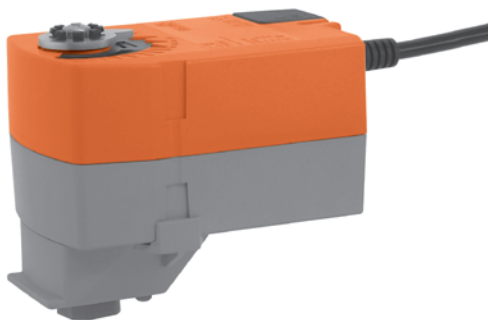


Multifunctional rotary actuator with emergency control for 2 and 3 way control ball valve

- Torque 2 Nm
- Nominal voltage AC/DC 24 V
- Control: Modulating DC 0 ... 10 V or variable
- Position feedback DC 2 ... 10 V or variable
- Communication via Belimo MP-Bus
- Conversion of sensor signals
- TRF24-MFT: deenergised NC
- TRF24-MFT-O: deenergised NO



Technical data

Electrical data

Nominal voltage	AC 24 V, 50/60 Hz / DC 24 V
Power supply range	AC 19.2 ... 28.8 V / DC 21.6 ... 28.8 V
Power consumption	In operation 2.5 W at nominal torque
	At rest 1 W
	For wire sizing 4 VA
Connection	Cable 1 m, 4 x 0.75 mm ²
Parallel connection	Yes

Functional data		Factory settings	Variable	Settings
Torque (nominal torque)	Motor	Min. 2 Nm at nominal voltage		
	Spring-return	Min. 2 Nm		
Control	Control signal Y	DC 0 ... 10 V, input impedance 100 kΩ	Open-close, 3-point	
	Working range	DC 2 ... 10 V	Start point DC 0.5 ... 30 V End point DC 2.5 ... 32 V	
Position feedback (measuring voltage U)		DC 2 ... 10 V, max. 0.5 mA	Start point DC 0.5 ... 8 V End point DC 2.5 ... 10 V	
Uni-rotation		±5%		
Direction of rotation	Motor	Can be selected ↺ / ↻		
	Spring-return TRF24-MFT	Deenergised NC, ball valve closed (A – AB = 0%)		
	TRF24-MFT-O	Deenergised NO, ball valve open (A – AB = 100%)		
Direction of motion at Y = 0 V		In switch position 0 ↺ or 1 ↻	Electronically reversible	
Manual override		No		
Angle of rotation		Max. 95° <↺		
Running time	Motor	90 s / 90° <↺	75 ... 300 s	
	Spring-return	<25 s @ –20 ... 50°C / max. 60 s @ –30°C		
Automatic adjustment of running time, operating range and measuring signal U to match the mechanical angle of rotation		Manual triggering of the adaption by switching from ↺ to ↻ twice within 5 s or with PC-Tool.	Automatic adaption whenever the supply voltage is switched on, or manual triggering	
Override control (with reference to the effective angle of rotation)		MAX (maximum position) = 100%	MAX = (MIN + 32%) ... 100%	
		MIN (minimum position) = 0%	MIN = 0% ... (MAX – 32%)	
		ZS (intermediate position, AC only) = 50%	ZS = MIN ... MAX	
Sound power level	Motor	Max. 35 dB (A)		
	Spring-return	~ 62 dB (A)		
Service life		Min. 60'000 emergency settings		
Position indication		Mechanical		

Safety

Protection class	III Safety extra-low voltage
Degree of protection	IP42 in all mounting positions
EMC	CE according to 89/336/EEC
Mode of operation	Type 1 (to EN 60730-1)
Rated impulse voltage	0.8 kV (to EN 60730-1)
Control pollution degree	3 (to EN 60730-1)

Technical data

(Continued)

Safety

Ambient temperature range	0 ... +50 °C
Temperature of medium	+5 ° ... +100 °C (in the ball valve)
Non-operating temperature	-40 ... +80 °C
Ambient humidity range	95% r.H., non-condensating (to EN 60730-1)
Maintenance	Maintenance-free

Dimensions/weight

Dimensions	See «Dimensions» on page 5
Weight	Approx. 600 g (without the ball valve)

Safety notes



- The actuator has been designed for use in stationary heating, ventilation and air conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- It may only be installed by suitably trained personnel.
All applicable legal or institutional installation regulations must be complied with.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cable is not allowed to be removed from the unit.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. All locally valid regulations and requirements must be observed.

Product features

Mode of operation	The actuator moves the ball valve into the operating position while simultaneously charging the return spring. The ball valve is turned back into the safety position by the application of spring energy when the power supply is interrupted. <i>Conventional operation:</i> The actuator is controlled with a standard modulating signal of DC 0 ... 10 V and travels to the position defined by the control signal. Measuring voltage U serves for the electrical display of the damper position 0 ... 100% and as slave control signal for other actuators. <i>Operation on the MP-Bus:</i> The actuator receives its digital positioning signal from the higher level controller via the MP-Bus and travels to the position defined. Connection U serves as communication interface and does not supply an analogue measuring voltage														
Converter for sensors	Connection option for a sensor (passive or active sensor or switching contact). The MP actuator serves as an analogue/digital converter for the transmission of the sensor signal via MP-Bus to the higher level system.														
Parameterisable actuators	The factory settings cover the most common applications. Input and output signals and other parameters can be altered with the MFT-H parameterising device or the BELIMO Service Tool, MFT-P.														
Simple direct mounting	Simple direct mounting on the ball valve with only one screw. The mounting position in relation to the ball valve can be selected in 90° < steps.														
High functional reliability	The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.														
Home position	When the supply voltage is switched on, the actuator automatically detects its safety position (zero initialisation). This process, which takes place with the actuator stationary, lasts approximately 15 s.														
	<table><tr><td>TRF24-MFT-O</td><td>TRF24-MFT</td></tr><tr><td></td><td></td></tr><tr><td colspan="2">Direction of rotation switch</td></tr><tr><td></td><td></td></tr><tr><td>Y = 0</td><td>Y = 0</td></tr><tr><td></td><td></td></tr><tr><td colspan="2">A – AB = 0%</td></tr></table>	TRF24-MFT-O	TRF24-MFT			Direction of rotation switch				Y = 0	Y = 0			A – AB = 0%	
TRF24-MFT-O	TRF24-MFT														
															
Direction of rotation switch															
															
Y = 0	Y = 0														
															
A – AB = 0%															
Combination valve actuators	Refer to the valve documentation for suitable valves, their permitted media temperatures and closing pressures.														

Accessories

	Description	Data sheet
Electrical accessories	Manual parameterising device MFT-H	T2 - MFT-H
	PC-Tool MFT-P	T2 - MFT-P
	Position sensor SG..24	T2 - SG..24
	Digital position indication ZAD24	T2 - ZAD24

Electrical installation

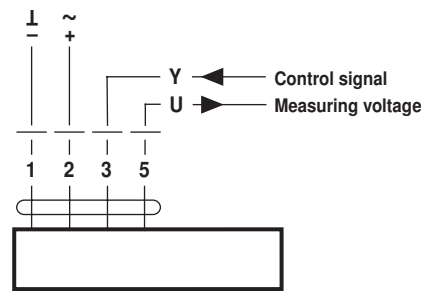
Wiring diagram

Note

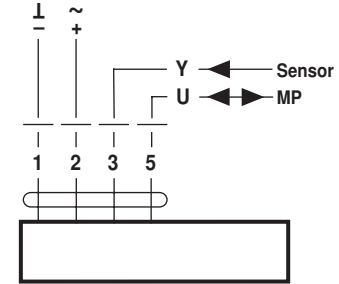
- Connect via safety isolation transformer.
- Parallel connection of other actuators possible. Note the performance data.



Conventional operation

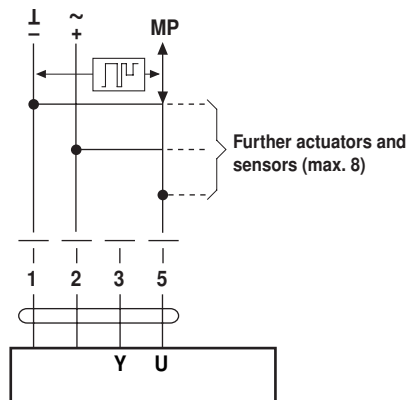


Operation on the MP-Bus



Functions when operated on MP-Bus

Connection on the MP-Bus

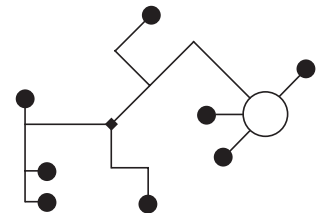


Supply and communication

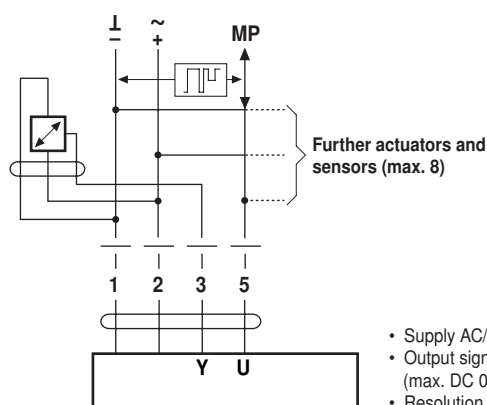
- in one and the same 3-wire cable
- no shielding or twisting necessary
- no terminating resistors required

Power topology

There are no restrictions for the network topology (star, ring, tree or hybrid forms are permitted).

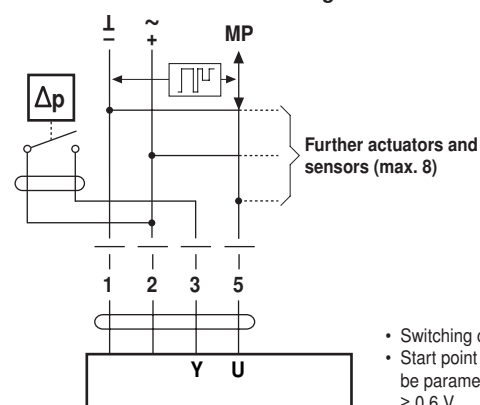


Connection of active sensors



- Supply AC/DC 24 V
- Output signal DC 0 ... 10 V (max. DC 0 ... 32 V)
- Resolution 30 mV

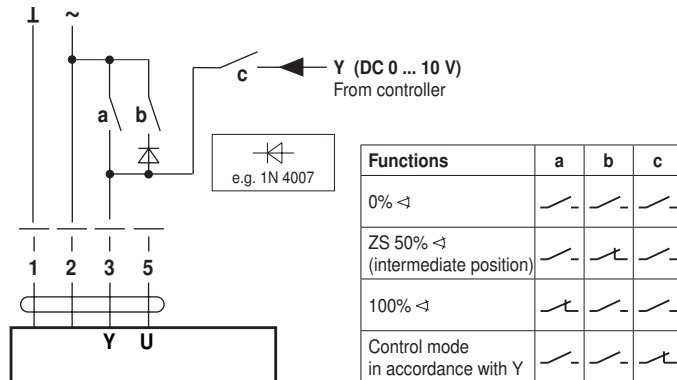
Connection of external switching contact



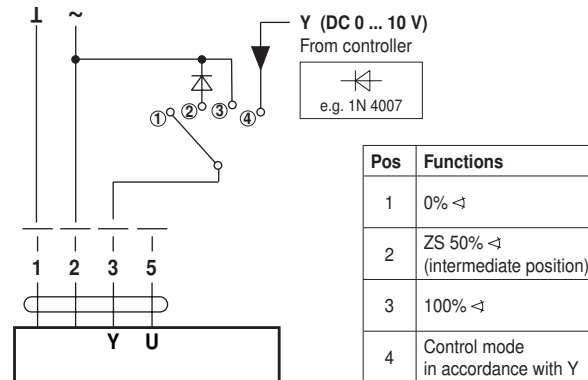
- Switching current 16 mA @ 24 V
- Start point of the operating range must be parameterised on the MP actuator as ≥ 0.6 V

Functions with basic values

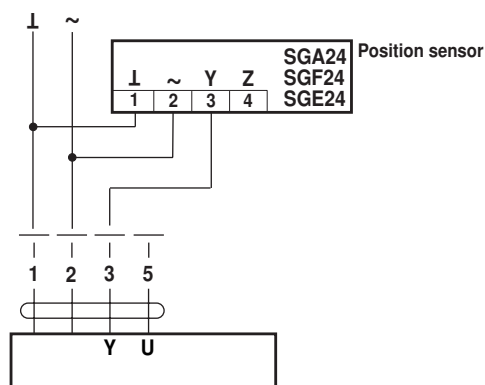
Override control with AC 24 V with relay contacts



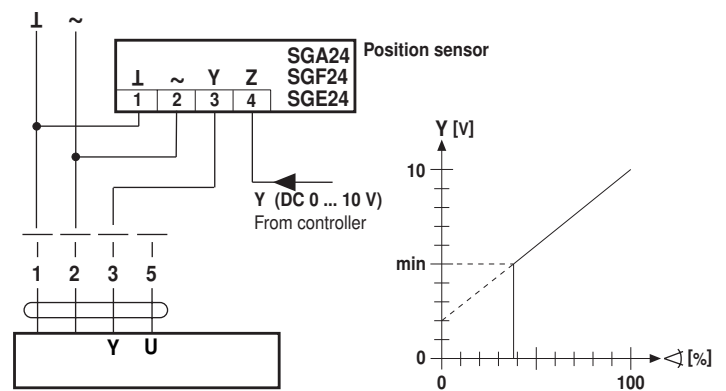
Override control with AC 24 V with rotary control switch



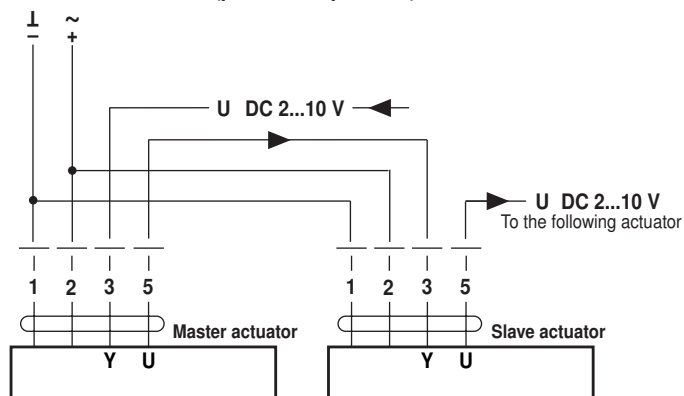
Remote control 0 ... 100 %



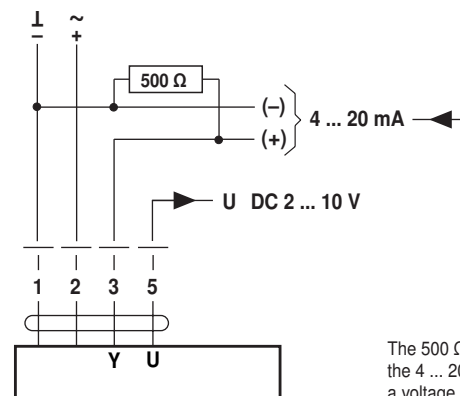
Minimum limit



Master/Slave control (position-dependent)

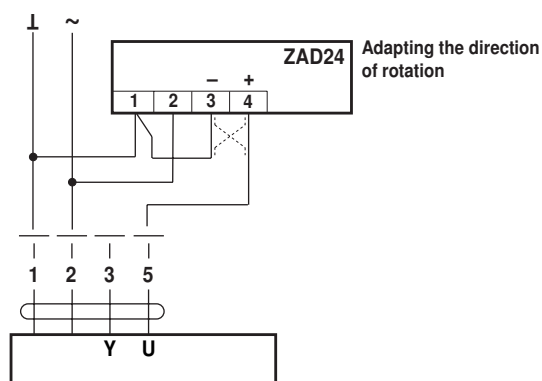


Control with 4 ... 20 mA via external resistance

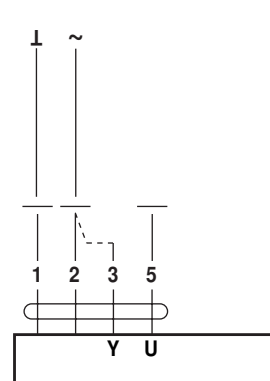


The 500 Ω resistor converts the 4 ... 20 mA current signal to a voltage signal DC 2 ... 10 V

Position indication



Functional check

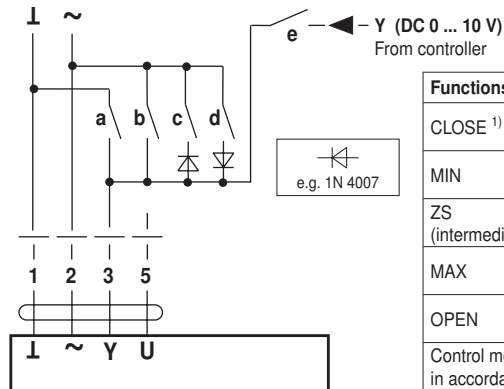


Procedure

- Apply AC 24 V to connection 1 and 2
- Disconnect connection 3:
 - For direction of rotation ↻: Actuator turns in the direction of ↻
 - For direction of rotation ↻: Actuator turns in the direction of ↻
- Short circuit connections 2 and 3:
 - Actuator runs in the opposite direction

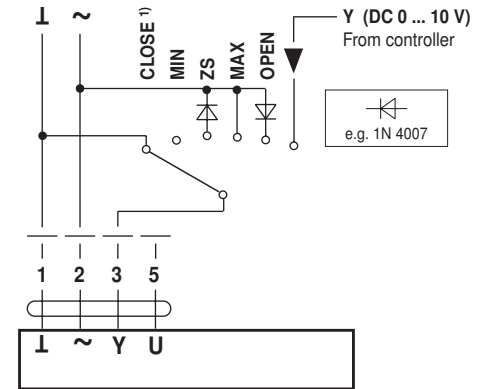
Functions for actuators with specific parameters

Override control and limiting with AC 24 V with relay contacts



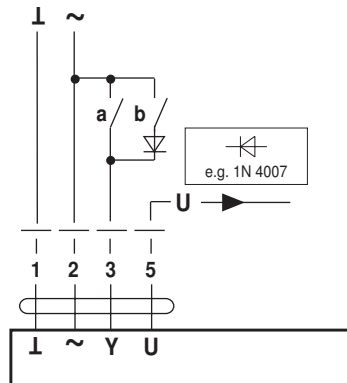
Functions	a	b	c	d	e
CLOSE ¹⁾					
MIN					
ZS (intermediate position)					
MAX					
OPEN					
Control mode in accordance with Y					

Override control and limiting with AC 24 V with rotary switch



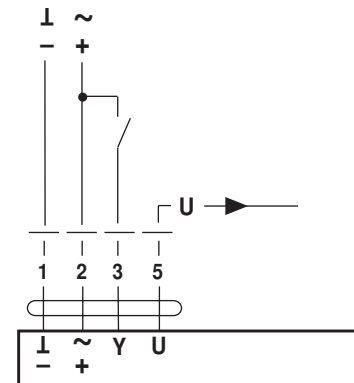
¹⁾ **Caution!** This function is only guaranteed if the start point of the operating range is defined as min. 0.6 V.

3-point control



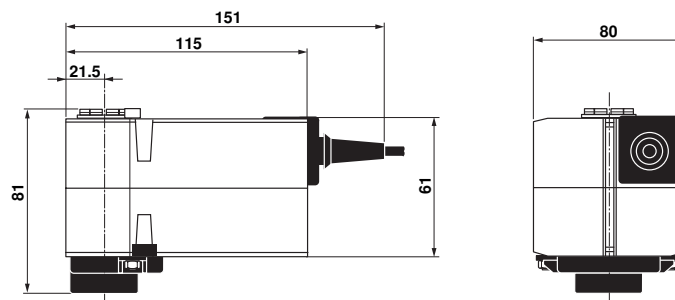
	TRF24-MFT-O	TRF24-MFT	
	Direction of rotation switch		
a			
b			
			A - AB = 100%
			A - AB = 0%

Open/close control



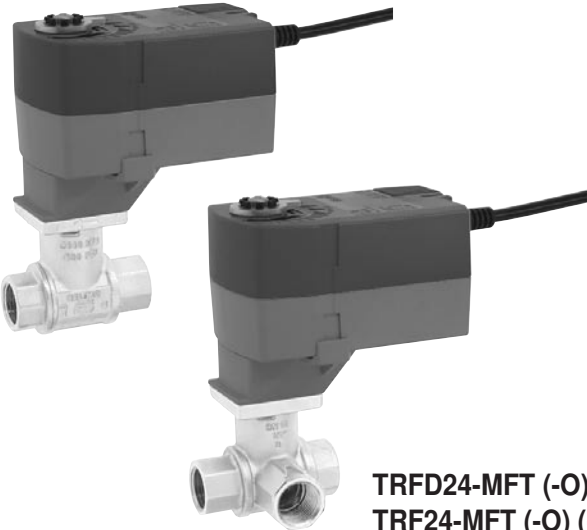
Dimensions [mm]

Dimensional diagrams



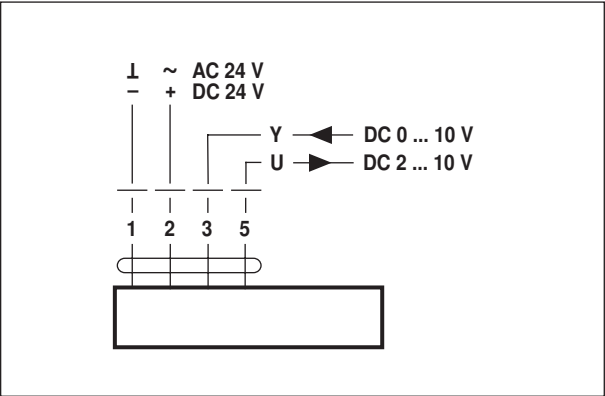
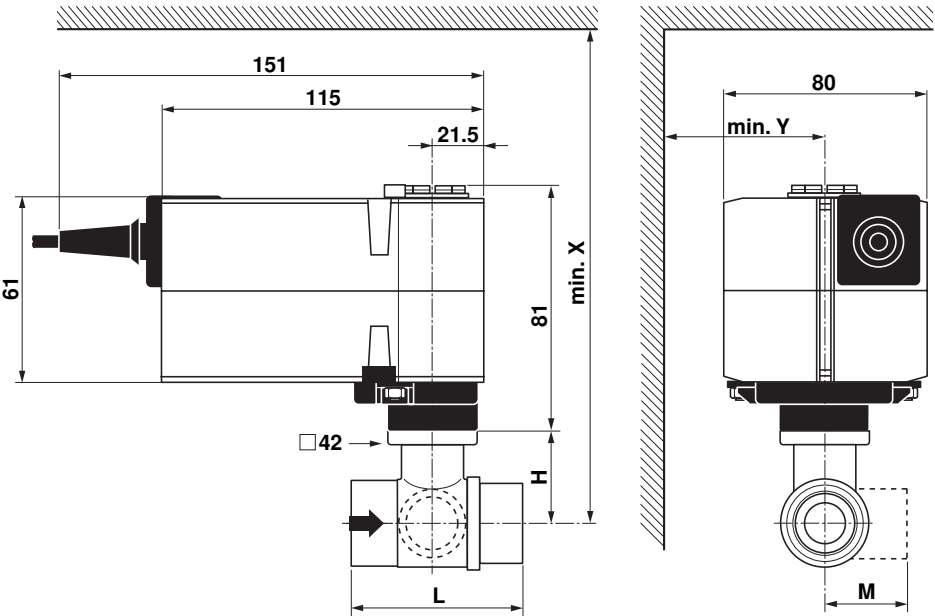
Further documentations

- Complete overview of actuators for water solutions
- Data sheets for butterfly valves
- Installation instructions for actuators and/or ball valves
- Notes for project planning (hydraulic characteristic curves and circuits, installation regulations, commissioning, maintenance etc.)

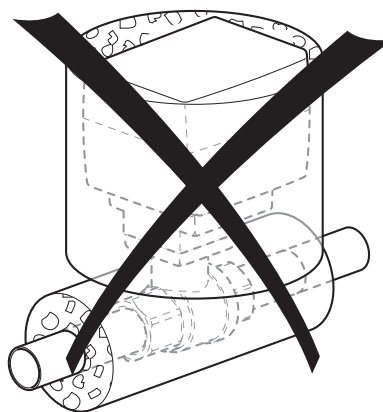
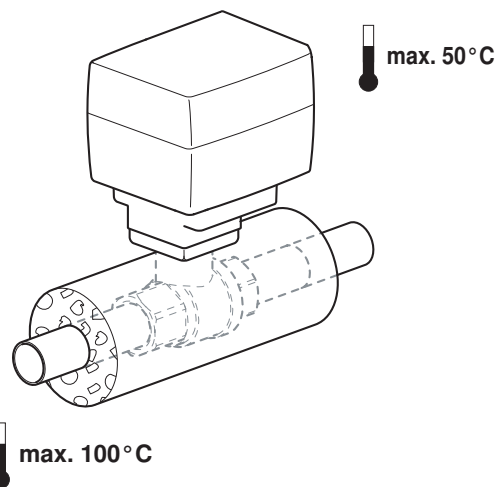


TRFD24-MFT (-O) (-T)
TRF24-MFT (-O) (-T)

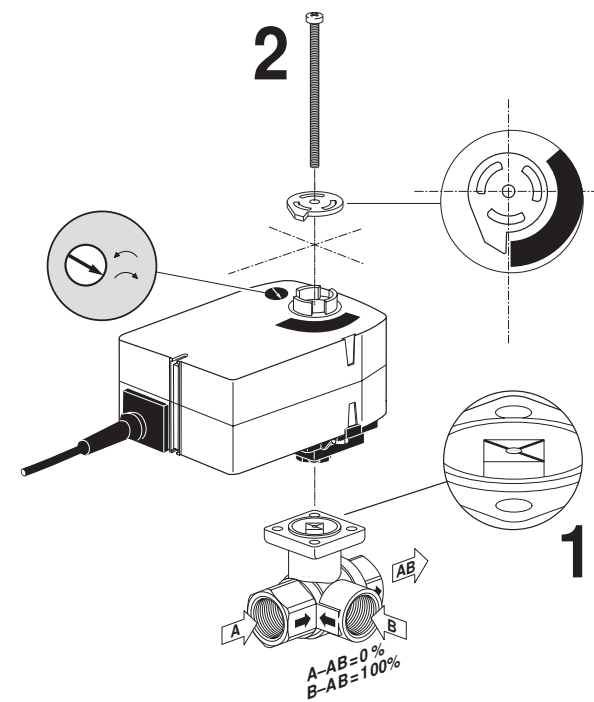
70356-00001.A



		DN		Rp	G	PN	mm			TRFD..(-O)(-T)		TRF..(-O)(-T)	
		mm	"				L	H	M	X	Y	X	Y
R2..K	R3..K	10	3/8	3/8			52	35	28	180	80		
R4..K	R5..K	10	3/8		3/4		69	31.5	34	180	80		
R2..	R3..	15	1/2	1/2			67	45	39			190	80
R4..	R5..	15	1/2		1		74	44	38			190	80
R6..R	R7..R	15	1/2			6	101.5	45	73			190	80



TRFD..(-T)
TRF..(-T)



TRFD..-O (-T)
TRF..-O (-T)

