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REL100 Relay module

Installation instructions, edition 04/2018 EN

1 Introduction

These installation instructions contain important information that should be followed when installing the REL100 Relay module.

- Read all the instructions carefully before installing and commis-sioning the REL100 Relay module to avoid possible risks and mistakes.
- Keep the installation instructions in a safe place for future reference.

2 Safety instructions

These instructions contain notes that you must follow for your own personal safety and to avoid injury and damage to property. They are highlighted by warning triangles and are shown as follows according to the level of danger.

2.1 Hazard classification

The signal word designates a hazard with a high degree of risk which, if it is not avoided, will result in death or severe injury.

The signal word designates a hazard with a **medium** degree of risk which, if it is not avoided, will result in death or severe injury.

The signal word designates a hazard with a low degree of risk which, if it is not avoided, could result in minor or moderate injury.

NOTE

A note as used in these instructions contains important information about the product or about a part of the manual to which particular attention should be paid.

2.2 Notes on installation

- Follow ALL danger and warning instructions and notes on precautionary measures.
- Read section 2 "Safety instructions" carefully.

2.3 Notes on using the module safely

Danger of death by electric shock.

Mains voltage components carry potentially fatal voltages.

Install the TQ-Automation modules only in approved housings or distribution boards so that the connections for the outer and neutral conductors are located behind a cover or guard to prevent accidental contact

The housing or distribution board must be accessible only with a key or suitable tool in order to limit access to authorised personnel

- Before starting any installation or maintenance work, switch off the input voltage and secure it to prevent it being switched on again accidentally.
- Remember that the terminals on the backplane can still carry voltage when the module is removed.
- Install the REL100 module only in a dry environment.
- Protect the REL100 module against moisture and wet conditions.
- Please note that the relay interfaces must not be used with a combination of SELV and mains voltages.

🔨 WARNING

Install an additional electrical isolating device upstream of every line of connected TQ-Automation modules so that every TQ-Automation module in the line can be electrically disconnected.

NOTE

- Always run data and mains cables separately or in separate conduits. Refer to EN 50174-2.
- Always run SELV and mains cables separately or in separate conduits.
- Protect the REL100 module against damage by transient overvoltages by installing additional overvoltage protection elements conforming to SPD type 1 (coarse protection) and SPD type 2 (medium protection) upstream of the POW100 mains adapter.
- Make sure that the POW100 mains adapter that powers the REL100 can be isolated from the supply, e.g. with a type C2 or B6 circuit breaker. This must be identified as the isolating device for the POW100 and must be easily accessible.
- Make sure that the REL100 module is adequately ventilated. Make sure that the ventilation slots are not covered to prevent the REL100 module from overheating.
- The REL100 module requires no maintenance.

NOTE

Special notes on the relay interfaces

- Please note that the relay interfaces are approved for currents up to a maximum of 6 A (RMS). The relay interfaces should therefore be protected with a 6 A overcurrent protection device.
- Please note that the relay interfaces require a wire cross-section of 1.5 mm²
- Please note that the relay interfaces are merely switching elements. They do not guarantee safe isolation.
- Please note that the relay interfaces are approved only for voltages up to a maximum of 230 V AC (single-phase).

3 Target group

The activities described in this manual must only be carried out by technicians with the following gualifications:

- Training in the installation and commissioning of electrical devices
- Training in electrical hazards and the local safety requirements
- Knowledge of the relevant standards and directives
- Knowledge and observance of this document and all the safety instructions

4 Description

The REL100 module is an I/O unit for building automation. It has four universal input / output channels (UIO), four relay interfaces (REL) in the form of NO contacts (230 V AC), four relay interfaces (REL) in the form of changeover contacts (230 V AC) and one input for an optional power supply (AUX IN). The REL100 module is made up of two parts - the backplane and the electronic module, which is electrically connected to the backplane via contacts. The backplane latches into place on a DIN rail with two snap locks. All the cables from interfaces, actuators and sensors are connected to the backplane with push-in terminals. The backplane has a mechanical housing encoding to prevent any confusion between different modules of the same width. The electronic module is plugged into the backplane. In the event of a fault, the electronic module can be easily replaced without having to detach any wiring. The POW100 mains adapter provides the 24 V supply voltage for the REL100 module. The supply voltage is supplied to the REL100 module via the CAB bus.

5 Intended usage

- The REL100 module may only be operated when it is installed on the DIN rail in the distribution board and the protective covers are attached.
- The REL100 module is approved only for use in dry interior areas
- Only use the REL100 module as specified in these instructions provided. Any other usage may result in injury or damage to property.

- For safety reasons, no changes may be made to the REL100 module, including the software, unless they are expressly approved for the product by TQ-Automation.
- The intended usage also includes compliance with all the notes in these instructions.

NOTE

Any types of usage other than those specified in section 5 "Intended usage" are regarded as contrary to the intended usage and will invalidate the warranty.

6 Scope of delivery



Fig. 1: View of the REL100 Relay module

| Item | Designation | Quantity |
|------|---------------------------|----------|
| 1 | REL100 Relay module | 1x |
| 2 | Backplane | 1x |
| 3 | Backplane connector* | 1x |
| - | Installation instructions | 1x |

The backplane connector is used to connect adjacent backplanes of other modules.

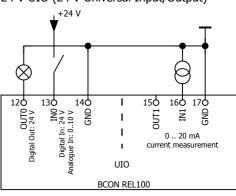
Technical data 7

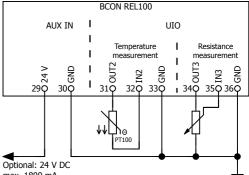
| Input data | | | | | | | |
|--|--|--|--|--|--|--|--|
| Supply voltage | 24 V DC | | | | | | |
| Power consumption | Max. 6 W | | | | | | |
| Universal Input / Output (24 V UIO) | | | | | | | |
| 24 V OUT | OUT0 - OUT3, see group guideline 1 in Fig. 2 | | | | | | |
| 24 V IN, configured as digital inputs | IN0 - IN3 | | | | | | |
| 24 V IN, configured as analogue inputs | IN0 - IN3 | | | | | | |
| Voltage measurement | 0 to 10 V DC | | | | | | |
| Current measurement | 0 to 20 mA | | | | | | |
| Temperature measurement | -10 °C to 45 °C | | | | | | |
| Resistance measurement | 600 to 10,000 Ω | | | | | | |
| Relay connections (230 V REL), group 1 | | | | | | | |
| Changeover contact, 230 V AC, max. 6 A | NO0, C0, NC0 NO2, C2, NC2 | | | | | | |
| Normally open contact, 230 V AC, | NO1, C1 | | | | | | |
| max. 6 A | NO3, C3 | | | | | | |
| Relay connections (230 V REL), gro | | | | | | | |
| Changeover contact, 230 V AC, max. 6 A | NO4, C4, NC4 NO6, C6, NC6 | | | | | | |
| Normally open contact, 230 V AC, max. 6 A | NO5, C5 NO7, C7 | | | | | | |
| Input | | | | | | | |
| AUX IN (LED position 29) | 24 V DC / 1800 mA | | | | | | |
| Line connections | Line connections | | | | | | |
| Relay interface connection cross-section | 1.5 mm ² | | | | | | |
| Connection cross-section of other interfaces | 0.5 mm ² to 1.5 mm ² | | | | | | |
| Housing protection | | | | | | | |
| IP code | IP20 | | | | | | |
| Protection class | 11 | | | | | | |
| Overvoltage category | II (EN 61010-1:2010) | | | | | | |

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| Ambient conditions | | | | | |
|----------------------------------|--|--|--|--|--|
| Ambient temperature | | | | | |
| - Operation | 0 °C to 50 °C | | | | |
| — Storage | -25 °C to 60 °C | | | | |
| Relative humidity (non condens.) | 50 % to 95 % | | | | |
| Air pressure during operation | 790 hPa to 1070 hPa | | | | |
| Dimensions/weight | | | | | |
| Dimensions (W x H x D) | 90 mm x 95 mm x 67 mm, width equals 5 DIN units | | | | |
| Weight | 0.32 kg | | | | |
| Handling | | | | | |
| Max. altitude during operation | 2000 m above sea level | | | | |
| DIN rail system | TS 35 (35 mm x 7.5 mm, 1 mm thick) | | | | |

8 Wiring diagrams for the connections 24 V UIO (24 V Universal Input/Output)





Group guideline

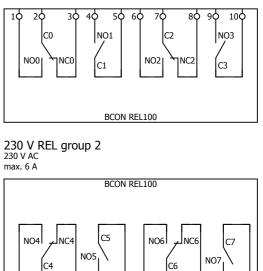
1) The total load of the four OUT0 to OUT3 outputs must not exceed 100 mA or 1600 mA (max. 400 mA/output)*.

* NOTE:

Max. 100 mA from an internal or max. 1800 mA from an external power supply. The total load can be increased to a maximum of 1800 mA by connecting an external supply (AUX IN).

230 V REL group 1 230 V AC

max. 6 A



Wiring diagrams for UIO and REL channels Fig. 2:

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max. 1800 mA cable length < 3 m

9 Controls

There are three pushbuttons and a USB port beneath the service flap (item 5 in Fig. 3) on the REL100 module.

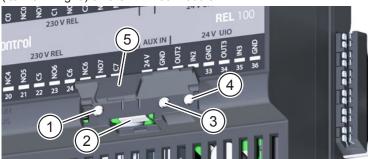


Fig. 3: Controls

| ltem | Control | Function |
|------|-----------------------|--|
| 1 | RESET button | Restarts the REL100 module |
| 2 | USB port (Micro-B) | For software and firmware updates or manually controlling the module |
| 3 | BTN1 button | Assigned to a software function |
| 4 | BTN2 button | Assigned to a software function |

10 LED status displays

All the status LEDs are arranged on the front panel of the REL100 module. There is an overview of the LED status displays in Table 1 and Table 2.

11 Installation

Danger of death by electric shock.

Mains voltage components carry potentially fatal voltages.

- Disconnect the connection points from the power supply.
- Secure the fuses to prevent switching on again.
- Make sure that the conductors to be connected are voltage-free.

Tools and equipment 11.1

- Screwdriver, insulated, size 1, max. blade width 3 mm
- Voltmeter

11.2 Install the backplane

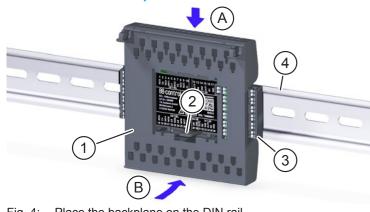


Fig. 4: Place the backplane on the DIN rail

- Arrange the backplane (item 1 in Fig. 4) so that the tab (item 2 in Fig. 4) is underneath.
- ► Holding the backplane at an angle, engage it from above (item A in Fig. 4) in the top edge of the DIN rail (item 4 in Fig. 4).
- Carefully press the backplane (item 1 in Fig. 4) against the DIN rail (item 4 in Fig. 4) until it snaps into place (item B in Fig. 4).

NOTE

- There must be no backplane connector (item 3 in Fig. 4) inserted on the last module of a row of DIN rails or on the last module of the entire installation.
- To detach the backplane from the DIN rail. press the tab (item 2 in Fig. 4) down lightly and swivel the backplane up.

11.3 Wire the backplane

- Wire the backplane as described in the installation specifications. The openings for the push-in terminals (item 1 in Fig. 5) are at the top and bottom of the backplane. The label on the backplane shows the terminal assignments.
- Strip the insulation from the end of the hook-up wire:
- Rigid wire 0.5 to 1.5 mm², stripped length 10 mm Strand 0.5 to 1.5 mm², ferrule, length 10 mm

NOTE

Note the length of the ferrule (10 mm).

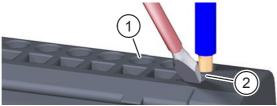


Fig. 5: Wire the backplane

Insert the rigid wire or ferrule into the round opening of the pushin terminal (item 1 in Fig. 5) as far as it will go.

NOTE

For small hook-up wire cross-sections:

- Insert the screwdriver from the front into the square opening (item 2 in Fig. 5) at a 45° angle.
- Press the screwdriver lightly against the terminal and insert the hook-up wire into the round opening as far as it will go.
- Pull on the hook-up wire to make sure that it is seated firmly in the push-in terminal.

NOTE

To release the hook-up wire from the terminal:

- Insert the screwdriver from the front into the square opening (item 2 in Fig. 5) at a 45° angle.
- Press the screwdriver lightly against the terminal and pull the hook-up wire out.

11.4 Install the electronic module

- Remove the protective film from the backplane.
- Insert the pivot axes (item 4 in Fig. 6) of the electronic module (item 1 in Fig. 6) into the hooks (item 3 in Fig. 6) of the backplane (item 2 in Fig. 6).
- Tilt the electronic module down and press it carefully against the backplane until it latches into place.



Fig. 6: Install the electronic module

11.5 Start up the REL100 module

NOTE

- Carry out an insulation measurement before starting up.
- Switch on the POW100 mains adapter. The L LED on the POW100 module and the RUN LED on the POW100 and REL100 modules light up green.
- Check the LED statuses according to Table 1 and Table 2.

11.6 Uninstalling the electronic module

To uninstall the electronic module from the backplane:

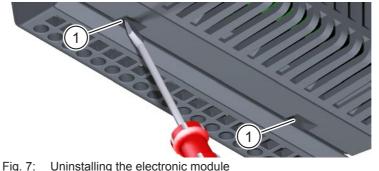
Insert the screwdriver into the two gaps (item 1 in Fig. 7) on the underside of the electronic module one after the other in order to detach the module from its fixing.

| Function | Labelling | LED position | LED colour | Status if LED is off | Status if LED is on | Status if LED is flashing |
|----------------------|-----------|---------------------|--------------------------|---|---|---|
| Module status | RUN | Item A in Fig. 1 | red/ green | The module is switched off or the status is not OK if the module is switched on | red: the module is switched on, but the processor is not responding or the module is in the boot- loader state green: the module is ready-to-operate | red (< 150/150 ms interval): software exception red alternating with the CAB bus status LED: CAB bootloader active green (1750/250 m interval): module status OK |
| CAB bus status | BUS | Item B in Fig. 1 | red/ yellow/ green | CAB bus inactive | red: baud rate synchronisation is active green: CAB bus is ready-to-operate | red (500 ms interval): bus in scan mode red (1 s interval): bus in position detection mode red alternating with the module status LED: module in the bootloader state yellow (250 ms interval): bus in PREOP mode yellow (1 s interval): bus in SAFEOP mode |
| Bus termi- nation | TERM | Item C in Fig. 1 | yellow | Termination is inactive | Termination is active | - |
| I/O error | ERR | Item D in Fig. 1 | red | Module is switched off or is working normally | An I/O error has occurred (e.g. over- load) | - |

Table 1: LED status displays for module functions

| Interface | Labelling | LED pos. | LED colour | Status if LED is off | Status if LED is on |
|---|--------------------------|-------------------|---------------|--|---|
| Relay 0, relay 2, | NO0, NO2, NO4, NO6 | 1, 6, 18, 23 | green | Module is switched off, relay is de-energised or status is not OK | Relay energised |
| relay 4, relay 6, (changeover contacts) | NC0, NC2, NC4, NC6 | 3, 8, 20, 25 | green | Module is switched off, relay is energised or status is not OK | Relay de-energised |
| Relay 1, relay 3, relay 5, relay 7, (NO contacts) | NO1, NO3, NO5, NO7 | 4, 9 21, 26 | green | Module is switched off, relay is de-energised or status is not OK | Relay energised |
| AUX IN | 24 V | 29 | green | External supply not connected, off or faulty | External supply available and OK |
| 24 V UIO | OUT0, OUT1 OUT2, OUT3 | 12, 15, 31, 34 | red/ green | Output is OFF | red: short-circuit green: 24 V output ON |
| | IN0, IN1, IN2, IN3 | 13, 16, 32, 35 | red/ green | Software-defined, e.g. input = LOW | – red: broken sensor – green: 24 V input = HIGH |

Table 2: LED status displays for interfaces



Filt the electronic module upwards and lift it away from the backplane.

NOTE

Once you have removed the module from the backplane, reattach the protective film to the backplane. This will protect the contacts against soiling by dust on site, for example.

12 Environmentally-friendly disposal

- The REL100 module must not be disposed of in the residual waste bin.
- Dispose of the REL100 module in accordance with the electronic waste disposal regulations that apply on site.

13 Fault finding

- The RUN LED does not light up: fault in the electronic module. Contact Customer Service.
- The RUN LED flashes red: a fault has occurred.
- Contact Customer Service.
- The RUN LED lights up red: the module is in the bootloader state or a software update is in progress.

14 Software licence

This product also contains open source software that was developed by third parties. You will find the licence texts and associated notes on our home page www.tq-automation.com.

15 Contact

If you have technical problems with the product, contact TQ-Automation Customer Service. We will need the following information to be able to give you specific help:

- Serial number of the REL100 module
- Description of the fault

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