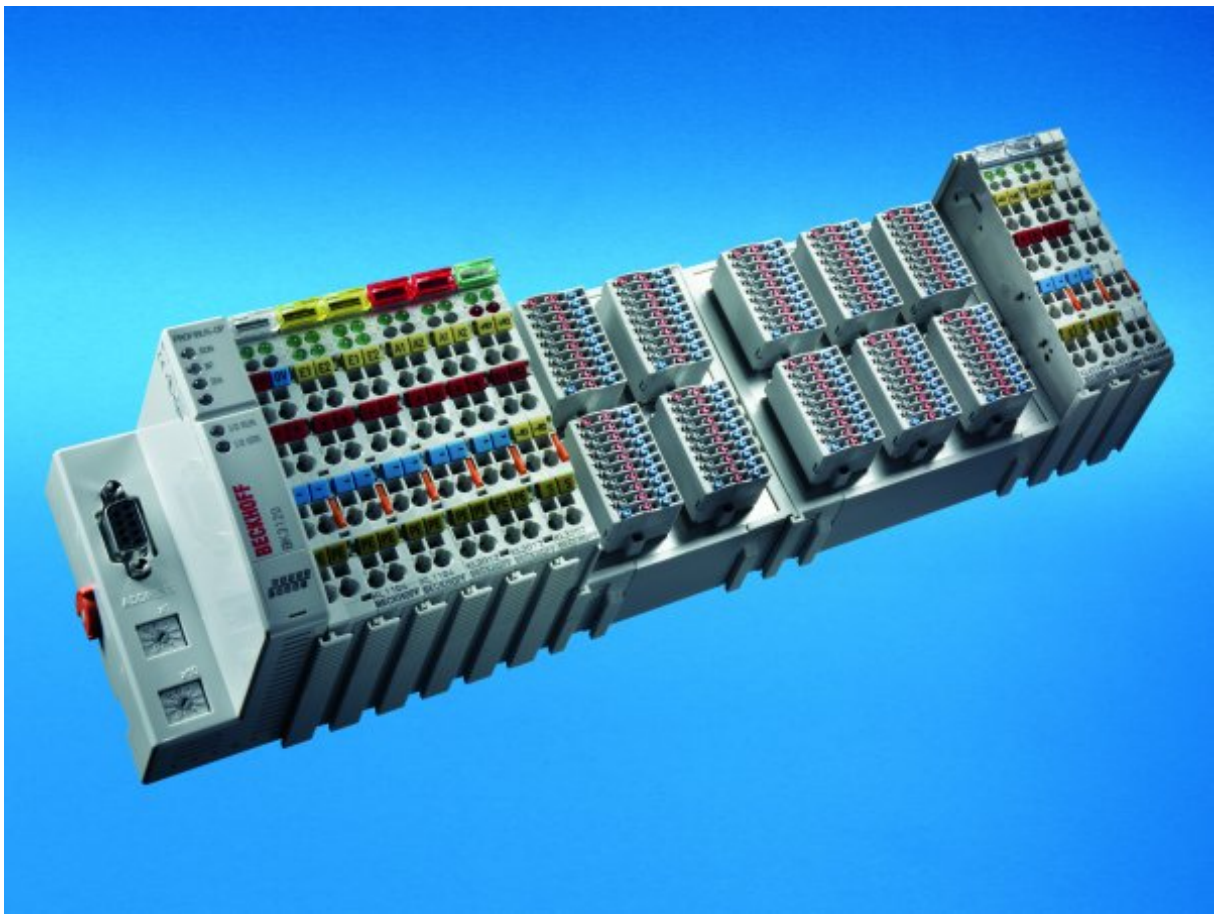

Documentation

EM2042

Sixteen Channel Digital Output Module with D-Sub Connector

Version: 2.1.0
Date: 2019-03-11

BECKHOFF

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1 Foreword

1.1 Notes on the documentation

Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.
It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.
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.

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Patent Pending

The EtherCAT Technology is covered, including but not limited to the following patent applications and patents: EP1590927, EP1789857, DE102004044764, DE102007017835 with corresponding applications or registrations in various other countries.

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1.2 Safety instructions

Safety regulations

Please note the following safety instructions and explanations!
Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

Personnel qualification

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

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.

1.3 Documentation issue status

Version	Comment
2.1.0	• Update chapter "Notes on the documentation" • Update chapter "Instructions for ESD protection" • Update Firmware and Hardware versions • Update structure • EL95xx removed
2.0.0	• Migration • Update structure
1.1.0	• Correction chapter "Technical data"
1.0.0	• First published

Firmware and hardware versions

Documentation, version	Firmware version	Hardware version
2.1.0	00	06
1.1.0	00	01
1.0.0	00	00

The firmware and hardware versions (delivery state) can be taken from the serial number printed on the side of the terminal module.

Syntax of the serial number

Structure of the serial number: WW YY FF HH

WW - week of production (calendar week)
YY - year of production
FF - firmware version
HH - hardware version

Example with ser. no.: 31 09 00 01:

31 - week of production 31
09 - year of production 2009
00 - firmware version 00
01 - hardware version 01

2 Product overview

2.1 Technical data

Technical data	EM2042
Number of outputs	16
Rated load voltage	24 V_{DC} (-15 %/+20 %)
Load type	ohmic, inductive, lamp load
Output current	max. 0,5 A each channel, individually short-circuit proof, total current max. 4 A
Short circuit current	0.6 A…1.0 A
Breaking energy (ind.)	< 150 mJ/channel
Switching times	T_{ON}: typically 60 µs T_{OFF}: typically 300 µs
Electrical isolation	500 V (E-bus/field voltage)
Power supply for the electronics	via the E-bus
Current consumption via E-bus	typically 115 mA
Data width in the input process image	0 bit
Data width in the output process image	16 bit
Dimensions without antenna (W x H x D)	approx. 26.5 mm x 100 mm x 70 mm (width aligned: 24 mm)
Weight	approx. 90 g
Permissible ambient temperature range during operation	0°C ... + 55°C
Permissible ambient temperature range during storage	-25°C ... + 85°C
Permissible relative humidity	95 %, no condensation
Mounting [▶ 11]	on a 35 mm mounting rail [▶ 10] (e.g. mounting rail TH 35-7.5 conforming to EN 60715)
Vibration/shock resistance	conforms to EN 60068-2-6 / EN 60068-2-27
EMC immunity/emission	conforms to EN 61000-6-2 / EN 61000-6-4, EN 300-440-02
Protection class	IP20
Installation position	variable
Approval	CE

2.2 Introduction

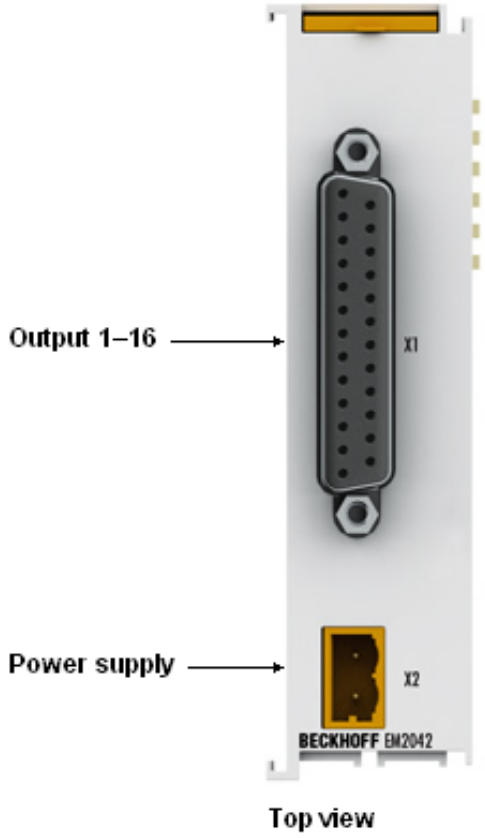


Fig. 1: EM2042

The EM2042 Terminal Module combines 16 digital outputs in a Sub-D plug connector in a compact design.

The binary control signals are transferred (electrically isolated) to the actuators at the process level.

Like the standard Bus Terminals, the terminal modules are integrated in the I/O system.

3 Mounting and wiring

3.1 Instructions for ESD protection

NOTE

Destruction of the devices by electrostatic discharge possible!

The devices contain components at risk from electrostatic discharge caused by improper handling.

- Please ensure you are electrostatically discharged and avoid touching the contacts of the device directly.
- Avoid contact with highly insulating materials (synthetic fibers, plastic film etc.).
- Surroundings (working place, packaging and personnel) should by grounded probably, when handling with the devices.
- Each assembly must be terminated at the right hand end with an EL9011 or EL9012 bus end cap, to ensure the protection class and ESD protection.

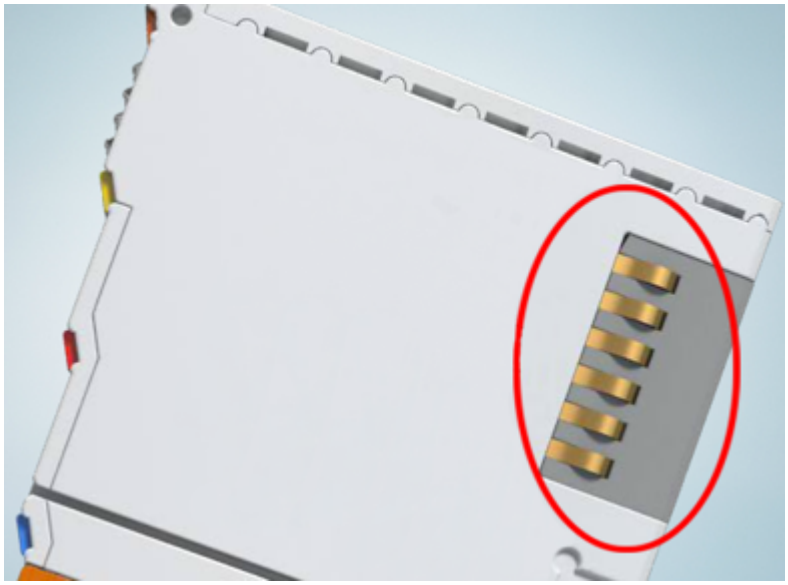


Fig. 2: Spring contacts of the Beckhoff I/O components

3.2 Recommended mounting rails

Terminal Modules und EtherCAT Modules of KMxxxx and EMxxxx series, same as the terminals of the EL66xx and EL67xx series can be snapped onto the following recommended mounting rails:

- DIN Rail TH 35-7.5 with 1 mm material thickness (according to EN 60715)
- DIN Rail TH 35-15 with 1,5 mm material thickness

Pay attention to the material thickness of the DIN Rail

Terminal Modules und EtherCAT Modules of KMxxxx and EMxxxx series, same as the terminals of the EL66xx and EL67xx series does not fit to the DIN Rail TH 35-15 with 2,2 to 2,5 mm material thickness (according to EN 60715)!

3.3 Mounting and demounting - terminals with front unlocking

The terminal modules are fastened to the assembly surface with the aid of a 35 mm mounting rail (e.g. mounting rail TH 35-15).

Fixing of mounting rails

The locking mechanism of the terminals and couplers extends to the profile of the mounting rail. At the installation, the locking mechanism of the components must not come into conflict with the fixing bolts of the mounting rail. To mount the recommended mounting rails under the terminals and couplers, you should use flat mounting connections (e.g. countersunk screws or blind rivets).

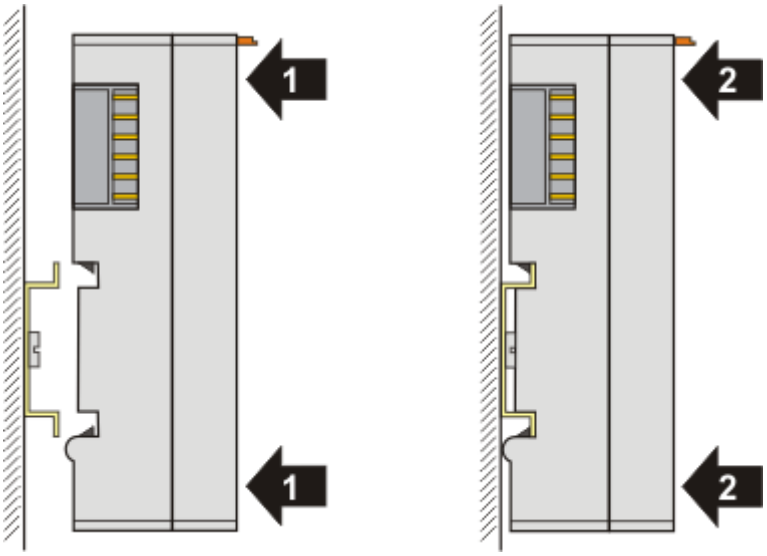
⚠ WARNING

Risk of electric shock and damage of device!

Bring the bus terminal system into a safe, powered down state before starting installation, disassembly or wiring of the Bus Terminals!

Mounting

- Fit the mounting rail to the planned assembly location.

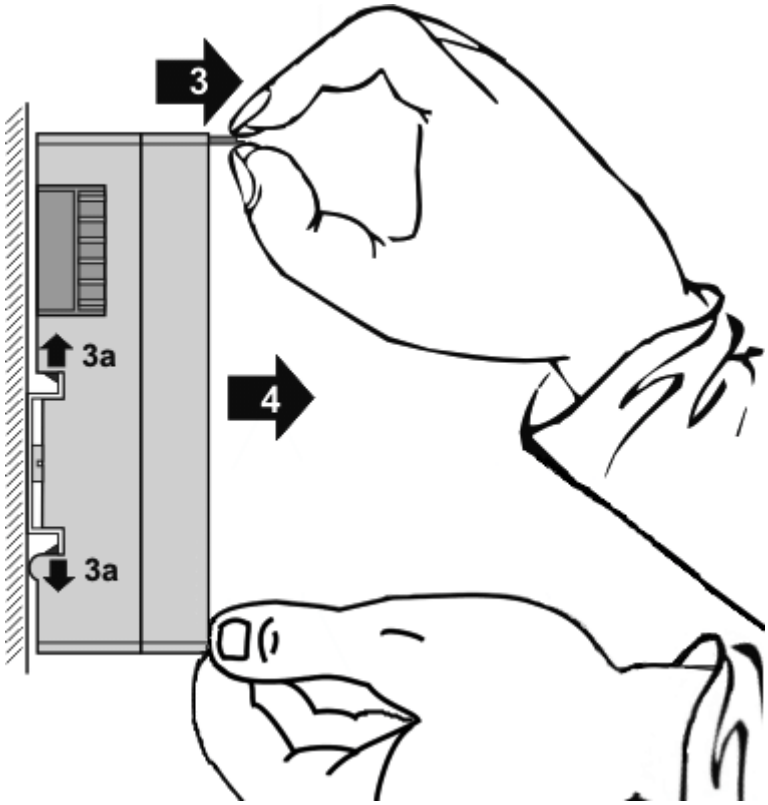


and press (1) the terminal module against the mounting rail until it latches in place on the mounting rail (2).

- Attach the cables.

Demounting

- Remove all the cables.
- Lever the unlatching hook back with thumb and forefinger (3). An internal mechanism pulls the two latching lugs (3a) from the top hat rail back into the terminal module.



- Pull (4) the terminal module away from the mounting surface.
  Avoid canting of the module; you should stabilize the module with the other hand, if required.

3.4 Dimensions

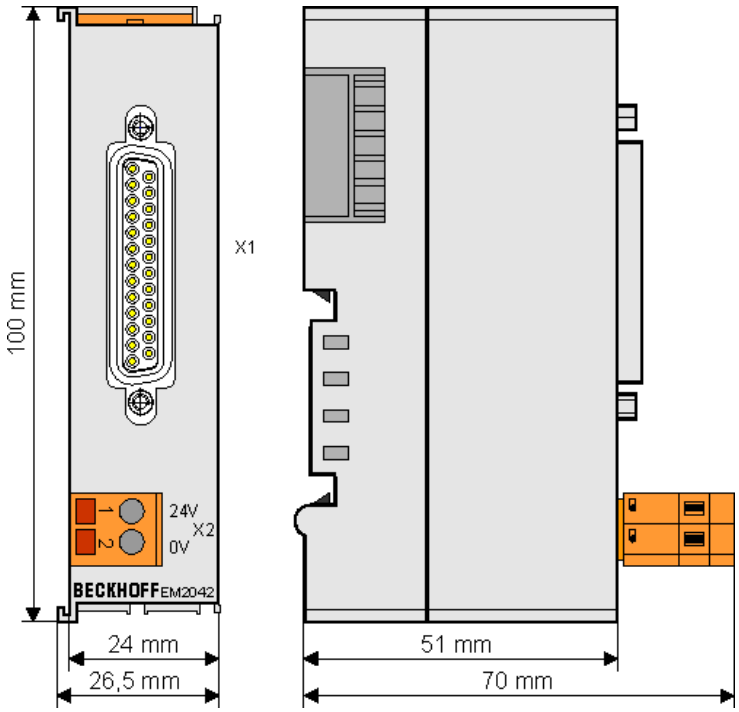


Fig. 3: EM2042 Dimensions

3.5 Positioning of passive Terminals

Hint for positioning of passive terminals in the bus terminal block

EtherCAT Terminals (ELxxxx / ESxxxx), which do not take an active part in data transfer within the bus terminal block are so called passive terminals. The passive terminals have no current consumption out of the E-Bus.
To ensure an optimal data transfer, you must not directly string together more than 2 passive terminals!

Examples for positioning of passive terminals (highlighted)

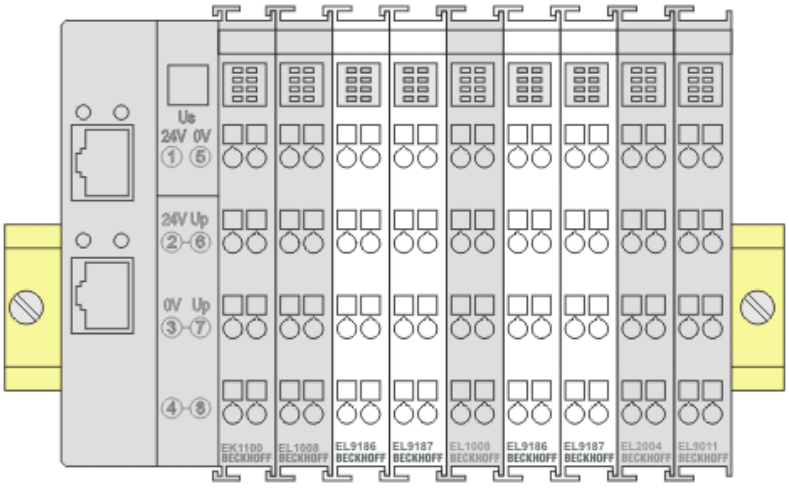


Fig. 4: Correct positioning

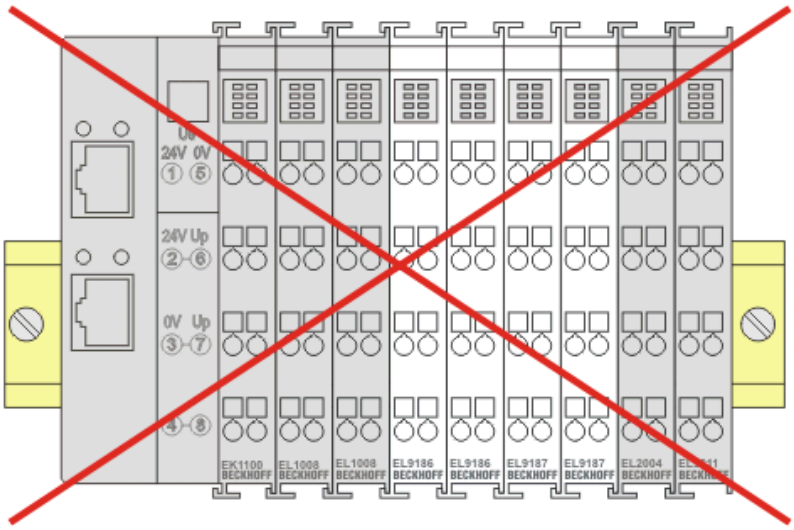


Fig. 5: Incorrect positioning

3.6 Connection

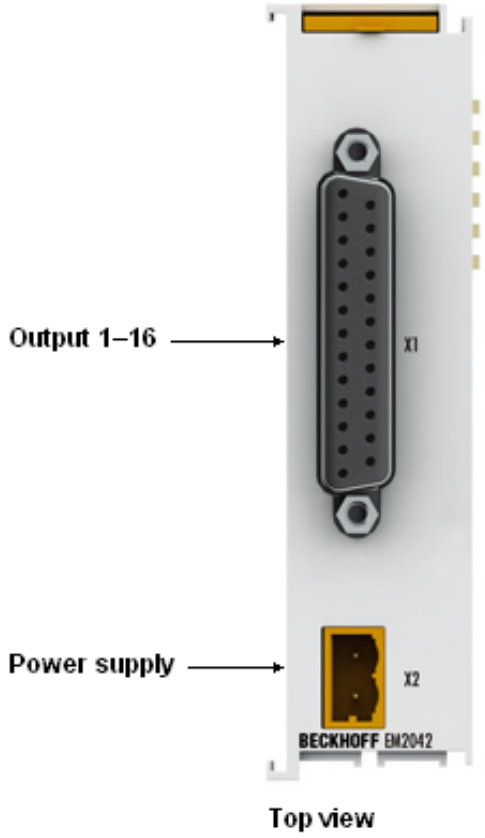


Fig. 6: EM2042

X1: Signal connection, digital outputs, D-Sub 25

The EM2042 digital output module transmits the binary control signals from the automation unit on to the actuators at the process level.

The 16 outputs deliver load currents of up to 0.5 A, although the total current from all the outputs must not exceed 4 A.

The signal connection is made through a 25-pin D-Sub socket.

The outputs are short-circuit proof and protected against inverse connection.

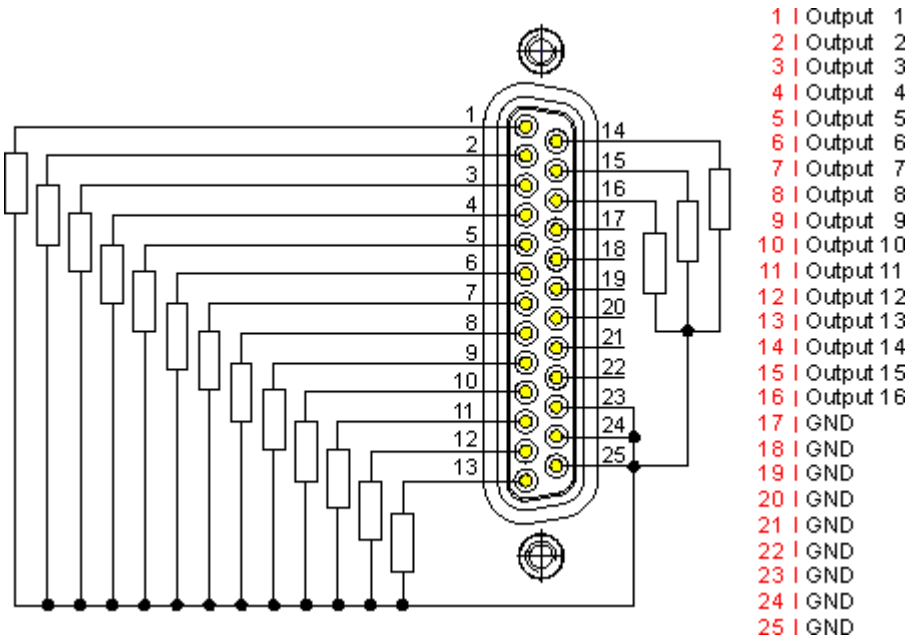


Fig. 7: D-Sub 25 - signal connection, digital outputs

X2: Connection of the voltage supply for the outputs

Name	Description
24 V	Supply voltage 24 V
0 V	Supply voltage 0 V

4 Appendix

4.1 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

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Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

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You will also find further documentation for Beckhoff components there.

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