BECKHOFF New Automation Technology

Documentation | EN

EL9xxx

EtherCAT System Terminals

2024-01-31 | Version: 4.8.1

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1 Foreword

1.1 Notes on the documentation

Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
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 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
Explosion Protection for Terminal Systems (PDF)	Notes on the use of the Beckhoff terminal systems in hazardous areas according to ATEX and IECEx
Control Drawing I/O, CX, CPX (PDF)	Connection diagrams and Ex markings (conform to cFMus)
EtherCAT Terminals in the Marine Sector (PDF)	Notes for operation of the Beckhoff EtherCAT Terminal System in the Marine Sector (DNV GL)
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.

1.4 Documentation issue status

Version	Comment
4.8.1	• Update chapter “UL notes” • Update chapter “Technical data” • Update structure
4.8	• Product images for EL9150, EL9160, EL9250 and EL9260 updated • Update technical data • Update structure
4.7	• Update chapter "Technical data" • Update chapter "LEDs and connection" • UL note added • Update structure
4.6	• Update chapter "LEDs and connection" • Update structure
4.5	• Update chapter “Interference-free Bus Terminals” • Update structure
4.4	• EL9540 and EL9550, application example added • Update structure
4.4	• EL9540 and EL9550, application example added • Update structure
4.3	• Update chapter "Technical data" • Update structure
4.2	• Update chapter "LEDs and connection" • Udate structure
4.1	• EL9450-0010, EL9550-0010 added • Update chapter "Technical data" • Update structure
4.0	• Update chapter "Technical data" • Update structure
0.1 … 3.9	• *archieved*

1.5 Intended use

⚠ WARNING

Intended use

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.6 Version identification of EtherCAT devices

1.6.1 General notes on marking

Designation

A Beckhoff EtherCAT device has a 14-digit designation, made up of

- family key
- type
- version
- revision

Example	Family	Type	Version	Revision
EL3314-0000-0016	EL terminal 12 mm, non-pluggable connection level	3314 4-channel thermocouple terminal	0000 basic type	0016
ES3602-0010-0017	ES terminal 12 mm, pluggable connection level	3602 2-channel voltage measurement	0010 high-precision version	0017
CU2008-0000-0000	CU device	2008 8-port fast ethernet switch	0000 basic type	0000

Notes

- The elements mentioned above result in the **technical designation**. EL3314-0000-0016 is used in the example below.
- EL3314-0000 is the order identifier, in the case of “-0000” usually abbreviated to EL3314. “-0016” is the EtherCAT revision.
- The **order identifier** is made up of
  - family key (EL, EP, CU, ES, KL, CX, etc.)
  - type (3314)
  - version (-0000)
- The **revision** -0016 shows the technical progress, such as the extension of features with regard to the EtherCAT communication, and is managed by Beckhoff.
  In principle, a device with a higher revision can replace a device with a lower revision, unless specified otherwise, e.g. in the documentation.
  Associated and synonymous with each revision there is usually a description (ESI, EtherCAT Slave Information) in the form of an XML file, which is available for download from the Beckhoff web site.
  From 2014/01 the revision is shown on the outside of the IP20 terminals, see Fig. *“EL2872 with revision 0022 and serial number 01200815”*.
- The type, version and revision are read as decimal numbers, even if they are technically saved in hexadecimal.

1.6.2 Version identification of EL terminals

The serial number/ data code for Beckhoff IO devices is usually the 8-digit number printed on the device or on a sticker. The serial number indicates the configuration in delivery state and therefore refers to a whole production batch, without distinguishing the individual modules of a batch.

Structure of the serial number: **KK YY FF HH**	Example with serial number 12 06 3A 02:
KK - week of production (CW, calendar week)	12 - production week 12
YY - year of production	06 - production year 2006
FF - firmware version	3A - firmware version 3A
HH - hardware version	02 - hardware version 02

Fig. 1: EL2872 with revision 0022 and serial number 01200815

1.6.3 Beckhoff Identification Code (BIC)

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

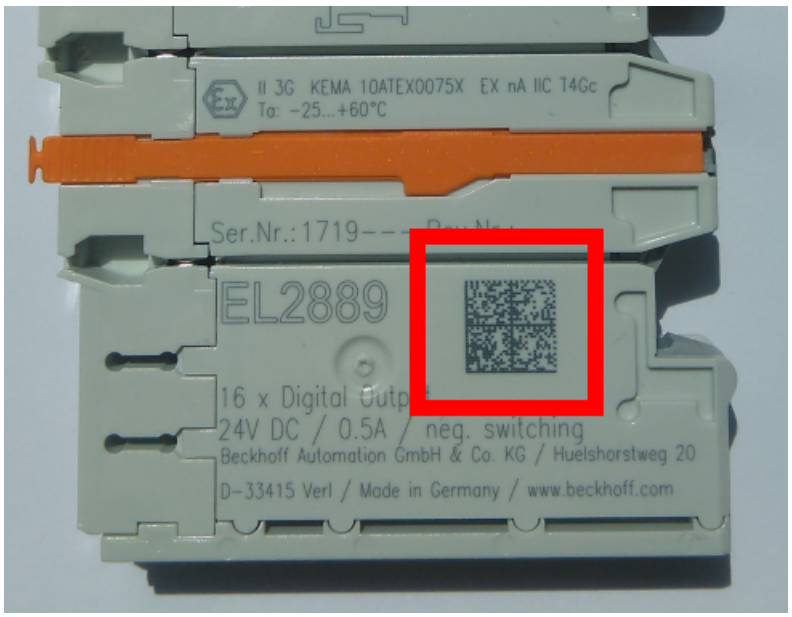


Fig. 2: BIC as data matrix code (DMC, code scheme ECC200)

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

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

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

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

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

Following information is possible, positions 1 to 4 are always present, the other according to need of production:

Position	Type of information	Explanation	Data identifier	Number of digits incl. data identifier	Example
1	Beckhoff order number	**Beckhoff order number**	1P	8	1P072222
2	Beckhoff Traceability Number (BTN)	**Unique serial number, see note below**	SBTN	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	51S678294
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 positions 1 to 4 and with the above given example value on position 6. The data identifiers are highlighted in bold font:

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

Accordingly as DMC:

Fig. 3: 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, position 2). The BTN is a unique serial number consisting of eight characters that will replace all other serial number systems at Beckhoff in the long term (e.g. batch designations on IO components, previous serial number range for safety products, etc.). The BTN will also be introduced step by step, so it may happen that the BTN is not yet coded in the BIC.

NOTICE

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

1.6.4 Electronic access to the BIC (eBIC)

Electronic BIC (eBIC)

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

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

K-bus devices (IP20, IP67)

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

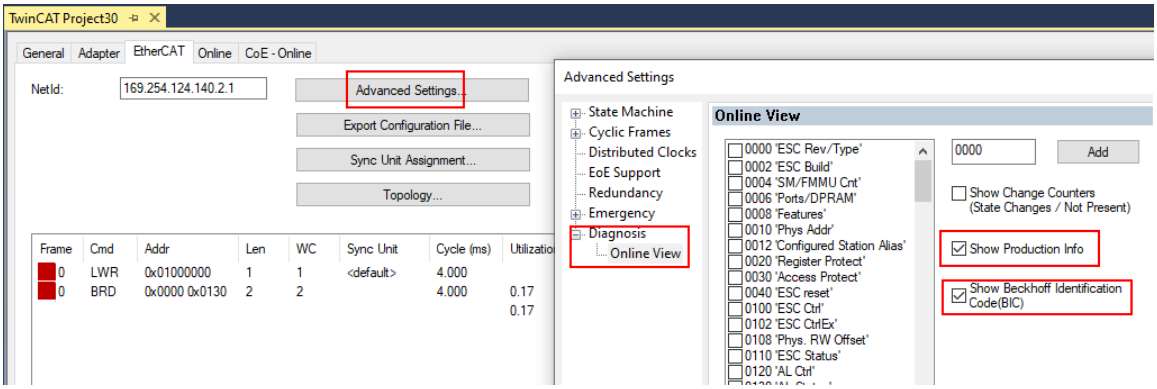
EtherCAT devices (IP20, IP67)

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

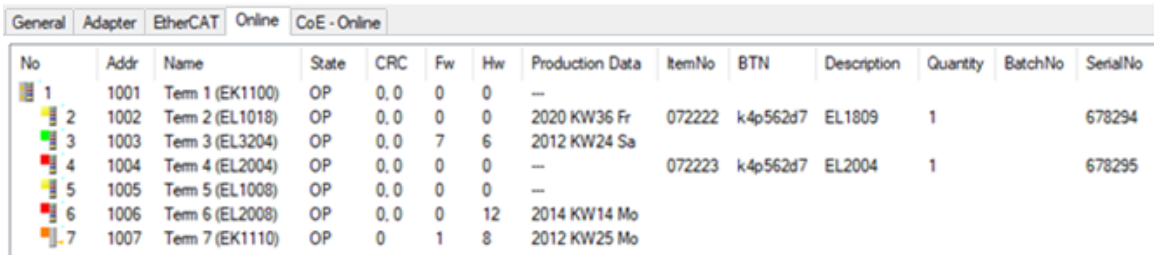
Beckhoff also stores the eBIC in the ESI-EEPROM. The eBIC was introduced into Beckhoff IO production (terminals, box modules) in 2020; as of 2023, implementation is largely complete.

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

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

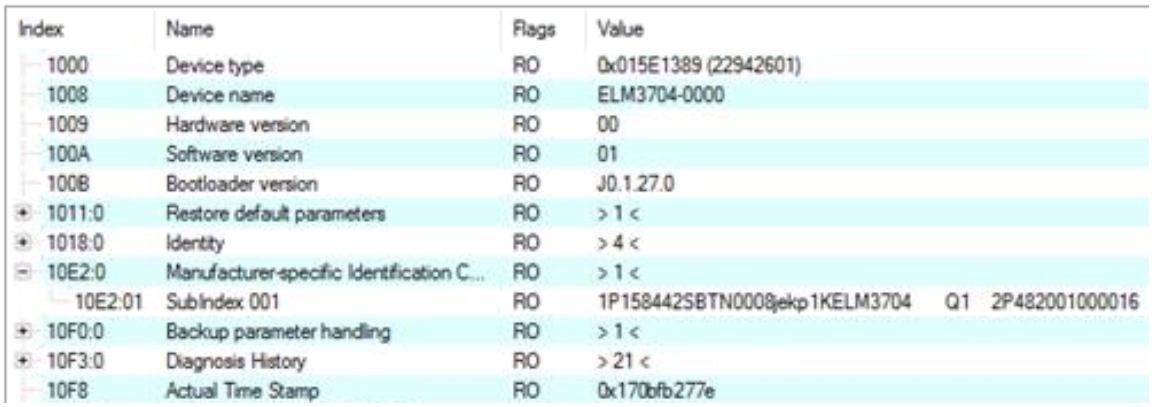


  - The BTN and its contents are then displayed:



  - Note: As shown in the figure, the production data HW version, FW version, and production date, which have been programmed since 2012, can also be displayed with "Show production info".
  - Access from the PLC: From TwinCAT 3.1. build 4024.24, the functions *FB_EcReadBIC* and *FB_EcReadBTN* for reading into the PLC are available in the Tc2_EtherCAT library from v3.3.19.0.
- EtherCAT devices with a CoE directory may also have the object 0x10E2:01 to display their own eBIC, which can also be easily accessed by the PLC:

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



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

  - The object 0x10E2 will be preferentially introduced into stock products in the course of necessary firmware revision.
  - From TwinCAT 3.1. build 4024.24, the functions *FB_EcCoEReadBIC* and *FB_EcCoEReadBTN* for reading into the PLC are available in the Tc2_EtherCAT library from v3.3.19.0
- The following auxiliary functions are available for processing the BIC/BTN data in the PLC in *Tc2_Utilities* as of TwinCAT 3.1 build 4024.24
  - F_SplitBIC: The function splits the Beckhoff Identification Code (BIC) sBICValue into its components using known identifiers and returns the recognized substrings in the ST_SplittedBIC structure as a return value
  - BIC_TO_BTN: The function extracts the BTN from the BIC and returns it as a return value
- Note: If there is further electronic processing, the BTN is to be handled as a string(8); the identifier "SBTN" is not part of the BTN.
- Technical background
  The new BIC information is written as an additional category in the ESI-EEPROM during device production. The structure of the ESI content is largely dictated by the ETG specifications, therefore the additional vendor-specific content is stored using a category in accordance with the ETG.2010. ID 03 tells all EtherCAT masters that they may not overwrite these data in the event of an update or restore the data after an ESI update.
  The structure follows the content of the BIC, see here. The EEPROM therefore requires approx. 50..200 bytes of memory.
- Special cases
  - If multiple hierarchically arranged ESCs are installed in a device, only the top-level ESC carries the eBIC information.
  - If multiple non-hierarchically arranged ESCs are installed in a device, all ESCs carry the eBIC information.
  - If the device consists of several sub-devices which each have their own identity, but only the top-level device is accessible via EtherCAT, the eBIC of the top-level device is located in the CoE object directory 0x10E2:01 and the eBICs of the sub-devices follow in 0x10E2:nn.

PROFIBUS; PROFINET, and DeviceNet devices

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

1.7 Interference-free Bus Terminals

Use of interference-free Bus or EtherCAT Terminals in safety applications

If a Bus or EtherCAT Terminal is described as interference-free, this means that the consecutive terminal behaves passively in a safety application (e.g. in the case of the all-pole switch-off of a potential group).
In this case the terminals do not represent an active part of the safety controller and do not affect the Safety Integrity Level (SIL) or Performance Level (PL) attained in the safety application.
For details, please refer chapter “All-pole disconnection of a potential group with downstream interference-free standard terminals (Category 4, PL e)” and following in the TwinSAFE application manual.

NOTICE

Pay attention to the hardware version

Please pay attention to the information about the hardware version and non-reactivity of the respective Bus Terminal in the chapters "Technical Data" or "Firmware Compatibility"!
Only terminals with the appropriate hardware version may be used without the attained SIL/PL being affected!

The Bus or EtherCAT Terminals regarded as interference-free at the time of preparing this document are listed in the following tables together with their respective hardware versions.

Terminal name Bus Terminal	from hardware version
KL2408	05
KL2809	02
KL2134	09
KL2424	05
KL9110	07

Terminal name EL/ELX terminal	from hardware version
EL2004	15
EL2008	07
EL2014	00
EL2022	09
EL2024	06
EL2034	06
EL2044	01
EL2068	00
EL2212	00
EL2258	00
EL2809	01
EL2819	00
EL2828	00
EL2869	00
EL2872	01
EL2878-0005	00
EL9110	13
EL9184	00
EL9185	00
EL9186	00
EL9187	00
EL9410	16
ELX1052	00
ELX1054	00
ELX1058	00
ELX2002	00
ELX2008	00
ELX3152	00
ELX3181	00
ELX3202	00
ELX3204	00
ELX3252	00
ELX3312	00
ELX3314	00
ELX3351	00
ELX4181	00
ELX5151	00
ELX9560	03

External wiring

The following requirements are to be ensured *by the system manufacturer* and must be incorporated into the user documentation.

- **Protection class IP54**
  The terminals must be installed in IP54 control cabinets to ensure the necessary protection class IP54.
- **Power supply unit**
  The standard terminals must be supplied with 24 V by an SELV/PELV power supply unit with an output voltage limit U_{max} of 60 V in the event of a fault.
- **Prevention of feedback**
  Feedback can be prevented through different measures. These are described below. In addition to mandatory requirements there are also optional requirements, of which only one needs to be selected.
  - **No switching of loads with a separate power supply**
    Loads that have their own power supply must not be switched by standard terminals, since in this case feedback via the load cannot be ruled out.

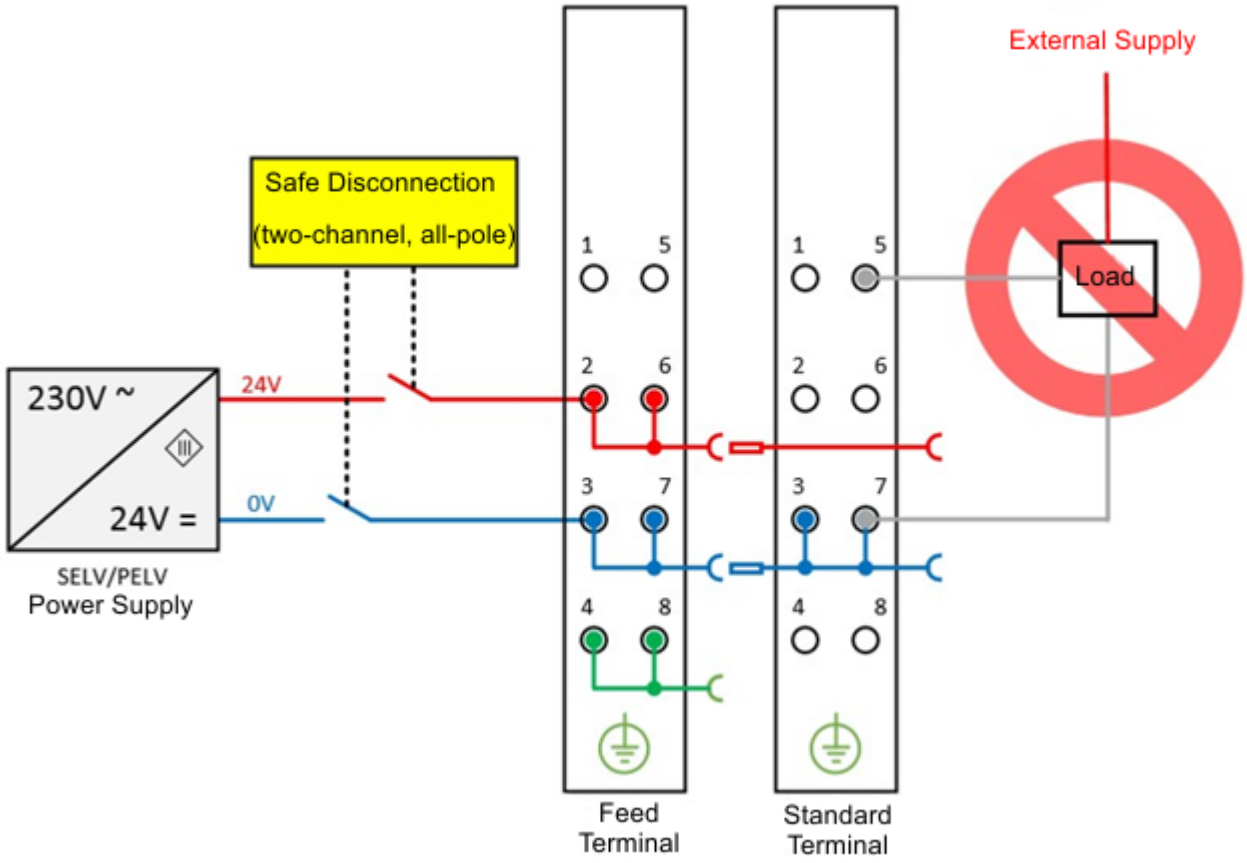


Fig. 4: Negative example – active load

- The control of an STO input of a frequency converter could serve here as a **negative example**. **Exceptions** to the general requirement are allowed only if the manufacturer of the connected load guarantees that feedback to the control input cannot occur. This can be achieved, for example, through adherence to load-specific standards.
- **Option 1: Ground feedback and all-pole disconnection**
  The ground connection of the connected load must be fed back to the safely switched ground.

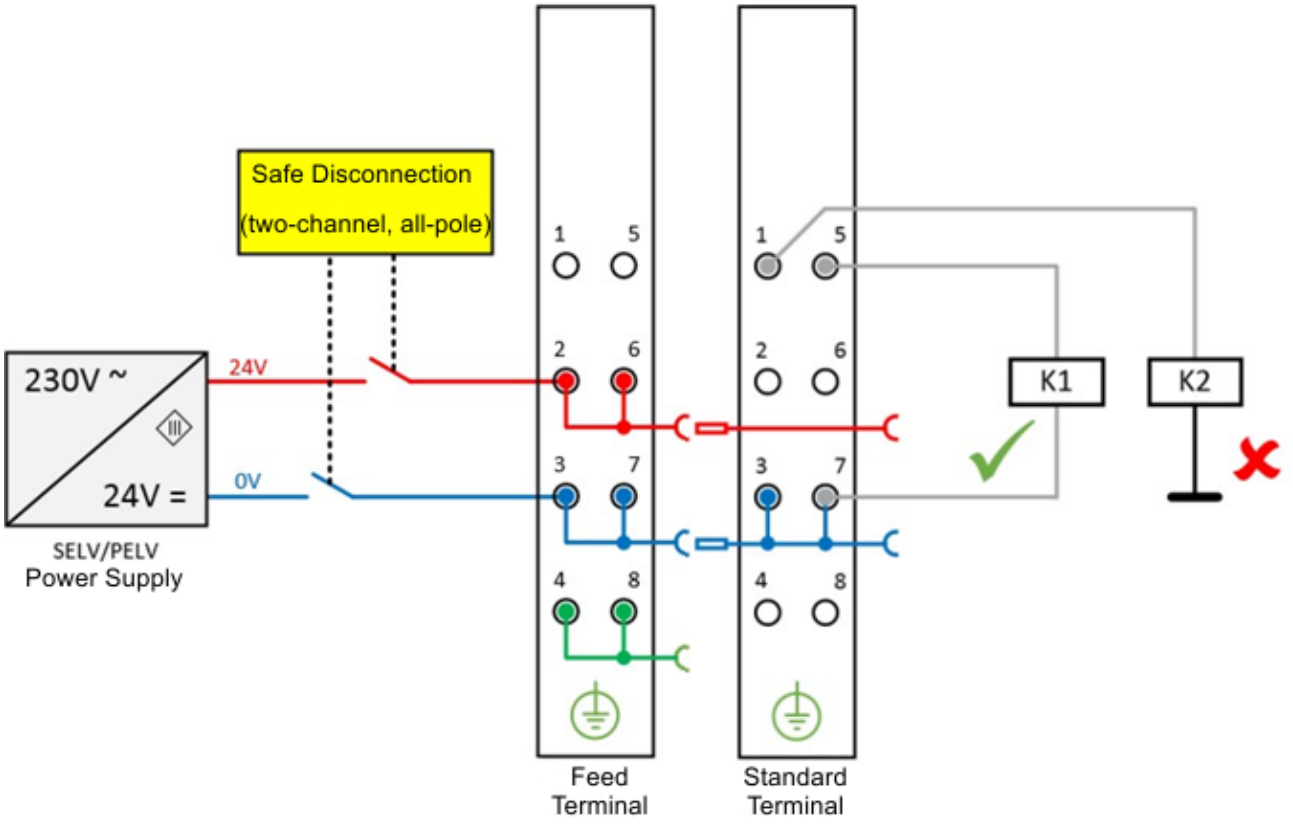


Fig. 5: Ground connection of the load: correct (K1) and incorrect (K2)

- If either
  a) the ground of the load is not fed back to the terminal or
  b) the ground is not safely switched but connected permanently

  then fault exclusions are necessary with regard to a short-circuit with external potential in order to be able to achieve Cat. 4 PLe according to EN ISO 13849-1:2007 or SIL3 according to IEC 61508:2010 (refer here to the overview in the chapter "Effect of options on the safety level").
- **Option 2: Cable short-circuit fault exclusion**
  If solution option 1 is not feasible, the ground feedback and all-pole disconnection can be dispensed with if the danger of feedback due to a cable short-circuit can be excluded by other measures. These measures, which can be implemented alternatively, are described in the following sections.

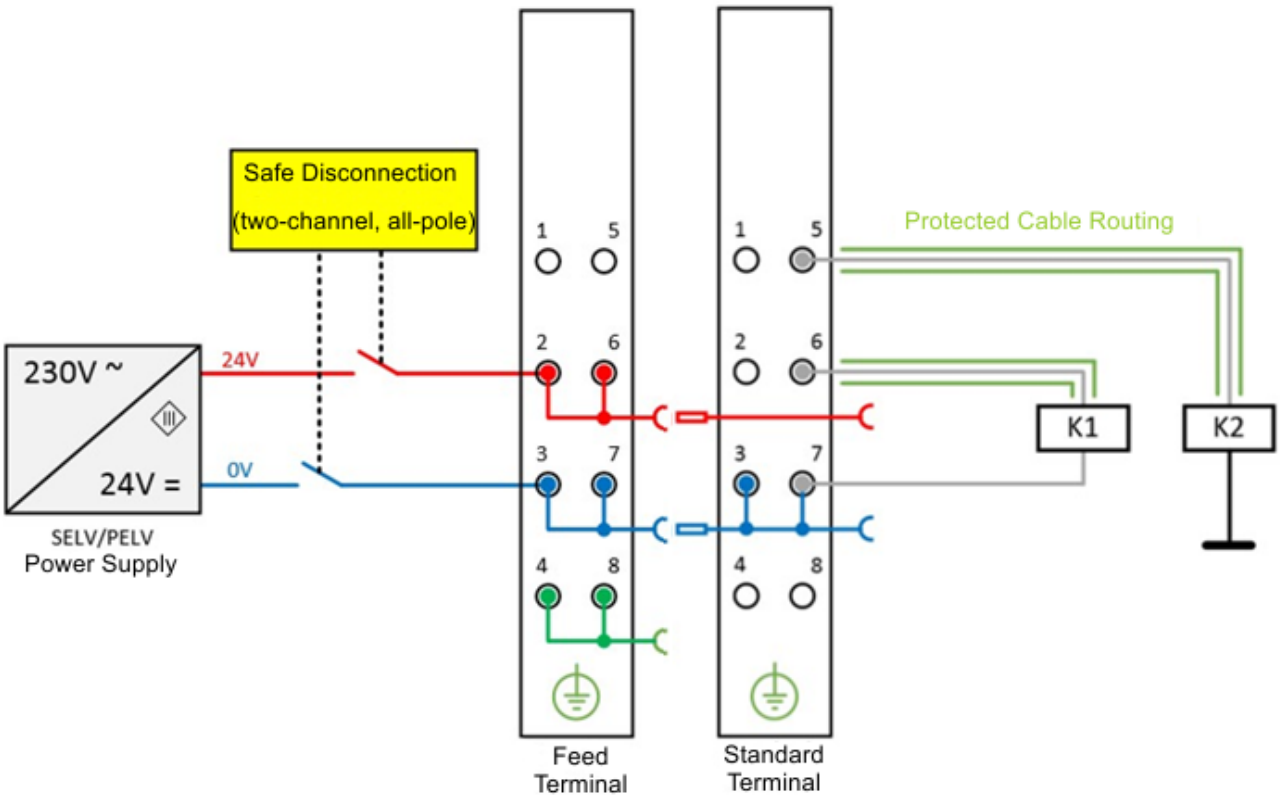


Fig. 6: Short circuit fault exclusion through protected cable laying

- **a) Possibility 1: Load connection via separate sheathed cables**
  The non-safely switched potential of the standard terminal may not be conducted together with other potential-conducting cores inside the same sheathed cable. *(Fault exclusion, see EN ISO 13849-2:2013, Table D.4)*
- **b) Possibility 2: Wiring only inside the control cabinet**
  All loads connected to the non-safe standard terminals must be located in the same control cabinet as the terminals. The cables are routed entirely inside the control cabinet. *(Fault exclusion, see EN ISO 13849-2:2013, Table D.4)*
- **c) Possibility 3: Dedicated earth connection per conductor**
  All conductors connected to the non-safe standard terminals are protected by their own earth connection. *(Fault exclusion, see EN ISO 13849-2:2013, Table D.4)*
- **d) Possibility 4: Cable permanently (fixed) installed and protected against external damage**
  All conductors connected to the non-safe standard terminals are permanently fixed and, e.g. protected against external damage by a cable duct or armored pipe.

- **Effect of the options on the safety level**
  In principle, standard terminals in safely switched potential groups are not an active part of the safety controller. Accordingly, **the safety level attained is defined only by the higher-level safety controller**, i.e. the standard terminals are not included in the calculation! However, the wiring of the standard terminals can lead to limitations in the maximum attainable safety level.
  Depending on the solution selected for the avoidance of feedback and the safety standard considered (see Option 1 and Option 2), different maximum attainable safety levels result, which are summarized in the following table:

Summary of safety classifications

Feedback avoidance measures	DIN EN ISO 13849-1	IEC 61508	EN 62061
Fault exclusion Cable short-circuit	max. Cat. 4	max. SIL3	max. SIL2 *
Ground feedback and all-pole disconnection	PLe		max. SIL3

Note: All terminals in a potential group must be interference-free and it must be ensured that no energy is fed back by external circuitry, even in the event of a fault.

2 Product description

2.1 Overview EtherCAT System and Function terminals

EL9011 [▶ 22] (End cap)
EL9012 [▶ 22] (End cap)

EL9070 [▶ 24] (Shield terminal)

EL9080 [▶ 22] (Separation terminal)

EL9100 [▶ 26] (Feed terminal, 24 VDC)
EL9110 [▶ 26] (Feed terminal, 24 VDC, with diagnosis)

EL9150 [▶ 30] (Feed terminal, 230 VAC [120 VAC])
EL9160 [▶ 30] (Feed terminal, 230 VAC [120 VAC], with diagnosis)

EL9180 [▶ 33] (Potential distribution terminal, 2 terminal points per power contact)

EL9181 [▶ 36] (Potential distribution terminal, 2 separated potentials)
EL9182 [▶ 36] (Potential distribution terminal, 8 separated potentials)
EL9183 [▶ 36] (Potential distribution terminal, 1 potential, 16 terminal points)
EL9184 [▶ 40] (Potential distribution terminals, 2 x 8 channels)

EL9185 [▶ 40] (Potential distribution terminals, 2 x 4 channels)
EL9185-0010 [▶ 40] (Potential distribution terminals, 2 x 4 channels, potential supply function up to 230 V AC)
EL9186 [▶ 40], EL9187 [▶ 40] (Potential distribution terminals, 8 channels)

EL9188 [▶ 40], EL9189 [▶ 40] (Potential distribution terminals, 16 channels

EL9190 [▶ 26] (Feed terminal, up to 230 V AC/DC)

EL9195 [▶ 50] (Shield terminal, up to 230 V AC/DC)

EL9200 [▶ 53] (Feed terminal, fused, 24 VDC)
EL9210 [▶ 53] (Feed terminal, fused, 24 VDC, with diagnosis)

EL9250 [▶ 57] (Feed terminal, fused, 230 VAC)
EL9260 [▶ 57] (Feed terminal, fused, 230 VAC, with diagnosis)
EL9290 [▶ 53] (Feed terminal, fused, up to 230 VAC)

EL9400 [▶ 60] (Power supply unit terminal for E-bus)
EL9410 [▶ 60] (Power supply unit terminal for E-bus with diagnosis

EL9540 [▶ 63] (Surge filter field supply)
EL9540-0010 [▶ 63] (Surge filter field supply for analog terminals with diagnostics)
EL9550 [▶ 63] (Surge filter system and field supply)
EL9550-0010 [▶ 63] (Surge filter system and field supply for digital terminals with diagnostics)
EL9550-0012 [▶ 63] (Surge filter system and field supply with up to 10 A)

EL9570 [▶ 73] (Buffer capacitor terminal)

2.2 EL9011, EL9012, EL9080

2.2.1 EL9011, EL9012, EL9080 - Introduction and Technical Data

End cap

Fig. 7: EL9011, EL9012

Each EtherCAT terminal block must be terminated at the right-hand end with an EL9011or EL9012 bus end cap due to mechanical and electrical protection.
In addition to the E-bus, the EL9012 also covers the power contacts and is color-matched to the EL terminal series.

Separation terminal

Fig. 8: EL9080

The EL9080 separation terminal interrupts the power contacts within a bus terminal block. The terminal enables operation with different voltages on the separated sides of the power contacts. But the E-Bus is looped through. The discontinuance of the Power Contacts is especially displayed by the orange front plate of the EL9080. The EL9080 separation terminal does not have any other function or connection facility.

Technical Data	EL9011	EL9012	EL9080
Electrical isolation	-		500 V (E-bus/field potential)
Bit width in the process image	0		
Configuration	no address or configuration settings		
Diagnosis	-		
PE contact	no		
Renewed infeed	-		
Connection facility to additional power contact	-		
Side by side mounting on Bus Terminals with power contact	yes		
Side by side mounting on Bus Terminals without power contact	yes		
Electrical connection to mounting rail	no		
Weight	approx. 8 g	approx. 10 g	approx. 40 g
Permissible ambient temperature	-25°C ... +60°C (extended temperature range)		
Permissible ambient temperature range (during storage)	-40°C ... +85°C		
Permissible relative humidity	95%, no condensation		
Dimensions (W x H x D)	approx. 8 mm x 100 mm x 34 mm (width aligned: 5 mm)	approx. 8 mm x 100 mm x 55 mm (width aligned: 5 mm)	approx.15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Mounting [▶ 93]	aligned to the last terminal in the terminal block		on 35 mm mounting rail conforms to EN 60715
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27		
EMC resistance burst/ESD	conforms to EN 61000-6-2/EN 61000-6-4		
Protection class	IP20		
Installation position	variable		
Markings*	CE, UKCA, EAC		
Approvals*	ATEX [▶ 87], IECEx [▶ 88], cULus [▶ 92]	cULus [▶ 92]	ATEX [▶ 87], IECEx [▶ 88], cULus [▶ 92]

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

2.3 EL9070

2.3.1 EL9070 - Introduction and Technical Data

Shield terminal

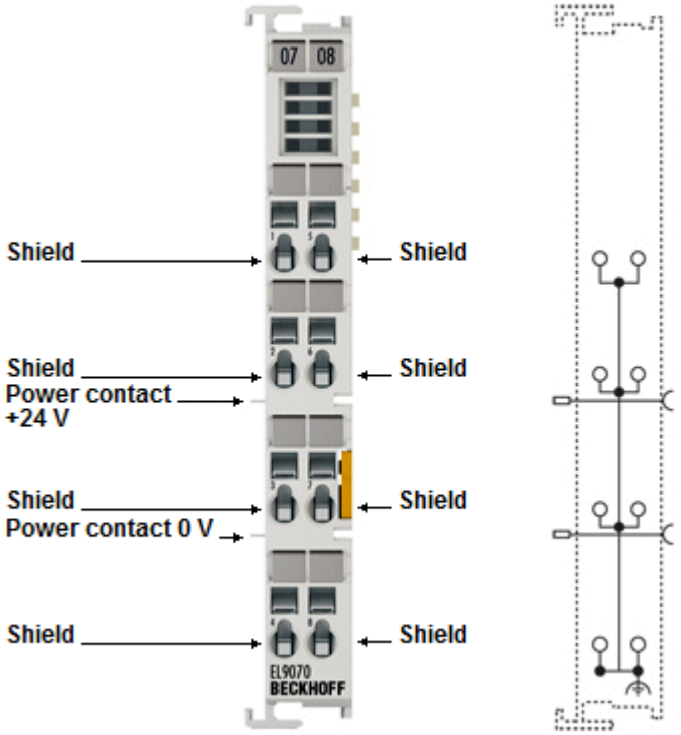


Fig. 9: EL9070

The EL9070 shield terminal provides eight terminal points with the potential of the mounting rail and enables the screening to be picked up without further modular terminal blocks or wiring. With its internal seamless copper surface, the EL9070 offers good screening between two EtherCAT Terminals.

Technical data

Technical Data	EL9070
Technology	shield terminal
Current load	≤ 10 A
Power LED	-
Error LED	-
Current consumption E-bus	-
Nominal voltage	arbitrary up to 230 V AC
Integrated fine-wire fuse	-
Electrical isolation	500 V (E-bus/field potential)
Diagnostics in the process image	-
Reported to E-bus	-
PE contact	no
Shield connection	8 x
E-bus looped through	yes
Bit width in the process image	0
Electrical connection to mounting rail	yes (dissipation of EMC interference via large copper surfaces on the mounting rail)
Electrical connection to power contacts	-
Renewed infeed	-
Connection facility to additional power contact	no
Side by side mounting on Bus Terminals with power contact	yes, left side without PE
Side by side mounting on Bus Terminals without power contact	-
Configuration	no address or configuration settings
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Weight	approx. 50 g
Permissible ambient temperature range (during operation)	0°C ... +55°C
Permissible ambient temperature range (during storage)	-25°C ... +85°C
Permissible relative humidity	95%, no condensation
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP20
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC

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

Connection

Terminal point		Meaning
Indication	No.	
1 - 8	1 - 8	Terminal points 1 - 8 are connected internally

2.4 EL9100, EL9110, EL9190

2.4.1 EL9100, EL9110, EL9190 - Introduction and Technical Data

Feed terminals, 24 V DC

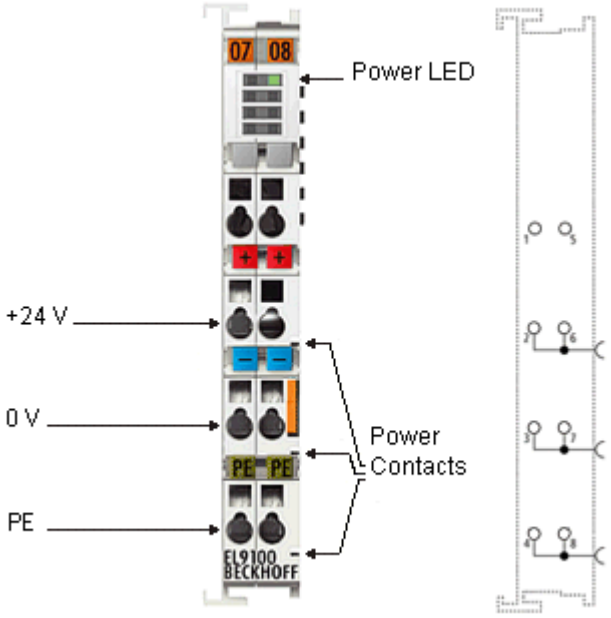


Fig. 10: EL9100

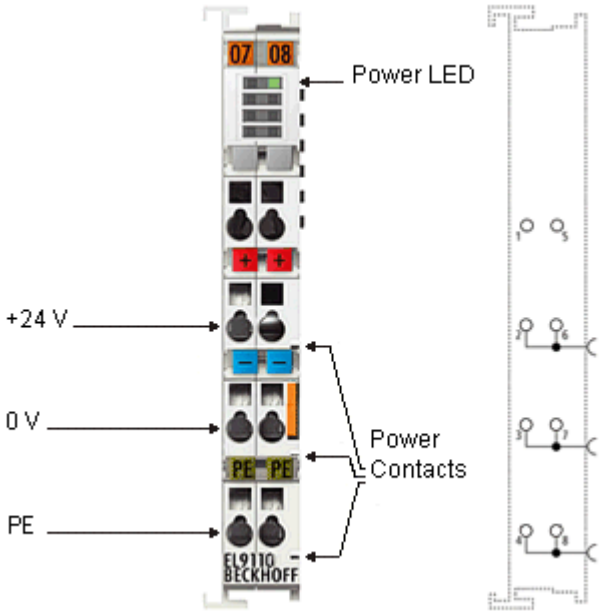


Fig. 11: EL9110

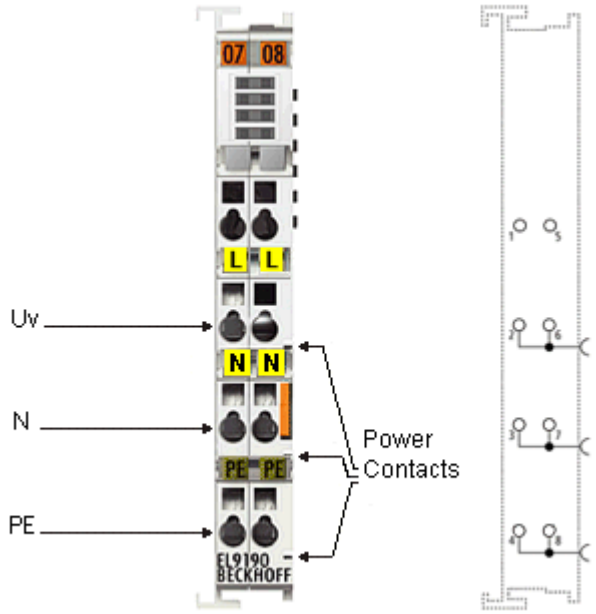


Fig. 12: EL9190

The EL9100, EL9110 and EL9190 feed terminal can be positioned at any location between the input and output terminals for establishing a further potential group or for supplying the terminals following on the right in applications with high current load. The E-Bus is looped through. As opposed to the EL9100 and EL9190, the EL9110 has a diagnostic function which is displayed on the process image.

Technical data

Technical data	EL9100	EL9110	EL9190
Nominal voltage	24 V DC		variable, up to 230 V AC/DC
Power contact current load	max. 10 A		
Electrical isolation	500 V (E-bus/field potential)		
Current consumption from E-Bus	-	typ. 90 mA	-
Bit width in the process image	-	1 bit (diagnosis)	-
Configuration	no address or configuration settings		
Power LED	yes	yes	no
Diagnosis	no	yes, in process image	no
Electrical connection to mounting rail	no		
PE contact	yes		
Renewed infeed	yes		
Connection facility to additional power contact	1		
Side by side mounting on Bus Terminals with power contact	yes		
Side by side mounting on Bus Terminals without power contact	yes		
Weight	approx. 50 g		
Permissible ambient temperature range (during operation)	-25°C ... +60°C (extended temperature range)		0°C ... +55°C
Permissible ambient temperature range (during storage)	-40°C ... +85°C		-25°C ... +85°C
Permissible relative humidity	95%, no condensation		
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)		
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715		
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity		-
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27		
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4		
Protection class	IP20		
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"	variable	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 87], IECEx [▶ 88]		CE, cULus [▶ 92], UKCA, EAC

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9100, EL9110, EL9190

⚠ CAUTION

Hazard to individuals and devices!

When designing a Bus Terminal block with different potentials on the power contacts (e.g. 230 V AC/DC and 24 V DC), please note that it is mandatory to use potential separation terminals (EL9080)!
Bring the bus system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Terminal point		Description
Indication	No.	
	1	not used
+24 V* / 230 V AC/DC**	2	Supply input + 24 V [EL9100, EL9110] Supply input 230 V AC [EL9190: variable voltage, up to 230 V AC/DC] connected internally with terminal 6 and positive [EL9100, EL9110] resp. 230 V AC/DC [EL9190] power contact)
0 V* / N**	3	0 V for supply input [EL9100, EL9110] N for supply input [EL9190] connected internally with terminal 7 and negative [EL9100, EL9110] resp. neutral [EL9190] power contact)
PE***	4	PE (connected internally with terminal 8 and PE power contact)
	5	not used
+24 V* / 230 V AC/DC**	6	Supply input + 24 V [EL9100, EL9110] Supply input 230 V AC/DC [EL9190: variable voltage, up to 230 V AC/DC] connected internally with terminal 2 and positive [EL9100, EL9110] resp. 230 V AC/DC [EL9190] power contact)
0 V* / N**	7	0 V for supply input [EL9100, EL9110] N for supply input [EL9190] connected internally with terminal 3 and negative [EL9100, EL9110] resp. neutral [EL9190] power contact)
PE***	8	PE (connected internally with terminal 4 and PE power contact)

* only EL9100, EL9110
** only EL9190
*** from hardware status 02

LEDs

LED	Color	Meaning	
Power LED**	green	off	No input voltage at supply input
		on	24 V DC at supply input

** only EL9100, EL9110

Process data (only EL9110)

The EL9110 has a bit width of 1 bit (diagnosis bit for the power contacts voltage, "PowerOK") and is displayed in the TwinCAT tree as follows:

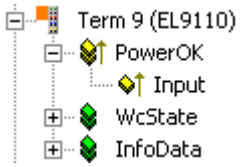


Fig. 13: EL9110 in the TwinCAT tree

If there is *no* voltage impressed on the power contacts, the corresponding diagnosis bit 'PowerOK' has FALSE (0) status.

2.5 EL9150, EL9160

2.5.1 EL9150, EL9160 - Introduction and Technical Data

Feed terminals, 230 V AC

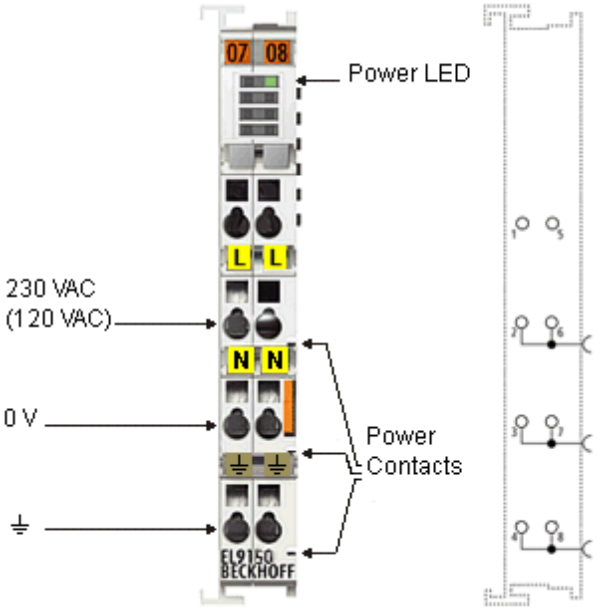


Fig. 14: EL9150

The EL9150 feed terminal can be positioned at any location between the input and output terminals for establishing a further potential group or for supplying the terminals following on the right in applications with high current load. The E-Bus is looped through.

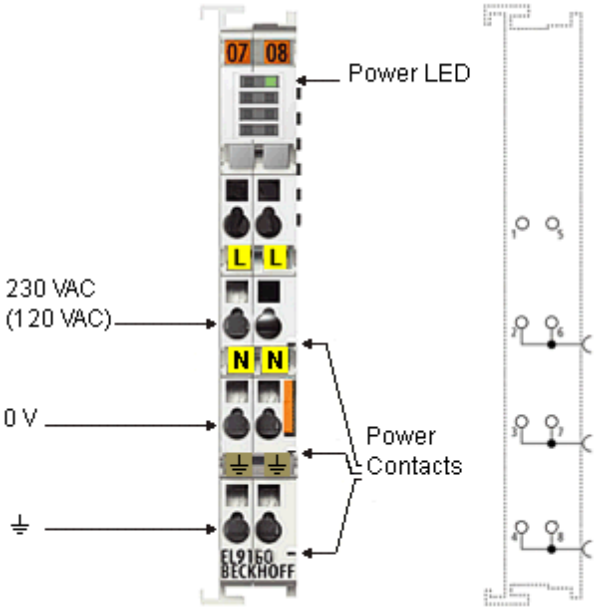


Fig. 15: EL9160

As opposed to the EL9150, the EL9160 has a diagnostic function which is displayed on the process image.

Technical data

Technical data	EL9150	EL9160
Nominal voltage	230 V_{AC} (120 V_{AC})	
Power contact current load	max. 10 A	
Electrical isolation	500 V (E-bus/field potential)	
Current consumption from E-Bus	-	typ. 90 mA
Bit width in the process image	0	1 bit (diagnosis)
Configuration	no address or configuration settings	
Power LED	yes	
Diagnosis	no	yes, in process image
Electrical connection to mounting rail	no	
PE contact	yes	
Renewed infeed	yes	
Connection facility to additional power contact	1	
Side by side mounting on Bus Terminals with power contact	yes	
Side by side mounting on Bus Terminals without power contact	yes	
Weight	approx. 50 g	
Permissible ambient temperature range (during operation)	0°C ... +55°C	
Permissible ambient temperature range (during storage)	-25°C ... +85°C	
Operating height	max. 2000 m	
Overvoltage category	II	
Degree of pollution	2	
Permissible relative humidity	95%, no condensation	
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)	
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715	
Vibration / shock resistance	conforms to EN 60068-2-6/EN 60068-2-27	
EMC resistance burst / ESD	conforms to EN 61000-6-2/EN 61000-6-4	
Protection class	IP20	
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"	variable
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC	

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

Connection EL9150, EL9160

⚠ CAUTION

Hazard to individuals and devices!

When designing a Bus Terminal block with different potentials on the power contacts (e. g. 230 V_{AC} and 24 V_{DC}), please note that it is mandatory to use potential separation terminals (EL9080)!
Bring the bus system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Terminal point		Description
Indication	No.	
	1	not used
230 V_{AC} (120 V_{AC})	2	Supply input 230 V_{AC} (120 V_{AC}), connected internally with terminal 6 and power contact)
0 V	3	0 V for supply input (connected internally with terminal 7 and power contact)
Earth	4	Earth (connected internally with terminal 8 and earth power contact)
	5	not used
230 V_{AC} (120 V_{AC})	6	Supply input 230 V_{AC} (120 V_{AC}, (connected internally with terminal 2 and power contact)
0 V	7	0 V for supply input (connected internally with terminal 3 and power contact)
Earth	8	Earth (connected internally with terminal 4 and earth power contact)

LEDs

LED	Color	Meaning	
Power LED	green	off	No input voltage at supply input
		on	230 V_{AC} (120 V_{AC}) at supply input

Process data (only EL9160)

The EL9160 has a bit width of 1 bit (diagnosis bit for the power contacts voltage, "PowerOK") and is displayed in the TwinCAT tree as follows:

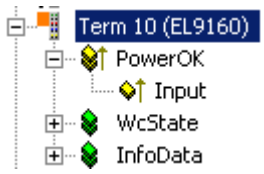


Fig. 16: EL9160 in the TwinCAT tree

If there is no voltage impressed on the power contacts, the corresponding diagnosis bit 'PowerOK' has FALSE (0) status.

2.6 EL9180

2.6.1 EL9180 - Introduction and Technical Data

Potential distribution terminal

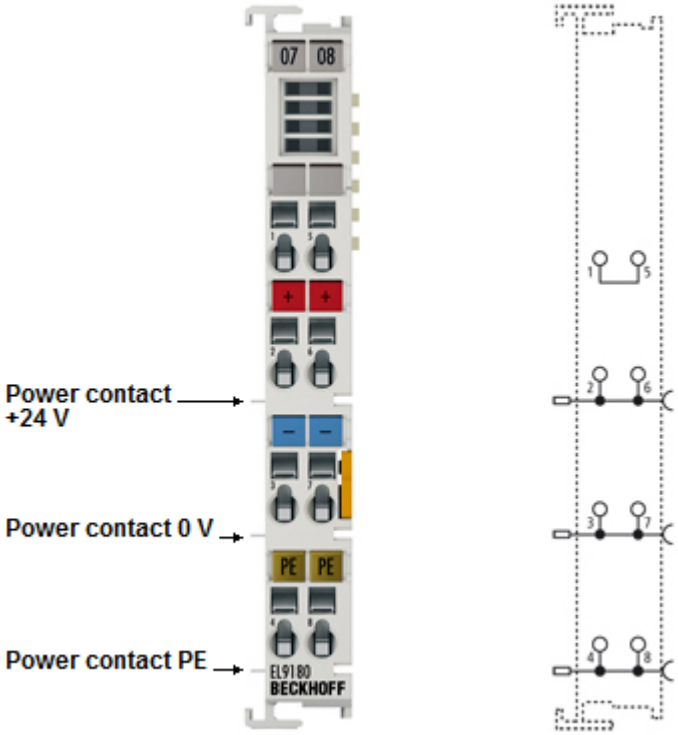


Fig. 17: EL9080

The EL9180 allows the supply voltage to be accessed a number of times via spring force terminals. The EtherCAT Terminal makes it unnecessary to use additional terminal blocks on the terminal strip.

Technical data

Technical data	EL9180
Technology	potential distribution terminal
Power contact current load	≤ 10 A
Power LED	-
Defect LED	-
Current consumption from E-Bus	-
Nominal voltage	arbitrary up to 230 V AC/DC
Integrated fine-wire fuse	-
Electrical isolation	500 V (E-bus/field potential)
Diagnosis	-
Reported to E-bus	-
Power contact	3 x power contact
PE contact	yes
Shield connection	-
Renewed infeed	-
Connection facility to additional power contact	2
Side by side mounting on Bus Terminals with power contact	yes
Side by side mounting on Bus Terminals without power contact	-
Electrical connection to mounting rail	yes
Bit width in the process image	-
Configuration	no address or configuration settings
Weight	approx. 50 g
Permissible ambient temperature range (during operation)	0°C ... +55°C
Permissible ambient temperature range (during storage)	-25°C ... +85°C
Permissible relative humidity	95%, no condensation
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Mounting [▶ 93]	on 35 mm mounting rail conform to EN 60715
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP20
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Approvals / markings*)	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 86], IECEx [▶ 88]

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9180

Terminal point No.	Description
1	connected internally with terminal 5
2	+24 V (connected internally with terminal 6 and positive power contact)
3	0 V (connected internally with terminal 7 and negative power contact)
4	PE (connected internally with terminal 8 and PE power contact)
5	connected internally with terminal 1
6	+24 V (connected internally with terminal 2 and positive power contact)
7	0 V (connected internally with terminal 3 and negative power contact)
8	PE (connected internally with terminal 4 and PE power contact)

2.7 EL9181, EL9182, EL9183

2.7.1 EL9181, EL9182, EL9183 - Introduction and Technical Data

Potential distribution terminal, HD housing

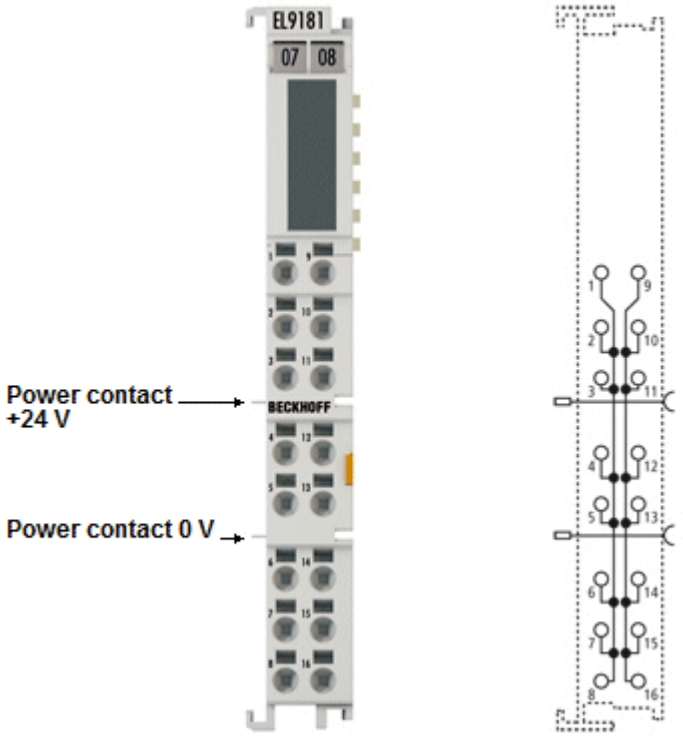


Fig. 18: EL9181

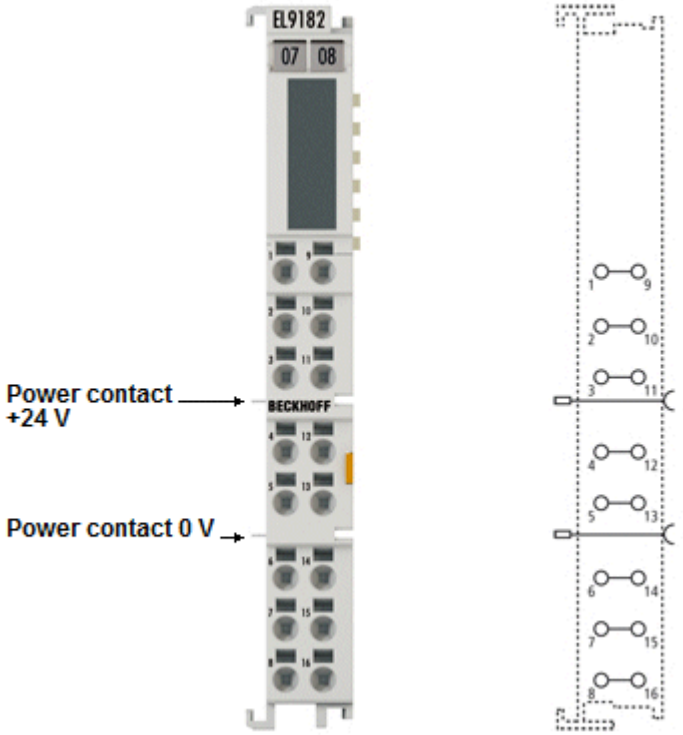


Fig. 19: EL9182

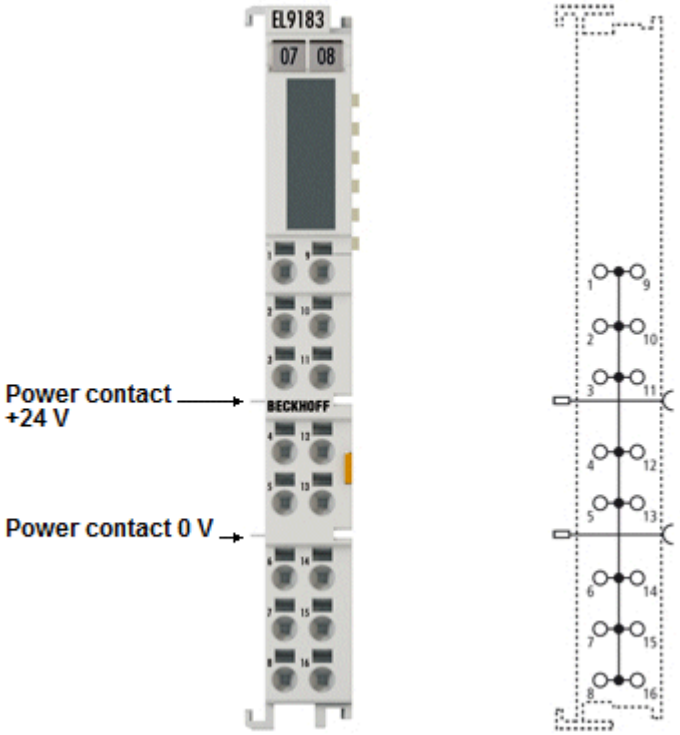


Fig. 20: EL9183

The potential distribution terminals EL9181, EL9182 and EL9183 provide 16 terminal points for potential distribution and enable the voltage to be picked up without further terminal blocks or wiring. The power contacts are fed through to the next terminal without connecting to the terminal points.

The HD EtherCAT Terminals (High Density) with increased packing density feature 16 connection points in the housing of a 12 mm EtherCAT Terminal. The conductors can be connected without tools in the case of solid wires using a direct plug-in technique

Technical data

Technical Data	EL9181	EL9182	EL9183
Technology	Potential distribution terminal		
Number of separate potentials	2	8	1
Terminal points per potential	8	2	16
Nominal voltage	≤ 60 V_{DC}		
Current load	max. 10 A		
Current consumption from E-Bus	-		
E-bus looped through	yes		
Power contacts looped through	yes (2 power contacts)		
Diagnosis	-		
Message to E-Bus	-		
PE contact	no		
Renewed infeed	-		
Connection facility to additional power contact	-		
Side by side mounting on Bus Terminals with power contact	yes		
Side by side mounting on Bus Terminals without power contact	-		
Bit width in the process image	0		
Electrical connection to mounting rail	-		
Electrical connection to power contacts	-		
Electrical isolation	500 V (E-bus/field potential)		
Configuration	no address or configuration settings		
Conductor types	solid wire, stranded wire and ferrule		
Conductor connection	solid wire conductors: direct plug-in technique; stranded wire conductors and ferrules: spring actuation by screwdriver		
Rated cross-section	solid wire: 0.08…1.5 mm²; stranded wire: 0.25…1.5 mm²; ferrule: 0.14…0.75 mm²		
Weight	approx. 60 g		
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 humidity	95%, no condensation		
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)		
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715		
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity		
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27		
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4		
Protection class	IP20		
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"		
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 87], IECEx [▶ 88],	CE, cULus [▶ 92], UKCA, EAC,	

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9181

Terminal point		Meaning
Indication	No.	
1 - 8	1 - 8	Terminal points 1 - 8 are connected internally
9 - 16	9 - 16	Terminal points 9 - 16 are connected internally

Connection EL9182

Terminal point		Meaning
Indication	No.	
1, 9	1 + 9	Terminal points 1 + 9 are connected internally
2, 10	2 + 10	Terminal points 2 +10 are connected internally
3, 11	3 + 11	Terminal points 3 + 11 are connected internally
4, 12	4 + 12	Terminal points 4 + 12 are connected internally
5, 13	5 + 13	Terminal points 5 + 13 are connected internally
6, 14	6 + 14	Terminal points 6 + 14 are connected internally
7, 15	7 + 15	Terminal points 7 + 15 are connected internally
8, 16	8 + 16	Terminal points 8 + 16 are connected internally

Connection EL9183

Terminal point		Meaning
Indication	No.	
1 - 16	1 - 16	Terminal points 1 - 16 are connected internally

2.8 EL9184, EL9185, EL9185-0010, EL9186, EL9187, EL9188, EL9189

2.8.1 EL9184, EL9185, EL9185-0010, EL9186, EL9187, EL9188, EL9189 - Introduction and Technical Data

Potential distribution terminals

EL9185

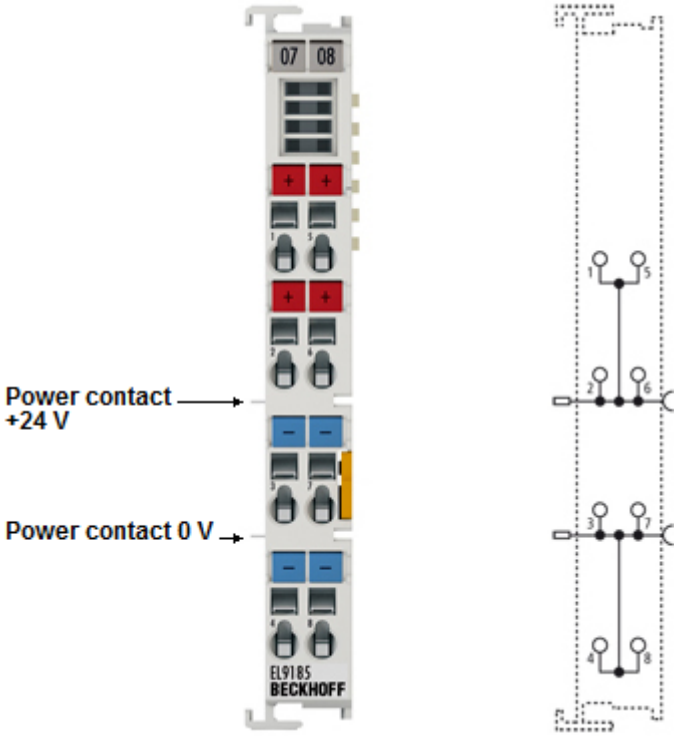


Fig. 21: EL9185

The EL9185 EtherCAT Terminal allows the supply voltage to be accessed a number of times via spring force terminals. The EL9185 makes it unnecessary to use additional terminal blocks on the terminal strip.

Technical data

Technical Data	EL9185
Nominal voltage	arbitrary up to 230 V AC/DC
Current load	≤ 10 A
Diagnosis	-
Message to E-Bus	-
PE contact	no
Shield connection	-
Current consumption from E-Bus	-
Bit width in the process image	0
Electrical connection to mounting rail	-
Electrical isolation	500 V (E-bus/field potential)
Renewed infeed	-
Side by side mounting on EtherCAT Terminals with power contact	only 2 power contacts, no PE
Side by side mounting on EtherCAT Terminals without power contact	-
Connection facility to additional power contact	4
Configuration	no address or configuration settings
Weight	approx. 65 g
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 humidity	95%, no condensation
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP20
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 87], IECEx [▶ 88]

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9185

Terminal point		Description
Indication	No.	
Output 1, 2 ,5, 6	1, 2 ,5, 6	Output 1, 2 ,5, 6 (internally connected with positive power contact)
Output 3, 4, 7, 8	3, 4, 7, 8	Output 3, 4, 7, 8 (internally connected with negative power contact)

EL9185-0010

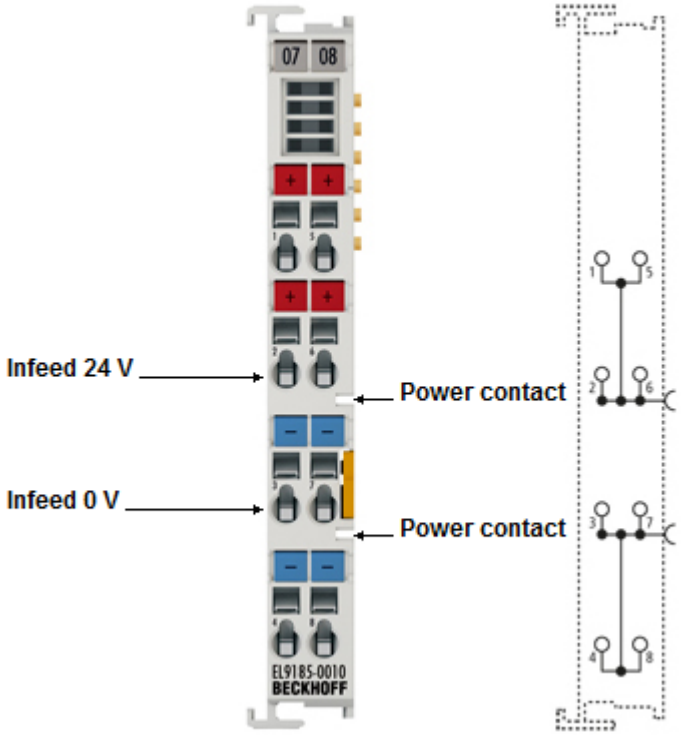


Fig. 22: EL9185-0010

The EL9185-0010 potential distribution terminal with additional power feed function enables multiple tapping of the supply voltage at the terminal points. In addition, it feeds in the supply voltage for the downstream terminals via power contacts and as a result forms a new potential group, as no power contacts are fed out on the left side of the EL9185-0010. The EL9185-0010 makes the use of additional terminal blocks on the terminal strip unnecessary.

Technical data

Technical Data	EL9185-0010
Nominal voltage	arbitrary up to 230 V AC/DC
Current load	≤ 10 A
Diagnosis	-
Message to E-Bus	-
PE contact	no
Shield connection	-
Current consumption from E-Bus	-
Bit width in the process image	0
Electrical connection to mounting rail	-
Electrical isolation	500 V (E-bus/field potential)
Renewed infeed	yes
Side by side mounting on EtherCAT Terminals with power contact	yes
Side by side mounting on EtherCAT Terminals without power contact	yes
Connection facility to additional power contact	3
Configuration	no address or configuration settings
Weight	approx. 65 g
Permissible ambient temperature range (during operation)	0°C ... +55°C
Permissible ambient temperature range (during storage)	-25°C ... +85°C
Permissible relative humidity	95%, no condensation
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP20
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Approvals / markings*	CE, UKCA, EAC

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

Connection EL9185-0010

Terminal point		Description
Indication	No.	
Output 1, 2 ,5, 6	1, 2 ,5, 6	Output 1, 2 ,5, 6 (internally connected with positive power contact, right-sided)
Output 3, 4, 7, 8	3, 4, 7, 8	Output 3, 4, 7, 8 (internally connected with negative power contact, right-sided)

EL9186, EL9187

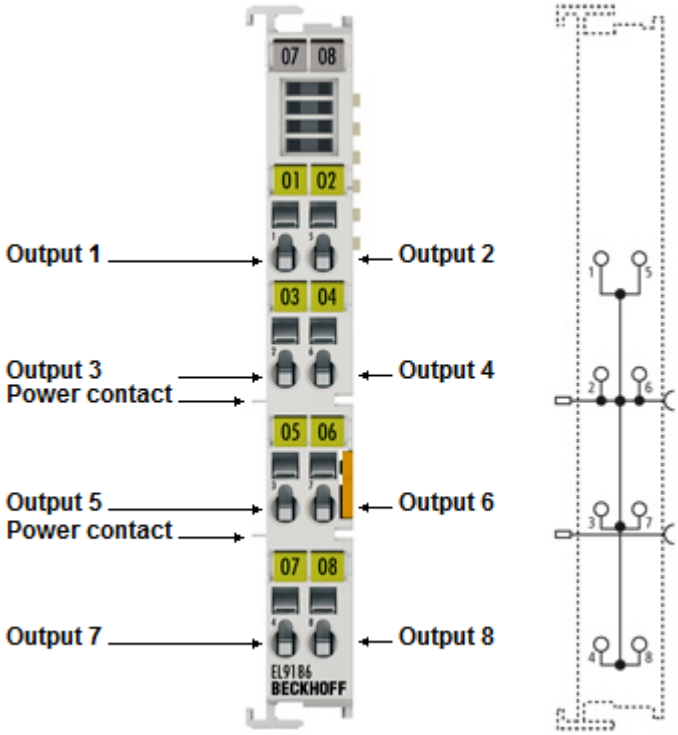


Fig. 23: EL9186

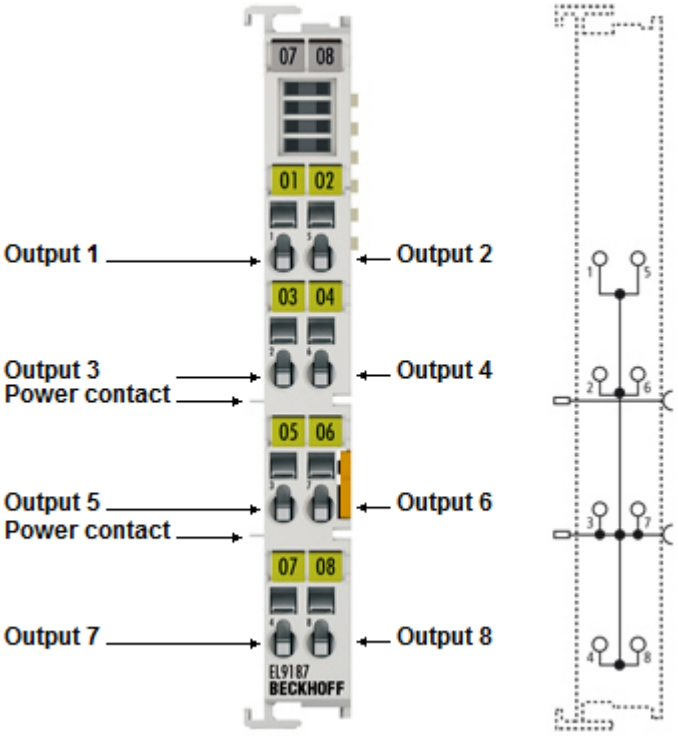


Fig. 24: EL9187

The potential distribution terminals EL9186 and EL9187 provide 8 terminal points with a potential and enable the voltage to be picked up without further bus terminal blocks or wiring.

Technical Data

Technical Data	EL9186	EL9187
Nominal voltage	≤ 60V DC / ≤ 30V AC	
Current load	≤ 10 A	
Diagnosis	-	
Message to E-Bus	-	
PE contact	no	
Shield connection	-	
Outputs	8 (connected with positive power contact)	8 x 0 V contact (connected with negative power contact)
Current consumption from E-Bus	-	
Bit width in the process image	0	
Electrical connection to mounting rail	-	
Electrical isolation	500 V (E-bus/field potential)	
Renewed power feed	-	
Side by side mounting on EtherCAT Terminals with power contact	yes, left side without PE	
Side by side mounting on EtherCAT Terminals without power contact	-	
Connection facility to additional power contact	8	
Configuration	no address or configuration settings	
Weight	approx. 65 g	
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 humidity	95%, no condensation	
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)	
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715	
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4	
Protection class	IP20	
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"	
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 87], IECEx [▶ 88]	

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9186

Terminal point		Description
Indication	No.	
Output 1 - 8	1 - 8	Output 1 - 8 (internally connected with positive power contact)

Connection EL9187

Terminal point		Description
Indication	No.	
Output 1 - 8	1 - 8	Output 1 - 8 (internally connected with negative power contact)

Potential distribution terminals, HD housing

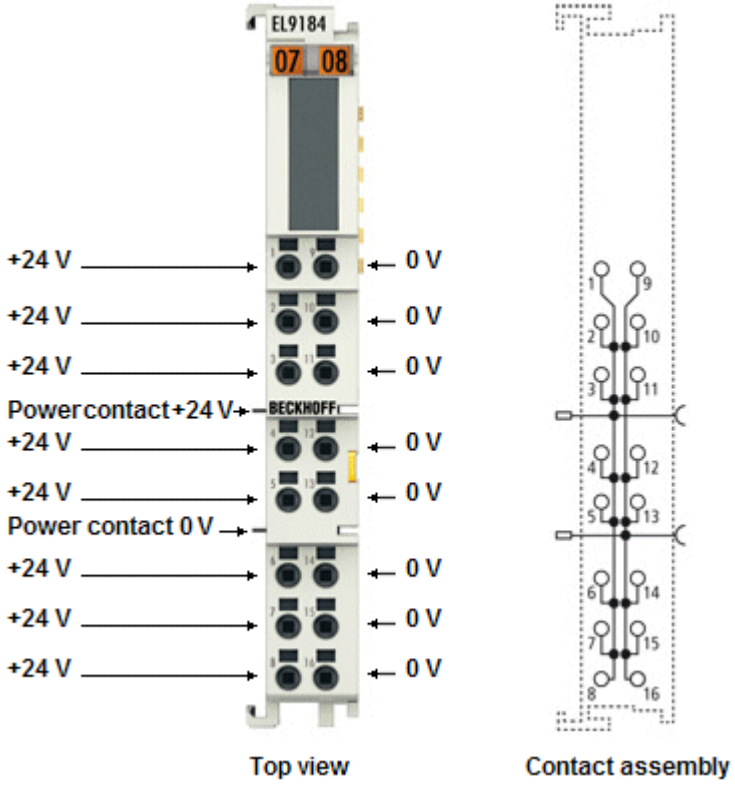


Fig. 25: EL9184

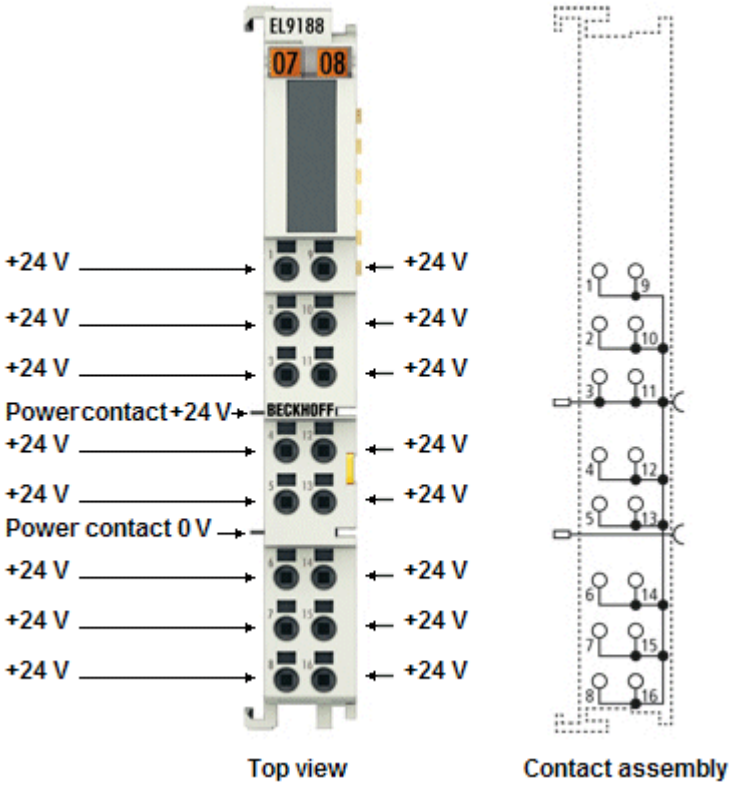


Fig. 26: EL9188

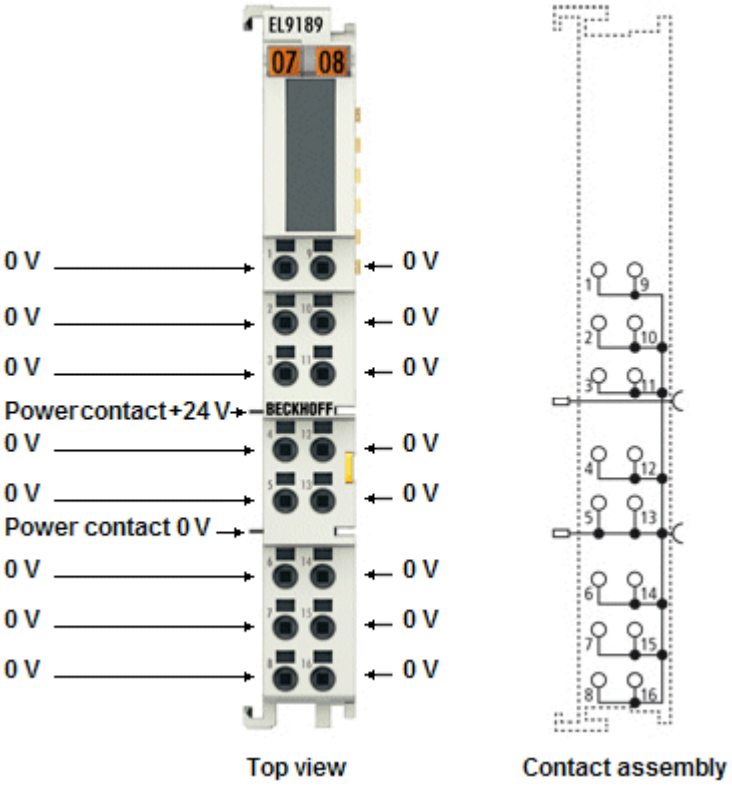


Fig. 27: EL9189

The potential distribution terminals EL9188 and EL9189 provide 16 terminal points with a potential and enable the voltage to be picked up without further bus terminal blocks or wiring.
The EL9184 provides the potential of the 24 V DC contact at 8 terminal points and the potential of the 0 V contact at 8 terminal points.

The conductors can be connected without tools in the case of solid wires using a direct plug-in technique.

The HD EtherCAT Terminals (High Density) with increased packing density feature 16 connection points in the housing of a 12 mm terminal block.

Technical Data

Technical Data	EL9184	EL9188	EL9189
Nominal voltage	≤ 60 V_{DC}		
Current load	≤ 10 A		
Power LED	-		
Error LED	-		
Message to E-Bus	-		
Shield connection	-		
Renewed power feed	-		
Connection facility to additional power contact	8	16	
Side by side mounting on EtherCAT Terminals with power contact	yes, left side without PE		
Side by side mounting on EtherCAT Terminals without power contact	-		
PE contact	no		
Outputs	2 x 8 (e.g.: 8 x 24 V contact, 8 x 0 V contact)	16 (e.g. 16 x 24 V contact)	16 (e.g. 16 x 0 V contact)
Current consumption from E-Bus	-		
Bit width in the process image	0		
Electrical connection to mounting rail	-		
Electrical isolation	500 V (E-bus/field potential)		
Configuration	no address or configuration settings		
Conductor types	solid wire, stranded wire and ferrule		
Conductor connection	solid wire conductors: direct plug-in technique; stranded wire conductors and ferrules: spring actuation by screwdriver		
Rated cross-section	solid wire: 0.08…1.5 mm²; stranded wire: 0.25…1.5 mm²; ferrule: 0.14…0.75 mm²		
Weight	approx.. 60 g		
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 humidity	95%, no condensation		
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)		
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715		
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity		
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27		
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4		
Protection class	IP20		
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"		
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 87], IECEx [▶ 88]		

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9184

Terminal point		Description
Indication	No.	
+24 V	1 - 8	+24 V output (internally connected with positive power contact)
0 V	9 - 16	0 V (internally connected with negative power contact)

Connection EL9188

Terminal point		Description
Indication	No.	
+24 V	1 - 16	+24 V output (internally connected with positive power contact)

Connection EL9189

Terminal point		Description
Indication	No.	
0 V	1 - 16	0 V (internally connected with negative power contact)

2.9 EL9195

2.9.1 EL9195 - Introduction and Technical Data

Shield terminal

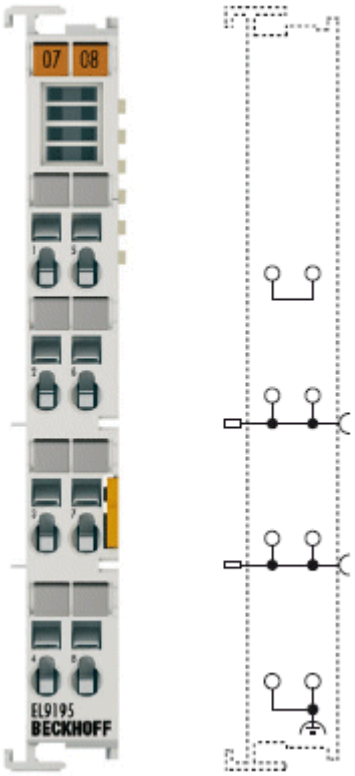


Fig. 28: EL9195

The EL9195 shield terminal enables the connection of the shield from the front via two terminal contacts, which are connected directly to the DIN rail, in order to be able to optimally dissipate electromagnetic irradiation.

The multiple tapping of the supply voltage via the front-side terminal contacts is additionally ensured by the EL9195 EtherCAT terminal. 24 V and 0 V can each be tapped twice from the front. The power contacts are connected to the front-side terminal contacts and are passed through to the adjacent terminal. With the EL9195, the use of additional terminal blocks on the terminal strip can be reduced.

Technical data

Technical data	EL9195
Technology	shield terminal, for dissipation of EMC interference
Power contact current load	max. 10 A
Power LED	-
Defect LED	-
Current consumption from E-Bus	-
Nominal voltage	arbitrary up to 230 V AC/DC
Integrated fine-wire fuse	-
Electrical isolation	500 V (E-bus/field potential)
Diagnosis	-
Reported to E-bus	-
Power contact	2 x power contact
PE contact	-
Renewed infeed	-
Connection facility to additional power contact	2
Side by side mounting on Bus Terminals with power contact	only 2 power contacts
Side by side mounting on Bus Terminals without power contact	-
Shield connection	2 x
Electrical connection to mounting rail	yes
Bit width in the process image	0
Configuration	no address or configuration settings
Weight	approx. 50 g
Permissible ambient temperature range (during operation)	0°C ... +55°C
Permissible ambient temperature range (during storage)	-25°C ... +85°C
Permissible relative humidity	95%, no condensation
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Mounting [▶ 93]	on 35 mm mounting rail conform to EN 60715
Enhanced mechanical load capacity	yes, see Installation instructions [▶ 98] for enhanced mechanical load capacity
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4
Protection class	IP20
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Approvals / markings*	CE, cULus [▶ 92], UKCA, EAC, ATEX [▶ 86], IECEx [▶ 88],

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9195

⚠ CAUTION

Hazard to individuals and devices!

When designing a Bus Terminal block with different potentials on the power contacts (e. g. 230 V_{AC} and 24 V_{DC}), please note that it is mandatory to use potential separation terminals (EL9080)!
Bring the bus system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Terminal point No.	Description
1	connected internally with terminal 5
2	Supply input: variable voltage, up to 230 V AC/DC connected internally with terminal 6 and positive resp. phase power contact)
3	0 V / N connected internally with terminal 7 and negative resp. neutral power contact)
4	Shield (connected internally with terminal 8 and mounting rail contact)
5	connected internally with terminal 1
6	Supply input: variable voltage, up to 230 V AC/DC connected internally with terminal 6 and positive resp. phase power contact)
7	0 V / N connected internally with terminal 3 and negative resp. neutral power contact)
8	Shield (connected internally with terminal 8 and mounting rail contact)

2.10 EL9200, EL9210, EL9290

2.10.1 EL9200, EL9210, EL9290 - Introduction and Technical Data

Feed terminals, 24 V DC

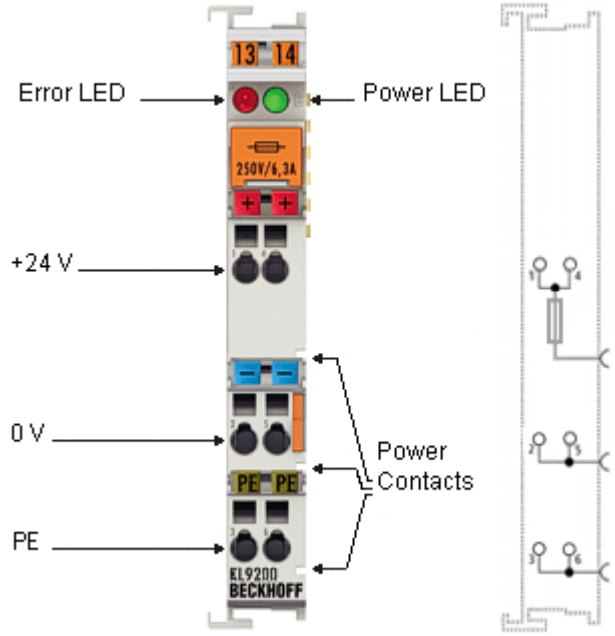


Fig. 29: EL9200

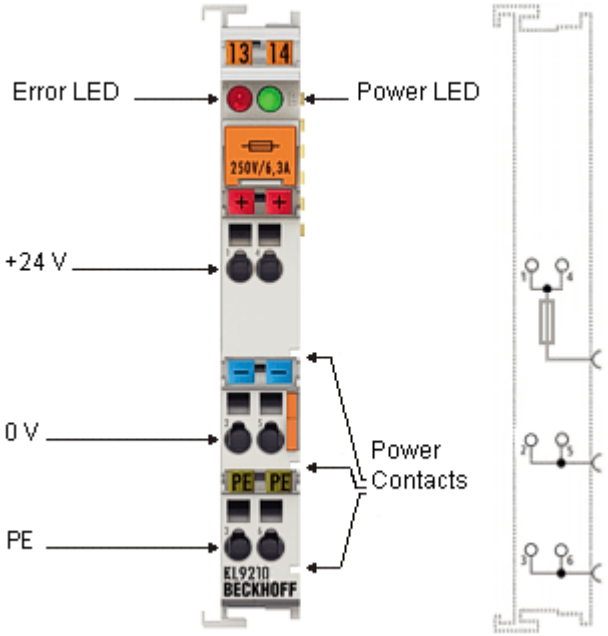


Fig. 30: EL9210

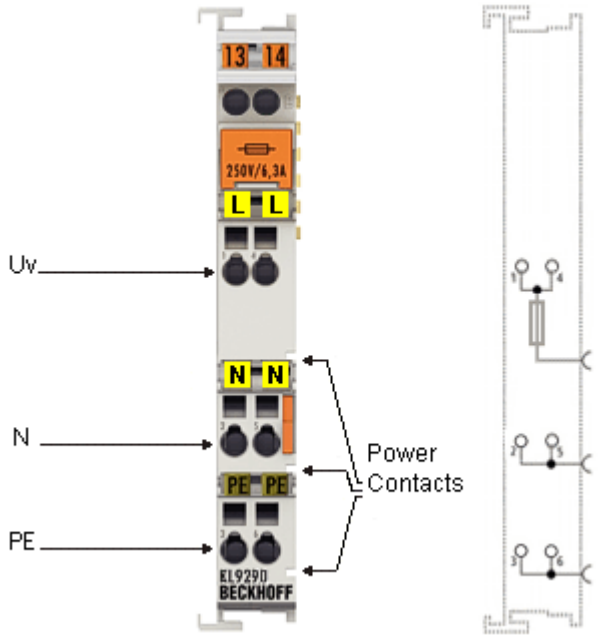


Fig. 31: EL9290

The EL9200, EL9210 and EL9290 feed terminals can be positioned at any location between the input and output terminals for establishing a further potential group or for supplying the terminals following on the right in applications with high current load. The E-Bus is looped through. As opposed to the EL9200 and EL9290, the EL9210 has a diagnostic function which is displayed on the process image. The feed-in is protected by a 6.3 A fine-wire fuse at all terminals.

Technical data

Technical data	EL9200	EL9210	EL9290
Nominal voltage	24 V_{DC}		variable, up to 230 V AC
Power contact current load	max. 10 A		
Electrical isolation	500 V (E-bus/field potential)		
Integrated fine-wire fuse	yes; 6.3 A		
Current consumption from E-Bus	-	typ. 90 mA	-
Bit width in the process image	-	2 diagnostic bits (PowerOK; FuseError)	-
Configuration	no address or configuration settings		
Power LED	yes	yes	no
Diagnosis (fuse)	yes, Error LED	yes, in process image and ErrorLED	no
Electrical connection to mounting rail	no		
PE contact	yes		
Renewed infeed	yes		
Connection facility to additional power contact	1		
Side by side mounting on Bus Terminals with power contact	yes		
Side by side mounting on Bus Terminals without power contact	yes		
Weight	approx. 55 g		
Permissible ambient temperature range (during operation)	0°C ... +55°C		
Permissible ambient temperature range (during storage)	-25°C ... +85°C		
Permissible relative humidity	95%, no condensation		
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)		
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715		
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27		
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4		
Protection class	IP 20		
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"	variable	variable, see chapter "Mounting of Passive Terminals [▶ 99]"
Markings*	CE, UKCA, EAC		
Approvals*	cULus [▶ 92], ATEX [▶ 86], IECEx [▶ 88],	cULus [▶ 92], DNV GL, ATEX [▶ 86], IECEx [▶ 88],	-

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

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc
IECEx	Ex nA IIC T4 Gc

Connection EL9200, EL9210, EL9290

⚠ CAUTION

Hazard to individuals and devices!

When designing a Bus Terminal block with different potentials on the power contacts (e. g. 230 V_{AC} and 24 V_{DC}), please note that it is mandatory to use potential separation terminals (EL9080)!
Bring the bus system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Terminal point		Description
Indication	No.	
+24 V* / 230 V AC**	1	Supply input + 24 V [EL9200, EL9210] Supply input 230 V AC [EL9290: variable voltage, up to 230 V AC] connected internally with terminal 4 and positive [EL9200, EL9210] resp. 230 V AC [EL9290] power contact)
0 V* / N**	2	0 V for supply input [EL9200, EL9210] N for supply input [EL9290] connected internally with terminal 5 and negative [EL9200, EL9210] resp. neutral [EL9290] power contact)
PE	3	PE (connected internally with terminal 6 and PE power contact)
+24 V* / 230 V AC**	4	Supply input + 24 V [EL9200, EL9210] Supply input 230 V AC [EL9290: variable voltage, up to 230 V AC] connected internally with terminal 1 and positive [EL9200, EL9210] resp. 230 V AC [EL9290] power contact)
0 V* / N**	5	0 V for supply input [EL9200, EL9210] N for supply input [EL9290] connected internally with terminal 2 and negative [EL9200, EL9210] resp. neutral [EL9290] power contact)
PE	6	PE (connected internally with terminal 3 and PE power contact)

* only EL9200, EL9210
** only EL9290

LEDs

LED	Color	Meaning	
Power LED**	green	off	No input voltage at supply input
		on	24 V_{DC} at supply input
Error LED**	red	off	Fuse OK
		on	Fuse error

** only EL9200, EL9210

Process data (only EL9210)

The EL 9210 has a bit width of 2 bits (diagnosis bit for the power contacts voltage, "PowerOK" and diagnosis bit for fuse error, "FuseError") and is displayed in the TwinCAT tree as follows:

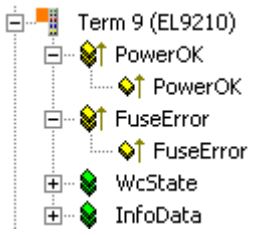


Fig. 32: EL9210 in the TwinCAT tree

If there is no voltage impressed on the power contacts, the corresponding diagnosis bit 'PowerOK' has FALSE (0) status.
If there is a fuse error, the corresponding diagnosis bit 'FuseError' has TRUE (1) status.

2.11 EL9250, EL9260

2.11.1 EL9250, EL9260 - Introduction and Technical Data

Feed terminals, 230 V AC

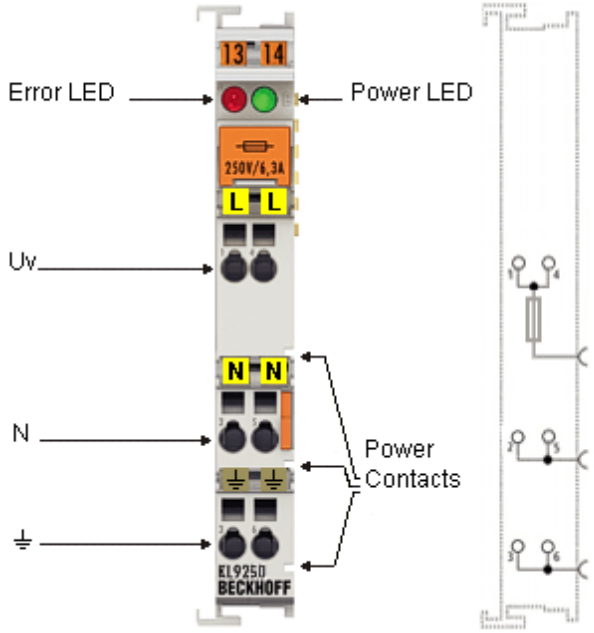


Fig. 33: EL9250

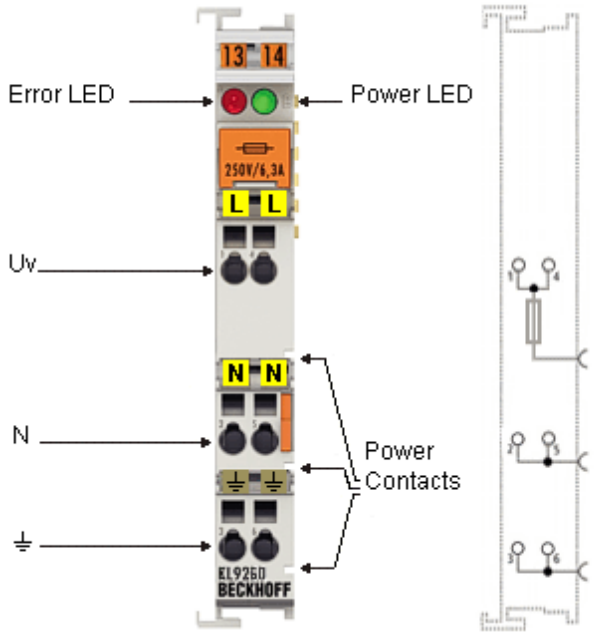


Fig. 34: EL9260

The EL9250 and EL9260 feed terminal can be positioned at any location between the input and output terminals for establishing a further potential group or for supplying the terminals following on the right in applications with high current load. The E-Bus is looped through. As opposed to the EL9250, the EL9260 has a diagnostic function which is displayed on the process image. The feed-in is protected by a 6.3 A fine-wire fuse at all terminals.

Technical data

Technical data	EL9250	EL9260
Nominal voltage	230 V AC	
Power contact current load	max. 10 A	
Electrical isolation	500 V (E-bus/field potential)	
Integrated fine-wire fuse	yes; 6.3 A (see also UL note [▶ 92]!)	
Current consumption from E-Bus	-	typ. 90 mA
Bit width in the process image	-	2 bit (diagnosis)
Configuration	no address or configuration settings	
Power LED	yes	
Diagnosis (fuse)	yes, Error LED	yes, in process image and Error LED
Electrical connection to mounting rail	no	
PE contact	yes	
Renewed infeed	yes	
Connection facility to additional power contact	1	
Side by side mounting on Bus Terminals with power contact	yes	
Side by side mounting on Bus Terminals without power contact	yes	
Weight	approx. 55 g	
Permissible ambient temperature range (during operation)	0°C ... +55°C	
Permissible ambient temperature range (during storage)	-25°C ... +85°C	
Operating height	max. 2000 m	
Overvoltage category	II	
Degree of pollution	2	
Permissible relative humidity	95%, no condensation	
Dimensions (W x H x D)	approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)	
Mounting [▶ 93]	on 35 mm mounting rail conforms to EN 60715	
Vibration / shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27	
EMC resistance burst / ESD	conforms to EN 61000-6-2 / EN 61000-6-4	
Protection class	IP20	
Installation position	variable, see chapter "Mounting of Passive Terminals [▶ 99]"	variable
Approvals / markings*	CE, UKCA, EAC,	

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

Connection EL9250, EL9260

⚠ CAUTION

Hazard to individuals and devices!

When designing a Bus Terminal block with different potentials on the power contacts (e. g. 230 V_{AC} and 24 V_{DC}), please note that it is mandatory to use potential separation terminals (EL9080)!
Bring the bus system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Terminal point		Description
Indication	No.	
230 V AC	1	Supply input 230 V AC; connected internally with terminal 4 and 230 V AC power contact)
N	2	N for supply input; connected internally with terminal 5 and neutral power contact)
Earth	3	Earth; connected internally with terminal 6 and earth power contact)
230 V AC	4	Supply input 230 V AC; connected internally with terminal 1 and 230 V AC power contact)
N	5	N for supply input; connected internally with terminal 2 and neutral power contact)
Earth	6	Earth; connected internally with terminal 3 and earth power contact)

LEDs

LED	Color	Meaning	
Power LED	green	off	No input voltage at supply input
		on	230 V AC at supply input
Error LED	red	off	Fuse OK
		on	Fuse error

Process data (only EL9260)

The EL9260 has a bit width of 2 bits (diagnosis bit for the power contacts voltage, "PowerOK" and diagnosis bit for fuse error, "FuseError") and is displayed in the TwinCAT tree as follows:

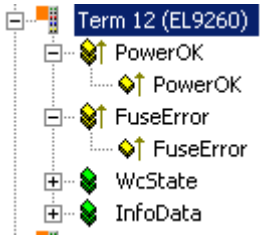


Fig. 35: EL9260 in the TwinCAT tree

If there is no voltage impressed on the power contacts, the corresponding diagnosis bit 'PowerOK' has FALSE (0) status.
If there is a fuse error, the corresponding diagnosis bit 'FuseError' has TRUE (1) status.

2.12 EL9400, EL9410

2.12.1 EL9400, EL9410 - Introduction and Technical Data

Power supply terminals

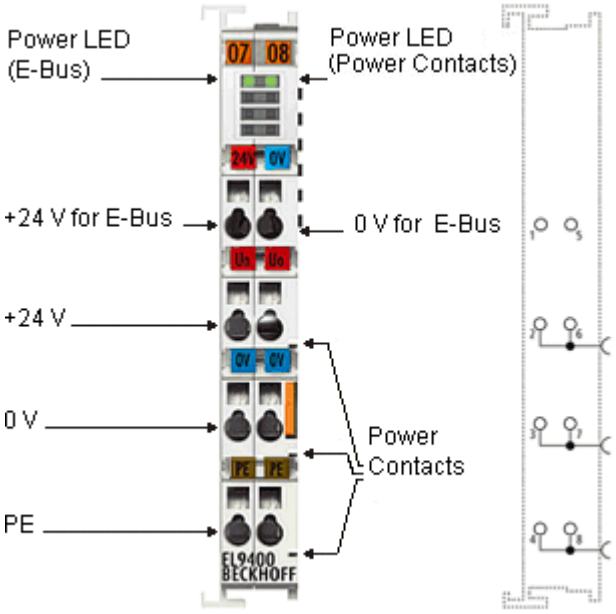


Fig. 36: EL9400

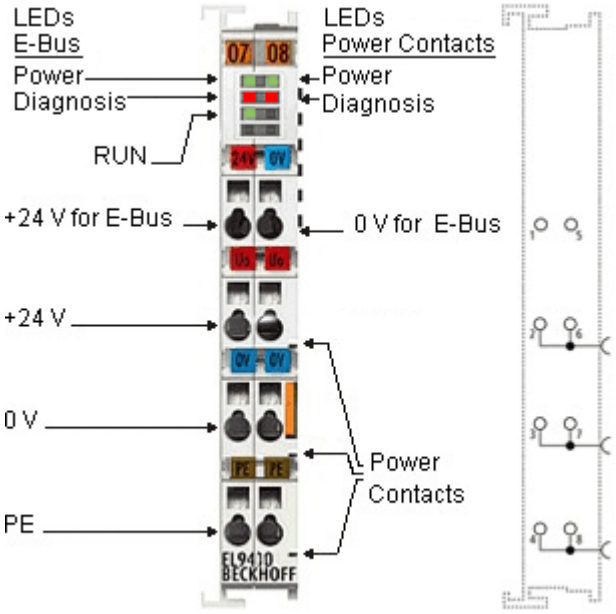


Fig. 37: EL9410

The EL9400 and EL9410 power supply terminals are used to refresh the E-bus.

Data is exchanged between the coupler and the EtherCAT Terminal over the E-bus. Each terminal draws a certain amount of current from the E-bus (see “current consumption E-bus” in the technical data). This current is fed into the E-bus by the relevant coupler’s power supply unit. In configurations with many terminals, it is possible to use the EL9400/EL9410 in order to supply an extra 2 A to the E-bus. As opposed to the EL9400, the EL9410 has a diagnostic function which is displayed by LED and on the process image. At the same time the EL9400/EL9410 can establish another potential group by an external 24 V feed-in via the power contacts on the right side.