BECKHOFF New Automation Technology

Documentation | EN

EL10xx, EL11xx

Digital Input Terminals

2024-01-16 | Version: 4.8

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1 Foreword

1.1 Product overview EtherCAT digital input terminals

EL1002, EL1004, EL1008 [▶ 16] (2, 4, 8 channels; 24 V_{DC}, 3 ms input filter)
EL1004-0020 [▶ 16] (4 channels; 24 V_{DC}, 3 ms input filter, 2500 V electrical isolation)

EL1012, EL1014, EL1018 [▶ 22] (2, 4, 8 channels; 24 V_{DC}, 10 µs input filter)

EL1024 [▶ 28] (4 channels; 24 V_{DC}, 3 ms input filter for type 2 sensors)

EL1034 [▶ 28] (4 channels; 24 V_{DC}, 10 µs input filter, potential-free)

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EL1124, EL1144, EL1134 [▶ 40] (4 channels; 5/12/48 V_{DC}, 10 µs input filter)

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.

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.

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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
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 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.

1.5 Documentation issue status

Version	Comment
4.8	• Update chapter “Technical data” • Update structure
4.7	• Update chapter “Technical data” • Update structure
4.6	• Update chapter “Technical data” • Update structure
4.5	• Update chapter “UL notice” • Update chapter “Technical data” • Update structure
4.4	• Addenda EL1004-0020 • Structural update • Update Chapter "Technical data" • Update Chapter "LEDs and connection"
4.3	• Structural update • Update Chapter "Technical data" • Update Chapter "LEDs and connection"
4.2	• Structural update • Update Chapter "Technical data"
4.1	• Structural update • Correction Chapter "Application notes" • Change Chapter "Configuration with the TwinCAT System Manager" > "Configuration with the TwinCAT System Manager – digital input – and output terminals" • Change chapter "CoE Interface" > "Coe Interface: notes"
4.0	• First publication in PDF format • Structural update
3.3	• “Technical data” section updated • “Assembly instructions with increased mechanical load capacity” section supplemented
3.2	• Technical data supplemented • Structural update
3.1	• Connection diagrams updated
3.0	• Note regarding firmware compatibility added
2.9	• UL requirements added
2.8	• Technical description amended, technical note added
2.7	• Technical description (EL101x, EL1114) amended
2.6	• Technical description (EL1024, EL1034) amended
2.5	• Technical description amended
2.4	• Technical data amended (EL1124)
2.3	• Technical data amended
2.2	• Technical data amended
2.1	• Terminals EL1124, EL1144, EL1034 added, technical data amended
2.0	• Terminals EL1002, EL1008, EL1018, EL1084, EL1088, EL1094, EL1098, EL1104, EL1114 added, technical data amended
1.0	• Technical data amended
0.1	• Provisional documentation for EL10xx

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. *“EL5021 EL terminal, standard IP20 IO device with batch number and revision ID (since 2014/01)”*.
- 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.

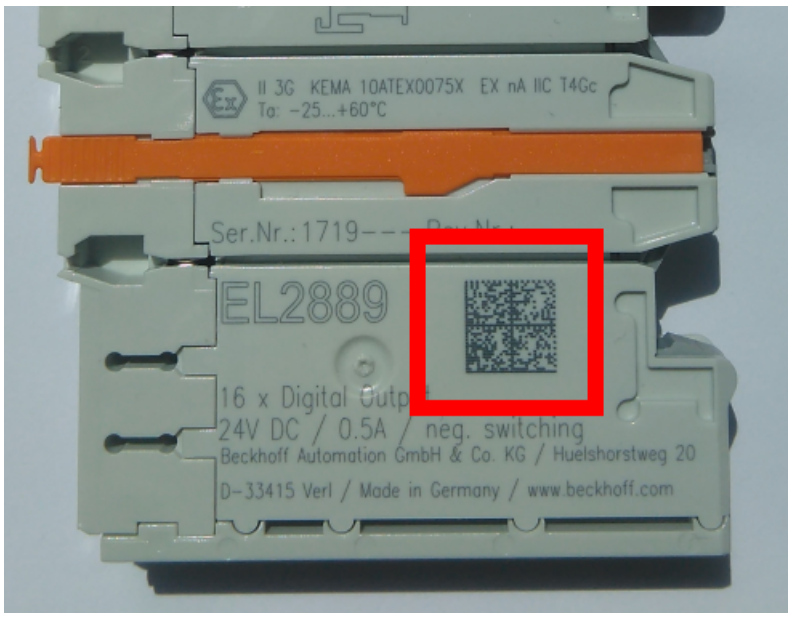


Fig. 2: BIC as data matrix code (DMC, code scheme ECC200)

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 information.

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.

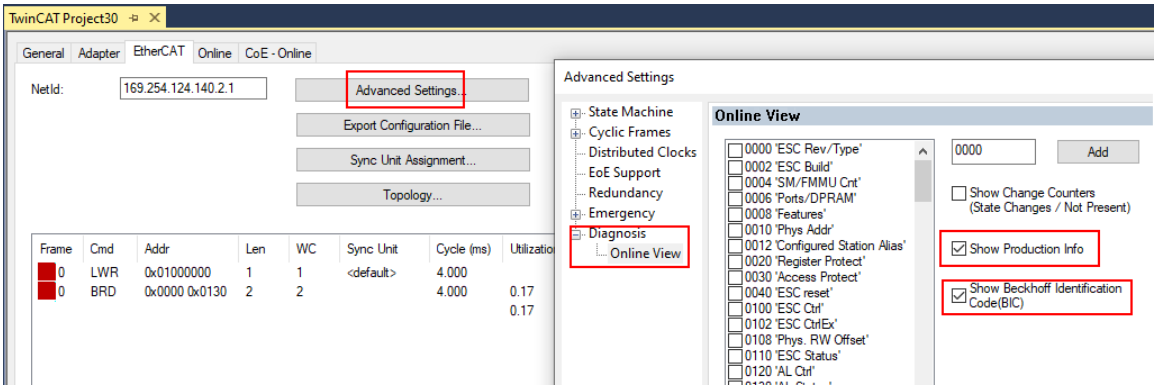
EtherCAT devices (IP20, IP67)

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.

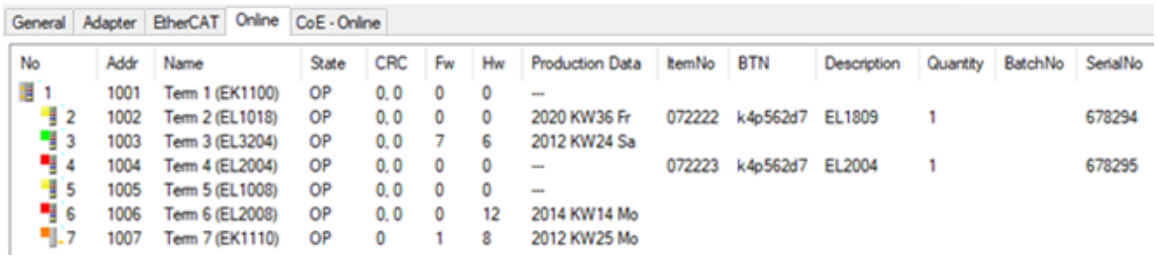
Beckhoff also stores the eBIC in the ESI-EEPROM. The eBIC was introduced into Beckhoff IO production (terminals, box modules) in 2020; as of 2023, implementation is largely complete.

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:

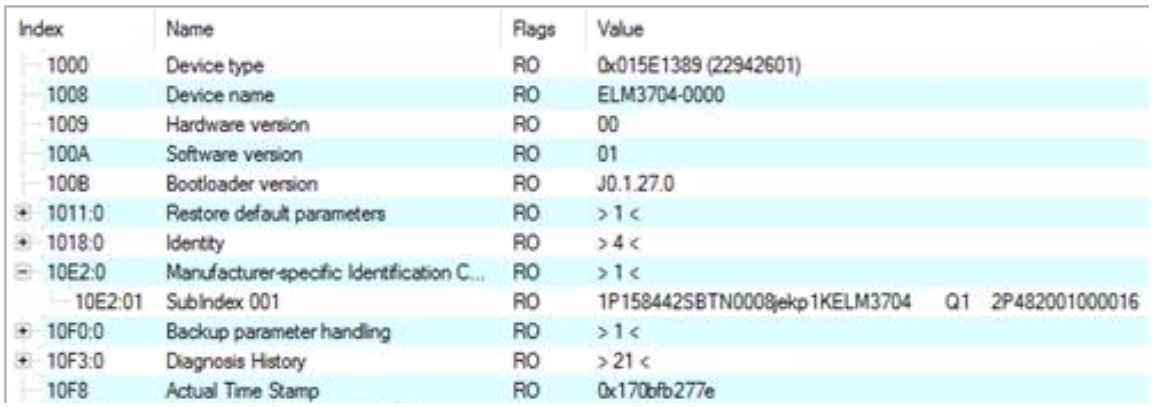


  - The BTN and its contents are then displayed:



  - 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.

2 Product description

2.1 EL1002, EL1004-00x0, EL1008 - Introduction

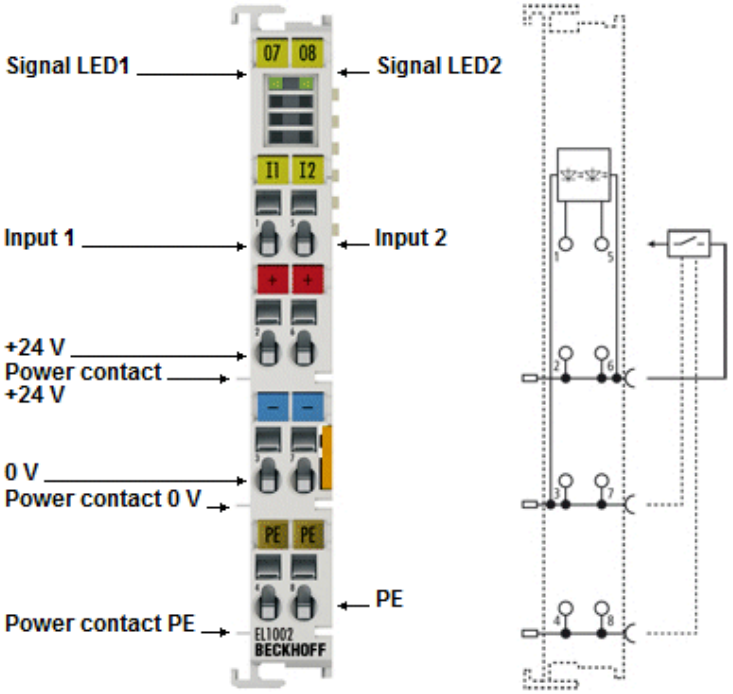


Fig. 4: EL1002

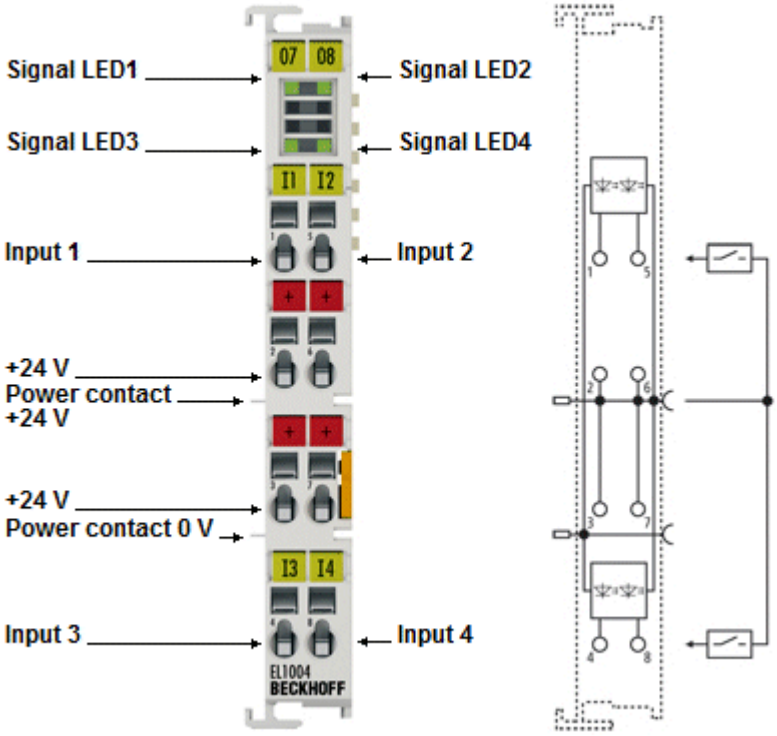


Fig. 5: EL1004

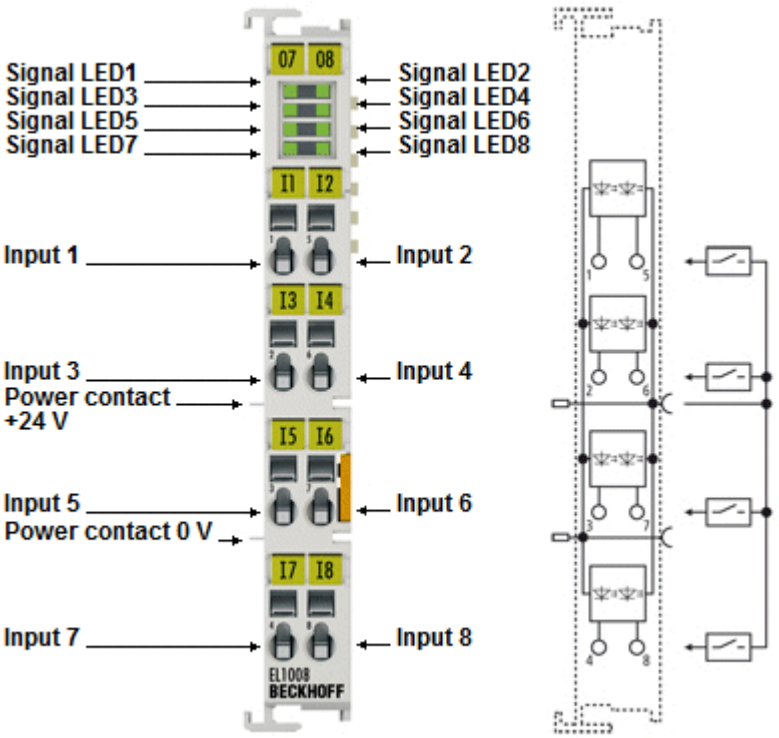


Fig. 6: EL1008

Two-, four- and eight-channel digital input terminals 24 V_{DC}, 3 ms input filter

The EL1002, EL1004 and EL1008 digital input terminals acquire binary control signals from the process level and transmit them, in an electrically isolated form, to the higher-level automation device. They differ in the number of channels and the pin assignment. The digital input terminals of the EL100x series feature an input filter (3 ms) and indicate their signal state through an LED for each channel.
The variant of the EL1004-0020 is designed with a functional potential separation of 2500 V (test voltage E-bus / field voltage).

2.1.1 EL1002 - LEDs and connection

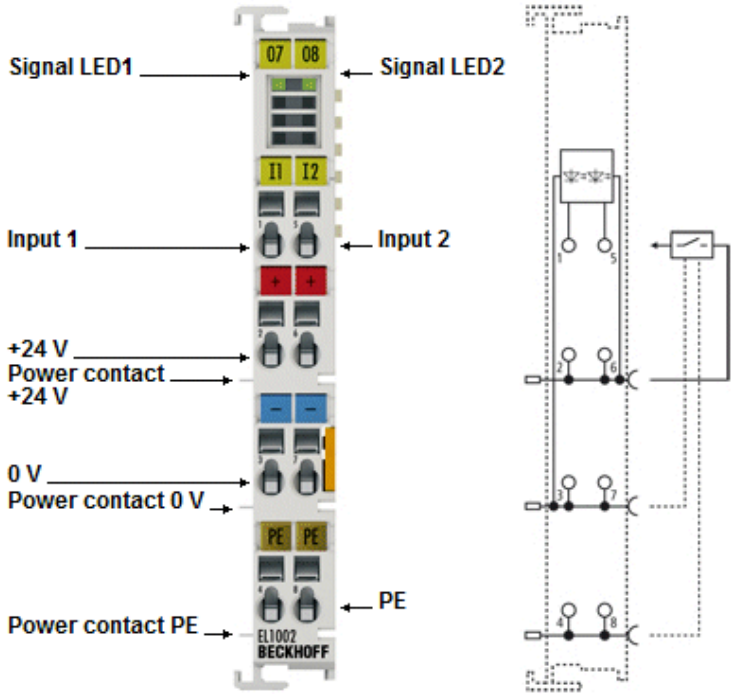


Fig. 7: EL1002

EL1002 - LEDs			
LED	**Color**	**Meaning**	
INPUT 1 INPUT 2	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1002 - Connection		
Terminal point		**Description**
Name	**No.**	
Input 1	1	Input 1
+24 V	2	Sensor supply for input 1 (internally connected to terminal point 6 and positive power contact)
0 V	3	Ground for input 1 (internally connected to terminal point 7 and negative power contact)
PE	4	PE (internally connected to terminal point 8)
Input 2	5	Input 2
+24 V	6	Sensor supply for input 2 (internally connected to terminal point 2 and positive power contact)
0 V	7	Ground for input 2 (internally connected to terminal point 3 and negative power contact)
PE	8	PE (internally connected to terminal point 4)

2.1.2 EL1004-00x0 - LEDs and connection

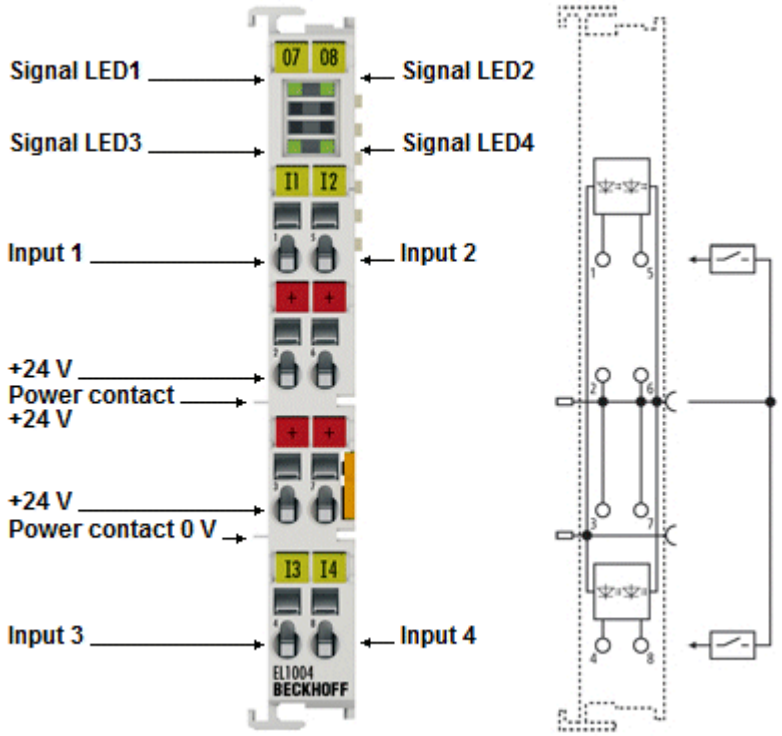


Fig. 8: EL1004

EL1004-00x0 - LEDs

LED	Colour	Meaning	
INPUT 1- 4	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1004-00x0 - Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
+24 V	2	Sensor supply for input 1 (internally connected to terminal points 3, 6, 7 and positive power contact)
+24 V	3	Sensor supply for input 3 (internally connected to terminal points 2, 6, 7 and positive power contact)
Input 3	4	Input 3
Input 2	5	Input 2
+24 V	6	Sensor supply for input 2 (internally connected to terminal points 2, 3, 7 and positive power contact)
+24 V	7	Sensor supply for input 4 (internally connected to terminal points 2, 3, 6 and positive power contact)
Input 4	8	Input 4

2.1.3 EL1008 - LEDs and connection

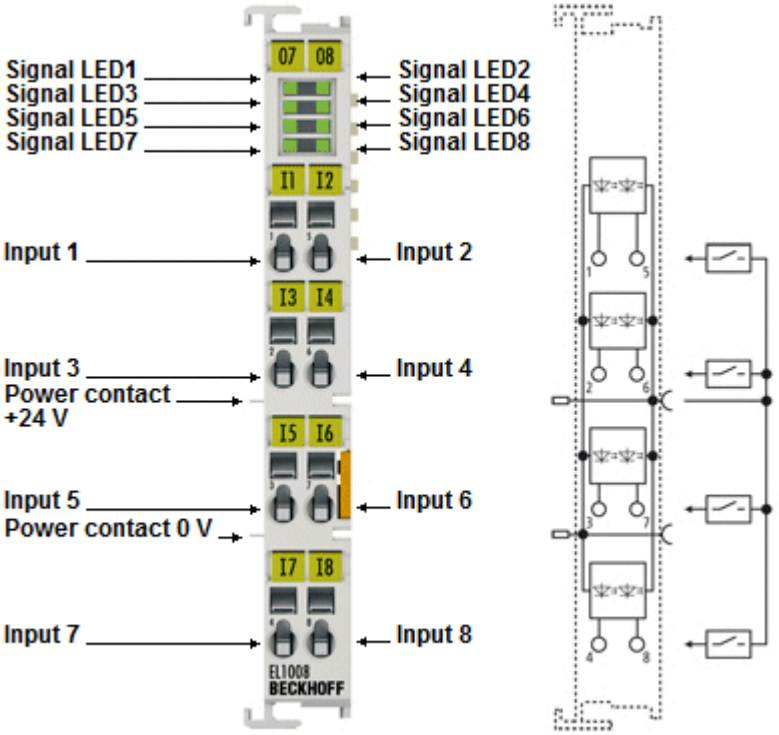


Fig. 9: EL1008

EL1008 - LEDs

LED	Colour	Meaning	
INPUT 1- 8	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1008 - Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
Input 3	2	Input 3
Input 5	3	Input 5
Input 7	4	Input 7
Input 2	5	Input 2
Input 4	6	Input 4
Input 6	7	Input 6
Input 8	8	Input 8

2.1.4 EL1002, EL1004-00x0, EL1008 - Technical data

Technical data	EL1002	EL1004	EL1004-0020	EL1008
Number of inputs	2	4		8
Number of simultaneously controllable inputs, depending on the ambient temperature	2 (-25°C … +60°C)	4 (-25°C ... +55°C) 2 (> +55°C)	4 (0°C ... +55°C)	8 (-25°C ... +55°C) 4 (> +55°C) (aligned in horizontal installation position) [▶ 63]
Nominal voltage of the inputs	24 V_{DC} (-15% / +20%)			
Signal voltage "0"	-3 V ... 5 V (EN 61131-2, type 1/3)			
Signal voltage "1"	11 V ... 30 V (EN 61131-2, type 1/3)			
Input filter	3 ms			
Input current	typically 3 mA (EN 61131-2, type 1/3)			
Current consumption power contacts	typ. 2 mA + load			
Current consumption via E-bus	typ. 90 mA			
Electrical isolation	500 V (E-bus/field voltage)		2500 V functional isolation (test voltage E-bus / field voltage, production test).	500 V (E-bus/field voltage)
Bit width in the process image	2 input bits	4 input bits		8 input bits
Configuration	no address setting, configuration via TwinCAT System Manager			
Weight	approx. 55 g			
Permissible ambient temperature range during operation	-25°C ... +60°C (extended temperature range)		0°C ... +55°C	-25°C ... +60°C (extended temperature range, aligned in horizontal installation position [▶ 63]) -25°C ... +45°C (all other installation positions [▶ 63])
Permissible ambient temperature range during storage	-40°C ... +85°C		-25°C ... +85°C	-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 [▶ 51]	on 35 mm mounting rail conforms to EN 60715			
Enhanced mechanical load capacity	Yes, see also Installation instructions for terminals with increased mechanical load capacity [▶ 65]		-	Yes, see also Installation instructions for terminals with increased mechanical load capacity [▶ 65]
Vibration/shock resistance	according 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 note [▶ 63]
Approvals/markings*	CE, UKCA, EAC cULus [▶ 58], ATEX [▶ 53], IECEx [▶ 54], cFMus [▶ 56], DNV GL		CE, UKCA, EAC, cULus [▶ 58]	CE, UKCA, EAC, cULus [▶ 58], ATEX [▶ 53], IECEx [▶ 54], cFMus [▶ 56], DNV GL

*) 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
cFMus	Class I, Division 2, Groups A, B, C, D Class I, Zone 2, AEx/Ex ec IIC T4 Gc

2.2 EL1012, EL1014, EL1018 - Introduction

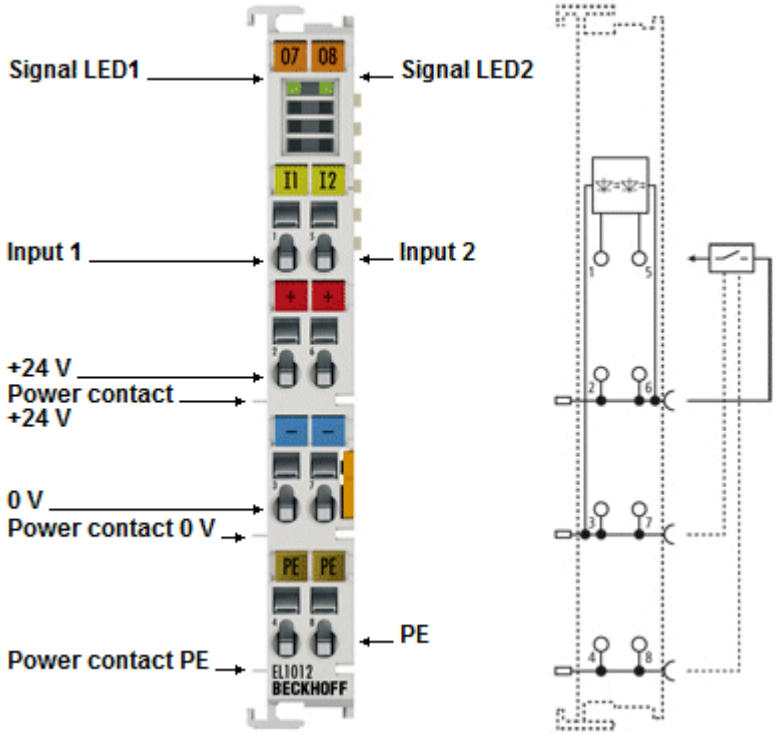


Fig. 10: EL1012

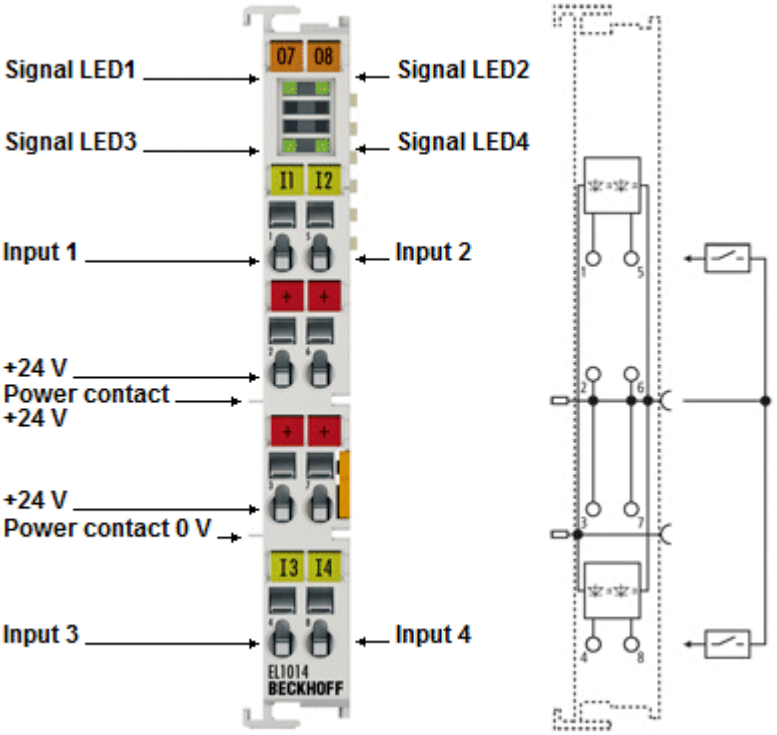


Fig. 11: EL1014

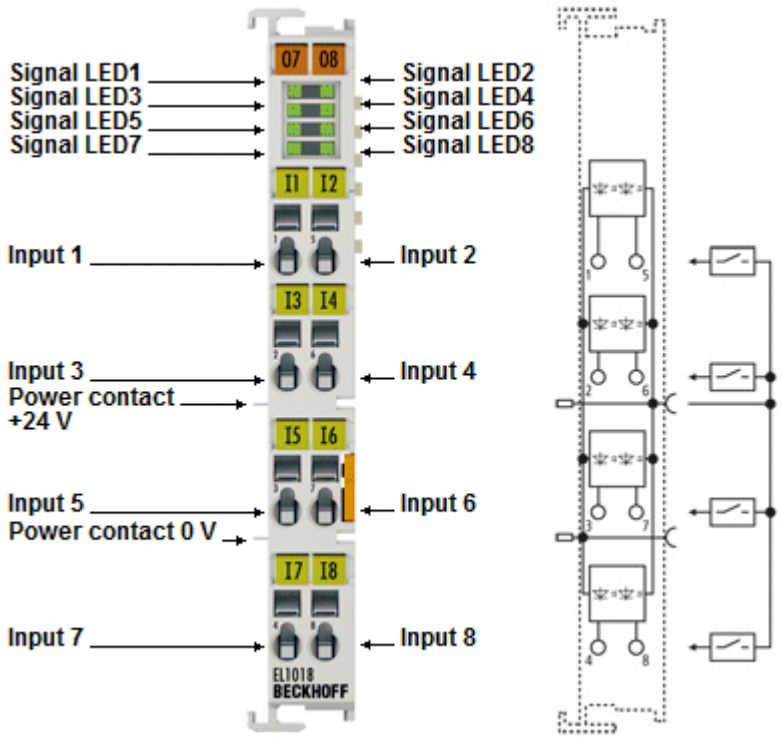


Fig. 12: EL1018

Two-, four- and eight-channel digital input terminals 24 V_{DC}, 10 µs input filter

The EL101x digital input terminals acquire binary control signals from the process level and transmit them, in an electrically isolated form, to the higher-level automation device. They differ in the number of channels and the pin assignment. The digital input terminals of the EL101x series feature an input filter (10 µs) and indicate their signal state through an LED for each channel.

2.2.1 EL1012 - LEDs and connection

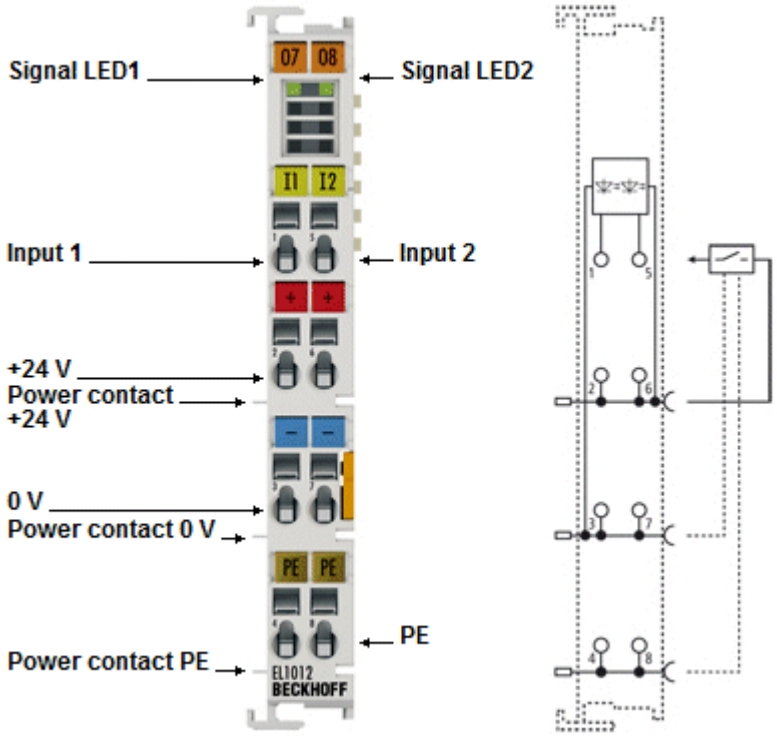


Fig. 13: EL1012

EL1012 - LEDs

LED	Color	Meaning	
INPUT 1 INPUT 2	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1012 – Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
+24 V	2	Sensor supply for input 1 (internally connected to terminal point 6 and positive power contact)
0 V	3	Ground for input 1 (internally connected to terminal point 7 and negative power contact)
PE	4	PE (internally connected to terminal point 8)
Input 2	5	Input 2
+24 V	6	Sensor supply for input 2 (internally connected to terminal point 2 and positive power contact)
0 V	7	Ground for input 2 (internally connected to terminal point 3 and negative power contact)
PE	8	PE (internally connected to terminal point 4)

2.2.2 EL1014 - LEDs and connection

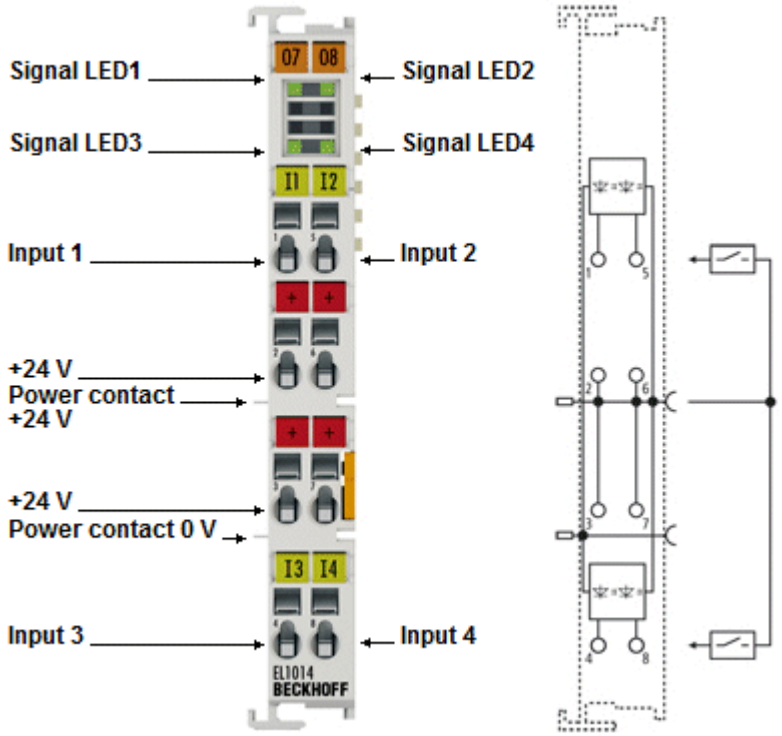


Fig. 14: EL1014

EL1014 - LEDs

LED	Color	Meaning	
INPUT 1- 4	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1014 - Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
+24 V	2	Sensor supply for input 1 (internally connected to terminal points 3, 6, 7 and positive power contact)
+24 V	3	Sensor supply for input 3 (internally connected to terminal points 2, 6, 7 and positive power contact)
Input 3	4	Input 3
Input 2	5	Input 2
+24 V	6	Sensor supply for input 2 (internally connected to terminal points 2, 3, 7 and positive power contact)
+24 V	7	Sensor supply for input 4 (internally connected to terminal points 2, 3, 6 and positive power contact)
Input 4	8	Input 4

2.2.3 EL1018 - LEDs and connection

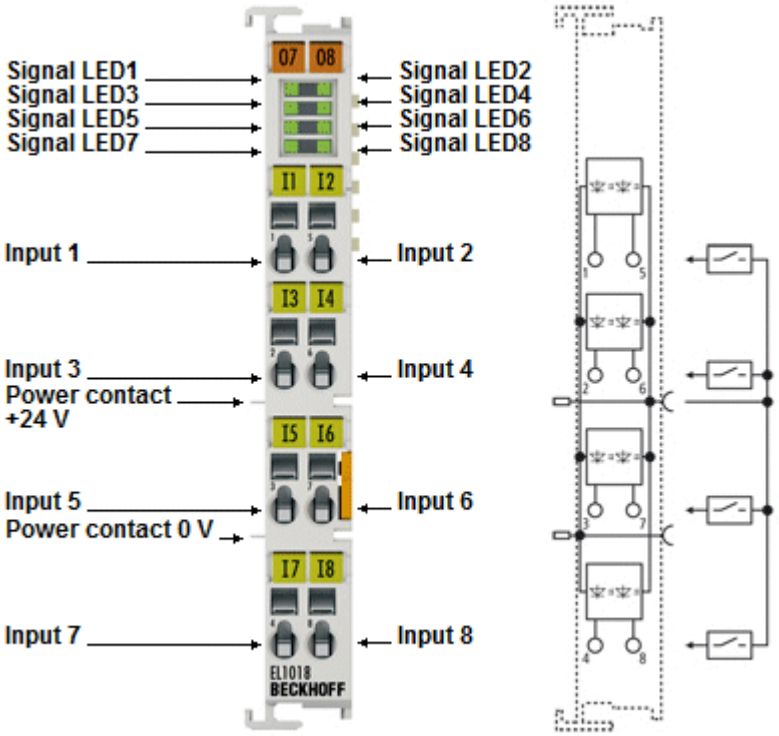


Fig. 15: EL1018

EL1018 - LEDs

LED	Color	Meaning	
INPUT 1- 8	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1018 - Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
Input 3	2	Input 3
Input 5	3	Input 5
Input 7	4	Input 7
Input 2	5	Input 2
Input 4	6	Input 4
Input 6	7	Input 6
Input 8	8	Input 8

2.2.4 EL1012, EL1014, EL1018 - Technical data

Technical data	EL1012	EL1014	EL1018
Number of inputs	2	4	8
Number of simultaneously controllable inputs, depending on the ambient temperature	2 (-25°C … +60°C)	4 (-25°C ... +55°C) 2 (> +55°C)	8 (-25°C ... +55°C) 4 (> +55°C) (aligned in horizontal installation position) [▶ 63]
Nominal voltage of the inputs	24 V_{DC} (-15% / +20%)		
Signal voltage "0"	-3 V ...5 V (EN 61131-2, type 1/3)		
Signal voltage "1"	11 V ... 30 V (EN 61131-2, type 1/3)		
Input filter	10 µs typ. (10...50 µs)		
Input current	typically 3 mA (EN 61131-2, type 1/3)		
Current consumption power contacts	typ. 2 mA + load		
Current consumption via E-bus	typ. 90 mA	typ. 90 mA	typ. 90 mA
Electrical isolation	500 V (E-bus/field voltage)		
Bit width in the process image	2 input bits	4 input bits	8 input bits
Configuration	no address setting, configuration via TwinCAT System Manager		
Weight	approx. 55 g		
Permissible ambient temperature range during operation	-25°C ... +60°C (extended temperature range)		-25°C ... +60°C (extended temperature range, aligned in horizontal installation position [▶ 63]) -25°C ... +45°C (all other installation positions [▶ 63])
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 [▶ 51]	on 35 mm mounting rail conforms to EN 60715		
Enhanced mechanical load capacity	yes, see also Installation instructions for terminals with increased mechanical load capacity [▶ 65]		
Vibration/shock resistance	according 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 note [▶ 63]
Approvals/markings*	CE, UKCA, EAC, cULus [▶ 58], ATEX [▶ 53], IECEx [▶ 54], DNV GL		

*) 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 EL1024, EL1034 - Introduction

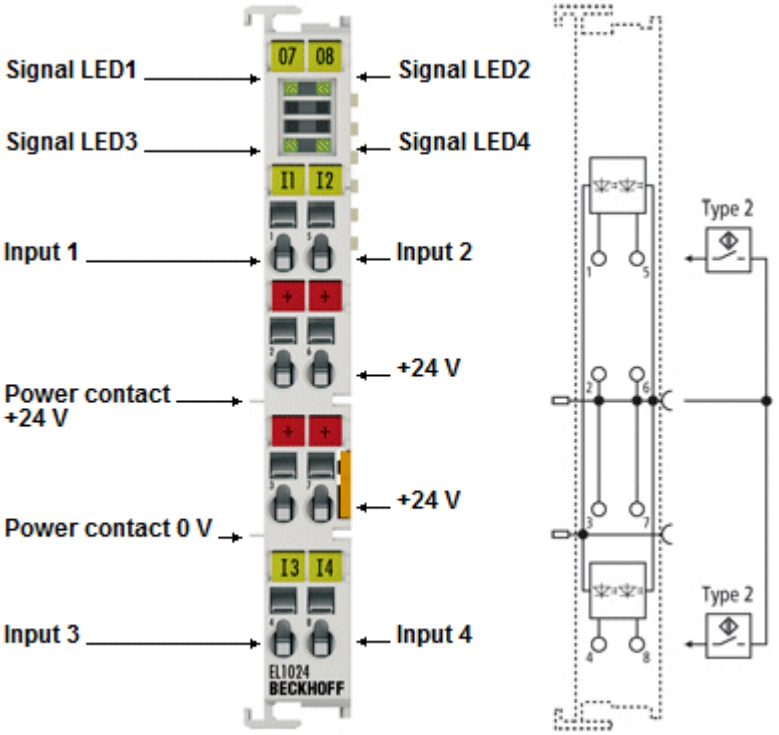


Fig. 16: EL1024

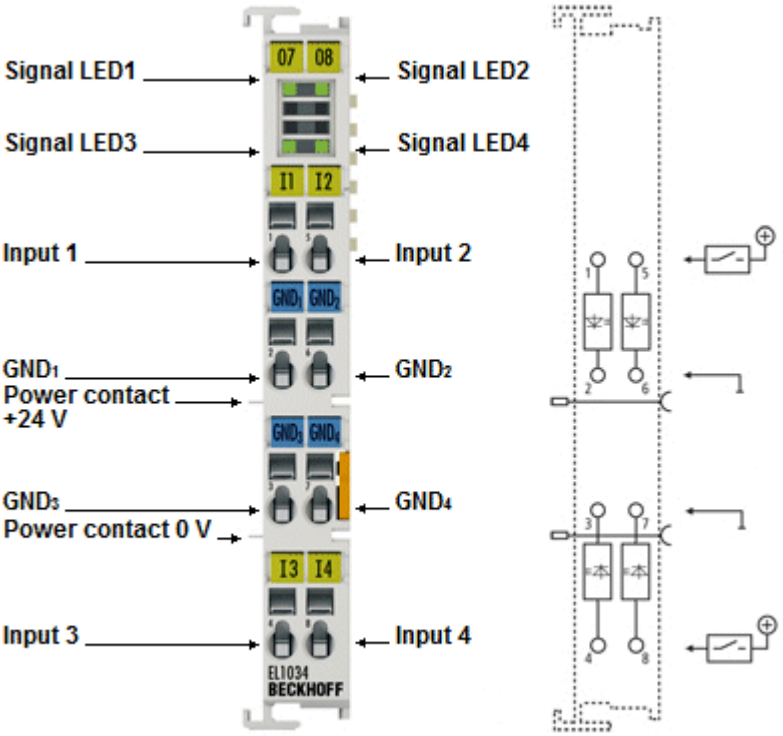


Fig. 17: EL1034

EL1024 - four-channel digital input terminals 24 $V_{DC,}$ for type 2 sensors
EL1034 - four-channel digital input terminals 24 V_{DC}, potential-free inputs

The EL1024 digital input terminal acquires the binary 24 V control signals and transmits them, in an electrically isolated form, to the higher-level automation system. The EtherCAT Terminal contains four channels that indicate its signal state by means of light emitting diodes. With its input signal the EL1024 corresponds to IEC 61131-2, Type 2. Additionally, the 4-channel EtherCAT Terminals enable the direct connection of four 2-wire sensors. Four +24 V connection points are provided.

The EL1034 features electrical isolation of the individual channels. With its input signal it corresponds to IEC 61131-2, Type 1.

2.3.1 EL1024 - LEDs and connection

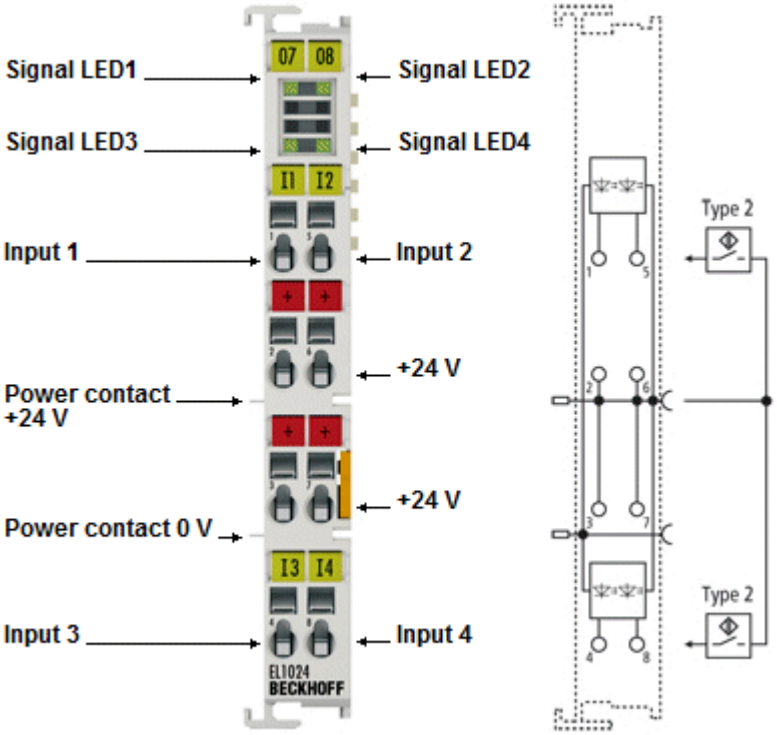


Fig. 18: EL1024

EL1024 - LEDs

LED	Color	Meaning	
INPUT 1- 4	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (11 V ... 30 V)

EL1024 - Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
+24 V	2	Sensor supply for input 1 (internally connected to terminal points 3, 6, 7 and positive power contact)
+24 V	3	Sensor supply for input 3 (internally connected to terminal points 2, 6, 7 and positive power contact)
Input 3	4	Input 3
Input 2	5	Input 2
+24 V	6	Sensor supply for input 2 (internally connected to terminal points 2, 3, 7 and positive power contact)
+24 V	7	Sensor supply for input 4 (internally connected to terminal points 2, 3, 6 and positive power contact)
Input 4	8	Input 4

2.3.2 EL1034 - LEDs and connection

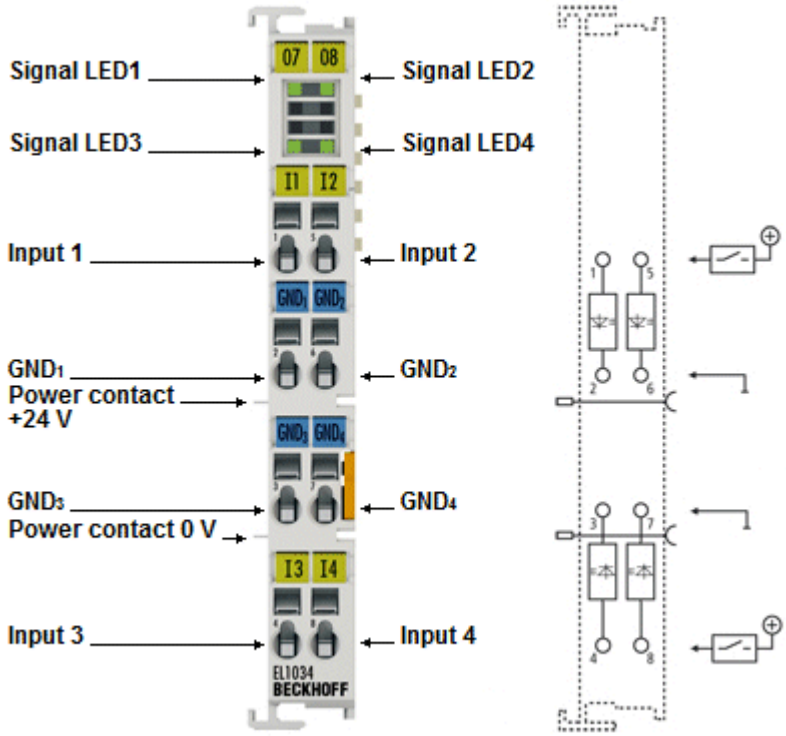


Fig. 19: EL1034

EL1034 - LEDs

LED	Color	Meaning	
INPUT 1- 4	green	off	Signal voltage "0" (-3 V ... 5 V)
		on	Signal voltage "1" (15 V ... 30 V)

EL1034 - Connection

Terminal point		Description
Name	No.	
Input 1	1	Input 1
GND 1	2	Ground (GND) 1
GND 3	3	Ground (GND) 3
Input 3	4	Input 3
Input 2	5	Input 2
GND 2	6	Ground (GND) 2
GND 4	7	Ground (GND) 4
Input 4	8	Input 4

2.3.3 EL1024, EL1034 - Technical data

Technical data	EL1024	EL1034
Number of inputs	4	4 (potential-free)
Nominal voltage of the inputs	24 V_{DC} (-15% / +20%)	
Signal voltage "0"	-3 V ... 5 V (EN 61131-2, type 2)	-3 V ... 5 V (EN 61131-2, type 1)
Signal voltage "1"	11 V ... 30 V (EN 61131-2, type 2)	15 V ... 30 V (EN 61131-2, type 1)
Input filter	3 ms	10 µs
Input current	typically 6 mA (EN 61131-2, type 2)	typically 3 mA (EN 61131-2, type 1)
Current consumption power contacts	typ. 30 mA + load	-
Current consumption via E-bus	typ. 90 mA	
Electrical isolation	500 V (E-bus/field voltage)	
Bit width in the process image	4 input bits	
Configuration	no address setting, configuration via TwinCAT System Manager	
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 [▶ 51]	on 35 mm mounting rail conforms to EN 60715	
Enhanced mechanical load capacity	yes, see also Installation instructions for terminals with increased mechanical load capacity [▶ 65]	
Vibration/shock resistance	according 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	
Approvals/markings*	CE, UKCA, EAC, cULus [▶ 58], ATEX [▶ 52], IECEx [▶ 54]	

*) 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