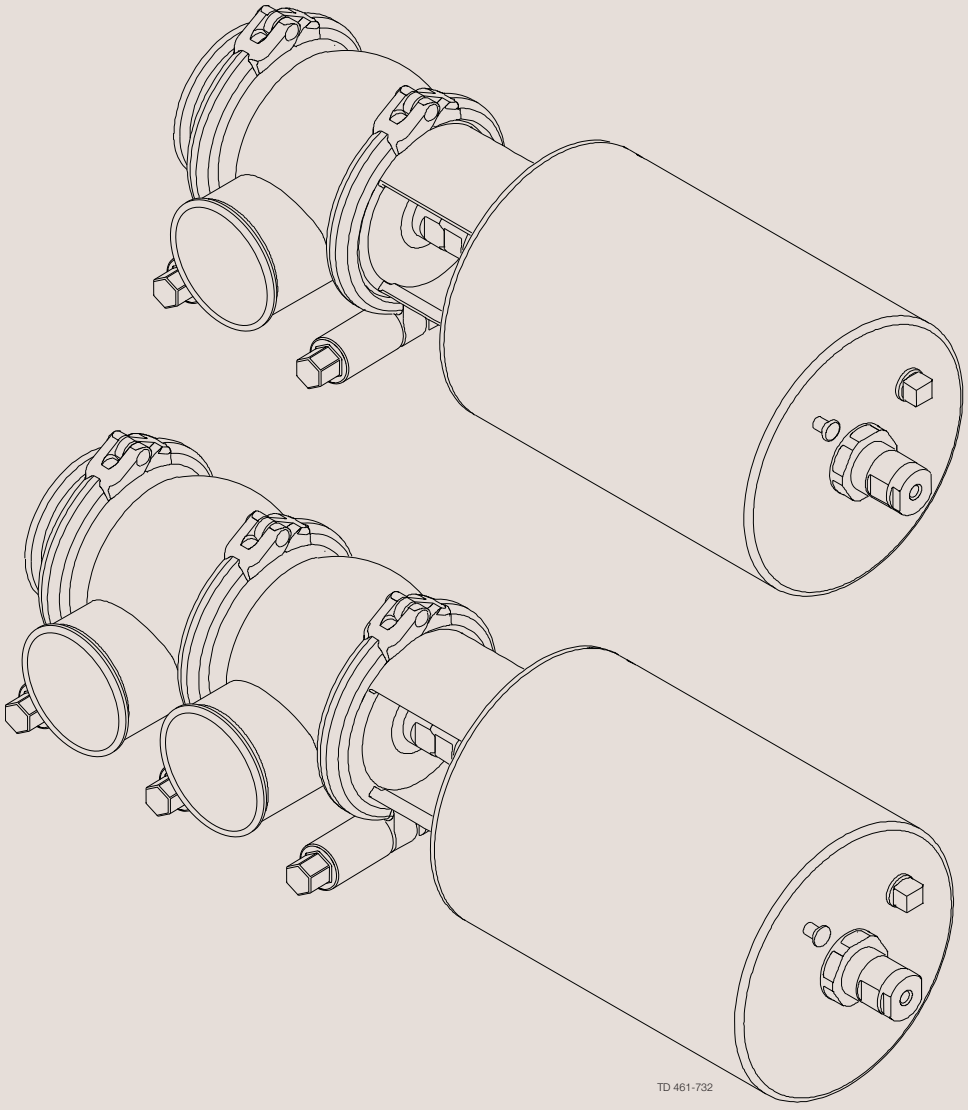
Instruction Manual

Unique 7000 Series Tangential body/Tank Valve



ESE00586-ENUS3 2012-01

Original manual

Tri-Clover®

Table of contents

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 designating company

Alfa Laval
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Unique 7000 Series Valve	Tangential body/Tank Valve	
Denomination	Type	Year

is in conformity with the following directives:
- 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	
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 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:

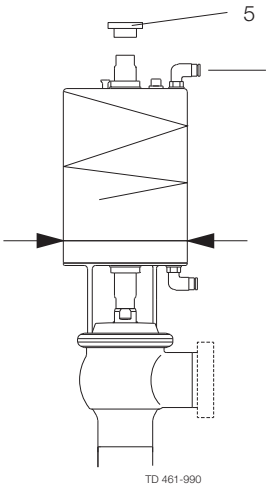
2 Safety

All warnings in the manual are 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

Actuators marked with year 2012 (New actuator design):

Alfa Laval recommend only to use 43.5 PSI (3 bar) support air on the spring side in all the Unique 7000 actuators, to ensure 145 PSI (10 bar) product pressure without leakage.
Plastic adapter (Pos. 5) is always used on the new design.



Alfa Laval recommend max. 43.5 PSI (3 bar)

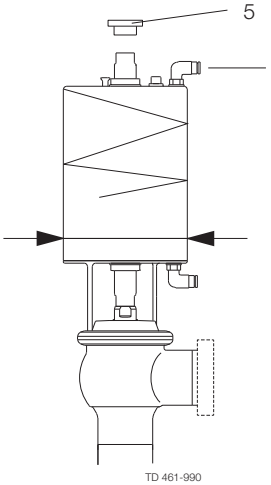
ø6 1/5 inch
ø157.5 mm

Actuators marked with year 2006-2011 (old actuator design):

⚠
WARNING!
When using “support air” on spring side in all the Unique 7000 actuators, the pressure must **NOT** exceed 43.5 PSI (3 bar).

When using Unique 7000 actuators with OD156 mm with support air, **always** use the “steel adapter” (pos. 5). Tighten the “steel adapter” with torque of 21 lbf-ft (30 Nm) and use Loctite 243.

The actuator with OD156 mm is mainly used on valves ISO76/DN80 – ISO101/DN100. The outer actuator diameter = ø6 1/7 inch (156 mm).



Max. 43.5 PSI (3 bar) “support air” on spring side.

ø6 1/7 inch
ø156 mm

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 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 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 6 Technical data)
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 6 Technical data)
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

3 Installation

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.

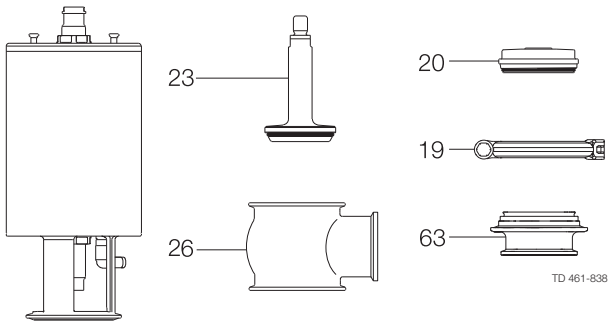
3.1 Unpacking/delivery

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

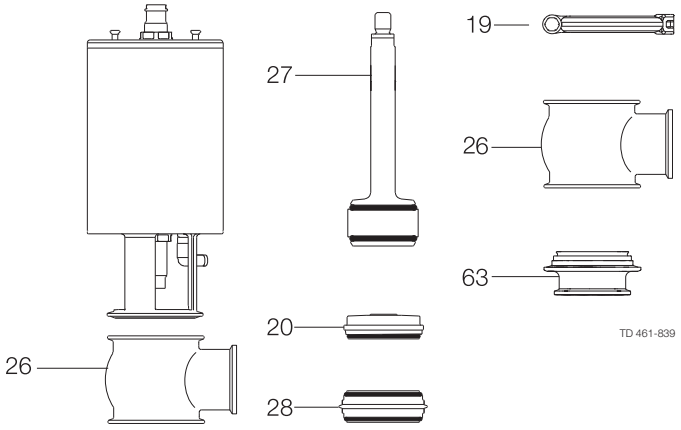
Check the delivery for:
1. Complete valve, shut off valve (RA) or change-over valve (RA) (see steps 2a and 2b).
2. Delivery note.
3. Instruction manual.

Step 2

2a
Shut-off valve:
1. Complete actuator.
2. Bonnet (20).
3. 2 x clamp (19).
4. Valve plug (23).
5. Valve body (26).
6. Port seal element (63)



2b
Change-over valve:
1. Complete actuator.
2. Bonnet (20).
3. 3 x clamp (19).
4. Valve plug (27).
5. Valve seat (28).
6. 2 x upper valve body (26).
7. Port seal element (63).



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.

3.2 General installation

Step 1

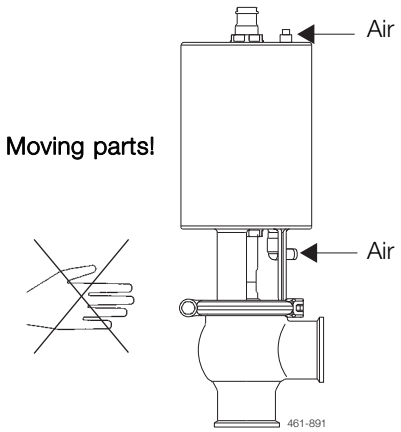
Always read the technical data thoroughly.
See chapter 6 Technical data

Always release compressed air after use.

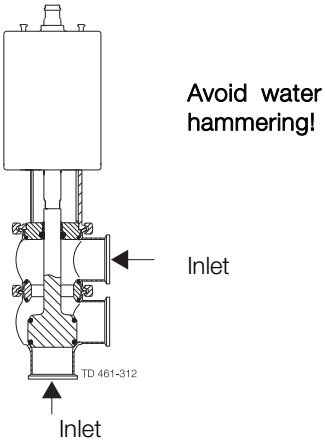
CAUTION
Alfa Laval cannot be held responsible for incorrect installation.

Step 2

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



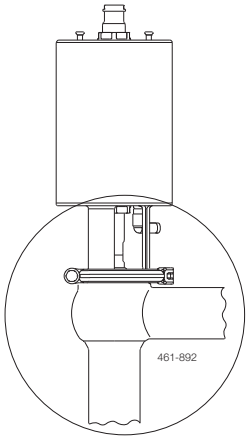
Step 3
It is recommended to install the valve so that the flow is against the closing direction to avoid water hammer.



3 Installation

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 4
Avoid stressing the valve.
Pay special attention to:
- Vibrations.
- Thermal expansion of the pipelines.
- Excessive welding.
- Overloading of the pipelines.



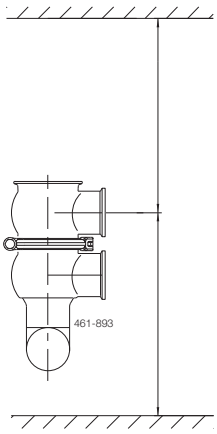
Risk of damage!

3.3 Welding

Step 1
Always install valves with more than one valve body so that the seals between the valve bodies can be replaced. Do not weld more than one valve body into the system.

Valve size	A (inch)	B (inch)
1”	*	24.8
1 ½”	*	27.6
2”	*	29.5
2 ½”	*	29.1
3”	*	31.5
4”	*	31.1

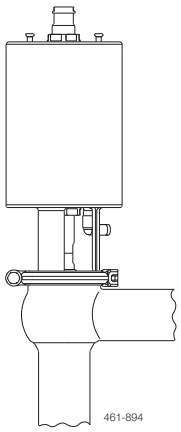
* Depending on body combination and piping solution.

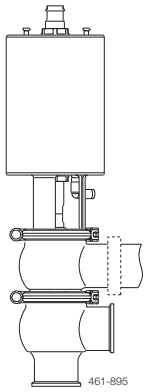


B (incl. top unit)

A*

Step 2
Assemble the valve in accordance with the steps on page .
Pay special attention to the warnings!

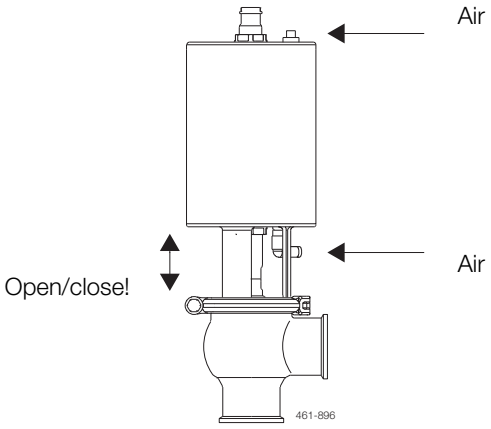




Study the instructions carefully.
The valve is supplied as separate parts to facilitate the welding.
The items refer to the parts list and service kits section.
Check the valve for smooth operation after welding.

Step 3
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 the welding.
The items refer to the parts list and service kits section.
Check the valve for smooth operation after welding.

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

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

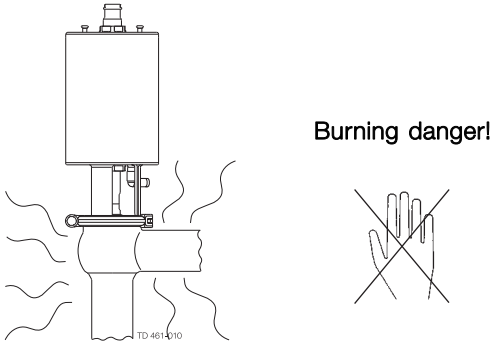
Always read the technical data thoroughly.
See chapter 6 Technical data

Always release compressed air after use.

CAUTION
Alfa Laval cannot be held responsible for incorrect operation.

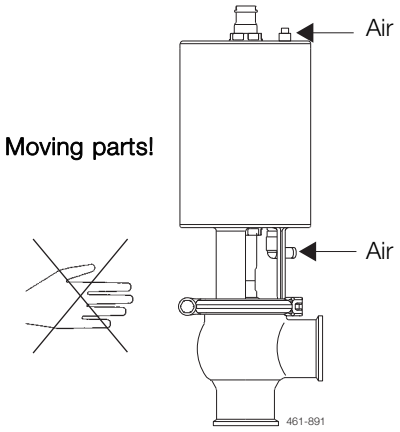
Step 2

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



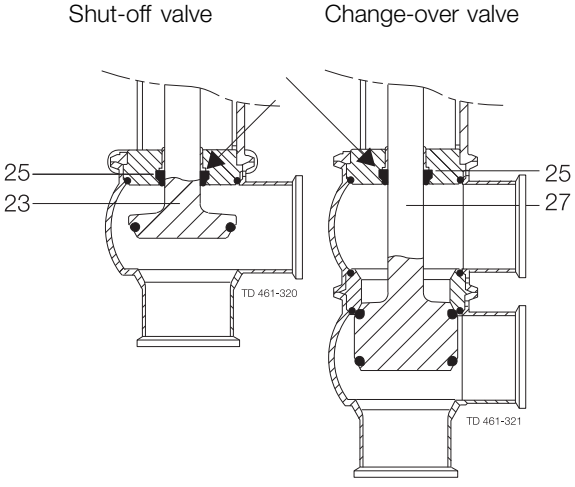
Step 3

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



Step 4
Lubrication of valves:

1. Ensure smooth movement between lip seal (25) and plug stem (23, 27).
2. Lubricate with Klüber Paraliq GTE 703 if necessary (see section 5.1).

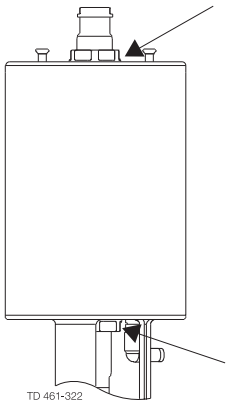


4 Operation

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.

Step 5
Lubrication of actuator

1. Ensure smooth movement of the actuator (the actuator is lubricated before delivery).
2. Lubricate 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.

4.2 Troubleshooting

NOTE!

Study the maintenance instructions carefully before replacing worn parts. - See section 5.1!

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
	- Product pressure exceeds actuator specification	- Replace with a high pressure actuator - Use auxiliary air on the spring side - Reduce product pressure
Water hammer	The flow direction is the same as the closing direction	- The flow direction should be against the closing direction - Throttle air release of solenoid in top unit
The valve does not open/close	Product pressure exceeds actuator specification	- Replace with a high pressure actuator - Use auxiliary air on the spring side - Reduce product pressure

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.

4.3 Recommended cleaning

Step 1

Always handle lye and acid with great care.

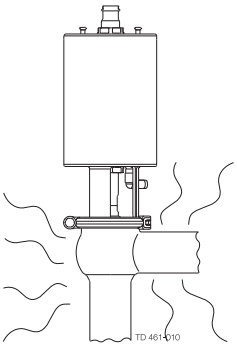
Caustic danger!

Always use rubber gloves!

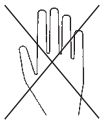
Always use protective goggles!

Step 2

Never touch the valve or the pipelines when sterilizing.



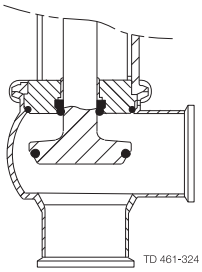
Burning danger!



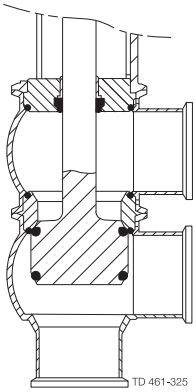
Step 3

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

Shut-off valve



Change-over valve



Step 4

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

1. 1% by weight NaOH at 158°F

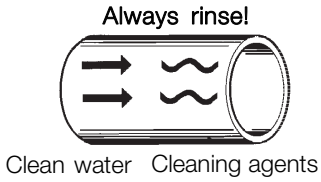
2.2 lb NaOH	+	26.4 gal water	=	Cleaning agent.
0.6 gal 33% NaOH	+	26.4 gal water	=	Cleaning agent.

2. 0.5% by weight HNO_3 at 158°F

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

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 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.



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

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.

5.1 General maintenance

Step 1

Always read the technical data thoroughly.
See chapter 6.

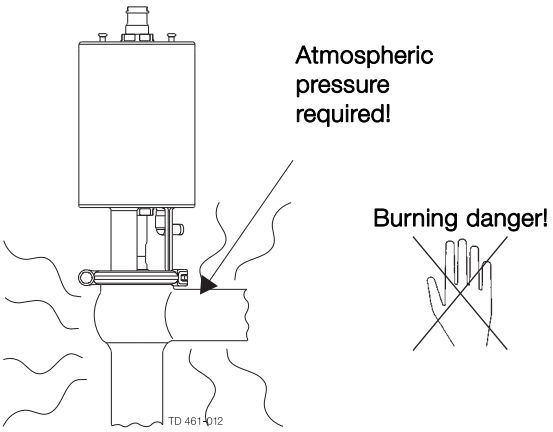
Always release compressed air after use.

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

Step 2

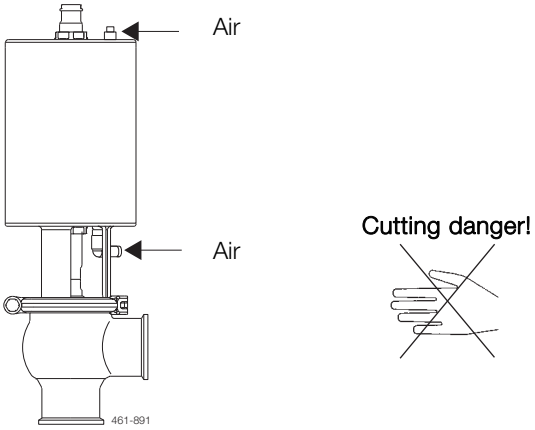
Never service the valve when it is hot.

Never service the valve with valve and pipelines under pressure.



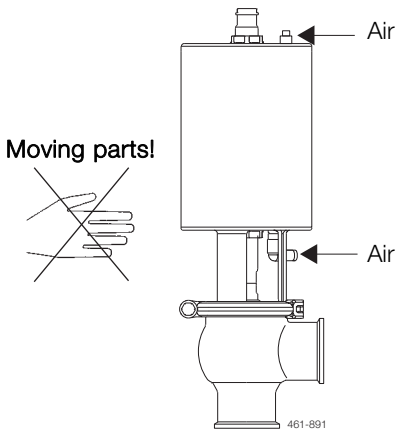
Step 3

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



Step 4

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



5 Maintenance

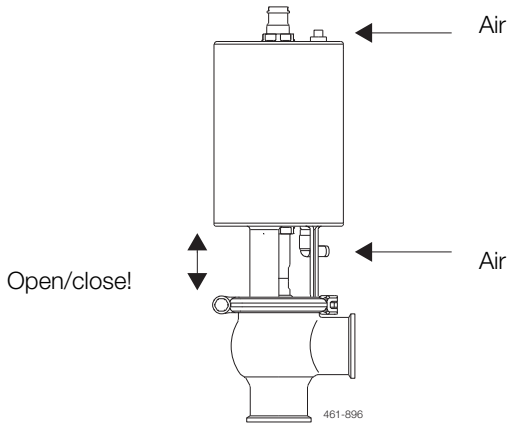
Maintain the valve regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and lip seals in stock.

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 page 25)

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.
A/A = Air/air activated.

5.2 Dismantling of valve

Step 1

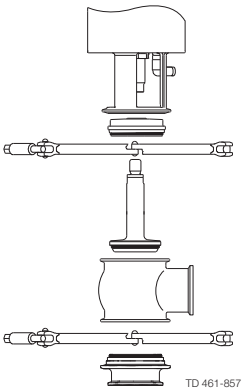
1a
Shut-off valve:

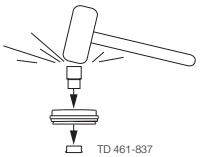
1. Supply compressed air to the actuator (only NC).
2. Loosen and remove upper clamp.
3. Release compressed air (only NC).
4. Lift away the actuator.
5. Unscrew and remove valve plug.
6. Remove O-ring, lip seal and bushing in bonnet.
   (Use bushing tool and rubber mallet).
7. Loosen and remove lower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

Note! Be careful not to damange the bushing.

Pay special attention to the warnings!

Note! For plug seal replacement please see section 5.3.





Note!
Be careful not to damage the bushing.

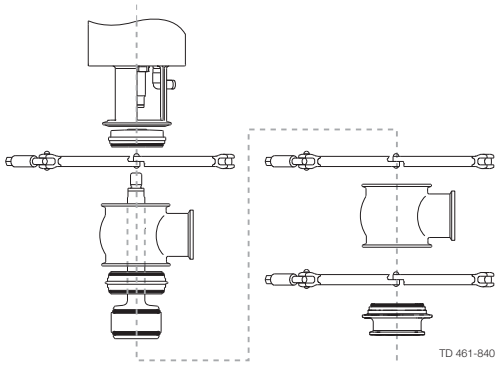
1b
Change-over valve:

1. Supply compressed air to the actuator (only NC).
2. Loosen and remove middle clamp.
3. Release compressed air (only NC).
4. Lift away the actuator and upper valve body.
5. Supply compressed air to the actuator (only NO).
6. Unscrew and remove valve plug.
7. Release compressed air (only NO).
8. Remove seat and O-rings.
9. Loosen and remove upper clamp.
10. Remove upper valve body.
11. Remove O-ring, lip seal and bushing in bonnet.
    (Use bushing tool and rubber mallet.
    See drawing, step 1a).
12. Loosen and remove lower clamp.
13. Remove valve body.
14. Remove O-ring in port seal element.

Note! Be careful not to damage the bushing.

Pay special attention to the warnings!

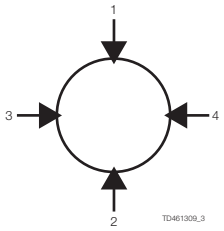
Note! For plug seal replacement please see section 5.3.



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

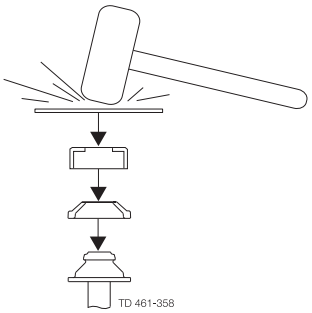
5.3 Seat ring replacement

5.3.a 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.

5.3.b TR2 seat ring replacement



1. Place the plug element on a firm support.
2. Using a utility knife, partially AND CAREFULLY cut through the upper ring portion of the TR2 plug avoiding contact with stainless steel stem.
3. Force apart both cut ends of the plug for removal from stem.
4. TR2 plugs are installed by applying uniform pressure on all sides.
   (Pressure can be applied by using the seat assembly tool).
5. Using a piece of metal an a rubber mallet, place a precise tab to make the TR2 plug snap on to the stem. Reverse the tool and tab again to secure proper fit.
6. Examine seat assembly to be sure the TR2 plug is properly mounted, holding the seat assembly in one hand - rotate the TR2 plug.
   (For proper CIP cleaning the TR2 plug should turn freely on the stem.)

For more explicit instructions, please refer to the maintenance video.

5.4 Assembly of valve

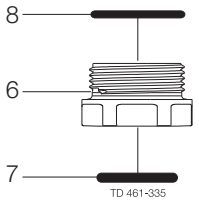
Reverse order of 5.2, Dismantling of valve.
Lubricate O-ring (21) and lip seal (25) with Klüber Paraliq GTE 703.
Remember to tighten spindle and plug with a torque M = 23 lbf-ft (30 Nm) (Use two 17 mm spanners)
If there are vibrations in the pipeline Alfa Laval recommend to use loctite nr. 243.

5 Maintenance

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

5.5 Actuator bushing replacement

1. Unscrew and remove top and bottom bushings with O-rings.
2. Lubricate O-rings with Molykote Longterm 2 plus before fitting.
3. Fit bushings and O-rings. Tighten brushing with a torque = 7 lbf-ft (10 Nm). Be careful not to overtighten.

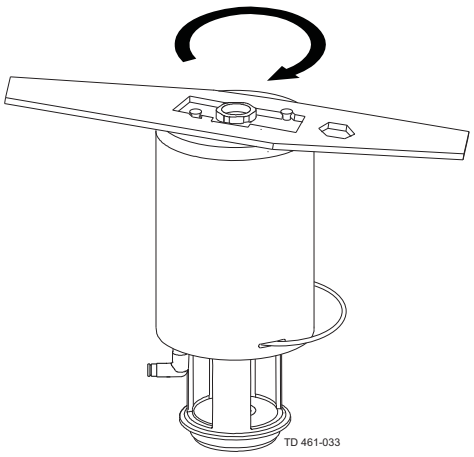


5.6 Dismantling of optional maintainable actuator

1. Rotate cylinder.
2. Remove lock wire and pull away cylinder.
3. Unscrew nuts and remove yoke. The nuts must be tightened again to M = 12lbf-ft (17 Nm). Be careful not to overtighten.
4. Unscrew top an bottom bushings.
5. Remove piston with O-ring and spring assembly.
6. Remove O-rings and support disc.

Note! The A/A actuator has no spring assembly.

Rotate cylinder with service tool.



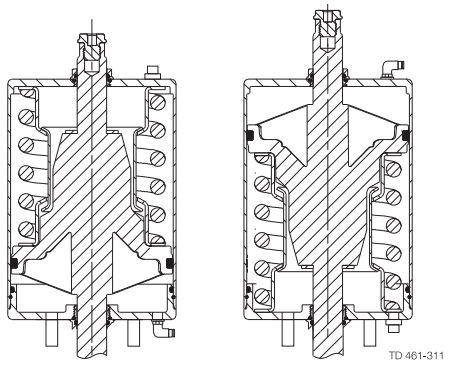
5.7 Assembly of optional maintainable actuator

Reverse order of 5.6. Dismantling of actuator.
Lubricate O-ring (3, 7, 11) with Molykote Longterm 2 plus before fitting.

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

5.8 Additional equipment

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).



Pneumatic movement upwards NC

Pneumatic movement downwards NO

6 Technical data

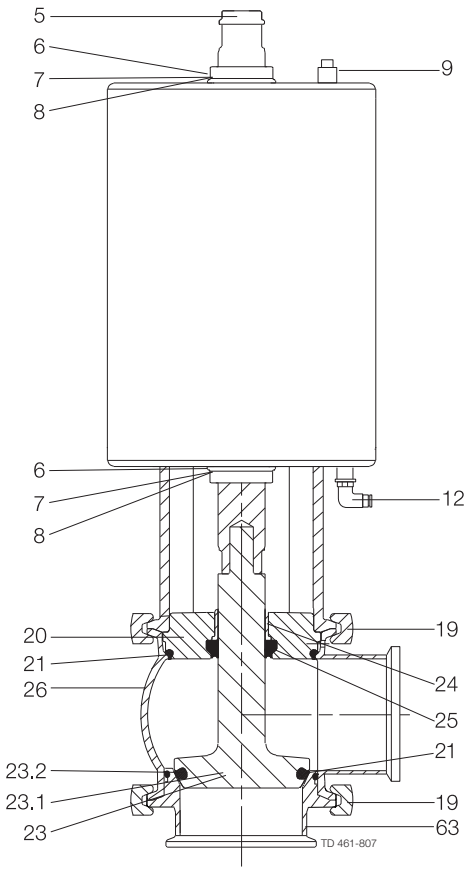
It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.

6.1 Technical data

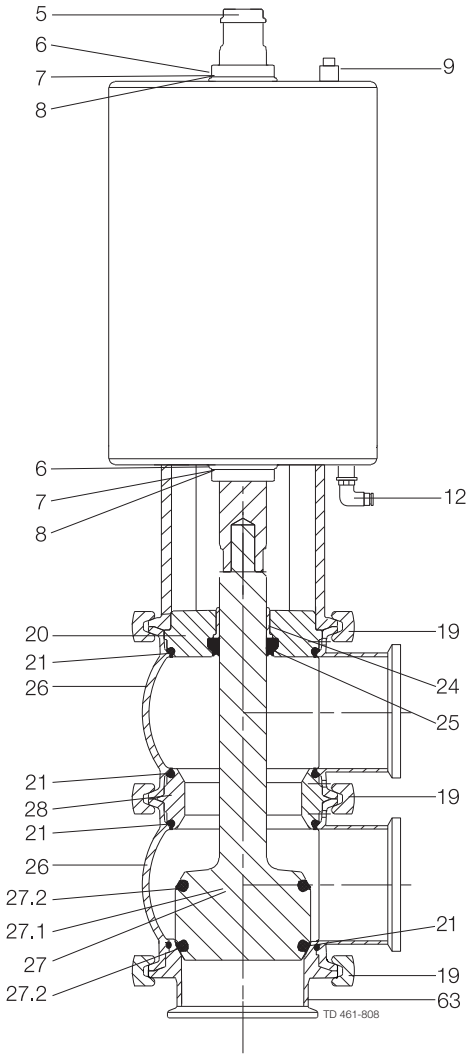
Data - valve/actuator	
Max. product pressure	145 PSI (1000 kPa) (10 bar)
Min. product pressure	Full vacuum (depending on product specifications)
Temperature range	14°F to + 284°F (standard EPDM seal)
Air pressure, actuator	72.5 to 101.5 PSI (500 to 700 kPa) (5 to 7 bar)
Materials - valve/actuator	
Product wetted steel parts	AISI 316L (internal Ra < 32 µ inch)
Other steel parts	AISI 304
Plug seal	EPDM / PTFE (TR2)
Other product wetted seals	EPDM (standard)
Optional product wetted seals	HNBR and FPM
Other seals	NBR

For parts lists please see section 7.2. The drawing includes all items.

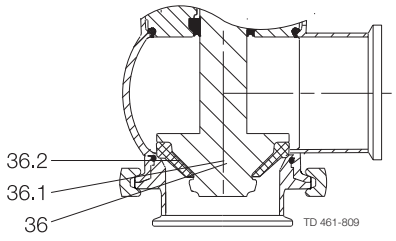
7.1 Unique 7000 Series - Tangential body/Tank Valve



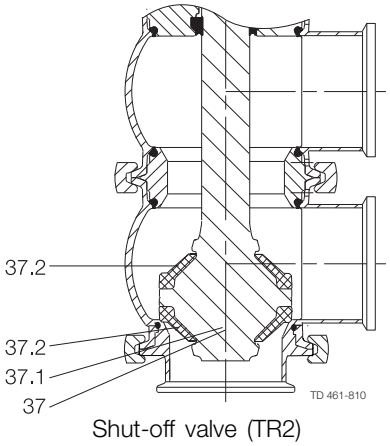
Shut-off valve (elastomer)



Change-over valve (elastomer)



Shut-off valve (TR2)

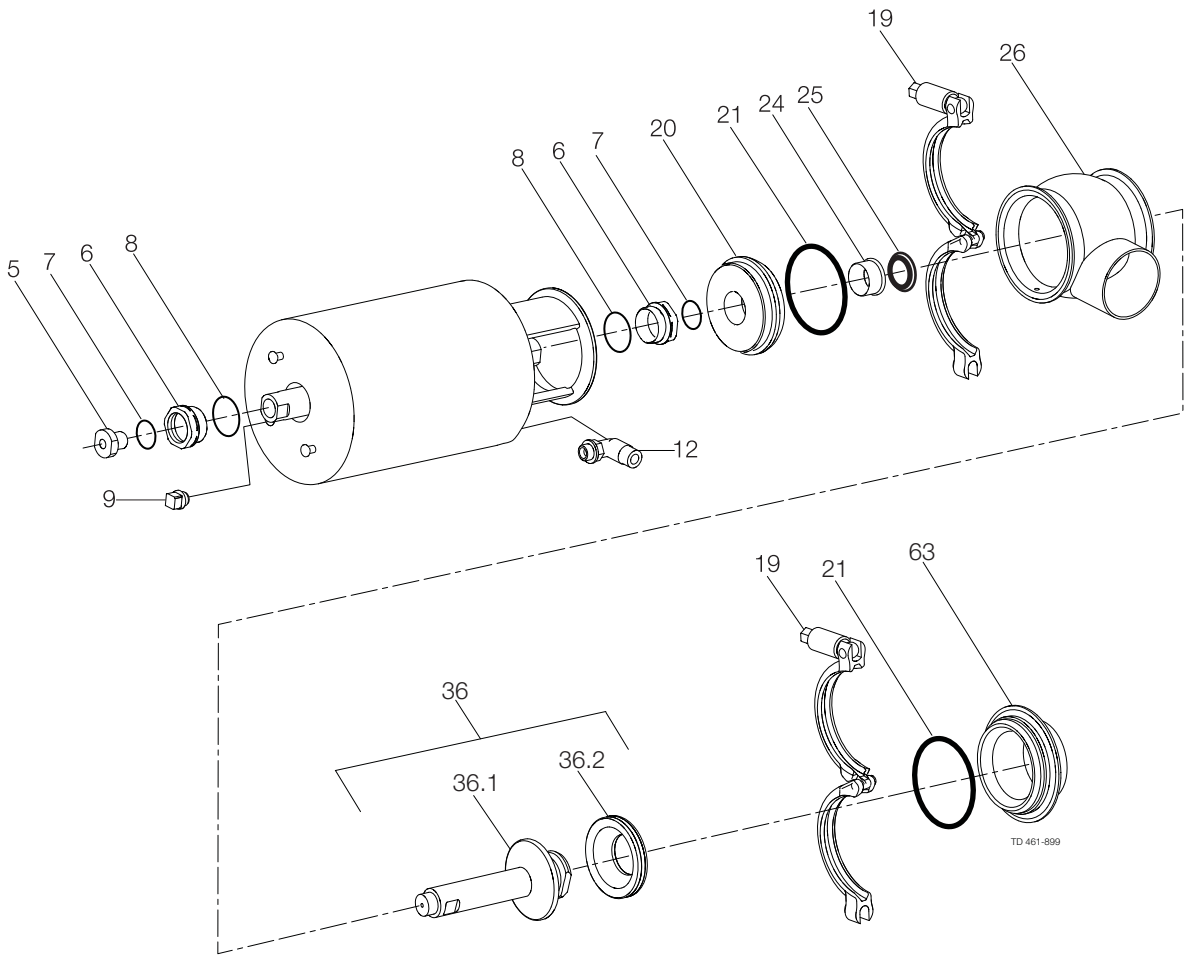


Shut-off valve (TR2)

7 Parts list and Service Kits

For parts lists please see section 7.2. The drawing includes all items.

7.2 Unique 7000 Series Tangential body/Tank Valve - Shut-off-Valve 2”-4”



For parts lists please see section 7.2. The drawing includes all items.

Parts list

Pos.		Qty	Denomination
			Actuator
			Actuator
			Actuator
5		1	Adapter
		1	Adapter
6	□	2	Bushing
7	□	2	O-ring
8	□	2	O-ring
9		1	Plug
12		1(2)	Air fitting
19		2	Clamp
20		1	Bonnet
21	♦	2	O-ring
			O-ring
			O-ring
			O-ring
24		1	Bushing
25	♦	1	Lip seal
			Lip seal
			Lip seal
			Lip seal
26		1	Valve body
		1	Valve body
		1	Valve body
		1	Valve body
36		1	Plug
36.1		1	Plug
36.2	♦	1	Plug seal
63		1	Port seal element
		1	Port seal element

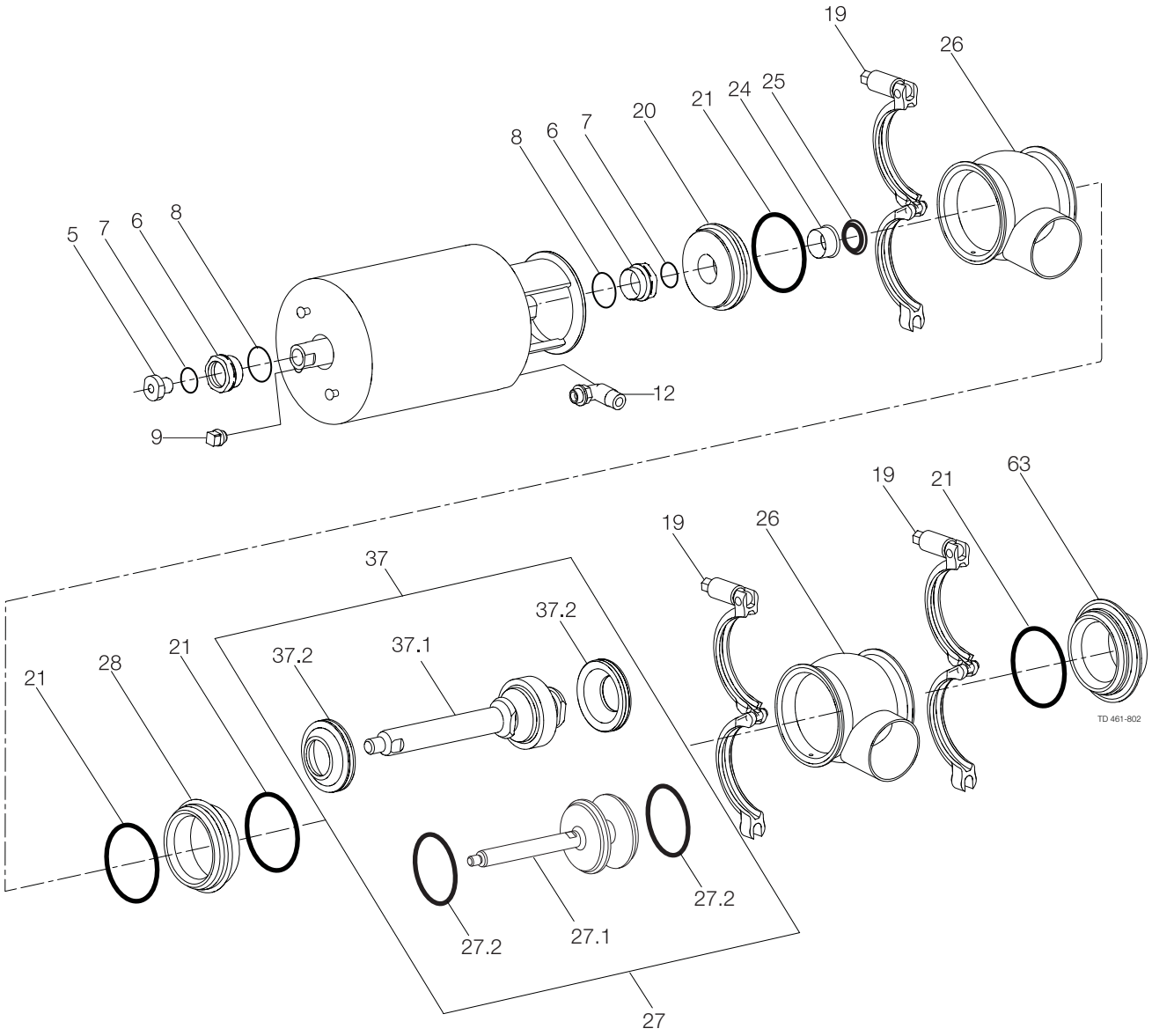
Service kits

	Denomination	2"	2½"	3"	4"
Actuator					
□	Service kit	9611-92-6500	9611-92-6500	9611-92-6500	9611-92-6500
Product wetted parts					
♦	Service kit, EPDM	9611-92-6767	9611-92-6768	9611-92-6769	9611-92-6770
♦	Service kit, HNBR	9611-92-6771	9611-92-6772	9611-92-6773	9611-92-6774
♦	Service kit, FPM	9611-92-6775	9611-92-6776	9611-92-6777	9611-92-6778

7 Parts list and Service Kits

For parts lists please see section 7.2. The drawing includes all items.

7.3 Unique 7000 Series Tangential body/Tank Valve - Change-over Valve 2”-4”



For parts lists please see section 7.2. The drawing includes all items.

Parts list

Pos.		Qty	Denomination
			Actuator
			Actuator
			Actuator
5		1	Adapter
		1	Adapter, steel (Period 2009-2011)
6	□	2	Bushing
7	□	2	O-ring
8	□	2	O-ring
9		1	Plug
12		1(2)	Air fitting
19		3	Clamp
20		1	Bonnet
21	♦	4	O-ring
			O-ring
			O-ring
			O-ring
24		1	Bushing
25	♦	1	Lip seal
			Lip seal
			Lip seal
			Lip seal
26		2	Valve body
		2	Valve body
		2	Valve body
		2	Valve body
28		1	Seat
37		1	Plug, change over
37.1		1	Plug
37.2	♦	2	Plug seal
			Plug seal
63		1	Port seal element
		1	Port seal element

Service kits

Denomination	2"	2½"	3"	4"
Actuator				
Service kit	9611-92-6500	9611-92-6500	9611-92-6500	9611-92-6500
Product wetted parts				
Service kit, EPDM	9611-92-6779	9611-92-6780	9611-92-6781	9611-92-6782
Service kit, HNBR	9611-92-6783	9611-92-6784	9611-92-6785	9611-92-6786
Service kit, FPM	9611-92-6787	9611-92-6788	9611-92-6789	9611-92-6790

Recommended spare parts: Service kits

Parts marked with □♦ are included in the service kits.

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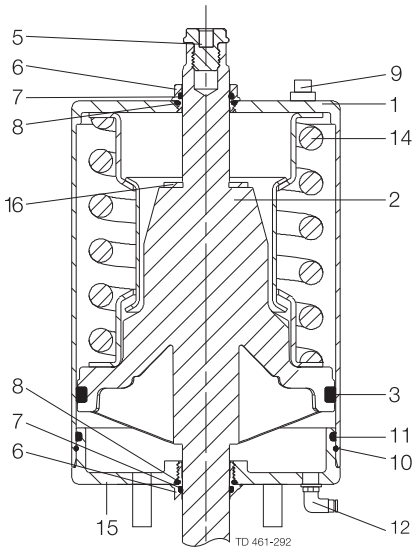
7 Parts list and Service Kits

For parts lists please see section 7.2. The drawing includes all items.

7.4 Maintainable actuator



For parts lists please see section 7.2. The drawing includes all items.

Parts list

Pos.		Qty	Denomination
			Actuator
			Actuator
			Actuator
1		1	Cylinder (blasted)
		1	Cylinder (polished)
2		1	Piston
3	□♦	1	O-ring
5		1	Adapter
		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 (2)	Air fitting (only 2 for A/A)
13		1	Yoke
14		1	Spring assembly
15		1	Bottom
16	□♦	1 (2)	Support disc (only 2 for A/A)
17		3	Washer
18		3	Nut

Service kits

Denomination	1"	1½"	2"	2½"	3"	4"
Actuator						
Service kit, NO , NC	9611-92-6497	9611-92-6497	9611-92-6498	9611-92-6498	9611-92-6499	9611-92-6499
Service kit, A/A	9611-92-6519	9611-92-6519	9611-92-6520	9611-92-6520	9611-92-6521	9611-92-6521

Recommended spare parts: Service kits

Parts marked with □♦ are included in the service kits.

TD 900-362/1

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.