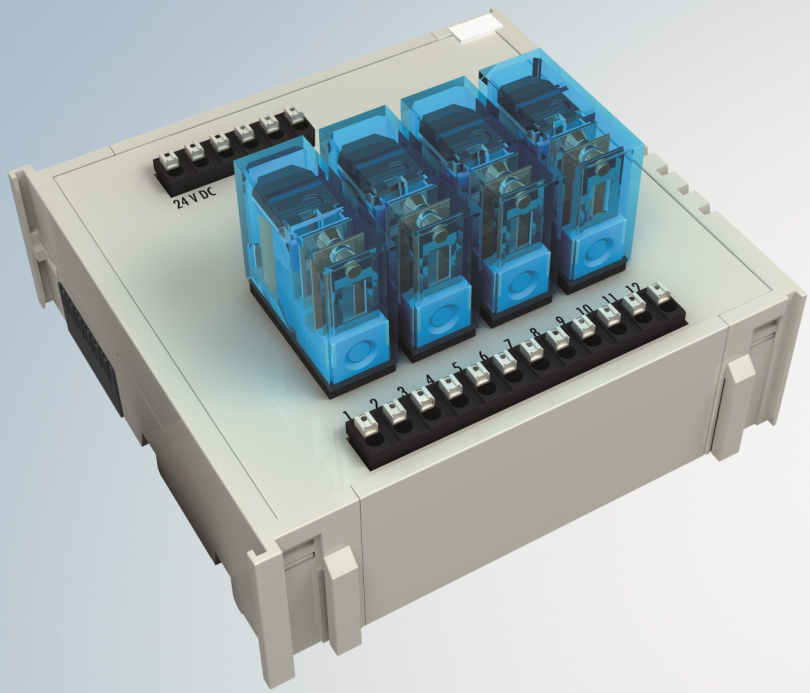
BECKHOFF New Automation Technology

Documentation | EN

KM2604 and KM2614

Four channel relay modules



2022-09-13 | Version: 2.2.0

Tabel of contents

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.

Trademarks

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Patent Pending

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

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Copyright

1.2 Safety instructions

Safety regulations

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

Exclusion of liability

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

Personnel qualification

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

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
2.2.0	• Chapter “Technical data” updated • Document structure updated • Chapter “Disposal” added • New title page • Revision status updated
2.1.0	• KM2614 added
2.0.0	• Migration
1.0.1	• Pin assignment for relay supply (24 V_{DC}) corrected
1.0.0	• First release
0.1.0	• First provisional documentation

Firmware and hardware versions

Documentation Version	KM2604		KM2614	
	Firmware version	Hardware version	Firmware version	Hardware version
2.2.0	00	06	-	05
2.1.0	00	05	-	04
2.0.0	00	05	-	-
1.0.1	00	00	-	-
1.0.0	00	00	-	-
0.1.0	00	00	-	-

The hardware version is indicated in the serial number printed on the top 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 (not applicable for digital modules)
HH - hardware version

Example with ser. no.: 35 05 00 01:

35 - week of production 35
05 - year of production 2005
00 - firmware version 00
01 - hardware version 01

2 Product overview

2.1 Terminal Modules - System Overview

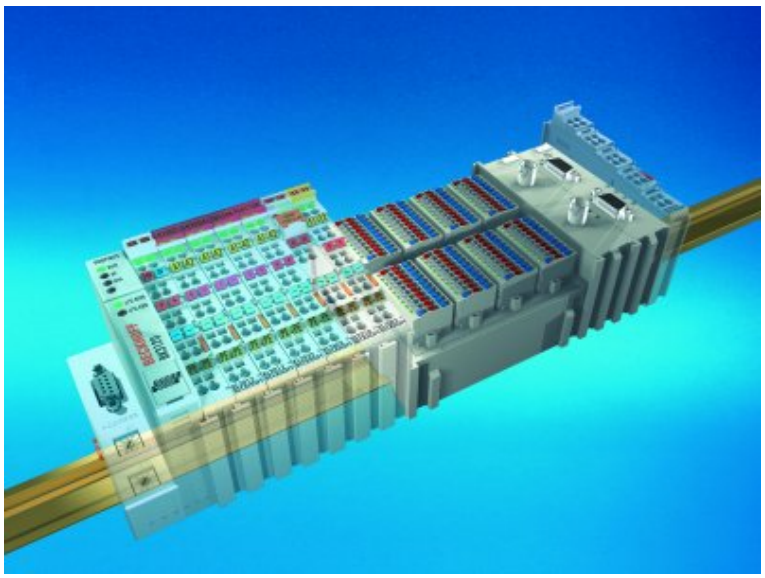


Fig. 1: Bus Terminal Block

Better sensor and actuator functionality makes machines and systems more and more powerful. The Bus Terminal reliably meets increased requirements for I/O signals through its modularity and compact design. The existing Beckhoff Bus Terminal system is complemented by the new version of the EMxxxx / KMxxxx Terminal Module with increased packing density. In many areas of application, cost benefits can be realized through lower overall installed size and application-specific signal mix.

The new Terminal Modules are fully system-compatible. Like the Bus Terminals, they are bus-neutral and can therefore be operated with any Beckhoff Bus Coupler and Bus Terminal Controller. Like the standard Bus Terminals, the EM / KM modules are integrated in the I/O system and connected with the internal terminal bus (E-bus / K-bus). Bus Terminals and terminal modules can be combined without restriction.

Plug connector

Like for the Bus Terminals, no tools are required for the wiring. Spring-loaded technology is used, however the connection layer is pluggable (fixed wiring).

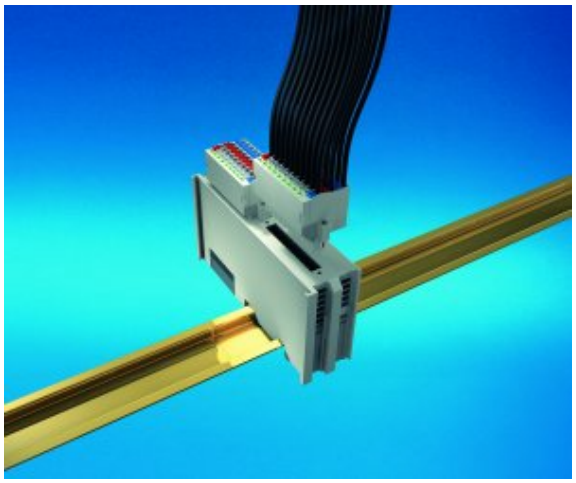


Fig. 2: Pluggable connection (fixed wiring)

Connection

Plug connectors are available for single and triple conductor connection methods.

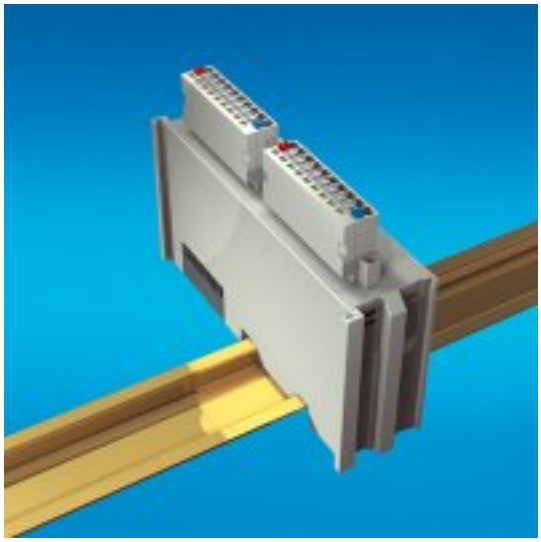


Fig. 3: Terminal module with plug connector for single conductor connection method (ZS2001-0002)

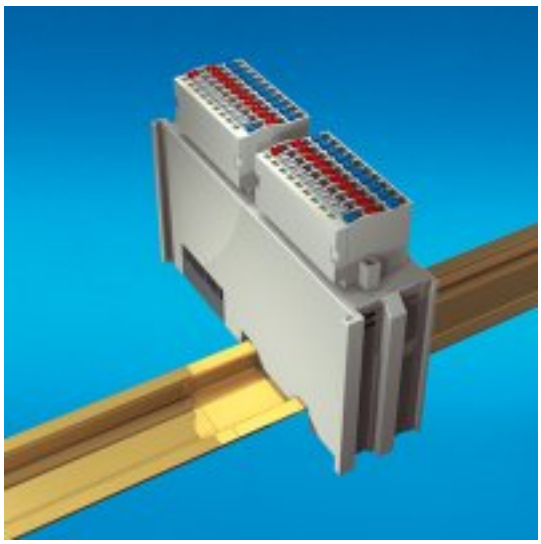


Fig. 4: Terminal module with plug connector for triple-conductor connection method (ZS2001-0004)

Packing density

The Terminal Modules combine 16, 32 or 64 digital inputs or outputs on a very small area. This compact and slimline design enables very high packing densities, leading to smaller control cabinets and terminal boxes.

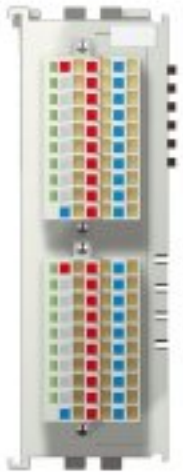


Fig. 5: Terminal module with 16 channels

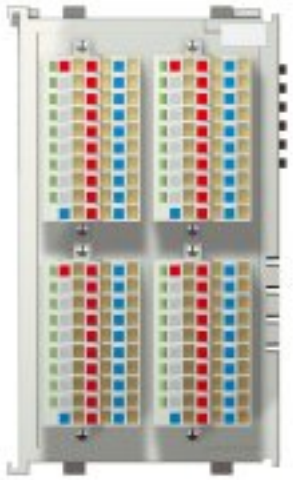


Fig. 6: Terminal module with 32 channels

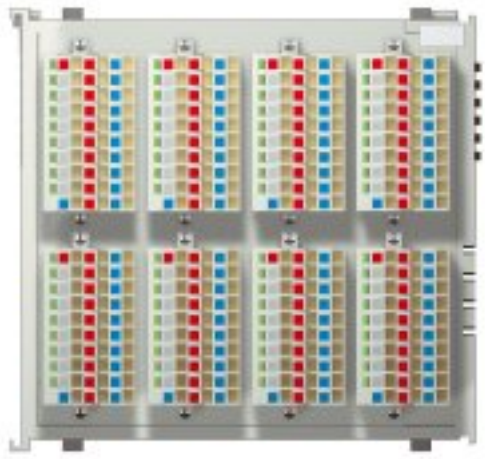


Fig. 7: Terminal module with 64 channels

2.2 Introduction

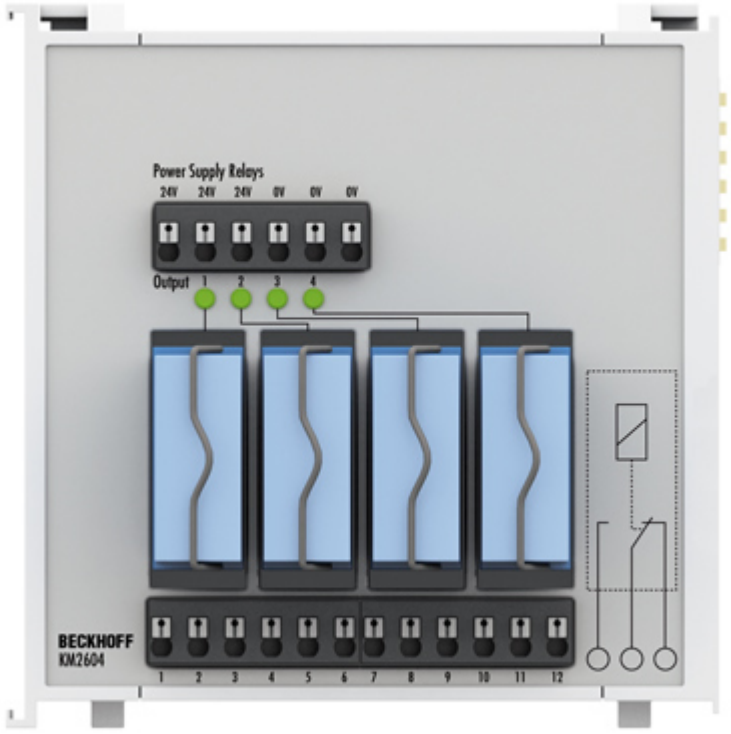


Fig. 8: KM2604

Fig. 9: KM2614

Four-channel relay module, 230 V_{AC}, 16 A

The KM2604 and KM2614 terminal module combines 4 pluggable power relays (ZB2601 or ZB2602) in one fieldbus module. The high switching capacity of 16 A at 230 V_{AC} enables direct mains connection of consumers with high current consumption. The relays are positioning at the top and can therefore be exchanged easily.

The KM2614 terminal module enables each relay to be manually switched to the ON status. A seal indicates the initial manual operation.

2.3 Technical Data

Technical Data	KM2604	KM2614
Number of relays	4 change-over contacts	
Manual operation	no	at the relays
Rated switching voltage	250 V_{AC}, 30 V_{DC}	
Starting current	max. 30 A	
Continuous current	max. 16 A	
Breaking current	max. 16 A	
Minimum permitted load	5 mA (at 10 V_{DC})	
Mechanical switching cycles	see relay data [▶ 13]	
Electrical switching cycles	see relay data [▶ 13]	
Power supply for the electronics	via the K-bus	
Current consumption from the K-bus	typically 15 mA	
Current consumption from the relay power supply (24 V_{DC})	typically 50 mA for each active relay	
Width of a bus terminal block	maximum [▶ 14] 64 Bus Terminals/terminal modules or 80 cm	
Electrical isolation	1.5 V (K-bus/signal voltage) 2.5 kV (rated surge voltage for overvoltage category III)	
Configuration	No address or configuration settings	
Bit width in the output process image	4 outputs	
Dimensions with relay (W x H x D)	approx. 99 mm x 100 mm x 62 mm (width aligned: 96 mm), see dimensional drawing [▶ 14]	
Weight (with 4 relays)	approx. 250 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	
Mounting [▶ 15]	on 35 mm mounting rail according to EN60715	
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	
Protection class	IP20	
Installation position	variable	
Approvals/Markings*	CE, UKCA, EAC	

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

2.4 Relay

Technical Data	ZB2601	ZB2602
Manual operation	no	yes
Number of contacts	1 change-over contacts	
Starting current	maximum 30 A	
Continuous current	maximum 16 A	
Breaking current (230 V_{AC}, 30 V_{DC})	maximum 16 A	
Rated switching voltage	230 V_{AC}, 30 V_{DC}	
Max. switching voltage	400 V_{AC}	
1 phase motor load, AC3 operation with 230 V_{AC}	max. 550 W	
Min. switching load	10 V, 5 mA	
Rated coil voltage	24 V_{DC}	
Rated coil current	typically 50 mA	
Mechanical switching cycles	minimum 5 x 10^6	
Electrical switching cycles	minimum 1 x 10^6 (1 A_{AC}/250 V_{AC})	
Weight	approx. 20 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	
Mounting	on relay base with reteiner bracket	on relay socket
Approval	CE	

3 Mounting and wiring

3.1 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)!

3.2 Dimensions

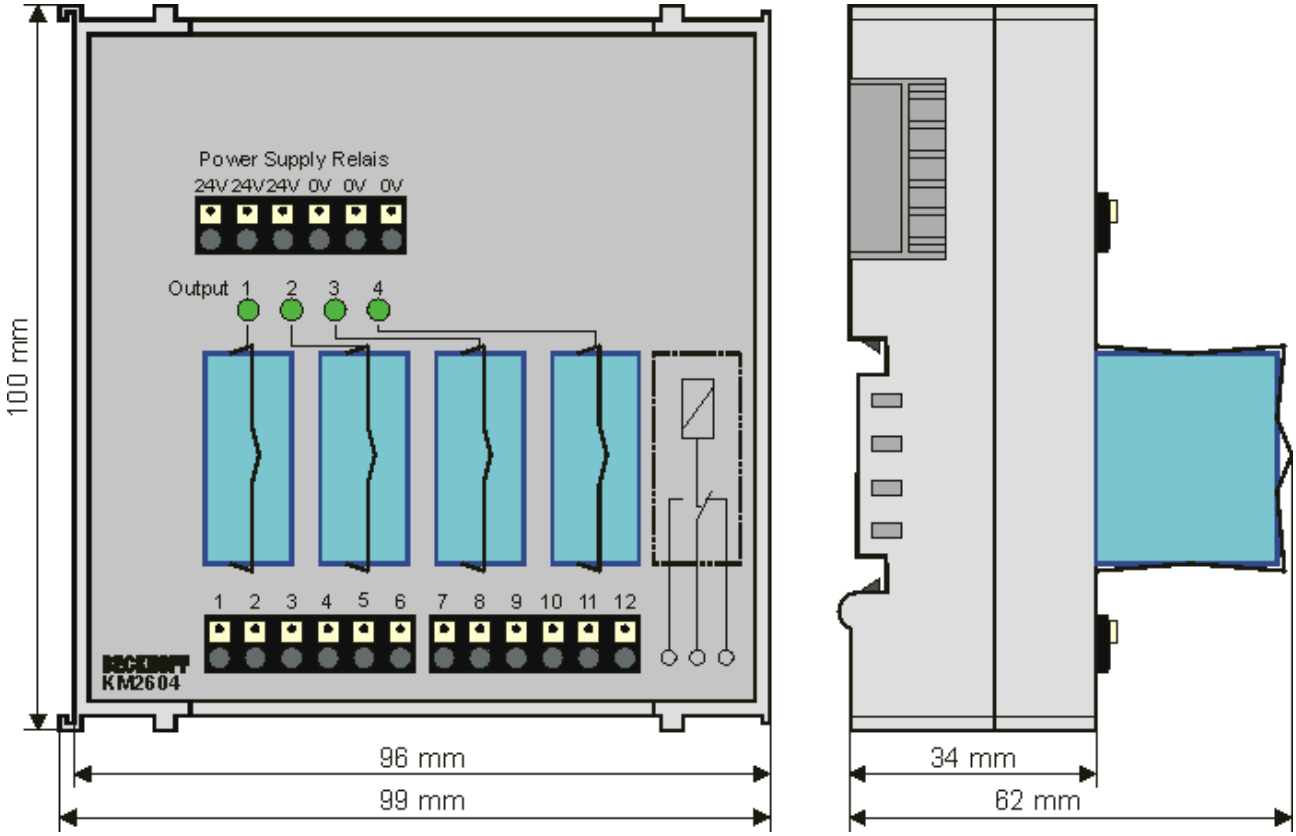


Fig. 10: Dimensions

Width of a bus terminal block

NOTE

Note the maximum number of Bus Terminals

The maximum number of Bus Terminals or terminal modules that can be connected to a Bus Coupler is 64!
An overall width of 80 cm must not be exceeded!
Also ensure that the current consumption of the Bus Terminals/terminal modules from the K-bus does not overload the K-bus power supply of the Bus Coupler.

3.3 Mounting and demounting - terminals with traction lever 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).

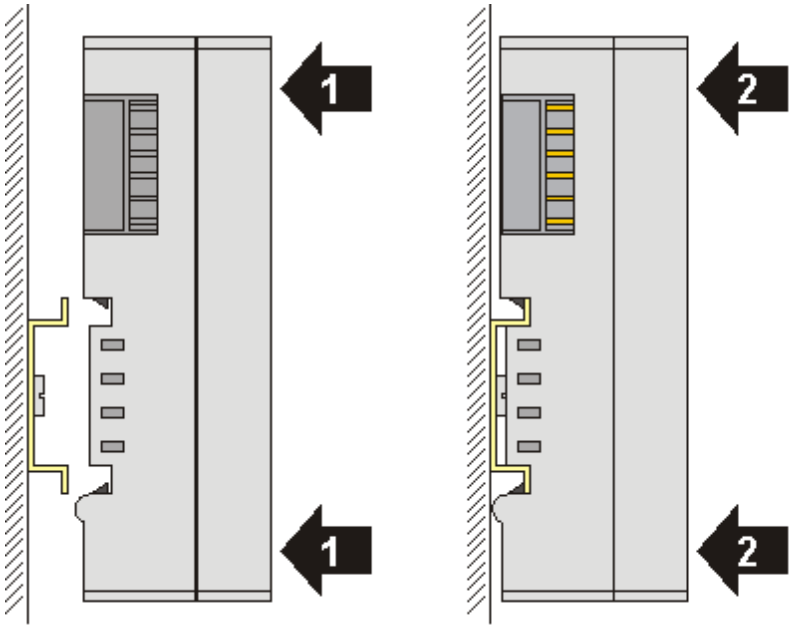
⚠ WARNING

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

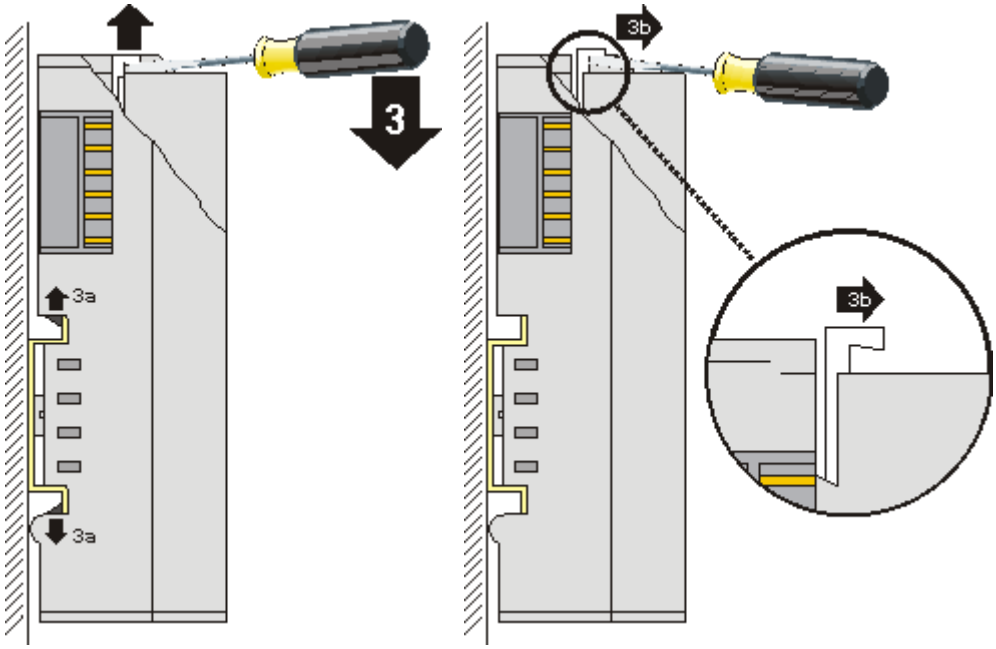
- Fit the mounting rail to the planned assembly location.



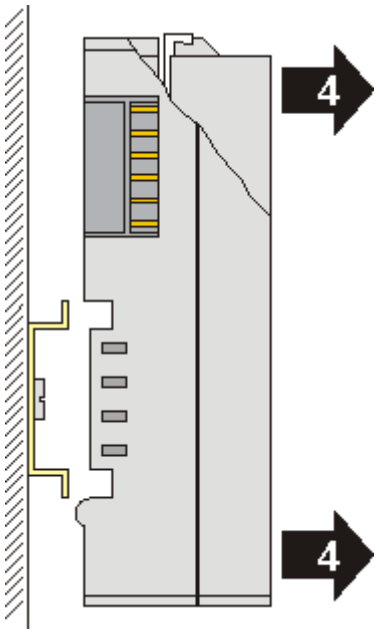
  and press (1) the terminal module against the mounting rail until it latches in place on the mounting rail (2).
- Attach the cables.

Demounting

- Remove all the cables. Thanks to the KM/EM connector, it is not necessary to remove all the cables separately for this, but for each KM/EM connector simply undo 2 screws so that you can pull them off (fixed wiring)!
- Lever the unlatching hook on the left-hand side of the terminal module upwards with a screwdriver (3). As you do this
  - an internal mechanism pulls the two latching lugs (3a) from the top hat rail back into the terminal module,
  - the unlatching hook moves forwards (3b) and engages



- In the case 32 and 64 channel terminal modules (KMxxx4 and KMxxx8 or EMxxx4 and EMxxx8) you now lever the second unlatching hook on the right-hand side of the terminal module upwards in the same way.
- Pull (4) the terminal module away from the mounting surface.



3.4 Disposal

Products marked with a crossed-out wheeled bin shall not be discarded with the normal waste stream. The device is considered as waste electrical and electronic equipment. The national regulations for the disposal of waste electrical and electronic equipment must be observed.

3.5 Connection

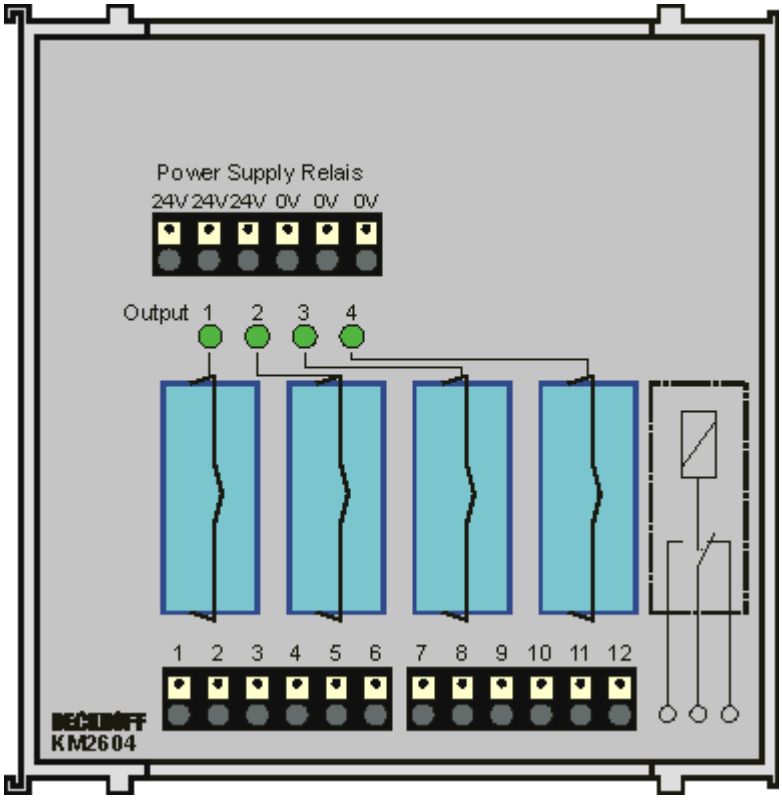


Fig. 11: Connection KM2604

Power supply for the relays

Terminal point	Comment
24 V	24 V_{DC} supply for relays
24 V	
24 V	
0 V	0 V supply for relays
0 V	
0 V	

Connecting the relays

Terminal point no.	Output/relay	Relay connection
1	1	14
2		11
3		12
4	2	14
5		11
6		12
7	3	14
8		11
9		12
10	4	14
11		11
12		12

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.

Beckhoff's branch offices and representatives

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

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages: https://www.beckhoff.com

You will also find further documentation for Beckhoff components there.

Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

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e-mail:	support@beckhoff.com

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- spare parts service
- hotline service

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