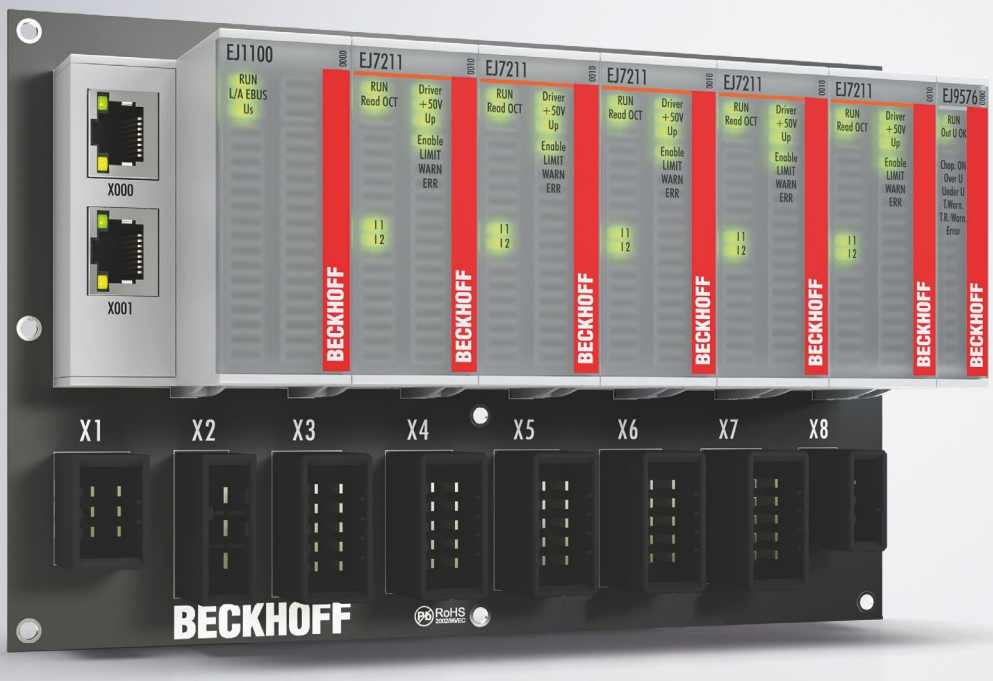
BECKHOFF New Automation Technology

Documentation | EN

EJ2521-0224, EJ2522

Pulse train output module, incremental encoder simulation module



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1 Foreword

1.1 Product Overview pulse train output modules

EJ2521-0224 [▶ 18]	1-channel pulse train output module 24 V_{DC}
EJ2522 [▶ 23]	2-channel pulse train output module, incremental encoder simulation module, RS422, 50 mA

1.2 Notes on the documentation

Intended audience

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

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

Disclaimer

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

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

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

Trademarks

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

Patent Pending

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

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

Copyright

1.3 Safety instructions

Safety regulations

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

Exclusion of liability

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

Personnel qualification

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

Description of instructions

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

⚠ DANGER

Serious risk of injury!

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

⚠ WARNING

Risk of injury!

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

⚠ CAUTION

Personal injuries!

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

NOTE

Damage to environment/equipment or data loss

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

Tip or pointer

This symbol indicates information that contributes to better understanding.

1.4 Intended use

⚠ WARNING

Caution - Risk of injury!

EJ components may only be used for the purposes described below!

1.5 Signal distribution board

NOTE

Signal distribution board

Make sure that the EtherCAT plug-in modules are used only on a signal distribution board that has been developed and manufactured in accordance with the Design Guide.

1.6 Documentation issue status

Version	Comment
1.6	• Structural update
1.5	• Update chapter *Marking of EtherCAT plug-in modules*
1.4	• Update chapter *Marking of EtherCAT plug-in modules* • Update Technical data • Chapter *Disposal* added
1.3	• New title page • EJ2522 added • Update chapter *EJ2521-0224 - Product description* • Chapters *Basics communication, TwinCAT Quick Start* , *TwinCAT development environment* and *General Notes - EtherCAT Slave Application* replaced by references in the chapter *Guide through the documentation* • Chapter *EJ2521-0224 - Object description and parameterization* added • Chapter *EJ2522 - Object description and parameterization* added • Update revision status • Structural update
1.2	• Note *Signal Distribution Board* added • Chapter *Version identification of EtherCAT devices* replaced by *Marking of EtherCAT plug-in modules* • Update Technical data • Update chapter *Connection*
1.1	• Chapter *Intended use* added • Update Technical data • Update chapter *Connection* • Update chapter *Installation of EJ modules* • Structural update
1.0	• First publication EJ2521-0224

1.7 Guide through documentation

NOTE

Further components of documentation

The documentations named in the following table are further components of the complete documentation. These documentations are required for the use of EtherCAT plug-in modules.

No.	Title	Description
[1]	EtherCAT System Documentation	• System overview • EtherCAT basics • Cable redundancy • Hot Connect • Distributed Clocks • Configuration of EtherCAT-Components
[2]	Infrastructure for EtherCAT/Ethernet	• Technical recommendations and notes for design, implementation an testing
[3]	Design GuideSignal-Distribution-Board for standard EtherCAT plug-in modules	Requirements for the design of a Signal-Distribution-Board for standard EtherCAT plug-in modules • Backplane mounting guidelines • Module placement • Routing guidelines
[4]	Documentation of the corresponding terminal ELxxxx	• Notes on the principle of operation and • Descriptions for configuration and parameterization are transferable to the corresponding Module EJxxxx (s. note on documentation of ELxxxx [▶ 43]).

1.8 Marking of EtherCAT plug-in modules

Designation

A Beckhoff EtherCAT device has a 14-digit **technical designation**, made up as follows (e.g. EJ1008-0000-0017)

- **Order identifier**
  - family key: EJ
  - product designation: The first digit of product designation is used for assignment to a product group (e.g. EJ2xxx = digital output module).
  - Version number: The four digit version number identifies different product variants.
- **Revision number:**
  It is incremented when changes are made to the product.

The Order identifier and the revision number are printed on the side of EtherCAT plug-in modules (s. following illustration (A and B).

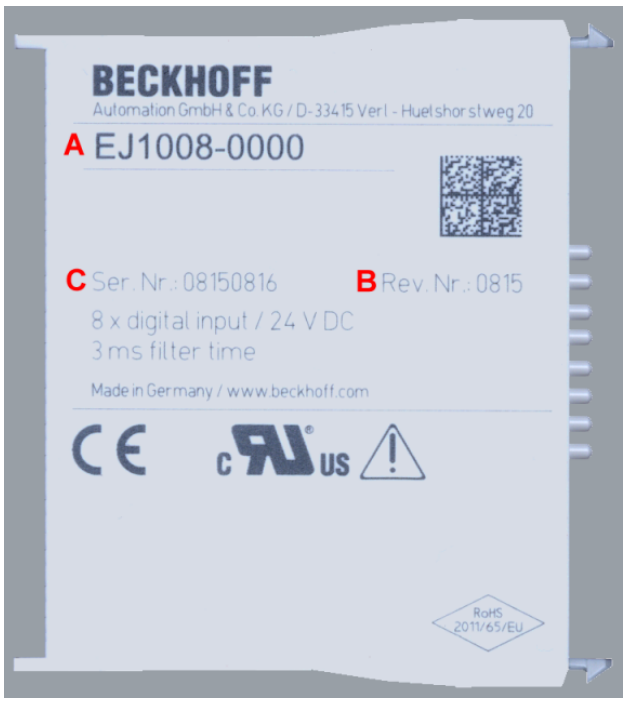


Fig. 1: Order identifier (A), Revision number (B) and serial number (C) using the example of EJ1008

Product group	Example		
	Product designation	Version	Revision
EtherCAT Coupler EJ11xx	EJ1101	-0022 (Coupler with external connectors, power supply module and optional ID switches	-0016
Digital input modules EJ1xxx	EJ1008 8-channel	-0000 (basic type)	-0017
Digital output modules EJ2xxx	EJ2521 1-channel	-0224 (2 x 24 V outputs)	-0016
Analog input modules EJ3xxx	EJ3318 8-channel thermocouple	-0000 (basic type)	-0017
Analog output modules EJ4xxx	EJ4134 4-channel	-0000 (basic type)	-0019
Special function modules EJ5xxx, EJ6xxx	EJ6224 IO-Link master	-0090 (with TwinSAFE SC)	-0016
Motion modules EJ7xxx	EJ7211 servomotor	-9414 (with ECT, STO and TwinSAFE SC)	-0029

Notes

- The elements mentioned above result in the **technical designation**. EJ1008-0000-0017 is used in the example below.
- EJ1008-0000 is the **order identifier**, in the case of “-0000” usually abbreviated to EJ1008.
- The **revision** -0017 shows the technical progress, such as the extension of features with regard to the EtherCAT communication, and is managed by Beckhoff.
  In principle, a device with a higher revision can replace a device with a lower revision, unless specified otherwise, e.g. in the documentation.
  Associated and synonymous with each revision there is usually a description (ESI, EtherCAT Slave Information) in the form of an XML file, which is available for download from the Beckhoff web site.
- The product designation, version and revision are read as decimal numbers, even if they are technically saved in hexadecimal.

Serial number

The serial number for EtherCAT plug-in modules is usually the 8-digit number printed on the side of the module (see following illustration C). The serial number indicates the configuration in delivery state and therefore refers to a whole production batch, without distinguishing the individual modules of a batch.

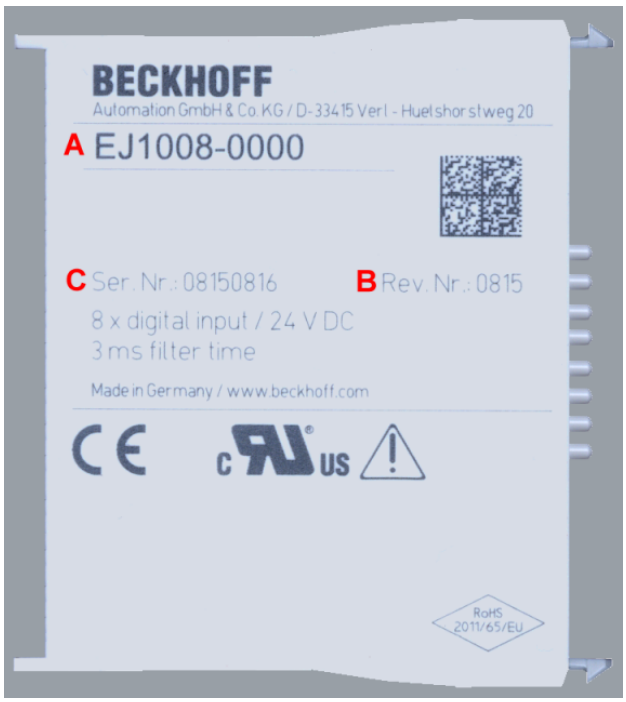


Fig. 2: Order identifier (A), revision number (B) and serial number (C) using the example of EJ1008

Serial number	Example serial number: 08 15 08 16
KK - week of production (CW, calendar week)	08 - week of production: 08
YY - year of production	15 - year of production: 2015
FF - firmware version	08 -f irmware version: 08
HH - hardware version	16 - hardware version: 16

1.8.1 Beckhoff Identification Code (BIC)

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

Fig. 3: BIC as data matrix code (DMC, code scheme ECC200)

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

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

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

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

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

The following information is contained:

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

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

Structure of the BIC

Example of composite information from items 1 - 4 and with the above given example value on positon 6. The data identifiers are marked in bold font for better display:

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

Accordingly as DMC:

Fig. 4: Example DMC **1P**072222**S**BTNk4p562d7**1K**EL1809 **Q**1 **51S**678294

BTN

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

NOTE

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

1.8.2 Electronic access to the BIC (eBIC)

Electronic BIC (eBIC)

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

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

K-bus devices (IP20, IP67)

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

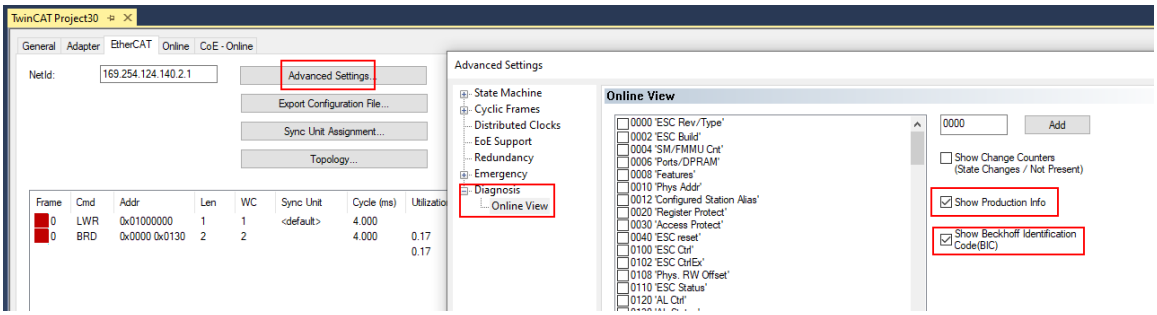
EtherCAT devices (IP20, IP67)

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

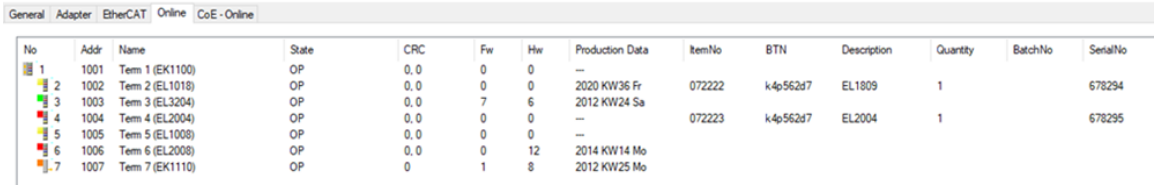
The eBIC is also stored in the ESI-EEPROM. The eBIC was introduced into the Beckhoff I/O production (terminals, boxes) from 2020; widespread implementation is expected in 2021.

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

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



  - The BTN and its contents are then displayed:



  - Note: as can be seen in the illustration, the production data HW version, FW version and production date, which have been programmed since 2012, can also be displayed with "Show Production Info".
- In the case of EtherCAT devices with CoE directory, the object 0x10E2:01 can additionally by used to display the device's own eBIC; the PLC can also simply access the information here:

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

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

- the object 0x10E2 will be introduced into stock products in the course of a necessary firmware revision.

- Note: in the case of electronic further processing, the BTN is to be handled as a string(8); the identifier "SBTN" is not part of the BTN.
- Technical background
  The new BIC information is additionally written as a category in the ESI-EEPROM during the device production. The structure of the ESI content is largely dictated by the ETG specifications, therefore the additional vendor-specific content is stored with the help of a category according to ETG.2010. ID 03 indicates to all EtherCAT masters that they must not overwrite these data in case of an update or restore the data after an ESI update.
  The structure follows the content of the BIC, see there. This results in a memory requirement of approx. 50..200 bytes in the EEPROM.
- Special cases
  - If multiple, hierarchically arranged ESCs are installed in a device, only the top-level ESC carries the eBIC Information.
  - If multiple, non-hierarchically arranged ESCs are installed in a device, all ESCs carry the eBIC Information.
  - If the device consists of several sub-devices with their own identity, but only the top-level device is accessible via EtherCAT, the eBIC of the top-level device is located in the CoE object directory 0x10E2:01 and the eBICs of the sub-devices follow in 0x10E2:nn.

Profibus/Profinet/DeviceNet... Devices

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

1.8.3 Certificates

- The EhterCAT plug-in modules meet the requirements of the EMC and Low Voltage Directive. The CE mark is printed on the side of the modules.
- The cRUus imprint identifies devices that meet product safety requirements according to U.S. and Canadian regulations.
- The warning symbol is a request to read the corresponding documentation. The documentations for EtherCAT plug-in modules can be downloaded from the Beckhoff homepage.

Fig. 5: Marking for CE and UL using EJ1008 as an example

2 System overview

Electronically, the EJxxxx EtherCAT plug-in modules are based on the EtherCAT I/O system. The EJ system consists of the signal distribution board and EtherCAT plug-in modules. It is also possible to connect an IPC to the EJ system.
The EJ system is suitable for mass production applications, applications with small footprint and applications requiring a low total weight.
The machine complexity can be extended by means of the following:

- reserve slots,
- the use of placeholder modules,
- linking of EtherCAT Terminals and EtherCAT Boxes via an EtherCAT connection.

The following diagram illustrates an EJ system. The components shown are schematic, to illustrate the functionality.

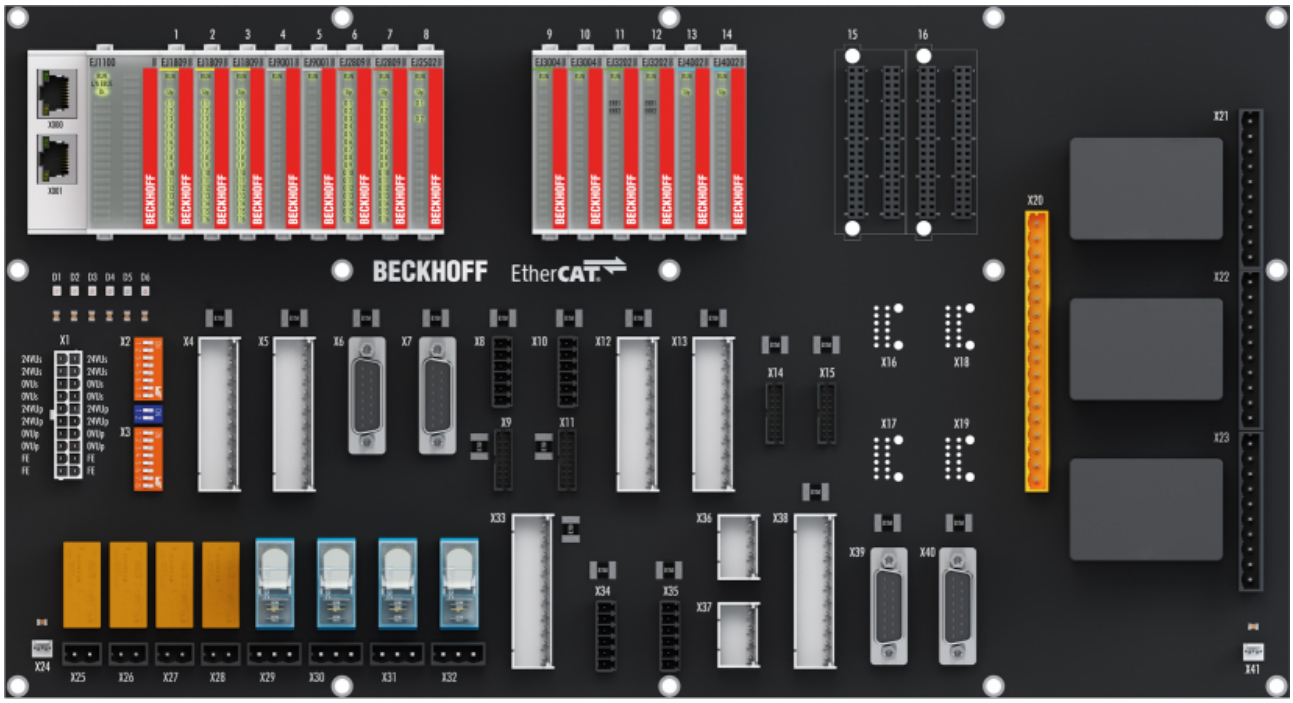


Fig. 6: EJ system sample

Signal distribution board

The signal distribution board distributes the signals and the power supply to individual application-specific plug connectors, in order to connect the controller to further machine modules. Using pre-assembled cable harnesses avoids the need for time-consuming connection of individual wires. Coded components reduce the unit costs and the risk of miswiring.
Beckhoff offers development of signal distribution boards as an engineering service. Customers have the option to develop their own signal distribution board, based on the design guide.

EtherCAT plug-in modules

Similar to the EtherCAT terminal system, a module strand consists of a Bus Coupler and I/O modules. Almost all of the EtherCAT Terminals can also be manufactured in the EJ design as EtherCAT plug-in modules. The EJ modules are directly attached to the signal distribution board. The communication, signal distribution and supply take place via the contact pins at the rear of the modules and the PCB tracks of the signal distribution board. The coding pins at the rear serve as mechanical protection against incorrect connection. Color coding on the housing facilitates distinguishing of the modules.

3 EJ2521-0224 - Product Description

3.1 Introduction

Fig. 7: EJ2521-0224

1-channel pulse train output module 24 V_{DC}

The EJ2521-0224 1-channel pulse train output module outputs a digital frequency signal via two 24 V tracks (A/B). The signal is used to control motor drivers and signal receivers which are controlled by single cycles. The pulse sequence and the pulse frequency or number of pulses are specified directly via the process data.

The module has a 24 V latch input for connecting a limit switch for example and two 24 V switch outputs (capture/compare), which can be switched depending on the counter value in the module.

The LEDs indicate the active outputs and the input.

3.2 Technical data

Technical data	EJ2521-0224
Connection technology	Pulse train (frequency output)
Number of outputs	1 channel (2 outputs A, B),
Number of capture/compare inputs/ outputs	1/2
Load type	Ohmic, inductive
Distributed Clocks	Yes
Input specification	24 V_{DC}
Output specification	5 V .. 24 V_{DC}, external supply
Max. output current	1 A
Base frequency	0 .. 500 kHz, preset: 50 kHz
Resolution	Max. 15-bit (16-bit + sign)
Short-circuit current	-
Power supply for the electronics	via the E-bus
Current consumption via E-bus	typ. 135 mA
Special features	Different modes, ramp function, travel distance control
Electrical isolation	500 V (E-bus/field voltage)
Permissible ambient temperature range during operation	0°C .. + 55°C
Permissible ambient temperature range during storage	-25°C .. + 85°C
Permissible relative air humidity	95 %, no condensation
Operating altitude	max. 2,000 m
Dimensions (W x H x D)	approx. 12 mm x 66 mm x 55 mm
Weight	app. 30 g
Mounting	on signal distribution board
Pollution degree	2
Installation position	Standard [▶ 31]
Position of the coding pins [▶ 34]	1 and 4
Color coding	red
Vibration / shock resistance	according to EN 60068-2-6/EN 60068-2-27 (with corresponding signal distribution board)
EMC immunity / emission	according to EN 61000-6-2/EN 61000-6-4 (with corresponding signal distribution board)
Protection class	EJ module: IP20 EJ system: dependent on the signal distribution board and housing
Approvals / markings	CE, EAC, UKCA, UL

CE approval

The CE Marking refers to the EtherCAT plug-in module mentioned above.
If the EtherCAT plug-in module is used in the production of a ready-to-use end product (PCB in conjunction with a housing), the manufacturer of the end product must check compliance of the overall system with relevant directives and CE certification.
To operate the EtherCAT plug-in modules, they must be installed in a housing.

3.3 Connection

EJ2521-0224				
Pin#		Signal		
1	2	U_{EBUS}	U_{EBUS}	**E-Bus contacts**
3	4	GND	GND	
5	6	RX0+	TX1+	
7	8	RX0-	TX1-	The power supply U_{EBUS} is provided by the coupler and supplied from the supply voltage U_S of the EtherCAT coupler.
9	10	GND	GND	
11	12	TX0+	RX1+	
13	14	TX0-	RX1-	
15	16	GND	GND	
17	18	A+	B+	**Signals**
19	20	A-	B-	
21	22	Latch	Output 1	
23	24	GND_L_O1_O2	Output 2	
25	26	Up Output 1	Up Output 2	
27	28	NC	NC	
29	30	NC	NC	
31	32	NC	NC	
33	34	NC	NC	**U_P-Contacts**
35	36	NC	NC	The device has no U_P-contacts. The power is supplied exclusively via U_{EBUS}.
37	38	NC	NC	
39	40	SGND	SGND	

Signal	Description
U_{EBUS}	E-Bus power supply 3.3 V
GND	E-Bus GND signal. Don`t connect with 0V Up!
RXn+	Positive E-Bus receive signal
RXn-	Negative E-Bus receive signal
TXn+	Positive E-Bus transmit signal
TXn-	Negative E-Bus transmit signal
A+	Output A+
A-	Output A-
Latch	24 V latch input
GND_L_O1_O2	Signal ground for the outputs and the Latch input
B+	Output B+
B-	Output B-
Up Output 1	5 V...24 V_{DC} (external supply)
Up Output 2	5 V...24 V_{DC} (external supply)
Output 1... Output 2	Outputs 1...2 (0 V, 24 V manually or with compare function switchable)
NC	Do not connect
SGND	Shield Ground

Fig. 8: EJ2521-0224 - Pinout

The PCB footprint can be downloaded from the Beckhoff homepage.

NOTE

Damage to devices possible!

- The pins named with “NC” must not be connected.
- Before installation and commissioning read the chapters Installation of EJ modules [▶ 27] and Commissioning [▶ 43]!

3.3.1 Connection to optocoupler (with external supply voltage)

For connection to inputs with large input resistances, an external supply voltage (up to 24 V) can be used with the EJ2521-0224 in order to create the necessary current.

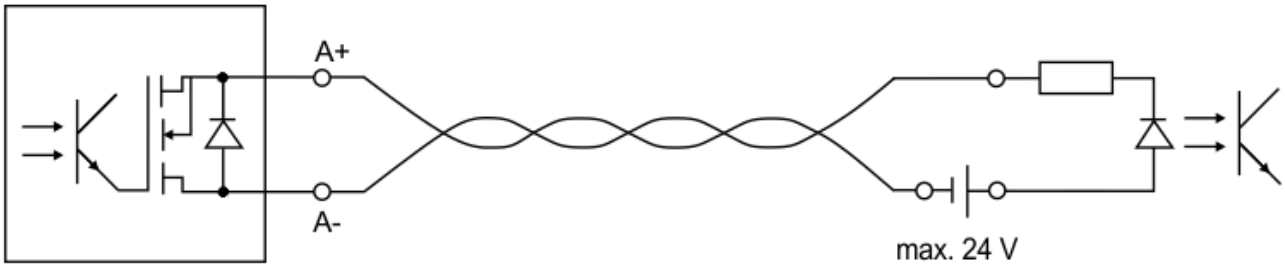


Fig. 9: *EJ2521-0224, wiring with external power source*

NOTE

EJ2521-0224 ground potential

In the case of the EJ2521-0224 module the outputs -A and -B must be connected to the GND_L_O1_O2 (pin 23) in order to avoid damage to the module (see fig. EJ2521-0224 - connection [▶ 20])!

3.4 LEDs

LED No.	EJ2521-0224
A	RUN
B	
C	
1	A
2	B
3	L
4	O 1
5	O 2
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Fig. 10: EJ2521-0224 LEDs

LED	Color	Display	State	Description
RUN	green	off	Init	State of the EtherCAT State Machine: **INIT** = initialization of the plug-in module
		flashing	Pre-Operational	State of the EtherCAT State Machine: **PREOP =** function for mailbox communication and different default settings set
		single flash	Safe – Operational	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager channels and the distributed clocks. Outputs remain in safe state
		on	Operational	State of the EtherCAT State Machine: **OP =** normal operating state; mailbox and process data communication is possible
		flickering	Bootstrap	State of the EtherCAT State Machine: **BOOTSTRAP** = function for firmware updates of the plug-in module
L	green	off	-	There is no input signal at the latch input
		on	-	Input signal at the latch input
A, B	green	off		Output inactive
		on		The illumination of the LEDs for the active frequency outputs A or B at higher frequencies can only be perceived as a glow at half brightness.
O1 .. O2	green	off	-	No output voltage at the respective output
		on	-	+24 V_{DC} output voltage at the respective output

4 EJ2522 - Product Description

4.1 Introduction

Fig. 11: EJ2522

2-channel incremental encoder simulation module (pulse train)

The EJ2522 incremental encoder simulation module (pulse train) outputs a frequency-modulable signal on two channels with four outputs. The signal can be used to control motor drivers or other signal receivers, which are controlled by single cycles. The pulse sequence and pulse number can be specified directly via the process data in the frequency. Alternatively, the integrated path control can be used.

For each channel the operating mode (frequency modulation, pulse/direction specification and incremental encoder simulation) can be selected.

In addition, the EJ2522 EtherCAT plug-in module can control three output channels in the ABC encoder simulation.

4.2 Technical data

Technical data	EJ2522
Connection technology	Pulse train (frequency output)
Number of outputs	RS422 differential outputs alternatively: 2-channel (A,B) or 1-channel (A, B, C)
Output specification	RS422, differential, 50 mA, min. 120 Ω load
Signal voltage	RS422 level (differential min. 1 V, max. 3 V)
Distributed Clocks	Yes
Base frequency	0 .. 4 MHz, default: 50 kHz
Duty cycle	50 % (±10 %)
Resolution	16 bits (incl. sign, scaled via the set frequency range)
Step size	min. 10 ns (internal)
Current consumption via E-bus	typ. 180 mA
Current consumption load voltage (Up contacts)	typ. 50 mA (load-dependent)
Special features	ABC incremental encoder simulation including interfacing with TwinCAT NC
Electrical isolation	500 V (E-bus/field voltage)
Permissible ambient temperature range during operation	0 °C ... + 55 °C
Permissible ambient temperature range during storage	-25 °C ... +85 °C
Permissible relative air humidity	95 %, no condensation
Operating altitude	max. 2,000 m
Dimensions (W x H x D)	approx. 24 mm x 66 mm x 55 mm
Weight	approx. 50 g
Mounting	on signal distribution board
Degree of pollution	2
Installation position	Installation positions [▶ 31]
Mechanical position coding [▶ 34]	1 and 4
Color coding	red
Vibration / shock resistance	conforms to EN 60068-2-6/EN 60068-2-27 (with corresponding signal distribution board)
EMC immunity / emission	conforms to EN 61000-6-2 /EN 61000-6-4 (with corresponding signal distribution board)
Protection class	EJ module: IP20 EJ system: dependent on the signal distribution board and housing
Approvals / markings	CE, EAC, UKCA

CE approval

The CE Marking refers to the EtherCAT plug-in module mentioned above.
If the EtherCAT plug-in module is used in the production of a ready-to-use end product (PCB in conjunction with a housing), the manufacturer of the end product must check compliance of the overall system with relevant directives and CE certification.
To operate the EtherCAT plug-in modules, they must be installed in a housing.

4.3 Connection

EJ2522 Left connector (Encoder)				EJ2522 Right connector (Power supply)			
Pin#		Signal		Pin#		Signal	
1	2	U_{EBUS}	U_{EBUS}	1	2	NC	NC
3	4	GND	GND	3	4	GND	GND
5	6	RX0+	TX1+	5	6	NC	NC
7	8	RX0-	TX1-	7	8	NC	NC
9	10	GND	GND	9	10	GND	GND
11	12	TX0+	RX1+	11	12	NC	NC
13	14	TX0-	RX1-	13	14	NC	NC
15	16	GND	GND	15	16	GND	GND
17	18	A1+	B1+	17	18	NC	NC
19	20	A1-	B1-	19	20	NC	NC
21	22	NC	NC	21	22	NC	NC
23	24	NC	NC	23	24	NC	GND Sensor
25	26	A2+/C1+	B2+	25	26	NC	NC
27	28	A2-/C1-	B2-	27	28	NC	NC
29	30	NC	NC	29	30	NC	NC
31	32	NC	NC	31	32	NC	GND Sensor
33	34	0V Up	0V Up	33	34	0V Up	0V Up
35	36	0V Up	24V Up	35	36	0V Up	24V Up
37	38	24V Up	24V Up	37	38	24V Up	24V Up
39	40	SGND	SGND	39	40	SGND	SGND

E-Bus contacts

The power supply U_{EBUS} is provided by the coupler and supplied from the supply voltage U_S of the EtherCAT coupler.

Signals

1-channel (ABC): A1, B1, C1

2-channel (AB): Ch. 1 A1, B1; Ch. 2 A2, B2

U_P-Contacts

The peripheral voltage U_P supplies the electronics on the field side.

Left connector (Encoder)		Right connector (Power supply)	
Signal	**Description**	**Signal**	**Description**
U_{EBUS}	E-Bus power supply 3.3 V	NC	Do not connect
GND	E-Bus GND signal Don`t connect with 0V Up!	GND	E-Bus GND signal Don`t connect with 0V Up!
RXn+	Positive E-Bus receive signal		
RXn-	Negative E-Bus receive signal		
TXn+	Positive E-Bus transmit signal		
TXn-	Negative E-Bus transmit signal		
A1+	Output A1+	NC	Do not connect
A1-	Output A1-		
B1+	Output B1+		
B1-	Output B1-		
NC	Do not connect	GND Sensor	0 V Encoder Supply
A2+/C1+	Output A2+ (2-channel mode) / Output C1+ (1-channel-mode)		
A2-/C1-	Output A2- (2-channel-mode) / Output C1- (1-channel-mode)		
B2+	Output B2+		
B2-	Output B2-		
NC	Do not connect	GND Sensor	0 V Encoder Supply
0V Up	Field side GND signal	0V Up	Field side GND signal
24V Up	Field side power supply 24 V	24V Up	Field side power supply 24 V
SGND	Shield Ground	SGND	Shield Ground

Fig. 12: EJ2522 - Connection

The PCB footprint can be downloaded from the Beckhoff homepage.

NOTE

Damage to devices possible!

- The pins named with “NC” must not be connected.
- Before installation and commissioning read the chapters Installation of EJ modules [▶ 27] and Commissioning [▶ 43]!

4.4 LEDs

LED No.	EJ2522	
	Left	Right
A	RUN	
B		
C		Up (5V)
1	A1	
2	B1	
3	C1	
4	A2	
5	B2	
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Fig. 13: EJ2522-LEDs

LEDs (left side)					
LED	**Color**	**Display**	**State**	**Description**	
RUN	green	off	Init	State of the EtherCAT State Machine: **INIT** = initialization of the plug-in module	
		flashing	Pre-Operational	State of the EtherCAT State Machine: **PREOP =** function for mailbox communication and different default settings set	
		Single flash	Safe – Operational	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager channels and the distributed clocks. Outputs remain in safe state	
		on	Operational	State of the EtherCAT State Machine: **OP =** normal operating state; mailbox and process data communication is possible	
		flickering	Bootstrap	State of the EtherCAT State Machine: **BOOTSTRAP** = function for firmware updates of the plug-in module	
A1, A2, B1, B2, C1	green	Off		Output inactive	
		on		The illumination of the LEDs for the active frequency output at higher frequencies can only be perceived as a glow at half brightness.	
				1-channel mode: A1, B1, C1	**2-channel mode:** A1, A2, B1, B2

LEDs (right side)				
LED	**Color**	**Display**	**State**	**Description**
U_P (5V)	green	off	-	Supply voltage incremental encoder (5 V_{DC}) not available
		on	-	Supply voltage incremental encoder (5 V_{DC}) available

5 Installation of EJ modules

5.1 Power supply for the EtherCAT plug-in modules

⚠ WARNING

Power supply

A SELV/PELV power supply must be used to supply power for the EJ coupler and modules. Couplers and modules have to be connected to SELV/PELV circuits exclusively.

The signal distribution board should have a power supply designed for the maximum possible current load of the module string. Information on the current required from the E-bus supply can be found for each module in the respective documentation in section “Technical data”, online and in the catalog. The power requirement of the module string is displayed in the TwinCAT System Manager.

E-bus power supply with EJ1100 or EJ1101-0022 and EJ940x

The EJ1100 Bus Coupler supplies the connected EJ modules with the E-bus system voltage of 3.3 V. The Coupler can accommodate a load up to 2.2 A. If a higher current is required, a combination of the coupler EJ1101-0022 and the power supply units EJ9400 (2.5 A) or EJ9404 (12 A) should be used. The EJ940x power supply units can be used as additional supply modules in the module string.

Depending on the application, the following combinations for the E-bus supply are available:

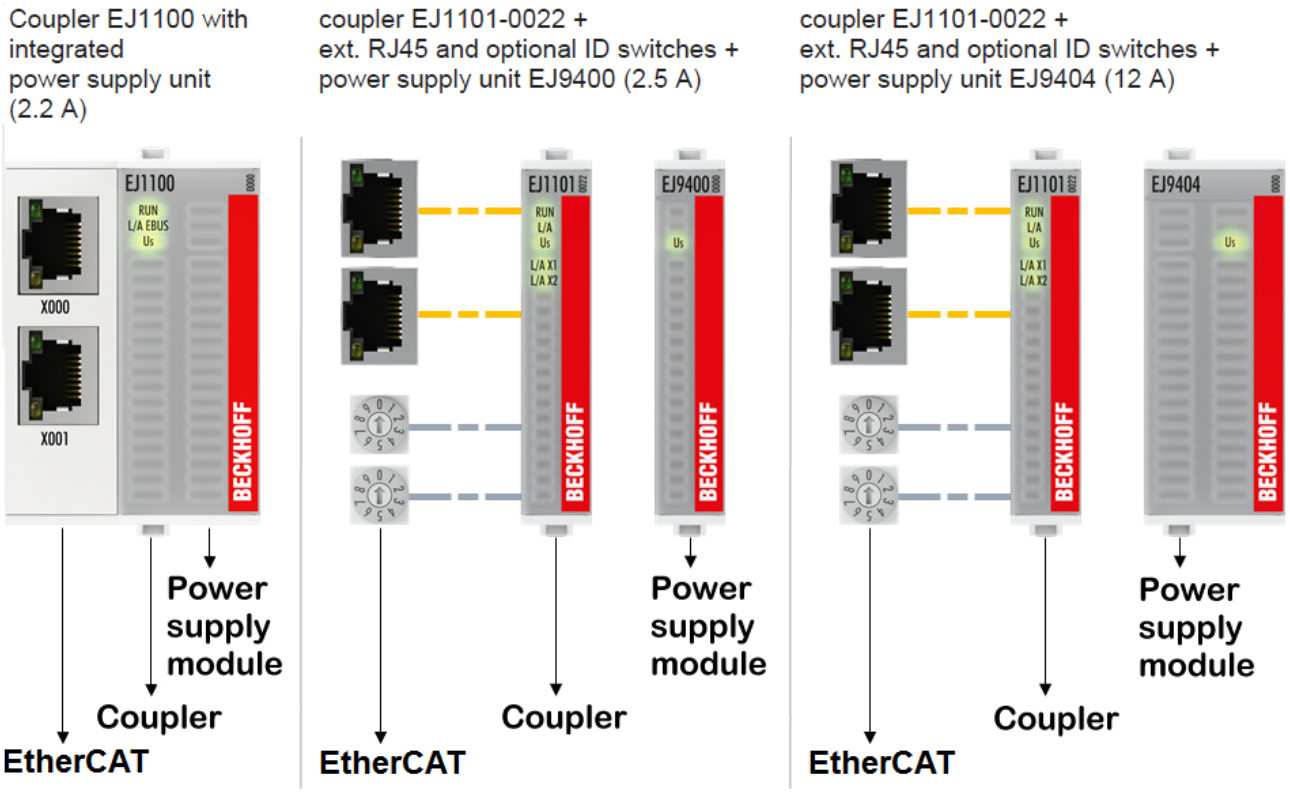


Fig. 14: E-bus power supply with EJ1100 or EJ1101-0022 + EJ940x

In the EJ1101-0022 coupler, the RJ45 connectors and optional ID switches are external and can be positioned anywhere on the signal distribution board, as required. This facilitates feeding through a housing.

The EJ940x power supply plug-in modules provide an optional reset function (see chapter Connection of the documentation for EJ9400 and EJ9404)

E-bus power supply with CXxxxx and EK1110-004x

The Embedded PC supplies the attached EtherCAT terminals and the EtherCAT EJ coupler

- with a supply voltage Us of 24 V_{DC} (-15 %/+20%). This voltage supplies the E-bus and the bus terminal electronics.
  The CXxxxx units supply the E-bus with up to 2,000 mA E-bus current. If a higher current is required due to the attached terminals, power feed terminals or power supply plug-in modules must be used for the E-bus supply.
- with a peripheral voltage Up of 24 V_{DC} to supply the field electronics.

The EK1110-004x EtherCAT EJ couplers relay the following parameters to the signal distribution board via the rear connector:

- the E-bus signals,
- the E-bus voltage U_{EBUS} (3.3 V) and
- the peripheral voltage U_P (24 V_{DC}).

Fig. 15: PCB with Embedded PC, EK1110-0043 and EJxxxx, rear view EK1110-0043

5.2 EJxxxx - dimensions

The EJ modules are compact and lightweight thanks to their design. Their volume is approx. 50% smaller than the volume of the EL terminals. A distinction is made between four different module types, depending on the width and the height:

Module type	Dimensions (W x H x D)	Sample in figure below
Coupler	44 mm x 66 mm x 55 mm	EJ1100 (ej_44_2xrj45_coupler)
Single module	12 mm x 66 mm x 55 mm	EJ1809 (ej_12_16pin_code13)
Double module	24 mm x 66 mm x 55 mm	EJ7342 (ej_24_2x16pin_code18)
Single module (long)	12 mm x 152 mm x 55 mm	EJ1957 (ej_12_2x16pin_extended_code4747)

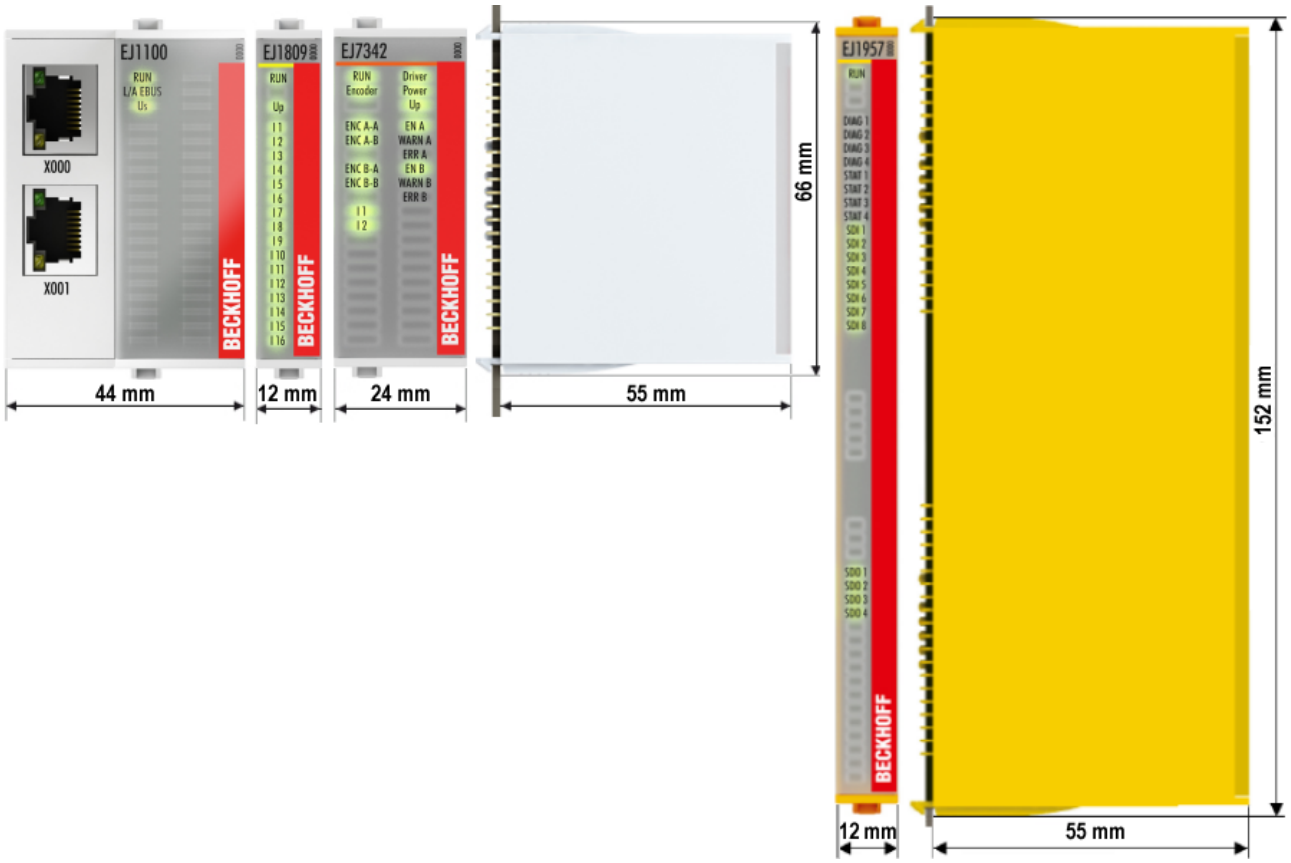


Fig. 16: EJxxxx - Dimensions

The technical drawings can be downloaded from the Beckhoff homepage. The drawings are named as described in the drawing below.

Fig. 17: Naming of the technical drawings

5.3 Installation positions and minimum distances

5.3.1 Minimum distances for ensuring installability

Note the dimensions shown in the following diagram for the design of the signal distribution board to ensure safe latching and simple assembly / disassembly of the modules.

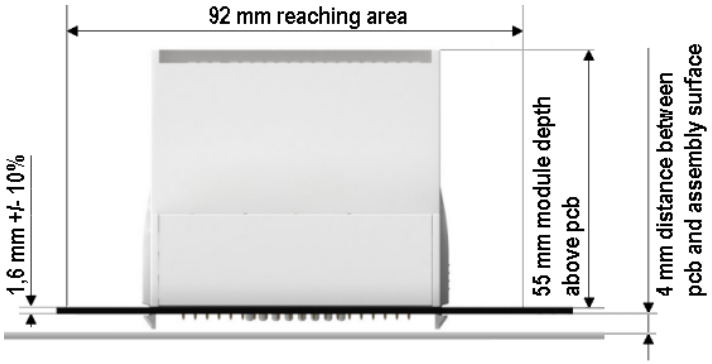


Fig. 18: Mounting distances EJ module - PCB

Observing the reaching area

A minimum reaching area of 92 mm is required for assembly / disassembly, in order to be able to reach the mounting tabs with the fingers.
Adherence to the recommended minimum distances for ventilation (see section Installation position [▶ 31]) ensures an adequate reaching area.

The signal distribution board must have a thickness of 1.6 mm and a minimum distance of 4 mm from the mounting surface, in order to ensure latching of the modules on the board.

5.3.2 Installation positions

NOTE

Constraints regarding installation position and operating temperature range

Please refer to the technical data [▶ 24] for the installed components to ascertain whether any restrictions regarding the mounting position and/or the operating temperature range have been specified. During installation of modules with increased thermal dissipation, ensure adequate distance above and below the modules to other components in order to ensure adequate ventilation of the modules during operation!

The standard installation position is recommended. If a different installation position is used, check whether additional ventilation measures are required.

Ensure that the specified conditions (see Technical data) are adhered to!

Optimum installation position (standard)

For the optimum installation position the signal distribution board is installed horizontally, and the fronts of the EJ modules face forward (see Fig. *Recommended distances for standard installation position*). The modules are ventilated from below, which enables optimum cooling of the electronics through convection. “From below” is relative to the acceleration of gravity.

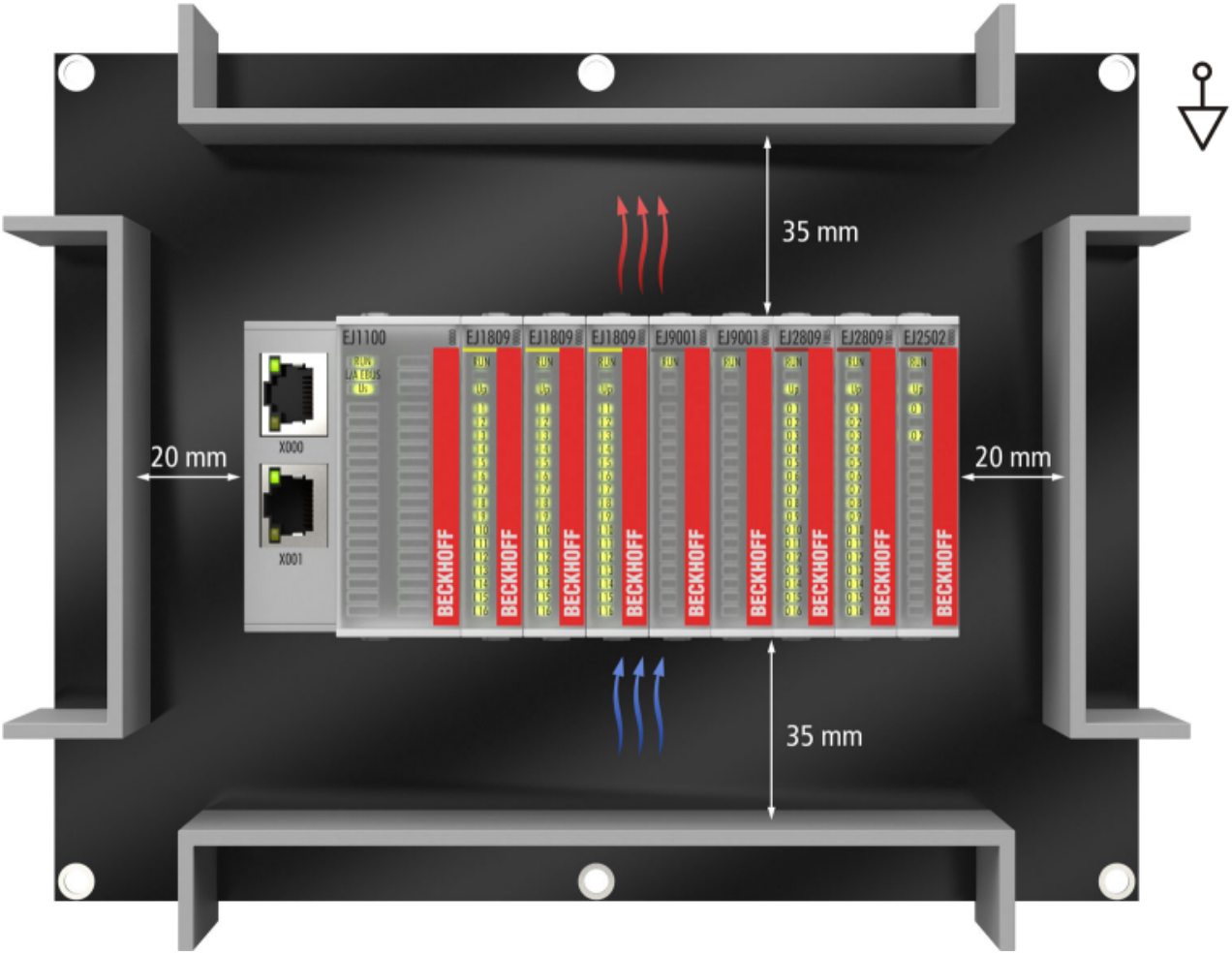


Fig. 19: Recommended distances for standard installation position

Compliance with the distances shown in Fig. *Recommended distances for standard installation position* is recommend. The recommended minimum distances should not be regarded as restricted areas for other components. The customer is responsible for verifying compliance with the environmental conditions described in the technical data. Additional cooling measures must be provided, if required.

Other installation positions

All other installation positions are characterized by a different spatial position of the signal distribution board, see Fig. *Other installation positions.*

The minimum distances to ambient specified above also apply to these installation positions.

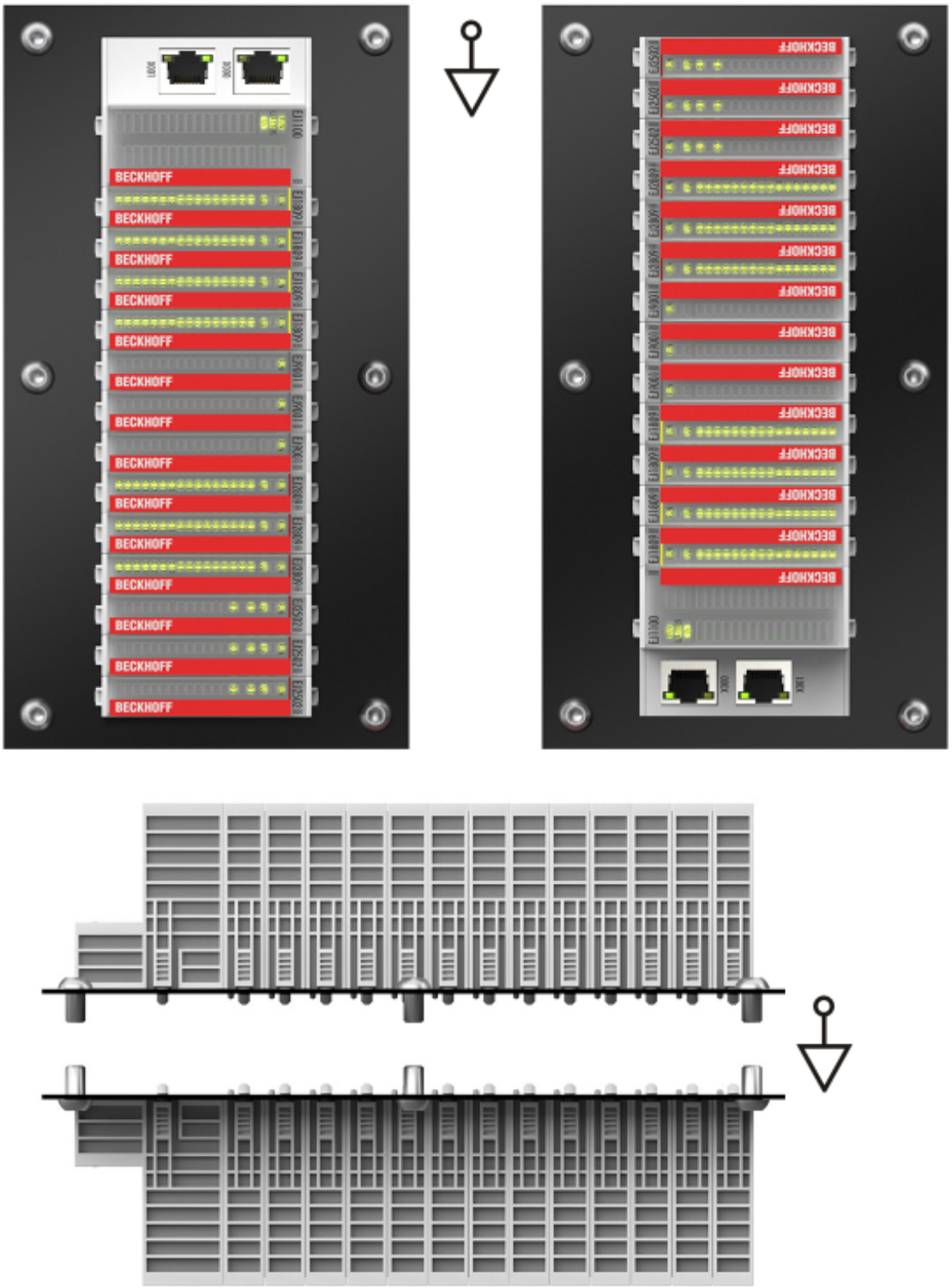


Fig. 20: Other installation positions

5.4 Codings

5.4.1 Color coding

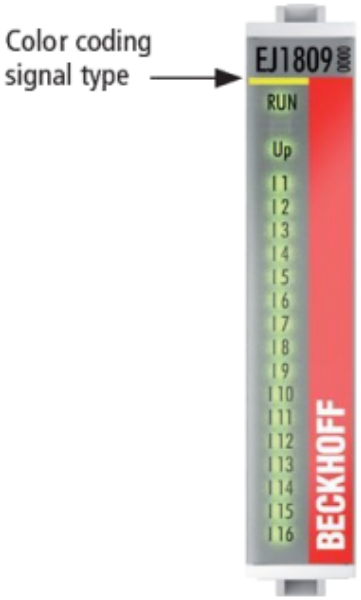


Fig. 21: EJ modules color code; sample: EJ1809

The EJ modules are color-coded for a better overview in the control cabinet (see diagram above). The color code indicates the signal type. The following table provides an overview of the signal types with corresponding color coding.

Signal type	Modules	Color
Coupler	EJ11xx	No color coding
Digital input	EJ1xxx	Yellow
Digital output	EJ2xxx	Red
Analog input	EJ3xxx	Green
Analog output	EJ4xxx	Blue
Position measurement	EJ5xxx	grey
Communication	EJ6xxx	grey
Motion	EJ7xxx	orange
System	EJ9xxx	grey

5.4.2 Mechanical position coding

The modules have two signal-specific coding pins on the underside (see Figs. B1 and B2 below). In conjunction with the coding holes in the signal distribution board (see Figs. A1 and A2 below), the coding pins provide an option for mechanical protection against incorrect connection. This significantly reduces the risk of error during installation and service.
Couplers and placeholder modules have no coding pins.

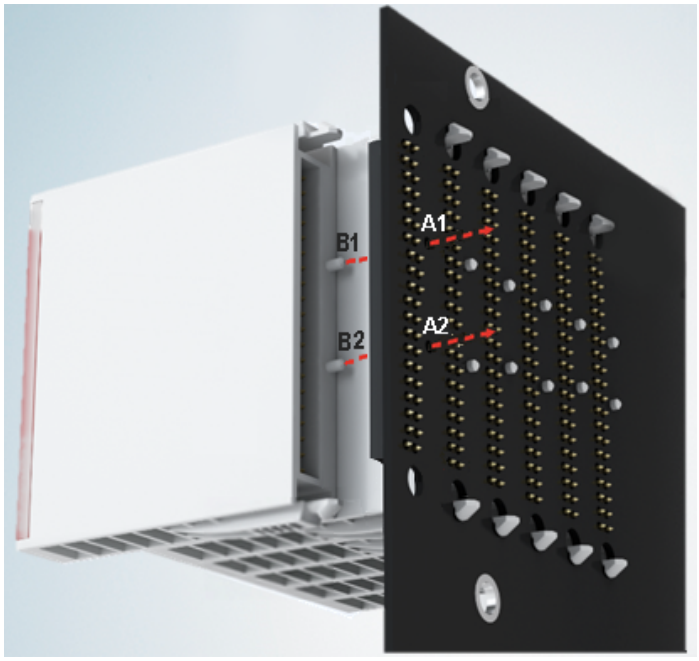


Fig. 22: Mechanical position coding with coding pins (B1 and B2) and coding holes (A1 and A2)

The following diagram shows the position of the position coding with position numbers on the left-hand side. Modules with the same signal type have the same coding. For sample, all digital input modules have the coding pins at positions one and three. There is no plug protection between modules with the same signal type. During installation the module type should therefore be verified based on the device name.

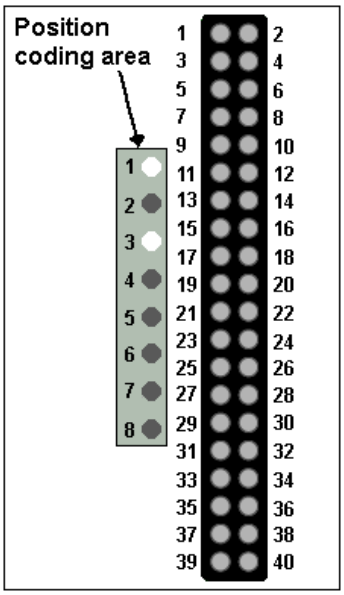


Fig. 23: Pin coding; sample: digital input modules

5.5 Installation on the signal distribution board

EJ modules are installed on the signal distribution board. The electrical connections between coupler and EJ modules are realized via the pin contacts and the signal distribution board.

The EJ components must be installed in a control cabinet or enclosure which must provide protection against fire hazards, environmental conditions and mechanical impact.

⚠ WARNING

Risk of injury through electric shock and damage to the device!

Bring the module system into a safe, de-energized state before starting installation, disassembly or wiring of the modules.

NOTE

Risk of damage to components through electrostatic discharge!

Observe the regulations for ESD protection.

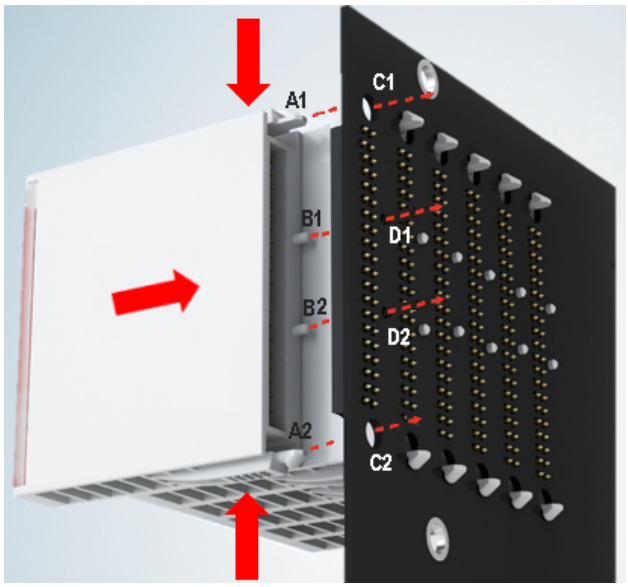


Fig. 24: Installation of EJ modules

A1 / A2	Latching lugs top / bottom	C1 / C2	Mounting holes
B1 / B2	Coding pins	D1 / D2	Coding holes

To install the modules on the signal distribution board proceed as follows:

1. Before the installation, ensure that the signal distribution board is securely connected to the mounting surface. Installation on an unsecured signal distribution board may result in damage to the board.
2. If necessary, check whether the positions of the coding pins (B) match the corresponding holes in the signal distribution board (D).
3. Compare the device name on the module with the information in the installation drawing.
4. Press the upper and the lower mounting tabs simultaneously and push the module onto the board while gently moving it up and down, until the module is latched securely.
   The required contact pressure can only be established and the maximum current carrying capacity ensured if the module is latched securely.
5. Use placeholder modules (EJ9001) to fill gaps in the module strand.

NOTE

- During installation ensure safe latching of the modules on the signal distribution board! The consequences of inadequate contact pressure include:

⇨ loss of quality of the transferred signals,

⇨ increased power dissipation of the contacts,

⇨ impairment of the service life.

5.6 Extension options

Three options are available for modifications and extensions of the EJ system.

- Replacing the placeholder modules with the function modules provided for the respective slot
- Assigning function modules specified for the respective slots for the reserve slots at the end of the module string
- Linking with EtherCAT Terminals and EtherCAT Box modules via an Ethernet/EtherCAT connection

5.6.1 Using placeholder modules for unused slots

The EJ9001 placeholder modules are used to close temporary gaps in the module strands (see Fig. A1 below). Gaps in the module strand cause interruption in EtherCAT communication and must be equipped with placeholder modules.
In contrast to the passive terminals of the EL series, the placeholder modules actively participate in the data exchange. Several placeholder modules can therefore be connected in series, without impairing the data exchange.
Unused slots at the end of the module strand can be left as reserve slots (see Fig. B1 below).

The machine complexity is extended (extended version) by allocating unused slots (see Figs. A2 below - Exchanging placeholder modules and B2 - Assigning reserve slots) according to the specifications for the signal distribution board.

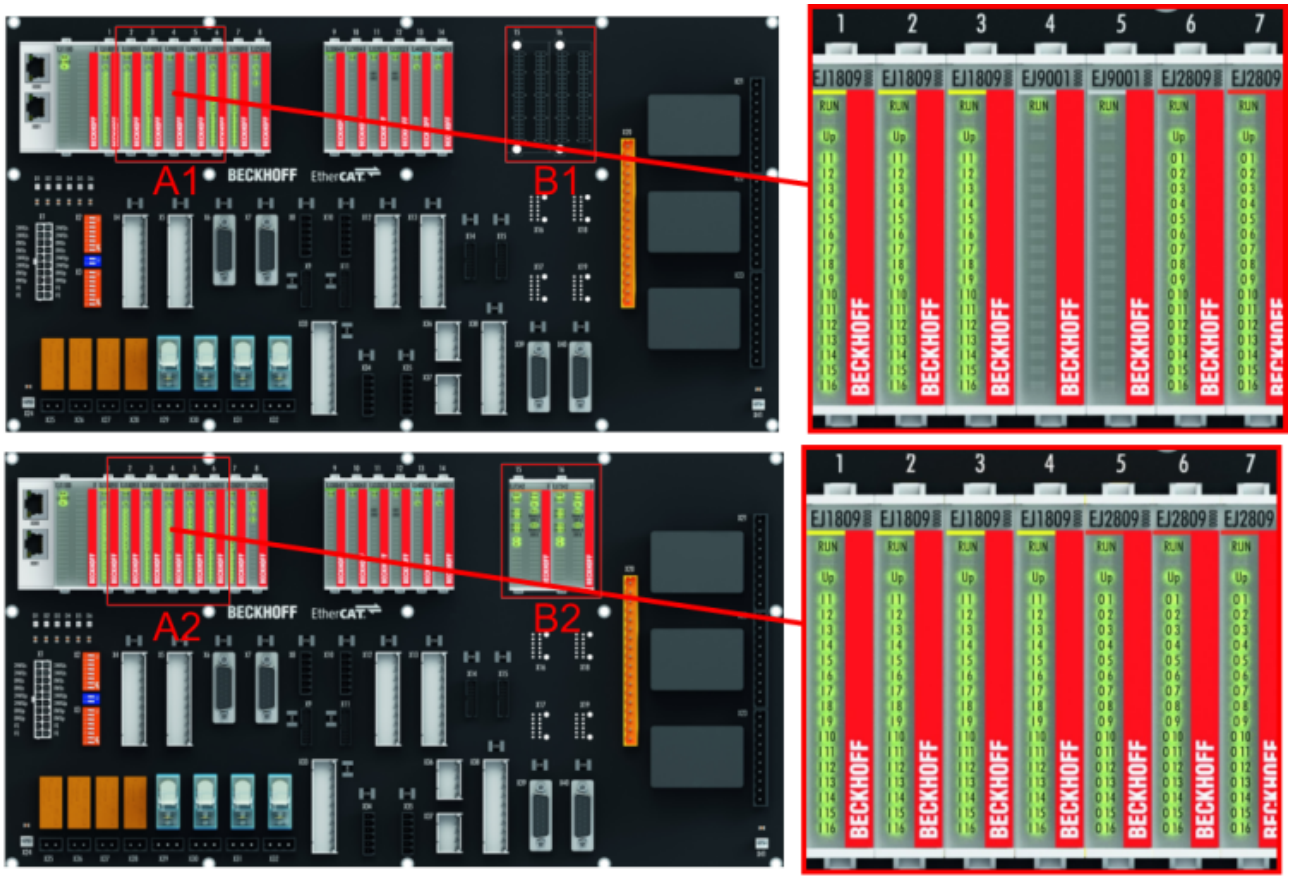


Fig. 25: Sample: Exchanging placeholder modules and assigning reserve slots

E-bus supply

Exchange the placeholder modules with other modules changes the current input from the E-Bus. Ensure that adequate power supply is provided.

5.6.2 Linking with EtherCAT Terminals and EtherCAT Box modules via an Ethernet/EtherCAT connection

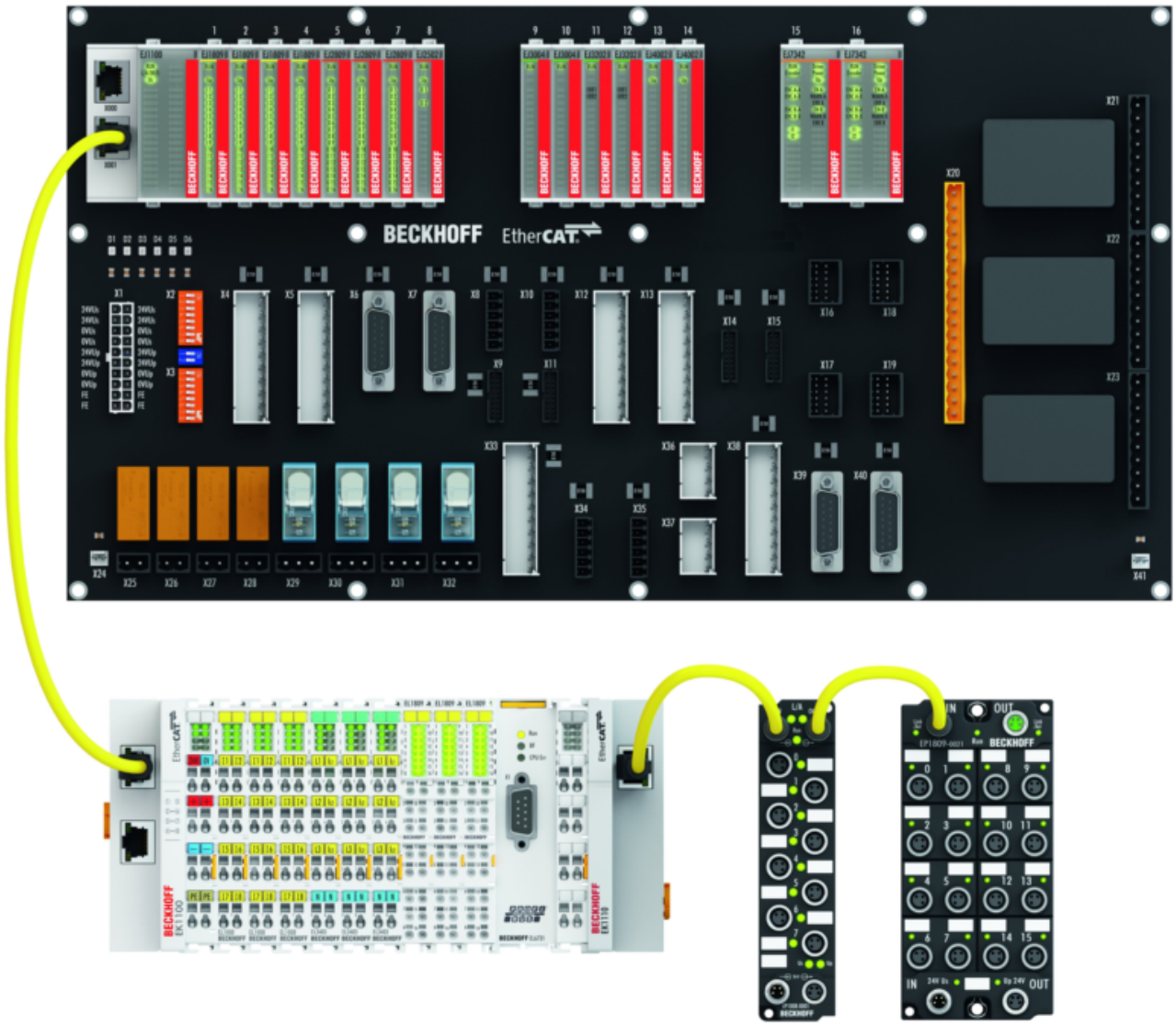


Fig. 26: Example of extension via an Ethernet/EtherCAT connection

5.7 IPC integration

Connection of CX and EL terminals via the EK1110-004x EtherCAT EJ Coupler

The EK1110-0043 and EK1110-0044 EtherCAT EJ couplers connect the compact DIN-rail PCs of the CX series and attached EtherCAT terminals (ELxxxx) with the EJ modules on the signal distribution board.

The EK1110-004x are supplied from the power supply unit of the Embedded PC.
The E-bus signals and the supply voltage of the field side U_P are routed directly to the PCB via a plug connector at the rear of the EtherCAT EJ couplers.

Due to the direct coupling of the Embedded PC and the EL terminals with the EJ modules on the PCB, no EtherCAT extension (EK1110) or EtherCAT coupler (EJ1100) is required.

The Embedded PC can be expanded with EtherCAT terminals that are not yet available in the EJ system, for example.

Fig. 27: Example PCB with Embedded PC, EK1110-0043 and EJxxxx, rear view EK1110-0043

Connection of C6015 / C6017 via the EJ110x-00xx EtherCAT Coupler

Thanks to their ultra-compact design and versatile mounting options, the C6015 and C6017 IPCs are ideally suited for connection to an EJ system.

In combination with the ZS5000-0003 mounting set, it is possible to place the C6015 and C6017 IPCs compactly on the signal distribution board.
The EJ system is optimally connected to the IPC via the corresponding EtherCAT cable (see following Fig. [A]).
The IPC can be supplied directly via the signal distribution board using the enclosed power plug (see Fig. [B] below).

NOTE

Positioning on the signal distribution board

The dimensions and distances for placement and other details can be found in the Design Guide and the documentation for the individual components.

The figure below shows the connection of a C6015 IPC to an EJ system as an example. The components shown are schematic, to illustrate the functionality.

Fig. 28: Example for the connection of a C6015 IPC to an EJ system

5.8 Disassembly of the signal distribution board

⚠ WARNING

Risk of injury through electric shock and damage to the device!

Bring the module system into a safe, de-energized state before starting installation, disassembly or wiring of the modules.

NOTE

Risk of damage to components through electrostatic discharge!

Observe the regulations for ESD protection.

Each module is secured through latching on the distribution board, which has to be released for disassembly.

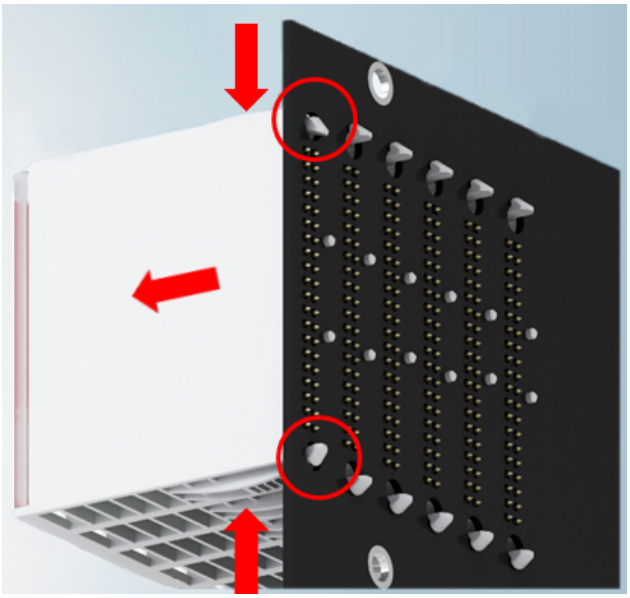


Fig. 29: Disassembly of EJ modules

To disassemble the module from the signal distribution board proceed as follows:

1. Before disassembly, ensure that the signal distribution board is securely connected to the mounting surface. Disassembly of an unsecured signal distribution board may result in damage to the board.
2. Press the upper and lower mounting tabs simultaneously and pull the module from board while gently moving it up and down.

5.9 Disposal

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

6 EtherCAT basics

Please refer to the EtherCAT System Documentation for the EtherCAT fieldbus basics.

7 EJ2521-0224 - Commissioning

7.1 Note on documentation for the EL252x

Detailed documentation on the commissioning of the EJ252x modules is being prepared.

Note on documentation for the EL252x

The descriptions and notes on the commissioning of the EL252x EtherCAT Terminals are transferable to the EJ252x EtherCAT plug-in modules.

Before commissioning, read the detailed description of the process data, operating modes and parameterization in the EL252x documentation.

7.2 Object description and parameterization

EtherCAT XML Device Description

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

Parameterization via the CoE list (CAN over EtherCAT)

The EtherCAT device is parameterized via the CoE - Online tab (with a double click on the respective object) or via the Process Data tab (assignment of PDOs). A detailed description can be found in the EtherCAT System-Documentation in chapter “EtherCAT subscriber configuration”
Please note the general CoE notes in the EtherCAT System Documentation in chapter “CoE-interface” when using/manipulating the CoE parameters:
- Keep a startup list if components have to be replaced
- Differentiation between online/offline dictionary, existence of current XML description
- use "CoE reload" for resetting changes

Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization during commissioning:
  - Restore [▶ 44] object index 0x1011
  - Configuration data [▶ 45] index 0x80n0
- Objects intended for regular operation, e.g. through ADS access.
- Profile-specific objects:
  - Input data [▶ 46] index 0x60n0
  - Output data [▶ 48] index 0x70n0
  - Information and diagnostic data [▶ 48] Index 0xF000, 0xF008, 0xF010
- Standard objects [▶ 49]

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

7.2.1 Restore object

Index 1011 Restore default parameters

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

7.2.2 Configuration data

Index 8000 PTO Settings

Index (hex)	Name	Meaning	Data type	Flags	Default
8000:0	PTO Settings	Max. Subindex	UINT8	RO	0x16 (24_{dec})
8000:02	Emergency ramp active	TRUE: If the watchdog timer responds, the module ramps with the time constant set in index 0x8000:18 to the value set in index 0x8000:11. FALSE: The function is deactivated	BOOLEAN	RW	0x00 (0_{dec})
8000:03	Watchdog timer inactive	TRUE: The watchdog timer is deactivated FALSE: The watchdog timer is activated in the delivery state. Either the manufacturer's of the user's switch-on value is output if the watchdog overflows.	BOOLEAN	RW	0x00 (0_{dec})
8000:04	Sign/amount representation	TRUE: The output value is displayed in signed amount representation: -2_{dec}= 0x8002 -1_{dec} = 0x8001 1_{dec} = 0x0001 2_{dec} = 0x0002 FALSE: The output value is output as signed integer in the two's complement: -2_{dec} = 0xFFFE -1_{dec} = 0xFFFF 1_{dec} = 0x0001 2_{dec} = 0x0002	BOOLEAN	RW	0x00 (0_{dec})
8000:06	Ramp function active	TRUE: Ramp function activated FALSE: Ramp function deactivated	BOOLEAN	RW	0x00 (0_{dec})
8000:07	Ramp base frequency	Selection in the pull-down menu: 0_{dec}: Ramp base frequency: 10 Hz 1_{dec}: Ramp base frequency: 1 kHz	BIT1	RW	0x00 (0_{dec})
8000:08	Direct input mode	TRUE: Direct input mode FALSE:' Relative input mode	BOOLEAN	RW	0x00 (0_{dec})
8000:09	User switch-on value on wdt	Determines the behavior with triggered watchdog timer TRUE: User switch-on value FALSE: Manufacturer's switch-on value	BOOLEAN	RW	0x00 (0_{dec})
8000:0A	Travel distance control active	TRUE: Travel distance control activated FALSE: Travel distance control deactivated	BOOLEAN	RW	0x00 (0_{dec})
8000:0B	Output set active low	Inversion of the output logic for output 24 V FALSE: HIGH level in switched state TRUE: LOW level in switched state	BOOLEAN	RW	0x00 (0_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
8000:0E	Operating mode	Selection in the pull-down menu: $0_{dec:}$ Frequency modulation operation mode $1_{dec:}$ Pulse direction specification operation mode $2_{dec:}$ Incremental encoder operation mode	BIT2	RW	0x00 (0_{dec})
8000:10	Negative logic	TRUE: Negative logic FALSE: Positive logic	BOOLEAN	RW	0x00 (0_{dec})
8000:11	User switch-on-value	User switch-on value (frequency)	UINT16	RW	0x0000 (0_{dec})
8000:12	Base frequency 1	Base frequency 1 = 50000 Hz	UINT32	RW	0x0000C350 (50000_{dec})
8000:13	Base frequency 2	Base frequency 2 = 100000 Hz	UINT32	RW	0x000186A0 (100000_{dec})
8000:14	Ramp time constant (rising)	Ramp time constant (rising)	UINT16	RW	0x03E8 (1000_{dec})
8000:15	Ramp time constant (falling)	Ramp time constant (falling)	UINT16	RW	0x03E8 (1000_{dec})
8000:16	Frequency factor (digit x 10 mHz)	Frequency factor (direct input, digit x 10 mHz)	UINT16	RW	0x0064 (100_{dec})
8000:17	Slowing down frequency	Slowing down frequency, travel distance control	UINT16	RW	0x0032 (50_{dec})
8000:18	Ramp time constant (emergency)	Ramp time constant for controlled switch-off; User switch-on value is driven to (index 0x8000:11)	UINT16	RW	0x03E8 (1000_{dec}

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

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

7.2.3.1 Input data

Index 0x6000 PTO Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6000:0	PTO Inputs	Max. Subindex	UINT8	RO	0x10 (16_{dec})
6000:01	Sel. Ack/End counter	Confirms the change of the base frequency with activated travel distance control: target counter value reached	BOOLEAN	RO	0x00 (0_{dec})
6000:02	Ramp active	Ramp is currently being followed	BOOLEAN	RO	0x00 (0_{dec})
6000:07	Error	General error bit, is set together with overrange and underrange	BOOLEAN	RO	0x00 (0_{dec})
6000:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6000:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})

Index 0x6010 ENC Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6010:0	ENC Inputs	Max. Subindex	UINT8	RO	0x12 (18_{dec})
6010:02	Latch extern valid	The counter value was locked by the external latch input. The data with index 0x6010:12 match the latched value when the bit is set. To reactivate the latch input, index 0x7010:02 [▶ 67] or index 0x7010:04 [▶ 67] must be canceled and then reset.	BOOLEAN	RO	0x00 (0_{dec})
6010:03	Set counter done	Counter was set.	BOOLEAN	RO	0x00 (0_{dec})
6010:04	Counter underflow	This bit is set if the 16-bit counter underflows (0 -> 65535). It is reset when the counter drops below two thirds of its measuring range (43690 -> 43689) or immediately an overflow occurs.	BOOLEAN	RO	0x00 (0_{dec})
6010:05	Counter overflow	This bit is set if the 16-bit counter overflows (65535 -> 0). It is reset when the counter exceeds one third of its measuring range (21845 -> 21846) or immediately an underflow occurs.	BOOLEAN	RO	0x00 (0_{dec})
6010:0D	Status of extern latch	The status of the latch input	BOOLEAN	RO	0x00 (0_{dec})
6010:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6010:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6010:11	Counter value	Counter value	UINT32	RO	0x00000000 (0_{dec})
6010:12	Latch value	Latch value	UINT32	RO	0x00000000 (0_{dec})

Index 0x6020 PLS Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6020:0	PLS Inputs	Max. Subindex	UINT8	RO	0x10 (16_{dec})
6020:01	PLS Enabled	Automatic counting function activated	BOOLEAN	RO	0x00 (0_{dec})
6020:04	Status of output	Status of the output	BOOLEAN	RO	0x00 (0_{dec})
6020:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6020:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})

Index 0x6030 PLS Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6030:0	PLS Inputs	Max. Subindex	UINT8	RO	0x10 (16_{dec})
6030:01	PLS Enabled	Automatic counting function activated	BOOLEAN	RO	0x00 (0_{dec})
6030:04	Status of output	Status of the output	BOOLEAN	RO	0x00 (0_{dec})
6030:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6030:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})

7.2.3.2 Output data

Index 7000 PTO Outputs

Index (hex)	Name	Meaning	Data type	Flags	Default
7000:0	PTO Outputs	Max. Subindex	UINT8	RO	0x12 (18_{dec})
7000:01	Frequency select	Fast toggling of the base frequency (only if ramp function is deactivated) 0_{bin} = base frequency 1 (index 0x8000:12 [▶ 45]) 1_{bin} = base frequency 2 (index 0x8000:13 [▶ 45])	BOOLEAN	RO	0x00 (0_{dec})
7000:02	Disable ramp	The ramp function is disabled despite active index 0x8000:06 [▶ 45].	BOOLEAN	RO	0x00 (0_{dec})
7000:03	Go counter	If travel distance control is activated (index 0x8000:0A [▶ 45]), a specified counter value is driven to if the bit is set	BOOLEAN	RO	0x00 (0_{dec})
7000:11	Frequency value	Output frequency	UINT16	RO	0x0000 (0_{dec})
7000:12	Target counter value	Target counter value	UINT32	RO	0x00000000 (0_{dec})

Index 7010 ENC Outputs

Index (hex)	Name	Meaning	Data type	Flags	Default
7010:0	ENC Outputs	Max. Subindex	UINT8	RO	0x11 (17_{dec})
7010:02	Enable latch extern on positive edge	Activate external latch with positive edge.	BOOLEAN	RO	0x00 (0_{dec})
7010:03	Set counter	Set counter value	BOOLEAN	RO	0x00 (0_{dec})
7010:04	Enable latch extern on negative edge	Activate external latch with negative edge.	BOOLEAN	RO	0x00 (0_{dec})
7010:11	Set counter value	This is the counter value to be set via "Set counter" (index 0x7010:03).	UINT32	RO	0x00000000 (0_{dec})

Index 7020 PLS Outputs

Index (hex)	Name	Meaning	Data type	Flags	Default
7020:0	PLS Outputs	Max. Subindex	UINT8	RO	0x12 (18_{dec})
7020:01	Enable PLS	Activate automatic counting function	BOOLEAN	RO	0x00 (0_{dec})
7020:04	Output	Signal at the output	BOOLEAN	RO	0x00 (0_{dec})
7020:11	Switch-on value	Counter value at which the "Output 24 V" is switched on.	UINT32	RO	0x00000000 (0_{dec})
7020:12	Switch-off value	Counter value at which the "Output 24 V" is switched off.	UINT32	RO	0x00000000 (0_{dec})

Index 7030 PLS Outputs

Index (hex)	Name	Meaning	Data type	Flags	Default
7030:0	PLS Outputs	Max. Subindex	UINT8	RO	0x11 (17_{dec})
7030:01	Enable PLS	Activate automatic counting function	BOOLEAN	RO	0x00 (0_{dec})
7030:04	Output	Signal at the output	BOOLEAN	RO	0x00 (0_{dec})
7030:11	Switch-on value	Counter value at which the "Output 24 V" is switched on.	UINT32	RO	0x00000000 (0_{dec})
7030:12	Switch-off value	Counter value at which the "Output 24 V" is switched off.	UINT32	RO	0x00000000 (0_{dec})

7.2.3.3 Information and diagnostic data

Index F000 Modular device profile

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

Index F008 Code word

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

Index F010 Module list

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	Max. Subindex	UINT8	RW	0x04 (4_{dec})
F010:01	Subindex 001	Reserved	UINT32	RO	0x000000FD (253_{dec})
F010:02	Subindex 002	Reserved	UINT32	RO	0x000001FF (511_{dec})
F010:03	Subindex 003	Reserved	UINT32	RO	0x00000200 (512_{dec})
F010:04	Subindex 004	Reserved	UINT32	RO	0x00000200 (512_{dec})

Index F082 MDP Profile Compatibility

Index (hex)	Name	Meaning	Data type	Flags	Default
F082:0	MDP profile compatibility	Max. Subindex	UINT8	RW	0x01 (1_{dec})
F082:01	Compatible input cycle counter	reserved	BOOLEAN	RW	0x00 (0_{dec})

7.2.4 Standard objects (0x1000-0x1FFF)

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

Index 1000 Device type

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

Index 1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EJ2521-0224

Index 1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	STRING	RO	00

Index 100A Software version

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

Index 1018 Identity

Index (hex)	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4_{dec})
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2_{dec})
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x09D92852 (165226578_{dec})
1018:03	Revision	Revision number of the EtherCAT slave; the Low Word (bit 0-15) indicates the special module number, the High Word (bit 16-31) refers to the device description	UINT32	RO	0x00000000 (0_{dec})
1018:04	Serial number	Serial number of the EtherCAT slave; the Low Byte (bit 0-7) of the Low Word contains the year of production, the High Byte (bit 8-15) of the Low Word contains the week of production, the High Word (bit 16-31) is 0	UINT32	RO	0x00000000 (0_{dec})

Index 10F0 Backup parameter handling

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

Index 1401 PTO RxPDO-Par Target compact

Index (hex)	Name	Meaning	Data type	Flags	Default
1401:0	PTO RxPDO-Par Target compact	PDO Parameter RxPDO 2	UINT8	RO	0x06 (6_{dec})
1401:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 2.	OCTET-STRING[2]	RO	02 16 04 16 06 16 08 16

Index 1402 PTO RxPDO-Par Target

Index (hex)	Name	Meaning	Data type	Flags	Default
1402:0	PTO RxPDO-Par Target	PDO Parameter RxPDO 3	UINT8	RO	0x06 (6_{dec})
1402:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 3.	OCTET-STRING[2]	RO	01 16 03 16 05 16 07 16

Index 1403 ENC RxPDO-Par Control compact

Index (hex)	Name	Meaning	Data type	Flags	Default
1403:0	ENC RxPDO-Par Control compact	PDO Parameter RxPDO 4	UINT8	RO	0x06 (6_{dec})
1403:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 4.	OCTET-STRING[2]	RO	02 16 04 16 06 16 08 16

Index 1404 ENC RxPDO-Par Control

Index (hex)	Name	Meaning	Data type	Flags	Default
1404:0	ENC RxPDO-Par Control	PDO Parameter RxPDO 5	UINT8	RO	0x06 (6_{dec})
1404:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 5.	OCTET-STRING[2]	RO	01 16 03 16 05 16 07 16

Index 1405 PLS RxPDO-Par Control compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1405:0	PLS RxPDO-Par Control compact Ch.1	PDO Parameter RxPDO 6	UINT8	RO	0x06 (6_{dec})
1405:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 6	OCTET-STRING[2]	RO	02 16 04 16 06 16

Index 1406 PLS RxPDO-Par Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1406:0	PLS RxPDO-Par Control Ch.1	PDO Parameter RxPDO 7	UINT8	RO	0x06 (6_{dec})
1406:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 7	OCTET-STRING[2]	RO	01 16 03 16 05 16

Index 1407 PLS RxPDO-Par Control compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1407:0	PLS RxPDO-Par Control compact Ch.2	PDO Parameter RxPDO 8	UINT8	RO	0x06 (6_{dec})
1407:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 8	OCTET-STRING[2]	RO	02 16 04 16 08 16

Index 1408 PLS RxPDO-Par Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1408:0	PLS RxPDO-Par Control Ch.2	PDO Parameter RxPDO	UINT8	RO	0x06 (6_{dec})
1408:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 9	OCTET-STRING[2]	RO	01 16 03 16 07 16

Index 1600 PTO RxPDO-Map Control

Index (hex)	Name	Meaning	Data type	Flags	Default
1600:0	PTO RxPDO-Map Control	PDO Mapping RxPDO 1	UINT8	RO	0x06 (6_{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x01 (Frequency select))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x02 (Disable ramp))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x03 (Go counter))	UINT32	RO	0x7000:03, 1
1600:04	SubIndex 004	4. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1600:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1600:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x11 (Frequency value))	UINT32	RO	0x7000:11, 16

Index 1601 PTO RxPDO-Map Target compact

Index (hex)	Name	Meaning	Data type	Flags	Default
1601:0	PTO RxPDO-Map Target compact	PDO Mapping RxPDO 2	UINT8	RO	0x01 (1_{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x12 (Target counter value))	UINT32	RO	0x7000:12, 16

Index 1602 PTO RxPDO-Map Target

Index (hex)	Name	Meaning	Data type	Flags	Default
1602:0	PTO RxPDO-Map Target	PDO Mapping RxPDO 3	UINT8	RO	0x01 (1_{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x12 (Target counter value))	UINT32	RO	0x7000:12, 32

Index 1603 ENC RxPDO-Map Control compact

Index (hex)	Name	Meaning	Data type	Flags	Default
1603:0	ENC RxPDO-Map Control compact	PDO Mapping RxPDO 4	UINT8	RO	0x07 (7_{dec})
1603:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1603:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7010:02, 1
1603:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x03 (Set counter))	UINT32	RO	0x7010:03, 1
1603:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7010:04, 1
1603:05	SubIndex 005	5. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1603:06	SubIndex 006	6. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1603:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x11 (Set counter value))	UINT32	RO	0x7010:11, 16

Index 1604 ENC RxPDO-Map Control

Index (hex)	Name	Meaning	Data type	Flags	Default
1604:0	ENC RxPDO-Map Control	PDO Mapping RxPDO 5	UINT8	RO	0x07 (7_{dec})
1604:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1604:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7010:02, 1
1604:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x03 (Set counter))	UINT32	RO	0x7010:03, 1
1604:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7010:04, 1
1604:05	SubIndex 005	5. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1604:06	SubIndex 006	6. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1604:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (ENC Outputs), entry 0x11 (Set counter value))	UINT32	RO	0x7010:11, 32

Index 1605 PLS RxPDO-Map Control compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1605:0	PLS RxPDO-Map Control compact Ch.1	PDO Mapping RxPDO 6	UINT8	RO	0x07 (7_{dec})
1605:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x01 (Enable PLS))	UINT32	RO	0x7020:01, 1
1605:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1605:03	SubIndex 003	3. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x04 (Output))	UINT32	RO	0x7020:04, 1
1605:04	SubIndex 004	4. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1605:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1605:06	SubIndex 006	6. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x11 (Switch on value))	UINT32	RO	0x7020:11, 16
1605:07	SubIndex 007	7. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x12 (Switch off value))	UINT32	RO	0x7020:12, 16

Index 1606 PLS RxPDO-Map Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1606:0	PLS RxPDO-Map Control Ch.1	PDO Mapping RxPDO 7	UINT8	RO	0x07 (7_{dec})
1606:01	SubIndex 001	1. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x01 (Enable PLS))	UINT32	RO	0x7020:01, 1
1606:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1606:03	SubIndex 003	3. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x04 (Output))	UINT32	RO	0x7020:04, 1
1606:04	SubIndex 004	4. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1606:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1606:06	SubIndex 006	6. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x11 (Switch on value))	UINT32	RO	0x7020:11, 32
1606:07	SubIndex 007	7. PDO Mapping entry (object 0x7020 (PLS Outputs), entry 0x12 (Switch off value))	UINT32	RO	0x7020:12, 32

Index 1607 PLS RxPDO-Map Control compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1607:0	PLS RxPDO-Map Control compact Ch.2	PDO Mapping RxPDO 8	UINT8	RO	0x07 (7_{dec})
1607:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x01 (Enable PLS))	UINT32	RO	0x7030:01, 1
1607:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1607:03	SubIndex 003	3. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x04 (Output))	UINT32	RO	0x7030:04, 1
1607:04	SubIndex 004	4. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1607:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1607:06	SubIndex 006	6. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x11 (Switch on value))	UINT32	RO	0x7030:11, 16
1607:07	SubIndex 007	7. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x12 (Switch off value))	UINT32	RO	0x7030:12, 16

Index 1608 PLS RxPDO-Map Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1608:0	PLS RxPDO-Map Control Ch.2	PDO Mapping RxPDO 9	UINT8	RO	0x07 (7_{dec})
1608:01	SubIndex 001	1. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x01 (Enable PLS))	UINT32	RO	0x7030:01, 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 0x7030 (PLS Outputs), entry 0x04 (Output))	UINT32	RO	0x7030:04, 1
1608:04	SubIndex 004	4. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1608:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1608:06	SubIndex 006	6. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x11 (Switch on value))	UINT32	RO	0x7030:11, 32
1608:07	SubIndex 007	7. PDO Mapping entry (object 0x7030 (PLS Outputs), entry 0x12 (Switch off value))	UINT32	RO	0x7030:12, 32

Index 1801 ENC TxPDO-Par Status compact

Index (hex)	Name	Meaning	Data type	Flags	Default
1801:0	ENC TxPDO-Par Status compact	PDO Mapping TxPDO 1	UINT8	RO	0x06 (6_{dec})
1801:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 1.	OCTET-STRING[2]]	RO	02 1A

Index 1802 ENC TxPDO-Par Status

Index (hex)	Name	Meaning	Data type	Flags	Default
1802:0	ENC TxPDO-Par Status	PDO Mapping TxPDO 2	UINT8	RO	0x06 (6_{dec})
1802:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 2.	OCTET-STRING[2]]	RO	01 1A

Index 0x1A00 PTO TxPDO-Map Status

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	PTO TxPDO-Map Status	PDO Mapping TxPDO 1	UINT8	RO	0x08 (8_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (PTO Inputs), entry 0x01 (Sel. Ack/End counter))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (PTO Inputs), entry 0x02 (Ramp active))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (PTO Inputs), entry 0x07 (Error))	UINT32	RO	0x6000:07, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (PTO Inputs), entry 0x0E (Sync error))	UINT32	RO	0x6000:0E, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (PTO Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1

Index 0x1A01 ENC TxPDO-Map Status compact

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	ENC TxPDO-Map Status compact	PDO Mapping TxPDO 2	UINT8	RO	0x0D (13_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x02 (Latch extern valid))	UINT32	RO	0x6010:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x03 (Set counter done))	UINT32	RO	0x6010:03, 1
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x04 (Counter underflow))	UINT32	RO	0x6010:04, 1
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x05 (Counter overflow))	UINT32	RO	0x6010:05, 1
1A01:06	SubIndex 006	6. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1A01:07	SubIndex 007	7. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x0D (Status of extern latch))	UINT32	RO	0x6010:0D, 1
1A01:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x0E (Sync error))	UINT32	RO	0x6010:0E, 1
1A01:0A	SubIndex 010	10. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A01:0B	SubIndex 011	11. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1
1A01:0C	SubIndex 012	12. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x11 (Counter value))	UINT32	RO	0x6010:11, 16
1A01:0D	SubIndex 013	13. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x12 (Latch value))	UINT32	RO	0x6010:12, 16

Index 0x1A02 ENC TxPDO-Map Status

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	ENC TxPDO-Map Status	PDO Mapping TxPDO 3	UINT8	RO	0x0D (13_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x02 (Latch extern valid))	UINT32	RO	0x6010:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x03 (Set counter done))	UINT32	RO	0x6010:03, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x04 (Counter underflow))	UINT32	RO	0x6010:04, 1
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x05 (Counter overflow))	UINT32	RO	0x6010:05, 1
1A02:06	SubIndex 006	6. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1A02:07	SubIndex 007	7. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x0D (Status of extern latch))	UINT32	RO	0x6010:0D, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x0E (Sync error))	UINT32	RO	0x6010:0E, 1
1A02:0A	SubIndex 010	10. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A02:0B	SubIndex 011	11. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1
1A02:0C	SubIndex 012	12. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x11 (Counter value))	UINT32	RO	0x6010:11, 32
1A02:0D	SubIndex 013	13. PDO Mapping entry (object 0x6010 (ENC Inputs), entry 0x12 (Latch value))	UINT32	RO	0x6010:12, 32

Index 1A03 PLS TxPDO-Map Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	PLS TxPDO-Map Status Ch.1	PDO Mapping TxPDO 4	UINT8	RO	0x07 (7_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (object 0x6020 (PLS Inputs), entry 0x01 (PLS enabled))	UINT32	RO	0x6020:01, 1
1A03:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (PLS Inputs), entry 0x04 (Status of output))	UINT32	RO	0x6020:04, 1
1A03:04	SubIndex 004	4. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A03:05	SubIndex 005	5. PDO Mapping entry (object 0x6020 (PLS Inputs), entry 0x0E (Sync error))	UINT32	RO	0x6020:0E, 1
1A03:06	SubIndex 006	6. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:07	SubIndex 007	7. PDO Mapping entry (object 0x6020 (PLS Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6020:10, 1

Index 0x1A04 PLS TxPDO-Map Status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	PLS TxPDO-Map Status Ch.2	PDO Mapping TxPDO 4	UINT8	RO	0x07 (7_{dec})
1A04:01	SubIndex 001	1. PDO Mapping entry (object 0x6030 (PLS Inputs), entry 0x01 (PLS enabled))	UINT32	RO	0x6030:01, 1
1A04:02	SubIndex 002	2. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A04:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (PLS Inputs), entry 0x04 (Status of output))	UINT32	RO	0x6030:04, 1
1A04:04	SubIndex 004	4. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A04:05	SubIndex 005	5. PDO Mapping entry (object 0x6030 (PLS Inputs), entry 0x0E (Sync error))	UINT32	RO	0x6030:0E, 1
1A04:06	SubIndex 006	6. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A04:07	SubIndex 007	7. PDO Mapping entry (object 0x6030 (PLS Inputs), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6030:10, 1

Index 1C00 Sync manager type

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

Index 1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RO	0x02 (2_{dec})
1C12:01	Subindex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1600 (5632_{dec})
1C12:02	Subindex 002	2. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1601 (5633_{dec})
1C12:03	Subindex 003	3. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1603 (5635_{dec})
1C12:04	Subindex 004	4. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1605 (5637_{dec})
1C12:05	Subindex 005	5. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1607 (5639_{dec})

Index 1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x04 (4_{dec})
1C13:01	SubIndex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	SubIndex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A01 (6657_{dec})
1C13:03	SubIndex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A03 (6659_{dec})
1C13:04	SubIndex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A04 (6660_{dec})

Index 1C32 SM output parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32_{dec})
1C32:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 2 Event	UINT16	RW	0x0001 (1_{dec})
1C32:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchron with SM 2 Event: Master cycle time	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	0x00000000 (0_{dec})
1C32:04	Sync modes supported	Supported synchronization modes: • Bit 0 = 1: free run is supported • Bit 1 = 1: Synchron with SM 2 Event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output Shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 0x1C32:08)	UINT16	RO	0x4C07 (19463_{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000186A0 (100000_{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0_{dec})
1C32:06	Minimum delay time	Minimum time between SYNC1 event and output of the outputs (in ns)	UINT32	RO	0x00000000 (0_{dec})
1C32:08	Command	• 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 0x1C32:03, 0x1C32:05, 0x1C32:06, 0x1C32:09 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	0x00000000 (0_{dec})
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0_{dec})
1C32:0D	Shift too short counter	Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C32:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC mode only).	BOOLEAN	RO	0x00 (0_{dec})

Index 1C33 SM input parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32_{dec})
1C33:01	Sync mode	Current synchronization mode: • Bit 0 = 0: Free Run • Bit 0 = 1: Synchron with SM 2 Event • Bit 15 = 0: Standard • Bit 15 = 1: FastOp mode (CoE deactivated)	UINT16	RW	0x0022 (34_{dec})
1C33:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchron with SM 2 Event: Master cycle time • DC mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x000F4240 (1000000_{dec})
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:04	Sync modes supported	Supported synchronization modes: • Bit 0: free run is supported • Bit 1: Synchron with SM 2 Event is supported (outputs available) • Bit 1: Synchron with SM 3 Event is supported (no outputs available) • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 01: Input Shift through local event (outputs available) • Bit 4-5 = 10: Input Shift with SYNC1 event (no outputs available) • Bit 14 = 1: dynamic times (measurement through writing of 0x1C33:08)	UINT16	RO	0x4C07 (19463_{dec})
1C33:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000186A0 (100000_{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	Min. time between SYNC1 event and the reading of the inputs (in ns, DC mode only)	UINT32	RO	0x00000000 (0_{dec})
1C33:08	Command	With this entry the real required process data provision time can be measured. • 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 0x1C33:03, 0x1C33:06, 1C33:09 are updated with the maximum measured values. For a subsequent measurement the measured values are reset.	UINT16	RW	0x0000 (0_{dec})
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C33:0C	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})
1C33:0D	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})
1C33:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC mode only)	BOOLEAN	RO	0x00 (0_{dec})

8 EJ2522 - commissioning

8.1 Note on documentation for the EL252x

Detailed documentation on the commissioning of the EJ252x modules is being prepared.

Note on documentation for the EL252x

The descriptions and notes on the commissioning of the EL252x EtherCAT Terminals are transferable to the EJ252x EtherCAT plug-in modules.

Before commissioning, read the detailed description of the process data, operating modes and parameterization in the EL252x documentation.

8.2 Object description and parameterization

EtherCAT XML Device Description

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

Parameterization via the CoE list (CAN over EtherCAT)

The EtherCAT device is parameterized via the CoE - Online tab (with a double click on the respective object) or via the Process Data tab (assignment of PDOs). A detailed description can be found in the EtherCAT System-Documentation in chapter “EtherCAT subscriber configuration”
Please note the general CoE notes in the EtherCAT System Documentation in chapter “CoE-interface” when using/manipulating the CoE parameters:
- Keep a startup list if components have to be replaced
- Differentiation between online/offline dictionary, existence of current XML description
- use "CoE reload" for resetting changes

Introduction

The CoE overview contains objects for different intended applications:

- Objects required for parameterization during commissioning:
  - Restore [▶ 60] object index 0x1011
  - Configuration data [▶ 61] index 0x80n0
- Objects intended for regular operation, e.g. through ADS access.
- Profile-specific objects:
  - Input data [▶ 65] index 0x60n0
  - Output data [▶ 66] index 0x70n0
  - Information and diagnostic data [▶ 67] Index 0xF000, 0xF008, 0xF010
- Standard objects [▶ 68]

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

8.2.1 Restore object

Index 1011 Restore default parameters

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

8.2.2 Configuration data

Index 8000 PTO Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8000:0	PTO Settings Ch.1	Max. Subindex	UINT8	RO	0x16 (24_{dec})
8000:01	Adapt A/B on position set	If the counter value is set to "0", the C-track goes into the "high" state. The behavior of channels A and B can be defined in this case. By default the value is FALSE, the position of the C track to A and B is then not changed. If the value is set to TRUE, channels A and B are both set to high. Consequently, a change of state occurs on both channels!	BOOLEAN	RW	0x00 (0_{dec})
8000:02	Emergency ramp active	TRUE: If the watchdog timer responds, the module ramps with the time constant set in index 0x8000:18 to the value set in index 0x8000:11. FALSE: The function is deactivated	BOOLEAN	RW	0x00 (0_{dec})
8000:03	Watchdog timer inactive	TRUE: The watchdog timer is deactivated FALSE: The watchdog timer is activated in the delivery state. Either the manufacturer's of the user's switch-on value is output if the watchdog overflows.	BOOLEAN	RW	0x00 (0_{dec})
8000:04	Sign/amount representation	TRUE: The output value is displayed in signed amount representation: -2_{dec}= 0x8002 -1_{dec} = 0x8001 1_{dec} = 0x0001 2_{dec} = 0x0002 FALSE: The output value is output as signed integer in the two's complement: -2_{dec} = 0xFFFE -1_{dec} = 0xFFFF 1_{dec} = 0x0001 2_{dec} = 0x0002	BOOLEAN	RW	0x00 (0_{dec})
8000:06	Ramp function active	TRUE: Ramp function activated FALSE: Ramp function deactivated	BOOLEAN	RW	0x00 (0_{dec})
8000:07	Ramp base frequency	Selection in the pull-down menu: 0_{dec}: Ramp base frequency: 10 Hz 1_{dec}: Ramp base frequency: 1 kHz	BIT1	RW	0x00 (0_{dec})
8000:08	Direct input mode	TRUE: Direct input mode FALSE:' Relative input mode	BOOLEAN	RW	0x00 (0_{dec})
8000:09	User switch-on value on wdt	Determines the behavior with triggered watchdog timer TRUE: User switch-on value FALSE: Manufacturer's switch-on value	BOOLEAN	RW	0x00 (0_{dec})
8000:0A	Travel distance control active	TRUE: Travel distance control activated FALSE: Travel distance control deactivated	BOOLEAN	RW	0x00 (0_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
8000:0E	Operating mode	Selection in the pull-down menu: $0_{dec:}$ Frequency modulation operation mode $1_{dec:}$ Pulse direction specification operation mode $2_{dec:}$ Incremental encoder operation mode	BIT2	RW	0x00 (0_{dec})
8000:10	Negative logic	TRUE: Negative logic FALSE: Positive logic	BOOLEAN	RW	0x00 (0_{dec})
8000:11	User switch-on-value	User switch-on value (frequency)	UINT16	RW	0x0000 (0_{dec})
8000:12	Base frequency 1	Base frequency 1 = 50000 Hz	UINT32	RW	0x0000C350 (50000_{dec})
8000:13	Base frequency 2	Base frequency 2 = 100000 Hz	UINT32	RW	0x000186A0 (100000_{dec})
8000:14	Ramp time constant (rising)	Ramp time constant (rising)	UINT16	RW	0x03E8 (1000_{dec})
8000:15	Ramp time constant (falling)	Ramp time constant (falling)	UINT16	RW	0x03E8 (1000_{dec})
8000:16	Frequency factor (digit x 10 mHz)	Frequency factor (direct input, digit x 10 mHz)	UINT16	RW	0x0064 (100_{dec})
8000:17	Slowing down frequency	Slowing down frequency, travel distance control	UINT16	RW	0x0032 (50_{dec})
8000:18	Ramp time constant (emergency)	Ramp time constant for controlled switch-off; User switch-on value is driven to (index 0x8000:11)	UINT16	RW	0x03E8 (1000_{dec}

Index 8010 PTO Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8010:0	PTO Settings Ch.2	Max. Subindex	UINT8	RO	0x16 (24_{dec})
8010:01	Adapt A/B on position set	If the counter value is set to "0", the C-track goes into the "high" state. The behavior of channels A and B can be defined in this case. By default the value is FALSE, the position of the C track to A and B is then not changed. If the value is set to TRUE, channels A and B are both set to high. Consequently, a change of state occurs on both channels!	BOOLEAN	RW	0x00 (0_{dec})
8010:02	Emergency ramp active	TRUE: If the watchdog timer responds, the module ramps with the time constant set in index 0x8000:18 to the value set in index 0x8000:11. FALSE: The function is deactivated	BOOLEAN	RW	0x00 (0_{dec})
8010:03	Watchdog timer inactive	TRUE: The watchdog timer is deactivated FALSE: The watchdog timer is activated in the delivery state. Either the manufacturer's of the user's switch-on value is output if the watchdog overflows.	BOOLEAN	RW	0x00 (0_{dec})
8010:04	Sign/amount representation	TRUE: The output value is displayed in signed amount representation: -2_{dec}= 0x8002 -1_{dec} = 0x8001 1_{dec} = 0x0001 2_{dec} = 0x0002 FALSE: The output value is output as signed integer in the two's complement: -2_{dec} = 0xFFFE -1_{dec} = 0xFFFF 1_{dec} = 0x0001 2_{dec} = 0x0002	BOOLEAN	RW	0x00 (0_{dec})
8010:06	Ramp function active	TRUE: Ramp function activated FALSE: Ramp function deactivated	BOOLEAN	RW	0x00 (0_{dec})
8010:07	Ramp base frequency	Selection in the pull-down menu: 0_{dec}: Ramp base frequency: 10 Hz 1_{dec}: Ramp base frequency: 1 kHz	BIT1	RW	0x00 (0_{dec})
8010:08	Direct input mode	TRUE: Direct input mode FALSE:' Relative input mode	BOOLEAN	RW	0x00 (0_{dec})
8010:09	User switch-on value on wdt	Determines the behavior with triggered watchdog timer TRUE: User switch-on value FALSE: Manufacturer's switch-on value	BOOLEAN	RW	0x00 (0_{dec})
8010:0A	Travel distance control active	TRUE: Travel distance control activated FALSE: Travel distance control deactivated	BOOLEAN	RW	0x00 (0_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
8010:0E	Operating mode	Selection in the pull-down menu: $0_{dec:}$ Frequency modulation operation mode $1_{dec:}$ Pulse direction specification operation mode $2_{dec:}$ Incremental encoder operation mode	BIT2	RW	0x00 (0_{dec})
8000:10	Negative logic	TRUE: Negative logic FALSE: Positive logic	BOOLEAN	RW	0x00 (0_{dec})
8010:11	User switch-on-value	User switch-on value (frequency)	UINT16	RW	0x0000 (0_{dec})
8010:12	Base frequency 1	Base frequency 1 = 50000 Hz	UINT32	RW	0x0000C350 (50000_{dec})
8010:13	Base frequency 2	Base frequency 2 = 100000 Hz	UINT32	RW	0x000186A0 (100000_{dec})
8010:14	Ramp time constant (rising)	Ramp time constant (rising)	UINT16	RW	0x03E8 (1000_{dec})
8010:15	Ramp time constant (falling)	Ramp time constant (falling)	UINT16	RW	0x03E8 (1000_{dec})
8010:16	Frequency factor (digit x 10 mHz)	Frequency factor (direct input, digit x 10 mHz)	UINT16	RW	0x0064 (100_{dec})
8010:17	Slowing down frequency	Slowing down frequency, travel distance control	UINT16	RW	0x0032 (50_{dec})
8010:18	Ramp time constant (emergency)	Ramp time constant for controlled switch-off; User switch-on value is driven to (index 0x8000:11)	UINT16	RW	0x03E8 (1000_{dec})

Index 8020 ENC Settings Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
8020:0	ENC Settings Ch.1	Max. Subindex	UINT8	RO	0x1A (26_{dec})
8020:01	Enable C reset	The counter is reset via the C-track	BOOLEAN	RW	0x00 (0_{dec})
8020:0A	Enable micro increments	The counter is more highly resolved with the bits specified in 0x8pp0:16	BOOLEAN	RW	0x00 (0_{dec})
8020:18	Micro increment bits	If 0x8pp0:0A is enabled: number of micro increment bits	UINT16	RW	0x0008 (8_{dec})
8020:19	Pulses per revolution	If C-reset active: Number of increments per revolution. At 1024 the counter counts.	UINT32	RW	0x00000400 (1024_{dec})
8020:1A	Autoset threshold	If the difference between "Target counter value" and "Counter value" exceeds this threshold, no output takes place. 0: function for automatic setting is inactive	UINT32	RW	0x00000000 (0_{dec})

Index 0x8030 ENC Settings Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
8030:0	ENC Settings Ch.2	Max. Subindex	UINT8	RO	0x1A (26_{dec})
8030:01	Enable C reset	The counter is reset via the C-track	BOOLEAN	RW	0x00 (0_{dec})
8030:0A	Enable micro increments	The counter is more highly resolved with the bits specified in 0x8pp0:16	BOOLEAN	RW	0x00 (0_{dec})
8030:18	Micro increment bits	If 0x8pp0:0A is enabled: number of micro increment bits	UINT16	RW	0x0008 (8_{dec})
8030:19	Pulses per revolution	If C-reset active: Number of increments per revolution. At 1024 the counter counts.	UINT32	RW	0x00000400 (1024_{dec})
8030:1A	Autoset threshold	If the difference between "Target counter value" and "Counter value" exceeds this threshold, no output takes place. 0: function for automatic setting is inactive	UINT32	RW	0x00000000 (0_{dec})

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

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

8.2.3.1 Input data

Index 0x6000 PTO Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6000:0	PTO Inputs Ch.1	Max. Subindex	UINT8	RO	0x10 (16_{dec})
6000:01	Sel. Ack/End counter	Confirms the change of the base frequency with activated travel distance control: target counter value reached	BOOLEAN	RO	0x00 (0_{dec})
6000:02	Ramp active	Ramp is currently being followed	BOOLEAN	RO	0x00 (0_{dec})
6000:07	Error	General error bit, is set together with overrange and underrange	BOOLEAN	RO	0x00 (0_{dec})
6000:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6000:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})

Index 0x6010 PTO Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6010:0	PTO Inputs Ch.2	Max. Subindex	UINT8	RO	0x10 (16_{dec})
6010:01	Sel. Ack/End counter	Confirms the change of the base frequency with activated travel distance control: target counter value reached	BOOLEAN	RO	0x00 (0_{dec})
6010:02	Ramp active	Ramp is currently being followed	BOOLEAN	RO	0x00 (0_{dec})
6010:07	Error	General error bit, is set together with overrange and underrange	BOOLEAN	RO	0x00 (0_{dec})
6010:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6010:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})

Index 0x6020 ENC Inputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
6020:0	ENC Inputs Ch.1	Max. Subindex	UINT8	RO	0x11 (17_{dec})
6020:03	Set counter done	Counter was set.	BOOLEAN	RO	0x00 (0_{dec})
6020:04	Counter underflow	This bit is set if the 16-bit counter underflows (0 -> 65535). It is reset when the counter drops below two thirds of its measuring range (43690 -> 43689) or immediately an overflow occurs.	BOOLEAN	RO	0x00 (0_{dec})
6020:05	Counter overflow	This bit is set if the 16-bit counter overflows (65535 -> 0). It is reset when the counter exceeds one third of its measuring range (21845 -> 21846) or immediately an underflow occurs.	BOOLEAN	RO	0x00 (0_{dec})
6020:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6020:0F	TxPDO State	Validity of the data of the associated TxPDO (0 = valid, 1 = invalid).	BOOLEAN	RO	0x00 (0_{dec})
6020:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6020:11	Counter value	Counter value	UINT32	RO	0x00000000 (0_{dec})

Index 0x6030 ENC Inputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
6030:0	ENC Inputs Ch.2	Max. Subindex	UINT8	RO	0x11 (17_{dec})
6030:03	Set counter done	Counter was set.	BOOLEAN	RO	0x00 (0_{dec})
6030:04	Counter underflow	This bit is set if the 16-bit counter underflows (0 -> 65535). It is reset when the counter drops below two thirds of its measuring range (43690 -> 43689) or immediately an overflow occurs.	BOOLEAN	RO	0x00 (0_{dec})
6030:05	Counter overflow	This bit is set if the 16-bit counter overflows (65535 -> 0). It is reset when the counter exceeds one third of its measuring range (21845 -> 21846) or immediately an underflow occurs.	BOOLEAN	RO	0x00 (0_{dec})
6030:0E	Sync error	The Sync error bit is only required for Distributed Clocks mode. It indicates whether a synchronization error has occurred during the previous cycle.	BOOLEAN	RO	0x00 (0_{dec})
6030:0F	TxPDO State	Validity of the data of the associated TxPDO (0 = valid, 1 = invalid).	BOOLEAN	RO	0x00 (0_{dec})
6030:10	TxPDO Toggle	The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
6030:11	Counter value	Counter value	UINT32	RO	0x00000000 (0_{dec})

8.2.3.2 Output data

Index 7000 PTO Outputs Ch1.

Index (hex)	Name	Meaning	Data type	Flags	Default
7000:0	PTO Outputs Ch.1	Max. Subindex	UINT8	RO	0x13 (19_{dec})
7000:01	Frequency select	Fast toggling of the base frequency (only if ramp function is deactivated) 0_{bin} = base frequency 1 (index 0x8000:12) 1_{bin} = base frequency 2 (index 0x8000:13)	BOOLEAN	RO	0x00 (0_{dec})
7000:02	Disable ramp	The ramp function is disabled despite active index 0x8000:06.	BOOLEAN	RO	0x00 (0_{dec})
7000:03	Go counter	If travel distance control is activated (index 0x8000:0A), a specified counter value is driven to if the bit is set	BOOLEAN	RO	0x00 (0_{dec})
7000:04	Automatic direction	The shortest direction is automatically determined	BOOLEAN	RW	0x00 (0_{dec})
7000:05	Forward	Manual specification of the output direction. ("Automatic direction" may not be set)	BOOLEAN	RW	0x00 (0_{dec})
7000:06	Backward	Manual specification of the output direction. ("Automatic direction" may not be set)	BOOLEAN	RW	0x00 (0_{dec})
7000:11	Frequency value	Output frequency	UINT16	RO	0x0000 (0_{dec})
7000:12	Target counter value	Target counter value	UINT32	RO	0x00000000 (0_{dec})
7000:13	Target arrival time	DC time at which the target counter value should be reached	UINT64	RO	0x0000000000000000 (0_{dec})

Index 7010 PTO Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
7010:0	PTO Outputs Ch.2	Max. Subindex	UINT8	RO	0x13 (19_{dec})
7010:01	Frequency select	Fast toggling of the base frequency (only if ramp function is deactivated) 0_{bin} = base frequency 1 (index 0x8010:12 [▶ 63]) 1_{bin} = base frequency 2 (index 0x8010:13 [▶ 63])	BOOLEAN	RO	0x00 (0_{dec})
7010:02	Disable ramp	The ramp function is disabled despite active index 0x8010:06 [▶ 63].	BOOLEAN	RO	0x00 (0_{dec})
7010:03	Go counter	If travel distance control is activated (index 0x8010:0A [▶ 63]), a specified counter value is driven to if the bit is set	BOOLEAN	RO	0x00 (0_{dec})
7010:04	Automatic direction	The shortest direction is automatically determined	BOOLEAN	RW	0x00 (0_{dec})
7010:05	Forward	Manual specification of the output direction. ("Automatic direction" may not be set)	BOOLEAN	RW	0x00 (0_{dec})
7010:06	Backward	Manual specification of the output direction. ("Automatic direction" may not be set)	BOOLEAN	RW	0x00 (0_{dec})
7010:11	Frequency value	Output frequency	UINT16	RO	0x0000 (0_{dec})
7010:12	Target counter value	Target counter value	UINT32	RO	0x00000000 (0_{dec})
7010:13	Target arrival time	DC time at which the target counter value should be reached	UINT64	RO	0x0000000000000000 (0_{dec})

Index 7020 ENC Outputs Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
7020:0	ENC Outputs Ch.1	Max. Subindex	UINT8	RO	0x11 (17_{dec})
7020:03	Set counter	Set counter value	BOOLEAN	RO	0x00 (0_{dec})
7020:10	Reserved	Reserved	BOOLEAN	RO	0x00 (0_{dec})
7020:11	Set counter value	This is the counter value to be set via "Set counter" (index 0x7020:03).	UINT32	RO	0x00000000 (0_{dec})

Index 7030 ENC Outputs Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
7030:0	ENC Outputs Ch.2	Max. Subindex	UINT8	RO	0x11 (17_{dec})
7030:03	Set counter	Set counter value	BOOLEAN	RO	0x00 (0_{dec})
7030:10	Reserved	Reserved	BOOLEAN	RO	0x00 (0_{dec})
7030:11	Set counter value	This is the counter value to be set via "Set counter" (index 0x7030:03).	UINT32	RO	0x00000000 (0_{dec})

8.2.3.3 Information and diagnostic data

Index A000 PTO Diag data Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
A000:0	PTO Diag data Ch.1	Max. Subindex	UINT8	RO	0x01 (1_{dec})
A000:01	Overspeed counter	Counts up if the calculated set position does not correspond to the actual position in the next cycle. Possible causes: • the output frequency is limited by the corresponding "Base frequency 1" • Micro increments are active and the "internal 100 MHz" are exceeded	UINT16	RO	0x0000 (0_{dec})

Index A010 PTO Diag data Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
A010:0	PTO Diag data Ch.2	Max. Subindex	UINT8	RO	0x01 (1_{dec})
A010:01	Overspeed counter	Counts up if the calculated set position does not correspond to the actual position in the next cycle. Possible causes: • the output frequency is limited by the corresponding "Base frequency 1" • Micro increments are active and the "internal 100 MHz" are exceeded	UINT16	RO	0x0000 (0_{dec})

Index F000 Modular device profile

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

Index F008 Code word

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

Index F010 Module list

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	Max. Subindex	UINT8	RW	0x04 (4_{dec})
F010:01	Subindex 001	Reserved	UINT32	RO	0x000000FD (253_{dec})
F010:02	Subindex 002	Reserved	UINT32	RO	0x000000FD (253_{dec})
F010:03	Subindex 003	Reserved	UINT32	RO	0x000001FF (511_{dec})
F010:04	Subindex 004	Reserved	UINT32	RO	0x000001FF (511_{dec})

8.2.4 Standard objects (0x1000-0x1FFF)

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

Index 1000 Device type

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

Index 1008 Device name

Index (hex)	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	EJ2522

Index 1009 Hardware version

Index (hex)	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version of the EtherCAT slave	STRING	RO	00

Index 100A Software version

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

Index 1018 Identity

Index (hex)	Name	Meaning	Data type	Flags	Default
1018:0	Identity	Information for identifying the slave	UINT8	RO	0x04 (4_{dec})
1018:01	Vendor ID	Vendor ID of the EtherCAT slave	UINT32	RO	0x00000002 (2_{dec})
1018:02	Product code	Product code of the EtherCAT slave	UINT32	RO	0x09DA2852 (165292114_{dec})
1018:03	Revision	Revision number of the EtherCAT slave; the Low Word (bit 0-15) indicates the special module number, the High Word (bit 16-31) refers to the device description	UINT32	RO	0x00000000 (0_{dec})
1018:04	Serial number	Serial number of the EtherCAT slave; the Low Byte (bit 0-7) of the Low Word contains the year of production, the High Byte (bit 8-15) of the Low Word contains the week of production, the High Word (bit 16-31) is 0	UINT32	RO	0x00000000 (0_{dec})

Index 10F0 Backup parameter handling

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

Index 1400 PTO RxPDO-Par Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1400:0	PTO RxPDO-Par Control Ch.1	PDO Parameter RxPDO 1	UINT8	RO	0x06 (6_{dec})
1400:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 1	OCTET-STRING[6]	RO	01 16 04 16 00 00

Index 1401 PTO RxPDO-Par Control Position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1401:0	PTO RxPDO-Par Control Position Ch.1	PDO Parameter RxPDO 2	UINT8	RO	0x06 (6_{dec})
1401:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 2.	OCTET-STRING[2]	RO	00 16 02 16 03 16

Index 1402 PTO RxPDO-Par Target compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1402:0	PTO RxPDO-Par Target compact Ch.1	PDO Parameter RxPDO 3	UINT8	RO	0x06 (6_{dec})
1402:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 3.	OCTET-STRING[2]	RO	01 16 03 16 00 00

Index 1403 PTO RxPDO-Par Target Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1403:0	PTO RxPDO-Par Target Ch.1	PDO Parameter RxPDO 4	UINT8	RO	0x06 (6_{dec})
1403:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 4.	OCTET-STRING[2]	RO	01 16 02 16

Index 1404 PTO RxPDO-Par Arrival Ch. 1

Index (hex)	Name	Meaning	Data type	Flags	Default
1404:0	PTO RxPDO-Par Arrival Ch. 1	PDO Parameter RxPDO 5	UINT8	RO	0x06 (6_{dec})
1404:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 5.	OCTET-STRING[2]	RO	00 16 02 16 03 16

Index 1405 PTO RxPDO-Par Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1405:0	PTO RxPDO-Par Control Ch.2	PDO Parameter RxPDO 6	UINT8	RO	0x06 (6_{dec})
1405:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 6	OCTET-STRING[2]	RO	06 16 09 16

Index 1406 PTO RxPDO-Par Control Position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1406:0	PTO RxPDO-Par Control Position Ch.2	PDO Parameter RxPDO 7	UINT8	RO	0x06 (6_{dec})
1406:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 7	OCTET-STRING[2]	RO	05 16 07 16 08 16

Index 1407 PTO RxPDO-Par Target compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1407:0	PTO RxPDO-Par Target compact Ch.2	PDO Parameter RxPDO 8	UINT8	RO	0x06 (6_{dec})
1407:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 8	OCTET-STRING[2]	RO	06 16 08 16 00 00

Index 1408 PTO RxPDO-Par Target Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1408:0	PTO RxPDO-Par Target Ch.2	PDO Parameter RxPDO 9	UINT8	RO	0x06 (6_{dec})
1408:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 9	OCTET-STRING[2]	RO	06 16 07 16 00 00

Index 1409 PTO RxPDO-Par Arrival Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1409:0	PTO RxPDO-Par Arrival Ch.2	PDO Parameter RxPDO 10	UINT8	RO	0x06 (6_{dec})
1409:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 10	OCTET-STRING[6]	RO	05 16 07 16 08 16

Index 140A ENC RxPDO-Par Control compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
140A:0	ENC RxPDO-Par Control compact Ch.1	PDO Parameter RxPDO 11	UINT8	RO	0x06 (6_{dec})
140A:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 11	OCTET-STRING[6]	RO	0B 16 00 00 00 00

Index 140B ENC RxPDO-Par Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
140B:0	ENC RxPDO-Par Control Ch.1	PDO Parameter RxPDO 12	UINT8	RO	0x06 (6_{dec})
140B:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 12	OCTET-STRING[6]	RO	0A 16 00 00 00 00

Index 140C ENC RxPDO-Par Control compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
140C:0	ENC RxPDO-Par Control compact Ch.2	PDO Parameter RxPDO 13	UINT8	RO	0x06 (6_{dec})
140C:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 13	OCTET-STRING[6]	RO	0D 16 00 00 00 00

Index 140D ENC RxPDO-Par Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
140D:0	ENC RxPDO-Par Control Ch.2	PDO Parameter RxPDO 14	UINT8	RO	0x06 (6_{dec})
140D:06	Exclude RxPDOs	Specifies the RxPDOs (index of RxPDO mapping objects) that must not be transferred together with RxPDO 14	OCTET-STRING[6]	RO	0C 16 00 00 00 00

Index 1600 PTO RxPDO-Map Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1600:0	PTO RxPDO-Map Control	PDO Mapping RxPDO 1	UINT8	RO	0x05 (5_{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs), entry 0x01 (Frequency select))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x02 (Disable ramp))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x03 (Go counter))	UINT32	RO	0x7000:03, 1
1600:04	SubIndex 004	4. PDO Mapping entry (13 bits align)	UINT32	RO	0x0000:00, 13
1600:05	SubIndex 005	5. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x11 (Frequency value))	UINT32	RO	0x7000:11, 16

Index 1601 PTO RxPDO-Map Control Position Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1601:0	PTO RxPDO-Map Control Position Ch.1	PDO Mapping RxPDO 2	UINT8	RO	0x06 (6_{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x04 (Automatic direction))	UINT32	RO	0x7000:04, 1
1601:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x05 (Forward))	UINT32	RO	0x7000:05, 1
1601:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x06 (Backward))	UINT32	RO	0x7000:06, 1
1601:05	SubIndex 005	5. PDO Mapping entry (10 bits align)	UINT32	RO	0x0000:00, 10
1601:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x12 (Target counter value))	UINT32	RO	0x7000:12, 32

Index 1602 PTO RxPDO-Map Target compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1602:0	PTO RxPDO-Map Target compact Ch.1	PDO Mapping RxPDO 3	UINT8	RO	0x01 (1_{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x12 (Target counter value))	UINT32	RO	0x7000:12, 16

Index 1603 PTO RxPDO-Map Target Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1603:0	PTO RxPDO-Map Target Ch.1	PDO Mapping RxPDO 4	UINT8	RO	0x01 (1_{dec})
1603:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x12 (Target counter value))	UINT32	RO	0x7000:12, 32

Index 1604 PTO RxPDO-Map Arrival Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1604:0	PTO RxPDO-Map Arrival Ch.1	PDO Mapping RxPDO 5	UINT8	RO	0x01 (1_{dec})
1604:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (PTO Outputs Ch.1), entry 0x13 (Target arrival time))	UINT32	RO	0x7000:13, 64

Index 1605 PTO RxPDO-Map Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1605:0	PTO RxPDO-Map Control Ch.2	PDO Mapping RxPDO 6	UINT8	RO	0x05 (5_{dec})
1605:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x01 (Frequency select))	UINT32	RO	0x7010:01, 1
1605:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x02 (Disable ramp))	UINT32	RO	0x7010:02, 1
1605:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x03 (Go counter))	UINT32	RO	0x7010:03, 1
1605:04	SubIndex 004	4. PDO Mapping entry (13 bits align)	UINT32	RO	0x0000:00, 13
1605:05	SubIndex 005	5. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x11 (Frequency value))	UINT32	RO	0x7010:11, 16

Index 1606 PTO RxPDO-Map Control Position Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1606:0	PTO RxPDO-Map Control Position Ch.2	PDO Mapping RxPDO 7	UINT8	RO	0x06 (6_{dec})
1606:01	SubIndex 001	1. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1606:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x04 (Automatic direction))	UINT32	RO	0x7010:04, 1
1606:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x05 (Forward))	UINT32	RO	0x7010:05, 1
1606:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x06 (Backward))	UINT32	RO	0x7010:06, 1
1606:05	SubIndex 005	5. PDO Mapping entry (10 bits align)	UINT32	RO	0x000:00, 10
1606:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x12 (Target counter value))	UINT32	RO	0x7010:12, 32

Index 1607 PTO RxPDO-Map Target compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1607:0	PTO RxPDO-Map Target compact Ch.2	PDO Mapping RxPDO 8	UINT8	RO	0x01 (1_{dec})
1607:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x12 (Target counter value))	UINT32	RO	0x7010:12, 16

Index 1608 PTO RxPDO-Map Target Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1608:0	PTO RxPDO-Map Target Ch.2	PDO Mapping RxPDO 9	UINT8	RO	0x01 (1_{dec})
1608:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x12 (Target counter value))	UINT32	RO	0x7010:12, 32

Index 1609 PTO RxPDO-Map Arrival Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1609:0	PTO RxPDO-Map Arrival Ch.2	PDO Mapping RxPDO 10	UINT8	RO	0x01 (1_{dec})
1609:01	SubIndex 001	1. PDO Mapping entry (object 0x7010 (PTO Outputs Ch.2), entry 0x13 (Target arrival time))	UINT32	RO	0x7010:13, 64

Index 160A ENC RxPDO-Map Control compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
160A:0	ENC RxPDO-Map Control compact Ch.1	PDO Mapping RxPDO 11	UINT8	RO	0x05 (5_{dec})
160A:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
160A:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (ENC Outputs Ch.1), entry 0x03 (Set counter))	UINT32	RO	0x7020:03, 1
160A:03	SubIndex 003	3. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
160A:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (ENC Outputs Ch.1), entry 0x10 (Reserved))	UINT32	RO	0x7020:10, 1
160A:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7020:11, 16

Index 160B ENC RxPDO-Map Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
160B:0	ENC RxPDO-Map Control Ch.1	PDO Mapping RxPDO 12	UINT8	RO	0x05 (5_{dec})
160B:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
160B:02	SubIndex 002	2. PDO Mapping entry (object 0x7020 (ENC Outputs Ch.1), entry 0x03 (Set counter))	UINT32	RO	0x7020:03, 1
160B:03	SubIndex 003	3. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
160B:04	SubIndex 004	4. PDO Mapping entry (object 0x7020 (ENC Outputs Ch.1), entry 0x10 (Reserved))	UINT32	RO	0x7020:10, 1
160B:05	SubIndex 005	5. PDO Mapping entry (object 0x7020 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7020:11, 32

Index 160C ENC RxPDO-Map Control compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
160C:0	ENC RxPDO-Map Control compact Ch.2	PDO Mapping RxPDO 13	UINT8	RO	0x05 (5_{dec})
160C:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
160C:02	SubIndex 002	2. PDO Mapping entry (object 0x7030 (ENC Outputs Ch.2), entry 0x03 (Set counter))	UINT32	RO	0x7030:03, 1
160C:03	SubIndex 003	3. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
160C:04	SubIndex 004	4. PDO Mapping entry (object 0x7030 (ENC Outputs Ch.2), entry 0x10 (Reserved))	UINT32	RO	0x7030:10, 1
160C:05	SubIndex 005	5. PDO Mapping entry (object 0x7030 (ENC Outputs Ch.2), entry 0x11 (Set counter value))	UINT32	RO	0x7030:11, 16

Index 160D ENC RxPDO-Map Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
160D:0	ENC RxPDO-Map Control Ch.2	PDO Mapping RxPDO 14	UINT8	RO	0x05 (5_{dec})
160D:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
160D:02	SubIndex 002	2. PDO Mapping entry (object 0x7030 (ENC Outputs Ch.2), entry 0x03 (Set counter))	UINT32	RO	0x7030:03, 1
160D:03	SubIndex 003	3. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
160D:04	SubIndex 004	4. PDO Mapping entry (object 0x7030 (ENC Outputs Ch.2), entry 0x10 (Reserved))	UINT32	RO	0x7030:10, 1
160D:05	SubIndex 005	5. PDO Mapping entry (object 0x7030 (ENC Outputs Ch.2), entry 0x11 (Set counter value))	UINT32	RO	0x7030:11, 32

Index 1802 ENC TxPDO-Par Status compact Ch.1

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

Index 1803 ENC TxPDO-Par Status Ch.1

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

Index 1804 ENC TxPDO-Par Status compact Ch.2

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

Index 1805 ENC TxPDO-Par Status Ch.2

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

Index 1A00 PTO TxPDO-Map Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	PTO TxPDO-Map Status Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x08 (8_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (PTO Inputs Ch.1), entry 0x01 (Sel. Ack/End counter))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (PTO Inputs Ch.1), entry 0x02 (Ramp active))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (PTO Inputs Ch.1), entry 0x07 (Error))	UINT32	RO	0x6000:07, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (PTO Inputs Ch.1), entry 0x0E (Sync error))	UINT32	RO	0x6000:0E, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (PTO Inputs Ch.1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1

Index 1A01 PTO TxPDO-Map Status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	PTO TxPDO-Map Status Ch.2	PDO Mapping TxPDO 2	UINT8	RO	0x08 (8_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (PTO Inputs Ch.2), entry 0x01 (Sel. Ack/End counter))	UINT32	RO	0x6010:01, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (PTO Inputs Ch.2), entry 0x02 (Ramp active))	UINT32	RO	0x6010:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (PTO Inputs Ch.2), entry 0x07 (Error))	UINT32	RO	0x6010:07, 1
1A01:05	SubIndex 005	5. PDO Mapping entry (6 bits align)	UINT32	RO	0x0000:00, 6
1A01:06	SubIndex 006	6. PDO Mapping entry (object 0x6010 (PTO Inputs Ch.2), entry 0x0E (Sync error))	UINT32	RO	0x6010:0E, 1
1A01:07	SubIndex 007	7. PDO Mapping entry (1 bits align)	UINT32	RO	0x0000:00, 1
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x6010 (PTO Inputs Ch.2), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6010:10, 1

Index 1A02 ENC TxPDO-Map Status compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	ENC TxPDO-Map Status compact Ch.1	PDO Mapping TxPDO 3	UINT8	RO	0x09 (9_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6020:03, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6020:04, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6020:05, 1
1A02:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1A02:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x0E (Sync error))	UINT32	RO	0x6020:0E, 1
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x0F (TxPDO State))	UINT32	RO	0x6020:0F, 1
1A02:08	SubIndex 008	8. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6020:10, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6020:11, 16

Index 1A03 ENC TxPDO-Map Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	ENC TxPDO-Map Status Ch.1	PDO Mapping TxPDO 4	UINT8	RO	0x09 (9_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A03:02	SubIndex 002	2. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6020:03, 1
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6020:04, 1
1A03:04	SubIndex 004	4. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6020:05, 1
1A03:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1A03:06	SubIndex 006	6. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x0E (Sync error))	UINT32	RO	0x6020:0E, 1
1A03:07	SubIndex 007	7. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x0F (TxPDO State))	UINT32	RO	0x6020:0F, 1
1A03:08	SubIndex 008	8. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6020:10, 1
1A03:09	SubIndex 009	9. PDO Mapping entry (object 0x6020 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6020:11, 32

Index 1A04 ENC TxPDO-Map Status compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	ENC TxPDO-Map Status compact Ch.2	PDO Mapping TxPDO 5	UINT8	RO	0x09 (9_{dec})
1A04:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A04:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x03 (Set counter done))	UINT32	RO	0x6030:03, 1
1A04:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x04 (Counter underflow))	UINT32	RO	0x6030:04, 1
1A04:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x05 (Counter overflow))	UINT32	RO	0x6030:05, 1
1A04:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1A04:06	SubIndex 006	6. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x0E (Sync error))	UINT32	RO	0x6030:0E, 1
1A04:07	SubIndex 007	7. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x0F (TxPDO State))	UINT32	RO	0x6030:0F, 1
1A04:08	SubIndex 008	8. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6030:10, 1
1A04:09	SubIndex 009	9. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x11 (Counter value))	UINT32	RO	0x6030:11, 16

Index 1A05 ENC TxPDO-Map Status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A05:0	ENC TxPDO-Map Status Ch.2	PDO Mapping TxPDO 6	UINT8	RO	0x09 (9_{dec})
1A05:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A05:02	SubIndex 002	2. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x03 (Set counter done))	UINT32	RO	0x6030:03, 1
1A05:03	SubIndex 003	3. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x04 (Counter underflow))	UINT32	RO	0x6030:04, 1
1A05:04	SubIndex 004	4. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x05 (Counter overflow))	UINT32	RO	0x6030:05, 1
1A05:05	SubIndex 005	5. PDO Mapping entry (8 bits align)	UINT32	RO	0x0000:00, 8
1A05:06	SubIndex 006	6. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x0E (Sync error))	UINT32	RO	0x6030:0E, 1
1A05:07	SubIndex 007	7. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x0F (TxPDO State))	UINT32	RO	0x6030:0F, 1
1A05:08	SubIndex 008	8. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6030:10, 1
1A05:09	SubIndex 009	9. PDO Mapping entry (object 0x6030 (ENC Inputs Ch.2), entry 0x11 (Counter value))	UINT32	RO	0x6030:11, 32

Index 1C00 Sync manager type

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

Index 1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RO	0x06 (6_{dec})
1C12:01	Subindex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1600 (5632_{dec})
1C12:02	Subindex 002	2. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1603 (5635_{dec})
1C12:03	Subindex 003	3. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1605 (5637_{dec})
1C12:04	Subindex 004	4. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x1608 (5640_{dec})
1C12:05	Subindex 005	5. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x160B (5643_{dec})
1C12:06	Subindex 006	6. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RO	0x160D (5645_{dec})

Index 1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x04 (4_{dec})
1C13:01	SubIndex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{dec})
1C13:02	SubIndex 002	2. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A01 (6657_{dec})
1C13:03	SubIndex 003	3. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A03 (6659_{dec})
1C13:04	SubIndex 004	4. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A05 (6661_{dec})

Index 1C32 SM output parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C32:0	SM output parameter	Synchronization parameters for the outputs	UINT8	RO	0x20 (32_{dec})
1C32:01	Sync mode	Current synchronization mode: • 0: Free Run • 1: Synchron with SM 2 Event	UINT16	RW	0x0001 (1_{dec})
1C32:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchron with SM 2 Event: Master cycle time	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	0x00000000 (0_{dec})
1C32:04	Sync modes supported	Supported synchronization modes: • Bit 0 = 1: free run is supported • Bit 1 = 1: Synchron with SM 2 Event is supported • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 10: Output Shift with SYNC1 event (only DC mode) • Bit 14 = 1: dynamic times (measurement through writing of 0x1C32:08)	UINT16	RO	0x4C07 (19463_{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000186A0 (100000_{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0_{dec})
1C32:06	Minimum delay time	Minimum time between SYNC1 event and output of the outputs (in ns)	UINT32	RO	0x00000000 (0_{dec})
1C32:08	Command	• 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 0x1C32:03, 0x1C32:05, 0x1C32:06, 0x1C32:09 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	0x00000000 (0_{dec})
1C32:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C32:0C	Cycle exceeded counter	Number of occasions the cycle time was exceeded in OPERATIONAL (cycle was not completed in time or the next cycle began too early)	UINT16	RO	0x0000 (0_{dec})
1C32:0D	Shift too short counter	Number of occasions that the interval between SYNC0 and SYNC1 event was too short (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C32:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC mode only).	BOOLEAN	RO	0x00 (0_{dec})

Index 1C33 SM input parameter

Index (hex)	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32_{dec})
1C33:01	Sync mode	Current synchronization mode: • Bit 0 = 0: Free Run • Bit 0 = 1: Synchron with SM 2 Event • Bit 15 = 0: Standard • Bit 15 = 1: FastOp mode (CoE deactivated)	UINT16	RW	0x0022 (34_{dec})
1C33:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchron with SM 2 Event: Master cycle time • DC mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x000F4240 (1000000_{dec})
1C33:03	Shift time	Time between SYNC0 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:04	Sync modes supported	Supported synchronization modes: • Bit 0: free run is supported • Bit 1: Synchron with SM 2 Event is supported (outputs available) • Bit 1: Synchron with SM 3 Event is supported (no outputs available) • Bit 2-3 = 01: DC mode is supported • Bit 4-5 = 01: Input Shift through local event (outputs available) • Bit 4-5 = 10: Input Shift with SYNC1 event (no outputs available) • Bit 14 = 1: dynamic times (measurement through writing of 0x1C33:08)	UINT16	RO	0x4C07 (19463_{dec})
1C33:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000186A0 (100000_{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	Min. time between SYNC1 event and the reading of the inputs (in ns, DC mode only)	UINT32	RO	0x00000000 (0_{dec})
1C33:08	Command	With this entry the real required process data provision time can be measured. • 0: Measurement of the local cycle time is stopped • 1: Measurement of the local cycle time is started The entries 0x1C33:03, 0x1C33:06, 1C33:09 are updated with the maximum measured values. For a subsequent measurement the measured values are reset.	UINT16	RW	0x0000 (0_{dec})
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, only DC mode)	UINT32	RO	0x00000000 (0_{dec})
1C33:0B	SM event missed counter	Number of missed SM events in OPERATIONAL (DC mode only)	UINT16	RO	0x0000 (0_{dec})
1C33:0C	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})
1C33:0D	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})
1C33:20	Sync error	The synchronization was not correct in the last cycle (outputs were output too late; DC mode only)	BOOLEAN	RO	0x00 (0_{dec})

9 Appendix

9.1 Support and Service

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

Beckhoff's branch offices and representatives

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

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

You will also find further documentation for Beckhoff components there.

Beckhoff Support

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

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

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

Beckhoff Service

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

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

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