Modulating control actuators DM.1.1-MB Modbus / BACnet series

Technical detailes:

- Torque: 8 Nm, 16 Nm, 14 Nm, 32 Nm
- Damper size: 2 m^2, 4 m^2, 6 m^2, 8 m^2
- Power supply: 24 V AC/DC +/- 10 %
- Control 0-100% using: 0-10VDC, 2-10VDC, 0-20mA, 4-20mA signals or communication interface **BacNet MS -TP / Modbus - RTU**
- Selectable direction of rotation
- Life cycle: 60.000
- IP Protection: IP 54
- Maintenance free

1. Operation description of the device

Modulating control actuators DM-…-1./MB/… series are used to open and close air dampers in heating and air-conditioning systems. These actuators are used to control air dampers of different sizes. Control of actuators of this series is carried out either by current or voltage signal or by communication interface in BacNet MS-TP protocol (default communication speed 9600 bps). Actuators have a changing direction of rotation switch and operating mode switch.

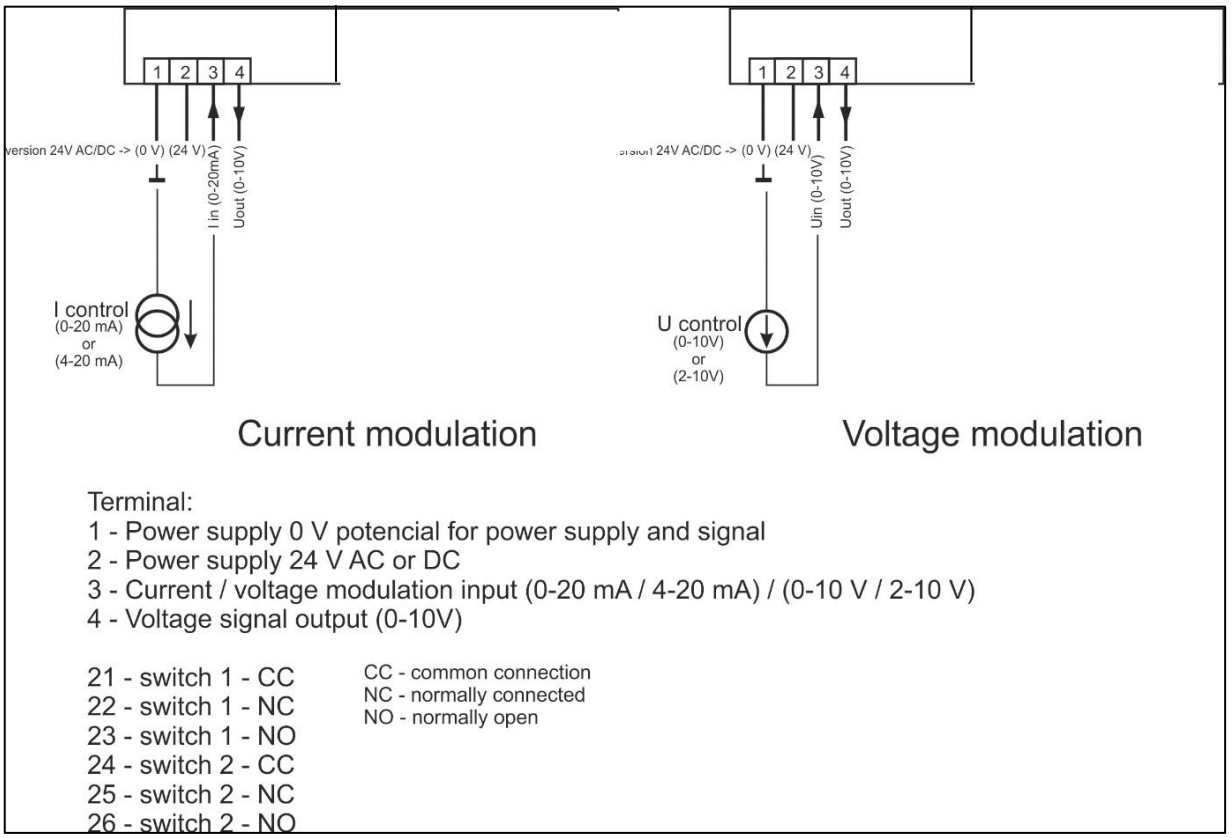
2. Types of actuators

Torque	Running Time Open/Close	Power supply	Model/Type
8 Nm	30 – 45 s	24 V AC or DC	**DMS1.1-MB**
16 Nm	60 - 80 s	24 V AC or DC	**DM1.1-MB**
24 Nm	120-160 s	24 V AC or DC	**DML1.1-MB**
32 Nm	140-160 s	24 V AC or DC	**DMG1.1-MB**

3. Technical detailes of actuators

	DMS1.1-MB	DM1.1-MB	DML1.1-MB	DMG1.1-MB
Torque	8 Nm	16 Nm	24 Nm	32 Nm
Air damper size	2 m^2	4 m^2	6 m^2	8 m^2
Power supply	24 V AC/DC +/- 10%	24 V AC/DC +/- 10%	24 V AC/DC +/- 10%	24 V AC/DC +/- 10%
Frequency	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz	50 – 60 Hz
Power consumption	5 VA	6 VA	7 VA	7 VA
Control signal	0(2)...10 V DC or 0(4)...20 mA	0(2)...10 V DC or 0(4)...20 mA	0(2)...10 V DC or 0(4)...20 mA	0(2)...10 V DC or 0(4)...20 mA
Control Input resistance	100kΩ/voltage 510Ω/current	100kΩ/voltage 510Ω/current	100kΩ/voltage 510Ω/current	100kΩ/voltage 510Ω/current
Feedback signal	0...10 V DC max. 10 mA	0...10 V DC max. 10 mA	0...10 V DC max. 10 mA	0...10 V DC max. 10 mA
Load capacity of auxiliary contact	2 A in AC1	2 A in AC1	2 A in AC1	2 A in AC1
Angle of rotation	90°	90°	90°	90°
Angle of limiting	Yes	Yes	Yes	Yes
Shaft dimensions	Φ10-20 mm □ 10-16 mm	Φ10-20 mm □ 10-16 mm	Φ10-20 mm □ 10-16 mm	Φ10-20 mm □ 10-16 mm
Weight	1300 g	1300 g	1300 g	1300 g
Life cycle	60.000 cycles	60.000 cycles	60.000 cycles	60.000 cycles
IP Protection	IP 54	IP 54	IP 54	IP 54
Operating	-20...50 °C	-20...50 °C	-20...50 °C	-20...50 °C
Storage temperature	-30...70 °C	-30...70 °C	-30...70 °C	-30...70 °C
Ambient humidity	5...95 % non-condensing	5...95 % non-condensing	5...95 % non-condensing	5...95 % non-condensing

4. Control methods 0-10V, 2-10V, 0-20mA ,4-20mA



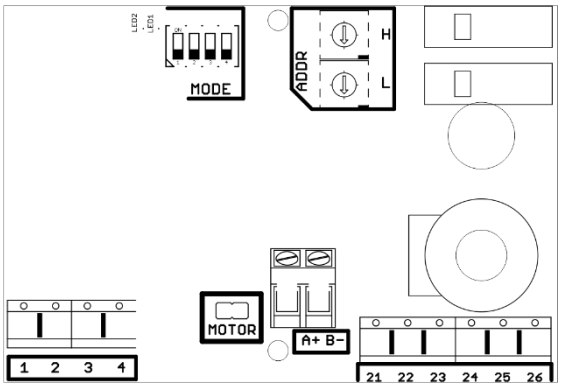
Terminal:
1 - Power supply 0 V potencial for power supply and signal
2 - Power supply 24 V AC or DC
3 - Current / voltage modulation input (0-20 mA / 4-20 mA) / (0-10 V / 2-10 V)
4 - Voltage signal output (0-10V)

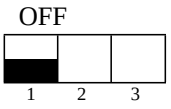
21 - switch 1 - CC
22 - switch 1 - NC
23 - switch 1 - NO
24 - switch 2 - CC
25 - switch 2 - NC
26 - switch 2 - NO

CC - common connection
NC - normally connected
NO - normally open

5. Operating mode - MODE

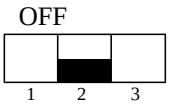
Switch



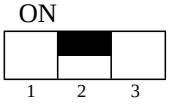


Control signal range (position 1)
0-10 V or 0-20 mA

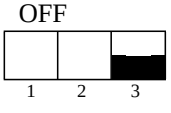
Control signal range (position 1)
2-10 V or 4-20 mA



Direction of rotation (position 2)
clockwise



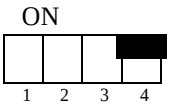
Direction of rotation (position 2)
counterclockwise



Control signal selection (position 3)
voltage signal

Control signal selection (position 3)
current signal

Communication mode (position 4) Modbus RTU



Communication mode (position 4) BACnet MS/TP

6. Digital communication BacNet MS-TP

Setting the address and the arrangement of terminals:

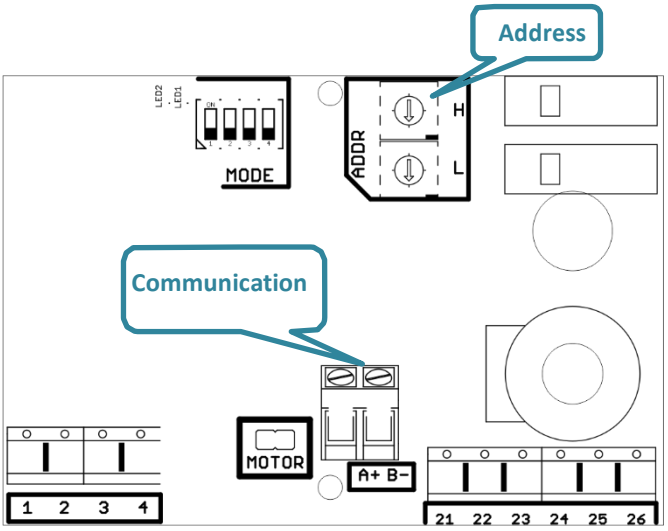
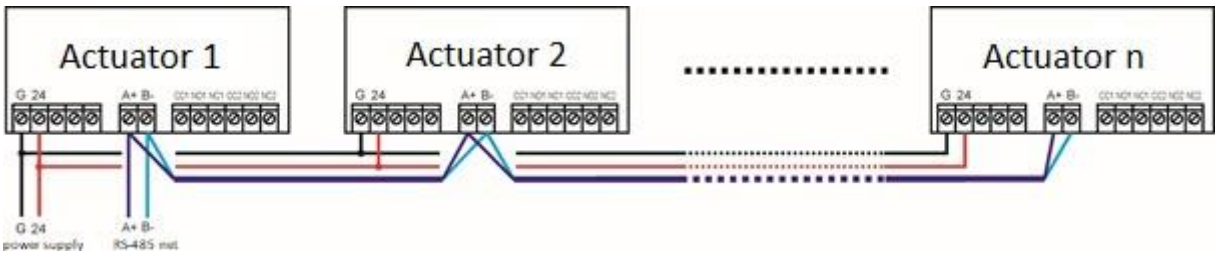


Diagram of actuators connection in the network:



BACnet Objects list:

BacNet Address	Default Name	Description	R/W
	Analog Input Objects		
0	Analog_Input	The state of analog control input. Present_Value can be overwritten with a value between 0 and 10. If there is no overwriting within 60 seconds, Present_Value will return to the value from the physical analog input. The object exists only for modulated actuators (analog controlled).	R/W

Analog Output Objects			
0	Analog_Output	The state of the analog output feedback. The object is only for modulated actuators (analog controlled)	R
Analog Value Objects			
0	Positison	Current position read from the potentiometer in range 0 - 100%.	R
1	WD_timeout	The timeout for activating the Watchdog function	R/W
Binary Value Objects			
0	Run	Information about the actuator's motor operation.	R
1	Ain_Range	Control range information (0-10V or 2-10V) read from jumpers	R
2	Reverse	Information about direction of rotation of the actuator read from jumpers	R
3	Blocked	Information if the actuator is in a locked state. He encountered resistance and stopped the motor. The resumption of operation will occur after 60 seconds or when the actuator is driven in the opposite direction.	R
4	Dew_point	Current dew point sensor state	R
Multi-state Value Objects			
0	Bus speed	Selecting the speed of the communication bus: 2.4 kbit, 4.8 kbit, **9.6 kbit (default)**, 14.4 kbit, 19.2 kbit, 28.8 kbit, 38.4 kbit, 57.6 kbit, 76.8 kbit, 115.2 kbit, 230.4 kbit, 250 kbit, 500 kbit	R/W
1	WD_mode	Operation mode for Watchdog function: *Set command* – the Watchdog is reset every time when present value of analog input is overriden *Com online* – the Watchdog is reset every time when any communication with device is performed	R/W
2	WD_action	Action to be taken after Watchdog activating: *Close* – close the valve *Open* – open the valve *Analog in* – the valve is control by the analog input signal *Nothing* – nothing happend	R/W
3	DP_config	Configure analog input as a dew point sensor input *Inactive* – the dew point sensor is inactive *Active Close* – dew point sensor treshold activate valve close *Active Open* – dew point sensor treshold activate valve open	R/W
4	DP_polarity	Polarization of the dew point signal *Normal 0* – when on analog input is high state the dew point sensor treshold is active *Normal 1* – when on analog input is low state the dew point sensor treshold is active	R/W

Device Object			
Settable	Instance Number	Information about device. Object properies: *OBJECT_IDENTIFIER, OBJECT_NAME, OBJECT_TYPE, SYSTEM_STATUS, VENDOR_NAME, PROP_VENDOR_IDENTIFIER, MODEL_NAME, FIRMWARE_REVISION, APPLICATION_SOFTWARE_VERSION, PROTOCOL_VERSION, PROTOCOL_REVISION, PROTOCOL_SERVICES_SUPPORTED, PROTOCOL_OBJECT_TYPES_SUPPORTED, OBJECT_LIST, MAX_APDU_LENGTH_ACCEPTED, SEGMENTATION_SUPPORTED, MAX_SEGMENTS_ACCEPTED, APDU_SEGMENT_TIMEOUT, APDU_TIMEOUT, NUMBER_OF_APDU_RETRIES, PROP_MAX_MASTER, MAX_INFO_FRAMES, DEVICE_ADDRESS_BINDING, DATABASE_REVISION*	R/W

Modbus Registers List:

Address	Name	Description	R/W
0x0000	Analog Input	The state of analog control input. Value can be overwritten with a value between 0 - 100 => 0 - 10V. If there is no overwriting within 60 seconds, the value will return to the value from the physical analog input.	R/W
0x0100	Analog Output	The state of the analog output feedback. 0 – 100 => 0 - 10V	R
0x0200	Position	Current position read from the potentiometer in range 0 - 100%	R
0x201	WD_timeout	The timeout for activating the Watchdog function	R/W
0x0500	Run	Information about the actuator's motor operation. 0-1	R
0x0501	Ain Range	Control range information (0-10V or 2-10V) read from jumpers. 0-1	R
0x0502	Reverse	Information about direction of rotation of the actuator read from jumpers. 0-1	R
0x0503	Blocked	Information if the actuator is in a locked state. He encountered resistance and stopped the motor. The resumption of operation will occur after 60 seconds or when the actuator is driven in the opposite direction. 0-1	R
0x0600	Bus speed	Selecting the speed of the communication bus in Modbus RTU mode: *0 - 2.4 kbit, 1 - 4.8 kbit, 2 - 9.6 kbit (default), 3 - 14.4 kbit, 4 - 19.2 kbit, 5 - 28.8 kbit, 6 - 38.4 kbit, 7 - 57.6 kbit, 8 - 76.8 kbit, 9 - 115.2 kbit, 10 - 230.4 kbit, 11 - 250 kbit, 12 - 500 kbit*	R/W
0x0601	WD_mode	Operation mode for Watchdog function: *0* – the Watchdog is reset every time when present value of	

		analog input is overriden *1* – the Watchdog is reset every time when any communication with device is performed	
0x0602	WD_action	Action to be taken after Watchdog activating: *0* – close the valve *1* – open the valve *2* – the valve is control by the analog input signal *3* – nothing happend	
0x0603	DP_config	Configure analog input as a dew point sensor input *0* – the dew point sensor is inactive *1* – dew point sensor treshold activate valve close *2* – dew point sensor treshold activate valve open	
0x0604	DP_polarity	Polarization of the dew point signal *0* – when on analog input is high state the dew point sensor treshold is active *1* – when on analog input is low state the dew point sensor treshold is active	

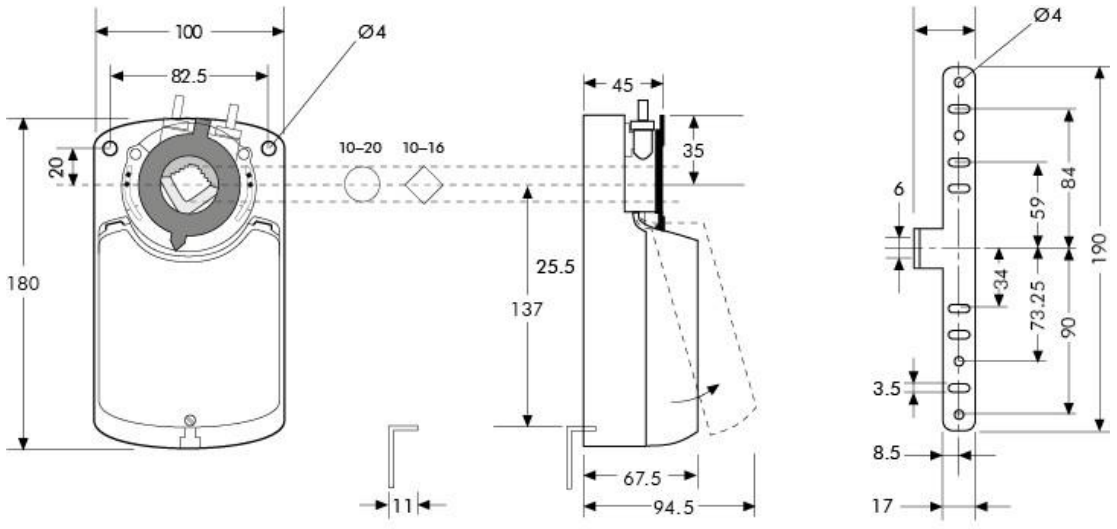
7. Watchdog

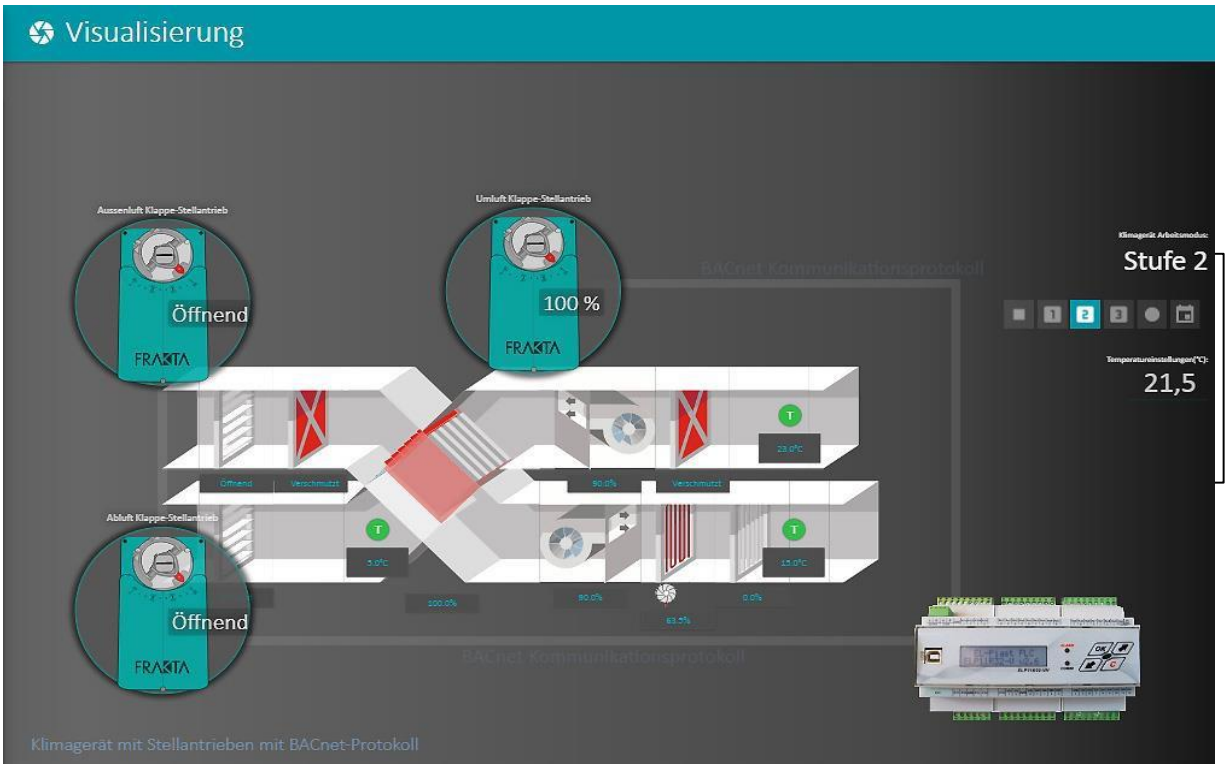
The device has been equipped with a Watchdog function. If there is no change in the control value within 60 seconds, the actuator switches to the closing mode.

8. Restoring default settings

To restore the default settings, turn the power off, set the DEC 15 address and turn the power on.

9. Dimensions





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