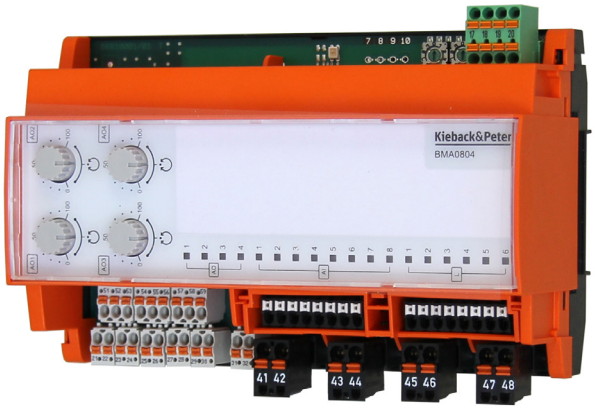
BMA0804 Input/output module

Application



The input/output module with 8 analog inputs and 4 analog outputs receives analog signals in the DDC4000e automation system and activates analog control functions.

Manual/automatic rotary switch for controlling the 4 analog outputs. In manual mode, the output signal can be set in 10% increments 0..100% (0(2)..10 V DC).

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.

Content

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Important Information Regarding Product Safety

Safety Instructions

This data sheet contains information on installing and commissioning the product "BMA0804". Each person who carries out work on this product must have read and understood this data sheet. If you have any questions that are not resolved by this data sheet, you can obtain further information from the supplier or manufacturer.

If the product is not used in accordance with this data sheet, the protection provided will be impaired.

Applicable regulations must be observed when installing and using the device. Within the EU, these include regulations regarding occupational safety and accident prevention as well as those from the VDE (Association for Electrical, Electronic & Information Technologies). If the device is used in other countries, it is the responsibility of the system installer 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 due to technical training, knowledge and experience as well as knowledge of the appropriate regulations.

Legend

WARNING

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

CAUTION

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

CAUTION

Indicates a hazard of medium risk which can result in material damage or malfunctions if it is not avoided.

NOTE

Indicates additional information that can simplify the work with the product for you.

Notes on Disposal

For disposal, the product is considered waste from electrical and electronic equipment (electronic waste) and must not be disposed of as household waste. Special treatment for specific components may be legally binding or ecologically sensible. The local and currently applicable legislation must be observed.

Item

BMA0804	Input/output module with 8 analog inputs and 4 analog outputs with manual/automatic rotary switch 0..100% for the analog outputs

Technical Data

Nominal voltage	12..24 V DC ± 10%; 2.5 W
Inputs and outputs	■ 4 analog outputs, 0(2)..10 V DC; maximum 2.5 mA ■ 8 analog inputs, See chapter “Sensor Types”, page 4. ■ Separate auxiliary power (terminal 53, 56, 59) 10 V DC; Σ 70 mA for connecting external setting knobs ■ Support terminal blocks terminal “81” through “88” and terminal “91” through “98” max. power load 230 V AC; 6 A (3 A)
Indicators and Controls	■ 12 LED status indicators of inputs and outputs ■ 6 freely configurable LEDs ■ 1 LED for displaying bus communication See chapter “LED displays”, page 11. ■ 4 manual/automatic rotary switches for automatic and manual operation of analog outputs 0..100% 0(2)..10 V DC.
Address switch	Two rotary switches for addressing from 01 to 63
Interfaces	CAN bus as: ■ Fieldbus, F-bus: 2,000 m; 20 kBd; **or** ■ Switch cabinet bus, SBM bus: 200 m, 40 kBd (note special CAN BUS settings. Further information can be found in the DDC4000 project planning documentation)
Housing	Plastic housing
Overvoltage category	III
Rated impulse voltage	800 V
Level of contamination	2
Method of operation	Type 1
Degree of protection	IP20
Ambient temperature	0..55 °C
Ambient humidity	20..80 % r.h.; non-condensing
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	0.22 kg
Dimensions	WxHxD: 143.5 x 90 x 67 mm

Connection terminal

- Spring-loaded terminals, printers
- All terminals can be inserted with conductor end sleeves of 10 mm length
- Twisting two conductors is not permitted, twin wire-end ferrules can be used

	Input terminals  Terminal 21..32 and 51..59	Output terminals  Terminal 41..48	Supporting termi-  nals Terminal 81..88 and 91..98	Bus terminals  Terminal 17..20
Stripping length	8..9 mm	10 mm	10 mm	10 mm
Conductor cross-section single-wire conductor	0.2..1.5 mm^2	0.08..2.5 mm^2	0.08..1.5 mm^2	0.2..1.5 mm^2
Conductor cross-section fine-wire conductor	0.25..1.5 mm^2	0.08..2.5 mm^2	0.08..1.5 mm^2	0.25..1.5 mm^2
Conductor cross-section fine-wire conductor with wire-end ferrules	0.25..0.75 mm^2	0.08..2.5 mm^2	0.8..1.5 mm^2	0.25..0.75 mm^2
Recommended crimping tools	Square hex	Square hex	Square hex	Square hex

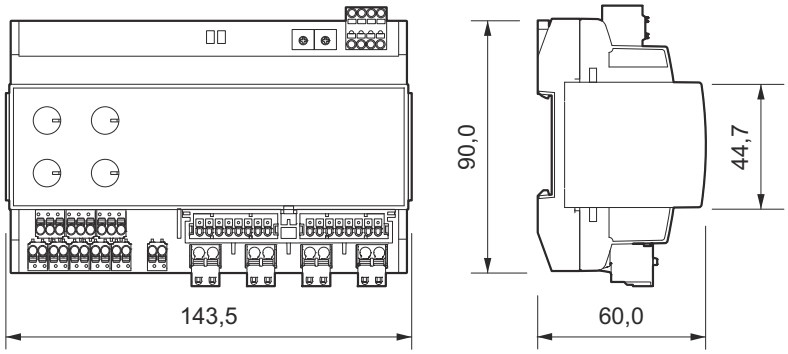
Sensor Types

Sensor type	Measuring range
0(2) V..10 V	0..100 %
KP10	-50..+150 °C
KP250	-50..+150 °C
ML2	-50..+150 °C
Ni100	-50..+150 °C
Ni1000 (DIN)	-50..+150 °C
Ni1000 (L&G)	-50..+150 °C
NTC1,8K	-50..+150 °C
NTC5K	-50..+150 °C
NTC10K	-40..+150 °C
NTC10KPRE	-40..+150 °C
NTC20K	-30..+150 °C
PT100	-100..+850 °C
PT1000	-100..+850 °C
Balco500	-40..+150 °C
Satchwell DC1100	-20..+120 °C
Satchwell DC1400	-40..+120 °C
Resistor (potentiometer)	0..500 kΩ

NOTE

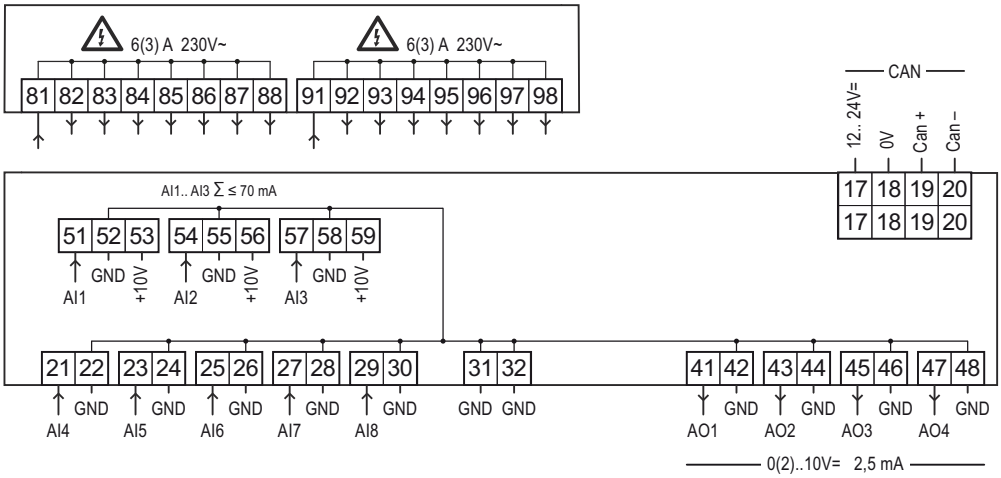
You can find more information on the sensor types in the “Temperature Sensor Tables” product description (1.10-90.100-01).

Dimensions

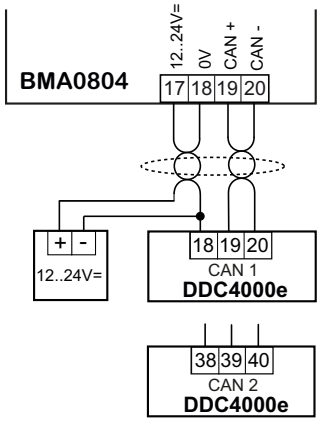


Connection

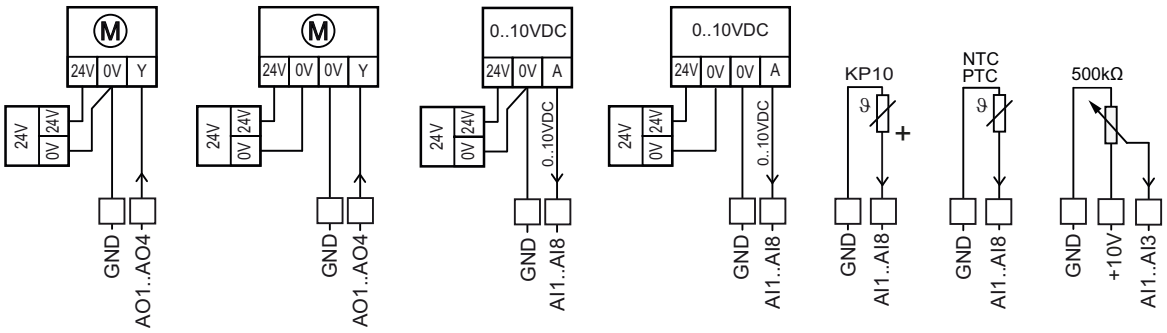
- Two support terminal blocks, terminals “81” to “88” and terminals “91” to “98”



DDC4000e connection

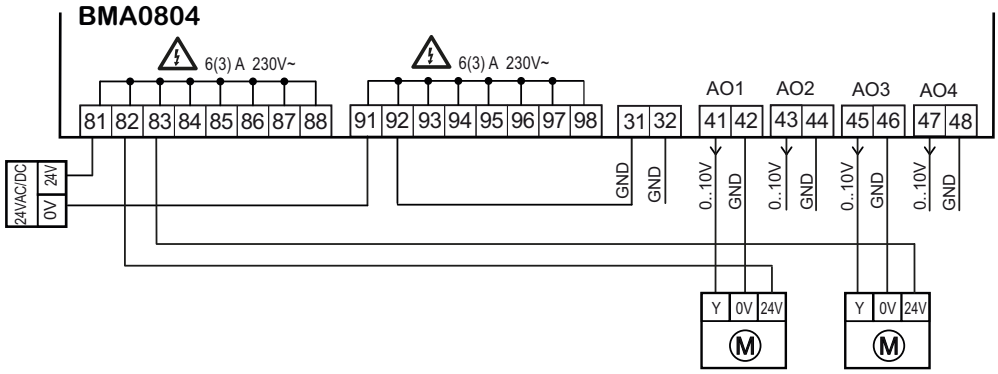


Connection for the actuators and sensors



Connection examples

- Connection of actuators using the support clamps (3 conductors)

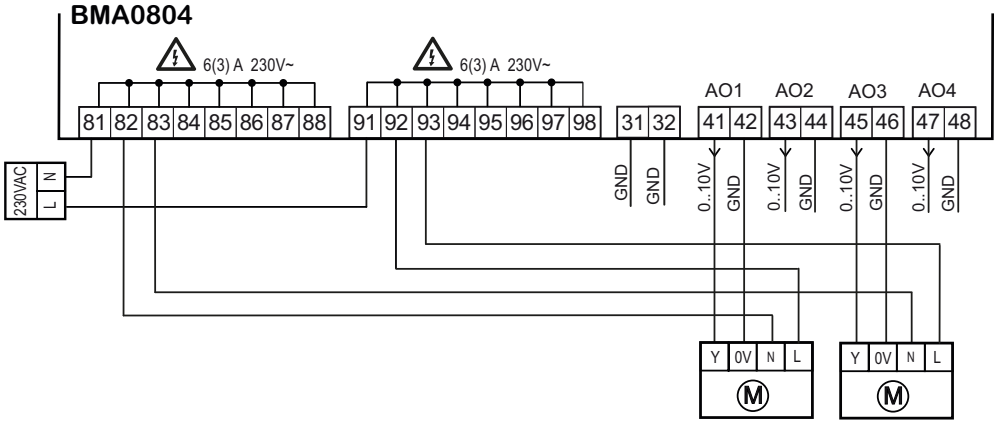


CAUTION

For trouble-free operation, the GND connection terminal “31” or terminal “32” is required to be connected to the GND (0 V) of the supply voltage"

This GND connection may only be made when using protective extra-low voltage (rated voltage ≤ 24V AC/DC).

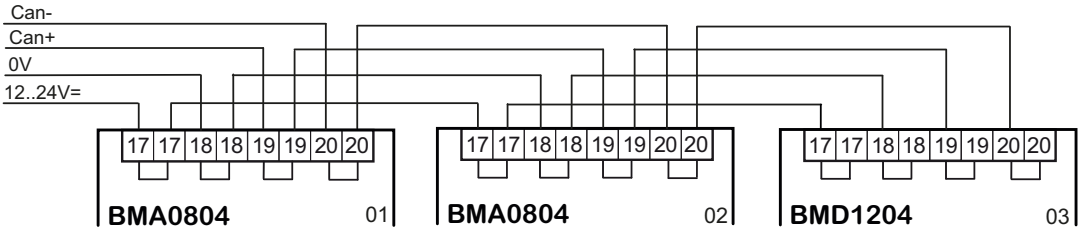
- Connection of actuators using the support clamps (4 conductors)



CAUTION

3-wire and 4-wire applications may not be mixed.

- 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.

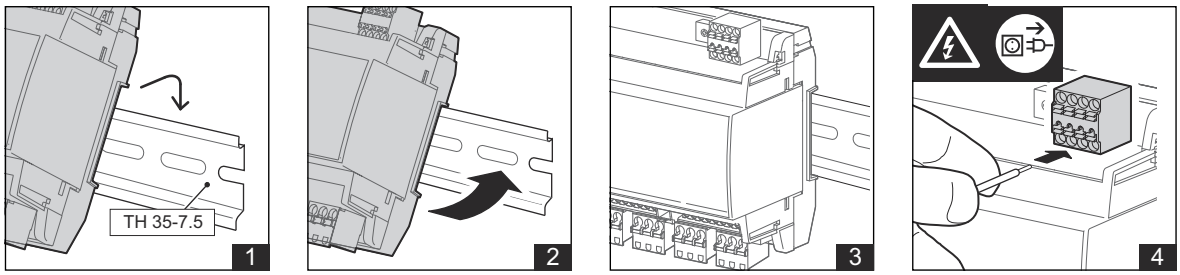
The maximum cable length for the Fieldbus is 2000 m.

Mounting

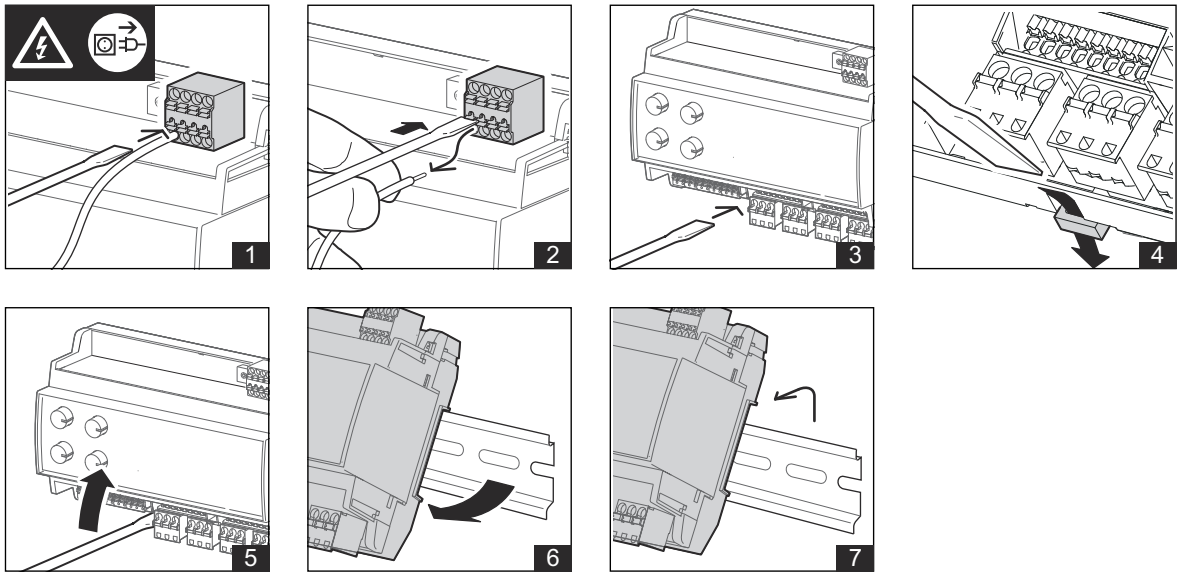
WARNING

Contact with live parts of electrical domestic installation can cause death due to electric shock.

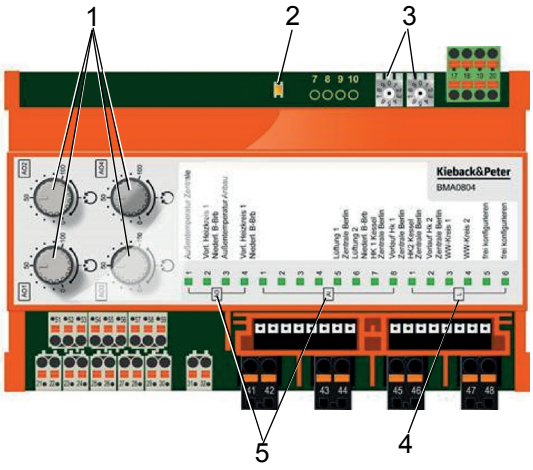
Mounting/removal may only be carried out when power is switched off.



Removal



Function and operation



(1) Manual / automatic rotary switch
↻= auto, 0 ..50..100 = manual operation
(2) Combi LED (green, red) CAN bus
(3) Address switch
(4) Freely configurable LEDs
(5) Status LEDs of inputs and outputs

Manual/Automatic Mode

You can switch to the corresponding operating mode using the manual/automatic rotary switch (1).

In manual mode, the respective output signal is set in the range 0 ..100% (0 (2) ..10 V DC) with the manual/automatic rotary switch (1), depending on the parameterization.

The light intensity of the status LED (5) changes depending on the output signal.

Parameterization

The following functions are defined via parameterization:

- Permanent shutdown of the manual control
- Analog inputs can be configured according to the sensor type table
- Setting range of the analog outputs 2..10V DC or 0..10 V DC.
- Default value for the outputs in the event of bus failure or failure of the automation station

NOTE

Parameterization is retained in the event of a power failure.

Set address 99 to delete the parameterization.

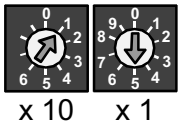
Setting CAN Bus Address

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(3), the second number on the second rotary address switch (3).

The example shows the address 15.



NOTE

On delivery, the address “00” is set, which means:

- No bus communication
- No parameterization possible
- Manual operation is effective. The 4 analog outputs can be switched in 10% increments (0..10 V DC) . In automatic rotary switch position, the output is 0 V DC.
- Sensor inputs in test mode

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”.

- The function and wiring of the 4 outputs 0..10 V DC can be tested with the manual/automatic rotary switch.
- The correct polarity and wiring of the 8 AI1 through AI8 inputs can be checked with a diode and a resistor 180 Ω (series connection).

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 displays

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)	

Status of inputs and outputs

Outputs:

- 0..100% green, the luminosity of the LED changes depending on the output signal, 100% = full luminosity
- In manual mode, the output LEDs additionally flash yellow

Inputs:

- Sensor value valid: LED lights up green:
- Sensor value outside the measuring range: LED lights up red
- No sensor (sensor type) configured: LED off
- Negative voltage at the input falsifies the measuring signal: all input LEDs light up red. The affected input flashes red.
- The +10 V DC auxiliary voltage breaks down. Caused by incorrect wiring:
  LEDs of the 0/2..10 V DC inputs lights up red.