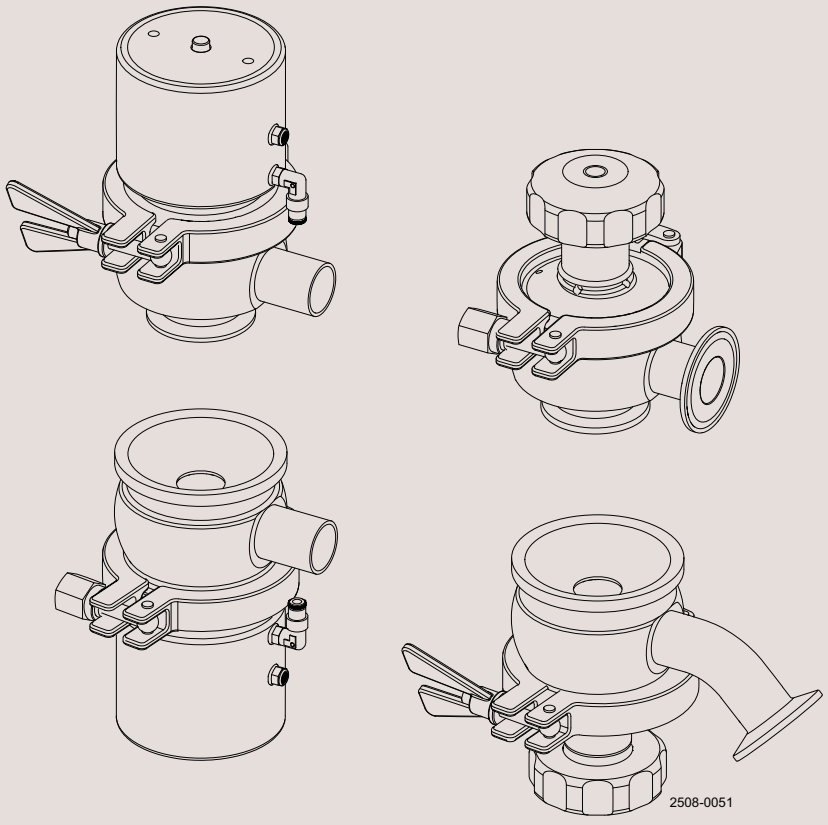
Instruction Manual

Radial Diaphragm Valve UltraPure



ESE02132-EN2 2013-09

Original manual

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The information herein is correct at the time of issue but may be subject to change without prior notice

1 CE Declaration of Conformity

The designating company

Alfa Laval
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Radial Diaphragm Valve UltraPure	Diaphragm Valves	November 2011
Denomination	Type	Year

is in conformity with the following directives:
- Machinery Directive 2006/42/EC
- Pressure Equipment Directive 97/23/EC category 1 and subjected to assessment procedure Module A.

Note: Tank outlet valve is not prepared for build into pressure vessels according to PED/ASME, but only into “open” vessels.

Manager, Product Centres, Compact Heat Exchangers & Fluid Handling	Bjarne Søndergaard
Title	Name
Alfa Laval Kolding	
Company	Signature

Designation

2 Safety

Unsafe practices and other important information are emphasised in this manual.
Warnings are emphasised by means of special signs.

2.1 Important information

Always read the manual before using the valve!

WARNING
Indicates that special procedures must be followed to avoid serious personal injury.

CAUTION
Indicates that special procedures must be followed to avoid damage to the valve.

NOTE
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning:

Caustic agents:

2 Safety

All warnings in the manual are summarised on this page.
Pay special attention to the instructions below so that severe personal injury and/or damage to the valve are avoided.

2.3 Safety precautions

Installation:

Always read the technical data thoroughly. (See chapter 6 Technical data)
Always release compressed air after use.
Never touch the moving parts if the actuator is supplied with compressed air.
Never touch the valve or the pipelines when processing hot liquids or when sterilising.
Never dismantle the valve with the valve and pipelines under pressure.
Never dismantle the valve when it is hot.

Operation:

Never dismantle the valve with the valve and pipelines under pressure.
Never dismantle the valve when it is hot.
Always read the technical data thoroughly. (See chapter 6 Technical data)
Always release compressed air after use.
Never touch the valve or pipelines when processing hot liquids or when sterilising.
Never touch the moving parts if the actuator is supplied with compressed air.
Always rinse well with clean water after cleaning.

Always handle lye and acid with great care.

Maintenance:

Always read the technical data thoroughly. (See chapter 6 Technical data)
Always release compressed air after use.
Never service the valve when it is hot.
Never service the valve with the valve and pipelines under pressure.
Never stick your fingers through the valve ports if the actuator is supplied with compressed air.
Never touch the moving parts if the actuator is supplied with compressed air.

Transportation:

Always secure that compressed air is released.
Always secure that all connections are disconnected before attempting to remove the valve from the installation.
Always drain liquid out of valves before transportation.

Always use pre-designed lifting points if defined.
Always secure sufficient fixing of the valve during transportation - if specially designed packaging material is available it must be used.

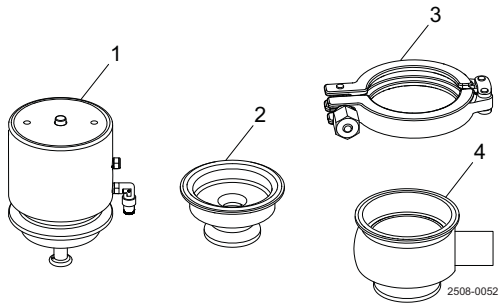
The instruction manual is part of the delivery. Study the instructions carefully.
The items refer to Parts list and service kits section.
The valve is supplied as separate parts as standard (for welding).

3.1 Unpacking/delivery

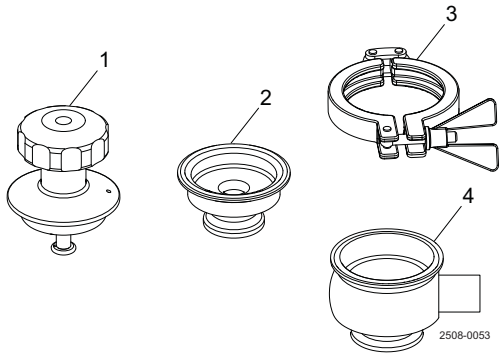
Step 1
CAUTION
Alfa Laval cannot be held responsible for incorrect unpacking.

Check the delivery for:
1. Complete valve, shut off valve, tank outlet, manual shut off or manual tank outlet valve (see steps 2 and 3)
2. Delivery note
3. Instruction Manual
4. Q doc Manual

Step 2
Shut-off valve and tank outlet valve
1. Complete actuator
2. Diaphragm
3. Clamp (wingnut or hexnut)
4. Valve body

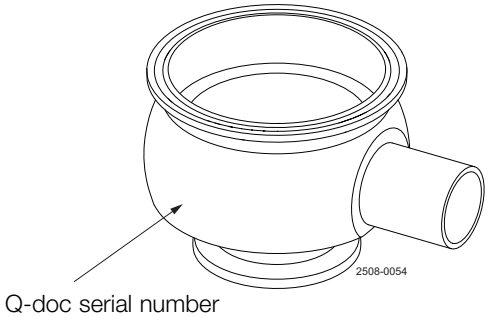


Step 3
Manual shut-off valve and tank outlet valve
1. Manual actuator
2. Diaphragm
3. Clamp (wingnut or hexnut)
4. Lower valve body



Step 4
Remove any possible packing materials from the valve/valve parts

Step 5
Inspect the valve and valve parts for visible transport damages.
Avoid damaging the valve and valve parts.
Check that the Q-doc. serial number and the “Q-doc manual number” are identical.



Q-doc serial number

3 Installation

Study the instructions carefully and pay special attention to the warnings!
The valve has welding ends and a clamp fitting on the bottom as standard but can also be supplied with clamp fittings on the port ends.

3.2 General installation

Step 1

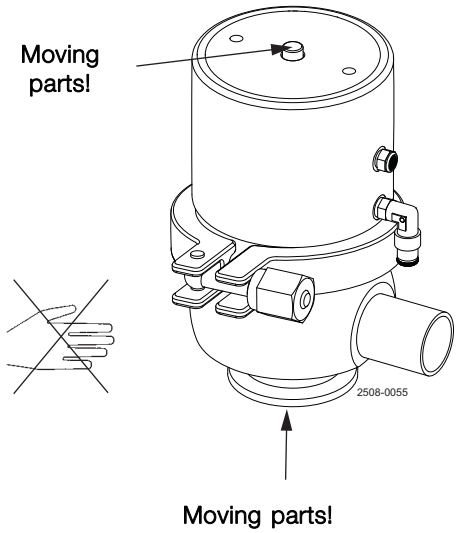
Always read the technical data thoroughly.
See chapter 6 Technical data.

Always release compressed air after use.

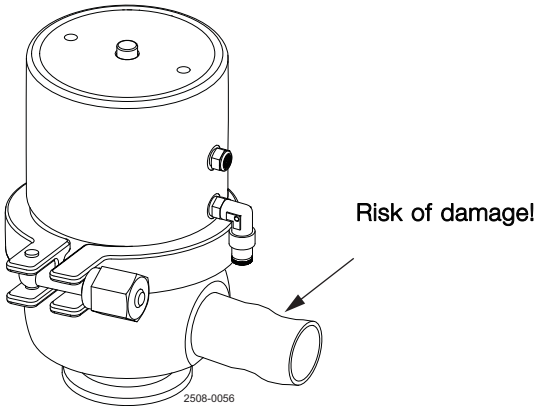
CAUTION
Alfa Laval cannot be held responsible for incorrect installation.

Step 2

Never touch the moving parts if the actuator is supplied with compressed air.



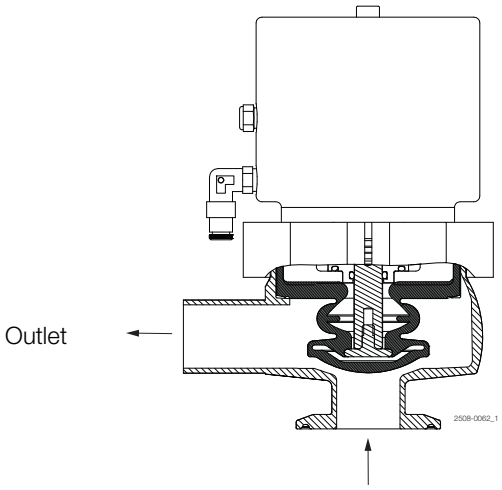
Step 3
Avoid putting stress on the valve.
Pay special attention to:
- Vibrations
- Thermal expansion of the pipelines
- Excessive welding
- Overloading of the pipelines



Study the instructions carefully and pay special attention to the warnings!
The valve has welding ends and a clamp fitting on the bottom as standard but can also be supplied with clamp fittings on the port ends.

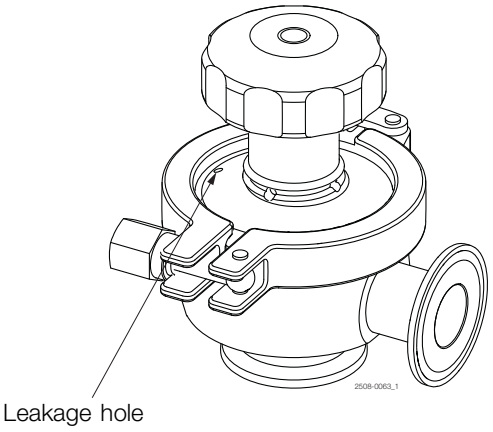
Step 4

It is recommended to install the valve so that the flow is against the closing direction to avoid water hammer.



Step 5

It is recommended that the leakage hole in the pneumatic/manual actuator is placed so it is visible.
If there is fluid sleeping from the leakage hole the diaphragm is worn out and must be replaced.



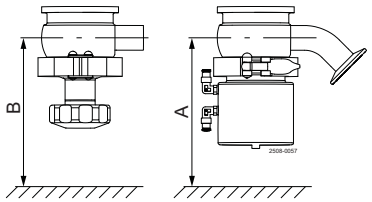
3 Installation

Study the instructions carefully.
The valve is supplied as separate parts to facilitate welding. The items refer to the Parts list and service kits section.
Check the valve for smooth operation after welding. Man = Manually open and close, NC = Normally closed.

3.3 Welding

Step 1

Always weld the valve so that the actuator with the internal parts can be removed.



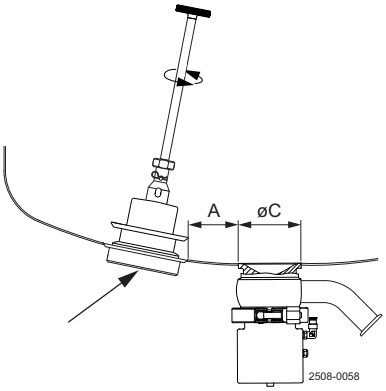
Valve size DN/OD	A mm (inch) Air actuator	B mm (inch) Manual actuator
12.7 mm (½ inch)	132 mm (5.2 inch)	92 mm (3.6 inch)
25 mm (1 inch)	168 mm (6.6 inch)	98 mm (3.9 inch)
38 mm (1½ inch)	182 mm (7.1 inch)	112 mm (4.4 inch)

NOTE! If there is a risk of foot damage, Alfa Laval recommends to leave a distance of 120 mm (4.7") below the actuator.

Step 2

Placement of the tank outlet valve

The valve housing is usually placed according to the figure below, but other locations may exist

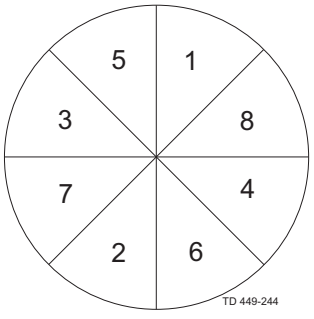


e.g. Weldplate mixer

A = Min. distance between the weld in components, in accordance with the PED.

Valve size	Diameter of weld flange (hole)
	øC
12.7 mm / ½ inch	ø50 mm / 1.97 inch
25 mm / 1 inch	ø79 mm / 3.11 inch
38 mm / 1½ inch	ø85 mm / 3.35 inch

A hole (see table) for the valve is cut in the tank plate.
Grind the edge so there is no gap between valve and tank plate.
Only use pulsed arc welding (low heat input) to avoid deforming the valve body.
Tack weld **always** on the opposite side (8 segments with filler metal).
Weld root if possible without filler metal.
Welding of the final run must be done in 8 segments to avoid cracking.
The inside and outside of the weld is ground and polished to the required finish.

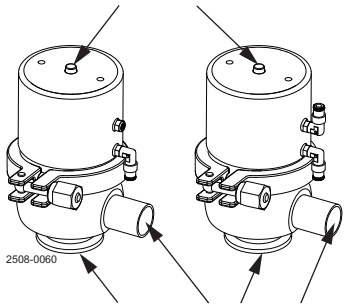


Study the instructions carefully.
The valve is supplied as separate parts to facilitate welding. The items refer to the Parts list and service kits section.
Check the valve for smooth operation after welding. Man = Manually open and close, NC = Normally closed.

Step 3
Shut off and tank outlet valves:
Assemble the valve is accordance with the steps in section 5.4 Assembly of valve .
1. Supply compressed air to the actuator.
2. Open and close the valve several times to ensure that it operates smoothly.

Pay special attention to the warnings!

Moving parts!



Moving parts!

3.4 Recycling information

• Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps.
- Wood and cardboard boxes can be reused, recycled or used for energy recovery.
- Plastics should be recycled or burnt at a licensed waste incineration plant.
- Metal straps should be sent for material recycling.

• Maintenance

- During maintenance oil and wearing parts in the machine are replaced.
- All metal parts should be sent for material recycling.
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling.
- Oil and all non-metal wearing parts must be taken care of in accordance with local regulations.

• Scrapping

- At the end of use, the equipment should be recycled according to relevant, local regulations. Apart from the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact the local Alfa Laval sales company.

4 Operation

Study the instructions carefully and pay special attention to the warnings!
Ensure that the valve operates smoothly.
The items refer to the Parts list and service kits section.
A-A = Air open and close, NC = Normally closed.

4.1 Operation

Step 1

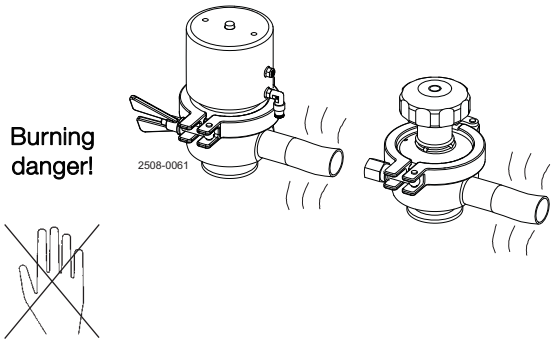
Always read the technical data thoroughly.
See chapter 6 Technical data.

Always release compressed air after use.

CAUTION
Alfa Laval cannot be held responsible for incorrect operation.

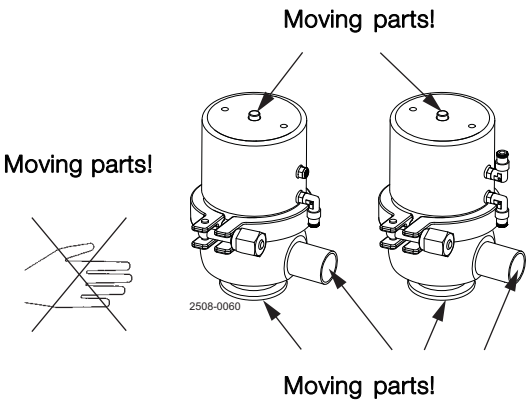
Step 2

Never touch the valve or pipelines when processing hot liquids or when sterilising.
The manually handle will get hot - use hand protection if the valve must be operated.



Step 3

Never touch the moving parts if the actuator is supplied with compressed air.



Pay attention to possible faults. Study the instructions carefully.
The items refer to the Parts list and service kits section.

4.2 Troubleshooting

Problem	Possible cause	Repair
Manual valve does not open when actuator is turned counter-clockwise.	1. Diaphragm has stuck. 2. Diaphragm is not properly mounted on the actuator. 3. Actuator is broken. 4. Incorrect flow direction in combination with high fluid pressure.	1. Inspect diaphragm and replace it if required. 2. Correct mounting. Some force must be used to push the actuator into the diaphragm. 3. Inspect and replace if required. 4. Correct flow direction or lower fluid pressure.
Manual valve does not close when actuator is turned clockwise.	1. Incorrect flow direction in combination with high fluid pressure. 2. Actuator is broken.	1. Correct flow direction or lower fluid pressure. 2. Inspect and replace id required.
Pneumatic valve does not open when opened via a solenoid valve.	1. Diaphragm has stuck. 2. Diaphragm is not properly mounted on the actuator. 3. Actuator is broken. 4. Compressed air supply is too low. 5. Pneumatic hose is damaged. 6. Solenoid valve fault or forced in wrong position manually. 7. Incorrect flow direction in combination with high fluid pressure.	1. Inspect diaphragm and replace it if required. 2. Correct mounting. Some force must be used to push the actuator into the diaphragm. 3. Inspect and replace is required. 4. Check compressed air supply pressure. 5. Replace pneumatic hose. 6. Check that the solenoid valve is not operated manually. Replace solenoid valve. 7. Correct flow direction or lower fluid pressure.
Pneumatic valve is open all through closed via the solenoid valve.	1. Solenoid valve fault. 2. Electrical cable is damaged. 3. Pneumatic system does not ventilate. 4. Incorrect flow direction in combination with high fluid pressure.	1. Inspect and replace if required. 2. Replace electrical cable. 3. Check ventilation of pneumatic system. 4. Correct flow direction or lower fluid pressure.
Cleaning in CIP is not satisfactory.	1. Cleaning chemicals wrong type or too low concentration. 2. Flow too low. 3. Poor draining. 4. Flow obstructed. 5. Diaphragm broken.	1. Analyse for correct chemicals and concentration. 2. Increase flow. 3. Check drainabillity and turn valve if required. 4. Check flow path. 5. Replace diaphragm.

4 Operation

Pay attention to possible faults. Study the instructions carefully.
The items refer to the Parts list and service kits section.

Problem	Possible cause	Repair
Water hammer.	The flow direction is the same as the closing direction.	The flow direction should be against the closing direction.
Diaphragm has short length of line.	1. Incorrect materials for the application. 2. Media has too high temperature. 3. Air-air actuator has too high air pressure. 4. Manual is “over-tightened”	1. Check materials compability (EPDM or silicone). 2. Lower temperature or EPDM. 3. Reduce air pressure to 4 bar 4. Be careful not to tighten to hard.
External product leaking (Telltale hole).	1. Diaphragm broken.	1. Replace diaphragm.
Valve leaking.	1. Clamp not properly mounted. 2. Too high fluid pressure.	1. Mount clamp or replace if broken. 2. Check that pressure does not exceed design pressure.
Actuator leaking air.	1. Sealings in actuator worn out.	1. Replace actuator or change seals.

The valve is designed for cleaning in place (CIP). CIP = Cleaning In Place.
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic Soda.
HNO_3 = Nitric acid.

4.3 Recommended cleaning

Step 1

Always handle lye and acid with great care.

Caustic danger!

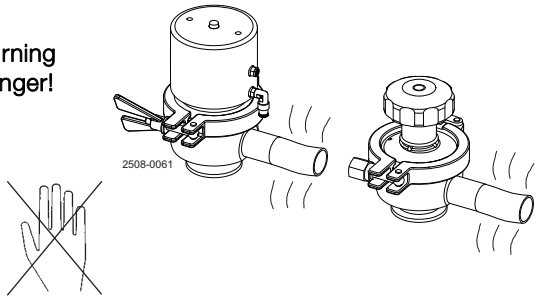
Always use rubber gloves!

Always use protective goggles!

Step 2

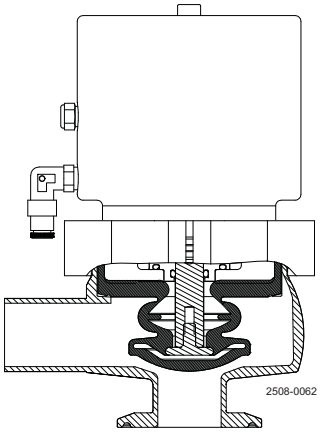
Never touch the valve or the pipelines when processing hot liquids or when sterilising.

Burning danger!



Step 3

Clean the plug and the seats correctly.
Pay special attention to the warnings!
Lift and lower diaphragm momentarily!



4 Operation

The valve is designed for cleaning in place (CIP). CIP = Cleaning In Place.
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic Soda.
HNO_3 = Nitric acid.

Step 4
Examples of cleaning agents:
Use clean water, free from chlorides.

1. 1% by weight NaOH at 70 °C (158 °F)

1 kg NaOH	+	100 l water	=	Cleaning agent.
2.2 lb NaOH		26.4 gal water		

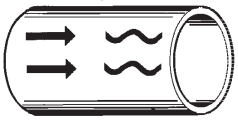
2.2 l 33% NaOH		100 l water	=	Cleaning agent.
0.6 gal 33% NaOH	+	26.4 gal water		

2. 0.5% by weight HNO_3 at 70 °C (158 °F)

0.7 l 53% HNO_3		100 l water	=	Cleaning agent.
0.2 gal 53% HNO_3	+	26.4 gal water		

Step 5
1. Avoid excessive concentration of the cleaning agent.
2. Adjust the cleaning flow to the process.
3. **Always** rinse well with clean water after cleaning.

Always rinse!



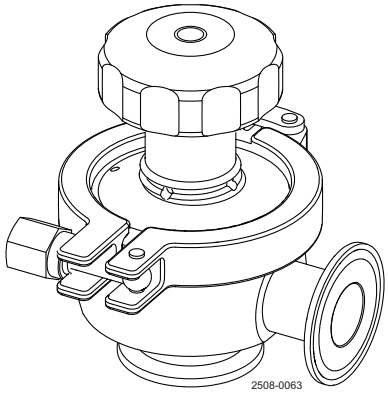
Clean water Cleaning agents

Step 6
NOTE
The cleaning agents must be stored/disposed of in accordance with current regulations/directives.

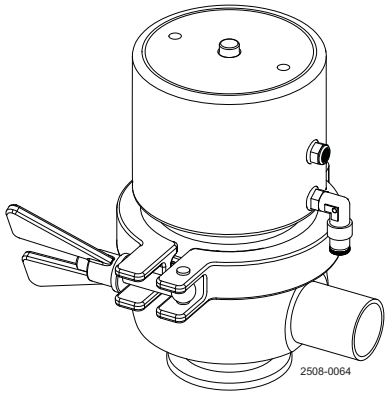
The valve is designed for cleaning in place (CIP). CIP = Cleaning In Place.
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic Soda.
HNO_3 = Nitric acid.

Step 7
Autoclaving

The manually opened actuator can be autoclaved.
Max. temperature 130 °C



The pneumatic actuator can not be autoclaved.



5 Maintenance

Maintain the valve regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals in stock.
Check the valve for smooth operation after service.

5.1 General maintenance

Step 1

Always read the technical data thoroughly.
See chapter 6 Technical data.

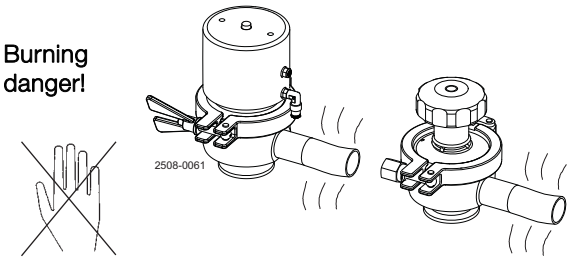
Always release compressed air after use.

NOTE
All scrap must be stored/discharged in accordance with current rules/directives.

Step 2

Never service the valve when it is hot.

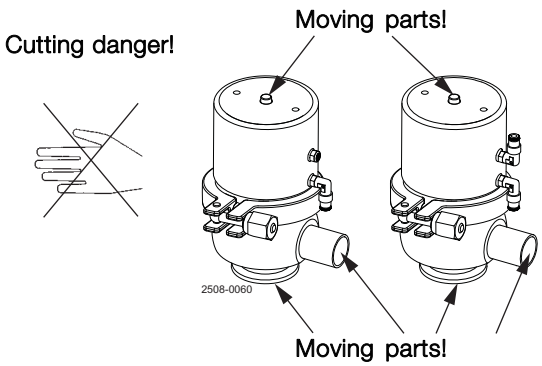
Never service the valve with valve and pipelines under pressure.



Step 3

Never stick your fingers through the valve ports if the actuator is supplied with compressed air.

Never touch the moving parts if the actuator is supplied with compressed air.



5 Maintenance

Maintain the valve regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals in stock.
Check the valve for smooth operation after service.

Below are some guidelines for maintenance and lubrication intervals. Please note that the guidelines are for normal working conditions in one shift.

	Product wetted seals	Actuator
Preventive maintenance	**Diaphragm replacement, see section 5.3 Diaphragm replacement**	**Special tools required for pneumatic actuator, see section 5.5 Disassembly of actuator and 5.6 Assembly of actuator .**
Planned maintenance	- Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for planning of inspections **Replace after leakage**	- Regular inspection for leakage and smooth operation - Keep a record of the actuator - Use the statistics for planning of inspections **Replace after leakage**
Lubrication	**Not necessary**	**Inside actuator use Kluber Paraliq GTE 703** But special tools reguired for pneumatic actuator (see section 5.5 Disassembly of actuator and 5.6 Assembly of actuator)

Clamps should be greased frequently at the thread with “molycole TP 42”
Negligence may result in damaged and stuck threads.

Recommended spare parts
Service kits (see spare parts - section 7 Parts list and service kits)

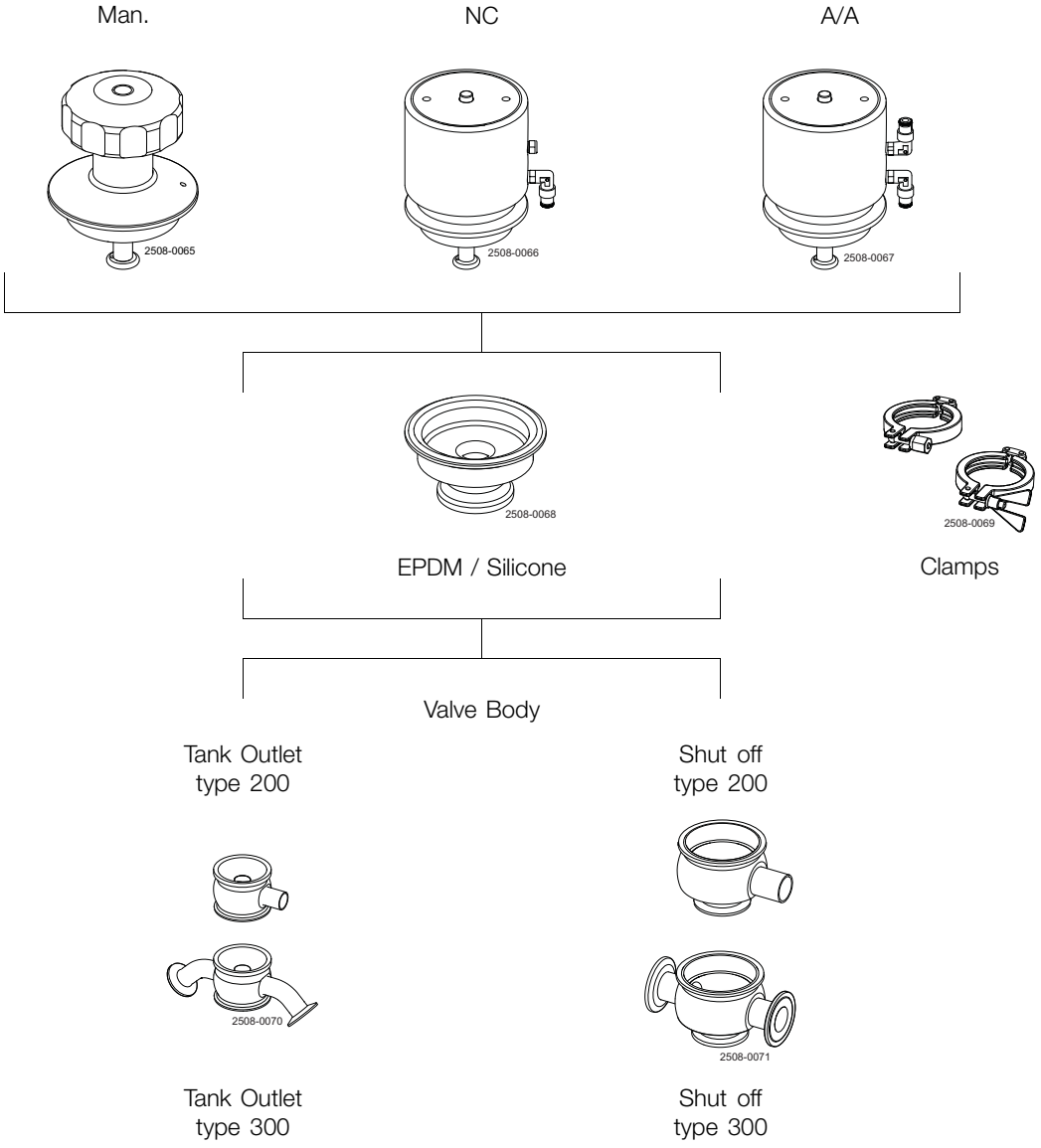
5 Maintenance

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

5.2 Dismantling the valve

Step 1
The actuator must be in the “open position” when dismantling the clamp.
Danger!
Always make sure that there is no product pressure in the pipeline before opening the valve.
Never service the valve when it is hot.

1. Supply compressed air to the actuator (only NC).
   The manually handle is turned counter-clockwise.
2. Loosen and remove clamp.
3. Release compressed air (only NC).
4. Lift away the actuator and diaphragm.
5. Release compressed air (only NC)
6. The manually actuator spindle must be in the “closed position” to remove the diaphragm, which is done by rotating the handle clockwise. The diaphragm is pushed away from the actuator housing.
7. Remove the diaphragm (see section 5.3 Diaphragm replacement)

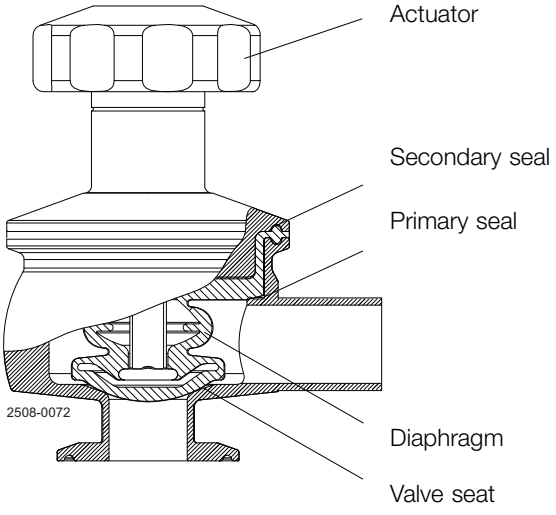


The ø12.7 / ½ inch and the ø25 mm / 1 inch is snapped onto the actuator rod.
The ø38 / 1½ inch is screwed onto the actuator spindle.

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

5.3 Diaphragm replacement

The diaphragm seals against the valve body seat while the valve is closed. The diaphragm also operates as a static seal. There are two sealing faces between the valve housing and the actuator. The diaphragm is available in EPDM and silicone.



The material that the diaphragms are made of, will be affected by parameters as temperature, pressure, media, activations and combinations of these parameters.

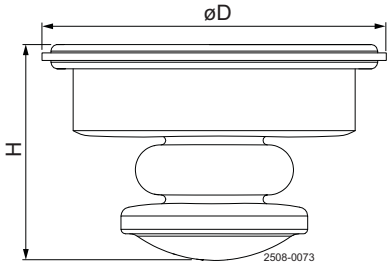
The service life of the diaphragm depends on its working conditions.

In general, inspection should be performed every 50 hours of sterilisation (e.g. exposure to steam or super heated water).

The interval may however vary between different installations, depending on chemicals and utilities used, and temperature during SIP. The following guidelines can be used:

1. Exposure to water < 100 °C.
   The diaphragm should be inspected after approx. 1000 hours of operation.
2. Exposure to steam > 100 °C, but max. 135 °C (1 hour).
   The diaphragm should be inspected after approx. 50 hours exposure, e.g. after 50 sterilisation of 60 minutes.
3. For EPDM diaphragms which are constantly subjected to pure steam, the interval of inspection can typically be extended to about 250 hours.
   Use an on/off valve before the valve to prolong length of life of the EPDM membrane.

Table 1. Diaphragm size (silicone or EPDM)



Size		ØD	H
mm	inch		
12.7	½	50.5 (2 inch)	31 (1 ¼inch)
25	1	77.5 (3 inch)	50 (2 inch)
38	1½	77.5 (3 inch)	57 (2 ¼inch)

5 Maintenance

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

Diaphragm marking
Fig. A

Size 12.7 / ½ inch and 25 / 1 inch is “a snap connection”. The diaphragm must be all the way on, or it will be over-stretched and damaged in the closed position. Some force may be needed to push the diaphragm over the “snap connection”.

The diaphragm is mounted onto the actuator rod (which must be in the close position) = diaphragm is uncompressed.

Fig. B

Size 38 (1½) is a screwed connection.
NOTE! The manually actuator must be locked by using small screwdriver into the ø4 hole in the rod (ø4 hole is only in the manually rod and not the pneumatic version).
The diaphragm is mounted onto the actuator rod (which must be in the close position) = diaphragm is uncompressed.

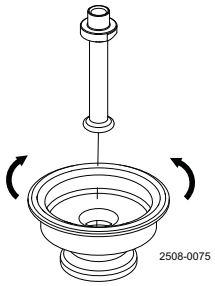


Figure A

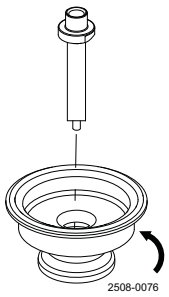
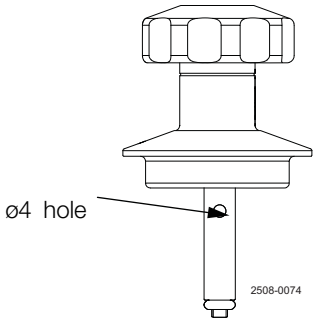


Figure B



Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

5.4 Assembly of valve

Step 1
Start by fitting the diaphragm onto the actuator rod (see section 5.3 Diaphragm replacement).

Step 2
To fit the actuator onto the valve body, the actuator must be in the open position (diaphragm is then compressed) when assembling the valve.
Supply compressed air to the actuator (only NC and A/A).
The manually handle is turned counter-clockwise.

Step 3
Mount the clamp and be sure that it is fitted correctly. Knock with a plastic hammer on both side of the clamp while tightening.

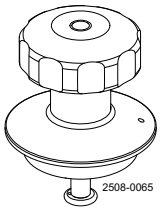
Step 4
Release compressed air (only NC + A/A).

5 Maintenance

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

5.5 Disassembly of actuator

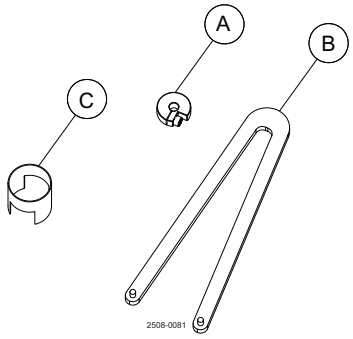
Step 1
Manual actuator
The manually operated actuator can not be dismantled.
The reason is that the lifetime is very long due to few activations compared to the pneumatic actuator.



NOTE:
In the event that you need to dismantle the actuator, this can be done safely as there are no springs inside.

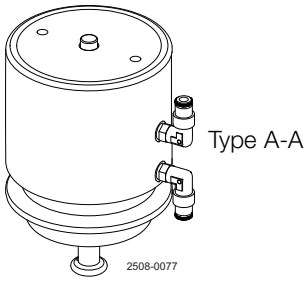
Step 2
⚠
Pneumatic actuator

⚠
Always release compressed air before dismantling the actuator.
The pneumatic actuator can be dismantled by using a special tool. (The part no. is shown on the spare part).



A = Tool to lock the actuator rod to avoid breaking the “spring guides” inside the actuator.
B = Tool to loosen actuator cap (spanner wrench)
C = Distance piece

Type A-A:
In the pneumatic actuator type A-A there is no spring inside the housing.
The actuator can only therefore be opened by using the special tool “B”.
It is not necessary to use special tool “A” and “C”.



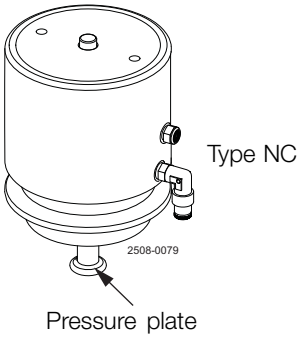
Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

Type NC:

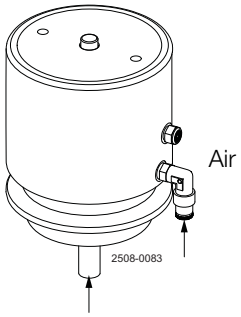
In the pneumatic actuator type NC ø12.7 mm / 1/2 inch there are no “spring guides” inside the housing.
The actuator can only therefore be opened by the special tool “B”.
It is not necessary to use special tool “A” and “C”.

In the pneumatic actuator type NC size ø25 mm / 1 inch and ø38 mm / 1 1/2 inch there are “spring guides” inside the housing.
This is why it its necessary to use the special tool “A”, “B” and “C”.

1) Remove pressure plate.
Be careful not to scratch the rod.



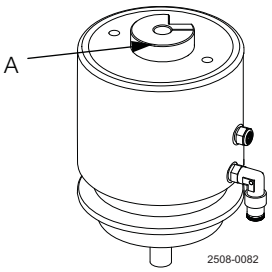
2) Put air on actuator and activate.



5 Maintenance

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

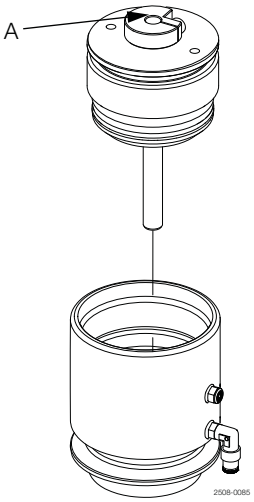
3) With actuator compressed mount “A” (locking tool) and tighten properly.
4) RELEASE COMPRESSED AIR and remove the hose.
The “A” (locking tool) should still lock the rod.



⚠
CAREFULLY - Spring under load

5) Unscrew cap with tool “B” (spanner wrench).
6) Remove “piston unit” from housing and handle it carefully as spring is under load

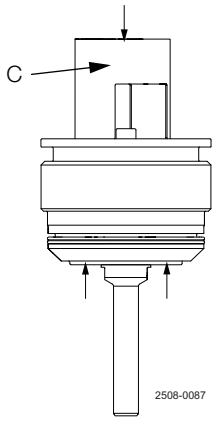
.



Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

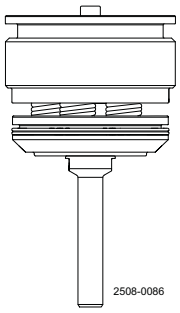
⚠
CAREFULLY - Spring under load

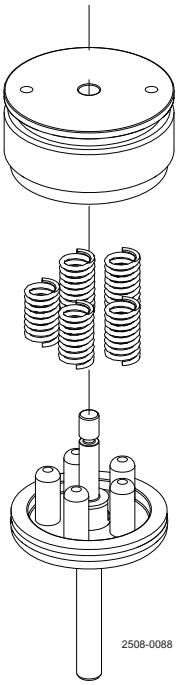
Hydraulic press



7) Fit “C” (distance piece) so it is possible to loosen “A” (locking tool).
This must be done in a hydraulic press.
Compress cap and piston and loosen the tool “A” (locking tool) in the compressed state.

8) With the tool “A” loosen, then slowly release the compression in the hydraulic press.
Careful as springs are under load.





5.6 Assembly of actuator

⚠
CAREFULLY - Spring under load
Step 1
Assembly is performed in reverse order as shown in the “Disassembly of actuator”, (See section 5.5 Disassembly of actuator)

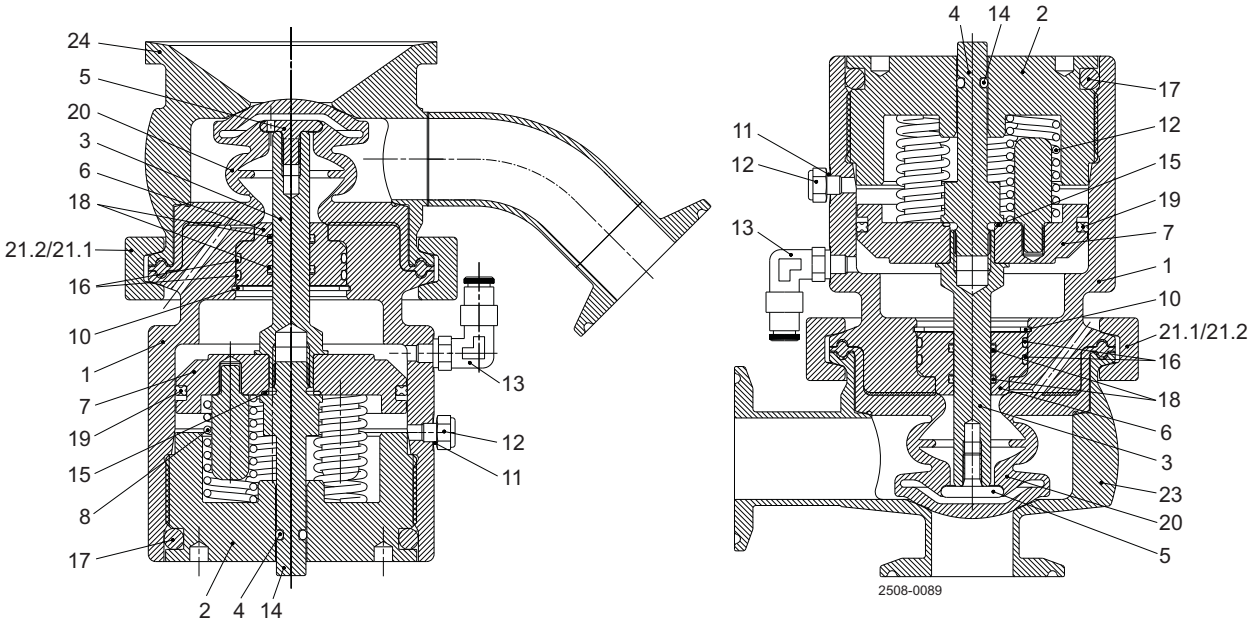
6 Technical data

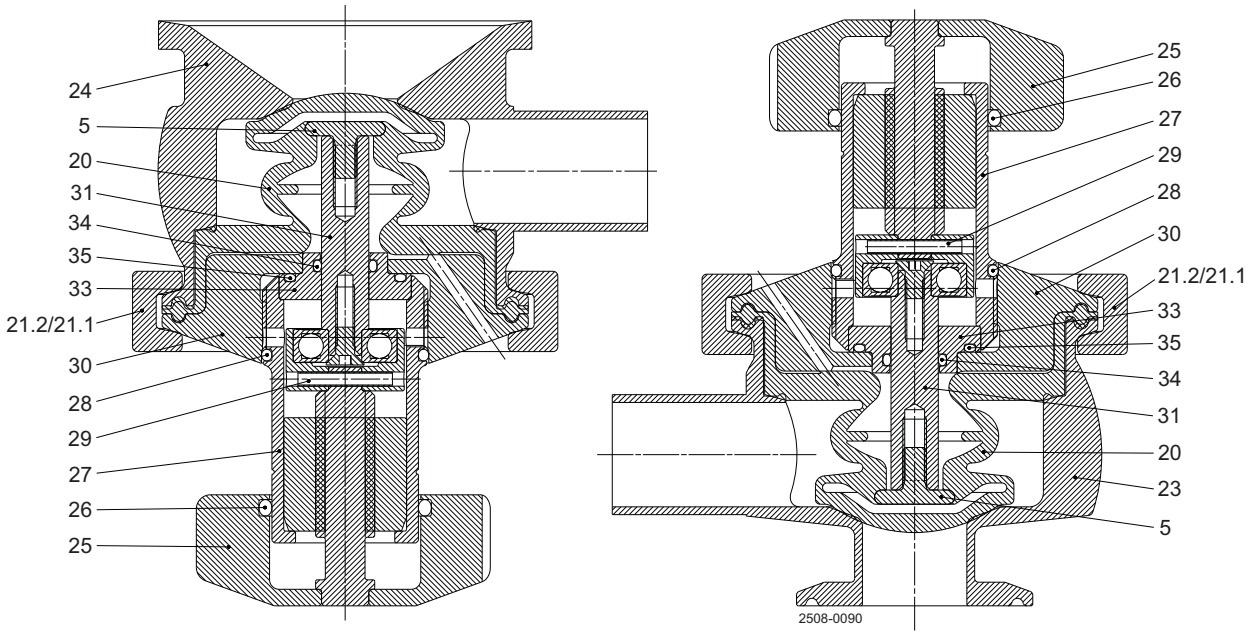
Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

6.1 Technical data

Design temperature	
Sterilisation In Place (SIP)	Max. 135 °C / (275 °F) (at 1 hour)
Autoclave clearing	
Pneumatic actuator can not be autoclaved. Manual actuator can be autoclaved. Autoclave (manual valves only can be autoclaved)	 Max. 130 °C (266 °F) (at 1 hour)
Design pressure	
Minimum working pressure	Full vacuum
Maximum working pressure	7 bar (101 PSI)
Other design data	
pH range	3-11
Viscocity	0-1000 cP
Material	
Housing (valve body)	AISI 316L
Actuator cover	AISI 304
Diaphragm	
Silicone	According to FDA specification of approved material (FDA 21 CFR § 177.2600)
EPDM	According to FDA specification of approved material (FDA 21 CFR § 177.2600)
See section 5.3 for information about the diaphragms	
Surface treatment	
Internally	High grade polished Ra 0.5 µm or (SFI) electro polish Ra 0.4 µm (SF4)
Externally	Ra 0.8 µm
Operating data for pneumatic actuator	
Actuator function:	
SA: Pneumatic upward movement, spring return (NC)	
AA: Pneumatic upward and downward movement	
Man: Manually operated	
Operating data: Pneumatic actuator (Spring operated) SA	
Control air	Dry, free from particies and oil (ISO 8573.1 Class 2.2.1)
Supply pressure, recommended	6 bar (88 PSI)
Supply pressure, minimum	5.5 bar (79 PSI)
Supply pressure, maximum	7 bar (101 PSI)
Operating data - Pneumatic actuator (Air operated) AA	
Control air	Dry, free from particies and oil (ISO 8573.1 Class 2.2.1)
Supply pressure, recommended	3.5 bar (51 PSI)
Supply pressure, minimum	3 bar (44 PSI)
Supply pressure, maximum	4 bar (58 PSI)
Air consumption - Pneumatic actuators (AA & SA)	
Air consumption RDV-UP ½"	0.03 Nl/stroke at 4 bar
Air consumption RDV-UP 1"	0.12 Nl/stroke at 4 bar
Air consumption RDV-UP 1 ½"	0.3 Nl/stroke at 4 bar
Air connection	M5 thread
Hose, quick connection	4mm hose

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

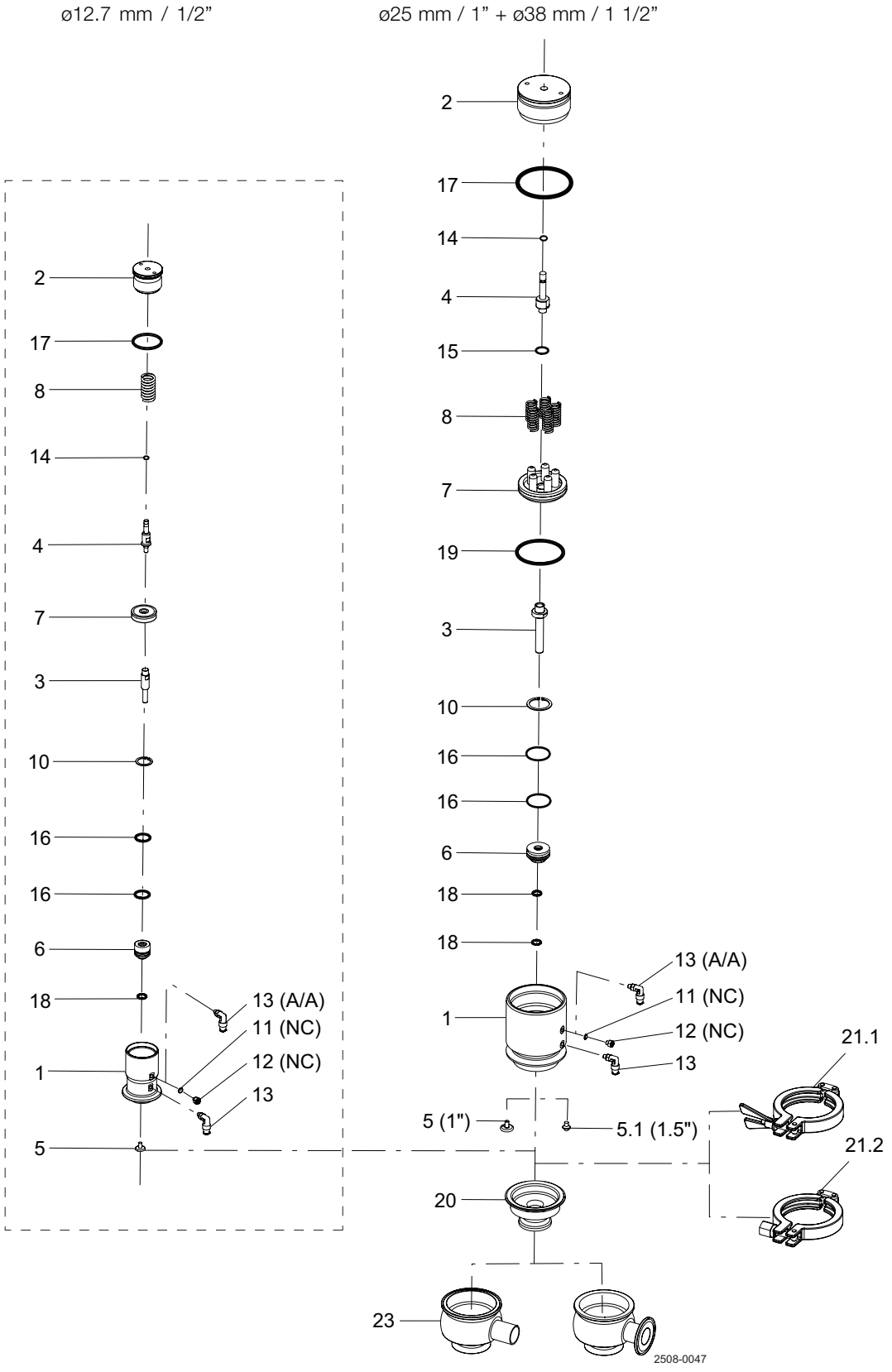




7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

7.1 Radial Diaphragm Valve UltraPure - shut off - actuator



7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

Parts list

Pos.		Qty	Denomination
			Actuator, complete (NC)
			Actuator, complete (A/A)
1		1	Actuator housing
2		1	Lid
3		1	Rod
4		1	Indicator rod
5		1	Pressure plate
5.1		1	Threaded insert
6		1	Bushing
7		1	Piston
8		1	Spring (NC)
		5	Spring (NC)
10		1	Clip
11	□	1	Seal
12		1	Air silencer (NC)
13		1	Air fitting
		2	Air fitting
14	□	1	O-ring
15	□	1	O-ring
16	□	2	O-ring
17	□	1	O-ring
18	□	1	X-ring
	□	2	X-ring
19	□	1	X-ring
20	♦	1	Diaphragm
21.1		1	Clamp with wing nut
21.2		1	Clamp with hex nut
23		1	Valve body

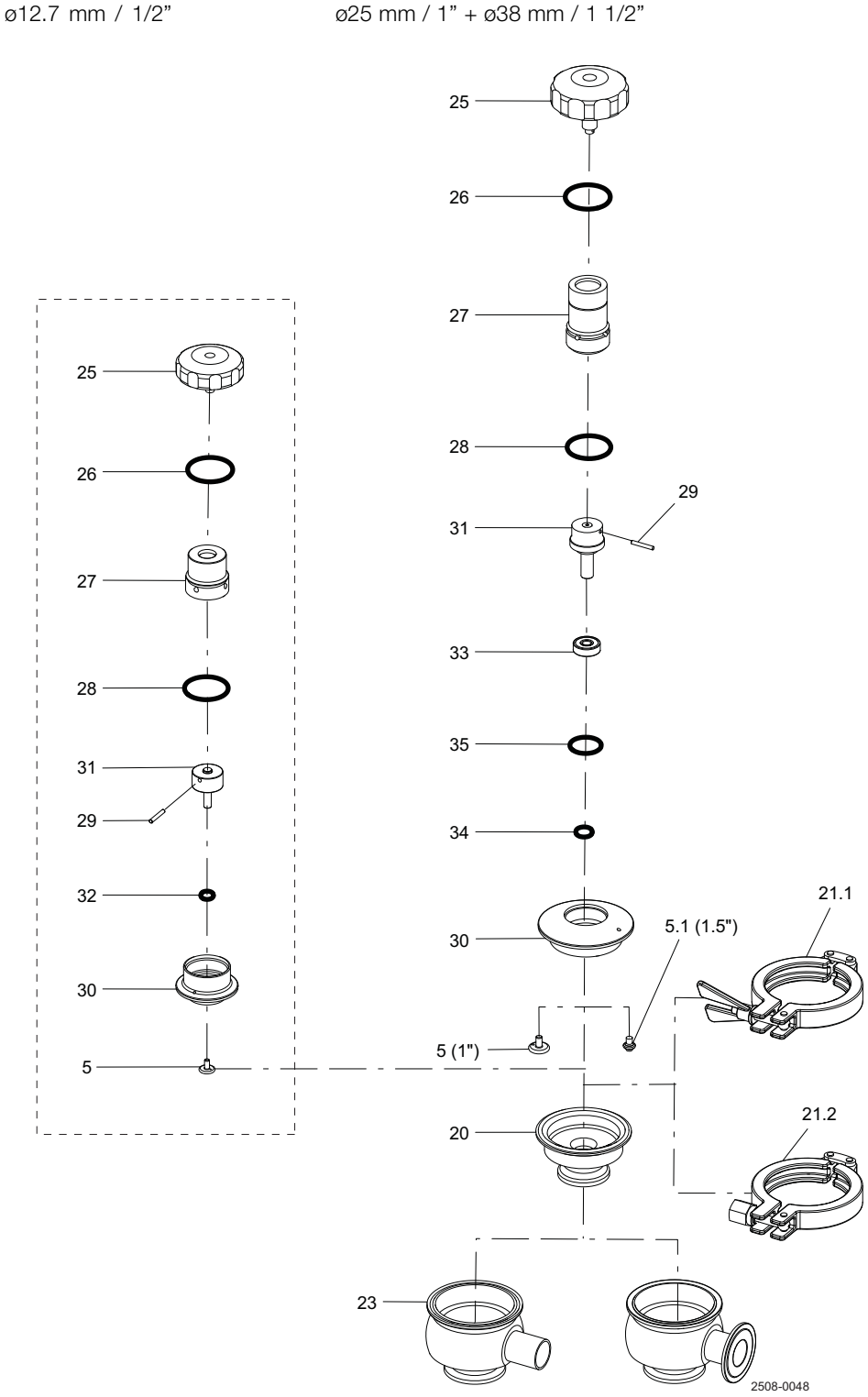
Service kits

	Denomination	ø12.7 mm 1/2"	ø25 mm 1"	ø38 mm 1 1/2"
Recommended spare parts:				
□	Service kit, actuator	9611-92-4306	9611-92-4307	9611-92-4308
♦	Diaphragm, Silicone (incl. Q-doc)	9614-0989-01	9614-0989-03	9614-0989-05
♦	Diaphragm, EPDM (incl. Q-doc)	9614-0989-02	9614-0989-04	9614-0989-06

7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

7.2 Radial Diaphragm Valve UltraPure - shut off - manual



7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

Parts list

Pos.	Qty	Denomination
		Manual handle, complete
5	1	Pressure plate
5.1	1	Threaded insert
20 ♦	1	Diaphragm
21.1	1	Clamp with wing nut
21.2	1	Clamp with hex nut
23	1	Valve body
25	1	Handle
26	1	O-ring
27	1	Housing
28	1	O-ring
29	1	Spring pin
30	1	Flange
31	1	Rod with bearing
32	1	O-ring
33	1	Bushing
34	1	O-ring
35	1	O-ring

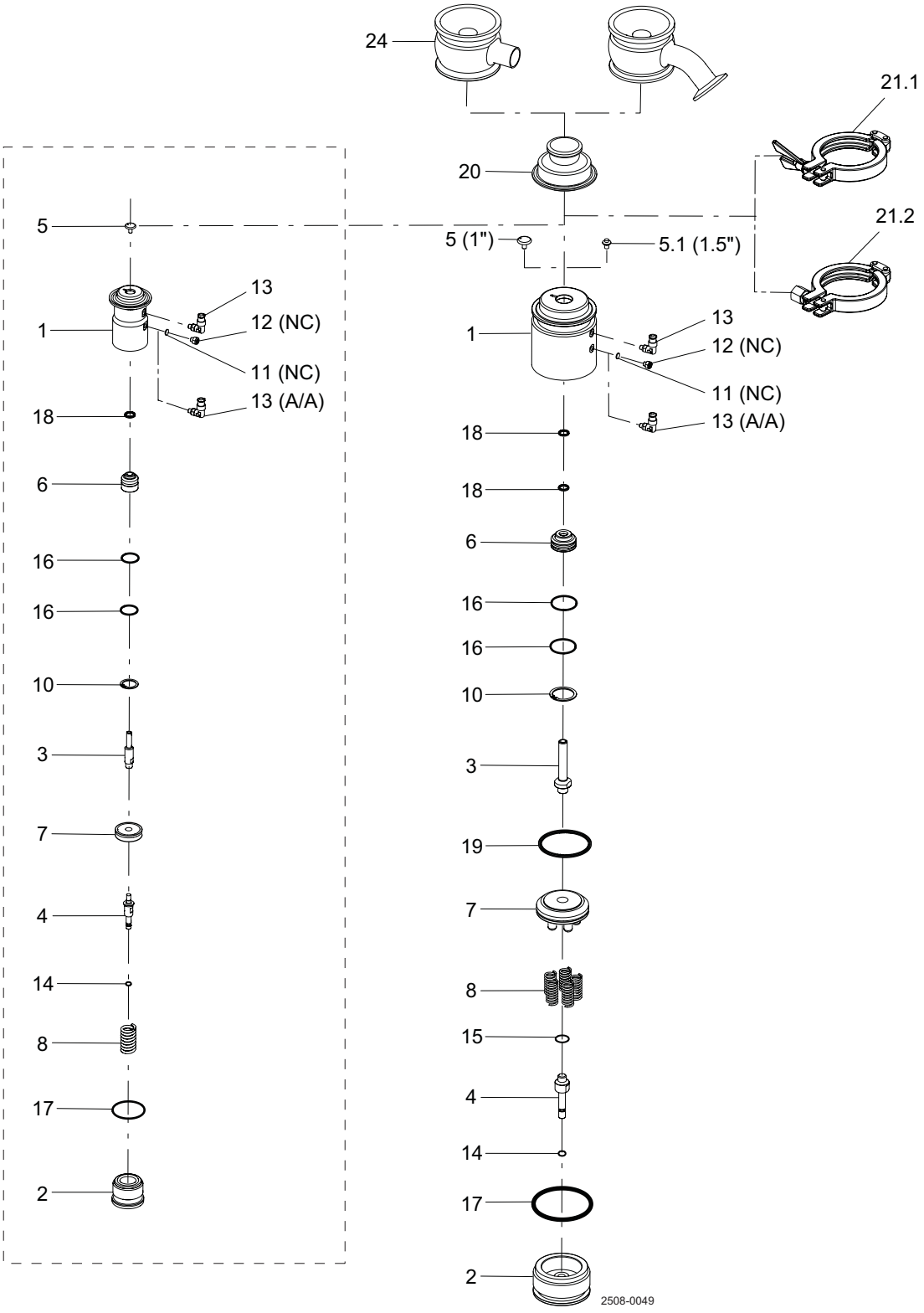
Service kits

Denomination	ø12.7 mm 1/2"	ø25 mm 1"	ø38 mm 1 1/2"
Recommended spare parts:			
♦ Diaphragm, Silicone (incl. Q-doc)	9614-0989-01	9614-0989-03	9614-0989-05
♦ Diaphragm, EPDM (incl. Q-doc)	9614-0989-02	9614-0989-04	9614-0989-06

7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

7.3 Radial Diaphragm Valve UltraPure - tank outlet - actuator



ø12.7 mm / 1/2” ø25 mm / 1” + ø38 mm / 1 1/2”

7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

Parts list

Pos.		Qty	Denomination
			Actuator, complete (NC)
			Actuator, complete (A/A)
1		1	Actuator housing
2		1	Lid
3		1	Rod
4		1	Indicator rod
5		1	Pressure plate
5.1		1	Threaded insert
6		1	Bushing
7		1	Piston
8		1	Spring (NC)
		5	Spring (NC)
10		1	Clip
11	□	1	Seal
12		1	Air silencer (NC)
13		1	Air fitting (NC)
		2	Air fitting (A/A)
14	□	1	O-ring
15	□	1	O-ring
16	□	2	O-ring
17	□	1	O-ring
18	□	1	X-ring
	□	2	X-ring
19	□	1	X-ring
20	♦	1	Diaphragm
21.1		1	Clamp with wing nut
21.2		1	Clamp with hex nut
24		1	Valve body

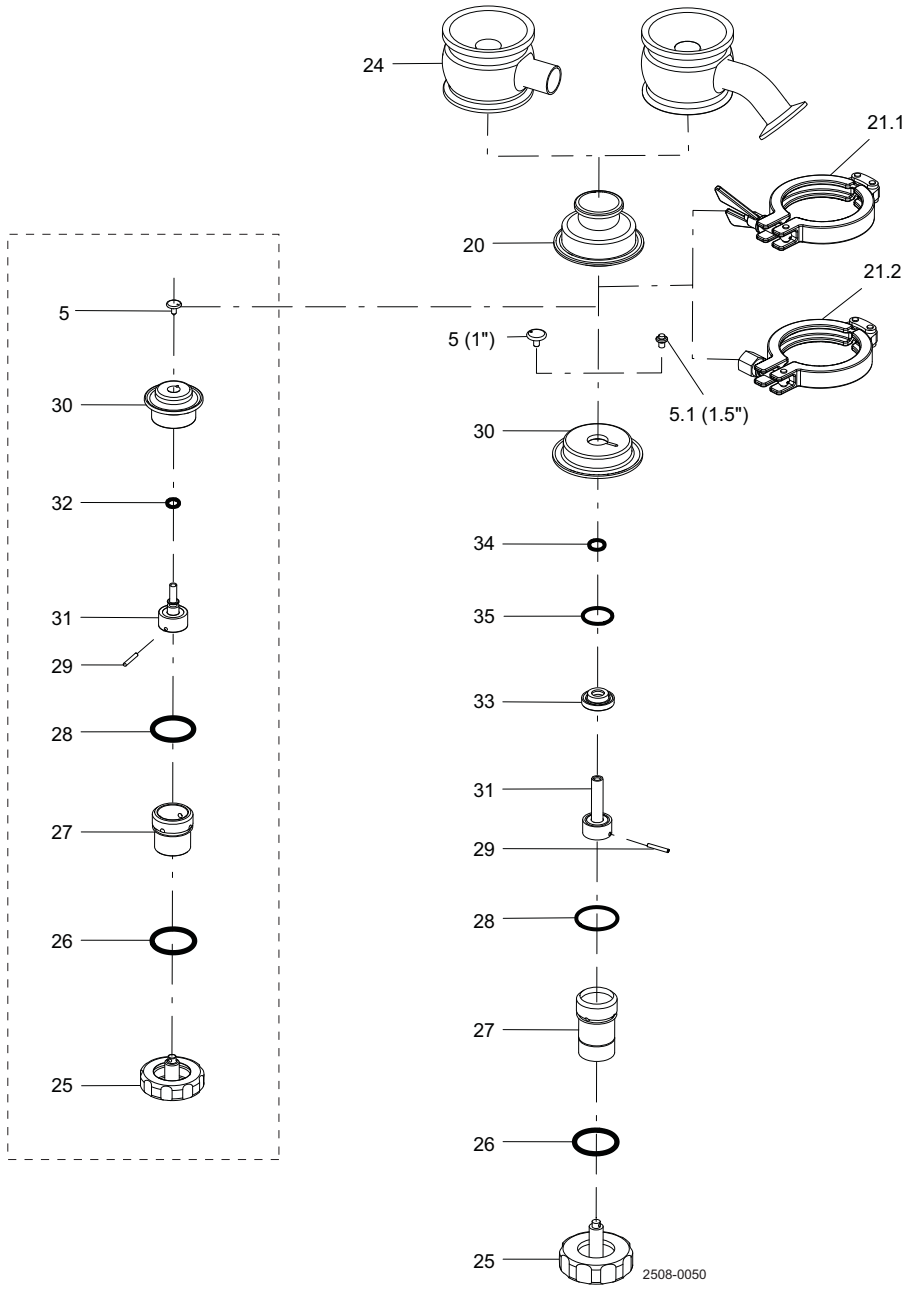
Service kits

	Denomination	ø12.7 mm 1/2"	ø25 mm 1"	ø38 mm 1 1/2"
Recommended spare parts:				
□	Service kit, actuator	9611-92-4306	9611-92-4307	9611-92-4308
♦	Diaphragm, Silicone (incl. Q-doc)	9614-0989-01	9614-0989-03	9614-0989-05
♦	Diaphragm, EPDM (incl. Q-doc)	9614-0989-02	9614-0989-04	9614-0989-06

7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

7.4 Radial Diaphragm Valve UltraPure - tank outlet - manual



ø12.7 mm / 1/2" ø25 mm / 1" + ø38 mm / 1 1/2"

7 Parts list and service kits

Study the instructions carefully. The items refer to the Parts list and service kits section. Handle scrap correctly.
Man = Manually activated
NC = Normally closed.
A/A = Air/air activated.

Parts list

Pos.	Qty	Denomination
		Manual handle, complete
5	1	Pressure plate
5.1	1	Threaded insert
20 ♦	1	Diaphragm
21.1	1	Clamp with wing nut
21.2	1	Clamp with hex nut
24	1	Valve body
25	1	Handle
26	1	O-ring
27	1	Housing
28	1	O-ring
29	1	Spring pin
30	1	Flange
31	1	Rod with bearing
32	1	O-ring
33	1	Bushing
34	1	O-ring
35	1	O-ring

Service kits

Denomination	ø12.7 mm 1/2"	ø25 mm 1"	ø38 mm 1 1/2"
Recommended spare parts:			
♦ Diaphragm, Silicone (incl. Q-doc)	9614-0989-01	9614-0989-03	9614-0989-05
♦ Diaphragm, EPDM (incl. Q-doc)	9614-0989-02	9614-0989-04	9614-0989-06

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