Macon ZMC - DDC

The Macon Model ZMC-DDC Proportional is a thermoelectric actuator for the discrete control of heating and cooling systems in direct proportion to the applied control voltage. The control of the actuators is performed by a 0-10 V DC signal via a central DDC system or by a room thermostat. Principal area of application is the building management systems range.

1) Features

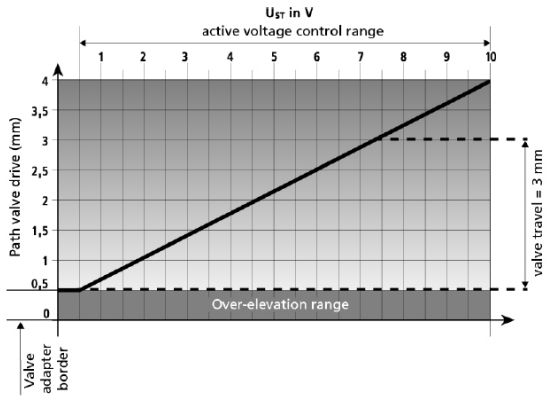
- Simple plug-in installation
- Travel path variants 4.0 mm / 5.0 mm (further variants on request)
- “normally closed” (NC)
- Power consumption of only 1 watt
- Control by a 0-10 V DC signal
- 360° installation position
- Short response times, resulting in improved control response
- Closing point verification and possible adaptation during operation
- All-round function display
- Complete compatibility to the valve adapter system
- Noiseless and maintenance-free
- High functional safety and long expected service life
- Patented 100% protection in case of leaky valves
- “First open” function
- Adaptation check on the valve
- Plug-in connecting cable
- Alignment aid on the valve
- Compact size, small dimensions

2) Function

The actuator mechanism of the Macon ZMC-DDC uses a PTC resistor-heated elastic element and a compression spring. The elastic element is heated by applying the operating voltage and moves the integrated plunger. The force generated by this movement is transferred to the plunger, thus opening or closing the valve.

2.1 Version NC: Normally Closed (valve closed)

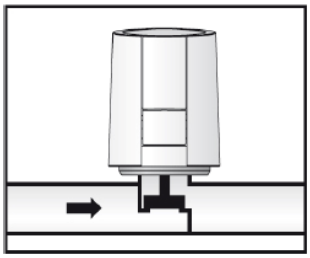
After switching on the operating voltage, the first-open function is unlocked. Directly after that, the actuator automatically detects the valve closing point and switches to regular operation. This process guarantees an optimum adaptation of the actuator to the valve. If a control voltage is applied after the closing point detection, the actuator opens the valve evenly with the plunger movement after the dead time has elapsed. An internal wear-free position detection controls the temperature required for the maximum stroke (minus over-elevation) and consequently the energy intake of the elastic element. No excess energy is stored inside the elastic element. If the control voltage is reduced, the electronic control system immediately adapts the heat input to the elastic element. In the range of 0 – 0.5 V (depending on the model) the actuator remains in a quiescent state in order to ignore ripple voltage occurring in long cables (rpm). The closing force of the compression spring is matched to the closing force of commercially available valves and keeps the valve closed when de-energized.

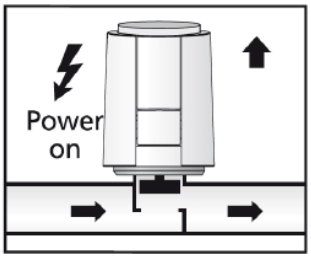


If a 4 mm actuator without valve path recognition is used or valves with an actuator travel of 3 mm, the actuator ravels without load for control voltages from 7.5 V to 10 V.

2.2 Function Display

The function display (all-round display) of the Macon ZMC - DDC shows at first glance whether the valve is open or closed; this can be also felt in the dark.





- In case of the NC version, an extended function display shows opening of the valve.

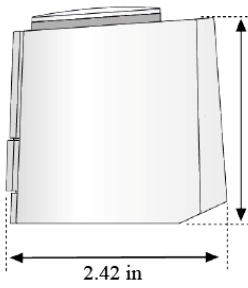
2.3 "First Open" function (for NC only)

In its delivery condition, the Macon ZMC-DDC is normally open due to the "First Open" function. This enables heating operation during the construction phase even when the electric wiring of the single room control is not yet complete. When commissioning the system at a later date, the "First Open" function is automatically unlocked by applying the operating voltage (for more than 6 minutes) and the actuator is fully operable.

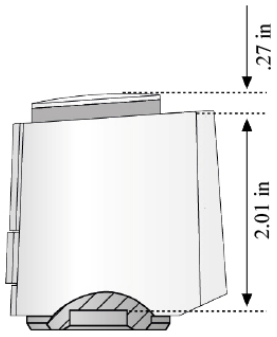
3) Technical Data

Voltage (according to variant)	24 V AC, -10% … +20-%, 50-60 Hz 24 V AC, -20% … + 20%,	
Control voltage range	0 V … 10 V (reverse polarity protected)	
Max. inrush current	< 300 mA during max. 2 min.	
Operating power	1 W [1)]	
Resistance of control voltage input	100 kΩ	
Stroke (actuator travel)	4.0 / 5.0 mm (minus 0.5 mm over-elevation)	
Actuating force	100 N ± 5%	
Fluid temperature	32° F - 212° F [2)]	
Storage temperature	-130° F - 149° F	
Ambient temperature	32° F - 140° F	
Degree / class of protection	IP 54 [3)] / III	
CE conformity according to	EN 60730	
Housing material / color	Polyamide / white	1) measured with precision reference meter LMG95
Connection line / color	3 x 0.22 mm² PVC / white	
Cable length	3' 3"	2) depending on the adapter even higher
Weight with connecting cable (1 m)	approx. 3.9 oz	
Surge protection according to EN 60730-1	min. 1 kV	3) in all installation positions

3.1 Dimensions



Dimensions

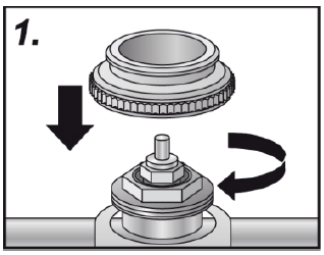


Installation height

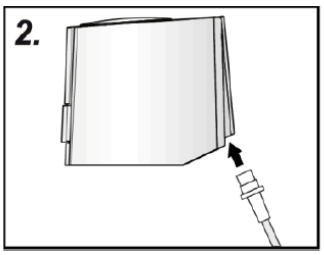
4) Installation notes

4.1 Installation with valve adapter

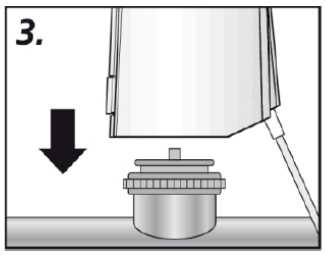
The valve adapter assortment guarantees a perfect match of the valve drive to almost any valve bottom and heating circuit distributor available on the market. Simply snap-on the Macon ZMC-ES to the manually pre-installed valve adapter.



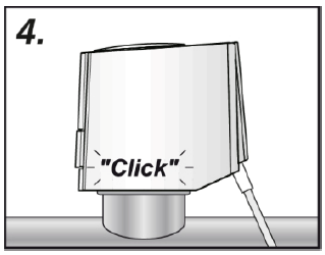
Screw the adaptor manually onto the valve.



Connect the line to the actuator.

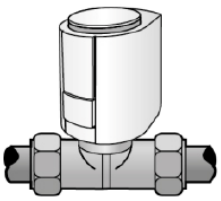


Place the Macon ZMC-DDC manually in vertical position to the valve adaptor.

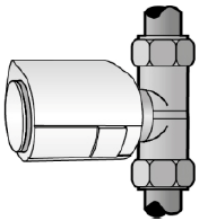


The Macon ZMC-ES snaps onto the valve adaptor with a “click” when pressed down vertically by hand.

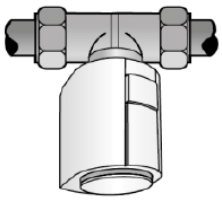
4.2 Installation position



vertical



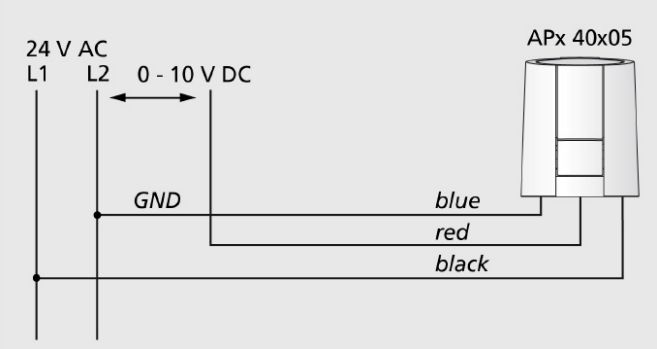
horizontal



overhead

The Macon ZMC-DDC must be installed preferably in vertical or horizontal installation position. For overhead” installation special circumstances (e. g. drainwater) can reduce the lifetime of the actuator.

4.3 Electrical connection



Calculation of maximum cable length (copper cable) for 24 V rated voltage

L = C x A / n
L Cable length in m
K Constant (269 m/mm²)
A Conductor cross-section in mm²
n Number of Alpha-Actuators

We recommend the following cables for installing a 24 V system:

Telephone wire: J-Y(ST)Y	0.8 mm²	
Light plastic-sheathed cable:	NYM	1.5 mm²
Flat webbed building wire:	NYIF	1.5 mm²

Transformer:
A safety isolating transformer according to EN 61558-2-6 (Europe) must always be used. Transformer dimensioning results from the making capacity of the Macon ZMC-DDC.

Rule-of-thumb formula:
$P_{Transformer}$ = 6 W x n
n = Number of Actuators

5) Accessories

- Protection Cap AA SK 1004

Protection against theft and vandalism available for valve drives with a stroke of 4mm or 5mm.