ENGINEERING
TOMORROW

Data sheet

Actuators for modulating control

AME 113 NL SU/SD - with safety function (stem up/down)

AME 113 NLX SU/SD - with feedback signal and safety function

Description

AME 113 is a series of gear actuators for opening and closing valves for heating and cooling systems. The predominant area of application is the energy-efficient control of water-bearing valves in the area of building services and automation.

The actuator is equipped with a safety function. If the power supply fails, the valve pressure plate moves into a parking position. The energy for this is provided by an internal rechargeable accumulator.

The actuator has an equal percentage characteristic, meaning the flow through the valve is equal percentage to the control signal. The control is performed by a 0-10 V DC control signal sent by a central DDC system or a room thermostat. The current position and the control voltage are shown on an LC display.

The actuator is supplied with a pluggable connecting cable and has a manual valve adjustment which can be used, for example, for maintenance or installation.

A version with feedback signal is available. The back channel transmits information about the current valve position as well as about possibly occurred errors to the DDC installation.

Features

- Suitable for AC and DC operation
- Internal energy storage for the safety function. Positioning in case of supply voltage failure
- Stroke 8.5 mm or valve path recognition
- Actuating force 125 N
- LC display for status indication
- Function display via LED
- Equal percentage characteristic
- Very fine resolution in valve positioning
- Very short response times
- Max. energy efficiency by means of motor control via microcontroller
- Self-locking gear in all positions, de-energized
- Antitheft device by removable locking latch
- Special feature for NLX version is feedback signal
- Safety function in case of power failure
- Force-dependent deactivation in case of overload or when the final stop resp. the closing position is reached
- Manual valve setting
- Very low power consumption
- Valve adapter system
- Simple plug-in installation without tools
- 100 % protection in case of leaky valves (IP 54)
- 360° installation position
- Plug-in connecting cable
- Low-noise and maintenance-free
- High functional safety and long expected service life
- Control input suitable for 0-10 V
- Automatic valve path recognition / no load detection

Type		AME 113 NLX SD	AME 113 NLX SU	AME 113 NL SD	AME 113 NL SU
Operating voltage		24 V AC, -10 % ... +20 %, 50-60 Hz 24 V DC, -20 % ... +20 %			
Operating power		2.6 VA/ 1.4 W			
Charging operating power with battery (temporarily)		3.1 VA/ 1.7 W			
Safety activations / Tag		4			
Charging time of int. battery, if empty		16 h			
Max. power consumption		<160 mA			
Standby power consumption		<10 mA			
Control voltage		0...10 V DC			
Working range of the control voltage		0.5...10 V DC			
Resistance of control voltage input		100 kΩ			
Stroke		Max. 8.5 mm			
Actuation force		125 N -20/+40%			
Actuation time		15 s/mm			
Noise level		<30dB/A			
LCD (H x W)		10 x 20 mm			
LED		Multicolour LED			
Fluid temperature		0 °C to +100 °C			
Storage temperature		-20 °C to +70 °C			
Characteristic		Equal percentage			
Ambient temperature		0 °C to +50 °C			
Degree of protection		IP 54 [1]			
Protection class		III			
CE conformity according to		EN 60730			
Casing	Material	Polyamide			
	Colour	Signal white (RAL 9003)			
Casing cover	Material	(polycarbonate)			
	Colour	Transparent			
Cable	Type	4 x 0.22 mm² PVC		3 x 0.22 mm² PVC	
	Colour	white			
	Length	1 m			
Dimensions (H x W x D)		65 x 45 x 90 mm			
Weight with connection cable (1 m)		155 g			
Surge strength according to EN 60730-1		1 kV			
Safety function		Yes (down)	Yes (up)	Yes (down)	Yes (up)
Power failure response		Safety function extends the stem, closes the AB-QM valve	Safety function retracts the stem, opens the AB-QM valve	Safety function extends the stem, closes the AB-QM valve	Safety function retracts the stem, opens the AB-QM valve
Feedback Signal:	Voltage range	0 - 10 V		-	
	Output current	1 mA		-	
	Load impedance	10 kΩ - 1000 kΩ		-	
	Resolution	0.1 V		-	

[1] *In all installation positions.*

Ordering

Type	Supply voltage	Feedback	Code no.
AME 113 NLX SD	24 V- AC / DC	0-10 V	**082H5000**
AME 113 NLX SU	24 V- AC / DC	0-10 V	**082H5001**
AME 113 NL SD	24 V- AC / DC	-	**082H5007M**
AME 113 NL SU	24 V- AC / DC	-	**082H5008**

Variation

The actuator is available in various versions which differ in their functional features:

	AME 113 NLX SD	AME 113 NLX SU	AME 113 NL SD	AME 113 NL SU
LC display	✓	✓	✓	✓
Function display via LED	✓	✓	✓	✓
Valve path recognition	✓	✓	✓	✓
Feedback signal	✓	✓		
Manual setting	✓	✓	✓	✓
Safety function display via LED	✓	✓	✓	✓

Function

The actuator mechanism works with a stop motor, a micro controller and a gearing mechanism. After switching on the power supply, the actuator carries out an initialization. In the initialization phase, the traverse path is determined; in the display, alternately “In” (for initialization) and the applied control voltage are shown. For further descriptions on initialization, refer to the chapter on the actuator.

© Danfoss | 2021.08

Initialization

First the valve pressure plate is completely retracted; the upper end stop of the actuator is determined by this. The valve pressure plate then extends completely and determines the lower end stop, the closing point of the valve. Subsequently the actual valve path recognition is performed. For this, the valve pressure plate retracts at high speed and extends again slowly. The valve travel is detected during this process. If the actuator does not detect the valve path, control is performed using the parameterized stroke (factory setting: 8.5 mm).

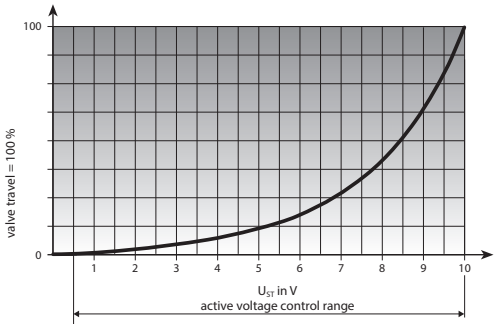
Due to different conditions, the valve travel for the actuator can change in practice. The valve has been readjusted or the actuator has been mounted on a new valve. In both cases, the values determined during initialization will change. In order for the actuator to adjust to the new valve path, the voltage supply and the control voltage must be interrupted briefly. After the power supply has been switched on again, a new initialization phase is carried out.

Note:
The AME 113 needs a maximum of 15 min for an initialization phase.

Operation

The AME 113 actuator is controlled via a 0-10 V DC control signal from a room thermostat or a building management system. The control signal allows a precise activation and positioning of the actuator.

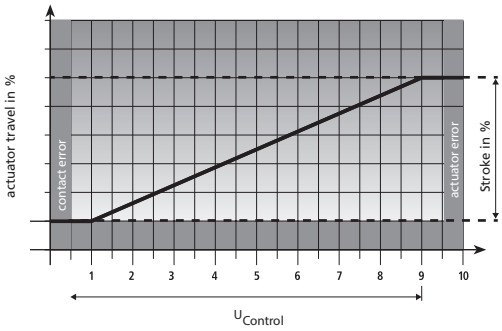
Note:
1. For poppet valves with a soft rubber seal, the compression of the rubber seal is detected as the valve path.
2. The following diagrams only apply when the appropriate valve adapter ring is used:



Optional feedback signal (AME 113 NLX)

The 0-10 V feedback signal of the actuator enables direct feedback of the current operating status to the DDC system. Voltages of 1-9 V provide information about the actuator position. Voltages <0.5 V and >9.5 V signal any errors that may occur. The connection of the feedback signal is volt-age resistant up to 24 V. It outputs a voltage proportional to the actuator position, which is made available to the DDC system.

Voltage	Description
< 0.5 V	No function or no contacting
1-9 V	Voltage emitted proportionally to the stroke
1 V	Corresponds to a closed valve
9 V	Corresponds to an open valve
>9.5 V	Internal error



Safety function

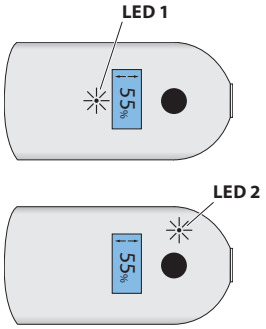
The electronic system of the actuator continuously monitors the supply voltage. If this fails for >= 2 seconds, the valve spindle moves to the specified parking position and closes e. g. the valve. The actuator remains in this parking position until an operating voltage is applied again.

In the event of a power failure during the initialization phase, the drive stops the initialization and then moves to the parking position.

- The internal energy storage may only have a small residual charge after longer storage.
- The internal energy storage is designed for at least 4 power failures per day.
- The charging time for a completely empty energy storage is 16 hours.
- When the operating voltage is applied to the failsafe drive again, it starts initialization, see paragraph Initialization.
- A short start-up can trigger a failsafe event. The valve pressure plate extends and the actuator can no longer be mounted. In this case, retract the valve pressure plate manually. See paragraph Manual valve setting.
- Perform the commissioning of the valve.

Function display via LED

For function signalling of operating statuses, the actuator has two multi-coloured LEDs. Green and red are used as signal colours.

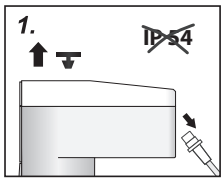


LED 1	Description
Green (flashes)	Initialisation
Red	Error1

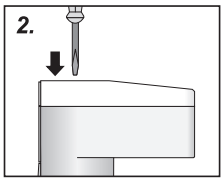
LED 2	Description
Green (flashes)	Failsafe operation, parking position is approached
Green	Device ready
Orange	Ready for operation, battery is charging
Red	Error1

Manual valve setting

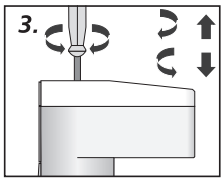
The manual valve setting allows to bring the valve pressure plate to the desired position in de-energised status. This facilitates e. g. maintenance and installation.



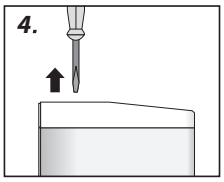
Remove the protective plug and the connection line, or switch off the voltage supply.



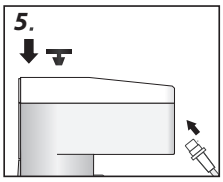
Introduce a screwdriver (0.3 x 2 mm) into the manual valve setting device.



When turning to the right, the valve pressure plate is retracted; turning to the left extracts it. Note: When the stop is reached, turn back by 1/4.



Remove the screwdriver after reaching the desired position.



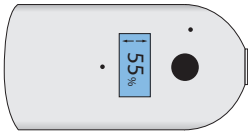
Install the protective plug and connect the connection line.

Note
Pull the plug for manual setting. Then wait for the fail-safe function to end until LED 2 (green) goes out. See also the chapter "Function display via LED".

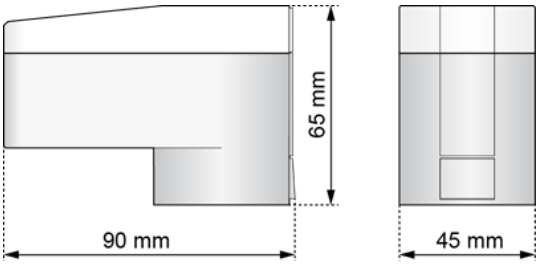
[1] *In case of error: Disconnect from voltage, keep voltage free for 20 minutes and then reconnect. If this occurs more than once, replace the device.*

LC display

The LC display alternatively shows the setting position and the applied control voltage. In case of a control requirement, the current driving direction is shown in the LC display by means of an arrow. In case of an error, the corresponding error code is shown and the error is indicated by a steadily lighted LED.

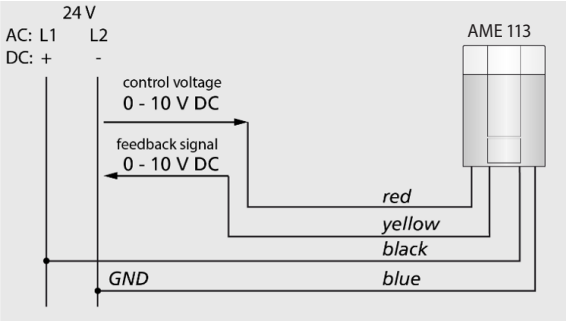


Dimensions



© Danfoss | 2021.08

Electrical connection 24 V AC/DC L1 (+) L2 (-)



The actuator is controlled via a 0-10 V control unit or a building management system.

Connection line

We recommend the following maximum cable lengths for installing a 24 V system:

Cable	Section	Length
Standard DDC line	0.22 mm²	20 m
J-Y(ST)Y	0.8 mm²	45 m
NYM / NYIF	1.5 mm²	136 m

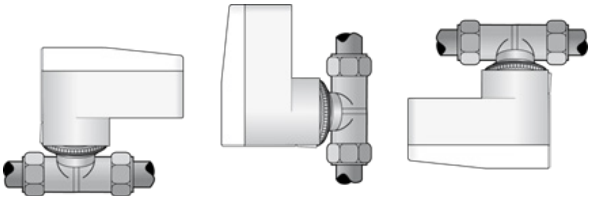
Transformer/power supply unit:

A safety isolating transformer according to EN 61558-2-6 or a switching power supply according to EN 61558-2-16 must always be used.

The dimensioning of the transformer or the switching power supply results from the maximum making capacity of the actuators.

Installation position

The actuator can be operated in any installation position.



vertical horizontal "overhead"

Installation with valve adapter

Note:
The AME 113 needs a maximum of 15 min for an initialization phase.

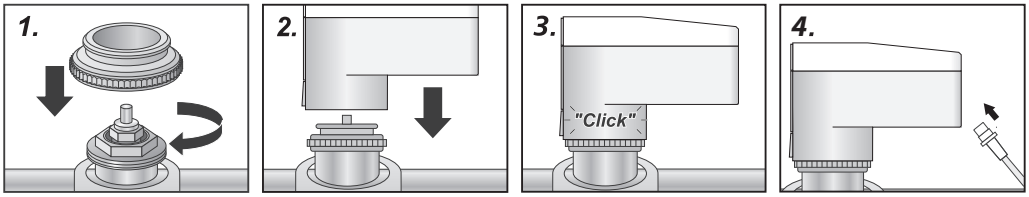
ATTENTION!

Installation with extracted valve pressure plate leads to actuator damage.

• Only install the actuator with completely retracted valve pressure plate.

• Retract an extracted valve pressure plate with the manual valve setting, or electrically.

The actuator is mounted on the valve using a valve adapter. The actuator is simply plugged onto the valve adapter previously installed manually. The fact that the valve pressure plate is retracted in factory, allows for easy installation.



Screw the valve adapter manually onto the valve.

Position the actuator manually in vertical position to the valve adapter.

Simply latch the actuator to the valve adapter manually by applying vertical pressure; a clicking sound can be heard.

Connect the connection line to the actuator.

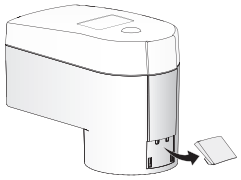
Error codes

Queued errors are indicated by an error code.

Error code	Description	Error correction
E8	Indicates an internal error.	The actuator performs a re-initialisation after 10 seconds. If the error cannot be eliminated automatically after a maximum of three attempts, the indication will become steady. In this case the customer service must be called.

Anti-theft device

The actuator is secured against disassembly by unauthorised persons by simply removing the locking button.



Certificates

The AME 113 has NRTL approval by TÜV Süd.

ІМПОРТЕР:
UA: ТОВ з ІІ «Данфосс ТОВ», вул. Вікентія Хвойки, 15/15/6, м. Київ, 04080, Україна

Danfoss A/S
Climate Solutions • danfoss.com • +45 7488 2222

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material.
Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product.
All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.