



Documentation

EP9214-0023 and EP9224-0023

Power Distribution for EtherCAT Box Modules

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BECKHOFF

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1 Foreword

1.1 Notes on the documentation

Intended audience

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

It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.

It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

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

Disclaimer

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

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

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

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, DE102004044764, DE102007017835 with corresponding applications or registrations in various other countries.

The TwinCAT Technology is covered, including but not limited to the following patent applications and patents: EP0851348, US6167425 with corresponding applications or registrations in various other countries.



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1.2 Safety instructions

Safety regulations

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

Exclusion of liability






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

Personnel qualification

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

Description of symbols

In this documentation the following symbols are used with an accompanying safety instruction or note. The safety instructions must be read carefully and followed without fail!

 DANGER	Serious risk of injury! Failure to follow the safety instructions associated with this symbol directly endangers the life and health of persons.
 WARNING	Risk of injury! Failure to follow the safety instructions associated with this symbol endangers the life and health of persons.
 CAUTION	Personal injuries! Failure to follow the safety instructions associated with this symbol can lead to injuries to persons.
 Attention	Damage to the environment or devices Failure to follow the instructions associated with this symbol can lead to damage to the environment or equipment.
 Note	Tip or pointer This symbol indicates information that contributes to better understanding.

1.3 Documentation issue status

Version	Comment
2.3.1	<ul style="list-style-type: none"> chapter <i>Switch of behavior</i> updated Nut torque for connectors updated
2.3.0	<ul style="list-style-type: none"> Cabling added
2.2.0	<ul style="list-style-type: none"> Operation with or without EtherCAT master updated
2.1.0	<ul style="list-style-type: none"> Power Connection updated
2.0.0	<ul style="list-style-type: none"> migration chapter <i>mounting and cabling</i> updated chapter <i>nut torque for connectors</i> extended chapter <i>switch off behavior</i> updated object descriptions updated
1.1.0	<ul style="list-style-type: none"> EP9224-0023 added
1.0.0	<ul style="list-style-type: none"> first release
0.1	<ul style="list-style-type: none"> preliminary version (only German available)

Firm and hardware version

The documentation refers to the firm and hardware status that was valid at the time it was prepared.

The properties of the modules are subject to continuous development and improvement. Modules having earlier production statuses cannot have the same properties as modules with the latest status. Existing properties, however, are always retained and are not changed, so that these modules can always be replaced by new ones.

Documentation version	EP9214-0023		EP9224-0023	
	firmware	hardware	firmware	hardware
2.1.0	09	11	04	10
2.0.0	09	10	04	10
1.1.0	09	06	04	06
1.0.0	07	03	-	-
0.1	07	03	-	-

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

Syntax of the batch number (D number)

WW YY FF HH

WW - week of production (calendar week)

YY - year of production

FF - firmware version

HH - hardware version

Example with ser. no.: 55 09 01 00:

55 - week of production 55

09 - year of production 2009

01 - firmware version 01

00 - hardware version 00

2 Product overview

2.1 EtherCAT Box - Introduction

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

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

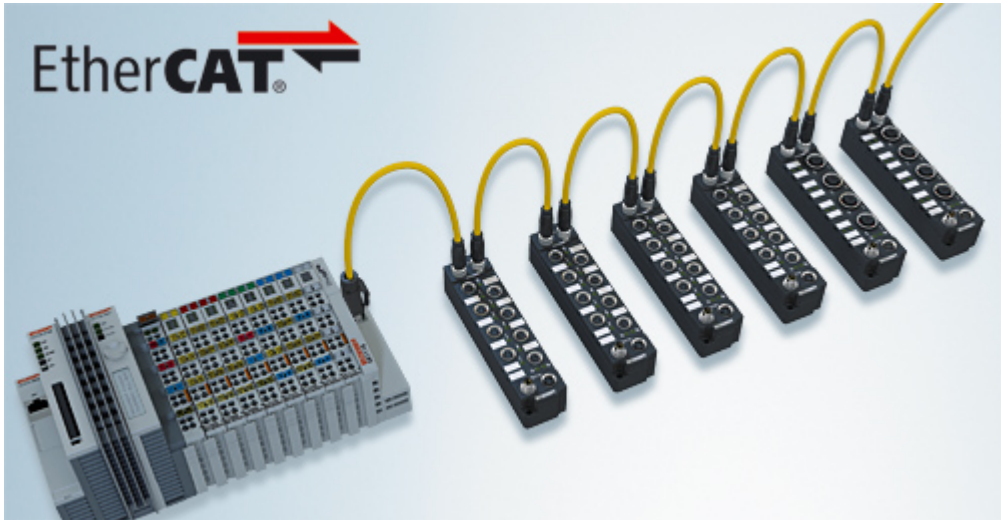


Fig. 1: EtherCAT Box Modules within an EtherCAT network

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

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

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

- digital inputs with different filters (3.0 ms or 10 μ s)
- 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

	<p>Basic EtherCAT documentation</p> <p>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.</p>
	<p>XML files</p> <p>You will find XML files (XML Device Description Files) for Beckhoff EtherCAT modules on our website (www.beckhoff.com) under Downloads, in the Configuration Files area.</p>

2.2 EP9214 - Introduction

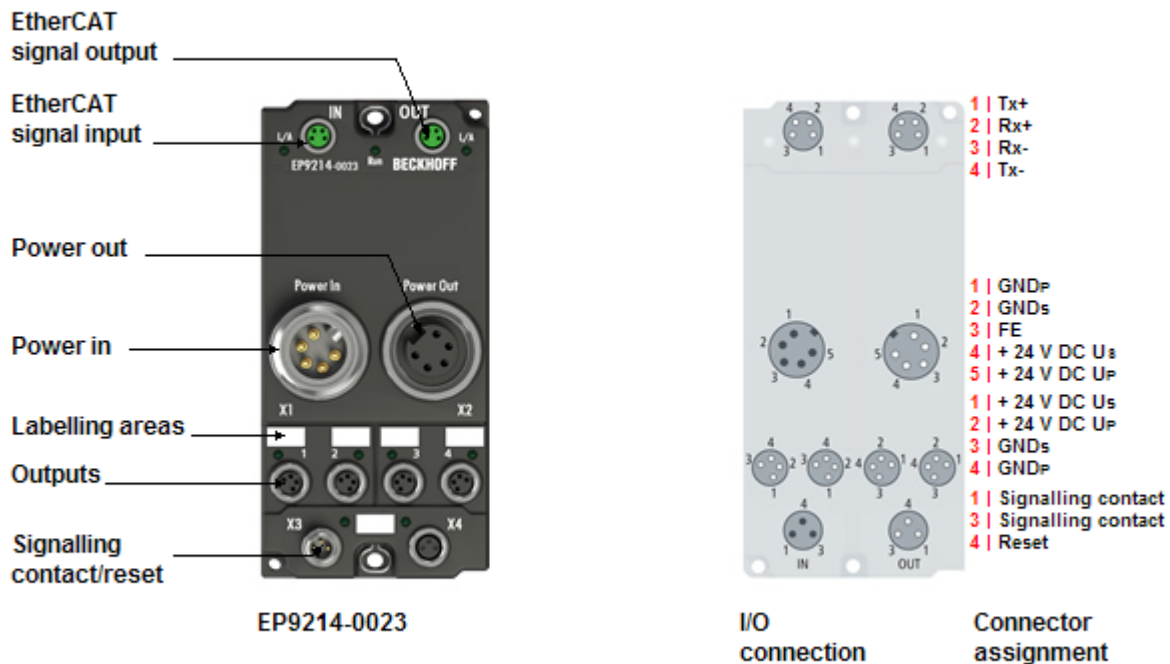


Fig. 4: EP9214

Power distribution for EtherCAT Box (24 V_{DC})

The EP9214-0023 enables connection of four power supply branches. In each branch the current consumption for the control voltage U_S and the peripheral voltage U_P is monitored, limited, and, if necessary, switched off.

The power distribution is supplied via a 7/8" connector with up to 16 A (per voltage supply U_S/U_P). Several modules can be configured in a cascade arrangement. In the event of a short-circuit in one of the four outputs, the affected output is switched off. The supply for the other branches remains active. The switch-off and control is done in such a way that the input voltage does not fall below 21 V or other modules are going down, caused by undervoltage.

During startup consumers with large capacities can be added without problem.

The master can read diagnostic messages from the individual channels via the EtherCAT interface. Independent switching of individual consumer branches is also possible via the EtherCAT master.

In delivery state the eight outputs of the box (4 times U_S, 4 times U_P) are activated to enable operation without EtherCAT.

After an error caused the switch off of a channel, this channel remains switched off when you try to switch it on again and has to be set back actively by the EtherCAT master or a hardware reset at the box (lower M8 socket).

Quick links

[Installation \[► 13\]](#)

[Configuration \[► 32\]](#)

2.3 EP9224 - Introduction

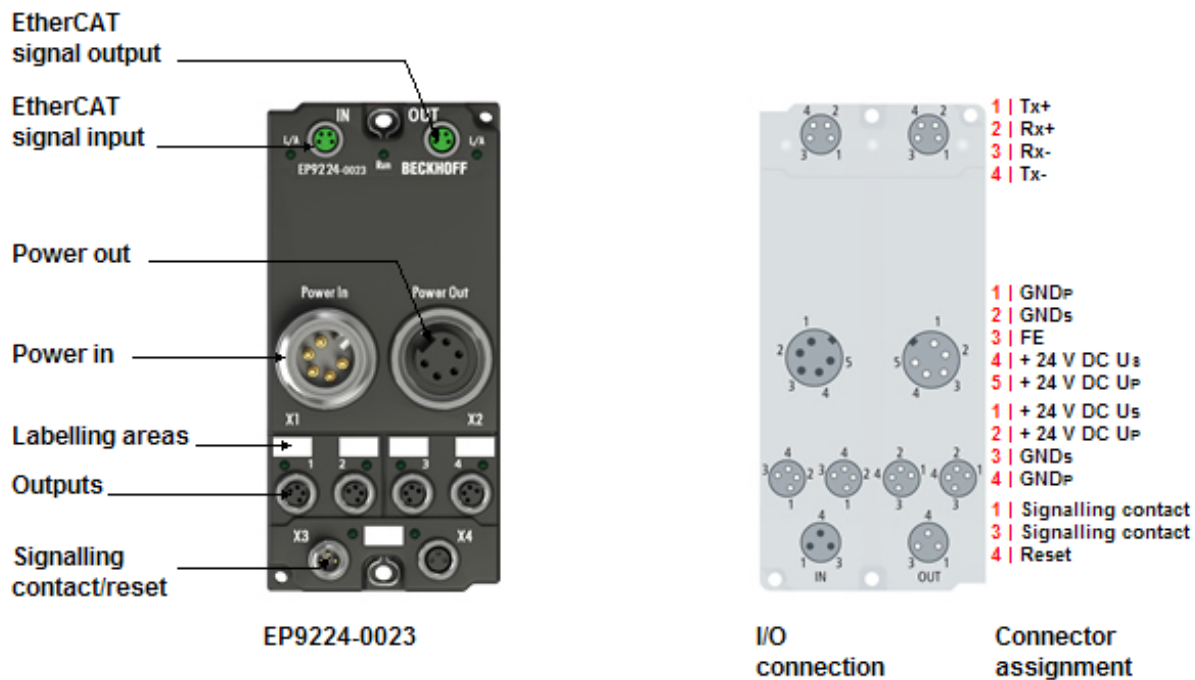


Fig. 5: EP9224

Power distribution for EtherCAT Box (24 V_{DC}) with data logging

The EP9224-0023 enables connection of four power supply branches. In each branch the current consumption for the control voltage U_S and the peripheral voltage U_P is monitored, limited, and, if necessary, switched off.

The power distribution is supplied via a 7/8" connector with up to 16 A (per voltage supply U_S/U_P). Several modules can be configured in a cascade arrangement. In the event of a short-circuit in one of the four outputs, the affected output is switched off. The supply for the other branches remains active. The switch-off and control is done in such a way that the input voltage does not fall below 21 V or other modules are going down, caused by undervoltage.

During startup consumers with large capacities can be added without problem.

The master can read diagnostic messages from the individual channels via the EtherCAT interface. Independent switching of individual consumer branches is also possible via the EtherCAT master.

In delivery state the eight outputs of the box (4 times U_S, 4 times U_P) are activated to enable operation without EtherCAT.

After an error caused the switch off of a channel, this channel remains switched off when you try to switch it on again and has to be set back actively by the EtherCAT master or a hardware reset at the box (lower M8 socket).

Additional to this basic functionality that is also provided by EP9214, the EP9224 displays the voltage values of PowerIn supply and all current values of inputs and outputs within the process data.

The box has got an internal log file, that is writing the system values continuously into a ring buffer. This data logging has to be activated at the startup.

In error case it is stopped, so a history of the system parameters from before the error case can be read out. This enables a much quicker error localization.

Quick links[Installation \[► 13\]](#)[Configuration \[► 35\]](#)**2.4 Technical data**

Technical data	EP9214-0023	EP9224-0023
Rated voltage	24 V _{DC} (-15 % / +20 %)	
Power supply	Feed: Plug 7/8", max. 16 A for each Us/Up Onward connection: Socket 7/8", max. 16 A for each Us/Up	
Number of load outputs	4 x M8, for each Us and Up	
Voltage drop V _{ON} in the load circuits	90 mV / Ampere	
Parallel connection of several load outputs	not permissible	
Overload switch-off	dependent on selected load curve (20 ms at 3 x I _N , see time/current characteristics)	
Temperature switch-off	Internal temperature switch-off	
Switch-on delay	10, 100 or 200 ms (adjustable via CoE)	
Selectivity	in case of an error, the channel concerned is switched off	
Signalling contact	1	
Reset contact	1	
Connections for signal and reset contacts	in : 1 x M8 plug out : 1 x M8 socket	
Fieldbus	EtherCAT	
Fieldbus connection	2 x M8 sockets, screened, marked green	
Electrical isolation	Control voltage/fieldbus: 500 V	
Supply of the module circuitry	from the control voltage Us	
Current consumption of the module circuitry	typically 110 mA from Us, typically 40 mA from Up	
Process image	Inputs: 5 x 16 bit Outputs: 5 x 16 bit	Inputs: 16 x 16 Bit Outputs: 5 x 16 Bit
Data logging	-	40 samples (1 ms - 1000 ms sample time)
Permissible ambient temperature during operation	-25°C ... +60°C	
Permissible ambient temperature during storage	-25 °C... +85°C	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC immunity/emission	conforms to EN 61000-6-2 / EN 61000-6-4	
Dimensions	126 mm x 60 mm x 40 mm	
Weight	approx. 450 g	
Installation position	variable	
Protection class	IP65, IP66, IP67 (according to EN 60529)	
Approvals	CE, UL in preparation	

3 Mounting and cabling

3.1 Mounting

3.1.1 Dimensions

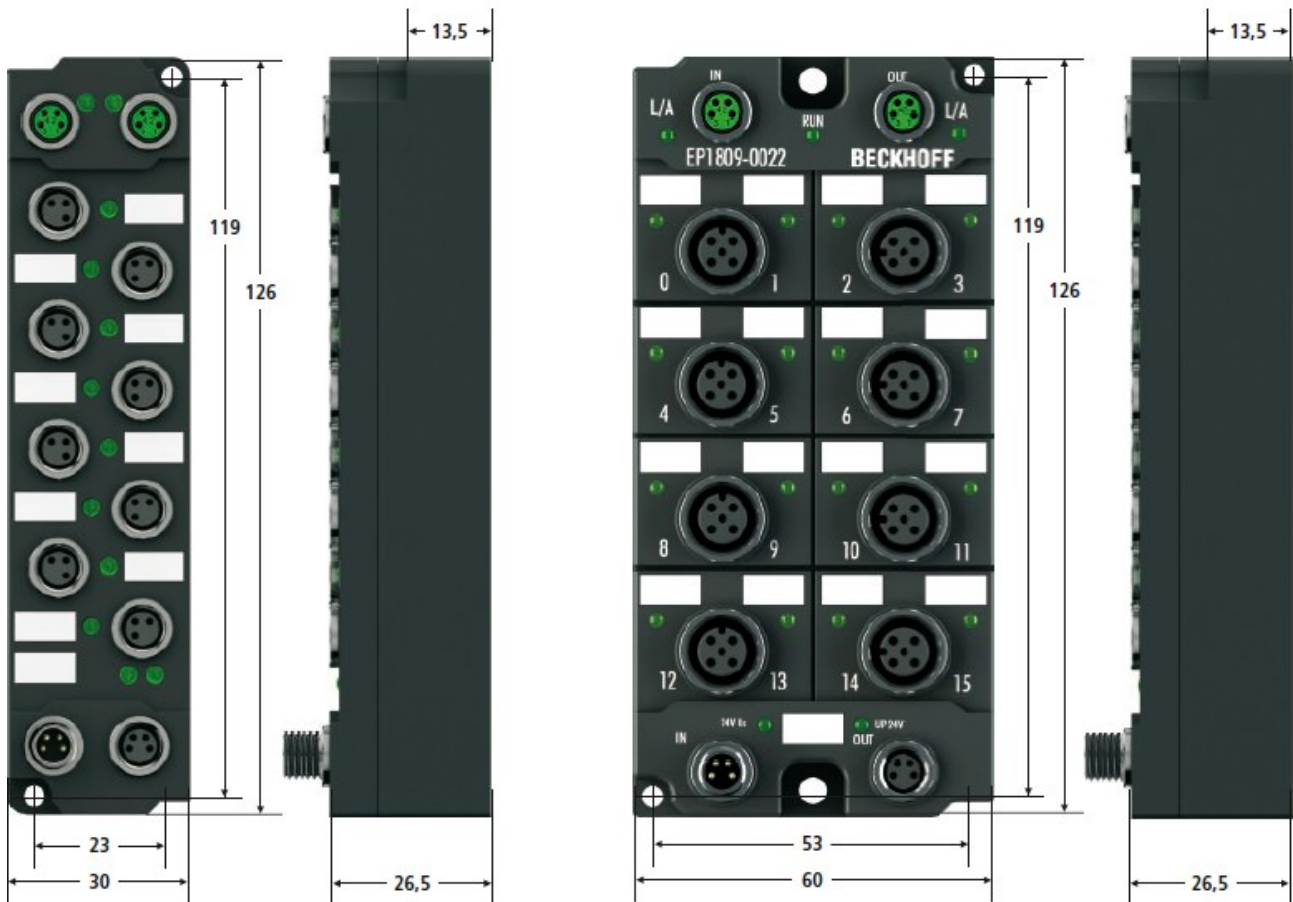


Fig. 6: Dimensions of the EtherCAT Box Modules

All dimensions are given in millimeters.



Housing properties

EtherCAT Box	lean body	wide body
Housing material	PA6 (polyamide)	
Casting compound	Polyurethane	
Mounting	two fastening holes Ø 3 mm for M3	two fastening holes Ø 3 mm for M3 two fastening holes Ø 4,5 mm for M4
Metal parts	Brass, nickel-plated	
Contacts	CuZn, gold-plated	
Power feed through	max. 4 A	
Installation position	variable	
Protection class	IP65, IP66, IP67 (conforms to EN 60529) when screwed together	
Dimensions (H x W x D)	ca. 126 x 30 x 26,5 mm	ca. 126 x 60 x 26,5 mm
Weight	approx. 125 g, depending on module type	approx. 250 g, depending on module type

3.1.2 Mounting

EP9214 modules are mounted using two M3 bolts in the mounting holes located in the corners or using two M4 bolts in the centrally located mounting holes.

The bolts must be longer than 15 mm. The mounting holes in the modules have no thread.

 Note	<p>Protect connectors against soiling</p> <p>Protect all module connections from soiling during installation! The protection classes IP65, IP66, IP67 (in accordance with EN 60529) are ensured only if all connectors are wired or sealed! Unused connectors must be sealed with suitable protective caps (see Beckhoff catalogue for connector sets and protective caps)!</p>
 Note	<p>Cooling plate</p> <p>The EP9214 module has a cooling plate on the underside. For the effective dissipation of the resultant power loss, the box must be bolted to a metal base, e.g. the machine bed, if possible making contact over the entire surface. A temperature-related automatic switch-off of the box can occur if care is not taken to ensure that the power loss from the module is dissipated via the cooling plate. A corresponding temperature error bit is then set!</p>

Note when mounting that the overall height is increased further by the fieldbus connections. See the Accessories section

3.1.3 Nut torque for connectors

M8 connectors

It is recommended to pull the M8 connectors tight with a nut torque of **0.4 Nm**. When using the torque control screwdriver ZB8800 is also a max. torque of **0.5 Nm** permissible.

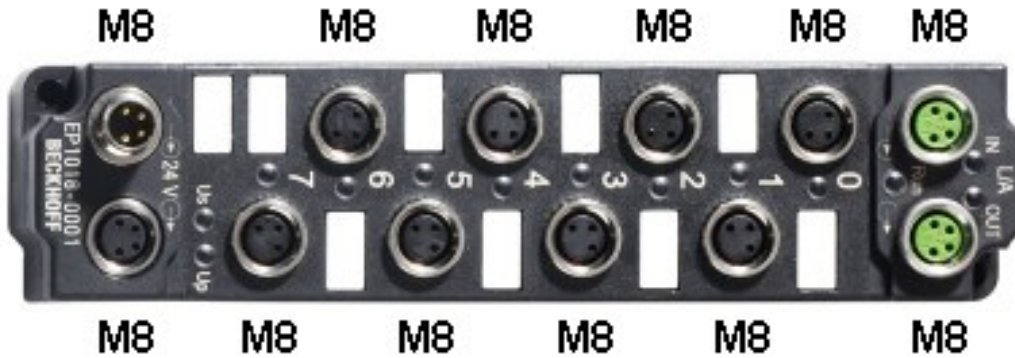


Fig. 7: EtherCAT Box with M8 connectors

M12 connectors

It is recommended to pull the M12 connectors tight with a nut torque of **0.6 Nm**.

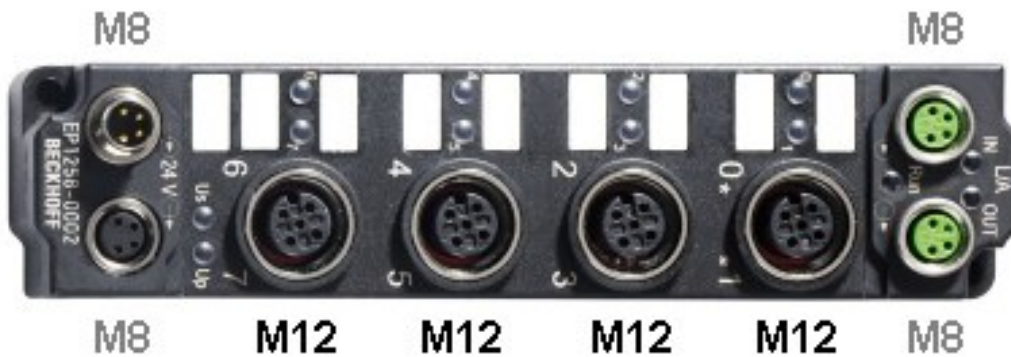


Fig. 8: EtherCAT Box with M8 and M12 connectors

7/8" plug connectors

We recommend fastening the 7/8" plug connectors with a torque of **1.5 Nm**.

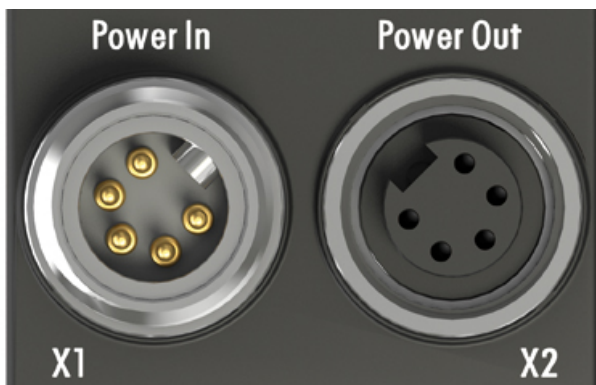


Fig. 9: 7/8" plug connectors

Torque socket wrenches



Fig. 10: ZB8801 torque socket wrench



Note

Ensure the right torque

Use the torque socket wrenches available by Beckhoff to pull the connectors tight ([ZB8800](#), [ZB8801-0000](#))!

3.2 EtherCAT

3.2.1 EtherCAT connection

For the incoming and ongoing EtherCAT connection,

- the EtherCAT Box (EPxxxx) has two M8 sockets, marked in **green**
- the Coupler Box (FBB-x110) has two M12 sockets

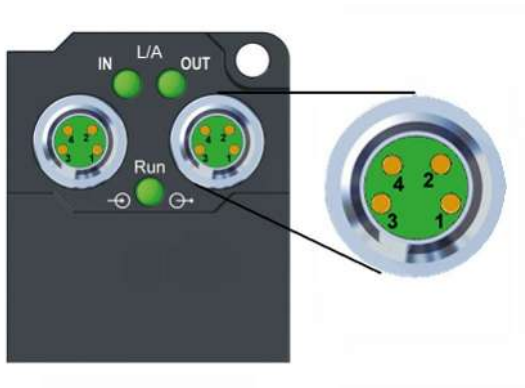


Fig. 11: EtherCAT Box: M8 (30 mm housing)

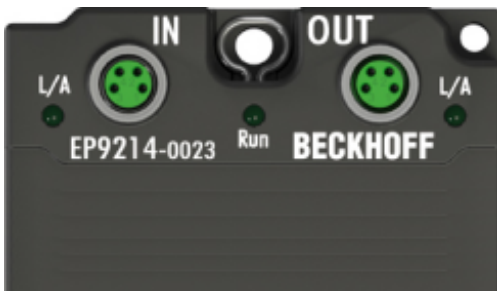


Fig. 12: EtherCAT Box: M8 60 mm housing (EP9214 for example)

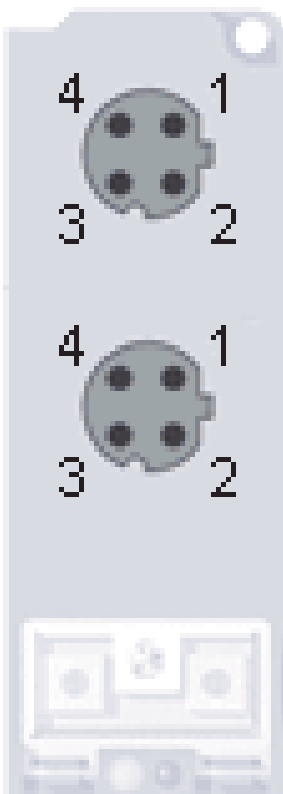


Fig. 13: Coupler Box: M12

Assignment


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

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

¹) colored markings according to EN 61918 in the four-pin RJ45 connector ZS1090-0003

²) wire colors according to EN 61918

³) wire colors

 Note	<p>Assimilation of color coding for cable ZB9030, ZB9032 and ZK1090-3xxxx-xxxx (with M8 connectors)</p> <p>For unification the prevalent cables ZB9030, ZB9032 and ZK1090-3xxx-xxxx this means the pre assembled cables with M8 connectors were changed to the colors of EN61918 (yellow, orange, white, blue). So different color coding exists. But the electrical properties are absolutely identical.</p>
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EtherCAT connectors

The following connectors can be supplied for use in Beckhoff EtherCAT systems.

Designation	Plug connector	Comment
ZS1090-0003	RJ45	four-pin, IP20, for field assembly
ZS1090-0004	M12	four-pin, IP67, for field assembly
ZS1090-0005	RJ45	eight-pin, IP20, for field assembly, suitable for GigaBit Ethernet
ZS1090-0006	M8 male	four-pin, IP67, for field assembly, for ZB903x cable
ZS1090-0007	M8 female	four-pin, IP67, for field assembly, for ZB903x cable
ZS1090-1006	M8 male	four-pin, IP67, for field assembly up to OD = 6.5 mm
ZS1090-1007	M8 female	four-pin, IP67, for field assembly up to OD = 6.5 mm

3.2.2 EtherCAT - Fieldbus LEDs



Fig. 14: EtherCAT-LEDs

LED display

LED	Display	Meaning
IN L/A	off	no connection to the preceding EtherCAT module
	Lit	LINK: connection to the preceding EtherCAT module
	flashing	ACT: Communication with the preceding EtherCAT module
OUT L/A	off	no connection to the following EtherCAT module
	Lit	LINK: connection to the following EtherCAT module
	flashing	ACT: Communication with the following EtherCAT module
Run	off	Status of the EtherCAT module is Init
	flashes quickly	Status of the EtherCAT module is pre-operational
	flashes slowly	Status of the EtherCAT module is safe-operational
	Lit	Status of the EtherCAT module is operational



Note

EtherCAT statuses

The various statuses in which an EtherCAT module may be found are described in the Basic System Documentation for EtherCAT, which is available for download from our website (www.beckhoff.com) under Downloads.

3.3 Power supply

3.3.1 Power Connection



Attention

Use cables with suitable cross-sections!

Ensure that the cross-sections of the cables employed are suitable for the load circuit inputs and outputs and the respective rated current being used!

The supply voltages are fed and relayed onward via two 7/8" connectors in the center of the modules:

- Power In: left-hand 7/8" plug for the feed-in of supply voltages
- Power Out: right-hand 7/8" socket for the onward feeding of supply voltages

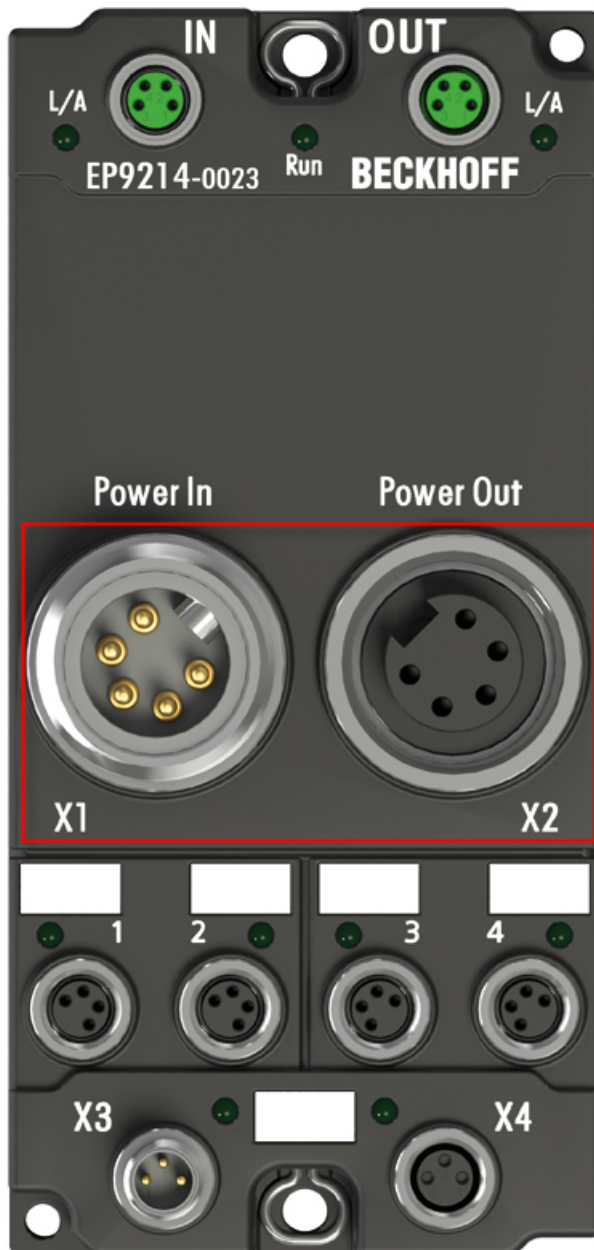


Fig. 15: EP9214-0023 - 7/8" connectors

The contacts of the 7/8" plug connectors can conduct a maximum current of 16 A (40°C).

Two LEDs next to the device identifier label indicate the status of the supply voltages.

Pin assignment

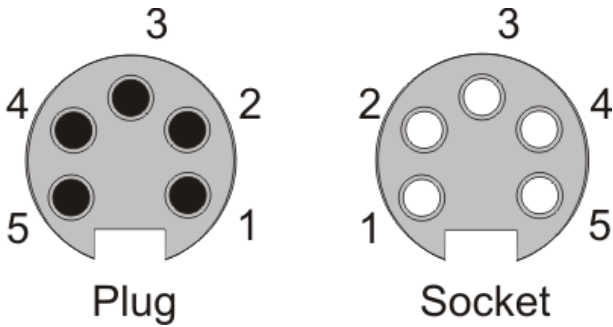



Fig. 16: Pin assignment of 7/8" plug connectors

Contact	Voltage
1	GND Up
2	GND Us
3	FE (Functional earth), (as well as contact at central mounting holes)
4	Control voltage Us, +24 V _{DC}
5	Peripheral voltage Up, +24 V _{DC}

 Attention	<p>Do not confuse the power output with the EtherCAT connection!</p> <p>Never connect the power cables (M8, 24 VDC) to the green-marked EtherCAT sockets of the EtherCAT Box Modules. This can cause the destruction of the modules!</p>
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Control voltage Us: 24V_{DC}


The fieldbus and the processor logic are supplied from the 24 V_{DC} control voltage Us. The control voltage is electrically isolated from the fieldbus circuitry.

Peripheral voltage Up: 24V_{DC}

The peripheral voltage Up is monitored and fed to the power outputs, but is not used in the EP9214.

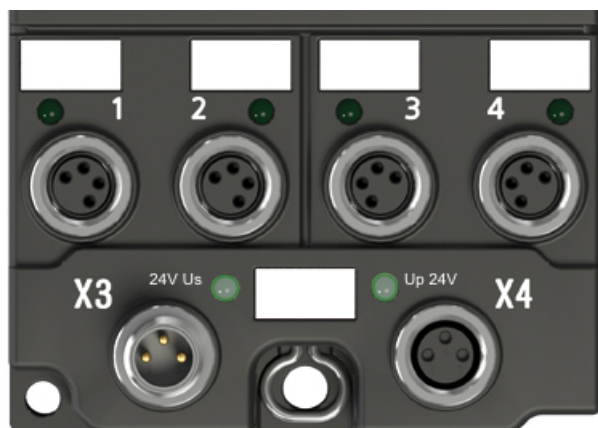
Redirection of the supply voltages

The power connections Power In and Power Out are bridged in the module. Hence, the supply voltages Us and Up can be passed from EtherCAT Box to EtherCAT Box in a simple manner.

 Attention	<p>Observe the maximum current of the 7/8" plug connectors!</p> <p>Also ensure when relaying the supply voltages Us and Up onward that the maximum permissible current of 16 A / 40 °C for each 7/8" plug connector is not exceeded!</p>
---	---

3.3.2 Power LEDs

Status-LEDs for the power supply



LED	Display	Meaning
Us (control voltage)	off	The power supply voltage, Us, is not present
	Green illuminated	The power supply voltage, Us, is present
Up (peripheral voltage)	off	The power supply voltage, Up, is not present
	Green illuminated	The power supply voltage, Up, is present

3.3.3 Power cable conductor losses M8

The ZK2020-xxxx-yyyy power cables should not exceed the total length of 15 m at 4 A (with continuation). When planning the cabling, note that at 24 V nominal voltage, the functionality of the module can no longer be assured if the voltage drop reaches 6 V. Variations in the output voltage from the power supply unit must also be taken into account.

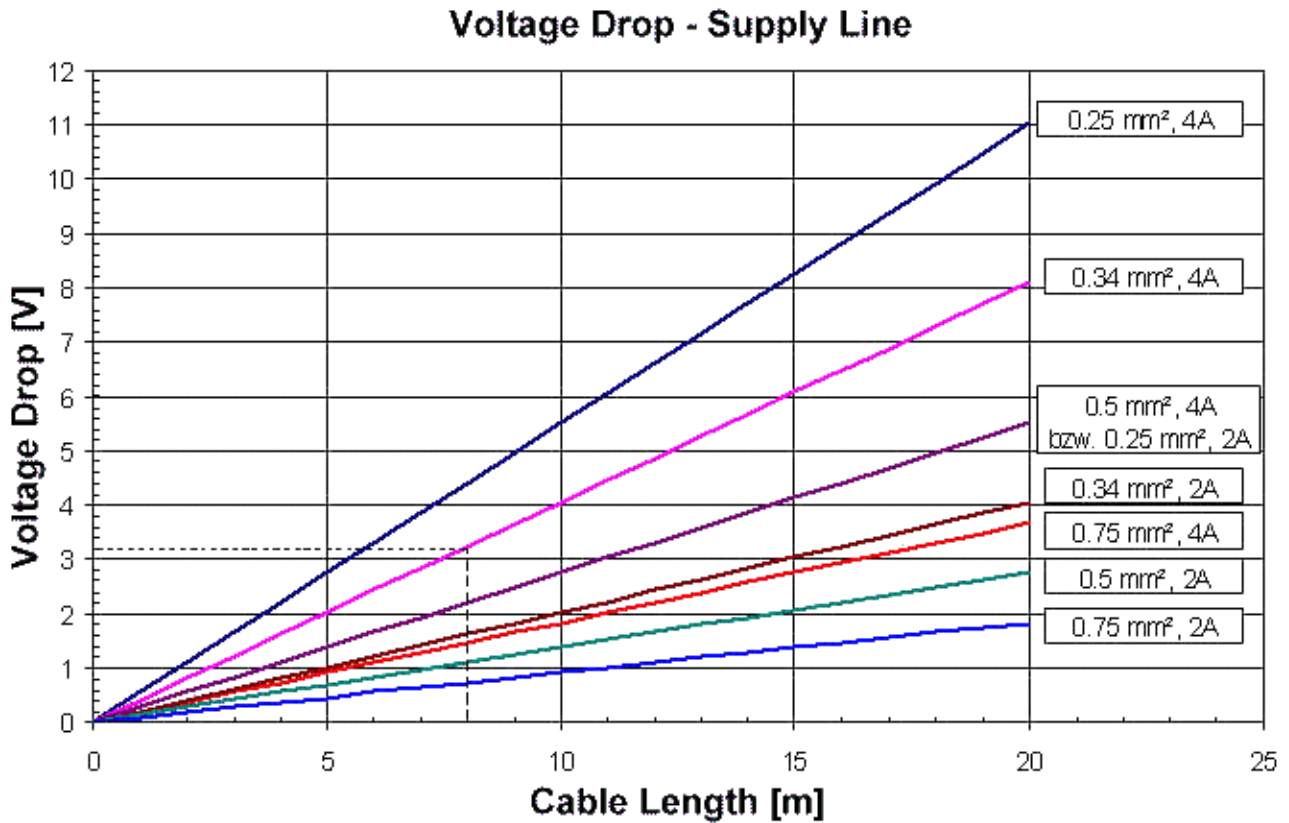



Fig. 17: Power cable conductor losses

Example

8 m power cable with 0.34 mm² cross-section has a voltage drop of 3.2 V at 4 A.

 Note	<p>EP92x4 Power Distribution Modules</p> <p>With EP9214 and EP9224 Power Distribution Modules intelligent concepts for voltage supply are available. Further information may be found under www.beckhoff.com/EP9224.</p>
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3.3.4 Power cable 7/8"



Fig. 18: Power cable 7/8"

Technical data

Technical data	
Rated voltage according to IEC 61076-2-101	300 V (according to IEC 61076-2-101)
Contamination level according to IEC 60664-1	3/2 (according to IEC 60664-1)
Insulation resistance IEC 60512-2	>10 ⁹ W
Current carrying capacity according to IEC 60512-3	16 A at 40°C (according to IEC 60512-3)
Volume resistance according to IEC 60512-2	< 5 mW
Protection class conforms to IEC 60529	IP65/66/67, when screwed together
Permissible ambient temperature	-30°C to +80°C
Material properties	TPE-U (PUR) halogen-free according to DIN VDE 0472 Part 815, flame-retardant according to cULus 20549
Approbations	UL
Cable outside diameter	7.80 ± 0.20 mm
Bending radius	min. 6 x D (external diameter)
Parameter	Max. speed 5 m/s, max. acceleration 10 m/s ²
Number of cycles	At least 10 million cycles with a max. travel path of 20 meters

Ordering data

Order identifier	Power cable	Screw type connector	Contacts	Cross-section	Length			
ZK2030-1200-0010	Straight socket, open end	7/8"	5-pin	1,50 mm ²	1.00 m			
ZK2030-1200-0030					3.00 m			
ZK2030-1200-0050					5.00 m			
ZK2030-1200-0100					10.00 m			
ZK2030-1400-0010	Angled socket, open end							1.00 m
ZK2030-1400-0030					3.00 m			
ZK2030-1400-0050					5.00 m			
ZK2030-1400-0100					10.00 m			
ZK2030-1112-0010	Straight socket, straight plug							1.00 m
ZK2030-1112-0030					3.00 m			
ZK2030-1112-0050					5.00 m			
ZK2030-1112-0100					10.00 m			
ZK2030-1314-0010	Angled socket, angled plug				1.00 m			
ZK2030-1314-0030		3.00 m						
ZK2030-1314-0050		5.00 m						
ZK2030-1314-0100		10.00 m						

Further available power cables and the associated data sheets can be found in the Beckhoff catalogue or on our website (<http://www.beckhoff.com>).

3.3.5 Conductor losses 7/8"

In the case of the power cables ZK2030-xxxx-yyy, a total length of 15 m should not be exceeded at 16 A. When wiring, note that with a rated voltage of 24 V the function of the modules can no longer be guaranteed from a voltage drop of 6 V. Variations in the output voltage from the power supply unit must also be taken into account.

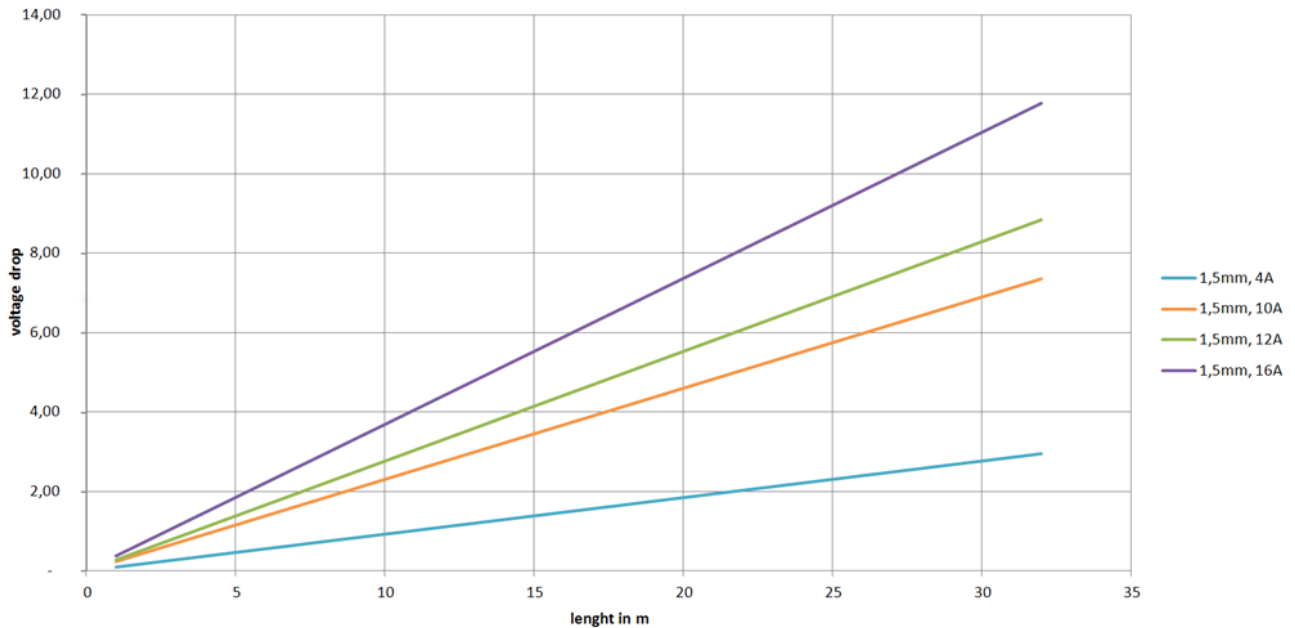


Fig. 19: ZK2030-xxxx-yyy - Conductor losses

Alternatively, larger cable cross-section can be used, e.g. 2.5 mm².

3.3.6 Power outputs

The supply voltages are output via four 4-pole M8 sockets in the lower third of the modules (1, 2, 3 and 4).



Fig. 20: M8 sockets

Pin assignment

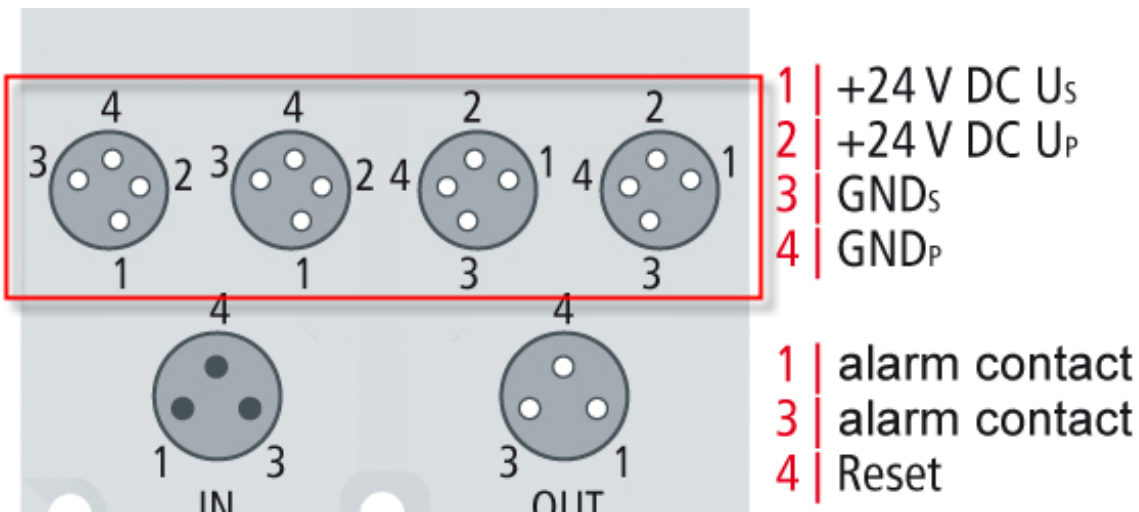


Fig. 21: Pin assignment of the M8 sockets

Contact	Voltage	
1	Control voltage U_S , +24 V _{DC}	
2	Peripheral voltage U_P , +24 V _{DC}	
3	GND _S *	*) can be internally connected to one another depending on the connected module: see individual module descriptions
4	GND _P *	

The contacts of the M8 plug connectors can conduct a maximum current of 4 A.

A LED indicates the status of the power outputs.

 Attention	<p>Do not confuse the power outputs with the EtherCAT connection</p> <p>Never connect the power cables (M8, 24 V_{DC}) to the green-marked EtherCAT sockets of the EtherCAT Box Modules. This can cause the destruction of the modules!</p>
----------------------	--

Control voltage Us: 24 V_{DC}

Power is supplied to the fieldbus, the processor logic, the inputs and the sensors from the control voltage Us (24 V_{DC}). The control voltage is electrically isolated from the fieldbus circuitry.

Peripheral voltage Up: 24 V_{DC}

The peripheral voltage Up (24 V_{DC}) supplies the digital outputs; it can be brought in separately. Hence, if the load voltage is switched off, the fieldbus function as well as the supply and function of the inputs are retained.

Electrical isolation

The grounds of the control voltage (GNDs) and peripheral voltage (GNDp) are electrically isolated from each other in order to ensure the electrical isolation of the peripheral devices on Up from the control voltage.

**Attention****The electrical isolation can be nullified**

If you connect digital and analog EtherCAT Box Modules directly to one another via four-pole power lines, then there may no longer be any electrical isolation due to the connected boxes!

3.4 Cabling

A list of EtherCAT cables, power cables, sensor cables, Ethernet/EtherCAT connectors and field-configurable connectors can be found under the following link: http://download.beckhoff.com/download/document/catalog/main_catalog/german/Beckhoff_EtherCAT-Box-Zubehoer.pdf


The corresponding data sheets can be found under the following link:

https://beckhoff.de/default.asp?ethercat-box/ethercat_box_cables.htm?id=690338951657421

EtherCAT cables

Fig. 22: ZK1090-3131-0xxx

For connecting EtherCAT devices, only use shielded Ethernet cables with a minimum specification of **category 5 (CAT5)** according to **EN 50173** or **ISO/IEC 11801**.

 Note	<p>Wiring recommendations</p> <p>Detailed recommendations for EtherCAT cabling can be found in the documentation "Design recommendations for EtherCAT/Ethernet infrastructure", which is available for download from www.beckhoff.de.</p>
--	---

EtherCAT uses four cable wires for signal transmission. Due to automatic cable detection (auto-crossing) symmetric (1:1) or cross-over cables can be used between EtherCAT devices from Beckhoff.

Power cable



Fig. 23: ZK2020-3132-0xxx

Sensor cables



Fig. 24: Selection of Beckhoff sensor cables

3.5 Status LEDs and status bits

Below is a table showing the meaning of the status LEDs and status bits for the power outputs (EP9214 for example):

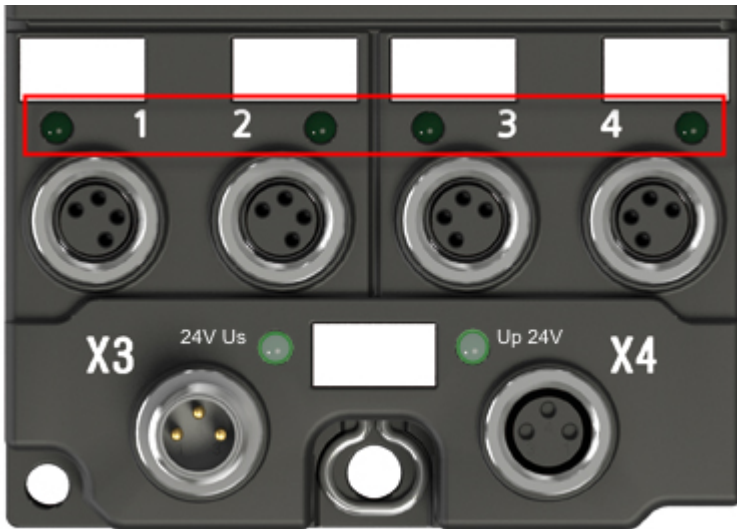


Fig. 25: EP9214 - status LEDs

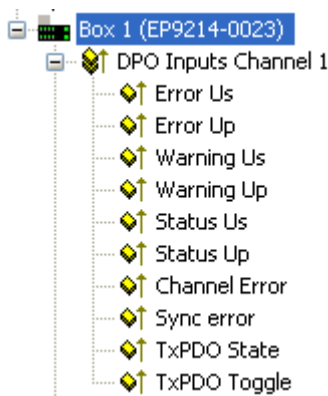


Fig. 26: EP9214 - status bits

Initialization

When switching on the voltage supply to the EP9214 / EP9224, all green LEDs and then all red LEDs are switched on briefly to test the LEDs.

The LED is valid for both voltages and currents (Us and Up; OR).

LED	Status Us / Up	Warning	Error Us / Up	Description
Off	0	0	0	The output is ready
Green	1	0	0	The output is just switching on
Green	1	0	0	The output is switched on. Normal operating status.
Flashing green	1	1	0	The output is still operating, but will switch off if conditions remain unchanged (Warning Ux).
Flashing red	0	1	1	The output has been switched off. Switching on again is not yet possible (waiting time of 20 seconds)
Red	0	0	1	The output has been deactivated and can be returned to a normal state by a reset.

3.6 Monitoring and reset contacts

The EP9214 has a monitoring contact (signal contact) and a reset contact. These contacts are fed out via an M8 plug and an M8 socket.

The contacts of this M8 plug and M8 socket are wired together 1:1.

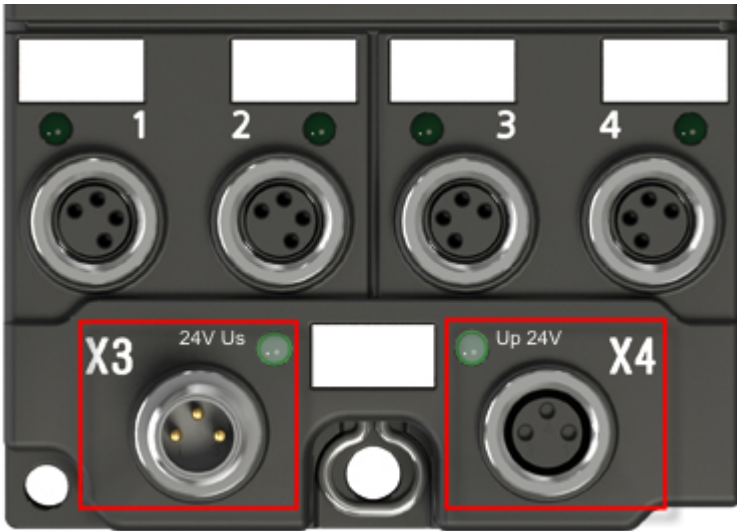


Fig. 27: EP9214 - Monitoring and reset connectors

Pin assignment



Fig. 28: EP9214 - Monitoring and reset contacts

Contact	Meaning
Pin 1 and 3: Monitoring	Potential-free signalling contact (normally open contact), closes on application of the supply voltage and if an error occurs in one of the eight load circuits
Pin 4: Reset	all errors are reset by applying 24 V _{DC} to the Reset contact.

The contacts of the M8 plug connectors can conduct a maximum current of 4 A.

4 Comissioning and Configuration

4.1 Inserting into the EtherCAT network



Note

Installation of the latest XML device description

Please ensure that you have installed the latest XML device description in TwinCAT. This can be downloaded from the Beckhoff website (<http://www.beckhoff.de/english/download/elconfg.htm?id=1983920606140>) and installed according to the installation instructions.

At the Beckhoff TwinCAT System Manager the configuration tree can be build in two different ways:

- by scanning [▶ 32] for existing hardware (called "online") and
- by manual inserting/appendig [▶ 32] of fieldbus devices, couplers and slaves.

Automatic scanning in of the box

- The EtherCAT system must be in a safe, de-energized state before the EtherCAT modules are connected to the EtherCAT network!
- Switch on the operating voltage, open the TwinCAT System Manager [▶ 35] (Config mode), and scan in the devices (see Fig. 1). Acknowledge all dialogs with "OK", so that the configuration is in "FreeRun" mode.

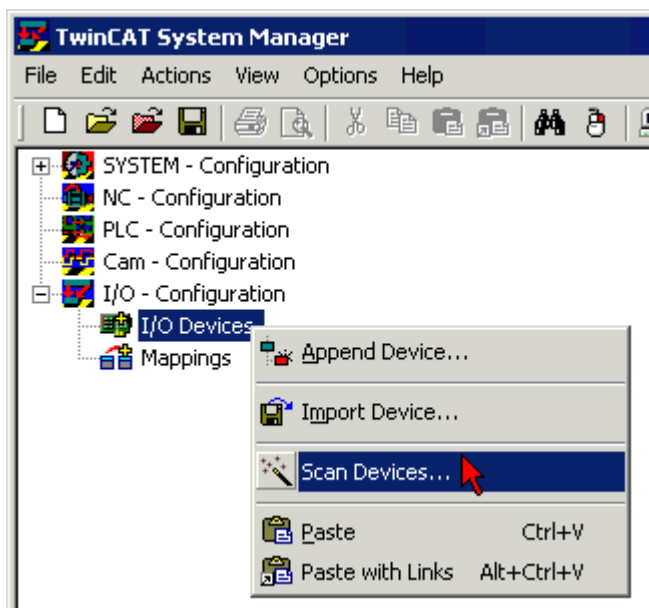


Fig. 29: Scanning in the configuration (I/O Devices -> right-click -> Scan Devices...)

Appending a module manually

- The EtherCAT system must be in a safe, de-energized state before the EtherCAT modules are connected to the EtherCAT network!
- Switch on the operating voltage, open the TwinCAT System Manager [▶ 35] (Config mode)
- Append a new I/O device. In the dialog that appears select the device *EtherCAT (Direct Mode)*, and confirm with *OK*.

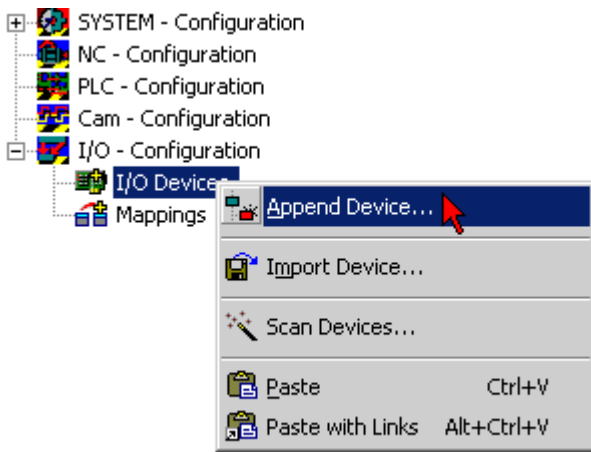


Fig. 30: Appending a new I/O device (I/O Devices -> right-click -> Append Device...)

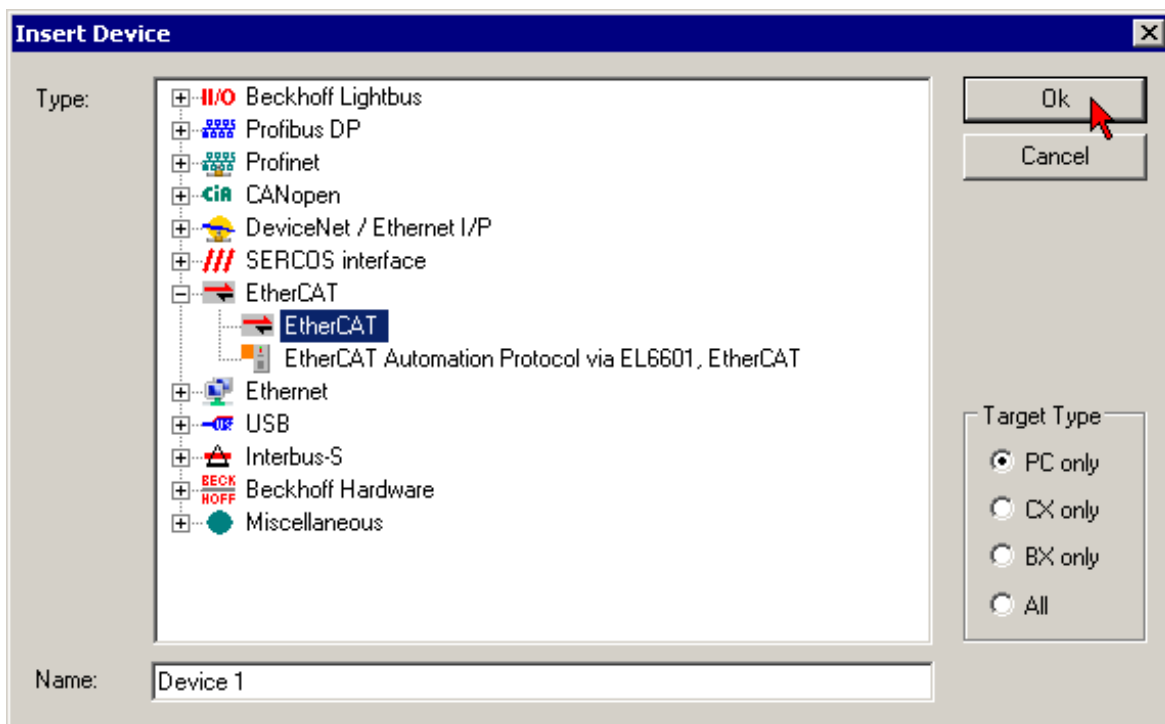


Fig. 31: Selecting the device EtherCAT

- Append a new box.

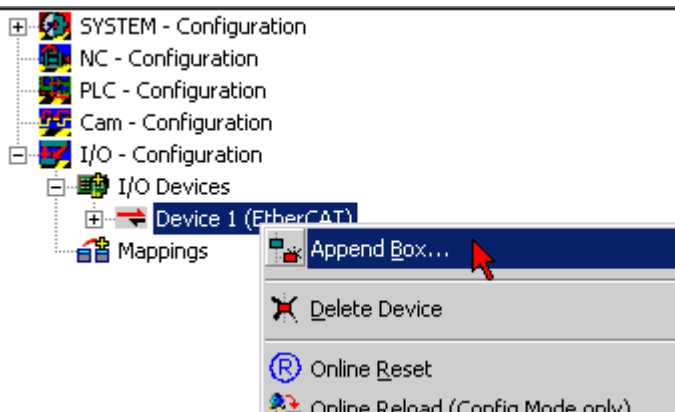


Fig. 32: Appending a new box (Device -> right-click -> Append Box...)

- In the dialog that appears select the desired box (e.g. EP2816-0008), and confirm with OK.

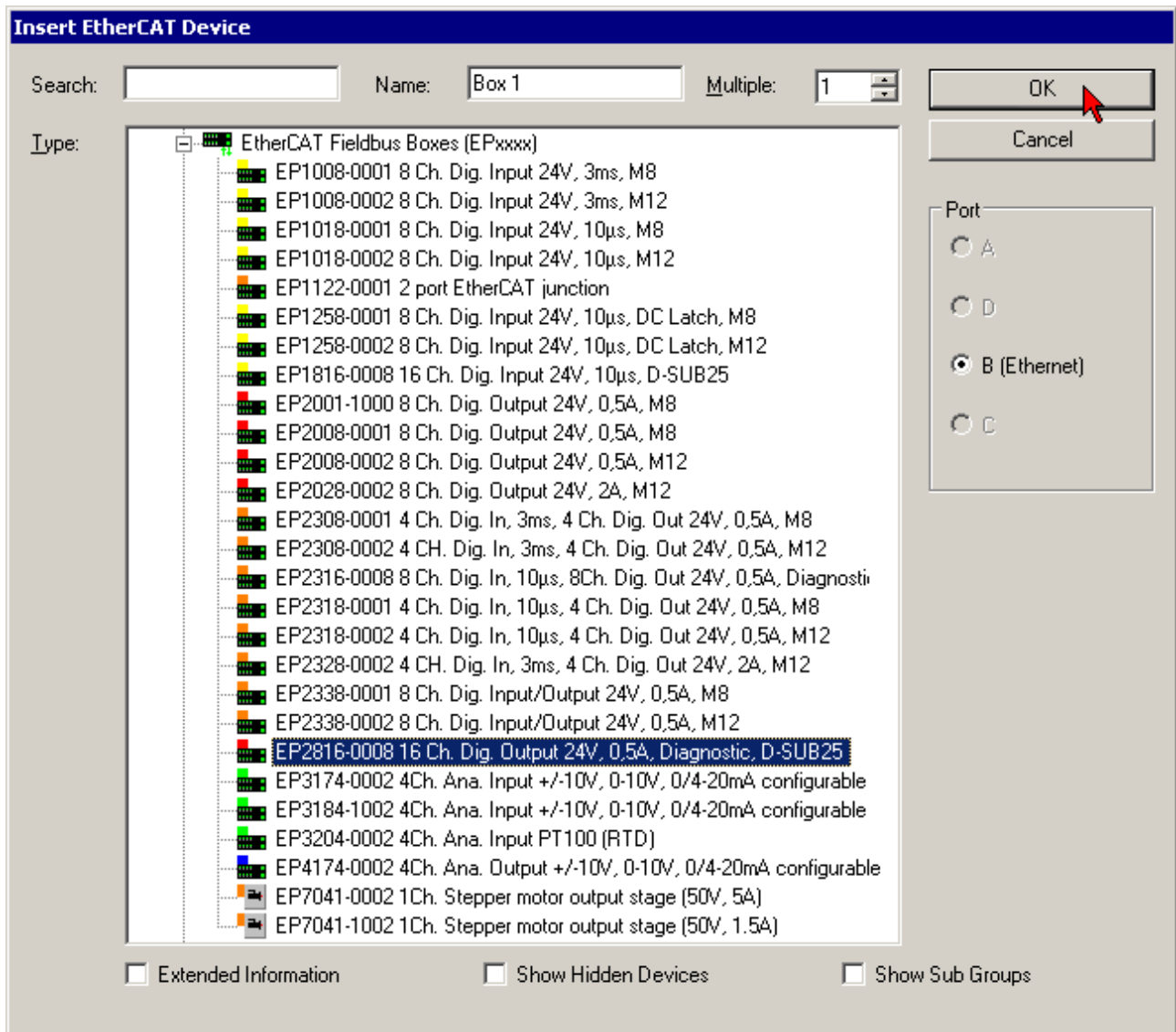


Fig. 33: Selecting a Box (e.g. EP2816-0008)

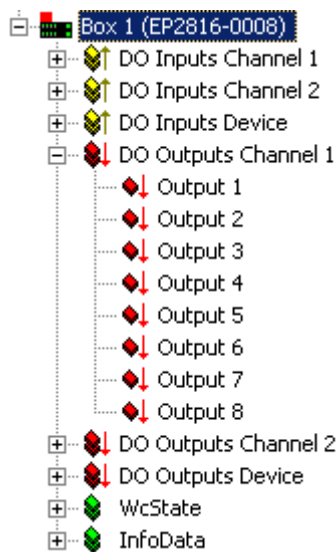


Fig. 34: Appended Box in the TwinCAT tree

4.2 Configuration via TwinCAT

In the left-hand window of the TwinCAT System Manager, click on the branch of the EtherCAT Box you wish to configure (EP2816-0008 in this example).

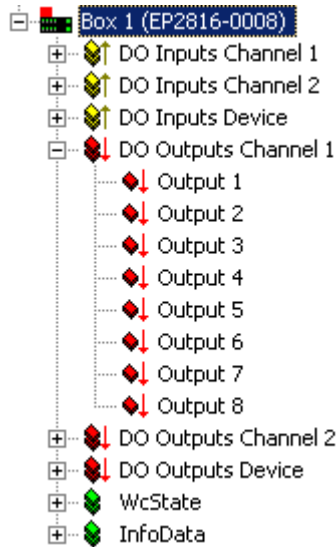


Fig. 35: Branch of the EtherCAT box to be configured

In the right-hand window of the TwinCAT System manager, various tabs are now available for configuring the EtherCAT Box.

General tab

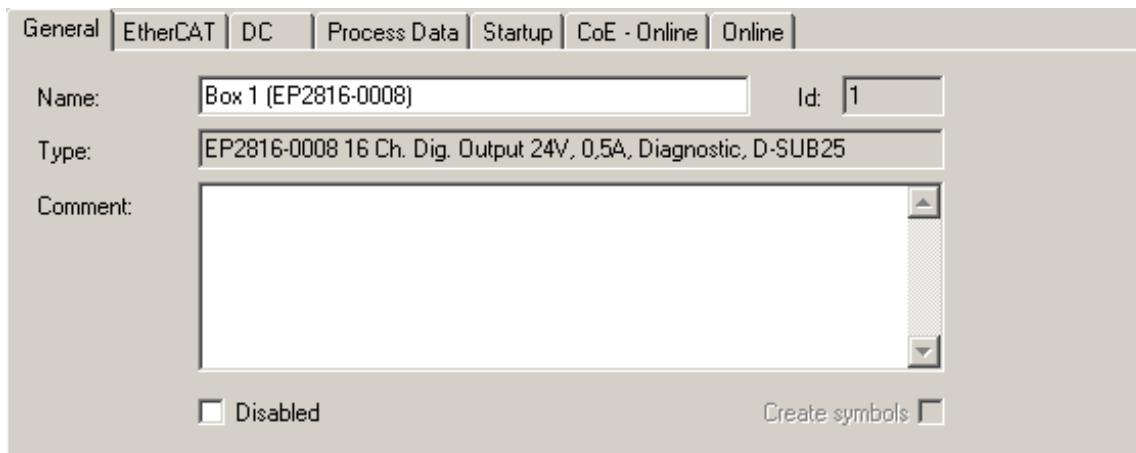


Fig. 36: General tab

Name	Name of the EtherCAT device
Id	Number of the EtherCAT device
Type	EtherCAT device type
Comment	Here you can add a comment (e.g. regarding the system).
Disabled	Here you can deactivate the EtherCAT device.
Create symbols	Access to this EtherCAT slave via ADS is only available if this checkbox is activated.

EtherCAT tab

Fig. 37: EtherCAT tab

Type	EtherCAT device type
Product/Revision	Product and revision number of the EtherCAT device
Auto Inc Addr.	Auto increment address of the EtherCAT device. The auto increment address can be used for addressing each EtherCAT device in the communication ring through its physical position. Auto increment addressing is used during the start-up phase when the EtherCAT master allocates addresses to the EtherCAT devices. With auto increment addressing the first EtherCAT slave in the ring has the address 0000_{hex} . For each further slave the address is decremented by 1 ($FFFF_{\text{hex}}$, $FFFE_{\text{hex}}$ etc.).
EtherCAT Addr.	Fixed address of an EtherCAT slave. This address is allocated by the EtherCAT master during the start-up phase. Tick the checkbox to the left of the input field in order to modify the default value.
Previous Port	Name and port of the EtherCAT device to which this device is connected. If it is possible to connect this device with another one without changing the order of the EtherCAT devices in the communication ring, then this combobox is activated and the EtherCAT device to which this device is to be connected can be selected.
Advanced Settings	This button opens the dialogs for advanced settings.

The link at the bottom of the tab points to the product page for this EtherCAT device on the web.

Process Data tab

Indicates the configuration of the process data. The input and output data of the EtherCAT slave are represented as CANopen process data objects (PDO). The user can select a PDO via PDO assignment and modify the content of the individual PDO via this dialog, if the EtherCAT slave supports this function.

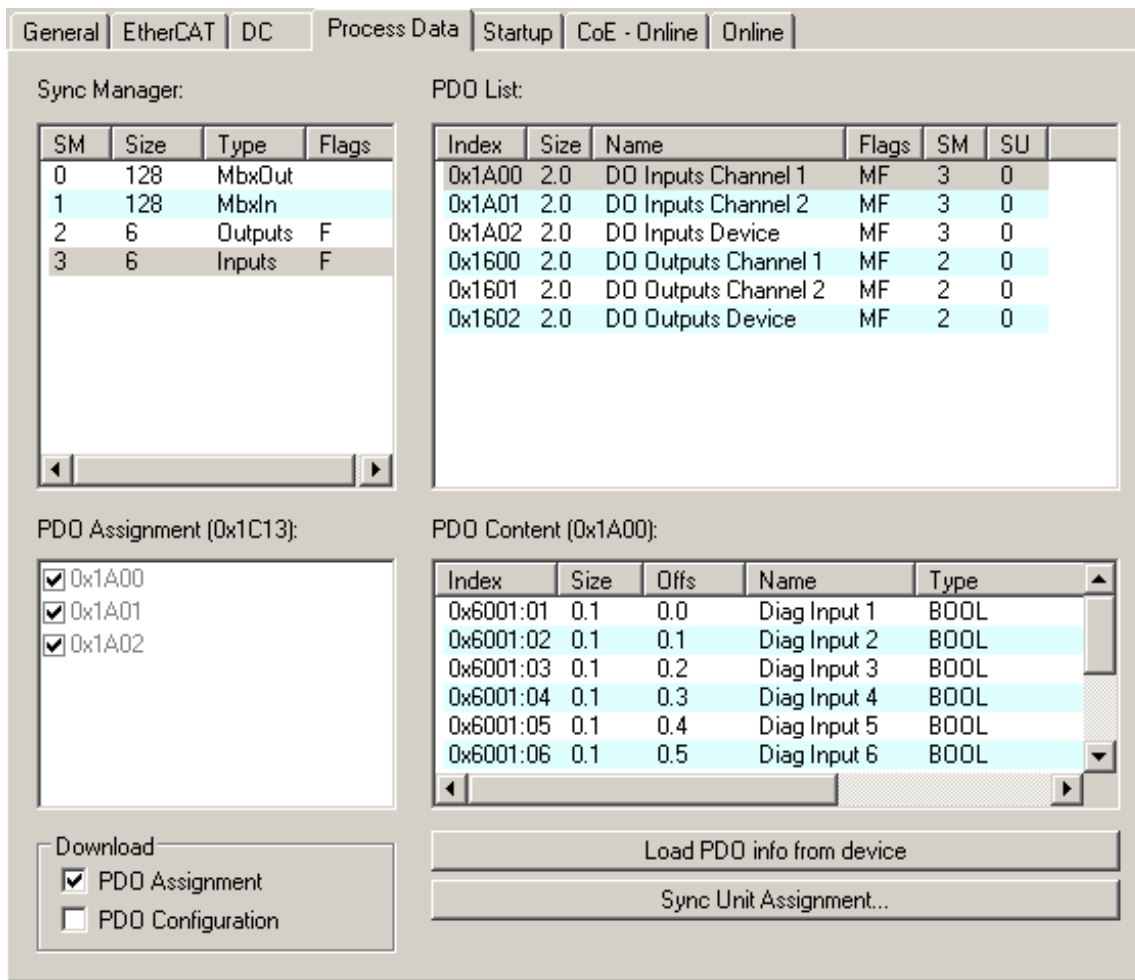


Fig. 38: Process Data tab

Sync Manager

Lists the configuration of the Sync Manager (SM).

If the EtherCAT device has a mailbox, SM0 is used for the mailbox output (MbxOut) and SM1 for the mailbox input (MbxIn).

SM2 is used for the output process data (outputs) and SM3 (inputs) for the input process data.

If an input is selected, the corresponding PDO assignment is displayed in the *PDO Assignment* list below.


PDO Assignment

PDO assignment of the selected Sync Manager. All PDOs defined for this Sync Manager type are listed here:

- If the output Sync Manager (outputs) is selected in the Sync Manager list, all RxPDOs are displayed.
- If the input Sync Manager (inputs) is selected in the Sync Manager list, all TxPDOs are displayed.

The selected entries are the PDOs involved in the process data transfer. In the tree diagram of the System Manager these PDOs are displayed as variables of the EtherCAT device. The name of the variable is identical to the *Name* parameter of the PDO, as displayed in the PDO list. If an entry in the PDO assignment list is deactivated (not selected and greyed out), this indicates that the input is excluded from the PDO assignment. In order to be able to select a greyed out PDO, the currently selected PDO has to be deselected first.

**Note****Activation of PDO assignment**

- the EtherCAT slave has to run through the PS status transition cycle (from pre-operational to safe-operational) once (see [Online tab \[► 41\]](#)),
- and the System Manager has to reload the EtherCAT slaves ( button)

PDO list

List of all PDOs supported by this EtherCAT device. The content of the selected PDOs is displayed in the *PDO Content* list. The PDO configuration can be modified by double-clicking on an entry.

Column	Description
Index	PDO index.
Size	Size of the PDO in bytes.
Name	Name of the PDO. If this PDO is assigned to a Sync Manager, it appears as a variable of the slave with this parameter as the name.
Flags	F Fixed content: The content of this PDO is fixed and cannot be changed by the System Manager.
	M Mandatory PDO. This PDO is mandatory and must therefore be assigned to a Sync Manager! Consequently, this PDO cannot be deleted from the <i>PDO Assignment</i> list
SM	Sync Manager to which this PDO is assigned. If this entry is empty, this PDO does not take part in the process data traffic.
SU	Sync unit to which this PDO is assigned.

PDO Content

Indicates the content of the PDO. If flag F (fixed content) of the PDO is not set the content can be modified.

Download

If the device is intelligent and has a mailbox, the configuration of the PDO and the PDO assignments can be downloaded to the device. This is an optional feature that is not supported by all EtherCAT slaves.

PDO Assignment

If this check box is selected, the PDO assignment that is configured in the PDO Assignment list is downloaded to the device on startup. The required commands to be sent to the device can be viewed in the [Startup \[► 38\]](#) tab.

PDO Configuration

If this check box is selected, the configuration of the respective PDOs (as shown in the PDO list and the PDO Content display) is downloaded to the EtherCAT slave.

Startup tab

The *Startup* tab is displayed if the EtherCAT slave has a mailbox and supports the *CANopen over EtherCAT* (CoE) or *Servo drive over EtherCAT* protocol. This tab indicates which download requests are sent to the mailbox during startup. It is also possible to add new mailbox requests to the list display. The download requests are sent to the slave in the same order as they are shown in the list.

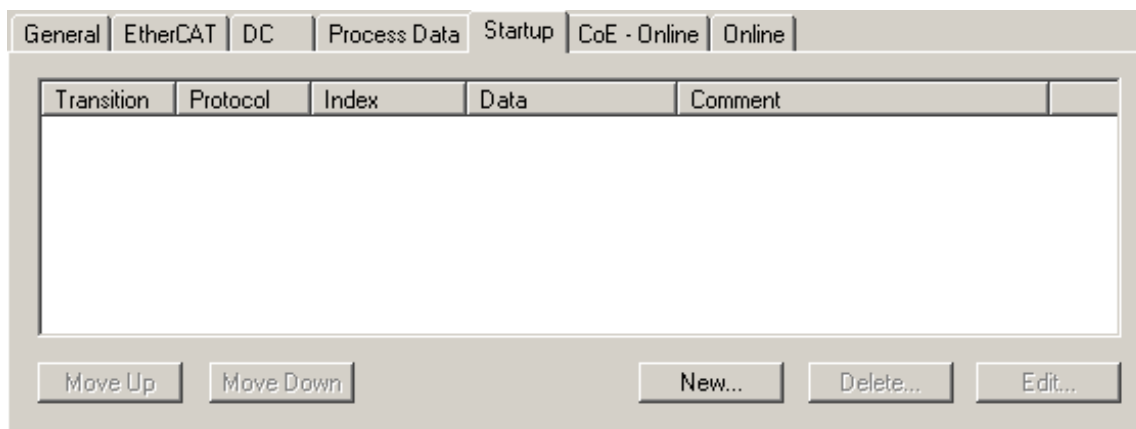


Fig. 39: Startup tab

Column	Description
Transition	Transition to which the request is sent. This can either be <ul style="list-style-type: none"> • the transition from pre-operational to safe-operational (PS), or • the transition from safe-operational to operational (SO). If the transition is enclosed in "<>" (e.g. <PS>), the mailbox request is fixed and cannot be modified or deleted by the user.
Protocol	Type of mailbox protocol
Index	Index of the object
Data	Date on which this object is to be downloaded.
Comment	Description of the request to be sent to the mailbox

- Move Up** This button moves the selected request up by one position in the list.
- Move Down** This button moves the selected request down by one position in the list.
- New** This button adds a new mailbox download request to be sent during startup.
- Delete** This button deletes the selected entry.
- Edit** This button edits an existing request.

CoE - Online tab

The additional *CoE - Online* tab is displayed if the EtherCAT slave supports the *CANopen over EtherCAT* (CoE) protocol. This dialog lists the content of the object directory of the slave (SDO upload) and enables the user to modify the content of an object from this list. Details for the objects of the individual EtherCAT devices can be found in the device-specific object descriptions.

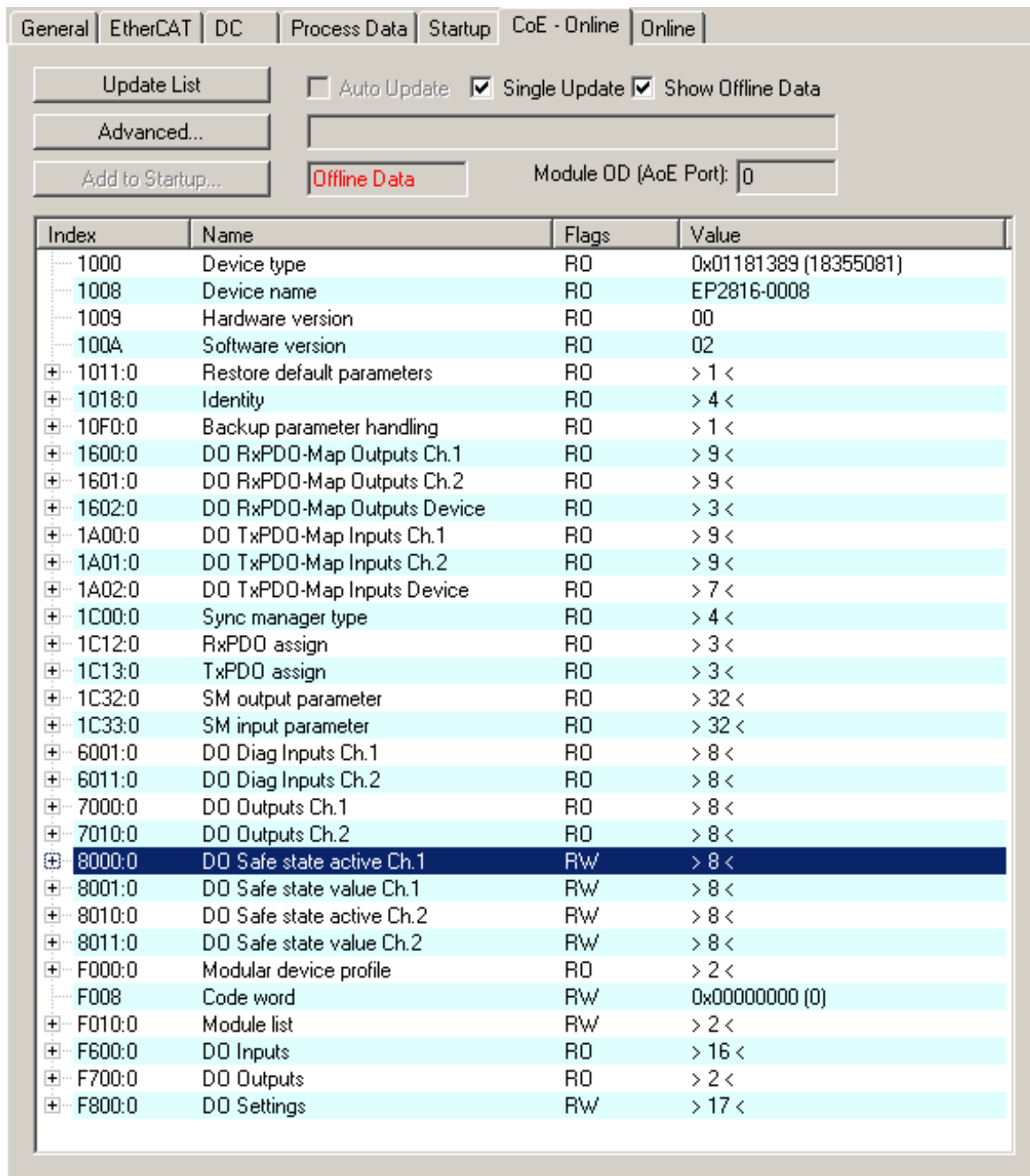


Fig. 40: CoE - Online tab

Object list display

Column	Description
Index	Index and subindex of the object
Name	Name of the object
Flags	RW The object can be read, and data can be written to the object (read/write)
	RO The object can be read, but no data can be written to the object (read only)
	P An additional P identifies the object as a process data object.
Value	Value of the object

- Update List** The *Update list* button updates all objects in the displayed list
- Auto Update** If this check box is selected, the content of the objects is updated automatically.
- Advanced** The *Advanced* button opens the *Advanced Settings* dialog. Here you can specify which objects are displayed in the list.

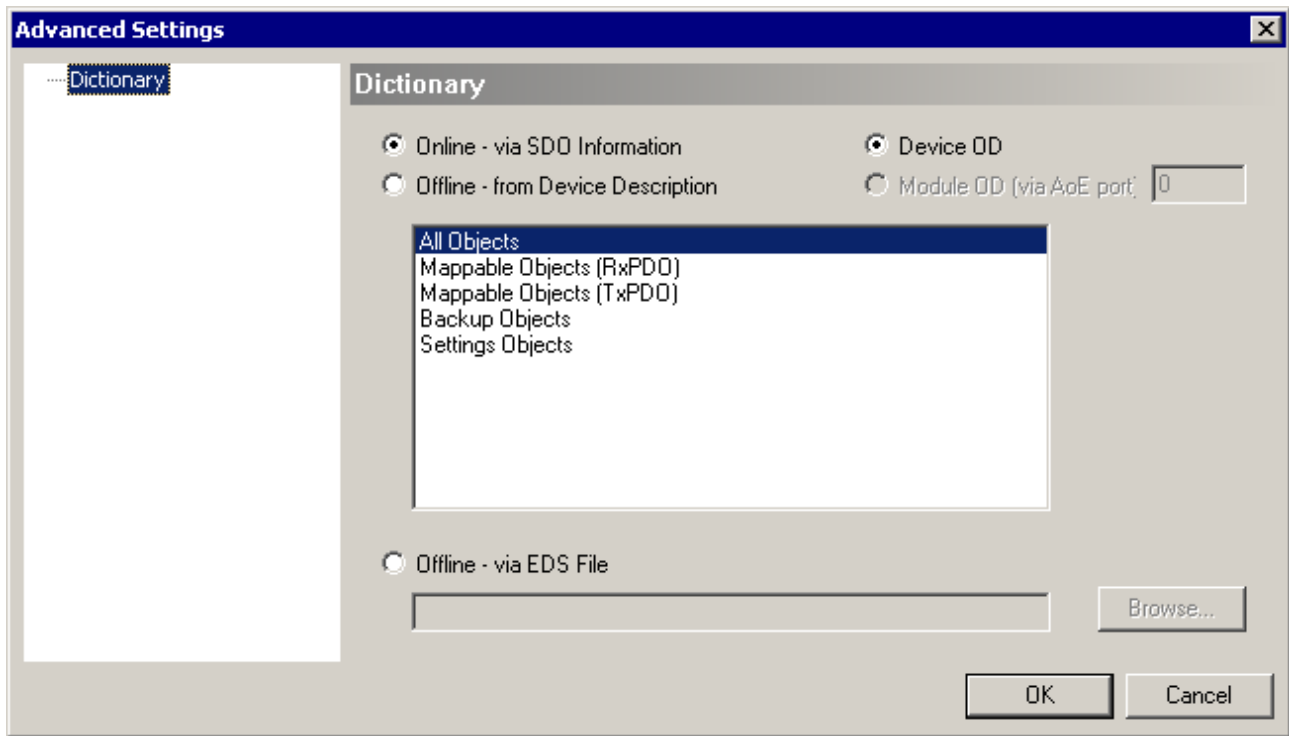


Fig. 41: Advanced settings

Online - via SDO information

If this option button is selected, the list of the objects included in the object directory of the slave is uploaded from the slave via SDO information. The list below can be used to specify which object types are to be uploaded.

Offline - via EDS file

If this option button is selected, the list of the objects included in the object directory is read from an EDS file provided by the user.

Online tab

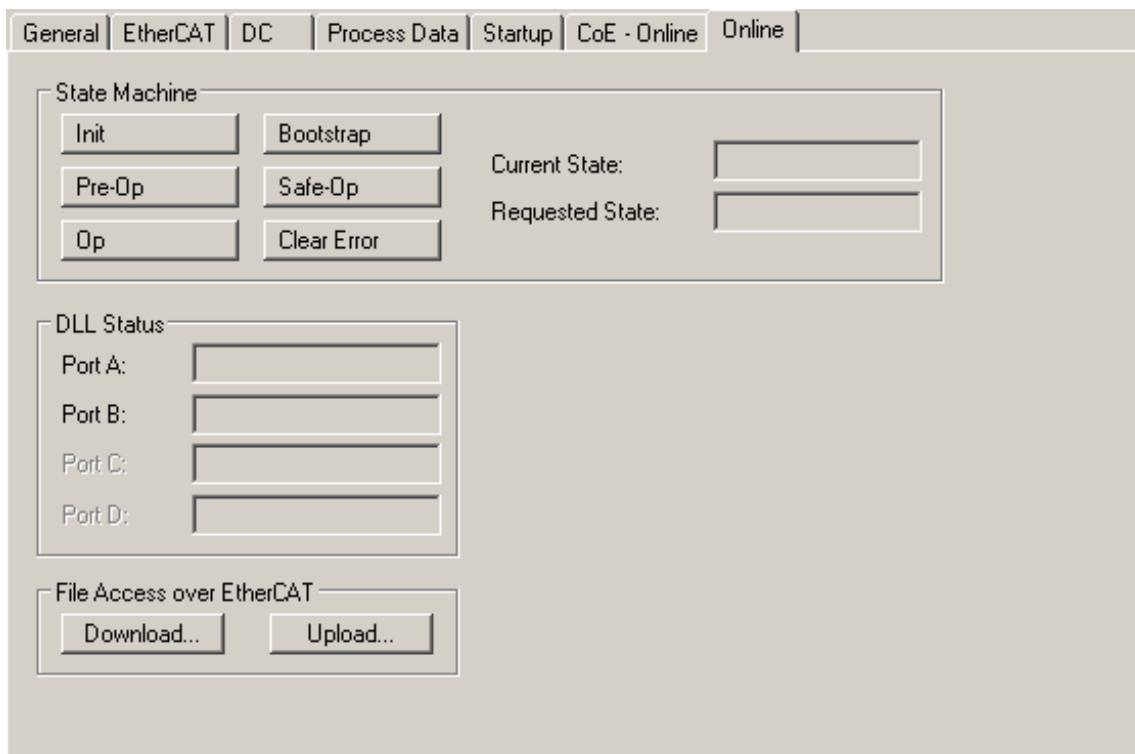


Fig. 42: Online tab

State Machine

Init	This button attempts to set the EtherCAT device to the <i>Init</i> state.
Pre-Op	This button attempts to set the EtherCAT device to the <i>pre-operational</i> state.
Op	This button attempts to set the EtherCAT device to the <i>operational</i> state.
Bootstrap	This button attempts to set the EtherCAT device to the <i>Bootstrap</i> state.
Safe-Op	This button attempts to set the EtherCAT device to the <i>safe-operational</i> state.
Clear Error	This button attempts to delete the fault display. If an EtherCAT slave fails during change of state it sets an error flag. Example: An EtherCAT slave is in PREOP state (pre-operational). The master now requests the SAFEOP state (safe-operational). If the slave fails during change of state it sets the error flag. The current state is now displayed as ERR PREOP. When the <i>Clear Error</i> button is pressed the error flag is cleared, and the current state is displayed as PREOP again.
Current State	Indicates the current state of the EtherCAT device.
Requested State	Indicates the state requested for the EtherCAT device.

DLL Status

Indicates the DLL status (data link layer status) of the individual ports of the EtherCAT slave. The DLL status can have four different states:


Status	Description
No Carrier / Open	No carrier signal is available at the port, but the port is open.
No Carrier / Closed	No carrier signal is available at the port, and the port is closed.
Carrier / Open	A carrier signal is available at the port, and the port is open.
Carrier / Closed	A carrier signal is available at the port, but the port is closed.

File Access over EtherCAT

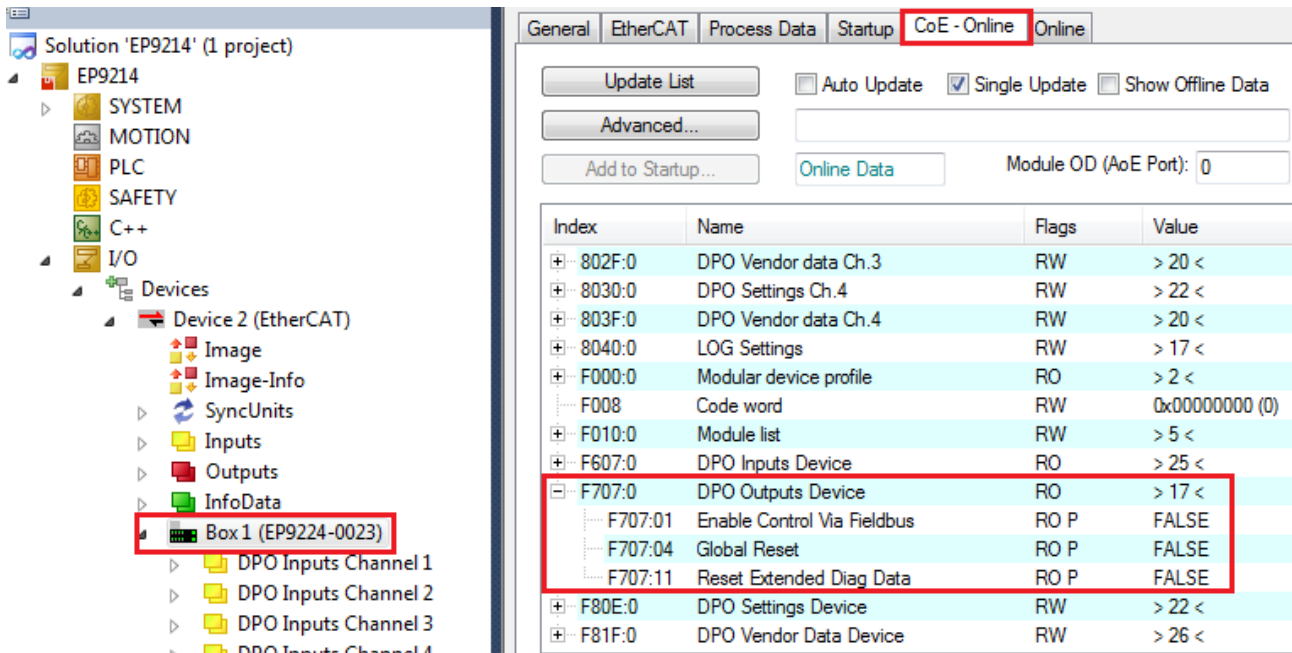
Download	With this button a file can be written to the EtherCAT device.
Upload	With this button a file can be read from the EtherCAT device.

4.3 Operation with or without EtherCAT master

The EP92x4 is preset in the factory and delivered with a set rated current of 4.0 A and all eight channels switched on.

 Attention	<p>The channels switch on automatically during commissioning</p> <p>In the basic setting the rated current of the EP92x4 is 4 A per channel. Shortly after the EP92x4 is supplied with voltage, all channels are switched on with a delay of 100 ms each.</p>
---	--

This is preset by the CoE object 0xF707:01




Index	Name	Flags	Value
802F:0	DPO Vendor data Ch.3	RW	> 20 <
8030:0	DPO Settings Ch.4	RW	> 22 <
803F:0	DPO Vendor data Ch.4	RW	> 20 <
8040:0	LOG Settings	RW	> 17 <
F000:0	Modular device profile	RO	> 2 <
F008	Code word	RW	0x00000000 (0)
F010:0	Module list	RW	> 5 <
F607:0	DPO Inputs Device	RO	> 25 <
F707:0	DPO Outputs Device	RO	> 17 <
F707:01	Enable Control Via Fieldbus	RO P	FALSE
F707:04	Global Reset	RO P	FALSE
F707:11	Reset Extended Diag Data	RO P	FALSE
F80E:0	DPO Settings Device	RW	> 22 <
F81F:0	DPO Vendor Data Device	RW	> 26 <


Fig. 43: CoE object 0xF707:01 - Enable Control via Fieldbus

If the EP92x4 is operated on an EtherCAT master, the basic setting or the bootup can be adapted.

This is done via the variable DPO Outputs Device -> *Enable control via Fieldbus* in the process data.

At the next power-on of the box the load circuits will then be switched on depending on the settings in the CoE objects.

 Note	<p>Customize all parameters when EtherCAT is used for the first time</p> <p>If the EP92x4 operated for the first time with EtherCAT connection, all parameters need to be adjusted.</p>
--	--

 Attention	<p>Without EtherCAT connection the outputs switch in default status</p> <p>After the EP92x4 was configured with an EtherCAT master you can disconnect the EtherCAT connection. But in this case the parameters of all outputs switch in the default status. When the connection is restored to the EtherCAT master, the previously set values are available again.</p>
---	---

Example for parametrizing the outputs when using EtherCAT

Via the tab “CoE – Online” you can adjust different settings of the box module. For example, it is possible to adjust the “Nominal Current I_N ” (Index: 8000:12), by double-clicking to the respective parameter opens the “Set Value Dialog” (see following figure).

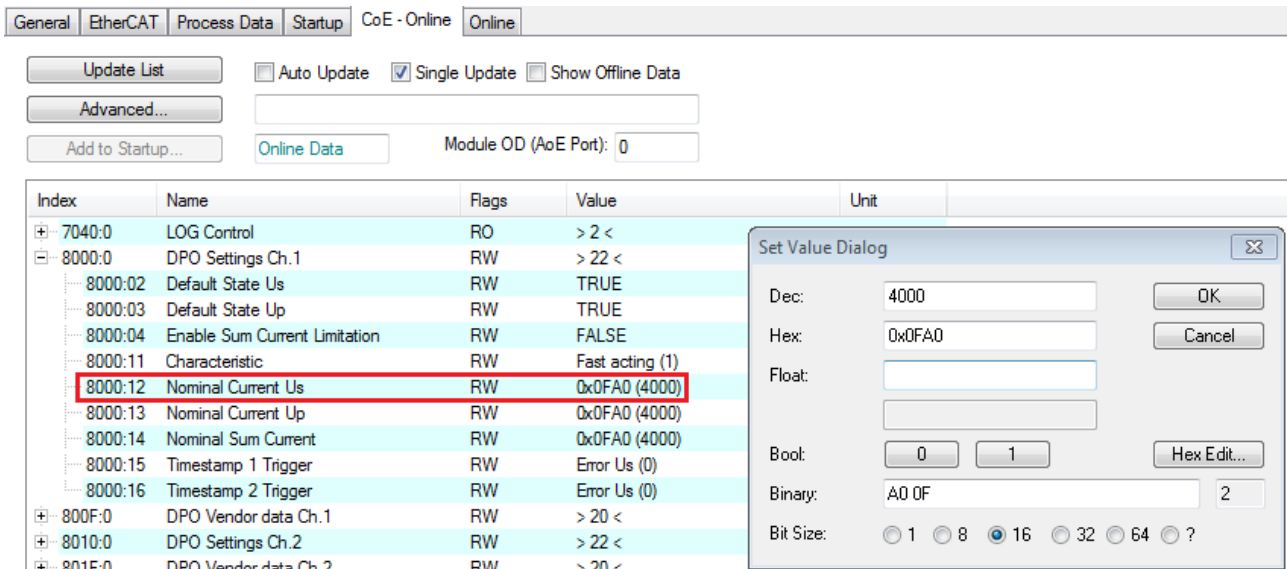


Fig. 44: Adjust the “DPO Settings Ch.1” with EtherCAT connection

If the EtherCAT connection is disconnected, the option “Show Offline Data” should be activated. Then the default values of the parameters are displayed.

4.4 Switch of behavior

4.4.1 Switch-off characteristics

The EP9214 EtherCAT Box selectively protects all connected 24 V_{DC} load circuits. This is done via various electronic circuits, additionally protected by a 7 A micro-fuse.

Selective switch-off means that the load circuits are individually monitored and if a channel is exceeded, only that channel is switched off.

This ensures the function of the remaining consumers connected to the higher-level power supply unit.

General functional principle

The EP9214 EtherCAT Box monitors the current for each of the 8 output channels. 4 x Us, 4 x Up. Switching off takes place depending on the selected nominal current and release characteristic.

Superordinate to all is the hardware switch-off, which responds if

- 7 A is reached for 50 ms
- there is a short-circuit for 50 ms
- the capacitive load and thus the start-up current of the connected devices is too high

Due to the intelligent current limitation an output current exceeding 7 A is not possible under operating conditions. The additionally installed 7 A micro fuse thus blows only if the upstream electronic switch-off is already defective.

The nominal current can be set for each channel individually between 1 A and 4 A.

Index	Name	Flags	Value
8000:0	DPO Settings Ch.1	RW	> 22 <
8000:02	Default State Us	RW	TRUE
8000:03	Default State Up	RW	TRUE
8000:04	Enable Sum Current Limitation	RW	FALSE
8000:11	Characteristic	RW	Fast acting (1)
8000:12	Nominal Current Us	RW	0x0FA0 (4000)
8000:13	Nominal Current Up	RW	0x0FA0 (4000)
8000:14	Nominal Sum Current	RW	0x0000 (0)
8000:15	Timestamp 1 Trigger	RW	Error Us (0)
8000:16	Timestamp 2 Trigger	RW	Error Us (0)
8010:0	DPO Settings Ch.2	RW	> 22 <
8020:0	DPO Settings Ch.3	RW	> 22 <
8030:0	DPO Settings Ch.4	RW	> 22 <
8040:0	LOG Settings	RW	> 17 <
F80E:0	DPO Settings Device	RW	> 22 <


Fig. 45: Setting the nominal current

All set characteristics are referenced to the set nominal current. The following table shows the response time of the monitoring in relation to the nominal current and characteristic.

Nominal current	Very fast acting	Fast acting	Slow acting	Time delay
100 %	1 h	-	-	-
110 %	1 h	4 h	-	-
120 %	7 min	4 h	-	-
150 %	30 s	30 min	1 h	4 h
210 %	500 ms	20 s	20 s	100 s
275 %	500 ms	1 s	20 s	10 s
300 %	20 ms	100 ms	1 s	3 s

If overcurrent (\geq nominal current) is detected and it is foreseeable that the current monitoring will trip if conditions remain unchanged, then a warning is given both in the process data and in form of a flashing LED. An output switch-off due to overcurrent is indicated by a red LED.

If one of the outputs was switched off due to a diagnosis, it must be reactivated by an active RESET.

 Note	Restart after power OFF/ON If an output was switched off due to an error, then an active reset by the RESET contact or the fieldbus is necessary. Switching off and on again is not sufficient! To protect the electronic a RESET can be done at maximum all 20 seconds.
--	--

Switching on can be done either via EtherCAT or by applying 24 V to the RESET contact. To protect the circuitry, a RESET can take place maximally every 20 seconds. Faster successive edges are ignored.

Switch-on delay of load circuits 1 to 4 without fieldbus control

Here is a table of the startup times, adjustable in the CoE object 0xF80E:11

Description	Switch-on delay
Fast	10 ms
Moderate	100 ms
Slow	200 ms

4.4.2 Current limitation, switching the load circuits off

The switch-off behavior of the individual load circuits can be adapted to the application.

The following modes can be set individually for each channel:

- Very fast acting
- Fast acting
- Slow acting
- Time delay

Release time (switch-off time) of the modes

Rated current	Very fast acting	Fast acting	Slow acting	Time delay
100 %	1 h	-	-	-
110 %	1 h	4 h	-	-
120 %	7 min	4 h	-	-
150 %	30 s	30 min	1 h	4 h
210 %	500 ms	20 sec	20 s	100 s
275 %	500 ms	1 sec	20 s	10 s
300 %	20 ms	100 ms	1 s	3 s

The release time depends on the set rated current.

Following the switch-off of a channel it is necessary to reactivate it after rectification of the cause of the error.

Switch-off of the box due to overtemperature

The EP9214 is internally protected against overheating. A warning is given in the process data if a temperature of about 80 °C is reached.

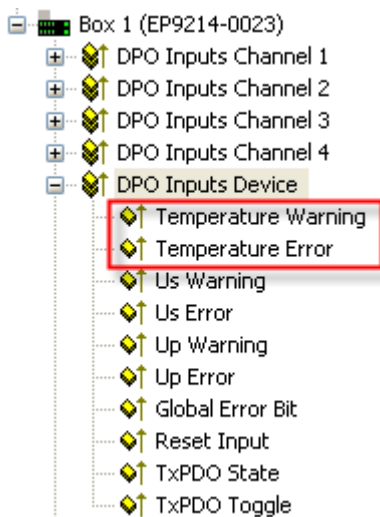


Fig. 46: Temperature Warning and Temperature Error bits

On reaching 85°C all load circuits are switched off in order to protect the hardware against destruction. In this case the *Temperature Error* bit is set.

So that the permitted temperature is not exceeded, the box is to be mounted with its rear wall on the flattest possible thermally conductive surface.

Switch off of the box due to undervoltage

Since undervoltage impairs the function of the safety mechanisms, a warning is given in the process data from an input voltage of 21.5 V. If the voltage falls below 18 V all outputs are switched off and the *Error* bit is set.

Undervoltage is detected independently for Us and Up.

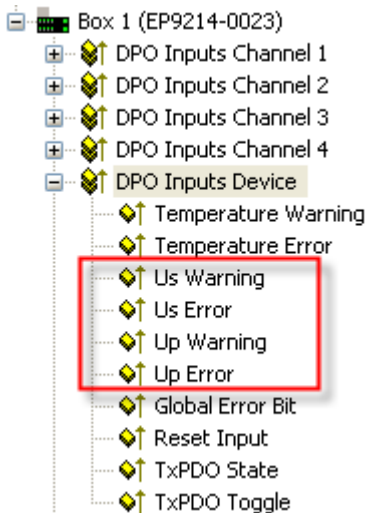



Fig. 47: Undervoltage bits

 Note	<p>Switching on again</p> <p>Switching off due to undervoltage and overtemperature is equivalent to the response of the current monitoring, but applies to the entire box and all outputs. The error must be reset by setting the process data GLOBAL RESET or by power off / restart of the module, furthermore the temperature must have fallen below 75 °C!</p>
--	---

Switching load circuits on again after switch-off

This takes place either via the process data by EtherCAT or by the reset input directly on the box.

Also see about this

- 📄 EP9214-0023 - Process image [▶ 65]
- 📄 Monitoring and reset contacts [▶ 31]

4.4.3 Setting the current limitation

The switch-off behavior of the individual load circuits can be adapted to the application.

The following modes can be set individually for each channel:

- Very fast acting
- Fast acting
- Slow acting
- Time delay

Release time (switch-off time) of the modes

Rated current	Very fast acting	Fast acting	Slow acting	Time delay
100 %	1 h	-	-	-
110 %	1 h	4 h	-	-
120 %	7 min	4 h	-	-
150 %	30 s	30 min	1 h	4 h
210 %	500 ms	20 sec	20 s	100 s
275 %	500 ms	1 sec	20 s	10 s
300 %	20 ms	100 ms	1 s	3 s

The release time depends on the set rated current.

CoE parameters for setting the current limiting characteristic

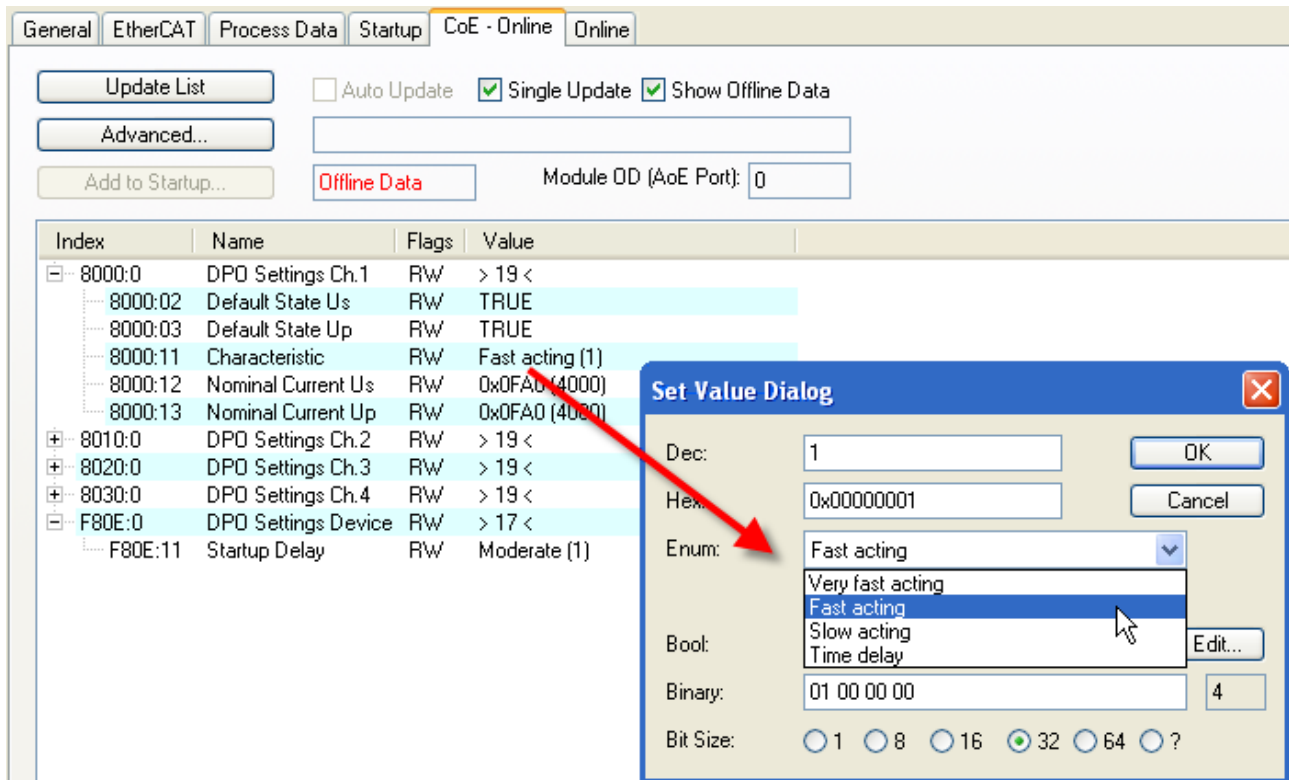


Fig. 48: CoE parameters for setting the current limiting characteristic

Meaning of the parameters

Index	Name	Meaning
0x80n0:02	Default State Us	TRUE: in case of operation without fieldbus the load circuit Us of channel n is automatically switched on FALSE: in case of operation without fieldbus the load circuit Us of channel n remains switched off
0x80n0:02	Default State Up	TRUE: in case of operation without fieldbus the load circuit Up of channel n is automatically switched on FALSE: in case of operation without fieldbus the load circuit Up of channel n remains switched off
0x80n0:11	Characteristic	Release time depending on rated current
0x80n0:12	Nominal Current Us	Specification of the rated current of Us in mA
0x80n0:13	Nominal Current Up	Specification of the rated current of Up in mA

Switching load circuits on again after switch-off

This takes place either via the process data [▶ 65] by EtherCAT or by the reset input [▶ 31] directly on the box.

4.4.4 Status LEDs and status bits

Below is a table showing the meaning of the status LEDs and status bits for the power outputs (EP9214 for example):

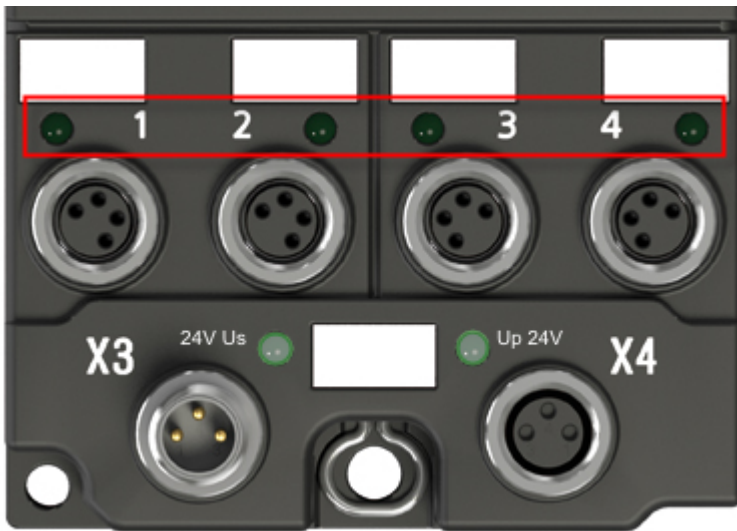


Fig. 49: EP9214 - Status bits

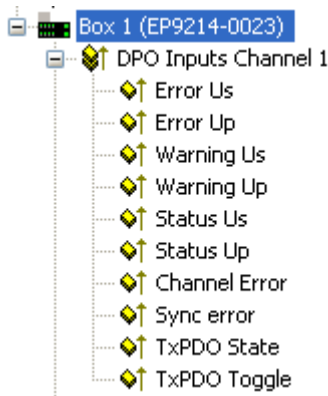


Fig. 50: EP9214 - status bits

Initialization


When switching on the voltage supply to the EP9214/EP9224, all green LEDs and then all red LEDs are switched on briefly to test the LEDs.


The LED is valid for both voltages and currents (Us and Up; OR).

LED	Status Us / Up	Warning	Error Us / Up	Description
Off	0	0	0	The output is ready
Green	1	0	0	The output is just switching on
Green	1	0	0	The output is switched on. Normal operating status.
Flashing green	1	1	0	The output is still operating, but will switch off if conditions remain unchanged (Warning Ux).
Flashing red	0	1	1	The output has been switched off. Switching on again is not yet possible (waiting time of 20 seconds)
Red	0	0	1	The output has been deactivated and can be returned to a normal state by a reset.

4.5 EP9214-0023

4.5.1 EP9214-0023 - Object description

 Note	Parameterization Terminals' parameterization will be conducted by the CoE tab (double-click on the referring object) or the Process data tab (PDO assignment)
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 Note	EtherCAT XML Device Description The description correspond to the display of the CoE objects from the EtherCAT XML Device Description. It is strongly recommended to download the latest revision of the corresponding XML file from the Beckhoff website (http://www.beckhoff.com/english/default.htm?download/elconfig.htm) and follow the installation instructions.
--	---

The CoE overview contains objects for different intended applications:

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

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

4.5.1.1 Objects for parameterization

4.5.1.1.1 Index 1011 Restore default parameters

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

4.5.1.1.2 Index 8000 DPO Settings Ch.1

Index	Name	Meaning	Data type	Flags	Default
8010:0	DPO Settings Ch.1		UINT8	RO	0x13 (19 _{dec})
8010:02	Default State Us	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8010:03	Default State Up	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8010:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8010:12	Nominal Current Us	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8010:13	Nominal Current Up	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})

4.5.1.1.3 Index 8010 DPO Settings Ch.2

Index	Name	Meaning	Data type	Flags	Default
8010:0	DPO Settings Ch.2		UINT8	RO	0x13 (19 _{dec})
8010:02	Default State Us	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8010:03	Default State Up	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8010:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8010:12	Nominal Current Us	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8010:13	Nominal Current Up	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})

4.5.1.1.4 Index 8020 DPO Settings Ch.3

Index	Name	Meaning	Data type	Flags	Default
8020:0	DPO Settings Ch.3		UINT8	RO	0x13 (19 _{dec})
8020:02	Default State Us	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8020:03	Default State Up	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8020:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8020:12	Nominal Current Us	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8020:13	Nominal Current Up	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})

4.5.1.1.5 Index 8030 DPO Settings Ch.4

Index	Name	Meaning	Data type	Flags	Default
8030:0	DPO Settings Ch.4		UINT8	RO	0x13 (19 _{dec})
8030:02	Default State Us	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8030:03	Default State Up	The output adopts this value if F707:01 is not set	boolean	RW	0x01 (1 _{dec})
8030:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8030:12	Nominal Current Us	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8030:13	Nominal Current Up	Nominal maximum current at the output	UINT16	RW	0x0FA0 (4000 _{dec})

4.5.1.1.6 Index F707 DPO Outputs Device

Index	Name	Meaning	Data type	Flags	Default
F707:0	DPO Outputs Device		UINT8	RO	0x04 (4 _{dec})
F707:01	Enable Control Via Fieldbus	0 _{bin} : All outputs are set to their default values (80X0:02, 80X0:03) 1 _{bin} : All outputs are set according to their PDOs (70X0:01, 70X0:02)	boolean	RO	0x00 (0 _{dec})
F707:04	Global Reset	All error bits are reset	boolean	RO	0x00 (0 _{dec})

4.5.1.1.7 Index F80E DPO Settings Device

Index	Name	Meaning	Data type	Flags	Default
F80E:0	DPO Settings Device		UINT8	RO	0x11 (17 _{dec})
F80E:11	Startup Delay	Sets the time that is kept between two switch-on procedures: 1 _{dec} : fast (10 ms) 2 _{dec} : moderate (100 ms) 3 _{dec} : slow (200 ms)	UINT16	RW	0x0001 (1 _{dec})

4.5.1.2 Standard objects

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

4.5.1.2.1 Index 1000 Device type

Index	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: The low word contains the CoE profile used (5001). The high word contains the module profile according to the modular device profile.	UINT32	RO	0x010E1389 (17699721 _{dec})

4.5.1.2.2 Index 1008 Device name

Index	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EP9214-0023

4.5.1.2.3 Index 1009 Hardware version

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

4.5.1.2.4 Index 100A Software version

Index	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version of the EtherCAT slave	STRING	RO	06

4.5.1.2.5 Index 1018 Identity

Index	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4 _{dec})
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2 _{dec})
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x23FE4052 (603865170 _{dec})
1018:03	Revision	Revision number of the EtherCAT slave; the low word (bit 0-15) indicates the special terminal number, the high word (bit 16-31) refers to the device description	UINT32	RO	0x00000000 (0 _{dec})
1018:04	Serial number	Serial number of the EtherCAT slave; the low byte (bit 0-7) of the low word contains the year of production, the high byte (bit 8-15) of the low word contains the week of production, the high word (bit 16-31) is 0	UINT32	RO	0x00000000 (0 _{dec})

4.5.1.2.6 Index 10F0 Backup parameter handling

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

4.5.1.2.7 Index 1600 DPO RxPDO-Map Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1600:0	DPO RxPDO-Map Outputs Ch.1	PDO Mapping RxPDO 1	UINT8	RO	0x06 (6 _{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x01 (Output Us))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x02 (Output Up))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1600:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x05 (Reset Us))	UINT32	RO	0x7000:05, 1
1600:05	SubIndex 005	5. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x06 (Reset Up))	UINT32	RO	0x7000:06, 1
1600:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.5.1.2.8 Index 1601 DPO RxPDO-Map Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1601:0	DPO RxPDO-Map Outputs Ch.2	PDO Mapping RxPDO 2	UINT8	RO	0x06 (6 _{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DPO Outputs Ch.2), entry 0x01 (Output Us))	UINT32	RO	0x7010:01, 1
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (DPO Outputs Ch.2), entry 0x02 (Output Up))	UINT32	RO	0x7010:02, 1
1601:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1601:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (DPO Outputs Ch.2), entry 0x05 (Reset Us))	UINT32	RO	0x7010:05, 1
1601:05	SubIndex 005	5. PDO Mapping entry (object 0x7010 (DPO Outputs Ch.2), entry 0x06 (Reset Up))	UINT32	RO	0x7010:06, 1
1601:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.5.1.2.9 Index 1602 DPO RxPDO-Map Outputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1602:0	DPO RxPDO-Map Outputs Ch.3	PDO Mapping RxPDO 3	UINT8	RO	0x06 (6 _{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x01 (Output Us))	UINT32	RO	0x7020:01, 1
1602:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x02 (Output Up))	UINT32	RO	0x7020:02, 1
1602:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1602:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x05 (Reset Us))	UINT32	RO	0x7020:05, 1
1602:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x06 (Reset Up))	UINT32	RO	0x7020:06, 1
1602:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.5.1.2.10 Index 1603 DPO RxPDO-Map Outputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
1603:0	DPO RxPDO-Map Outputs Ch.4	PDO Mapping RxPDO 4	UINT8	RO	0x06 (6 _{dec})
1603:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x01 (Output Us))	UINT32	RO	0x7030:01, 1
1603:02	SubIndex 002	2. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x02 (Output Up))	UINT32	RO	0x7030:02, 1
1603:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1603:04	SubIndex 004	4. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x05 (Reset Us))	UINT32	RO	0x7030:05, 1
1603:05	SubIndex 005	5. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x06 (Reset Up))	UINT32	RO	0x7030:06, 1
1603:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.5.1.2.11 Index 1604 DPO RxPDO-Map Outputs Device

Index	Name	Meaning	Data type	Flags	Default
1604:0	DPO RxPDO-Map Outputs Device	PDO Mapping RxPDO 5	UINT8	RO	0x04 (4 _{dec})
1604:01	SubIndex 001	1. PDO Mapping entry (object 0xF707 (DPO Outputs Device), entry 0x01 (Enable Control Via Fieldbus))	UINT32	RO	0xF707:01, 1
1604:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1604:03	SubIndex 003	3. PDO Mapping entry (object 0xF707 (DPO Outputs Device), entry 0x04 (Global Reset))	UINT32	RO	0xF707:04, 1
1604:04	SubIndex 004	4. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12

4.5.1.2.12 Index 1A00 DPO TxPDO-Map Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1A00:0	DPO TxPDO-Map Inputs Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x0B (11 _{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x01 (Error Us))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x02 (Error Up))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x03 (Warning Us))	UINT32	RO	0x6000:03, 1
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x04 (Warning Up))	UINT32	RO	0x6000:04, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x05 (Status Us))	UINT32	RO	0x6000:05, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x06 (Status Up))	UINT32	RO	0x6000:06, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x07 (Channel Error))	UINT32	RO	0x6000:07, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A00:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x0E (Sync error))	UINT32	RO	0x6000:0E, 1
1A00:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x0F (TxPDO State))	UINT32	RO	0x6000:0F, 1
1A00:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1

4.5.1.2.13 Index 1A01 DPO TxPDO-Map Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1A01:0	DPO TxPDO-Map Inputs Ch.2	PDO Mapping TxPDO 2	UINT8	RO	0x0B (11 _{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x01 (Error Us))	UINT32	RO	0x6010:01, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x02 (Error Up))	UINT32	RO	0x6010:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x03 (Warning Us))	UINT32	RO	0x6010:03, 1
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x04 (Warning Up))	UINT32	RO	0x6010:04, 1
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x05 (Status Us))	UINT32	RO	0x6010:05, 1
1A01:06	SubIndex 006	6. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x06 (Status Up))	UINT32	RO	0x6010:06, 1
1A01:07	SubIndex 007	7. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x07 (Channel Error))	UINT32	RO	0x6010:07, 1
1A01:08	SubIndex 008	8. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A01:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x0E (Sync error))	UINT32	RO	0x6010:0E, 1
1A01:0A	SubIndex 010	10. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x0F (TxPDO State))	UINT32	RO	0x6010:0F, 1
1A01:0B	SubIndex 011	11. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1

4.5.1.2.14 Index 1A02 DPO TxPDO-Map Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1A02:0	DPO TxPDO-Map Inputs Ch.3	PDO Mapping TxPDO 3	UINT8	RO	0x0B (11 _{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x01 (Error Us))	UINT32	RO	0x6020:01, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x02 (Error Up))	UINT32	RO	0x6020:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x03 (Warning Us))	UINT32	RO	0x6020:03, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x04 (Warning Up))	UINT32	RO	0x6020:04, 1
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x05 (Status Us))	UINT32	RO	0x6020:05, 1
1A02:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x06 (Status Up))	UINT32	RO	0x6020:06, 1
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x07 (Channel Error))	UINT32	RO	0x6020:07, 1
1A02:08	SubIndex 008	8. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x0E (Sync error))	UINT32	RO	0x6020:0E, 1
1A02:0A	SubIndex 010	10. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x0F (TxPDO State))	UINT32	RO	0x6020:0F, 1
1A02:0B	SubIndex 011	11. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6020:10, 1

4.5.1.2.15 Index 1A03 DPO TxPDO-Map Inputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
1A03:0	DPO TxPDO-Map Inputs Ch.4	PDO Mapping TxPDO 4	UINT8	RO	0x0B (11 _{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x01 (Error Us))	UINT32	RO	0x6030:01, 1
1A03:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x02 (Error Up))	UINT32	RO	0x6030:02, 1
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x03 (Warning Us))	UINT32	RO	0x6030:03, 1
1A03:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x04 (Warning Up))	UINT32	RO	0x6030:04, 1
1A03:05	SubIndex 005	5. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x05 (Status Us))	UINT32	RO	0x6030:05, 1
1A03:06	SubIndex 006	6. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x06 (Status Up))	UINT32	RO	0x6030:06, 1
1A03:07	SubIndex 007	7. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x07 (Channel Error))	UINT32	RO	0x6030:07, 1
1A03:08	SubIndex 008	8. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A03:09	SubIndex 009	9. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x0E (Sync error))	UINT32	RO	0x6030:0E, 1
1A03:0A	SubIndex 010	10. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x0F (TxPDO State))	UINT32	RO	0x6030:0F, 1
1A03:0B	SubIndex 011	11. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6030:10, 1

4.5.1.2.16 Index 1A04 DPO TxPDO-Map Inputs Device

Index	Name	Meaning	Data type	Flags	Default
1A04:0	DPO TxPDO-Map Inputs Device	PDO Mapping TxPDO 5	UINT8	RW	0x0C (12 _{dec})
1A04:01	SubIndex 001	1. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x01 (Temperature Warning))	UINT32	RW	0xF607:01, 1
1A04:02	SubIndex 002	2. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x02 (Temperature Error))	UINT32	RW	0xF607:02, 1
1A04:03	SubIndex 003	3. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x03 (Us Warning))	UINT32	RW	0xF607:03, 1
1A04:04	SubIndex 004	4. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x04 (Us Error))	UINT32	RW	0xF607:04, 1
1A04:05	SubIndex 005	5. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x05 (Up Warning))	UINT32	RW	0xF607:05, 1
1A04:06	SubIndex 006	6. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x06 (Up Error))	UINT32	RW	0xF607:06, 1
1A04:07	SubIndex 007	7. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x07 (Global Error Bit))	UINT32	RW	0xF607:07, 1
1A04:08	SubIndex 008	8. PDO Mapping entry (4 bits align)	UINT32	RW	0x0000:00, 4
1A04:09	SubIndex 009	9. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x0C (Reset Input))	UINT32	RW	0xF607:0C, 1
1A04:0A	SubIndex 010	10. PDO Mapping entry (2 bits align)	UINT32	RW	0x0000:00, 2
1A04:0B	SubIndex 011	11. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x0F (TxPDO State))	UINT32	RW	0xF607:0F, 1
1A04:0C	SubIndex 012	12. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x10 (TxPDO Toggle))	UINT32	RW	0xF607:10, 1

4.5.1.2.17 Index 1C00 Sync manager type

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

4.5.1.2.18 Index 1C12 RxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x05 (5 _{dec})
1C12:01	Subindex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1600 (5632 _{dec})
1C12:02	Subindex 002	2. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1601 (5633 _{dec})
1C12:03	Subindex 003	3. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1602 (5634 _{dec})
1C12:04	Subindex 004	4. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1603 (5635 _{dec})
1C12:05	Subindex 005	5. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1604 (5636 _{dec})

4.5.1.2.19 Index 1C13 TxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x05 (5 _{dec})
1C13:01	Subindex 001	1. Allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656 _{dec})
1C13:02	Subindex 002	2. Allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A01 (6657 _{dec})
1C13:03	Subindex 003	3. Allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A02 (6658 _{dec})
1C13:04	Subindex 004	4. Allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A03 (6659 _{dec})
1C13:05	Subindex 005	5. Allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A04 (6660 _{dec})

4.5.1.2.20 Index 1C32 SM output parameter

Index	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32 _{dec})
1C32:01	Sync mode	Current synchronization mode: <ul style="list-style-type: none"> • 0: Free Run • 1: synchronous with SM 2 Event • 2: DC-Mode - synchronous with SYNC0 Event • 3: DC-Mode - synchronous with SYNC1 Event 	UINT16	RW	0x0000 (0 _{dec})
1C32:02	Cycle time	Cycle time (in ns): <ul style="list-style-type: none"> • Free Run: Cycle time of the local timer • synchronous with SM 2 Event: Master cycle time • DC-Mode: SYNC0/SYNC1 Cycle Time 	UINT32	RW	0x000F4240 (1000000 _{dec})
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000384 (900 _{dec})
1C32:04	Sync modes supported	Supported synchronization modes: <ul style="list-style-type: none"> • Bit 0 = 1: free run is supported • Bit 1 = 1: Synchronous with SM 2 event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08) 	UINT16	RO	0xC007 (49159 _{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000F4240 (1000000 _{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0 _{dec})
1C32:07	Minimum delay time		UINT32	RO	0x00000384 (900 _{dec})
1C32:08	Command	<ul style="list-style-type: none"> • 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 1C32:03, 1C32:05, 1C32:06, 1C32:09, 1C33:03, 1C33:06, and 1C33:09 are updated with the maximum measured values. For a subsequent measurement the measured values are reset	UINT16	RW	0x0000 (0 _{dec})
1C32:09	Maximum delay time	Time between SYNC1 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000384 (900 _{dec})
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0 _{dec})
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0 _{dec})
1C32:0D	Shift too short counter	Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only)	UINT16	RO	0x0000 (0 _{dec})
1C32:20	Sync error	The synchronization was not correct in the last cycle, (outputs were output too late; DC mode only)	boolean	RO	0x00 (0 _{dec})

4.5.1.2.21 Index 1C33 SM input parameter

Index	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32 _{dec})
1C33:01	Sync mode	Current synchronization mode: <ul style="list-style-type: none"> • 0: Free Run • 1: synchronous with SM 3 event (no outputs available) • 2: DC - synchronous with SYNC0 Event • 3: DC - synchronous with SYNC1 Event • 34: synchronous with SM 2 event (outputs available) 	UINT16	RW	0x0000 (0 _{dec})
1C33:02	Cycle time	as 1C32:02	UINT32	RW	0x000F4240 (1000000 _{dec})
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000384 (900 _{dec})
1C33:04	Sync modes supported	Supported synchronization modes: <ul style="list-style-type: none"> • Bit 0: free run is supported • Bit 1: synchronous with SM 2 event is supported (outputs available) • Bit 1: synchronous with SM 3 event is supported (no outputs available) • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 01: input shift 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) 	UINT16	RO	0xC007 (49159 _{dec})
1C33:05	Minimum cycle time	as 1C32:05	UINT32	RO	0x000F4240 (1000000 _{dec})
1C33:06	Calc and copy time	Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode)	UINT32	RO	0x00000000 (0 _{dec})
1C33:07	Minimum delay time		UINT32	RO	0x00000384 (900 _{dec})
1C33:08	Command	as 1C32:08	UINT16	RW	0x0000 (0 _{dec})
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000384 (900 _{dec})
1C33:0B	SM event missed counter	as 1C32:11	UINT16	RO	0x0000 (0 _{dec})
1C33:0C	Cycle exceeded counter	as 1C32:12	UINT16	RO	0x0000 (0 _{dec})
1C33:0D	Shift too short counter	as 1C32:13	UINT16	RO	0x0000 (0 _{dec})
1C33:20	Sync error	as 1C32:32	boolean	RO	0x00 (0 _{dec})

4.5.1.3 Profile-specific objects (0x6000-0xFFFF)

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

4.5.1.3.1 Index 6000 DPO Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
6000:0	DPO Inputs Ch.1	Input of the first channel	UINT8	RO	0x10 (16 _{dec})
6000:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a 'Global Reset' (F707:04) or by the corresponding Reset Us (7000:05). The output cannot be activated as long as the bit is 1.	boolean	RO	0x00 (0 _{dec})
6000:02	Error Up	The current monitoring of Up has tripped.	boolean	RO	0x00 (0 _{dec})
6000:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6000:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6000:05	Status Us	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6000:06	Status Up	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6000:07	Channel Error	6000:01 or 6000:02 are set	boolean	RO	0x00 (0 _{dec})
6000:0E	Sync error		boolean	RO	0x00 (0 _{dec})
6000:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6000:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})

4.5.1.3.2 Index 6010 DPO Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
6010:0	DPO Inputs Ch.2	Input of the first channel	UINT8	RO	0x10 (16 _{dec})
6010:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a 'Global Reset' (F707:04) or by the corresponding Reset Us (7000:05). The output cannot be activated as long as the bit is 1.	boolean	RO	0x00 (0 _{dec})
6010:02	Error Up	The current monitoring of Up has tripped.	boolean	RO	0x00 (0 _{dec})
6010:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6010:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6010:05	Status Us	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6010:06	Status Up	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6010:07	Channel Error	6010:01 or 6010:02 are set	boolean	RO	0x00 (0 _{dec})
6010:0E	Sync error		boolean	RO	0x00 (0 _{dec})
6010:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6010:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})

4.5.1.3.3 Index 6020 DPO Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
6020:0	DPO Inputs Ch.3	Input of the first channel	UINT8	RO	0x10 (16 _{dec})
6020:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a 'Global Reset' (F707:04) or by the corresponding Reset Us (7000:05). The output cannot be activated as long as the bit is 1.	boolean	RO	0x00 (0 _{dec})
6020:02	Error Up	The current monitoring of Up has tripped.	boolean	RO	0x00 (0 _{dec})
6020:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6020:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6020:05	Status Us	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6020:06	Status Up	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6020:07	Channel Error	6020:01 or 6020:02 are set	boolean	RO	0x00 (0 _{dec})
6020:0E	Sync error		boolean	RO	0x00 (0 _{dec})
6020:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6020:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})

4.5.1.3.4 Index 6030 DPO Inputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
6030:0	DPO Inputs Ch.4	Input of the first channel	UINT8	RO	0x10 (16 _{dec})
6030:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a 'Global Reset' (F707:04) or by the corresponding Reset Us (7000:05). The output cannot be activated as long as the bit is 1.	boolean	RO	0x00 (0 _{dec})
6030:02	Error Up	The current monitoring of Up has tripped.	boolean	RO	0x00 (0 _{dec})
6030:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6030:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6030:05	Status Us	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6030:06	Status Up	0: The output is switched off 1: The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6030:07	Channel Error	6030:01 or 6030:02 are set	boolean	RO	0x00 (0 _{dec})
6030:0E	Sync error		boolean	RO	0x00 (0 _{dec})
6030:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6030:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})

4.5.1.3.5 Index 7000 DPO Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
7000:0	DPO Outputs Ch.1		UINT8	RO	0x06 (6 _{dec})
7000:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7000:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7000:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7000:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})

4.5.1.3.6 Index 7010 DPO Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
7010:0	DPO Outputs Ch.2		UINT8	RO	0x06 (6 _{dec})
7010:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7010:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7010:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7010:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})

4.5.1.3.7 Index 7020 DPO Outputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
7020:0	DPO Outputs Ch.3		UINT8	RO	0x06 (6 _{dec})
7020:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7020:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7020:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7020:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})

4.5.1.3.8 Index 7030 DPO Outputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
7030:0	DPO Outputs Ch.4		UINT8	RO	0x06 (6 _{dec})
7030:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7030:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7030:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7030:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})

4.5.1.3.9 Index 800F DPO Vendor data Ch.1

Index	Name	Meaning	Data type	Flags	Default
800F:0	DPO Vendor data Ch.1		UINT8	RO	0x14 (20 _{dec})
800F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
800F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
800F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
800F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.5.1.3.10 Index 801F DPO Vendor data Ch.2

Index	Name	Meaning	Data type	Flags	Default
801F:0	DPO Vendor data Ch.2		UINT8	RO	0x14 (20 _{dec})
801F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
801F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
801F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
801F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.5.1.3.11 Index 802F DPO Vendor data Ch.3

Index	Name	Meaning	Data type	Flags	Default
802F:0	DPO Vendor data Ch.3		UINT8	RO	0x14 (20 _{dec})
802F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
802F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
802F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
802F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.5.1.3.12 Index 803F DPO Vendor data Ch.4

Index	Name	Meaning	Data type	Flags	Default
803F:0	DPO Vendor data Ch.4		UINT8	RO	0x14 (20 _{dec})
803F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
803F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
803F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
803F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.5.1.3.13 Index F000 Modular device profile

Index	Name	Meaning	Data type	Flags	Default
F000:0	Modular device profile	General information for the modular device profile	UINT8	RO	0x02 (2 _{dec})
F000:01	Module index distance	Index spacing of the objects of the individual channels	UINT16	RO	0x0010 (16 _{dec})
F000:02	Maximum number of modules	Number of channels	UINT16	RO	0x0004 (4 _{dec})

4.5.1.3.14 Index F008 Code word

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

4.5.1.3.15 Index F010 Module list

Index	Name	Meaning	Data type	Flags	Default
F010:0	Module list		UINT8	RW	0x04 (4 _{dec})
F010:01	SubIndex 001		UINT32	RW	0x0000010E (270 _{dec})
F010:02	SubIndex 002		UINT32	RW	0x0000010E (270 _{dec})
F010:03	SubIndex 003		UINT32	RW	0x0000010E (270 _{dec})
F010:04	SubIndex 004		UINT32	RW	0x0000010E (270 _{dec})

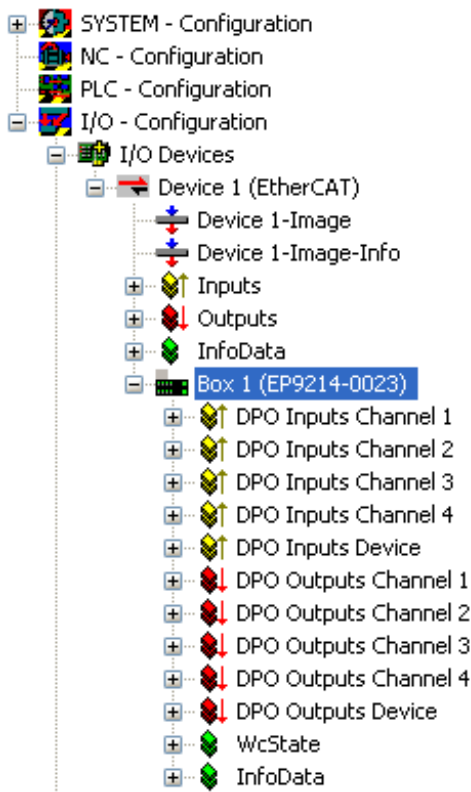
4.5.1.3.16 Index F607 DPO Inputs Device

Index	Name	Meaning	Data type	Flags	Default
F607:0	DPO Inputs Device		UINT8	RO	0x10 (16 _{dec})
F607:01	Temperature Warning	A temperature of about 80°C has been reached	boolean	RO	0x00 (0 _{dec})
F607:02	Temperature Error	A critical temperature of about 85°C has been reached, the outputs will be switched off. The bit must be reset by a Global Reset (F707:04) or by a voltage reset. No output can be switched on if the error bit is set.	boolean	RO	0x00 (0 _{dec})
F607:03	Us Warning	Us is less than 21.5 V, no further outputs can be switched on.	boolean	RO	0x00 (0 _{dec})
F607:04	Us Error	Us is less than 19 V, all Us outputs will be switched off. The bit must be reset by a 'Global Reset' (F707:04) or by a voltage reset. No Us output can be switched on if the error bit is set.	boolean	RO	0x00 (0 _{dec})
F607:05	Up Warning	See F607:03	boolean	RO	0x00 (0 _{dec})
F607:06	Up Error	See F607:04	boolean	RO	0x00 (0 _{dec})
F607:07	Global Error Bit	One of the error bits of the four channels or F607:02 or F607:04 or F607:06 is set	boolean	RO	0x00 (0 _{dec})
F607:0C	Reset Input	0: there is no voltage on the external reset input 1: 24 V is present on the external reset input	boolean	RO	0x00 (0 _{dec})
F607:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
F607:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})

4.5.1.3.17 Index F81F DPO Vendor Data Device

Index	Name	Meaning	Data type	Flags	Default
F81F:0	DPO Vendor Data Device		UINT8	RO	0x1A (26 _{dec})
F81F:01	Enable Auto Offset Calibration	reserved	boolean	RW	0x00 (0 _{dec})
F81F:02	Enable Crosstalk Compensation	reserved	boolean	RW	0x01 (1 _{dec})
F81F:10	Enable Calibration Mode	reserved	boolean	RW	0x00 (0 _{dec})
F81F:11	GainS	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:12	OffsetS	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:13	GainP	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:14	OffsetP	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:15	Gain US	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:16	Offset US	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:17	Gain UP	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:18	Offset UP	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:19	Gain Temperature	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:1A	Offset Temperature	reserved	INT16	RW	0x0000 (0 _{dec})

4.5.2 EP9214-0023 - Process image



The EP9214 has 4 x 16-bit status data of the four output channels **DPO Inputs Channel n**.

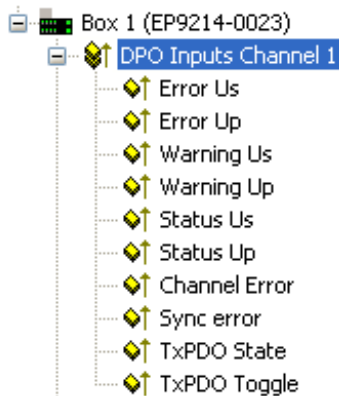
Subsequently, a status word follows for the complete device **DPO Inputs Device**.

In the output section there are 4 x 16-bit output data of the four output channels **DPO Outputs Channel n**.

An output word follows for the complete device **DPO Outputs Device**.

WcState and **InfoData** are standard EtherCAT system variables.

DPO Inputs Channel 1 to 4

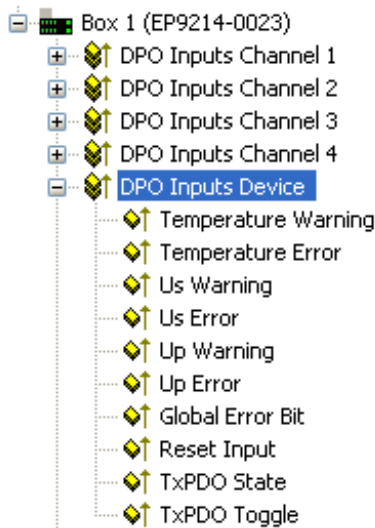


The four channels each have status bits for displaying the current channel state:

see [Status LEDs \[► 30\]](#)

Channel Error:
Error Us or Error Up is TRUE

DPO Inputs Device

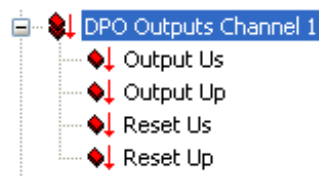


The EP9214 has 4 x 16-bit status data of the four output channels **DPO Inputs Channel n**.

Subsequently, a status word follows for the complete device **DPO Inputs Device**.

Channel Error:
Error Us or Error Up
One of the eight channels is TRUE

DPO Outputs Channel 1 to 4

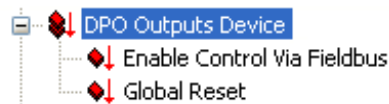


The EP9214 has 4 x 16-bit output data of the four output channels **DPO Outputs Channel n**.

Output Us:
TRUE - switches on the output
FALSE - switches off the output

Reset Us:
TRUE - reset in the event of an error...

DPO Outputs Device



Subsequently, a status word follows for the complete device **DPO outputs Device**.

Enable Control Via Fieldbus:
TRUE - control of all outputs via the fieldbus / the PLC
FALSE - automatic switch-on depending on the CoE entries

Global Reset:
resets all errors in the box

4.6 EP9224-0023

4.6.1 EP9224-0023 - Diagnostic functions

4.6.1.1 Special features of the EP9224

The EP9224 EtherCAT Box offers all the basic properties of the EP9214-0023. Beyond that it permits more detailed settings and a further-reaching diagnosis of the output channels.

The diagnostic information is either directly visible in the process data or can be read out via the *logdata.csv* log file in the event of an error.

The limitation of the sum current can be implemented as a supplement to the channel current limitation in the EP9214 basic version.

Additional properties

- [Switch-off due to sum current monitoring \[► 67\]](#)
- [Extended diagnostic data by process data \[► 69\]](#)
- [Data Logging \[► 73\]](#)

Additional settings in the CoE

Settings for each output channel

The object 80n0:04 must be activated in order to activate the sum current limitation.

The sum current can then be defined in the object 80n0:14.


Index	Name	Flags	Value
8000:0	DPO Settings Ch.1	RW	> 22 <
8000:02	Default State Us	RW	TRUE
8000:03	Default State Up	RW	TRUE
8000:04	Enable Sum Current Limitation	RW	FALSE
8000:11	Characteristic	RW	Fast acting (1)
8000:12	Nominal Current Us	RW	0x0FA0 (4000)
8000:13	Nominal Current Up	RW	0x0FA0 (4000)
8000:14	Nominal Sum Current	RW	0x0FA0 (4000)
8000:15	Timestamp 1 Trigger	RW	Error Us (0)
8000:16	Timestamp 2 Trigger	RW	Error Us (0)
8010:0	DPO Settings Ch.2	RW	> 22 <
8020:0	DPO Settings Ch.3	RW	> 22 <
8030:0	DPO Settings Ch.4	RW	> 22 <
8040:0	LOG Settings	RW	> 17 <
F80E:0	DPO Settings Device	RW	> 22 <

Fig. 51: Object 8000:14 Nominal Sum Current

CoE	Title	Description
80n0:04	Enable Sum Current Limitation	The CoE object 80n0:04 must be set to TRUE in order to activate 80n0:14
80n0:14	Nominal Sum Current	Apart from the nominal current for each Us and Up (basic function of the EP92x4), the sum current of both outputs can also be limited per channel. This property is recommended if the end device may not exceed a total power. The default value is 4.0 A (4000), the maximum sum current 8 A. The sum current switch-off corresponds to the behavior of the load circuit concerned (CoE 80n0:11).
80n0:15 / 16	Timestamp n Trigger	On occurrence of the selected event, the corresponding value (Peak Value n [► 69]) and the appropriate timestamp are set in the process data.

If overcurrent (\geq nominal current) is detected and it is foreseeable that the current monitoring will trip if conditions remain unchanged, then a warning is given both in the process data and in form of a flashing LED. An output switch-off due to overcurrent is indicated by a red LED.

If one of the outputs was switched off due to a diagnosis, it must be reactivated by an active RESET.

 Note	<p>Restart after Power OFF/ON</p> <p>If an output was switched off due to an error, then an active reset by the RESET contact or the fieldbus is necessary. Switching off and on again is not sufficient!</p>
--	--

Switching on can be done either via EtherCAT or by applying 24 V to the RESET contact. To protect the circuitry, a RESET can take place maximally every 20 seconds. Faster successive edges are ignored.

Additional diagnosis

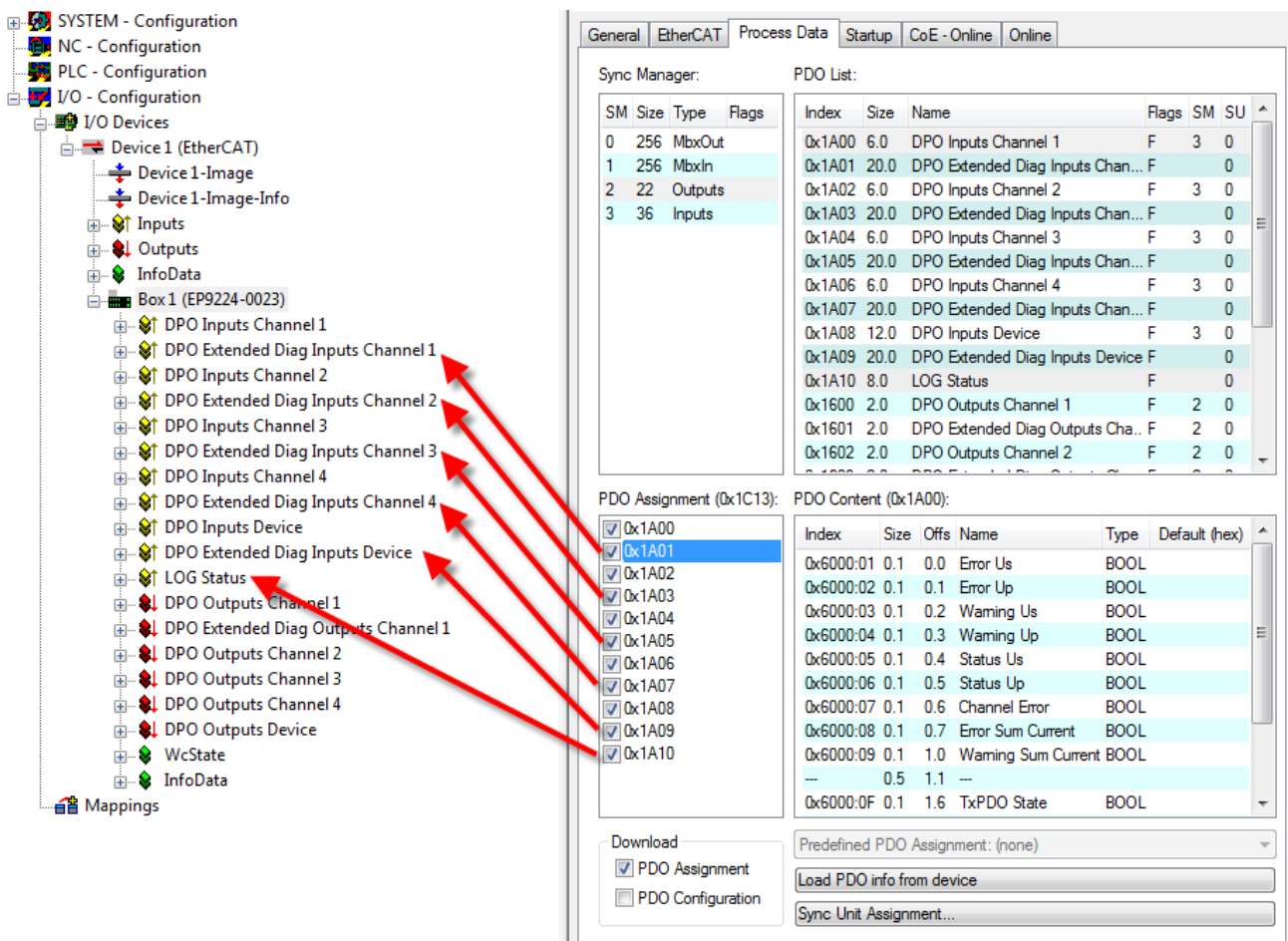
[Extended diagnosis \[▶ 69\]](#) and [data logging \[▶ 73\]](#)

4.6.1.2 Additional PDOs of the EP9224

The selection of additional PDOs in the PDO Mapping is required for the use of the diagnostic functions.

This allows the display of [further diagnostic data \[▶ 69\]](#) in the process data section.

Additional input PDOs



The screenshot shows the configuration interface for an EP9224 device. On the left, a tree view under 'I/O Devices' shows 'Box 1 (EP9224-0023)' with various input and output channels. On the right, the 'Process Data' window is open, displaying a 'PDO List' table. Red arrows indicate the mapping between the 'DPO Extended Diag Inputs Channel' items in the tree and the corresponding entries in the PDO List table.

SM	Size	Type	Flags	Index	Size	Name	Flags	SM	SU
0	256	MbxOut		0x1A00	6.0	DPO Inputs Channel 1	F 3 0		
1	256	MbxIn		0x1A01	20.0	DPO Extended Diag Inputs Chan...	F 0		
2	22	Outputs		0x1A02	6.0	DPO Inputs Channel 2	F 3 0		
3	36	Inputs		0x1A03	20.0	DPO Extended Diag Inputs Chan...	F 0		
				0x1A04	6.0	DPO Inputs Channel 3	F 3 0		
				0x1A05	20.0	DPO Extended Diag Inputs Chan...	F 0		
				0x1A06	6.0	DPO Inputs Channel 4	F 3 0		
				0x1A07	20.0	DPO Extended Diag Inputs Chan...	F 0		
				0x1A08	12.0	DPO Inputs Device	F 3 0		
				0x1A09	20.0	DPO Extended Diag Inputs Device	F 0		
				0x1A10	8.0	LOG Status	F 0		
				0x1600	2.0	DPO Outputs Channel 1	F 2 0		
				0x1601	2.0	DPO Extended Diag Outputs Cha...	F 2 0		
				0x1602	2.0	DPO Outputs Channel 2	F 2 0		

Index	Size	Offs	Name	Type	Default (hex)
0x6000:01	0.1	0.0	Error Us	BOOL	
0x6000:02	0.1	0.1	Error Up	BOOL	
0x6000:03	0.1	0.2	Warning Us	BOOL	
0x6000:04	0.1	0.3	Warning Up	BOOL	
0x6000:05	0.1	0.4	Status Us	BOOL	
0x6000:06	0.1	0.5	Status Up	BOOL	
0x6000:07	0.1	0.6	Channel Error	BOOL	
0x6000:08	0.1	0.7	Error Sum Current	BOOL	
0x6000:09	0.1	1.0	Warning Sum Current	BOOL	
---	0.5	1.1	---		
0x6000:0F	0.1	1.6	TxPDO State	BOOL	

Fig. 52: EP9224 - Additional input PDOs

Additional output PDOs

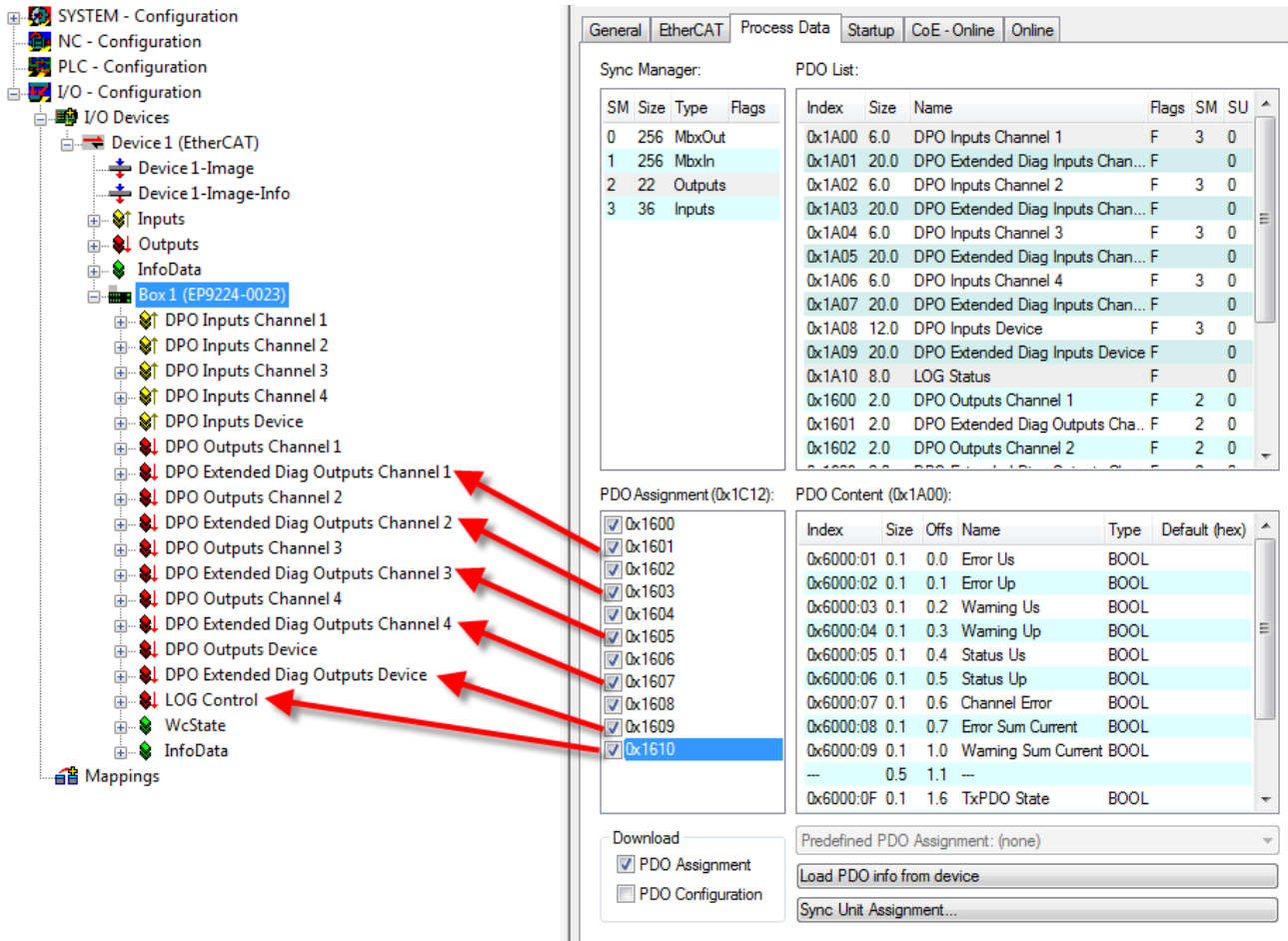


Fig. 53: EP9224 - Additional output PDOs

4.6.1.3 Extended channel and device diagnosis of the EP9224

The selection of additional PDOs in the PDO Mapping is required for the use of the diagnostic functions.

Certain values can be recorded with time stamp (*timestamp / trigger [▶ 71]*) for each channel of **DPO Extended Diag Inputs Channel n** and for the **DPO Extended Diag Inputs Device** module.

DPO Extended Diag Output Device resets the recording.

DPO Extended Diag Inputs Channel n

The *DPO Extended Diag Inputs Channel n* can be activated with each channel.

It continuously indicates the respective current value *Peak Value n* and the precise time of the arrival *Timestamp n*.

The selection of the triggering event takes place in the CoE object 80x0:15 or 16.

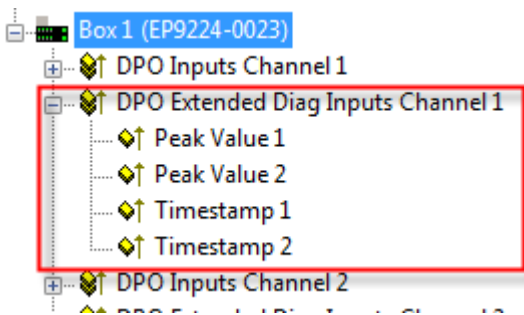


Fig. 54: EP9224 - DPO Extended Diag Inputs Channel 1

DPO Extended Diag Inputs Device

As for each channel there is also a *DPO Extended Diag Inputs Device* for the entire EP9224.

It continuously indicates the respective current value *Peak Value n* and the precise time of the arrival *Timestamp n*.

The selection of the triggering event takes place in the CoE object F80E:15 or 16.

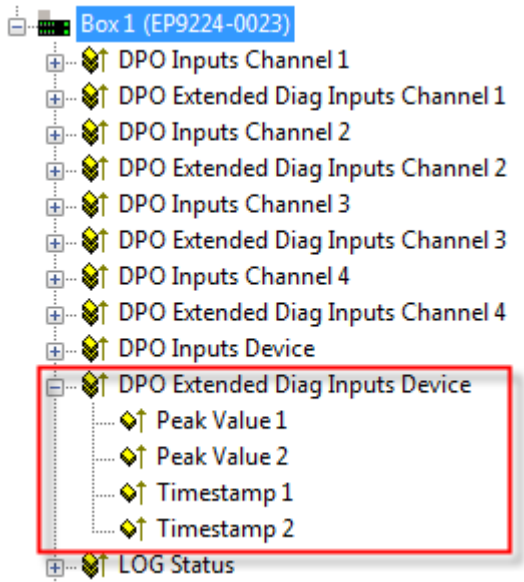


Fig. 55: EP9224 - DPO Extended Diag Inputs Device

DPO Extended Diag Outputs Channel n

The *Peak Value* and *Timestamp* data of the respective channel are reset by setting the *Reset Extended Diag Data* bit.

The bit is state-triggered.

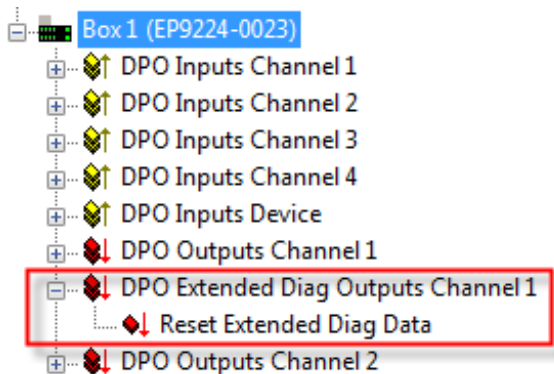


Fig. 56: EP9224 - DPO Extended Diag Outputs Channel 1

DPO Extended Diag Outputs Device

The *Peak Value* and *Timestamp* data of the module are reset by setting the *Reset Extended Diag Data* bit.

The bit is state-triggered.

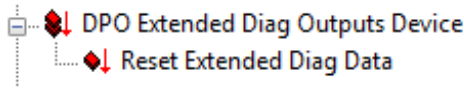


Fig. 57: EP9224 - DPO Extended Diag Outputs Device

4.6.1.4 Timestamp / trigger of the EP9224

The last min/max values **Peak Value n** and the respective timestamp **Timestamp n** can be displayed or recorded via the *Timestamp / Trigger* setting, depending on the trigger criterion in the CoE 80n0:15 and 16.

Process data

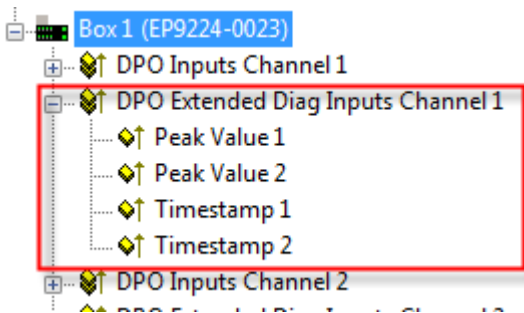


Fig. 58: EP9224 - process data

Peak value / Timestamp

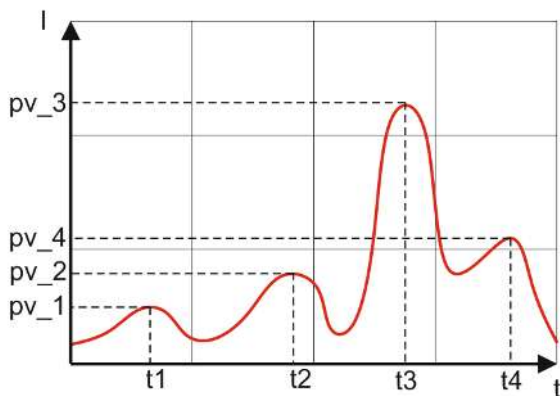


Fig. 59: EP9224 - Peak value / Timestamp

The present value and the associated timestamp are set each time the value momentarily saved in **Peak Value n** is exceeded or fallen below.

Thus, for example, in the above case with the setting *Maximum Current Us*, the value pv_3 is displayed in the process data with the timestamp t3.

Selection of the trigger criterion

Settings for each output channel

The object 80n0:15 or 16 must be adapted for the selection.

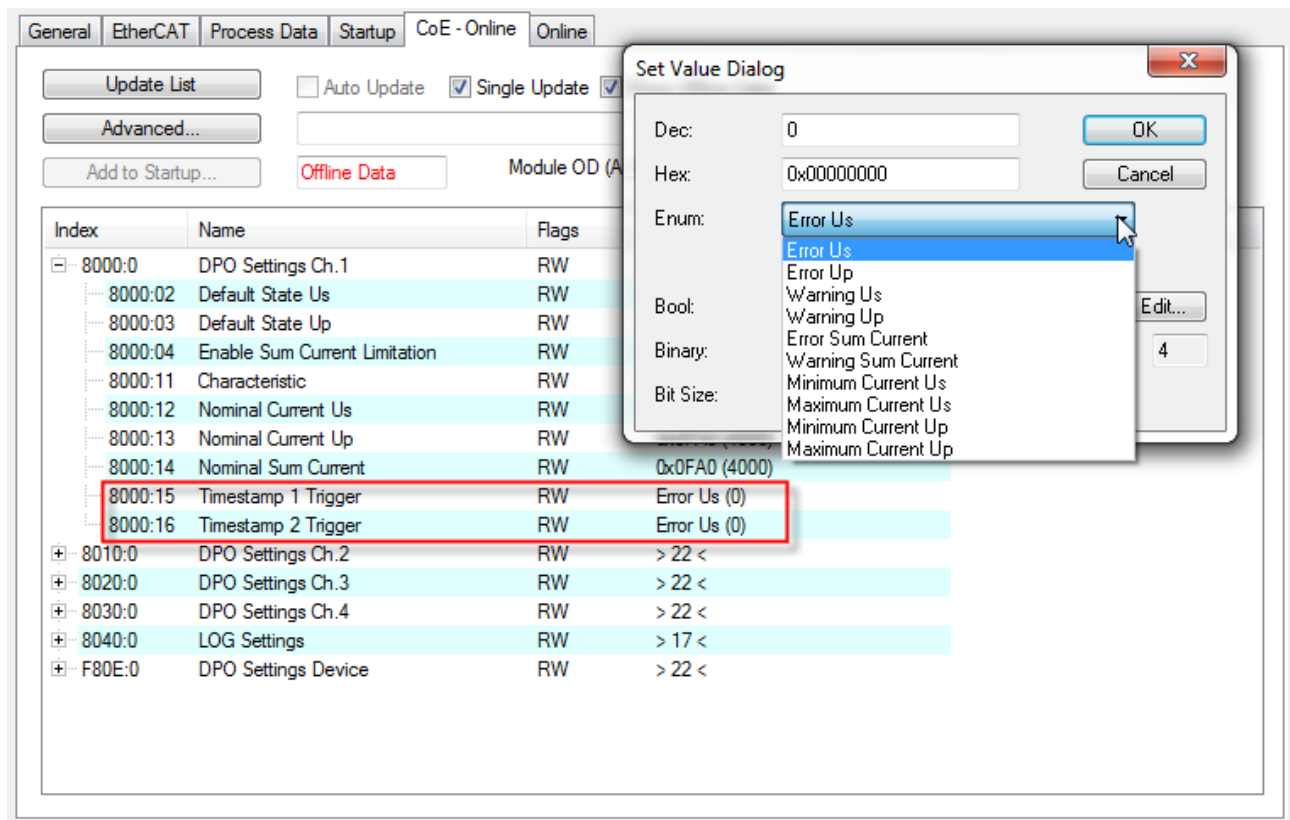


Fig. 60: EP9224 - Selection of the trigger criterion - Settings for each output channel

Description of the setting

CoE	Title	Description
80n0:15 / 16	Error Us	Switch-off of Us due to an error (edge triggered 0->1)
	Error Up	Switch-off of Up due to an error (edge triggered 0->1)
	Warning Us	Imminent switch-off of Us due to a continuous overload > 100% (edge triggered 0->1)
	Warning Up	Imminent switch-off of Up due to a continuous overload > 100% (edge triggered 0->1)
	Error Sum Current	Switch-off of Us and Up due to a total current error (edge triggered 0->1)
	Warning Sum Current	Imminent switch-off of Us and Up due to a total current error (edge triggered 0->1)
	Minimum Current Us	Minimum current on Us
	Maximum Current Us	Maximum current on Us
	Minimum Current Up	Minimum current on Up
	Maximum Current Up	Maximum current on Up

Reset of the values

Reset of *Peak Value n* and *Timestamp* for each channel

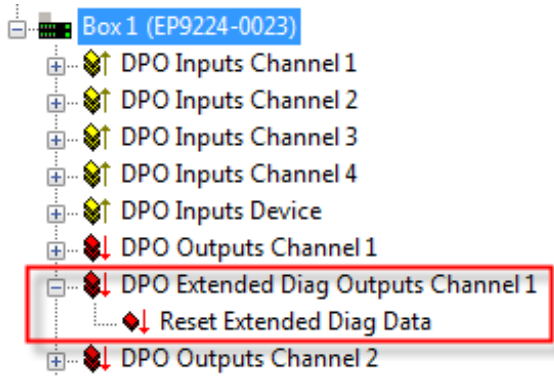


Fig. 61: EP9224 - Reset extended diag data for the channel

Reset of *Peak Value n* and *Timestamp* of the module

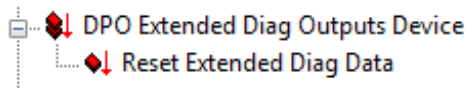


Fig. 62: EP9224 - Reset extended diag data for the module

4.6.1.5 Data logging

Overview

With the data logging the continuous logging of all relevant EP9224 data can be started.

These data are written to a 40-line ring buffer.

On the first error the recording is stopped so that the data can be evaluated after an error or during normal operation.

In the event of an error, data are still written for a few cycles. The switching-off of a channel is indicated by OFF.

The writing rate or scanning rate is 10 ms in the factory setting. The value can be adjusted from 1 ms to 1000 ms in the CoE.

Setting of the scanning rate via CoE object 8040:11

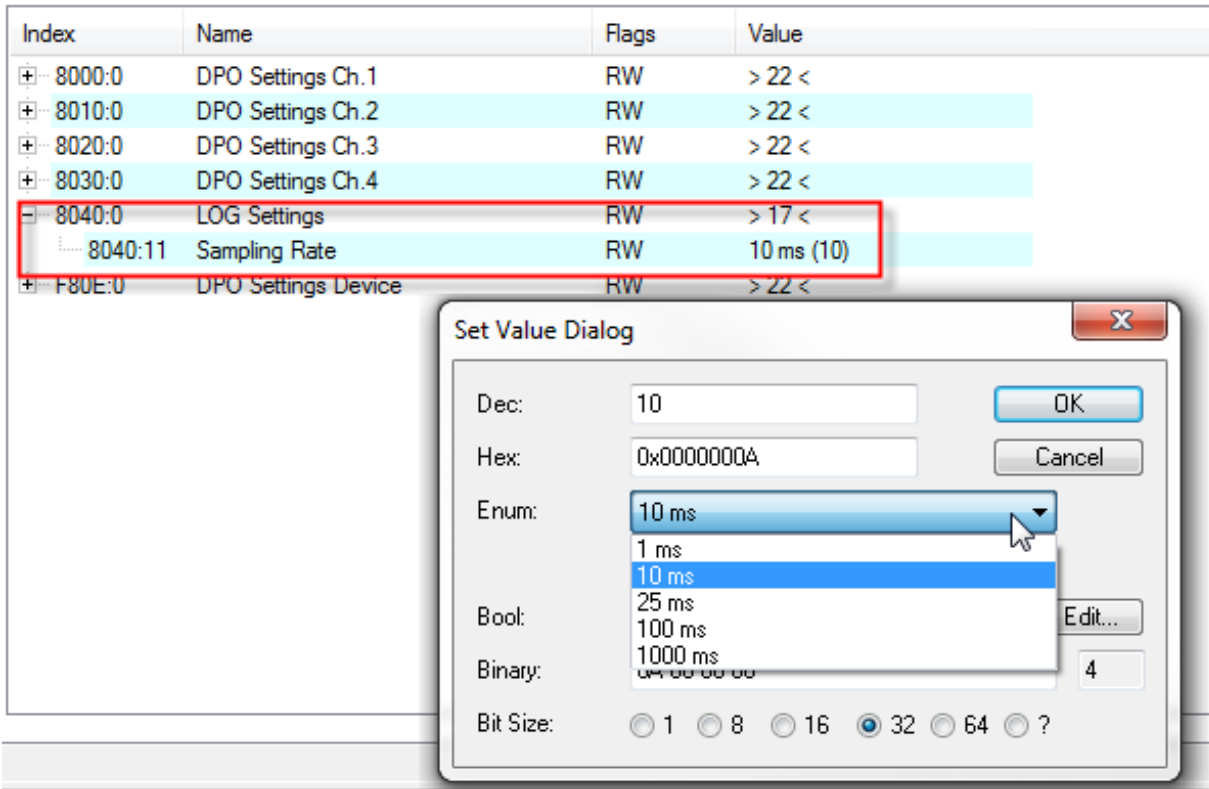


Fig. 63: EP9224 - Setting of the scanning rate

Starting the logger

The logger is started/stopped via the process data

- Start logger and
- Stop logger

These must be activated via the PDO mapping 0x1610 (see PDO settings [▶ 68]).

DPO LOG Control

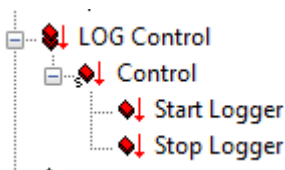


Fig. 64: EP9224 - DPO LOG Control

The log file is written when stopping the logger or in the case of an error.

The state of the logger can be tracked in the PDO input area.

To do this it is necessary to activate the PDO 0x1A10 (see PDO settings [▶ 68]).

DPO LOG Status

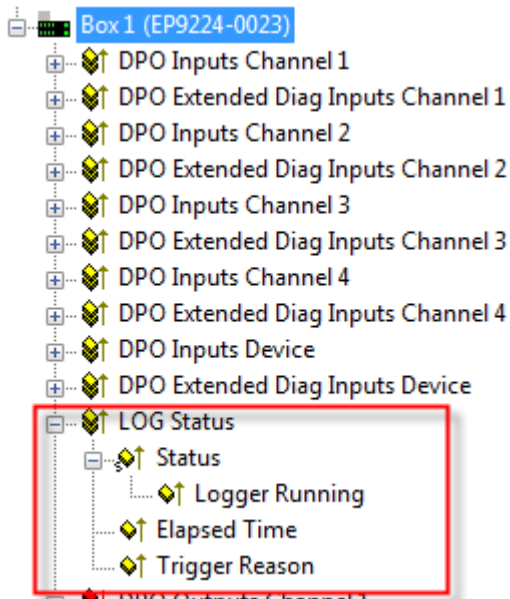


Fig. 65: EP9224 - DPO LOG Status

Upload the file from the EP9224

The EP9224 creates the file, giving it the name *logdata.csv*. This cannot be changed.

When uploading, for example, it must be specified accordingly in TwinCAT.

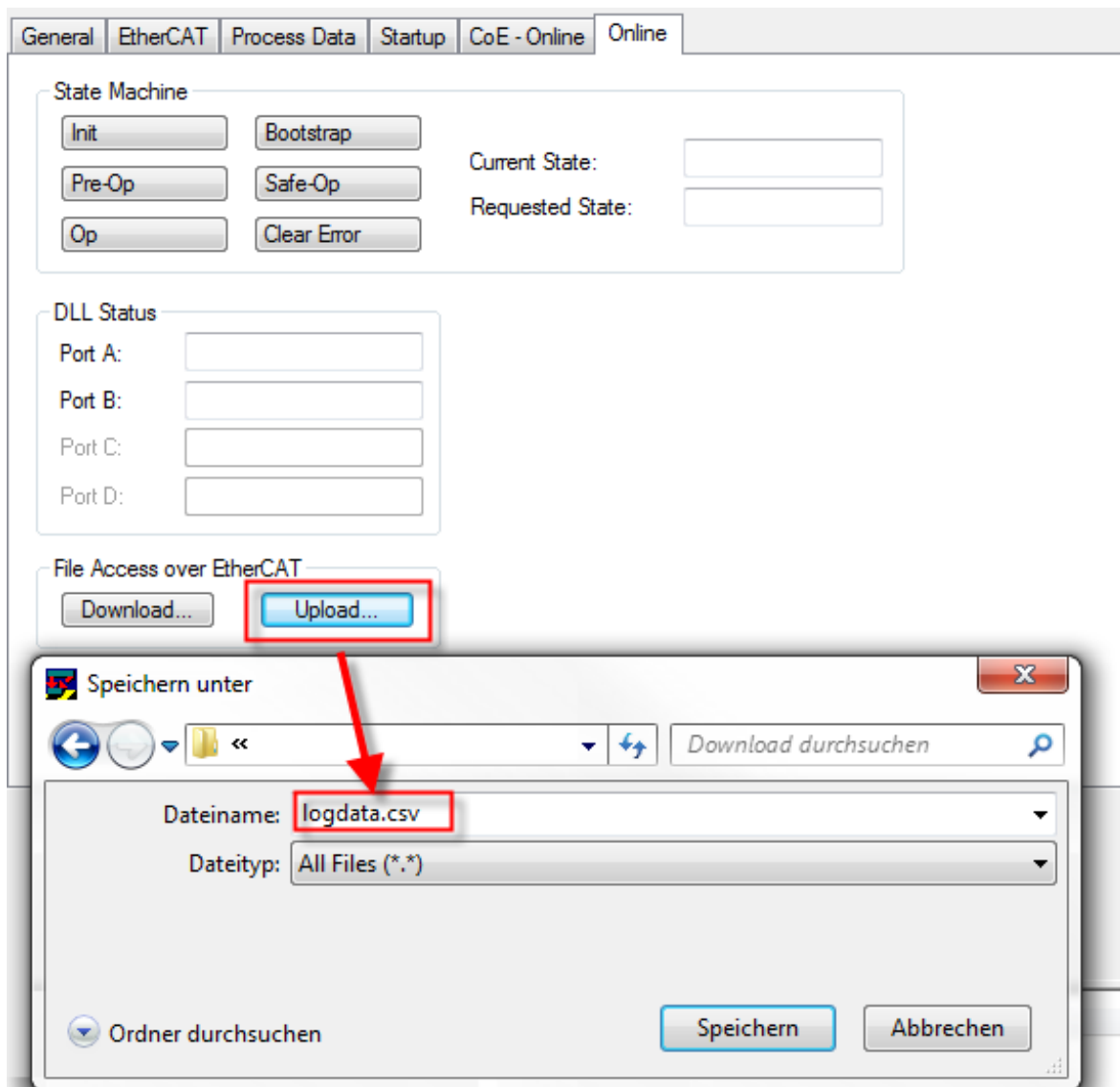


Fig. 66: EP9224 - Uploading the file

Structure of the logging file: logdata.csv

The data are saved in the CSV format, so that simple viewing with EXCEL or a corresponding interpretation is possible.

**** Logfile from Ethercat Slave ****			
Device Name	EP9224-0023		
File Version	01. Mai		
Reason for which the snapshot was taken	Overcurrent		
Age of snapshot	55 s		
System timestamp (0 if DC not supported)	2,47326E+13		
Column description	Time offset addition:	I(Us1)	I(Us2)
Unit	ms	100 mA	100 mA
		390	25
		380	25
		370	25
		360	25
		350	25

Fig. 67: EP9224 - Structure of the file: logdata.csv

Header

Type	Description
Device name	Name of the module
File Version	Version number (note: when importing from EXCEL the version, e.g. 1.5, is interpreted/displayed as a date (1st May))
Reason for which the snapshot was taken	Cause of switching off the data logger
Age of snapshot	Period elapsed between preparing the file and the upload
System timestamp (0 if DC not supported)	current time stamp when uploading

Columns

Type	Description
Time offset additional to snapshot age	The age of the measured values in the row in relation to the stopping of the data logger (0 = stop, > 0 older values) in ms
I(U...)	present current values of the channels Us / Up 1 - 4 in 100 mA
Internal Temperature	internal module temperature in °C
Us / Up	Input voltage Us and Up at the 7/8" input in V
Sum Current Us / Up	Sum current of Us and Up in A
I ² t(U...)	virtual overload, incremented or decremented depending on the nominal current <ul style="list-style-type: none"> • from 10% warning • at 100% shut-off

Example: slow exceeding of the current (simulation with potentiometer)

logdata.csv (zip)


Time offset ms	I(Us1) 100 mA	I(Us2) 100 mA	I(Us3) 100	I(Us4) 100 n	I(U1) 100	I(U2) 100	I(U3) 100	I(U4) 10	Internal °C	Us V	Up V	Sum c A	Sum A	I ^t (Us1) %
390	30	0	0	0	1	0	0	0	38	22	23	3	0	0
380	30	0	0	0	1	0	0	0	38	22	23	3	0	0
370	33	0	0	0	1	0	0	0	38	22	22	3	0	0
360	33	0	0	0	1	0	0	0	38	22	23	3	0	0
350	33	0	0	0	1	0	0	0	38	22	23	3	0	0
340	33	0	0	0	1	0	0	0	38	22	23	3	0	0
330	33	0	0	0	1	0	0	0	38	22	23	3	0	0
320	33	0	0	0	1	0	0	0	38	22	22	3	0	0
310	33	0	0	0	1	0	0	0	38	22	22	3	0	0
300	33	0	0	0	1	0	0	0	38	22	22	3	0	0
290	33	0	0	0	1	0	0	0	38	22	22	3	0	0
280	33	0	0	0	1	0	0	0	38	22	23	3	0	0
270	36	0	0	0	1	0	0	0	38	22	23	3	0	0
260	36	0	0	0	1	0	0	0	38	22	22	3	0	0
250	36	0	0	0	1	0	0	0	38	22	23	3	0	0
240	36	0	0	0	1	0	0	0	38	22	23	3	0	0
230	36	0	0	0	1	0	0	0	38	22	23	3	0	0
220	36	0	0	0	1	0	0	0	38	22	23	3	0	0
210	36	0	0	0	1	0	0	0	38	22	22	3	0	0
200	36	0	0	0	1	0	0	0	38	22	22	3	0	0
190	36	0	0	0	1	0	0	0	38	22	22	3	0	0
180	36	0	0	0	1	0	0	0	38	22	23	3	0	1
170	36	0	0	0	1	0	0	0	38	22	22	3	0	1
160	40	0	0	0	1	0	0	0	38	22	23	4	0	1
150	40	0	0	0	1	0	0	0	38	22	22	4	0	1
140	41	0	0	0	1	0	0	0	38	22	23	4	0	1
130	40	0	0	0	1	0	0	0	38	22	23	4	0	1
120	40	0	0	0	1	0	0	0	38	22	23	4	0	1
110	40	0	0	0	1	0	0	0	38	22	22	4	0	1
100	46	0	0	0	1	0	0	0	38	22	23	4	0	11
90	46	0	0	0	1	0	0	0	38	22	23	4	0	21
80	46	0	0	0	1	0	0	0	38	22	23	4	0	31
70	46	0	0	0	1	0	0	0	38	22	23	4	0	41
60	46	0	0	0	1	0	0	0	38	22	23	4	0	51
50	46	0	0	0	1	0	0	0	38	22	23	4	0	61
40	46	0	0	0	1	0	0	0	38	22	22	4	0	71
30	51	0	0	0	1	0	0	0	38	21	22	5	0	81
20	49	0	0	0	1	0	0	0	38	21	21	4	0	91
10 Off		0	0	0	1	0	0	0	38	22	22	0	0	99
0 Off		0	0	0	1	0	0	0	38	23	23	0	0	99


Fig. 68: EP9224 - logdata.csv

Description:

- EP9224: Setting the Us channel to a nominal current of 1500 mA
- Continuous increase of the current on channel 1 Us within the recorded range of 3.0 A to 4.9 A, then shut-off takes place.
- Overcurrent begins from 180 ms
- 100% overload reached (99), channel is switched off
- the module now waits for an error correction or an active reset of the error

4.6.2 EP9224-0023 - Object description

 Note	<p>Parameterization</p> <p>Terminals' parameterization will be conducted by the CoE tab (double-click on the referring object) or the Process data tab (PDO assignment)</p>
--	--

 Note	<p>EtherCAT XML Device Description</p> <p>The description correspond to the display of the CoE objects from the EtherCAT XML Device Description. It is strongly recommended to download the latest revision of the corresponding XML file from the Beckhoff website (http://www.beckhoff.com/english/default.htm?download/elconfig.htm) and follow the installation instructions.</p>
--	--

The CoE overview contains objects for different intended applications:

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

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

4.6.2.1 Objects for parameterization

4.6.2.1.1 Index 1011 Restore default parameters

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

4.6.2.1.2 Index 8000 DPO Settings Ch.1

Index	Name	Meaning	Data type	Flags	Default
8000:0	DPO Settings Ch.1		UINT8	RO	0x16 (22 _{dec})
8000:02	Default State Us	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8000:03	Default State Up	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8000:04	Enable Sum Current Limitation	Sum current limitation: 0 _{bin} : disabled 1 _{bin} : enabled	boolean	RW	0x00 (0 _{dec})
8000:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8000:12	Nominal Current Us	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8000:13	Nominal Current Up	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8000:14	Nominal Sum Current	Nominal total current	UINT16	RW	0x0FA0 (4000 _{dec})
8000:15	Timestamp 1 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})
8000:16	Timestamp 2 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})

4.6.2.1.3 Index 8010 DPO Settings Ch.2

Index	Name	Meaning	Data type	Flags	Default
8010:0	DPO Settings Ch.2		UINT8	RO	0x16 (22 _{dec})
8010:02	Default State Us	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8010:03	Default State Up	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8010:04	Enable Sum Current Limitation	Sum current limitation: 0 _{bin} : disabled 1 _{bin} : enabled	boolean	RW	0x00 (0 _{dec})
8010:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8010:12	Nominal Current Us	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8010:13	Nominal Current Up	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8010:14	Nominal Sum Current	Nominal total current	UINT16	RW	0x0FA0 (4000 _{dec})
8010:15	Timestamp 1 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})
8010:16	Timestamp 2 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})

4.6.2.1.4 Index 8020 DPO Settings Ch.3

Index	Name	Meaning	Data type	Flags	Default
8020:0	DPO Settings Ch.3		UINT8	RO	0x16 (22 _{dec})
8020:02	Default State Us	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8020:03	Default State Up	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8020:04	Enable Sum Current Limitation	Sum current limitation: 0 _{bin} : disabled 1 _{bin} : enabled	boolean	RW	0x00 (0 _{dec})
8020:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8020:12	Nominal Current Us	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8020:13	Nominal Current Up	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8020:14	Nominal Sum Current	Nominal total current	UINT16	RW	0x0FA0 (4000 _{dec})
8020:15	Timestamp 1 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})
8020:16	Timestamp 2 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})

4.6.2.1.5 Index 8030 DPO Settings Ch.4

Index	Name	Meaning	Data type	Flags	Default
8030:0	DPO Settings Ch.4		UINT8	RO	0x16 (22 _{dec})
8030:02	Default State Us	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8030:03	Default State Up	The output adopts this value if <i>Enable Control via Fieldbus</i> (F707:01) is not set or no connection to the fieldbus	boolean	RW	0x01 (1 _{dec})
8030:04	Enable Sum Current Limitation	Sum current limitation: 0 _{bin} : disabled 1 _{bin} : enabled	boolean	RW	0x00 (0 _{dec})
8030:11	Characteristic	Specifies the characteristic with which the current monitoring reacts: 0 _{dec} : very fast acting 1 _{dec} : fast acting 2 _{dec} : slow acting 3 _{dec} : time delay	UINT16	RW	0x0001 (1 _{dec})
8030:12	Nominal Current Us	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8030:13	Nominal Current Up	Nominal current at the output	UINT16	RW	0x0FA0 (4000 _{dec})
8030:14	Nominal Sum Current	Nominal total current	UINT16	RW	0x0FA0 (4000 _{dec})
8030:15	Timestamp 1 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})
8030:16	Timestamp 2 Trigger	Trigger condition for extended diagnosis	UINT16	RW	0x0000 (0 _{dec})

4.6.2.1.6 Index 8040 LOG Settings

Index	Name	Meaning	Data type	Flags	Default
8040:0	LOG Set-tings		UINT8	RO	0x11 (17 _{dec})
8040:11	Sampling Rate	permitted values: 1: 1 ms 10: 10 ms 25: 25 ms 100: 100 ms	UINT16	RW	0x000A (10 _{dec})

4.6.2.1.7 Index F607 DPO Inputs Device

Index	Name	Meaning	Data type	Flags	Default
F607:0	DPO Inputs Device		UINT8	RO	0x19 (25 _{dec})
F607:01	Temperature Warning	A temperature of about 80°C has been reached	boolean	RO	0x00 (0 _{dec})
F607:02	Temperature Error	A critical temperature of about 85°C has been reached, the outputs will be switched off. The bit must be reset by a <i>Global Reset</i> (F707:04) or by a voltage reset. No output can be switched on if the error bit is set.	boolean	RO	0x00 (0 _{dec})
F607:03	Us Warning	Us is less than 21.5 V, no further outputs can be switched on.	boolean	RO	0x00 (0 _{dec})
F607:04	Us Error	Us is less than 19 V, all Us outputs will be switched off. The bit must be reset by a <i>Global Reset</i> (F707:04) or by a voltage reset. No Us output can be switched on if the error bit is set.	boolean	RO	0x00 (0 _{dec})
F607:05	Up Warning	Up is less than 21.5 V, no further outputs can be switched on.	boolean	RO	0x00 (0 _{dec})
F607:06	Up Error	Up is less than 19 V, all Up outputs will be switched off. The bit must be reset by a <i>Global Reset</i> (F707:04) or by a voltage reset. No Up output can be switched on if the error bit is set.	boolean	RO	0x00 (0 _{dec})
F607:07	Global Error Bit	One of the error bits of the four channels or F607:02 or F607:04 or F607:06 is set	boolean	RO	0x00 (0 _{dec})
F607:08	Sum Current Warning	Sum current monitoring has detected a peak current	boolean	RO	0x00 (0 _{dec})
F607:09	Sum Current Error	Sum current monitoring has detected an over current. All outputs are switched off	boolean	RO	0x00 (0 _{dec})
F607:0C	Reset Input	Us is less than 21.5 V, no further outputs can be switched on.	boolean	RO	0x00 (0 _{dec})
F607:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
F607:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})
F607:11	Current Us	Sum current of the module at Us	INT16	RO	0x0000 (0 _{dec})
F607:12	Current Up	Sum current of the module at Up	INT16	RO	0x0000 (0 _{dec})
F607:13	Voltage Us	Voltage at input Us	INT16	RO	0x0000 (0 _{dec})
F607:14	Voltage Up	Voltage at input Up	INT16	RO	0x0000 (0 _{dec})
F607:15	Temperature	Internal temperature of power stage	INT16	RO	0x0000 (0 _{dec})
F607:16	Peak Value 1	Extended diagnosis	INT16	RO	0x0000 (0 _{dec})
F607:17	Peak Value 2	Extended diagnosis	INT16	RO	0x0000 (0 _{dec})
F607:18	Timestamp 1		UINT64	RO	
F607:19	Timestamp 2		UINT64	RO	

4.6.2.1.8 Index F707 DPO Outputs Device

Index	Name	Meaning	Data type	Flags	Default
F707:0	DPO Out-puts Device		UINT8	RO	0x11 (17 _{dec})
F707:01	Enable Control Via Fieldbus	0 _{bin} : All outputs are set to their default values (80X0:02, 80X0:03) 1 _{bin} : All outputs are set according to their PDOs (70X0:01, 70X0:02)	boolean	RO	0x00 (0 _{dec})
F707:04	Global Reset	All error bits are reset	boolean	RO	0x00 (0 _{dec})
F707:11	Reset Extended Diag Data	Peak Values and time stamps from F607 are reset	boolean	RO	0x00 (0 _{dec})

4.6.2.1.9 Index F80E DPO Settings Device

Index	Name	Meaning	Data type	Flags	Default
F80E:0	DPO Settings Device		UINT8	RO	0x16 (22 _{dec})
F80E:02	Enable Sum Current Limitation	Sum Current monitoring: 0 _{bin} : enabled 1 _{bin} : disabled	boolean	RW	0x00 (0 _{dec})
F80E:03	Automatic Restart After Uncritic Events on Us	Switch on automatically after undervoltage und overtemperature: 0 _{bin} : enabled 1 _{bin} : disabled	boolean	RW	0x00 (0 _{dec})
F80E:04	Automatic Restart After Uncritic Events on Up	Switch on automatically after undervoltage und overtemperature: 0 _{bin} : enabled 1 _{bin} : disabled	boolean	RW	0x00 (0 _{dec})
F80E:11	Startup Delay	Sets the time that is kept between two switch-on procedures: 1 _{dec} : fast (10 ms) 2 _{dec} : moderate (100 ms) 3 _{dec} : slow (200 ms)	UINT16	RW	0x0001 (1 _{dec})
F80E:12	Nominal Sum Current	Nominal sum current	INT16	RW	0x2710 (10000 _{dec})
F80E:13	Sum Current Characteristic	Characteristic of sum current monitoring	UINT16	RW	0x0001 (1 _{dec})
F80E:15	Timestamp 1 Trigger	Item that ist to be monitored for extended diagnosis: 0: Temperature Warning 1: Temperature Error 2: Us Warning 3: Us Error 4: Up Warning 5: Up Error 6: Global Error Bit 7: Sum Current Warning 8: Sum Current Error 16: Minmum Current Us 17: Maximum Current Us 18: Minimum Current Up 19: Maximum Current Up 20: Minimum Voltage Us 21: Maximum Voltage Us 22: Minimum Voltage Up 23: Maximum Voltage Up 25: Maximum Temperature 24: Minimum Temperature	UINT16	RW	0x0000 (0 _{dec})
F80E:16	Timestamp 2 Trigger	Item that ist to be monitored for extended diagnosis: 0: Temperature Warning 1: Temperature Error 2: Us Warning 3: Us Error 4: Up Warning 5: Up Error 6: Global Error Bit 7: Sum Current Warning 8: Sum Current Error 16: Minmum Current Us 17: Maximum Current Us 18: Minimum Current Up 19: Maximum Current Up 20: Minimum Voltage Us 21: Maximum Voltage Us 22: Minimum Voltage Up 23: Maximum Voltage Up 25: Maximum Temperature 24: Minimum Temperature	UINT16	RW	0x0000 (0 _{dec})

4.6.2.2 Standard objects

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

4.6.2.2.1 Index 1000 Device type

Index	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: the Lo-Word contains the CoE profile used (5001). The Hi-Word contains the module profile according to the modular device profile.	UINT32	RO	0x00001389 (5001 _{dec})

4.6.2.2.2 Index 1008 Device name

Index	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EP9224-0023

4.6.2.2.3 Index 1009 Hardware version

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

4.6.2.2.4 Index 100A Software version

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

4.6.2.2.5 Index 1018 Identity

Index	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4 _{dec})
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2 _{dec})
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x24084052 (604520530 _{dec})
1018:03	Revision	Revision number of the EtherCAT slave; the low word (bit 0-15) indicates the special terminal number, the high word (bit 16-31) refers to the device description	UINT32	RO	0x00000000 (0 _{dec})
1018:04	Serial number	Serial number of the EtherCAT slave; the low byte (bit 0-7) of the low word contains the year of production, the high byte (bit 8-15) of the low word contains the week of production, the high word (bit 16-31) is 0	UINT32	RO	0x00000000 (0 _{dec})

4.6.2.2.6 Index 10F0 Backup parameter handling

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

4.6.2.2.7 Index 1600 DPO RxPDO-Map Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1600:0	DPO RxPDO-Map Outputs Ch.1	PDO Mapping RxPDO 1	UINT8	RO	0x06 (6 _{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x01 (Output Us))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x02 (Output Up))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1600:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x05 (Reset Us))	UINT32	RO	0x7000:05, 1
1600:05	SubIndex 005	5. PDO Mapping entry (object 0x7000 (DPO Outputs Ch.1), entry 0x06 (Reset Up))	UINT32	RO	0x7000:06, 1
1600:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.6.2.2.8 Index 1601 DPO RxPDO-Map Extended Diag Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1601:0	DPO RxPDO-Map Extended Diag Outputs Ch.1	PDO Mapping RxPDO 2	UINT8	RO	0x02 (2 _{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (DPO Outputs Ch.2), entry 0x01 (Output Us))	UINT32	RO	0x7000:11, 1
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (DPO Outputs Ch.2), entry 0x02 (Output Up))	UINT32	RO	0x0000:00, 15

4.6.2.2.9 Index 1602 DPO RxPDO-Map Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1602:0	DPO RxPDO-Map Outputs Ch.2	PDO Mapping RxPDO 3	UINT8	RO	0x06 (6 _{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x01 (Output Us))	UINT32	RO	0x7010:01, 1
1602:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x02 (Output Up))	UINT32	RO	0x7010:02, 1
1602:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1602:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x05 (Reset Us))	UINT32	RO	0x7010:05, 1
1602:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x06 (Reset Up))	UINT32	RO	0x7010:06, 1
1602:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.6.2.2.10 Index 1603 DPO RxPDO-Map Extended Diag Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1603:0	DPO RxPDO-Map Extended Diag Outputs Ch.2	PDO Mapping RxPDO 4	UINT8	RO	0x02 (2 _{dec})
1603:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x01 (Output Us))	UINT32	RO	0x7010:11, 1
1603:02	SubIndex 002	2. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x02 (Output Up))	UINT32	RO	0x0000:00, 15

4.6.2.2.11 Index 1604 DPO RxPDO-Map Outputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1604:0	DPO RxPDO-Map Outputs Ch.3	PDO Mapping RxPDO 5	UINT8	RO	0x06 (6 _{dec})
1604:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x01 (Output Us))	UINT32	RO	0x7020:01, 1
1604:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x02 (Output Up))	UINT32	RO	0x7020:02, 1
1604:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1604:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x05 (Reset Us))	UINT32	RO	0x7020:05, 1
1604:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x06 (Reset Up))	UINT32	RO	0x7020:06, 1
1604:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.6.2.2.12 Index 1605 DPO RxPDO-Map Extended Diag Outputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1605:0	DPO RxPDO-Map Extended Diag Outputs Ch.3	PDO Mapping RxPDO 6	UINT8	RO	0x02 (2 _{dec})
1605:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (DPO Outputs Ch.3), entry 0x11 (Reset Extended Diag Data))	UINT32	RO	0x7020:11, 1
1605:02	SubIndex 002	2. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15

4.6.2.2.13 Index 1606 DPO RxPDO-Map Outputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
1606:0	DPO RxPDO-Map Outputs Ch.4	PDO Mapping RxPDO 7	UINT8	RO	0x06 (6 _{dec})
1606:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x01 (Output Us))	UINT32	RO	0x7030:01, 1
1606:02	SubIndex 002	2. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x02 (Output Up))	UINT32	RO	0x7030:02, 1
1606:03	SubIndex 003	3. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1606:04	SubIndex 004	4. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x05 (Reset Us))	UINT32	RO	0x7030:05, 1
1606:05	SubIndex 005	5. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x06 (Reset Up))	UINT32	RO	0x7030:06, 1
1606:06	SubIndex 006	6. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10

4.6.2.2.14 Index 1607 DPO RxPDO-Map Extended Diag Outputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
1607:0	DPO RxPDO-Map Extended Diag Outputs Ch.4	PDO Mapping RxPDO 8	UINT8	RO	0x02 (2 _{dec})
1607:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (DPO Outputs Ch.4), entry 0x11 (Reset Extended Diag Data))	UINT32	RO	0x7030:11, 1
1607:02	SubIndex 002	2. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15

4.6.2.2.15 Index 1608 DPO RxPDO-Map Outputs Device

Index	Name	Meaning	Data type	Flags	Default
1608:0	DPO RxPDO-Map Outputs Device	PDO Mapping RxPDO 9	UINT8	RO	0x04 (4 _{dec})
1608:01	SubIndex 001	1. PDO Mapping entry (object 0xF707 (DPO Outputs Device), entry 0x01 (Enable Control Via Fieldbus))	UINT32	RO	0xF707:01, 1
1608:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1608:03	SubIndex 003	3. PDO Mapping entry (object 0xF707 (DPO Outputs Device), entry 0x04 (Global Reset))	UINT32	RO	0xF707:04, 1
1608:04	SubIndex 004	4. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12

4.6.2.2.16 Index 1609 DPO RxPDO-Map Extended Diag Outputs Device

Index	Name	Meaning	Data type	Flags	Default
1609:0	DPO RxPDO-Map Extended Diag Outputs Device	PDO Mapping RxPDO 10	UINT8	RO	0x02 (2 _{dec})
1609:01	SubIndex 001	1. PDO Mapping entry (object 0xF707 (DPO Outputs Device), entry 0x11 (Reset Extended Diag Data))	UINT32	RO	0xF707:11, 1
1609:02	SubIndex 002	2. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15

4.6.2.2.17 Index 1610 LOG RxPDO-Map Control

Index	Name	Meaning	Data type	Flags	Default
1610:0	LOG Rx-PDO-Map Control	PDO Mapping RxPDO 17	UINT8	RO	0x03 (3 _{dec})
1610:01	SubIndex 001	1. PDO Mapping entry (object 0x7040 (LOG Control), entry 0x01 (Start Logger))	UINT32	RO	0x7040:01, 1
1610:02	SubIndex 002	2. PDO Mapping entry (object 0x7040 (LOG Control), entry 0x02 (Stop Logger))	UINT32	RO	0x7040:02, 1
1610:03	SubIndex 003	3. PDO Mapping entry (14 bits align)	UINT32	RO	0x0000:00, 14

4.6.2.2.18 Index 1A00 DPO TxPDO-Map Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1A00:0	DPO Tx-PDO-Map Inputs Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x0E (14 _{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x01 (Error Us))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x02 (Error Up))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x03 (Warning Us))	UINT32	RO	0x6000:03, 1
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x04 (Warning Up))	UINT32	RO	0x6000:04, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x05 (Status Us))	UINT32	RO	0x6000:05, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x06 (Status Up))	UINT32	RO	0x6000:06, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x07 (Channel Error))	UINT32	RO	0x6000:07, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x08 (Error Sum Current))	UINT32	RO	0x6000:08, 1
1A00:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x09 (Warning Sum Current))	UINT32	RO	0x6000:09, 1
1A00:0A	SubIndex 010	10. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 5
1A00:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x0E (Sync error))	UINT32	RO	0x6000:0F, 1
1A00:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x0F (TxPDO State))	UINT32	RO	0x6000:10, 1
1A00:0D	SubIndex 013	13. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:11, 16
1A00:0E	SubIndex 014	14. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x11 (Current Us))	UINT32	RO	0x6000:12, 16

4.6.2.2.19 Index 1A01 DPO TxPDO-Map Extended Diag Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
1A01:0	DPO Tx-PDO-Map Extended Diag Inputs Ch.1	PDO Mapping TxPDO 2	UINT8	RO	0x04 (4 _{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x13 (Maximum Current Us))	UINT32	RO	0x6000:13, 16
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x14 (Maximum Current Up))	UINT32	RO	0x6000:14, 16
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x15 (Minimum Current Us))	UINT32	RO	0x6000:17, 64
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (DPO Inputs Ch.1), entry 0x16 (Minimum Current Up))	UINT32	RO	0x6000:18, 64

4.6.2.2.20 Index 1A02 DPO TxPDO-Map Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1A02:0	DPO Tx-PDO-Map Inputs Ch.2	PDO Mapping TxPDO 3	UINT8	RO	0x0E (14 _{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x01 (Error Us))	UINT32	RO	0x6010:01, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x02 (Error Up))	UINT32	RO	0x6010:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x03 (Warning Us))	UINT32	RO	0x6010:03, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x04 (Warning Up))	UINT32	RO	0x6010:04, 1
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x05 (Status Us))	UINT32	RO	0x6010:05, 1
1A02:06	SubIndex 006	6. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x06 (Status Up))	UINT32	RO	0x6010:06, 1
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x07 (Channel Error))	UINT32	RO	0x6010:07, 1
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x08 (Error Sum Current))	UINT32	RO	0x6010:08, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x09 (Warning Sum Current))	UINT32	RO	0x6010:09, 1
1A02:0A	SubIndex 010	10. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 5
1A02:0B	SubIndex 011	11. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x0E (Sync error))	UINT32	RO	0x6010:0F, 1
1A02:0C	SubIndex 012	12. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x0F (TxPDO State))	UINT32	RO	0x6010:10, 1
1A02:0D	SubIndex 013	13. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6010:11, 16
1A02:0E	SubIndex 014	14. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x11 (Current Us))	UINT32	RO	0x6010:12, 16

4.6.2.2.21 Index 1A03 DPO TxPDO-Map Extended Diag Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
1A03:0	DPO Tx-PDO-Map Extended Diag Inputs Ch.2	PDO Mapping TxPDO 4	UINT8	RO	0x04 (4 _{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x13 (Maximum Current Us))	UINT32	RO	0x6010:13, 16
1A03:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x14 (Maximum Current Up))	UINT32	RO	0x6010:14, 16
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x15 (Minimum Current Us))	UINT32	RO	0x6010:17, 64
1A03:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (DPO Inputs Ch.2), entry 0x16 (Minimum Current Up))	UINT32	RO	0x6010:18, 64

4.6.2.2.22 Index 1A04 DPO TxPDO-Map Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1A04:0	DPO Tx-PDO-Map Inputs Ch.3	PDO Mapping TxPDO 5	UINT8	RO	0x0E (14 _{dec})
1A04:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x01 (Error Us))	UINT32	RO	0x6020:01, 1
1A04:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x02 (Error Up))	UINT32	RO	0x6020:02, 1
1A04:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x03 (Warning Us))	UINT32	RO	0x6020:03, 1
1A04:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x04 (Warning Up))	UINT32	RO	0x6020:04, 1
1A04:05	SubIndex 005	5. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x05 (Status Us))	UINT32	RO	0x6020:05, 1
1A04:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x06 (Status Up))	UINT32	RO	0x6020:06, 1
1A04:07	SubIndex 007	7. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x07 (Channel Error))	UINT32	RO	0x6020:07, 1
1A04:08	SubIndex 008	8. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x08 (Error Sum Current))	UINT32	RO	0x6020:08, 1
1A04:09	SubIndex 009	9. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x09 (Warning Sum Current))	UINT32	RO	0x6020:09, 1
1A04:0A	SubIndex 010	10. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 5
1A04:0B	SubIndex 011	11. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x0E (Sync error))	UINT32	RO	0x6020:0F, 1
1A04:0C	SubIndex 012	12. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x0F (TxPDO State))	UINT32	RO	0x6020:10, 1
1A04:0D	SubIndex 013	13. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6020:11, 16
1A04:0E	SubIndex 014	14. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x11 (Current Us))	UINT32	RO	0x6020:12, 16

4.6.2.2.23 Index 1A05 DPO TxPDO-Map Extended Diag Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
1A05:0	DPO Tx-PDO-Map Extended Diag Inputs Ch.3	PDO Mapping TxPDO 6	UINT8	RO	0x04 (4 _{dec})
1A05:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x13 (Maximum Current Us))	UINT32	RO	0x6020:13, 16
1A05:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x14 (Maximum Current Up))	UINT32	RO	0x6020:14, 16
1A05:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x15 (Minimum Current Us))	UINT32	RO	0x6020:17, 64
1A05:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (DPO Inputs Ch.3), entry 0x16 (Minimum Current Up))	UINT32	RO	0x6020:18, 64

4.6.2.2.24 Index 1A06 DPO TxPDO-Map Inputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
1A06:0	DPO Tx-PDO-Map Inputs Ch.4	PDO Mapping TxPDO 7	UINT8	RO	0x0E (14 _{dec})
1A06:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x01 (Error Us))	UINT32	RO	0x6030:01, 1
1A06:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x02 (Error Up))	UINT32	RO	0x6030:02, 1
1A06:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x03 (Warning Us))	UINT32	RO	0x6030:03, 1
1A06:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x04 (Warning Up))	UINT32	RO	0x6030:04, 1
1A06:05	SubIndex 005	5. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x05 (Status Us))	UINT32	RO	0x6030:05, 1
1A06:06	SubIndex 006	6. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x06 (Status Up))	UINT32	RO	0x6030:06, 1
1A06:07	SubIndex 007	7. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x07 (Channel Error))	UINT32	RO	0x6030:07, 1
1A06:08	SubIndex 008	8. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x08 (Error Sum Current))	UINT32	RO	0x6030:08, 1
1A06:09	SubIndex 009	9. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x09 (Warning Sum Current))	UINT32	RO	0x6030:09, 1
1A06:0A	SubIndex 010	10. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 5
1A06:0B	SubIndex 011	11. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x0E (Sync error))	UINT32	RO	0x6030:0F, 1
1A06:0C	SubIndex 012	12. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x0F (TxPDO State))	UINT32	RO	0x6030:10, 1
1A06:0D	SubIndex 013	13. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6030:11, 16
1A06:0E	SubIndex 014	14. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x11 (Current Us))	UINT32	RO	0x6030:12, 16

4.6.2.2.25 Index 1A07 DPO TxPDO-Map Extended Diag Inputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
1A07:0	DPO Tx-PDO-Map Extended Diag Inputs Ch.4	PDO Mapping TxPDO 8	UINT8	RO	0x04 (4 _{dec})
1A07:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x13 (Maximum Current Us))	UINT32	RO	0x6030:13, 16
1A07:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x14 (Maximum Current Up))	UINT32	RO	0x6030:14, 16
1A07:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x15 (Minimum Current Us))	UINT32	RO	0x6030:17, 64
1A07:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (DPO Inputs Ch.4), entry 0x16 (Minimum Current Up))	UINT32	RO	0x6030:18, 64

4.6.2.2.26 Index 1A08 DPO TxPDO-Map Inputs Device

Index	Name	Meaning	Data type	Flags	Default
1A08:0	DPO Tx-PDO-Map Inputs Device	PDO Mapping TxPDO 9	UINT8	RO	0x13 (19 _{dec})
1A08:01	SubIndex 001	1. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x01 (Temperature Warning))	UINT32	RO	0xF607:01, 1
1A08:02	SubIndex 002	2. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x02 (Temperature Error))	UINT32	RO	0xF607:02, 1
1A08:03	SubIndex 003	3. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x03 (Us Warning))	UINT32	RO	0xF607:03, 1
1A08:04	SubIndex 004	4. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x04 (Us Error))	UINT32	RO	0xF607:04, 1
1A08:05	SubIndex 005	5. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x05 (Up Warning))	UINT32	RO	0xF607:05, 1
1A08:06	SubIndex 006	6. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x06 (Up Error))	UINT32	RO	0xF607:06, 1
1A08:07	SubIndex 007	7. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x07 (Global Error Bit))	UINT32	RO	0xF607:07, 1
1A08:08	SubIndex 008	8. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x08 (Sum Current Warning))	UINT32	RO	0xF607:08, 1
1A08:09	SubIndex 009	9. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x09 (Sum Current Error))	UINT32	RO	0xF607:09, 1
1A08:0A	SubIndex 010	10. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A08:0B	SubIndex 011	11. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x0C (Reset Input))	UINT32	RO	0xF607:0C, 1
1A08:0C	SubIndex 012	12. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A08:0D	SubIndex 013	13. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x0F (TxPDO State))	UINT32	RO	0xF607:0F, 1
1A08:0E	SubIndex 014	14. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x10 (TxPDO Toggle))	UINT32	RO	0xF607:10, 1
1A08:0F	SubIndex 015	15. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x11 (Current Us))	UINT32	RO	0xF607:11, 16
1A08:10	SubIndex 016	16. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x12 (Current Up))	UINT32	RO	0xF607:12, 16
1A08:11	SubIndex 017	17. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x13 (Voltage Us))	UINT32	RO	0xF607:13, 16
1A08:12	SubIndex 018	18. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x14 (Voltage Up))	UINT32	RO	0xF607:14, 16
1A08:13	SubIndex 019	19. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x15 (Temperature))	UINT32	RO	0xF607:15, 16

4.6.2.2.27 Index 1A09 DPO TxPDO-Map Extended Diag Inputs Device

Index	Name	Meaning	Data type	Flags	Default
1A09:0	DPO Tx-PDO-Map Extended Diag Inputs Device	PDO Mapping TxPDO 10	UINT8	RO	0x04 (4 _{dec})
1A09:01	SubIndex 001	1. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x16 (Peak Value 1))	UINT32	RO	0xF607:16, 16
1A09:02	SubIndex 002	2. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x17 (Peak Value 2))	UINT32	RO	0xF607:17, 16
1A09:03	SubIndex 003	3. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x18 (Timestamp 1))	UINT32	RO	0xF607:18, 64
1A09:04	SubIndex 004	4. PDO Mapping entry (object 0xF607 (DPO Inputs Device), entry 0x19 (Timestamp 2))	UINT32	RO	0xF607:19, 64

4.6.2.2.28 Index 1A10 LOG TxPDO-Map Status

Index	Name	Meaning	Data type	Flags	Default
1A10:0	LOG Tx-PDO-Map Status	PDO Mapping TxPDO 17	UINT8	RO	0x04 (4 _{dec})
1A10:01	SubIndex 001	1. PDO Mapping entry (object 0x6040 (LOG Status), entry 0x01 (Logger Running))	UINT32	RO	0x6040:01, 1
1A10:02	SubIndex 002	2. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15
1A10:03	SubIndex 003	3. PDO Mapping entry (object 0x6040 (LOG Status), entry 0x11 (Elapsed Time))	UINT32	RO	0x6040:11, 32
1A10:04	SubIndex 004	4. PDO Mapping entry (object 0x6040 (LOG Status), entry 0x12 (Trigger Reason))	UINT32	RO	0x6040:12, 16

4.6.2.2.29 Index 1C00 Sync manager type

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

4.6.2.2.30 Index 1C12 RxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x05 (5 _{dec})
1C12:01	Subindex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1600 (5632 _{dec})
1C12:02	Subindex 002	2. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1602 (5634 _{dec})
1C12:03	Subindex 003	3. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1604 (5636 _{dec})
1C12:04	Subindex 004	4. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1606 (5638 _{dec})
1C12:05	Subindex 005	5. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1608 (5640 _{dec})
1C12:06	Subindex 006	6. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C12:07	Subindex 007	7. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C12:08	Subindex 008	8. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C12:09	Subindex 009	9. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C12:0A	Subindex 010	10. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C12:0B	Subindex 011	11. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})

4.6.2.2.31 Index 1C13 TxPDO assign

Index	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x05 (5 _{dec})
1C13:01	Subindex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656 _{dec})
1C13:02	Subindex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A02 (6658 _{dec})
1C13:03	Subindex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A04 (6660 _{dec})
1C13:04	Subindex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A06 (6662 _{dec})
1C13:05	Subindex 005	5. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A08 (6664 _{dec})
1C13:06	Subindex 006	6. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C13:07	Subindex 007	7. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C13:08	Subindex 008	8. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C13:09	Subindex 009	9. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C13:0A	Subindex 010	10. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})
1C13:0B	Subindex 011	11. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x0000 (0 _{dec})

4.6.2.2.32 Index 1C32 SM output parameter

Index	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32 _{dec})
1C32:01	Sync mode	Current synchronization mode: <ul style="list-style-type: none"> • 0: Free Run • 1: Synchronous with SM 2 event • 2: DC-Mode - Synchronous with SYNC0 Event • 3: DC-Mode - Synchronous with SYNC1 event 	UINT16	RW	0x0000 (0 _{dec})
1C32:02	Cycle time	Cycle time (in ns): <ul style="list-style-type: none"> • Free Run: Cycle time of the local timer • Synchronous with SM 2 event: Master cycle time • DC-Mode: SYNC0/SYNC1 Cycle Time 	UINT32	RW	0x000F4240 (1000000 _{dec})
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000384 (900 _{dec})
1C32:04	Sync modes supported	Supported synchronization modes: <ul style="list-style-type: none"> • Bit 0 = 1: free run is supported • Bit 1 = 1: Synchronous with SM 2 event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 1C32:08) 	UINT16	RO	0x0001 (1 _{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000F4240 (1000000 _{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0 _{dec})
1C32:07	Minimum delay time		UINT32	RO	0x00000384 (900 _{dec})
1C32:08	Command	<ul style="list-style-type: none"> • 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 1C32:03, 1C32:05, 1C32:06, 1C32:09, 1C33:03, 1C33:06, and 1C33:09 are updated with the maximum measured values. For a subsequent measurement the measured values are reset	UINT16	RW	0x0000 (0 _{dec})
1C32:09	Maximum delay time	Time between SYNC1 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000384 (900 _{dec})
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0 _{dec})
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0 _{dec})
1C32:0D	Shift too short counter	Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only)	UINT16	RO	0x0000 (0 _{dec})
1C32:20	Sync error	The synchronization was not correct in the last cycle, (outputs were output too late; DC mode only)	boolean	RO	0x00 (0 _{dec})

4.6.2.2.33 Index 1C33 SM input parameter

Index	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32 _{dec})
1C33:01	Sync mode	Current synchronization mode: <ul style="list-style-type: none"> 0: Free Run 1: Synchronous with SM 3 event (no outputs available) 2: DC - Synchronous with SYNC0 Event 3: DC - Synchronous with SYNC1 Event 34: Synchronous with SM 2 event (outputs available) 	UINT16	RW	0x0000 (0 _{dec})
1C33:02	Cycle time	as 1C32:02	UINT32	RW	0x000F4240 (1000000 _{dec})
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000384 (900 _{dec})
1C33:04	Sync modes supported	Supported synchronization modes: <ul style="list-style-type: none"> Bit 0: free run is supported Bit 1: synchronous with SM 2 event is supported (outputs available) Bit 1: synchronous with SM 3 event is supported (no outputs available) Bit 2-3 = 01: DC mode is supported Bit 4-5 = 01: input shift 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) 	UINT16	RO	0x0001 (1 _{dec})
1C33:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000F4240 (1000000 _{dec})
1C33:06	Calc and copy time	Time between reading of the inputs and availability of the inputs for the master (in ns, only DC mode)	UINT32	RO	0x00000000 (0 _{dec})
1C33:07	Minimum delay time		UINT32	RO	0x00000384 (900 _{dec})
1C33:08	Command	<ul style="list-style-type: none"> 0: Measurement of the local cycle time is stopped 1: Measurement of the local cycle time is started <p>The entries 1C32:03, 1C32:05, 1C32:06, 1C32:09, 1C33:03, 1C33:06, and 1C33:09 are updated with the maximum measured values. For a subsequent measurement the measured values are reset</p>	UINT16	RW	0x0000 (0 _{dec})
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000384 (900 _{dec})
1C33:0B	SM event missed counter	as 1C32:11	UINT16	RO	0x0000 (0 _{dec})
1C33:0C	Cycle exceeded counter	as 1C32:12	UINT16	RO	0x0000 (0 _{dec})
1C33:0D	Shift too short counter	as 1C32:13	UINT16	RO	0x0000 (0 _{dec})
1C33:20	Sync error	as 1C32:32	boolean	RO	0x00 (0 _{dec})

4.6.2.3 Profile-specific objects (0x6000-0xFFFF)

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

4.6.2.3.1 Index 6000 DPO Inputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
6000:0	DPO Inputs Ch.1	Input of the first channel	UINT8	RO	0x18 (24 _{dec})
6000:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7000:05). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6000:02	Error Up	The current monitoring of Up has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7000:06). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6000:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6000:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6000:05	Status Us	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6000:06	Status Up	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6000:07	Channel Error	6000:01 or 6000:02 are set	boolean	RO	0x00 (0 _{dec})
6000:08	Error Sum Current	Sum current of the channel has been exceeded. So the output is switched off. An active reset is required to set the output again.	boolean	RO	0x00 (0 _{dec})
6000:09	Warning Sum Current	An overcurrent peak has been detected. If the output will be loaded furthermore in this way it will switch off.	boolean	RO	0x00 (0 _{dec})
6000:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6000:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})
6000:11	Current Us	Current from Us	INT16	RO	0x0000 (0 _{dec})
6000:12	Current Up	Current from Up	INT16	RO	0x0000 (0 _{dec})
6000:13	Peak Value 1	Peak value of the 1. item, that was measured for extended diagnosis of channel 1.	INT16	RO	0x0000 (0 _{dec})
6000:14	Peak Value 2	Peak value of the 2. item, that was measured for extended diagnosis of channel 1.	INT16	RO	0x0000 (0 _{dec})
6000:17	Timestamp 1	Time stamp when the peak value 6000:13 was measured	UINT64	RO	
6000:18	Timestamp 2	Time stamp when the peak value 6000:14 was measured	UINT64	RO	

4.6.2.3.2 Index 6010 DPO Inputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
6010:0	DPO Inputs Ch.2	Input of the first channel	UINT8	RO	0x18 (24 _{dec})
6010:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7010:05). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6010:02	Error Up	The current monitoring of Up has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7010:06). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6010:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6010:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6010:05	Status Us	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6010:06	Status Up	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6010:07	Channel Error	6010:01 or 6010:02 are set	boolean	RO	0x00 (0 _{dec})
6010:08	Error Sum Current	Sum current of the channel has been exceeded. So the output is switched off. An active reset is required to set the output again.	boolean	RO	0x00 (0 _{dec})
6010:09	Warning Sum Current	An overcurrent peak has been detected. If the output will be loaded furthermore in this way it will switch off.	boolean	RO	0x00 (0 _{dec})
6010:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6010:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})
6010:11	Current Us	Current from Us	INT16	RO	0x0000 (0 _{dec})
6010:12	Current Up	Current from Up	INT16	RO	0x0000 (0 _{dec})
6010:13	Peak Value 1	Peak value of the 1. item, that was measured for extended diagnosis of channel 2.	INT16	RO	0x0000 (0 _{dec})
6010:14	Peak Value 2	Peak value of the 2. item, that was measured for extended diagnosis of channel 2.	INT16	RO	0x0000 (0 _{dec})
6010:17	Timestamp 1	Time stamp when the peak value 6010:13 was measured	UINT64	RO	
6010:18	Timestamp 2	Time stamp when the peak value 6010:14 was measured	UINT64	RO	

4.6.2.3.3 Index 6020 DPO Inputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
6020:0	DPO Inputs Ch.3	Input of the first channel	UINT8	RO	0x18 (24 _{dec})
6020:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7020:05). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6020:02	Error Up	The current monitoring of Up has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7020:06). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6020:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6020:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6020:05	Status Us	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6020:06	Status Up	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6020:07	Channel Error	6020:01 or 6020:02 are set	boolean	RO	0x00 (0 _{dec})
6020:08	Error Sum Current	Sum current of the channel has been exceeded. So the output is switched off. An active reset is required to set the output again.	boolean	RO	0x00 (0 _{dec})
6020:09	Warning Sum Current	An overcurrent peak has been detected. If the output will be loaded furthermore in this way it will switch off.	boolean	RO	0x00 (0 _{dec})
6020:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6020:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})
6020:11	Current Us	Current from Us	INT16	RO	0x0000 (0 _{dec})
6020:12	Current Up	Current from Up	INT16	RO	0x0000 (0 _{dec})
6020:13	Peak Value 1	Peak value of the 1. item, that was measured for extended diagnosis of channel 3.	INT16	RO	0x0000 (0 _{dec})
6020:14	Peak Value 2	Peak value of the 2. item, that was measured for extended diagnosis of channel 3.	INT16	RO	0x0000 (0 _{dec})
6020:17	Timestamp 1	Time stamp when the peak value 6020:13 was measured	UINT64	RO	
6020:18	Timestamp 2	Time stamp when the peak value 6020:14 was measured	UINT64	RO	

4.6.2.3.4 Index 6030 DPO Inputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
6030:0	DPO Inputs Ch.4	Input of the first channel	UINT8	RO	0x18 (24 _{dec})
6030:01	Error Us	The current monitoring of Us has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7030:05). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6030:02	Error Up	The current monitoring of Up has tripped. The bit must be reset by a <i>Global Reset</i> (F707:04) or by the corresponding Reset Us (7030:06). The output cannot be activated as long as the bit is set.	boolean	RO	0x00 (0 _{dec})
6030:03	Warning Us	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6030:04	Warning Up	The monitoring has detected overcurrent; the switching off of output Us on this channel is imminent if the current consumption of the branch does not decrease.	boolean	RO	0x00 (0 _{dec})
6030:05	Status Us	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6030:06	Status Up	0 _{bin} : The output is switched off 1 _{bin} : The output supplies 24 V	boolean	RO	0x00 (0 _{dec})
6030:07	Channel Error	6030:01 or 6030:02 are set	boolean	RO	0x00 (0 _{dec})
6030:08	Error Sum Current	Sum current of the channel has been exceeded. So the output is switched off. An active reset is required to set the output again.	boolean	RO	0x00 (0 _{dec})
6030:09	Warning Sum Current	An overcurrent peak has been detected. If the output will be loaded furthermore in this way it will switch off.	boolean	RO	0x00 (0 _{dec})
6030:0F	TxPDO State		boolean	RO	0x00 (0 _{dec})
6030:10	TxPDO Toggle		boolean	RO	0x00 (0 _{dec})
6030:11	Current Us	Current from Us	INT16	RO	0x0000 (0 _{dec})
6030:12	Current Up	Current from Up	INT16	RO	0x0000 (0 _{dec})
6030:13	Peak Value 1	Peak value of the 1. item, that was measured for extended diagnosis of channel 4.	INT16	RO	0x0000 (0 _{dec})
6030:14	Peak Value 2	Peak value of the 2. item, that was measured for extended diagnosis of channel 4.	INT16	RO	0x0000 (0 _{dec})
6030:17	Timestamp 1	Time stamp when the peak value 6030:13 was measured	UINT64	RO	
6030:18	Timestamp 2	Time stamp when the peak value 6030:14 was measured	UINT64	RO	

4.6.2.3.5 Index 6040 LOG Status

Index	Name	Meaning	Data type	Flags	Default
6040:0	LOG Status		UINT8	RO	0x12 (18 _{dec})
6040:01	Logger Running	0: Logger still running	boolean	RO	0x00 (0 _{dec})
6040:11	Elapsed Time	Time since the logger was stopped	UINT32	RO	0x00000000 (0 _{dec})
6040:12	Trigger Reason	Reason the logger was stopped for	UINT16	RO	0x0000 (0 _{dec})

4.6.2.3.6 Index 7000 DPO Outputs Ch.1

Index	Name	Meaning	Data type	Flags	Default
7000:0	DPO Outputs Ch.1		UINT8	RO	0x11 (17 _{dec})
7000:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7000:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7000:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7000:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})
7000:11	Reset Extended Diag Data	The peak values and time stamps of the extended diagnosis for this channel are deleted.	boolean	RO	0x00 (0 _{dec})

4.6.2.3.7 Index 7010 DPO Outputs Ch.2

Index	Name	Meaning	Data type	Flags	Default
7010:0	DPO Outputs Ch.2		UINT8	RO	0x11 (17 _{dec})
7010:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7010:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7010:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7010:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})
7010:11	Reset Extended Diag Data	The peak values and time stamps of the extended diagnosis for this channel are deleted.	boolean	RO	0x00 (0 _{dec})

4.6.2.3.8 Index 7020 DPO Outputs Ch.3

Index	Name	Meaning	Data type	Flags	Default
7020:0	DPO Outputs Ch.3		UINT8	RO	0x11 (17 _{dec})
7020:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7020:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7020:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7020:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})
7020:11	Reset Extended Diag Data	The peak values and time stamps of the extended diagnosis for this channel are deleted.	boolean	RO	0x00 (0 _{dec})

4.6.2.3.9 Index 7030 DPO Outputs Ch.4

Index	Name	Meaning	Data type	Flags	Default
7030:0	DPO Outputs Ch.4		UINT8	RO	0x11 (17 _{dec})
7030:01	Output Us	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7030:02	Output Up	0: Us will be switched off 1: Us will be switched on	boolean	RO	0x00 (0 _{dec})
7030:05	Reset Us	An error on Us will be reset	boolean	RO	0x00 (0 _{dec})
7030:06	Reset Up	An error on Up will be reset	boolean	RO	0x00 (0 _{dec})
7030:11	Reset Extended Diag Data	The peak values and time stamps of the extended diagnosis for this channel are deleted.	boolean	RO	0x00 (0 _{dec})

4.6.2.3.10 Index 7040 LOG Control

Index	Name	Meaning	Data type	Flags	Default
7040:0	LOG Control		UINT8	RO	0x02 (2 _{dec})
7040:01	Start Logger		boolean	RO	0x00 (0 _{dec})
7040:02	Stop logger		boolean	RO	0x00 (0 _{dec})

4.6.2.3.11 Index 800F DPO Vendor data Ch.1

Index	Name	Meaning	Data type	Flags	Default
800F:0	DPO Vendor data Ch.1		UINT8	RO	0x14 (20 _{dec})
800F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
800F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
800F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
800F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.6.2.3.12 Index 801F DPO Vendor data Ch.2

Index	Name	Meaning	Data type	Flags	Default
801F:0	DPO Vendor data Ch.2		UINT8	RO	0x14 (20 _{dec})
801F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
801F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
801F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
801F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.6.2.3.13 Index 802F DPO Vendor data Ch.3

Index	Name	Meaning	Data type	Flags	Default
802F:0	DPO Vendor data Ch.3		UINT8	RO	0x14 (20 _{dec})
802F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
802F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
802F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
802F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.6.2.3.14 Index 803F DPO Vendor data Ch.4

Index	Name	Meaning	Data type	Flags	Default
803F:0	DPO Vendor data Ch.4		UINT8	RO	0x14 (20 _{dec})
803F:11	GainS		UINT16	RW	0x4000 (16384 _{dec})
803F:12	OffsetS		INT16	RW	0x0000 (0 _{dec})
803F:13	GainP		UINT16	RW	0x4000 (16384 _{dec})
803F:14	OffsetP		INT16	RW	0x0000 (0 _{dec})

4.6.2.3.15 Index F000 Modular device profile

Index	Name	Meaning	Data type	Flags	Default
F000:0	Modular device profile	General information for the modular device profile	UINT8	RO	0x02 (2 _{dec})
F000:01	Module index distance	Index spacing of the objects of the individual channels	UINT16	RO	0x0010 (16 _{dec})
F000:02	Maximum number of modules	Number of channels	UINT16	RO	0x0005 (5 _{dec})

4.6.2.3.16 Index F008 Code word

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

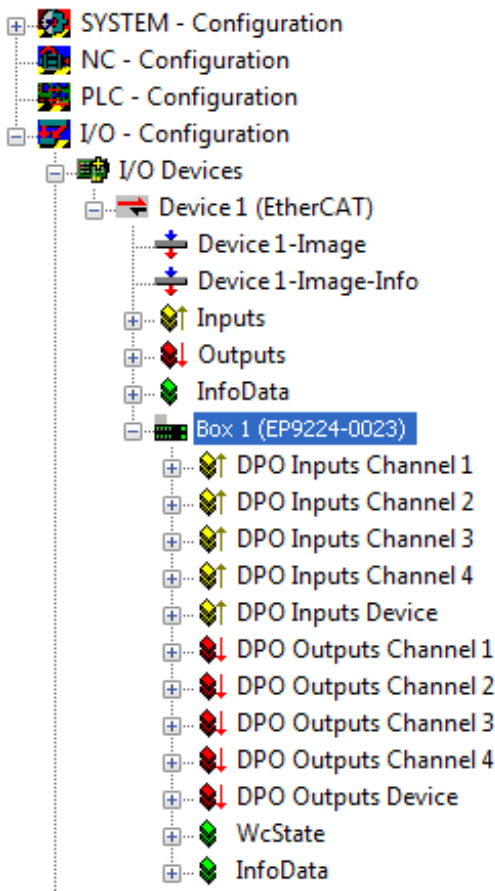
4.6.2.3.17 Index F010 Module list

Index	Name	Meaning	Data type	Flags	Default
F010:0	Module list		UINT8	RW	0x05 (5 _{dec})
F010:01	SubIndex 001		UINT32	RW	0x0000010E (270 _{dec})
F010:02	SubIndex 002		UINT32	RW	0x0000010E (270 _{dec})
F010:03	SubIndex 003		UINT32	RW	0x0000010E (270 _{dec})
F010:04	SubIndex 004		UINT32	RW	0x0000010E (270 _{dec})
F010:05	SubIndex 005		UINT32	RW	0x00000384 (900 _{dec})

4.6.2.3.18 Index F81F DPO Vendor Data Device

Index	Name	Meaning	Data type	Flags	Default
F81F:0	DPO Vendor Data Device		UINT8	RO	0x1A (26 _{dec})
F81F:10	Enable Calibration Mode	reserved	boolean	RW	0x00 (0 _{dec})
F81F:11	GainS	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:12	OffsetS	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:13	GainP	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:14	OffsetP	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:15	Gain US	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:16	Offset US	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:17	Gain UP	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:18	Offset UP	reserved	INT16	RW	0x0000 (0 _{dec})
F81F:19	Gain Temperature	reserved	UINT16	RW	0x4000 (16384 _{dec})
F81F:1A	Offset Temperature	reserved	INT16	RW	0x0000 (0 _{dec})

4.6.3 EP9224-0023 - Process image



The EP9214 has four output channels, **DPO Inputs Channel n**.

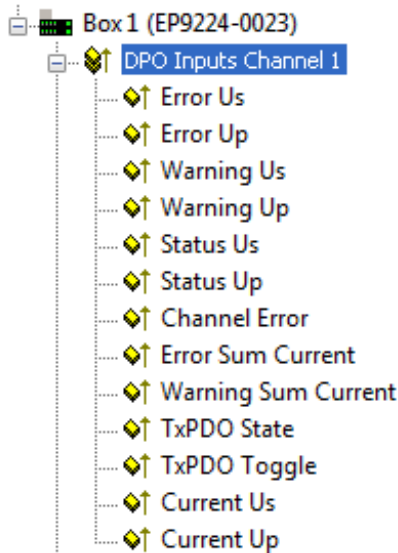
Subsequently, a status channel follows for the complete device **DPO Inputs Device**.

In the output section there are four output channels, **DPO Outputs Channel n**.

An output word follows for the complete device **DPO Outputs Device**.

WcState and **InfoData** are standard EtherCAT system variables.

DPO Inputs Channel 1 to 4



The four channels each have status bits and [status LEDs](#) [▶ 30] for displaying the current channel state:

Error Us: Us was switched off due to an error

Error Up: Up was switched off due to an error

Warning Us: If the current value set in CoE object 80n0:12 persists, the channel will be switched off

Warning Up: If the current value set in CoE object 80n0:13 persists, the channel will be switched off

Status Us: Channel switched on or off

Status Up: Channel switched on or off

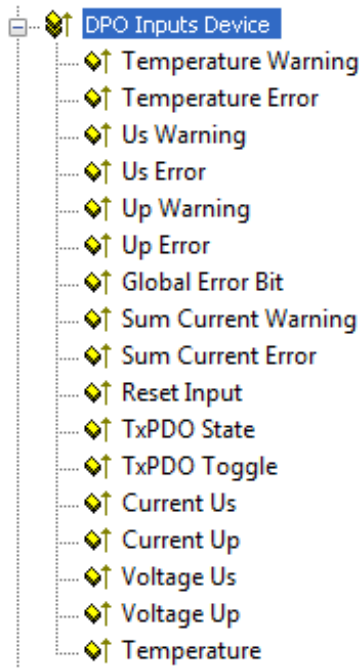
Channel Error: Error Us or Error Up is TRUE

Error Sum Current: The sum value for Is and Ip of the channel set in CoE object 8000:14 has been exceeded for too long.

Warning Sum Current: If the sum value for Is and Ip of the channel set in CoE object 8000:14 persists, the channel will be switched off

Current Us, Current Up: These two 16-bit process words represent the present current value of Us or Up respectively.

DPO Inputs Device



Subsequently, a status word follows for the complete device **DPO Inputs Device**.

Temperature Warning: The internal temperature of the EP9224 will soon reach the shut-off point.

Temperature Error: The internal temperature was too high. The output channels were switched off.

Us/Up Warning: The value of the input voltage Us/Up is less than 21.5 V

Us/Up Error: The value of the input voltage Us/Up is less than 18,0V

Global Error Bit: One of the eight channels is TRUE

Sum Current Warning: The sum value for Is and Ip of the box set in CoE object F80E:12 has been exceeded for too long.

Error Sum Current: If the sum value for Is and Ip of the channel set in CoE object 8000:14 persists, the channel will be switched off

Reset Input: Reset pin to HIGH (lower M8)

Current Us: Present sum current of the supply input socket Us

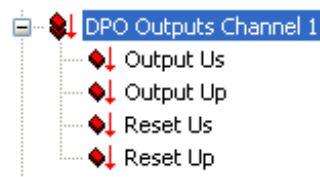
Current Up: Present sum current of the supply input socket Up

Voltage Us: Present input voltage of the supply input socket Us in 1/10V

Voltage Up: Present input voltage of the supply input socket Up in 1/10V

Temperature: Current internal temperature of the box

DPO Outputs Channel 1 to 4

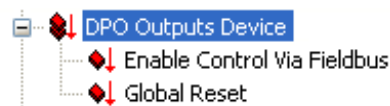


The EP9214 has 4 x 16-bit output data of the four output channels **DPO Outputs Channel n**.

Output Us/Up: TRUE - switch the output on, FALSE - switch the output off

Reset Us/Up: TRUE - reset in the event of an error...

DPO Outputs Device



Subsequently, a status word follows for the complete device **DPO outputs Device**.

Enable Control Via Fieldbus: TRUE - control all outputs via the fieldbus / PLC, FALSE - automatic switch-on depending on the CoE entries

Global Reset: resets all errors in the box

4.7 Restoring the delivery state

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

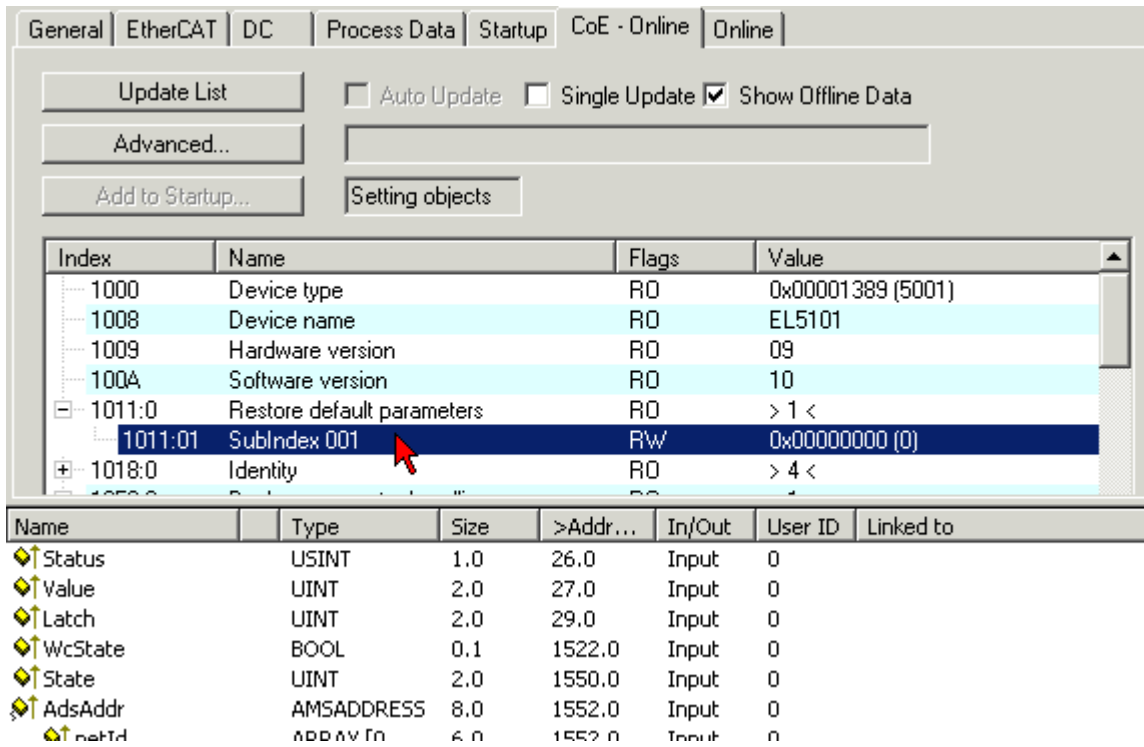


Fig. 69: Selecting the Restore default parameters PDO

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

All backup objects are reset to the delivery state.

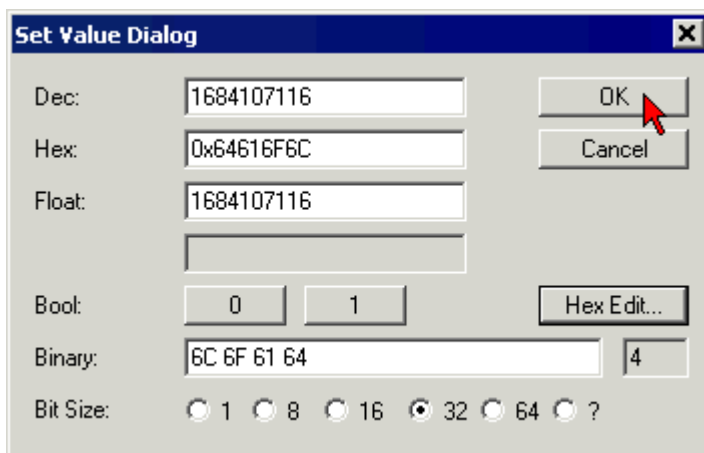


Fig. 70: Entering a restore value in the Set Value dialog



Note

Alternative restore value

In some older terminals / boxes the backup objects can be switched with an alternative restore value:

Decimal value: 1819238756

Hexadecimal value: 0x6C6F6164

An incorrect entry for the restore value has no effect.

5 Appendix

5.1 General operating conditions

Protection degrees (IP-Code)

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

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

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

*) These protection classes define only protection against water!

Chemical Resistance

The Resistance relates to the Housing of the Fieldbus/EtherCAT Box and the used metal parts. In the table below you will find some typical resistance.

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

Key

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

5.2 EtherCAT Box- / EtherCAT P Box - Accessories**Fixing**

Ordering information	Description
ZS5300-0001	Mounting rail (500 mm x 129 mm)

Marking material, plugs

Ordering information	Description
ZS5000-0000	Fieldbus Box set M8 (contact labels, plugs)
ZS5000-0002	Fieldbus Box set M12 (contact labels, plugs)
ZS5000-0010	plugs M8, IP67 (50 pieces)
ZS5000-0020	plugs M12, IP67 (50 pieces)
ZS5100-0000	marking labels, not printed, 4 stripes at 10 pieces
ZS5100-xxxx	printed marking labels, on request

Tools

Ordering information	Description
ZB8800	torque wrench for M8 cables with knurl, incl. ratchet
ZB8800-0001	M12 ratchet for torque wrench ZB8800
ZB8800-0002	M8 ratchet (field assembly) for torque wrench ZB8800
ZB8801-0000	torque wrench for hexagonal plugs, adjustable
ZB8801-0001	torque cable key, M8/wrench size 9, for torque wrench ZB8801-0000
ZB8801-0002	torque cable key, M12/wrench size 13, for torque wrench ZB8801-0000
ZB8801-0003	torque cable key, M12 field assembly/wrench size 13, for torque wrench ZB8801-0000

**Note****Further accessories**

Further accessories may be found at the price list for Beckhoff fieldbus components and at the internet under www.beckhoff.com.

5.3 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.

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