# BMAU24 Input/output module



## Application

The input/output module with 24 analog inputs or outputs receives DDC4000 automation and control system analog signals and activates analog control functions.

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

The function can be individually selected as an input or output for each of the 24 connections by means of DDC configuration.

Communication is controlled via LED.

Data is transferred between the automation station and the input/output module via the CAN bus.

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).

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

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## Important Information on Product Safety

### Safety instructions

This document contains information on installing and commissioning the product “BMAU24”. 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

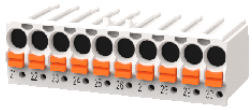
| | |
|---|---|
| BMAU24 | Input/output module with 24 analog inputs or outputs |

## Technical Data

| | |
|---|---|
| Nominal voltage | DC 12..24 V ± 10%; 3.9 W |
| Inputs and outputs | ■ 24 AIs/AOs can be independently configured as:<br>- Analog output DC 0(2) V..10 V; max. 2.5 mA<br>- Analog input see table "Sensor types" on page 4.<br>■ Separate auxiliary power (terminal 69, 78) DC 10 V Σ 70 mA for connecting external setting knobs |
| Address switch | Addressing 01..63 through 2 rotary switches |
| Interfaces | CAN bus as:<br>■ Fieldbus, F-bus: 2000 m, 20 kBd **or**<br>■ Switch cabinet bus, SBM bus: 200 m, 40 kBd (note the special CAN BUS settings. You can find more information 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 |
| Protection class | III |
| Ambient temperature | 0..55 °C |
| Ambient humidity | 20%..80% r.h.; non-condensing |
| Installation position | 360° vertical position |
| Mounting | TH 35x7.5 top hat rail in closed housing<br>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: 143.5 x 90 x 60 mm |

### Connection clamps

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

| |  Terminals 21..30; 31.. 40 41..50; 51..60, 61..70 |  Terminals 3..6; 71..74, 75..78 |  Bus terminals Terminals 17..20 |
|---|---|---|---|
| Single-wire conductor<br>Conductor cross-section:<br>Stripping: | <br>0.5..1.5 mm²<br>8 mm | <br>0.5..1.5 mm²<br>8 mm | <br>0.5..1.0 mm²<br>10 mm |
| Multiwire conductor<br>Conductor cross-section:<br>Stripping: | <br>0.5..1.5 mm²<br>8 mm | <br>0.5..1.5 mm²<br>8 mm | <br>0.5..1.0 mm²<br>10 mm |
| Multi-wire conductor with wire end sleeve and plastic collar<br>Conductor cross-section:<br>Wire end sleeve length: | <br>0.5..1.0 mm²<br>10 mm | <br>0.5..1.0 mm²<br>10 mm | <br>0.5..1.0 mm²<br>10 mm |
| Multi-wire conductor with wire end sleeve without plastic collar<br>Conductor cross-section:<br>Wire end sleeve length: | <br>0.5..1.0 mm²<br>10 mm | <br>0.5..1.0 mm²<br>10 mm | <br>0.5..1.0 mm²<br>10 mm |
| Required crimping | Square crimping | Square crimping | Square crimping |

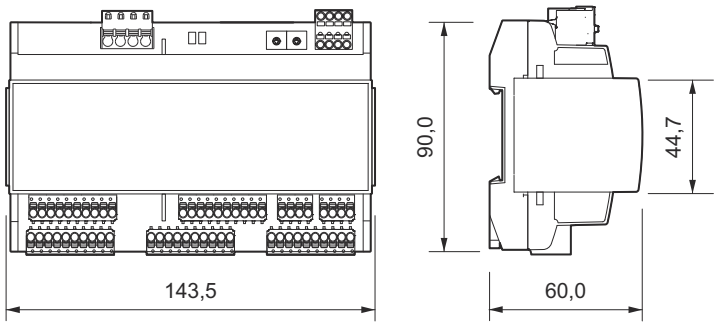
### Sensor types

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



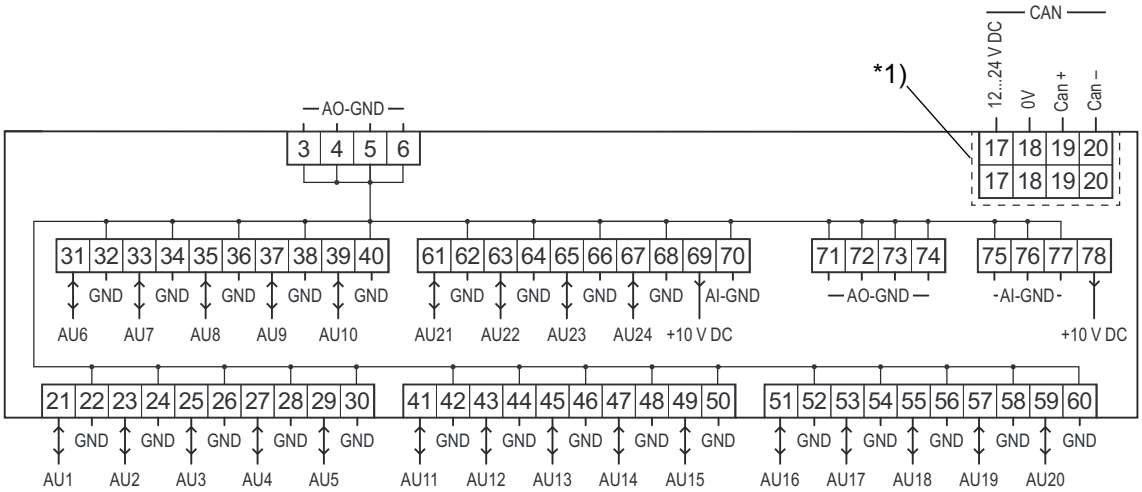

## Connection

**NOTE**

The devices have a galvanic isolation of the bus power supply against the inputs and outputs. This is a function separation which is intended to prevent unwanted ground loops.

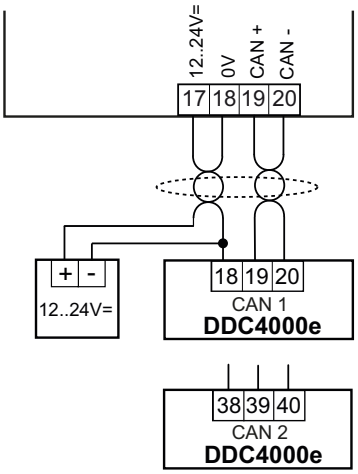
By means of this function separation, each module can offer its own and independent ground plane, which structurally prevents ground loops and potential shifts between the modules.

However, if the system configuration requires it, the ground levels of the modules can also be connected without problems.

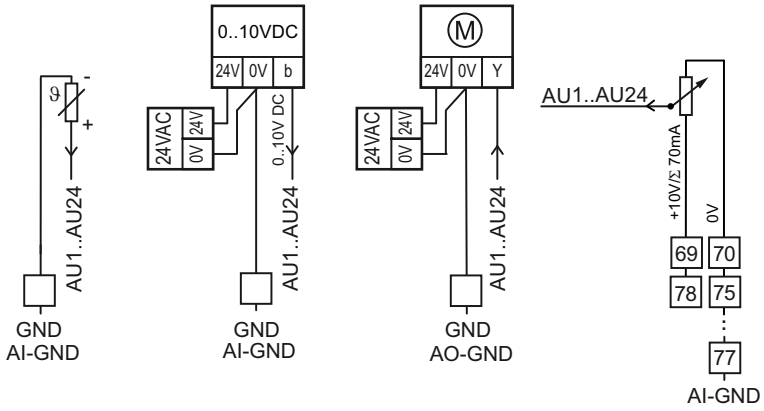



*1) Galvanic isolation

### Terminal DDC4000e




### Sensor and actuator connection



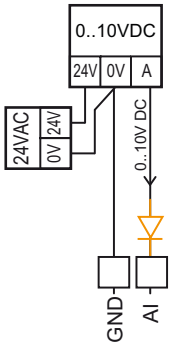

**CAUTION**

A negative input voltage on a measuring channel leads to a significant influence on all inputs. Therefore, all analog inputs (AI) are represented as invalid (???) in the "b" parameter in the pin object. This guarantees the measurement quality.

**NOTE**

If negative input voltages are to be expected due to the sensor used (e.g. in en:air plants with the differential pressure transmitter DE23 from Fischer), appropriate measures must be taken to limit the input voltage outside the module.

Example: Use of a diode in the component plug and matching terminal block




Diode: BAT86 (Schottky diode)
Component plug: Phoenix P-CO or equivalent
Terminal block: Phoenix PT 4-FSI/F GY or equivalent

## 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 automation station DDC4000e, 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 field bus or switch cabinet bus.

You can find more information 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).

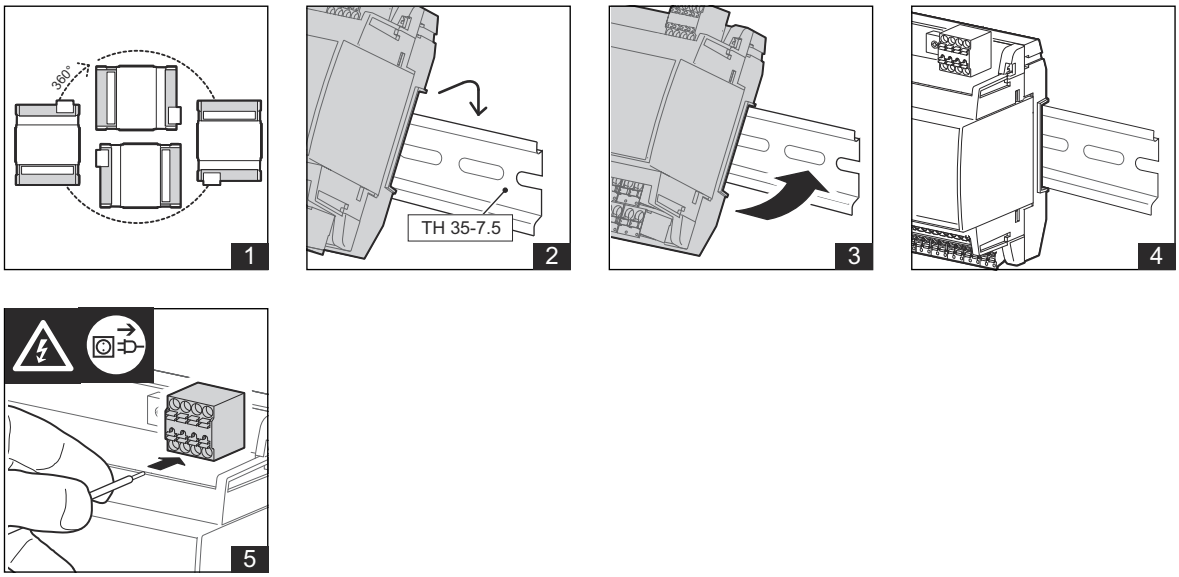
At the end of the fieldbus (furthest point from the DDC controller), install a terminating resistor of about 180 ohms between both data lines (+ and -). The terminating resistor is included with the DDC controller.

The maximum cable length for the Fieldbus is 2000 m.

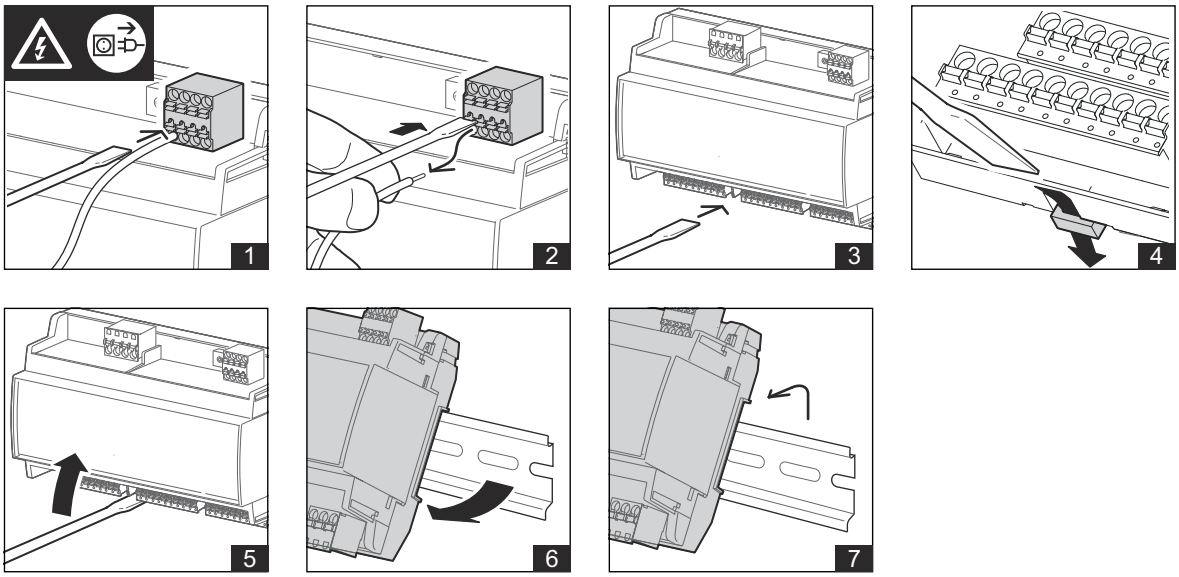
## Mounting

**WARNING**

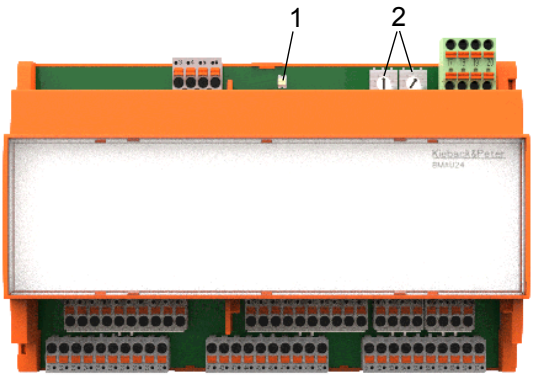
Contact with live parts of electrical domestic installation can cause death due to electric shock.
Mounting/removal may only be carried out when power is switched off.




## Removal



## Setting the CAN Bus Address



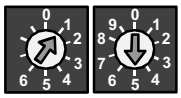

(1) Combination LED (green, red) for CAN Bus
(2) Address switches

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.




## Commissioning

**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.

- 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.

**NOTE**

The parameterization of the fallback values at the outputs and the PIN configuration is maintained in the event of a voltage failure.

Set address 99 to delete the parameterization.

**NOTE**

In the delivered condition, the address is set to "00," meaning:

- no bus communication
- no parameterization possible

## LED displays

### LED CAN

| 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 registered | Short circuit on the bus lines (against the ground or each other), Bus lines mixed up or interrupted |
| | Address 00 (manual operation effective, function test possible) | |
| Yellow flashing (green LED and red LED flashing concurrently) 1 s flashing period | Address error, no bus activity | Outside the address range #01..#63, address assigned multiple times |
| Green LED flashes and red LED off | Module OK, bus activity | |
| Red LED and green LED slowly flash in alternation 6 s flashing period | Update is being transferred from DDC4000e to module | |
| Red LED lights up continuously | Address 99 (deletion of the parameterization) | |