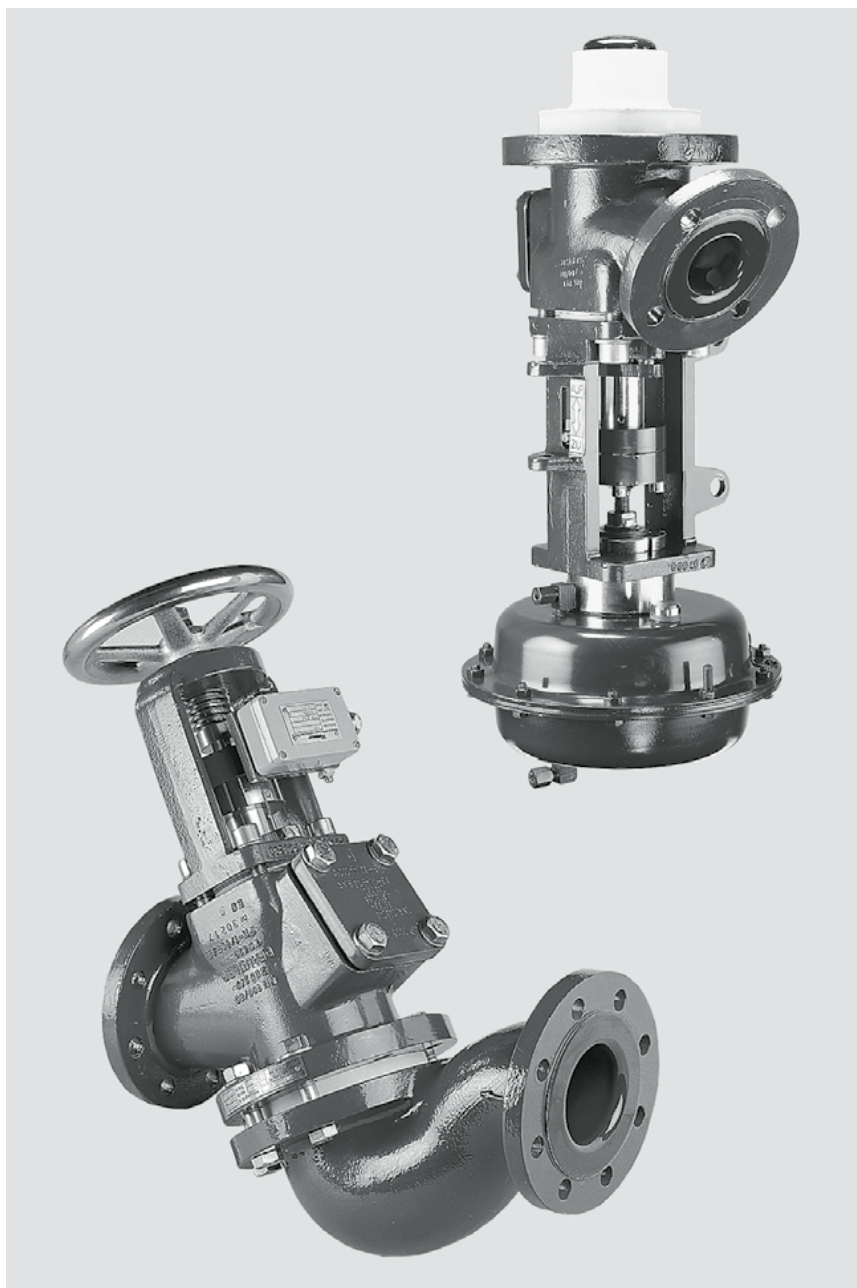


Glasslined outlet valves AMA-BT/APA-BT 80/50 ... 150/100

Glasslined line valves DMA-BT/DPA-BT 50 ... 100



Contents

- 1 Safety instructions**
 - 1.1 General Safety instructions
 - 1.2 Note for manually operated valves
- 2 Description/Technical Data and Limits of Application**
 - 2.1 Description of the valve series
 - 2.2 Explanation of type designations
 - 2.3 Technical data
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- 3 Transport and storage**
- 4 Installation**
 - 4.1 Installation of outlet valve
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- 5 Commissioning**
- 6 Retrofits**
 - 6.1 Retrofitting the TMI temperature probe
 - 6.2 Retrofitting a pneumatic operating mechanism
 - 6.3 Retrofitting a manual opening device
 - 6.4 Note on 30° adapter
- 7 Operation and maintenance**
 - 7.1 Protection against exceeding the allowable limits
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 - 8.1 Replacement of TMI temperature probe
 - 8.2 Spare parts
- 9 Special accessories**
- 10 Shut-down and disposal**
- 11 Warranty and liability**

Operating Instructions

The statutory accident prevention regulations and the current state of the art are a binding and integral part of the present operating instructions.

1 Safety instructions

1.1 General Safety instructions

The valves have been manufactured in accordance with the recognized rules of safety technology and comply with the state of the art. They may only be used for their intended purpose. Any defects which impair the safety must be immediately eliminated. The intended purpose also includes the observation of all notes contained in the operating instructions. All required inspection, maintenance and repair works must be carried out. The transport, assembly, removal, commissioning, and maintenance of the valves is reserved to properly trained and instructed personnel. Any person entrusted with this work must be familiar with the fundamental rules of work protection and accident prevention regulations and must have read and understood the sections on safety and the warnings contained in the present manual.

1.2 Note for manually operated valves

In order to avoid damages to the valve seat, the handwheel may only be closed with manual force. Do not use any additional tools!

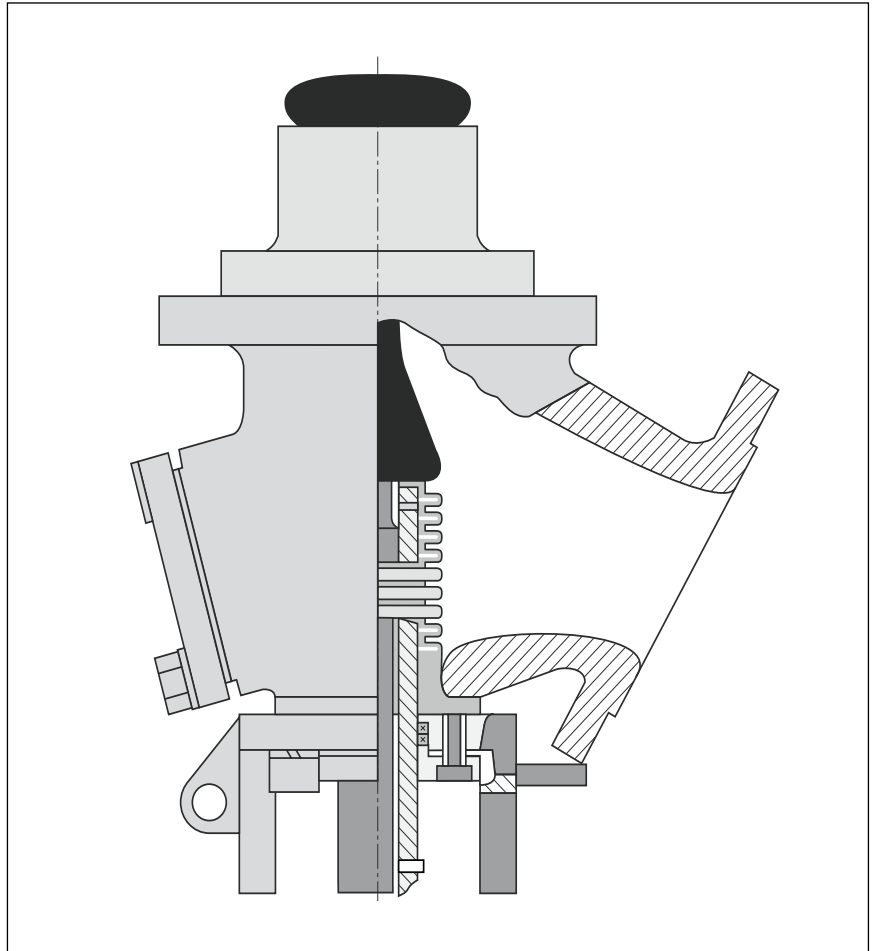


Figure 1 Valve construction

2 Description/Technical Data and Limits of Application

2.1 Description of the valve series

The present Operating Instructions contain information on:

- the glasslined outlet valves type AMA BT/APA-BT size DN 80/50 ... 150/100
- the glasslined line valves type DMA BT/DPA-BT size DN 50 ... 100

Outlet valves are primarily used in conjunction with glasslined apparatus, whereas line valves are installed in pipelines. Due to their glasslining, the valves are equally corrosion-resistant as the Pfaudler reactors – cf. Publication 614 and Operating Instructions 303.

The glasslined valves described in the present Operating Instructions have the following properties:

- The glasslined valves meet the essential safety requirements contained in annex I of the Pressure Equipment Directive. Due to their construction, they are considered “technically tight” as defined in TA-Luft (German Clean Air Act).
- The valves are “pressure accessories” as defined in Article 1 of the Pressure Equipment Directive and satisfy the requirements of AD2000 code sheet A4. Each valve is supplied together with a declaration of conformity pursuant to Annex VII of the Pressure Equipment Directive.
- The valves meet the technical conditions of delivery for valves issued by the German chemical industry of scale.
- The part of the valve cone not protected by a glass layer is sealed by bellows. The standard bellows are made of PTFE. If required by the customer, for example, Hastelloy® is also available.
- Additional safety gland.
- A connection opening for the helium leak detection test (vacuum method) is available.
- Glass fiber reinforced PTFE valve seat with integrated gasket.
- Easy cleaning and maintenance of the valve inside space through lateral maintenance opening.
- The valves carry the CE mark pursuant to Article 14 of the Pressure Equipment Directive. Pneumatically operated valves comply with the requirements of the Machinery Directive 2006/42/EC.
- The structural dimensions of the outlet valves comply with DIN 28140-1. The structural dimensions of the line valves comply with DIN 3202-F9.

2.2 Explanation of type designations

AMA-BT = Outlet valve-manual-external seal-sealing provided by PTFE bellows

APA-BT = Outlet valve-pneumatic-external seal-sealing provided by PTFE bellows

DMA-BT = Line valve-manual-external seal-sealing provided by PTFE bellows

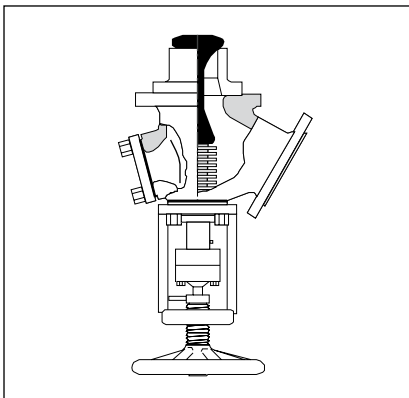


Figure 2 AMA-BT

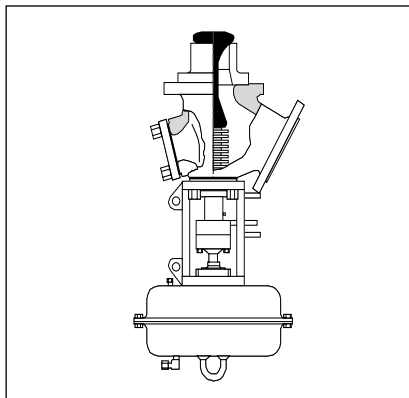


Figure 3 APA-BT

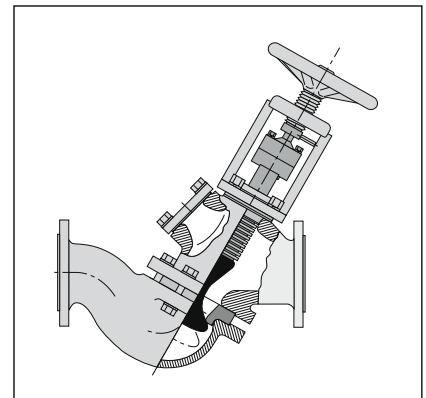


Figure 4 DMA-BT

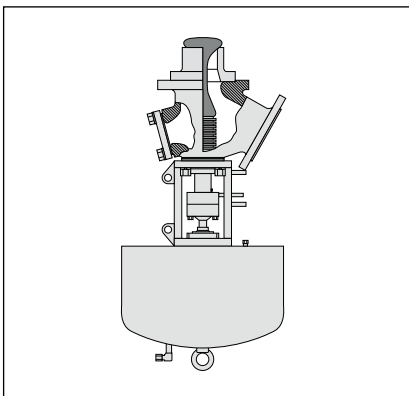


Figure 5 APA-F

Glasslined outlet valves AMA-BT/APA-BT 80/50 ... 150/100
Glasslined line valves DMA-BT/DPA-BT 50 ... 100

Typ / type		Baujahr / Year built		CE 0036
● max. zul. Druck / max. allowable pressure PS bar		Auftrags-Nr. / Order No		●
zul. min/max Temp. / max/min allowable temperature TS °C		Teilenummer / Part No		

Figure 6 Nameplate

Table 1 Limits of application

Size	max/min allowable temperature [°C]	max. allowable pressure PS [bar]
80/50	-60 ... +200	-1 ... +16
100/80	-60 ... +200	-1 ... +10
150/100	-60 ... +200	-1 ... +10

Pneumatic pressure setting max. 6 bar
 adm. ambient temperature (pneumatics) -25 ... +80 °C
 Dimensions refer to Publication 143

Table 2 Weight of outlet valves

Size	Weight [kg] AMA-BT	Weight [kg] APA-BT	Weight [kg] APA-F
80/50	29	36	48
100/80	42	60	72
150/100	50	69	80

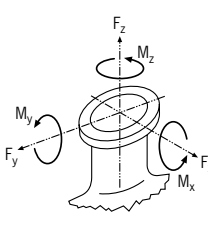
Table 3 Weight of line valves

Size	Weight [kg] DMA-BT	Weight [kg] DPA-BT
50	41	47
80	58	76
100	71	90

Table 4 Tightening torques of graphitized screws [Nm]

Valve type	80/50	100/80	150/100
Valve assembly/valve body AMA-BT, APA-BT	20	25	25
Valve assembly/valve body APA-F	70	70	70
Gland	5	5	5
Befestigungsmuttern Ventilschaft/Kupplungsoberteil	30	30	30
Valve shaft/upper coupling half fastening nuts	10	15	15
Maintenance opening AMA-BT, APA-BT	10	30	30
Maintenance opening APA-F	70	70	70

Table 5 Permitted nozzle loads

	Nominal nozzle size [mm]	Force		Torque	
		Fx = Fy [N]	Fz [N]	Mx = My [Nm]	Mz [Nm]
	50	400	1800	120	75
	80	600	2800	300	180
	100	750	3500	400	250
	150	1100	5300	900	550
	200	1500	7000	1500	900

2.3 Technical data

Assembly drawing

The assembly drawing and the parts list are the binding basis for the design of the glasslined valve. These documents form an integral part of the present Operating Instructions.

Nameplate

The nameplate on the valve contains important data, such as structural size, design, max. allowable operating conditions, year of construction, part number and order number as well as the CE mark according to the Pressure Equipment Directive. Please indicate the part number and the order number in all correspondence.

2.4 Application limits

Never exceed the permitted limits specified in Table 1 for which the valve is rated as stated on the nameplate.

⚠ Non-compliance with the application limits may cause damages on the valve; safe operation is no longer guaranteed in this case.

External fires were not considered in the design of the standard version. When the max. allowable temperature is exceeded, safe operation of the parts made of PTFE and the gaskets can no longer be guaranteed. Therefore, increased leakage rates up to uncontrolled release of hazardous substances may occur.

If the intended purpose warrants accounting for external fires, a special fire-safe design certified to BS 6755 is available.

Pfautler glass offers extremely high corrosion resistance to acids, water, and alkalis. The application limits of the material have been described in the following publications:

616 Pfautler glass WWG
615 PharmaGlass PPG
103 Alkali-resistant chemical glass 4300
104 Pfautler glass 3100

If no experience with glassteel apparatuses and components is available for certain processes, we recommend performing a corrosion test according to DIN 51174 under realistic conditions beforehand.

You will find a description of the thermal loading resistance and thermal conductivity in Operating Instructions 303.



Glass is not resistant to hydrofluoric acid or fluorine-containing acid solutions!

Damages to the glass layer lead to the immediate loss of corrosion resistance. Under the influence of aggressive media, you may experience break-outs in the steel and release of hazardous substances within short periods of time.

We recommend establishing an emergency procedure prior to commissioning the valve which will be followed upon the slightest indication or suspicion of glass damages. Please observe the inspection intervals specified.

Product leaking out of the inspection opening indicates a defect of the gasket system. In this case, the valve has to be repaired without delay.

Pfautler glass is highly resistant to abrasion by any type of amorphous or crystalline solid particles, regardless of their hardness or shape, up to a particle size of approx. 1 mm in diameter, if these particles are contained in suspension. An increasing solids concentration will lead to increased wear. Sudden, impulsive wear stress should be avoided for glasslined steel apparatuses.



Do not exceed the permitted load on glasslined nozzles as specified in Table 5. All flange connections at the glasslined flanges have to be tightened with the torque prescribed in Operating Instructions 318.

The reaction forces of any pipelines connected should not be allowed to cause major additional loads on the glasslined nozzle. If necessary, expansion bellows must be installed, also refer to Operating Instructions 351.

2.5 Assemblies

If a valve is combined with other components to form an assembly as defined in the Pressure Equipment Directive, please ensure that:

- the components to be assembled together are reliable and suitable for their operating conditions. The limit values of the valve are shown on the nameplate and must never be exceeded. The pressure setting of the safety valve within an assembly should not rise above the pressure setting specified for the glasslined valve.
- the proper installation of all components and their appropriate integration and installation within the assembly is guaranteed. In particular, the information provided in the present Operating Instructions concerning permitted nozzle loads and tightening torques should be observed.

3 Transport and storage

Any valves not installed immediately after delivery should be stored in their original packing in a dust-free, dry location. The hose clamp at the valve seat prevents distortions of the PTFE valve seat when not installed — do not remove hose clamp before installing the valve! When storing a disassembled valve, fit a suitable hose clamp.

4 Installation



- Note local safety codes.
- Make sure that the adjacent reactors and pipelines have been de-pressurized and emptied.

4.1 Installation of outlet valve

Required items:

- suitable hoisting gear
- screws for split flange at the outlet nozzle, quality rating A2-70 or 5.6.
- gasket, screws, nuts, and split flange for outgoing pipeline

Procedure:

- ▼ Position and align valve below reactor.
- ▼ Remove protective cap and hose clamp from the valve seat.
- ▼ Introduce the valve upward into the reactor outlet nozzle using a suitable hoisting gear. The gasket is integrated into the PTFE valve seat. No additional gasket may be installed at the outlet nozzle!
- ▼ Align valve to outgoing pipeline.
- ▼ Install the flange connection at the outlet nozzle. The companion flange has threaded bores; washers or nuts are not required. Apply screws evenly cross-wise and tighten them with the prescribed torque. For tightening torques of flange connections, refer to assembly drawing. For tightening torques not specified in the assembly drawing, please refer to Operating Instructions 318 or Table 4 of the present Operating Instructions.
- ▼ The discharge pipe should be installed without any stress, taking into account the building situation and the applicable standards. Note the prescribed supports!
- ▼ Connect the control line of pneumatically operated valves.

For installing outlet valves, a 1 mm backlash between the external diameter of the valve seat and the internal diameter of the outlet nozzle is admissible. The PTFE valve seat will adapt to the outlet nozzle diameter during operation.

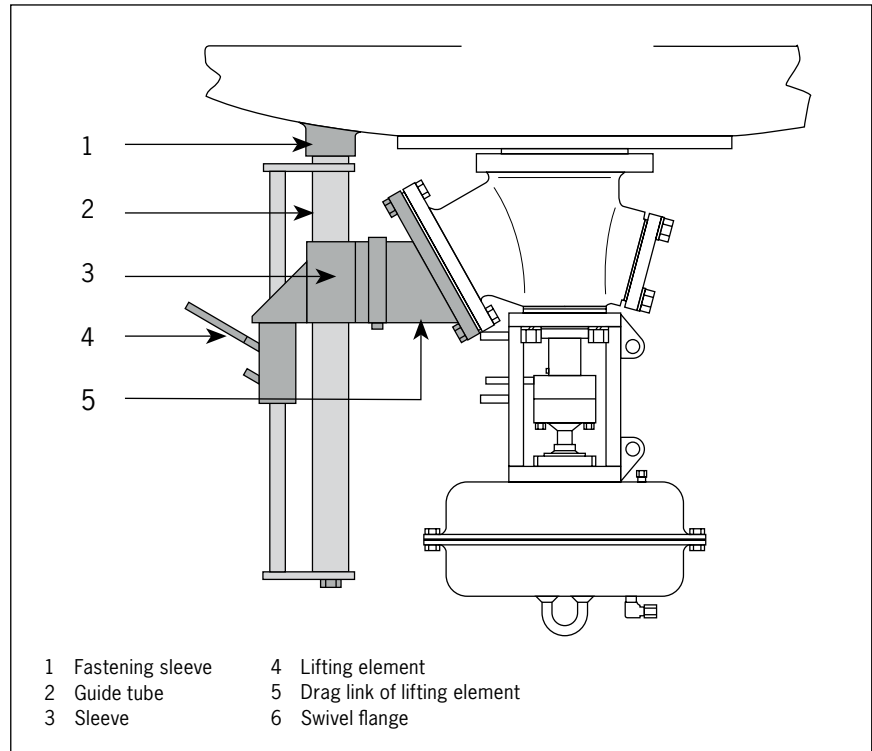


Figure 6 Valve installation device



Caution!

Check all screw tightening torques after the first two temperature intervals and re-tighten screws if necessary.

4.2 Valve installation device (special accessory)

The valve installation device is suitable for installing and removing valve types AMA/APA 100/80 and 150/100. However, the valve installation device can only be used if a **fastening sleeve** is available on the reactor (cf. Fig. 6, item 1).

The fastening sleeve is welded to the reactor jacket. If not available, the fastening sleeve must be welded to the reactor jacket at a distance of 300 mm from the reactor center. Please note that the pressure test has to be repeated after welding operations on the jacket.

Procedure for valve installation

- ▼ Screw the guide tube into the fastening sleeve.
- ▼ Push the lifting device including the drag link onto the guide tube until the lifting device is located below the swivel flange.
- ▼ Fasten the swivel flange to the hinge using a bolt and protect it with a split pin against sliding out. The head of the bolt must point upward.
- ▼ Totally lower the swivel flange to ensure that the valve cone of the outlet valve is under the outlet nozzle during installation. The lifting device can be moved with a two-position operating lever (item 4). The upper holder serves for lifting, the lower one for lowering the valve.
- ▼ Fasten the valve outlet flange to the swivel flange of the lifting device using two screws.

- ▼ Carefully lift the valve by operating the lever. Before introducing the PTFE valve seat into the reactor nozzle, make sure that the glasslining of the valve plunger and the outlet nozzle will not be damaged.
- ▼ Fully insert the valve into the outlet nozzle and screw it to the split flange so that the valve can be turned manually to the desired position when the lifting device has been removed.
- ▼ Carefully unscrew the connection between the swivel flange and the outlet flange and lower lifting device.
- ▼ Turn valve into the desired position.
- ▼ Fasten valve with the prescribed tightening torque to the split flange; cf. Operating Instructions 318.
- ▼ Remove valve installation device.

The valve may be removed by proceeding analogously in reverse order.

Maintenance and repair of the valve installation device

The valve installation device is largely maintenance-free. Please ensure the following:

- The guide tube must have been slightly greased to ensure jerk-free movement of the valve during lifting and lowering.
- The link that holds the lifting device must be free from grease during installation and removal to prevent the lifting device from sliding down.
- The valve installation device should be protected against corrosion on the guiding elements during storage.

4.3 Installation of line valve

Required items:

- suitable hoisting gear
- gaskets, screws, nuts, and split flanges for connecting the line valve to the pipelines. Screw quality rating A2-70 or 5.6

Procedure:

- Make sure that the installation clearance between the pipeline flanges is wide enough to accommodate the line valve and the two gaskets.
- Position valve in the installation clearance using a suitable hoisting gear and insert the gaskets.
- Connect the flanges using the related screws, washers, and nuts. Tighten screws cross-wise with the prescribed tightening torque.
- Fasten the outgoing pipeline stress-free as permitted by the local conditions and in compliance with TRR. Note the prescribed supports!
- Connect the control line of pneumatically operated valves.

When installed horizontally, large valves must be supported by suitable elements to avoid that the whole load is carried by the pipelines.



Caution!

Check all screw tightening torques after the first two temperature intervals, and retighten screws, if necessary.

5 Commissioning

Perform function check. The opening/closing movement of the valve cone can be verified by the position indicator protruding from the side of the support stool (pin in oblong hole of the support stool).

6 Retrofits

6.1 Retrofitting the TMI temperature probe

All valve cones have been prepared for TMI temperature measurement as a standard. The retrofit kit includes: terminal box, support, Pt 100 and fastening accessories. Please contact our service department.

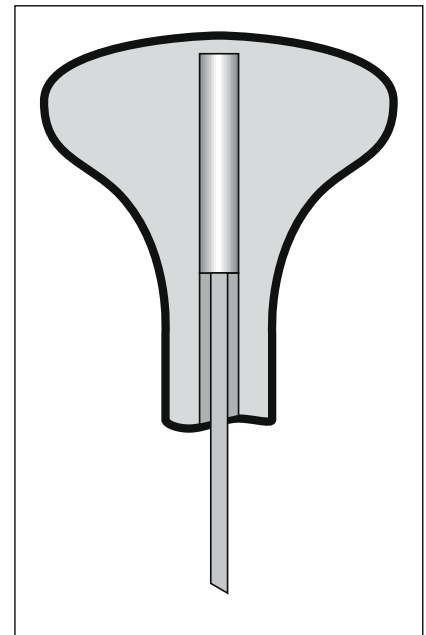


Figure 8 TMI temperature probe

6.2 Retrofitting a pneumatic operating mechanism

Manually operated valves can always be retrofitted with a pneumatic system using a conversion kit. Please contact our service department.

6.3 Retrofitting a manual opening device

The manual opening device serves to open pneumatically operated valves in case of a compressed air system failure. The device is fastened to the lugs provided on the support stool using two bolts. The two cams of the opening device engage with the coupling on the valve cone. Turning the handwheel clockwise will open the valve manually. Turning it counterclockwise will close the valve by means of the springs of the pneumatic operating mechanism.

6.4 Note on 30° adapter

In order to replace an outlet valve of the previous series (outgoing pipeline angle of 45°) with an outlet valve type AMA/APA-BT (outgoing pipeline angle of 60°), an adapter is required for connecting the valve to an existing horizontal pipeline, as shown in Fig. 10. For part numbers, refer to 8.2.

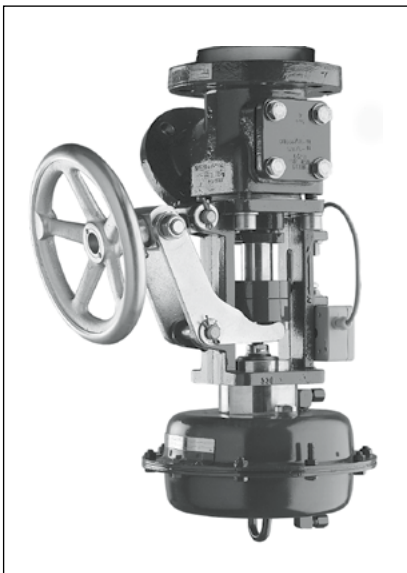


Figure 9 Manual opening device

7 Operation and maintenance

If you have any further questions on the operation and maintenance of the valve, please contact our service team. Standardized parts are immediately available ex stock. Our fitters will be ready to help you 24 hours a day.

The reactor must be vented through one of the process nozzles provided when being emptied through the outlet valve.

! The outlet valve may be subject to high surface temperatures during operation and when emptying the reactor. Therefore, you should never work without suitable personal protective equipment.

! If high local flow rates are present, cavitation may occur inside the valves which will result in glass damages in the long run. The first sign of such a damage is a local matte spot on the glass surface.

If these signs are discovered, the flow rate when emptying the reactor must be reduced, e.g., by depressurizing the reactor prior to emptying.

7.1 Protection against exceeding the allowable limits

! Never exceed the allowable limits for which the valve is rated as stated on the nameplate. In particular, special safety accessories should be provided that measure and limit the pressure and temperature. The valve must not be operated without protection against overpressure. The valve may also be protected by other protective devices as part of a module, e.g., a reactor and/or pipe line.

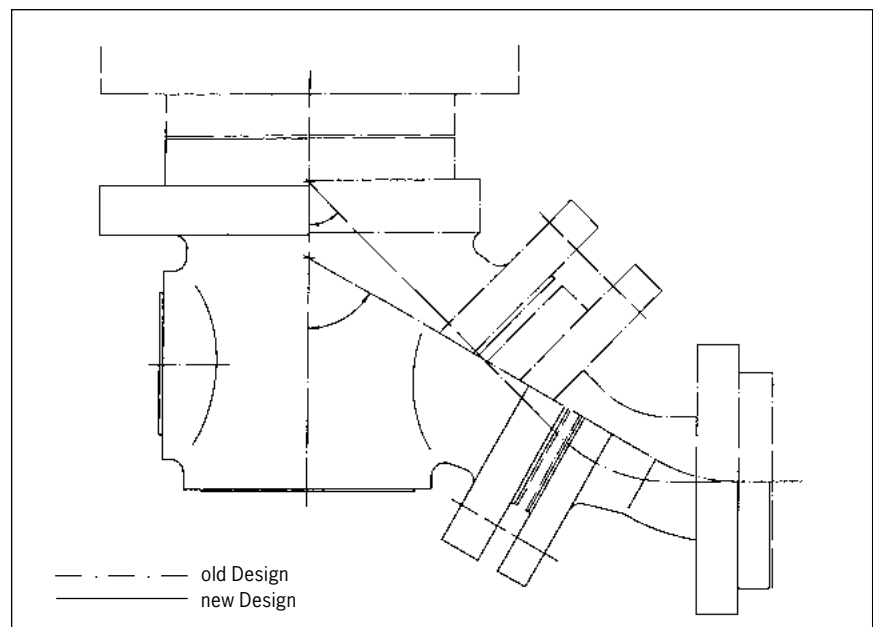


Figure 10 Adapter

7.2 Regular maintenance

The time intervals of repetitive testing should be specified by the operator on the basis of the experience made with the operating method, product and result

of previous repetitive tests. The inside and the bellows can be inspected through the maintenance opening. The valve need not be removed for this purpose.

Table 6 Regular maintenance

Item	Maintenance location	Maintenance interval/year
1	Function check	at least 4 times
2	Check tightening torques of flange connections	at least once
3	Check tightening torques of fastening screws between valve lantern and valve body	at least once
4	Leakage test, e.g. by checking reactor pressure drop	at least once
5	Inspection of bellows – visual inspection through maintenance opening – through control opening using helium leak detection test, or – visual inspection through control opening	at least once
6	Function of safety devices	permanently
7	Visual inspection of the glass through the maintenance opening	at least once

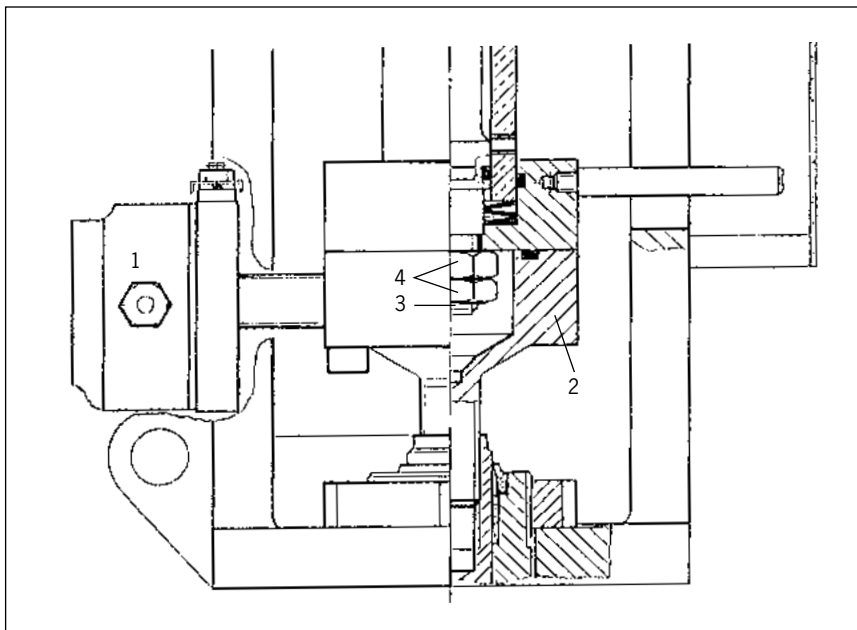


Figure 11 Removal/Installation of TMI

8 Repair

Valves marked with the CE sign must not be subjected to any modifications.

The valve can be removed analogously in reverse order of the installation procedure; cf. section 4. We recommend having Pfadler perform all repair works. This is the only way to ensure that only original spare parts are used, all dimension settings and tightening torques are correct and the valve is subjected to a leakage test.

8.1 Replacement of TMI temperature probe

Removal:

- Drain reactor and operate it until it is de-pressurized.
- Remove (pneumatic) operating mechanism.
- Detach and remove connection wires from the terminal box (1).
- Remove lower coupling half (2).
- Unscrew and remove threaded pin M10 (3) in valve shaft. Secure the valve shaft with a wrench size 13. **Do not unscrew the two locked nuts (4) on the valve shaft.**
- Pull out Pt 100 downward.
- Re-use the spacer sleeve for installation.

Assemble the probe in reverse order after having applied a thin, even layer of a conducting mass to the face of Pt 100. For spare parts orders, please indicate

Glasslined outlet valves AMA-BT/APA-BT 80/50 ... 150/100
Glasslined line valves DMA-BT/DPA-BT 50 ... 100

Table 7 Pt 100 part numbers

2 wires	3 wires	4 wires	Pt
	593 3004	593 3006	single
593 3002	593 3005		double
593 3003			triple

8.2 Spare parts

Please indicate the part number shown on the part list in all spare parts orders. All valves have a lateral cleaning opening, i.e. you may clean the valve inside and inspect the internal fittings without removing the valve.

Table 8 Spare parts

Special accessories	Part number
Proximity detector set	026 182
Lateral manual opening device	205 266
Installation device	253 654
Adapter 30° DN 50	205 272
Adapter 30° DN 80	205 273
Adapter 30° DN 100	205 274

9 Special accessories

- proximity detector (intrinsically safe) for pneumatic operating mechanism; open/closed indicator
- lateral manual opening device for pneumatically operated valves
- temperature measurement inside the valve cone. The valves have been prepared for TMI as a standard.
- glass damage monitoring probe inside the valve cone
- installation device for easy installation of outlet valve
- 30° adapter for outlet valves enabling you to re-use existing horizontal pipelines in conjunction with the valves without any conversion.

10 Shut-down and disposal

When the valve is finally shut down, please note the following prior to disposal:

- Totally evacuate the valve, flush and remove it.
- Clean the valve, i.e. the product side and the outside. The valve must be completely free from hazardous substances, which may be toxic, combustible, explosive, or aggressive, or which develop toxic, combustible or aggressive vapors when heated.
- Properly dispose of the valve and all related components.

Our fitters will also assist you with the shut-down and disposal of your glasslined valves.

11 Warranty and liability

Our "Conditions of sale and delivery" are applicable as amended from time to time. They will be made available to the user on or before contract-making. Warranty and liability claims for personal injury and damage to property will not be accepted if they are due to at least one of the following causes:

- Use of the valves or the installation devices for purposes other than their intended purpose.
- Inadequate assembly, commissioning, operation, and inspection.
- Failure to observe the notes concerning transport, storage, assembly,



EU Declaration of Conformity

Explosion Protection Directive 2014/34/EU

Equipment: Valve stems with measuring probes
Types: T, P and TMI

subject to the conditions and limits specified in the technical documentation and the operating instructions.

We hereby declare that the reference measuring probes are suitable for their intended use in potentially explosive atmospheres and comply with the essential health and safety requirements stipulated in Annex II of Directive 2014/34/EU. Other assembled equipment and components are referred to the manufacturer's EU Declaration of Conformity and their operating instructions.

Conformity assessment
procedure applied:

EU – Type Examination, Module B pursuant to Annex III
No. PTB 06 ATEX 2049 X

Notified body no. 0102
Physikalisch – Technische Bundesanstalt (PTB)
Bundesallee 100, 38116 Braunschweig, Germany

Quality Assurance of the Production Process, Modul D
pursuant to Annex IV

Notified body no. 0123
TÜV SÜD Product Service GmbH
Ridlerstraße 65, 80339 Munich, Germany

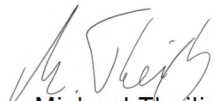
Type of protection:
Harmonized standards
applied:

Ex II 1/2 G Ex ia IIB T6 Ga/Gb
EN IEC 60079-0:2018
EN 60079-11:2012
EN 60079-26:2015

Community Directives
applied:

Explosion protection Directive 2014/34/EU

Pfaudler GmbH


ppa. Michael Theilig
Technical Manager


i.V. Thorsten Hambsch
Quality Manager

Waghäusel, 01.06.2022
KE012E

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EDLON
Fluoropolymers



Declaration of compliance with the order

EN 10204 – 2.1

Fire-Safe Test for Bottom Outlet Valve

We hereby certify that the bottom outlet valves of the series type:

APA-F 80/50, 100/80 and 150/100

comply with the requirements of BS6755, Part 2 (Testing of valves, Part 2, Specification for fire type-testing requirements).

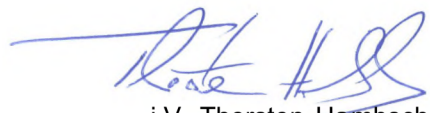
The bottom outlet valve type APA-F 80/50 with a nominal width of DN50 and a pressure level PN 16 was subjected to a fire-safe test by the Federal Institute of Material Research and Testing (BAM),
12200 Berlin, on November 28, 2002.

The valve complied with the requirements of the standard.

By testing nominal width DN50, nominal widths DN65, DN80 and DN100 are also covered by the qualification. For the series tested, this corresponds to valve types **APA-F 80/50, 100/80 and 150/100**.

This certificate is based on the BAM Test Report, ref. no. II-1959/2002 dated December 18, 2002. The test report is kept by the manufacturer and can be inspected there.

Pf: 
ppa. Michael Theilig
Technical Manager


i.V. Thorsten Hambsch
Quality Manager

Waghäusel, 14.06.2022
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EDLON
— Fluoropolymers



Declaration of compliance with the order

EN 10204 – 2.1

The manufacturer hereby declares that those materials of the valves:

AMA-BT, APA-BT, DMA-BT DPA-BT, AMA-BH, APA-BH, DMA-BH und DPA-BH

that are in contact with product comply with the requirements of the US Food and Drug Administration (FDA). They may be used in any application in which the material gets in contact with food.

Materials:

**PTFE-Valve seat FDA Titel 21 § 177.1550
PTFE-Valve bellow FDA Titel 21 § 177.155**

Pfaudler GmbH


ppa. Michael Theilig
Technical Manager


i.V. Thorsten Hambsch
Quality Manager

Waghäusel, 14.06.2022
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