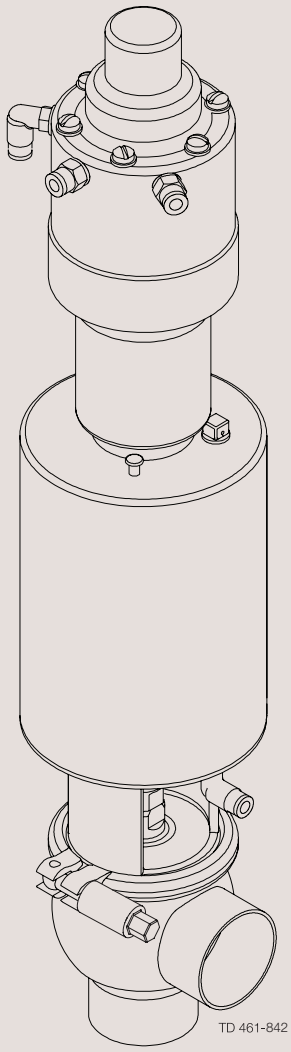
Instruction Manual

Unique SPC-1 Regulating Valve



ESE00589EN 2008-11

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

Unique SPC-1 Series Valve	Regulating Valve	2008
Denomination	Type	Year

is in conformity with the following directive:

- **Machinery Directive 98/37/EEC**
- **Pressure Equipment Directive 97/23/EC category 1 and subjected to assessment procedure Module A.**

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

Designation

CE

1.1 Important information
1.2 Warning signs

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

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 practices.

General warning: 

Caustic agents: 

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

Installation

- **Always** read the technical data thoroughly (see chapter 5).
- **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 sterilizing.
- **Never** dismantle the valve with valve and pipelines under pressure.
- **Never** dismantle the valve when it is hot.

Operation

- **Never** dismantle the valve with valve and pipelines under pressure.
- **Never** dismantle the valve when it is hot.
- **Always** read the technical data thoroughly (see chapter 5).
- **Always** release compressed air after use.
- **Never** touch the valve or the pipelines when processing hot liquids or when sterilizing.
- **Never** touch the moving parts if the actuator is supplied with compressed air.
- **Always** rinse well with clean water after the cleaning.

Always handle lye and acid with great care.

Maintenance

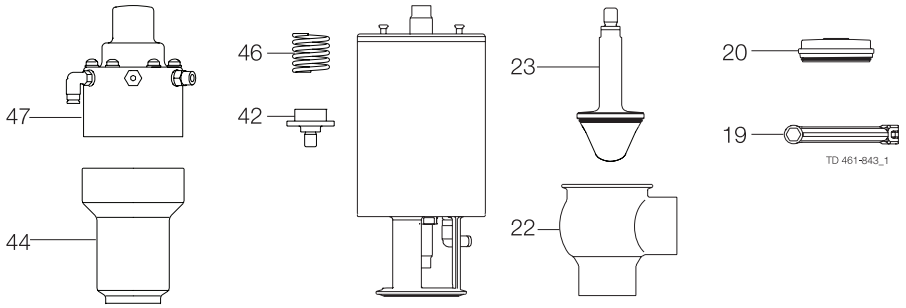
- **Always** read the technical data thoroughly (see chapter 5).
- **Always** release compressed air after use.
- **Never** service the valve when it is hot.
- **Never** service the valve with valve and pipelines under pressure.
- **Never** stick your fingers through the valve ports if the actuator is supplied with compressed air.
- **Never** touch the moving parts if the actuator is supplied with compressed air.

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).
The valve is assembled before delivery, if it is supplied with fittings.

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.

2a
1. Complete actuator.
2. Bonnet (20).
3. Clamp (19).
4. Valve plug (23).
5. Valve body (22).
6. Spring connection piece (42)
7. Positioner yoke (44)
8. Spring (46)
9. Positioner (47)



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

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.

Step1

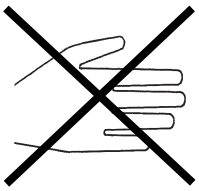
- **Always** read the technical data thoroughly (see chapter 5).
- **Always** release compressed air after use.

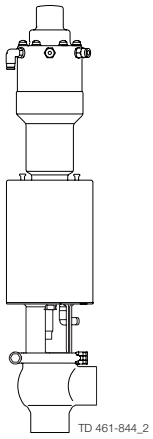
CAUTION!
Alfa Laval cannot be held responsible for incorrect installation.

Step 2

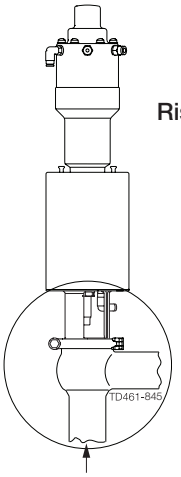
Never touch the moving parts if the actuator is supplied with compressed air.

Moving parts!





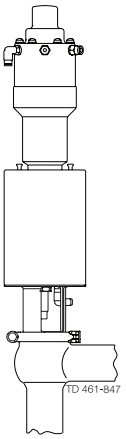
Step 3
Avoid stressing the valve.
Pay special attention to:
- Vibrations.
- Thermal expansion of the pipelines.
- Excessive welding.
- Overloading of the pipelines.



Risk of damage!

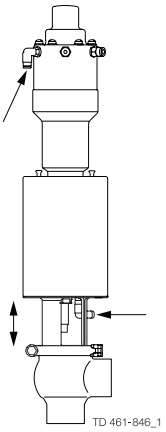
Study the instructions carefully.
The valve is supplied as separate parts to facilitate the welding.
The items refer to the parts list and service kits section.
Check the valve for smooth operation after welding.

Step 1
Assemble the valve in accordance with the steps in section 4.4.
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!



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.

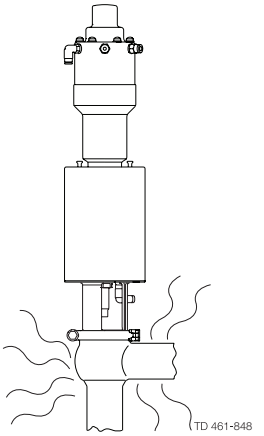
Step 1

- **Always** read the technical data thoroughly (see chapter 5).
- **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 sterilizing.

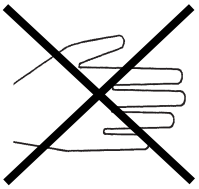


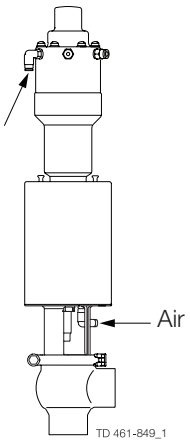
Burning danger!

Step 3

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

Moving parts!

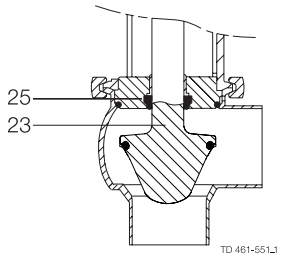




Step 4
Lubrication of valves:

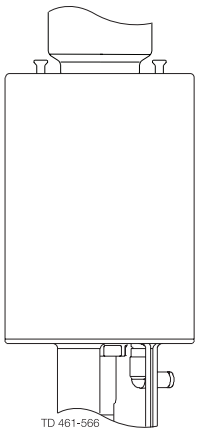
1. Ensure smooth movement between lip seal (25) and plug stem (23).
2. Lubricate with Klüber Paraliq GTE 703 if necessary. (see section 4.1)

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.



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

NOTE!
Study the maintenance instructions carefully before replacing worn parts. - See section 4.1!

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). CIP = Cleaning In Place.
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic Soda.
HNO_3 = Nitric acid.

Step 1

Always handle lye and acid with great care.

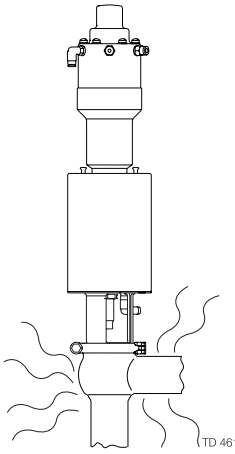
Caustic danger!

Always use rubber gloves!

Always use protective goggles!

Step 2

Never touch the valve or the pipelines when sterilizing.

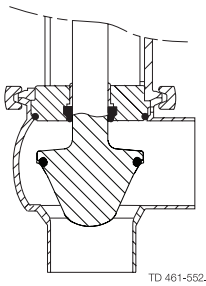


Burning danger!

Step 3

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

Shut-off valve



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

1. 1% by weight NaOH at 70° C

1 kg NaOH	+	100 l water	=	Cleaning agent
2.2 l 33% NaOH	+	100 l water	=	Cleaning agent

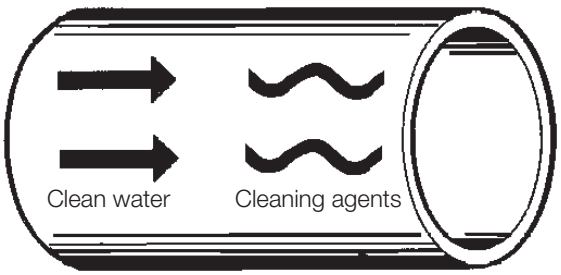
2. 0.5% by weight HNO_3 at 70° C

0.7 l 53% HNO_3	+	100 l 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 the cleaning.

Always rinse!



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.

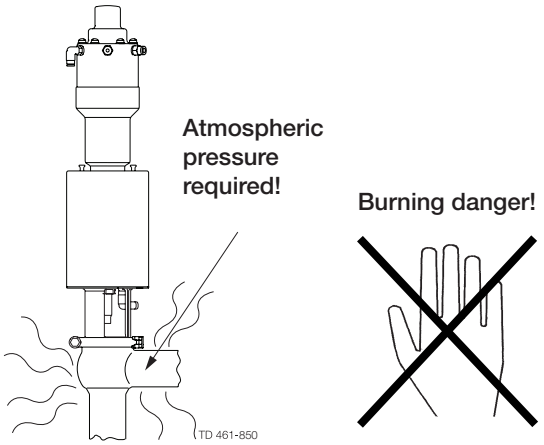
Step 1

- **Always** read the technical data thoroughly (see chapter 5).
- **Always** release the compressed air after use.

CAUTION!
All scrap must be stored/disposed of in accordance with current rules/directives.

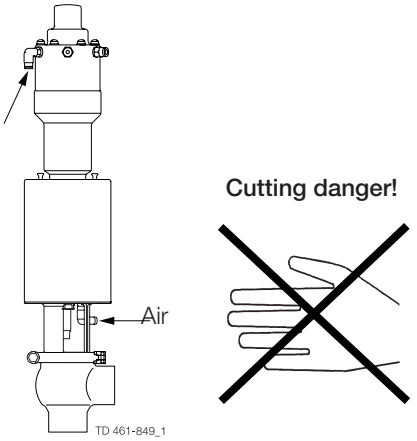
Step 2

- **Never** service the valve when it is hot.
- **Never** service the valve with valve and pipelines under pressure.



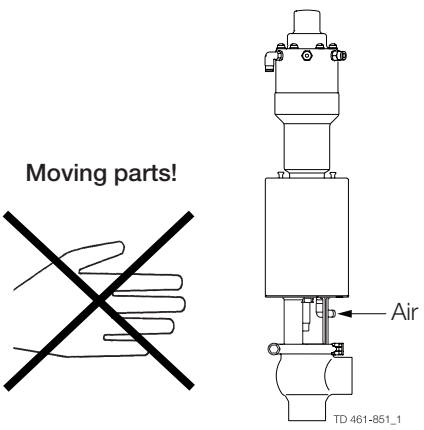
Step 3

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



Step 4

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

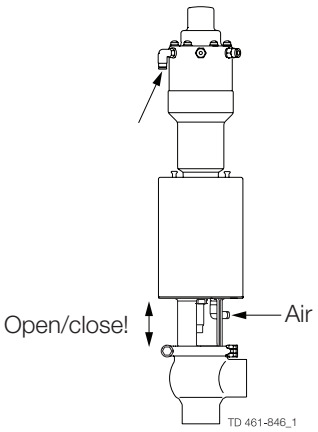


Maintain the valve regularly.
Study the instructions carefully.
Always keep spare rubber seals and lip seals in stock.
Check the valve for smooth operation after service.

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 conditions**	**Replace after 5 years depending on working conditions**
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 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	**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 6)

4.2 Dismantling of valve
4.3 Plug seal replacement
4.4 Assembly of valve

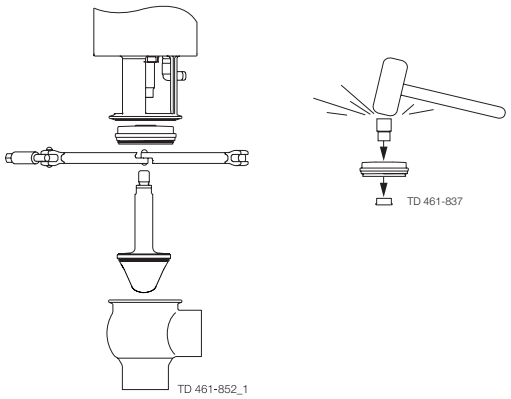
Study the instructions carefully. The items refer to the parts list and service kits section. Handle scrap correctly.
NC = Normally closed.
NO = Normally open.

4.2 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).

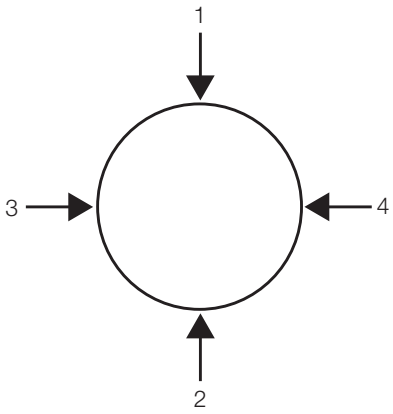
Pay special attention to the warnings!

Note! For plug seal replacement please see section 4.3.



4.3 Elastomer seat ring replacement

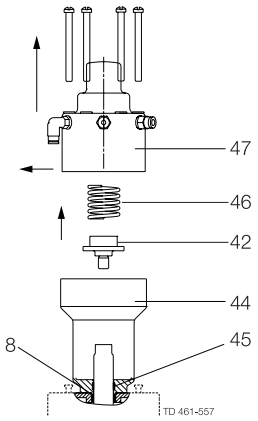
1. Remove old seal ring using a knife, screwdriver or similar.
   Be careful not to damage metal parts.
2. Pre-mount plug seal without pressing it into the groove.
3. Squeeze plug seal into the groove using opposite pressure points.
4. Release compressed air behind plug seal.



4.4 Assembly of valve

Reverse order of 4.2, Dismantling of valve.
Lubricate O-ring (21) and lip seal (25) with Klüber Paraliq GTE 703.

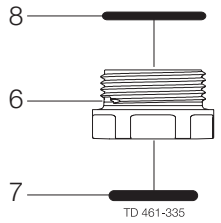
1. Remove the air hose connections of the positioner (47) and the actuator.
2. Loosen the screws and lift off the positioner from its yoke. (44).
3. Remove the positioner spring (46) and unscrew the spring connection piece (42) from the actuator spindle.
4. Unscrew the positioner yoke (44) from the cylinder.
5. Remove the guide ring (45) and the O-ring. (8)



Study the instructions carefully.
The items refer to the parts list and service kits section.
Handle scrap correctly.
Service tool: See Spare Parts

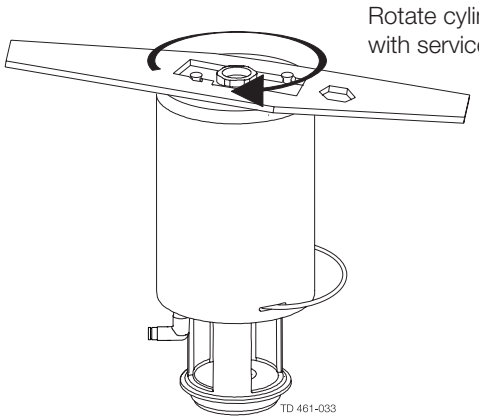
4.6 Actuator bushing replacement

1. Unscrew and remove O-rings.
2. Lubricate O-rings with Molykote Longterm 2 plus before fitting.
3. Fit bushings and O-rings. Be careful not to overtighten.



4.7 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.



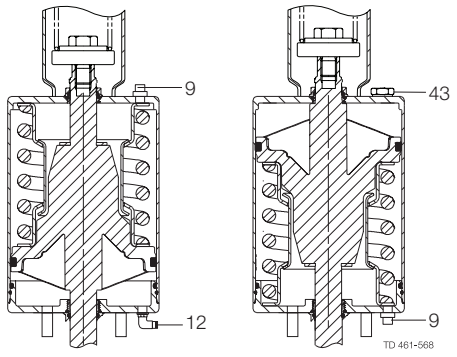
4.8 Assembly of optional maintainable actuator

Reverse order of 4.6. Dismantling of actuator.
Lubricate O-ring (3,7,11) with Molykote Longterm 2 plus before fitting.

4.9 Reversing optional maintainable actuator operation

NB: Requires a new positioner and air fittings (12) or plug (43)

1. Rotate cylinder (1).
2. Remove lock wire (10) and pull away cylinder (1).
3. Reverse stem (2) and spring assembly (14).
4. Fit plugs (9, 43) and air fitting (12) as shown on the drawing.
5. Re-assemble in reverse order (3 to1).



NC
pneumatic movement
upwards

NO
pneumatic movement
downwards

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

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

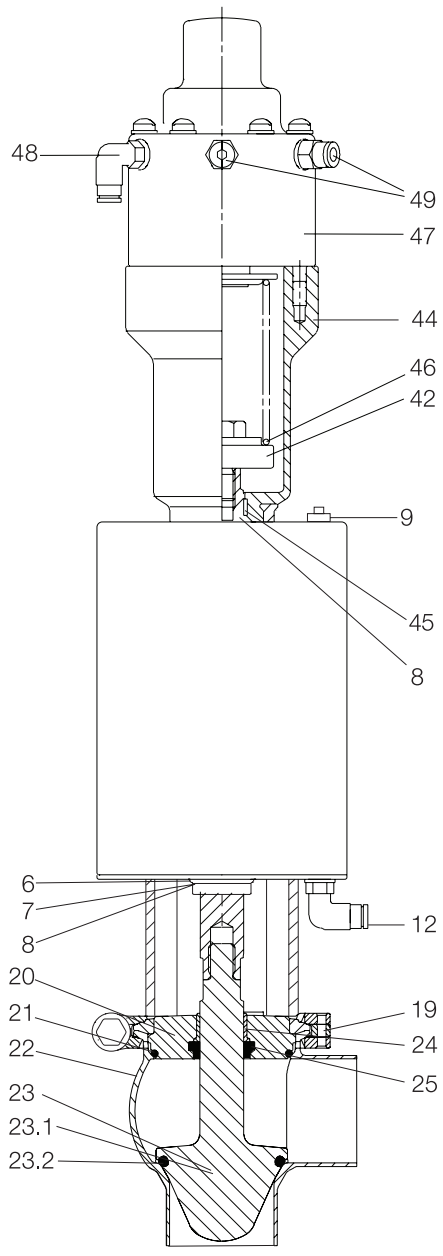
For positioner see Positioner manual

Data Positioner

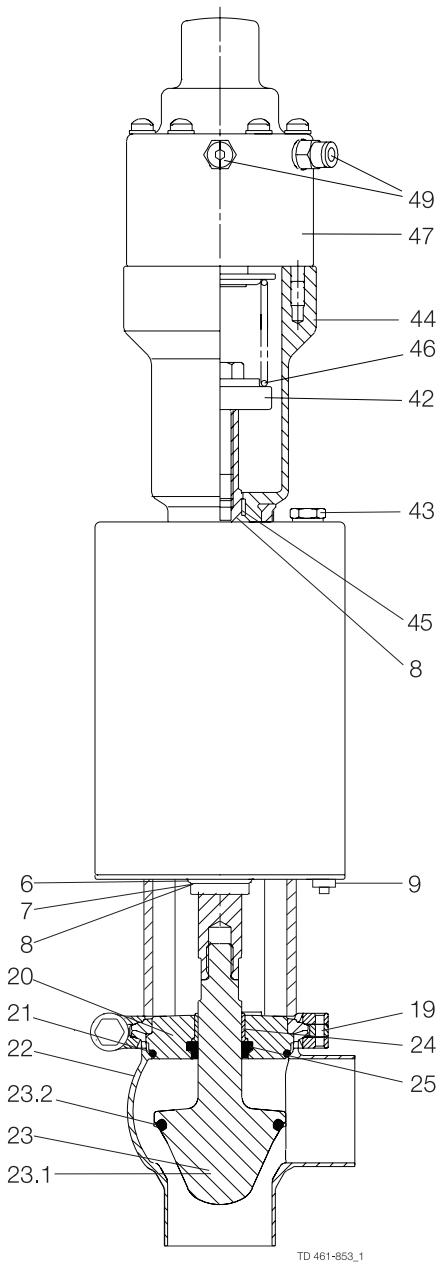
General Specifications

Instrument Input Pressure Range	0.2-1 bar (standard) 0.2-0.6, 0.6-1, 0.6-1.8 bar (option)
Instrument Input Pressure, Maximum	1 bar (15 psi) for instrument input pressure spans of 0.8 bar (12 psi) or less and 1.8 bar (27 psi) for instrument spans of 1.2 bar (16 psi) or greater
Supply Pressure	
Minimum	0.2 bar above required actuator pressure
Maximum	7 bar
Air Consumption	17 l/min (in balance condition with 1.4 bar supply and 0.6 bar dead ended output)
Valve Travel	
Minimum	6.3 mm
Maximum	101 mm
Response Level	0.25% of scale (Output sensitivity to input pressure changes)
Ambient Temperature Limits	-10°C to +82°C (14°F to +284°F)

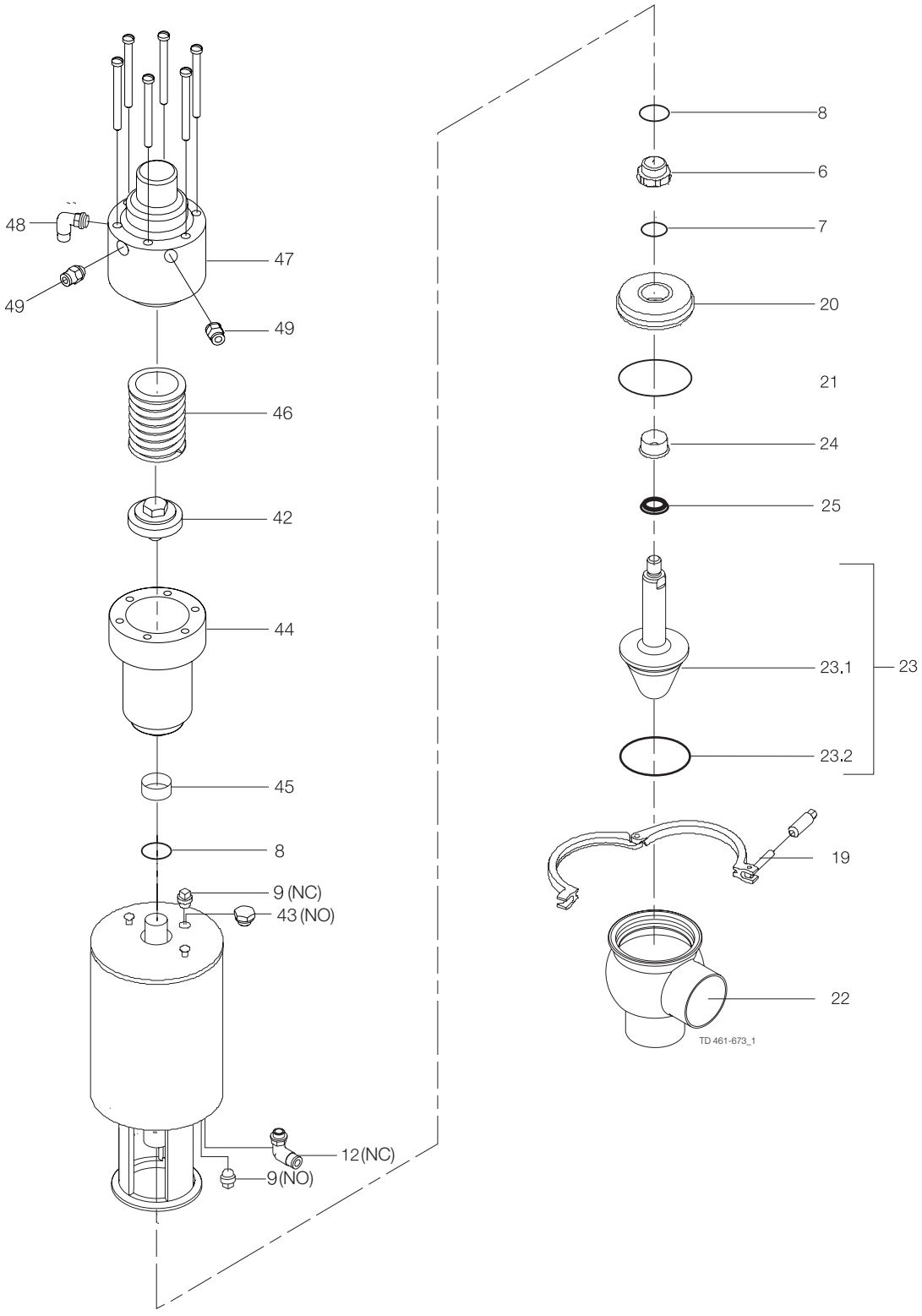
For parts lists please see section 6.1.
The drawings include all items.
NC = Normally closed
NO = Normally open



NC



NO


48
47
49
49
46
42
44
45
8
9 (NC)
43 (NO)
12 (NC)
9 (NO)
8
6
7
20
21
24
25
23.1
23
23.2
19
22
TD 461-673_1

The parts list includes all items.

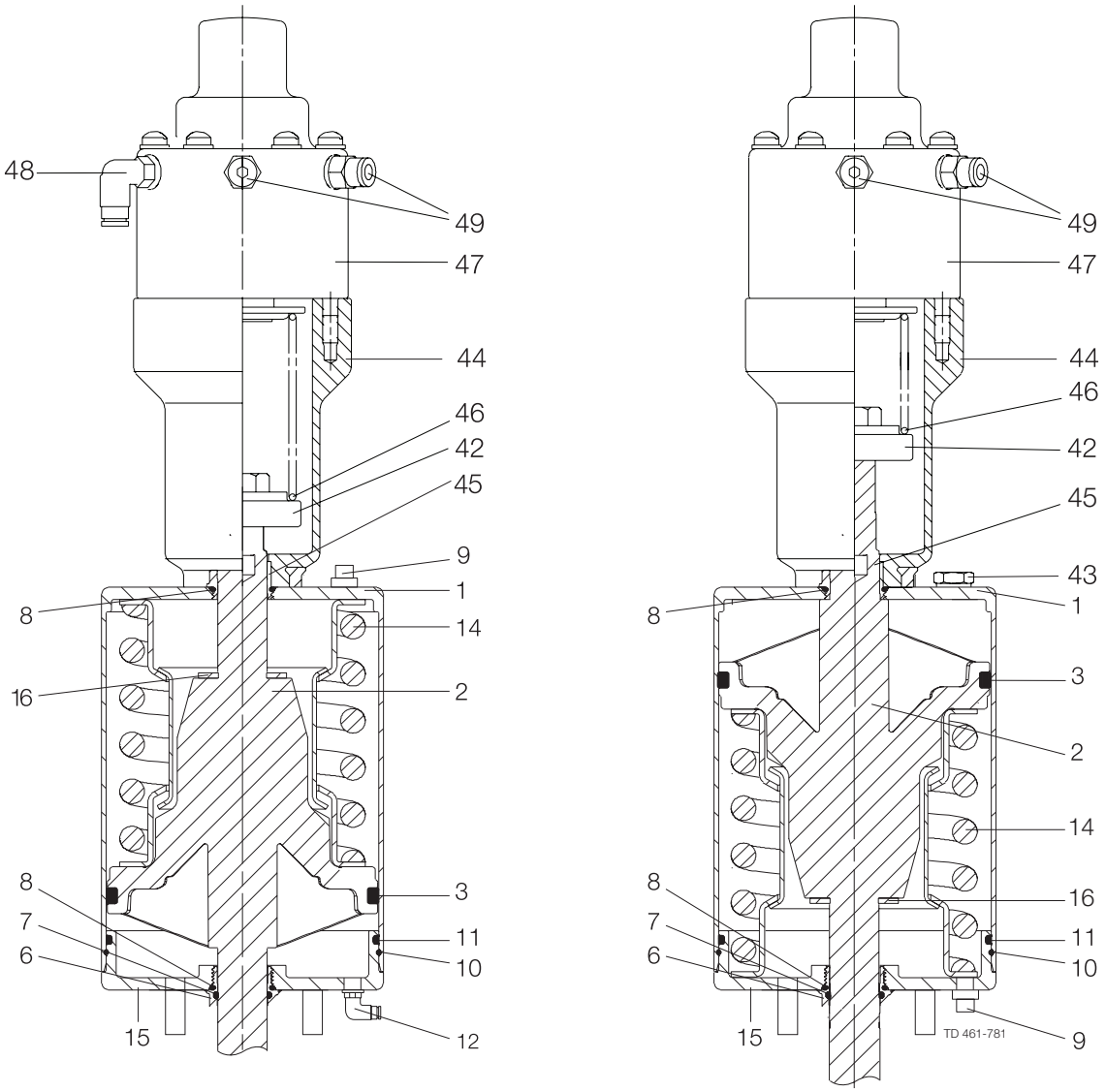
Parts List

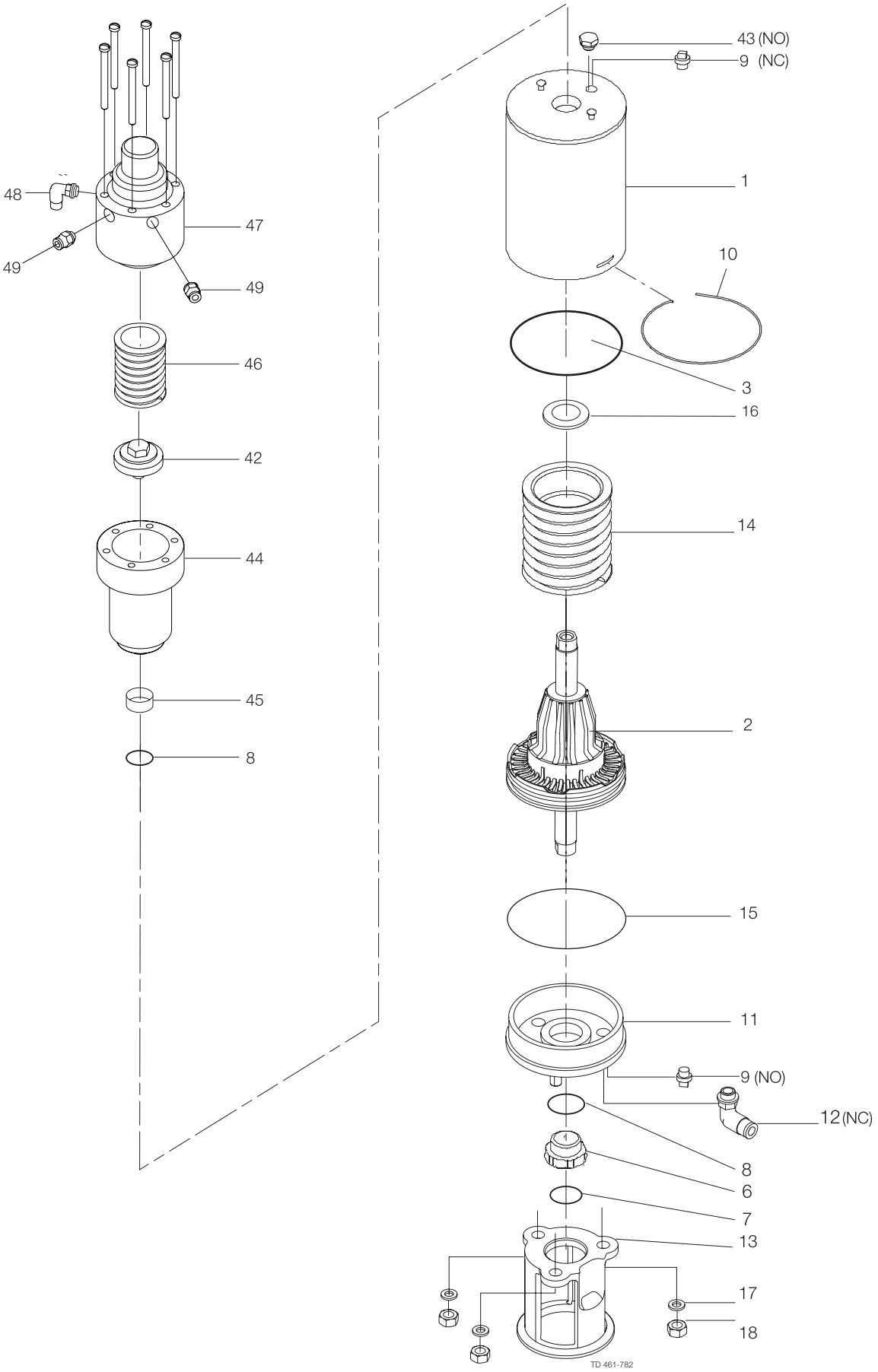
Pos.		Qty.	Denomination
			Actuator, complete
6	●	1	Bushing
7	●	1	O-ring
8	●	2	O-ring
9		1	Plug (NO+NC)
12		1	Air fitting (NC)
19		1	Clamp
20		1	Bonnet
21	Δ	1	O-ring
22		1	Valve body
23		1	Plug complete
23.1		1	Plug
23.2	Δ	1	Plug seal
24		1	Bushing
25	Δ	1	Lip seal
42		1	Spring connection piece
43		1	Plug (NO)
44		1	Positioner yoke
45	●	1	Guide ring
46		1	Spring
47		1	Positioner
48		1	Air fitting (NC)
49		2	Air fitting (NC+NO)

●: Service kits - Actuator
Δ: Service kits - EPDM
Δ: Service kits - HNBR
Δ: Service kits - FPM

Denomination	
Servicekit/Actuator	9611-92-6737
Service Kits/Product wetted parts	
38 mm/DN40	
EPDM.....	9611-92-6502
HNBR.....	9611-92-6508
FPM	9611-92-6514
51 mm/DN50	
EPDM.....	9611-92-6503
HNBR.....	9611-92-6509
FPM	9611-92-6515
63.5 mm/DN65	
EPDM.....	9611-92-6504
HNBR.....	9611-92-6510
FPM	9611-92-6516
76.1 mm/DN80	
EPDM.....	9611-92-6505
HNBR.....	9611-92-6511
FPM	9611-92-6517
101.6 mm/DN100	
EPDM.....	9611-92-6506
HNBR.....	9611-92-6512
FPM	9611-92-6518

The parts list includes all items.
NC = Normally closed.
NO = Normally open.




43 (NO)
9 (NC)
1
10
3
16
14
2
15
11
9 (NO)
12 (NC)
8
6
7
13
17
18
48
49
47
49
46
42
44
45
8
TD 461-782

The parts list includes all items.
NC = Normally closed.
NO = Normally open.

Parts List

Pos.		Qty.	Denomination
			Actuator, complete
1		1	Cylinder
2		1	Piston
3	●	1	O-ring
5		1	Adapter
6	●	1	Bushing
7	●	1	O-ring
8	●	2	O-ring
9		1	Plug (NO+NC)
10		1	Lock wire
11	●	1	O-ring
12		1	Air fitting (NC)
14		1	Spring assembly
15		1	Bottom
16	●	1	Support disc
42		1	Spring connection piece
43		1	Plug (NO)
44		1	Positioner yoke
45	●	1	Guide ring
46		1	Spring
47		1	Positioner
48		1	Air fitting (NC)
49		2	Air fitting (NC+NO)
13		1	Yoke (not shown in drawing)
17		3	Washer (not shown in drawing)
18		3	Nut (not shown in drawing)

●: Service kits - Actuator, NO, NC

Service Kits

Denomination	Item number
Service kit, actuator	
1½”	
NO, NC	9611-92-6740
2” - 2½”	
NO, NC	9611-92-6741
3” - 4”	
NO, NC	9611-92-6742

How to contact Alfa Laval
Contact details for all countries are continually updated on our website. Please visit www.alfalaval.com to access the information direct.