

Data sheet

# Actuators for modulating control AME 110 NL / NLX

Description



AME 110 is a high accuracy modulating control actuator, specifically designed for use in combination with the Pressure Independent Control Valve type AB-QM in sizes from DN 10-32.

The flow is modulated by the AB-QM pressure independent control valve to avoid overflow and reduced boiler and/or chiller efficiency.

The actuator with AB-QM is used to control water supply to fan coil units, chilled beams, induction units, small re-heaters, re-coolers, AHU's and other terminal units for zone control, in which heated/chilled water is the controlled medium. Due to its accuracy and LED indication, the AME 110 facilitates an accelerated commissioning process, allows easy maintenance, improves indoor comfort and increases energy savings. Control is achieved via voltage or current input signal to the actuator.

**Typical applications are:**

- Radiant ceiling panels, supplied by 2 or 4 pipes (Heating supply and return or/and cooling supply and return).
- Fan coil units, with single coils supplied by 2 or 4 pipes (Heating supply and return or/and cooling supply and return).

**General features:**

- High position resolution and accuracy
- Power supply AC or DC
- LED bar displaying information on position, status and alarms
- Electronic calibration process with valve stroke detection
- No tools required for mounting
- Maintenance-free lifetime
- Broken wire and missing control signal detection, when using 2-10V/4-20mA mode
- Low-noise operation (on 12 s/mm)
- Harmonized halogen free cables
- IP54 in all orientations
- Selectable speed 12 and 3 s/mm (for fast acting applications)
- Preventive LED warnings indicating possible issues for early problem solving
- QR code as a web page link containing all product documentation
- Mis-wiring protection on any wire up to 30 V

Ordering

Type	Supply voltage (V)	Feedback signal (V)	Cable length (m)	Code No.		Industry pack quantity
				Single Pack	Industry Pack	
AME 110 NL	24 AC/DC	/	1.5	082H8110	082H8118	24 pcs
			2.5	/	082H8119	18 pcs
			5	/	082H8120	18 pcs
AME 110 NLX		0 - 10 V	1.5	082H8114	082H8122	24 pcs
			2.5	/	082H8123	18 pcs
			5	/	082H8124	18 pcs

Technical data

Type		AME 110 NL	AME 110 NLX
Power supply	V	24 AC/DC; ±20%	
Power consumption	running	1.1 W (DC) / 1.1 VA (AC)	
	standby	1.0 W (DC) / 1.0 VA (AC)	
Frequency	Hz	50/60	
Control input Y	V	0-10 (2-10) Ri = 110 kΩ	
	mA	0-20 (4-20) Ri = 500 Ω	
Feedback signal X	V	/	0-10V (2-10V); ± 0.1 V
Nominal closing force	N	150*	
Stroke	mm	7.5	
Stroke resolution range	Motor steps	Max 4000 steps (at 100% valve setting) - max voltage signal resolution Min 450 steps (at 10% valve setting) - shortest valve stroke resolution	
Position Accuracy	mm	±0.1 mm	
Speed	s/mm	default 12 s/mm, selectable 3 s/mm	
Relative humidity		95% r.h., non-condensing (according to EN 60730-1)	
Max. medium temperature	°C	95	
Ambient temperature		-10 ... 55**	
Storage and transport temperature		-40 ... 70	
Protection class		II	
Grade of enclosure		IP 54 (all positions)	
Weight	kg	0.3	
marking in accordance with standards		EMC Directive 2014/30/EU EN 60730-1, EN 60730-2-14 RoHS 2011/65/EU standard EN IEC 63000	
Low Voltage Directive		Safety assurance is checked according to EN 60730-1, EN 60730-2-14	

\*When used at temperatures below 0°C, the closing force may in some worst cases drop to minimum 120N. For AB-QM valves this is above requirement, but consider if using the actuator on other valves besides AB-QM.  
 \*\* Can be used below 2°C of medium or ambient temperature, if ice forming on the spindle is prevented. Therefore valve and actuator neck should be insulated with vapor tight insulation, or prevent condensation by using a stem heater.

Commissioning

The factory setting of the actuator spindle is the fully stem up position, because of easier mechanical connection of the actuator to the valve.

Each actuator is supplied with the connecting cable for the controller.

Installation

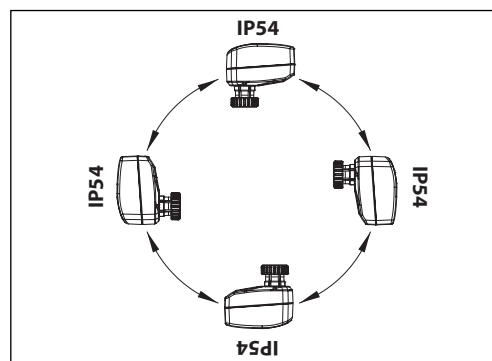
**Mechanical**

The AME 110 can be mounted on the valve in any orientation.

The actuator is fixed to the valve body by means of a locking nut, which requires no tools for installation. The nut should be tightened by hand.

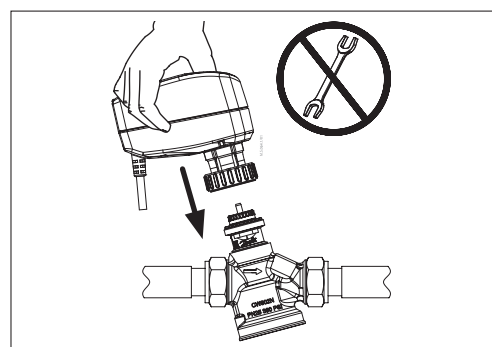
**Electrical**

**Important:** It is strongly recommended that the mechanical installation is completed before the electrical installation.

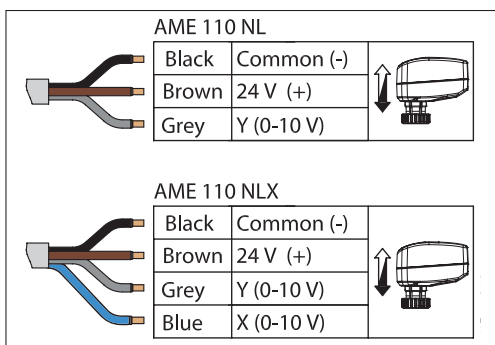


Installation procedure

1. Check the valve neck, the valve setting should be set before mounting the actuator.
2. The actuator must be in the factory position (stem up), then mount it securely on the valve body.
3. Wire the actuator according to the wiring diagram
4. The direction of the stem movement can be observed on the LED indication



Wiring



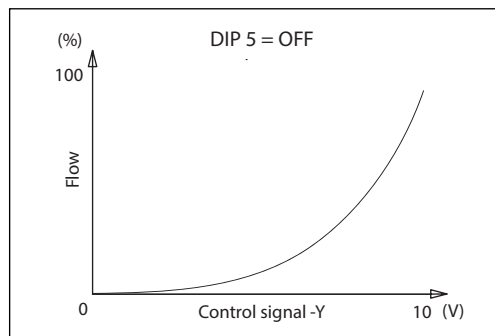
Calibration

1. On the first “wake up” (or power reset or press of the reset button), the actuator will go into calibration procedure and adjust the stroke of the actuator according to the valve stroke.
2. If actuator AME 110 NL/NLX is charged by 24 V supply voltage and if it is not installed on AB-QM valve, it will cause a failed calibration (visible by an alarm on LEDs).
3. **In case the calibration is not done, the actuator will move to the upper position. This way it can be easily mounted on the valve, if it has not been on the last attempt.**
4. Re-calibration is started by pressing the RESET button or by cycling the power supply.

Input/Output

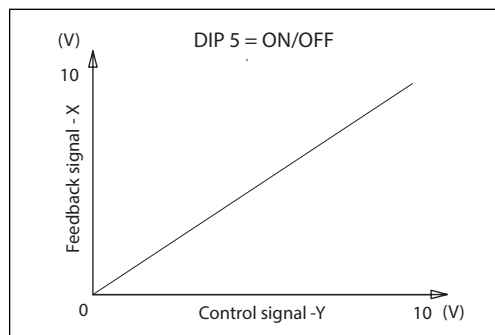
Control signal

Control signal (Y) must be connected on the grey wire, and it controls the actuator to open/close the valve. By changing the DIP switch no. 2, it can be used as Voltage (0-10 V) or as Current (0-20 mA) control. To ensure that we can always close and open the valve 0-100%, there are two zones in the control signal where the actuator will fully close and open. This voltage is below 0,12 V and above 9,88 V. With this even if there is “noise” in the signal we ensure full flow and especially no leakage.



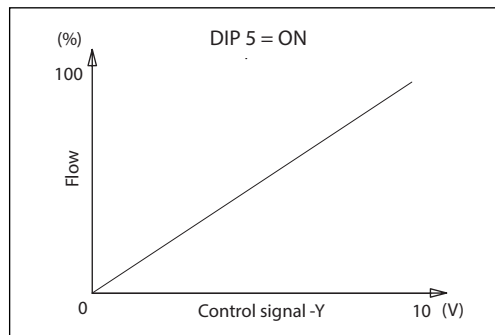
Feedback signal

The 0-10 V feedback signal (X) is present on the blue wire on the NLX versions of the actuator. It enables direct feedback in the form of voltage signal (0-10 V). This gives information on the actuator’s operating status to the DDC system. When the control voltage (Y) changes, the actuator will need a few seconds (up to a minute, depending on the change) to reach the new position. At this point both the control (Y) and feedback (X) signals should be the same. When Y and X signals are the same, it shows that the actuator is in the required position and has stopped moving.



The feedback signal is not directly “related” to the valve position. The actuator by default, will move on an equal percentage characteristic (LOG). This gives the best performance in a water to air applications.

It can be changed, by moving the DIP switch no. 5 to ON, then the actuator will have Linear characteristic. The feedback signal remains unchanged (always linear) regardless of the no. 5 DIP switch position. When changing the DIP switch no. 2 to ON, the feedback signal will only work in a 2-10 V range.



LED indication

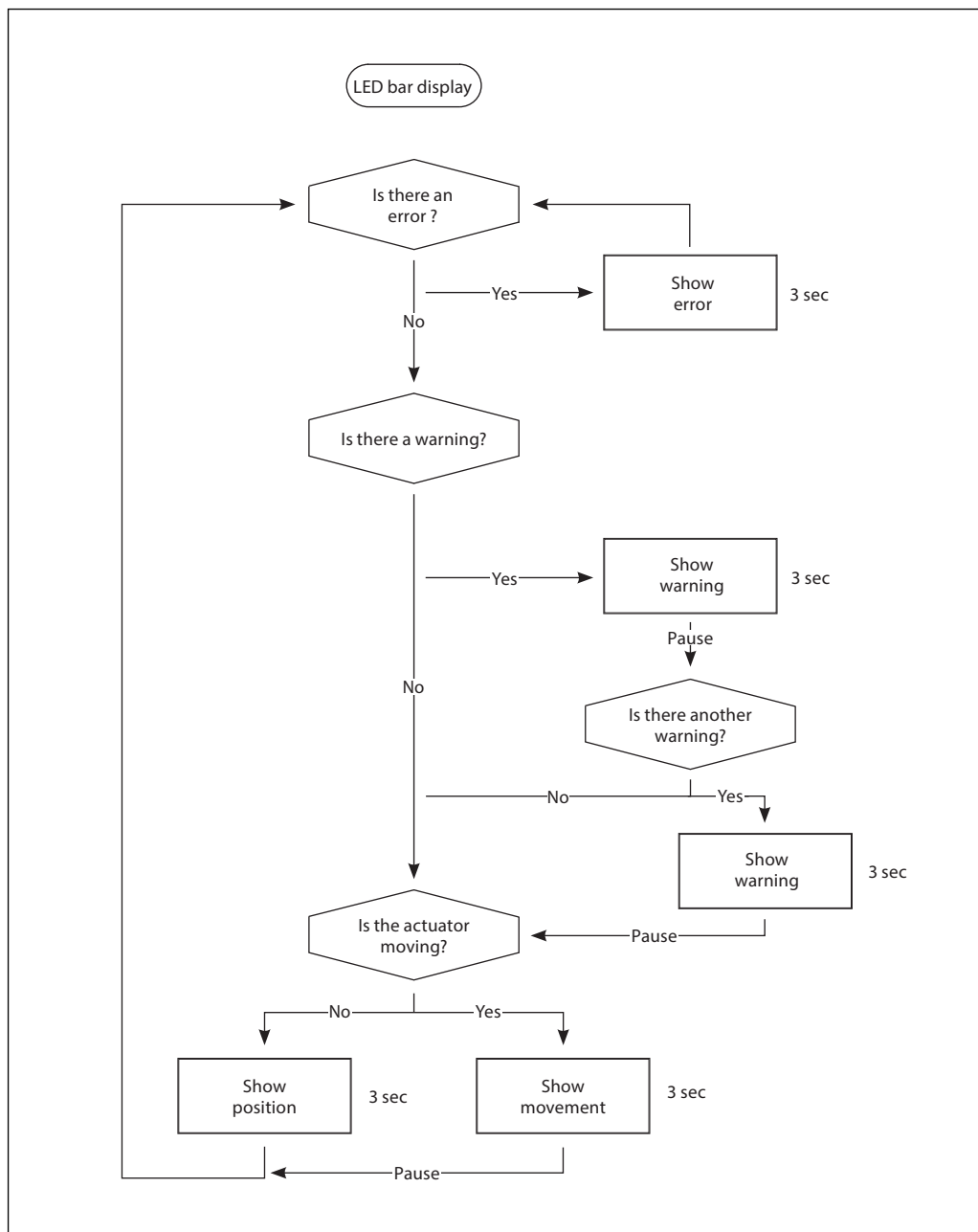
Functionality	LED visual pattern			LED pattern
Calibration				Repetitive animation
	Actuator is checking and calibrating to the mechanical stroke of the valve.			
<b>Movement</b>				
Opening				Repetitive animation
	Opening the AB-QM valve - Actuator stem is moving up to the retracted position.			
Closing				Repetitive animation
	Closing the AB-QM valve - Actuator stem is moving down to the extended position			
<b>Position</b>				
Closed 0%		Open 50-74%		Constant - lit
Open 1-24%		Open 75-99%		Constant - lit
Open 25-49%		Open 100%		Constant - lit
<b>Reset (button)</b>				
Press reset button, keep pressing until:				
Under 1 second = Calibration 2 seconds = Turn OFF/ON LED indication 3 seconds or more = normal operation	Click button	1 second	2 second	3 second
Calibration		OFF/ON LED		One time animation
<b>Alarm / Error (actuator stops working)</b>				
Error during calibration				Constant - blinking
	Verify if the actuator is correctly attached to the valve and recalibrate.			
Power supply fail				Constant - lit
	Power supply level was at a dangerous level, actuator stopped working.			
Motor is not working				Constant - blinking
	Motor has reached a level where it is not working anymore, due to damage or lifetime wear. Replacement is necessary.			
Internal error				Constant - blinking
	Internal error has been detected in the software. Cycle the power off and on. If the error persists actuator replacement may be necessary.			
<b>Alarm / Warning (actuator still works)</b>				
Valve stroke reduced				Lit
	Actuator detected shorter valve stroke. Flushing valve may solve the problem. Re-calibration will adjust the actuator to the new shorter stroke.			
Internal temperature too high/low				Blinking
	Ambient temperature has likely exceeded 60°C or dropped below -15°C			
Valve setting conflict				Lit
	Measured valve stroke during calibration was too short. Check valve setting, adjust it and recalibrate afterwards.			
Missing Control Signal				Blinking
	In 2-10 V / 4-20 mA mode, missing signal or broken control wire was detected.			
Power supply outside limits				Lit
	Supply voltage is outside the allowed limit, check voltage levels.			
Forced position change				Blinking
	While under power, forced change in actuator position was detected. Recalibrate to clear the warning. Avoid moving the actuator under power.			

Blinking LED patterns have a 2 Hz frequency (blink twice per second)

**Flowchart for LED bar display**

This flowchart can be used to better understand the LED visuals. The LED bar is displaying a lot of information (movement, warning, position, error). In some cases it can be showing multiple things at once in a span of 10-20 seconds. There could be movement, two warnings and position, all shown one after the other.

There is always a pause between LEDs, when showing multiple warnings and/or movement. Only when an error occurs, this will be the only thing showing, because the actuator is not working correctly.



**DIP Switch Setting**

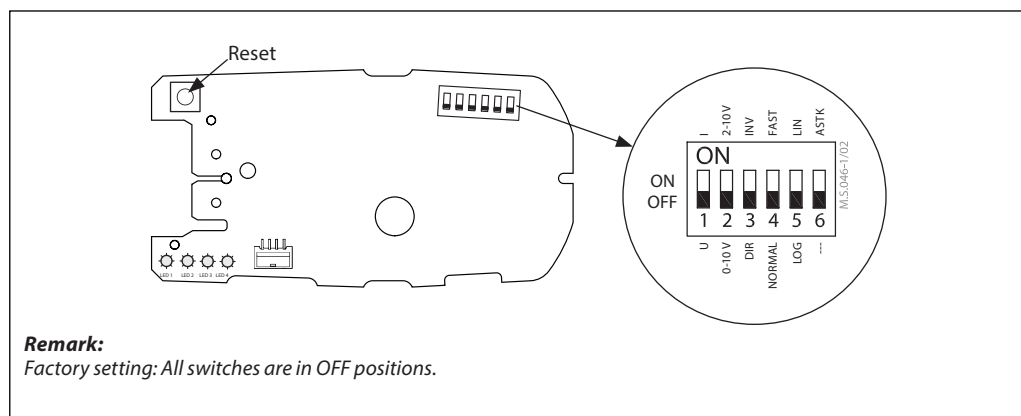
(for commissioning purposes only)

The actuator has a function selection DIP switch under the removable cover.

The switch provides the following functions:

- DIP 1:  
**U/I - Input signal type selector**  
If set to OFF position, voltage input is selected.  
If set to ON position, current input is selected.
- DIP 2:  
**0/2 - Input signal range selector**  
If set to OFF position, the input signal is in the range from 0-10 V (voltage input) or from 0-20 mA (current input).  
If set to ON position, the input signal is in the range from 2-10 V (voltage input) or from 4-20 mA (current input).
- DIP 3:  
**D/I - Direct or inverse acting selector**  
If set to OFF position, the actuator is direct acting (stem retracts as voltage increases).  
If the actuator is set to ON position, the actuator is inverse acting (stem extends as voltage increases).
- DIP 4:  
**NORMAL/FAST - Speed selector**  
If set to OFF position, the normal actuating speed 12 s/mm is selected.  
If set to ON position, the faster actuating speed 3 s/mm is selected.

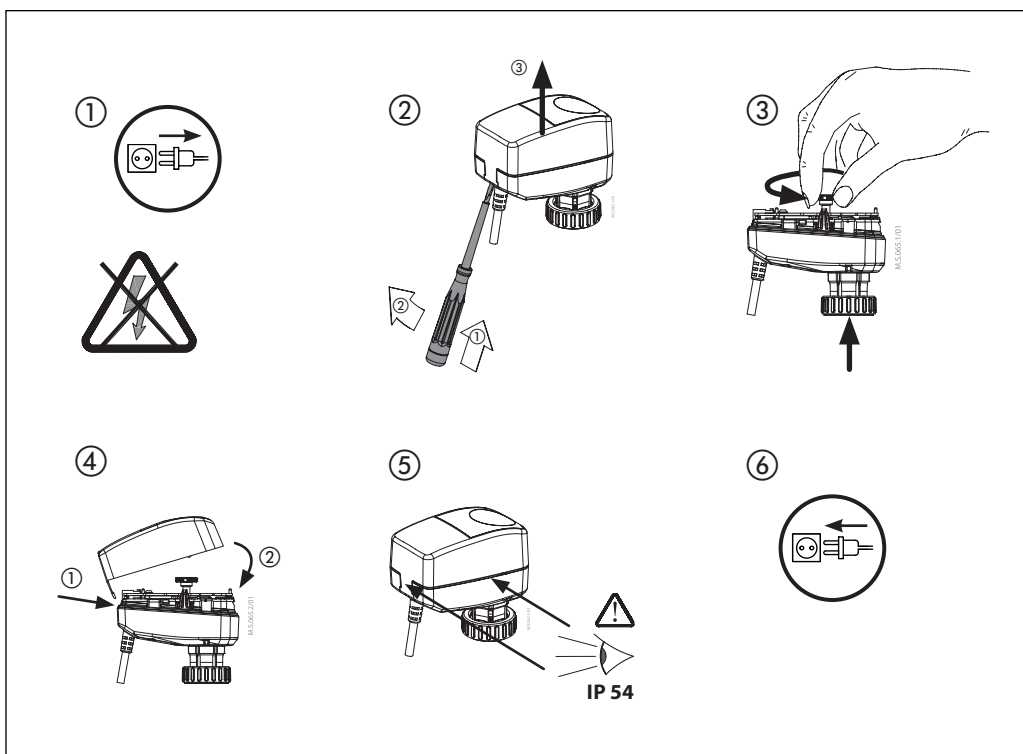
- DIP 5:  
**LOG/LIN - Equal percentage (LOG) or linear flow through valve selector**  
If set to OFF position, the flow through the valve is equal percentage-wise according to the control signal.  
If set to ON position, the valve position is linear according to the control signal.
- DIP 6:  
**---/ASTK - Anti-sticking function**  
If set to OFF position (---), the function is disabled.  
If set to ON position (ASTK), the periodical valve motion is switched on. The actuator moves up and down 2 mm and exercises the valve every 7 days.  
It moves the valve to avoid blocking in periods when the heating/cooling is off.
- **Reset button:**  
If the reset button is only pressed shortly (click) for less than 1 second, the actuator will go into calibration procedure.  
If the reset button is pressed and held for 2 seconds, you can switch between LED indication or NO LED indication (except errors/warnings).



**Manual override**  
(for service purposes only)

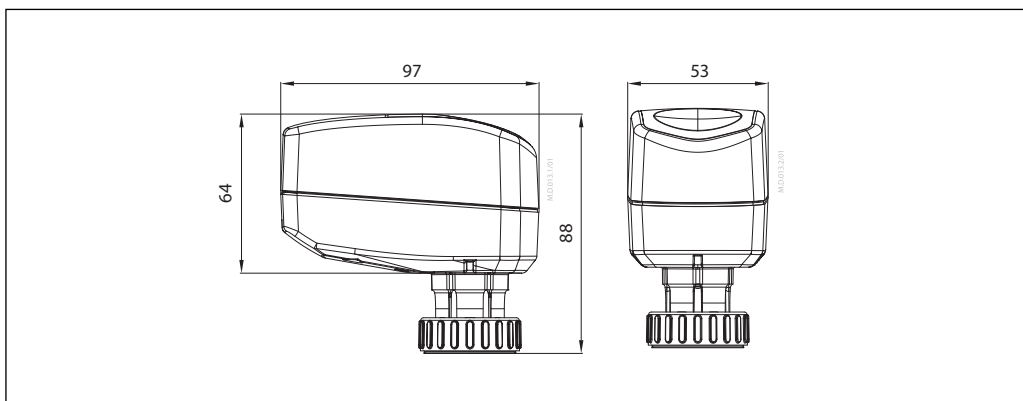


**Caution:**  
Do not manually operate the drive if power is connected!



1. Disconnect the power supply
2. Remove the cover
3. Use the manual operation knob to move the actuator up/down
4. Put back the cover
5. Make sure the power cable and cover are in the correct position (improper installation can affect the IP54 rating)
6. Reconnect the power supply

**Dimensions (mm)**



## Tender text

AME 110 is a high-performance actuator for commercial HVAC applications. It offers precise water flow control, enhancing system efficiency and occupant comfort. Designed for seamless integration with Danfoss AB-QM valves, room controllers and advanced building management systems (BMS), the AME 110 NL/NLX stands out for its unique features that optimize performance and reliability.

**Mechanical Specifications:**

Nominal Force: 150 N.  
Stroke Length: 7.5 mm.  
Operation Type: Modulating.  
Resolution: Min. 450 steps (at 10% valve setting)  
Position Accuracy:  $\pm 0.1$  mm.  
Speed of the actuator: 12 or 3 s/mm. providing flexibility in valve control.

**Electrical Specifications:**

Power Supply: 24V AC/DC, 50/60 Hz.  
Power Consumption: 1 W DC, 1.1 VA AC.  
Control Signal: 0(2)-10V DC or 0(4)-20mA, providing flexibility in system integration.  
Feedback Signal for NLX versions: 0(2)-10V DC, enabling accurate monitoring of valve position.

**Features:**

Logarithmic and linear characteristic settings available in the same product allowing for optimized control based on your specific application requirements.

**Calibration:** Automatic electronic calibration on power up to detect the opening and closing point of the valve.

**Anti-Blocking/Sticking Function:** Our gear actuator incorporates a selectable anti-blocking/sticking function, preventing valve blockages, ensuring smooth and reliable operation.

**Actuator Mode Signaling:** The actuator features LED signaling to indicate its operating mode, including running, standby, calibrate, and error modes, enabling quick and easy troubleshooting.

**Direct or inverse acting actuator,** allows for easy selection between direct or inverse acting modes, adapting to different control system requirements.

**Manual Override Operation:** In the event of power failure or maintenance, the actuator can be manually operated, ensuring continuous valve control.

**Environmental Conditions:**

Operating Temperature Range:  $-10^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$   
Protection Class: IP54, providing protection against dust and water ingress from all directions, ensuring durability and longevity. This enables mounting of the AB-QM valves in all directions.  
Humidity: 5% to 95% RH, non-condensing.

**Compatibility:**

Valve Types: Specifically designed for Danfoss Pressure Independent Control Valves, type AB-QM.

Halogen-Free Cable: The actuator comes with a 1.5m halogen-free cable as standard. Additional cable lengths of 2.5m and 5m are available.

**Compliance and Standards:**

EMC Directive 2014/30/EU EN 60730-1, EN 60730-2-14  
RoHS 2011/65/EU standard EN IEC 63000  
Low Voltage Directive - safety assurance is checked according to EN 60730-1, EN 60730-2-14