BECKHOFF New Automation Technology

Documentation | EN

EL20xx, EL2124

Digital Output Terminals

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1 Product overview, digital output terminals

EL2002 [▶ 24]	2 channels, 24 V_{DC}, 0.5 A
EL2004 [▶ 24]	4 channels, 24 V_{DC}, 0.5 A
EL2008 [▶ 24]	8 channels, 24 V_{DC}, 0.5 A
EL2014 [▶ 30]	4 channels, 24 V_{DC}, 0.5 A, diagnostics
EL2022, EL2024 [▶ 50]	2 and 4 channels, 24 V_{DC}, 2 A
EL2024-0010 [▶ 50]	4 channels, 12 V_{DC}, 2 A
EL2032, EL2034 [▶ 55]	2 and 4 channels, 24 V_{DC}, 2 A, diagnostics
EL2042 [▶ 60]	2 channels, 24 V_{DC}; 2 x 4 A/1 x 8 A
EL2084, EL2088 [▶ 64]	4 and 8 channels, 24 V_{DC}, 0.5 A
EL2124 [▶ 68]	4 channels, 5 V_{DC}, CMOS-outputs

2 Foreword

2.1 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.
It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

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

Disclaimer

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

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

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

Trademarks

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

Patent Pending

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

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2.2 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.

Description of instructions

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

⚠ DANGER

Serious risk of injury!

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

⚠ WARNING

Risk of injury!

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

⚠ CAUTION

Personal injuries!

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

NOTE

Damage to environment/equipment or data loss

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

Tip or pointer

This symbol indicates information that contributes to better understanding.

2.3 Documentation issue status

Version	Comment
5.5	• Update chapter “Technical data” • Update chapter “Version identification of EtherCAT devices” • Update Notes • Update structure
5.4	• Update chapter “Introduction” • Update chapter “Technical data” • Update structure • Update revision status
5.3	• Update chapter “Technical data” • Update structure • Chapter “Non-reactive Bus Terminals” updated
5.2	• Update structure • Chapter “Non-reactive Bus Terminals” updated
5.1	• Update structure • Chapter “Non-reactive Bus Terminals” updated
5.0	• Update structure • Chapter “Technical data” updated
4.9	• Chapter “Non-reactive Bus Terminals” updated
4.8	• Chapter “Introduction” updated • Chapter “LEDs and connection” updated • Update structure
4.7	• Chapter “Non-reactive Bus Terminals” updated • Update structure
4.6	• Chapter “Non-reactive Bus Terminals” updated • Chapter “Technical data” updated
4.5	• Chapter “Introduction” Notes updated • Chapter “Technical data” updated
4.4	• Chapter “Foreword” – “Notes on the documentation“ updated • Technical data corrected • Chapter “TwinCAT Quickstart” added • Chapter “EtherCAT slave process data settings” removed
4.3	• Chapter “Technical data” updated • Chapter “Connection” updated
4.2	• Chapter “Non-reactive Bus Terminals” added
4.1	• Terminal EL2014 added
4.0	• First publication in PDF format • Structural update • Correction: EL2032 pin assignment, EL2042 pin assignment, EL2088 pin assignment
3.5	• “Technical data” section updated • “Assembly instructions with increased mechanical load capacity” section supplemented • Structural update
3.4	• *“Technical data” section updated
3.3	• Sections "EtherCAT state machine" and "Watchdog" updated
3.2	• Connection diagrams updated
3.1	• Firmware compatibility note amended
3.0	• UL note added
2.9	• EL2084, EL2088 added
2.8	• "Device description update" amended
2.7	• Trademark notes added
2.6	• Technical description amended, EL2042 amended
2.5	• Technical description amended, EL2024-0010 amended
2.4	• Technical description amended, EL2124 amended

Version	Comment
2.3	• Technical description amended
2.2	• Technical data amended, watchdog documentation amended
2.1	• Terminals EL2022, EL2024, EL2034 added
2.0	• Terminals EL2002, EL2008 added, technical data amended
1.0	• Technical data amended
0.1	• Provisional documentation for EL20xx

2.4 Version identification of EtherCAT devices

2.4.1 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.

2.4.2 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

2.4.3 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.

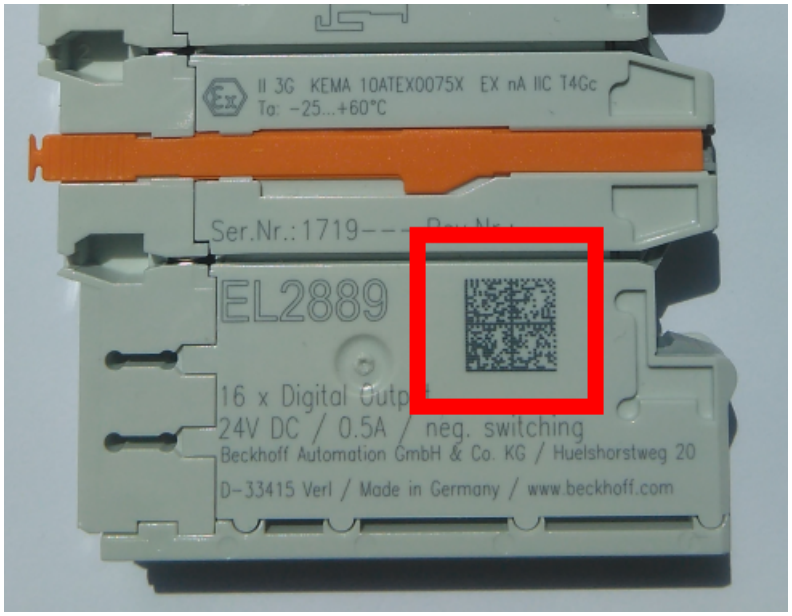


Fig. 2: BIC as data matrix code (DMC, code scheme ECC200)

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.

NOTE

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

2.4.4 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.

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

K-bus devices (IP20, IP67)

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

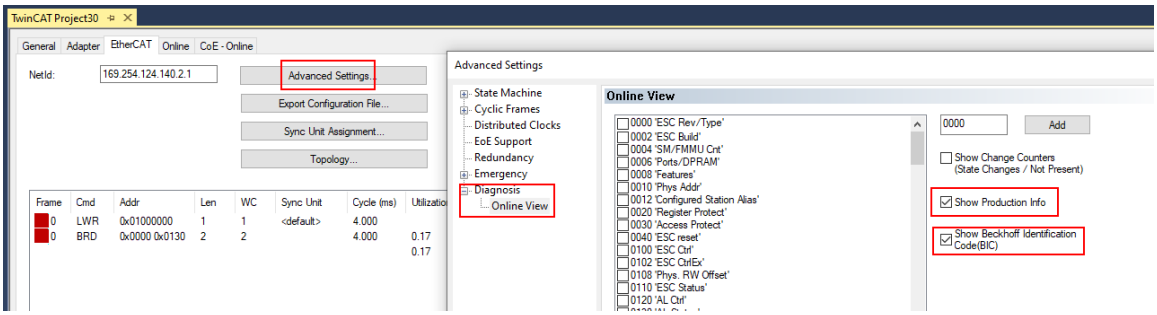
EtherCAT devices (IP20, IP67)

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

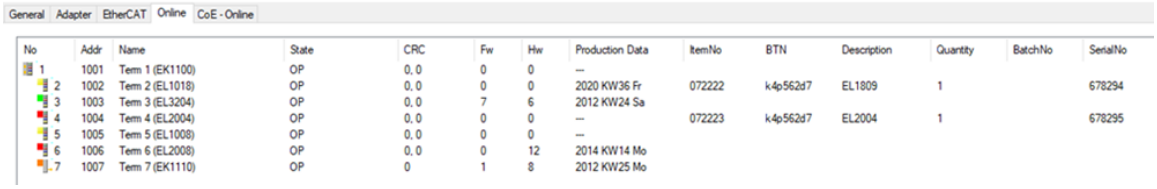
The eBIC is also stored in the ESI-EEPROM. The eBIC was introduced into the Beckhoff I/O production (terminals, box modules) from 2020; widespread implementation is expected in 2021.

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

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



  - The BTN and its contents are then displayed:



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

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

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

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

◦ From TwinCAT 3.1. build 4024.24 the functions *FB_EcCoEReadBIC* and *FB_EcCoEReadBTN* for reading into the PLC and further eBIC auxiliary functions are available in the Tc2_EtherCAT Library from v3.3.19.0.

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

Profibus/Profinet/DeviceNet... Devices

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

2.5 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.

NOTE

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
EL2022	09
EL2024	06
EL2034	06
EL2068	00
EL2809	01
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.

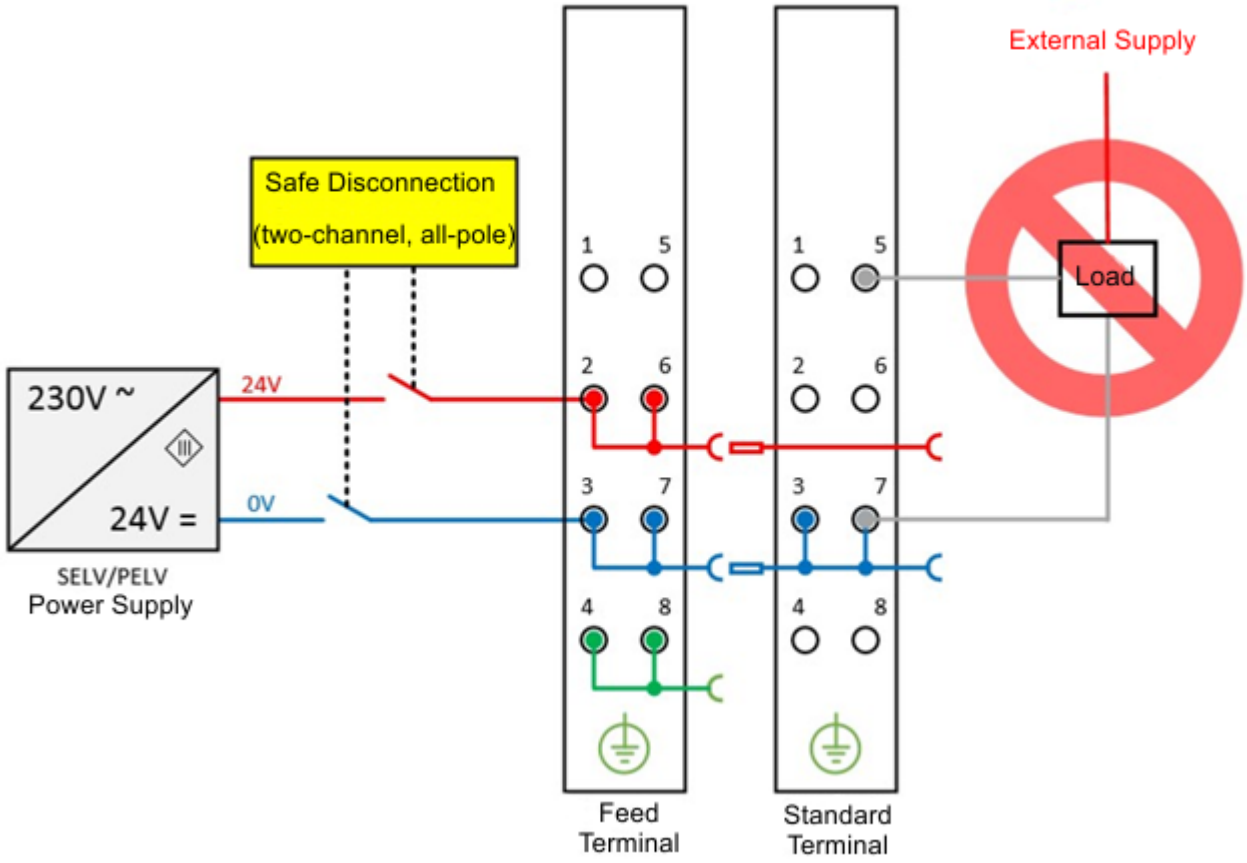


Fig. 4: Negative example – active load

- 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.

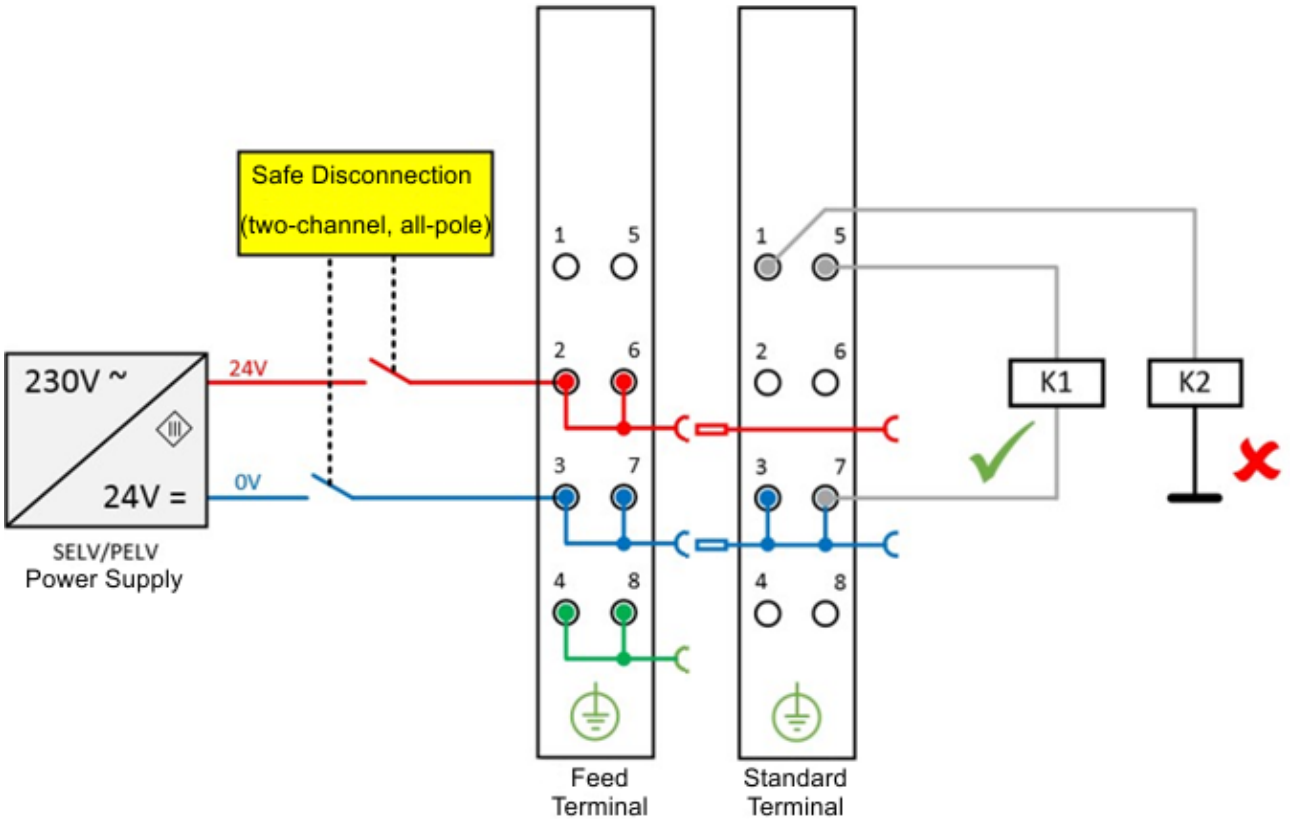


Fig. 5: Ground connection of the load: correct (K1) and incorrect (K2)

- 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.

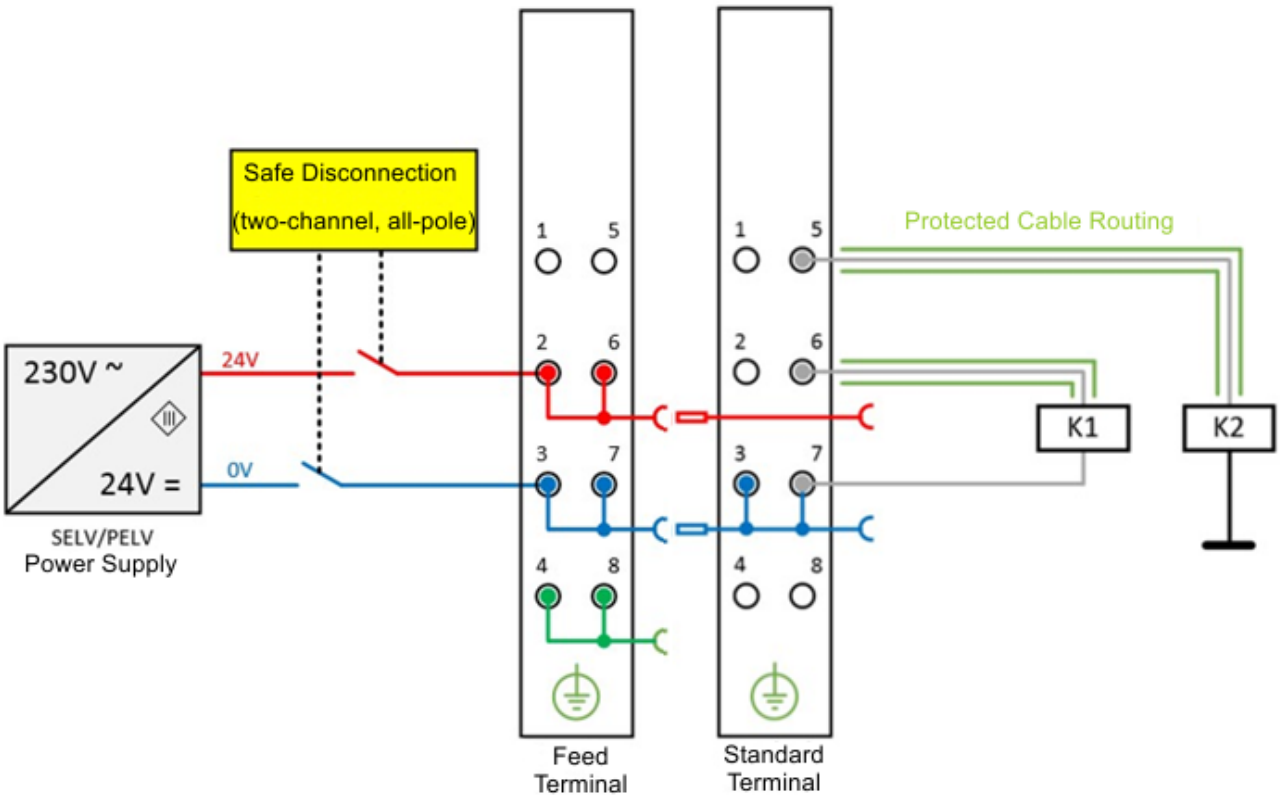


Fig. 6: Short circuit fault exclusion through protected cable laying

- **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	max.	max. SIL3	max. SIL2 *
Cable short-circuit	Cat. 4		
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.

3 Product description

3.1 EL2002, EL2004, EL2008 - Introduction

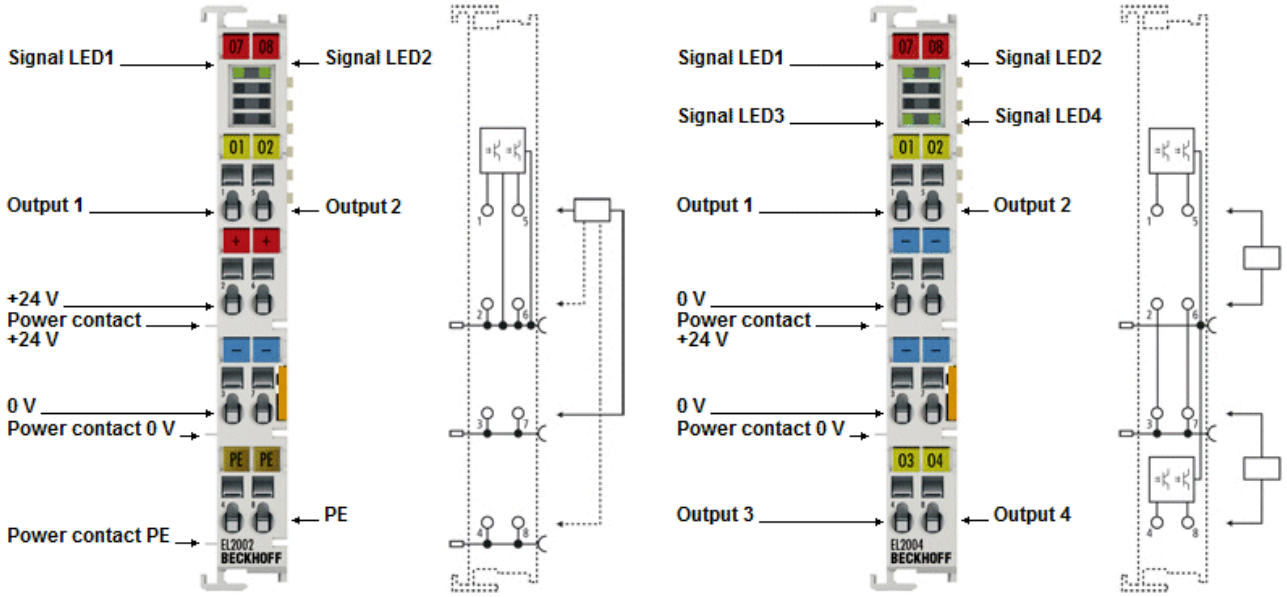


Fig. 7: EL2002, EL2004

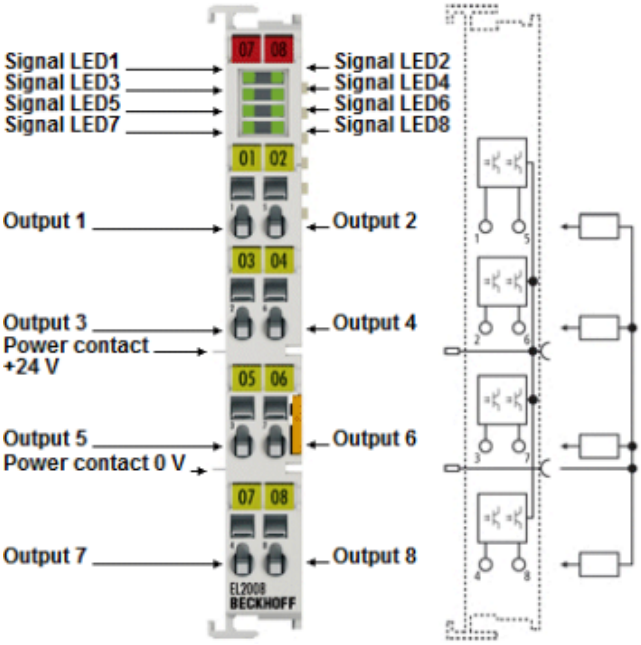


Fig. 8: EL2008

Two-, four-, and eight-channel digital output terminals 24 V_{DC}, 0.5 A

The EL200x digital output terminals relay binary control signals of the automation device in an electrically isolated manner to the actuators of the process level. They are protected against reverse polarity at the power contacts. The digital output terminals of the EL200x series indicate their signal state through an LED for each channel.

⚠ CAUTION

Watchdog settings

Please refer to section "Notes for setting the watchdog [▶ 72]".

3.1.1 EL2002, EL2004, EL2008 - Technical data

Technical data	EL2002	EL2004	EL2008
Number of outputs	2	4	8
Non-reactive outputs	-	yes (see notice [▶ 18])	yes (see notice [▶ 18])
Load type	ohmic, inductive, lamp load		
Nominal output voltage	24 V_{DC} (-15% / +20%)		
Switching times	T_{ON}: 60 µs typ.; T_{OFF}: 300 µs typ.		
Output current per channel	maximum 0.5 A (short-circuit proof)		
Switch-off energy (inductive)	max. 150 mJ/channel		
Current consumption from load voltage (power contacts)	typ. 15 mA		
Supply voltage for electronic	via the E-Bus		
Current consumption via E-bus	typ. 100 mA	typ. 100 mA	typ. 110 mA
Electrical isolation	500 V (E-bus/field voltage)		
Bit width in the process image	2 output bits	4 output bits	8 output 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)		Aligned in horizontal installation position: -25°C ... +60°C (extended temperature range) All other installation positions, see note [▶ 95]: -25°C ... +45°C
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 [▶ 82]	on 35 mm mounting rail conforms to EN 60715		
Vibration/shock resistance	according to EN 60068-2-6/EN 60068-2-27, see also Installation instructions for terminals with increased mechanical load capacity [▶ 93]		
EMC resistance burst/ESD	conforms to EN 61000-6-2 / EN 61000-6-4		
Protection class	IP20		
Installation position	variable	variable	see note [▶ 95]
Marking / Approval	CE, UKCA, EAC cULus [▶ 89] ATEX [▶ 84] DNV GL		CE, UKCA, EAC cULus [▶ 89] ATEX [▶ 84] IECEx [▶ 85] cFMus [▶ 87] DNV GL

Ex markings

Standard	Marking
ATEX	II 3 G Ex nA IIC T4 Gc II 3 D Ex tc IIIC T135 °C Dc
IECEx	Ex nA IIC T4 Gc Ex tc IIIC T135 °C Dc
cFMus	Class I, Division 2, Groups A, B, C, D Class I, Zone 2, AEx/Ex ec IIC T4 Gc

3.1.2 EL2002 - LEDs and connection

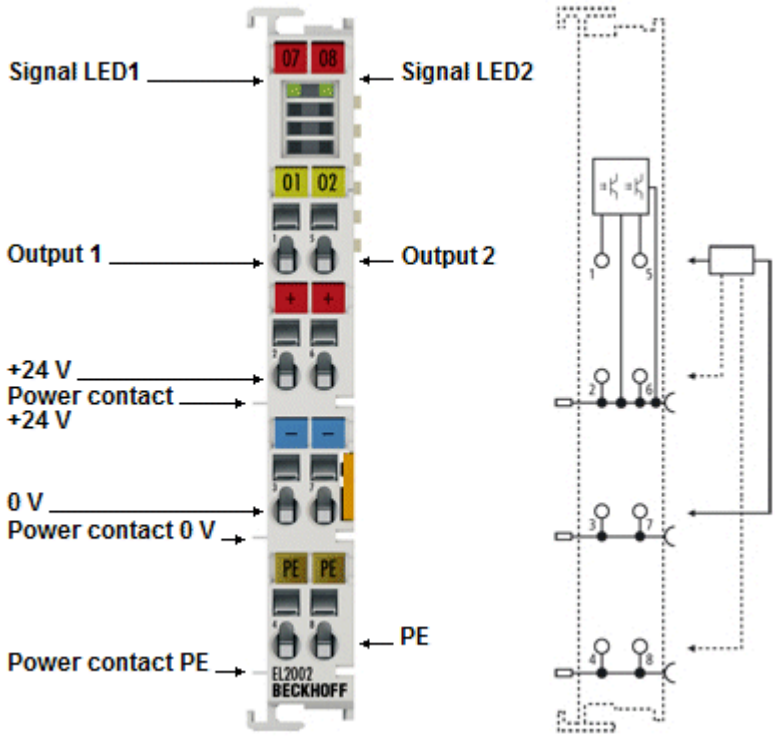


Fig. 9: EL2002

EL2002 - LEDs

LED	Color	Meaning	
OUTPUT 1 OUTPUT 2	green	off	No output signal
		on	24 V_{DC} output signal at the respective output

EL2002 - Connection

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

3.1.3 EL2004 - LEDs and connection

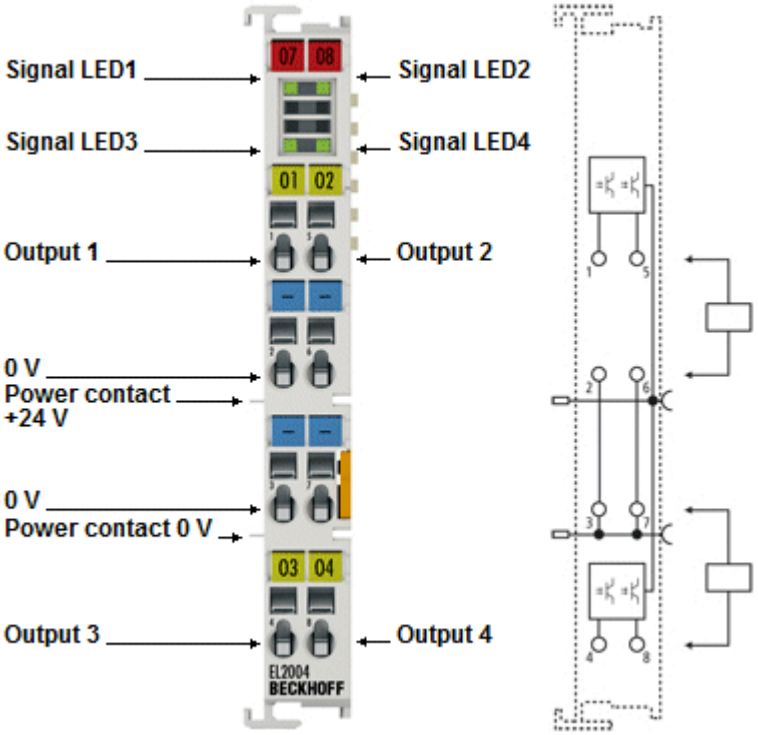


Fig. 10: EL2004

EL2004 - LEDs

LED	Color	Meaning	
OUTPUT 1- 4	green	off	No output signal
		on	24 V_{DC} output signal at the respective output

EL2004 - Connection

Terminal point		Description
Name	No.	
Output 1	1	Output 1
0 V	2	Ground for output 1 (internally connected to terminal point 3, 6, 7 and negative power contact)
0 V	3	Ground for output 3 (internally connected to terminal point 2, 6, 7 and negative power contact)
Output 3	4	Output 3
Output 2	5	Output 2
0 V	6	Ground for output 2 (internally connected to terminal point 2, 3, 7 and negative power contact)
0 V	7	Ground for output 4 (internally connected to terminal point 2, 3, 6 and negative power contact)
Output 4	8	Output 4

3.1.4 EL2008 - LEDs and connection

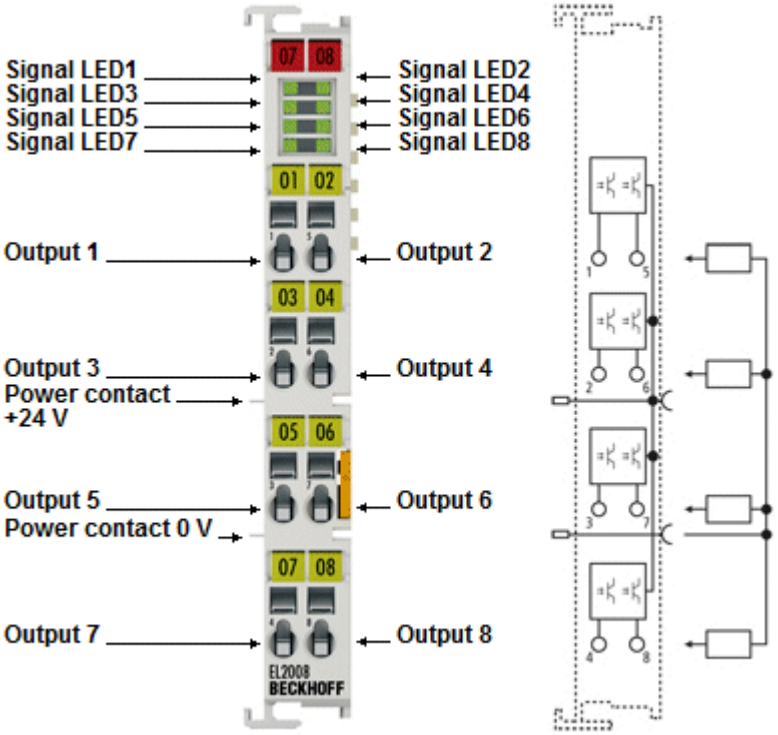


Fig. 11: EL2008

EL2008 - LEDs

LED	Color	Meaning	
OUTPUT 1- 8	green	off	No output signal
		on	24 V_{DC} output signal at the respective output

EL2008 - Connection

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

3.2 EL2014

3.2.1 EL2014 - Introduction

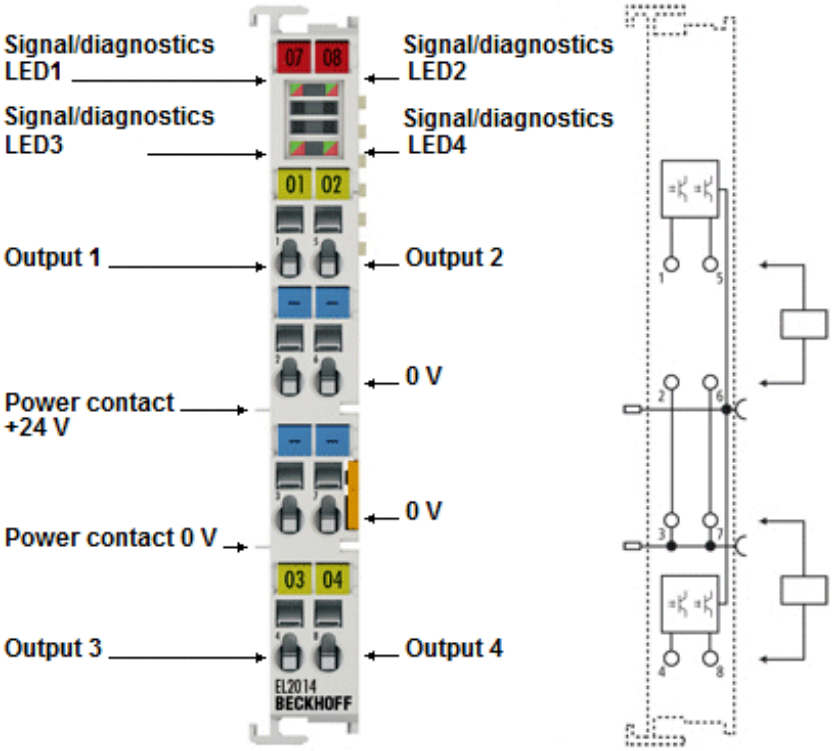


Fig. 12: EL2014

Four-channel digital output terminal, 24 V_{DC}, 0.5A, with diagnostics

The EL2014 digital output terminal connects the binary control signals from the automation device on to the actuators at the process level with electrical isolation. The EL2014 is protected against polarity reversal and processes load currents with outputs protected against overload and short-circuit. The integrated diagnosis can be evaluated in the controller and is indicated by the LEDs. Overtemperature and the lack of a voltage supply to the terminal are supplied as diagnostic information. Beyond that each channel can among other things signal a short circuit individually. The output behavior of the channels in the case of a bus error can be parameterized. The switching state and any error of the output are indicated by the LED. Maintenance of the application is simplified by the diagnosis. The power contacts are continuous; reference potential of the outputs is the 0 V power contact.

The outputs are fed via the 24 V power contact in the EL2014.

NOTE

Watchdog settings

Please refer to section "Notes for setting the watchdog [▶ 72]".