BECKHOFF New Automation Technology

Documentation | EN

EL41xx

Analog Output Terminals (16 bit)

2024-01-10 | Version: 4.9

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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.

Copyright

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
I/O Analog Manual (PDF)	Notes on I/O components with analog in and outputs
Explosion Protection for Terminal Systems (PDF)	Notes on the use of the Beckhoff terminal systems in hazardous areas according to ATEX and IECEx
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
4.9	• Update chapter "Basic function principles" • Structural update
4.8	• Update chapter "Technical data" • Update chapter "Connection, display and diagnostics" • Update revision status • Structural update
4.7	• Update chapter "Technical data" • Update chapter "Connection, display and diagnostics" • Update chapter "Analog specifications" • Update chapter "Basic function principles" • Update chapter "Object description and parameterization" • Update revision status • Structural update
4.6	• EL4134-0020, EL4134-0030 amended • Update chapter "Introduction" • Update chapter "Technical data" • Update revision status • Structural update
4.5	• Update chapter "EL4x1x, EL4x2x Current output" • Update revision status • Structural update
4.4	• Update chapter "Commissioning" • Update revision status • Structural update
4.3	• Update Technical data • Update revision status • Structural update
4.2	• Update Technical data • Update revision status • Structural update
4.1	• Update chapter "Notes on the documentation" • Update Technical data • Update chapter "TwinCAT 2.1x" -> chapter "TwinCAT development environment" and chapter "TwinCAT Quick Start" • Update revision status
4.0	• Migration • Structural update • Update revision status
0.1 - 3.6	*archived*

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.

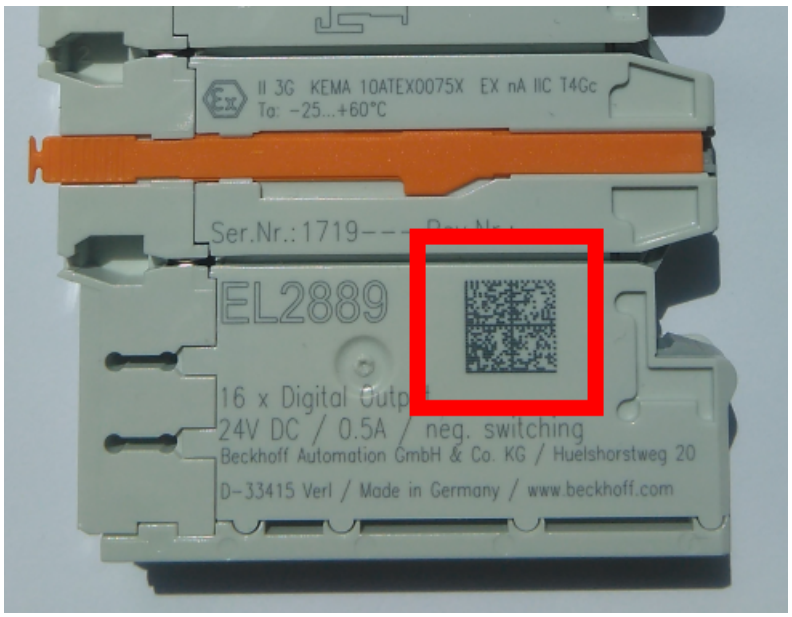


Fig. 2: BIC as data matrix code (DMC, code scheme ECC200)

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.

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

K-bus devices (IP20, IP67)

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

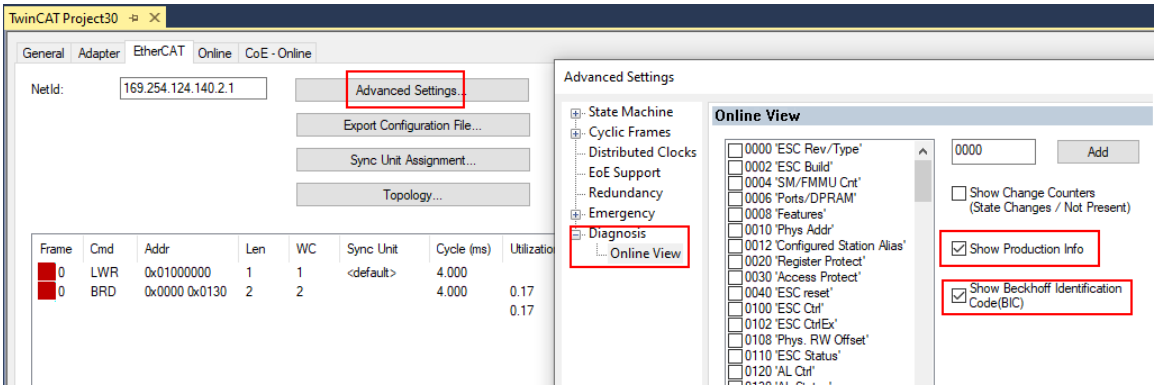
EtherCAT devices (IP20, IP67)

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

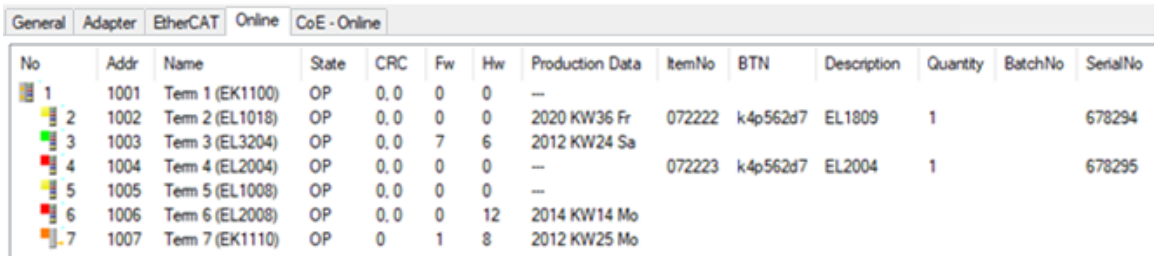
The eBIC is also stored in the ESI-EEPROM. The eBIC was introduced into the Beckhoff I/O production (terminals, box modules) from 2020; widespread implementation is expected in 2021.

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

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

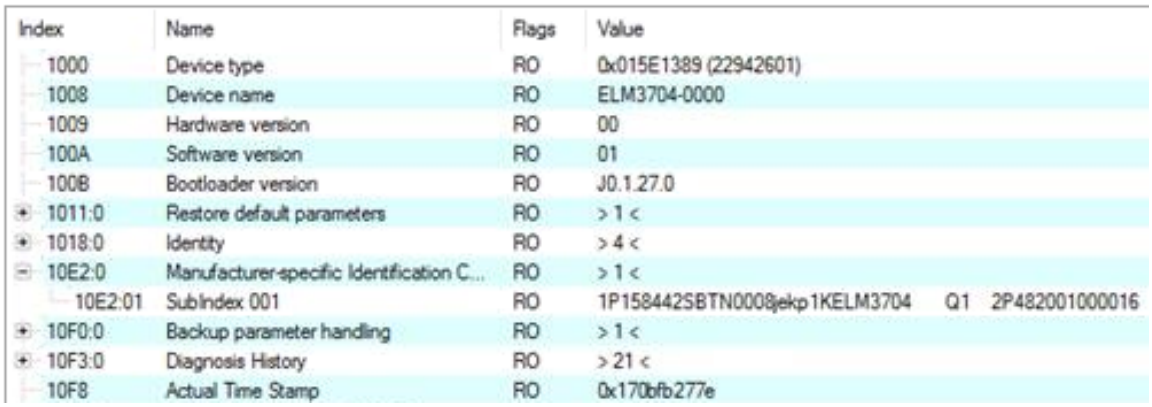


  - The BTN and its contents are then displayed:



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

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



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

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

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

PROFIBUS, PROFINET, DeviceNet devices etc.

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

2 Product description

2.1 EL4102

2.1.1 EL4102 - Introduction

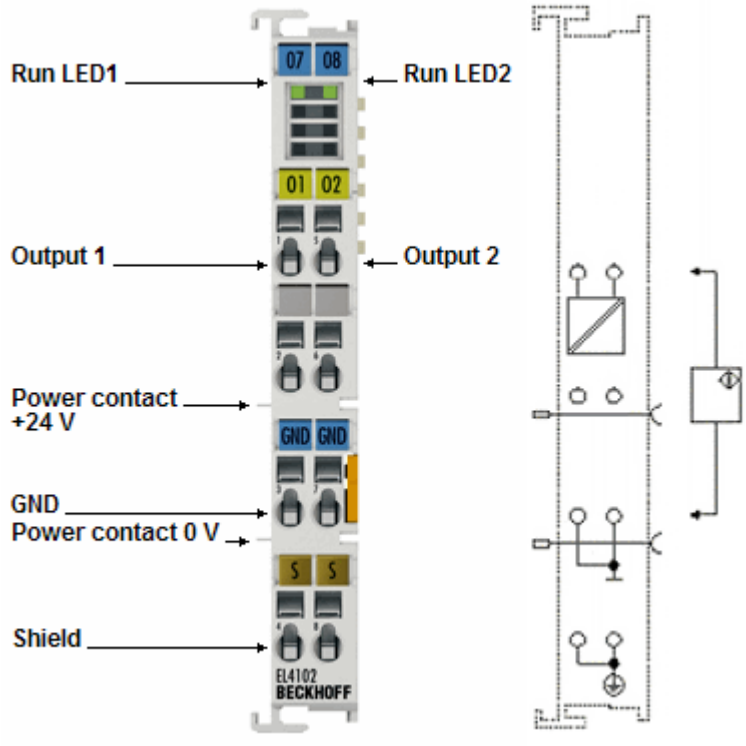


Fig. 4: EL4102

2 channel analog output terminal 0 V to +10 V

The EL4102 analog output terminal generates signals in the range from 0 V to +10 V.
The voltage is supplied to the process level with a resolution of 16 bits and is electrically isolated. The output channels of the terminals have a common ground potential. The Run LEDs give an indication of the data exchange with the Bus Coupler.

Quick links

- Technical data [▶ 19]
- Connection, display and diagnostics [▶ 20]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.1.2 EL4102 - Technical data

Technical data		EL4102
Number of outputs		2
Output voltage		0 V...+10 V (short-circuit proof)
Measuring error		< ± 0.1% (at 0 °C... +55 °C, relative to the full scale value) < ± 0.2% (when using the extended temperature range)
Resolution		16 bits (including sign)
Sampling type		simultaneous
Ground reference		single ended
Load		> 5 kΩ
Distributed Clocks (DC)		Yes, from EL4102-0000-1017
Max. sampling rate (output rate)	DC disabled **)	Normal operation: 10 kSps (corresponds to minimum EtherCAT cycle time of 100 µs) Fast mode: 15 kSps (corresponds to minimum EtherCAT cycle time of 66.6 µs) Fast mode 1-channel: 20 kSps (corresponds to minimum EtherCAT cycle time of 50 µs)
	DC enabled	Normal operation: 5 kSps (corresponds to minimum EtherCAT cycle time of 200 µs) Fast mode: not possible
Power supply for outputs		via the E-bus
Power supply for the electronics		via the E-bus
Current consumption via E-bus		typ. 170 mA (210 mA***))
Electrical isolation		500 V (E-bus/field voltage)
Bit width in process image		Outputs: 2 x 16 bit data
Configuration		no address or configuration settings required
Weight		approx. 55 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 air humidity		95 %, no condensation
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27, see also Installation instructions [▶ 71] for enhanced mechanical load capacity
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating		IP20
Installation position		variable
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 59], IECEx [▶ 60], cULus [▶ 64]

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

**) SyncManager synchronous, EtherCAT frame triggered.
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 18 / FW 09, Rev.-1021 [▶ 212]

Ex markings

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

2.1.3 EL4102 - Connection, display and diagnostics

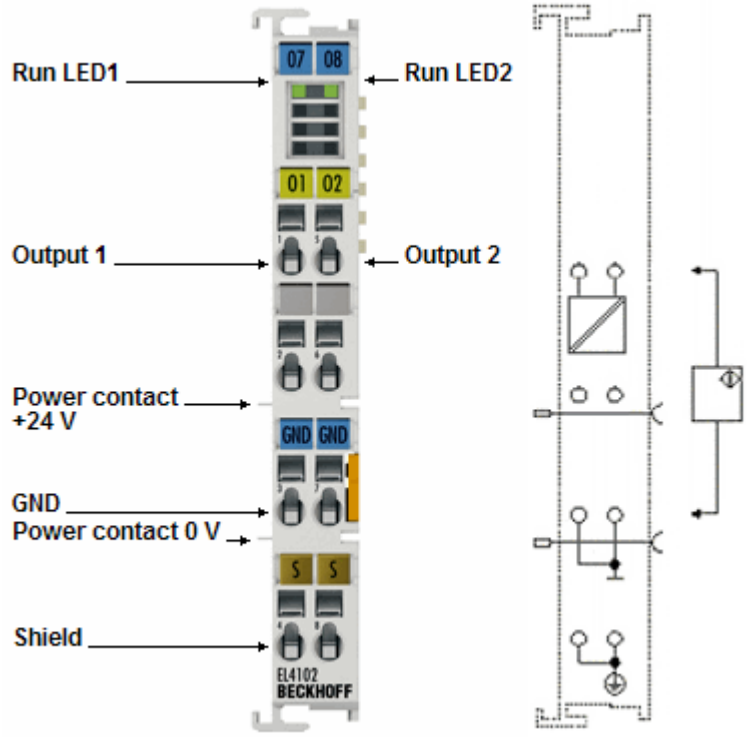


Fig. 5: LEDs and connection EL4102

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Comment	Internally connected with connector	Max. current carrying capacity *)
Designation	No.			
Output 1	1	Output 1	-	Specified by output power
-	2	Without function	-	-
GND	3	Signal ground for Output 1	7	40 mA
Shield	4	Shield (FE)	8, mounting rail	100 mA **)
Output 2	5	Output 2	-	Specified by output power
-	6	Without function	-	-
GND	7	Signal ground for Output 2	3	40 mA
Shield	8	Shield (FE)	4, mounting rail	100 mA **)

*) Constant and peak value
**) Shield lines should be de-energized!

Terminal points „Without function“

Terminal points "without function" may be equipped for production reasons, they must not be connected to conductors.

2.2 EL4104

2.2.1 EL4104 - Introduction

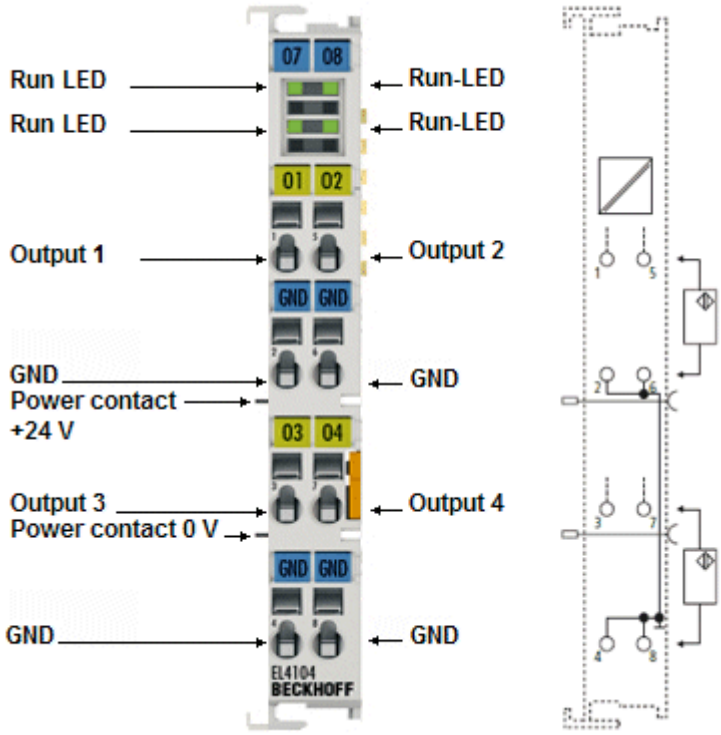


Fig. 6: EL4104

4 channel analog output terminal 0 V to +10 V

The EL4104 analog output terminal generates signals in the range from 0 to 10 V.
The voltage is supplied to the process level with a resolution of 16 bits and is electrically isolated. The output channels of an EtherCAT Terminal have a common ground potential. The Run LEDs give an indication of the data exchange with the Bus Coupler.

Quick links

- Technical data [▶ 23]
- Connection, display and diagnostics [▶ 24]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.2.2 EL4104 - Technical data

Technical data		EL4104
Number of outputs		4
Output voltage		0 V...10 V (short-circuit proof)
Accuracy		< ± 0.1% (at 0 °C... +55 °C, relative to the full scale value) < ± 0.2% (when using the extended temperature range)
Resolution		16 bits (including sign)
Sampling type		simultaneous
Ground reference		single ended
Load		> 5 kΩ
Distributed Clocks (DC)		yes
Max. sampling rate (output rate)	DC disabled **)	4 kSps (corresponds to minimum EtherCAT cycle time of 250 µs)
	DC enabled	2.5 kSps (corresponds to minimum EtherCAT cycle time 400 µs)
Power supply for the electronics		via the E-bus
Power supply for outputs		via the E-bus
Current consumption via E-bus		typ. 190 mA
Electrical isolation		500 V (E-bus/field voltage)
Bit width in process image		Outputs: 4 x 16 bit data
Configuration		no address or configuration settings required
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 air humidity		95 %, no condensation
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity [▶ 71]
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating		IP20
Installation position		variable
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 59], IECEx [▶ 60], cULus [▶ 64]

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

**) SyncManager synchronous, EtherCAT frame triggered.
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

Ex markings

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

2.2.3 EL4104 - Connection, display and diagnostics

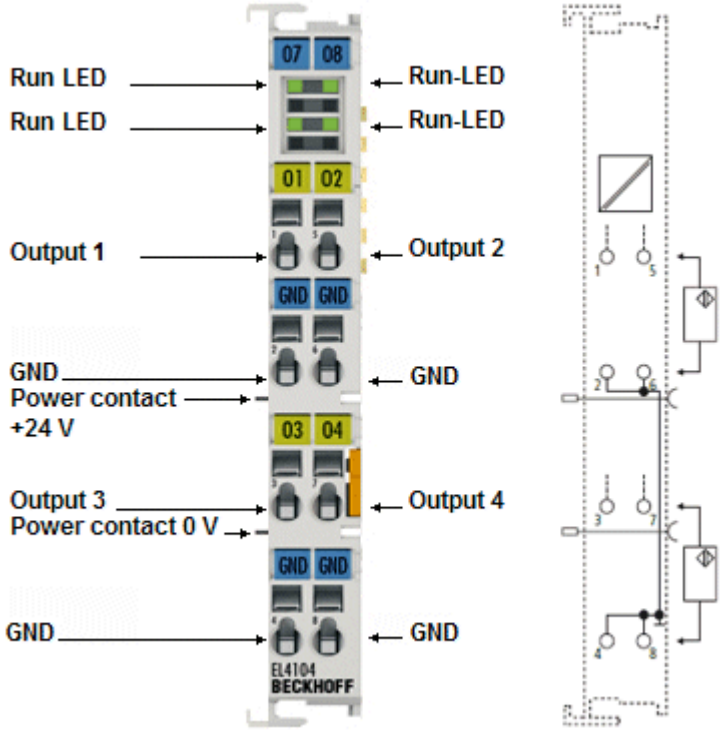


Fig. 7: LEDs and connection EL4104

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Comment	Internally connected with connector	Max. current carrying capacity *)
Designation	No.			
Output 1	1	Output 1	4, 6, 8	Specified by output power
GND	2	Signal ground for Output 1	-	40 mA
Output 3	3	Output 3	2, 6, 8	Specified by output power
GND	4	Signal ground for Output 3	-	40 mA
Output 2	5	Output 2	2, 4, 8	Specified by output power
GND	6	Signal ground for Output 2	-	40 mA
Output 4	7	Output 4	2, 4, 6	Specified by output power
GND	8	Signal ground for Output 4	-	40 mA

*) Constant and peak value

2.3 EL4112, EL4112-0010

2.3.1 EL4112, EL4112-0010 - Introduction

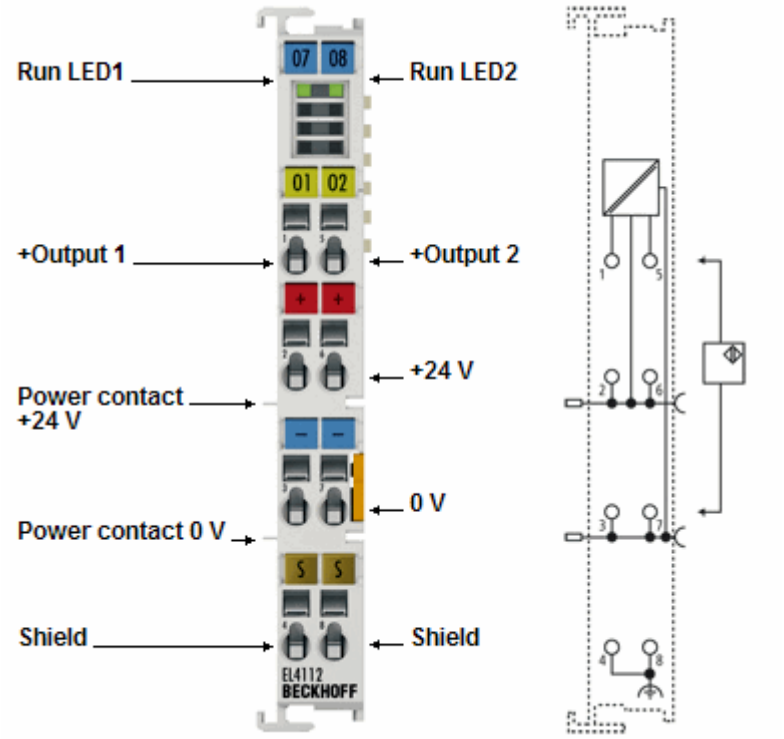


Fig. 8: EL4112-00xx

2 channel analog output terminal 0 mA to 20 mA, -10 mA to +10 mA

The EL4112 analog output terminal generates signals in the range from 0 mA to 20 mA.
The EL4112-0010 analog output terminal generates signals in the range from -10 mA to +10 mA.
The power is supplied electrically isolated to the process level with a resolution of 16 bits. The output channels of the terminals have a common ground potential. The Run LEDs give an indication of the data exchange with the Bus Coupler.

Quick links

- Technical data [▶ 26]
- Connection, display and diagnostics [▶ 27]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.3.2 EL4112, EL4112-0010 - Technical data

Technical data		EL4112	EL4112-0010
Number of outputs		2	
Output current per channel		0 ... 20 mA (short-circuit proof)	-10 ... +10 mA (short-circuit proof)
Accuracy		± 0.1% of full-scale value	± 0.3% of full-scale value (at load < 200 Ω, max. 500 Ω permitted)
Resolution		16 bits (including sign)	
Sampling type		simultaneous	
Ground reference		single ended	
Load [▶ 191]		< 500 Ω	
Distributed Clocks (DC)		Yes, from EL4112-0000-1017	Yes, from EL4112-0010-1017
Max. sampling rate (output rate)	DC disabled **)	Normal operation: 10 kSps (corresponds to minimum EtherCAT cycle time of 100 µs) Fast mode: 15 kSps (corresponds to minimum EtherCAT cycle time of 66.6 µs) Fast mode 1-channel: 20 kSps (corresponds to minimum EtherCAT cycle time of 50 µs)	
	DC enabled	Normal operation: 5 kSps (corresponds to minimum EtherCAT cycle time of 200 µs) Fast mode: not possible	
Power supply for outputs		via the power contacts	
Current consumption power contacts		15 mA typ. + load	
Power supply for the electronics		via the E-bus	
Current consumption via E-bus		typ. 110 mA (160 mA***))	typ. 110 mA (150 mA****))
Electrical isolation		500 V (E-bus/field voltage)	
Bit width in process image		Outputs: 2 x 16 bit data	
Configuration		no address or configuration settings required	
Weight		approx. 60 g	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 air humidity		95 %, no condensation	
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)	
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715	
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity [▶ 71]	
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4	
Protection rating		IP20	
Installation position		variable	
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 58], IECEx [▶ 60], cULus [▶ 64]	

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

**) SyncManager synchronous, EtherCAT frame triggered.
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 12 / FW 09, Rev.-1021 [▶ 212]

***) valid for HW / FW / revision combinations before HW 09 / FW 09, Rev.-1021 [▶ 212]

Ex markings

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

2.3.3 EL4112, EL4112-0010 - Connection, display and diagnostics

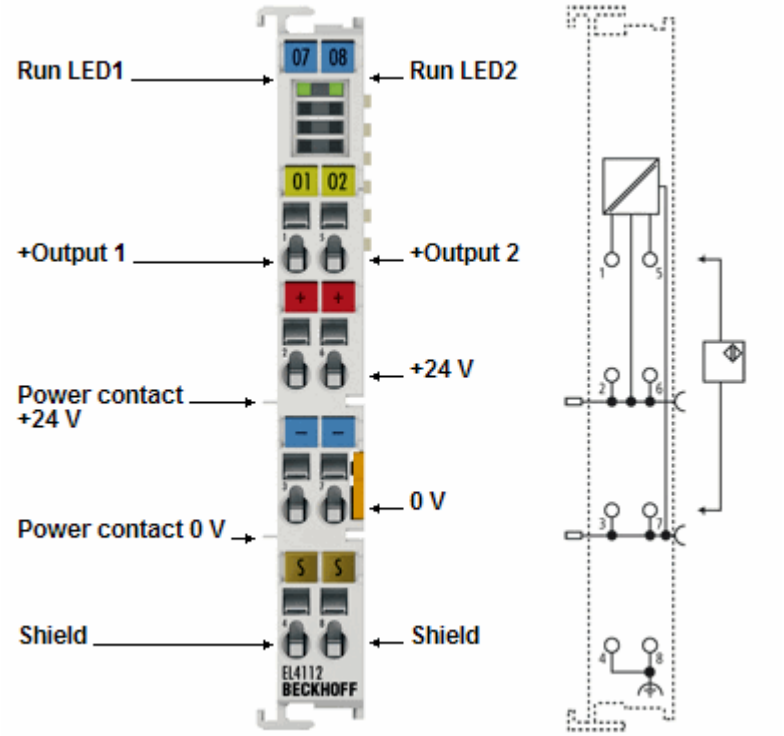


Fig. 9: LEDs and connection EL4112-00xx

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Comment	Internally connected with connector	Max. current carrying capacity *)
Designation	No.			
Output 1	1	Output 1	-	Specified by output power
+24 V	2	+24 V	6, positive power contact	4 A
0 V	3	0 V, signal ground for Output 1	7, negative power contact	4 A
Shield	4	Shield (FE)	8, mounting rail	100 mA **)
Output 2	5	Output 2	-	Specified by output power
+24 V	6	+24 V	2, positive power contact	4 A
0 V	7	0 V, signal ground for Output 2	3, negative power contact	4 A
Shield	8	Shield (FE)	4, mounting rail	100 mA **)

*) Constant and peak value
**) Shield lines should be de-energized!

2.4 EL4114, EL4114-0020

2.4.1 EL4114, EL4114-0020 - Introduction

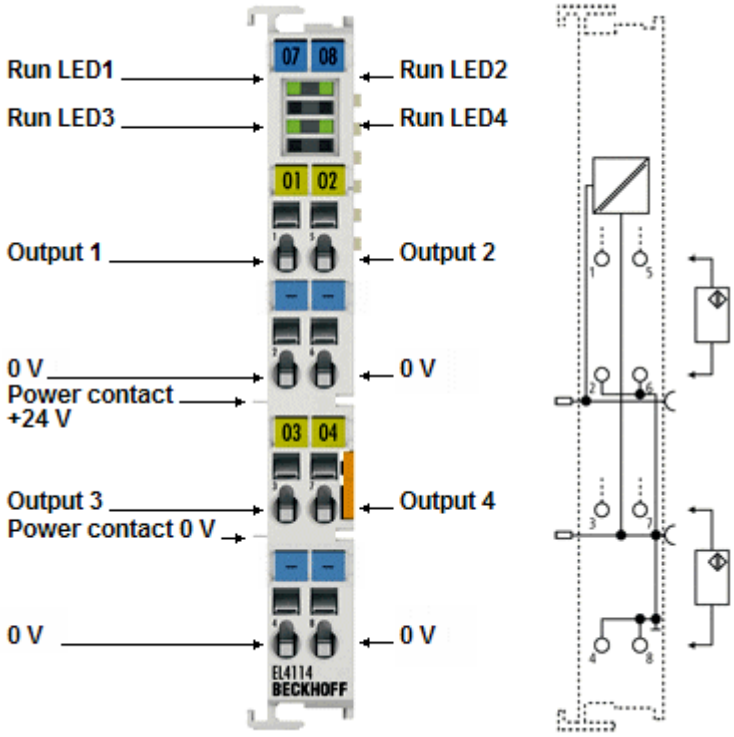


Fig. 10: EL4114-xxxx

4 channel analog output terminal 0 mA to 20 mA

The EL4114 analog output terminal generates signals in the range from 0 to 20 mA.
The power is supplied to the process level with a resolution of 16 bits and is electrically isolated. Ground potential for the output channels of an EtherCAT Terminal is common with the 24 V_{DC} supply. The output stages are powered by the 24 V supply. The Run LEDs give an indication of the data exchange with the Bus Coupler.
The EL4114-0020 is available as a calibrated variant with a factory calibration certificate [▶ 62].

Quick links

- Technical data [▶ 29]
- Connection, display and diagnostics [▶ 30]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.4.2 EL4114, EL4114-0020 - Technical data

Technical data		EL4114	EL4114-0020
Number of outputs		4	
Output current per channel		0 mA to 20 mA (short-circuit proof)	
Accuracy		± 0.1% of full-scale value	
Resolution		16 bits (including sign)	
Sampling type		simultaneous	
Ground reference		single ended	
Load		< 350 Ω (short-circuit proof)	
Distributed Clocks (DC)		yes	
Max. sampling rate (output rate)	DC disabled **)	4 kSps (corresponds to minimum EtherCAT cycle time of 250 µs)	
	DC enabled	2.5 kSps (corresponds to minimum EtherCAT cycle time 400 µs)	
Power supply for outputs		via the power contacts	
Current consumption power contacts		15 mA typ. + load	
Power supply for the electronics		via the E-bus	
Current consumption via E-bus		typ. 110 mA (265 mA***))	
Electrical isolation		500 V (E-bus/field voltage)	
Bit width in process image		Outputs: 4 x 16 bit data	
Configuration		no address or configuration settings required	
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 air humidity		95 %, no condensation	
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)	
Installation		on 35 mm mounting rail, conforms to EN 60715	
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity	
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4	
Protection rating		IP20	
Installation position		variable	
Factory working standard calibration certificate [▶ 62]		-	yes
Identification / approval*)		CE, EAC, UKCA ATEX, IECEx [▶ 60], cULus	

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

**) SyncManager-synchronous, EtherCAT frame-triggered
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 08 / FW 03, Rev.-1021 [▶ 212]

Ex markings

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

2.4.3 EL4114, EL4114-0020 - Connection, display and diagnostics

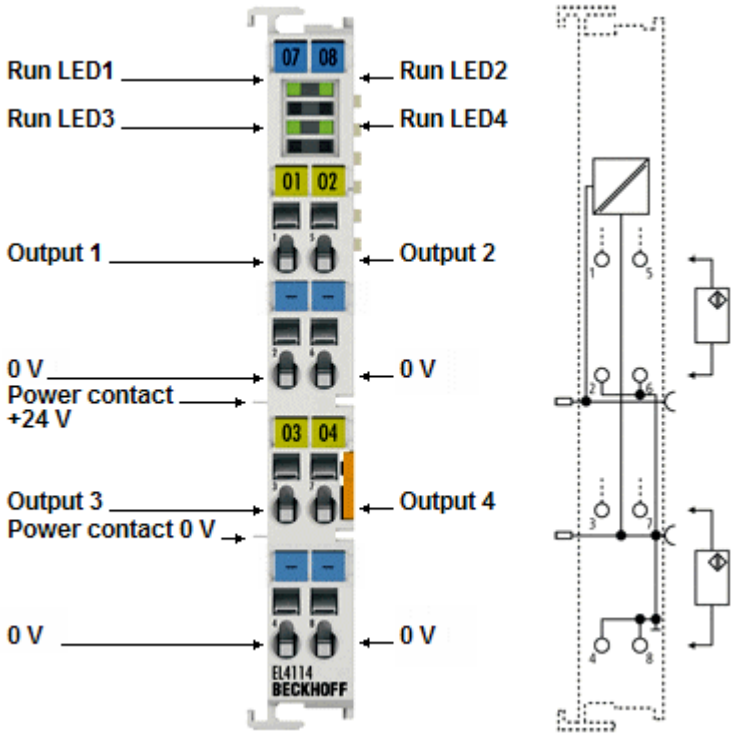


Fig. 11: LEDs and connection EL4114-00xx

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Description	Internally connected with connection	Max. current carrying capacity *)
Name	No.			
Output 1	1	Output 1	-	Given by output power
0 V	2	0 V, Signal ground for output 1	4, 6, 8; negative power contact	500 mA
Output 3	3	Output 3	-	Given by output power
0 V	4	0 V, Signal ground for output 3	2, 6, 8; negative power contact	500 mA
Output 2	5	Output 2	-	Given by output power
0 V	6	0 V, Signal ground for output 2	2, 4, 8; negative power contact	500 mA
Output 4	7	Output 4	-	Given by output power
0 V	8	0 V, Signal ground for output 4	2, 4, 6; negative power contact	500 mA

*) Constant and peak value

2.5 EL4122

2.5.1 EL4122 - Introduction

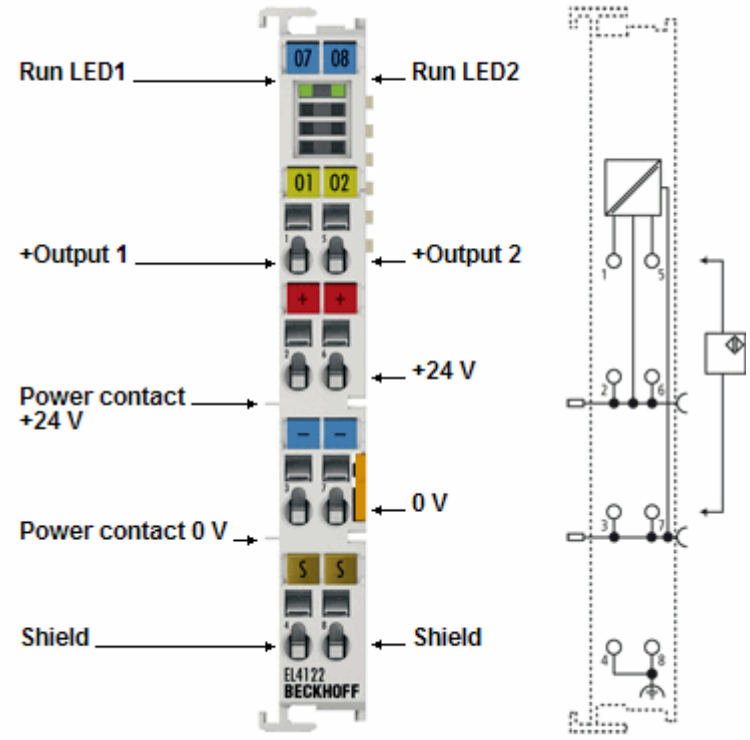


Fig. 12: EL4122

2 channel analog output terminal 4 mA to 20 mA

The EL4122 analog output terminal generates signals in the range from 4 mA to 20 mA.
The power is supplied electrically isolated to the process level with a resolution of 16 bits. The output channels of the terminals have a common ground potential. The Run LEDs give an indication of the data exchange with the Bus Coupler.

Quick links

- Technical data [▶ 32]
- Connection, display and diagnostics [▶ 33]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.5.2 EL4122 - Technical data

Technical data		EL4122
Number of outputs		2
Output current per channel		4 ... 20 mA (short-circuit proof)
Accuracy		± 0.1% of full-scale value
Resolution		16 bits (including sign)
Sampling type		simultaneous
Ground reference		single ended
Load [▶ 191]		< 500 Ω
Distributed Clocks (DC)		Yes, from EL4122-0000-1017
Max. sampling rate (output rate)	DC disabled **)	Normal operation: 10 kSps (corresponds to minimum EtherCAT cycle time of 100 µs) Fast mode: 15 kSps (corresponds to minimum EtherCAT cycle time of 66.6 µs) Fast mode 1-channel: 20 kSps (corresponds to minimum EtherCAT cycle time of 50 µs)
	DC enabled	Normal operation: 5 kSps (corresponds to minimum EtherCAT cycle time of 200 µs) Fast mode: not possible
Power supply for outputs		via the power contacts
Current consumption power contacts		15 mA typ. + load
Power supply for the electronics		via the E-bus
Current consumption via E-bus		typ. 110 mA (160 mA***))
Electrical isolation		500 V (E-bus/field voltage)
Bit width in process image		Outputs: 2 x 16 bit data
Configuration		no address or configuration settings required
Weight		approx. 60 g
Permissible ambient temperature range during operation		0 °C ... +55 °C
Permissible ambient temperature range during storage		-25 °C ... +85 °C
Permissible relative air humidity		95 %, no condensation
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity [▶ 71]
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating		IP20
Installation position		variable
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 58], IECEx [▶ 60], cULus [▶ 64]

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

**) SyncManager-synchronous, EtherCAT frame-triggered
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 12 / FW 09, Rev.-1021 [▶ 212]

Ex markings

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

2.5.3 EL4122 - Connection, display and diagnostics

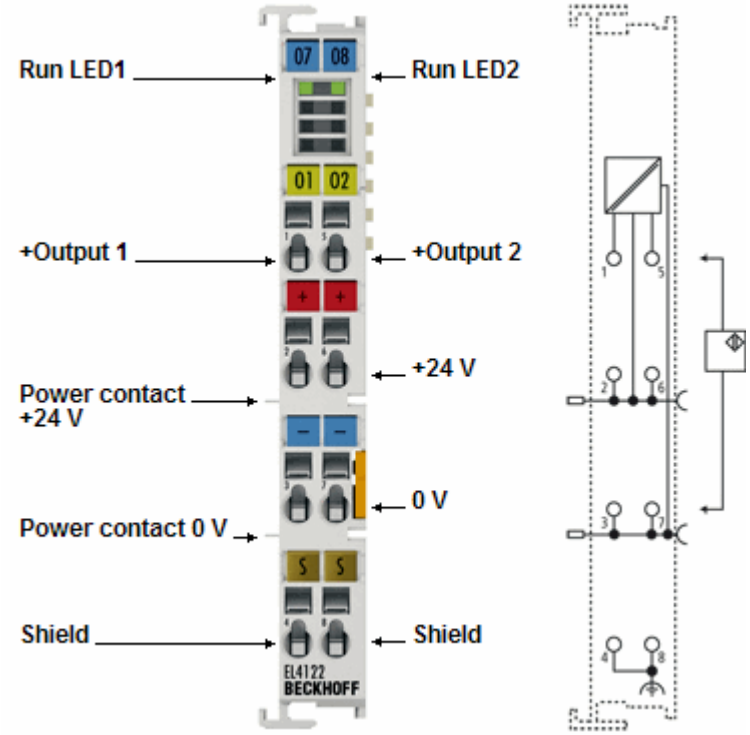


Fig. 13: LEDs and connection EL4122

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Comment	Internally connected with connector	Max. current carrying capacity *)
Designation	No.			
Output 1	1	Output 1	-	Specified by output power
+24 V	2	+24 V	6, positive power contact	4 A
0 V	3	0 V, signal ground for Output 1	7, negative power contact	4 A
Shield	4	Shield (FE)	8, mounting rail	100 mA **)
Output 2	5	Output 2	-	Specified by output power
+24 V	6	+24 V	2, positive power contact	4 A
0 V	7	0 V, signal ground for Output 2	3, negative power contact	4 A
Shield	8	Shield (FE)	4, mounting rail	100 mA **)

*) Constant and peak value
**) Shield lines should be de-energized!

2.6 EL4124

2.6.1 EL4124 - Introduction

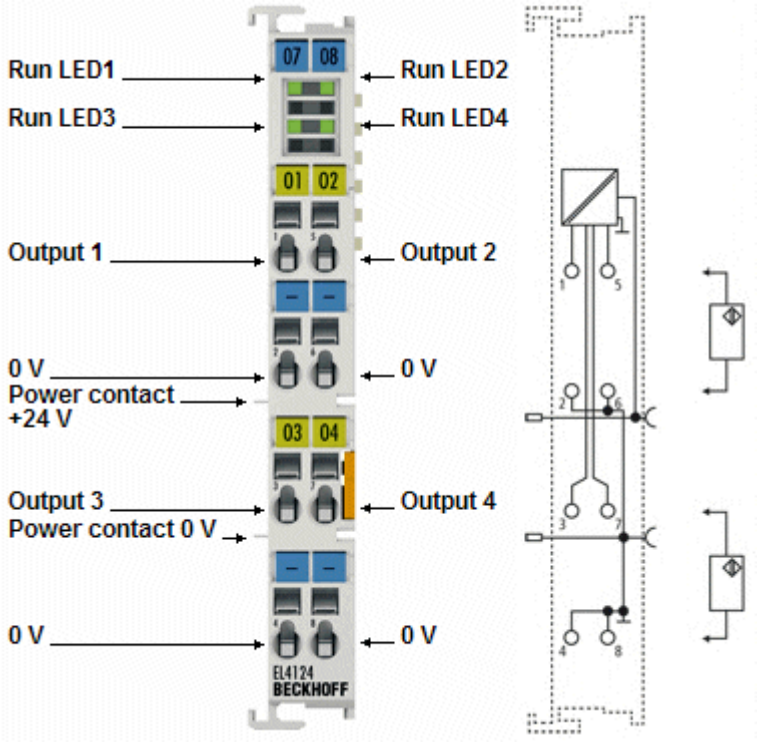


Fig. 14: EL4124

4 channel analog output terminal 4 mA to 20 mA

The EL4124 analog output terminal generates signals in the range from 4 to 20 mA. The power is supplied to the process level with a resolution of 16 bits and is electrically isolated. Ground potential for the output channels of an EtherCAT Terminal is common with the 24 V_{DC} supply. The output stages are powered by the 24 V supply. The Run LEDs give an indication of the data exchange with the Bus Coupler.

Quick links

- Technical data [▶ 35]
- Connection, display and diagnostics [▶ 36]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.6.2 EL4124 - Technical data

Technical data		EL4124
Number of outputs		4
Output current per channel		4 mA to 20 mA (short-circuit proof)
Accuracy		± 0.1% of full-scale value
Resolution		16 bits (including sign)
Sampling type		simultaneous
Ground reference		single ended
Load [▶ 191]		< 350 Ω (short-circuit proof)
Distributed Clocks (DC)		yes
Max. sampling rate (output rate)	DC disabled **)	4 kSps (corresponds to minimum EtherCAT cycle time of 250 µs)
	DC enabled	2.5 kSps (corresponds to minimum EtherCAT cycle time 400 µs)
Power supply for outputs		via the power contacts
Current consumption power contacts		15 mA typ. + load
Power supply for the electronics		via the E-bus
Current consumption via E-bus		typ. 110 mA (190 mA***))
Electrical isolation		500 V (E-bus/field voltage)
Bit width in process image		Outputs: 4 x 16 bit data
Configuration		no address or configuration settings required
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 air humidity		95 %, no condensation
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity [▶ 71]
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating		IP20
Installation position		variable
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 58], IECEx [▶ 60], cULus [▶ 64]

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

**) SyncManager-synchronous, EtherCAT frame-triggered
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 08 / FW 03, Rev.-1021 [▶ 212]

Ex markings

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

2.6.3 EL4124 - Connection, display and diagnostics

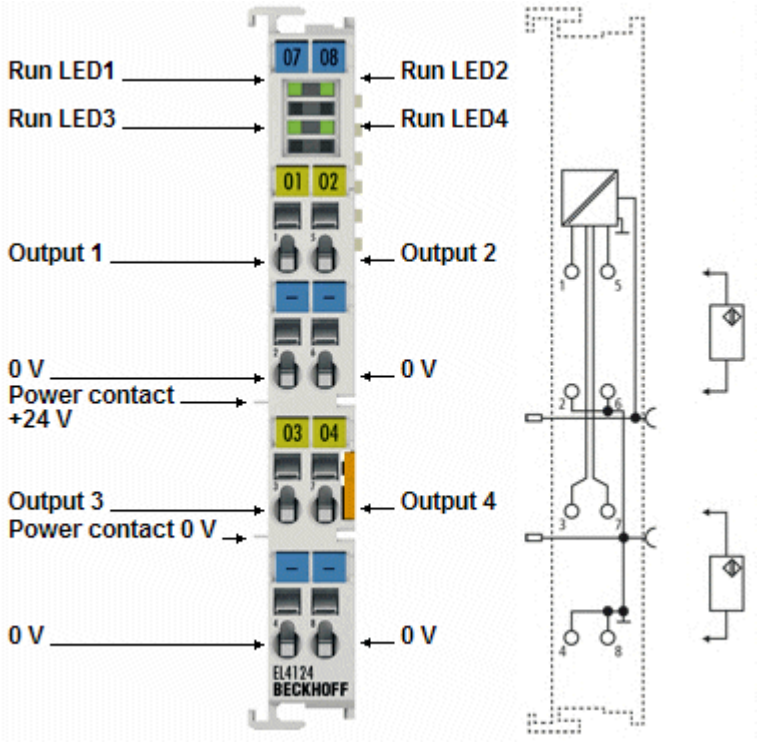


Fig. 15: LEDs and connection EL4124

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Description	Internally connected with connection	Max. current carrying capacity *)
Name	No.			
Output 1	1	Output 1	-	Given by output power
0 V	2	0 V, Signal ground for output 1	4, 6, 8; negative power contact	500 mA
Output 3	3	Output 3	-	Given by output power
0 V	4	0 V, Signal ground for output 3	2, 6, 8; negative power contact	500 mA
Output 2	5	Output 2	-	Given by output power
0 V	6	0 V, Signal ground for output 2	2, 4, 8; negative power contact	500 mA
Output 4	7	Output 4	-	Given by output power
0 V	8	0 V, Signal ground for output 4	2, 4, 6; negative power contact	500 mA

*) Constant and peak value

2.7 EL4132

2.7.1 EL4132 - Introduction

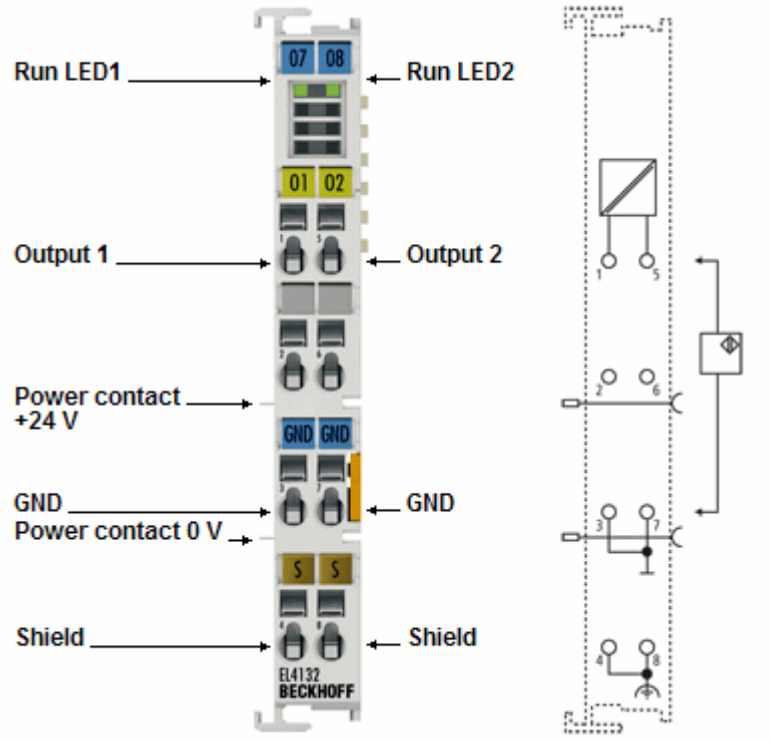


Fig. 16: EL4132

2 channel analog output terminal -10 V to +10 V

The EL4132 analog output terminal generates signals in the range from -10 V to +10 V.
The voltage is supplied to the process level with a resolution of 16 bits and is electrically isolated. The output channels of the terminals have a common ground potential. The Run LEDs give an indication of the data exchange with the Bus Coupler.

Quick links

- Technical data [▶ 38]
- Connection, display and diagnostics [▶ 39]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.7.2 EL4132 - Technical data

Technical data		EL4132
Number of outputs		2
Output voltage		-10 V...+10 V (short-circuit proof)
Measuring error		< ± 0.1% (at 0 °C... +55 °C, relative to the full scale value) < ± 0.2% (when using the extended temperature range)
Resolution		16 bits (including sign)
Sampling type		simultaneous
Ground reference		single ended
Load		> 5 kΩ
Distributed Clocks (DC)		Yes, from EL4132-0000-1017
Max. sampling rate (output rate)	DC disabled **)	Normal operation: 10 kSps (corresponds to minimum EtherCAT cycle time of 100 µs) Fast mode: 15 kSps (corresponds to minimum EtherCAT cycle time of 66.6 µs) Fast mode 1-channel: 20 kSps (corresponds to minimum EtherCAT cycle time of 50 µs)
	DC enabled	Normal operation: 5 kSps (corresponds to minimum EtherCAT cycle time of 200 µs) Fast mode: not possible
Power supply for outputs		via the E-bus
Power supply for the electronics		via the E-bus
Current consumption via E-bus		typ. 170 mA (210 mA***))
Electrical isolation		500 V (E-bus/field voltage)
Bit width in process image		Outputs: 2 x 16 bit data
Configuration		no address or configuration settings required
Weight		approx. 55 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 air humidity		95 %, no condensation
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27, see also Installation instructions [▶ 71] for enhanced mechanical load capacity
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating		IP20
Installation position		variable
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 59], IECEx [▶ 60], cULus [▶ 64]

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

**) SyncManager synchronous, EtherCAT frame triggered.
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 18 / FW 09, Rev.-1021 [▶ 212]

Ex markings

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

2.7.3 EL4132 - Connection, display and diagnostics

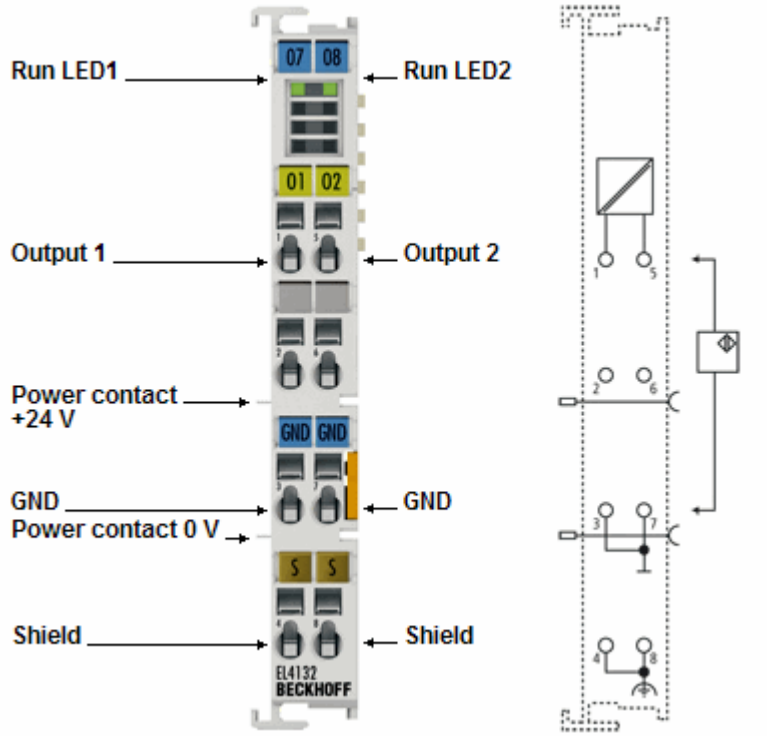


Fig. 17: LEDs and connection EL4132

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Comment	Internally connected with connector	Max. current carrying capacity *)
Designation	No.			
Output 1	1	Output 1	-	Specified by output power
-	2	Without function	-	-
GND	3	Signal ground for Output 1	7	40 mA
Shield	4	Shield (FE)	8, mounting rail	100 mA **)
Output 2	5	Output 2	-	Specified by output power
-	6	Without function	-	-
GND	7	Signal ground for Output 2	3	40 mA
Shield	8	Shield (FE)	4, mounting rail	100 mA **)

*) Constant and peak value
**) Shield lines should be de-energized!

Terminal points „Without function“

Terminal points "without function" may be equipped for production reasons, they must not be connected to conductors.

2.8 EL4134, EL4134-0020, EL4134-0030

2.8.1 EL4134, EL4134-0020, EL4134-0030 - Introduction

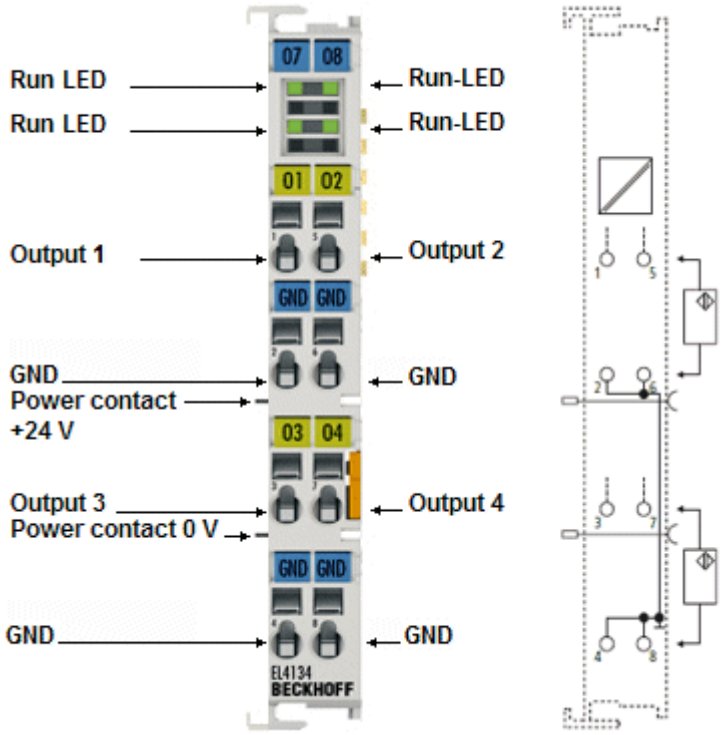


Fig. 18: EL4134-00xx

4 channel analog output terminal -10 V to +10 V

The EL4134 analog output terminal generates signals in the range from -10 V to +10 V.
The voltage is supplied to the process level with a resolution of 16 bits and is electrically isolated. The output channels of an EtherCAT Terminal have a common ground potential. The Run LEDs give an indication of the data exchange with the Bus Coupler.

The EL4134-0020 is available as a calibrated variant with a factory calibration certificate [▶ 62], and the EL4134-0030 with a "DAkkS" or ISO 17025 certificate [▶ 62] from an accredited service provider in cooperation with Beckhoff.

Quick links

- Technical data [▶ 42]
- Connection, display and diagnostics [▶ 44]
- Mounting and wiring [▶ 57]
- Commissioning [▶ 77]

2.8.2 EL4134 - Technical data

Technical data		EL4134
Number of outputs		4
Output voltage		-10 V...+10 V (short-circuit proof)
Accuracy		< ± 0.1% (at 0 °C... +55 °C, relative to the full scale value) < ± 0.2% (when using the extended temperature range)
Resolution		16 bits (including sign)
Sampling type		simultaneous
Ground reference		single ended
Load		> 5 kΩ
Distributed Clocks (DC)		yes
Max. sampling rate (output rate)	DC disabled **)	4 kSps (corresponds to minimum EtherCAT cycle time of 250 µs)
	DC enabled	2.5 kSps (corresponds to minimum EtherCAT cycle time 400 µs)
Power supply for the electronics		via the E-bus
Power supply for outputs		via the E-bus
Current consumption via E-bus		typ. 190 mA (265 mA***))
Electrical isolation		500 V (E-bus/field voltage)
Bit width in process image		Outputs: 4 x 16 bit data
Configuration		no address or configuration settings required
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 air humidity		95 %, no condensation
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity [▶ 71]
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4
Protection rating		IP20
Installation position		variable
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 59], IECEx [▶ 60], cULus [▶ 64]

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

**) SyncManager synchronous, EtherCAT frame triggered.
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 10 / FW 03, Rev.-1021 [▶ 212]

Ex markings

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

2.8.3 EL4134-0020, EL4134-0030 - Technical data

Technical data		EL4134-0020	EL4134-0030
Connection technology		2-wire, single-ended	
Number of outputs		4	
Output voltage		-10 V...+10 V (short-circuit proof)	
Accuracy		< ±0.1 % (relative to full scale value)	
Resolution		16 bits (including sign)	
Sampling type		simultaneous	
Ground reference		single ended	
Load		> 5 kΩ	
Distributed Clocks (DC)		yes	
Max. sampling rate (output rate)	DC disabled **)	4 kSps (corresponds to minimum EtherCAT cycle time of 250 µs)	
	DC enabled	2.5 kSps (corresponds to minimum EtherCAT cycle time of 400 µs)	
Power supply for the electronics		via the E-bus	
Power supply for outputs		via the E-bus	
Current consumption via E-bus		typ. 190 mA (265 mA***))	
Electrical isolation		500 V (E-bus/field voltage)	
Bit width in process image		Outputs: 4 x 16 bit data	
Configuration		no address or configuration settings required	
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 air humidity		95 %, no condensation	
Dimensions (W x H x D)		approx. 15 mm x 100 mm x 70 mm (width aligned: 12 mm)	
Installation [▶ 65]		on 35 mm mounting rail, conforms to EN 60715	
Vibration / shock resistance		conforms to EN 60068-2-6 / EN 60068-2-27 see also Installation instructions for enhanced mechanical load capacity [▶ 71]	
EMC immunity / emission		conforms to EN 61000-6-2 / EN 61000-6-4	
Protection rating		IP20	
Installation position		variable	
Calibration certificate		Factory working standard calibration certificate [▶ 62]	DAkkS or ISO-17025 certificate [▶ 62]
Identification / approval*)		CE, EAC, UKCA ATEX [▶ 58], IECEx [▶ 60], cULus [▶ 64]	

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

**) SyncManager synchronous, EtherCAT frame triggered.
The EL41xx does not support oversampling, therefore the output rate is equal to the EtherCAT cycle time.

***) valid for HW / FW / revision combinations before HW 10 / FW 03, Rev.-1021 [▶ 212]

Ex markings

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

2.8.4 EL4134, EL4134-0020, EL4134-0030 -Connection, display and diagnostics

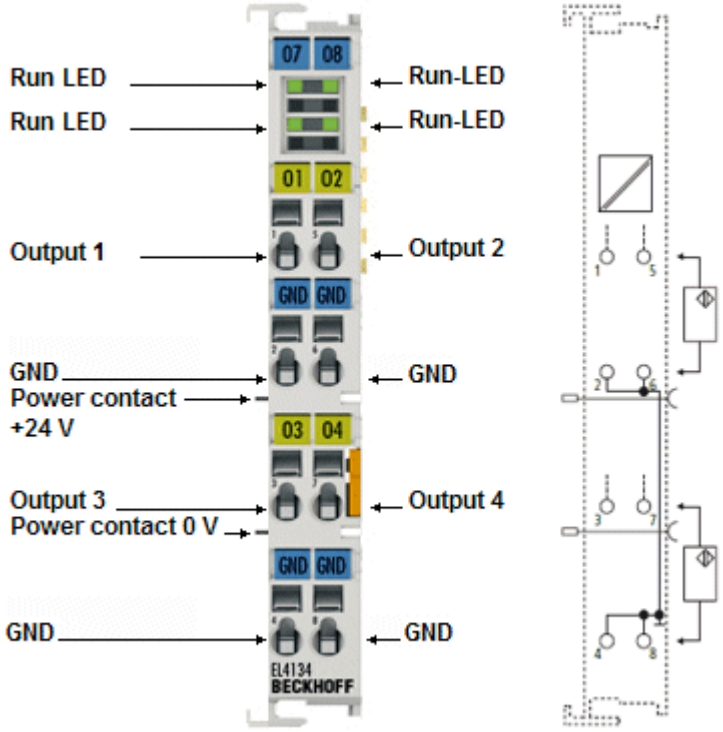


Fig. 19: LEDs and connection EL4134-00xx

LEDs

LED	Color	Meaning	
RUN	green	These LEDs indicate the terminal's operating state:	
		off	State of the EtherCAT State Machine [▶ 49]: **INIT** = initialization of the terminal or **BOOTSTRAP** = function for firmware updates [▶ 215] of the terminal
		flashing	State of the EtherCAT State Machine: **PREOP** = function for mailbox communication and different standard-settings set
		single flash	State of the EtherCAT State Machine: **SAFEOP** = verification of the Sync Manager [▶ 128] channels and the distributed clocks. Outputs remain in safe state
		on	State of the EtherCAT State Machine: **OP** = normal operating state; mailbox and process data communication is possible

If several RUN LEDs are present, all of them have the same function.

Connection

Terminal point		Comment	Internally connected with connector	Max. current carrying capacity *)
Designation	No.			
Output 1	1	Output 1	-	Specified by output power
GND	2	Signal ground for Output 1	4, 6, 8	40 mA
Output 3	3	Output 3	-	Specified by output power
GND	4	Signal ground for Output 2	2, 6, 8	40 mA
Output 2	5	Output 2	-	Specified by output power
GND	6	Signal ground for Output 3	2, 4, 8	40 mA
Output 4	7	Output 4	-	Specified by output power
GND	8	Signal ground for Output 4	2, 4, 6	40 mA

*) Constant and peak value

2.9 Start

For commissioning:

- mount the EL41xx as described in the chapter Mounting and wiring [▶ 57]
- configure the EL41xx in TwinCAT as described in the section Commissioning [▶ 77].