

Documentation | EN

ED183x

EtherCAT Terminals, digital input, 24 V DC, adjustable filter times, push-in

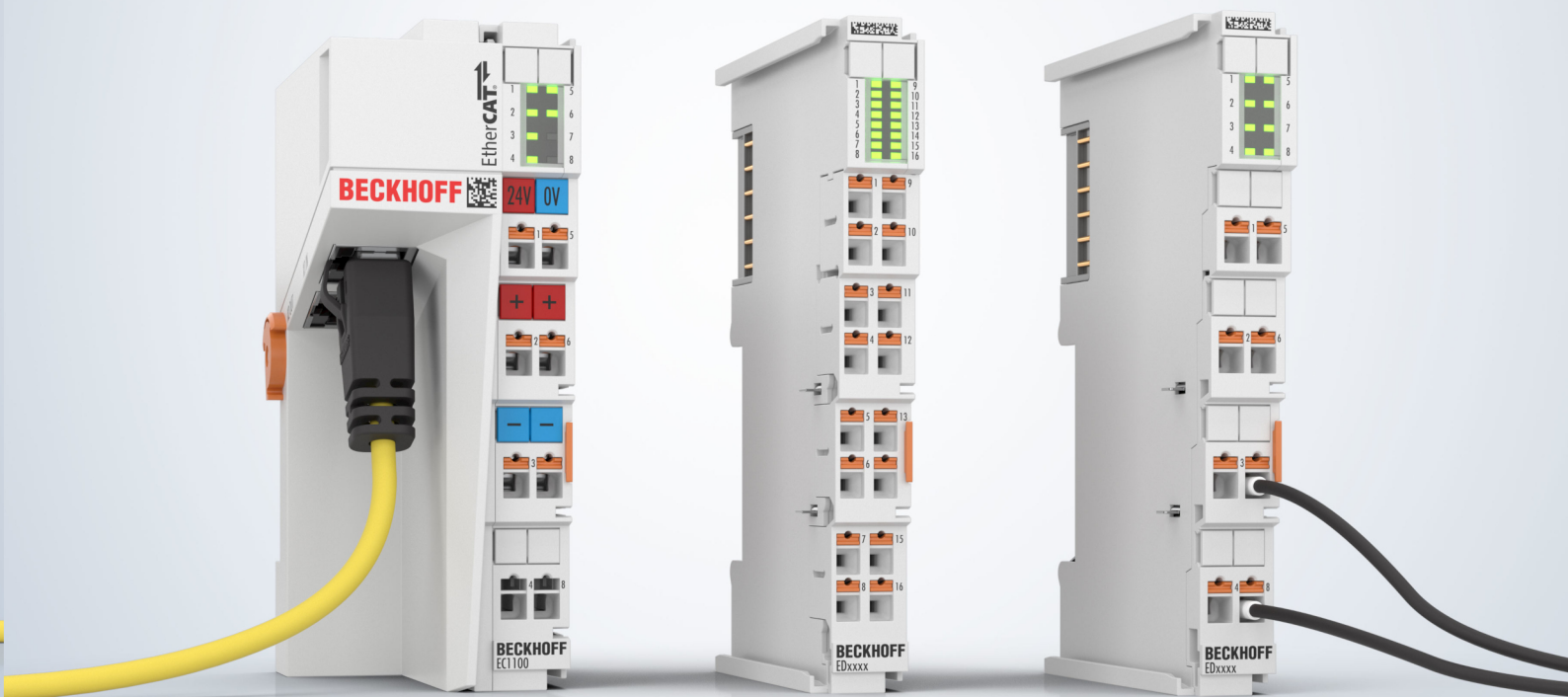


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1 Foreword

1.1 Product overview

EtherCAT Terminals, digital input, 24 V DC, push-in

This documentation covers the following products:

ED1837 ▶ 9	EtherCAT Terminal, 32-channel digital input, 24 V DC, adjustable filter time, push-in
ED1839 ▶ 13	EtherCAT Terminal, 16-channel digital input, 24 V DC, adjustable filter time, push-in

Use the tabular product overview or the product finder to find the right product for your application (<https://www.beckhoff.com/IO>).

1.2 Notes on the documentation

Intended audience

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

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

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.

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1.3 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
Infrastructure for EtherCAT/Ethernet (PDF)	Technical recommendations and notes for design, implementation and testing
Software Declarations I/O (PDF)	Open source software declarations for Beckhoff I/O components

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](#).

If you have any suggestions or proposals for our documentation, please send us an e-mail stating the documentation title and version number to: documentation@beckhoff.com

1.4 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.

2 Product description

2.1 ED1837



EtherCAT Terminal, 32-channel digital input, 24 V DC, adjustable, push-in

The ED1837 digital input terminal acquires the binary 24 V DC control signals from the process level and transmits them, in electrically isolated form, to the higher-level automation device.

The EtherCAT Terminal contains 32 channels whose signal state is indicated by LEDs. The power contacts are looped through. With the ED1837, the reference ground for all inputs is the 0 V DC power contact.

Special features:

- positive switching
- adjustable filter times for reliable signal detection depending on the application
- suitable for both fast and slow signal curves
- direct connection of multi-channel sensors using 1-wire connection technology in the smallest space

The ED-series EtherCAT Terminals have push-in connection technology which makes wiring easy and tool-free.

2.1.1 Technical data

General	ED1837
Number of channels Total	32
Internal communication protocol	EtherCAT

Digital input Standard digital Positive switching	ED1837
Number of channels	32
Connection technology	1-wire
Signal range Nominal	24 V DC
Specification	EN 61131-2, type 1/3
Signal voltage "0"	-3...+5 V DC
Signal voltage "1"	11...30 V DC
Input filter	typ. 0.1 ms, 0.5 ms, 1 ms, 3 ms, 10 ms, 20 ms (adjustable via object 0x8pp0 [► 29])
Input current	typ. 3 mA

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 μ s 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 terminal and the devices causing interference are recommended.

XFC	ED1837
Distributed clocks	no
Timestamp	no
Oversampling	no

Supply and electrical isolation	ED1837
Electronics Supply voltage	via E-bus, via power contacts
E-bus Current consumption	typ. 55 mA
Power contacts Input voltage	24 V _{DC} (-15%/+20%)
Power contacts Current carrying capacity	max. 10 A
Power contacts Current consumption	typ. 30 mA + load
Power contacts Output voltage	corresponds to Power contacts Input voltage
Electrical isolation Channel/channel	no
Electrical isolation Channel/bus	functional, 707 V DC (type test)

Environmental conditions	ED1837
Operating temperature	-25...+60°C
Storage temperature	-40...+85°C
Relative humidity	95%, no condensation
Installation position	variable

Standards and approvals	ED1837
Vibration resistance	conforms to EN 60068-2-6
Shock resistance	conforms to EN 60068-2-27
EMC immunity	conforms to EN 61000-6-2
EMC emission	conforms to EN 61000-6-4
Markings*)	CE
*) Real applicable approvals/markings, see name plate on the side (product labeling)	

Housing data	ED-24-2x16pin
Weight	approx. 100 g
Protection rating	IP20
Material	polycarbonate
Dimensions Width (single)	27 mm
Dimensions Width (stacked)	24 mm
Dimensions Height	100 mm
Dimensions Depth	65 mm
Installation Terminal/back wall	DIN rail, 35 mm (EN 60715)
Installation Terminal/terminal	double slot and key connection
Pluggable wiring level	no
Connection mechanism	push-in
Connection cross-section Solid wire	0.08...1.5 mm ²
Connection cross-section Stranded wire	0.25...1.5 mm ²
Connection cross-section With ferrule	0.14...0.75 mm ²
Connection cross-section AWG Solid wire	AWG28...16
Connection cross-section AWG Stranded wire	AWG22...16
Connection cross-section AWG With ferrule	AWG26...19
Stripping length	8...9 mm
Power contact "+" (left)	yes
Power contact "+" (right)	yes
Power contact "-" (left)	yes
Power contact "-" (right)	yes
Power contact "⊥" (left)	no
Power contact "⊥" (right)	no
Insertion lock for power contact "⊥"	yes

2.1.2 Connection and LEDs

⚠ WARNING

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

Bring the bus terminal system into a safe, de-energized state before beginning to mount, disassemble, or wire the bus terminals!

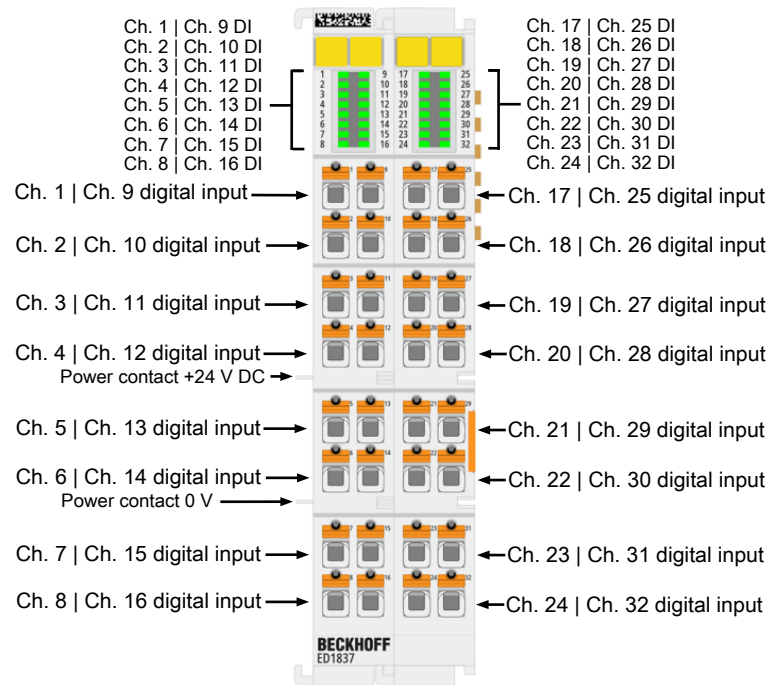


Fig. 1: ED1837

Connection

Terminal point		Description
Abbreviation	No.	
Ch1	1	digital input 1
...	...	..
Ch32	32	digital input 32

LEDs

Name	No.	Color	Meaning	
Input status Ch 1 - 32	1...32	green	off	signal voltage "0" (-3 V...5 V)
			on	signal voltage "1" (11 V...30 V)

2.2 ED1839



EtherCAT Terminal, 16-channel digital input, 24 V DC, adjustable, push-in

The ED1839 digital input terminal acquires the binary 24 V DC control signals from the process level and transmits them, in electrically isolated form, to the higher-level automation device.

The EtherCAT Terminal contains 16 channels whose signal state is indicated by LEDs. The power contacts are looped through. With the ED1839, the reference ground for all inputs is the 0 V DC power contact.

Special features:

- positive switching
- adjustable filter times for reliable signal detection depending on the application
- suitable for both fast and slow signal curves
- direct connection of multi-channel sensors using 1-wire connection technology in the smallest space

The ED-series EtherCAT Terminals have push-in connection technology which makes wiring easy and tool-free.

2.2.1 Technical data

General	ED1839
Number of channels Total	16
Internal communication protocol	EtherCAT

Digital input Standard digital Positive switching	ED1839
Number of channels	16
Connection technology	1-wire
Signal range Nominal	24 V DC
Specification	EN 61131-2, type 1/3
Signal voltage "0"	-3...+5 V DC
Signal voltage "1"	11...30 V DC
Input filter	typ. 0.1 ms, 0.5 ms, 1 ms, 3 ms, 10 ms, 20 ms (adjustable via object 0x8pp0 [► 29])
Input current	typ. 3 mA

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 μ s 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 terminal and the devices causing interference are recommended.

XFC	ED1839
Distributed clocks	no
Timestamp	no
Oversampling	no

Supply and electrical isolation	ED1839
Electronics Supply voltage	via E-bus, via power contacts
E-bus Current consumption	typ. 55 mA
Power contacts Input voltage	24 V _{DC} (-15%/+20%)
Power contacts Current carrying capacity	max. 10 A
Power contacts Current consumption	typ. 10 mA + load
Power contacts Output voltage	corresponds to Power contacts Input voltage
Electrical isolation Channel/channel	no
Electrical isolation Channel/bus	functional, 707 V DC (type test)

Environmental conditions	ED1839
Operating temperature	-25...+60°C
Storage temperature	-40...+85°C
Relative humidity	95%, no condensation
Installation position	variable

Standards and approvals	ED1839
Vibration resistance	conforms to EN 60068-2-6
Shock resistance	conforms to EN 60068-2-27
EMC immunity	conforms to EN 61000-6-2
EMC emission	conforms to EN 61000-6-4
Markings*)	CE
*) Real applicable approvals/markings, see name plate on the side (product labeling)	

Housing data	ED-12-16pin
Weight	approx. 60 g
Protection rating	IP20
Material	polycarbonate
Dimensions Width (single)	15 mm
Dimensions Width (stacked)	12 mm
Dimensions Height	100 mm
Dimensions Depth	65 mm
Installation Terminal/back wall	DIN rail, 35 mm (EN 60715)
Installation Terminal/terminal	double slot and key connection
Pluggable wiring level	no
Connection mechanism	push-in
Connection cross-section Solid wire	0.08...1.5 mm ²
Connection cross-section Stranded wire	0.25...1.5 mm ²
Connection cross-section With ferrule	0.14...0.75 mm ²
Connection cross-section AWG Solid wire	AWG28...16
Connection cross-section AWG Stranded wire	AWG22...16
Connection cross-section AWG With ferrule	AWG26...19
Stripping length	8...9 mm
Power contact "+" (left)	yes
Power contact "+" (right)	yes
Power contact "-" (left)	yes
Power contact "-" (right)	yes
Power contact "⊥" (left)	no
Power contact "⊥" (right)	no
Insertion lock for power contact "⊥"	yes

2.2.2 Connection and LEDs

⚠ WARNING

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

Bring the bus terminal system into a safe, de-energized state before beginning to mount, disassemble, or wire the bus terminals!

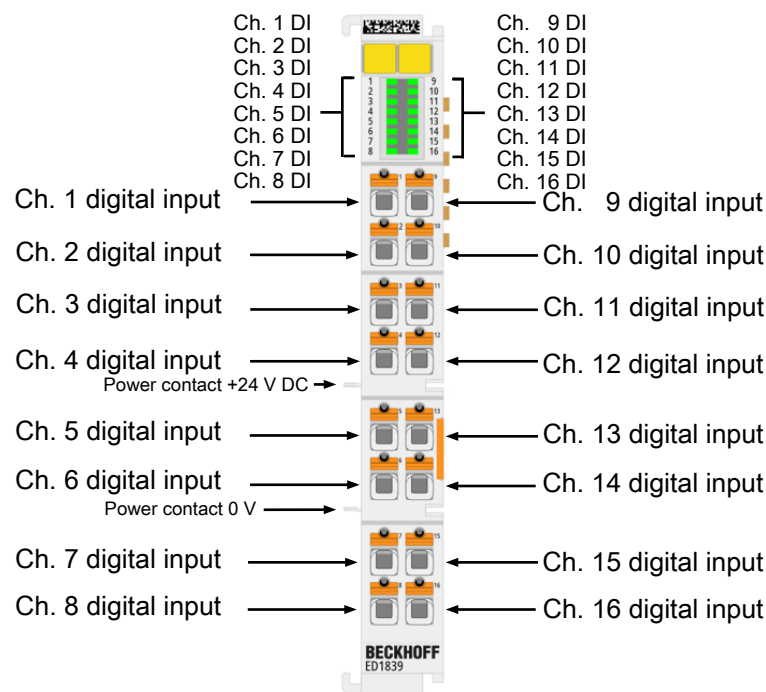


Fig. 2: ED1839

Connection

Terminal point		Description
Abbreviation	No.	
Ch 1	1	digital input 1
...	...	...
Ch 16	16	digital input 16

LEDs

Name	No.	Color	Meaning	
Input status Ch1 ...16	1...16	green	off	signal voltage "0" (-3 V...5 V)
			on	signal voltage "1" (11 V...30 V)

3 Mounting and wiring

3.1 Notes on ESD protection

NOTICE

Devices can be destroyed by electrostatic charging!

The devices contain electrostatically sensitive components which can be damaged by improper handling.

- When handling the components, take care to avoid electrostatic discharge; also, prevent direct contact with the spring-loaded contacts (see illustration).
- Contact with highly insulating materials (synthetic fibers, plastic films, etc.) should be avoided when simultaneously handling components.
- When handling the components, ensure proper earthing of the environment (workplace, packaging, and persons).
- Each bus station must be terminated with the [EL9011](#) or [EL9012](#) end cap on its right side to guarantee the protection rating and ESD protection.

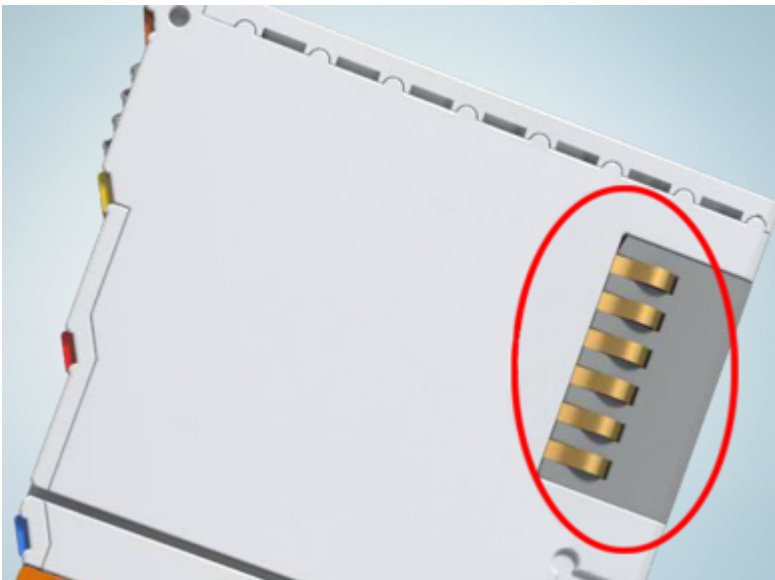


Fig. 3: Spring contacts of Beckhoff I/O components

3.2 Mounting rail installation

⚠ WARNING

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

Bring the bus terminal system into a safe, de-energized state before beginning to mount, disassemble, or wire the bus terminals!

The bus terminal system is designed for installation in a control cabinet or junction box.

Installation

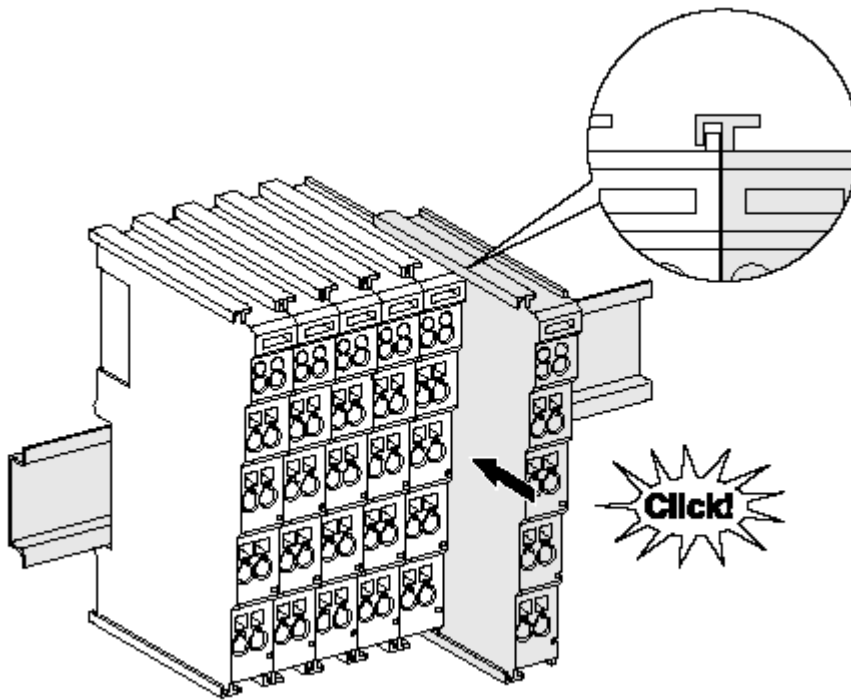


Fig. 4: Installation on the mounting rail

The bus couplers and bus terminals are attached to commercially available 35 mm mounting rails (DIN rail according to EN 60715) by applying slight pressure:

1. First attach the fieldbus coupler to the mounting rail.
2. The bus terminals are now attached on the right-hand side of the fieldbus coupler. To do this, connect the components with the slot and key and push the terminals against the mounting rail until the latch audibly engages on the mounting rail.

If you snap the terminals onto the mounting rail first and then push them next to each other without the slot and key engaging, no functional connection will be established! When correctly assembled, no significant gap should be visible between the housing units.

● Fastening the mounting rails

i The locking mechanism of the terminals and couplers protrudes into the profile of the mounting rail. When installing the components, make sure that the locking mechanism doesn't come into conflict with the fixing bolts of the mounting rail. When fastening mounting rails with a height of 7.5 mm under the terminals and couplers, use flat fastening components such as countersunk head screws or blind rivets.

NOTICE

Earth the mounting rail!

Make sure the mounting rail is properly earthed.

Connections within a bus terminal block

The electric connections between the bus coupler and the bus terminals are made automatically by joining the components:

- The six spring-loaded contacts of the E-bus/K-bus deal with the data transfer and the supply of the bus terminal electronics.
- The power contacts deal with the supply for the field electronics and thus represent a supply rail within the bus terminal block. The power contacts are supplied via terminal points on the bus coupler (up to 24 V) or via power supply terminals for higher voltages.

i Power contacts

When configuring a bus terminal block, note the contact assignments of the individual bus terminals, as some types

- do not loop through the power contacts or do not loop them through completely (e. g. analog bus terminals or digital 4-channel bus terminals),
- the power contacts are disconnected, thus marking the start of a new supply rail (power supply terminals).

Power contact $\perp$

The power contact marked $\perp$ (ground connection in accordance with IEC 60417-5017) can be used as a ground. For safety reasons this contact mates first when plugging together, and can ground short-circuit currents of up to 125 A.

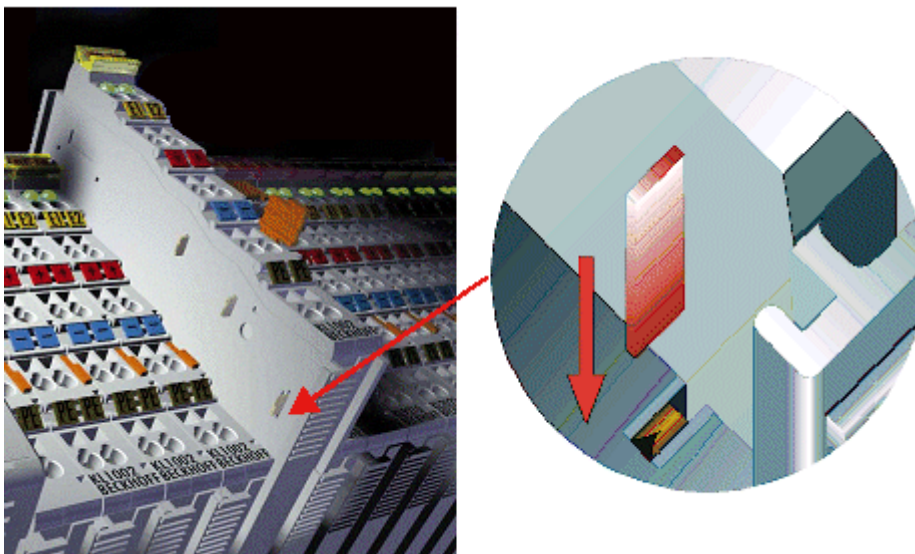


Fig. 5: Power contact on the left

⚠ WARNING

Risk of injury from electric shock!

The power contact marked $\perp$ may not be used for other potentials!

NOTICE

Risk of damage to the device

Note that, for electromagnetic compatibility, the earth contacts are capacitatively coupled to the mounting rail. This may lead to incorrect results during insulation testing or to damage to the terminal (e.g. disruptive discharge to the earth line during insulation testing of a consumer with a rated voltage of 230 V). For insulation testing, disconnect the earth supply line at the bus coupler or the power supply terminal! In order to decouple further supply points for testing, these power supply terminals can be released and pulled at least 10 mm from the group of terminals.

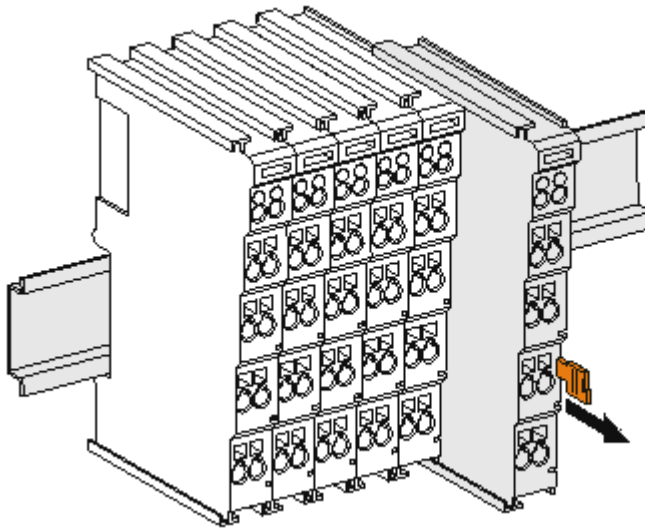
Disassembly

Fig. 6: Removal from mounting rail

Each terminal is secured by a lock on the mounting rail, which must be released for disassembly:

1. Pull down the terminal at its orange-colored straps from the mounting rail by approx. 1 cm. The rail locking of this terminal is automatically released, and you can now pull the terminal out of the bus terminal block with little effort.
2. To do this, grasp the unlocked terminal simultaneously at the top and bottom of the housing surfaces with your thumb and index finger and pull it out of the bus terminal block.

3.3 Positioning of passive terminals



Note on the placement of passive terminals in the bus terminal block

EtherCAT Terminals that do not take part in active data exchange within the bus terminal block are referred to as passive terminals. These terminals can be recognized because they do not consume power from the E-bus. To ensure optimal data exchange, no more than two passive terminals may be connected directly to each other!

Examples of the placement of passive terminals (highlighted in light color)

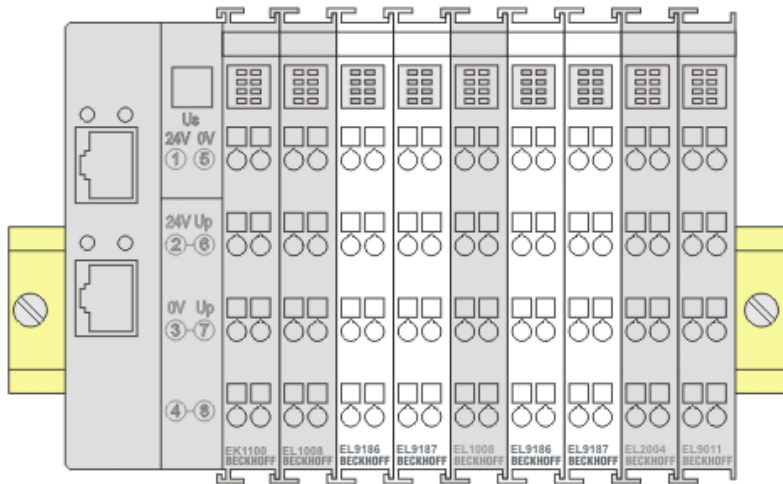


Fig. 7: Proper positioning

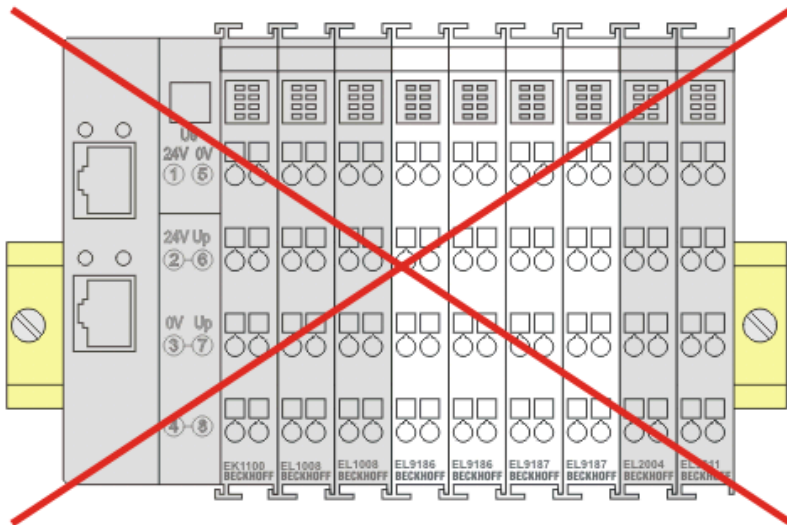


Fig. 8: Incorrect positioning

3.4 Installation positions

NOTICE

Constraints regarding installation position and operating temperature range

- Please refer to the technical data of the device to ascertain whether any restrictions regarding the installation position and/or the operating temperature range have been specified.
- When installing devices with increased heat dissipation, ensure that there is sufficient space above and below the devices during operation to guarantee adequate ventilation!

The installation positions and their names for mounting devices on mounting rails are specified below. The illustration of the devices in the following figures is an example.

The following applies to all installation positions: the reference direction “down” (see arrow) is the direction of the earth's gravitational force.

Horizontal installation (standard installation)

The mounting rail is mounted horizontally on a vertical mounting plate.
The connection level of the devices points to the front.

The devices are ventilated from below, which enables optimum cooling of the electronics through convection. This is therefore also the recommended installation position.

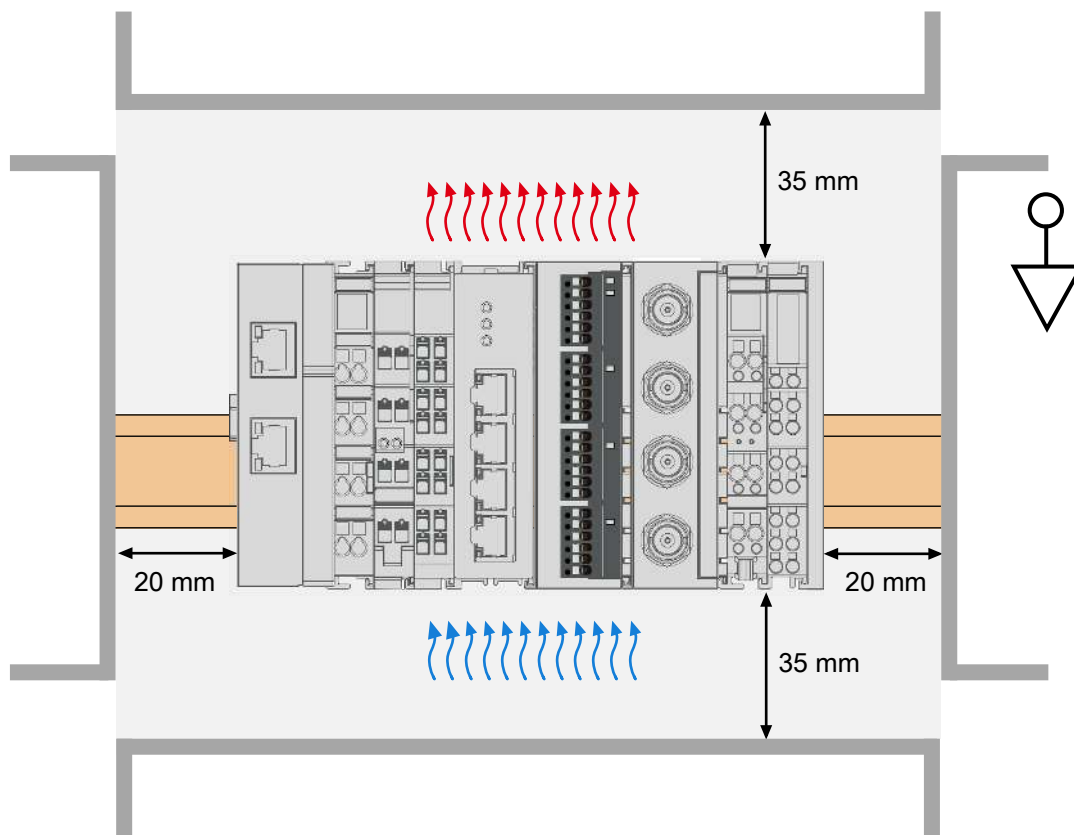


Fig. 9: Recommended minimum distances for standard installation position

NOTICE

Compliance with the minimum distances

Compliance with the minimum distances shown in the figure “Recommended minimum distances for standard installation position” is strongly recommended in all installation positions.

Vertical installation

The mounting rail is mounted vertically on a vertical mounting plate.
The connection level of the devices faces the front.
The devices can be arranged as follows:

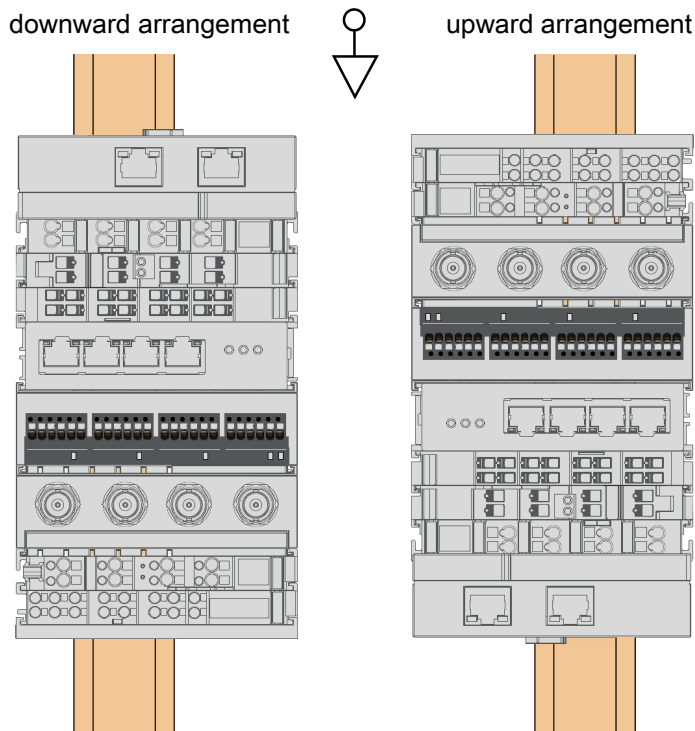


Fig. 10: Installation position: Vertical, downward arrangement (left)/upward arrangement (right)

Flat installation

The mounting rail is mounted on a horizontal mounting plate.
The connection level of the devices points upwards.

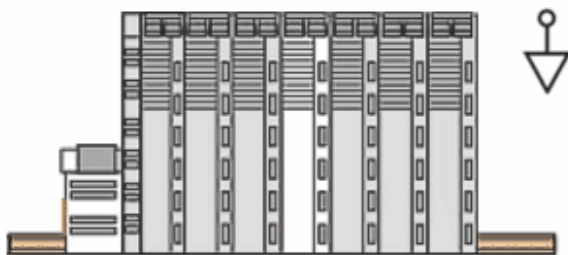


Fig. 11: Flat installation

NOTICE

Danger of sliding off the mounting rail

Particularly in the “vertical” installation position, but also in other installation positions under corresponding mechanical load, the terminal segment may move on the mounting rail. These can lead to undesirable malfunctions.

- If this risk exists, secure the terminal segment with appropriate locking devices, e.g. by clamping it to the mounting rail.

NOTICE

Compliance with the minimum distances

Compliance with the minimum distances shown in the figure “Recommended minimum distances for standard installation position” is strongly recommended in all installation positions.

Installation positions with **ZB8610** fan cartridge

If the cooling should or must be increased for the intended application, the ZB8610 fan cartridge can be mounted on the underside of the device. In the horizontal installation position, the devices are ventilated from bottom to top by the fan cartridge. This optimum cooling is further enhanced by convection ventilation (see following figure).

The fan cartridge can be used in any installation position.

Further information on operation with and without a fan can be found in the technical data for the device (e.g. derating, information on installation positions, etc.).

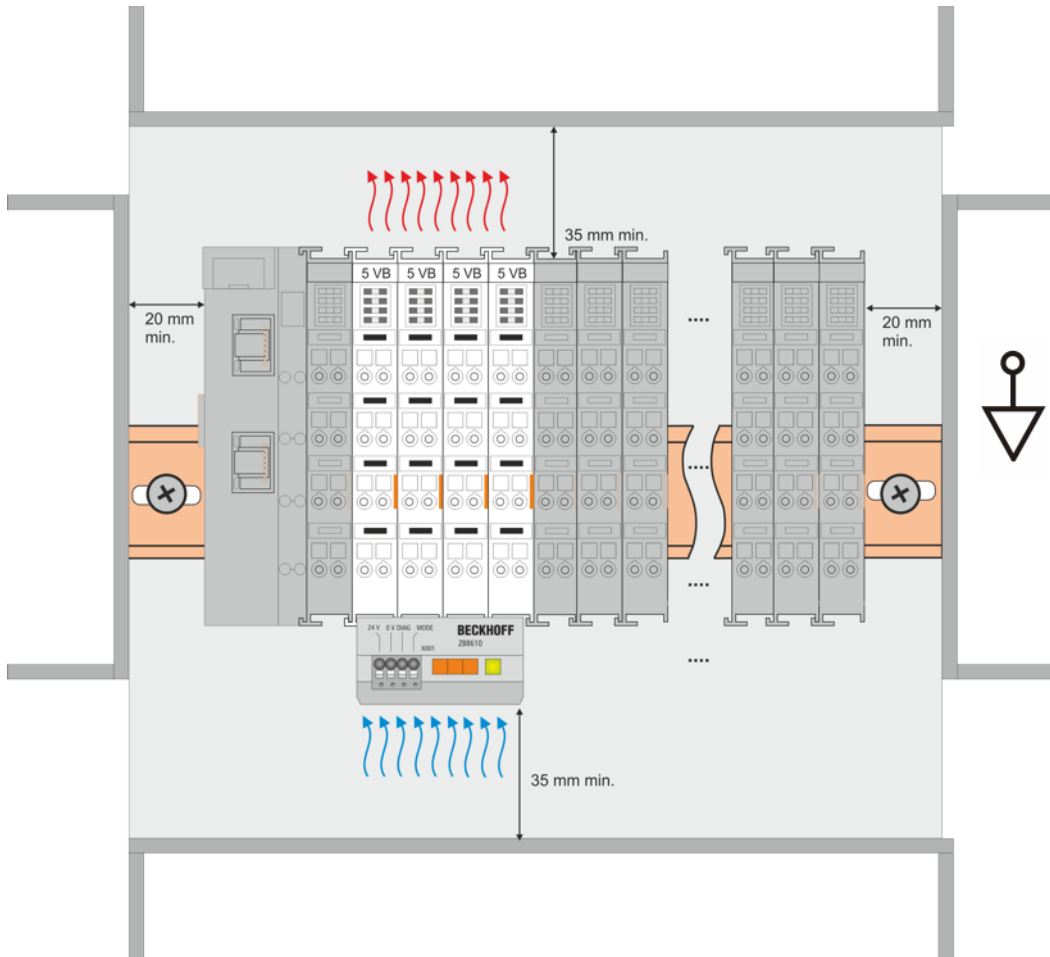


Fig. 12: Recommended minimum distances for operation with fan, using horizontal installation position as an example

NOTICE

Compliance with the minimum distances

Compliance with the minimum distances as shown in the figure “Recommended minimum distances for operation with fan” is strongly recommended.

3.5 Push-in connection technology (EC/ED/EFxxxx)

⚠ WARNING

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

Bring the bus terminal system into a safe, de-energized state before beginning to mount, disassemble, or wire the bus terminals!

In the case of EC/ED/EFxxxx-series Terminals with push-in connection technology, solid conductors fitted with wire end ferrules can be plugged in directly without tools (see “Wiring [▶ 26]” section).

● Ultrasonically compacted wires

i Ultrasonically compacted (ultrasonically welded) wires can also be connected.

- Please note the information on the connection cross-section in the table housing data in the chapter Technical data of the relevant device!



Fig. 13: Tool-free push-in connection; housing types ED-12-8pin, ED-12-16pin, and EF-12-8pin

The following connection options are available for optimum adaptation to the application:

- The EC/EDxxxx-series Terminals contain electronics and the connection level in one housing unit.
- The EFxxxx-series Terminals have a pluggable connection level. For servicing, the pluggable connection level allows the entire wiring to be removed from the top of the housing as a single plug. This reduces the installation time and eliminates the risk of wires being mixed up. The plug is only slightly protruding (for dimensions, see Technical data -> Housing data of the corresponding product). Installation and wiring are carried out as for the EDxxxx-series Terminals. Proceed as follows when replacing:
 - Press the unlocking hub and pull the lower part out of the terminal block.
 - Push in the replacement component and plug the connector with the upright wiring back in.

● Strain relief of the cable

i A tab for strain relief of the cable simplifies assembly in many applications and prevents entangling of the individual connection wires when the connector is pulled.

Overview of housing designs

EC/EDxxxx housing designs, contain the electronics and connection level in one housing	EFxxxx housing designs with pluggable wiring level	Description
EC-40-8pin	-	8 connection points on 40 mm
ED-12-8pin	EF-12-8pin	8 connection points on 12 mm
ED-24-2x8pin	EF-24-2x8pin	16 connection points on 24 mm
ED-12-16pin	-	16 connection points on 12 mm
ED-24-2x16pin	-	32 connection points on 24 mm

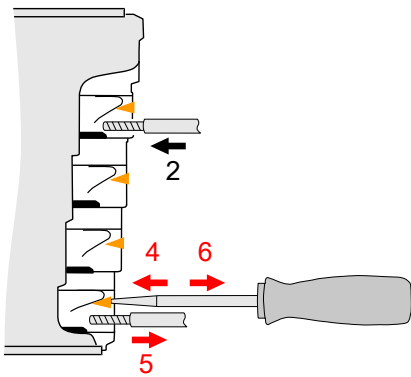
3.5.1 EC/ED/EFxxxx wiring with push-in connection technology

⚠ WARNING

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

Bring the bus terminal system into a safe, de-energized state before beginning to mount, disassemble, or wire the bus terminals!

1.) Tool-free connection for solid conductors and conductors with ferrules



2.) Connection by push-button actuation for stranded wire conductors and **loosening the conductor (with tools)**

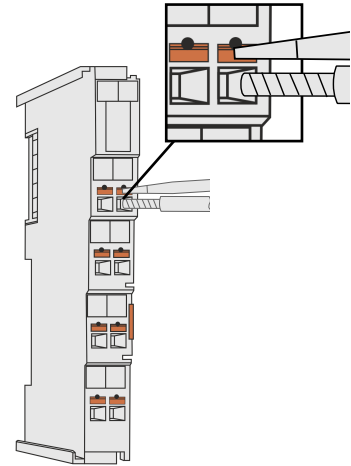
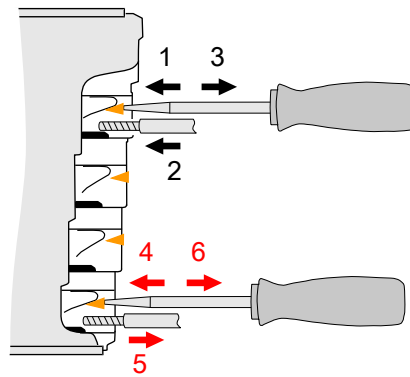


Fig. 14: Connecting and disconnecting the conductors

1. Connecting solid conductors and conductors with ferrules (Fig. top left, step 2)

These can be connected using a direct plug-in technique, without tools.

- Insert the conductor into the terminal point after stripping the insulation (2)

2. Connect stranded cables (Fig. top right, steps 1–3)

These must be connected via the push-button.

- Use a screwdriver to press the push-button to open the contact point (1).
- Then insert the conductor (2).
- Release the push-button by pulling back the screwdriver to close the terminal point (3).

Disconnect cables (Fig. above steps 4–6)

The release is performed using the push-button for all conductor types.

- Use a screwdriver to press the push-button to unlock the contact (4).
- Then pull out the conductor (5).
- Release the push-button by pulling back the screwdriver to close the terminal point (6).

NOTICE



Observe the permissible connection cross-sections and stripping lengths

The permissible conductor cross-section and stripping length depend on the type of housing, please refer to the housing data in the "Technical data" chapter for the device in question.

3.5.2 Shielding



Shielding

Encoders, analog sensors, and actuators should always be connected with shielded, pair-wise twisted cables.

3.6 Note on power supply

WARNING

Power supply from SELV / PELV power supply unit!

SELV / PELV circuits (safety extra-low voltage / protective extra-low voltage) according to IEC 61010-2-201 must be used to supply this device.

Notes:

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

3.7 Disposal



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

4 Commissioning

NOTICE



Further information

For information on commissioning with TwinCAT and EtherCAT basics, please refer to the [EtherCAT system documentation](#).

4.1 Process data

The scope of available process data can be changed through the “Process data” tab.

4.1.1 Process data overview

ED1837 PDO assignment

SM3, PDO assignment 0x1C13				
Index	Index of excluded PDOs	Size (byte.bit)	Name	PDO content
0x1A00	—	0.1	DI Channel 1	Index 0x6000:01 [► 31] – Input
...	...	...	...	...
0x1A1F		0.1	DI Channel 32	Index 0x61F0:01 [► 31] – Input

ED1839 PDO assignment

SM3, PDO assignment 0x1C13				
Index	Index of excluded PDOs	Size (byte.bit)	Name	PDO content
0x1A00	—	0.1	DI Channel 1	Index 0x6000:01 [► 31] – Input
...	...	...	...	...
0x1A0F		0.1	DI Channel 16	Index 0x60F0:01 [► 31] – Input

4.1.2 Configuration, setting the filter times

Configuration, setting the filter times

The input filters can be enabled using object [0x8pp0:02](#) [► 31].

The filter times can be set using object [0x8pp0:12](#) [► 31]. The permitted values are listed in the following table:

Index (hex)	Adjustable filter times		
	Enum	dec	hex
8pp0:12 [► 31]	100 µs	100	0x00000064
	500 µs	500	0x000001F4
	1 ms	1000	0x000003E8
	3 ms (default)	3000	0x00000BB8
	10 ms	10000	0x00002710
	20 ms	20000	0x00004E20

4.2 Object description

i 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

Introduction

The CoE overview contains objects for different intended applications:

- objects required for parameterization during commissioning:
 - Restore object [► 31] index 0x1011
 - Configuration data [► 31] index 0x80n0
- objects intended for regular operation, e.g. through ADS access.
- profile-specific objects:
 - Input data [► 31] index 0x60n0
 - Information and diagnostic data index 0xF000, 0xF008, 0xF081
- Standard objects [► 32]

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

4.2.1 ED183x

4.2.1.1 Restore object

Index 1011 Restore default parameters

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

4.2.1.2 Configuration data

Index 8pp0 DIP Settings

Index (hex)	Name	Meaning	Data type	Flags	Default
8pp0:0	DIP Settings	max. subindex	UINT8	RO	0x12 (18 _{dec})
8pp0:02	Enable Filter [► 29]	0: disables input filter 1: enables input filter (default)	BOOLEAN	RW	0x01 (1 _{dec})
8pp0:12	Filter Time [► 29]	Adjustable filter time Permitted values 100: 100 µs 500: 500 µs 1000: 1 ms 3000: 3 ms (default) 10000: 10 ms 20000: 20 ms	UINT32	RW	0x00000BB8 (3000 _{dec})
ED1837: Ch.1–Ch.32 (00 ≤ pp ≤ 1F)					
ED1839: Ch.1–Ch.16 (00 ≤ pp ≤ 0F)					

4.2.1.3 Input data

Index 6pp0 DIP Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
6pp0:0	DIP Inputs	max. subindex	UINT8	RO	0x01 (1 _{dec})
6pp0:01	Input	status of the digital input	BOOLEAN	RO	
ED1837: Ch.1–Ch.32 (00 ≤ pp ≤ 1F)					
ED1839: Ch.1–Ch.16 (00 ≤ pp ≤ 0F)					

4.2.1.4 Standard objects

Standard objects (0x1000-0x1FFF)

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

Index 1000 Device type

Index	Name	Meaning	Data type	Flags	Default
1000:0	Device type	Device type of the EtherCAT slave: The low word contains the CoE profile used (5001). The high word contains the module profile according to the modular device profile.	UINT32	RO	0x00651389 (6624137 _{dec})

Index 1008 Device name

Index	Name	Meaning	Data type	Flags	Default
1008:0	Device name	Device name of the EtherCAT slave	STRING	RO	ED1837 ED1839

Index 1009 Hardware version

Index	Name	Meaning	Data type	Flags	Default
1009:0	Hardware version	Hardware version des EtherCAT slaves	STRING	RO	

Index 100A Software version

Index	Name	Meaning	Data type	Flags	Default
100A:0	Software version	Firmware version des EtherCAT slaves	STRING	RO	00

Index 100B Bootloader version

Index	Name	Meaning	Data type	Flags	Default
100B:0	Bootloader version	Bootloader version	STRING	RO	n/a

Index 1018 Identity

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

* **ED1837:** 0x072D1052 (120393810_{dec}); **ED1839:** 0x072F1052 (120524882_{dec})

Index 1020 Device Statistics

Index	Name	Meaning	Data type	Flags	Default
1020:0	Device Statistics	max. subindex	UINT8	RO	0x03 (3 _{dec})
1020:01	Time since power on	Operating time since last power-on [s]	UINT32	RO	0x00000000 (0 _{dec})
1020:02	Total time powered	Total operating time [s]	UINT32	RO	0x00000000 (0 _{dec})
1020:03	Number of power cycles	Number of power cycles	UINT32	RO	0x00000000 (0 _{dec})

Index 10E2 Manufacturer-specific Identification Code

Index	Name	Meaning	Data type	Flags	Default
10E2:0	Manufacturer-specific Identification Code	Manufacturer-specific Identification Code	UINT8	RO	0x01 (1 _{dec})
10E2:01	SubIndex 001	reserved	STRING	RO	

Index 10F0 Backup parameter handling

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

Index 1App DIP TxPDO Map Inputs

Index (hex)	Name	Meaning	Data type	Flags	Default
1App:0	DIP TxPDO-Map Inputs	PDO Mapping TxPDO	UINT8	RO	0x01 (1 _{dec})
1App:01	SubIndex 001	PDO Mapping entry no. 1 (object 0x6pp0 (DIP Inputs Ch.1), entry 0x01 (Input))	UINT32	RO	0x6000:01, 1
ED1837: Ch.1–Ch.32 (00 ≤ pp ≤ 1F)					
ED1839: Ch.1–Ch.16 (00 ≤ pp ≤ 0F)					

Index 1C00 Sync manager type

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

Index 1C12 RxPDO assign

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

Index 1C13 TxPDO assign, ED1837

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RO	0x20 (32 _{dec})
1C13:01	SubIndex 001	allocated TxPDO no. 1 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A00 (6656 _{dec})
1C13:02	SubIndex 002	allocated TxPDO no. 2 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A01 (6657 _{dec})
...	...	...	...	...	...
1C13:1F	SubIndex 031	allocated TxPDO no. 31 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A1E (6686 _{dec})
1C13:20	SubIndex 032	allocated TxPDO no. 32 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A1F (6687 _{dec})

Index 1C13 TxPDO assign, ED1839

Index (hex)	Name	Meaning	Data type	Flags	Default
1C13:0	TxPDO assign	PDO Assign Inputs	UINT8	RO	0x10 (16 _{dec})
1C13:01	SubIndex 001	allocated TxPDO no. 1 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A00 (6656 _{dec})
1C13:02	SubIndex 002	allocated TxPDO no. 2 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A01 (6657 _{dec})
...	...	...	...	...	...
1C13:0F	SubIndex 031	allocated TxPDO no. 15 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A0E (6670 _{dec})
1C13:10	SubIndex 032	allocated TxPDO no. 16 (contains the index of the associated TxPDO mapping object)	UINT16	RO	0x1A0F (6671 _{dec})

Index 1C33 SM input parameter

Index	Name	Meaning	Data type	Flags	Default
1C33:0	SM input parameter	Synchronization parameters for the inputs	UINT8	RO	0x20 (32 _{dec})
1C33:01	Sync mode	Current synchronization mode: 0: free run 1: synchronous with SM 3 event (no outputs available) 2: DC – synchronous with SYNC0 event 3: DC – synchronous with SYNC1 event 34: synchronous with SM 2 event (outputs available)	UINT16	RW	0x0000 (0 _{dec})
1C33:02	Cycle time	Cycle time (in ns): - free run: cycle time of the local timer - synchronous with SM 2 event: cycle time of the master DC mode: SYNC0/SYNC1 Cycle Time	UINT32	RW	0x000186A0 (100000 _{dec})
1C33:03	Shift time	time between SYNC0 event and reading of the inputs (in ns, DC mode only)	UINT32	RO	0x00000000 (0 _{dec})
1C33:04	Sync modes supported	Supported synchronization modes: - bit 0: free run is supported - bit 1: synchronization with SM 2 event is supported (outputs available) - bit 1: synchronization with SM 3 event is supported (no outputs available) - bit 2–3 = 01: DC mode is supported - bit 4–5 = 01: input shift through local event (outputs available) - bit 4–5 = 10: input shift with SYNC1 event (no outputs available) bit 14 = 1: dynamic times (measurement through writing of 1C32:08 or 1C33:08)	UINT16	RO	0x0001 (1 _{dec})
1C33:05	Minimum cycle time	Minimum cycle time (in ns)	UINT32	RO	0x000186A0 (100000 _{dec})
1C33:06	Calc and copy time	Time between reading of the inputs and the inputs being available for the master (in ns, DC mode only)	UINT32	RO	0x00000000 (0 _{dec})
1C33:07	Minimum delay time	Min. time between SYNC1 event and reading of the inputs (in ns, DC mode only)	UINT32	RO	0x00000000 (0 _{dec})
1C33:08	Get Cycle Time	0: measurement of the local cycle time is stopped 1: measurement of the local cycle time is started Entries 1C32:03, 1C32:05, 1C32:06, 1C32:09, 1C33:03, 1C33:06, 1C33:09 are updated with the maximum measured values. For a subsequent measurement, the measured values are reset	UINT16	RW	0x0000 (0 _{dec})
1C33:09	Maximum delay time	Time between SYNC1 event and reading of the inputs (in ns, DC mode only)	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 cycle time violations in OPERATIONAL (cycle was not completed on time or the next cycle started too early)	UINT16	RO	0x0000 (0 _{dec})
1C33:0D	Shift too short counter	Number of times 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	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	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	ED1837: 0x0020 (32 _{dec}) ED1839: 0x0010 (16 _{dec})

Index F001 Code word

Index	Name	Meaning	Data type	Flags	Default
F008:0	Code word	Reserved (The vendor reserves the right to carry out the basic calibration of the terminals. The code word is therefore currently reserved.)	UINT32	RW	0x00000000 (0 _{dec})

Index F081 Download revision

Index	Name	Meaning	Data type	Flags	Default
F081:0	Download revision	max. subindex	UINT8	RO	0x01 (1 _{dec})
F081:01	Revision number	The subindex 0xF081:01 (Download revision) describes the revision level of the module.	UINT32	RW	

Download revision in the startup list

Individual terminals/modules automatically generate the entry from object 0xF081:01 in the startup list (see figure “Download revision in the startup list”). Object 0xF081:01 (Download revision) describes the revision of the terminal/module, e.g., 0x0018000A for EL7201-0010-0024, and is necessary to ensure compatibility. It is essential to ensure that this entry is not deleted from the startup list!

Transition	Protocol	Index	Data	Comment
<PS>	CoE	0x1C12 C 0	02 00 00 16 01 16	download pdo 0x1C12 index
<PS>	CoE	0x1C13 C 0	02 00 00 1A 01 1A	download pdo 0x1C13 index
IP	CoE	0xF081:01	0x0018000A (1572874)	

Fig. 15: Download revision in the startup list

5 Appendix

5.1 Firmware compatibility

Beckhoff EtherCAT devices are delivered with the latest available firmware version. Firmware and hardware must be compatible; not every combination ensures compatibility. The overview below shows the hardware versions on which a firmware can be operated.

Note

- The newest possible firmware for the respective hardware should be implemented
- Beckhoff is not under any obligation to provide customers with free firmware updates for delivered products.

NOTICE

Risk of damage to the device!

Observe the notes on the firmware update in the EtherCAT System Manual in chapter “[Firmware Update](#)”. If a device is set to BOOTSTRAP mode for firmware update, it may not check whether the new firmware is suitable during download.
This may result in damage to the device! Therefore, always make sure that the firmware is suitable for the hardware version!

ED1837			
Hardware (HW)	Firmware (FW)	Revision no.	Release date
00*	00		2025/08
	01*	ED1837-0000-0016	2025/12

ED1839			
Hardware (HW)	Firmware (FW)	Revision no.	Release date
00*	00		2025/08
	01*	ED1839-0000-0016	2025/12

*) This is the current compatible firmware/hardware version at the time of the preparing this documentation. Check on the Beckhoff website whether more up-to-date [documentation](#) is available.

5.2 Documentation issue status

Version	Comment
1.2.0	• Update chapter "Technical Data"
1.1.0	• Update structure
1.0.0	• first release

5.3 Support and Service

Beckhoff Support and Service provides assistance with questions regarding Beckhoff products and system solutions, as well as with their planning, commissioning, and operation.

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