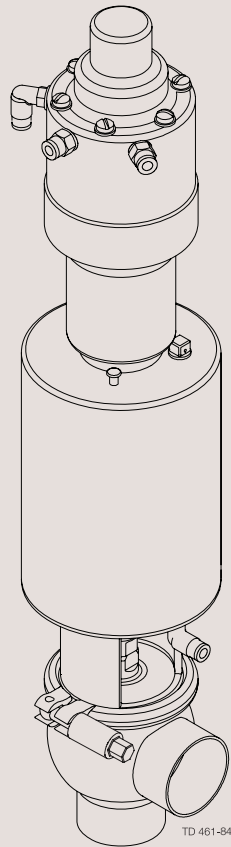




Instruction Manual

Unique SPC-1 Regulating Valve



ESE00589-EN4 2011-05

Original manual

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

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1 EC 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

Denomination

Regulating Valve

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.

Manager, Product Centre, Fluid Handling

Title

Bjarne Søndergaard

Name

Alfa Laval Kolding

Company



Signature

Designation



*Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized 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 summarized 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 compressed air is supplied to the actuator.

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

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 sterilizing.

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

Always rinse well with clean water after the 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 secure that compressed air is released.

Always secure that all connections is disconnected before attempt to remove the valve from the installation.

Always drain liquid out of valves before transportation.

Always used predesigned lifting points if defined.

Always secure sufficient fixing of the valve during transportation - if special 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).
The valve is assembled before delivery, if it is supplied with fittings.

3.1 Unpacking/Delivery

Step 1

CAUTION

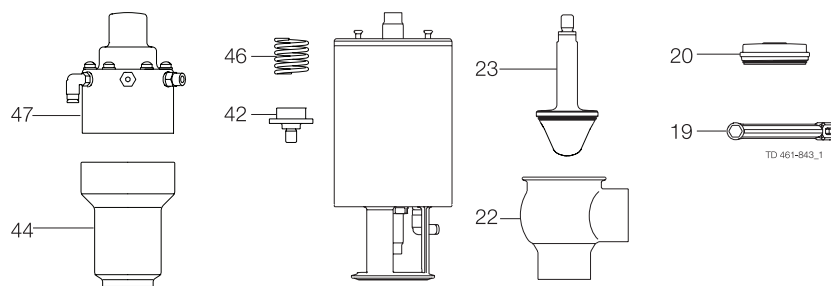
Alfa Laval cannot be held responsible for incorrect unpacking.

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. 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.

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

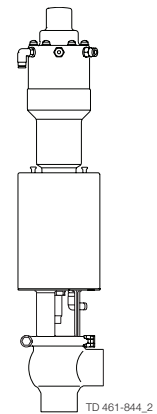
Alfa Laval cannot be held responsible for incorrect installation.

Step 2



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

Moving parts!



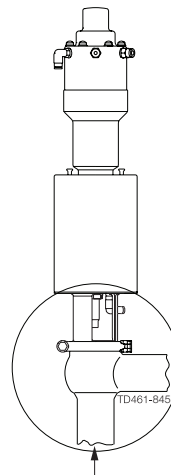
Step 3

Avoid stressing the valve.

Pay special attention to:

- Vibrations
- Thermal expansion of the tubes
- 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.

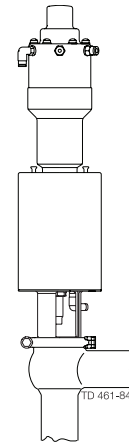
3.3 Welding

Step 1

Assemble the valve in accordance with the steps in chapter 5.4

Assembly of valve

Pay special attention to the warnings!

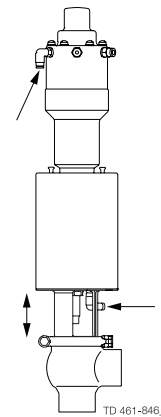


Step 2

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!



3.4 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 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 taken care of in agreement with local regulations

• Scrapping

- At end of use, the equipment shall be recycled according to relevant, local regulations. Beside 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.

4.1 Operation

Step 1



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

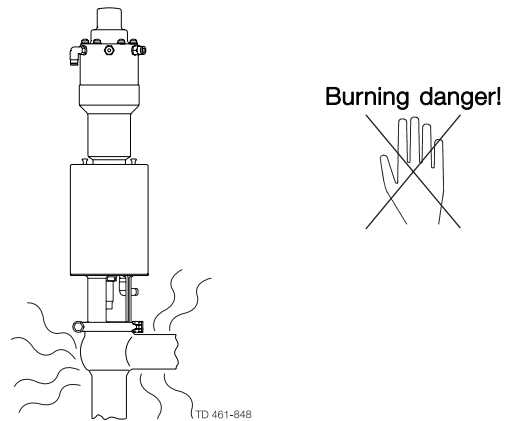
CAUTION

Alfa Laval cannot be held responsible for incorrect operation.

Step 2



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

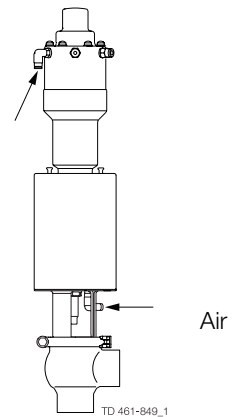


Step 3



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

Moving Parts!

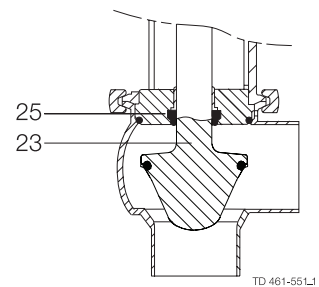


Step 4

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 chapter 5.1 General maintenance)

Shut-off valve



Study the instructions carefully and pay special attention to the warnings!

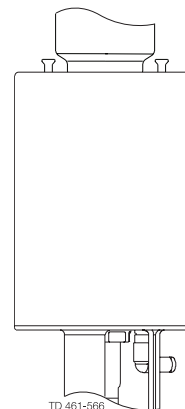
Ensure that the valve operates smoothly.

The items refer to the parts list and service kits section.

Step 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 Trouble shooting

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	<ul style="list-style-type: none"> - Replace the seals - Replace with seals of a different rubber grade
Internal product leakage	<ul style="list-style-type: none"> - Worn or product affected plug seal - Product deposits on the seat and/or plug - The product pressure on the plug is too high 	<ul style="list-style-type: none"> - Replace the seal - Replace with a seal of a different rubber grade - Frequent cleaning - 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	<ul style="list-style-type: none"> - No air - Actuator errors - Positioner errors 	<ul style="list-style-type: none"> Check air supply - Return the actuator to the supplier - 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.
 HNO₃ = Nitric acid.

4.3 Recommended cleaning

Step 1



Always handle lye and acid with great care.

Caustic danger!



Always use
rubber gloves!

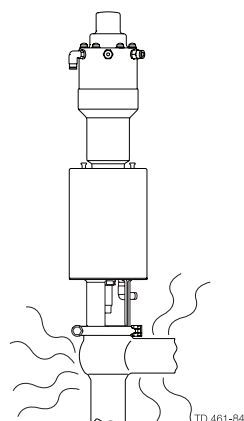


Always use
protective goggles!

Step 2



Never touch the valve or the pipelines when sterilizing.



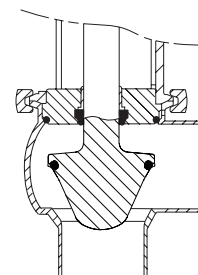
Burning danger!



Step 3

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

Shut-off valve



TD 461-562_J

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 HNO₃ at 70° C (158° F)

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!

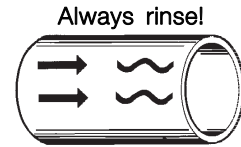
NaOH = Caustic Soda.

HNO₃ = Nitric acid.

$$\left| \begin{array}{l} 0.7 \text{ l (0.2 gal)} \\ 53\% \text{ HNO}_3 \end{array} \right| + \left| \begin{array}{l} 100 \text{ l} \\ (26.4 \text{ gal}) \\ \text{water} \end{array} \right| = \text{Cleaning agent.}$$

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.



Clean water Cleaning agents

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 .



Always release compressed air after use.

NOTE

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

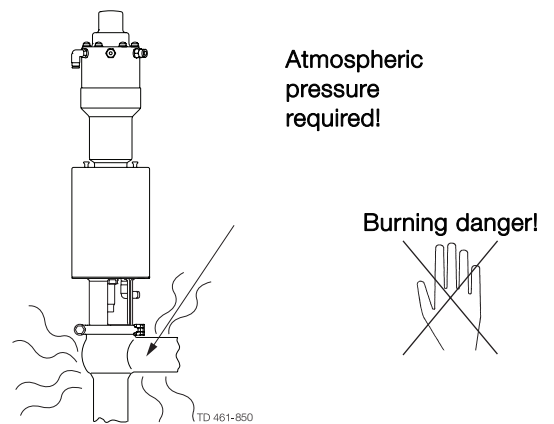
Step 2



Never service the valve when it is hot.



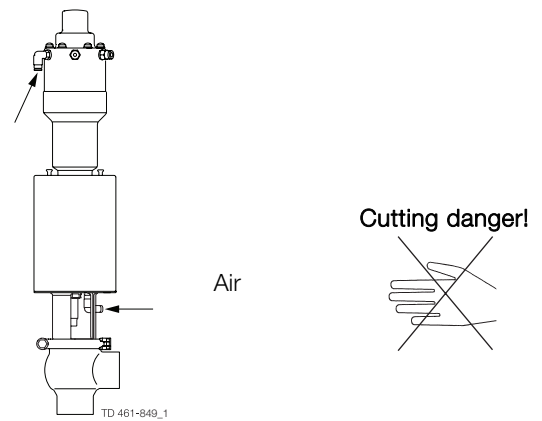
Never service the valve with valve and pipelines under pressure.



Step 3



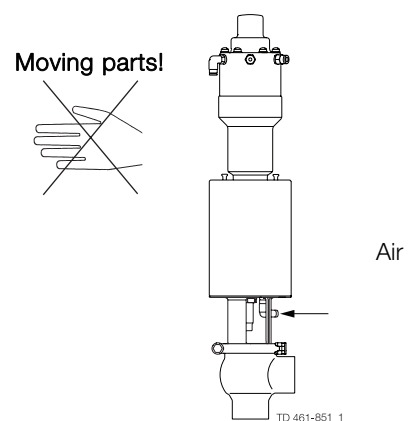
Never stick your fingers through the valve ports if the actuator is supplied with compressed air.



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.

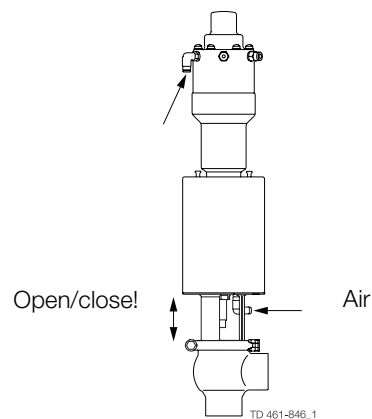
Below are some guidelines for maintenance and lubrication intervals.

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 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	<ul style="list-style-type: none"> - Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for planning of inspections Replace after leakage	<ul style="list-style-type: none"> - 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 7 Parts list and service kits)

Study the instructions carefully. The items refer to the parts list and service kits section. Handle scrap correctly.

NC = Normally closed.

NO = Normally open.

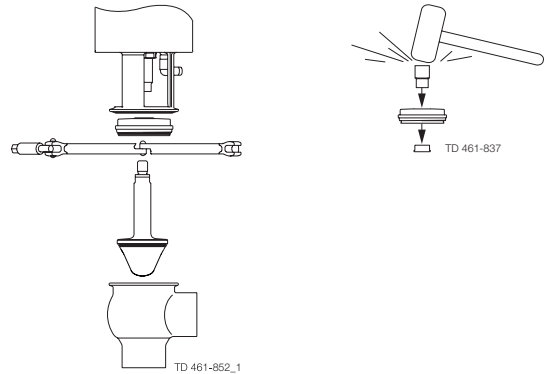
5.2 Dismantling of valve

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!

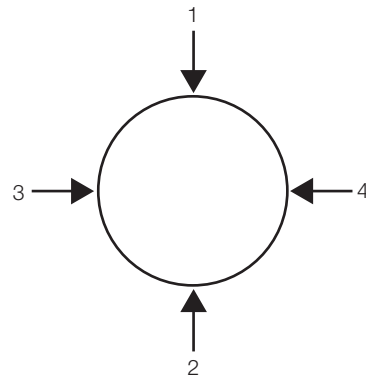
Note!

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.



5 Maintenance

Study the instructions carefully.

The items refer to the parts list and service kits section.

Handle scrap correctly.

Service tool: See Spare Parts

5.4 Assembly of valve

Reverse order of 5.2 Dismantling of valve

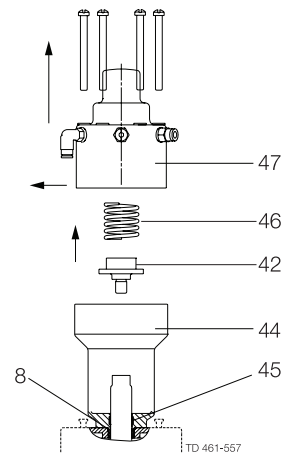
Lubricate O-ring (21) and lip seal (25) with Klüber Paraliq GTE 703.

Remember to tighten spindle and plug with a torque $M = 30\text{Nm}$ (Use two 17mm spanners)

If there are vibrations in the pipeline Alfa Laval recommend to use loctite no. 243.

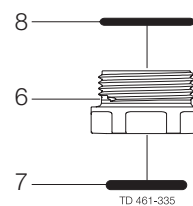
5.5 Positioner end

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)



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 brushing with a torque = 10Nm.
Be careful not to overtighten.



Study the instructions carefully.

The items refer to the parts list and service kits section.

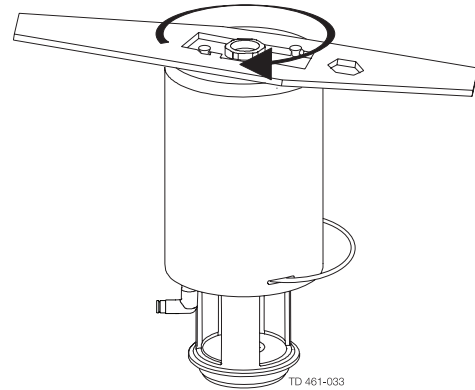
Handle scrap correctly.

Service tool: See Spare Parts

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

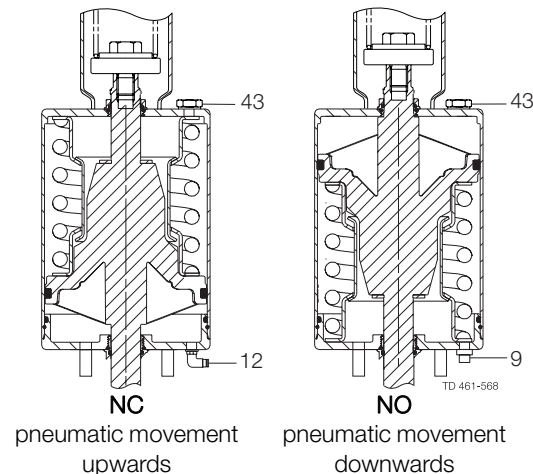
Reverse order of 5.7 Dismantling of optional maintainable actuator.

Lubricate O-ring (3,7,11) with Molykote Longterm 2 plus before fitting.

5.9 Reversing optional maintainable actuator operation

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 to 1).



6 Technical data

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

6.1 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

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

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)

Noise

One meter away from - and 1.6 meter above the exhaust the noise level of a valve actuator will be approximately 77dB(A) without noise damper and approximately 72 dB(A) with noise damper - Measured at 7 bars air-pressure.

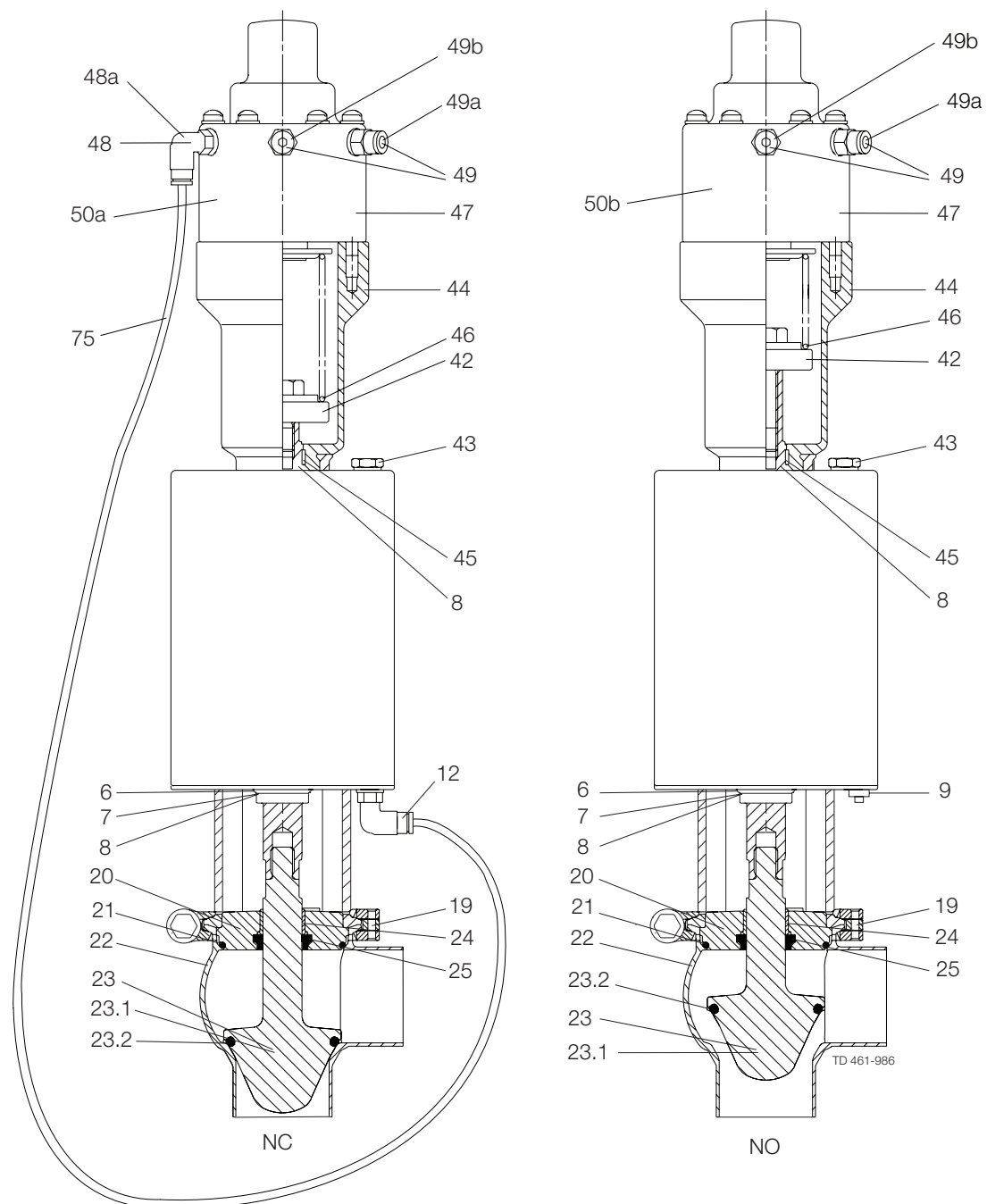
7 Parts list and service kits

The drawing include all items.

NC = Normally closed

NO = Normally open

7.1 Unique SPC-1 regulating valve



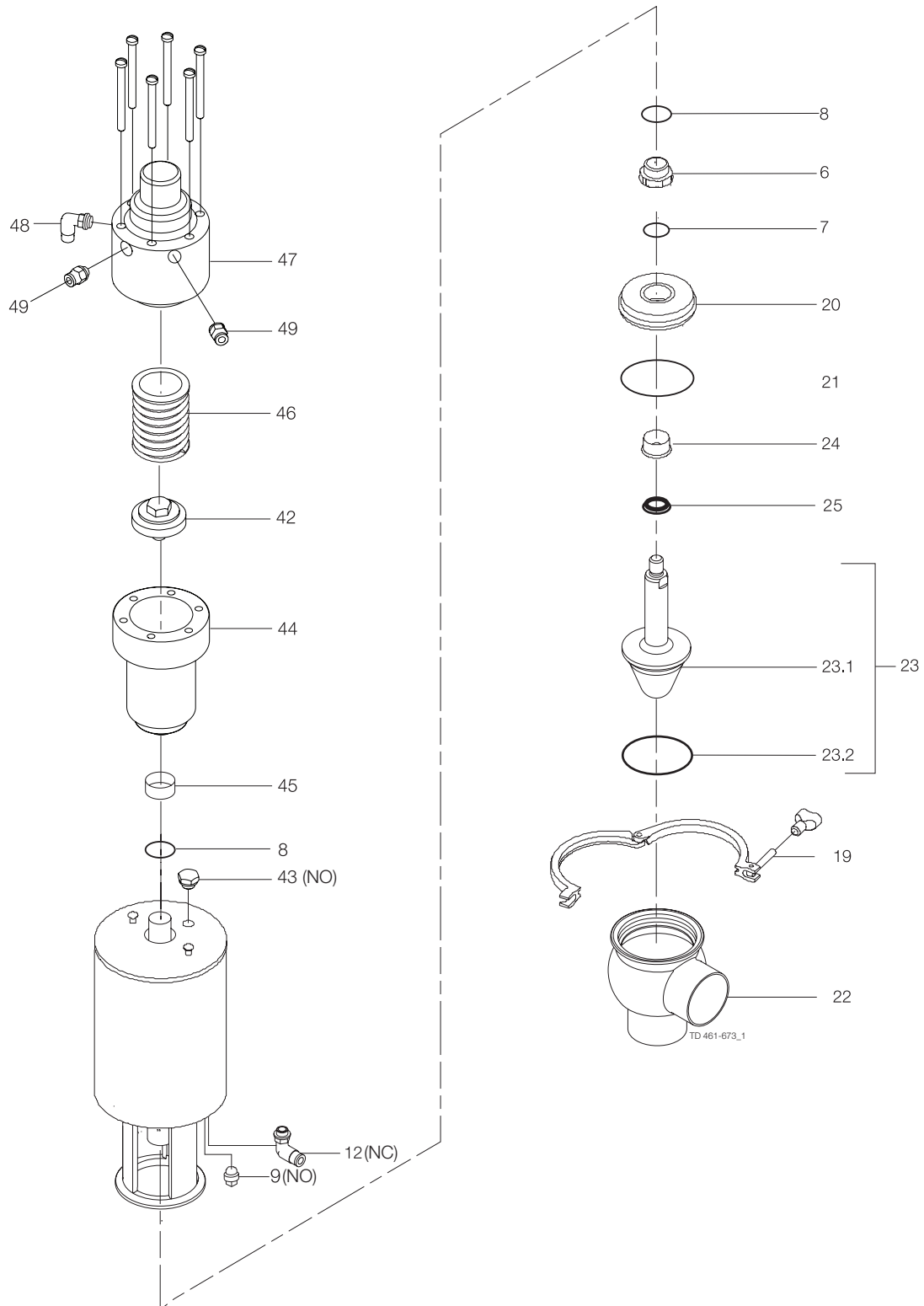
- 48a Valve connection
- 49a Supply air
- 49b Instrument air
- 50a Positioning type 73N-B
- 50b Positioning type 73N-F

7 Parts list and service kits

The drawing include all items.

NC = Normally closed

NO = Normally open



7 Parts list and service kits

The drawing include all items.

NC = Normally closed

NO = Normally open

Parts list

Pos.	Qty	Denomination
		O-ring set (10 pcs.) EPDM
		O-ring set (10 pcs.) HNBR
		O-ring set (10 pcs.) FPM
		Lip seal, set (10 pcs.) EPDM
		Lip seal, set (10 pcs.) HNBR
		Lip seal, set (10 pcs.) FPM
		Plug seal, set (10 pcs.) EPDM
		Plug seal, set (10 pcs.) HNBR
		Plug seal, set (10 pcs.) FPM
		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 ▲	1	O-ring
22	1	Valve body
23	1	Plug, complete
23.1	1	Plug
23.2 ▲	1	Plug seal
24	1	Bushing
25 ▲	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

Denomination	DN40 38 mm	DN50 /51 mm	DN65 63.5mm	DN80 76.1 mm	DN100 101.6 mm
--------------	---------------	----------------	----------------	-----------------	-------------------

Recommended spare parts: Service kits.

●	Service kit, actuator	9611-92-6737	9611-92-6737	9611-92-6737	9611-92-6737	9611-92-6737
▲	Service kit, EPDM	9611-92-6502	9611-92-6503	9611-92-6504	9611-92-6505	9611-92-6506
▲	Service kit, HNBR	9611-92-6508	9611-92-6509	9611-92-6510	9611-92-6511	9611-92-6512
▲	Service kit, FPM	9611-92-6514	9611-92-6515	9611-92-6516	9611-92-6517	9611-92-6518

Parts marked with ▲● are included in the service kits

900-460

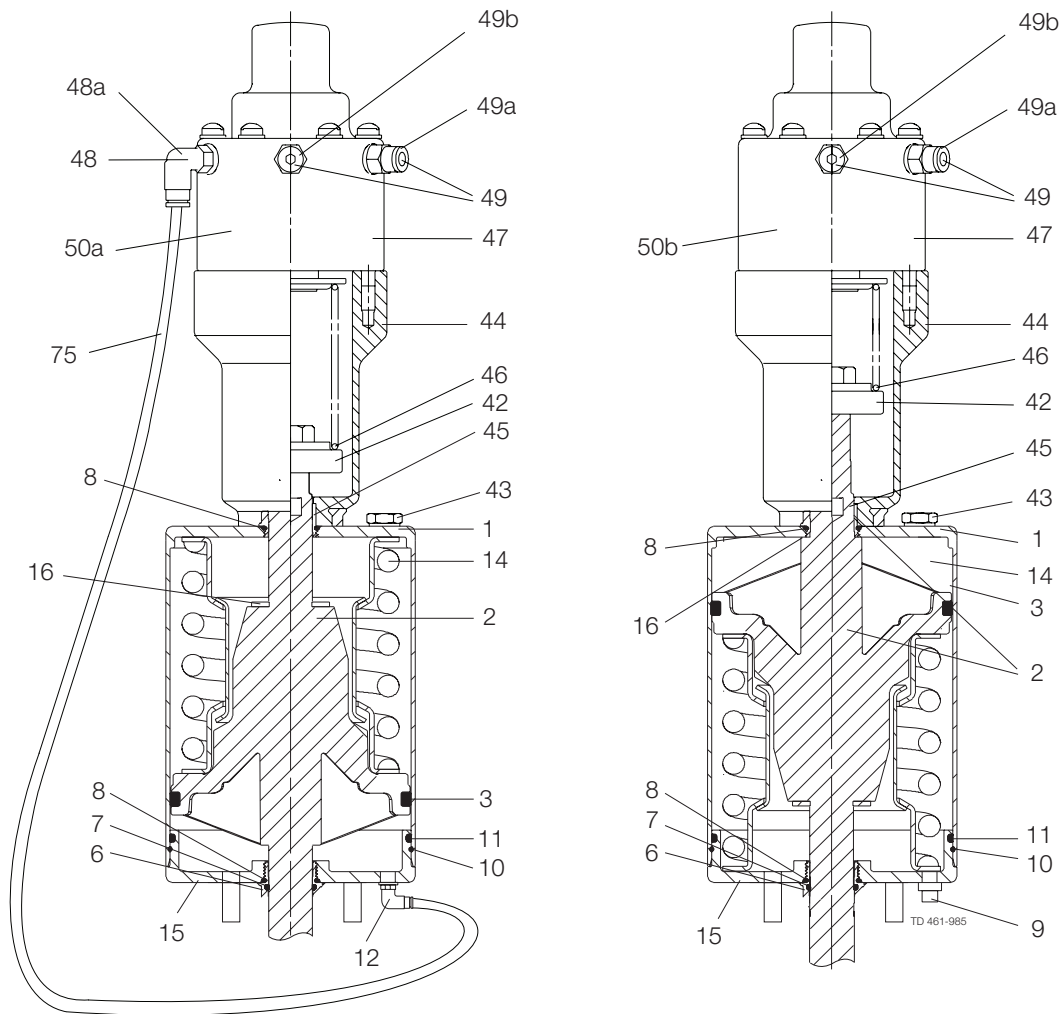
7 Parts list and service kits

The parts list includes all items.

NC = Normally closed

NO = Normally open.

7.2 Maintainable Actuator



48a Valve connection

49a Supply air

49b Instrument air

50a Positioning type 73N-B

50b Positioning type 73N-F

7 Parts list and service kits

The parts list includes all items.

NC = Normally closed

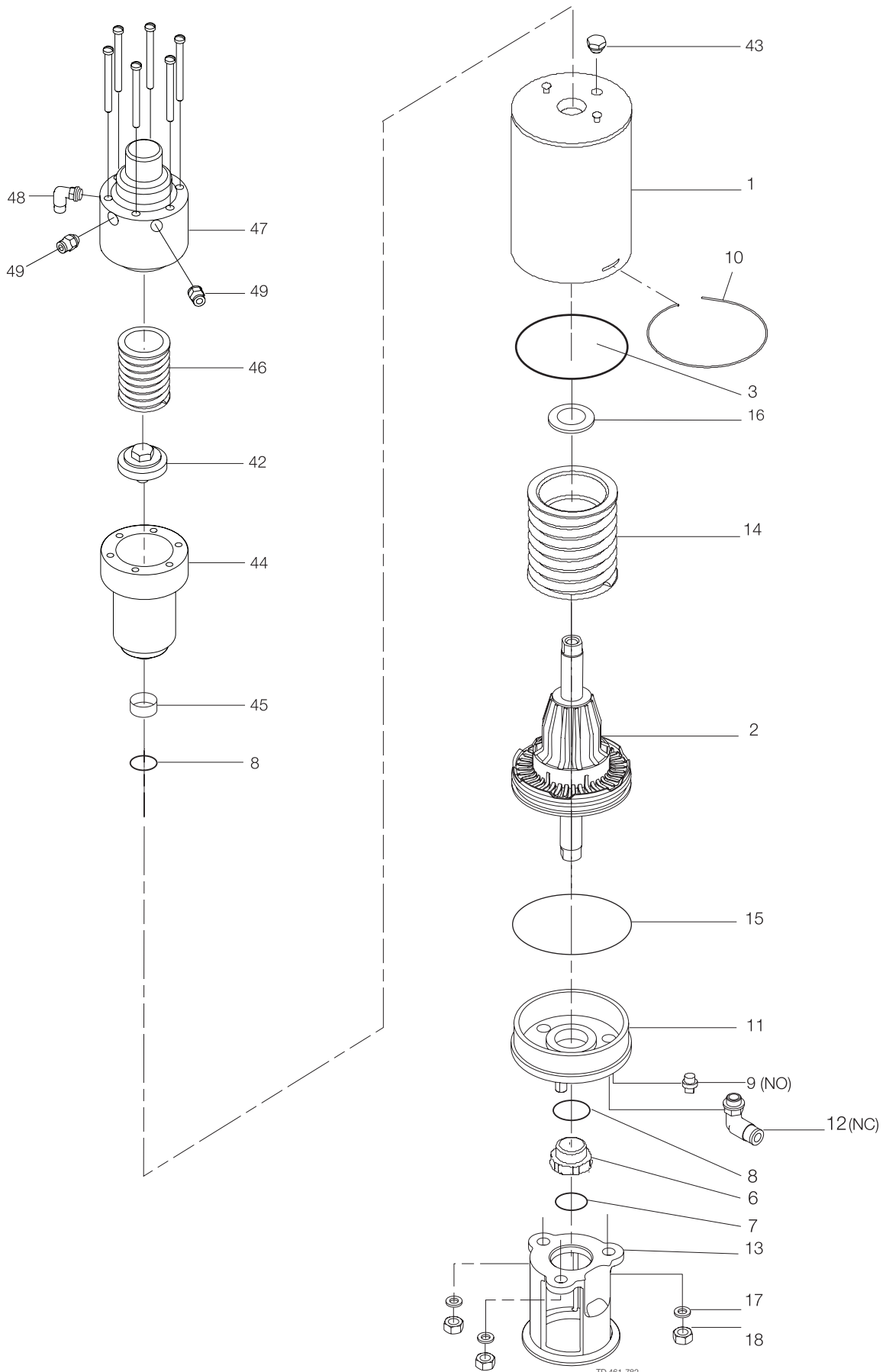
NO = Normally open.

7 Parts list and service kits

The parts list includes all items.

NC = Normally closed

NO = Normally open.



7 Parts list and service kits

The parts list includes all items.

NC = Normally closed

NO = Normally open.

Parts list

Pos.	Qty	Denomination
1	1	Actuator - complete
2	1	Cylinder
3 ●	1	Piston
5	1	O-ring
	1	Adapter
	1	Adapter, steel
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)
13	1	Yoke
14	1	Spring assembly
15	1	Bottom
16 ●	1	Support disc
17	3	Washer
18	3	Nut
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

Denomination	DN40 38 mm	DN50 51 mm	DN65 63.5mm	DN80 76.1 mm	DN100 101.6 mm
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Service Kits

● Service kit, Actuator 9611-92-6740 9611-92-6741 9611-92-6741 9611-92-6742 9611-92-6742

Parts marked with ▲● are included in the service kits (actuator)

Recommended spare parts: Service kits

900-482

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 directly.

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