Data sheet

Gear actuators

AME 435 QM

Description

AME 435 QM actuator for modulating control is used with pressure independent balancing and control valve type AB-QM from DN 40 to DN 100.

Features & Benefits

- it automatically adapts its stroke to the valve end positions which reduces commissioning time
- valve flow adjustment feature; flow can be variably-adjusted from linear to logarithmic or opposite.
- the advanced design incorporates load related 'switch-off' to ensure that actuators and valves are not exposed to overload

Ordering

Product code numbers

Type	Supply voltage [V] AC/DC	Code number
AME 435 QM	24	082H0171

Accessories code numbers

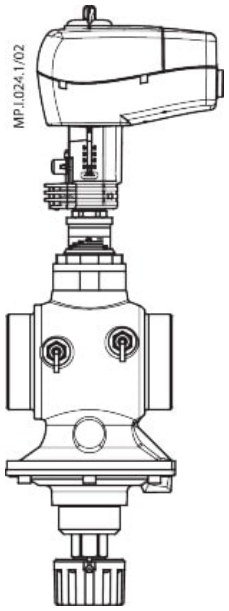
Adapter

Type	for valve's DN	for Actuator	Code No.
AB-QM adapter (1st generation)	40-100	AME 435 QM	**065Z0313**

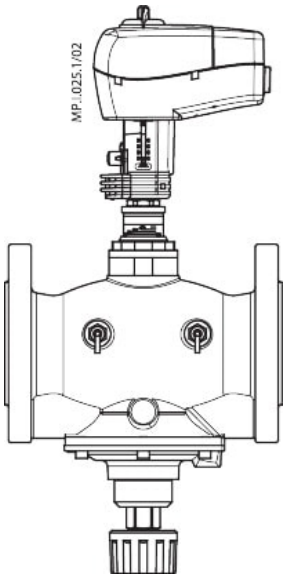
Overview

Product portfolio

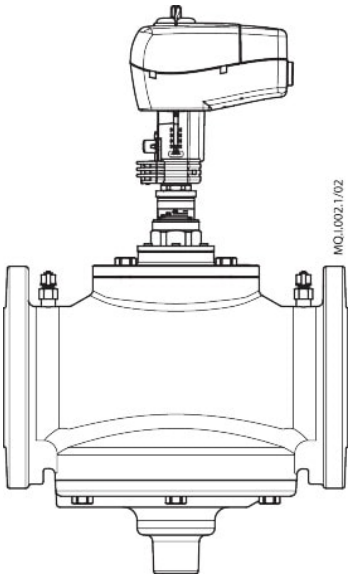
Actuator - valve combinations



AME 435 QM +
AB-QM (DN 40/50)



AME 435 QM +
AB-QM (DN 50)



AME 435 QM +
AB-QM (DN 65-100)

Functions

Operation

Commissioning

Complete the mechanical and electrical installation, set DIP-switches, then perform the necessary checks and tests:

- Apply power
  Note that the actuator will now perform automatic Calibrating function
- Apply the appropriate control signal and check:
  - SW7 setting
  - the actuator drives the valve over the entire stroke length

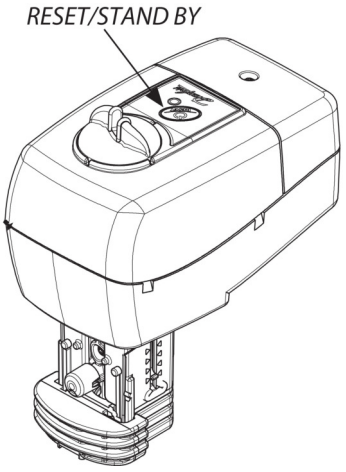
The unit is now fully commissioned.

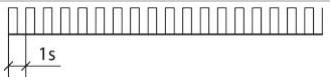
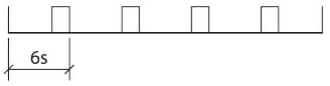
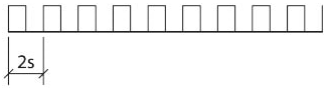
Automatic Calibrating feature
The actuator automatically adapts its stroke to the valve end positions :

- when power is applied for the first time or
- afterwards by pressing the STAND BY/RESET button 6-9 seconds (LED blinks green twice)

Testing entire valve stroke length
The actuator can be driven to the fully-open or closed positions by connecting SN to terminals 1 or 3.

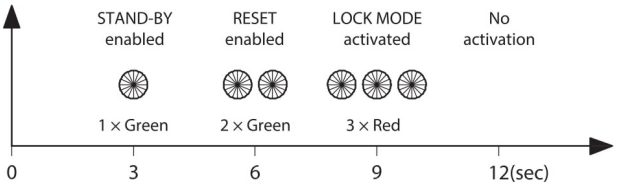
Led signalling/ Actuator operating modes



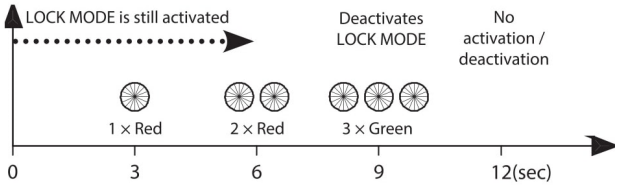
Flashing green LED: Calibrating mode (period is every second)	
Constant green LED: Positioning mode	
Flashing green LED: Normal mode (period is every 6 seconds)	
Flashing red LED: STAND BY mode (period is every two seconds)	
Constant red LED: ERROR MODE	

STAND-BY, RESET and LOCK MODE on actuator AME 435 QM

Starting from NORMAL MODE



Starting from LOCK MODE



LED function indicator
The bi-colour (green/red) LED function indicator is located on the actuator cover. It indicates the operating modes.

External button
Actuator has external RESET-button which is located next to LED indicator. By pressing on this button in different ways different operating modes are initiated:

• CALIBRATION MODE
Pressing the RESET-button for 6-9 sec. and releasing it after 2× green LED blinks causes the actuator to start the calibration: The bi-colour LED flashes green at 1 sec. intervals during calibration procedure, which begins by extracting the stem. When the maximum force is detected (at the end valve position), the actuator then retracts the stem, until the maximum force is once again detected (on the other valve end position). The actuator will then enter to normal mode and respond to the control signal.

• NORMAL MODE
When the positioning of the actuator is finished the LED flashes green every 6 seconds.

• STAND BY MODE
Pressing the RESET-button for 3-6 sec. and releasing it after 1× green LED blink causes the actuator to activate STAND-BY MODE. The actuator keeps its last position in this mode and does not react to any control signal. This mode can be used for manual operation during the commissioning of other equipment, or for service purposes.
The bi-colour LED flashes red at 2 sec. intervals.
After pressing the STAND-BY/RESET-button again actuator switches to normal mode.

• LOCK MODE
Pressing the RESET-button for 9-12 sec. and releasing it after 3× red LED blinks causes the actuator to activate LOCK MODE. The actuator can not be brought to STAND-BY MODE or CALIBRATION MODE until it was switched back again to NORMAL MODE by pressing the button as mentioned before (releasing the button now after 3× green LED blinks). During LOCK MODE, the actuator works just as described in NORMAL or POSITIONING MODE, but with partly locked button-functions (shown with 1× or 2× red LED blinks).

• REMARK
Pressing the RESET-button for more than 12 sec., no activation/deactivation occurs.

Manual override

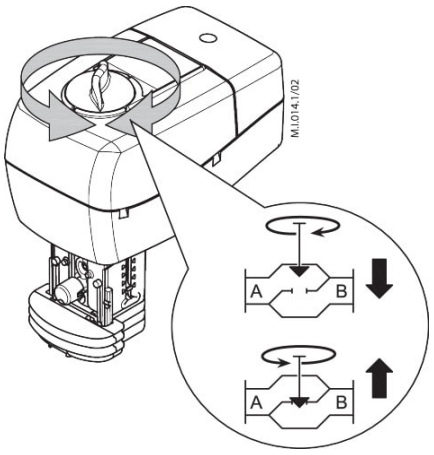
Manual override is done by means of control knob on actuator housing:

- Disconnect power supply or press STAND BY/ RESET button
- Adjust valve position using the control knob (observe the rotation direction)

When manual override is not needed:

- Restore power supply or press STAND BY/ RESET button again

Remark:
When the manual override has been used, the output signal (X) is not correct until the actuator reaches its end position.



Settings
DIP switch settings

DIP switches

• **SW 1:** U/I - Input signal type selector
- OFF position; voltage input is selected
- ON position; current input is selected

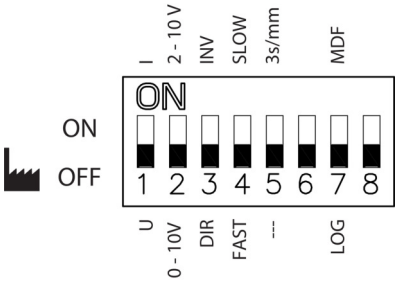
• **SW 2:** Input signal range selector
- OFF position; the input signal is in the range from 0-10 V (voltage input) or from 0-20 mA (current input)
- ON position; the input signal is in the range from 2-10 V (voltage input) or from 4-20 mA (current input)

• **SW 3:** Direct or inverse acting selector
- OFF position; the actuator is in direct acting mode (stem extracts as voltage increases)
- ON position; the actuator is in inverse acting mode (stem retracts as voltage increases)

• **SW 4:** Fast/Slow - Speed selector
- OFF position; the actuating speed is 7,5 s/mm
- ON position; the actuating speed is 15 s/mm

• **SW 5:** ---/ 3s/mm - Normal or Very high speed selector
If set to OFF position, the actuator is working in "normal" selected speed (7,5 or 15 s/mm).
If set to ON position, the actuator is working in very high actuating speed 3 s/mm.

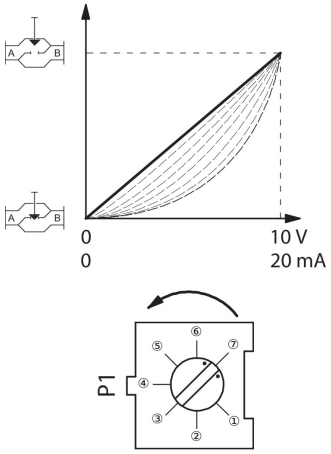
• **SW 6:** Not used

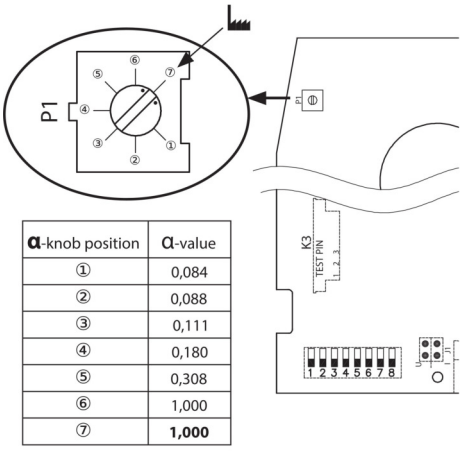


• **SW 7:** LOG/MDF - Logarithmic or modified flow through valve selector
- OFF position; ..... LOG (α=0.2, factory setting)
- ON position; .....MDF (initial setting: α=1, linear)

Explanation:
If SW 7 is in OFF position, alpha knob is not activated. Turning alpha knob will not influence α value (α=0.2).
If SW 7 is in ON position, α value can be manipulated using alpha knob. MDF initial setting of alpha knob is 1, which means linear setting. Regarding alpha knob setting see explanation below.

• **SW 8:** Not used





α-knob position	α-value
①	0,084
②	0,088
③	0,111
④	0,180
⑤	0,308
⑥	1,000
⑦	**1,000**

Alpha knob found on PCB in MDF initial setting (linear, α=1)

Equal-percentage valve-flow adjustment (SW 7 in position ON)

The actuator has a special valve-flow adjustment feature called alpha value. Actuator characteristics can be, by turning the alpha knob counter clockwise (CCW), variably-adjusted from α=1 (linear) to α=0.1.

In order to have optimal control, linear characteristics of system (valve, actuator, HEX) is required. This can be assured using the right α value. Appropriate α value depends on temperatures of heating/cooling medium and controlled temperature of heated/cooled medium. Calculate α value according to the Tech Note number VNHUA102 (Setting the right α value).

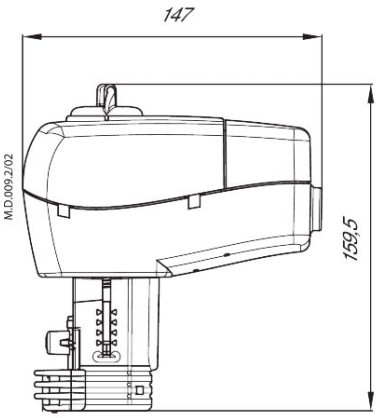
Product details

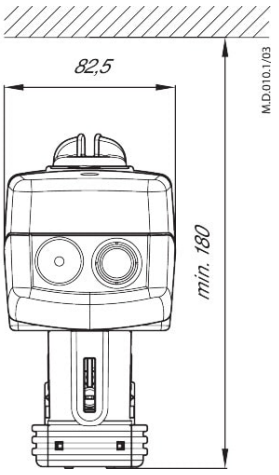
General data

Technical data

Power supply		V	24 AC/DC; ±10%
Power consumption	running	VA	4.5
	standby		1.2
Frequency		Hz	50/60
Control input Y		V	0-10 (2-10); Ri = 95 kΩ
		mA	0-20 (4-20); Ri = 500 Ω
Output signal X		V	0-10 (2-10); RL = 650 Ω (maximal load)
Closing force		N	400
Max. stroke		mm	20
Speed		s/mm	3 or 7.5 or 15
Max. medium temperature		°C	120
Ambient temperature			0 … 55
Storage and transport temperature			–40 … 70
Ambient temperature			95% rh., non-condensing
Protection class			II
Grade of enclosure			IP 54
Weight		kg	0.45
CE - marking in accordance with standards			Low Voltage Directive (LVD) 2014/35/EU: EN 60730-1, EN 60730-2-14 Electromagnetic Compatibility Directive (EMC) 2014/30/EU: EN 61000-6-2, EN 61000-6-3

Dimensions & weights





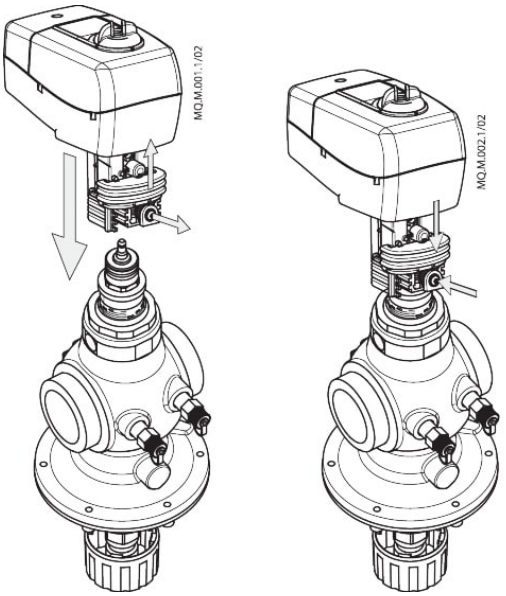
Installation

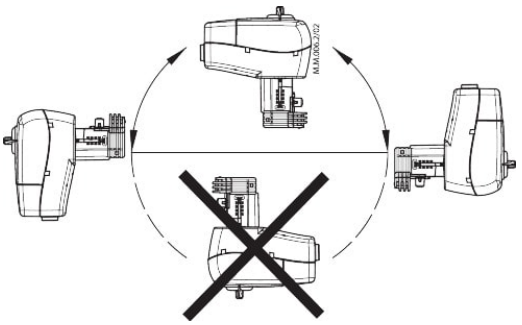
Mechanical

No tool is required to mount actuator on the valve. Installation of the valve with the actuator is allowed in horizontal position or upwards.
Installation downwards is not allowed.

The actuator must not be installed in an explosive atmosphere, at ambient temperature
lower than 0 °C or at ambient temperature higher than 55 °C. It must not be subject to steam jets, water jets or dripping liquid as well.

Note:
The actuator may be rotated up to 360° with respect to the valve stem by loosening the retaining fixture. Once the actuator is placed, retighten the fixture.





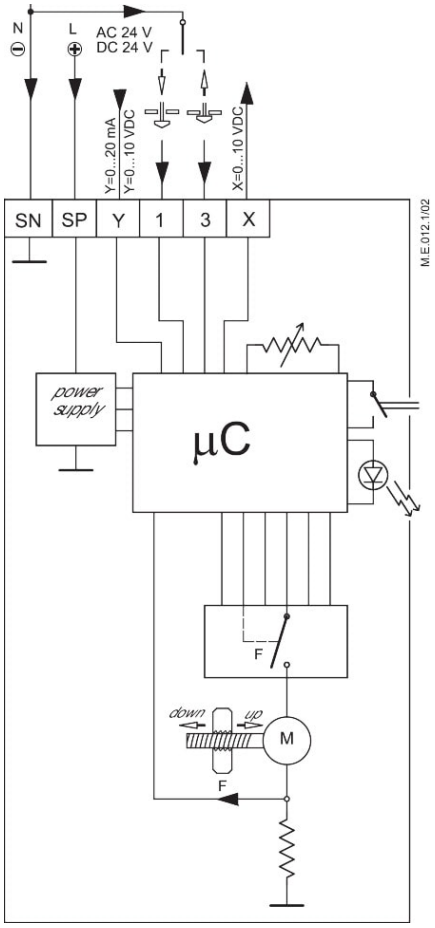
Electrical

Electrical connections can be accessed by removing the actuator cover. Two cable gland entries without thread (Ø16 and combined Ø16/Ø20) are prepared for cable glands. From factory one entry is provided by rubber cable gland and the other entry is prepared for opening.

Note:
Cable and cable gland used must not compromise the actuator's IP rating, and must ensure the connectors are fully strain relieved. Rubber cable gland delivered from factory does not compromise IP rating but it does not provide fully strain relieve according to LVD directive.
Please observe local rules and regulations as well.

Wiring

24 VAC/DC only



SP	24 VAC/DC	Power supply
SN	0 V	Common
Y	0-10 V (2-10 V)	Input signal
	0-20 mA (4-20 mA)	
X	0-10 V	Output signal
	(2-10 V)	
1, 3	Override input signal	

The actuator can be driven to the fully-closed position by connecting SN to terminal 1 or fully open by connecting SN to terminal 3.
E.g. terminal 3 can be connected to a thermostat to prevent freezing and terminal 1 can be connected to the thermostat to prevent overheating.

Wiring length	Recommended cross- sectional area of the wiring
0-50 m	0.75 mm^2
> 50 m	1.5 mm^2

Important: AME 435QM can be used only for modulating control. For 3-point control use AMV 435 (082H0162/163). It is recommended to use modulating control with AB-QM.

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
EU Declaration	Danfoss EU 221011EN0815101.03	Danfoss	LVD
Export Control Declaration	Gear and Thermal actuators	Danfoss	

Contact details

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