 75]
1C13	TxPDO assign [▶ 75]
1C32	SM output parameter [▶ 76]
1C33	SM input parameter [▶ 77]
6000	AI Inputs Ch.1 [▶ 79]
6010	AI Inputs Ch.2 [▶ 79]
6020	AI Inputs Ch.3 [▶ 79]
6030	AI Inputs Ch.4 [▶ 80]
6040	AI Inputs Ch.5 [▶ 80]
6050	AI Inputs Ch.6 [▶ 80]
6060	AI Inputs Ch.7 [▶ 81]

Index (hex)	Name
6070	AI Inputs Ch.8 [▶ 81]
7000	AI Outputs Ch.1 [▶ 81]
7010	AI Outputs Ch.2 [▶ 81]
7020	AI Outputs Ch.3 [▶ 81]
7030	AI Outputs Ch.4 [▶ 82]
7040	AI Outputs Ch.5 [▶ 82]
7050	AI Outputs Ch.6 [▶ 82]
7060	AI Outputs Ch.7 [▶ 82]
7070	AI Outputs Ch.8 [▶ 82]
8000	AI Settings Ch.1 [▶ 54]
800C	AI User Calibration Data Ch.1 [▶ 55]
800D	AI Advanced Settings Ch.1 [▶ 56]
800F	AI Vendor Calibration Data Ch.1 [▶ 57]
8010	AI Settings Ch.2 [▶ 54]
801C	AI User Calibration Data Ch.2 [▶ 55]
801D	AI Advanced Settings Ch.2 [▶ 56]
801F	AI Vendor Calibration Data Ch.2 [▶ 57]
8020	AI Settings Ch.3 [▶ 54]
802C	AI User Calibration Data Ch.3 [▶ 55]
802D	AI Advanced Settings Ch.3 [▶ 56]
802F	AI Vendor Calibration Data Ch.3 [▶ 57]
8030	AI Settings Ch.4 [▶ 54]
803C	AI User Calibration Data Ch.4 [▶ 55]
803D	AI Advanced Settings Ch.4 [▶ 56]
803F	AI Vendor Calibration Data Ch.4 [▶ 57]
8040	AI Settings Ch.5 [▶ 54]
804C	AI User Calibration Data Ch.5 [▶ 55]
804D	AI Advanced Settings Ch.5 [▶ 56]
804F	AI Vendor Calibration Data Ch.5 [▶ 57]
8050	AI Settings Ch.6 [▶ 54]
805C	AI User Calibration Data Ch.6 [▶ 55]
805D	AI Advanced Settings Ch.6 [▶ 56]
805F	AI Vendor Calibration Data Ch.6 [▶ 57]
8060	AI Settings Ch.7 [▶ 54]
806C	AI User Calibration Data Ch.7 [▶ 55]
806D	AI Advanced Settings Ch.7 [▶ 56]
806F	AI Vendor Calibration Data Ch.7 [▶ 57]
8070	AI Settings Ch.8 [▶ 54]
807C	AI User Calibration Data Ch.8 [▶ 55]
807D	AI Advanced Settings Ch.8 [▶ 56]
807F	AI Vendor Calibration Data Ch.8 [▶ 57]
9000	AI Internal Data Ch.1 [▶ 58]
9002	AI Info Data Ch.1 [▶ 58]
9010	AI Internal Data Ch.2 [▶ 58]
9012	AI Info Data Ch.2 [▶ 58]
9020	AI Internal Data Ch.3 [▶ 58]
9022	AI Info Data Ch.3 [▶ 58]
9030	AI Internal Data Ch.4 [▶ 58]
9032	AI Info Data Ch.4 [▶ 58]
9040	AI Internal Data Ch.5 [▶ 58]
9042	AI Info Data Ch.5 [▶ 58]
9050	AI Internal Data Ch.6 [▶ 58]

Index (hex)	Name
9052	AI Info Data Ch.6 [▶ 58]
9060	AI Internal Data Ch.7 [▶ 58]
9062	AI Info Data Ch.7 [▶ 58]
9070	AI Internal Data Ch.8 [▶ 58]
9072	AI Info Data Ch.8 [▶ 58]
F000	Modular Device Profile [▶ 77]
F008	Code word [▶ 77]
F009	Password protection [▶ 77]
F081	Download revision [▶ 78]
F900	DEV Info Data [▶ 58]
F915	LED Status [▶ 59]
FB00	DEV Command [▶ 78]

7.1 Configuration objects

8pp0 AI Settings Ch.n

- 8000 = Ch.1
- 8010 = Ch.2
- 8020 = Ch.3
- …

Subindex (hex)	Name	Meaning	Data type	Flags	Default
0	AI Settings Ch.n		USINT	RO	0x18 (24_{dec})
01	Enable User Scale	Enables the user scale.	BOOL	RW	00
02	Presentation	Format of the integer measured value. The measured value in Real format is not affected by this setting. Possible values: • 0_{dec}: Signed • 1_{dec}: Unsigned • 2_{dec}: Absolute MSB sign	USINT	RW	0x0 (0_{dec})
05	Siemens Bits	Enables the output of status information in the least significant three bits of the analog measured value as with a Siemens S5 controller.	BOOL	RW	00
06	Enable Filter 1	Enables the digital low-pass filter. See chapter Filter 1 (low-pass).	BOOL	RW	01
07	Enable Limit 1	Enables user-defined limit value monitoring, see chapter Limit function [▶ 40].	BOOL	RW	00
08	Enable Limit 2	Enables user-defined limit value monitoring, see chapter Limit function [▶ 40].	BOOL	RW	00
0A	Enable User Calibration	Enables user calibration.	BOOL	RW	00
0B	Enable Vendor Calibration	Enables vendor calibration.	BOOL	RW	01
0E	Swap Limit Bits	Swaps the bits of the process data values "Limit 1" and "Limit 2".	BOOL	RW	00
11	User Scale Offset	User scale offset. This parameter is only present for backward compatibility reasons. For new implementations, use the parameter 8ppD:1C "User Scale Offset (Real32)" instead	INT	RW	0x0 (0_{dec})
12	User Scale Gain	User scale gain. 65536_{dec} corresponds to a gain of 1. This parameter is only present for backward compatibility reasons. For new implementations, use the parameter 8ppD:1D "User Scale Gain (Real32)" instead.	DINT	RW	0x10000 (65536_{dec})
13	Limit 1	Limit 1 for user-defined limit value monitoring. This parameter is only present for backward compatibility reasons. For new implementations, use the parameter 8ppD:29 "Limit 1 (Real32)" instead.	INT	RW	0x0 (0_{dec})
14	Limit 2	Limit 2 for user-defined limit value monitoring. This parameter is only present for backward compatibility reasons. For new implementations, use the parameter 8ppD:2A "Limit 2 (Real32)" instead.	INT	RW	0x0 (0_{dec})

Subindex (hex)	Name	Meaning	Data type	Flags	Default
15	Filter Settings	The filter characteristic of the digital low-pass filter "Filter 1". **Notice Parameter 8000:15 configures filter 1 for all channels. The 80n0:15 parameters of the other channels have no effect.** Possible values: • 0_{dec}: 50 Hz FIR • 1_{dec}: 60 Hz FIR • 2_{dec}: IIR 1 • 3_{dec}: IIR 2 • 4_{dec}: IIR 3 • 5_{dec}: IIR 4 • 6_{dec}: IIR 5 • 7_{dec}: IIR 6 • 8_{dec}: IIR 7 • 9_{dec}: IIR 8	UINT	RW	0x0 (0_{dec})
17	User Calibration Offset	User calibration offset.	INT	RW	0x0 (0_{dec})
18	User Calibration Gain	User calibration gain.	UINT	RW	0x4000 (16384_{dec})

8ppC AI User Calibration Data Ch.n

- 800C = Ch.1
- 801C = Ch.2
- 802C = Ch.3
- …

Parameters for user calibration. See chapter Measured value processing [▶ 33].

Subindex (hex)	Name	Meaning	Data type	Flags	Default
0	AI User Calibration Data Ch.n		USINT	RO	0xD (13_{dec})
01	Calibration Date		ARRAY [0..3] OF BYTE	RW	[None]
03	S0	-	REAL	RW	-
04	S1	-	REAL	RW	-
05	S2	-	REAL	RW	-
06	S3	-	REAL	RW	-
0D	S1n	-	REAL	RW	-

8ppD AI Advanced Settings Ch.n

- 800D = Ch.1
- 801D = Ch.2
- 802D = Ch.3
- …

Subindex (hex)	Name	Meaning	Data type	Flags	Default
0	AI Advanced Settings Ch.n		USINT	RO	0x2A (42_{dec})
11	Input Interface	Selection of the measuring range. Possible values: • 0_{dec}: None • 17_{dec}: I +/-20mA • 18_{dec}: I 0-20mA • 19_{dec}: I 4-20mA • 20_{dec}: I 4-20mA NAMUR **Notice Each time this parameter is changed, the following parameters of the corresponding channel are reset to the factory setting:** • 8ppD:1C "User Scale Offset (Real32)" • 8ppD:1D "User Scale Gain (Real32)" • 8ppD:27 "Low Range Error (Real32)" • 8ppD:28 "High Range Error (Real32)"" • 8ppD:29 "Limit 1 (Real32)" • 8ppD:2A "Limit 2 (Real32)"	UINT	RW	0x11 (17_{dec})
12	Integer Scaler	Possible values: • 0_{dec}: Extended Range • 3_{dec}: Legacy Range	UINT	RW	0x0 (0_{dec})
17	Low Range Error	Threshold value for falling below the measuring range. This parameter is only present for backward compatibility reasons. For new implementations, use the parameter 8ppD:27 "Low Range Error (Real32)" instead.	DINT	RW	0xFFFF8000 (-32768_{dec})
18	High Range Error	Threshold value for exceeding the measuring range. This parameter is only present for backward compatibility reasons. For new implementations, use the parameter 8ppD:28 "High Range Error (Real32)" instead.	DINT	RW	0x7FFF (32767_{dec})
1A	Filter 2 Settings	Filter characteristic of the digital high-pass filter "Filter 2". See chapter Filter 2 (high-pass) [▶ 36]. Possible values: • 0_{dec}: Off • 1_{dec}: HP 0.001 Hz • 2_{dec}: HP 0.01 Hz • 3_{dec}: HP 0.1 Hz • 4_{dec}: HP 1 Hz • 5_{dec}: HP 10 Hz	UINT	RW	0x0 (0_{dec})
1C	User Scale Offset (Real32)	User scale offset.	REAL	RW	0.0
1D	User Scale Gain (Real32)	User scale gain.	REAL	RW	1.0
27	Low Range Error (Real32)	Threshold value for falling below the measuring range. See chapter Range error [▶ 38].	REAL	RW	-10.737420082092285
28	High Range Error (Real32)	Threshold value for exceeding the measuring range. See chapter Range error [▶ 38].	REAL	RW	10.737420082092285
29	Limit 1 (Real32)	Limit 1	REAL	RW	0.0
2A	Limit 2 (Real32)	Limit 2	REAL	RW	0.0

8ppF AI Vendor Calibration Data Ch.n

- 800F = Ch.1
- 801F = Ch.2
- 802F = Ch.3
- …

Vendor calibration parameters, cannot be adjusted by the user.

Subindex (hex)	Name	Meaning	Data type	Flags	Default
0	AI Vendor Calibration Data Ch.n		USINT	RO	0xD (13_{dec})
01	Calibration Date		ARRAY [0..3] OF BYTE	RW	[None]
03	S0	-	REAL	RW	-
04	S1	-	REAL	RW	-
05	S2	-	REAL	RW	-
06	S3	-	REAL	RW	-
07	T1	-	REAL	RW	-
08	T1S1	-	REAL	RW	-
0D	S1n	-	REAL	RW	-

7.2 Information objects

9pp0 AI Internal Data Ch.n

- 9000 = Ch.1
- 9010 = Ch.2
- 9020 = Ch.3
- …

Subindex (hex)	Name	Meaning	Data type	Flags	Default
0	AI Internal Data Ch.n		USINT	RO	0x1B (27_{dec})
02	ADC Raw Value	Intermediate values of the signal processing chain. See chapter Signal flow [▶ 27].	DINT	RO	-
03	Value After Filter 1		DINT	RO	-
04	Value After Interface		REAL	RO	-
05	Value After Vendor Calibration		REAL	RO	-
06	Value After User Calibration		REAL	RO	-
09	Value After Filter 2		REAL	RO	-
0B	Value After User Scale		REAL	RO	-
0C	Actual Positive Peak Hold	Positive drag indicator of the "Peak Hold" functional unit.	REAL	RO	-
0D	Actual Negative Peak Hold	Negative drag indicator of the "Peak Hold" functional unit.	REAL	RO	-
14	Underrange Error Counter	Underrange Error Counter	UDINT	RO	-
15	Overrange Error Counter	Overrange Error Counter	UDINT	RO	-
16	Limit 1 Counter Low	Counter for "Limit 1 Low" events	UDINT	RO	-
17	Limit 1 Counter High	Counter for "Limit 1 High" events	UDINT	RO	-
18	Limit 2 Counter Low	Counter for "Limit 2 Low" events	UDINT	RO	-
19	Limit 2 Counter High	Counter for "Limit 2 High" events	UDINT	RO	-
1A	Tare Value	Current tare value.	REAL	RO	-
1B	Sampling Rate	Current effective sampling rate, [1/sec]	REAL	RO	-

9pp2 AI Info Data Ch.n

- 9002 = Ch.1
- 9012 = Ch.2
- 9022 = Ch.3
- …

Subindex (hex)	Name	Meaning	Data type	Flags	Default
0	AI Info Data Ch.n		USINT	RO	0x12 (18_{dec})
11	Vendor Calibration Counter	Counter for changes to the vendor calibration data	UDINT	RO	-
12	User Calibration Counter	Counter for changes to the user calibration data	UDINT	RO	-

F900 DEV Info Data

Index (hex)	Name	Meaning	Data type	Flags	Default
F900:0	DEV Info Data		USINT	RO	0x14 (20_{dec})
F900:11	Operating Time	The operating time of the box in [min], cannot be deleted. Corresponds to an operating hours counter.	UDINT	RO	-
F900:12	Device Temperature	The current internal temperature in [°C]. This value can be significantly higher than the ambient temperature.	REAL	RO	-
F900:13	Min. Device Temperature	The lowest internal temperature ever measured by the box in [°C], cannot be deleted.	REAL	RO	-
F900:14	Max. Device Temperature	The highest internal temperature ever measured by the box in [°C], cannot be deleted.	REAL	RO	-

F915 LED Status

The interpretation of the values is described in the chapter Diagnostics [▶ 49].

Index (hex)	Name	Meaning	Data type	Flags	Default
F915:0	LED Status		USINT	RO	0x10 (16_{dec})
F915:01	RUN	Current display of the LED "RUN"	UDINT	RO	-
F915:09	Error Ch.1	Current display of the LED "1"	UDINT	RO	-
F915:0A	Error Ch.2	Current display of the LED "2"	UDINT	RO	-
F915:0B	Error Ch.3	Current display of the LED "3"	UDINT	RO	-
F915:0C	Error Ch.4	Current display of the LED "4"	UDINT	RO	-
F915:0D	Error Ch.5	Current display of the LED "5"	UDINT	RO	-
F915:0E	Error Ch.6	Current display of the LED "6"	UDINT	RO	-
F915:0F	Error Ch.7	Current display of the LED "7"	UDINT	RO	-
F915:10	Error Ch.8	Current display of the LED "8"	UDINT	RO	-

7.3 Standard objects

1000 Device type

Index (hex)	Name	Meaning	Data type	Flags	Default
1000:0	Device type		UDINT	RO	0x89132C01 (2299735041_{dec})

1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name		STRING(11)	RO	EP3048-0002

1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	-	STRING(2)	RO	-

100A Software version

Index (hex)	Name	Meaning	Data type	Flags	Default
100A:0	Software version	-	STRING(2)	RO	-

100B Bootloader version

Index (hex)	Name	Meaning	Data type	Flags	Default
100B:0	Bootloader version	-	STRING(32)	RO	-

1011 Restore default parameters

Index (hex)	Name	Meaning	Data type	Flags	Default
1011:0	Restore default parameters		USINT	RO	0x1 (1_{dec})

1018 Identity

Index (hex)	Name	Meaning	Data type	Flags	Default
1018:0	Identity		USINT	RO	0x4 (4_{dec})
1018:01	Vendor ID		UDINT	RO	0x2 (2_{dec})
1018:02	Product code		UDINT	RO	0xBE84052 (199770194_{dec})
1018:03	Revision	-	UDINT	RO	-
1018:04	Serial number	-	UDINT	RO	-

10E2 Manufacturer-specific Identification Code

Index (hex)	Name	Meaning	Data type	Flags	Default
10E2:0	Manufacturer-specific Identification Code		USINT	RO	0x1 (1_{dec})

10F0 Backup parameter handling

Index (hex)	Name	Meaning	Data type	Flags	Default
10F0:0	Backup parameter handling		USINT	RO	0x1 (1_{dec})
10F0:01	Checksum	-	UDINT	RO	-

1600 AI RxPDO-Map Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1600:0	AI RxPDO-Map Control Ch.1		USINT	RO	0x4 (4_{dec})
1600:01	SubIndex 001		UDINT	RO	0x0000:00, 3
1600:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7000:04, 1
1600:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7000:05, 1
1600:04	SubIndex 004		UDINT	RO	0x0000:00, 11

1602 AI RxPDO-Map Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1602:0	AI RxPDO-Map Control Ch.2		USINT	RO	0x4 (4_{dec})
1602:01	SubIndex 001		UDINT	RO	0x0000:00, 3
1602:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7010:04, 1
1602:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7010:05, 1
1602:04	SubIndex 004		UDINT	RO	0x0000:00, 11

1604 AI RxPDO-Map Control Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1604:0	AI RxPDO-Map Control Ch.3		USINT	RO	0x4 (4_{dec})
1604:01	SubIndex 001		UDINT	RO	0x0000:00, 3
1604:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7020:04, 1
1604:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7020:05, 1
1604:04	SubIndex 004		UDINT	RO	0x0000:00, 11

1606 AI RxPDO-Map Control Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1606:0	AI RxPDO-Map Control Ch.4		USINT	RO	0x4 (4_{dec})
1606:01	SubIndex 001		UDINT	RO	0x0000:00, 3
1606:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7030:04, 1
1606:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7030:05, 1
1606:04	SubIndex 004		UDINT	RO	0x0000:00, 11

1608 AI RxPDO-Map Control Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1608:0	AI RxPDO-Map Control Ch.5		USINT	RO	0x4 (4_{dec})
1608:01	SubIndex 001		UDINT	RO	0x0000:00, 3
1608:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7040:04, 1
1608:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7040:05, 1
1608:04	SubIndex 004		UDINT	RO	0x0000:00, 11

160A AI RxPDO-Map Control Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
160A:0	AI RxPDO-Map Control Ch.6		USINT	RO	0x4 (4_{dec})
160A:01	SubIndex 001		UDINT	RO	0x0000:00, 3
160A:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7050:04, 1
160A:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7050:05, 1
160A:04	SubIndex 004		UDINT	RO	0x0000:00, 11

160C AI RxPDO-Map Control Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
160C:0	AI RxPDO-Map Control Ch.7		USINT	RO	0x4 (4_{dec})
160C:01	SubIndex 001		UDINT	RO	0x0000:00, 3
160C:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7060:04, 1
160C:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7060:05, 1
160C:04	SubIndex 004		UDINT	RO	0x0000:00, 11

160E AI RxPDO-Map Control Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
160E:0	AI RxPDO-Map Control Ch.8		USINT	RO	0x4 (4_{dec})
160E:01	SubIndex 001		UDINT	RO	0x0000:00, 3
160E:02	SubIndex 002	PDO Mapping Entry for "Tare".	UDINT	RO	0x7070:04, 1
160E:03	SubIndex 003	PDO Mapping Entry for "Peak Hold Reset".	UDINT	RO	0x7070:05, 1
160E:04	SubIndex 004		UDINT	RO	0x0000:00, 11

1800 AI TxPDO-Par Standard Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1800:0	AI TxPDO-Par Standard Ch.1		USINT	RO	0x6 (6_{dec})
1800:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[011a101a111a]

1801 AI TxPDO-Par Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1801:0	AI TxPDO-Par Compact Ch.1		USINT	RO	0x6 (6_{dec})
1801:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[001a101a111a]

1802 AI TxPDO-Par Standard Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1802:0	AI TxPDO-Par Standard Ch.2		USINT	RO	0x6 (6_{dec})
1802:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[031a121a131a]

1803 AI TxPDO-Par Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1803:0	AI TxPDO-Par Compact Ch.2		USINT	RO	0x6 (6_{dec})
1803:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[021a121a131a]

1804 AI TxPDO-Par Standard Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1804:0	AI TxPDO-Par Standard Ch.3		USINT	RO	0x6 (6_{dec})
1804:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[051a141a151a]

1805 AI TxPDO-Par Compact Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1805:0	AI TxPDO-Par Compact Ch.3		USINT	RO	0x6 (6_{dec})
1805:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[041a141a151a]

1806 AI TxPDO-Par Standard Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1806:0	AI TxPDO-Par Standard Ch.4		USINT	RO	0x6 (6_{dec})
1806:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[071a161a171a]

1807 AI TxPDO-Par Compact Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1807:0	AI TxPDO-Par Compact Ch.4		USINT	RO	0x6 (6_{dec})
1807:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[061a161a171a]

1808 AI TxPDO-Par Standard Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1808:0	AI TxPDO-Par Standard Ch.5		USINT	RO	0x6 (6_{dec})
1808:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[091a181a191a]

1809 AI TxPDO-Par Compact Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1809:0	AI TxPDO-Par Compact Ch.5		USINT	RO	0x6 (6_{dec})
1809:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[081a181a191a]

180A AI TxPDO-Par Standard Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
180A:0	AI TxPDO-Par Standard Ch.6		USINT	RO	0x6 (6_{dec})
180A:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0b1a1a1a1b1a]

180B AI TxPDO-Par Compact Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
180B:0	AI TxPDO-Par Compact Ch.6		USINT	RO	0x6 (6_{dec})
180B:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0a1a1a1a1b1a]

180C AI TxPDO-Par Standard Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
180C:0	AI TxPDO-Par Standard Ch.7		USINT	RO	0x6 (6_{dec})
180C:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0d1a1c1a1d1a]

180D AI TxPDO-Par Compact Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
180D:0	AI TxPDO-Par Compact Ch.7		USINT	RO	0x6 (6_{dec})
180D:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0c1a1c1a1d1a]

180E AI TxPDO-Par Standard Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
180E:0	AI TxPDO-Par Standard Ch.8		USINT	RO	0x6 (6_{dec})
180E:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0f1a1e1a1f1a]

180F AI TxPDO-Par Compact Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
180F:0	AI TxPDO-Par Compact Ch.8		USINT	RO	0x6 (6_{dec})
180F:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0e1a1e1a1f1a]

1810 AI TxPDO-Par Standard (Real32) Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1810:0	AI TxPDO-Par Standard (Real32) Ch.1		USINT	RO	0x6 (6_{dec})
1810:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[001a011a111a]

1811 AI TxPDO-Par Compact (Real32) Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1811:0	AI TxPDO-Par Compact (Real32) Ch.1		USINT	RO	0x6 (6_{dec})
1811:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[001a011a101a]

1812 AI TxPDO-Par Standard (Real32) Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1812:0	AI TxPDO-Par Standard (Real32) Ch.2		USINT	RO	0x6 (6_{dec})
1812:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[021a031a131a]

1813 AI TxPDO-Par Compact (Real32) Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1813:0	AI TxPDO-Par Compact (Real32) Ch.2		USINT	RO	0x6 (6_{dec})
1813:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[021a031a121a]

1814 AI TxPDO-Par Standard (Real32) Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1814:0	AI TxPDO-Par Standard (Real32) Ch.3		USINT	RO	0x6 (6_{dec})
1814:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[041a051a151a]

1815 AI TxPDO-Par Compact (Real32) Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1815:0	AI TxPDO-Par Compact (Real32) Ch.3		USINT	RO	0x6 (6_{dec})
1815:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[041a051a141a]

1816 AI TxPDO-Par Standard (Real32) Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1816:0	AI TxPDO-Par Standard (Real32) Ch.4		USINT	RO	0x6 (6_{dec})
1816:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[061a071a171a]

1817 AI TxPDO-Par Compact (Real32) Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1817:0	AI TxPDO-Par Compact (Real32) Ch.4		USINT	RO	0x6 (6_{dec})
1817:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[061a071a161a]

1818 AI TxPDO-Par Standard (Real32) Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1818:0	AI TxPDO-Par Standard (Real32) Ch.5		USINT	RO	0x6 (6_{dec})
1818:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[081a091a191a]

1819 AI TxPDO-Par Compact (Real32) Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1819:0	AI TxPDO-Par Compact (Real32) Ch.5		USINT	RO	0x6 (6_{dec})
1819:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[081a091a181a]

181A AI TxPDO-Par Standard (Real32) Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
181A:0	AI TxPDO-Par Standard (Real32) Ch.6		USINT	RO	0x6 (6_{dec})
181A:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0a1a0b1a1b1a]

181B AI TxPDO-Par Compact (Real32) Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
181B:0	AI TxPDO-Par Compact (Real32) Ch.6		USINT	RO	0x6 (6_{dec})
181B:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0a1a0b1a1a1a]

181C AI TxPDO-Par Standard (Real32) Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
181C:0	AI TxPDO-Par Standard (Real32) Ch.7		USINT	RO	0x6 (6_{dec})
181C:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0c1a0d1a1d1a]

181D AI TxPDO-Par Compact (Real32) Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
181D:0	AI TxPDO-Par Compact (Real32) Ch.7		USINT	RO	0x6 (6_{dec})
181D:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0c1a0d1a1c1a]

181E AI TxPDO-Par Standard (Real32) Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
181E:0	AI TxPDO-Par Standard (Real32) Ch.8		USINT	RO	0x6 (6_{dec})
181E:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0e1a0f1a1f1a]

181F AI TxPDO-Par Compact (Real32) Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
181F:0	AI TxPDO-Par Compact (Real32) Ch.8		USINT	RO	0x6 (6_{dec})
181F:06	Exclude TxPDOs		ARRAY [0..5] OF BYTE	RO	[0e1a0f1a1e1a]

1A00 AI TxPDO-Map Standard Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	AI TxPDO-Map Standard Ch.1		USINT	RO	0x9 (9_{dec})
1A00:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6000:01, 1
1A00:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6000:02, 1
1A00:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6000:03, 2
1A00:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6000:05, 2
1A00:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6000:07, 1
1A00:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A00:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6000:0f, 1
1A00:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6000:10, 1
1A00:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6000:11, 16

1A01 AI TxPDO-Map Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	AI TxPDO-Map Compact Ch.1		USINT	RO	0x1 (1_{dec})
1A01:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6000:11, 16

1A02 AI TxPDO-Map Standard Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	AI TxPDO-Map Standard Ch.2		USINT	RO	0x9 (9_{dec})
1A02:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6010:01, 1
1A02:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6010:02, 1
1A02:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6010:03, 2
1A02:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6010:05, 2
1A02:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6010:07, 1
1A02:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A02:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6010:0f, 1
1A02:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6010:10, 1
1A02:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6010:11, 16

1A03 AI TxPDO-Map Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	AI TxPDO-Map Compact Ch.2		USINT	RO	0x1 (1_{dec})
1A03:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6010:11, 16

1A04 AI TxPDO-Map Standard Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	AI TxPDO-Map Standard Ch.3		USINT	RO	0x9 (9_{dec})
1A04:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6020:01, 1
1A04:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6020:02, 1
1A04:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6020:03, 2
1A04:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6020:05, 2
1A04:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6020:07, 1
1A04:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A04:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6020:0f, 1
1A04:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6020:10, 1
1A04:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6020:11, 16

1A05 AI TxPDO-Map Compact Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A05:0	AI TxPDO-Map Compact Ch.3		USINT	RO	0x1 (1_{dec})
1A05:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6020:11, 16

1A06 AI TxPDO-Map Standard Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A06:0	AI TxPDO-Map Standard Ch.4		USINT	RO	0x9 (9_{dec})
1A06:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6030:01, 1
1A06:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6030:02, 1
1A06:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6030:03, 2
1A06:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6030:05, 2
1A06:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6030:07, 1
1A06:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A06:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6030:0f, 1
1A06:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6030:10, 1
1A06:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6030:11, 16

1A07 AI TxPDO-Map Compact Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A07:0	AI TxPDO-Map Compact Ch.4		USINT	RO	0x1 (1_{dec})
1A07:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6030:11, 16

1A08 AI TxPDO-Map Standard Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1A08:0	AI TxPDO-Map Standard Ch.5		USINT	RO	0x9 (9_{dec})
1A08:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6040:01, 1
1A08:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6040:02, 1
1A08:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6040:03, 2
1A08:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6040:05, 2
1A08:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6040:07, 1
1A08:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A08:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6040:0f, 1
1A08:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6040:10, 1
1A08:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6040:11, 16

1A09 AI TxPDO-Map Compact Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1A09:0	AI TxPDO-Map Compact Ch.5		USINT	RO	0x1 (1_{dec})
1A09:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6040:11, 16

1A0A AI TxPDO-Map Standard Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0A:0	AI TxPDO-Map Standard Ch.6		USINT	RO	0x9 (9_{dec})
1A0A:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6050:01, 1
1A0A:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6050:02, 1
1A0A:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6050:03, 2
1A0A:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6050:05, 2
1A0A:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6050:07, 1
1A0A:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A0A:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6050:0f, 1
1A0A:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6050:10, 1
1A0A:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6050:11, 16

1A0B AI TxPDO-Map Compact Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0B:0	AI TxPDO-Map Compact Ch.6		USINT	RO	0x1 (1_{dec})
1A0B:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6050:11, 16

1A0C AI TxPDO-Map Standard Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0C:0	AI TxPDO-Map Standard Ch.7		USINT	RO	0x9 (9_{dec})
1A0C:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6060:01, 1
1A0C:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6060:02, 1
1A0C:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6060:03, 2
1A0C:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6060:05, 2
1A0C:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6060:07, 1
1A0C:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A0C:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6060:0f, 1
1A0C:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6060:10, 1
1A0C:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6060:11, 16

1A0D AI TxPDO-Map Compact Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0D:0	AI TxPDO-Map Compact Ch.7		USINT	RO	0x1 (1_{dec})
1A0D:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6060:11, 16

1A0E AI TxPDO-Map Standard Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0E:0	AI TxPDO-Map Standard Ch.8		USINT	RO	0x9 (9_{dec})
1A0E:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6070:01, 1
1A0E:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6070:02, 1
1A0E:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6070:03, 2
1A0E:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6070:05, 2
1A0E:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6070:07, 1
1A0E:06	SubIndex 006		UDINT	RO	0x0000:00, 7
1A0E:07	SubIndex 007	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6070:0f, 1
1A0E:08	SubIndex 008	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6070:10, 1
1A0E:09	SubIndex 009	PDO Mapping Entry for "Value".	UDINT	RO	0x6070:11, 16

1A0F AI TxPDO-Map Compact Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0F:0	AI TxPDO-Map Compact Ch.8		USINT	RO	0x1 (1_{dec})
1A0F:01	SubIndex 001	PDO Mapping Entry for "Value".	UDINT	RO	0x6070:11, 16

1A10 AI TxPDO-Map Standard (Real32) Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A10:0	AI TxPDO-Map Standard (Real32) Ch.1		USINT	RO	0xB (11_{dec})
1A10:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6000:01, 1
1A10:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6000:02, 1
1A10:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6000:03, 2
1A10:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6000:05, 2
1A10:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6000:07, 1
1A10:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A10:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6000:0c, 1
1A10:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A10:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6000:0f, 1
1A10:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6000:10, 1
1A10:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6000:13, 32

1A11 AI TxPDO-Map Compact (Real32) Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A11:0	AI TxPDO-Map Compact (Real32) Ch.1		USINT	RO	0x1 (1_{dec})
1A11:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6000:13, 32

1A12 AI TxPDO-Map Standard (Real32) Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A12:0	AI TxPDO-Map Standard (Real32) Ch.2		USINT	RO	0xB (11_{dec})
1A12:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6010:01, 1
1A12:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6010:02, 1
1A12:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6010:03, 2
1A12:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6010:05, 2
1A12:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6010:07, 1
1A12:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A12:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6010:0c, 1
1A12:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A12:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6010:0f, 1
1A12:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6010:10, 1
1A12:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6010:13, 32

1A13 AI TxPDO-Map Compact (Real32) Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A13:0	AI TxPDO-Map Compact (Real32) Ch.2		USINT	RO	0x1 (1_{dec})
1A13:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6010:13, 32

1A14 AI TxPDO-Map Standard (Real32) Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A14:0	AI TxPDO-Map Standard (Real32) Ch.3		USINT	RO	0xB (11_{dec})
1A14:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6020:01, 1
1A14:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6020:02, 1
1A14:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6020:03, 2
1A14:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6020:05, 2
1A14:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6020:07, 1
1A14:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A14:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6020:0c, 1
1A14:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A14:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6020:0f, 1
1A14:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6020:10, 1
1A14:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6020:13, 32

1A15 AI TxPDO-Map Compact (Real32) Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A15:0	AI TxPDO-Map Compact (Real32) Ch.3		USINT	RO	0x1 (1_{dec})
1A15:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6020:13, 32

1A16 AI TxPDO-Map Standard (Real32) Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A16:0	AI TxPDO-Map Standard (Real32) Ch.4		USINT	RO	0xB (11_{dec})
1A16:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6030:01, 1
1A16:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6030:02, 1
1A16:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6030:03, 2
1A16:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6030:05, 2
1A16:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6030:07, 1
1A16:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A16:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6030:0c, 1
1A16:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A16:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6030:0f, 1
1A16:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6030:10, 1
1A16:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6030:13, 32

1A17 AI TxPDO-Map Compact (Real32) Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A17:0	AI TxPDO-Map Compact (Real32) Ch.4		USINT	RO	0x1 (1_{dec})
1A17:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6030:13, 32

1A18 AI TxPDO-Map Standard (Real32) Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1A18:0	AI TxPDO-Map Standard (Real32) Ch.5		USINT	RO	0xB (11_{dec})
1A18:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6040:01, 1
1A18:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6040:02, 1
1A18:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6040:03, 2
1A18:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6040:05, 2
1A18:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6040:07, 1
1A18:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A18:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6040:0c, 1
1A18:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A18:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6040:0f, 1
1A18:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6040:10, 1
1A18:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6040:13, 32

1A19 AI TxPDO-Map Compact (Real32) Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1A19:0	AI TxPDO-Map Compact (Real32) Ch.5		USINT	RO	0x1 (1_{dec})
1A19:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6040:13, 32

1A1A AI TxPDO-Map Standard (Real32) Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1A:0	AI TxPDO-Map Standard (Real32) Ch.6		USINT	RO	0xB (11_{dec})
1A1A:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6050:01, 1
1A1A:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6050:02, 1
1A1A:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6050:03, 2
1A1A:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6050:05, 2
1A1A:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6050:07, 1
1A1A:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A1A:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6050:0c, 1
1A1A:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A1A:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6050:0f, 1
1A1A:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6050:10, 1
1A1A:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6050:13, 32

1A1B AI TxPDO-Map Compact (Real32) Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1B:0	AI TxPDO-Map Compact (Real32) Ch.6		USINT	RO	0x1 (1_{dec})
1A1B:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6050:13, 32

1A1C AI TxPDO-Map Standard (Real32) Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1C:0	AI TxPDO-Map Standard (Real32) Ch.7		USINT	RO	0xB (11_{dec})
1A1C:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6060:01, 1
1A1C:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6060:02, 1
1A1C:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6060:03, 2
1A1C:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6060:05, 2
1A1C:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6060:07, 1
1A1C:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A1C:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6060:0c, 1
1A1C:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A1C:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6060:0f, 1
1A1C:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6060:10, 1
1A1C:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6060:13, 32

1A1D AI TxPDO-Map Compact (Real32) Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1D:0	AI TxPDO-Map Compact (Real32) Ch.7		USINT	RO	0x1 (1_{dec})
1A1D:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6060:13, 32

1A1E AI TxPDO-Map Standard (Real32) Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1E:0	AI TxPDO-Map Standard (Real32) Ch.8		USINT	RO	0xB (11_{dec})
1A1E:01	SubIndex 001	PDO Mapping Entry for "Underrange".	UDINT	RO	0x6070:01, 1
1A1E:02	SubIndex 002	PDO Mapping Entry for "Overrange".	UDINT	RO	0x6070:02, 1
1A1E:03	SubIndex 003	PDO Mapping Entry for "Limit 1".	UDINT	RO	0x6070:03, 2
1A1E:04	SubIndex 004	PDO Mapping Entry for "Limit 2".	UDINT	RO	0x6070:05, 2
1A1E:05	SubIndex 005	PDO Mapping Entry for "Error".	UDINT	RO	0x6070:07, 1
1A1E:06	SubIndex 006		UDINT	RO	0x0000:00, 4
1A1E:07	SubIndex 007	PDO Mapping Entry for "Tare Active".	UDINT	RO	0x6070:0c, 1
1A1E:08	SubIndex 008		UDINT	RO	0x0000:00, 2
1A1E:09	SubIndex 009	PDO Mapping Entry for "TxPDO State".	UDINT	RO	0x6070:0f, 1
1A1E:0A	SubIndex 010	PDO Mapping Entry for "TxPDO Toggle".	UDINT	RO	0x6070:10, 1
1A1E:0B	SubIndex 011	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6070:13, 32

1A1F AI TxPDO-Map Compact (Real32) Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1F:0	AI TxPDO-Map Compact (Real32) Ch.8		USINT	RO	0x1 (1_{dec})
1A1F:01	SubIndex 001	PDO Mapping Entry for "Value (Real32)".	UDINT	RO	0x6070:13, 32

1A20 AI TxPDO-Map Cycle Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A20:0	AI TxPDO-Map Cycle Counter Ch.1		USINT	RO	0x1 (1_{dec})
1A20:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6000:14, 16

1A22 AI TxPDO-Map Cycle Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A22:0	AI TxPDO-Map Cycle Counter Ch.2		USINT	RO	0x1 (1_{dec})
1A22:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6010:14, 16

1A24 AI TxPDO-Map Cycle Counter Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
1A24:0	AI TxPDO-Map Cycle Counter Ch.3		USINT	RO	0x1 (1_{dec})
1A24:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6020:14, 16

1A26 AI TxPDO-Map Cycle Counter Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
1A26:0	AI TxPDO-Map Cycle Counter Ch.4		USINT	RO	0x1 (1_{dec})
1A26:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6030:14, 16

1A28 AI TxPDO-Map Cycle Counter Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
1A28:0	AI TxPDO-Map Cycle Counter Ch.5		USINT	RO	0x1 (1_{dec})
1A28:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6040:14, 16

1A2A AI TxPDO-Map Cycle Counter Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
1A2A:0	AI TxPDO-Map Cycle Counter Ch.6		USINT	RO	0x1 (1_{dec})
1A2A:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6050:14, 16

1A2C AI TxPDO-Map Cycle Counter Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
1A2C:0	AI TxPDO-Map Cycle Counter Ch.7		USINT	RO	0x1 (1_{dec})
1A2C:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6060:14, 16

1A2E AI TxPDO-Map Cycle Counter Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
1A2E:0	AI TxPDO-Map Cycle Counter Ch.8		USINT	RO	0x1 (1_{dec})
1A2E:01	SubIndex 001	PDO Mapping Entry for "Input Cycle Counter".	UDINT	RO	0x6070:14, 16

1C00 Sync manager type

Index (hex)	Name	Meaning	Data type	Flags	Default
1C00:0	Sync manager type		USINT	RO	0x4 (4_{dec})
1C00:01	SubIndex 001		USINT	RO	0x1 (1_{dec})
1C00:02	SubIndex 002		USINT	RO	0x2 (2_{dec})
1C00:03	SubIndex 003		USINT	RO	0x3 (3_{dec})
1C00:04	SubIndex 004		USINT	RO	0x4 (4_{dec})

1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	-	USINT	RO	-
1C12:01	SubIndex 001		UINT	RW	0x0 (0_{dec})
1C12:02	SubIndex 002		UINT	RW	0x0 (0_{dec})
1C12:03	SubIndex 003		UINT	RW	0x0 (0_{dec})
1C12:04	SubIndex 004		UINT	RW	0x0 (0_{dec})
1C12:05	SubIndex 005		UINT	RW	0x0 (0_{dec})
1C12:06	SubIndex 006		UINT	RW	0x0 (0_{dec})
1C12:07	SubIndex 007		UINT	RW	0x0 (0_{dec})
1C12:08	SubIndex 008		UINT	RW	0x0 (0_{dec})

1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign		USINT	RO	0x8 (8_{dec})
1C13:01	SubIndex 001		UINT	RW	0x101A (4122_{dec})
1C13:02	SubIndex 002		UINT	RW	0x121A (4634_{dec})
1C13:03	SubIndex 003		UINT	RW	0x141A (5146_{dec})
1C13:04	SubIndex 004		UINT	RW	0x161A (5658_{dec})
1C13:05	SubIndex 005		UINT	RW	0x181A (6170_{dec})
1C13:06	SubIndex 006		UINT	RW	0x1A1A (6682_{dec})
1C13:07	SubIndex 007		UINT	RW	0x1C1A (7194_{dec})
1C13:08	SubIndex 008		UINT	RW	0x1E1A (7706_{dec})
1C13:09	SubIndex 009		UINT	RW	0x0 (0_{dec})
1C13:0A	SubIndex 010		UINT	RW	0x0 (0_{dec})
1C13:0B	SubIndex 011		UINT	RW	0x0 (0_{dec})
1C13:0C	SubIndex 012		UINT	RW	0x0 (0_{dec})
1C13:0D	SubIndex 013		UINT	RW	0x0 (0_{dec})
1C13:0E	SubIndex 014		UINT	RW	0x0 (0_{dec})
1C13:0F	SubIndex 015		UINT	RW	0x0 (0_{dec})
1C13:10	SubIndex 016		UINT	RW	0x0 (0_{dec})

1C32 SM output parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	USINT	RO	0x20 (32_{dec})
1C32:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 2 Event • 2: DC-Mode - Synchron with SYNC0 Event 3: DC-Mode - Synchron with SYNC1 Event	UINT	RW	-
1C32:02	Cycle time	Cycle time (in ns): • Free Run: cycle time of the local timer • Synchron with SM 2 Event: cycle time of the master DC-Mode: SYNC0/SYNC1 Cycle Time	UDINT	RW	-
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC mode only)	UDINT	RO	-
1C32:04	Sync modes supported	Sync modes supported: • Bit 0 = 1: Free Run is supported • Bit 1 = 1: Synchron with SM 2 Event is supported • Bit 2-3 = 01: DC-Mode is supported • Bit 4-5 = 10: Output Shift with SYNC1 Event (only DC mode) Bit 14 = 1: dynamic times (measurement through writing of 1C32:08)	UINT	RO	0x4001 (16385_{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UDINT	RO	-
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC Mode only)	UDINT	RO	-
1C32:07	Minimum delay time		UDINT	RO	-
1C32:08	Get Cycle Time	• 0: Measurement of the local cycle time is stopped 1: Measurement of the local cycle time is started	UINT	RW	0x0 (0_{dec})
1C32:09	Maximum delay time	Time between SYNC1 event and output of the outputs (in ns, DC mode only)	UDINT	RO	-
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC Mode only)	UINT	RO	-
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)	UINT	RO	-
1C32:0D	Shift too short counter	Number of intervals between SYNC0 and SYNC1 events that are too short (DC Mode only)	UINT	RO	-
1C32:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC Mode only)	BOOL	RO	-

1C33 SM input parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	USINT	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)	UINT	RW	0x0 (0_{dec})
1C33:02	Cycle time	as 1C32:02	UDINT	RW	0xF4240 (1000000_{dec})
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, DC Mode only)	UDINT	RO	0x0 (0_{dec})
1C33:04	Sync modes supported	Sync modes supported: • Bit 0: Free Run is supported • Bit 1: Synchron with SM 2 Event is supported (outputs available) • Bit 1: Synchron with SM 3 Event is supported (no outputs available) • Bit 2-3 = 01: DC-Mode is supported • Bit 4-5 = 01: Input shift through local event (outputs available) • Bit 4-5 = 10: Input shift with SYNC1 event (no outputs available) Bit 14 = 1: dynamic times (measurement through writing of 1C32:08 or 1C33:08)	UINT	RO	0x4001 (16385_{dec})
1C33:05	Minimum cycle time	as 1C32:05	UDINT	RO	0x186A0 (100000_{dec})
1C33:06	Calc and copy time	Time between reading of the inputs and the inputs being available for the master (in ns, DC Mode only)	UDINT	RO	0x0 (0_{dec})
1C33:07	Minimum delay time		UDINT	RO	0x0 (0_{dec})
1C33:08	Get Cycle Time	as 1C32:08	UINT	RW	0x0 (0_{dec})
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, DC Mode only)	UDINT	RO	0x0 (0_{dec})
1C33:0B	SM event missed counter	as 1C32:11	UINT	RO	-
1C33:0C	Cycle exceeded counter	as 1C32:12	UINT	RO	-
1C33:0D	Shift too short counter	as 1C32:13	UINT	RO	-
1C33:20	Sync error	as 1C32:32	BOOL	RO	-

F000 Modular Device Profile

Index (hex)	Name	Meaning	Data type	Flags	Default
F000:0	Modular Device Profile		USINT	RO	0x2 (2_{dec})
F000:01	Index distance		UINT	RO	0x10 (16_{dec})
F000:02	Maximum number of modules		UINT	RO	0x8 (8_{dec})

F008 Code word

Index (hex)	Name	Meaning	Data type	Flags	Default
F008:0	Code word	-	UDINT	RO	-

F009 Password protection

Index (hex)	Name	Meaning	Data type	Flags	Default
F009:0	Password protection	-	UDINT	RO	-

F081 Download revision

Index (hex)	Name	Meaning	Data type	Flags	Default
F081:0	Download revision		USINT	RO	0x1 (1_{dec})
F081:01	Revision number	-	UDINT	RW	-

FB00 DEV Command

Index (hex)	Name	Meaning	Data type	Flags	Default
FB00:0	DEV Command		USINT	RO	0x3 (3_{dec})
FB00:01	Request		ARRAY [0..1] OF BYTE	RW	[None]
FB00:02	Status	-	USINT	RO	-
FB00:03	Response		ARRAY [0..5] OF BYTE	RO	[None]

7.4 Profile-specific objects

6000 AI Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6000:0	AI Inputs Ch.1		USINT	RO	0x14 (20_{dec})
6000:01	Underrange	-	BOOL	RO	-
6000:02	Overrange	-	BOOL	RO	-
6000:03	Limit 1	-	BIT2	RO	-
6000:05	Limit 2	-	BIT2	RO	-
6000:07	Error	-	BOOL	RO	-
6000:0C	Tare Active	-	BOOL	RO	-
6000:0F	TxPDO State	-	BOOL	RO	-
6000:10	TxPDO Toggle	-	BOOL	RO	-
6000:11	Value	-	INT	RO	-
6000:13	Value (Real32)	-	REAL	RO	-
6000:14	Input Cycle Counter	-	UINT	RO	-

6010 AI Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6010:0	AI Inputs Ch.2		USINT	RO	0x14 (20_{dec})
6010:01	Underrange	-	BOOL	RO	-
6010:02	Overrange	-	BOOL	RO	-
6010:03	Limit 1	-	BIT2	RO	-
6010:05	Limit 2	-	BIT2	RO	-
6010:07	Error	-	BOOL	RO	-
6010:0C	Tare Active	-	BOOL	RO	-
6010:0F	TxPDO State	-	BOOL	RO	-
6010:10	TxPDO Toggle	-	BOOL	RO	-
6010:11	Value	-	INT	RO	-
6010:13	Value (Real32)	-	REAL	RO	-
6010:14	Input Cycle Counter	-	UINT	RO	-

6020 AI Inputs Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
6020:0	AI Inputs Ch.3		USINT	RO	0x14 (20_{dec})
6020:01	Underrange	-	BOOL	RO	-
6020:02	Overrange	-	BOOL	RO	-
6020:03	Limit 1	-	BIT2	RO	-
6020:05	Limit 2	-	BIT2	RO	-
6020:07	Error	-	BOOL	RO	-
6020:0C	Tare Active	-	BOOL	RO	-
6020:0F	TxPDO State	-	BOOL	RO	-
6020:10	TxPDO Toggle	-	BOOL	RO	-
6020:11	Value	-	INT	RO	-
6020:13	Value (Real32)	-	REAL	RO	-
6020:14	Input Cycle Counter	-	UINT	RO	-

6030 AI Inputs Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
6030:0	AI Inputs Ch.4		USINT	RO	0x14 (20_{dec})
6030:01	Underrange	-	BOOL	RO	-
6030:02	Overrange	-	BOOL	RO	-
6030:03	Limit 1	-	BIT2	RO	-
6030:05	Limit 2	-	BIT2	RO	-
6030:07	Error	-	BOOL	RO	-
6030:0C	Tare Active	-	BOOL	RO	-
6030:0F	TxPDO State	-	BOOL	RO	-
6030:10	TxPDO Toggle	-	BOOL	RO	-
6030:11	Value	-	INT	RO	-
6030:13	Value (Real32)	-	REAL	RO	-
6030:14	Input Cycle Counter	-	UINT	RO	-

6040 AI Inputs Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
6040:0	AI Inputs Ch.5		USINT	RO	0x14 (20_{dec})
6040:01	Underrange	-	BOOL	RO	-
6040:02	Overrange	-	BOOL	RO	-
6040:03	Limit 1	-	BIT2	RO	-
6040:05	Limit 2	-	BIT2	RO	-
6040:07	Error	-	BOOL	RO	-
6040:0C	Tare Active	-	BOOL	RO	-
6040:0F	TxPDO State	-	BOOL	RO	-
6040:10	TxPDO Toggle	-	BOOL	RO	-
6040:11	Value	-	INT	RO	-
6040:13	Value (Real32)	-	REAL	RO	-
6040:14	Input Cycle Counter	-	UINT	RO	-

6050 AI Inputs Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
6050:0	AI Inputs Ch.6		USINT	RO	0x14 (20_{dec})
6050:01	Underrange	-	BOOL	RO	-
6050:02	Overrange	-	BOOL	RO	-
6050:03	Limit 1	-	BIT2	RO	-
6050:05	Limit 2	-	BIT2	RO	-
6050:07	Error	-	BOOL	RO	-
6050:0C	Tare Active	-	BOOL	RO	-
6050:0F	TxPDO State	-	BOOL	RO	-
6050:10	TxPDO Toggle	-	BOOL	RO	-
6050:11	Value	-	INT	RO	-
6050:13	Value (Real32)	-	REAL	RO	-
6050:14	Input Cycle Counter	-	UINT	RO	-

6060 AI Inputs Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
6060:0	AI Inputs Ch.7		USINT	RO	0x14 (20_{dec})
6060:01	Underrange	-	BOOL	RO	-
6060:02	Overrange	-	BOOL	RO	-
6060:03	Limit 1	-	BIT2	RO	-
6060:05	Limit 2	-	BIT2	RO	-
6060:07	Error	-	BOOL	RO	-
6060:0C	Tare Active	-	BOOL	RO	-
6060:0F	TxPDO State	-	BOOL	RO	-
6060:10	TxPDO Toggle	-	BOOL	RO	-
6060:11	Value	-	INT	RO	-
6060:13	Value (Real32)	-	REAL	RO	-
6060:14	Input Cycle Counter	-	UINT	RO	-

6070 AI Inputs Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
6070:0	AI Inputs Ch.8		USINT	RO	0x14 (20_{dec})
6070:01	Underrange	-	BOOL	RO	-
6070:02	Overrange	-	BOOL	RO	-
6070:03	Limit 1	-	BIT2	RO	-
6070:05	Limit 2	-	BIT2	RO	-
6070:07	Error	-	BOOL	RO	-
6070:0C	Tare Active	-	BOOL	RO	-
6070:0F	TxPDO State	-	BOOL	RO	-
6070:10	TxPDO Toggle	-	BOOL	RO	-
6070:11	Value	-	INT	RO	-
6070:13	Value (Real32)	-	REAL	RO	-
6070:14	Input Cycle Counter	-	UINT	RO	-

7000 AI Outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
7000:0	AI Outputs Ch.1		USINT	RO	0x5 (5_{dec})
7000:04	Tare	-	BOOL	RO	-
7000:05	Peak Hold Reset	-	BOOL	RO	-

7010 AI Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
7010:0	AI Outputs Ch.2		USINT	RO	0x5 (5_{dec})
7010:04	Tare	-	BOOL	RO	-
7010:05	Peak Hold Reset	-	BOOL	RO	-

7020 AI Outputs Ch.3

Index (hex)	Name	Meaning	Data type	Flags	Default
7020:0	AI Outputs Ch.3		USINT	RO	0x5 (5_{dec})
7020:04	Tare	-	BOOL	RO	-
7020:05	Peak Hold Reset	-	BOOL	RO	-

7030 AI Outputs Ch.4

Index (hex)	Name	Meaning	Data type	Flags	Default
7030:0	AI Outputs Ch.4		USINT	RO	0x5 (5_{dec})
7030:04	Tare	-	BOOL	RO	-
7030:05	Peak Hold Reset	-	BOOL	RO	-

7040 AI Outputs Ch.5

Index (hex)	Name	Meaning	Data type	Flags	Default
7040:0	AI Outputs Ch.5		USINT	RO	0x5 (5_{dec})
7040:04	Tare	-	BOOL	RO	-
7040:05	Peak Hold Reset	-	BOOL	RO	-

7050 AI Outputs Ch.6

Index (hex)	Name	Meaning	Data type	Flags	Default
7050:0	AI Outputs Ch.6		USINT	RO	0x5 (5_{dec})
7050:04	Tare	-	BOOL	RO	-
7050:05	Peak Hold Reset	-	BOOL	RO	-

7060 AI Outputs Ch.7

Index (hex)	Name	Meaning	Data type	Flags	Default
7060:0	AI Outputs Ch.7		USINT	RO	0x5 (5_{dec})
7060:04	Tare	-	BOOL	RO	-
7060:05	Peak Hold Reset	-	BOOL	RO	-

7070 AI Outputs Ch.8

Index (hex)	Name	Meaning	Data type	Flags	Default
7070:0	AI Outputs Ch.8		USINT	RO	0x5 (5_{dec})
7070:04	Tare	-	BOOL	RO	-
7070:05	Peak Hold Reset	-	BOOL	RO	-

8 Appendix

8.1 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

8.2 Accessories

Mounting

Ordering information	Description	Link
ZS5300-0011	Mounting rail	Website

Cables

A complete overview of pre-assembled cables can be found on the Beckhoff website: Link.

Ordering information	Description	Link
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

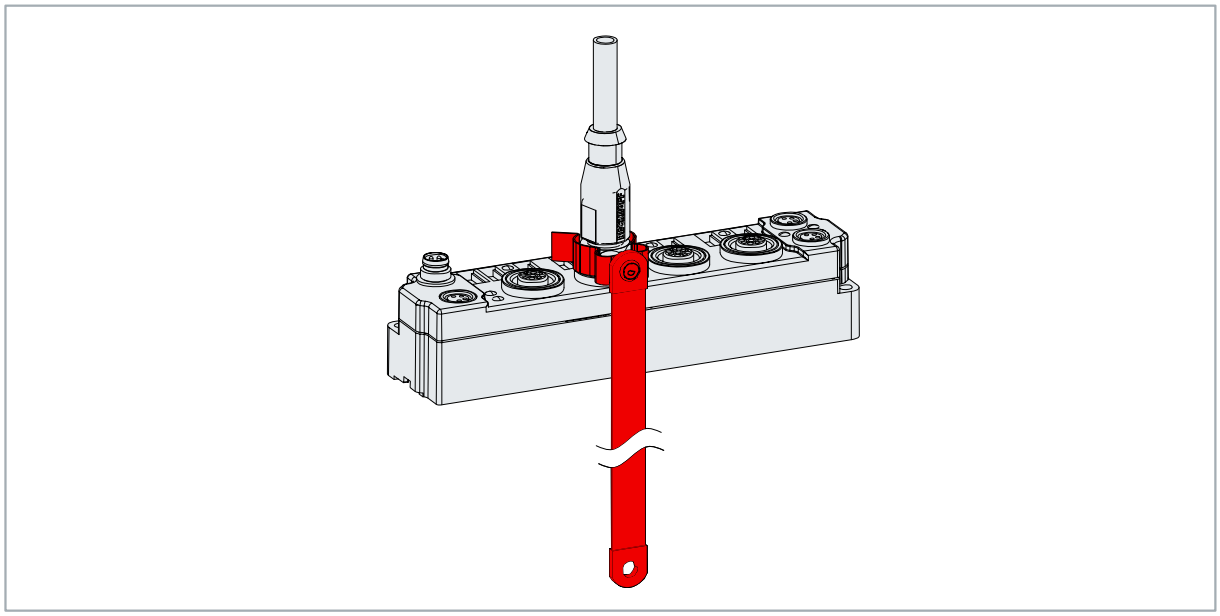
Tools

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.

8.2.1 ZB8513-0002 | EMC shield clamp on earthing tapes



https://www.beckhoff.com/zb8513-0002

8.3 Further documentation for I/O components with analog in and outputs

NOTICE	
	**Further documentation for I/O components with analog in and outputs** Also pay attention to the further 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 website www.beckhoff.com on the respective product pages! The content includes the basics of sensor technology and information on analog measured values.

8.4 Version identification of EtherCAT devices

8.4.1 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. *“EL2872 with revision 0022 and serial number 01200815”*.
- The type, version and revision are read as decimal numbers, even if they are technically saved in hexadecimal.

8.4.2 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

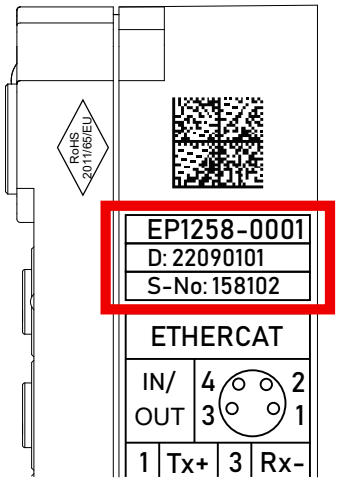


Fig. 37: EP1258-00001 IP67 EtherCAT Box with batch number/DateCode 22090101 and unique serial number 158102

8.4.3 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.

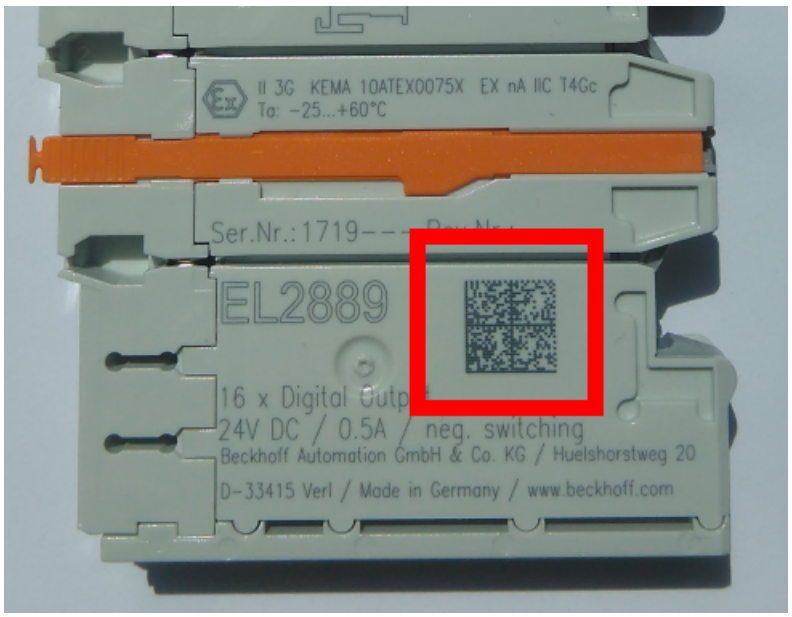


Fig. 38: BIC as data matrix code (DMC, code scheme ECC200)

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	**1P**072222
2	Beckhoff Traceability Number (BTN)	**Unique serial number, see note below**	SBTN	12	**SBTN**k4p562d7
3	Article description	**Beckhoff article description, e.g. EL1008**	1K	32	**1K**EL1809
4	Quantity	**Quantity in packaging unit, e.g. 1, 10, etc.**	Q	6	**Q**1
5	Batch number	Optional: Year and week of production	2P	14	**2P**401503180016
6	ID/serial number	Optional: Present-day serial number system, e.g. with safety products	51S	12	**51S**678294
7	Variant number	Optional: Product variant number on the basis of standard products	30P	12	**30P**F971, 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**SBTN**k4p562d7**1K**EL1809 **Q**1 **51S**678294

Accordingly as DMC:

Fig. 39: Example DMC **1P**072222**SBTN**k4p562d7**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 documentation.

8.4.4 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.

The interface that the product can be electronically addressed by is crucial for the electronic readout.

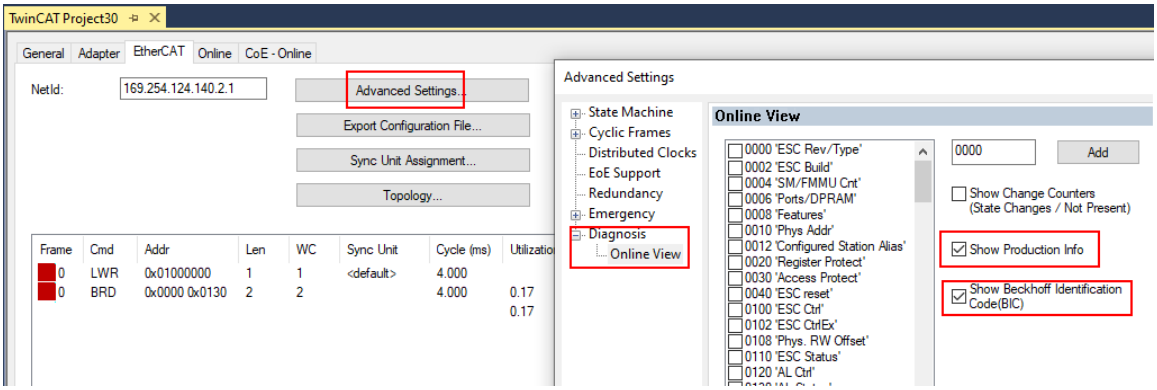
EtherCAT devices (IP20, IP67)

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

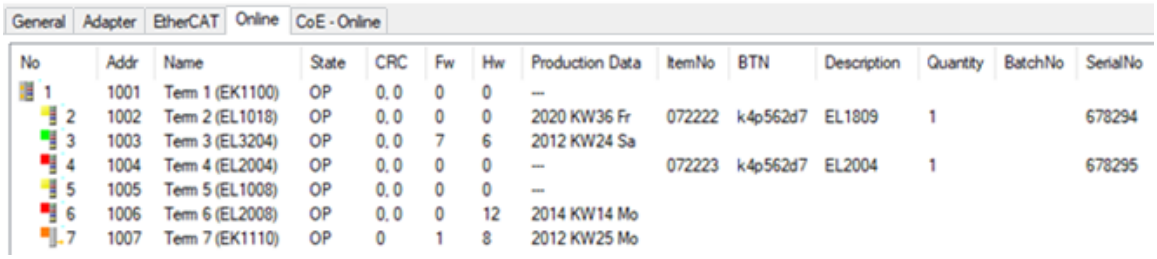
Beckhoff also stores the eBIC in the ESI-EEPROM. The eBIC was introduced into Beckhoff IO production (terminals, box modules) in 2020; as of 2023, implementation is largely complete.

The user can electronically access the eBIC (if present) 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 "Show Beckhoff Identification Code (BIC)" checkbox under EtherCAT → Advanced Settings → Diagnostics:

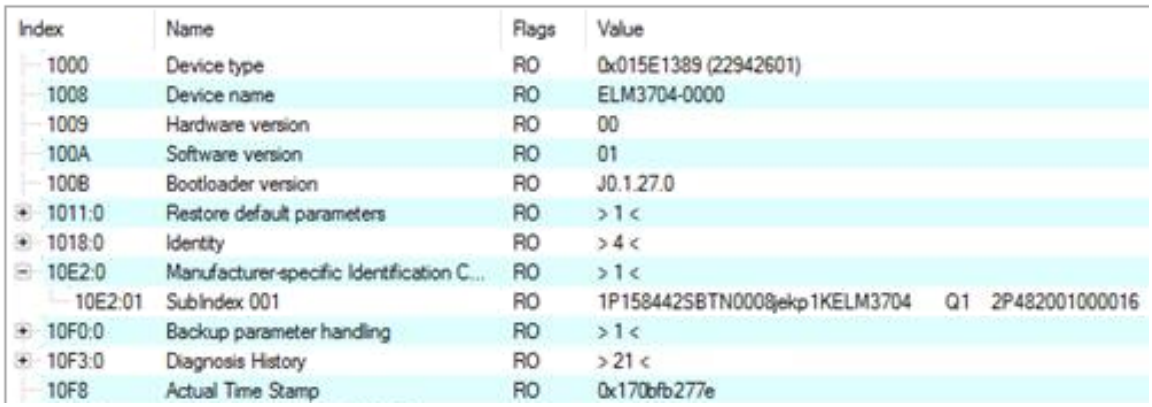


  - The BTN and its contents are then displayed:



  - Note: As shown in the figure, 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* for reading into the PLC are available in the Tc2_EtherCAT library from v3.3.19.0.
- EtherCAT devices with a CoE directory may also have the object 0x10E2:01 to display their own eBIC, which can also be easily accessed by the PLC:

- 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 preferentially introduced into stock products in the course of necessary firmware revision.
  - From TwinCAT 3.1. build 4024.24, the functions *FB_EcCoEReadBIC* and *FB_EcCoEReadBTN* for reading into the PLC are available in the Tc2_EtherCAT library from v3.3.19.0
- The following auxiliary functions are available for processing the BIC/BTN data in the PLC in *Tc2_Utilities* as of TwinCAT 3.1 build 4024.24
  - F_SplitBIC: The function splits the Beckhoff Identification Code (BIC) sBICValue into its components using known identifiers and returns the recognized substrings in the ST_SplittedBIC structure as a return value
  - BIC_TO_BTN: The function extracts the BTN from the BIC and returns it as a return value
- Note: If there is further electronic 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 written as an additional category in the ESI-EEPROM during device production. The structure of the ESI content is largely dictated by the ETG specifications, therefore the additional vendor-specific content is stored using a category in accordance with the ETG.2010. ID 03 tells all EtherCAT masters that they may not overwrite these data in the event of an update or restore the data after an ESI update.
  The structure follows the content of the BIC, see here. The EEPROM therefore requires approx. 50..200 bytes of memory.
- 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 which each have 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.

8.5 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
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

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web:	www.beckhoff.com/support

Service

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- spare parts service
- hotline service

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