



BMD0401-PO Input/Output Module

Application

The input/output module with 4 binary inputs and 1 binary output receives binary signals in the DDC4000 automation system and activates binary control functions.

The output signals can be defined in case communication between the input/output module and the automation station is interrupted.

Manual/automatic rotary switch for automatic and manual operation of the auto/on/off binary output.

LED displays for the operating states of the inputs and outputs.

Communication is controlled via LED.

Label carrier for system-specific description.

The power supply and the CAN bus are electrically isolated.

Data is transferred between the central unit and the input/output module via CAN bus.

The input/output module can be connected to an existing switch cabinet bus or fieldbus.

The input/output module can be replaced during operation, and there is no need to switch off or restart the DDC4000 automation system (hot-pluggable).

LO and ID bus interface for communication with the touch module central TMC-PO for the local override and indication device (LO and ID).



Content	Page
Important Information on Product Safety	2
Item	3
Technical Data	3
Dimensions	5
Connection	5
Installation	8
Mounting	10
Removal	10
Function and Operation	11
Commissioning	12
LED Indicators	13



Important Information on Product Safety

Safety instructions

This document contains information on installing and commissioning the product “BMD0401-PO”. Each person who carries out work on this product must have read and understood this document. If you have any questions that are not resolved by this document, you can obtain further information from the supplier or manufacturer.

If the product is not used in accordance with this document, the protection provided could be impaired.

The applicable regulations must be observed when installing and using the devices. Within the EU, these include regulations regarding occupational safety and accident prevention as well as those from the VDE (German Association for Electrical, Electronic & Information Technologies). If the device is used outside of the EU, it is the responsibility of the plant engineer or operator to comply with local regulations.

Mounting, installation and commissioning work on the devices may only be carried out by qualified technicians. Qualified technicians are persons who are familiar with the described product and who can assess given tasks and recognize possible dangers based on their technical training, knowledge and experience, as well as their knowledge of the applicable regulations.

Symbol meanings



WARNING

Indicates a hazard of medium risk which can result in death or serious bodily injury if not avoided.



CAUTION

Indicates a hazard of low risk which can result in minor or medium bodily injury if not avoided.



CAUTION

Indicates a hazard which can result in material damage or malfunctions if not avoided.



NOTE

Indicates additional information that can simplify working with the product.

Notes on disposal

In accordance with the applicable laws and directives of the European Union countries, the product should not be disposed of with household waste. This ensures environmental protection and sustainable recycling or raw materials.

Commercial users should contact their supplier and observe the conditions of the purchase agreement. This device may not be disposed of together with other commercial waste.

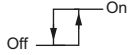
The local and currently applicable laws must be observed.



Item

BMD0401-PO Input/output module with 4 binary inputs and 1 binary output with manual/automatic auto/on/off rotary switch for the binary output and LVB Bus interface

Technical Data

Nominal voltage	DC 12..24 V $\pm$ 10%; 2.2 W
Inputs and outputs	■ 4 binary inputs, can also be used as pulse counter inputs up to 80 Hz Switching threshold off $\leq$ DC 2.5 V; on $\geq$ DC 5.0 V; 5 mA  Support of NAMUR sensors (proximity sensors) ■ 1 binary output as floating changeover contact, max. AC 230 V; 6 A (3 A) Relay contact for direct activation for AC voltage in accordance with utilization category AC-3 (classification in accordance with DIN EN 60947-1, appendix A). The appropriate protective devices for the motor must be provided in the switchgear. Other rating data for the relay contact for use in accordance with utilization category AC-3: - Switching voltage: AC 230 V - Switching capacity: 350 W - Continuous current: max. 2.5 A - Minimum switch-on/off duration: 5 s on/5 s off - Maximum switching frequency: 50,000 cycles ■ Support terminal blocks for terminals "81" to "86" and terminals "91" to "96" Max. power load: AC 230 V; 6 A (3 A)
Indicators and controls	■ 5 status LEDs for inputs and outputs ■ 3 freely configurable LEDs ■ 1 LED for displaying CAN bus communication ■ 1 LED for displaying RS485 LO and ID bus communication ■ manual/automatic rotary switch for automatic and manual operation of the auto/on/off binary output
Address switch	Addressing 01..63 through 2 rotary switches
Interfaces	■ CAN bus as: - Fieldbus, F-bus: 2000 m, 20 kBd or - Switch cabinet bus, SBM bus: 200 m, 40 kBd (note the special CAN bus settings. You can find further information in the DDC4000 project planning documentation) ■ LO and ID bus, 200 m PtP connection for the touch module central TMC-PO for the local override and indication device (LO and ID)
Housing	Plastic housing
Overvoltage category	III
Rated impulse voltage	4000 V
Level of contamination	2
Method of operation	Type 1
Degree of protection	IP20 (when installed)
Ambient temperature	0..55 °C



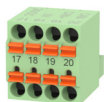
Product Description

BMD0401-PO

Ambient humidity	20..80% r.h., non-condensing
Installation position	360° vertical position
Mounting	TH 35x7.5 top hat rail in closed housing This device is intended for installation in a wall-mounted enclosure or switch cabinet with protection class I or II
Weight	0.20 kg
Dimensions	WxHxD 71.8 x 90 x 60 mm

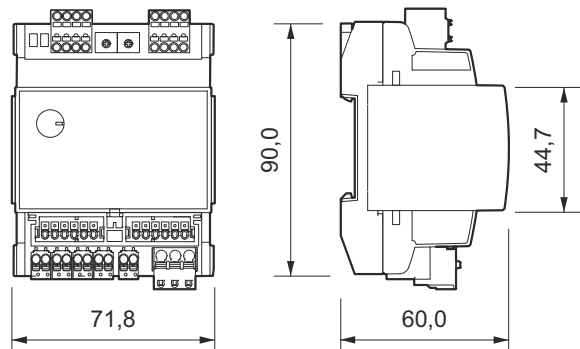
Connection clamps

- Spring-loaded terminals
- Twisting two conductors is not permitted, twin wire-end ferrules can be used

	Input terminals  Terminals 21..32	Output terminals  Terminals 41..43	Support terminals  Terminals 81..86 and 91..96	Bus terminals  Terminals 7..10 and 17..20
Single-wire conductor Conductor cross-section: Stripping:	0.5..1.5 mm ² 8 mm	0.5..2.5 mm ² 10 mm	0.5..1.5 mm ² up to 1 mm ² : 9 mm 1.5 mm ² : 10 mm	0.5..1.0 mm ² 10 mm
Multiwire conductor Conductor cross-section: Stripping:	0.5..1.5 mm ² 8 mm	0.5..2.5 mm ² 10 mm	0.5..1.5 mm ² up to 1 mm ² : 9 mm 1.5 mm ² : 10 mm	0.5..1.0 mm ² 10 mm
Multi-wire conductor with wire end sleeve and plastic collar Conductor cross-section: Wire end sleeve length:	0.5..1.0 mm ² 10 mm	0.5..1.5 mm ² 10 mm	0.5..1.0 mm ² 10 mm	0.5..1.0 mm ² 10 mm
Multi-wire conductor with wire end sleeve without plastic collar Conductor cross-section: Wire end sleeve length:	0.5..1.0 mm ² 10 mm	0.5..1.5 mm ² 10 mm	0.5..1.0 mm ² 10 mm	0.5..1.0 mm ² 10 mm
Required crimping	Square crimping	Square crimping	Square crimping	Square crimping



Dimensions



Connection



NOTE

Previously, the binary inputs in our devices were triggered by a potential-free connection to the GND. In the new device concept that is now implemented, the DC +12 V auxiliary voltage generated by the device is applied on each of the 2-pole input terminals. The binary inputs are now triggered by a connection between the two input terminals (binary message "ON").

This prevents there from being an unwanted connection to earth or the reference potential in secondary earthed systems (PELV) and prevents an active signal at the input/output module from being generated.



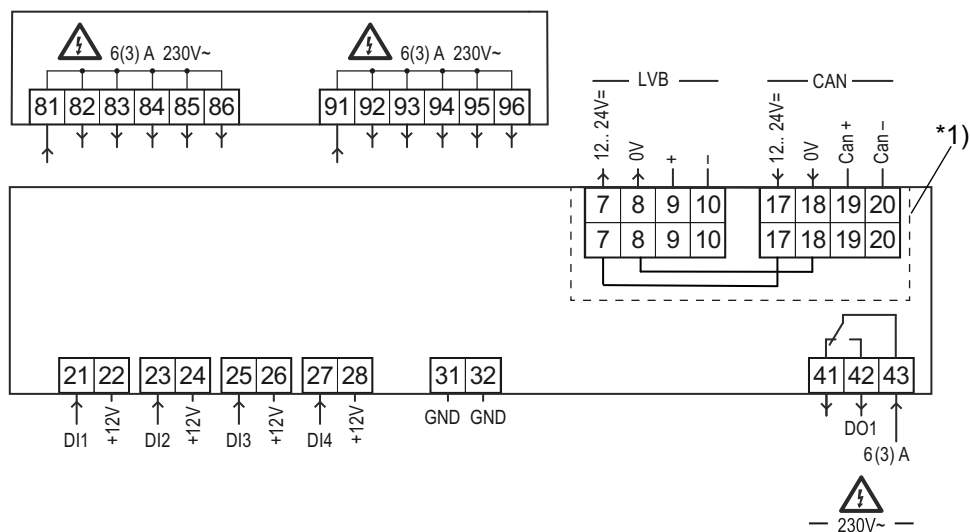
NOTE

The devices have galvanic isolation between the bus voltage supply and the inputs and outputs. This is a separation of duties that prevents unwanted ground loops.

Thanks to this functional separation, each module can provide its own ground plane that structurally prevents mass loops and potential shifts between the modules.

If the system layout requires it, however, the ground planes of the modules can also be connected without any issues.

- zwei Stützklemmenblöcke Klemme "81" bis "86" und Klemme "91" bis "96"

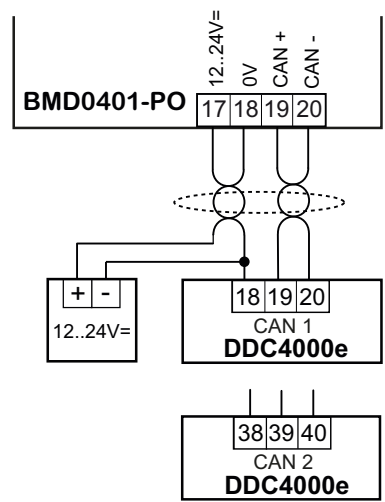


*1) Galvanic isolation

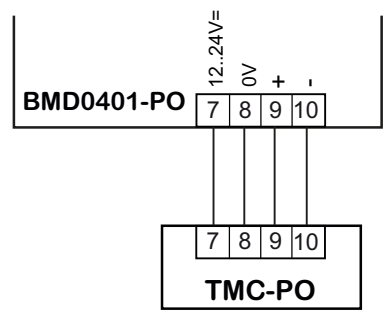


Product Description
BMD0401-PO

Connection of DDC4000e

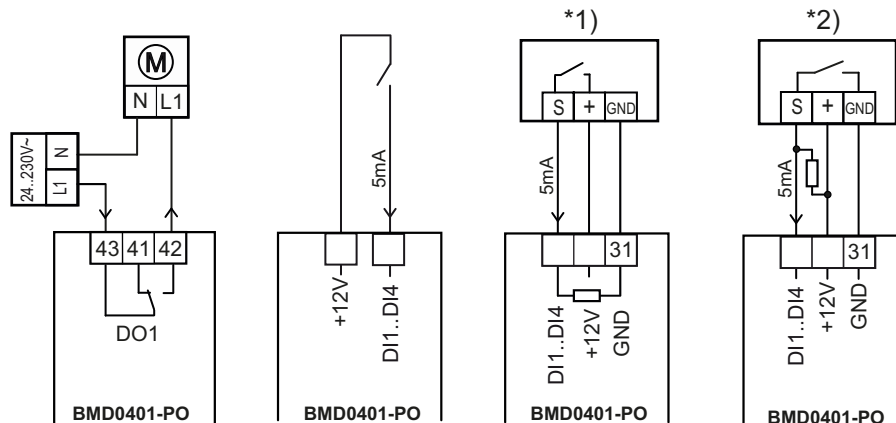


Connection of TMC-PO





Connection of binary inputs and outputs



*1) Sensor with PNP output (most frequent application).

The resistance is internal in the input/output module.

*2) Sensor with NPN output/open collector (when the sensor is switched on, the module input resistance is off).

The resistance of 2.2 kΩ must be set externally.



NOTE

Terminal 31 or 32 provides GND for all inputs DI1..DI4.

If switching sensors are supplied by the module, note that the voltage provided by the BMD0401-PO is +12V and the maximum current is 5 mA (e.g. 3-pole Namur sensors).

2-pole Namur transmitters are connected to DC +12 V and the binary input BE.

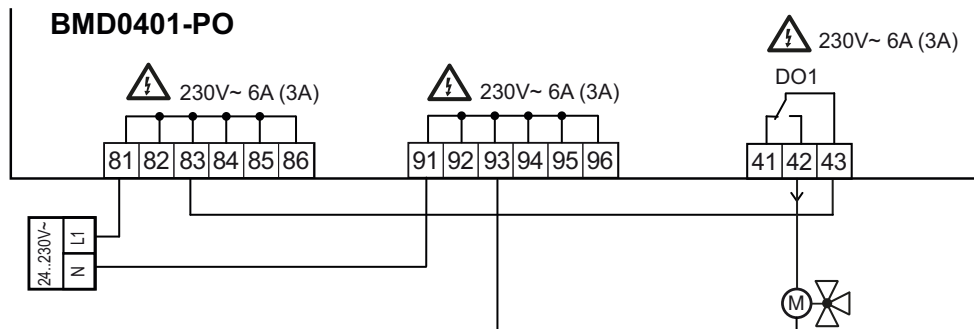


Product Description

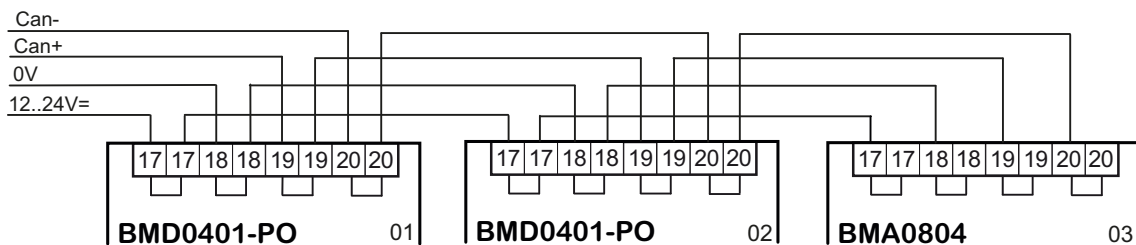
BMD0401-PO

Sample connection

- Sample connection of valves with two-point control and the use of support terminals



- Connection of several input/output modules via CAN bus



NOTE

The terminal block terminal “17” through terminal “20” (feed-through terminals) can be inserted and disconnected without interruption.

Installation



CAUTION

This product description contains the specific settings and functions of the input/output module. In addition to these instructions, the product descriptions of other system components, such as the DDC4000e automation station, are to be observed.



CAUTION

Switching on the power supply of unparameterized products can lead to unforeseen consequences such as malfunctions or material damage.

Switch on the power only after the device has been configured by the commissioning technician.



NOTE

The input/output module can be connected to an existing fieldbus or switch cabinet bus. Further information can be found in the DDC4000 project planning documentation



Switch cabinet bus

When connecting the switch cabinet bus, use a cable of at least type JY(St)Y 2x2x0.8 Lg: two x two leads stranded into a pair, plastic insulation and an electrostatic shield with a lead diameter of at least 0.8 mm. Use a stranded pair of leads for the data lines (+ and -) and another free lead for the ground (0).

At the end of the switch cabinet bus (farthest point from the DDC controller), install a terminating resistor of about 180 ohms between both data lines (+ and -). The terminating resistor is included with the DDC controller

The maximum cable length for the switch cabinet bus is 200 m.

Fieldbus

When connecting the fieldbus, use a cable of at least type JY(St)Y 2x2x0.8 Lg: two x two wires, twisted to a pair with plastic insulation and an electrostatic shield with a wire diameter of at least 0.8 mm. Use a stranded pair of wires for the data lines (+ and -) and another free wire for the ground connection (0).

At the end of the fieldbus (furthest point from the DDC controller), install a terminating resistor of about 180 ohms between both data lines (+ and -). The terminating resistor is included with the DDC controller.

The maximum cable length for the Fieldbus is 2000 m.

LO and ID bus

When connecting the local override and indication device bus, use a cable of at least type JY(St)Y 2x2x0.8 Lg: two x two leads stranded into a pair, plastic insulation and an electrostatic shield with a lead diameter of at least 0.8 mm. Use a stranded pair of wires for the data lines (+ and -) and another free wire for the ground (0).

The maximum cable length for the local override and indication device bus is 200 m.

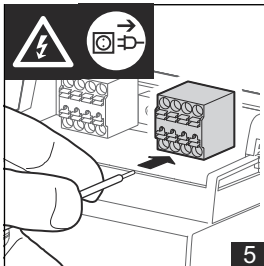
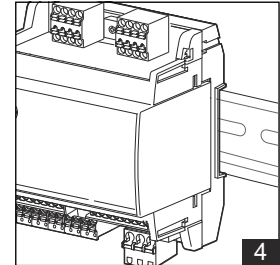
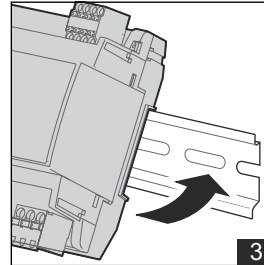
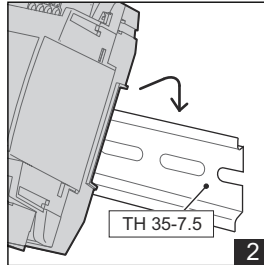
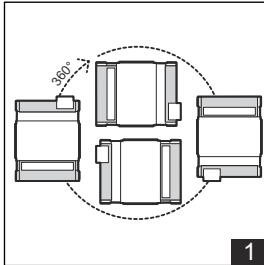


Mounting

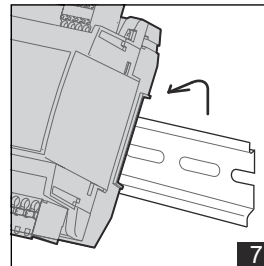
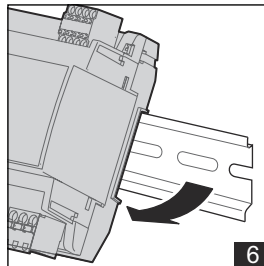
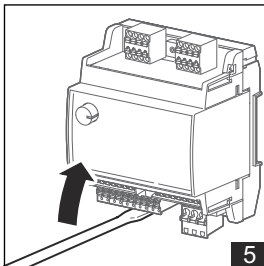
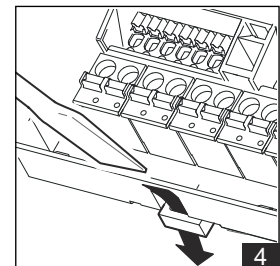
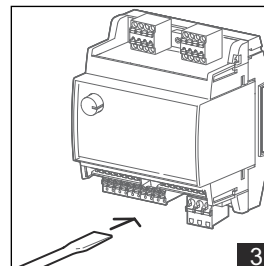
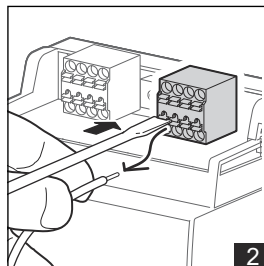
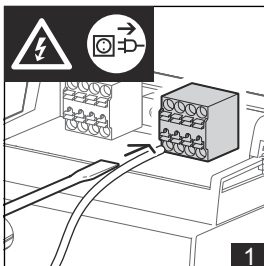


WARNING

Contact with live parts of electrical domestic installation can cause death due to electric shock.
Mounting/removal may only be carried out when power is switched off.

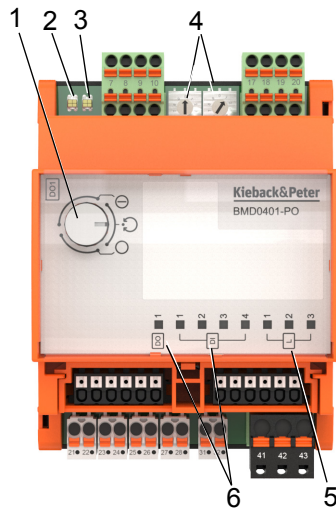


Removal





Function and Operation



- (1) Manual/automatic rotary switch
⌚ = auto, Ⓜ = on, Ⓚ = off
- (2) Combination LED (green, red) for LVB Bus
- (3) Combination LED (green, red) for CAN Bus
- (4) Address switches
- (5) Freely configurable LEDs
- (6) Status LEDs for inputs and outputs

Manual/automatic mode

You can use the manual/automatic rotary switch (1) to switch to the appropriate operating mode (auto/on/off) for the binary output when manual operation is activated and parameterized.



NOTE

In the event of a BUS or DDC failure, manual mode can be used as an emergency mode if it has not been permanently disabled using the parameterization.

Parameterization

The following functions are defined via parameterization:

- Activation of the binary inputs



NOTE

The parameterization is retained in case of power failure.

The counter values of the inputs are not retained after a power failure.

To delete the parameterization, set address 99.

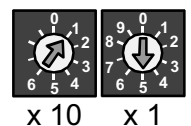
Setting CAN Bus Address

Permitted range for the switch cabinet bus address: 01..63.

Permitted range for fieldbus address: 01..63.

- Set the first number of the bus address on the address switch, the second number on the second rotary address switch.

The example shows the address 15.





NOTE

In the delivery state, the address is set to "00", meaning:

- no bus communication
 - no project planning possible
-

Commissioning



CAUTION

Commissioning by switching on the supply voltage may occur only after the commissioning technician/engineer has finished configuring the DDC and has set the bus address.

- Configuration is described in the DDC controller project planning documentation.
- Before switching on the supply voltage, check the electric installation and the device connections.
- After configuring the device and switching on the supply voltage, check the functions of the module and the connected inputs and outputs.

Functional test

It is possible to check the correct wiring and function of the inputs and outputs.

- ▶ Set the bus address "00".
- You can check the correct polarity and wiring for the 4 inputs DI1 to DI4 with a diode and a 180 Ω resistance (series connection).
- You can check the function (0/1) and wiring of the output using the manual/automatic rotary switch.

Target display:

- Open contact: Red LED
- Resistance diode combination correctly poled: Green LED

Possible wiring errors:

- Open contact: Green LED
- Resistance diode combination connection: Red LED



LED Indicators

LED CAN Bus

LED status (combination LED)	Meaning	Cause
off	Module not in operation	No operating voltage or operating voltage too low
Yellow on (green LED and red LED on)	Module in operation, but there is a bus error no CAN communication possible, module not logged on	Bus line short circuit (with respect to ground or each other), Bus lines reversed or interrupted
	Address 00 (manual operation effective, functional test possible)	
Yellow flashing (green LED and red LED flashing simultaneously) Flashing rate 1 sec.	Address error, no bus activity	Outside of address range #01..#63 address assigned multiple times
Green flashes and red LED off	Module OK, bus activity	
Red LED and green LED flash alternately slowly Flashing rate 6 sec.	Update is being transferred from DDC4000e to module	
Red LED permanent light	Address 99 (deleting the configuration, manual control effective)	

LED LVB bus

LED status (combination LED)	Meaning	Cause
Off	TMC-PO Module not in operation	No operating voltage or operating voltage too low or no macro configured
Yellow on (green LED and red LED on)	TMC-PO Module in operation, but there is an LO and ID bus error; cannot communicate with the TMC-PO module	Short circuit on the bus lines (against the ground or each other), Bus lines mixed up or interrupted No operating voltage or operating voltage too low on the TMC-PO module
Green LED flashes and red LED off	TMC-PO Module OK, LO and ID bus activity	

Status LED for inputs and outputs

Output:

- Contact on: LED lights up green
- Contact off: LED off
- In manual mode, the output LED also flashes yellow

Inputs:

- Contact closed: LED lights up in green
- Contact open: LED off
- The +12 V DC auxiliary voltage breaks down. Caused by incorrect wiring of the GND:



Product Description

BMD0401-PO

All input LEDs light up red