

BACnet MS/TP components – for automation in buildings, installations and systems



# I/O components with BACnet MS/TP -

### For automation in buildings, installations and systems

Safe and low-cost operation of infrastructures in large, but also in small, buildings nowadays requires that the most important operational functions such as system control, air-conditioning, ventilation and lighting are executed automatically. However, this also makes higher demands on the functions of the building installation, which can usually be met by conventional technology only with large expenditures. This is why building automation is increasingly using serial bus systems, which execute the transmission of information between sensors and actuators, switches and higher-ranking control systems.

### Bus systems, in particular BACnet MS/TP, offer different advantages:

- > easier planning and installation of the building functions
- > high flexibility in use of the building, as the functions are freely assignable and can thus be reset and readjusted as required at any time.



### Compact and intelligent I/O components for decentralized applications

Their compact design for the DIN rail (standard front dimension of 45 mm) and wide variety of types, also in the IP65 housing, make the I/O components from METZ CONNECT highly suitable for use in decentralized applications. The modules can be used where they are really needed. This considerably reduces the wiring effort for controls compared with a centralized installation in a switch cabinet. More-over, the compact mixing ratio of the METZ CONNECT I/O components adapted to the particular application optimizes the number of unused inputs and outputs.



## Minimum wiring required and series connection of the I/O components by means of jumper plugs

The power supply and the bus connection are established and passed on on the topside or front side of the I/O components. The use of jumper plugs allows up to 15 modules to be connected easily and quickly to one another and arranged in a row. A terminal block at the end allows transition to a continuing cable.

### Why BACnet?

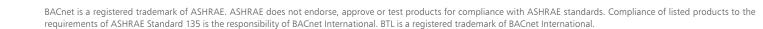
BACnet (Building Automation Control Network) is a neutral communication standard and has developed within a very short time to the world standard for building automation. BACnet has a key role in the equipment and control of efficient buildings and provides an integrated functional communication between building control systems, automation work stations, sensors and actors.

Thus the connection to the latest and most efficient technology in building automation is assured. Our modules support the master/slave and Token Passing (MS/TP) fieldbus communication wit B-ASC-Profile modules (Application Specific Controller) based on the RS485 data transmission interface.

### RS485 interface

The RS485 interface was developed for fast data transmission over long distances in the field, that means directly to sensors (such as our input modules) and actors (such as our output modules). Thus, it allows for cable lengths up to 1.2 km and data transmission rates of up to 500,000 Bit/s by so called twisted pair installation or field bus cables. This interface is more and more used in connection with the above mentioned communication protocol BACnet-MS/TP





A1 = C1 = 24V

BMT-DI10: 35 x 70 x 65 mm

BMT-DI4: 35 x 70 x 65 mm

BMT-DI4-IP: 159 x 41.5 x 120 mm

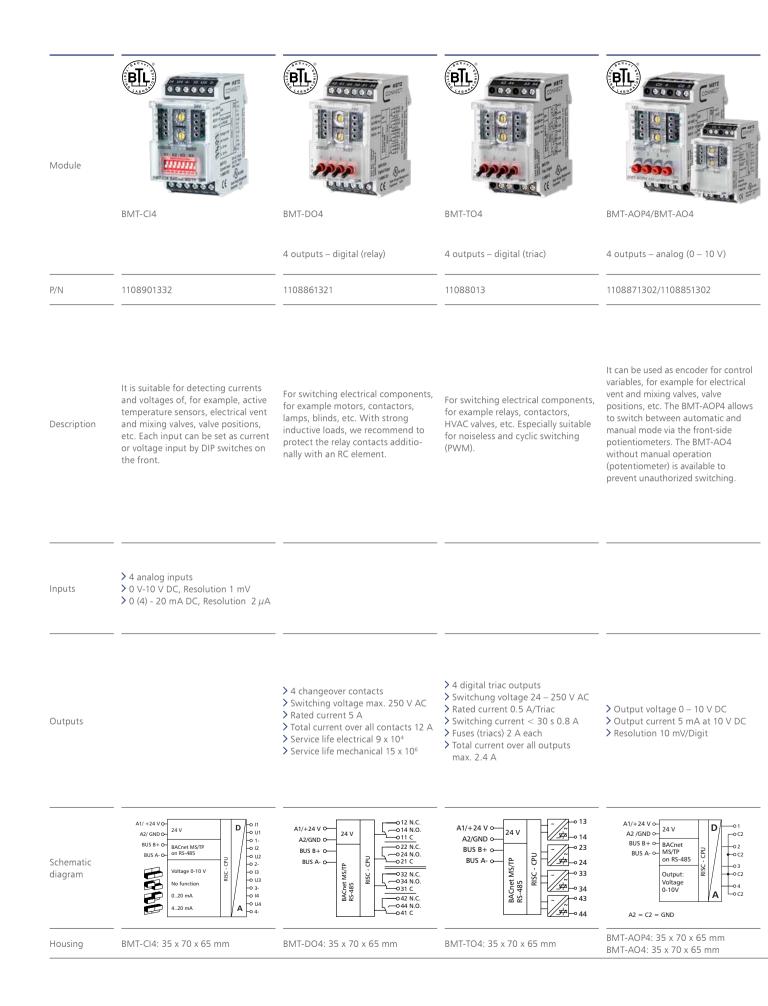
Housing

-0 S04+ o S04-

BMT-SI4: 35 x 70 x 65 mm

40 Ohm - 4 MOI

BMT-AI8: 50 x 70 x 65 mm





BMT-Multi-I/O

11 inputs – digital, 7 inputs – analog 8 outputs - digital, 2 outputs - analog 1 SO input

11089313

The BACnet module BMT-Multi I/O is a compact and rapidly to install solution to connect digital and analog signals from the actor and sensor level directly to a control unit in building automation via BACnet MS/TP protocol. 29 I/Os, some of them are configurable, are available for different tasks. The inputs and outputs can be controlled and scanned by standard objects via a BACnet Client. Module address and bit rate are set with two rotary switches on the front or by software. The relays K1 to K4 are equipped with a manual control and allow manual intervention. In this case it is necessary to protect the relay contacts by appropriate load-dependent measures. Suitable for decentralized mounting on DIN TH35 rail according to IEC 60715 in electrical distribution cabinets.

> 11 x digital optocouplers, galvanically isolated

> 6 x analog universal inputs 40 Ohm to 4 MOhm,

> 1 x S0 input

- 0 to 10 V DC > 1 x analog 0 to 20 mA

> 4 x relays changeover (SPDT)

> Switching voltage 250 V AC

> Buttons for manual operating

> 2 x analog 0 to 10 V DC

> Switching voltage 24 V AC/DC 100 mA

> Rated current 6 A

> 4 x PhotoMOS

light switches and room contacts and switching two light strips or as blind control. The control of 2 motorized fire dampers is also possible as are many other applications.

It is suitable for accommodating, for example in a room,

> 4 digital voltage inputs 30 V AC/DC > High signal detection > 7 V AC/DC

> Switch-on peak: 80 A/20 ms > Continuous current per relay BMT-DIO4/2: 16 A

> Total current of all contacts BMT-DIO4/2: 25 A

> Service life electrical: 1 x 10<sup>5</sup>

> A1/+24 V O A2/GND O-BUS B+ O-BUS A- c

BMT-DIO4/2: 50 x 70 x 65 mm BMT-DIO4/2-IP: 159 x 41 5 x 120 mm

A1 = C1 = 24 V

BMT-DIO4/2-IP 230 V

1108830526IP

The BACnet MS/TP module in IP65 housing with 4 digital inputs and 2 relay outputs with manual control was developed for decentralized switching tasks. It is suitable for accommodating, for example, light switches and window contacts in a room, switching two light strips or controlling louvers. It can also be used to control 2 motorized fire dampers. In this case it is necessary to protect the relay contacts by appropriate load-dependent measures. The inputs can be used as contact or voltage inputs. The inputs and outputs can be switched and scanned by means of standard objects via a BACnet client. Module address and bit rate are set with two rotary switches.

> 4 digital voltage inputs 30 V AC/DC

> High signal detection > 7 V AC/DC

> 2 changeover contacts

BMT-DIO4/2/BMT-DIO4/2-IP

2 outputs - digital (relay)

1108831326/1108831326IP

4 inputs – digital

- > Switching voltage 250 V AC
- BMT-DIO4/2-IP: 10 A
- BMT-DIO4/2-IP: 20 A
- mechanical: 30 x 106

> 2 digital outputs

> 2 changeover contacts

> Switching voltage max 250 V AC

> Rated current 8 A for relays (65 A for 20 ms)

N o-BUS A- O

Modbus F RS-485

BMT-Multi-I/O: 125 x 93 x 65 mm

BMT-DIO4/2-IP 230V: 159 x 41,5 x 120 mm



BMT-TP







BACnet IP / BACnet MS/TP Router

6 inputs - digital

2 outputs - digital (relay)

11088813

110561-01

NG4 (gray)

11080001

It is suitable for switching, for example, sun blind motors multi-level pumps, fans, burners or similar. With strong inductive loads, we recommend protecting the relay contacts additionally with an RC element. The inputs and outputs can be switched and scanned by means of standard objects via a BACnet client. The input terminals 1 to 6 are wired with the C2 terminals on two poles to potential-free switches or contacts. The module has a manual control for the outputs. The module address and the baud rate are set by means of two address switches on the front

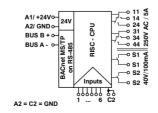
The power supply NG4 supplies regulated direct voltages for supplying power to the respective devices of the product range C|Logline. The device supplies regulated direct voltage 24 V DC at a power of 16 watts.

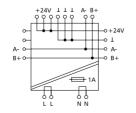
The BACnet IP/BACnet MS/TP Router provides stand-alone routing between BACnet networks such as BACnet/IP, BACnet Ethernet, and BACnet MS/TP – thereby allowing the system integrator to mix BACnet network technologies within a single BACnet internetwork. One 10/100 Mbps Ethernet port and an MS/TP port are used as communication interface to the respective BACnet networks. An integrated web server allows the configuration, status monitoring, and troubleshooting.

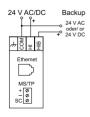
- > 6 digital voltage inputs 30 V AC/DC
- > High signal detection > 7 V AC/DC
- > Output contacts 2x NO contact (semiconductor), 2x two-stage (relays)
- > Semiconductor realys switching voltage 2x 40 V AC/DC Making/breaking current max. 500 mA Nominal current 100 mA
- Nominal > Relays

Switching current 2x 250 V AC
Nominal current 6 A (relays)
Service life mechanical 30 x 106 cycles
Service life electrical 9 x 10<sup>4</sup> cycles
Admissible switching frequency
6 / min. at nominal current

- > Nominal voltage 110 – 240 V AC, 50/60 Hz
- > Internal fuse T 1.0 A/250 V soldered fuse
- > Output power 16 W
- > Output voltage +24 V DC
- > Operating voltage display green LED
- > Output current (max.) 700 mA
- > As-delivered accuracy ±5 %
- > Mains failure backup 40 ms







BMT-TP: 50 x 70 x 65 mm

NG4 (gray): 50 x 70 x 65 mm

BACnet IP / BACnet MS/TP Router: 26 x 138 x 70 mm

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## Application matrix

### Application examples for I/O components

APPLICATION	FUNCTION	FUNCTION IS CARRIED OUT BY	APPROPRIATE DEVICE
Heating	Actuate heat registers	Relay, digital output	BMT-DO4
	Measure room temperatures	Analog input	BMT-AI8
	Actuate pumps (i.e. supply line)	Relay, digital output	BMT-DO4
	Actuate mixer motors	Analog output	BMT-AOP4, BMT-AO4
	Actuate motor valves (radiators)	TRIAC output, analog output	BMT-TO4, BMT-AOP4
	Actuate fan coils	Relay, digital output, TRIAC output	BMT-DO4, BMT-TO4
Air-conditioning	Actuate motor valves (radiators)	TRIAC output, analog output	BMT-TO4, BMT-AOP4
	Collect temperatures	Analog input	BMT-AI8
	Motor actuation of window flaps	Relay, digital output	BMT-DO4
	Collect wind speed data	Analog input	BMT-AI8
	Detect rain sensor	Analog or digital input (depending on sensor)	BMT-AI8, BMT-DI10
Aeration	Actuate fan motors	Relay, digital output	BMT-DO4
	Capture the position of aeration valves	Digital or analog output (depending on valve)	BMT-AI8, BMT-DI10
	Actuate aeration valves	Relay, digital or analog output	BMT-DO4, BMT-AOP4
	Measure and control volume flow rate	Analog input	BMT-AI8
	Capture air pressure on either side of pressure monitor	Analog input	BMT-AI8
	Measure CO <sub>2</sub> concentration in rooms (i.e. in large stores)	Analog input	BMT-AI8
	Harmful gas monitoring	Analog input	BMT-AI8

APPLICATION	FUNCTION	FUNCTION IS CARRIED OUT BY	APPROPRIATE DEVICE
Lighting and shading	Switch the light on or off	Relays, digital output	BMT-DO4, BMT-DIO4/2
	Collect switch states (i.e. light switches)	Digital input	BMT-DI10
	Up or down movement of sun blinds (three-point drive)	2 two-level relay outputs	ВМТ-ТР
	Brightness measurement	Analog input	BMT-AI8
	Collect wind speed (i.e. sun blind protection)	Analog input	BMT-AI8
	Actuation of motorized window curtains	2 two-level relay outputs	ВМТ-ТР
Fire alarm systems	Actuation of fire damper motors	Relay, digital output	BMT-DO4, BMT-DIO4/2
	Detect end positions of fire dampers	Digital inputs	BMT-DI10, BMT-DIO4/2
	Turn-on sprinkler system	Relays, digital output	BMT-DO4
Smoke extraction	Smoke extraction with flap drives	Relays, digital output	BMT-DO4
	Detect flap position	Digital or analog output	BMT-DI10, BMT-AI8
	Smoke extraction by fan actuation	Relays, digital output	BMT-DO4
	Unblock light barriers of elevators	Digital input	BMT-DI10, BMT-DI4
Burglary and access control	People counting	Digital input, counting input	BMT-SI4, BMT-DI10
	Motion detector	Digital input	BMT-DI10, BMT-DI4
	Monitor window contacts	Digital input	BMT-DI10, BMT-DI4
	Collect data of vibrabtion detectors (i.e. window panes)	Digital input	BMT-DI10, BMT-DI4
	Collect infrared sensor data	Digital input	BMT-DI10, BMT-DI4

APPLICATION	FUNCTION	FUNCTION IS CARRIED OUT BY	APPROPRIATE DEVICE
Burglary and access control	Collect radar sensor data	Digital input	BMT-DI10, BMT-DI4
	Alarm sensor	Relays, digital output	BMT-DO4
Energy management	Meter reading (water, gas, current, heat)	Digital input, counting input	BMT-SI4
	Load throw-off	Relays, digital output	BMT-DO4
	Motion sensor (turn the light off)	Digital input	BMT-DI10
	Collect temperatures	Analog input	BMT-AI8
	Allocate energy consumption to cost centers	Counting input	BMT-SI4
Room automation	Heating, air conditioning, ventilation, smoke extarction, fire detection, sequrity and access control, energy controlling, lightning and shading	Digital input	
		S0 input	BMT-Multi I/O, BMT-D110, BMT-D14, BMT-S14, BMT-D04, BMT-A18, BMT-AOP4, BMT-AO4, BMT-C14, BMT-TP, BMT-D104/2
		Analog input	
		Relays, Photo MOS, digital output	
		Analog output	

METZ CONNECT GmbH is member of the following organizations and associations.

























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