

Motoric Valve Drive: 24 V Proportional Failsafe

The Motoric Valve Drive: 24 V Proportional Failsafe is an electromotive actuator 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 failsafe 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 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 supplied with a pluggable connecting cable has a manual valve adjustment which can be used, for example, for maintenance or installation. A version with feedback signal is available as an option. The back channel transmits information about the current valve position as well as about possibly occurred errors to the DDC installation.



1.1 Features

- OEM design
- Suitable for AC and DC operation
- Internal energy storage for the failsafe function. Positioning in case of supply voltage failure
- Failsafe parking position adjustable in 10% steps in factory on request
- Stroke 8.5 mm or valve path recognition
- Actuating force 125 N or 200 N
- LC display for status indication
- Function display via LED
- Characteristic linearization (optional)
- 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
- 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
- Variants in stroke and operating times
- Control input suitable for 0-10 V and pulse width modulation (PWM)
- Optional: Automatic valve path recognition
- Optional: Feedback signal for position and status evaluation via a DDC system

1.2 Variants

In its basic version, the OEM Motoric Valve Drive: 24 V Proportional Failsafe is delivered without logo, with plugged connection cable, and without valve adapter. The following variants are available in the basic version.

Type	Operating voltage	Stroke	Actuation force	Actuation time	Control voltage	Scope of supply
Proportional (0-10V)	24 V, AC/DC	8.5 mm		15 s/mm	0-10 V	<ul style="list-style-type: none"> • Motoric Valve Drive: MPRF in single packaging • 1 m connection line (plug-in), white, PVC 3 x 0.22 mm² • Installation instruction in 12 languages
MPRF 46825-30			125 N			
MPRF 46845-30			200 N			
Prop., with valve path recognition	24 V, AC/DC	8.5 mm		15 s/mm	0-10 V	<ul style="list-style-type: none"> • Motoric Valve Drive: MPVF in single packaging • 1 m connection line (plug-in), white, PVC 3 x 0.22 mm² • Installation instruction in 12 languages
MPVF 46825-30			125 N			
MPVF 46845-30			200 N			
Prop., with valve path recognition and feedback	24 V, AC/DC	8.5 mm		15 s/mm	0-10 V	<ul style="list-style-type: none"> • Motoric Valve Drive: MPOF in individual packaging • 1 m connection line (plug-in), white, PVC 4 x 0.22 mm² • Installation instruction in 12 languages
MPOF 46825-30			125 N			
MPOF 46845-30			200 N			

Further variation possibilities:

MPxF xxxxx-x1 = 2- 10 V

MPxF xxxxx-x2 = 10- 0 V

MPxF xxxxx-2x = 30 s/mm

1.3 Optional differentiations to the basic version

Differentiations	
Line lengths	2 m, 3 m, 5 m; PVC in white – 3 or 4 x 0.22 mm ² - Special lengths <10 m, pluggable
Valve adapters	Available for almost all valves and distributors
Packaging	Packaging can be manufactured and printed individually according to requirements.
Imprint on casing	Imprint of the company logo and the individual type designation
Please contact us if you have further wishes.	

1.4 Equipment

The OEM Motoric Valve Drive: 24 V Proportional Failsafe is available in various versions which differ in their functional features:

	MPRF 468x5	MPVF 468x5	MPOF 468x5
LC display	✓	✓	✓
Background illumination	optional	optional	optional
Function display via LED	✓	✓	✓
Valve path recognition		✓	✓
Feedback signal			✓
Manual setting	✓	✓	✓
Failsafe function display via LED	✓	✓	✓

2 Function

The actuator mechanism of the OEM Motoric Valve Drive: 24 V Proportional Failsafe 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:

- ↳ **MPRF 468x5:** 2.1 Initialization (MPRF 468x5)
- ↳ **MPVF/MPOF 468x5:** 2.2 Initialization (MPVF/MPOF 468x5)

2.1 Initialization (MPRF 468x5)

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. When the actuator has come to a standstill again, the closing point of the valve has been detected. If a control voltage is applied subsequently, the actuator opens the valve evenly. The actuator calculates the setting position to be approached from the control voltage and the parameterized stroke and moves to it precisely.

Note

The MPRF 468x5 needs a maximum of 7 min for an initialization phase.

2.2 Initialization (MPVF/MPOF 468x5)

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

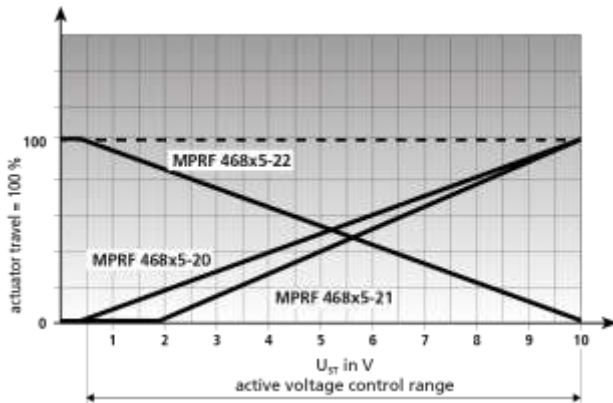
The MPVF/MPOF 468x5 needs a maximum of 15 min for an initialization phase.

2.3 Operation

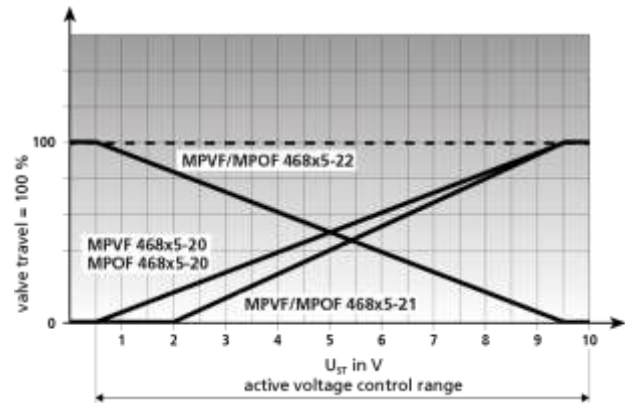
The actuator is controlled via a 0-10 V DC control signal from a room thermostat or a building management system. The control signal allows a precise activation and positioning of the actuator. Alternatively, a PWM signal can also be applied to the control voltage input.

Note

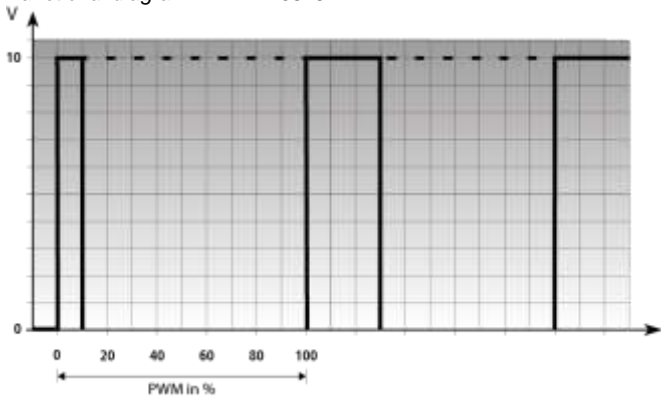
1. For poppet valves with a soft rubber seal, the compression of the rubber seal is detected as the valve path.
2. The following diagrams only apply when the appropriate valve adapter ring is used:



Functional diagram: MPRF 468x5



Functional diagram: MPVF 468x5 and MPOF 468x5



Pulse width frequency 100 Hz to 1000 Hz

2.4 Failsafe 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.

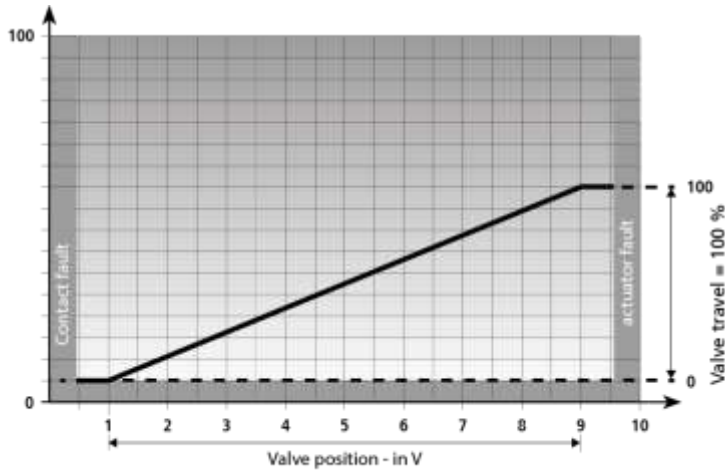
- The internal energy storage may only have a small residual charge after longer storage.
- The internal energy storage is designed for at least 4 power failures per day.
- The charging time for a completely empty energy storage is 16 hours.
- When the operating voltage is applied to the failsafe drive again, it starts initialization, see points 2.1 and 2.2.
- 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 section 2.7
- Perform the commissioning of the valve

2.4.1 OEM: Factory setting

The failsafe parking position can be set at the factory in increments of 10 percent at the customer's request.

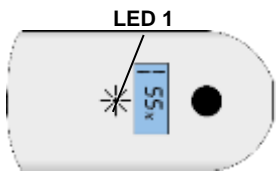
2.5 Optional feedback signal (MPOF)

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 voltage resistant up to 24 V. It outputs a voltage proportional to the actuator position, which is made available to the DDC system.



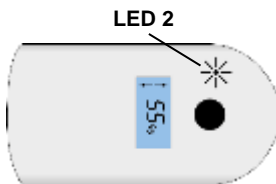
Voltage	Description
<0.5 V	No function or no contacting
1-9 V	Voltage emitted proportionally to the stroke
1 V	Corresponds to a closed valve
9 V	Corresponds to an open valve
> 9.5 V	Internal error

2.6 Function display via LED



For function signalling of operating statuses, the OEM Motoric Valve Drive: 24 V Proportional Failsafe has two multi-coloured LEDs. Green and red are used as signal colours.

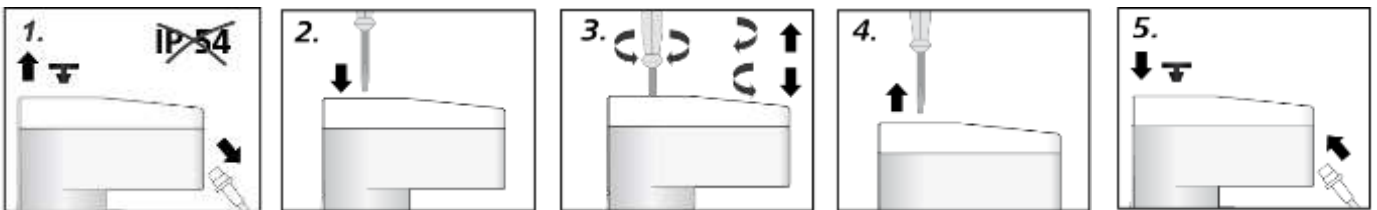
LED 1	Description
Green (flashes)	Initialisation
Red	Error ¹



LED 2	Description
Green (flashes)	Failsafe operation, parking position is approached
Green	Device ready
Orange	Ready for operation, battery is charging
Red	Error ¹

2.7 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.



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

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

3. 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.

4. Remove the screwdriver after reaching the desired position.

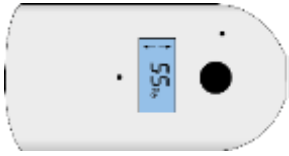
5. Install the protective plug and connect the connection line.

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".

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

2.8 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.

2.9 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.

2.10 Anti-theft device



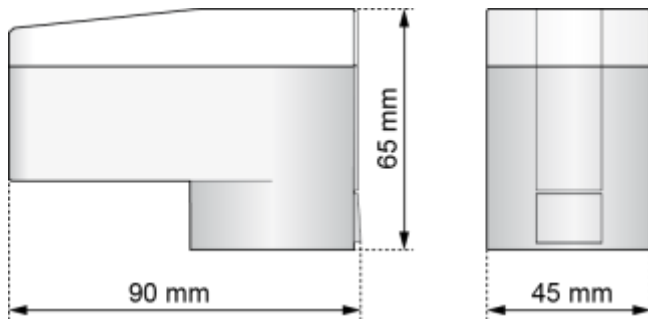
The OEM Motoric Valve Drive: 24 V Proportional Failsafe is secured against disassembly by unauthorised persons by simply removing the locking button.

3 Technical data

Type	MPRF 468x5	MPVF 468x5	MPOF 468x5
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		
Failsafe activations / day	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		
Feedback signal:	Voltage range	0 V... 10 V	
	Output current	1 mA	
	Load impedance	10 kΩ–1000 kΩ	
	Resolution	0.1 V	
Stroke	Standard	Max. 8.5 mm	
	Parametrisable in factory	2 mm to 8.5 mm	
Actuation force	Standard	125 N -20/+40%	
	depending on variant	200 N -20/+40%	
Actuation time	Standard -30	15 s/mm	
	Option -20	30 s/mm	
Noise level	<30dB/A		
LCD (H x W)	10 x 20 mm, optionally with blue background lighting		
LED	Multicolour LED		
Fluid temperature	0 °C to +100 °C		
Storage temperature	-20 °C to +70 °C		
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	3 x 0.22 mm ² PVC	4 x 0.22 mm ² 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		

1) in all installation positions

3.1 Dimensions



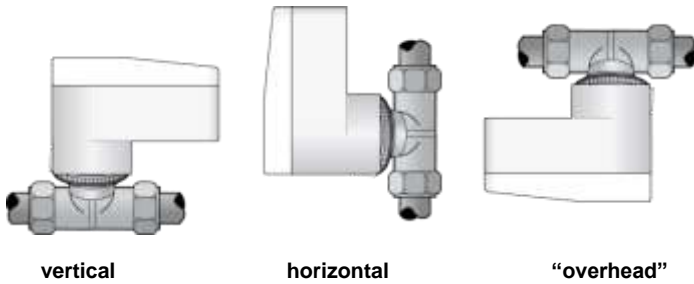
3.2 Certificates



The OEM actuator 5 has NRTL approval by TÜV Süd.

4 Installation notes

4.1 Installation position



The OEM Motoric Valve Drive: 24 V Proportional Failsafe can be operated in any installation position.

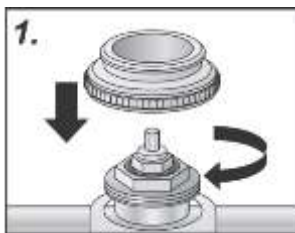
4.2 Installation with valve adapter

ATTENTION!

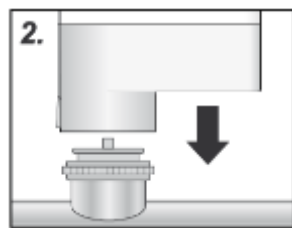
Installation with extracted valve pressure plate leads to actuator damage.

- Only install the actuator with completely retracted valve pressure plate.
- Retract an extracted valve pressure plate with the manual valve setting, or electrically.

The OEM Motoric Valve Drive: 24 V Proportional Failsafe is mounted on the valve using a valve adapter. An extensive range of valve adapters ensures perfect mechanical adaptation of the actuator to almost all valves on the market. The OEM Motoric Valve Drive: 24 V Proportional Failsafe 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.



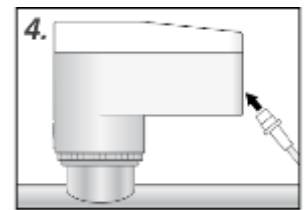
1. Screw the valve adapter manually onto the valve.



2. Position the OEM Actuator manually in vertical position to the valve adapter.



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

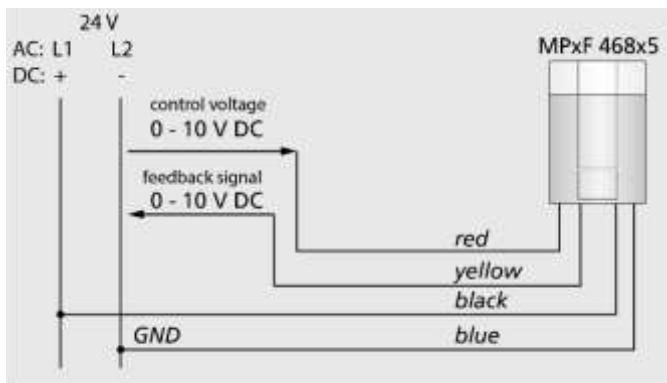


4. Connect the connection line to the OEM Actuator.

Note

The actuator should be commissioned on the valve. Briefly switching on the operating voltage triggers the failsafe function and the drive shaft extends. The actuator cannot be mounted with the shaft extended. It must be moved by hand to the mounting position before mounting.

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



Connection line

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

Cable	Section	Length
Standard DDC line	0.22 mm ²	20 m
J-Y(ST)Y	0.8 mm	45 m
NYM / NYIF	1.5 mm ²	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 OEM Actuators.

The Motoric Valve Drive Proportional Failsafe is controlled via a 0-10 V control unit or a building management system.

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