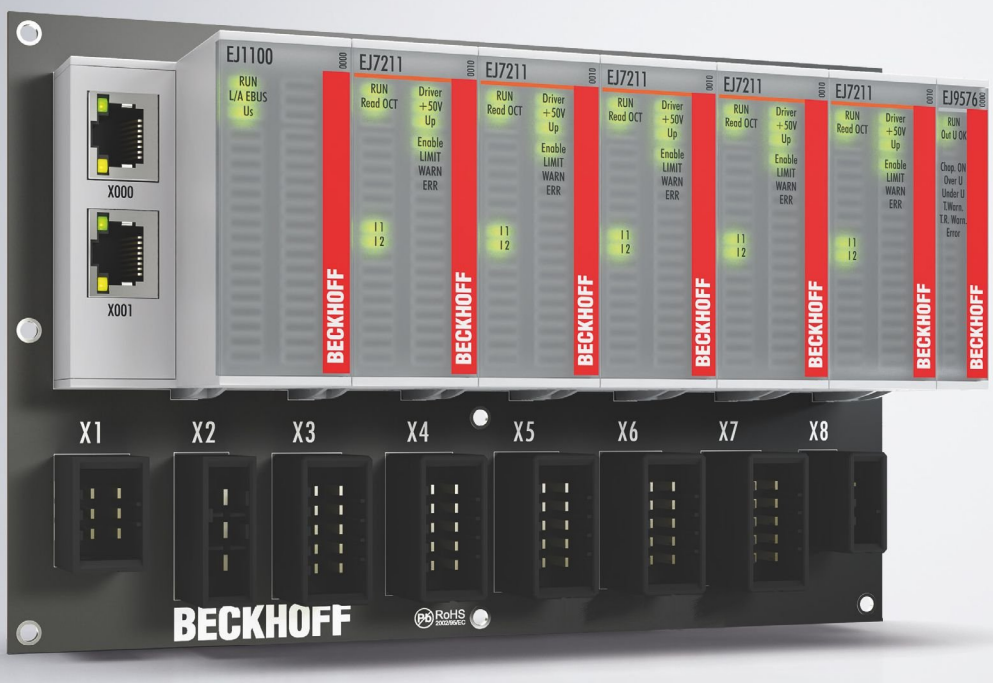
BECKHOFF New Automation Technology

Documentation | EN

EJ5112

2-Channel incremental encoder interface, 5 V DC (DIFF RS422, TTL, open collector), 5 MHz, 2 x AB or 1 x ABC



2023-12-07 | Version: 1.1

Table of contents

1 Foreword

1.1 Notes on the documentation

Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
The qualified personnel is obliged to always use the currently valid documentation.

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

Disclaimer

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

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

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

Trademarks

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

Patent Pending

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

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

Copyright

1.2 Safety instructions

Safety regulations

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

Exclusion of liability

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

Personnel qualification

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

Signal words

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

Personal injury warnings

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

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

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

Warning of damage to property or environment

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

Information on handling the product

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

1.3 Intended use

⚠ WARNING

Caution - Risk of injury!

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

1.4 Signal distribution board

NOTICE

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.

1.5 Documentation issue status

Version	Comment
1.1	• Update Technical data • Update chapter “Technology” -> “Incremental encoder basics” • Update chapter “Technical properties” • Update structure
1.0	• First publication EJ5112

1.6 Guide through documentation

NOTICE

Further components of documentation

This documentation describes device-specific content. It is part of the modular documentation concept for Beckhoff I/O components. For the use and safe operation of the device / devices described in this documentation, additional cross-product descriptions are required, which can be found in the following table.

Title	Description
EtherCAT System Documentation (PDF)	• System overview • EtherCAT basics • Cable redundancy • Hot Connect • EtherCAT devices configuration
Design Guide EJ8xxx - Signal distribution board for standard EtherCAT plug-in modules (PDF)	Notes on the design of a signal distribution board for standard EtherCAT plug-in modules. • Requirements for the signal distribution board • Backplane mounting guidelines • Module placement • Routing guidelines
Documentation of the corresponding ELxxxx EtherCAT Terminal (s. note on documentation of ELxxxx) [▶ 58]	• Notes on the principle of operation and • descriptions for configuration and parameterization are transferable to the corresponding EtherCAT plug-in modules
Infrastructure for EtherCAT/Ethernet (PDF)	Technical recommendations and notes for design, implementation and testing

The documentations can be viewed at and downloaded from the Beckhoff website (www.beckhoff.com) via:

- the “Documentation and Download” area of the respective product page,
- the Download finder,
- the Beckhoff Information System.

1.7 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).

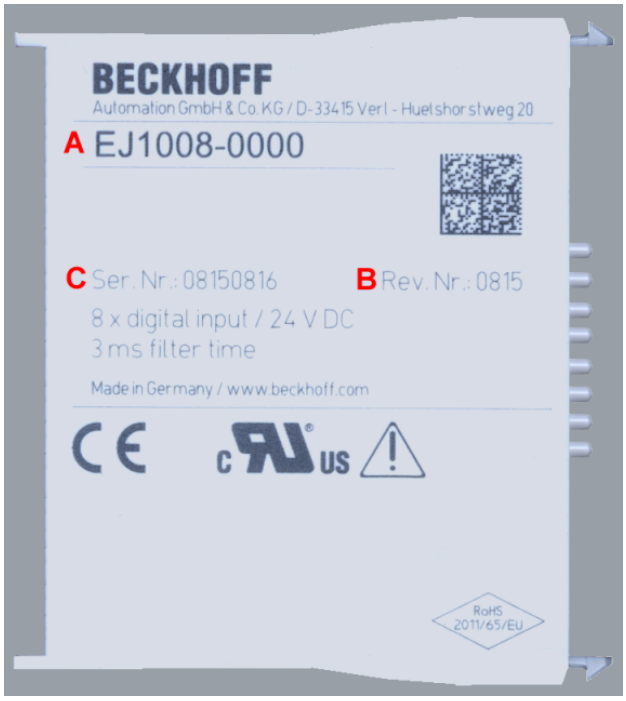


Fig. 1: Order identifier (A), Revision number (B) and serial number (C) using the example of EJ1008

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.

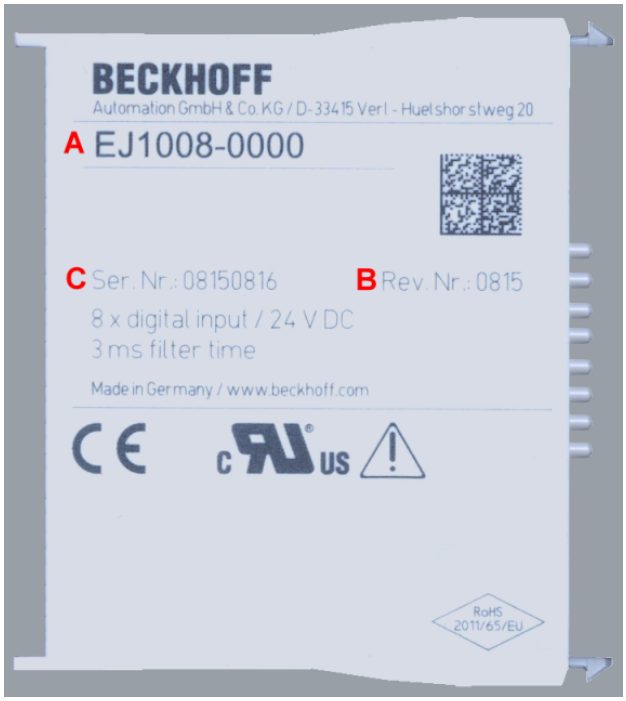


Fig. 2: Order identifier (A), revision number (B) and serial number (C) using the example of EJ1008

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

1.7.1 Beckhoff Identification Code (BIC)

The **B**eckhoff **I**dentification **C**ode (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.

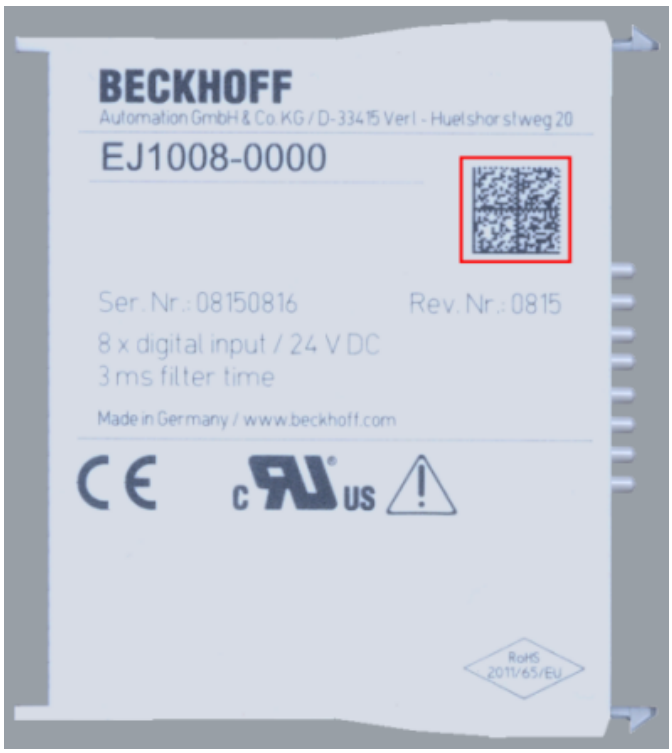


Fig. 3: BIC as data matrix code (DMC, code scheme ECC200)

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.

NOTICE

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

1.7.2 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.

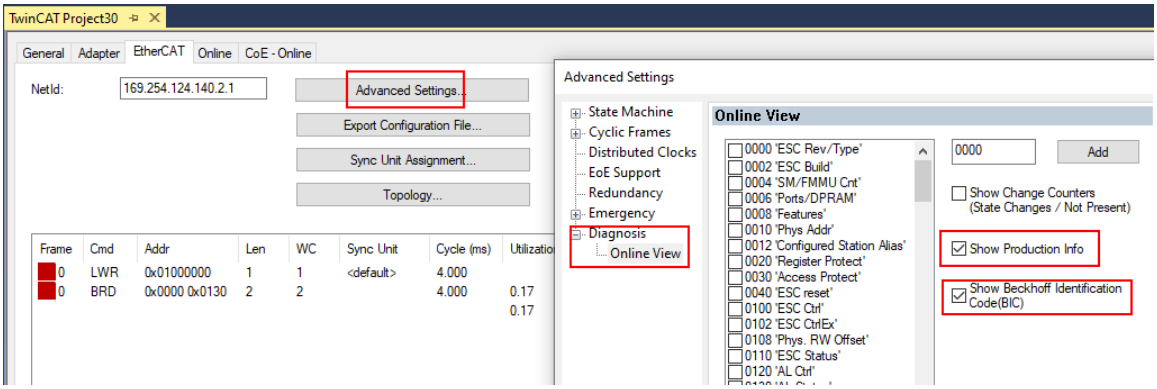
EtherCAT devices (IP20, IP67)

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.

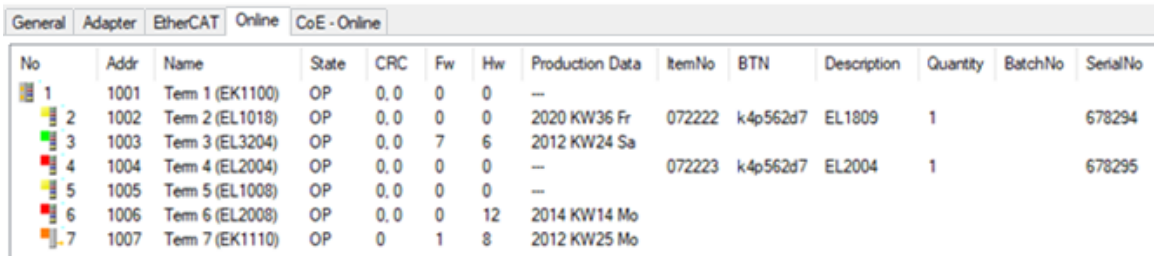
The eBIC is also stored in the ESI-EEPROM. The eBIC was introduced into the Beckhoff I/O production (terminals, box modules) from 2020; widespread implementation is expected in 2021.

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

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

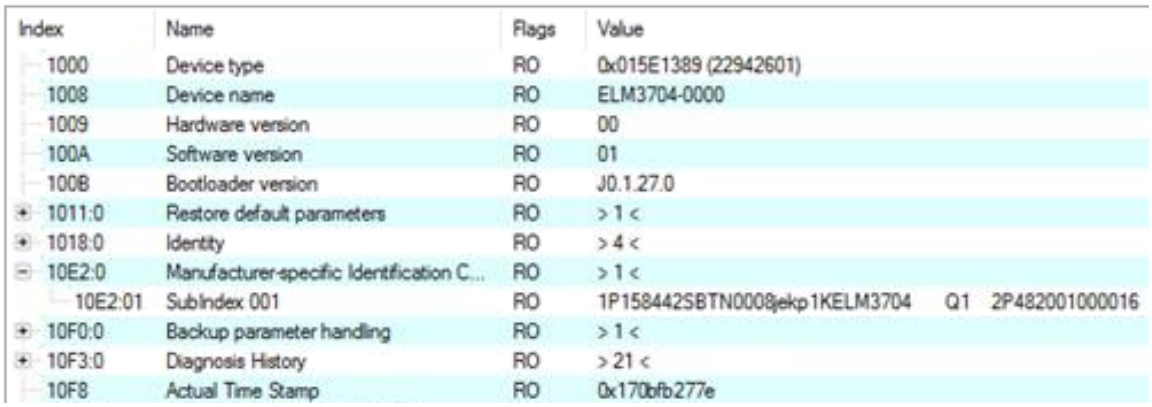


  - The BTN and its contents are then displayed:



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

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



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

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

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

PROFIBUS, PROFINET, DeviceNet devices etc.

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

1.7.3 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.

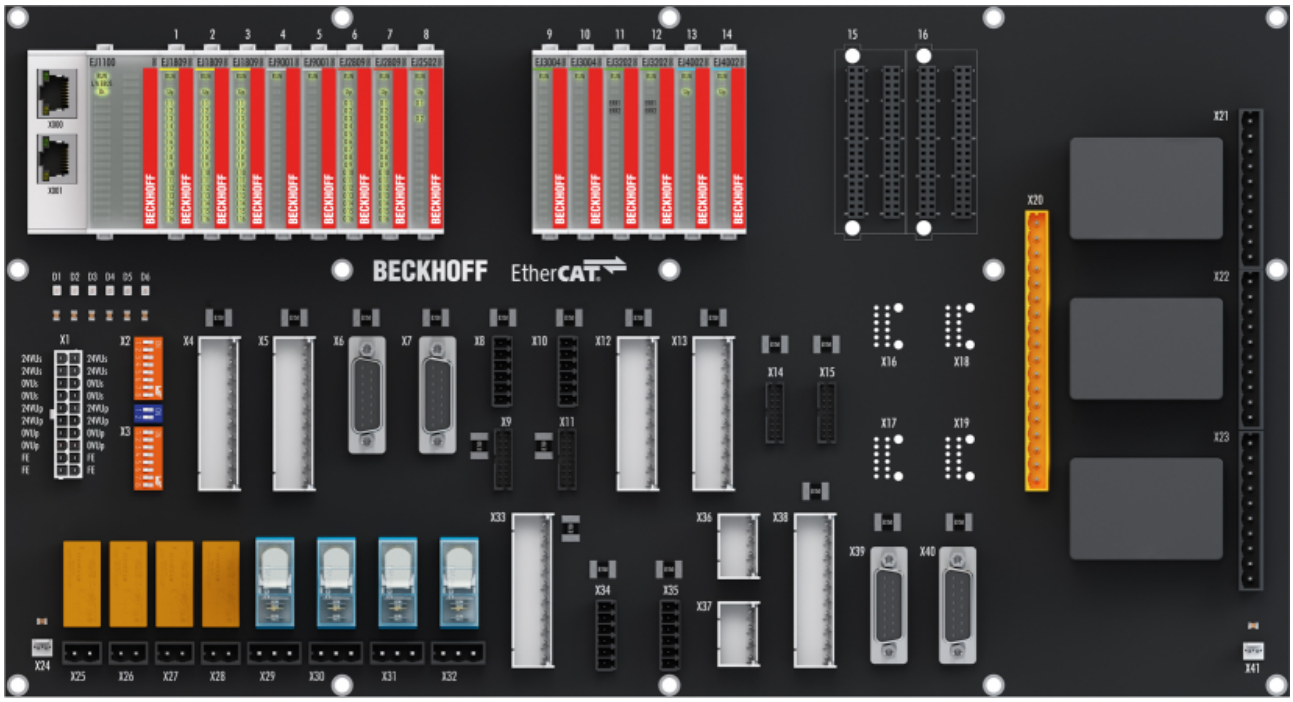


Fig. 6: EJ system sample

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 EJ5112 - Product description

3.1 Introduction

Fig. 7: EJ5112

2-Channel Incremental Encoder Interface, 5 V (2 x AB or 1 x ABC, RS422, TTL)

The EtherCAT plug-in module EJ5112 is an interface for the direct connection of two incremental encoders with A and B track or one encoder with A, B and C track. Encoders with differential signals (RS422) or single-ended signals (TTL and Open collector) can be connected. Input frequencies up to 5 MHz can be processed.

In 2-channel mode, one 24 V digital input per channel is available for storing, blocking and setting the counter status. In 1-channel operation, both inputs can be used. It is also possible to set the counter to a predefined value or to lock the counter directly through the process data. The 5 V, 12 V or 24 V supply of the encoder can be provided directly via the supply on the signal distribution board.

Special features:

- can be used as 1 x ABC or 2 x AB incremental encoder interface
- save, lock, set counter
- integrated frequency and period measurement
- optionally usable as 5 V up/down counter
- Microincrements
- synchronous reading of the position value via distributed clocks
- Timestamp on the last-registered incremental edge and the latch value via the 24 V digital inputs

In addition, the EJ5112 enables the measurement of a period, frequency or velocity with a resolution of 10 ns. A duty cycle measurement of the input signal in 1-channel mode is implemented.

With the optional interpolating microincrement functionality, the EJ5112 EtherCAT plug-in module can provide even more accurate axis positions for dynamic axes. It also supports synchronous reading of the encoder value together with other input data in the EtherCAT system via the high-precision EtherCAT distributed clocks (DC). A timestamp for the last-registered incremental edge, the edge at the latch input and the zero pulse track C is also available. The use of encoder profiles enables simple and fast linking of the process data for Motion Control applications.

3.2 Technical data

Encoder	EJ5112	
	Single-channel mode	**Two-channel mode**
Encoder type	Incremental, differential (RS422), single-ended (TTL, open collector), counter, pulse generator	
Encoder connection	Differential inputs (RS422): A, $\overline{A}$, B, $\overline{B}$, C, $\overline{C}$ Single-ended connection (TTL, Open Collector): A, B, C	Differential inputs (RS422): A, $\overline{A}$, B, $\overline{B}$ Single-ended connection (TTL, Open Collector): A, B Counters, pulse generators: A, B
Number of channels	1 x A, B, C	2 x A, B
Additional inputs	Latch, Gate/Latch (24 V_{DC}, t_{ON} > 1 µs), Status Input input (max. 5 V_{DC}, negative switching, t_{ON} > 10 µs)	Gate/Latch (24 V_{DC}, t_{ON} > 1 µs) per channel
Encoder operating voltage	5 V_{DC} (preset), 12 V_{DC}, 24 V_{DC} switchable, 0.3 A sum current (generated from the 24 V_{DC} - U_P-contacts)	
Counter	32 bit (default) or 16 bit switchable	
Cut-off frequency	RS422 mode: 20 million increments/s with 4-fold evaluation, corresponds to 5 MHz TTL mode: 4 million increments/s with 4-fold evaluation, corresponds to 1 MHz Open Collector: 400,000 increments/s with 4-fold evaluation, corresponds to 100 kHz	
Quadrature decoder	4-fold evaluation (preset), 2-fold, 1-fold evaluation switchable	

Function and communication	EJ5112	
	Single-channel mode	**Two-channel mode**
Micro-increments resolution	1/256 bit micro-increments	no
Broken wire detection to encoder	yes for RS422 encoder	
Distributed Clocks	yes	
Timestamp	Resolution 1 ns	no
Configuration	via TwinCAT System Manager	
Special functions	Period duration, frequency and speed measurement, Duty Cycle measurement, micro-increments, filters, Timestamp on: last incremental edge, zero pulse C, Latch input and Gate/Latch input	Period duration, frequency and speed measurement
Cycle time	min. 100 µs	

Supply and potentials	EJ5112	
	Single-channel mode	**Two-channel mode**
Current consumption via E-bus	typ. 210 mA	
Current consumption from Up contacts	typ. 10 mA + load	
Electrical isolation	500 V (E-bus/field voltage)	

Housing data	EJ5112	
	Single-channel mode	**Two-channel mode**
Design form	EtherCAT I/O plug-in module	
Dimensions (W x H x D)	approx. 12 mm x 66 mm x 55 mm	
Weight	approx. 30 g	
Mounting	on signal distribution board	
Pollution degree	2	
Mounting position	Standard [▶ 46]	
Position of the coding pins [▶ 49]	2 and 5	
Color coding	grey	

Environmental conditions	EJ5112	
	Single-channel mode	Two-channel mode
Permissible ambient temperature range during operation	-25°C ... +60°C (extended temperature range)	
Permissible ambient temperature range during storage	-40°C ... +85°C	
Permissible relative air humidity	95%, no condensation	
Operating altitude	max. 2,000 m	
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	

Standards and approvals	EJ5112	
	Single-channel mode	Two-channel mode
Approvals/markings*	CE, UKCA	

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

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 Pinout

EJ5112				
Pin#		Signal		
1	2	U_{EBUS}	U_{EBUS}	**E-Bus contacts**
3	4	GND	GND	
5	6	RX0+	TX1+	
7	8	RX0-	TX1-	
9	10	GND	GND	The power supply U_{EBUS} is provided by the coupler and supplied from the supply voltage U_S of the EtherCAT coupler.
11	12	TX0+	RX1+	
13	14	TX0-	RX1-	
15	16	GND	GND	
17	18	A1+	B1+	**Signals and power supply of the sensor**
19	20	A1-	B1-	
21	22	NC	V+ Sensor	
23	24	NC	GND Sensor	
25	26	C1+ / A2+	DI neg / B2+	
27	28	C1- / A2-	B2-	
29	30	NC	Latch	
31	32	NC	Gate	
33	34	0V Up	0V Up	**U_P-Contacts**
35	36	0V Up	24V Up	
37	38	24V Up	24V Up	The peripheral voltage U_P supplies the electronics on the field side.
39	40	SGND	SGND	

	Single-channel mode 1x ABC	Two-channel mode 2x AB
Signal	**Description**	**Description**
U_{EBUS}	E-Bus power supply 3.3 V	E-Bus power supply 3.3 V
GND	E-Bus GND signal. Don`t connect with 0V Up!	E-Bus GND signal. Don`t connect with 0V Up!
RXn+	Positive E-Bus receive signal	Positive E-Bus receive signal
RXn-	Negative E-Bus receive signal	Negative E-Bus receive signal
TXn+	Positive E-Bus transmit signal	Positive E-Bus transmit signal
TXn-	Negative E-Bus transmit signal	Negative E-Bus transmit signal
A1+	Encoder input A1+	Encoder input A1+
A1-	Encoder input A1-	Encoder input A1-
B1+	Encoder input B1+	Encoder input B1+
B1-	Encoder input B1-	Encoder input B1-
V+ Sensor	Encoder supply (parameterizable: 5 V (default), 12 V, 24 V	Encoder supply (parameterizable: 5 V (default), 12 V, 24 V
GND Sensor	Sensor GND signal	Sensor GND signal
C1+ / A2+	Encoder input C1+	Encoder input A2+
C1- / A2-	Encoder input C1-	Encoder input A2-
DI neg / B2+	Status input	Encoder input B2+
B2-	Do not connect	Encoder input B2-
Latch	"Latch extern" input	Gate/Latch combination input for encoder 1
Gate	Input Gate (can also be used as "Latch extern 2" input for encoder 1)	Gate/Latch combination input for encoder 2
NC	Do not connect	Do not connect
0V Up	GND signal field side	GND signal field side
24V Up	Power supply field side 24 V	Power supply field side 24 V
SGND	Shield Ground	Shield Ground

Fig. 8: EJ5112 - Pinout

The PCB footprint can be downloaded from the Beckhoff homepage.

NOTICE

Damage to devices possible!

- The pins named with “NC” must not be connected.
- Before installation and commissioning read the chapters Installation of EJ modules [▶ 42] and Commissioning [▶ 58]!

3.3.1 Single-channel mode (1 x A, B, C)

3.3.1.1 RS422 mode

NOTICE

Differential and single-ended connection

The RS422 signal transmits a differential voltage, which makes the signal less sensitive to interference compared to a single-ended signal.

If the encoder signal is to be transmitted over longer distances or at higher frequencies, an encoder with RS422 signals is recommended.

Shielded and twisted pair cables should be used.

Connection of RS422 encoders with or without zero pulse

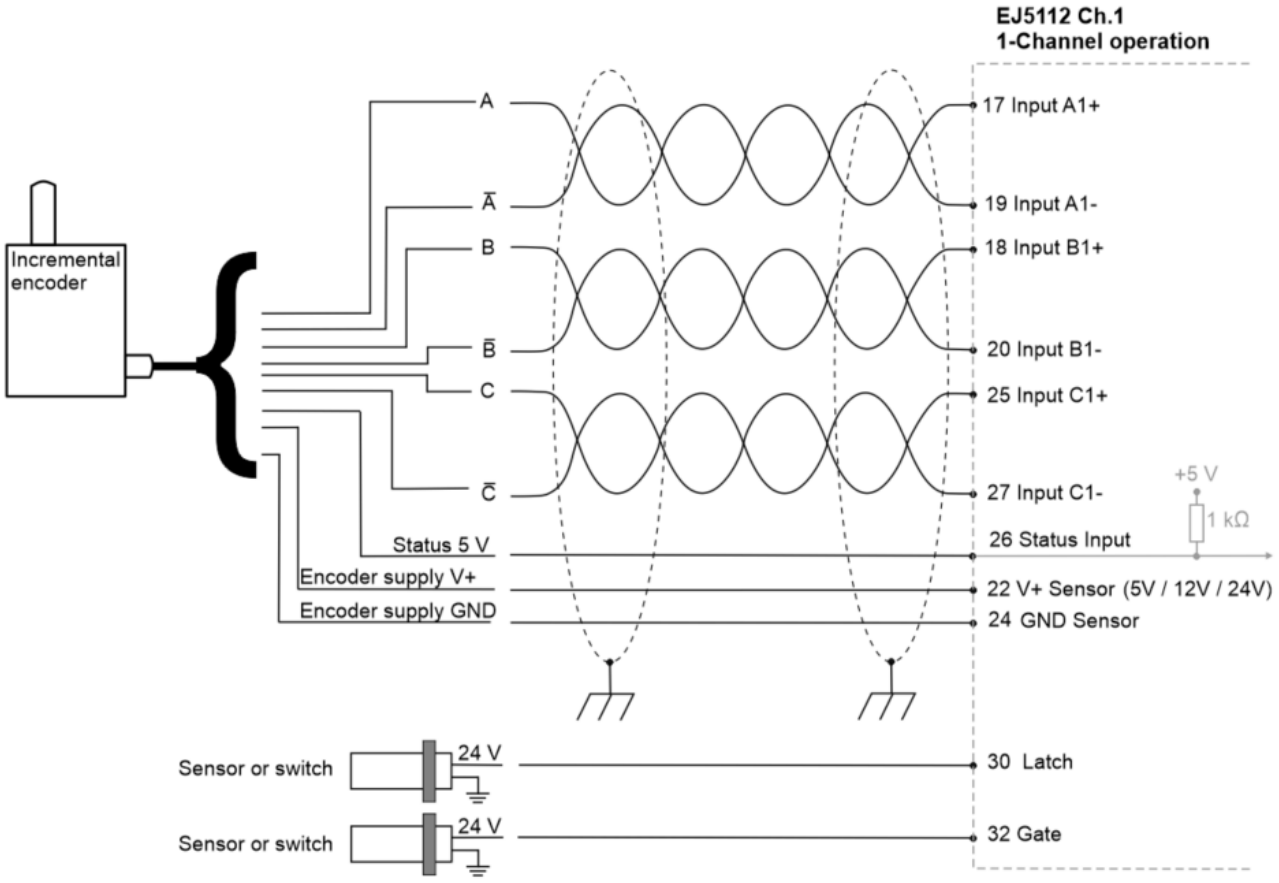


Fig. 9: Connection of RS422 encoders with zero pulse in single-channel mode

Connection instructions

- When using an encoder without zero pulse C, the module pins for the C track are not connected.

Connection of RS422 counters / pulse generators with or without zero pulse

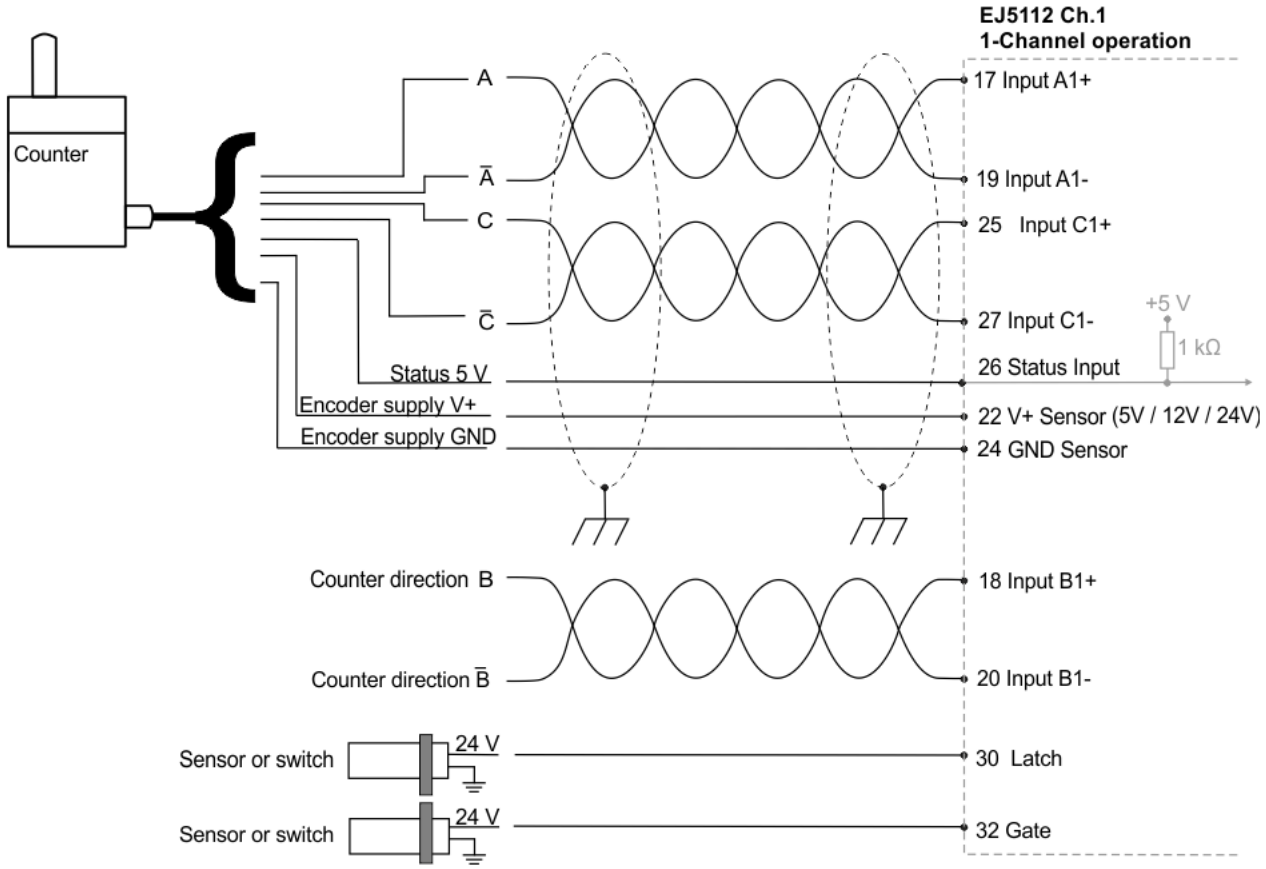


Fig. 10: Connection of RS422 counter / pulse generators with zero pulse in single-channel mode

Connection instructions

- If a counter / pulse generator is connected, the B track determines the counting direction. In RS422 mode a differential signal is expected on the B̄ track.
- When using a counter / pulse generator without zero pulse C, the module pins for the C track are not connected.

3.3.1.2 TTL mode

Connection of TTL encoders with or without zero pulse

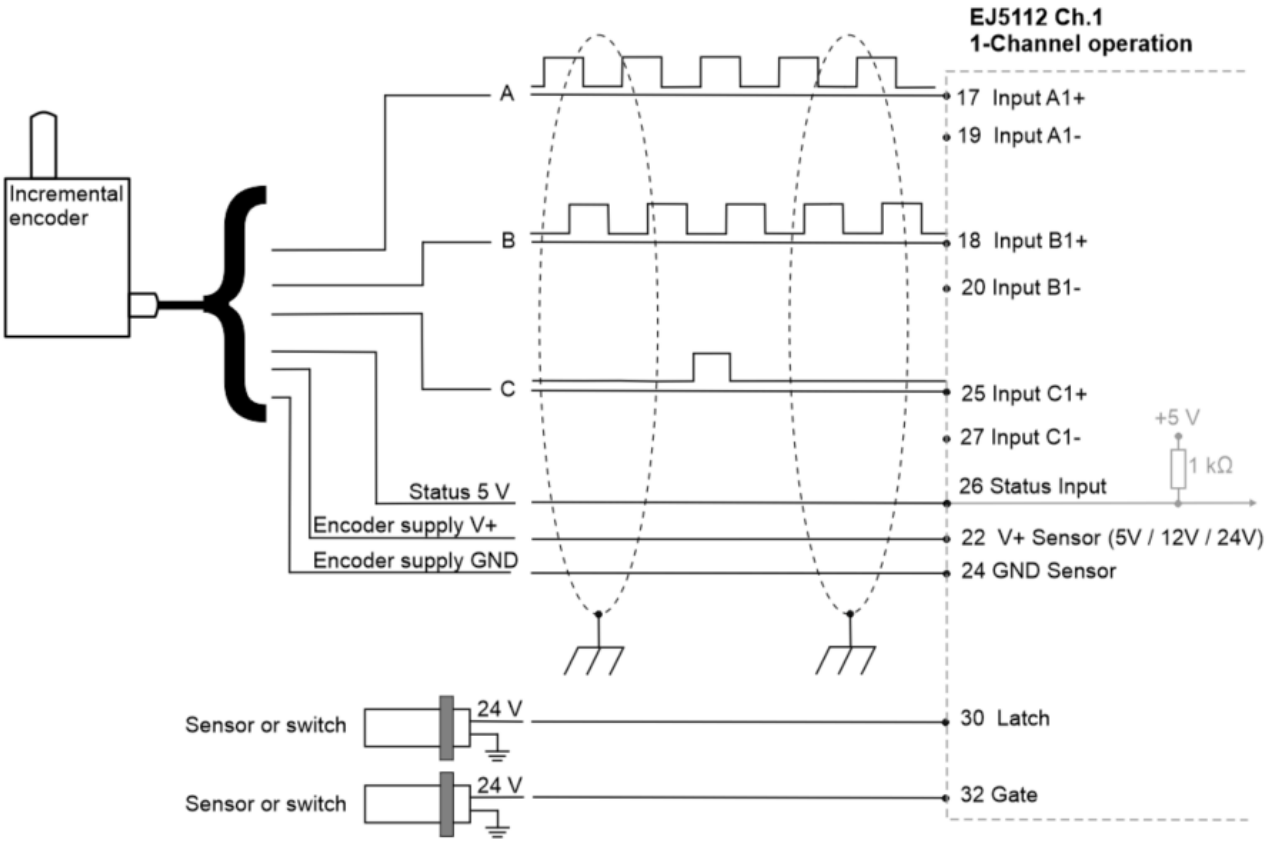


Fig. 11: Connection of encoders in TTL mode with zero pulse in single-channel mode

Connection instructions

- In TTL mode the inverse inputs are not connected.
- When using an encoder without zero pulse C, the module pins for the C track are not connected.

Connection of TTL counters / pulse generators with or without zero pulse

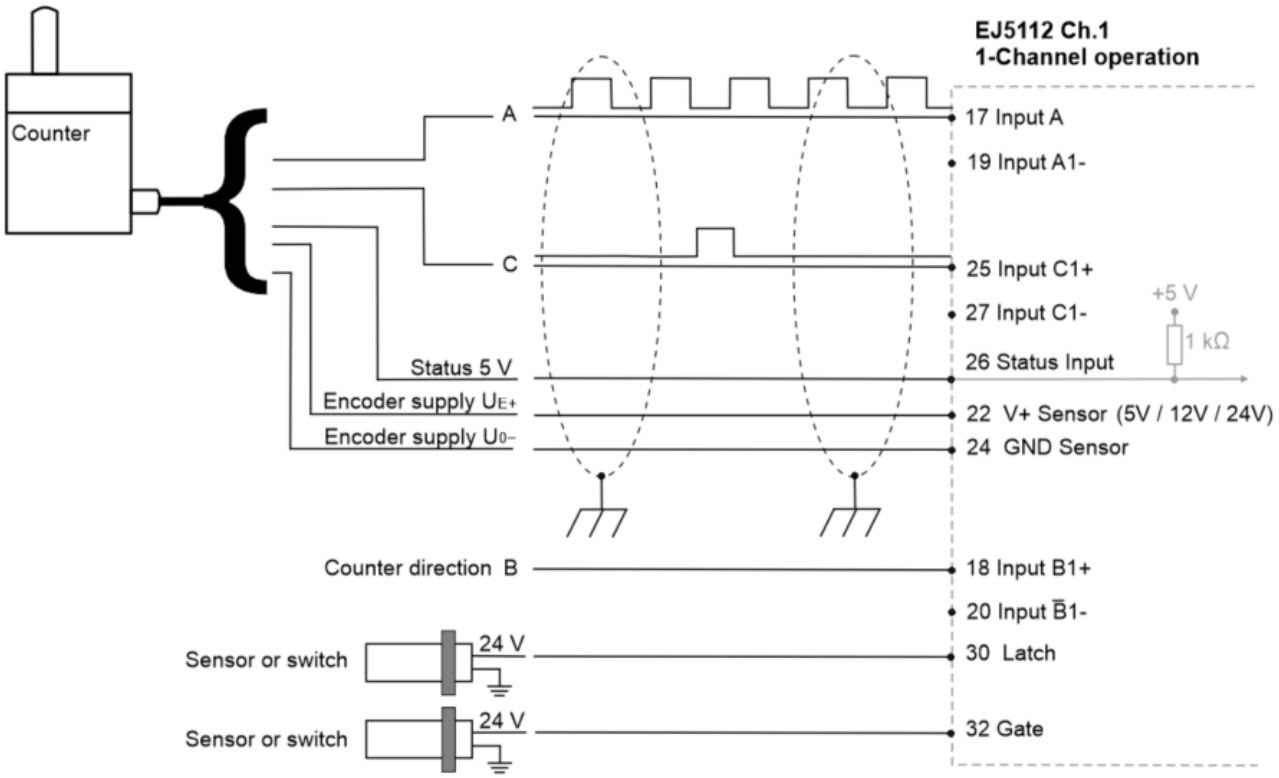


Fig. 12: Connection of counters / pulse generators in TTL mode with zero pulse in single-channel mode

Connection instructions

- In TTL mode the inverse inputs are not connected.
- If a counter / pulse generator is connected, the B track determines the counting direction. Input $\overline{B}$ is not connected.
- When using a counter / pulse generator without zero pulse C, the module pins for the C track are not connected.

3.3.1.3 Open Collector mode

Connection of Open Collector encoders with or without zero pulse

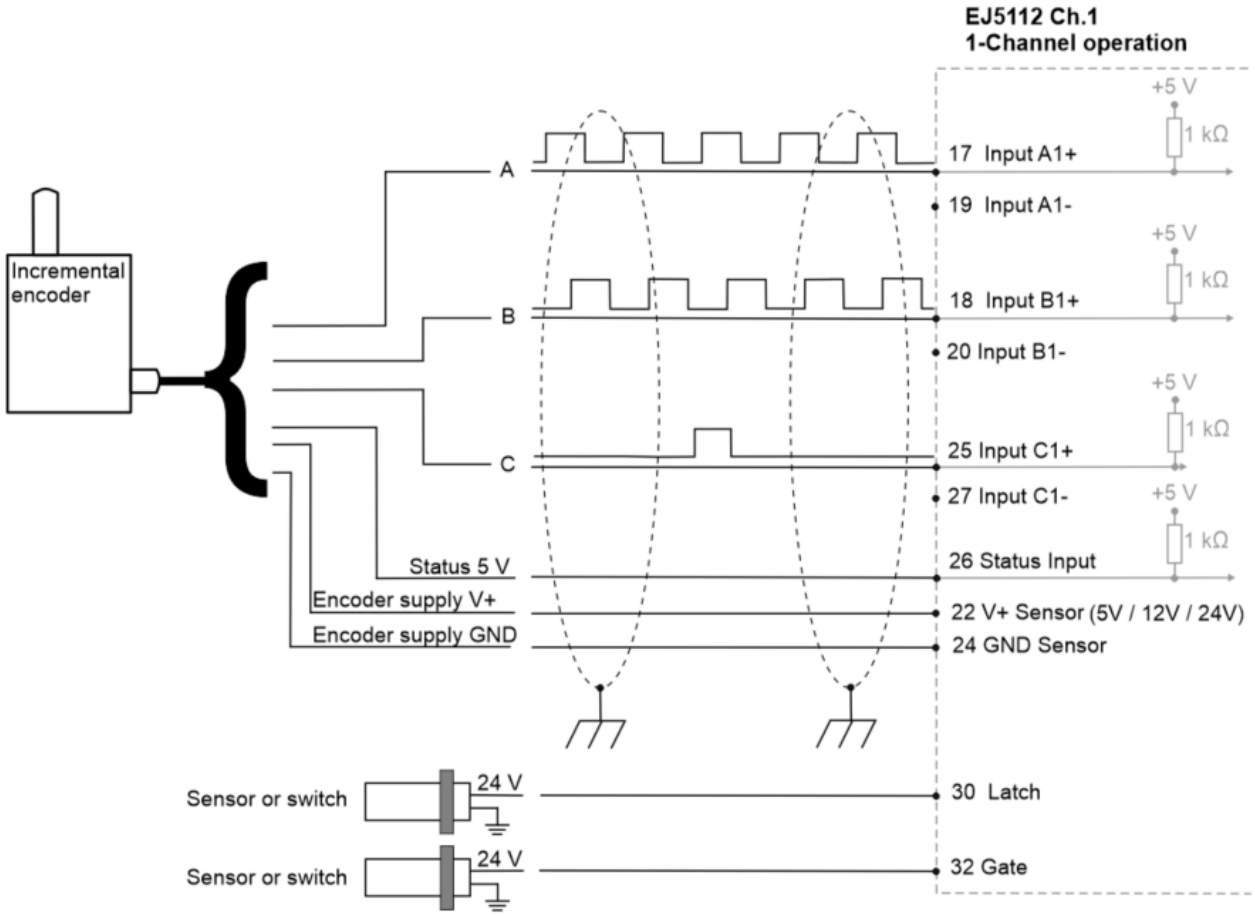


Fig. 13: Connection of encoders in Open Collector mode with zero pulse in single-channel mode

Connection instructions

- In Open Collector mode the inverse inputs are not connected.
- When using an encoder without zero pulse C, the module pins for the C track are not connected.

Connection of Open Collector counters / pulse generators with or without zero pulse

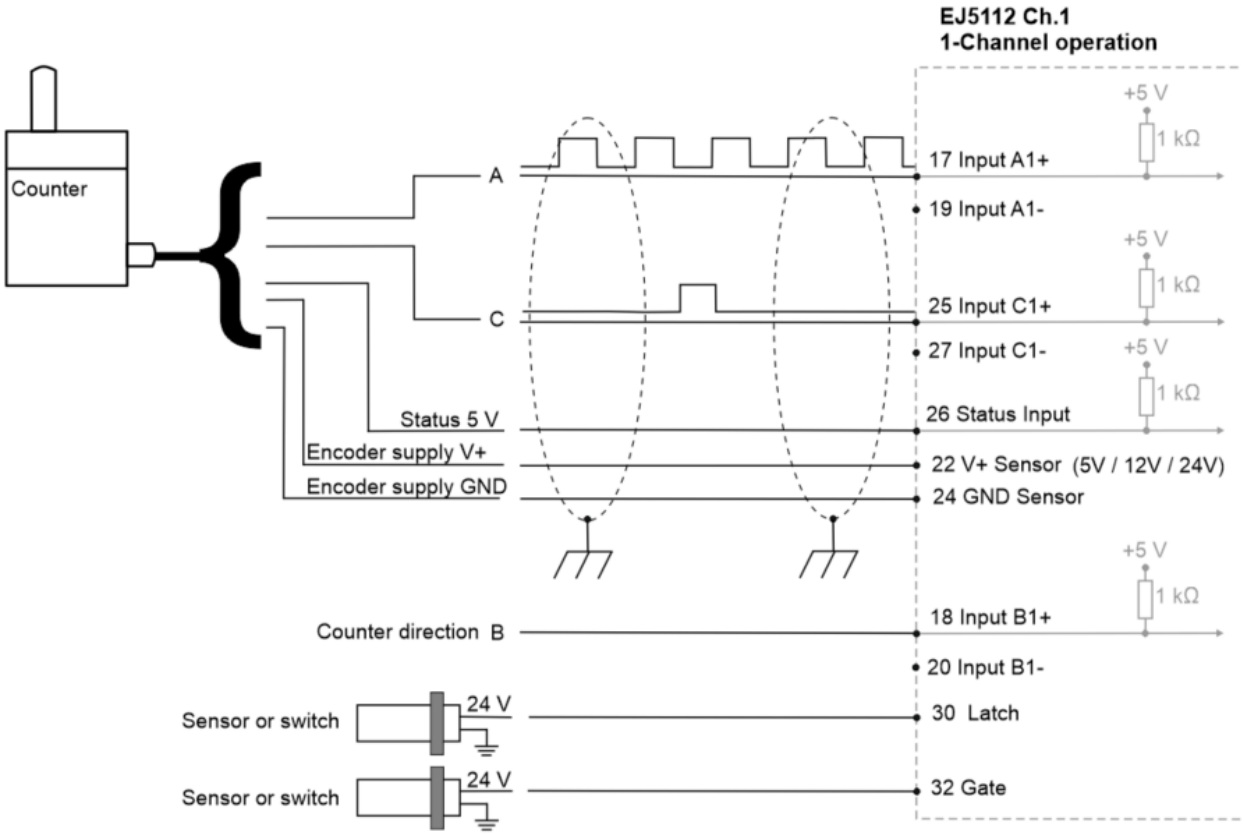


Fig. 14: Connection of counters / pulse generators in Open Collector mode with zero pulse in single-channel mode

Connection instructions

- In Open Collector mode the inverse inputs are not connected.
- If a counter / pulse generator is connected, the B track determines the counting direction. Input $\overline{B}$ is not connected.
- When using a counter / pulse generator without zero pulse C, the module pins for the C track are not connected.

3.3.2 Two-channel mode (2 x A, B)

3.3.2.1 RS422 mode

NOTICE

Differential and single-ended connection

The RS422 signal transmits a differential voltage, which makes the signal less sensitive to interference compared to a single-ended signal.

If the encoder signal is to be transmitted over longer distances or at higher frequencies, an encoder with RS422 signals is recommended.

Shielded and twisted pair cables should be used.

Connection of RS422 encoders without zero pulse in two-channel mode

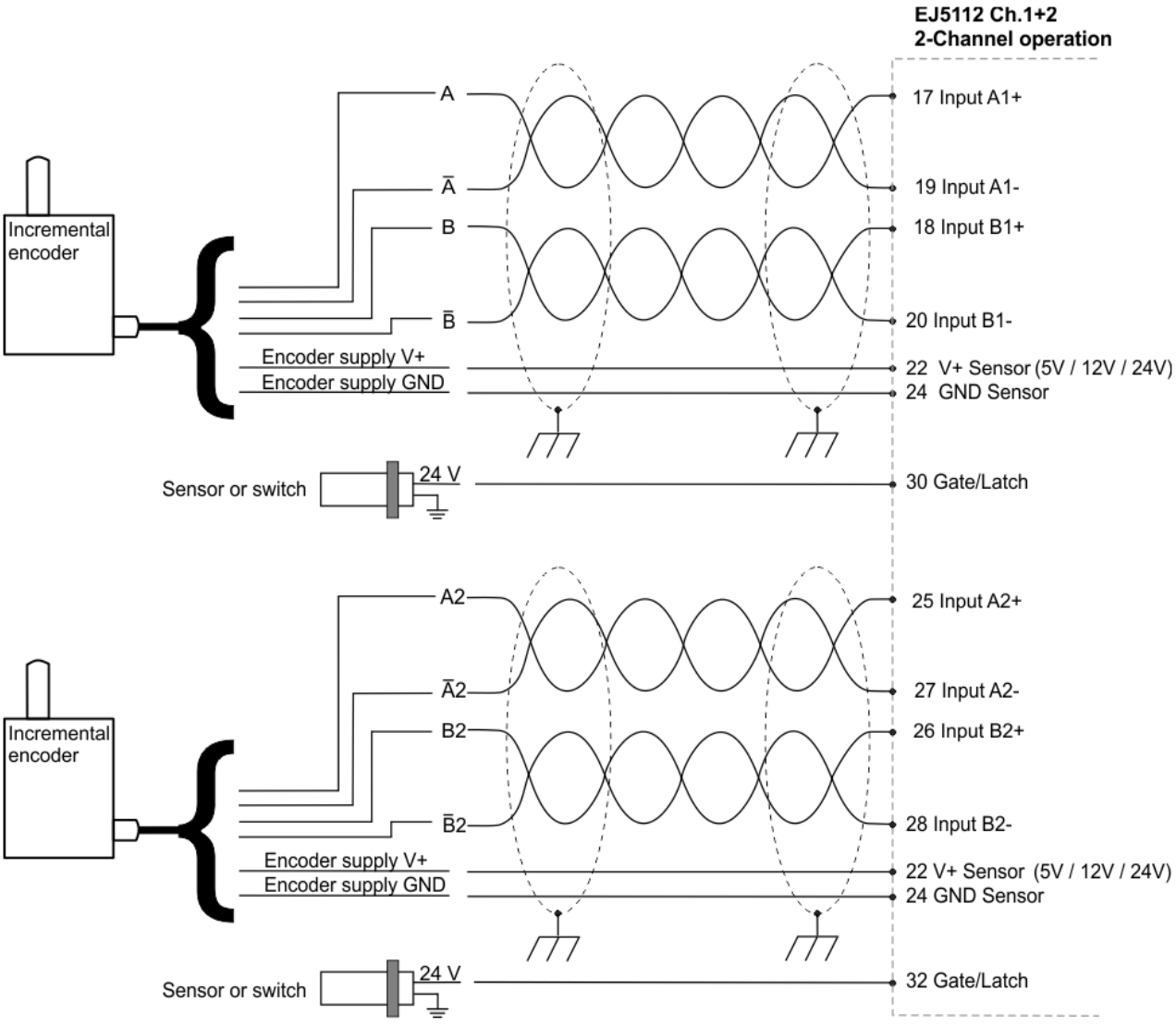


Fig. 15: Connection of encoders in RS422 mode without zero pulse in two-channel mode

Connection instructions

- In two-channel mode only encoders without zero pulse C can be used. The module pins for the C track are assigned the signals of the second A track.
- Both encoders are powered via module pins 22 and 24. Make sure that the sum of the supply currents does not exceed the sum current of 0.3 A.

Connection of RS422 counters / pulse generators without zero pulse in two-channel mode

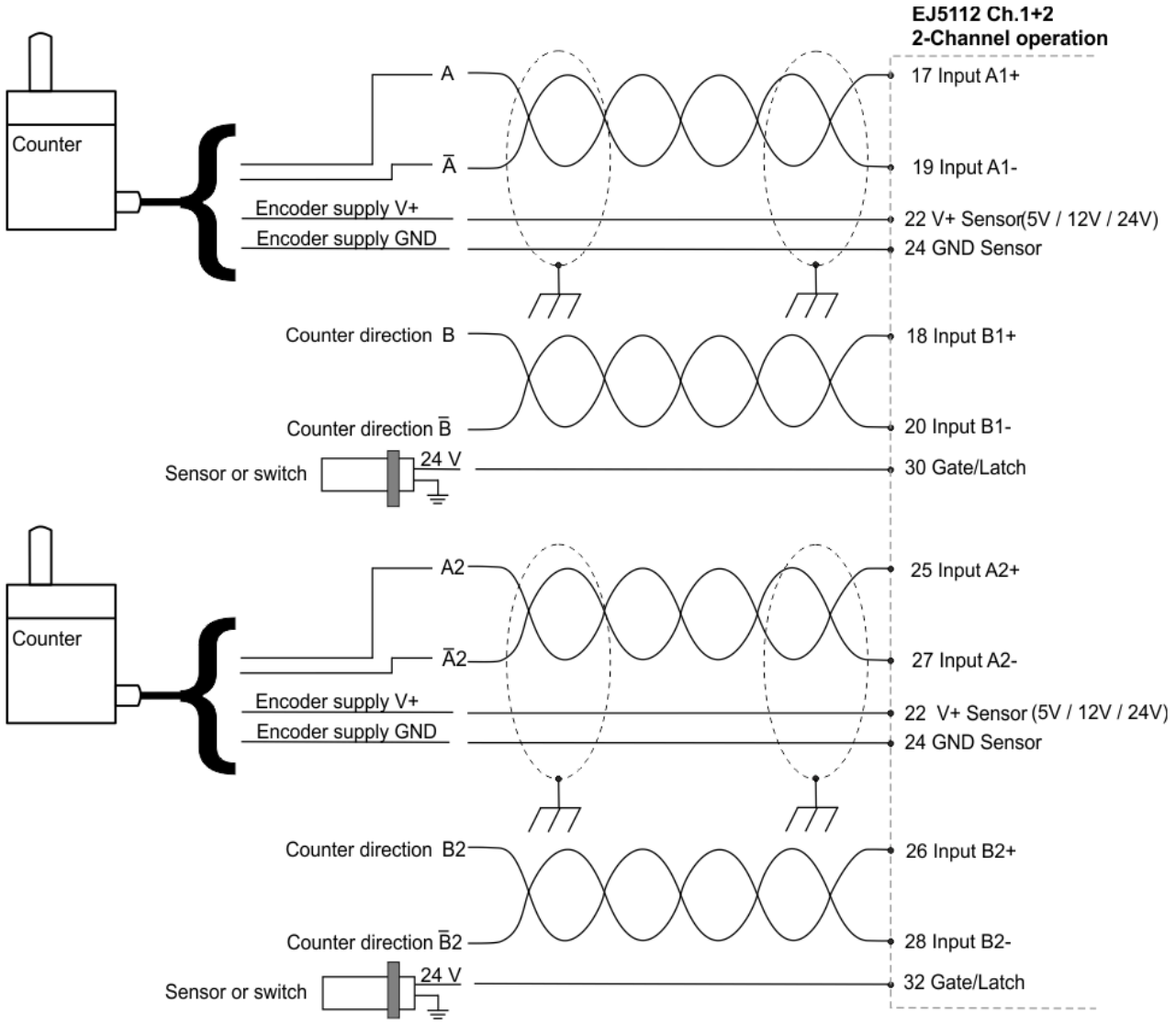


Fig. 16: Connection of counters / pulse generators in RS422 mode without zero pulse in two-channel mode

Connection instructions

- If a counter / pulse generator is connected, the B track determines the counting direction. In RS422 mode a differential signal is expected on the B̄ track.
- Only counters / pulse generators without zero pulse are suitable for use in two-channel mode. The module pins of the C track are assigned the signals of the second A track.
- Both encoders are powered via module pins 22 and 24. Make sure that the sum of the supply currents does not exceed the sum current of 0.3 A.

3.3.2.2 TTL mode

Connection of TTL encoders without zero pulse in two-channel mode

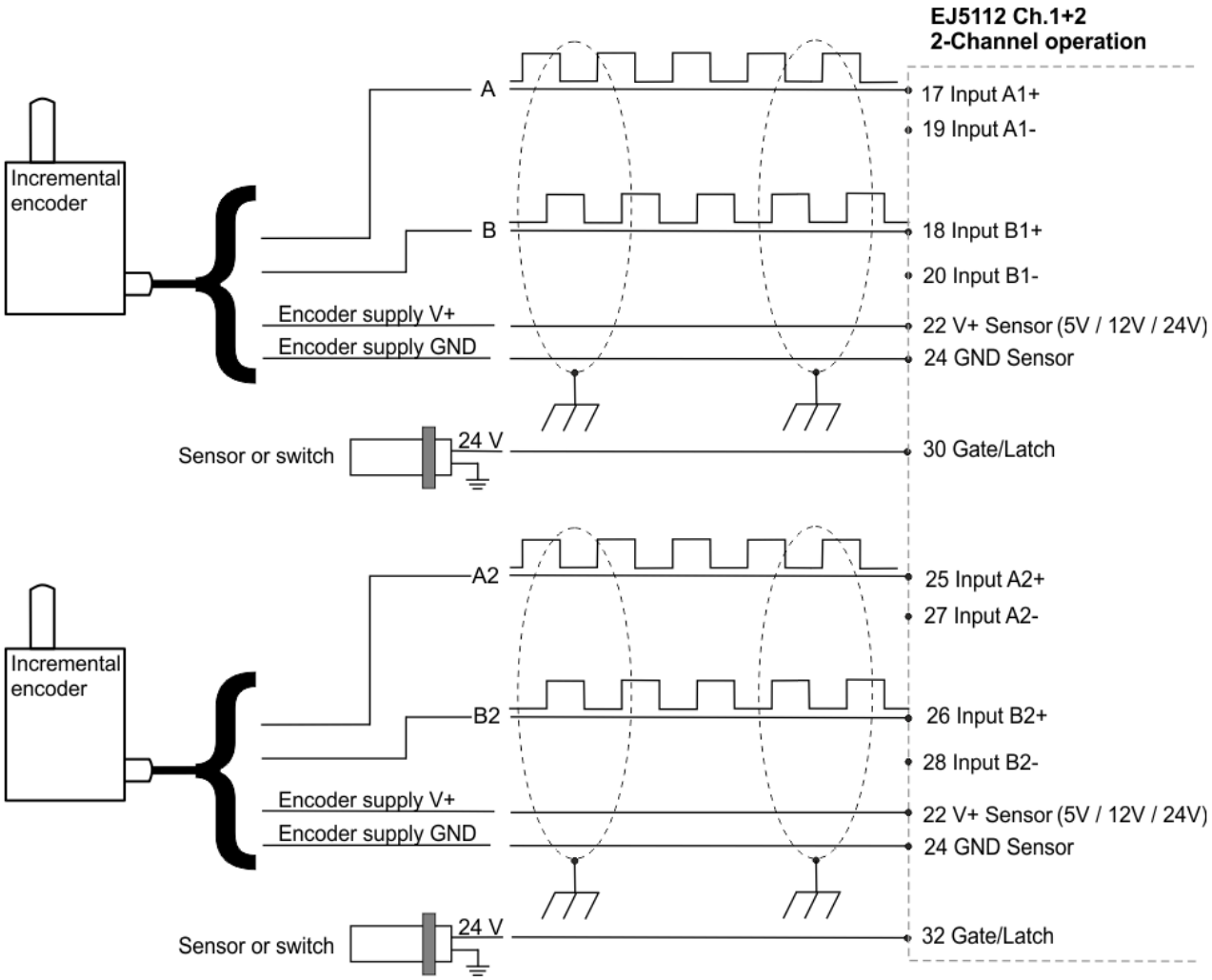


Fig. 17: Connection of encoders in TTL mode without zero pulse in two-channel mode

Connection instructions

- In TTL mode the inverse inputs are not connected.
- Only encoders without zero pulse are suitable for use in two-channel mode. The module pins for the C track are assigned the signals of the second A track.
- Both encoders are powered via module pins 22 and 24. Make sure that the sum of the supply currents does not exceed the sum current of 0.3 A.

Connection of TTL counters / pulse generators without zero pulse in two-channel mode

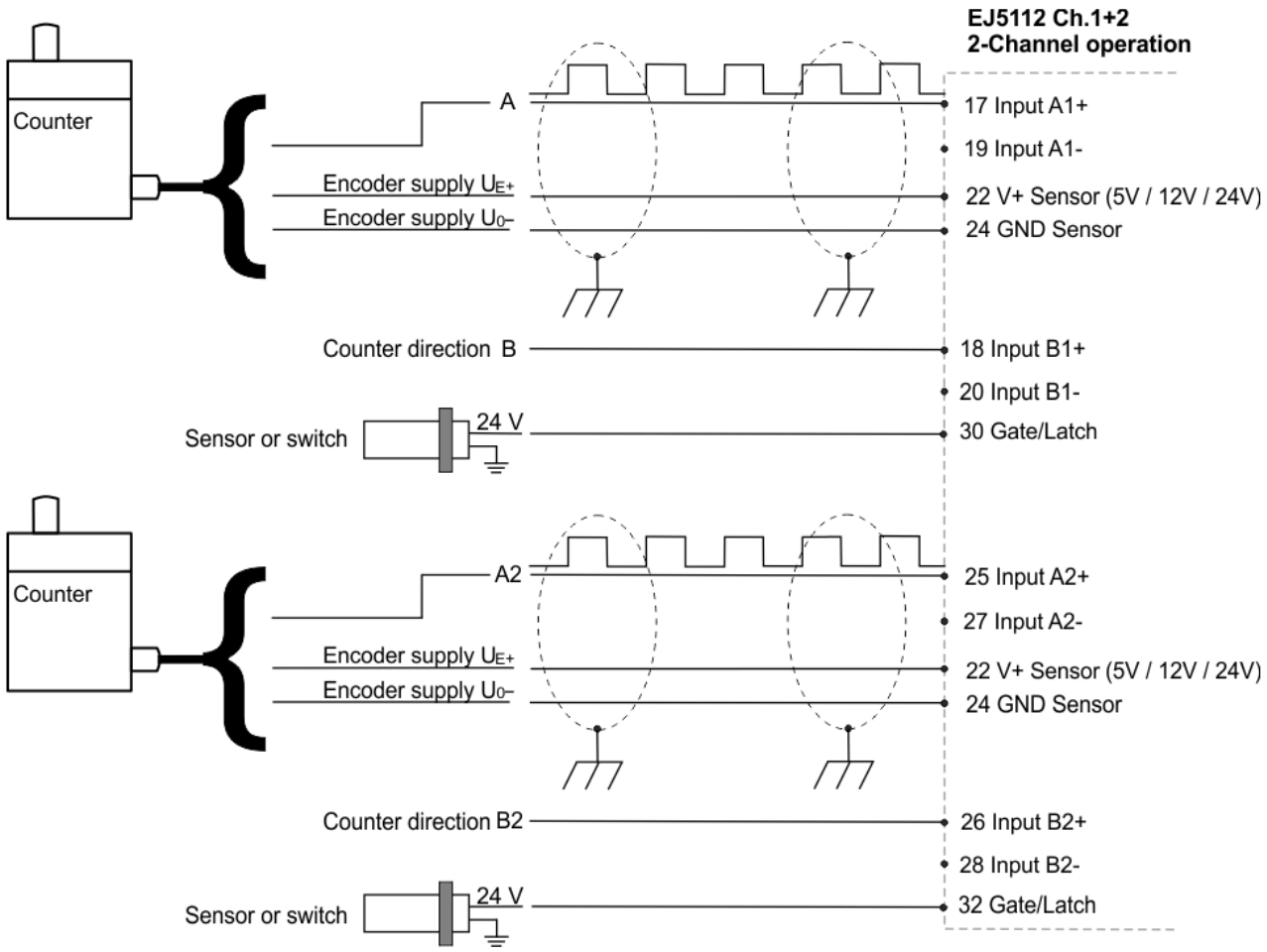


Fig. 18: Connection of counters / pulse generators in TTL mode without zero pulse in two-channel mode

Connection instructions

- In TTL mode the inverse inputs are not connected.
- If a counter / pulse generator is connected, the B track determines the counting direction. Input $\overline{B}$ is not connected.
- Only counters / pulse generators without zero pulse are suitable for use in two-channel mode. The module pins for the C track are assigned the signals of the second A track.
- Both encoders are powered via module pins 22 and 24. Make sure that the sum of the supply currents does not exceed the sum current of 0.3 A.

3.3.2.3 Open Collector mode

Connection of Open Collector encoders without zero pulse in two-channel mode

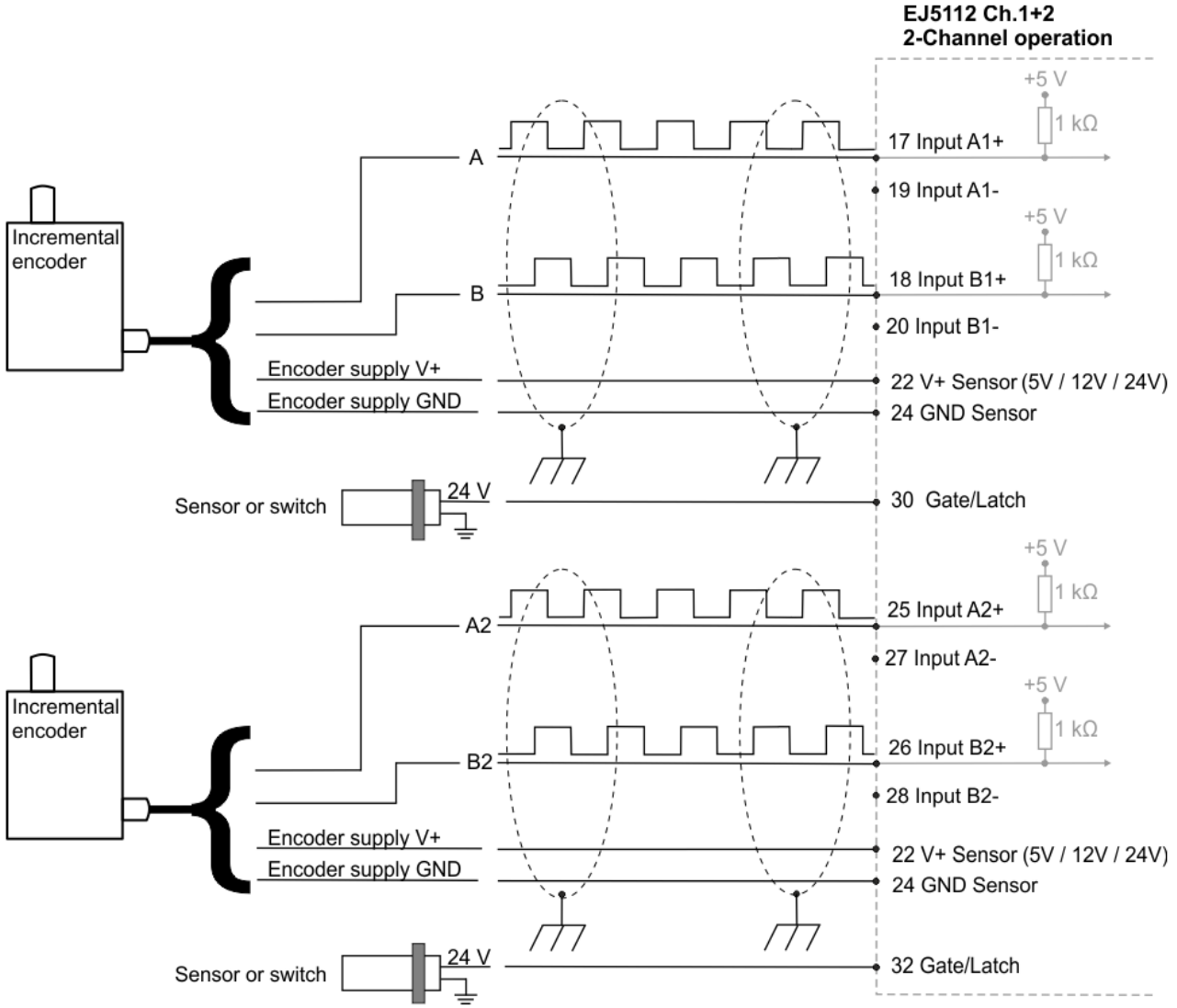


Fig. 19: Connection of encoders in Open Collector mode without zero pulse in two-channel mode

Connection instructions

- In Open Collector mode the inverse inputs are not connected.
- Only encoders without zero pulse are suitable for use in two-channel mode. The module pins for the C track are assigned the signals of the second A track.
- Both encoders are powered via module pins 22 and 24. Make sure that the sum of the supply currents does not exceed the sum current of 0.3 A.

Connection of Open Collector counters / pulse generators without zero pulse in two-channel mode

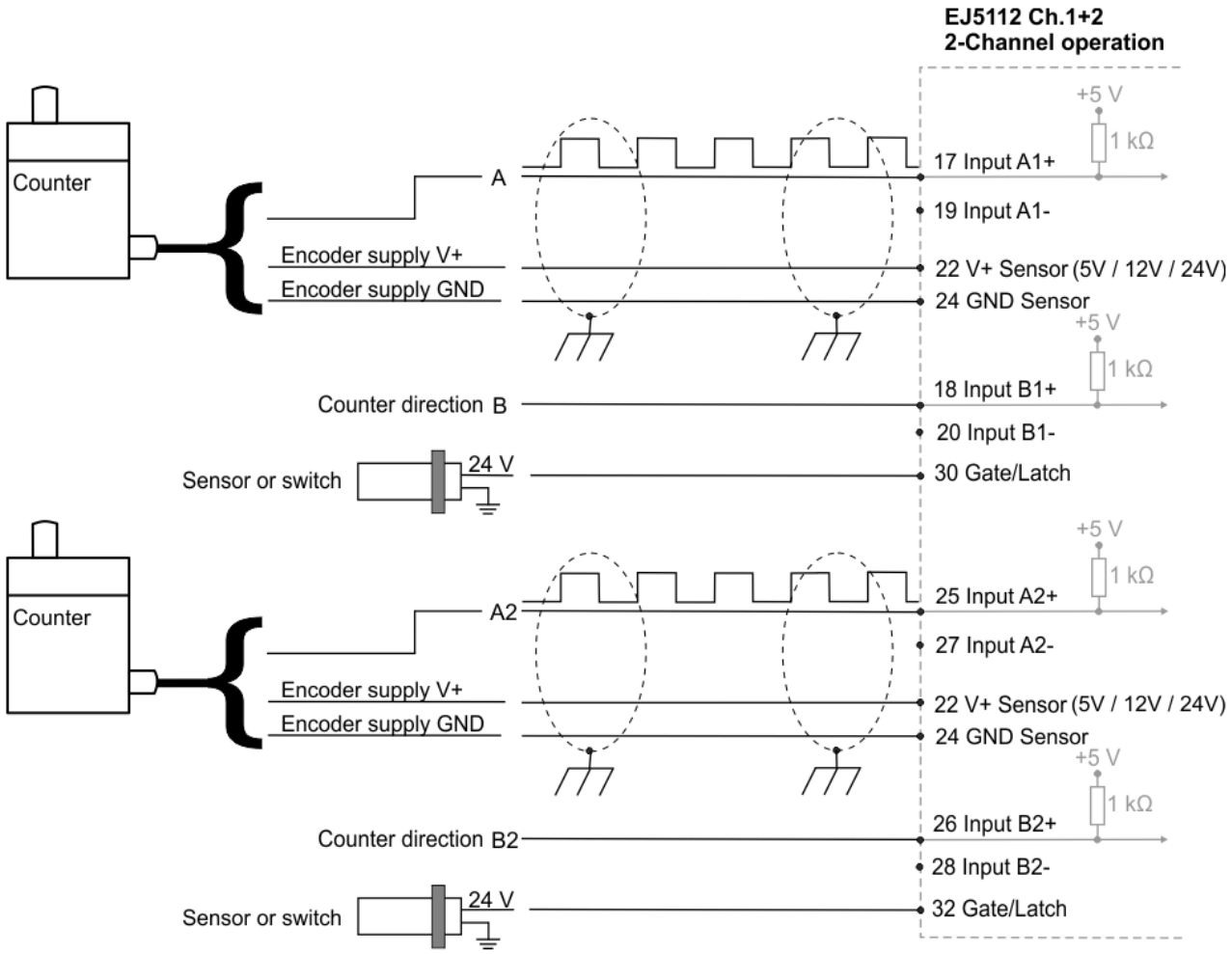


Fig. 20: Connection of counters / pulse generators in Open Collector mode without zero pulse in two-channel mode

Connection instructions

- In Open Collector mode the inverse inputs are not connected.
- If a counter / pulse generator is connected, the B track determines the counting direction. Input $\overline{B}$ is not connected.
- Only counters / pulse generators without zero pulse are suitable for use in two-channel mode. The module pins for the C track are assigned the signals of the second A track.
- Both encoders are powered via module pins 22 and 24. Make sure that the sum of the supply currents does not exceed the sum current of 0.3 A.

3.4 LEDs

LED No.	EJ5112
A	RUN
B	Diag
C	ENC
1	
2	A1
3	B1
4	C1/A2
5	DI neg/B2
6	Latch
7	Gate
8 ... 16	

Fig. 21: EJ5112 - LEDs

Single-Channel mode 1 x ABC

No.	Name	Color	Description	
A	Run	green	This LED indicates the module´s operating state:	
			off	State of the EtherCAT State Machine: **INIT** = initialization of the module or BOOTSTRAP = function for firmware updates of the module
			flashing	State of the EtherCAT State Machine: **PREOP =** function for mailbox communication and different default settings set
			Single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync-Manager channels and the distributed clocks. Outputs remain in safe state
			on	State of the EtherCAT State Machine: **OP =** normal operating state; mailbox and process data communication are possible
B	Diag	red	Initialization process active or state of the EtherCAT State Machine: **BOOT**	
C	ENC	green	Operating voltage display for incremental encoder power supply	
1	-	-	-	
2	A1	green, red	**green**: indicates TRUE level **red**: There is a broken wire at the respective input. Diagnosis is only possible if the following three conditions are met. • The corresponding input is differentially wired, i.e.: „Counter mode“ 0x8001:1D = 0 (Encoder RS422 (diff. Input)) or „Counter mode“ 0x8001:1D = 1 (Counter RS422 (diff. Input)) • "Error Detection" for the respective input is enabled: „Error Detection A“ 0x8000:0B = TRUE „Error Detection B“ 0x8000:0C = TRUE „Error Detection C“ 0x8000:0D = TRUE • The differential voltage $V_{ID\ Low}$ is typically less than 0.67 V (subject to change).	
3	B1			
4	C1			
5	DI neg	green	Fault signal input from encoder. Input is internally connected to 5 V via a pull-up resistor. The encoder output must actively pull the signal against GND.	
			ON	Output active at the encoder, a fault message is present at the encoder
			OFF	Output not active at the encoder; no fault message is present
6	Latch	green	is on, if a signal (+24 V) is presented to the latch input	
7	Gate	green	is on if a signal (+24 V) is presented at the gate/latch input	

LED No.	EJ5112
A	RUN
B	Diag
C	ENC
1	
2	A1
3	B1
4	C1/A2
5	DI neg/B2
6	Latch
7	Gate
8 ... 16	

Fig. 22: EJ5112 - LEDs

Two-Channel mode 2 x AB

No.	Name	Color	Description	
A	Run	green	This LED indicates the module´s operating state:	
			off	State of the EtherCAT State Machine: **INIT** = initialization of the module or BOOTSTRAP = function for firmware updates of the module
			flashing	State of the EtherCAT State Machine: **PREOP =** function for mailbox communication and different default settings set
			Single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync-Manager channels and the distributed clocks. Outputs remain in safe state
			on	State of the EtherCAT State Machine: **OP =** normal operating state; mailbox and process data communication are possible
B	Diag	red	Initialization process active or state of the EtherCAT State Machine: **BOOT**	
C	ENC	green	Operating voltage display for incremental encoder power supply	
1	-	-	-	
2	A1	green, red	**green**: indicates TRUE level **red**: There is a broken wire at the respective input. Diagnosis is only possible if the following three conditions are met. • The corresponding input is differentially wired, i.e.: „Counter mode“ 0x8001:1D = 0 (Encoder RS422 (diff. Input)) or „Counter mode“ 0x8001:1D = 1 (Counter RS422 (diff. Input)) • "Error Detection" for the respective input is enabled: „Error Detection A“ 0x8000:0B = TRUE „Error Detection B“ 0x8000:0C = TRUE • The differential voltage $V_{ID\,Low}$ is typically less than 0.67 V (subject to change).	
3	B1			
4	A2			
5	B2			
6	Latch	green	is on, if a signal (+24 V) is presented to the latch input	
7	Gate	green	is on if a signal (+24 V) is presented at the gate/latch input	

3.5 Incremental encoder basics

Incremental encoders divide a 360° rotation of the encoder axis into individual steps (increments) and mark a full revolution by means of a special mark (zero pulse). An RS422 encoder transmits the signal symmetrically as a differential line pair. TTL and Open Collector encoders use single signal lines (single-ended).

The module evaluates the 90° phase-shifted square wave signals of an incremental encoder on tracks A and B. The zero pulse is captured on track C. With a differential connection, the inverted signals ($\overline{A}$, $\overline{B}$, $\overline{C}$) are also recorded.

These signals are converted by means of the quadrature decoder and the 32-bit counter into a position value with optional quadruple, double or single evaluation. The digital inputs enable latch, reset and set functionalities and thus exact and speed-independent referencing and storage of the counter value.

Encoder type		Incremental signals
RS422 encoder	with zero pulse	A, $\overline{A}$, B, $\overline{B}$, C, $\overline{C}$
RS422 encoder	without zero pulse	A, $\overline{A}$, B, $\overline{B}$
RS422 counter or pulse generator	with zero pulse	A, $\overline{A}$, C, $\overline{C}$; counting direction specification via track B (B, $\overline{B}$)
RS422 counter or pulse generator	without zero pulse	A, $\overline{A}$; counting direction specification via track B (B, $\overline{B}$)
TTL, Open Collector encoder	with zero pulse	A, B, C
TTL, Open Collector encoder	without zero pulse	A, B
TTL, Open Collector counter or pulse generator	with zero pulse	A, C; counting direction specification via B
TTL, Open Collector counter or pulse generator	without zero pulse	A, counting direction specification via B

The phase position between the signals at track A and track B determines the counting direction.
Forward (cw): signal at track A is 90° leading with respect to track B
Backward (ccw): signal at track A is 90° lagging compared to track B.

With 1-fold evaluation the rising edges on track A are counted.
With 2-fold evaluation, the rising and falling edges on track A are counted.
With 4-fold evaluation, the rising and falling edges on track A and track B are counted.

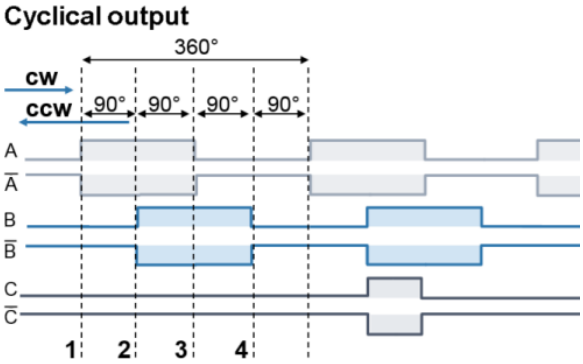


Fig. 23: Incremental signals

Absolute value encoders provide an absolute position value directly after switch-on, which is unambiguous over the entire travel path. With incremental encoders, a homing must be carried out after switching on in order to be able to determine a unique position.
Homing can be carried out, for example, with the aid of referencing cams or via the zero pulse of the encoder.

NOTICE

Differential and single-ended connection

The RS422 signal transmits a differential voltage, which makes the signal less sensitive to interference compared to a single-ended signal.

- If the encoder signal is to be transmitted over longer distances or at higher frequencies, an encoder with RS422 signals is recommended.
- Shielded and twisted pair cables should be used.

3.6 Technical properties

The EJ51xx series incremental encoder interface modules enable connection of incremental encoders. In addition to the encoder inputs A, B and optional zero pulse C, up to two additional 24 V_{DC} inputs are available (latch and gate/latch), which can be used for resetting, setting, blocking and storing the counter value. If the incremental encoder has a fault signal output, this can be connected to the Status Input input (5 V_{DC}).

The following inputs are available with the respective technical characteristics:

- Encoder connection: differential signals according to RS422 and single-ended signals from TTL encoders and Open Collector encoders are supported.
- Latch input and Gate/Latch input
- Status Input

The module also provides a parameterizable encoder supply.

- Encoder operating voltage

NOTICE

Fast digital inputs – interference from interfering devices

Please note that the input wiring has very little filtering. It has been optimized for fast signal transmission from the input to the evaluation unit. In other words, rapid level changes/pulses in the µs range and/or high-frequency interference signals from devices (e. g. proportional valves, stepper motor or DC motor output stages) arrive at the evaluation unit almost unfiltered/unattenuated. These interferences can be incorrectly detected as a signal.

- To suppress interference, an additional input filter can be parameterized.
- Furthermore, EMC-compliant cabling and the use of separate power supply units for the module and the devices causing interference are recommended.

3.6.1 Supported encoders / signal types

Differential signals according to RS422 are intended as encoder connection. Single-ended signals from TTL encoders and also signals from Open Collector encoders are also options, through internal pull-up resistances.

The following signal types are supported:

Encoder	Signal type	Setting in Index 0x80n1:1D * "Counter mode"	Cut-off frequency	Comments
Encoder with or without zero pulse track C	RS422 (diff. input)	0	20 million increments/s with 4-fold evaluation, corresponds to 5 MHz per track	Signal levels according to RS422 are expected Detection of wire break and short circuit [▶ 37]
Counter/pulse generator with or without zero pulse track C		1		
Encoder with or without zero pulse track C	TTL (single ended)	2	4 million increments/s with 4-fold evaluation, corresponds to 1 MHz per track	A voltage level of nominally 2.0 V to 6.0 V with a current of 2.1 mA or higher is expected. No wire break detection
Counter/pulse generator with or without zero pulse track C		3		
Encoder with or without zero pulse track C	open collector	4	400,000 increments/s with 4-fold evaluation, corresponds to 100 kHz per track	No wire break detection
Counter/pulse generator with or without zero pulse track C		5		
*) depending on the number of channels (n = 0 for channel 1 and n = 1 for channel 2)				

The correct wiring for the respective encoder can be found in chapter Connection [▶ 20].

3.6.1.1 Signal type RS422 (diff. input)

Differential signal levels according to RS422 are expected with the following settings in "Counter mode" (0x80n1:1D):

- 0: Encoder RS422 (diff. input)
- 1: Counter RS422 (diff. input)

A cut-off frequency of up to 20 million increments per second is permissible with 4-fold evaluation (corresponds to 5 MHz).

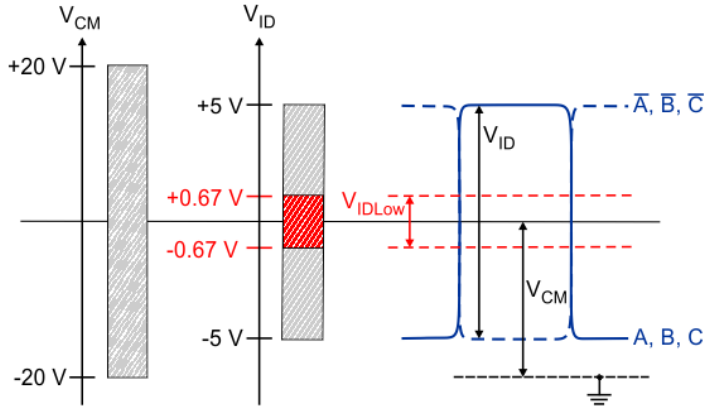


Fig. 24: RS422 signal level

Legend:

V_{CM}	Common mode voltage range	A, B, C	Signals A, B, C
V_{ID}	Differential voltage	$\overline{A}, \overline{B}, \overline{C}$	Inverted signals $\overline{A}, \overline{B}, \overline{C}$
V_{IDLow}	Differential voltage too low		

NOTICE

Exceeding of Common Mode range

Exceeding the Common Mode voltage range can lead to destruction of the device.

RS422 - wire break and short circuit detection (open circuit)

In the RS422 (differential input) modes it is possible to detect a wire break or short circuit at the individual encoder inputs.

- In case of wire break, e.g. between input A and input $\overline{A}$,
  - the differential voltage V_{ID} is almost 0 V,
  - which leads to an error with low differential voltage.
- In case of a short circuit, e.g. between input A and input $\overline{A}$, the error behavior is similar to a wire break and also leads to error detection.

Activation of error detection for each channel			
Index (hex)	**Name**	**Description**	
80n0:0B *	Error detection A	TRUE	Broken wire and short circuit detection for encoder input A enabled
		FALSE	Broken wire and short circuit detection for encoder input A disabled
80n0:0C *	Error detection B	TRUE	Broken wire and short circuit detection for encoder input B enabled
		FALSE	Broken wire and short circuit detection for encoder input B disabled
80n0:0D *	Error detection C	TRUE	Broken wire and short circuit detection for encoder input C enabled
		FALSE	Broken wire and short circuit detection for encoder input C disabled
*) depending on the number of channels (n = 0 for channel 1 and n = 1 for channel 2)			

Error detection using the example of a wire break or short circuit between inputs A and $\bar{A}$.		
Error diagnosis	**Display**	**Description**
LED A1	Green	A TRUE level is present
	Red	An error (open circuit) was detected
0x60n0:07 "Open circuit"	TRUE	Group error message for "Open circuit" A wire break or short circuit has occurred at one of the encoder inputs
	FALSE	There is no "open circuit" error.
0x60n0:0F "TxPDO State"	TRUE	The position data are invalid.
	FALSE	The position data are valid.
0xA0n0:01 "Error A"	TRUE	An "open circuit" error (wire break or short circuit) has occurred at encoder input A.
	FALSE	There is no "open circuit" error.

Error bits not permanently set in case of wire break at an encoder input

If a wire break is only present at one encoder input (e.g. only track A), it may happen in individual cases that the differential voltage (V_{ID}) is above the limit range (V_{IDLow}) due to the applied common mode voltage (V_{CM}).
This means that the error is not clearly identified.

The corresponding error bits ("Open circuit" and "Error A") are not permanently present!

NOTICE

Differential and single-ended connection

The RS422 signal transmits a differential voltage, which makes the signal less sensitive to interference compared to a single-ended signal.

- If the encoder signal is to be transmitted over longer distances or at higher frequencies, an encoder with RS422 signals is recommended.
- Shielded and twisted pair cables should be used.

3.6.1.2 Signal type TTL (single-ended) and Open Collector

With the following settings in "Counter mode" (0x80n1:1D), a voltage level of nominally 2.0 V to 6.0 V with a current of 2.1 mA or higher is expected:

- 2: Encoder TTL (single ended)
- 3: Counter TTL (single ended)
- 4: Encoder open collector
- 5: Counter open collector

For TTL encoders a cut-off frequency of up to 4 million increments per second is permissible with 4-fold evaluation. This corresponds to 1 MHz.

For Open Collector encoders, a cut-off frequency of up to 400,000 increments per second is permissible with 4-fold evaluation. This corresponds to 100 kHz.

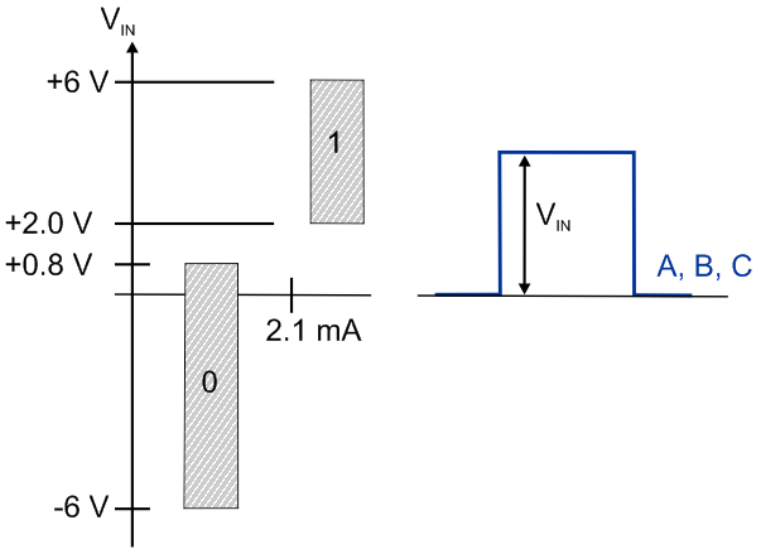


Fig. 25: TTL, Open Collector signal level (single-ended signal)

Key:

V_{IN}	Single-ended input voltage
A, B, C	Encoder signals A, B, C

NOTICE

Open circuit detection

Open circuit detection inherently does not work with single-ended lines: TTL and Open Collector encoders and counters/pulse generators.

NOTICE

Open Collector wiring

When selecting an Open Collector encoder under "Counter mode" (0x80n1:1D), the inputs A, B, C are connected to 5 V via pull-up resistors (1 kΩ).

3.6.2 Latch and Gate/Latch inputs

The module provides two digital 24 V_{DC} inputs. The function of these inputs is described in the respective chapter.

- Latch input (Latch extern)
- Gate/latch input (Latch extern 2)

Both inputs are type 3 inputs according to EN61131-2, with a minimum pulse duration of t_{ON} > 1µs.

Digital input type 3, according to EN61131-2	Voltage [V]	Input current [mA]
Signal voltage "0 - LOW"	-3 V ... +5 V typ.	0 mA ... 2.6 mA typ.
Signal voltage "1 - HIGH"	11 V ... 30 V typ.	typ. 2.5 mA

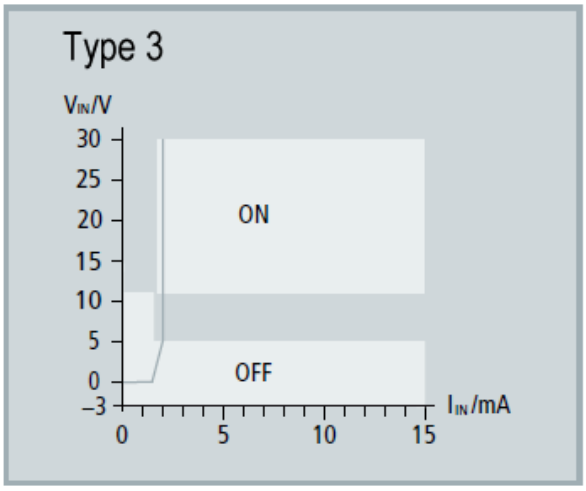


Fig. 26: Characteristic 24 V_{DC} Input type 3

NOTICE

Be aware of bouncing when using electromechanical switches and push buttons

When using electromechanical switches and push buttons, repeated closing and opening of the switch or push button can occur when the switch or push button is actuated, which is referred to as bouncing.

- If the function 0x80n0:22 "Enable continuous latch extern" or 0x80n0:23 "Enable continuous latch extern 2" is active, the stored value is overwritten several times due to the bouncing. As a result, parameter 0x60n0: 12 "Latch value" or 0x60n0: 22 "Latch value 2" contains the value that was saved last, not the value that was saved first.
- If the function is deactivated, only the first opening or closing of the switch or push button is detected and saved as a value in the corresponding parameter. No other transactions are taken into account.

3.6.3 Status Input

The module provides a Status Input. The function is described in chapter Status Input.

The input is 5 V compatible.

Digital input, 5 V TTL input characteristic	Voltage [V]	Input current [mA]
Signal voltage "0 - LOW"	-6 V … + 0.8 V	typ. 5 mA
Signal voltage "1 - HIGH"	+2 V … +6 V	typ. 0 mA

NOTICE

Wiring of the Status Input

In the module the Status Input is internally connected to 5 V via a pull-up resistor (1 kΩ). The encoder output must actively pull the signal against GND. The resistance must be dimensioned so that it is less than 120 Ω.

External power supply is not recommended. If an external supply is used, the maximum permitted voltage is 5 V against GND.

3.6.4 EJ5112 - Encoder operating voltage (supply voltage)

The encoder supply is generated internally from the 24 V of the power contacts. The encoder supply can be set in index 0x8001:17 [▶ 60] "Supply voltage". An operating voltage of 5 V_{DC} is preset. Voltage values of 5 V_{DC}, 12 V_{DC} and 24 V_{DC} can be selected. The setting applies to both channels. Before switching to higher voltages, ensure that both encoders support the voltage range.

The following tolerances apply

Voltage range	Tolerance
5 V_{DC}	+/- 5% (4.75 V … 5.25 V)
12 V_{DC}	+/- 10% (10.8 V … 13.2 V)
24 V_{DC}	-15% to +20% (20.4 V … 28.8 V)

Setting the encoder supply via index 0x8001:17 [▶ 60]

The encoder supply is set centrally for both channels via the index 0x8001:17 [▶ 60] (channel 1). The corresponding index 0x8011:17 of the second channel has no parameterization function.

NOTICE

Setting the encoder supply voltage

- Before switching to a higher voltage, make sure that the connected encoders support the selected voltage range!
- To write to 0x80n1:17 "Supply voltage" you have to set the value 0x72657375 (ASCII: "user") in index 0xF008 [▶ 90] "Code word".

4 Installation of EJ modules

4.1 Power supply for the EtherCAT plug-in modules

⚠ WARNING

Power supply from SELV/PELV power supply unit!

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

Notes:

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

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:

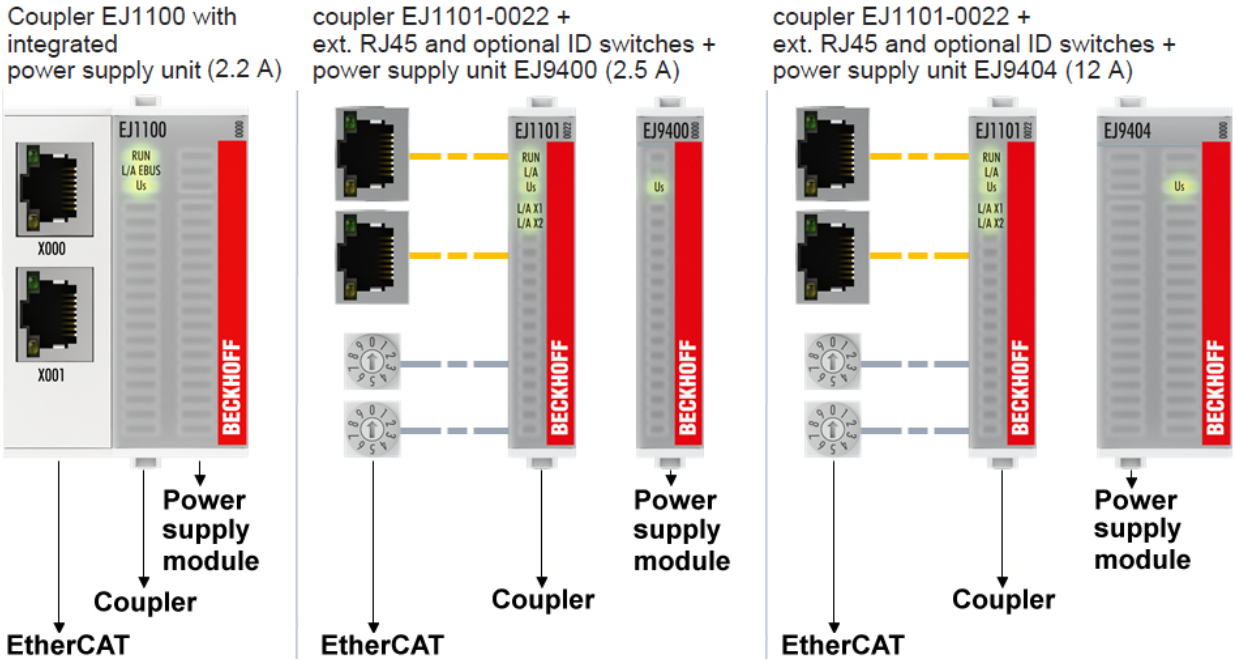


Fig. 27: E-bus power supply with EJ1100 or EJ1101-0022 + EJ940x

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

4.2 Note on load voltage supply

⚠ WARNING

Load voltage supply

Some devices permit an additional load voltage, e.g. 48 V DC, to be connected for the operation of a motor. In order to avoid stray currents on the protective conductor during operation, EN 60204-1:2018 provides for the possibility that the negative pole of the load voltage does not necessarily have to be connected to the protective conductor system (SELV).
Therefore, the load voltage supply should be designed as an SELV supply.

4.3 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)

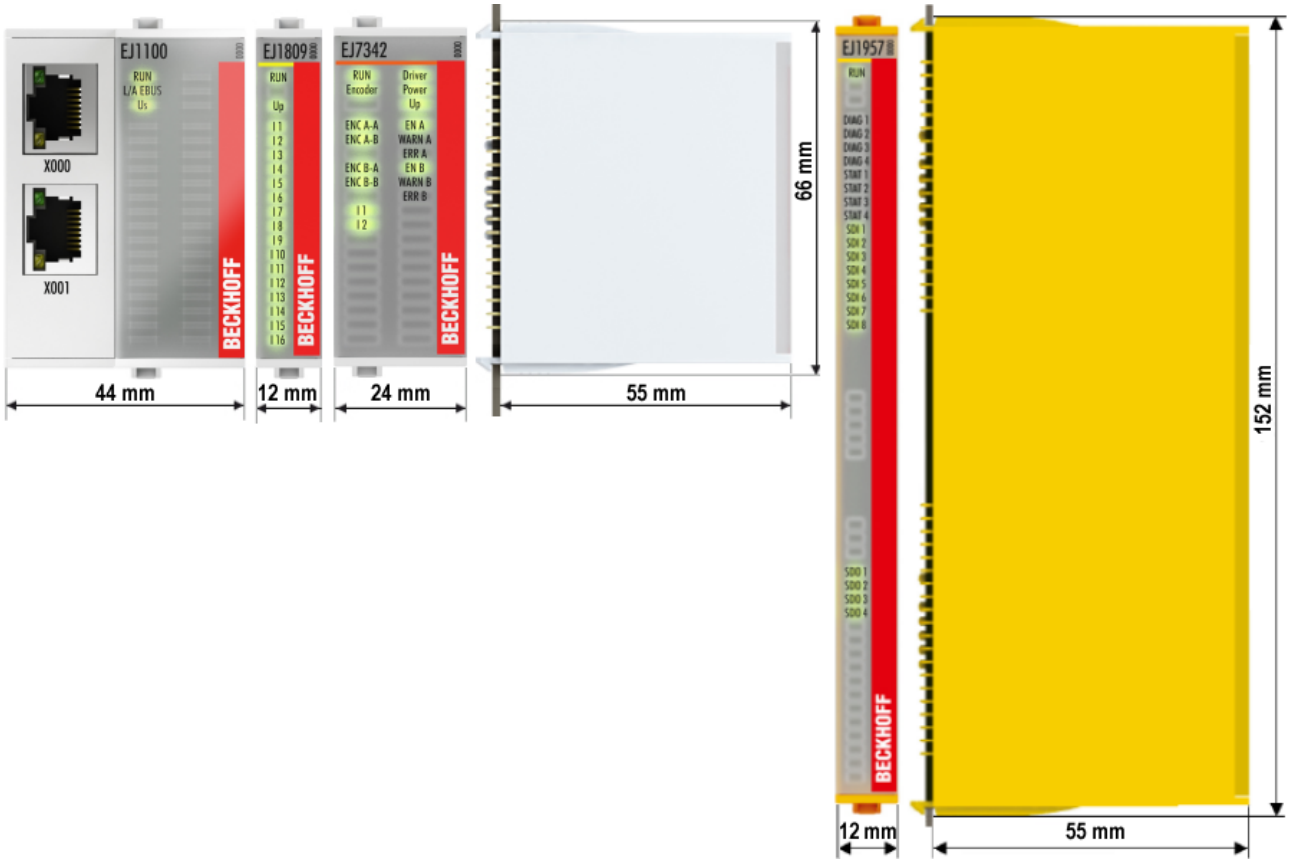


Fig. 29: EJxxxx - Dimensions

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

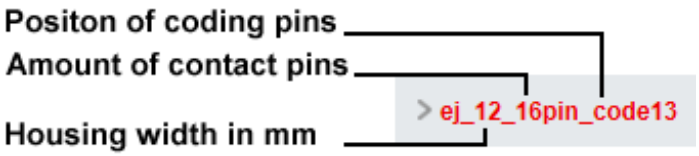


Fig. 30: Naming of the technical drawings

4.4 Installation positions and minimum distances

4.4.1 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.

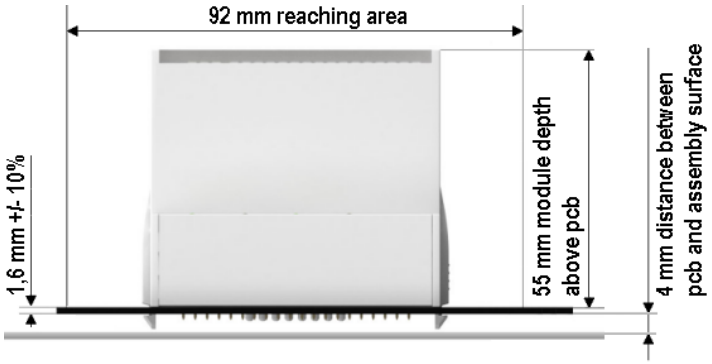


Fig. 31: Mounting distances EJ module - PCB

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 [▶ 46]) 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.

4.4.2 Installation positions

NOTICE

Constraints regarding installation position and operating temperature range

Please refer to the technical data [▶ 18] 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.

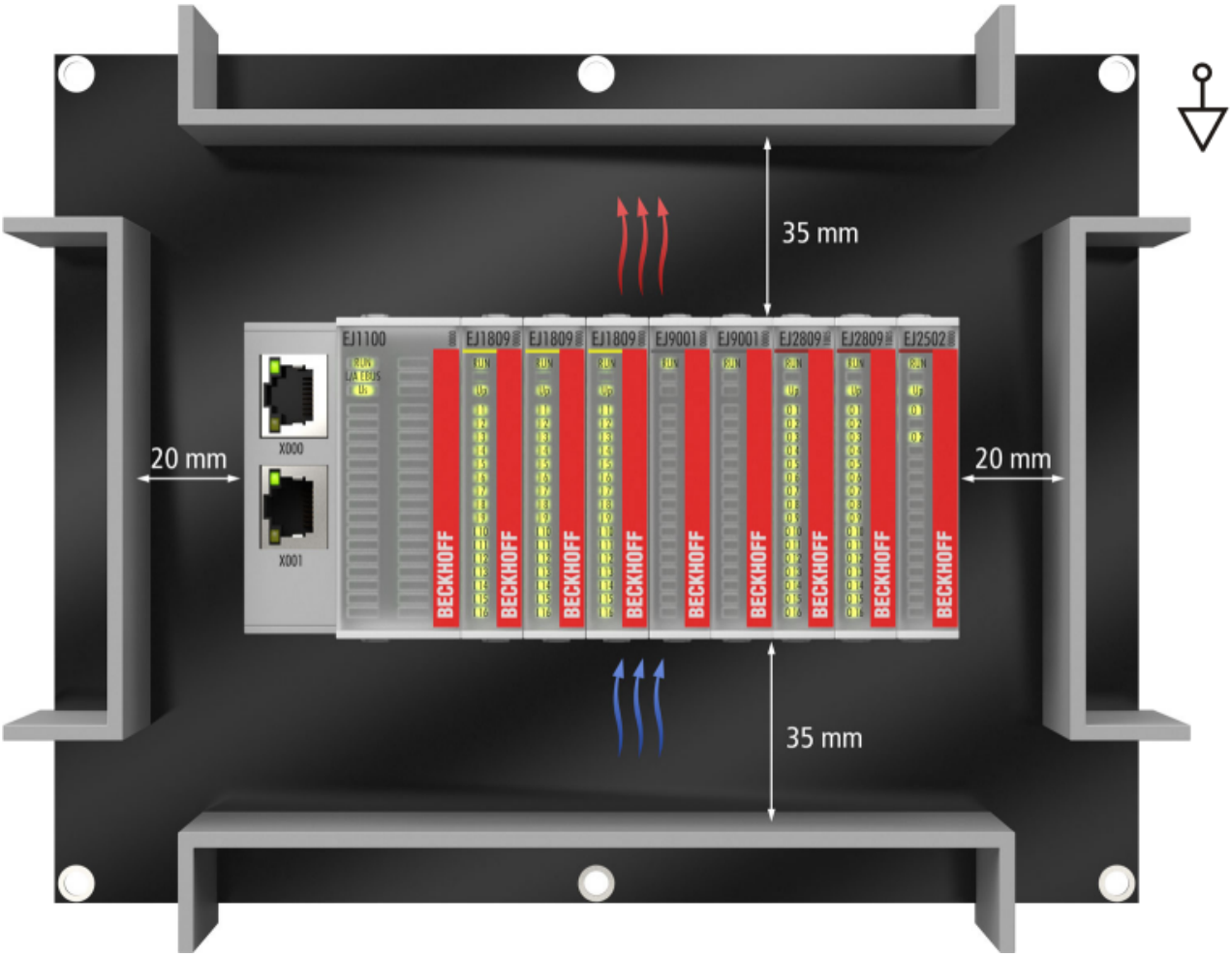


Fig. 32: Recommended distances for standard installation position

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.

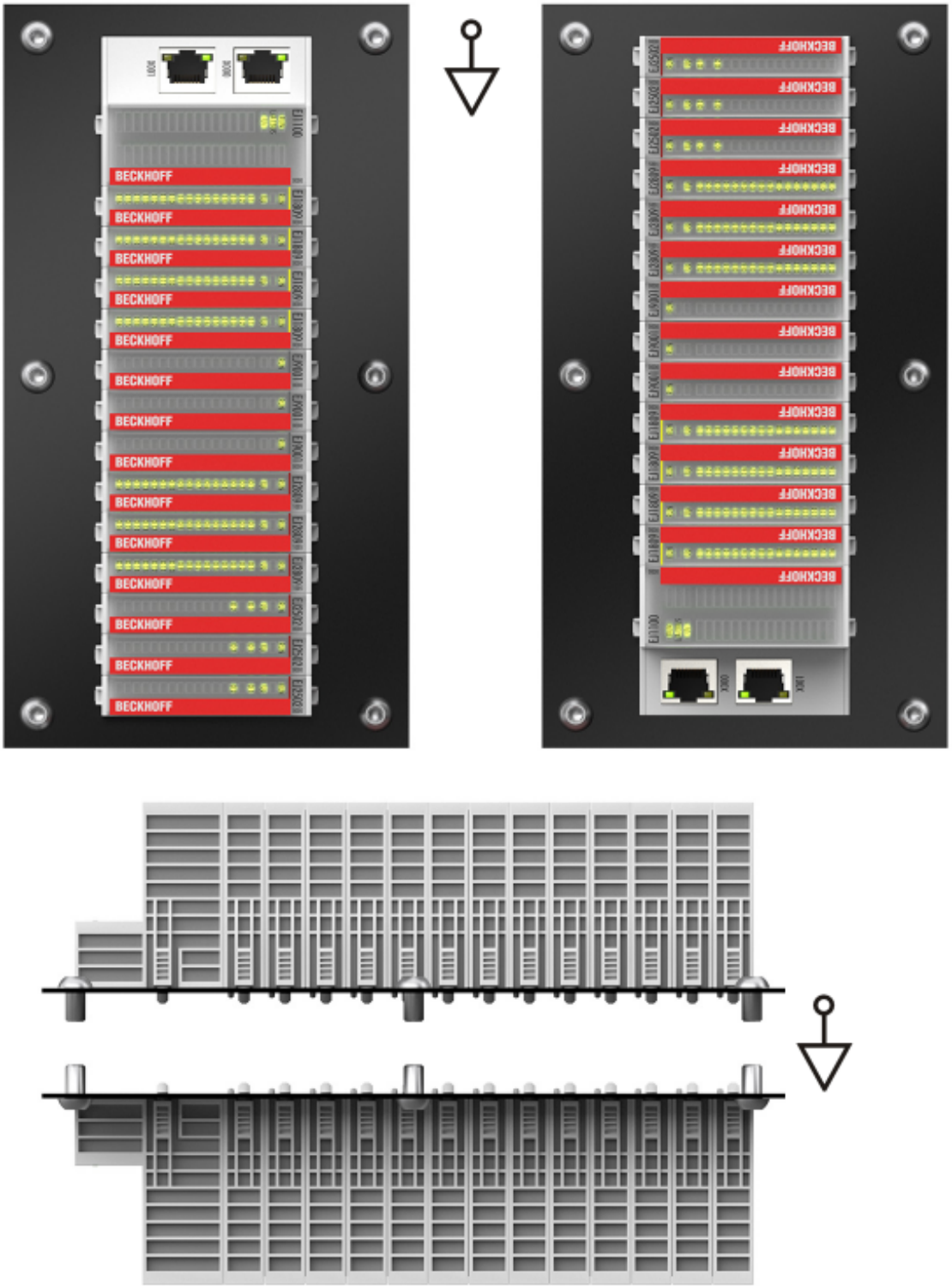


Fig. 33: Other installation positions

4.5 Codings

4.5.1 Color coding

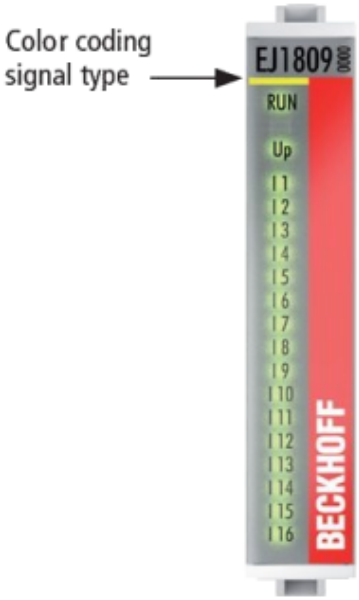


Fig. 34: EJ modules color code; sample: EJ1809

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

4.5.2 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.

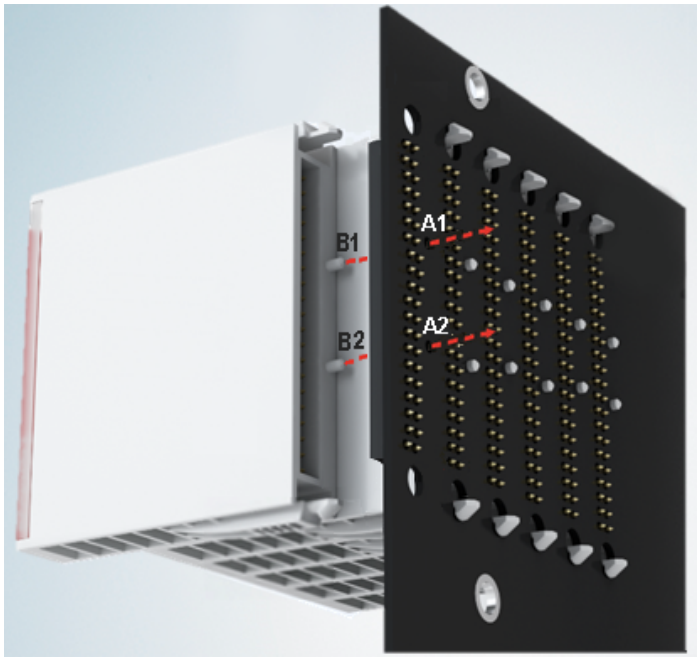


Fig. 35: Mechanical position coding with coding pins (B1 and B2) and coding holes (A1 and A2)

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.

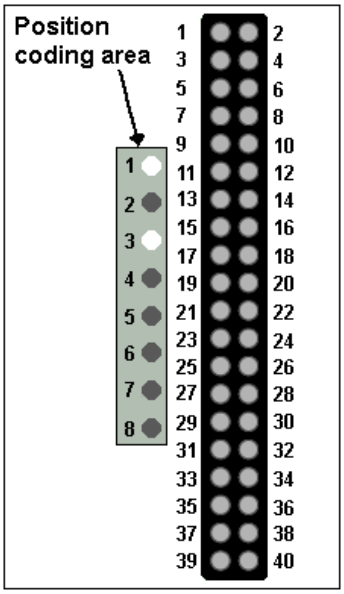


Fig. 36: Pin coding; sample: digital input modules

4.6 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.

NOTICE

Risk of damage to components through electrostatic discharge!

Observe the regulations for ESD protection.

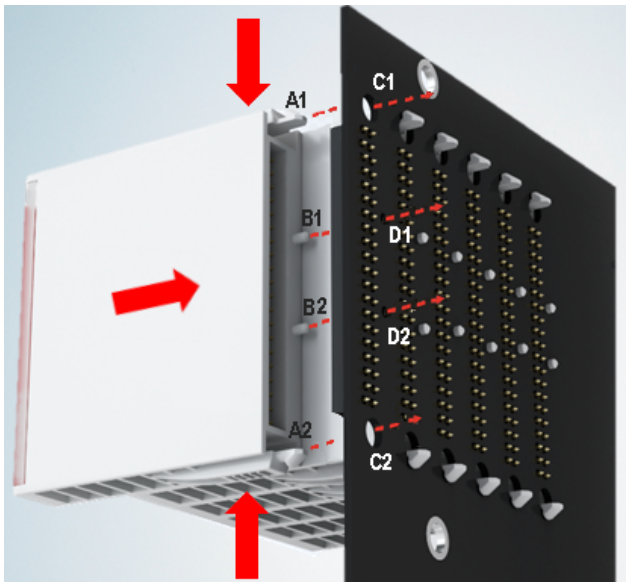


Fig. 37: Installation of EJ modules

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.

NOTICE

- 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.

4.7 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

4.7.1 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.

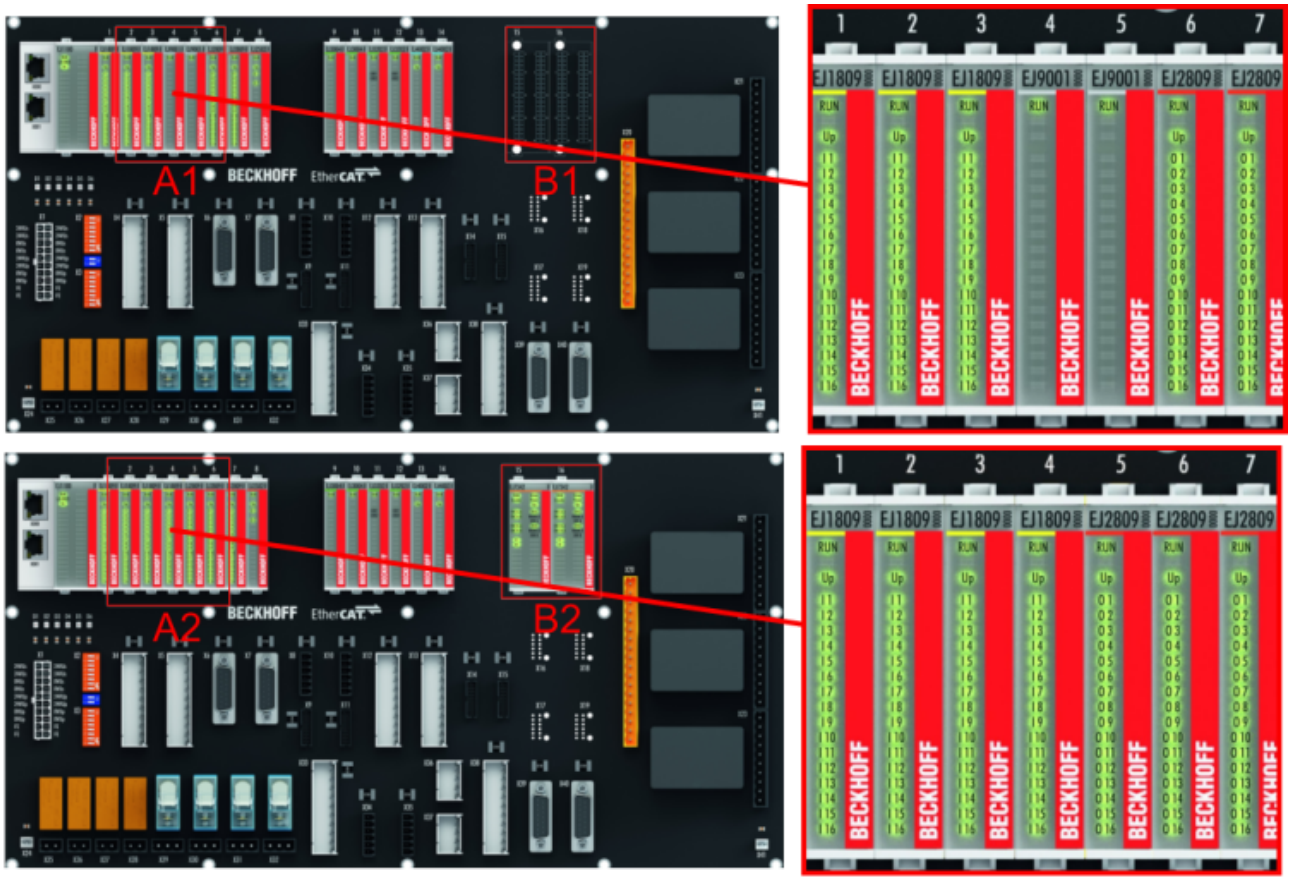


Fig. 38: Sample: Exchanging placeholder modules and assigning reserve slots

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.

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

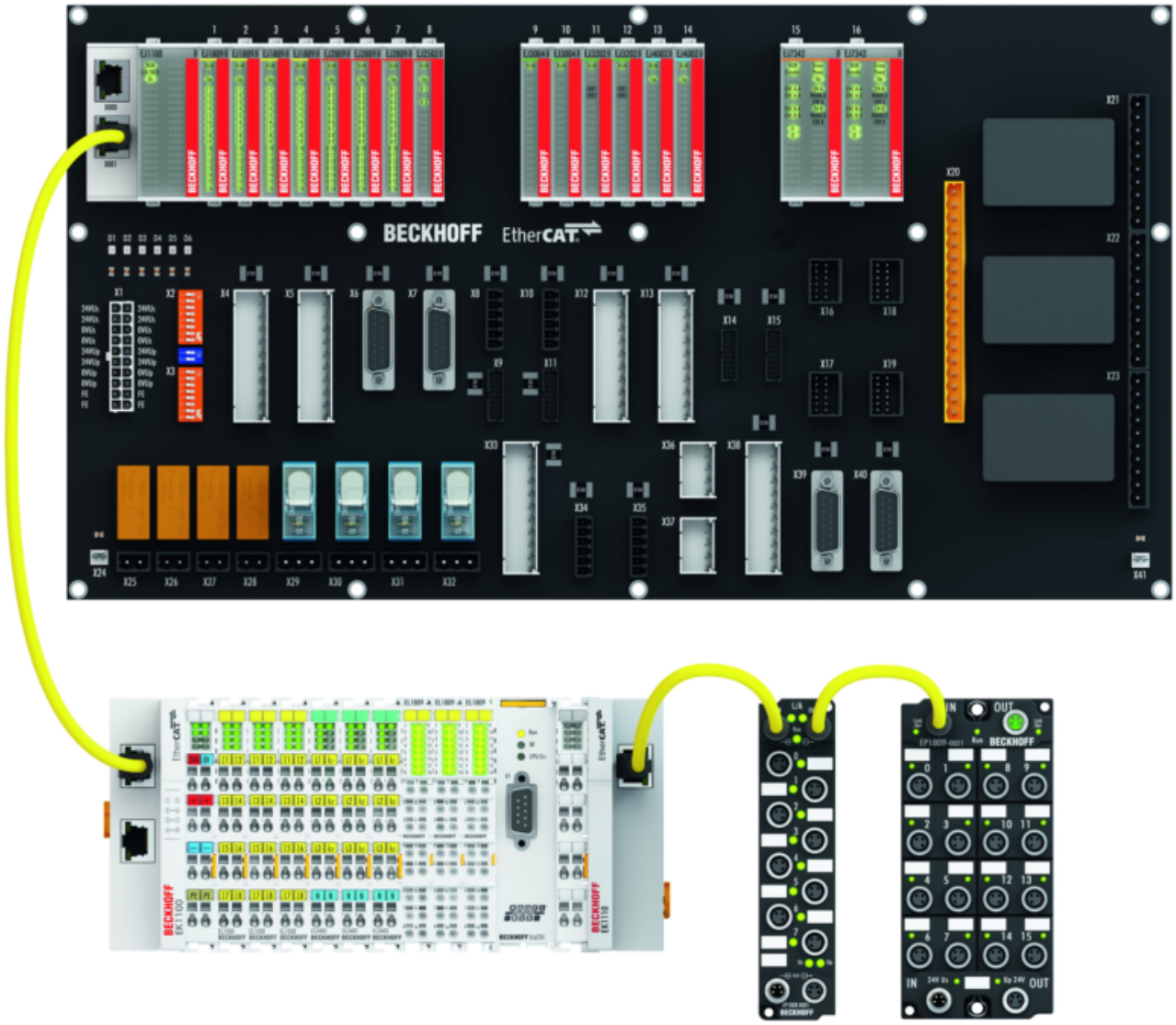


Fig. 39: Example of extension via an Ethernet/EtherCAT connection

4.8 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. 40: 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).

NOTICE

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

4.9 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.

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

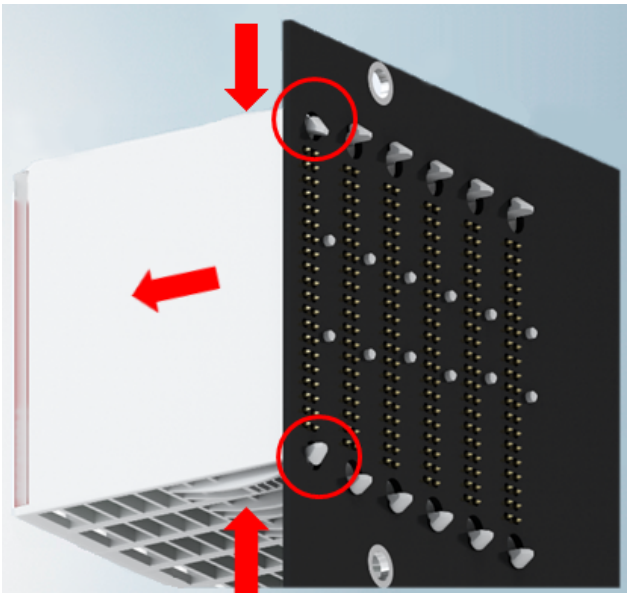


Fig. 42: Disassembly of EJ modules

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.

4.10 Disposal

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

5 EtherCAT basics

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

6 Commissioning

6.1 Reference to documentation EJ5112

Detailed documentation on the commissioning of the EJ5112 module is being prepared.

NOTICE

Damage to devices or loss of data

The descriptions and notes on the commissioning of the EL5112 EtherCAT Terminal are transferable to the EJ5112 EtherCAT plug-in module.

Before commissioning, read the detailed description of the process data, operation modes and parameterization in the EL5112 documentation.

6.2 EJ5112 - 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.

NOTICE

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

6.2.1 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})

6.2.2 Configuration data

Index 80n0 ENC Settings 0 Ch.n (for n=0 [channel 1], n=1 [channel 2])

Index (hex)	Name	Meaning	Data type	Flags	Default
80n0:0	ENC Settings 0 Ch. (n+1)	Maximum subindex	UINT8	RO	0x23 (35_{dec})
80n0:01	Enable C reset	The counter is reset via the C input.	BOOLEAN	RW	0x00 (0_{dec})
80n0:02	Enable extern reset	A counter reset is triggered via the external latch input (24 V)	BOOLEAN	RW	0x00 (0_{dec})
80n0:04	Gate polarity	0: Disable gate 1: Enable pos. gate (gate locks with HIGH signal level) 2: Enable neg. gate (gate locks with LOW signal level)	BIT2	RW	0x01 (1_{dec})
80n0:06	Evaluation mode	0: 4-fold (four-fold evaluation) 1: 1-fold (single evaluation) 2: 2-fold (two-fold evaluation)	BIT2	RW	0x00 (0_{dec})
80n0:08	Disable filter	0: Activates the input filter (inputs A, /A, B, /B, C, /C only) 1: Deactivates the input filter If a filter is activated a signal edge must be present for at least 2.4 µs in order to be counted as an increment.	BOOLEAN	RW	0x01 (1_{dec})
80n0:0A	Enable micro increments	If activated, the module interpolates micro-increments between the integral encoder increments in DC mode. The lower 8 bits of the counter value are used in each case for the display. A 32-bit counter thus becomes a 24+8-bit counter, a 16-bit counter becomes an 8+8-bit counter.	BOOLEAN	RW	0x00 (0_{dec})
80n0:0B	Error detection A	A broken wire or short circuit on track A is indicated in index 0x60n0:07 [▶ 62] and as process data. Diagnostics is only possible, if the associated input is wired differentially.	BOOLEAN	RW	0x01 (1_{dec})
80n0:0C	Error detection B	A broken wire or short circuit on track B is indicated in index 0x60n0:07 [▶ 62] and as process data. Diagnostics is only possible, if the associated input is wired differentially.	BOOLEAN	RW	0x01 (1_{dec})
80n0:0D	Error detection C	A broken wire or short circuit on track C is indicated in index 0x6000:07 [▶ 62] and as process data. Diagnostics is only possible, if the associated input is wired differentially.	BOOLEAN	RW	0x00 (0_{dec})
80n0:0E	Reversion of rotation	Activates reversion of rotation	BOOLEAN	RW	0x00 (0_{dec})
80n0:10	Extern reset polarity	0: Fall (the counter is set to zero with a falling edge) 1: Rise (the counter is set to zero with a rising edge)	BIT1	RW	0x01 (1_{dec})
80n0:11	Frequency window	This is the minimum time over which the frequency is determined; default value 10 ms [resolution: 1 µs]. The number of pulses in the timeframe + the following is measured. The maximum waiting time is specified in the "Frequency Wait Time" parameter. The number of pulses is divided by the actual time window size. The determined frequency is output in index 0x60n0:13 [▶ 62] and as process data. The frequency calculation is carried out locally without distributed clocks function.	UINT16	RW	0x2710 (10000_{dec})
80n0:13	Frequency scaling	Scaling of the frequency measurement (must be divided by this value to obtain the unit in Hz): 100: "0.01 Hz" (default) 1: "1 Hz"	UINT32	RW	0x00000064 (100_{dec})
80n0:14	Period scaling	Resolution of the period value in the process data: 10: "10 ns" Period value is a multiple of 10 ns 100: "100 ns" Period value is a multiple of 100 ns 500: "500 ns" Period value is a multiple of 500 ns	UINT32	RW	0x0000000A (10_{dec})

Index (hex)	Name	Meaning	Data type	Flags	Default
80n0:17	Frequency Wait Time	Waiting time [ms] for frequency measurement Once the time specified in the frequency window has elapsed, the system waits for the next positive edge from track A. This enables the update speed for the "Frequency" process data to be optimized, depending on the expected frequencies. At least double the period value of the minimum frequency to be measured should be entered here. t >= 2* (1 / f_{min})	UINT16	RW	0x53E2 (21474$_{dec}$)
80n0:1D	Frequency numerator	Frequency counter value, frequency scaling	UINT32	RW	0x00000001 (1$_{dec}$)
80n0:1E	Frequency denominator	frequency counter value, used for scaling the frequency and the velocity calculation (increments / unit).	UINT32	RW	0x00000001 (1$_{dec}$)
80n0:21	Enable encoder plausibility check	Activation of plausibility check	BOOLEAN	RW	0x00 (0$_{dec}$)
80n0:22	Enable continuous latch extern	FALSE: The following pulses at the Latch input have no influence on the latch value in index 0x60n0:12 "Latch value" when the bit in index 0x70n0:02 or 0x70n0:04 is set. TRUE: The counter value is written to index 0x60n0:12 "Latch value" at every parameterized edge at the Latch input. There is no need to reactivate index 0x70n0:02 or 0x70n0:04.	BOOLEAN	RW	0x00 (0$_{dec}$)
80n0:23	Enable continuous latch extern 2	FALSE: The following pulses at the Latch extern 2 input have no influence on the latch value in index 0x60n0:22 "Latch value 2" when the bit in index 0x70n0:0C or 0x70n0:0D is set. TRUE: The counter value is written to index 0x60n0:22 "Latch value 2" at every parameterized edge at the Latch extern 2 input. There is no need to reactivate index 0x70n0:02 or 0x70n0:04.	BOOLEAN	RW	0x00 (0$_{dec}$)

Index 80n1 ENC Settings 1 Ch.n (for n=0 [channel 1], n=1 [channel 2])

Index (hex)	Name	Meaning	Data type	Flags	Default
80n1:0	ENC Settings 1 Ch. (n+1)	Maximum subindex	UINT8	RO	0x1D (29$_{dec}$)
80n1:17	Supply voltage [▶ 41]	Setting the sensor supply 50$_{dec}$: 5.0 V (default) 120$_{dec}$: 12.0 V 240$_{dec}$: 24.0 V Refer to the Note on setting the encoder supply [▶ 41]	UINT32	RW	0x00000032 (50$_{dec}$)
80n1:19	Filter settings	Filter settings: 10$_{dec}$: 10 kHz 25$_{dec}$: 25 kHz 50$_{dec}$: 50 kHz 100$_{dec}$: 100 kHz 250$_{dec}$: 250 kHz 500$_{dec}$: 500 kHz 1000$_{dec}$: 1 MHz 2500$_{dec}$: 2.5 MHz 5000$_{dec}$: 5 MHz (default)	UINT32	RW	0x00001388 (5000$_{dec}$)
80n1:1A	Limit counter value	Specifies the value for the upper counter limit.	UINT32	RW	0xFFFFFFFF (-1$_{dez}$)
80n1:1B	Reset counter value	Specifies the value for the lower counter limit.	UINT32	RW	0x00000000 (0$_{dec}$)
80n1:1C	Direction inversion hysteresis	Enter the hysteresis in number of increments. A value greater than 0 must be selected. If the counter value exceeds the value, the bit in index 0x60n2:13 "Direction inversion detected" is set in the next PLC cycle.	UINT8	RW	0x0A (10$_{dec}$)
80n1:1D	Counter mode	0: Encoder RS422 (diff. input) 1: Counter RS422 (diff. input) 2: Encoder TTL (single-ended) 3: Counter TTL (single-ended) 4: Encoder open collector 5: Counter open collector	UINT32	RW	0x00000000 (0$_{dec}$)

6.2.3 Command object

Index FB00 RMB Command

Index (hex)	Name	Meaning		Data type	Flags	Default
FB00:0	RMB Command	Max. subindex		UINT8	RO	0x03 (3_{dec})
FB00:01	Request	Commands can be sent to the module via the request object. Command:		OCTET-STRING[2]	RW	{0}
		Reset Duty cycle min./max. value:				
		0x9130	Index 0x6000:24 “Duty cycle min” for channel 1 is set to zero			
		0x9131	Index 0x6010:24 “Duty cycle min” for channel 2 is set to zero			
		0x9140	Index 0x6000:25 “Duty cycle max” for channel 1 is set to zero			
		0x9141	Index 0x6010:25 “Duty cycle max” for channel 2 is set to zero			
		Reset plausibility error counter:				
		0x9151	Index 0xA000:13 “Encoder plausibility error counter” for channel 1 is set to zero			
		0x9161	Index 0xA010:13 “Encoder plausibility error counter” for channel 2 is set to zero			
		Reset of internal error counters:				
		0x9152	Index 0xA000:14 “Filter violation counter extern latch” for channel 1 is set to zero			
		0x9153	Index 0xA000:15 “Filter violation counter input gate” for channel 1 is set to zero			
		0x9154	Index 0xA000:16 “Filter violation counter” for channel 1 is set to zero			
		0x9162	Index 0xA010:14 “Filter violation counter extern latch” for channel 2 is set to zero			
		0x9163	Index 0xA010:15 “Filter violation counter input gate” for channel 2 is set to zero			
		0x9164	Index 0xA010:16 “Filter violation counter” for channel 2 is set to zero			
FB00:02	Status	Status of the command currently being executed 0: Command executed without error. 255: Command is being executed		UINT8	RO	0x00 (0_{dec})
FB00:03	Response	Optional response value of the command		OCTET-STRING[4]	RO	{0}

6.2.4 Input data

Index 60n0 ENC Inputs Ch.n (for n=0 [channel 1], n=1 [channel 2])

Index (hex)	Name	Meaning	Data type	Flags	Default
60n0:0	ENC Inputs Ch. (n+1)	Maximum subindex	UINT8	RO	0x25 (37_{dec})
60n0:01	Latch C valid	The counter value was stored with the zero pulse C input.	BOOLEAN	RO	0x00 (0_{dec})
60n0:02	Latch extern valid	The counter value was stored via the Latch extern input.	BOOLEAN	RO	0x00 (0_{dec})
60n0:03	Set counter done	The counter was set.	BOOLEAN	RO	0x00 (0_{dec})
60n0:04	Counter underflow	The value has fallen below the lower counter limit. The bit is reset when the counter value has fallen below 2/3 of the counting range.	BOOLEAN	RO	0x00 (0_{dec})
60n0:05	Counter overflow	The upper counter limit was exceeded. The bit is reset when the counter value has fallen below 1/3 of the counting range.	BOOLEAN	RO	0x00 (0_{dec})
60n0:06	Status of input status	State of the status input (alarm "input 1")	BOOLEAN	RO	0x00 (0_{dec})
60n0:07	Open circuit	Indicates an open circuit. Configuration via index 0x80n0:0A, 0x80n0:0B, 0x80n0:0C	BOOLEAN	RO	0x00 (0_{dec})
60n0:08	Extrapolation stall	The extrapolated part of the counter is invalid. The speed has fallen below the minimum speed required to use the micro-increments	BOOLEAN	RO	0x00 (0_{dec})
60n0:09	Status of input A	Status of input A	BOOLEAN	RO	0x00 (0_{dec})
60n0:0A	Status of input B	Status of input B	BOOLEAN	RO	0x00 (0_{dec})
60n0:0B	Status of input C	Status of input C	BOOLEAN	RO	0x00 (0_{dec})
60n0:0C	Status of input gate	The state of the gate input	BOOLEAN	RO	0x00 (0_{dec})
60n0:0D	Status of extern latch	Only in Legacy mode: Status of the Latch extern input	BOOLEAN	RO	0x00 (0_{dec})
60n0:0E	Sync Error	Only in Legacy mode: The Sync error bit is only required for DC mode. It indicates whether a synchronization error has occurred during the previous cycle. This means a SYNC signal was triggered in the module, although no new process data were available (0=OK, 1=NOK).	BOOLEAN	RO	0x00 (0_{dec})
60n0:0F	TxPDO State	Only in Legacy mode: Validity of the data of the associated TxPDO (0 = valid, 1 = invalid).	BOOLEAN	RO	0x00 (0_{dec})
60n0:10	TxPDO Toggle	Only in Legacy mode: The TxPDO toggle is toggled by the slave when the data of the associated TxPDO is updated.	BOOLEAN	RO	0x00 (0_{dec})
60n0:11	Counter value	Counter value	UINT32	RO	0x00000000 (0_{dec})
60n0:12	Latch value	Latch value	UINT32	RO	0x00000000 (0_{dec})
60n0:13	Frequency value	Frequency (the scaling is set in index 0x80n0:13)	UINT32	RO	0x00000000 (0_{dec})
60n0:14	Period value	Period value (the scaling is set in index 0x80n0:14)	UINT32	RO	0x00000000 (0_{dec})
60n0:16	Timestamp	Timestamp of the last counter change	UINT64	RO	
60n0:1F	Timestamp C	Timestamp of the last registered positive edge of zero pulse C	UINT64	RO	
60n0:20	Timestamp latch	Timestamp of the last edge (depending on the parameterization of the Latch input) at Latch extern.	UINT64	RO	
60n0:21	Timestamp latch 2	When the Gate/Latch input is used as Latch extern 2 input: Timestamp of the last edge (depending on the parameterization of the Gate/Latch input) at the Latch extern 2 input.	UINT64	RO	
60n0:22	Latch value 2	Latch value of the Latch extern 2 input (Gate input is used as second Latch input)	UINT32	RO	0x00000000 (0_{dec})
60n0:23	Duty cycle	Indicates the ratio of pulse duration / period value.	UINT16	RO	0x0000 (0_{dec})
60n0:24	Duty cycle min	Returns the smallest measured duty cycle value	UINT16	RO	0x0000 (0_{dec})
60n0:25	Duty cycle max	Returns the largest measured duty cycle value	UINT16	RO	0x0000 (0_{dec})

Index 60n2 ENC Input status Ch. n (for n=0 [channel 1], n=1 [channel 2])

Index (hex)	Name	Meaning	Data type	Flags	Default
60n2:0	ENC Inputs status Ch. (n+1)	Maximum subindex	UINT8	RO	0x15 (21_{dec})
60n2:0D	Diag	Indicates that a new message is available in the "Diag History"	BOOLEAN	RO	0x00 (0_{dec})
60n2:0E	TxPDO State	Validity of the data of the associated TxPDO (0 = valid, 1 = invalid)	BOOLEAN	RO	0x00 (0_{dec})
60n2:0F	Input cycle counter	2-bit counter for synchronization (incremented only if a new value is present)	BIT2	RO	0x00 (0_{dec})
60n2:11	Software gate valid	0: Counter unlocked (index 0x70n0:09 [▶ 63] "Set software gate" = FALSE) 1: Counter locked (index 0x70n0:09 "Set software gate" = TRUE)	BOOLEAN	RO	0x00 (0_{dec})
60n2:12	Latch extern 2 valid	0: A new counter value can be stored in index 0x60n0:22 [▶ 62] "Latch value 2". 1: No further counter values are stored in 0x60n0:22 "Latch value 2".	BOOLEAN	RO	0x00 (0_{dec})
60n2:13	Direction inversion detected	Indicates reversal of the counting direction	BOOLEAN	RO	0x00 (0_{dec})
60n2:14	Status of extern latch	Status of the ext. Latch extern input	BOOLEAN	RO	0x00 (0_{dec})
60n2:15	Counter value out of range	Indicates that counter value is outside the parameterized counter limits	BOOLEAN	RO	0x00 (0_{dec})

6.2.5 Output data

Index 70n0 ENC Outputs Ch.n (for n=0 [channel 1], n=1 [channel 2])

Index (hex)	Name	Meaning	Data type	Flags	Default
70n0:0	ENC Outputs Ch. (+1)n	Maximum subindex	UINT8	RO	0x11 (17_{dec})
70n0:01	Enable latch C	Enable saving via the zero pulse C input.	BOOLEAN	RO	0x00 (0_{dec})
70n0:02	Enable latch extern on positive edge	Enable saving via the Latch extern input with positive edge.	BOOLEAN	RO	0x00 (0_{dec})
70n0:03	Set counter	Set counter value	BOOLEAN	RO	0x00 (0_{dec})
70n0:04	Enable latch extern on negative edge	Enable saving via the Latch extern input with negative edge.	BOOLEAN	RO	0x00 (0_{dec})
70n0:08	Set counter on latch C	Enable counter value specification via the zero pulse C Input	BOOLEAN	RO	0x00 (0_{dec})
70n0:09	Set software gate	Locks the counter via a PLC variable 0: Counter is unlocked 1: Counter is locked	BOOLEAN	RO	0x00 (0_{dec})
70n0:0A	Set counter on latch extern on positive edge	Enables counter value specification via a positive edge at the Latch extern input. The counter value is specified in index 0x70n0:11 "Set counter value".	BOOLEAN	RO	0x00 (0_{dec})
70n0:0B	Set counter on latch extern on negative edge	Enables counter value specification via a negative edge at the Latch extern input. The counter value is specified in index 0x70n0:11 "Set counter value".	BOOLEAN	RO	0x00 (0_{dec})
70n0:0C	Enable latch extern 2 on positive edge	Enable saving via the Gate/Latch input with positive edge.	BOOLEAN	RO	0x00 (0_{dec})
70n0:0D	Enable latch extern 2 on negative edge	Enable saving via the Gate/Latch input with negative edge.	BOOLEAN	RO	0x00 (0_{dec})
70n0:11	Set counter value	The counter value to be set via "Set counter" (index 0x70n0:03).	UINT32	RO	0x00000000 (0_{dec})

6.2.6 Information / diagnostic data (channel specific)

Index A0n0 ENC Diag data Ch. n (for n=0 [channel 1], n=1 [channel 2])

Index (hex)	Name	Meaning	Data type	Flags	Default
A0n0:0	ENC Diag data Ch. (n+1)	Maximum subindex	UINT8	RO	0x16 (22_{dec})
A0n0:01	Error A	An "open circuit" error is present at input A	BOOLEAN	RO	0x00 (0_{dec})
A0n0:02	Error B	An "open circuit" error is present at input B	BOOLEAN	RO	0x00 (0_{dec})
A0n0:03	Error C	An "open circuit" error is present at input zero pulse C	BOOLEAN	RO	0x00 (0_{dec})
A0n0:04	Field power failure	Encoder supply voltage is not present	BOOLEAN	RO	0x00 (0_{dec})
A0n0:05	Error Input status	Over/undervoltage at the Status Input (alarm input)	BOOLEAN	RO	0x00 (0_{dec})
A0n0:13	Encoder plausibility error counter	Number of detected plausibility errors	UINT16	RO	0x0000 (0_{dec})
A0n0:14	Filter violation counter extern latch	Number of filter overruns detected at the Latch input	UINT16	RO	0x0000 (0_{dec})
A0n0:15	Filter violation counter input gate	Number of filter overruns detected at the Gate/Latch input	UINT16	RO	0x0000 (0_{dec})
A0n0:16	Filter violation counter	Number of filter overruns detected at the encoder inputs	UINT16	RO	0x0000 (0_{dec})

6.2.7 Information / diagnostic data (device specific)

Index 10F3 Diagnosis History

Index (hex)	Name	Meaning	Data type	Flags	Default
10F3:0	Diagnosis History	Max. Subindex	UINT8	RO	0x15 (21_{dec})
10F3:01	Maximum Messages	Maximum number of stored messages. A maximum of 16 messages can be stored	UINT32	RO	0x00000000 0_{dec})
10F3:02	Newest Message	Subindex of the latest message	UINT8	RO	0x00 0_{dec})
10F3:03	Newest Acknowledged Message	Subindex of the last confirmed message	UINT8	RO	0x00 (0_{dec})
10F3:04	New Message available	Indicates that a new message is available	BOOLEAN	RO	0x00 (0_{dec})
10F3:05	Flags	not used	UINT16	RO	0x0000 (0_{dec})
10F3:06	Diagnosis Message 001	Message 1	OCTET-STRING[20]	RO	{0}
…	…	…	…	…	…
10F3:015	Diagnosis Message 016	Message 16	OCTET-STRING[20]	RO	{0}

Index 10F8 Actual Time Stamp

Index (hex)	Name	Meaning	Data type	Flags	Default
10F8:0	Actual Time Stamp	Timestamp	UINT64	RO	

6.2.8 Standard objects

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	0x01FF1389 (33493897_{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	EJ5112

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 100B Bootloader version

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

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	0x13F83052 (335032402_{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 ENC 1400 RxPDO-Par Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1400:0	ENC 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 02 16 03 16 04 16 05 16 06 16 07 16

Index 1401 ENC RxPDO-Par Control Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1401:0	ENC RxPDO-Par Control Compact 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 04 16 05 16 06 16 07 16

Index ENC 1402 RxPDO-Par Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1402:0	ENC RxPDO-Par Control 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[6]	RO	00 16 01 16 03 16 04 16 05 16 06 16 07 16

Index 1403 ENC RxPDO-Par Control Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1403:0	ENC RxPDO-Par Control Compact 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	00 16 01 16 02 16 04 16 05 16 06 16 07 16

Index 1404 ENC RxPDO-Par Control Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1404:0	ENC RxPDO-Par Control Counter 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[6]	RO	00 16 01 16 02 16 03 16 05 16 06 16 07 16

Index 1405 ENC RxPDO-Par Control Compact Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1405:0	ENC RxPDO-Par Control Compact Counter 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[6]	RO	00 16 01 16 02 16 03 16 04 16 06 16 07 16

Index 1406 ENC RxPDO-Par Control Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1406:0	ENC RxPDO-Par Control Legacy 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[6]	RO	00 16 01 16 02 16 03 16 04 16 05 16 07 16

Index 1407 ENC RxPDO-Par Control Compact Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1407:0	ENC RxPDO-Par Control Compact Legacy Ch.1	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	00 16 01 16 02 16 03 16 04 16 05 16 06 16

Index 140A ENC RxPDO-Par Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
140A:0	ENC RxPDO-Par Control Ch.2	PDO Parameter RxPDO 9	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 09	OCTET-STRING[6]	RO	08 16 09 16 0B 16 0C 16 0D 16 0E 16 0F 16

Index 140B ENC RxPDO-Par Control Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
140B:0	ENC RxPDO-Par Control Compact Ch.2	PDO Parameter RxPDO 10	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 10	OCTET-STRING[6]	RO	08 16 09 16 0A 16 0C 16 0D 16 0E 16 0F 16

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

Index (hex)	Name	Meaning	Data type	Flags	Default
140C:0	ENC RxPDO-Par Control Counter Ch.2	PDO Parameter RxPDO 11	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 11	OCTET-STRING[6]	RO	08 16 09 16 0A 16 0B 16 0D 16 0E 16 0F 16

Index 140D ENC RxPDO-Par Control Compact Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
140D:0	ENC RxPDO-Par Control Compact Counter Ch.2	PDO Parameter RxPDO 12	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 12	OCTET-STRING[2]	RO	08 16 09 16 0A 16 0B 16 0C 16 0E 16 0F 16

Index 1600 ENC RxPDO-Map Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1600:0	ENC RxPDO-Map Control Ch.1	PDO Mapping RxPDO 1	UINT8	RO	0x0D (13_{dec})
1600:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x01 (Ctrl))	UINT32	RO	0x7000:01, 1
1600:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7000:02, 1
1600:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1600:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7000:04, 1
1600:05	SubIndex 005	5. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1600:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x08 (Set Counter on latch C))	UINT32	RO	0x7000:08, 1
1600:07	SubIndex 007	7. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x09 (Set software gate))	UINT32	RO	0x7000:09, 1
1600:08	SubIndex 008	8. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0A (Set counter on latch extern on positive edge))	UINT32	RO	0x7000:0A, 1
1600:09	SubIndex 009	9. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0B (Set counter on latch extern on negative edge))	UINT32	RO	0x7000:0B, 1
1600:0A	SubIndex 010	10. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0C (Enable latch extern 2 on positive edge))	UINT32	RO	0x7000:0C, 1
1600:0B	SubIndex 011	11. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0D (Enable latch extern 2 on negative edge))	UINT32	RO	0x7000:0D, 1
1600:0C	SubIndex 012	12. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1600:0D	SubIndex 013	13. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 32

Index 1601 ENC RxPDO-Map Control Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1601:0	ENC RxPDO-Map Control Compact Ch.1	PDO Mapping RxPDO 2	UINT8	RO	0x0D (13_{dec})
1601:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x01 (Ctrl))	UINT32	RO	0x7000:01, 1
1601:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7000:02, 1
1601:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1601:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7000:04, 1
1601:05	SubIndex 005	5. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1601:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x08 (Set Counter on latch C))	UINT32	RO	0x7000:08, 1
1601:07	SubIndex 007	7. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x09 (Set software gate))	UINT32	RO	0x7000:09, 1
1601:08	SubIndex 008	8. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0A (Set counter on latch extern on positive edge))	UINT32	RO	0x7000:0A, 1
1601:09	SubIndex 009	9. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0B (Set counter on latch extern on negative edge))	UINT32	RO	0x7000:0B, 1
1601:0A	SubIndex 010	10. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0C (Enable latch extern 2 on positive edge))	UINT32	RO	0x7000:0C, 1
1601:0B	SubIndex 011	11. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0D (Enable latch extern 2 on negative edge))	UINT32	RO	0x7000:0D, 1
1601:0C	SubIndex 012	12. PDO Mapping entry (3 bits align)	UINT32	RO	0x0000:00, 3
1601:0D	SubIndex 013	13. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 16

Index 1602 ENC RxPDO-Map Control Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1602:0	ENC RxPDO-Map Control Ch.1	PDO Mapping RxPDO 3	UINT8	RO	0x0A (10_{dec})
1602:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1602:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7000:02, 1
1602:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1602:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7000:04, 1
1602:05	SubIndex 005	5. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
1602:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x09 (Set software gate))	UINT32	RO	0x7000:09, 1
1602:07	SubIndex 007	7. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0A (Set counter on latch extern on positive edge))	UINT32	RO	0x7000:0A, 1
1602:08	SubIndex 008	8. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0B (Set counter on latch extern on negative edge))	UINT32	RO	0x7000:0B, 1
1602:09	SubIndex 009	9. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1602:0A	SubIndex 010	10. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 32

Index 1603 ENC RxPDO-Map Control Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1603:0	ENC RxPDO-Map Control Compact Ch.1	PDO Mapping RxPDO 4	UINT8	RO	0x0A (10_{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 0x7000 (ENC Outputs Ch.1), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7000:02, 1
1603:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1603:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7000:04, 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 (object 0x7000 (ENC Outputs Ch.1), entry 0x09 (Set software gate))	UINT32	RO	0x7000:09, 1
1603:07	SubIndex 007	7. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0A (Set counter on latch extern on positive edge))	UINT32	RO	0x7000:0A, 1
1603:08	SubIndex 008	8. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x0B (Set counter on latch extern on negative edge))	UINT32	RO	0x7000:0B, 1
1603:09	SubIndex 009	9. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1603:0A	SubIndex 010	10. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 16

Index 1604 ENC RxPDO-Map Control Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1604:0	ENC RxPDO-Map Control Counter Ch.1	PDO Mapping RxPDO 5	UINT8	RO	0x06 (6_{dec})
1604:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1604:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1604:03	SubIndex 003	3. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1604:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x09 (Set software gate))	UINT32	RO	0x7000:09, 1
1604:05	SubIndex 005	5. PDO Mapping entry (7 bits align)	UINT32	RO	0x0000:00, 7
1604:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 32

Index 1605 ENC RxPDO-Map Control Compact Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1605:0	ENC RxPDO-Map Control Counter Ch.1	PDO Mapping RxPDO 6	UINT8	RO	0x06 (6_{dec})
1605:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1605:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1605:03	SubIndex 003	3. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
1605:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x09 (Set software gate))	UINT32	RO	0x7000:09, 1
1605:05	SubIndex 005	5. PDO Mapping entry (7 bits align)	UINT32	RO	0x0000:00, 7
1605:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 16

Index 1606 ENC RxPDO-Map Control Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1606:0	ENC RxPDO-Map Control Legacy Ch.1	PDO Mapping RxPDO 7	UINT8	RO	0x06 (6_{dec})
1606:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x01 (Ctrl))	UINT32	RO	0x7000:01, 1
1606:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7000:02, 1
1606:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1606:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7000:04, 1
1606:05	SubIndex 005	5. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
1606:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 32

Index 1607 ENC RxPDO-Map Control Compact Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1607:0	ENC RxPDO-Map Control Compact Legacy Ch.1	PDO Mapping RxPDO 8	UINT8	RO	0x06 (6_{dec})
1607:01	SubIndex 001	1. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x01 (Ctrl))	UINT32	RO	0x7000:01, 1
1607:02	SubIndex 002	2. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7000:02, 1
1607:03	SubIndex 003	3. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x03 (Set Counter))	UINT32	RO	0x7000:03, 1
1607:04	SubIndex 004	4. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7000:04, 1
1607:05	SubIndex 005	5. PDO Mapping entry (12 bits align)	UINT32	RO	0x0000:00, 12
1607:06	SubIndex 006	6. PDO Mapping entry (object 0x7000 (ENC Outputs Ch.1), entry 0x11 (Set counter value))	UINT32	RO	0x7000:11, 16

Index 160A ENC RxPDO-Map Control Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
160A:0	ENC RxPDO-Map Control Ch.2	PDO Mapping RxPDO 9	UINT8	RO	0x0A (10_{dec})
160A:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
160A:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7010:02, 1
160A:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x03 (Set Counter))	UINT32	RO	0x7010:03, 1
160A:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7010:04, 1
160A:05	SubIndex 005	5. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
160A:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x09 (Set software gate))	UINT32	RO	0x7010:09, 1
160A:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x0A (Set counter on latch extern on positive edge))	UINT32	RO	0x7010:0A, 1
160A:08	SubIndex 008	8. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x0B (Set counter on latch extern on negative edge))	UINT32	RO	0x7010:0B, 1
160A:09	SubIndex 009	9. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
160A:0A	SubIndex 010	10. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x11 (Set counter value))	UINT32	RO	0x7010:11, 32

Index 160B ENC RxPDO-Map Control Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
160B:0	ENC RxPDO-Map Control Compact Ch.2	PDO Mapping RxPDO 10	UINT8	RO	0x0A (10_{dec})
160B:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
160B:02	SubIndex 002	2. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x02 (Enable latch extern on positive edge))	UINT32	RO	0x7010:02, 1
160B:03	SubIndex 003	3. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x03 (Set Counter))	UINT32	RO	0x7010:03, 1
160B:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x04 (Enable latch extern on negative edge))	UINT32	RO	0x7010:04, 1
160B:05	SubIndex 005	5. PDO Mapping entry (4 bits align)	UINT32	RO	0x0000:00, 4
160B:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x09 (Set software gate))	UINT32	RO	0x7010:09, 1
160B:07	SubIndex 007	7. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x0A (Set counter on latch extern on positive edge))	UINT32	RO	0x7010:0A, 1
160B:08	SubIndex 005	8. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x0B (Set counter on latch extern on negative edge))	UINT32	RO	0x7010:0B, 1
160B:09	SubIndex 006	9. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
160B:0A	SubIndex 007	10. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x11 (Set counter value))	UINT32	RO	0x7010:11, 16

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

Index (hex)	Name	Meaning	Data type	Flags	Default
160C:0	ENC RxPDO-Map Control Counter Ch.2	PDO Mapping RxPDO 11	UINT8	RO	0x06 (6_{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 0x7010 (ENC Outputs Ch.2), entry 0x03 (Set Counter))	UINT32	RO	0x7010:03, 1
160C:03	SubIndex 003	3. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
160C:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x09 (Set software gate))	UINT32	RO	0x7010:09, 1
160C:05	SubIndex 005	5. PDO Mapping entry (7 bits align)	UINT32	RO	0x0000:00, 7
160C:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x11 (Set counter value))	UINT32	RO	0x7010:11, 32

Index 160D ENC RxPDO-Map Control Compact Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
160D:0	ENC RxPDO-Map Control Compact Counter Ch.2	PDO Mapping RxPDO 12	UINT8	RO	0x06 (6_{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 0x7010 (ENC Outputs Ch.2), entry 0x03 (Set Counter))	UINT32	RO	0x7010:03, 1
160D:03	SubIndex 003	3. PDO Mapping entry (5 bits align)	UINT32	RO	0x0000:00, 5
160D:04	SubIndex 004	4. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x09 (Set software gate))	UINT32	RO	0x7010:09, 1
160D:05	SubIndex 005	5. PDO Mapping entry (7 bits align)	UINT32	RO	0x0000:00, 7
160D:06	SubIndex 006	6. PDO Mapping entry (object 0x7010 (ENC Outputs Ch.2), entry 0x11 (Set counter value))	UINT32	RO	0x7010:11, 16

Index 1800 ENC TxPDO-Par Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1800:0	ENC TxPDO-Par Status Ch.1	PDO parameter TxPDO 1	UINT8	RO	0x06 (6_{dec})
1800:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 1	OCTET-STRING[14]	RO	01 1A 02 1A 03 1A 04 1A 05 1A 06 1A 07 1A

Index 1801 ENC TxPDO-Par Status Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1801:0	ENC TxPDO-Par Status compact Ch.1	PDO parameter TxPDO 2	UINT8	RO	0x06 (6_{dec})
1801:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 2	OCTET-STRING[14]	RO	00 1A 02 1A 03 1A 04 1A 05 1A 06 1A 07 1A

Index 1802 ENC TxPDO-Par Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1802:0	ENC TxPDO-Par Status Ch.1	PDO parameter TxPDO 3	UINT8	RO	0x06 (6_{dec})
1802:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 3	OCTET-STRING[14]	RO	00 1A 01 1A 03 1A 04 1A 05 1A 06 1A 07 1A

Index 1803 ENC TxPDO-Par Status Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1803:0	ENC TxPDO-Par Status compact 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[14]	RO	00 1A 01 1A 02 1A 04 1A 05 1A 06 1A 07 1A

Index 1804 ENC TxPDO-Par Status Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1804:0	ENC TxPDO-Par Status Counter Ch.1	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[14]	RO	00 1A 01 1A 02 1A 03 1A 05 1A 06 1A 07 1A

Index 1805 ENC TxPDO-Par Status Compact Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1805:0	ENC TxPDO-Par Status Compact Counter Ch.1	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[14]	RO	00 1A 01 1A 02 1A 03 1A 04 1A 06 1A 07 1A

Index 1806 ENC TxPDO-Par Status Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1806:0	ENC TxPDO-Par Status Legacy Ch.1	PDO parameter TxPDO 7	UINT8	RO	0x06 (6_{dec})
1806:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 7	OCTET-STRING[14]	RO	00 1A 01 1A 02 1A 03 1A 04 1A 05 1A 07 1A

Index 1807 ENC TxPDO-Par Status Compact Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1807:0	ENC TxPDO-Par Status Compact Legacy Ch.1	PDO parameter TxPDO 8	UINT8	RO	0x06 (6_{dec})
1807:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 8	OCTET-STRING[14]	RO	00 1A 01 1A 02 1A 03 1A 04 1A 05 1A 06 1A

Index 1808 ENC TxPDO-Par Frequency Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1808:0	ENC TxPDO-Par Frequency Ch.1	PDO parameter TxPDO 9	UINT8	RO	0x06 (6_{dec})
1808:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 9	OCTET-STRING[14]	RO	09 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 1809 ENC TxPDO-Par Frequency Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1809:0	ENC TxPDO-Par Frequency Compact Ch.1	PDO parameter TxPDO 10	UINT8	RO	0x06 (6_{dec})
1809:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 10	OCTET-STRING[14]	RO	08 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 180A ENC TxPDO-Par Period Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
180A:0	ENC TxPDO-Par Period Ch.1	PDO parameter TxPDO 11	UINT8	RO	0x06 (6_{dec})
180A:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 11	OCTET-STRING[14]	RO	0B 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 180B ENC TxPDO-Par Period Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
180B:0	ENC TxPDO-Par Period Compact Ch.1	PDO parameter TxPDO 12	UINT8	RO	0x06 (6_{dec})
180B:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 12	OCTET-STRING[14]	RO	0A 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 180D ENC TxPDO-Par Timestamp Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
180D:0	ENC TxPDO-Par Timestamp Ch.1	PDO parameter TxPDO 13	UINT8	RO	0x06 (6_{dec})
180D:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 13	OCTET-STRING[14]	RO	0E 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 180E ENC TxPDO-Par Timestamp Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
180E:0	ENC TxPDO-Par Timestamp Compact Ch.1	PDO parameter TxPDO 14	UINT8	RO	0x06 (6_{dec})
180E:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 14	OCTET-STRING[14]	RO	0D 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 1811 ENC TxPDO-Par Status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1811:0	ENC TxPDO-Par Status Ch.2	PDO parameter TxPDO 15	UINT8	RO	0x06 (6_{dec})
1811:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 15	OCTET-STRING[14]	RO	0F 1A 10 1A 12 1A 13 1A 14 1A 15 1A 16 1A

Index 1812 ENC TxPDO-Par Status Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1812:0	ENC TxPDO-Par Status compact Ch.2	PDO parameter TxPDO 16	UINT8	RO	0x06 (6_{dec})
1812:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 16	OCTET-STRING[14]	RO	0F 1A 10 1A 11 1A 13 1A 14 1A 15 1A 16 1A

Index 1813 ENC TxPDO-Par Status Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1813:0	ENC TxPDO-Par Status Counter Ch.2	PDO parameter TxPDO 17	UINT8	RO	0x06 (6_{dec})
1813:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 17	OCTET-STRING[14]	RO	0F 1A 10 1A 11 1A 12 1A 14 1A 15 1A 16 1A

Index 1814 ENC TxPDO-Par Status Compact Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1814:0	ENC TxPDO-Par Status Compact Counter Ch.2	PDO parameter TxPDO 19	UINT8	RO	0x06 (6_{dec})
1814:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 19	OCTET-STRING[14]	RO	0F 1A 10 1A 11 1A 12 1A 13 1A 15 1A 16 1A

Index 1817 ENC TxPDO-Par Frequency Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1817:0	ENC TxPDO-Par Frequency Ch.2	PDO parameter TxPDO 20	UINT8	RO	0x06 (6_{dec})
1817:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 20	OCTET-STRING[14]	RO	18 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 1818 ENC TxPDO-Par Frequency Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1818:0	ENC TxPDO-Par Frequency Compact Ch.2	PDO parameter TxPDO 21	UINT8	RO	0x06 (6_{dec})
1818:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 21	OCTET-STRING[14]	RO	17 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 1819 ENC TxPDO-Par Period Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1819:0	ENC TxPDO-Par Period Ch.2	PDO parameter TxPDO 22	UINT8	RO	0x06 (6_{dec})
1819:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 22	OCTET-STRING[14]	RO	1A 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 181A ENC TxPDO-Par Period Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
181A:0	ENC TxPDO-Par Period Compact Ch.2	PDO parameter TxPDO 22	UINT8	RO	0x06 (6_{dec})
181A:06	Exclude TxPDOs	Specifies the TxPDOs (index of TxPDO mapping objects) that must not be transferred together with TxPDO 22	OCTET-STRING[14]	RO	19 1A 00 00 00 00 00 00 00 00 00 00 00 00

Index 1A00 ENC TxPDO-Map Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A00:0	ENC TxPDO-Map Status Ch.1	PDO Mapping TxPDO 1	UINT8	RO	0x18 (24_{dec})
1A00:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x01 (Latch C valid))	UINT32	RO	0x6000:01, 1
1A00:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x02 (Latch extern valid))	UINT32	RO	0x6000:02, 1
1A00:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A00:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6000:04, 1
1A00:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6000:05, 1
1A00:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x06 (Status of input status))	UINT32	RO	0x6000:06, 1
1A00:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x07 (Open circuit))	UINT32	RO	0x6000:07, 1
1A00:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x08 (Extrapolation stall))	UINT32	RO	0x6000:08, 1
1A00:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x09 (Status of input A))	UINT32	RO	0x6000:09, 1
1A00:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0A (Status of input B))	UINT32	RO	0x6000:0A, 1
1A00:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0B (Status of input C))	UINT32	RO	0x6000:0B, 1
1A00:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0C (Status of input gate))	UINT32	RO	0x6000:0C, 1
1A00:0D	SubIndex 013	13. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0D (Diag))	UINT32	RO	0x6002:0D, 1
1A00:0E	SubIndex 014	14. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0E (TxPDO State))	UINT32	RO	0x6002:0E, 1
1A00:0F	SubIndex 015	15. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0F (Input cycle counter))	UINT32	RO	0x6002:0F, 2
1A00:10	SubIndex 016	16. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x11 (Software gate valid))	UINT32	RO	0x6002:11, 1
1A00:11	SubIndex 017	17. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x12 (Latch extern 2 valid))	UINT32	RO	0x6002:12, 1
1A00:12	SubIndex 018	18. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x13 (Direction inversion detected))	UINT32	RO	0x6002:13, 1
1A00:13	SubIndex 019	19. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x14 (Status of extern latch))	UINT32	RO	0x6002:14, 1
1A00:14	SubIndex 020	20. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x15 (Counter value out of range))	UINT32	RO	0x6002:15, 1
1A00:15	SubIndex 021	21. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11
1A00:16	SubIndex 022	22. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 32
1A00:17	SubIndex 023	23. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x12 (Latch value))	UINT32	RO	0x6000:12, 32
1A00:18	SubIndex 024	24. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x22 (Latch value 2))	UINT32	RO	0x6000:22, 32

Index 1A01 ENC TxPDO-Map Status Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A01:0	ENC TxPDO-Map Status Ch.1	PDO Mapping TxPDO 2	UINT8	RO	0x18 (24_{dec})
1A01:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x01 (Latch C valid))	UINT32	RO	0x6000:01, 1
1A01:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x02 (Latch extern valid))	UINT32	RO	0x6000:02, 1
1A01:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A01:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6000:04, 1
1A01:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6000:05, 1
1A01:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x06 (Status of input status))	UINT32	RO	0x6000:06, 1
1A01:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x07 (Open circuit))	UINT32	RO	0x6000:07, 1
1A01:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x08 (Extrapolation stall))	UINT32	RO	0x6000:08, 1
1A01:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x09 (Status of input A))	UINT32	RO	0x6000:09, 1
1A01:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0A (Status of input B))	UINT32	RO	0x6000:0A, 1
1A01:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0B (Status of input C))	UINT32	RO	0x6000:0B, 1
1A01:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0C (Status of input gate))	UINT32	RO	0x6000:0C, 1
1A01:0D	SubIndex 013	13. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0D (Diag))	UINT32	RO	0x6002:0D, 1
1A01:0E	SubIndex 014	14. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0E (TxPDO State))	UINT32	RO	0x6002:0E, 1
1A01:0F	SubIndex 015	15. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0F (Input cycle counter))	UINT32	RO	0x6002:0F, 2
1A01:10	SubIndex 016	16. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x11 (Software gate valid))	UINT32	RO	0x6002:11, 1
1A01:11	SubIndex 017	17. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x12 (Latch extern 2 valid))	UINT32	RO	0x6002:12, 1
1A01:12	SubIndex 018	18. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x13 (Direction inversion detected))	UINT32	RO	0x6002:13, 1
1A01:13	SubIndex 019	19. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x14 (Status of extern latch))	UINT32	RO	0x6002:14, 1
1A01:14	SubIndex 020	20. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x15 (Counter value out of range))	UINT32	RO	0x6002:15, 1
1A01:15	SubIndex 021	21. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11
1A01:16	SubIndex 022	22. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 16
1A01:17	SubIndex 023	23. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x12 (Latch value))	UINT32	RO	0x6000:12, 16
1A01:18	SubIndex 024	24. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x22 (Latch value 2))	UINT32	RO	0x6000:22, 16

Index 1A02 ENC TxPDO-Map Status Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A02:0	ENC TxPDO-Map Status Ch.1	PDO Mapping TxPDO 3	UINT8	RO	0x17 (23_{dec})
1A02:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x02 (Latch extern valid))	UINT32	RO	0x6000:02, 1
1A02:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A02:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6000:04, 1
1A02:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6000:05, 1
1A02:06	SubIndex 006	6. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x07 (Open circuit))	UINT32	RO	0x6000:07, 1
1A02:08	SubIndex 008	8. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x09 (Status of input A))	UINT32	RO	0x6000:09, 1
1A02:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0A (Status of input B))	UINT32	RO	0x6000:0A, 1
1A02:0B	SubIndex 011	11. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0C (Status of input gate))	UINT32	RO	0x6000:0C, 1
1A02:0D	SubIndex 013	13. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0D (Diag))	UINT32	RO	0x6002:0D, 1
1A02:0E	SubIndex 014	14. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0E (TxPDO State))	UINT32	RO	0x6002:0E, 1
1A02:0F	SubIndex 015	15. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0F (Input cycle counter))	UINT32	RO	0x6002:0F, 2
1A02:10	SubIndex 016	16. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x11 (Software gate valid))	UINT32	RO	0x6002:11, 1
1A02:11	SubIndex 017	17. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:12	SubIndex 018	18. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:13	SubIndex 019	19. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A02:14	SubIndex 020	20. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x15 (Counter value out of range))	UINT32	RO	0x6002:15, 1
1A02:15	SubIndex 021	21. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11
1A02:16	SubIndex 022	22. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 32
1A02:17	SubIndex 023	23. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x12 (Latch value))	UINT32	RO	0x6000:12, 32

Index 1A03 ENC TxPDO-Map Status Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A03:0	ENC TxPDO-Map Status Compact Ch.1	PDO Mapping TxPDO 4	UINT8	RO	0x17 (23_{dec})
1A03:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x02 (Latch extern valid))	UINT32	RO	0x6000:02, 1
1A03:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A03:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6000:04, 1
1A03:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6000:05, 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 0x6000 (ENC Inputs Ch.1), entry 0x07 (Open circuit))	UINT32	RO	0x6000:07, 1
1A03:08	SubIndex 008	8. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x09 (Status of input A))	UINT32	RO	0x6000:09, 1
1A03:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0A (Status of input B))	UINT32	RO	0x6000:0A, 1
1A03:0B	SubIndex 011	11. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0C (Status of input gate))	UINT32	RO	0x6000:0C, 1
1A03:0D	SubIndex 013	13. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0D (Diag))	UINT32	RO	0x6002:0D, 1
1A03:0E	SubIndex 014	14. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0E (TxPDO State))	UINT32	RO	0x6002:0E, 1
1A03:0F	SubIndex 015	15. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x0F (Input cycle counter))	UINT32	RO	0x6002:0F, 2
1A03:10	SubIndex 016	16. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch. 1), entry 0x11 (Software gate valid))	UINT32	RO	0x6002:11, 1
1A03:11	SubIndex 017	17. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:12	SubIndex 018	18. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:13	SubIndex 019	19. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A03:14	SubIndex 020	20. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x15 (Counter value out of range))	UINT32	RO	0x6002:15, 1
1A03:15	SubIndex 021	21. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11
1A03:16	SubIndex 022	22. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 16
1A03:17	SubIndex 023	23. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x12 (Latch value))	UINT32	RO	0x6000:12, 16

Index 1A04 ENC TxPDO-Map Status Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A04:0	ENC TxPDO-Map Status Counter Ch.1	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 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A04:03	SubIndex 003	3. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A04:04	SubIndex 004	4. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x0D (Diag))	UINT32	RO	0x6002:0D, 1
1A04:05	SubIndex 005	5. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x0E (TxPDO State))	UINT32	RO	0x6002:0E, 1
1A04:06	SubIndex 006	6. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x0F (Input cycle counter))	UINT32	RO	0x6002:0F, 2
1A04:07	SubIndex 007	7. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x11 (Software gate valid))	UINT32	RO	0x6002:11, 1
1A04:08	SubIndex 008	8. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15
1A04:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 32

Index 1A05 ENC TxPDO-Map Status Compact Counter Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A05:0	ENC TxPDO-Map Status Compact Counter Ch.1	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 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A05:03	SubIndex 003	3. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A05:04	SubIndex 004	4. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x0D (Diag))	UINT32	RO	0x6002:0D, 1
1A05:05	SubIndex 005	5. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x0E (TxPDO State))	UINT32	RO	0x6002:0E, 1
1A05:06	SubIndex 006	6. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x0F (Input cycle counter))	UINT32	RO	0x6002:0F, 2
1A05:07	SubIndex 007	7. PDO Mapping entry (object 0x6002 (ENC Inputs status Ch.1), entry 0x11 (Software gate valid))	UINT32	RO	0x6002:11, 1
1A05:08	SubIndex 008	8. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15
1A05:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 16

Index 1A06 ENC TxPDO-Map Status Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A06:0	ENC TxPDO-Map Status Legacy Ch.1	PDO Mapping TxPDO 7	UINT8	RO	0x12 (18_{dec})
1A06:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x01 (Latch C valid))	UINT32	RO	0x6000:01, 1
1A06:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x02 (Latch extern valid))	UINT32	RO	0x6000:02, 1
1A06:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A06:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6000:04, 1
1A06:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6000:05, 1
1A06:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x06 (Status of input status))	UINT32	RO	0x6000:06, 1
1A06:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x07 (Open circuit))	UINT32	RO	0x6000:07, 1
1A06:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x08 (Extrapolation stall))	UINT32	RO	0x6000:08, 1
1A06:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x09 (Status of input A))	UINT32	RO	0x6000:09, 1
1A06:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0A (Status of input B))	UINT32	RO	0x6000:0A, 1
1A06:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0B (Status of input C))	UINT32	RO	0x6000:0B, 1
1A06:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0C (Status of input gate))	UINT32	RO	0x6000:0C, 1
1A06:0D	SubIndex 013	13. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0D (Status of extern latch))	UINT32	RO	0x6000:0D, 1
1A06:0E	SubIndex 014	14. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0E (Sync error))	UINT32	RO	0x6000:0E, 1
1A06:0F	SubIndex 015	15. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x0F (TxPDO State))	UINT32	RO	0x6000:0F, 1
1A06:10	SubIndex 016	16. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1
1A06:11	SubIndex 017	17. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 32
1A06:12	SubIndex 018	18. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x12 (Latch value))	UINT32	RO	0x6000:12, 32

Index 1A07 ENC TxPDO-Map Status Compact Legacy Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A07:0	ENC TxPDO-Map Status Compact Legacy Ch.1	PDO Mapping TxPDO 8	UINT8	RO	0x12 (18_{dec})
1A07:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x01 (Latch C valid))	UINT32	RO	0x6000:01, 1
1A07:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x02 (Latch extern valid))	UINT32	RO	0x6000:02, 1
1A07:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x03 (Set counter done))	UINT32	RO	0x6000:03, 1
1A07:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x04 (Counter underflow))	UINT32	RO	0x6000:04, 1
1A07:05	SubIndex 005	5. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x05 (Counter overflow))	UINT32	RO	0x6000:05, 1
1A07:06	SubIndex 006	6. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x06 (Status of input status))	UINT32	RO	0x6000:06, 1
1A07:07	SubIndex 007	7. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x07 (Open circuit))	UINT32	RO	0x6000:07, 1
1A07:08	SubIndex 008	8. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x08 (Extrapolation stall))	UINT32	RO	0x6000:08, 1
1A07:09	SubIndex 009	9. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x09 (Status of input A))	UINT32	RO	0x6000:09, 1
1A07:0A	SubIndex 010	10. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0A (Status of input B))	UINT32	RO	0x6000:0A, 1
1A07:0B	SubIndex 011	11. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0B (Status of input C))	UINT32	RO	0x6000:0B, 1
1A07:0C	SubIndex 012	12. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0C (Status of input gate))	UINT32	RO	0x6000:0C, 1
1A07:0D	SubIndex 013	13. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0D (Status of extern latch))	UINT32	RO	0x6000:0D, 1
1A07:0E	SubIndex 014	14. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x0E (Sync error))	UINT32	RO	0x6000:0E, 1
1A07:0F	SubIndex 015	15. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x0F (TxPDO State))	UINT32	RO	0x6000:0F, 1
1A07:10	SubIndex 016	16. PDO Mapping entry (object 0x6000 (ENC Inputs Ch. 1), entry 0x10 (TxPDO Toggle))	UINT32	RO	0x6000:10, 1
1A07:11	SubIndex 017	17. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x11 (Counter value))	UINT32	RO	0x6000:11, 16
1A07:12	SubIndex 018	18. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x12 (Latch value))	UINT32	RO	0x6000:12, 16

Index 1A08 ENC TxPDO-Map Frequency Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A08:0	ENC TxPDO-Map Frequency Ch.1	PDO Mapping TxPDO 9	UINT8	RO	0x01 (1_{dec})
1A08:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x13 (Frequency value))	UINT32	RO	0x6000:13, 32

Index 1A09 ENC TxPDO-Map Frequency Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A09:0	ENC TxPDO-Map Frequency Compact Ch.1	PDO Mapping TxPDO 10	UINT8	RO	0x01 (1_{dec})
1A09:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x13 (Frequency value))	UINT32	RO	0x6000:13, 16

Index 1A0A ENC TxPDO-Map Period Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0A:0	ENC TxPDO-Map Period Ch.1	PDO Mapping TxPDO 11	UINT8	RO	0x01 (1_{dec})
1A0A:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x14 (Period value))	UINT32	RO	0x6000:14, 32

Index 1A0B ENC TxPDO-Map Period Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0B:0	ENC TxPDO-Map Period Compact Ch.1	PDO Mapping TxPDO 12	UINT8	RO	0x01 (1_{dec})
1A0B:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x14 (Period value))	UINT32	RO	0x6000:14, 16

Index 1A0C ENC TxPDO-Map Duty Cycle Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0C:0	ENC TxPDO-Map Duty Cycle Ch.1	PDO Mapping TxPDO 13	UINT8	RO	0x03 (3_{dec})
1A0C:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x23 (Duty cycle))	UINT32	RO	0x6000:23, 16
1A0C:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x24 (Duty cycle min))	UINT32	RO	0x6000:24, 16
1A0C:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x25 (Duty cycle max))	UINT32	RO	0x6000:25, 16

Index 1A0D ENC TxPDO-Map Timestamp Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0D:0	ENC TxPDO-Map Timestamp Ch.1	PDO Mapping TxPDO 14	UINT8	RO	0x04 (4_{dec})
1A0D:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x16 (Timestamp))	UINT32	RO	0x6000:16, 64
1A0D:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x1F (Timestamp C))	UINT32	RO	0x6000:1F, 64
1A0D:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x20 (Timestamp latch))	UINT32	RO	0x6000:20, 64
1A0D:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x21 (Timestamp latch 2))	UINT32	RO	0x6000:21, 64

Index 1A0E ENC TxPDO-Map Timestamp Compact Ch.1

Index (hex)	Name	Meaning	Data type	Flags	Default
1A0E:0	ENC TxPDO-Map Timestamp Compact Ch.1	PDO Mapping TxPDO 15	UINT8	RO	0x04 (4_{dec})
1A0E:01	SubIndex 001	1. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x16 (Timestamp))	UINT32	RO	0x6000:16, 32
1A0E:02	SubIndex 002	2. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x1F (Timestamp C))	UINT32	RO	0x6000:1F, 32
1A0E:03	SubIndex 003	3. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x20 (Timestamp latch))	UINT32	RO	0x6000:20, 32
1A0E:04	SubIndex 004	4. PDO Mapping entry (object 0x6000 (ENC Inputs Ch.1), entry 0x21 (Timestamp latch 2))	UINT32	RO	0x6000:21, 32

Index 1A11 ENC TxPDO-Map Status Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A11:0	ENC TxPDO-Map Status Ch.2	PDO Mapping TxPDO 16	UINT8	RO	0x17 (23_{dec})
1A11:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x02 (Latch extern valid))	UINT32	RO	0x6010:02, 1
1A11:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x03 (Set counter done))	UINT32	RO	0x6010:03, 1
1A11:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x04 (Counter underflow))	UINT32	RO	0x6010:04, 1
1A11:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x05 (Counter overflow))	UINT32	RO	0x6010:05, 1
1A11:06	SubIndex 006	6. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:07	SubIndex 007	7. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x07 (Open circuit))	UINT32	RO	0x6010:07, 1
1A11:08	SubIndex 008	8. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:09	SubIndex 009	9. PDO Mapping entry (object object 0x6010 (ENC Inputs Ch.2), entry 0x09 (Status of input A))	UINT32	RO	0x6010:09, 1
1A11:0A	SubIndex 010	10. PDO Mapping entry (object 0x6010 (ENC Inputs Ch. 2), entry 0x0A (Status of input B))	UINT32	RO	0x6010:0A, 1
1A11:0B	SubIndex 011	11. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:0C	SubIndex 012	12. PDO Mapping entry (object 0x6010 (ENC Inputs Ch. 2), entry 0x0C (Status of input gate))	UINT32	RO	0x6010:0C, 1
1A11:0D	SubIndex 013	13. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x0D (Diag))	UINT32	RO	0x6012:0D, 1
1A11:0E	SubIndex 014	14. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x0E (TxPDO State))	UINT32	RO	0x6012:0E, 1
1A11:0F	SubIndex 015	15. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x0F (Input cycle counter))	UINT32	RO	0x6012:0F, 2
1A11:10	SubIndex 016	16. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x11 (Software gate valid))	UINT32	RO	0x6012:11, 1
1A11:11	SubIndex 017	17. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:12	SubIndex 018	18. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:13	SubIndex 019	19. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A11:14	SubIndex 020	20. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x15 (Counter value out of range))	UINT32	RO	0x6012:15, 1
1A11:15	SubIndex 021	21. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11
1A11:16	SubIndex 022	22. PDO Mapping entry (object object 0x6010 (ENC Inputs Ch.2), entry 0x11 (Counter value))	UINT32	RO	0x6010:11, 32
1A11:17	SubIndex 023	23. PDO Mapping entry (object object 0x6010 (ENC Inputs Ch.2), entry 0x12 (Latch value))	UINT32	RO	0x6010:12, 32

Index 1A12 ENC TxPDO-Map Status Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A12:0	ENC TxPDO-Map Status Compact Ch.2	PDO Mapping TxPDO 17	UINT8	RO	0x17 (23_{dec})
1A12:01	SubIndex 001	1. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x02 (Latch extern valid))	UINT32	RO	0x6010:02, 1
1A12:03	SubIndex 003	3. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x03 (Set counter done))	UINT32	RO	0x6010:03, 1
1A12:04	SubIndex 004	4. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x04 (Counter underflow))	UINT32	RO	0x6010:04, 1
1A12:05	SubIndex 005	5. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x05 (Counter overflow))	UINT32	RO	0x6010:05, 1
1A12:06	SubIndex 006	6. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:07	SubIndex 007	7. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x07 (Open circuit))	UINT32	RO	0x6010:07, 1
1A12:08	SubIndex 008	8. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:09	SubIndex 009	9. PDO Mapping entry (object object 0x6010 (ENC Inputs Ch.2), entry 0x09 (Status of input A))	UINT32	RO	0x6010:09, 1
1A12:0A	SubIndex 010	10. PDO Mapping entry (object 0x6010 (ENC Inputs Ch. 2), entry 0x0A (Status of input B))	UINT32	RO	0x6010:0A, 1
1A12:0B	SubIndex 011	11. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:0C	SubIndex 012	12. PDO Mapping entry (object 0x6010 (ENC Inputs Ch. 2), entry 0x0C (Status of input gate))	UINT32	RO	0x6010:0C, 1
1A12:0D	SubIndex 013	13. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x0D (Diag))	UINT32	RO	0x6012:0D, 1
1A12:0E	SubIndex 014	14. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x0E (TxPDO State))	UINT32	RO	0x6012:0E, 1
1A12:0F	SubIndex 015	15. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x0F (Input cycle counter))	UINT32	RO	0x6012:0F, 2
1A12:10	SubIndex 016	16. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch. 2), entry 0x11 (Software gate valid))	UINT32	RO	0x6012:11, 1
1A12:11	SubIndex 017	17. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:12	SubIndex 018	18. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:13	SubIndex 019	19. PDO Mapping entry (1 bit align)	UINT32	RO	0x0000:00, 1
1A12:14	SubIndex 020	20. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x15 (Counter value out of range))	UINT32	RO	0x6012:15, 1
1A12:15	SubIndex 021	21. PDO Mapping entry (11 bits align)	UINT32	RO	0x0000:00, 11
1A12:16	SubIndex 022	22. PDO Mapping entry (object object 0x6010 (ENC Inputs Ch.2), entry 0x11 (Counter value))	UINT32	RO	0x6010:11, 16
1A12:17	SubIndex 023	23. PDO Mapping entry (object object 0x6010 (ENC Inputs Ch.2), entry 0x12 (Latch value))	UINT32	RO	0x6010:12, 16

Index 1A13 ENC TxPDO-Map Status Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A13:0	ENC TxPDO-Map Status Counter Ch.2	PDO Mapping TxPDO 18	UINT8	RO	0x09 (9_{dec})
1A13:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A13:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x03 (Set counter done))	UINT32	RO	0x6010:03, 1
1A13:03	SubIndex 003	3. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A13:04	SubIndex 004	4. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x0D (Diag))	UINT32	RO	0x6012:0D, 1
1A13:05	SubIndex 005	5. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x0E (TxPDO State))	UINT32	RO	0x6012:0E, 1
1A13:06	SubIndex 006	6. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x0F (Input cycle counter))	UINT32	RO	0x6012:0F, 2
1A13:07	SubIndex 007	7. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x11 (Software gate valid))	UINT32	RO	0x6012:11, 1
1A13:08	SubIndex 008	8. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15
1A13:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x11 (Counter value))	UINT32	RO	0x6010:11, 32

Index 1A14 ENC TxPDO-Map Status Compact Counter Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A14:0	ENC TxPDO-Map Status Compact Counter Ch.2	PDO Mapping TxPDO 19	UINT8	RO	0x09 (9_{dec})
1A14:01	SubIndex 001	1. PDO Mapping entry (2 bits align)	UINT32	RO	0x0000:00, 2
1A14:02	SubIndex 002	2. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x03 (Set counter done))	UINT32	RO	0x6010:03, 1
1A14:03	SubIndex 003	3. PDO Mapping entry (9 bits align)	UINT32	RO	0x0000:00, 9
1A14:04	SubIndex 004	4. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x0D (Diag))	UINT32	RO	0x6012:0D, 1
1A14:05	SubIndex 005	5. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x0E (TxPDO State))	UINT32	RO	0x6012:0E, 1
1A14:06	SubIndex 006	6. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x0F (Input cycle counter))	UINT32	RO	0x6012:0F, 2
1A14:07	SubIndex 007	7. PDO Mapping entry (object 0x6012 (ENC Inputs status Ch.2), entry 0x11 (Software gate valid))	UINT32	RO	0x6012:11, 1
1A14:08	SubIndex 008	8. PDO Mapping entry (15 bits align)	UINT32	RO	0x0000:00, 15
1A14:09	SubIndex 009	9. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x11 (Counter value))	UINT32	RO	0x6010:11, 16

Index 1A17 ENC TxPDO-Map Frequency Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A17:0	ENC TxPDO-Map Frequency Ch.2	PDO Mapping TxPDO 20	UINT8	RO	0x01 (1_{dec})
1A17:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x13 (Frequency value))	UINT32	RO	0x6010:13, 32

Index 1A18 ENC TxPDO-Map Frequency Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A18:0	ENC TxPDO-Map Timestamp Ch.2	PDO Mapping TxPDO 21	UINT8	RO	0x04 (4_{dec})
1A18:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x13 (Frequency value))	UINT32	RO	0x6010:13, 16

Index 1A19 ENC TxPDO-Map Period Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A19:0	ENC TxPDO-Map Period Ch.2	PDO Mapping TxPDO 22	UINT8	RO	0x01 (1_{dec})
1A19:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x14 (Period value))	UINT32	RO	0x6010:14, 32

Index 1A1A ENC TxPDO-Map Period Compact Ch.2

Index (hex)	Name	Meaning	Data type	Flags	Default
1A1A:0	ENC TxPDO-Map Period Ch.2	PDO Mapping TxPDO 23	UINT8	RO	0x01 (1_{dec})
1A1A:01	SubIndex 001	1. PDO Mapping entry (object 0x6010 (ENC Inputs Ch.2), entry 0x14 (Period value))	UINT32	RO	0x6010:14, 16

Index 1C00 Sync manager type

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

Index 1C12 RxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C12:0	RxPDO assign	PDO Assign Outputs	UINT8	RW	0x01 (1_{dec})
1C12:01	SubIndex 001	1. allocated RxPDO (contains the index of the associated RxPDO mapping object)	UINT16	RW	0x1600 (5632_{dec})

Index 1C13 TxPDO assign

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RW	0x01 (1_{dec})
1C13:01	SubIndex 001	1. allocated TxPDO (contains the index of the associated TxPDO mapping object)	UINT16	RW	0x1A00 (6656_{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 • 2: DC-Mode - Synchron with SYNC0 Event • 3: DC-Mode - Synchron with SYNC1 Event	UINT16	RW	0x0001 (1_{dec})
1C32:02	Cycle time	Cycle time (in ns): • Free Run: Cycle time of the local timer • Synchron with SM 2 Event: Master cycle time • DC mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x000F4240 (1000000_{dec})
1C32:03	Shift time	Time between SYNC0 event and output of the outputs (in ns, DC mode only)	UINT32	RO	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	0x0807 (2055_{dec})
1C32:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000101D0 (66000_{dec})
1C32:06	Calc and copy time	Minimum time between SYNC0 and SYNC1 event (in ns, DC mode only)	UINT32	RO	0x00000000 (0_{dec})
1C32:07	Minimum delay time	Min. time between SYNC1 event and output of the outputs (in ns, DC mode only)	UINT32	RO	0x00000000 (000000_{dec})
1C32:08	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 0x1C32:03, 0x1C32:05, 0x1C32:06, 0x1C32:09, 0x1C33:03, 0x1C33:06, 0x1C33:09 [▶ 89] 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: • 0: Free Run • 1: Synchron with SM 3 Event (no outputs available) • 2: DC - Synchron with SYNC0 Event • 3: DC - Synchron with SYNC1 Event • 34: Synchron with SM 2 Event (outputs available)	UINT16	RW	0x0022 (34_{dec})
1C33:02	Cycle time	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 0x1C32:08 [▶ 88] or 0x1C33:08)	UINT16	RO	0x0807 (2055_{dec})
1C33:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000101D0 (66000_{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	0x000101D0 (66000_{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 (000000_{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 0x1C32:03, 0x1C32:05, 0x1C32:06, 0x1C32:09 [▶ 88], 0x1C33:03, 0x1C33:06, 0x1C33:09 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})

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	0x0002 (2_{dec})

Index F008 Code word

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

Index F010 Module list

Index (hex)	Name	Meaning	Data type	Flags	Default
F010:0	Module list	Maximum subindex	UINT8	RW	0x02 (2_{dec})
F010:01	SubIndex 001	reserved	UINT32	RW	0x000001FF (511_{dec})
F010:02	SubIndex 002	reserved	UINT32	RW	0x000001FF (511_{dec})

7 Appendix

7.1 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: www.beckhoff.com

You will also find further documentation for Beckhoff components there.

Support

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

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

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

Service

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

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

Hotline:	+49 5246 963 460
e-mail:	service@beckhoff.com
web:	www.beckhoff.com/service

Headquarters Germany

Beckhoff Automation GmbH & Co. KG

Hülshorstweg 20
33415 Verl
Germany

Phone:	+49 5246 963 0
e-mail:	info@beckhoff.com
web:	www.beckhoff.com

More Information:
www.beckhoff.com/EJ5112

Beckhoff Automation GmbH & Co. KG
Hülshorstweg 20
33415 Verl
Germany
Phone: +49 5246 9630
info@beckhoff.com
www.beckhoff.com