



MIO100 Multi I/O module

Installation instructions

Edition 05/2019 EN

1 Introduction

These installation instructions contain important information that should be followed when installing the MIO100 Multi I/O module.

- Read all the instructions carefully before installing and commissioning the MIO100 Multi I/O 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

DANGER

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.

WARNING

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.

CAUTION

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

WARNING

- 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

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 MIO100 module only in a dry environment.
- Protect the MIO100 module against moisture and wet conditions.

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.
- Protect the MIO100 module against damage by transient over-voltages by installing additional overvoltage protection elements conforming to SPD type 1 (coarse protection) and SPD type 2 (medium protection).
- Make sure that the device can be isolated from the supply, e.g. with a type C2 or B6 line circuit breaker. This must be identified as the isolating unit for the device and must be easily accessible.
- Make sure that the MIO100 module is adequately ventilated. Make sure that the ventilation slots are not covered to prevent the MIO100 module from overheating.
- The MIO100 module requires no maintenance.

3 Target group

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

- 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 MIO100 module is an I/O unit for building automation. The MIO100 module is made up of two parts - the backplane and the electronic module. The integrated mains adapter supplies the MIO100 module in normal operation. If the mains voltage fails, the extra-low voltage carried on the CAB bus is used to maintain the display and operating functions and communication via the CAB bus. In this case, other interfaces cannot be used.

5 Intended usage

- The MIO100 module may only be operated when it is installed on the DIN rail in the distributor box and the protective covers are attached.
- The MIO100 module is approved only for use in dry interior areas.
- Only use the MIO100 module as specified in the documentation provided. Any other usage may result in injury or damage to property.
- For safety reasons, no changes may be made to the MIO100 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.

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

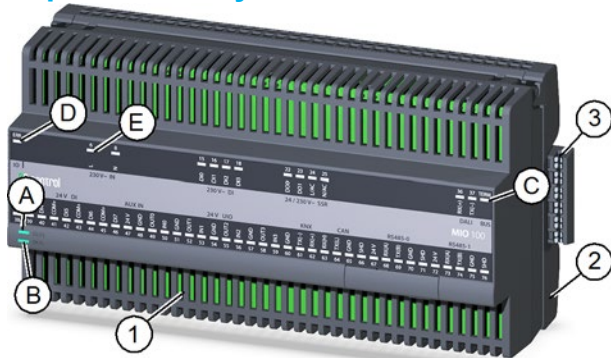


Fig. 1: View of the MIO100 Multi I/O module

Item	Designation	Quantity
1	MIO100 Multi I/O module	1x
2	Backplane	1x
3	Backplane connector*	1x
-	Installation instructions	1x

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

7 Technical data

Input data	
Rated input voltage	120 V AC to 240 V AC
Rated frequency	50 Hz to 60 Hz
Power consumption	Max. 50 VA
Potential isolation	SELV output voltage to EN 61010-1
Outputs	
RS485 supply for ext. devices	
— Output voltage	24 V DC \pm 10 % (SELV)
— Total load	Max. 100 mA
Digital outputs 24 V AC to 240 V AC	DO0, DO1 max. 1 A/channel
Universal Input / Output (24 V UIO)	
24 V OUT	OUT0-OUT3, see group guidelines 1 and 2 in Fig. 3
24 V digital inputs	IN0 - IN3, see group guideline 2 in Fig. 3
Analogue inputs	
— 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
Inputs	
24 V digital inputs	DI4 - DI7
COM+ 24 V	See group guidelines 3 and 4 in Fig. 3
AUX IN	24 V DC / 1800 mA
Digital inputs 120 V AC to 240 V AC	DI0 to DI3
Fieldbuses	
KNX (max. 8 stations)	Max. 8 mA / station
DALI (max. 8 stations)	Max. 4 mA / station
CAN	1x CAN2.0B
RS485	2x (half-duplex)
Line connections	
Connection cross section	0.5 mm ² to 1.5 mm ²
Housing protection	
IP code	IP20
Protection class	II
Overvoltage category	II (EN 61010)
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)	180 mm x 95 mm x 67 mm, 10 DIN units
Weight	0.58 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 Controls

There are three pushbuttons and a USB port beneath the service flap (item 5 in Fig. 2) on the MIO100 module.

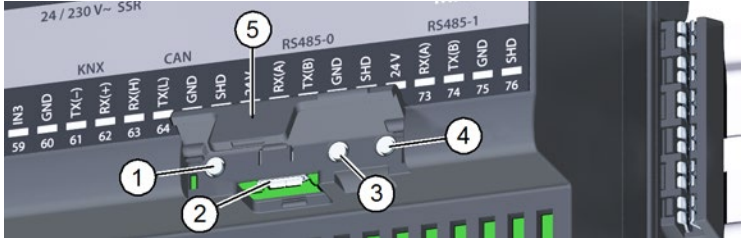
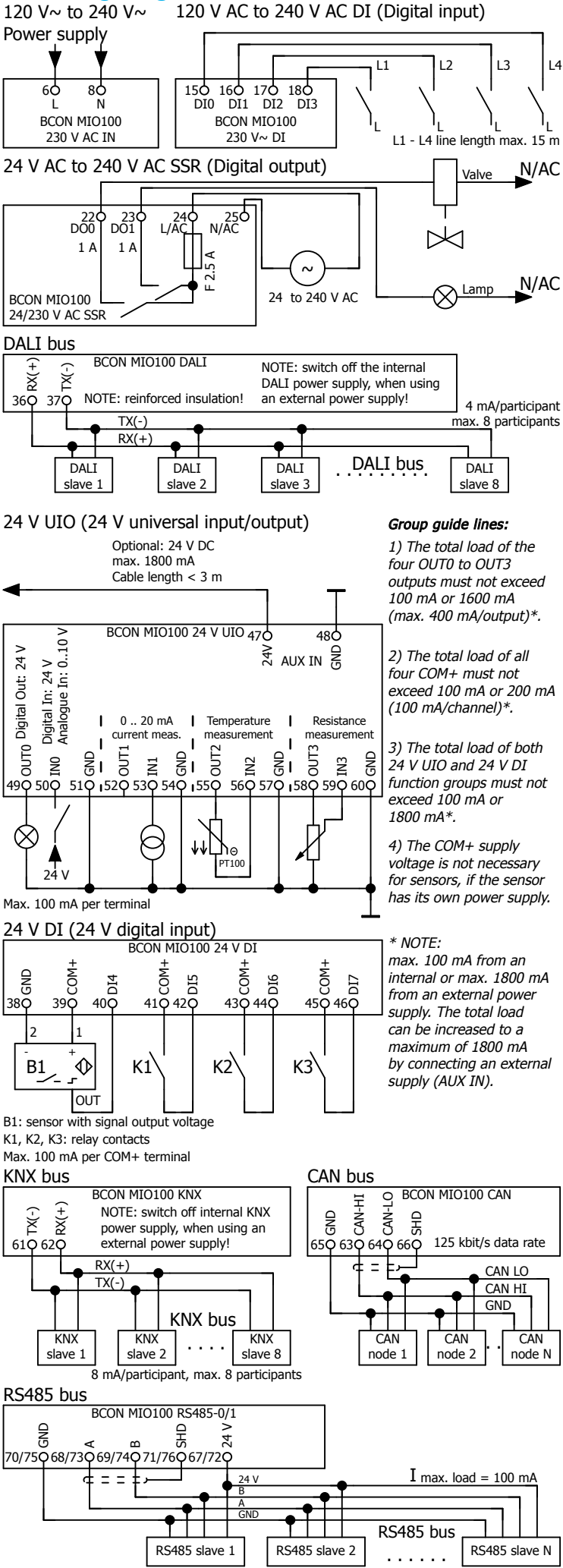


Fig. 2: Controls

Item	Control	Function
1	RESET button	Restarts the MIO100 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

9 Wiring diagrams for the connections



10 LED status displays

There is an overview of the LED status displays in Table 1 and Table 2.

11 Installation

DANGER

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.

11.1 Tools and equipment

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

11.2 Install the backplane

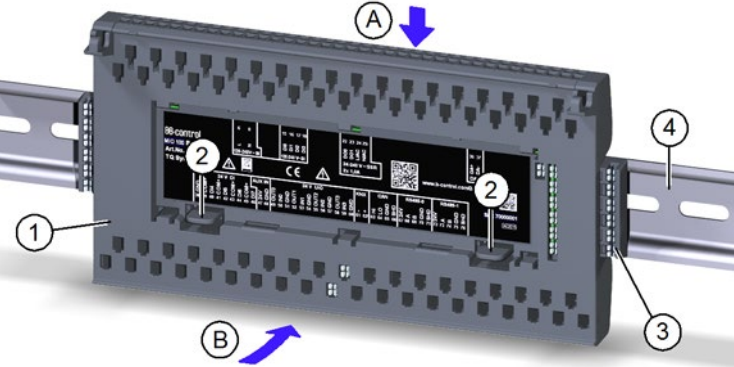


Fig. 4: Place the backplane on the DIN rail

- ▶ Arrange the backplane (item 1 in Fig. 4) so that the two tabs (item 2 in Fig. 4) are 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 two tabs (item 2 in Fig. 4) down lightly and swivel the backplane up.

11.3 Wire the backplane

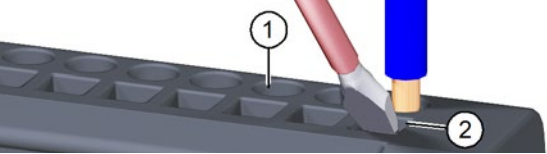


Fig. 5: Wire the backplane

- ▶ 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).
- ▶ Insert the rigid wire or ferrule into the round opening of the push-in 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 Terminate interfaces

On the back of the electronic module there is a switch with six slide contacts. These switch the terminating resistors for the CAN and RS485 interfaces.

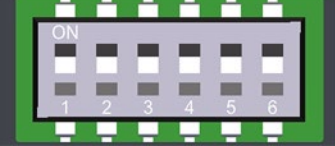


Fig. 6: Switches on the back of the electronic module

NOTE

- ▶ Make sure that the two slide contacts for each interface are always in the same position (ON or OFF).

Bus	Slide contact	Interface, terminated	Interface, not terminated
CAN	1	ON	OFF
	2	ON	OFF
RS485-0	3	ON	OFF
	4	ON	OFF
RS485-1	5	ON	OFF
	6	ON	OFF

11.5 Install the electronic module

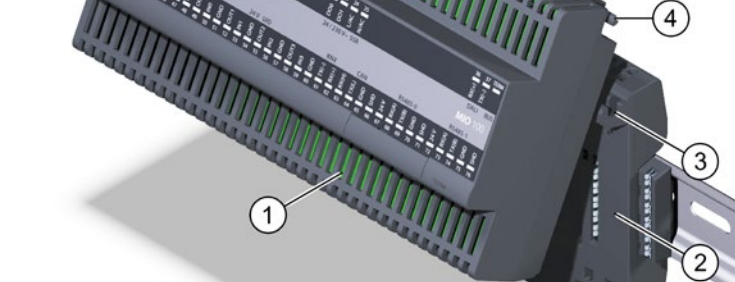


Fig. 7: Install the electronic module

- ▶ Insert the pivot axes (item 4 in Fig. 7) of the electronic module (item 1 in Fig. 7) into the hooks (item 3 in Fig. 7) of the backplane (item 2 in Fig. 7).
- ▶ Tilt the electronic module down and press it carefully against the backplane until it latches into place.

11.6 Start up the MIO100 module

NOTE

- ▶ Carry out an insulation measurement before starting up.
- ▶ Switch on the mains supply to the MIO100 module. The L LED and RUN LED light up green.
- ▶ Check the LED statuses according to Table 1 and Table 2.

11.7 Uninstalling the electronic module

To uninstall the electronic module from the backplane:

- ▶ Insert the screwdriver into the two gaps (item 1 in Fig. 8) on the underside of the electronic module one after the other in order to detach the module from its fixing.



Fig. 8: Uninstalling the electronic module

- ▶ Tilt 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 Fault finding

- The L LED does not light up. Check the mains supply.

Function	Labeling	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	– 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 – yellow: CAB bus in Init mode – 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 termination	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. overload)	-
230 V~ IN	L	6 (item E in Fig. 1)	red/ green	-	– red: no mains voltage available or AC/DC mains adapter is faulty – green: mains voltage is available and AC/DC mains adapter is OK	-

Table 1: LED status displays for module functions

Interface	Labelling	LED pos.	LED colour	Status if LED is off	Status if LED is on	Status if LED is flashing
230 V~ DI	DI0 to DI3	15, 16, 17, 18	green	No voltage at input	Voltage present at input	-
24 / 230 V~ SSR	DO0, DO1	22, 23	green	Output open	Output switched to L	-
DALI	RX(+) TX(-)	36 37	yellow green	Inactive Inactive	Both LEDs lit at the same time: no bus voltage available (int. power supply unit switched off, overload, short-circuit)	Data package received Data package sent
24 V DI	DI4 to DI7	40, 42, 44, 46	green	Input level LOW	Input level HIGH	-
AUX IN	24 V	47	green	External supply not connected, off or faulty	External supply available and OK	-
24 V UIO	OUT0 to OUT3	49, 52, 55, 58	red/ green	Output is OFF	– red (all LEDs): overload at an output – green: 24 V output ON	red (750/750 ms): cable break/broken sensor
	IN0 to IN3	50, 53, 56, 59	red/ green	Software-defined, e.g. input = LOW	– red (all LEDs): overload at an input – green: 24 V input = HIGH	red (750/750 ms): cable break/broken sensor
KNX	- +	61 62	green yellow	Inactive Inactive	Both LEDs lit at the same time: no bus voltage available (int. power supply unit switched off, overload, short-circuit)	Data package sent Data package received
CAN	HI LO	63 64	yellow green	- -	-	Data package received Data package sent
RS485-0/ RS485-1	24 V	67/72	red	Module switched off / auxiliary supply operating normally	Module switched on and auxiliary supply is overloaded	-
	A	68/73	yellow green	-	-	Data byte received
	B	69/74	yellow green	-	-	Data byte sent

Table 2: LED status displays for interfaces

- 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.
- 24 / 230 V AC SSR interface malfunction. Fuse blown. Contact Customer Service.

13 Environmentally-friendly disposal

- ✖ The MIO100 module must not be disposed of in the residual waste bin.
- ▶ Dispose of the MIO100 module in accordance with the electronic waste disposal regulations that apply on site.

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 MIO100 module
- Description of the fault

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