



# techsystem

automatyka klimatyzacja wentylacja

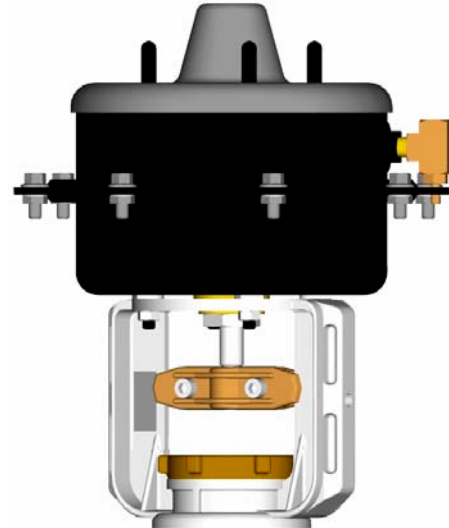
▸ zapoznaj się z naszą ofertą

## MP8xxxxx20 (MP8000) Pneumatic Valve-Actuator

### General

These service and data information (in brief SDI) are operating instructions and contain instructions for the safe installation and operation of the pneumatic actuator. Should difficulties occur, during installation, which cannot be solved with the help of this SDI please ask your supplier for further information.

These SDI are in accordance with the relevant safety standards and regulations of the EU. When operating the positioner outside the Federal Republic of Germany, it is the responsibility of the control system administrator or operator to ensure that valid national control standards are met. The manufacturer maintains all rights for technical changes and improvements at any time Operators are to receive instructions in accordance with this SDI.



### Qualified personnel

These are persons conversant with the erection, installation, commissioning, operation and service of the product and in possession of the respective qualifications through their activities and functions, e.g.:

- Instruction about and obligation to maintain adherence to all operative regional and factory-internal directives and requirements, conditional to application.
- Training or instruction in accordance with standards of safety in maintenance and utilisation of adequate safety- and protective equipment.
- Training in first aid, etc. (See TRB 700).

### Application:

Diaphragm actuators in conjunction with control valves serve to regulate the flow of fluids in heating systems, cooling systems and cold water systems. The stroke action distinguishes between direct or reverse action actuators. Decreasing actuator air pressure allows the stem to be retracted by spring force. The term "reversible actuator" means that it is possible to change the action of the actuator in-situ, with a conversion kit. When converting the action of an actuator with hand wheel, the action of the hand wheel must be taken into account. A pneumatic positioner (PR 10) can be used to regulate the stroke.

Valve and actuator application, are the responsibility of the control system administrator. Particular markings on the valve with actuator such as flow directional arrow are to be observed.

Dry compressed air is an absolute requirement during usage in below zero temperatures!

Valve and actuator may be supplied as single units or as valve / actuator combinations, factory mounted and tested.

### Technical data

- |  |              |                      |                   |
|--|--------------|----------------------|-------------------|
| • Diaphragm area 160 cm <sup>2</sup>                         | Stroke 13-mm | • Diaphragm material | EPDM              |
| • Ambient temperature  | -4 to +80°C  | • Housing material   | Ck 10 (1.1121)    |
| • Max. operating pressure                                    | 160 kPa      | • Stem material      | 9SMnPb36 (1.0737) |
| • Air quality requirements in accordance with DIN ISO 8573-1 |              |                      |                   |
| • Air quality class:   | 3 – 2 – 3    |                      |                   |

**Additional equipment**

- Hand wheel
- Pneumatic positioner
- (2) end position indicators + 2k $\Omega$ -feedback potentiometer

**Storage:**

- Storage temperature -4°C to +80°C, dry and free of dirt.
- Do not damage the lacquer. The lacquer is a foundation intended only as a protection against corrosion while in storage and during transport.
- In rooms where moisture or condensation are present use heating or a drying agent to maintain a moisture-free atmosphere.

**Transport:**

- Transport temperature -4°C to +80°C.
- Protect against external forces (shock, vibration etc.).
- Do not damage the protective lacquer.

Diaphragm Area (cm <sup>2</sup> )	Stroke (mm)	Spring range (kPa)	Spring close-off force (N)	Air pressure (kPa) to close-off force (N)		
				120	140	160
160	13	20 – 50	320	1120	1440	1760
		60 – 90	960	480	800	1120

**Air supply connection:**

The diaphragm actuator is equipped with a tube connection permitting connection with 4 x 6-mm plastic tubing.

**Caution:**

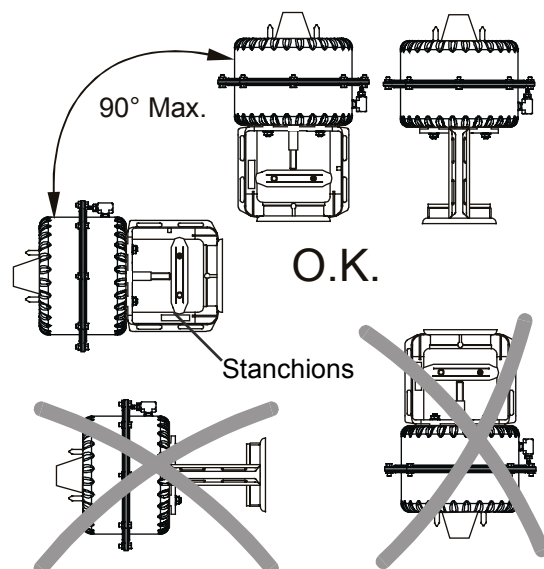
Remember to take tubing temperature limits into account.

**Mounting orientation**

It is recommended that the valves be mounted within 90° of the upright position, in an easily accessible location.

**Caution:**

When mounting in an *inclined to horizontal* position, the yoke should be fitted such that the stanchions are aligned vertically one above the other as is depicted.



**Danger:**

Safe operation of the valve is only ensured if the valve is installed, commissioned and serviced by qualified personnel in compliance with warning references in this SDI. In addition, the general installation and safety regulations for piping, installation construction and the professional use of tools and safety equipment must be guaranteed. Observe unconditionally during all work on the control valve. Ignoring this information may cause physical or material damages.

**Pre-installation precautions:**

- Provide protection against adverse weather conditions, e.g. moisture; (otherwise use drying agent).
- Suitable protective action prevents damage.

**Installation site information:**

The valve installation site should be easily accessible and provide sufficient room for service and removal of actuators. Manual shut-off valves should be located up and downstream of the control valve, to facilitate service and repairs without drainage of the piping system. The control valve should preferably be installed in vertical position with actuator installed in the upright position. Inclined to horizontal installation without support is only permissible for actuators with a low specific weight.

The permitted actuator weight when installed in the horizontal position, relative to valve stem, without additional support at site is:

7kg for DN 15 - 40

Pipes should be insulated to protect actuators against high temperatures; here sufficient room is to be left for servicing the stem seal pack. For trouble free function of the control valve the pipe immediately upstream of the valve should be straight for the length of at least 2x DN and the pipe immediately downstream for the length of at least 6x DN.

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**Actuator mounting and removal information:**

The control valve is normally supplied complete with actuator. It is not permitted to remove or replace an actuator on systems in operation, under operating temperature and pressure. For conversion or service, the actuator mounting procedure should follow the actuator SDI.

During mounting procedure care should be taken NOT to rotate the plug with downward pressure.

The maximum valve operating force must be observed when replacing the actuator. This is:

2000N for DN 15 – 40

**Commissioning:**

- Prior to commissioning check information on material, pressure, temperature and flow-direction are in conjunction with the installation piping system plan.
- Follow TRB 700.
- Impurities in the piping system and valves, such as dirt, welding beads etc. will cause the system to leak.
- Prior to commissioning a new installation, or re-commissioning after repairs or service, ensure that:
  - Correct installation- and assembly work has been completed.
  - Only qualified personnel carry out commissioning.
  - Correct functional position of the valve is ascertained.
  - Maintenance of existing protective facilities is carried out

**Note:**

The pressure equipment directive (PED) and also the VDI/VDE 2174 from October 1967 for pneumatic actuators, have been observed

**Abbreviations:****DA Actuator:**

Actuator stem extends (spring-return up).

**RA Actuator:**

Actuator stem retracts (spring-return down).

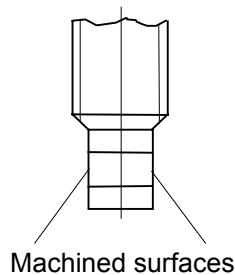
**Single item delivery**

DA and RA actuator construction details.

- Screw the stem extension as far as possible into the actuator stem.
- Always: Pull the valve stem up to connect to DA actuators.  
Push the valve stem down to connect to RA actuators.
- Place the actuator with yoke onto the valve bonnet and tighten the ring nut.
- Connect the air supply and impinge the diaphragm with initial start pressure (see table below).

Spring range	Impinging pressure [kPa]	Operating pressure [kPa]
20 - 50	20	50
60 - 90	60	90

- Unscrew the stem extension until it abuts the valve stem; observe the machined surfaces (see fig below).



- Fit the coupler.
- Fix the stroke position indication plate.
- Fit other accessories e.g. positioner, position feedback indicator etc in accordance with the device by-pack.

**Replacing the actuator and changing the DA or RA mode**

- Remove accessories e.g. positioner, position feedback indicator etc.
- Remove cover when fitted and remove the hand wheel assy. in accordance with paragraph Fitting and removing DA hand wheel.
- Remove coupler.
- Remove ring nut.
- Remove the actuator
- When **replacing** the actuator observe paragraph Single item delivery
- When **changing the action mode**, remove the yoke by removing the 4 bolts. Turn the actuator body upside down (180°) refit the yoke to the new position i.a.w. paragraph Single item delivery. When necessary, refit the hand wheel i.a.w. Fitting and removing DA hand wheel.

**Fitting and removing DA hand wheel.****Caution:**

It is necessary to grease the threaded bush (8) and threaded spindle (4). With the grease (in tube) provided.

**To fit carry out the following sequence**

1. Remove cover.
2. Screw the four spacer-studs (1) into actuator casing and place cover (11) in position.
3. Position the bearing (3) on the threaded spindle (4) as in diagram.
4. Now place the plate (2) and then the lock washer (5) on to the spindle and align the holes with the holes in the hand-wheel (6), then, fix with spring dowel (7).
5. Place O-ring (9) into the plate (2) groove.
6. Screw in the threaded bush (8) until it hits the stop (don't forget to grease).
7. Fit the pre-assembled unit onto spacer-studs (1) so that the threaded bush (8) is guided by the spacer-studs (1), also the cap fits into the plate (2) groove with O-ring (9).
8. Fasten the assembly onto the spacer-studs (1) with Allen screws (10).
9. Fix ID Plate on cover (11)

Test for trouble free function by operating the hand-wheel manually through one full stroke

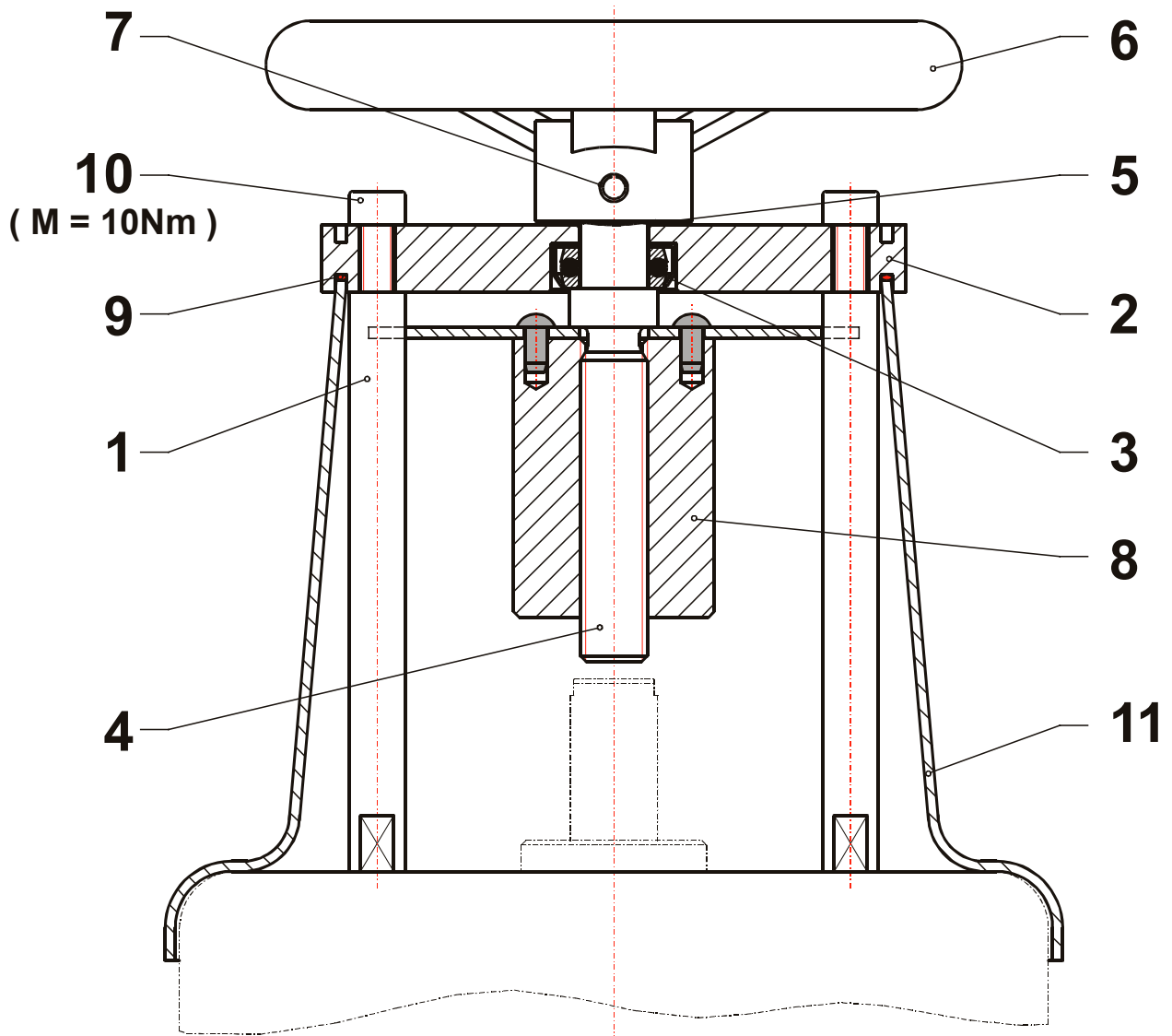
**Caution:**

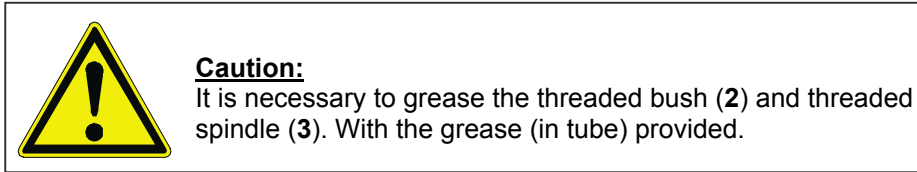
To ensure correct function during operation the hand wheel must be turned anti-clockwise till it hits the stop.

To remove follow the procedure in reverse

# Hand wheel DA

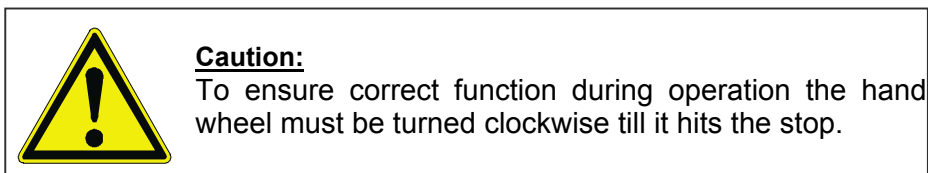
MP822



**Fitting and removing RA hand wheel.****To fit carry out the following sequence**

1. Remove cover.
2. Screw the four spacer-studs (1) into actuator casing.
3. Remove transport lock from threaded bush (2). Push the Allen key through the threaded bush into the 7/16<sup>th</sup> UNF bolt (X) and connect to actuator stem. Ensure that the threaded bush (2) is guided by the spacer-bolts (1).
4. Connect the hand wheel (4) to the threaded spindle (3) with the spring dowel (5)
5. Position the bearing (6) in the plate bore (7) as in diagram.
6. Place the hand wheel (4) with the threaded spindle (3) through the plate (2) as in diagram.
7. Place the corrugated washer (8) and washer (9) onto the threaded spindle (3). Carefully fit the circlip (10).
8. Place O-ring (11) into the plate (7) groove.
9. Place the cover (12) onto the actuator.
10. Screw the (don't forget to grease) threaded spindle (3) into the threaded bush (2) until it the plate (7) lays on the cover and the spacer-studs (1). Observe that the cover (12) fits into the plate (7) groove with O-ring (11).
11. Fasten the assembly onto the spacer-studs (1) with Allen screws (13).
12. Fix ID Plate on cover (12)

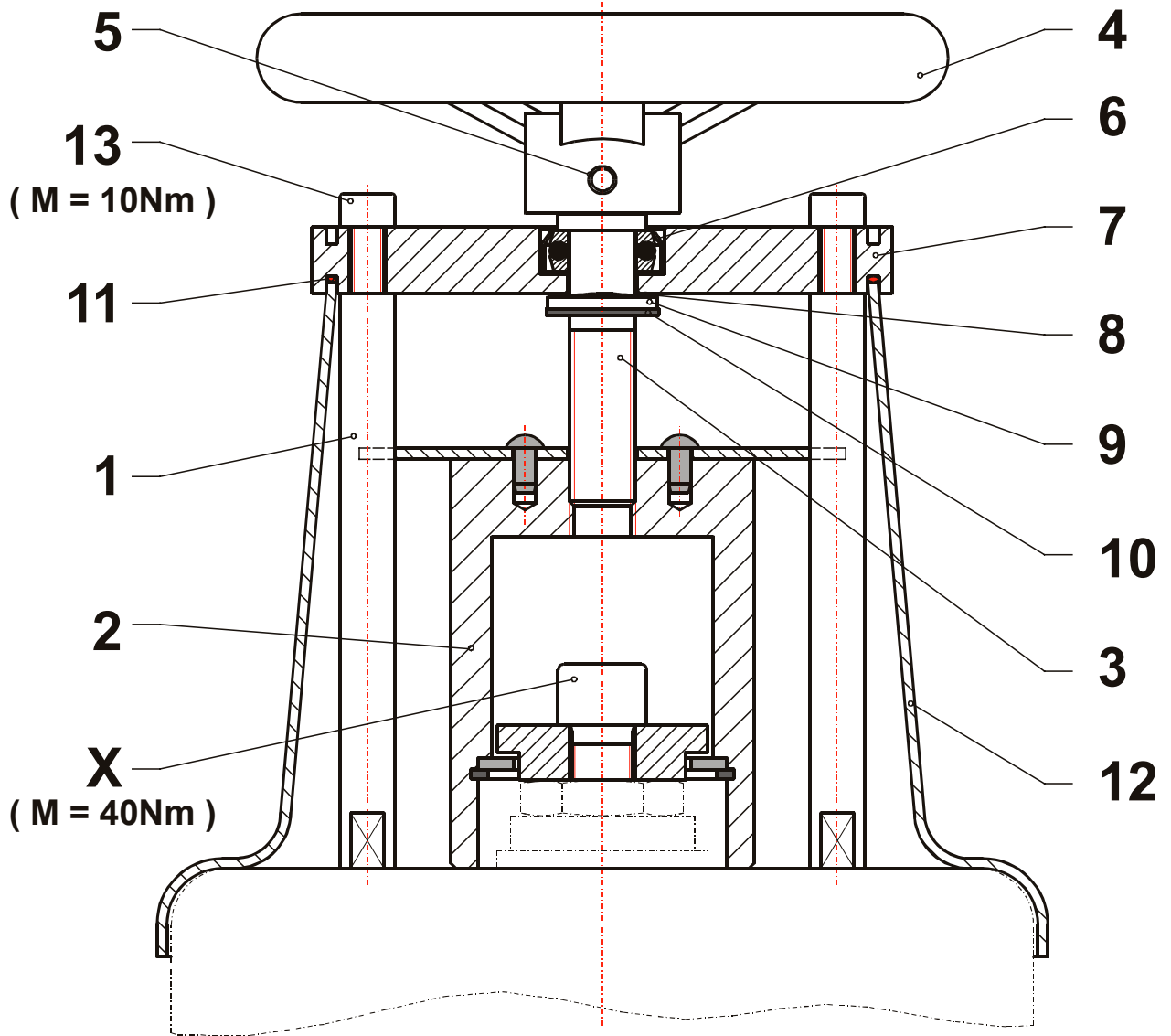
Test for trouble free function by operating the hand-wheel manually through one full stroke



To remove follow the procedure in reverse.

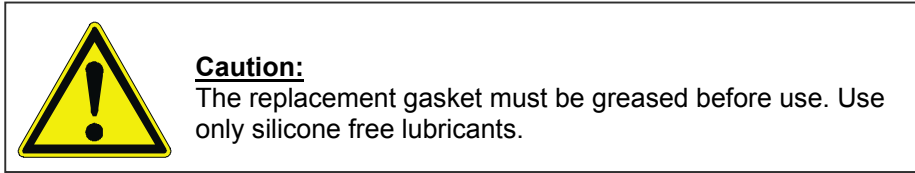
# Hand wheel RA

MP832



**To replace the hand-wheel gasket of a direct action device (DA):**

- Remove the hand-wheel assembly and cap. For refit see: *Fitting and removing hand wheel.*
- Remove the circlip, then the nylon spacer and replace the gasket.



- Refit nylon spacer and circlip then refit hand-wheel etc.

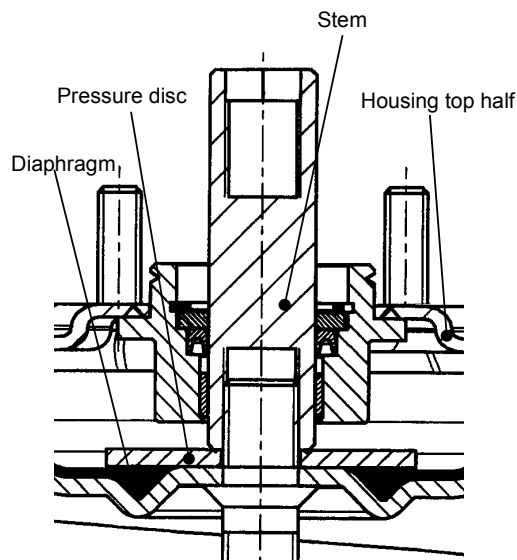
**To replace the hand-wheel gasket of a reverse action device (RA):**

**Condition:** The actuator is in-situ.

- Remove actuator as in paragraph: *Replacing the actuator and changing the DA or RA mode.*
- Replace the gasket as in paragraphs *To replace the hand-wheel gasket of a direct action device (DA)*
- For refit, carry out in reverse order.

**Replacing the diaphragm of a Direct Action or Reverse Action device:**

- Remove the hand-wheel assembly and cap. For refit see paragraphs: *Fitting and removing hand wheel.*
- Remove the nuts and bolts around the circumference of the actuator.
- Remove the housing top half.
- Slowly unscrew the spindle and remove the pressure disc.
- Carefully! Replace the diaphragm.
- Reassemble and refit the actuator.



**Removing the control valve (valve with actuator)**

Additional to the general installation guidelines and the TRB 700, the following points must be observed:

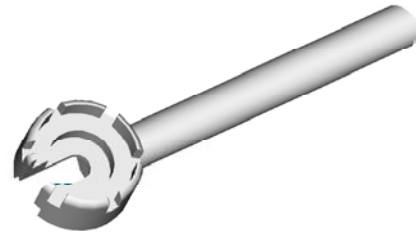


**Danger**

- Pressure free pipe system
- Sufficiently cooled fluid
- Drained system
- Sufficiently ventilated pipe system where aggressive and corrosive fluids are concerned
- Only qualified personnel are to be allowed to carry out installation.

**Tools and spares**

	MP8x2
Ring nut wrench:	111 6235 010
<b>For gasket and diaphragm replacement:</b>	
Circlip Pliers	111 5330 010
<b>Lubricant:</b>	
Silicone free actuator grease (60g tube)	111 5520 010
<b>Repair kits:</b>	
Diaphragm	MP8000-6325
Gasket	02-857-23



Ring nut wrench

**Accessories:**

Pneumatic positioner (PR10)  
 (2) auxiliary switches and 2kΩ (ER2)  
 Universal accessory kit  
 (Every accessory device requires an accessory kit)

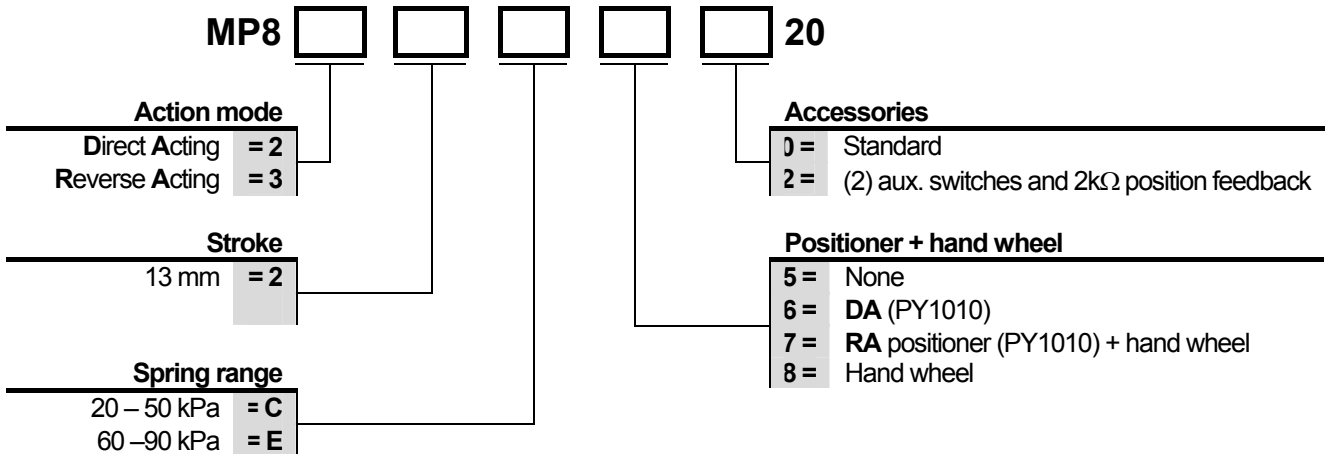
Order No.	Weight
PY - 1010 – 3000	1.0kg
PQ - 1000 – 3020	1.0kg
PQ - 2713 – 3011	0.4kg

**Hand wheel retro-fit kits**

Hand wheel DA (for MP822...)  
 Hand wheel RA (for MP832...)

Order No.	Weight
111 6128 011	2.0kg
111 6129 011	2.4kg

**Device code:**



### Close-off Pressures [kPa] with VG Valves

DN	K <sub>vs</sub> Coefficient	Actuator	DA Actuator Spring-return up PDTO Valve Mixing: Inlet 1 – Outlet Diverting: Inlet – Outlet 2 (Bypass)		DA Actuator Air Pressure closes PDTO Valve Mixing: Inlet 1 – Outlet Diverting: Inlet – Outlet 2 (Bypass)					
			RA Actuator Spring-return down PDTVC Valve Mixing: Inlet 2 – Outlet Diverting: Inlet – Outlet 2 (2-way)		RA Actuator Air Pressure closes PDTVC Valve Mixing: Inlet 2 – Outlet Diverting: Inlet – Outlet 2 (2-way)					
			Spring Range [kPa]		120 kPa Spring Range [kPa]		140 kPa Spring Range [kPa]		160 kPa Spring Range [kPa]	
			20 - 50	60 - 90	20 - 50	60 - 90	20 - 50	60 - 90	20 - 50	60 - 90
Spring ID No.		Spring ID No.		Spring ID No.		Spring ID No.		Spring ID No.		
23	63	23	63	23	63	23	63	23	63	

#### VG8000N PN 16 Valves

DN	K <sub>vs</sub>	Actuator	20 - 50	60 - 90	120 kPa	140 kPa	160 kPa	160 kPa	160 kPa	160 kPa
15	4.0 + 2.5	MP8x2	600	1600	1600	1600	1600	1600	1600	1600
15	0.1 – 1.6		1600	1600	1600	1600	1600	1600	1600	1600
20	4.0 / 6.3		200	1600	1600	890	1600	1600	1600	1600
25	6.3 / 10		90	1600	1600	560	1600	1510	1600	1600
32	10 / 16		-	1000	1250	230	1600	740	1600	1250
40	16 / 25		-	580	740	100	1060	420	1380	740

#### VG8300N PN 16 Valves

40	16 / 25	MP8x2	-	1600	1600	1600	1600	1600	1600	1600
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#### VG8000H PN 25 Valves

DN	K <sub>vs</sub>	Actuator	20 - 50	60 - 90	120 kPa	140 kPa	160 kPa	160 kPa	160 kPa	160 kPa
15	4.0 + 2.5	MP8x2	30	2500	2500	1330	2500	2500	2500	2500
15	0.1 – 1.6		820	2500	2500	2500	2500	2500	2500	2500
20	4.0 / 6.3		-	2500	2500	590	2500	1940	2500	2500
25	6.3 / 10		-	1780	2250	350	2500	1300	2500	2250
32	10 / 16		-	880	1140	120	1650	630	2160	1140
40	16 / 25		-	510	670	30	990	350	1320	670

#### VG8300H PN 25 Valves

40	16 / 25	MP8x2	-	2500	2500	2500	2500	2500	2500	2500
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**Close-off Pressures [kPa] with VBD Valves**

DN	K <sub>vs</sub> Coefficient	Actuator	DA Actuator Spring-return up PDTO Valve Mixing: Inlet 1 – Outlet Diverting: Inlet – Outlet 2 (Bypass)		DA Actuator Air Pressure closes PDTO Valve Mixing: Inlet 1 – Outlet Diverting: Inlet – Outlet 2 (Bypass)					
			RA Actuator Spring-return down PDTC Valve Mixing: Inlet 2 – Outlet Diverting: Inlet – Outlet 2 (2-way)		RA Actuator Air Pressure closes PDTC Valve Mixing: Inlet 2 – Outlet Diverting: Inlet – Outlet 2 (2-way)					
			Spring Range [kPa]		120 kPa Spring Range [kPa]		140 kPa Spring Range [kPa]		160 kPa Spring Range [kPa]	
			20 - 50	60 - 90	20 - 50	60 - 90	20 - 50	60 - 90	20 - 50	60 - 90
			Spring ID No.		Spring ID No.		Spring ID No.		Spring ID No.	
			23	63	23	63	23	63	23	63

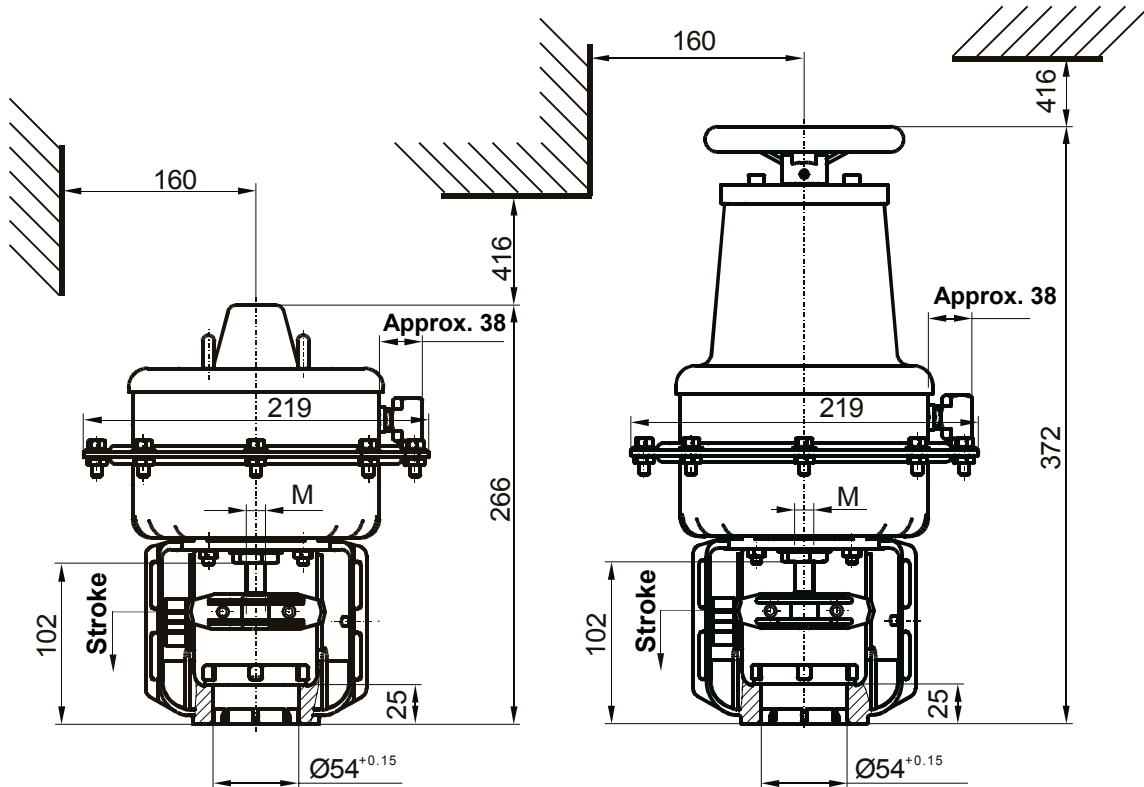
**VBD PDTC Two-Way Valves**

15	4.0	MP8x2	1340	2500	2500	2250	2500	2500	2500	2500
15	0.6 – 1.0		2430	2500	2500	2500	2500	2500	2500	2500
15	1.6 – 2.5		2500	2500	2500	2500	2500	2500	2500	2500
25	6.3 / 10		540	1850	2170	870	2500	1520	2500	2170
40	16 / 25		60	570	700	190	950	440	1210	700

**VBD Mixing Valves**

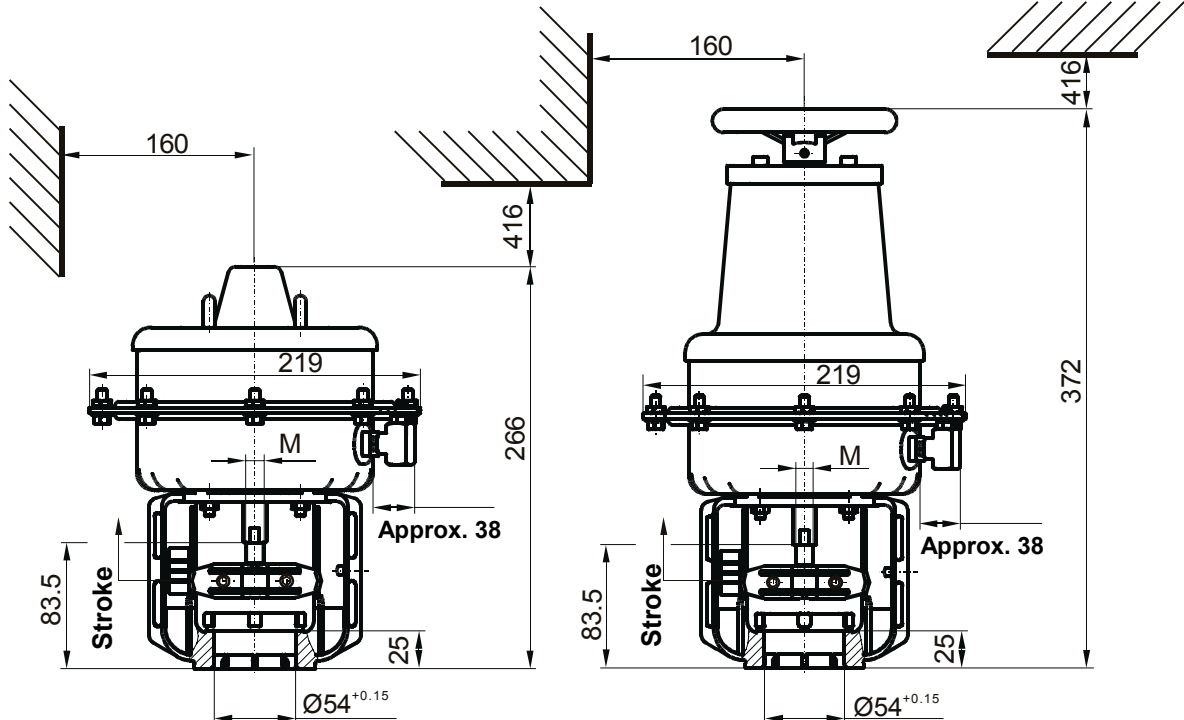
15	4.0	MP8x2	-	2500	2500	1150	2500	2500	2500	2500
15	0.6 – 1.0		370	2500	2500	2500	2500	2500	2500	2500
15	1.6 – 2.5		2500	2500	2500	2500	2500	2500	2500	2500
25	6.3 / 10		-	900	1330	-	2150	480	2500	1330
40	16 / 25		-	130	270	-	550	-	830	270

**Dimensions in mm**



DA actuator without hand wheel

DA actuator with hand wheel



RA actuator without hand wheel

RA actuator with hand wheel

## Causes and remedies when malfunction occurs

When experiencing malfunction please check that the installation and adjustments were carried out in accordance with these operating instructions. Properly qualified personnel (see: Qualified personnel) must always be present during maintenance or repair. The TRB 700 is to be observed.

Compare information regarding materials, pressure, temperature, flow direction, actuator action, spring range and controller, with installation plans of the piping system. The conditions of usage must also correspond to these operating instructions, the data sheet and the technical information given on the ID plate.



During troubleshooting, safety regulations must be observed unconditionally. If the problem cannot be solved using the following troubleshooting table please contact the supplier/manufacturer.

See paragraphs: **“Actuator mounting and removal information”** and **“Removing the control valve (valve with actuator)”** for any work to be carried out on the valve.

## Troubleshooting

Malfunction	Possible cause	Remedial action
Actuator does not move valve stem	No air pressure	Check air pressure system
	Split diaphragm	Replace membrane
	Valve plug stuck	Clean plug and valve seat or when necessary replace
Start-point incorrect	Actuator adjustment incorrect	Carry out new adjustment
	Control signal does not correspond to spring range	Check control and spring range
	High back pressure in valve	Use positioner
Valve stem moves jerkily	Valve plug etched by sticking dirt particles	Clean internal parts, smoothen damaged areas
	Positioner setting incorrect	Re-set positioner
High air consumption	Worn seals and gaskets	Replace
	Leaky tubes	
Stem moves constantly	Unstable control, oscillation in control system	Check amplification factor or time constant at the controller
	Positioner setting incorrect	Re-set positioner
Leakage rate is too high when valve closed	Sealing surfaces of the seat edge or plug washed away or worn	Replace plug (when necessary with stem) and / or seat ring
	Seat and plug dirty	Clean valve internal parts
	Pressure balance chamber leaking	Replace circlip
	Actuator thrust too low	Use actuator with more thrust
Valve stem „knocking“	Flow through valve in wrong direction	Correct the flow direction