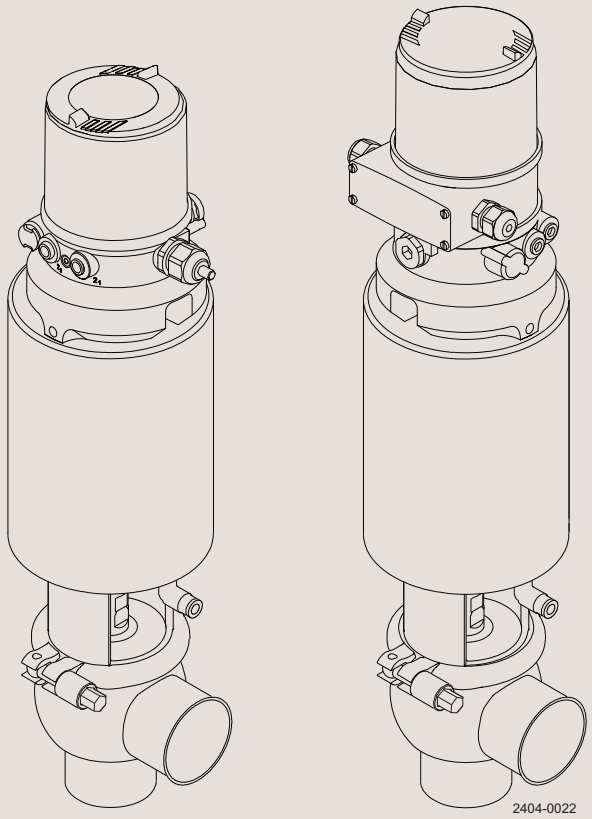
Instruction Manual

Unique RV-ST Regulating Valve



ESE02127-EN4 2015-04

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 EC Declaration of Conformity

The Designated Company

Alfa Laval Kolding A/S
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Valve
Designation

Unique SSV PN10
Type

From serial number 5099880 to 29999999999

is in conformity with the following directive with amendments:

- Machinery Directive 2006/42/EC
- Regulation (EC) No 1935/2004
- Pressure Equipment Directive 97/23/EC category 1 and subjected to assessment procedure Module A.

The person authorised to compile the technical file is the signer of this document

QHSE Manager, Quality, Health and safety & Environment
Title

Annie Dahl
Name

Kolding
Place

2012-04-01
Date


Signature

2 Installation

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 severe 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 Installation

All warnings in the manual are summarised on this page.
Pay special attention to the instructions below so that serious 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 compressed air is supplied to the actuator.
Never touch the valve or the pipelines when processing hot liquids or when sterilising.
Never dismantle the valve with valve and pipelines under pressure.
Never dismantle the valve when it is hot.

Operation

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

Always handle lye and acid with great care.

Maintenance

Always observe the technical data thoroughly (see chapter 6 Technical data).
Always release compressed air after use.
Never service the valve when it is hot.
The valve/actuator and the pipelines must **never** be pressurised when servicing the valve/actuator.

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 ensurethat compressed air are released.
Always ensurethat all connections are disconnected before attempting to remove the valve from the installation.
Always drain liquid out of valves before transportation.
Always use predesigned lifting points if defined.
Always encure adequate 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 the parts list and service kits section.
The valve is supplied as separate parts as standard (for welding).
The valve is assembled before delivery, if it is supplied with fittings.

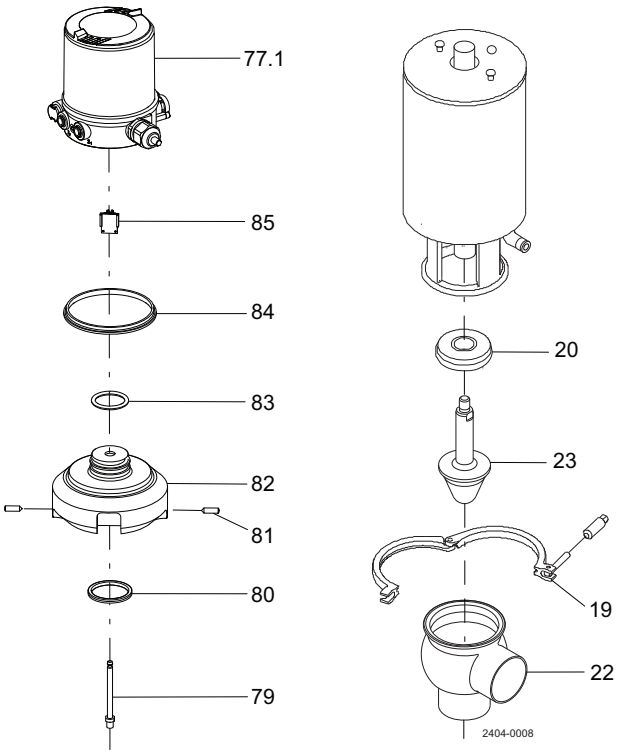
3.1 Unpacking/delivery

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

Check the delivery for:

1. Complete valve
2. Delivery note
3. Instruction Manual

Step 2
1. Complete actuator
2. Bonnet (20)
3. Clamp (19)
4. Valve plug (23)
5. Valve body (22)
6. Positioner (77.1)
7. Adapter (82)
8. Spindle (79)
9. Special X-ring (80)
10. Allen screw (81)
11. Puck sensor pad (85)
12. O-ring (83)
13. Gasket for adapter (84)



Step 3
Remove possible packing materials from the valve/valve parts.
Inspect the valve/valve parts for visible transport damage.
Avoid damaging the valve/valve parts.

3 Installation

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

3.2 General installation

Step 1

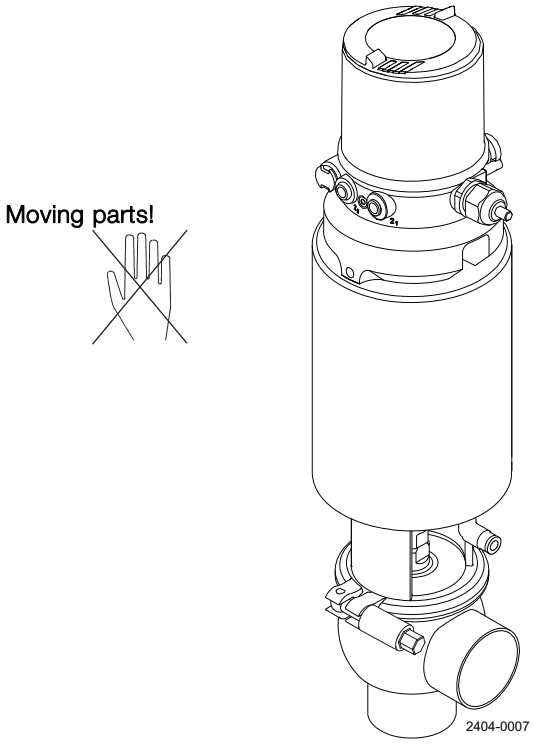
Always read the technical data thoroughly.

Always release compressed air after use.

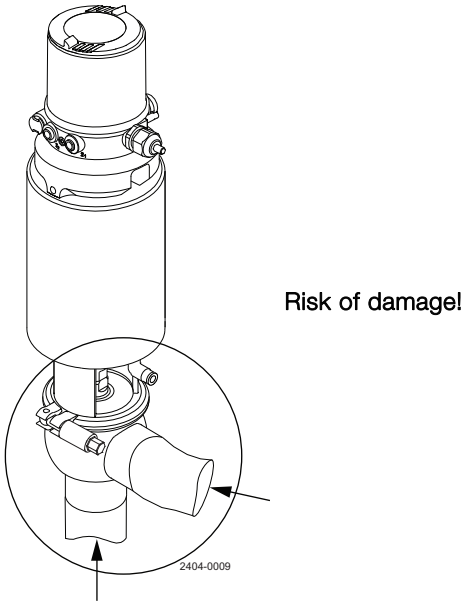
CAUTION
Alfa Laval cannot be held responsible for incorrect installation.

Step 2

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



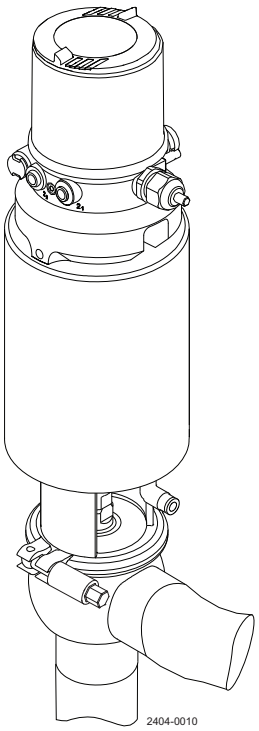
Step 3
Avoid stressing the valve.
Pay special attention to:
- Vibrations
- Thermal expansion of the tubes
- Excessive welding
- Overloading of the pipelines



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.

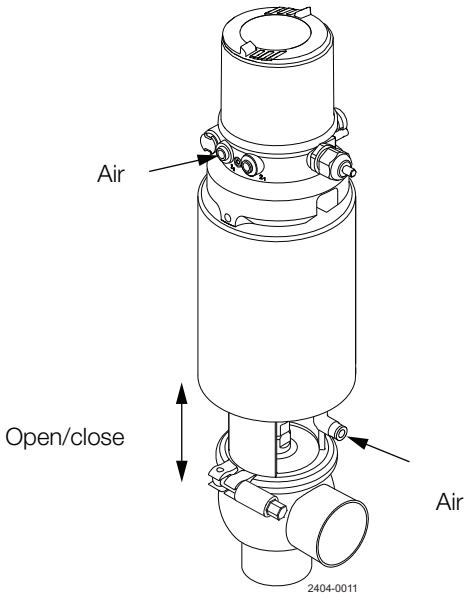
3.3 Welding

Step 1
Assemble the valve in accordance with the steps in chapter 5.4 Assembly of valve
Pay special attention to the warnings!



Step 2
Pre-use check:
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!

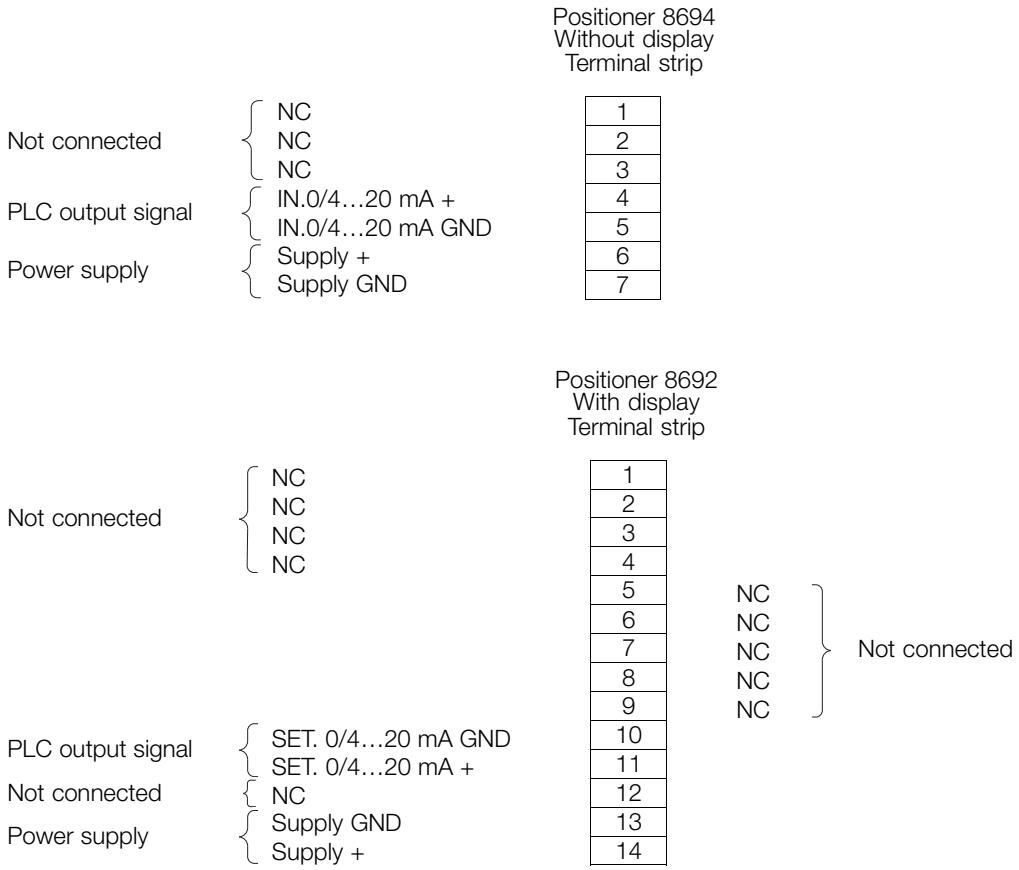


3 Installation

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.

3.4 Electrical connection

Electrical connection



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.

3.5 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 wear 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 wear parts must be disposed in accordance with local regulations

• Scrapping

- At end of use, the equipment must be recycled according to relevant, local regulations. Besides 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 your 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.

4.1 Operation

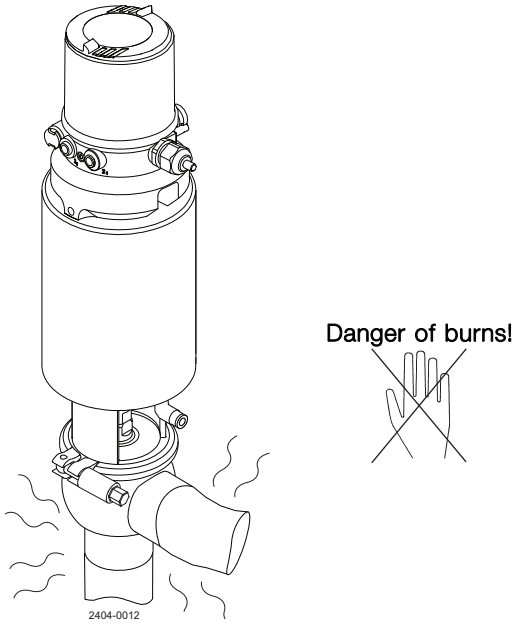
Step 1

Always read the technical data thoroughly.
Always release compressed air after use.

CAUTION
Alfa Laval cannot be held responsible for incorrect operation.

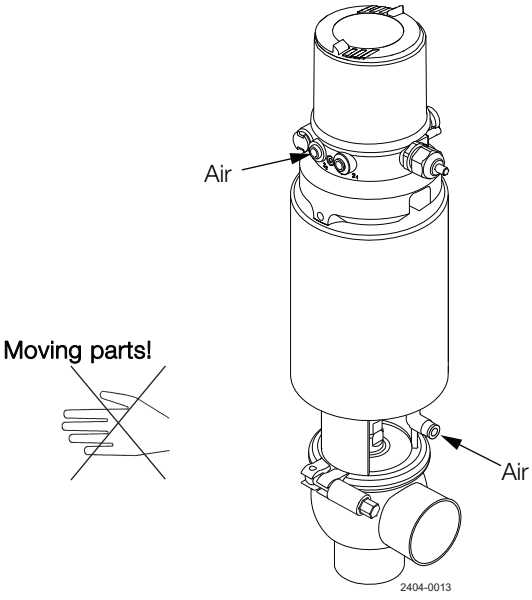
Step 2

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



Step 3

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

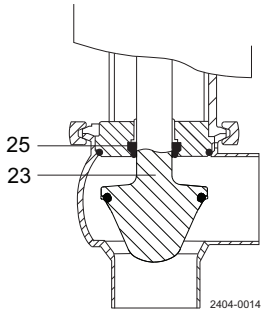


Study the instructions carefully and pay special attention to the warnings!
Ensure that the valve operates smoothly.
The items refer to the parts list and service kits section.

Step 4
Lubrication of valves:

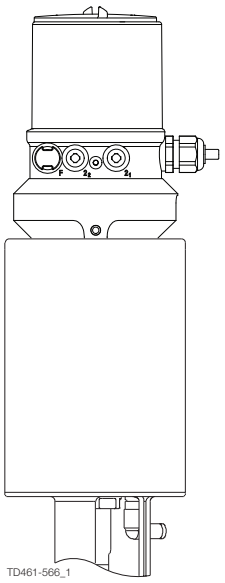
1. Ensure smooth movement between lip seal (25) and plug stem (23).
2. Lubricate with Klüber Paraliq GTE 703 if necessary (see chapter 5.1 General maintenance).

Shut-off valve



Step 5
Lubrication of actuator

1. Ensure smooth movement of the actuator (the actuator is lubricated before delivery).
2. Lubricate O-ring(s) with Molykote Longterm 2 plus if necessary.



4 Operation

Pay attention to possible faults. Study the instructions carefully.
The items refer to the parts list and service kits (chapter 7 Parts list and service kits).

4.2 Troubleshooting

NOTE!
Study the maintenance instructions carefully before replacing worn parts. See chapter 5.1 General maintenance.

Problem	Cause/result	Repair
External product leakage	Worn or product affected lip seal and/or O-ring	- Replace the seals - Replace with seals of a different rubber grade
Internal product leakage	- Worn or product affected plug seal	- Replace the seal - Replace with a seal of a different rubber grade
	- Product deposits on the seat and/or plug	- Frequent cleaning
	- The product pressure on the plug is too high	- Reduce product pressure
Water hammer	The flow direction is the same as the closing direction	- The flow direction should be against the closing direction
The valve does not open/close	- The pressure on the plug is too high	- Reduce the product pressure
Deviation in the flow regulation	- Mechanical parts have come loose (vibrations)	- Tighten and adjust
Actuator does not regulate	- No air	Check air supply
	- Actuator errors	- Return the actuator to the supplier
	- Positioner errors	- Check positioner (see positioner instruction)

The valve is designed for cleaning in place (CIP).
NaOH = Caustic Soda.
HNO3 = Nitric acid.

4.3 Recommended cleaning

Step 1

Always handle lye and acid with great care.

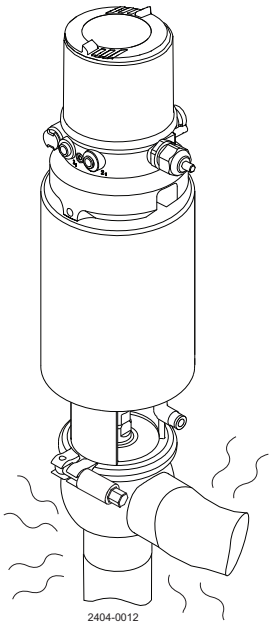
Caustic danger!

Always use rubber gloves!

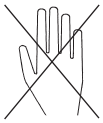
Always use protective goggles!

Step 2

Never touch the valve or the pipelines when sterilising.



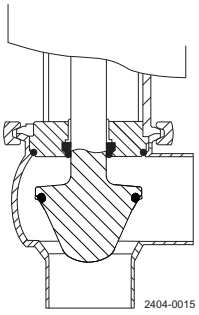
Danger of burns!



Step 3

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

Shut-off valve



4 Operation

The valve is designed for cleaning in place (CIP).
NaOH = Caustic Soda.
HNO3 = Nitric acid.

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

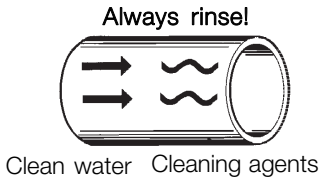
1. 1% by weight NaOH at 70° C (158° F)

1 kg (2.2 lbs) NaOH	+	100 l (26.4 gal) water	=	Cleaning agent
2.2 l (0.6 gal) 33% NaOH	+	100 l (26.4 gal) water	=	Cleaning agent

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

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

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.



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

Maintain the valve regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and lip 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.

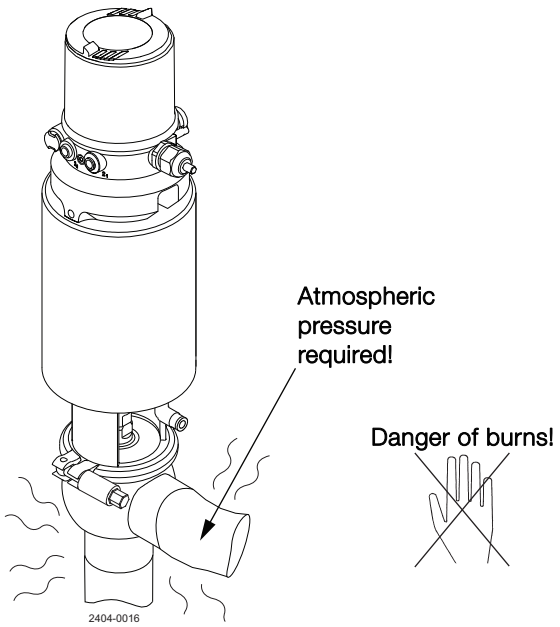
Always release compressed air after use.

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

Step 2

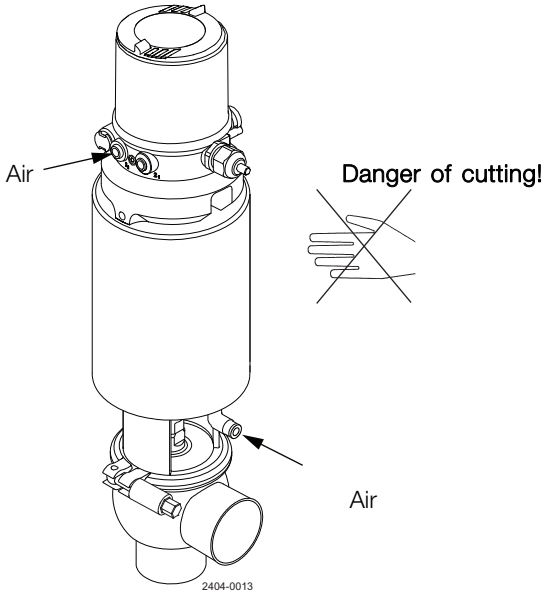
Never service the valve when it is hot.

Never service the valve with the valve and pipelines under pressure.



Step 3

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

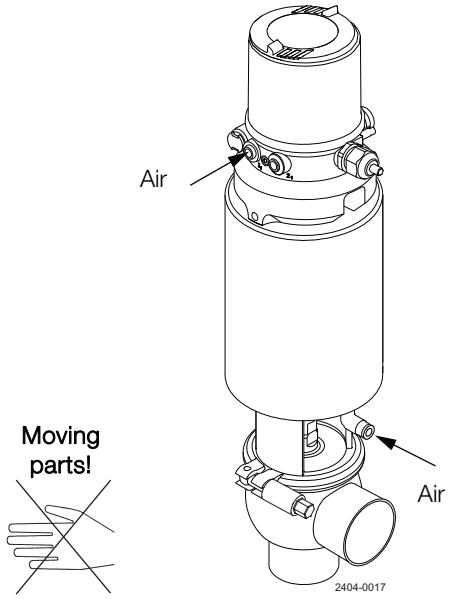


5 Maintenance

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

Step 4

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



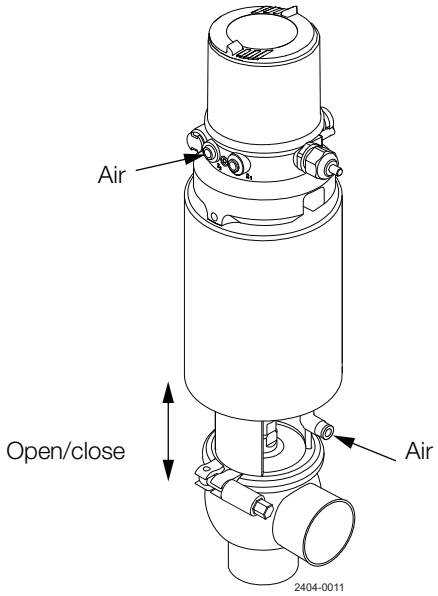
5 Maintenance

Maintain the valve regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and lip 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 bushings complete
Preventive maintenance	**Replace after 12 months depending on working condition**	**Replace after 5 years depending on working condition**
Maintenance after leakage (leakage normally starts slowly)	**Replace at the end of the day**	**Replace when possible**
Planned maintenance	- Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for inspection planning **Replace after leakage**	- Regular inspection for leakage and smooth operation - Keep a record of the actuator - Use the statistics for inspection planning **Replace after leakage**
Lubrication	**Before fitting** Klüber Paraliq GTE 703 or similar USDA H1 approved oil/grease	**Before fitting** Molykote Longterm 2 plus

Pre-use check:
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!**



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

5 Maintenance

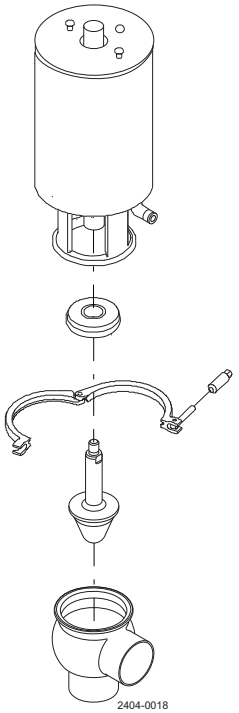
Study the instructions carefully. The items refer to the parts list and service kits section. Handle scrap correctly.
NC = Normally closed.
NO = Normally open.

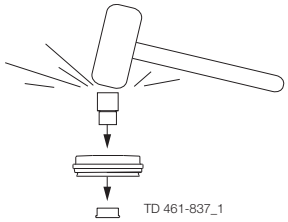
5.2 Dismantling of valve

1. Supply compressed air to the actuator (only NC).
2. Loosen and remove clamp.
3. Release compressed air (only NC)
4. Lift away the actuator.
5. Unscrew and remove valve plug.
6. Remove O-ring, lip seal and bushing in bonnet. (Use bushing tool and rubber mallet).

Pay special attention to the warnings!

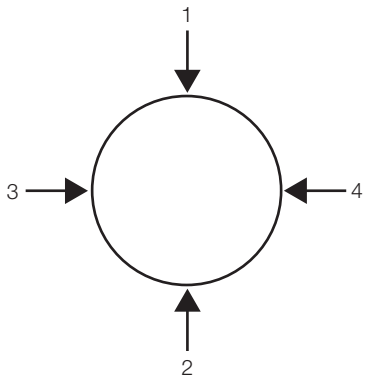
Note!
For plug seal replacement please see chapter 5.3 Plug seal replacement





5.3 Plug seal replacement

1. Remove old seal ring using a knife, screwdriver or similar. Be careful not to damage metal parts.
2. Pre-mount plug seal without pressing it into the groove.
3. Squeeze plug seal into the groove using opposite pressure points.
4. Release compressed air behind plug seal.



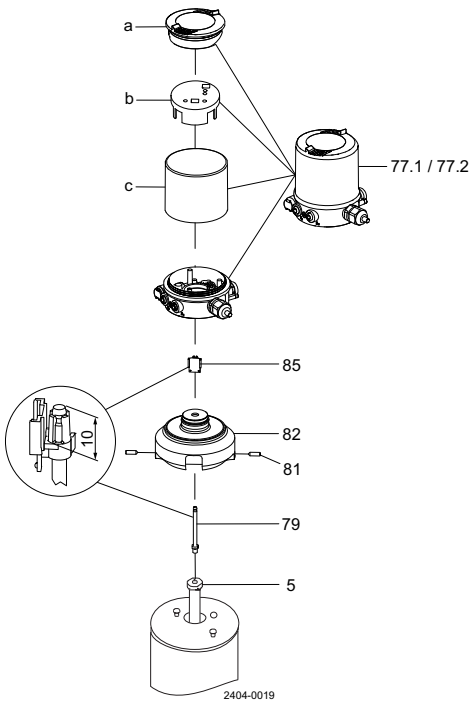
Study the instructions carefully. The items refer to the parts list and service kits section. Handle scrap correctly.
NC = Normally closed.
NO = Normally open.

5.4 Assembly of valve

Reverse order of 5.2 Dismantling of valve.
Lubricate O-ring (21) and lip seal (25) with Klüber Paraliq GTE 703.
Remember to tighten spindle and plug with a torque M = 30Nm (use two 17mm spanners).
If there are vibrations in the pipeline Alfa Laval recommend to use Loctite no. 243.

5.5 Assembly instruction for positioner

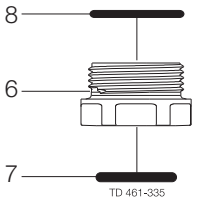
1. Mount the indication spindle (79) in top of actuator spindle (5).
2. Mount adapter (82) on top of actuator.
3. Fasten adapter by cross tighten the screws (81).
4. Mount the sensor pad (85) on the top of the indication spindle (79).
5. Remove top lid (a) and the cover (b) from positioner (77.1/77.2).
6. Grease seals lightly before assembly of the other parts with KlüberParaliq GTE 703.
7. Centring the sensor pad (85) in the guide rail inside the positioner when mounting the positioner unit (77.1/77.2) down over the adapter.
8. Fasten positioner (77.1/77.2) by cross tighten the screws.
9. Bring the actuator in top position (by using air if necessary).
10. Wire the electric connections according to “Quick start guide”.
11. Assemble the cover (c) and the top lid (a) again.
12. Mount the actuator on the valve and make the settings according to “Quick start guide”.



5.6 Actuator bushing replacement

1. Unscrew and remove O-rings.
2. Lubricate O-rings with Molykote Longterm 2 plus before fitting.
3. Fit bushings and O-rings. Tighten bushing with a torque = 10Nm.

Be careful not to overtighten.



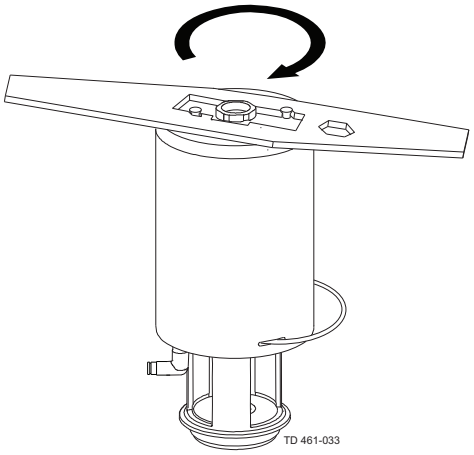
5 Maintenance

Study the instructions carefully. The items refer to the parts list and service kits section. Handle scrap correctly.
NC = Normally closed.
NO = Normally open.

5.7 Dismantling of optional maintainable actuator

1. Rotate cylinder (1).
2. Remove lock wire (10) and pull away cylinder (1).
3. Unscrew nuts (18) and remove yoke (13).
4. Unscrew bottom bushing (6).
5. Remove stem (2) with O-ring (3) and spring assembly (14).
6. Remove O-rings and support disc.

Rotate cylinder with service tool

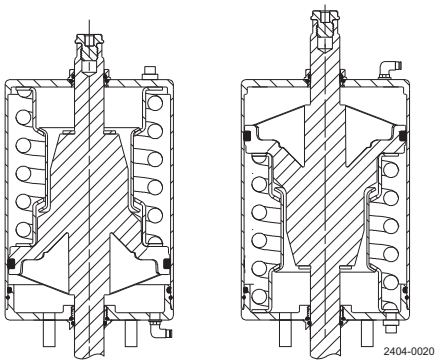


5.8 Assembly of optional maintainable actuator

Reverse order of 5.7 Dismantling of optional maintainable actuator.
Lubricate O-ring (3,7,11) with Molykote Longterm 2 plus before fitting.

5.9 Reversing optional maintainable actuator operation

1. Rotate cylinder.
2. Remove lock wire and pull away cylinder.
3. Reverse piston and spring assembly.
4. Reverse adapter, air fitting and plug to opposite end.
5. Re-assemble in reverse order (3 to 1).



NC
pneumatic
movement
upwards

NO
pneumatic
movement
downwards

It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

6.1 Technical data positioner

The valve is remote-controlled by a digital electro-pneumatic process controller. It has few and simple moveable parts which results in a very reliable valve.

Material:	
Body	PPS, Stainless Steel
Cover	PC
Sealing	EPDM
Power supply	24 VDC +/- 10%
Ripple	10%, no technical direct current
Setpoint setting	4 to 20 mA
Output resistance	180 Ω
Control medium:	Neutral gases, air DIN ISO 8573-1
Dust concentration	Class 5 (<40µm particle size)
Particle density	Class 5 (<10mg/m^3)
Pressure condensation point	Class 3 (<-20°C)
Oil concentration	Class 5 (<25mg/m^3)
Ambient temperature	0 to +60°C
Pilot air ports	Push-in connector (external ø6 mm or 1/4") or threaded ports G1/8
Supply pressure	Low air flow rate 5 to 7 bar [1)]
Air input filter	Exchangeable (mesh aperture~0.1mm)
Position detection module	Contact-free, wear-free
Stroke range valve spindle	3 to 28 mm
Installation	As required, preferably with actuator in upright position
Protection class	IP 65/67 according to EN 60529 (NEMA4x in preparation)
Power consumption	< 3.5 W
Electrical connection:	
Cable gland (in preparation)	1xM16x1.5 (cable-ø5-10mm), terminal screws (1.5 mm^2)
Protection class	3 according to VDE 0580
Conformity	CE acc. to EMC 2004/108/EC

1) The supply pressure has to be 0.5 - 1 bar above the minimum required pilot pressure for the valve actuator.

6.2 Technical data - valve/actuator

Data - valve/actuator	
Max. product pressure	10 bar (1000 kPa) (145 psi)
Min. product pressure	Full vacuum (depending on product specifications)
Temperature range	-10°C to + 140°C (standard EPDM seal)
Air pressure, actuator	5 to 7 bar (500 to 700 kPa) (72.5 to 101.5 psi)
Materials - valve/actuator	
Product wetted steel parts	AISI 316L (internal Ra < 0.8)
Other steel parts	AISI 304
Product wetted seals	EPDM (standard)
Optional product wetted seals	HNBR and FPM
Other seals	NBR

6 Technical data

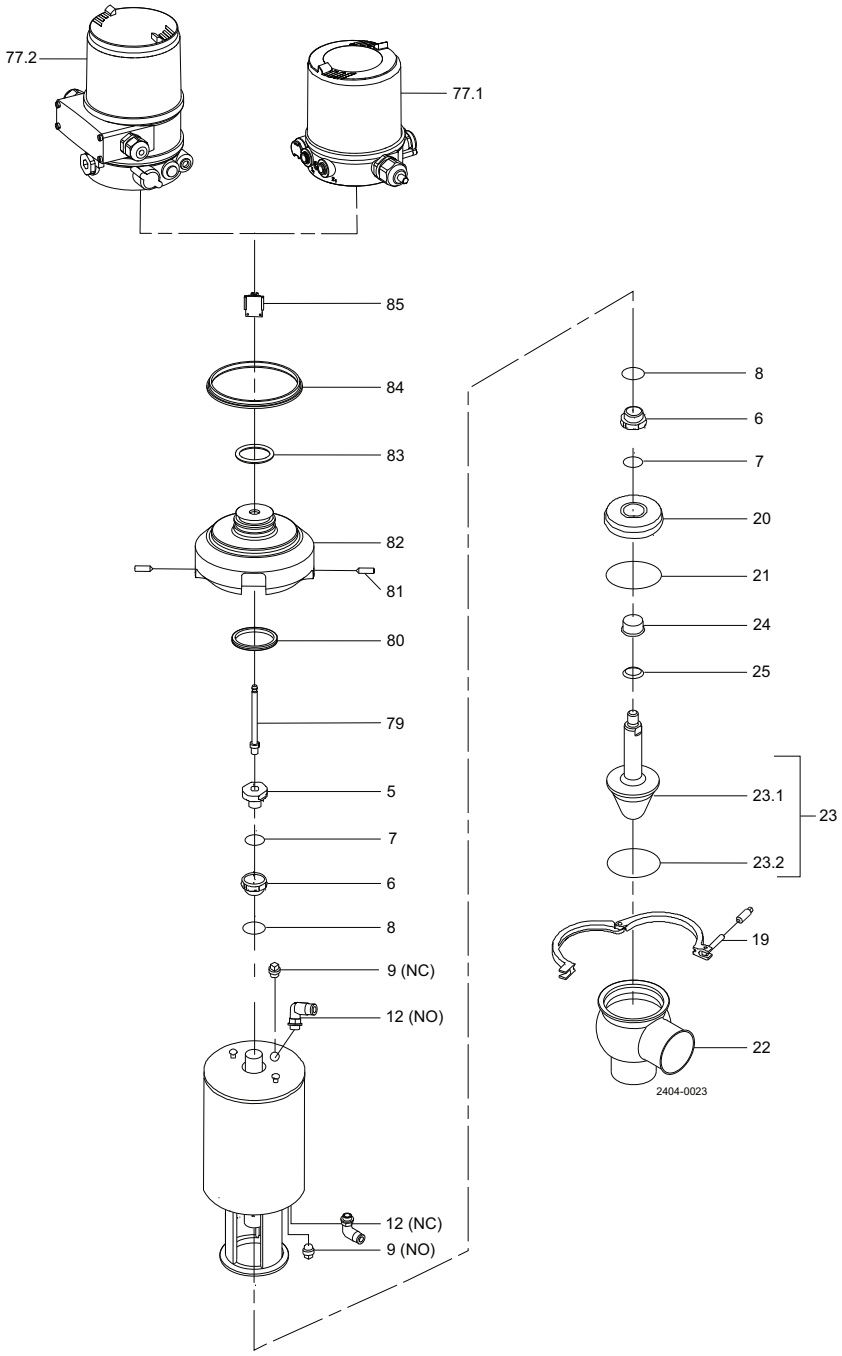
It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

Weight (kg)

Size	38 mm	51 mm	63.5 mm	76.1 mm	101.6 mm	DN 40	DN 50	DN 65	DN 80	DN 100
Weight (kg)	7.3	9.5	10.5	16.4	18.6	7.3	9.5	10.5	16.4	18.6

It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

7.1 Unique RV-ST Regulating Valve - Shut-off valve



7 Parts list and service kits

It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

Parts list

Pos.		Qty	Denomination
			Actuator, complete (NO)
			Actuator, complete (NC)
5		1	Adapter
6	•	2	Bushing
7	•	2	O-ring
8	•	2	O-ring
9		1	Plug
12		1	Air fitting
19		1	Clamp
20		1	Bonnet
21	□	1	O-ring
22		1	Valve body, lower
23		1	Plug, complete
23.1		1	Plug
23.2	□	1	Plug seal
24		1	Bushing
25	□	1	Lip seal
77.1		1	Positioner 8694 without display
77.2		1	Positioner 8692 with display
79		1	Spindle
80		1	Special X-ring
81		2	Allen screw
82		1	Adapter
83		1	O-ring
84		1	Gasket for adapter
85		1	Puck sensor pad, cpl.

Service kits

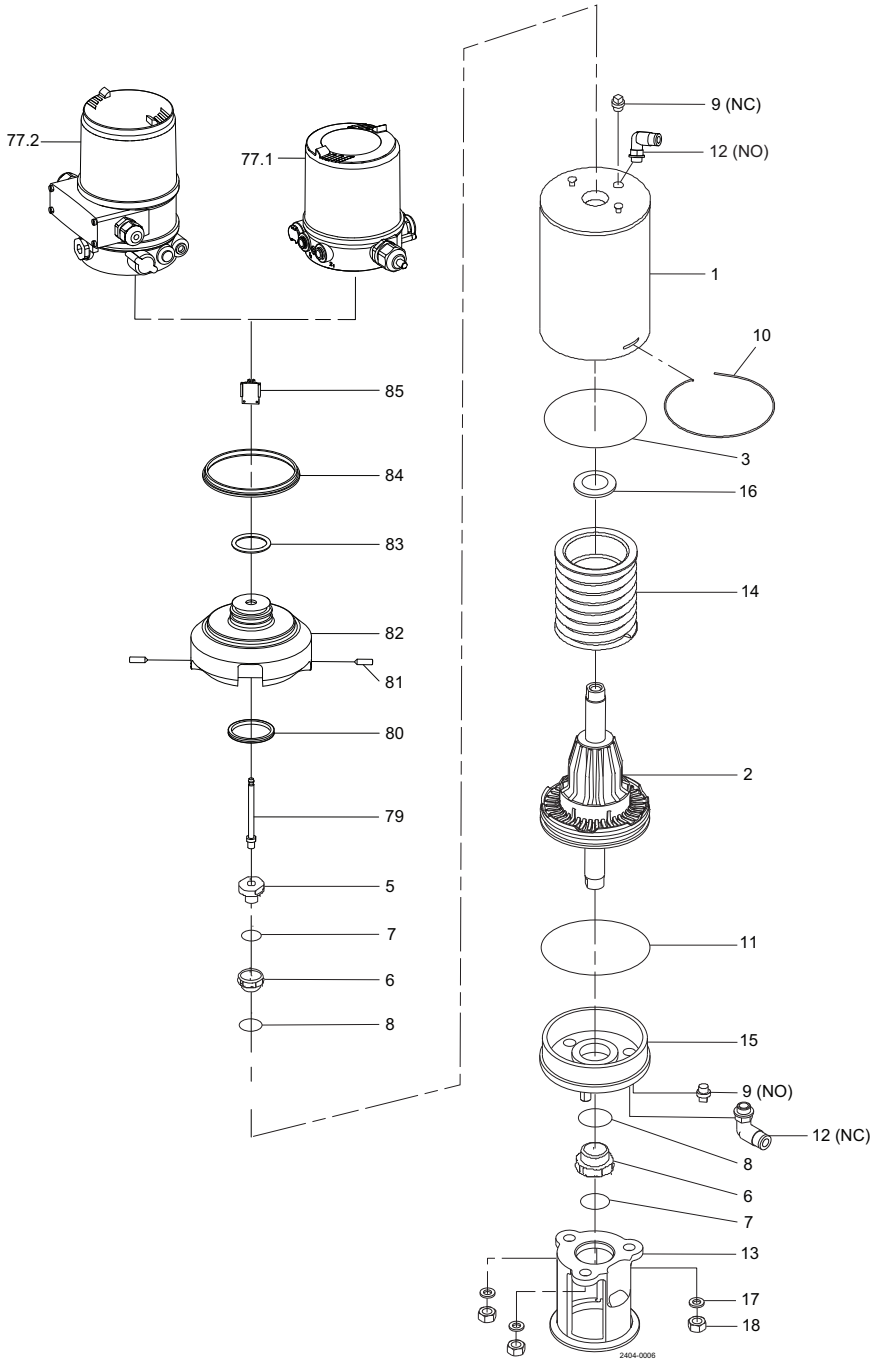
	Denomination	DN40 38 mm	DN50 51 mm	DN65 63.5 mm	DN80 76.1 mm	DN100 101.6 mm
•	Service kit, actuator	9611926500	9611926500	9611926500	9611926500	9611926500
□	Service kit, EPDM	9611926502	9611926503	9611926504	9611926505	9611926506
□	Service kit, HNBR	9611926508	9611926509	9611926510	9611926511	9611926512
□	Service kit, FPM	9611926514	9611926515	9611926516	9611926517	9611926518

Parts marked with • are included in the service kits (actuator)
Parts marked with □ are included in the service kits (product wetted parts)
Tool for bushing (pos. 24) 9613160901

TD 900-618

It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

7.2 Unique RV-ST Maintainable Actuator



7 Parts list and service kits

It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

Parts list

Pos.		Qty	Denomination
			Actuator - complete (NO)
			Actuator - complete (NC)
1		1	Cylinder
2		1	Piston
3	•	1	O-ring
5		1	Adapter
6	•	2	Bushing
7	•	2	O-ring
8	•	2	O-ring
9		1	Plug
10		1	Lock wire
11	•	1	O-ring
12		1	Air fitting
13		1	Yoke
14		1	Spring assembly
15		1	Bottom
16	•	1	Support disc
17		3	Washer
18		3	Nut
77.1		1	Positioner 8694 without display
77.2		1	Positioner 8692 with display
79		1	Spindle
80		1	Special X-ring
81		2	Allen screw
82		1	Adapter
83		1	O-ring
84		1	Gasket for adapter
85		1	Puck sensor pad, cpl.

Service kits

	Denomination	DN40 38 mm	DN50 51 mm	DN65 63.5 mm	DN80 76.1 mm	DN100 101.6 mm
•	Service kit, Actuator	9611926497	9611926498	9611926498	9611926499	9611926499

Parts marked with ● are included in the service kits (actuator)
Recommended spare parts: Service kits.

TD900-619

How to contact Alfa Laval
Contact details for all countries are
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Please visit www.alfalaval.com to access the information directly.