

Data sheet

Actuators for modulating control

AME 655 – without safety function

AME 658 SU, AME 658 SD – with safety function (spring up/down)

AME 659 SD – with EN certified safety function (spring down)

Description



Actuators are primarily designed to regulate valve in the respond to the demand of a controller in District Heating/cooling, Heating, Ventilating and Air conditioning systems.

Actuators AME 655, 658 and 659 can be controlled by electronic controllers with modulating or 3-point control output.

Please check power supply and power consumption prior connection!

Actuators can be used in combination with:

- Valve types VFM, VFS (DN 65-100), VFG(S), VFU, VF (DN 100-150) and VL (DN 100).
- Self-acting flow controller AHQM (DN 125-150), AFQM 6 and AFQM PN 25.

Features:

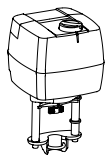
- Manual operation either mechanical and/or electrical
- Position indication
- LED signalling
- Selectable speed
- Inverse function
- Automatic adaptation of stroke to valve's end positions that reduces commissioning time (self stroking)
- Integrated external switch
- Characteristic optimization
- Stroke limitation
- Pulse or continuous output signal (4, 5)
- Voltage or current input signal Y
- Voltage or current output signal X
- External reset button
- Auto detection of Y signal
- 3-point or modulating control selection
- X and Y galvanic insulation
- Thermal and overload protection
- Precise regulation and fast response on 3-point signal (0,04s)

Main data:

- Nominal voltage (AC or DC):
 - 24 V, 50 Hz/60 Hz
 - 230 V, 50 Hz/60 Hz
- Control input signal: modulating or 3-point
- Force: 2000 N
- Stroke: 50 mm
- Speed (selectable): 3 (4) or 6 s/mm
- Max. medium temperature: 200 °C

Ordering

Actuators

Picture	Type	Power supply (V)	Code No.
	AME 655	24	082G3442
		230	082G3443
	AME 658 SU	24	082G3450*
		230	082G3451*
	AME 658 SD	24	082G3448
		230	082G3449
	AME 659 SD	24	082G3454*
		230	082G3455*

* Not available yet


Accessories - Stem heater

Type	DN	Code No.
Stem heater for VFM valves	65-125	065Z7020
	150-250	065Z7022

Accessories - Adapter

Type	Code No.
Adapter 1 VFG(S), VFU	065B3525
Adapter 2 VFG(S), VFU	065B3526
Adapter 3 VFG(S), AFQM 6, AFQM PN 25	065B3527

Technical data

Actuator type		AME 655	AME 658 SD	AME 658 SU	AME 659 SD
Power supply	V	24 or 230; +10 ... -15 %; AC or DC			
Power consumption	VA	14,4 (24 V) 16,1 (230 V)	19,2 (24 V) 35,7 (230 V)	19,2 (24 V) 35,7 (230 V)	19,2 (24 V) 35,7 (230 V)
Frequency	Hz	50/60			
Control input Y	V	0-10 (2-10) [Ri = 40 kΩ]			
	mA	0-20 (4-20) [Ri = 500 Ω]			
		3-point (wiring auto-detection)			
Control output X	V	0-10 (2-10) [Ri = 10 kΩ]			
	mA	0-20 (4-20) [Ri = 510 Ω]			
Closing force	N	2000	2000	2000	*N/A
Max. stroke	mm	50			
Speed (selectable)	s/mm	3 or 6	4 or 6	4 or 6	*N/A
Max. medium temperature	°C	200 (350 with extension piece for VFGS)			
Ambient temperature		0 ... + 55			
Storage and transport temperature		-40 ... +70 (storing for 3 days)			
Humidity		5-95%			
Protection class		II			
Grade of enclosure		IP 54			
Weight	kg	5,3	8,6	8,6	8,6
Safety function		-	Yes	Yes	Yes (EN)
Spring return runtime	s	-	120	120	120
Manual operation		Electrical and mechanical	Electrical and mechanical	Electrical and mechanical	Electrical
Power failure response		Stem remains in last position	Safety return function extracts the stem	Safety return function retracts the stem	Safety return function extracts the stem
 - marking in accordance with the standards		Low Voltage Directive 2006/95/EEC EMC Directive 2004/108/EEC			Low Voltage Directive 2006/95/EEC EMC Directive 2004/108/EEC Safety function according to EN 14597

* Data not available yet

Disposal

The actuator must be dismantled and the elements sorted into various material groups before disposal.

Before disassembly please contact Danfoss support for disassembly instructions.

Commissioning

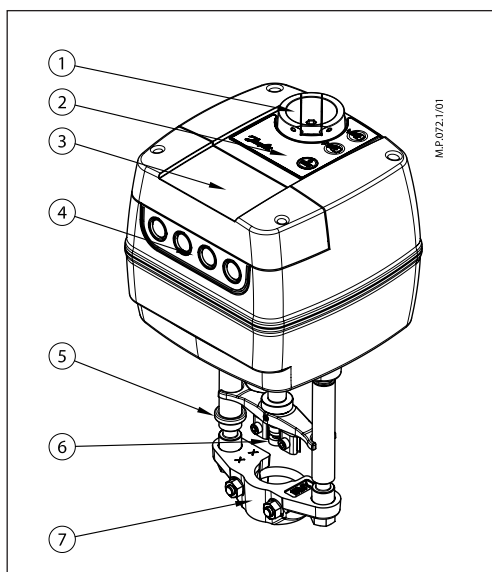
Complete the mechanical and electrical installation (see instructions) and perform the necessary checks and tests:

- Turn on the power
- Set the appropriate control signal and check that the valve stem direction is correct for the application.

The unit is now fully commissioned.

Design

1. Manual operation knob
2. Function buttons
3. Service cover
4. Removable gland support
5. Position indication ring
6. Stem connector
7. Valve connector



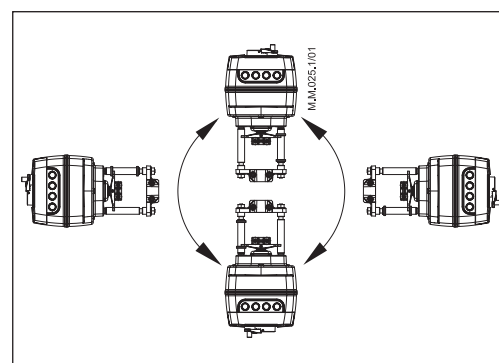
Installation

Mechanical

Please check what are allowed installation positions for the valve in combination. The actuator can be installed in all positions. Use M8/SW13 key (not supplied) to fit the actuator to the valve body. Allow for necessary clearance for maintenance purposes. To link valve and actuator stems use a 4mm Allen key (not supplied). The actuator has position indication rings which should be pushed together before el. connection; after self-stroking they indicate end positions of the stroke.

Electrical

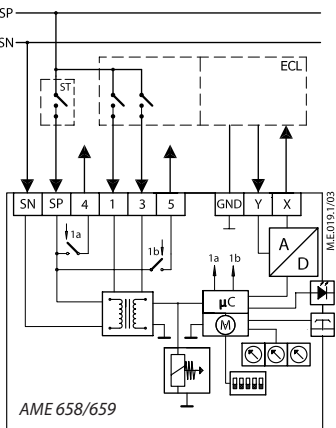
Electrical connections can be accessed by removing the service cover. Four cable entries on removable gland support are provided for M 16x1,5 or M 20x1,5 cable glands. Note that in order to maintain the enclosure IP rating, appropriate cable glands must be used.



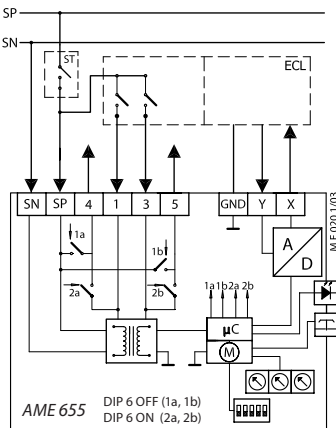
Wiring



Do not touch anything on the PCB!
Do not remove the service cover
before the power supply is fully
switched off.
**Max. allowed current output on
terminals 4 and 5 is 4 A.**



AME 658/659



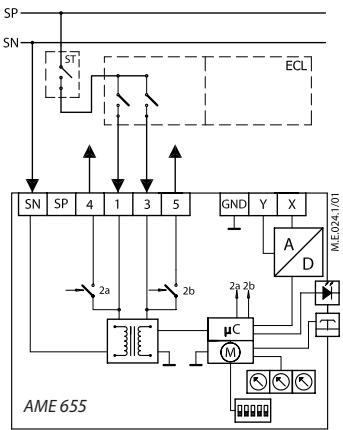
AME 655

DIP 6 OFF (1a, 1b)
DIP 6 ON (2a, 2b)



SN	0 V	Neutral
SP	24, 230 V AC/DC	Power supply
4, 5	SP(AC)	SP output
1		Input
3		
GND	0 V	Neutral
Y	0(2)-10 V 0(4)-20 mA	Input
X	0(2)-10 V 0(4)-20 mA	Output

Optional: AME 655 connected as 3-point version



AME 655



SN	0 V	Neutral
1, 3	24, 230 V AC/DC	Power supply
4, 5	SP(AC)	SP output
1		Input
3		

Recommended cross-sectional area of the wiring is 1.5 mm²

LED signalling / actuator operating modes

LED operating mode indicator

The three-colour (green/yellow/red) LED function indicators are located on the actuator cover. They indicate different operating modes.

RESET button

Actuators AME 655/658/659 have external RESET button which is located on top cover of the actuator next to LED indicators. With this button you can enter or exit Stand-By mode (press once) or Self stroking mode (press and hold for 5 seconds). See next paragraph for mode details.

Operating modes

• Self stroking mode

Self stroking mode starts automatically the first time when power supply is applied to the actuator. To start self stroking procedure **press and hold RESET button for 5 seconds** until the green light starts flashing. End positions of the valve are automatically set and the actuator goes to stationary mode and starts responding to the control signal.

• Stand-By mode

(versions AME 655/658/659)

Press the RESET button to enter Stand-By mode. The actuator stops in current position and stops responding to any control signal. Red light is constantly lit. You can manually operate the actuator with mechanical handle (versions AME 655/658) or control buttons (versions AME 655/658/659). This mode can be very useful during the commissioning of other equipment, or for service purposes. In this mode you can also set positions of the additional switches. To exit Stand-By mode press the RESET button again.

• Positioning mode

The actuator is operating automatically. The stem is extracting or retracting according to the control signal. When positioning is finished the actuator goes to stationary mode. If for one or another reason 3-point signal (terminaly 1 and 3) and Y signal would be present at the same time, 3-point signal would prevail.

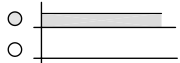



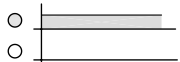


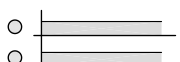

• Stationary mode

The actuator is operating without errors.

• Error mode

Working temperature is too high - check the ambient temperature.

Stroke is too short - check the connection with valve and valve operation, or check if valve is blocked.

LED	Indication type		Operating mode
Green		Constantly lit	Positioning mode - Actuator is retracting the stem
		Constantly lit	Positioning mode - Actuator is extracting the stem
		Flashing (1 s cycle)	Self stroking mode - Actuator is retracting the stem
		Flashing (1 s cycle)	Self stroking mode - Actuator is extracting the stem
Yellow		Constantly lit	Stationary mode - Actuator has reached upper end position (retracted stem)
		Constantly lit	Stationary mode - Actuator has reached bottom end position (extracted stem)
		Flashing	Stationary mode - Y present
Red		Constantly lit	Stand-By mode
		Flashing	Error Mode
Dark	No indication		No power supply

DIP switch setting

The actuator has a selection DIP switches (Fig. 1) under the service cover.

DIP1: FAST/SLOW – Speed selection

- FAST position; 3 (4) s/mm
- SLOW position; 6 s/mm

DIP2: DIR/INV – Direct or inverse acting selector (Fig. 2):

- DIR position; the actuator is direct acting to input signal
- INV position; the actuator is inverse acting to control signal

DIP3: 2-10V/0-10V – Input/output

- 2-10V position; the input signal is in the range from 2-10 V (voltage input) or from 4-20 mA (current input)
- 0-10V position; the input signal is in the range from 0-10 V (voltage input) or from 0-20 mA (current input)

Signal range selector sets Y and X signal.

DIP4: LIN/MDF – Characteristic modification function (Fig. 3):

- LIN position; Linear correlation between Y signal and stem position
- MDF position; Enables modified correlation between Y signal and stem position. Degree of modification depends on setting of potentiometer CM.

Function enables to change MCV (valve and actuator) characteristic (for example linear to logarithmic and logarithmic to linear) and works with all combinations of DIP switch settings.

DIP5: 100%/95% – Stroke limitation:

- 100% position; Full stroke
- 95% position; Stroke limited to 95%

DIP6: C/P – Output signal mode selector (Fig. 4):

Output signal is present on terminal 4 when position of the actuator is equal or lower then setpoint of S4.

Output signal is present on terminal 5 when position of the actuator is equal or higher then setpoint of S5.

- position C; output signal is present on terminals 4 or 5 independent of the input signal
- position P; output terminals 4 and 5 are bridged with input terminals 1 and 3

DIP7: Uy/Iy – Input signal type selector:

- position Uy; input signal Y is set to voltage (V)
- position Iy; input signal Y is set to current (mA)

DIP8: Ux/Ix – Output signal type selector:

- position Ux; output signal X is set to voltage (V)
- position Ix; output signal X is set to current (mA)

NOTE:

If DIP7 is in ON position, Y detection is disabled.

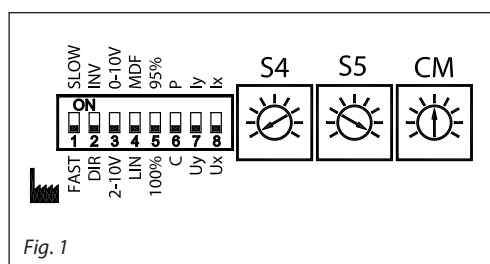


Fig. 1

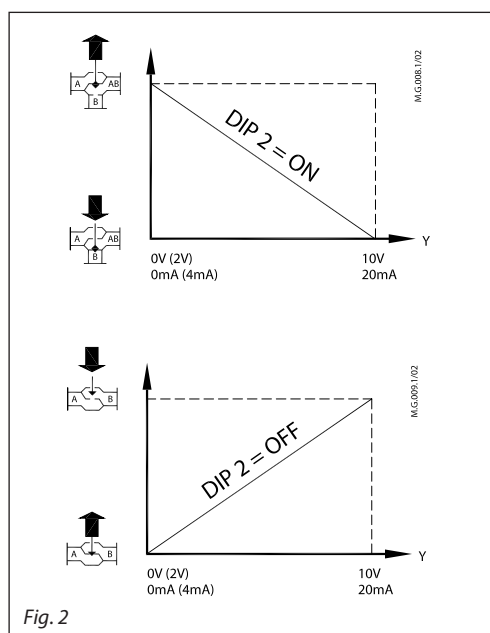


Fig. 2

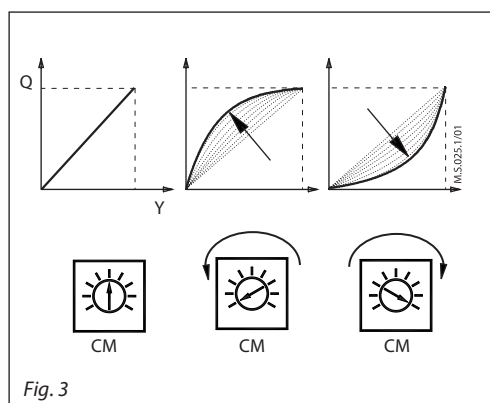


Fig. 3

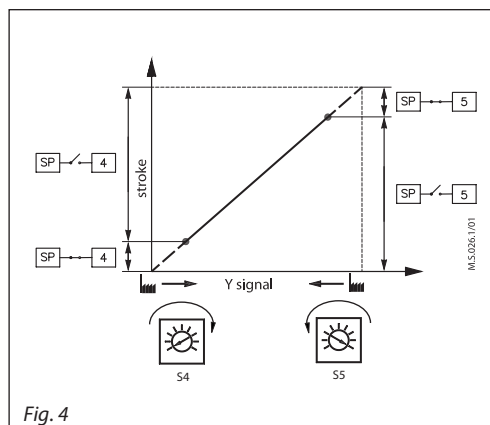


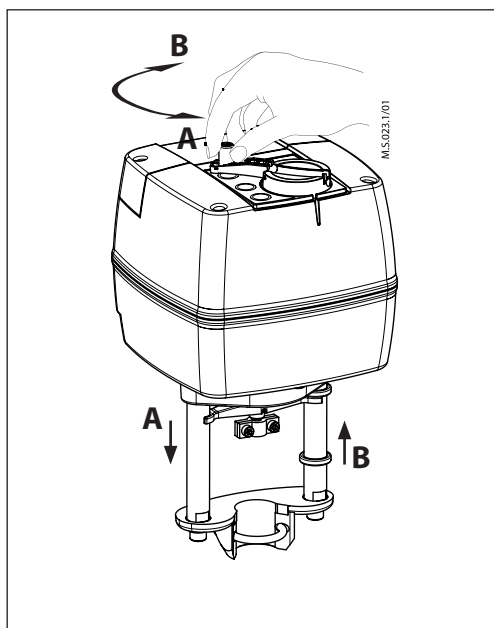
Fig. 4

Manual operation

⚠ Mechanical and electrical operation are not allowed to be used at the same time!

Actuators AME 655/658 can be manually positioned when in Stand-By mode or when there is no power supply (mechanically).
Actuators AME 659 can be manually positioned only in Stand-By mode.

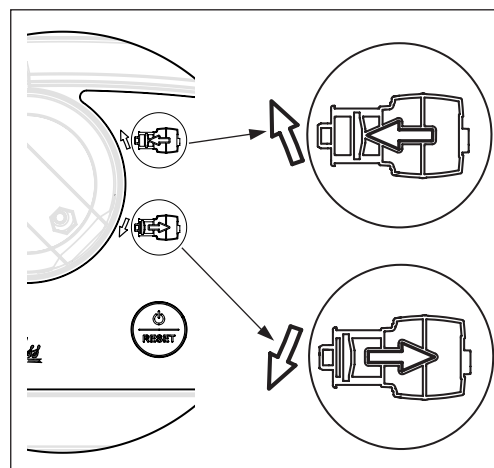
Actuator type	Mechanical operation	Electrical operation
AME 655	✓	✓
AME 658	✓	✓
AME 659	✗	✓



Mechanical manual operation

Actuators AME 655/658 have a manual operation knob on the top of the housing which enables hand positioning of the actuator.

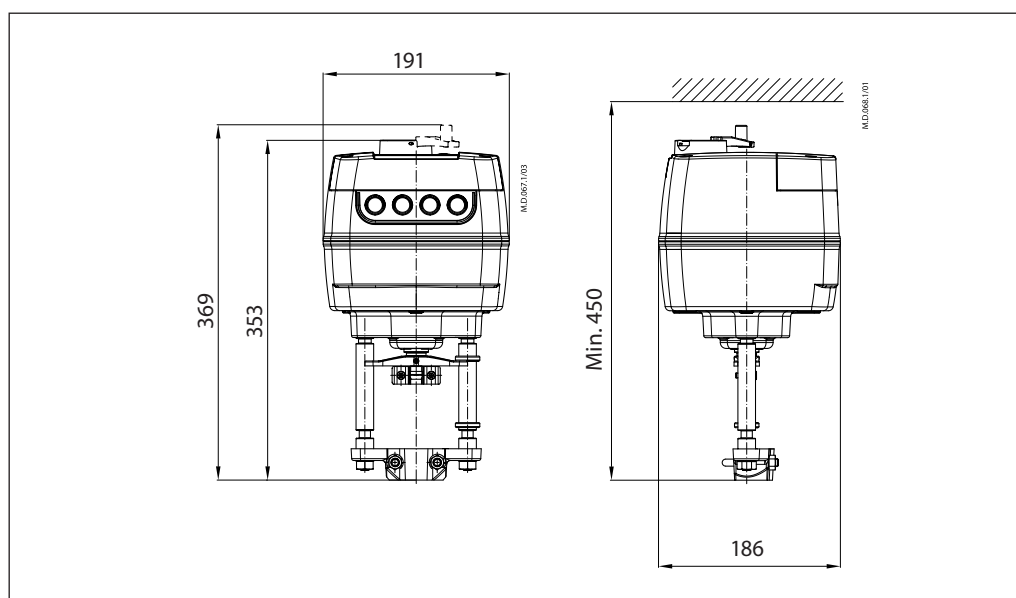
Mechanical manual operation shall be only when no power supply.



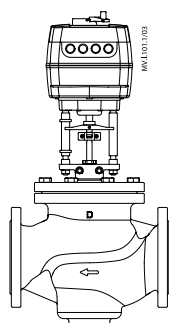
Electrical manual operation

Actuators AME 655, 658/659 have two buttons on the top of the housing that are used for electrical manual positioning (up or down) if the actuator is in Stand-By mode. First press the RESET button until the actuator goes to Stand-By mode (red LED is lit). By pressing the upper button the stem will be extracted and by pressing the lower button the stem will be retracted.

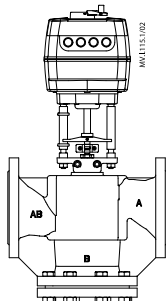
Dimensions



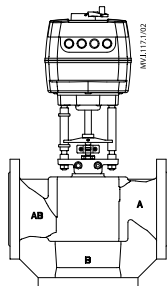
Actuator – valves combinations



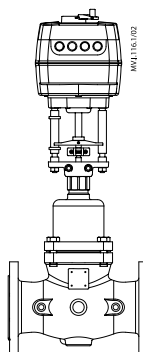
AME 65x +
VFM 2



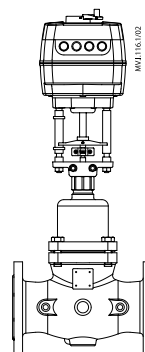
AME 65x +
VF 2 (DN 100-150)
VL 2 (DN 100)
VFS 2 (DN 65-100)



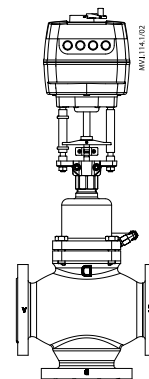
AME 65x +
VF 3 (DN 100-150)
VL 3 (DN 100)



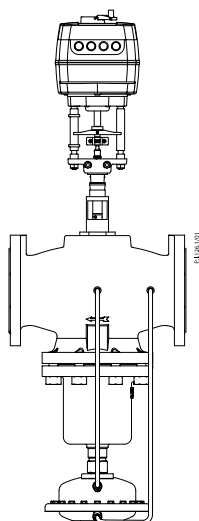
AME 65x +
VFG(S) 2 +
adapter:
065B3525 (DN 15-65)
065B3526 (DN 80-125)
065B3527 (DN 150-250)



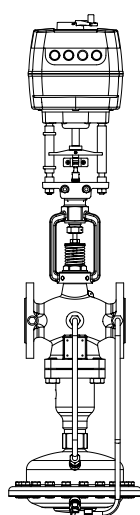
AME 65x +
VFU +
adapter:
065B3525 (DN 15-65)
065B3526 (DN 80-125)



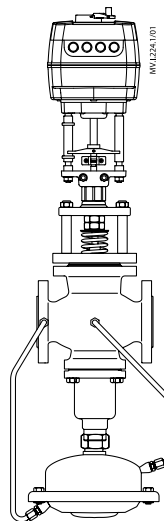
AME 65x +
VFG 3 +
adapter:
065B3525 (DN 25-50)
065B3526 (DN 65-125)



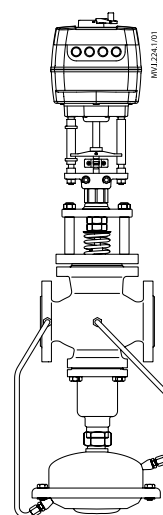
AME 65x +
AHQM (DN 125, 150)



AME 65x +
AFQM 6 +
adapter **065B3527**



AME 65x +
AFQM PN 16 (DN 65-125)



AME 65x +
AFQM PN 25 +
adapter **065B3527**