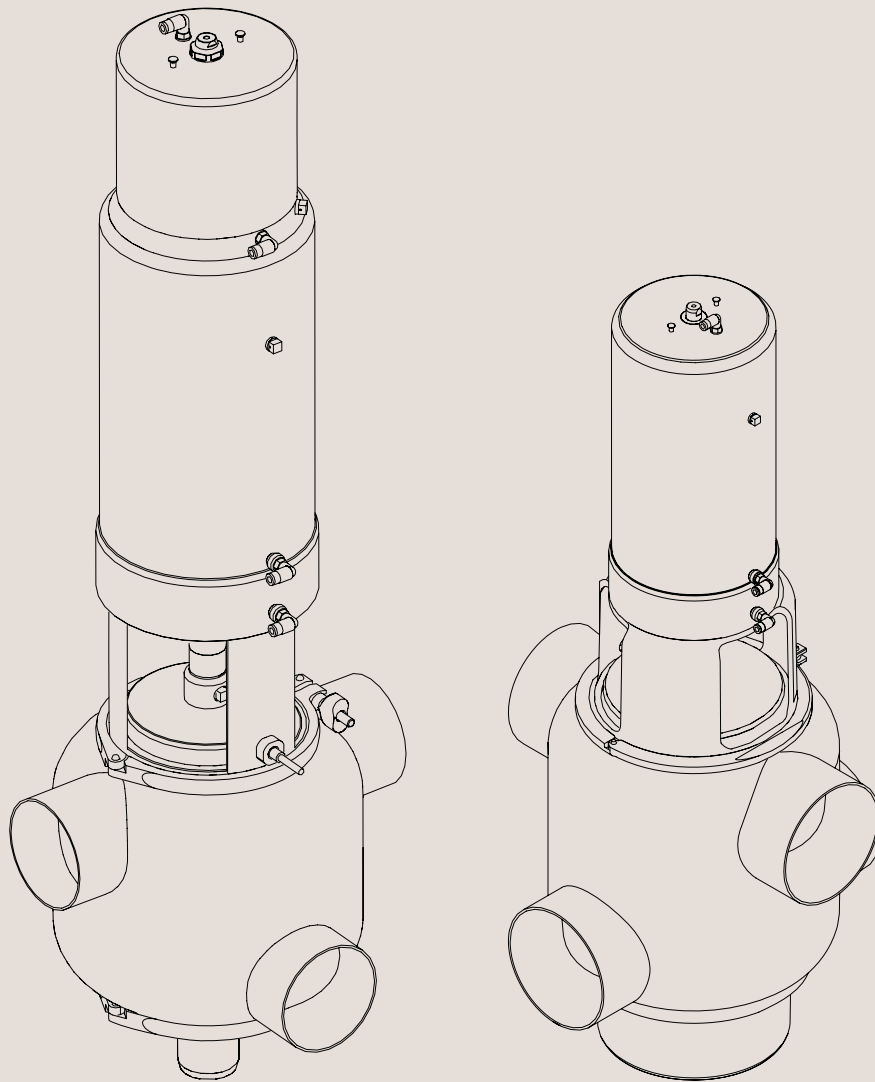




Instruction Manual

Unique Sanitary Mixproof LP and LP-F Valve



TD 482-009

ESE02021-ENUS1 2011-06

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

Sanitary Mixproof Valve

Denomination

Unique

Type

Year

is in conformity with the following directives:

- Machinery Directive 2006/42/EC

The valve is in compliance with the Pressure Equipment Directive 97/23/EC and was subjected to the following assessment procedure Module A. Diameters \geq DN125 may not be used for fluids group 1.

Manager, Product Centres, Compact
Heat Exchangers & Fluid Handling

Title

Bjarne Søndergaard

Name

Alfa Laval Kolding
Company

Signature



Designation



The instruction manual is part of the delivery.

Study the instructions carefully.

Fit the warning label supplied on the valve after installation so that it is normally visible.

2.1 Unpacking/intermediate storage

Step 1

CAUTION

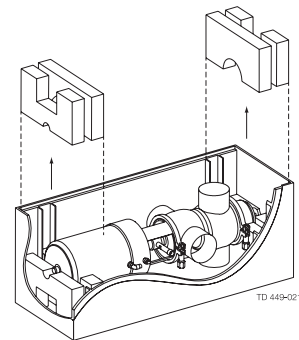
Alfa Laval cannot be held responsible for incorrect unpacking.

Check the delivery for:

1. Complete valve.
2. Delivery note.
3. Warning label.

Step 2

Remove upper support.

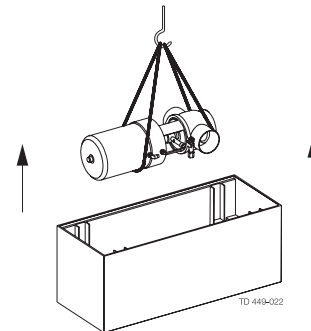


Step 3

Lift out the valve.

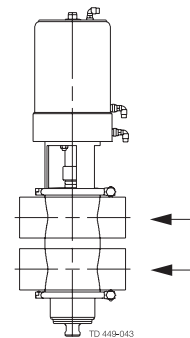
NOTE!

Please note weight of valve as printed on box.



Step 4

Remove possible packing materials from the valve ports.



2 Installation

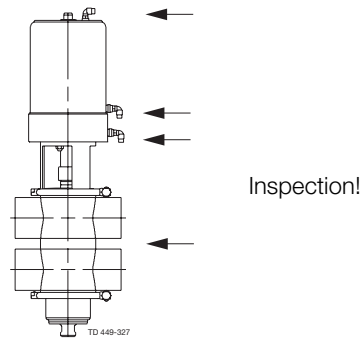
The instruction manual is part of the delivery.

Study the instructions carefully.

Fit the warning label supplied on the valve after installation so that it is normally visible.

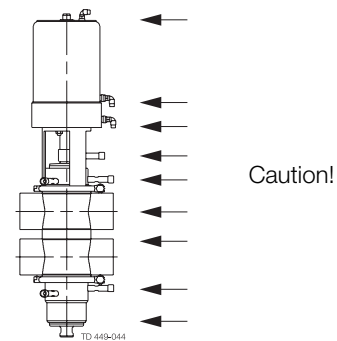
Step 5

Inspect the valve for visible transport damages.



Step 6

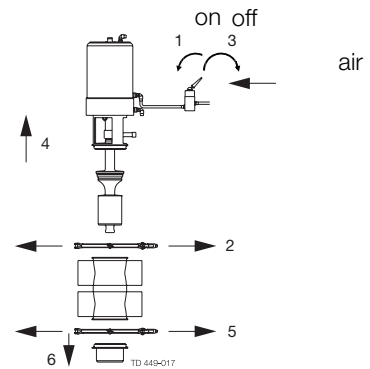
Avoid damaging the air connections, the leakage outlet, the valve ports and the CIP connections, if supplied.



Step 7

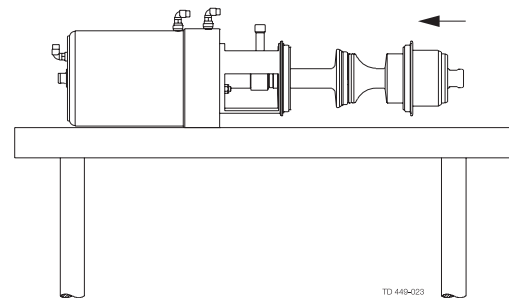
Disassemble according to illustrations 1 to 6 (please also see section 4.2).

1. Supply compressed air.
2. Remove upper clamp.
3. Release compressed air.
4. Lift out actuator with plugs.
5. Remove lower clamp.
6. Take away lower sealing element.



Step 8

Mount sealing element on valve.



The instruction manual is part of the delivery.

Study the instructions carefully.

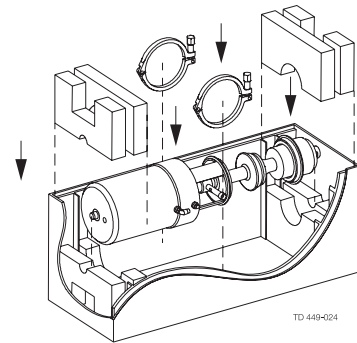
Fit the warning label supplied on the valve after installation so that it is normally visible.

Step 9

1. Place actuator part in the box.
2. Add supports.
3. Close box and store.

Advise!

Mark the valve body and box with the same number before intermediate storage.



2 Installation

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

2.2 General information

Step 1



Always read the technical data thoroughly.



Always release compressed air after use.



Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air (see the warning label).

CAUTION

Fit the supplied warning label on the valve so that it is normally visible.

CAUTION

Alfa Laval cannot be held responsible for incorrect installation.

NOTE

Always install the valve vertically.

NOTE

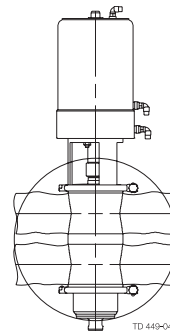
The leakage outlet must be turned downwards!

Step 2

Avoid stressing the valve as this can result in deformation of the sealing area and malfunction of the valve (leakage or faulty indication).

Pay special attention to:

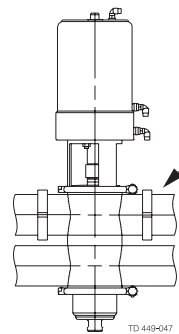
- Vibrations.
- Thermal expansion of the tubes.
- Excessive welding.
- Overloading of the pipelines.



Risk of damage!

Step 3

Fittings: Ensure that the connections are tight.



Remember seal rings!

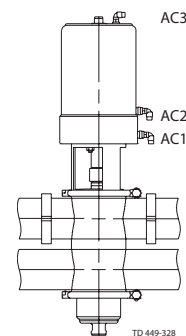
Step 4

Air connection: R 1/8" (BSP).

AC1: Cleaning of upper seat.

AC2: Open valve.

AC3: Cleaning of lower seat.



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

The valve has ends for welding as standard.

Weld carefully/aim at stressless welding to avoid deformation on sealing areas.

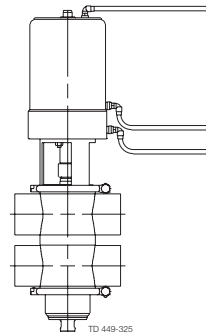
Check the valve for smooth operation after welding.

2.3 Welding

Step 1

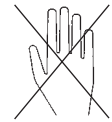


Never stick your fingers through the valve ports if the actuator is supplied with compressed air.



Air

Cutting danger!



Step 2

Dismantle the valve in accordance with step 1 in section 4.2.

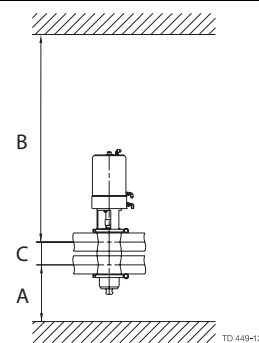
Step 3

NOTE

Maintain the minimum clearances so that the actuator with the internal valve parts can be removed - please see later this section!



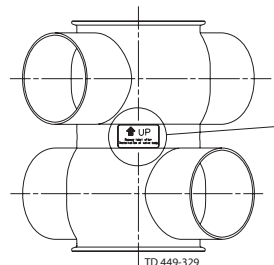
If there is a risk of foot damage, Alfa Laval recommends to leave a distance of 120 mm (4.7") below the valve (look at the specific built-in conditions).



Step 4

WARNING

Make sure to turn the valve body correctly - conical valve seat upwards.



UP Remove label after installation of valve body

Step 5

Assemble the valve in accordance with section 4.5 after welding.

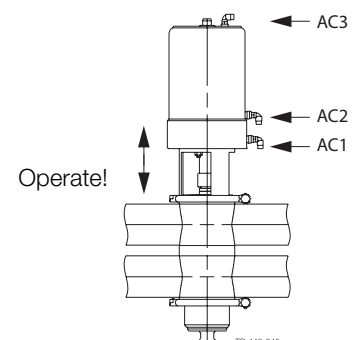
Pay special attention to the warnings!

Step 6

Pre-use check:

1. Supply compressed air to AC1, AC2 and AC3 one by one.
2. Operate the valve several times to ensure that it runs smoothly.

Pay special attention to the warnings!



2 Installation

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

The valve has ends for welding as standard.

Weld carefully/aim at stressless welding to avoid deformation on sealing areas.

Check the valve for smooth operation after welding.

NOTE!

If ThinkTop® is mounted, add 180 mm (7,1") to B measure.

A. Lower sealing element can be removed without taking out actuator and internal valve parts.

B. Actuator and internal valve parts can be lifted out of the valve body.

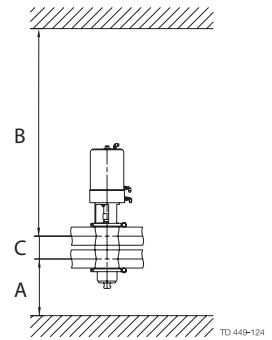


Table 1. Dimensions - all measures in Inches

Size	4"		6"	
	LP	LP-F	LP	LP-F
A	13,858	10,787	17,165	13,465
B	47,283	47,283	46,968	46,968
**C	4,866	4,866	6,798	6,798

NOTE!

**The measure C can always be calculated by the formula

$$C = \frac{1}{2}ID_{\text{upper}} + \frac{1}{2}ID_{\text{lower}} + 1"$$

*The valve is adjusted and tested before delivery.
Study the instructions carefully and pay special attention to the warnings!
Pay attention to possible faults.
The items refer to the parts list and service kits section.*

3.1 Operation

Step 1



Always read the technical data thoroughly.



Always release compressed air after use.



Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air (see the warning label).



Never pressurise air connections (AC1, AC3) simultaneously as both valve plugs can be lifted (can cause mixing).

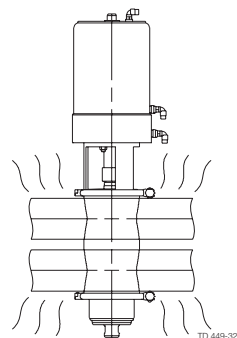
CAUTION

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!



3 Operation

The valve is adjusted and tested before delivery.

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

Pay attention to possible faults.

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

3.2 Fault finding and repair

NOTE

Study the maintenance instructions carefully before replacing worn parts.

Problem	Cause/result	Repair
Leakage between sealing element (79) and lower plug (75)	Worn/product affected o-rings/ lip seal (76/77/78)	<ul style="list-style-type: none"> - Replace the o-rings/lip seal - Change rubber grade - Lubricate correctly
Leakage at the leakage outlet	<ul style="list-style-type: none"> - Particles between valve seats and plug seals (56/74) - Worn/product affected plug seal rings (56/74) - Plug not assembled correctly 	<ul style="list-style-type: none"> - Remove the particles - Check the plug seals - Replace the plug seals - Change rubber grade - Assemble plug, see step 3 section 4.5
Leakage at sealing element (48)/upper plug (55)	Worn/product affected o-rings/lip seal (sizes 38/39/46/49)	<ul style="list-style-type: none"> - Replace the o-rings/lip seal - Change rubber grade - Clean and if necessary replace guide ring (45)
Leakage at clamp (64)	<ul style="list-style-type: none"> - Too old/product affected o-rings (76 and 47) (and 52 if clamped valve body) - Loose clamp (64) 	<ul style="list-style-type: none"> - Replace the o-rings - Change rubber grade - Tighten the clamp
CIP leakage	Worn o-rings (40/67/71)	Replace the o-rings
Leakage at spindle clamp (43)	Damaged o-ring (39) Worn/product affected lip seal (57) or spray nozzle (58)	<ul style="list-style-type: none"> - Replace the o-ring - Replace the plug seals - Change rubber grade
Lower plug not returning to closed position	<ul style="list-style-type: none"> - Wrong rubber grade - Wrongly fitted gasket - Mounted incorrectly (see section 2.3) 	<ul style="list-style-type: none"> - Change rubber grade - Fit new gasket correctly - Correct installation
Plug returns with uneven movements (slip/stick effect)	<ul style="list-style-type: none"> - Wrong rubber grade - Wrongly fitted gasket - Mounted incorrectly (see section 2.3) 	<ul style="list-style-type: none"> - Change rubber grade - Fit new gasket correctly - Correct installation

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.
 Internal leakage in the valve is externally visible by means of the leakage outlet.

3.3 Recommended cleaning

Step 1



Never touch the valve or the pipelines when sterilizing.

Caustic danger!



Always use rubber gloves!



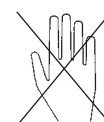
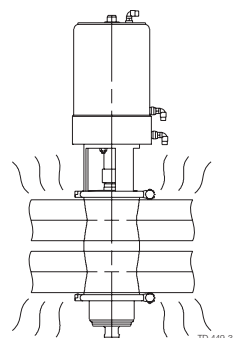
Always use protective goggles!

Step 2



Never touch the valve or the pipelines when sterilizing.

Burning danger!



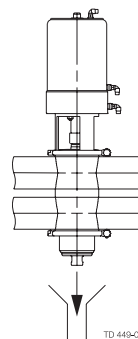
Step 3



Never throttle the leakage outlet.



Never throttle the CIP outlet, if supplied.
 (Risk of mixing due to overpressure).



Leakage/CIP out

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 lb) NaOH	+	100 l (26.4 gal) water	=	Cleaning agent.
--------------------	---	------------------------	---	-----------------

2. 0.5% by weight HNO₃ at 70° C (158°F).

0.7 l (0.2 gal) 53% HNO ₃	+	100 l (26.4 gal) water	=	Cleaning agent.
--------------------------------------	---	------------------------	---	-----------------

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

3 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.

Internal leakage in the valve is externally visible by means of the leakage outlet.

Step 5

1. Avoid excessive concentration of the cleaning agent

=> **Dose gradually!**

2. Adjust the cleaning flow to the process.

Milk sterilization/viscous liquids

=> **Increase the cleaning flow!**

Step 6

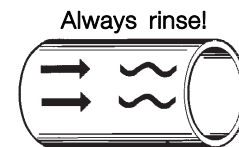
Advisory seat lift cleaning periods:

Cleaning periods of 3-6 seconds per CIP sequence.

Product	Periods
Milk	1-2
Yoghurt	3-5
Beer	2-5
Cold wort	5-10

Step 7

Always rinse well with clean water after the cleaning.



Clean water Cleaning agents

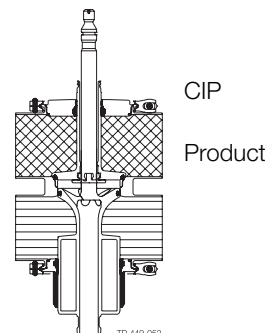
Step 8

NOTE

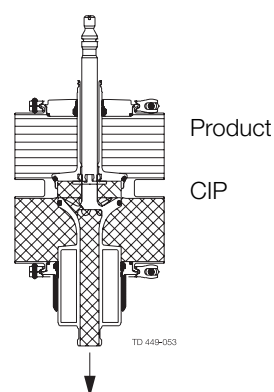
The cleaning agents must be stored/disposed of in accordance with current regulations/directives.

The valve is designed for cleaning in place (CIP). CIP = Cleaning In Place.
 Study the instructions carefully and pay special attention to the warnings!
 NaOH = Caustic Soda. HNO₃ = Nitric acid.
 Internal leakage in the valve is externally visible by means of the leakage outlet.

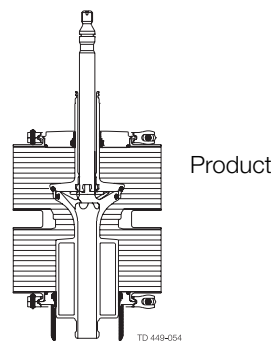
Seat-cleaning cycles:
 Pay special attention to the warnings!
 1. Closed valve



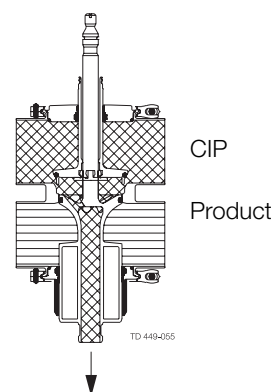
2. Cleaning through lower line



3. Open valve



4. Cleaning through upper line



4 Maintenance

Maintain the valve/actuator regularly. Study the instructions carefully and pay special attention to the warnings! Always keep spare rubber seals and guide rings in stock. The items refer to the parts list and service kits section. The valve is designed so that internal leakages do not result in the products becoming mixed. Internal leakage in the valve is externally visible. Check the valve for smooth operation after service.

4.1 General maintenance

Step 1



Always read the technical data thoroughly.



Always fit the seals correctly (risk of mixing).



Always release compressed air after use.



Always remove the CIP connections, if supplied, before service.

NOTE

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

Step 2

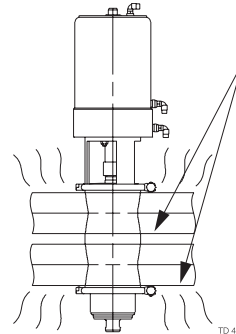


Never service the valve when it is hot.



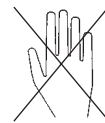
Never service the valve with valve/actuator under pressure.

Atmospheric pressure required!



TD 449-051

Burning danger!

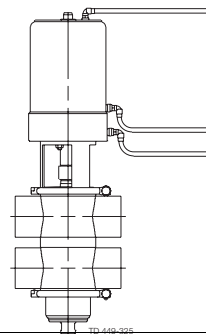


Step 3



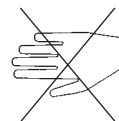
Never stick your fingers through the valve ports if the actuator is supplied with compressed air.

Air



TD 449-325

Cutting danger!



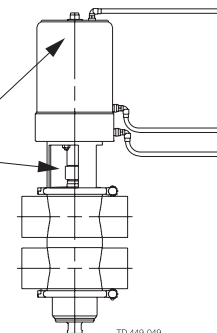
Step 4



Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air (see the warning label).

Moving parts

Air



TD 449-049

4 Maintenance

Maintain the valve/actuator regularly. Study the instructions carefully and pay special attention to the warnings!
 Always keep spare rubber seals and guide rings in stock. The items refer to the parts list and service kits section.
 The valve is designed so that internal leakages do not result in the products becoming mixed.
 Internal leakage in the valve is externally visible. Check the valve for smooth operation after service.

Recommended spare parts: Service kits

Order service kits from the service kits section

Ordering spare parts: Contact the Sales Department.

	Valve rubber seals	Valve plug seals	Valve guide rings
Preventive maintenance	Replace after 12 months(*)	Replace after 12 months(*)	Replace when required
Maintenance after leakage (leakage normally starts slowly)	Replace after production cycle	Replace after production cycle	
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 	<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 when required
Lubrication	When assembling Klüber Paraliq GTE 703 or similar USDA H1 approved oil/grease (**) (suitable for EPDM)	When assembling Klüber Paraliq GTE 703 or similar USDA H1 approved oil/grease (**) (suitable for EPDM)	None

NOTE!

Lubricate thread in valve plug parts with Klüber Paste UH1 84-201 or similar.

(*) Depending on working conditions! Please contact Alfa Laval.

(**) All products wetted seals.

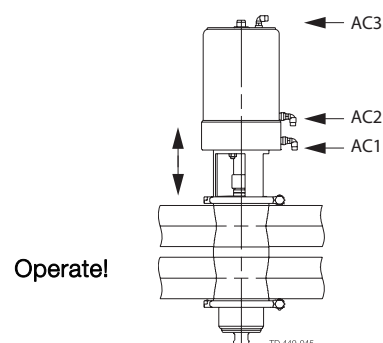
Repairing of actuator:

- The actuator is maintenance-free but repairable.
- If repair is required, replacing all actuator rubber seals is recommended.
- Lubricate seals with Klüberplex BE31.
- To avoid possible black remains on pos. 1 and 29, Alfa Laval recommends Klüber Paraliq GTE703 (white) for these two positions.

Pre-use check

1. Supply compressed air to AC1, AC2 and AC3 one by one.
2. Operate the valve several times to ensure that it operates smoothly.

Pay special attention to the warnings!



4 Maintenance

Study the instructions carefully.

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

Handle scrap correctly.

Replace seals if necessary.

4.2 Dismantling of valve

Step 1

Disassemble valve acc. to illustrations (1 to 6).

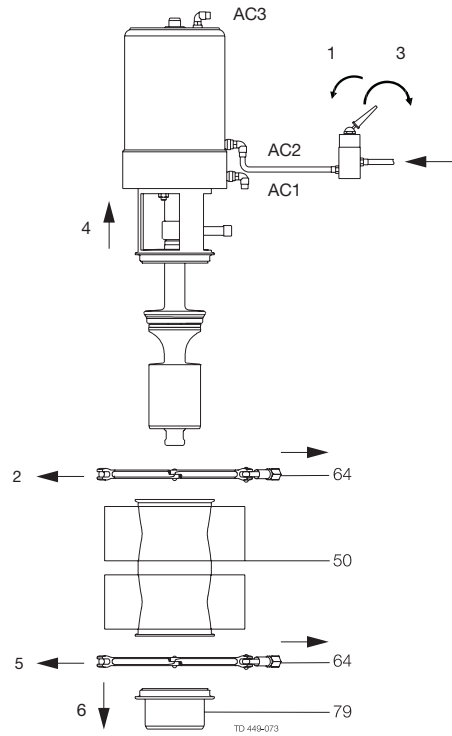
1. Supply compressed air to AC2.
2. Loosen and remove upper clamp (64).
3. Release compressed air.
4. Lift out the actuator together with the internal valve parts from valve body (50).
5. Loosen and remove lower clamp (64).
6. Take away lower sealing element (79).

OPTION:

If clamped valve body: Loosen and remove clamp and pull upper (51) and lower (53) valve bodies apart. Pull out o-ring (52).

NOTE

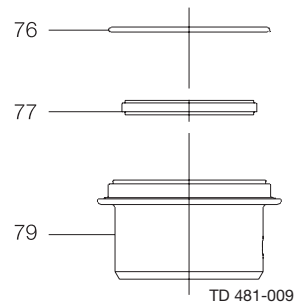
Release compressed air.



Step 2

Dismantling of lower sealing element:

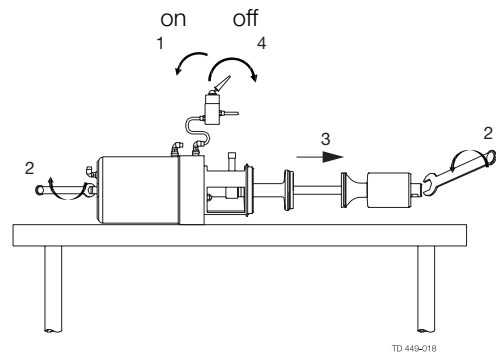
1. Pull out o-ring (76) and lip seal (77).



Step 3

1. Supply compressed air for AC1.
2. Loosen lower plug (75) while counterholding upper stem (1).
3. Remove the plug.
4. Release compressed air.

Note: For replacement of seal ring (74), please see section 4.3.



Study the instructions carefully.

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

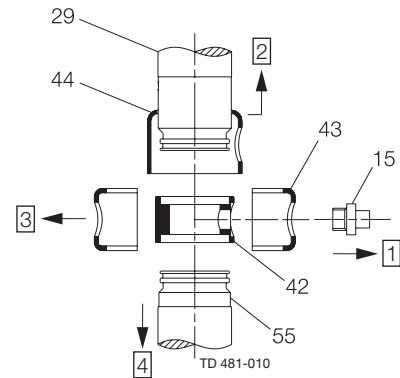
Handle scrap correctly.

Replace seals if necessary.

Step 4

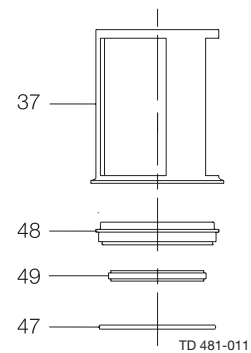
Remove coupling system and upper plug according to illustrations (1 to 4).

1. Unscrew plug (15)
2. Pull up lock (44) over piston rod (29).
3. Pull away clamps (43) from spindle liner (42).
4. Pull out upper plug (55). Make sure spindle liner is free of both piston rod and upper plug.



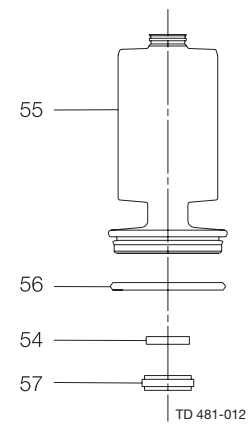
Step 5

1. Pull out upper sealing element (48) from intermediate piece (37).
2. Pull out o-ring (47) and lip seal (49) from upper sealing element.



Step 6

Remove lip seal (57). For removal and replacement of seal ring (56), please see section 4.3.



4 Maintenance

Study the instructions carefully.

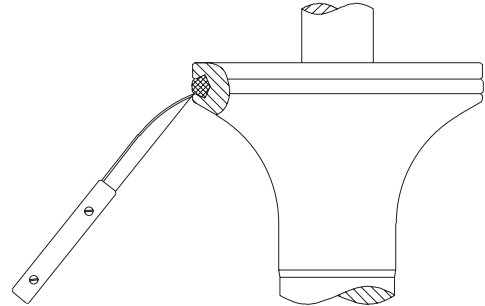
The items refer to the parts list and service kits section.

Handle scrap correctly.

4.3 Lower plug, replacement of radial seal

Step 1

Cut and remove old seal ring (74) using a knife, screwdriver or similar. Be careful not to scratch the plug.

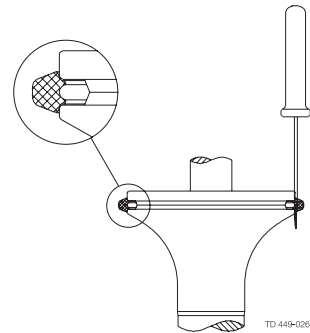


Step 2

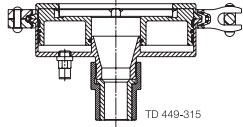
Pre-mount seal ring as shown on drawing.

Rotate along circumference to fix gasket as shown in the picture.

Carefully lubricate sealings with acceptable soap or lubricant, before pre-mounting.

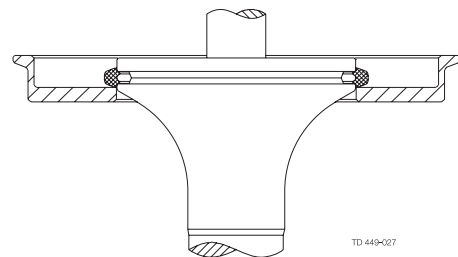


Step 3

Item No.		
Seat $\varnothing 143.9$	Seat $\varnothing 206.1$	Tool for radial sealing, lower plug
9613-4260-09	9613-4260-10	 TD 449-315

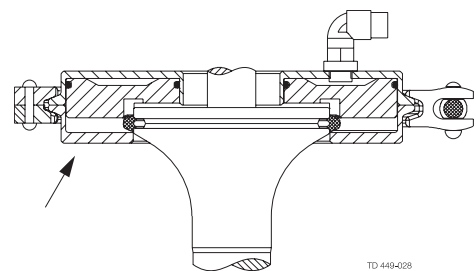
Step 4

Place lower tool part.



Step 5

1. Place upper tool part including piston.
2. Clamp the two tool parts together.



Tool marked with item number.

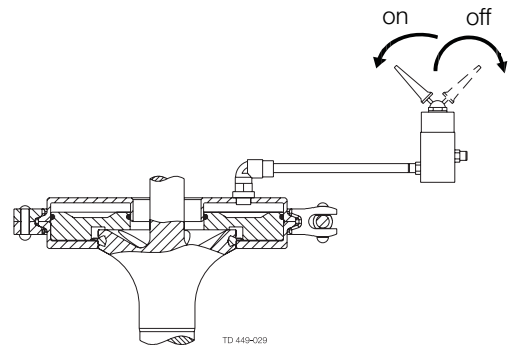
Study the instructions carefully.

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

Handle scrap correctly.

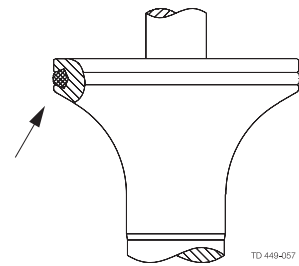
Step 6

1. Supply compressed air.
2. Release compressed air.
3. Remove tool parts.



Step 7

Inspect the seal to ensure it does not twist in the groove, and press in the 4 outsticking points with a screwdriver!



4 Maintenance

Study the instructions carefully.

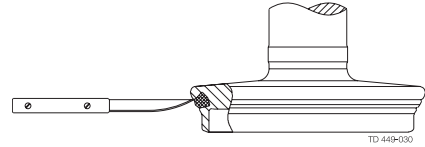
The items refer to the parts list and service kits section.

Handle scrap correctly

4.4 Upper plug, replacement of axial seal

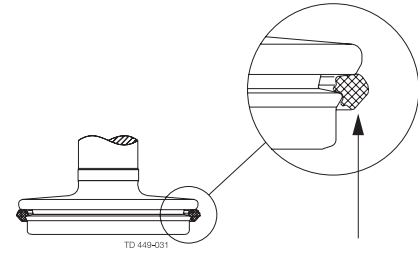
Step 1

Remove old seal ring (56) using a knife, screwdriver or similar. Be careful not to scratch the plug.



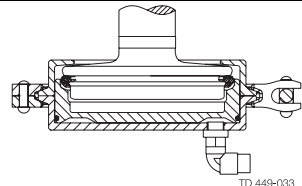
Step 2

Pre-mount seal ring as shown on drawing.



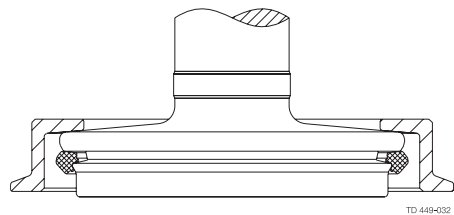
Carefully lubricate sealings with acceptable soap or lubricant, before pre-mounting.

Step 3

Item No.		Tool for axial sealing, upper plug
Seat $\varnothing 143.9$	Seat $\varnothing 206.1$	
9613-0505-07	9613-0505-10	

Step 4

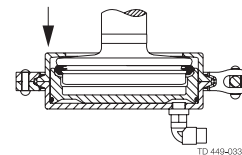
Place tool part 1.



Step 5

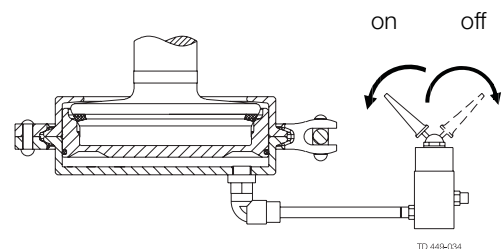
1. Place tool part 2 including piston.
2. Clamp the two tool parts together.

Tooling marked with item number



Step 6

1. Supply compressed air.
2. Release compressed air.
3. Rotate the tool 45° with regards to the plug.
4. Supply compressed air.
5. Release compressed air and remove tool.



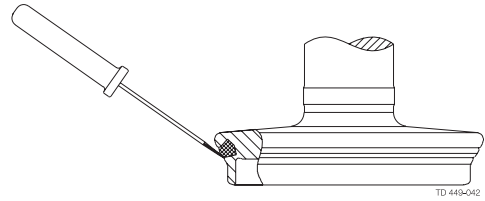
Study the instructions carefully.

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

Handle scrap correctly

Step 7

1. Inspect the seal.
2. Release air at 3 different positions of the circumference.



4 Maintenance

Study the instructions carefully.

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

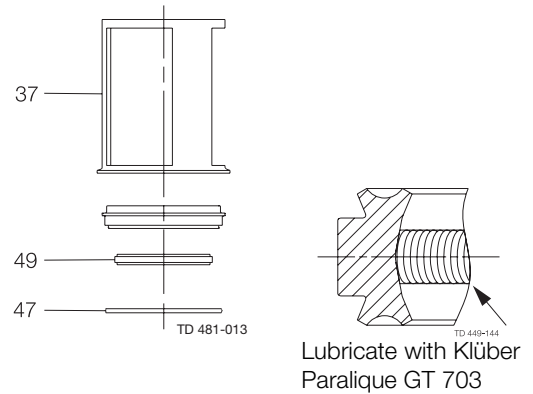
Handle scrap correctly.

Replace seals if necessary.

4.5 Assembly of valve

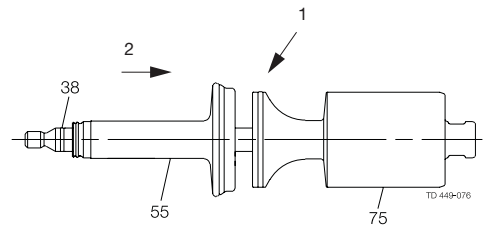
Step 1

1. Fit o-ring (47) (do not twist), lip seal (49) in upper sealing element (48) (Lubricate with Klüber Paralique GT 703).
2. Fit upper sealing element in intermediate piece (37).



Step 2

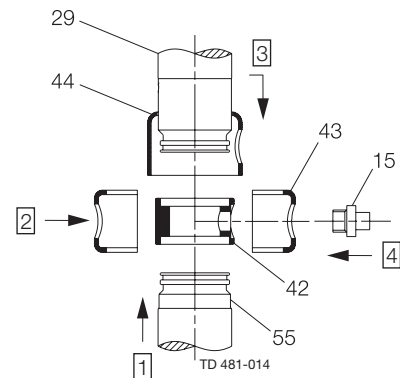
1. Place lip seal (57) in upper plug and the o-ring (38) in the lower plug.
 2. Press lower plug (75) rapidly into upper plug (55) through the lip seal.
- Note:** Do not damage the lips when lower plug (75) with o-ring (38) passes the lip seal.



Step 3

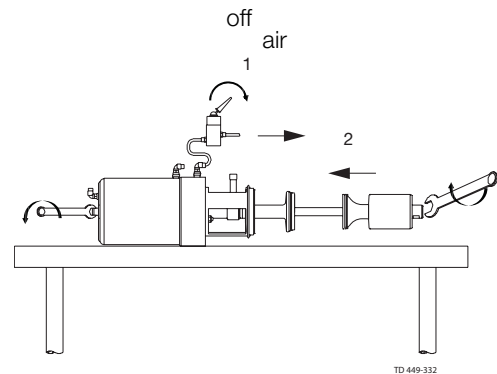
Place coupling system and upper plug according to illustrations (1 to 4).

1. Push lock (44) up over piston rod (29).
2. Place spindle liner (42) on piston rod. Fit upper plug (55).
3. Mount clamps (43) on spindle liner (42).
4. Fit lock (44).
5. Fit plug (15).



Step 4

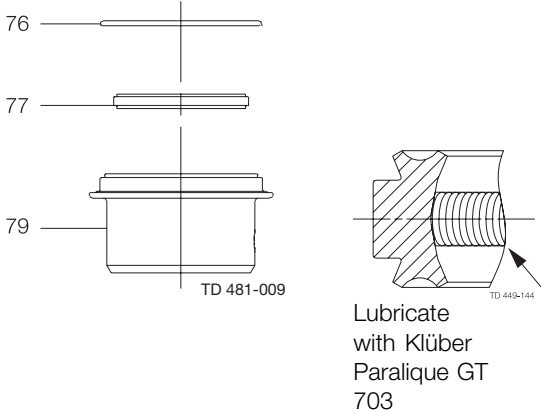
Recommended torque for fitting upper and lower plug parts 20/14.8 Nm/lbf-ft



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

Step 5

1. Fit lip seal (77) and o-ring (76) (do not twist the o-ring) and press it gently into the groove (lubri- cate with Klüber Paralique GT703)

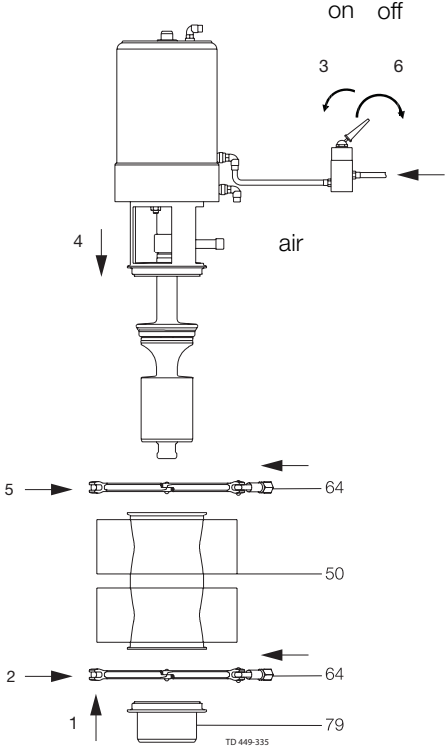


Step 6

- **Never** stick your fingers through the valve ports if the actuator is supplied with compressed air.
 - **Always** supply compressed air, before demounting the valve.
1. Fit lower sealing element (79).
 2. Fit and tighten lower clamp (64).
 3. Supply compressed air and mount the actuator together with the internal valve parts from valve body (50).
 4. Fit and tighten upper clamp (64). Greasing of clamp and clamp nut recommended!
(Maximum torque for clamp nut: 10Nm/7.4 lbf-ft)
 5. Release compressed air.

NOTE

Supply compressed air before demounting the valve.



4 Maintenance

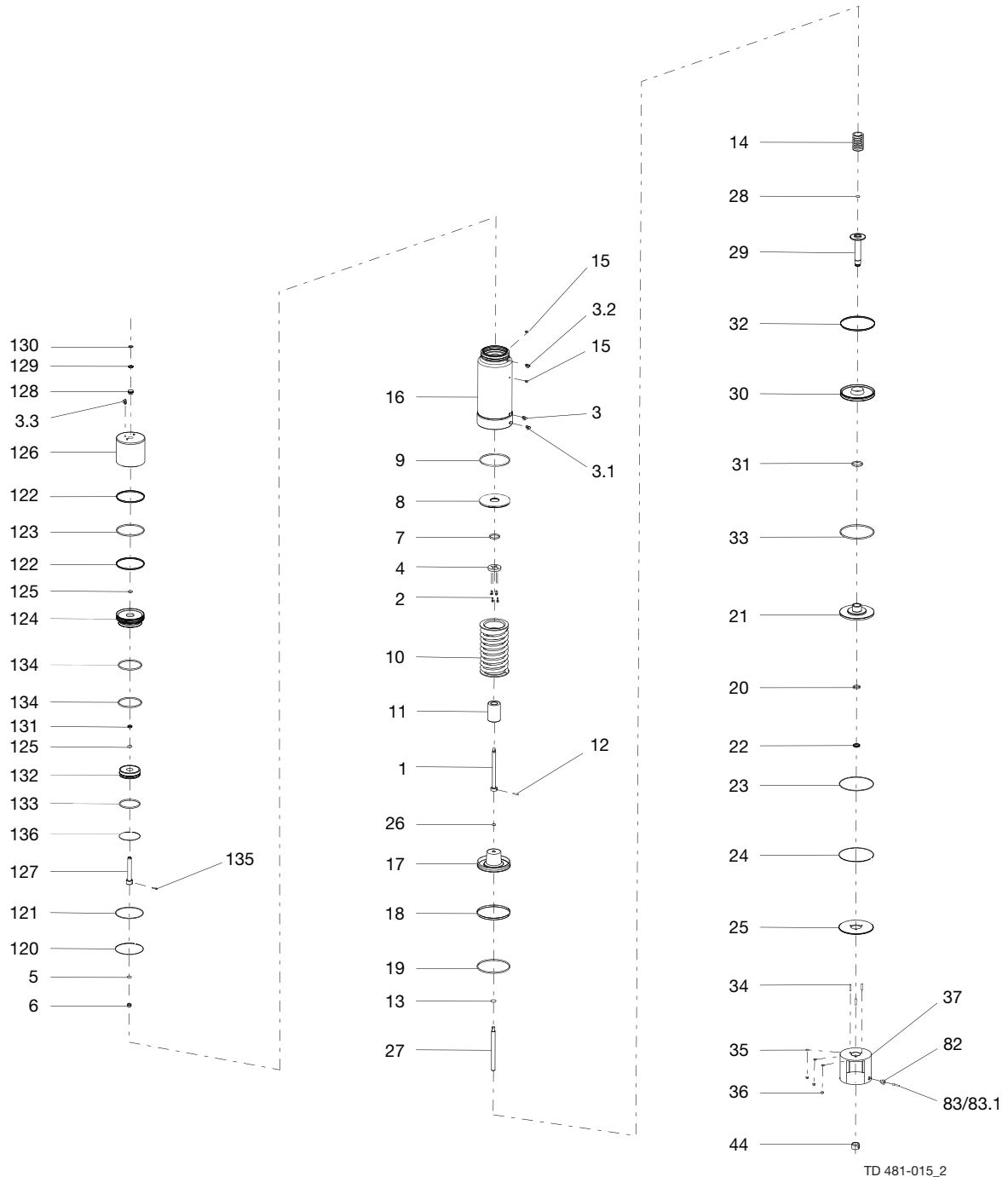
Study the instructions carefully.

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

Handle scrap correctly.

Replace seals if necessary.

4.6 Dismantling of actuator - 4"



TD 481-015_2

Study the instructions carefully.

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

Handle scrap correctly.

Replace seals if necessary.

Step 1

1. Dismantle the valve in accordance with instructions in section 4.2

Pay special attention to the warnings!

2. The actuator is now ready for service. Please see drawing when dismantling according to steps 2 to 6 on this page.

Note! The actuator is maintenance free but repairable.

Step 2

1. Place the actuator with intermediate piece in a vice.
 2. Remove booster cylinder (126) by turning the cylinder. Turn the cylinder until the lock ring (120) is fully removed through the groove in the cylinder and remove the cylinder.
 3. Remove the bushing (128) with O-rings (129 & 130).
 4. Remove the pistons (124 & 132).
 5. Remove the lock ring (136) and separate the two pistons. Remove all O-rings and bear rings (122, 123, 125, 134, 131 & 133)
 6. Activate main stroke (Air fitting Position 3).
 7. Remove screw (135) and pull out booster spindle (127).
 8. Deactivate main stroke and remove actuator from vice.
-

Step 3

1. Remove nuts (36) and washers (35).
 2. Pull out intermediate piece (37) from the actuator.
 3. Remove cover disk (25).
 4. Remove retaining ring (24).
-

Step 4

1. Remove piston rod (29), bottom (21) and lower piston (30).
 2. Separate the three parts.
 3. Remove o-rings (20, 22 and 23) from bottom, o-rings (33 and 31) and guide ring (32) from lower piston as well as o-ring (28) from piston rod.
 4. Remove spring assembly (14).
-

Step 5

1. Remove inner stem (27), main piston (17) and distance spacer (11). Remove guide ring (18) and o-ring (19)
 2. Remove spring assembly (10).
-

Step 6

1. Unscrew screws (2) (are glued!).
 2. Remove stop (4).
 3. Remove upper piston (8). Remove o-rings (7 and 9).
-

Step 7

1. Remove o-ring (5) and guide ring (6).
-

4 Maintenance

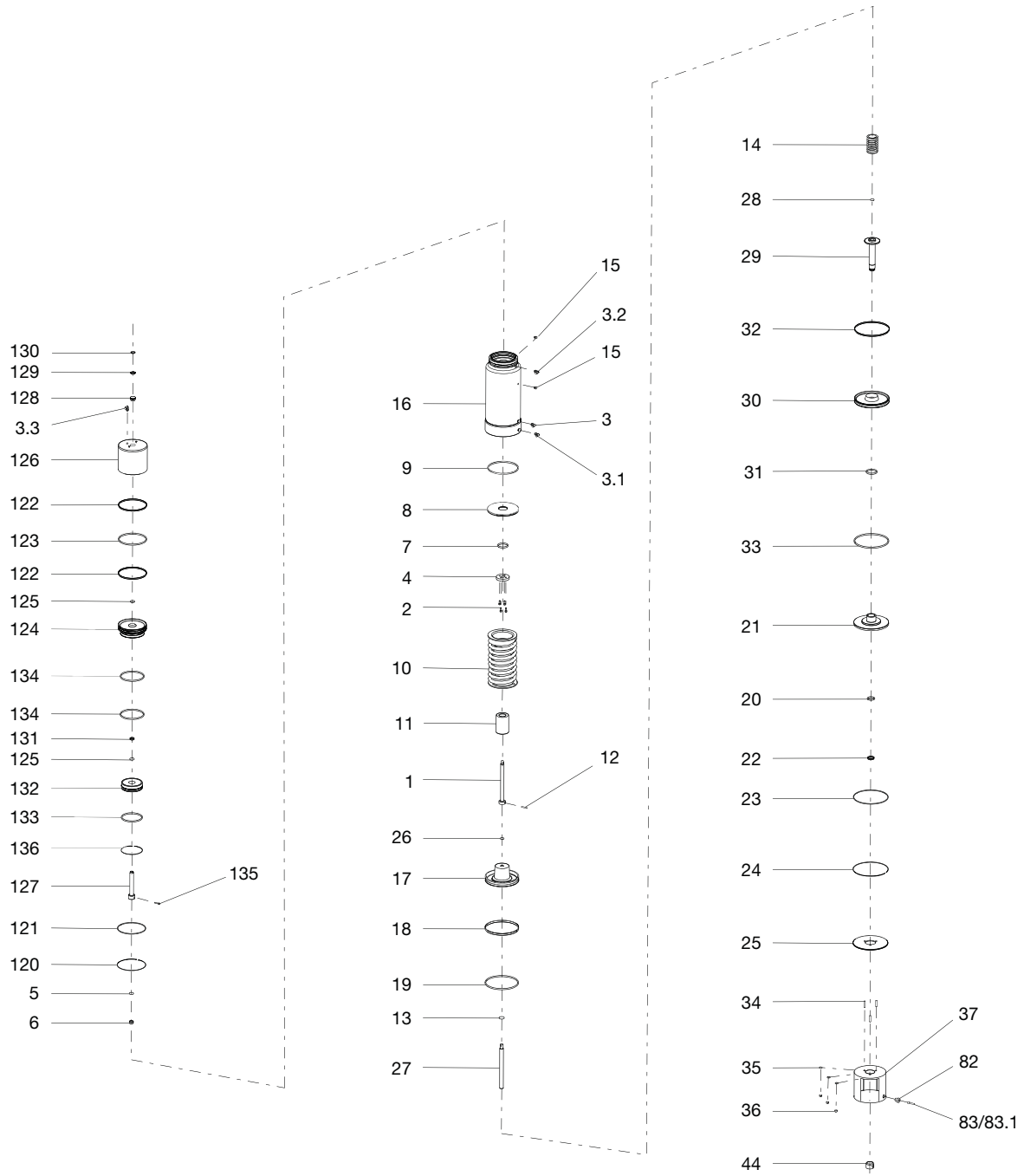
Study the instructions carefully.

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

Replace seals if necessary.

Lubricate the rubber seals before fitting them.

4.7 Assembly of actuator - 4"



TD 481-015_2

Study the instructions carefully.

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

Replace seals if necessary.

Lubricate the rubber seals before fitting them.

Step 1

Please see drawing when reassembling according to steps 2 to 5 on this page.

Note! The actuator is maintenance free but repairable.

Step 2

1. Fit guide ring (6) and o-ring (5).
 2. Fit o-rings (7 and 9). Place upper piston (8).
 3. Fit stop (4).
 4. Tighten screws (2). (Secure with glue)
-

Step 3

1. Place spring assembly (10).
 2. Fit o-ring (19) and guide ring (18). Mount distance spacer (11), main piston (17) and inner stem (27).
-

Step 4

1. Fit spring assembly (14).
 2. Fit o-ring (28) in piston rod, fit o-rings (33 and 31) and guide ring (32) in lower piston and fit o-rings (20, 22 and 23) in bottom.
 3. Fit piston rod (29), lower piston (30) and bottom (21).
 4. Mount the three parts.
-

Step 5

1. Fit retaining ring (24).
 2. Fit cover disk (25).
 3. Mount intermediate piece (37) on actuator.
 4. Fit and tighten nuts (36) and washers (35).
-

Step 6

1. Place the actuator with the intermediate in a vice.
 2. Activate main stroke (air fitting position 3).
 3. Mount upper stem (127) and secure it with the screw (135).
 4. Deactivate main stroke.
-

Step 7

1. Mount o-ring and guide ring (133, 125 & 131) on inner piston (132).
 2. Mount o-ring and guide rings (125, 122, 134 & 123) on piston (124).
 3. Insert the inner piston in the piston and secure the inner piston with the lock ring (136).
 4. Mount the pistons onto the upper stem (127).
-

Step 8

1. Mount bushing (128) and o-rings (129 & 130) on the top of the cylinder.
 2. Mount the cylinder onto the cylinder (16). Rotate the cylinder until the pin hole for the lock ring (120) can be seen through the slot on the side of the cylinder.
 3. Insert the lock ring (120) in the pin hole and turn the cylinder until the complete lock ring has wandered through the slot.
 4. Remove the actuator from the vice.
-

4 Maintenance

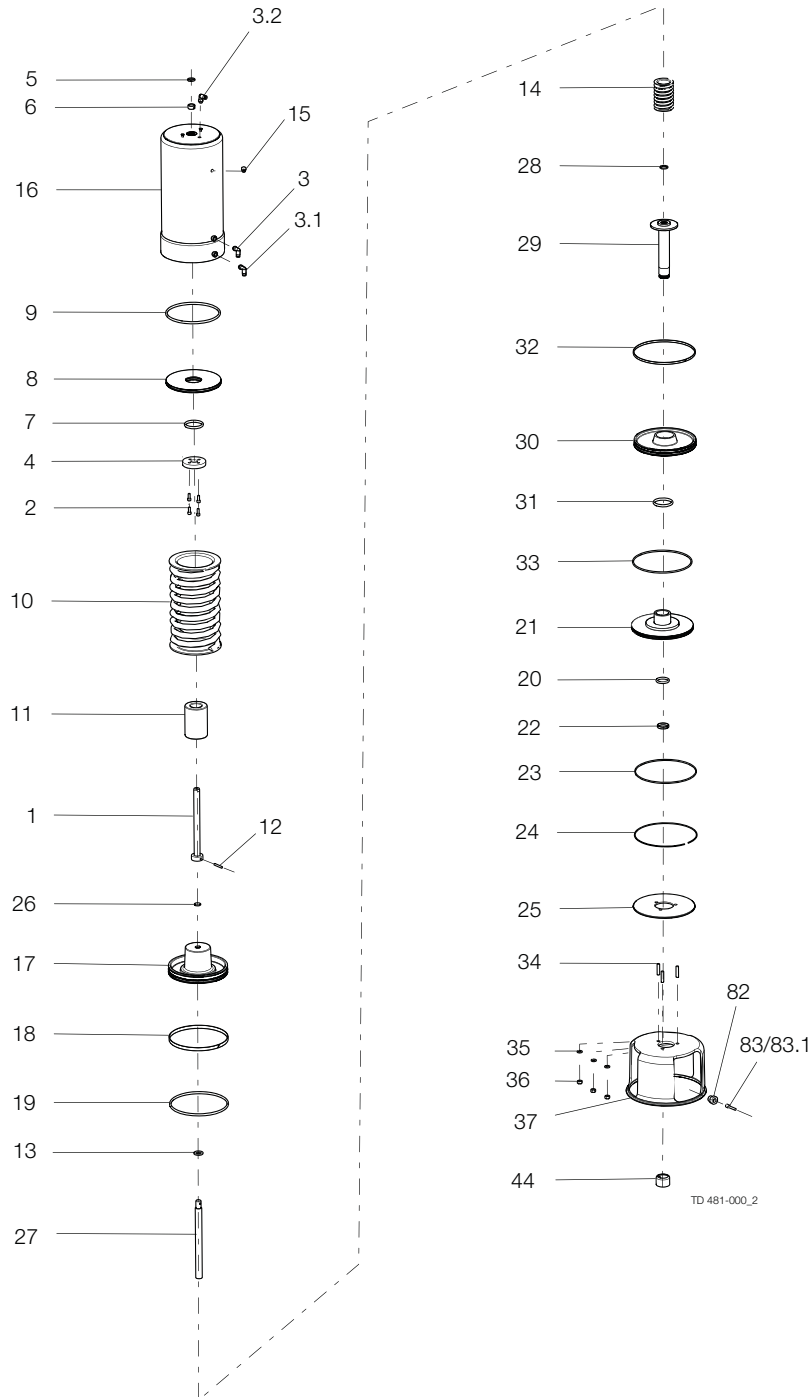
Study the instructions carefully.

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

Handle scrap correctly.

Replace seals if necessary.

4.8 Dismantling of actuator - 6"



Study the instructions carefully.

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

Handle scrap correctly.

Replace seals if necessary.

Step 1

1. Dismantle the valve in accordance with instructions in section 4.2

Pay special attention to the warnings!

2. The actuator is now ready for service.
Please see drawing when dismantling according to steps 2 to 6 on this page.

Note! The actuator is maintenance free but repairable.

Step 2

1. Remove nuts (36) and washers (35).
 2. Pull out intermediate piece (37) from the actuator.
 3. Remove cover disk (25).
 4. Remove retaining ring (24).
-

Step 3

1. Remove piston rod (29), bottom (21) and lower piston (30).
 2. Separate the three parts.
 3. Remove o-rings (20, 22 and 23) from bottom, o-rings (33 and 31) and guide ring (32) from lower piston as well as o-ring (28) from piston rod.
 4. Remove spring assembly (14).
-

Step 4

1. Remove inner stem (27), main piston (17) and distance spacer (11). Remove guide ring (18) and o-ring (19).
 2. Remove spring assembly (10).
-

Step 5

1. Unscrew screws (2) (are glued!).
 2. Remove stop (4).
 3. Remove upper piston (8). Remove o-rings (7 and 9).
-

Step 6

Remove o-ring (5) and guide ring (6).

4 Maintenance

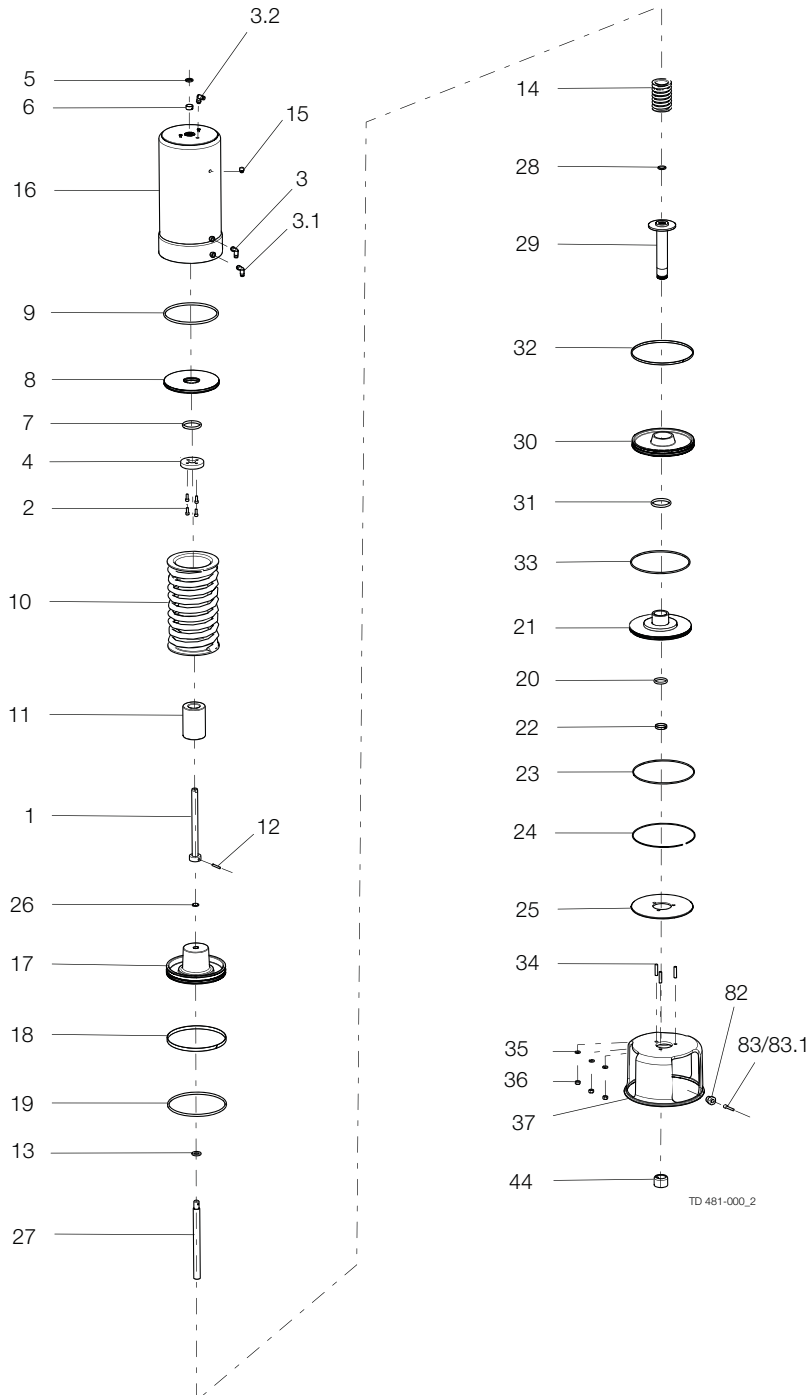
Study the instructions carefully.

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

Replace seals if necessary.

Lubricate the rubber seals before fitting them.

4.9 Assembly of actuator - 6"



Study the instructions carefully.

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

Replace seals if necessary.

Lubricate the rubber seals before fitting them.

Step 1

Please see drawing when reassembling according to steps 2 to 5 on this page.

Note! The actuator is maintenance free but repairable.

Step 2

1. Fit guide ring (6) and o-ring (5).
 2. Fit o-rings (7 and 9). Place upper piston (8).
 3. Fit stop (4).
 4. Tighten screws (2). (Secure with glue)
-

Step 3

1. Place spring assembly (10).
 2. Fit o-ring (19) and guide ring (18). Mount distance spacer (11), main piston (17) and inner stem (27).
-

Step 4

1. Fit spring assembly (14).
 2. Fit o-ring (28) in piston rod, fit o-rings (33 and 31) and guide ring (32) in lower piston and fit o-rings (20, 22 and 23) in bottom.
 3. Fit piston rod (29), lower piston (30) and bottom (21).
 4. Mount the three parts.
-

Step 5

1. Fit retaining ring (24).
 2. Fit cover disk (25).
 3. Mount intermediate piece (37) on actuator.
 4. Fit and tighten nuts (36) and washers (35).
-
-

5 Technical data

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

5.1 Technical data

Data	
Max. product pressure:	1000 kPa (10 bar) (145 psi)
Min. product pressure:	Full vacuum
Temperature range:	-5°C to +125°C (23°F - 257°F) (Depending on rubber quality)
Air pressure:	Max. 800 kPa (8 bar) (116 psi)
Products acc. to PED 97/23/EC	Category I, Fluids group 1, DN ≥ 6" Fluids group 2

Size		Unique LP OD		Unique LP-F OD	
		4"	6"	4"	6"
Cv-value Upper Seat-lift	[gpm/psi]	5.5	12.1	5.3	12.1
Cv-value Lower Seat-lift	[gpm/psi]	4.9	10.2	6.7	10.2
Air consumption Upper Seat-lift	* [cubic inches]	38	38	38	38
Air consumption Lower Seat-lift	* [cubic inches]	13	13	13	13
Air consumption Main Movement	* [cubic inches]	216	216	216	216

Note:

* [n litre] = volume at atmospheric pressure.

Formula to estimate CIP flow during seat lift (for liquids with comparable viscosity and density to water):

$$Q = K_v \cdot \sqrt{\Delta p}$$

$$Q = \text{CIP - flow (m}^3/\text{h)}$$

K_v = K_v value from the above table.

Δp = CIP pressure (bar).

$$C_v = 1.163 \times K_v \text{ gpm}$$

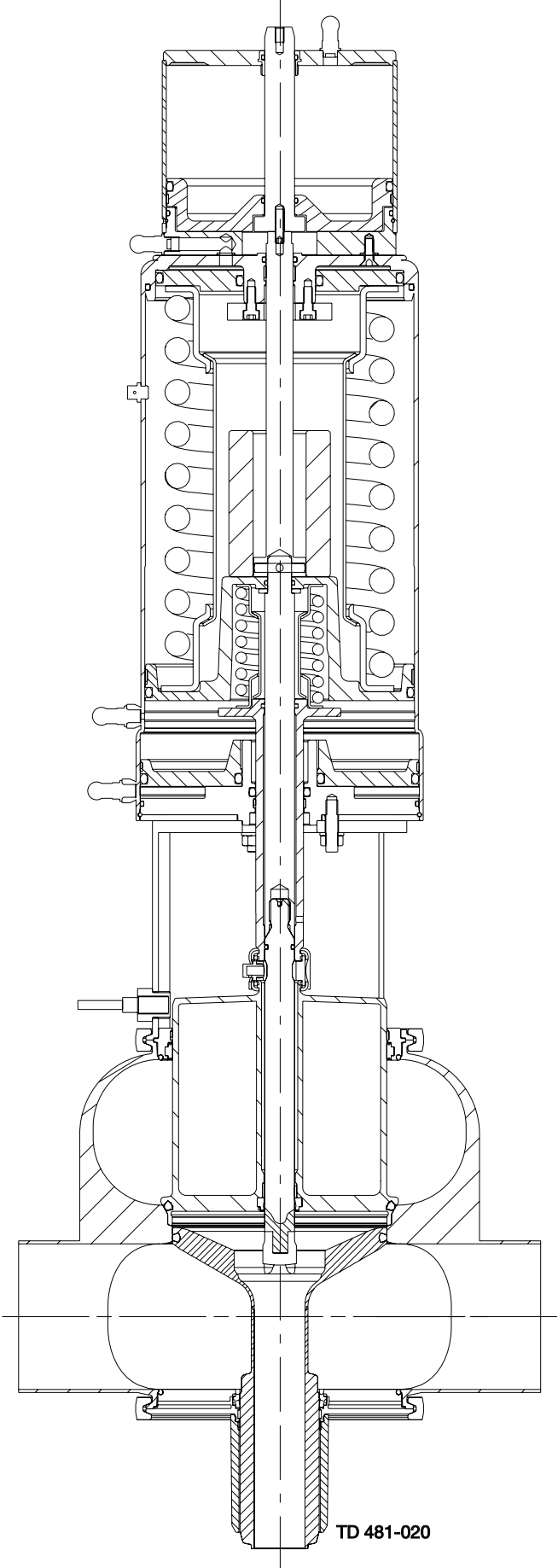
$$1 \text{ bar} = 14.5 \text{ psi}$$

Materials	
Product wetted steel parts:	Acid-resistant steel AISI 316L.
Other steel parts:	Stainless steel AISI 304
Product wetted parts:	EPDM, HNBR, NBR or FPM.
Other seals:	CIP seals: EPDM.
Actuator seals:	NBR.
Surface finish:	Internal/external matt (blasted) Ra < 1.6 (64 μ")
	Internal bright (polished) Ra < 0.8 (32 μ")
	Internal/external bright (internal polished) Ra < 0.8 (32 μ")

Note! The Ra-values are only for the internal surface.

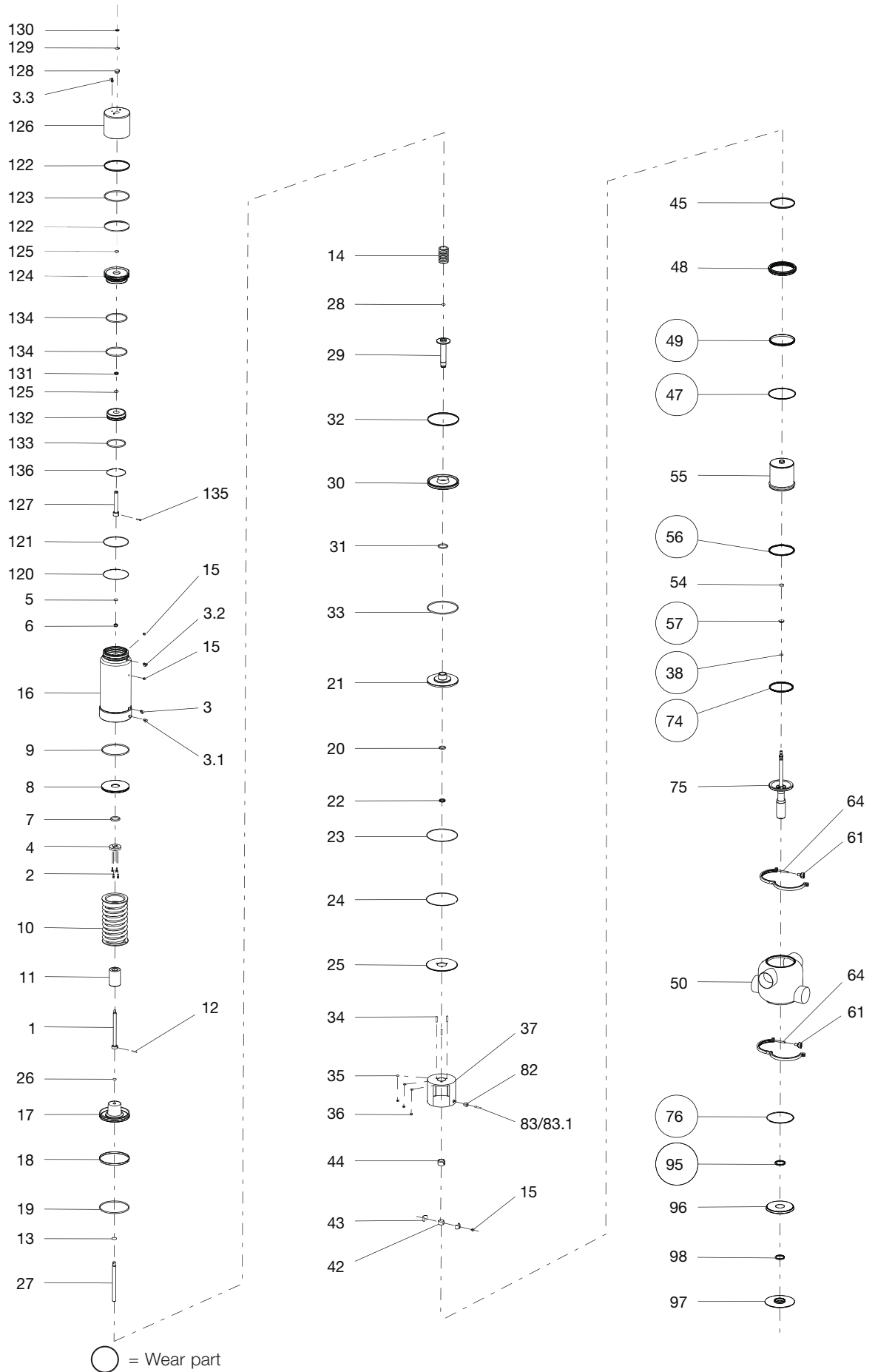
*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

6.1 Unique Mixproof LP Valve - 4"



6 Parts list and Service Kits

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



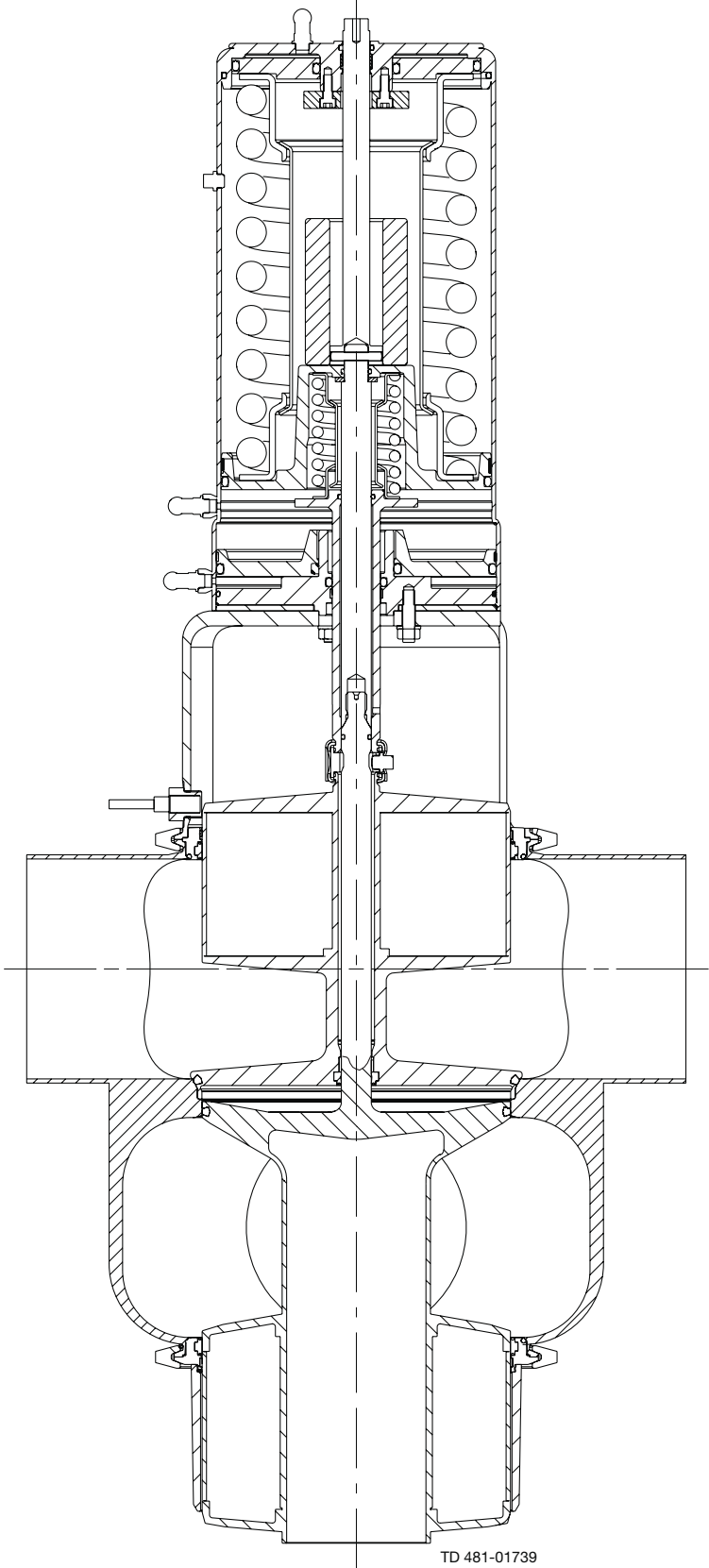
6 Parts list and Service Kits

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

Parts list		Service kits
Pos	Qty Denomination	Denomination
		PMO 4"
1	1 Cpl. Actuator	
2	4 Upper stem	Service kit, NBR 9611-92-6865
3	1 Screw	Service kit, EPDM..... 9611-92-6866
3.1	1 Air fitting , blue	Service kit, HNBR..... 9611-92-6867
3.2	1 Air fitting , red	Service kit, FPM..... 9611-92-6868
3.3	1 Air fitting , yellow	
4	1 Air fitting , blue	
4	1 Stop for upper piston	
5	1 O-ring, NBR	
6	1 Guide ring, Turcite	
7	1 O-ring, NBR	
8	1 Upper piston	
9	1 O-ring, NBR	
10	1 Spring assembly	
11	1 Distance spacer	
12	1 Pin	
13	1 Washer	
14	1 Spring assembly	
15	3 Plug	
16	1 Cylinder (3A marking)	
17	1 Main piston	
18	1 Guide ring, Turcite	
19	1 O-ring, NBR	
20	1 O-ring, NBR	
21	1 Bottom	
22	1 Guide ring, Turcite	
23	1 O-ring, NBR	
24	1 Retaining ring	
25	1 Cover disk	
26	1 O-ring, NBR	
27	1 Inner stem	
28	1 O-ring	
29	1 Piston rod	
30	1 Lower piston	
31	1 O-ring, NBR	
32	1 Guide ring, Turcite	
33	1 O-ring, NBR	
34	3 Bolt	
35	3 Washer	
36	3 Nut	
42	1 Spindle liner	
43	2 Clamp	
44	1 Lock	
45	1 Guide ring, PTFE	
48	1 Upper sealing element	
54	1 Guide ring, PTFE	
55	1 Upper plug	
61	2 Wingnut	
64	2 Clamp without nut	
75	1 Lower plug	
79	1 Lower sealing element	
80	1 Guide ring, PTFE	
81	1 Cover for Plug	
82	1 Bolt for indication	
83	1 Sensor for indication	
83.1	1 Cable for sensor for indication	
84	1 Plate for sensor for indication	
120	1 Lock ring	
121	1 O-ring, NBR	
122	2 Guide ring	
123	1 O-ring, NBR	
124	1 Piston	
125	2 O-ring, NBR	
126	1 Cylinder	
127	1 Upper stem, cpl.	
128	1 Bushing	
129	1 O-ring	
130	1 O-ring	
131	1 Guide ring	
132	1 Inner piston	
133	1 O-ring	
134	2 O-ring	
135	1 Screw	
136	1 Lock ring	

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

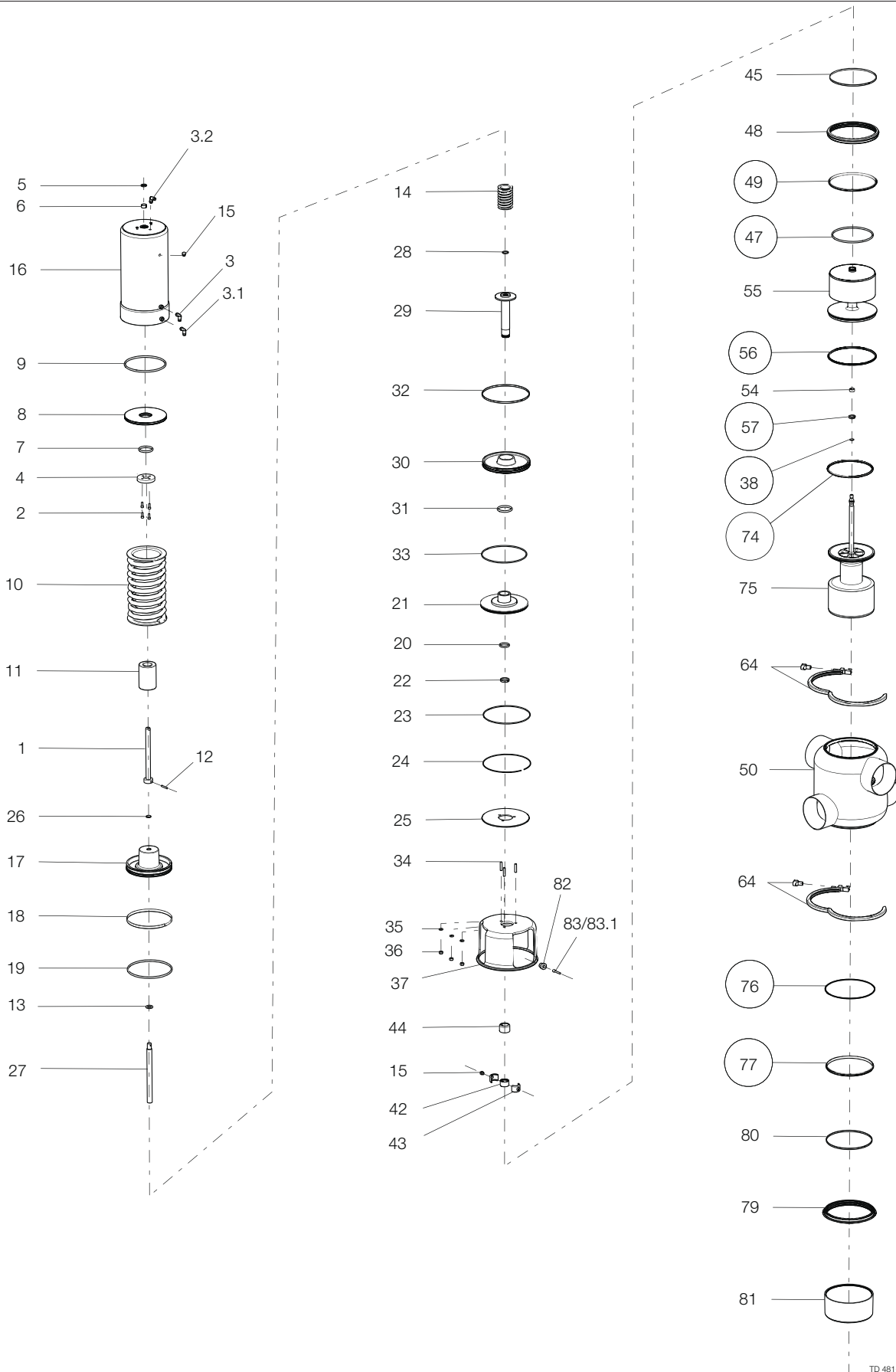
6.2 Unique Mixproof LP Valve - 6"



TD 481-01739

6 Parts list and Service Kits

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



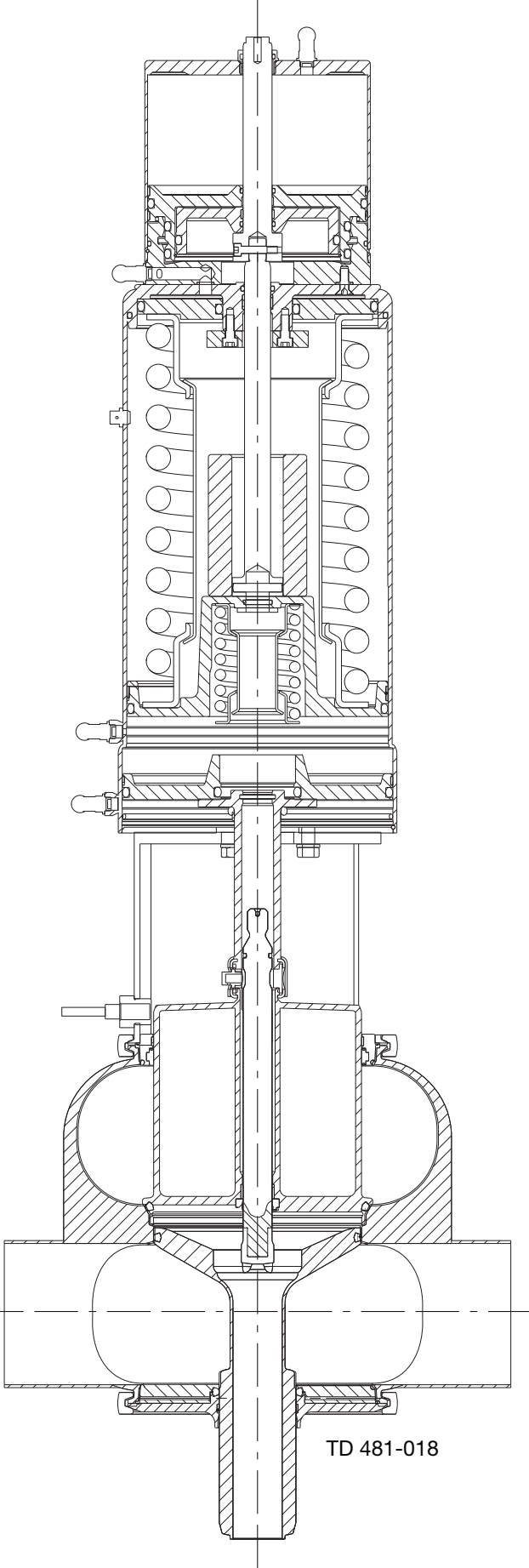
6 Parts list and Service Kits

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

Parts list		Service kits
Pos	Qty Denomination	Denomination
		PMO 6"
1	1 Cpl. Actuator	
2	4 Upper stem	Service kit, NBR 9611-92-6849
3	1 Screw	Service kit, EPDM..... 9611-92-6850
3.1	1 Air fitting , blue	Service kit, HNBR..... 9611-92-6851
3.2	1 Air fitting , red	Service kit, FPM..... 9611-92-6852
4	1 Air fitting , yellow	
5	1 Stop for upper piston	
6	1 O-ring, NBR	
7	1 Guide ring, Turcite	
8	1 O-ring, NBR	
9	1 Upper piston	
10	1 O-ring, NBR	
11	1 Spring assembly	
12	1 Distance spacer	
13	1 Pin	
14	1 Washer	
15	1 Spring assembly	
16	2 Plug	
17	1 Cylinder (3A marking)	
18	1 Main piston	
19	1 Guide ring, Turcite	
20	1 O-ring, NBR	
21	1 O-ring, NBR	
22	1 Bottom	
23	1 Guide ring, Turcite	
24	1 O-ring, NBR	
25	1 Retaining ring	
26	1 Cover disk	
27	1 O-ring, NBR	
28	1 Inner stem	
29	1 O-ring	
30	1 Piston rod	
31	1 Lower piston	
32	1 O-ring, NBR	
33	1 Guide ring, Turcite	
34	1 O-ring, NBR	
35	3 Bolt	
36	3 Washer	
42	3 Nut	
43	1 Spindle liner	
44	2 Clamp	
45	1 Lock	
48	1 Guide ring, PTFE	
54	1 Upper sealing element	
55	1 Guide ring, PTFE	
61	1 Upper plug	
64	2 Wing nut	
75	2 Clamp without nut	
79	1 Lower plug	
80	1 Lower sealing element	
81	1 Guide ring, PTFE	
82	1 Cover for Plug	
83	1 Bolt for indication	
83.1	1 Sensor for indication	
84	1 Cable for sensor for indication	
	1 Plate for sensor for indication	

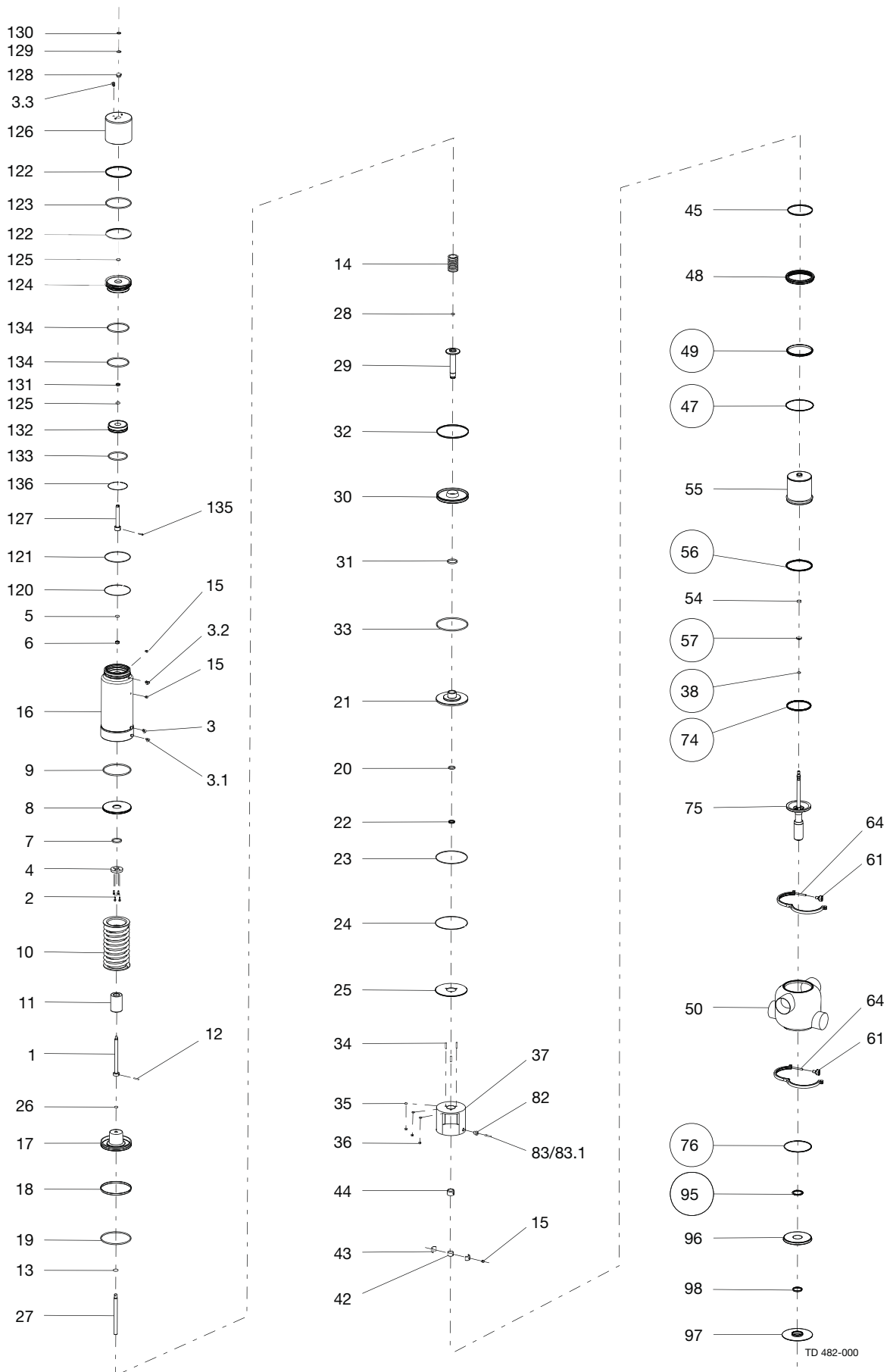
*It is important to observe the technical data during installation, operation and maintenance.
Inform the personnel about the technical data.*

6.3 Unique Mixproof LP-F Valve - 4"



6 Parts list and Service Kits

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



TD 482-000

6 Parts list and Service Kits

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Inform the personnel about the technical data.*

Parts list

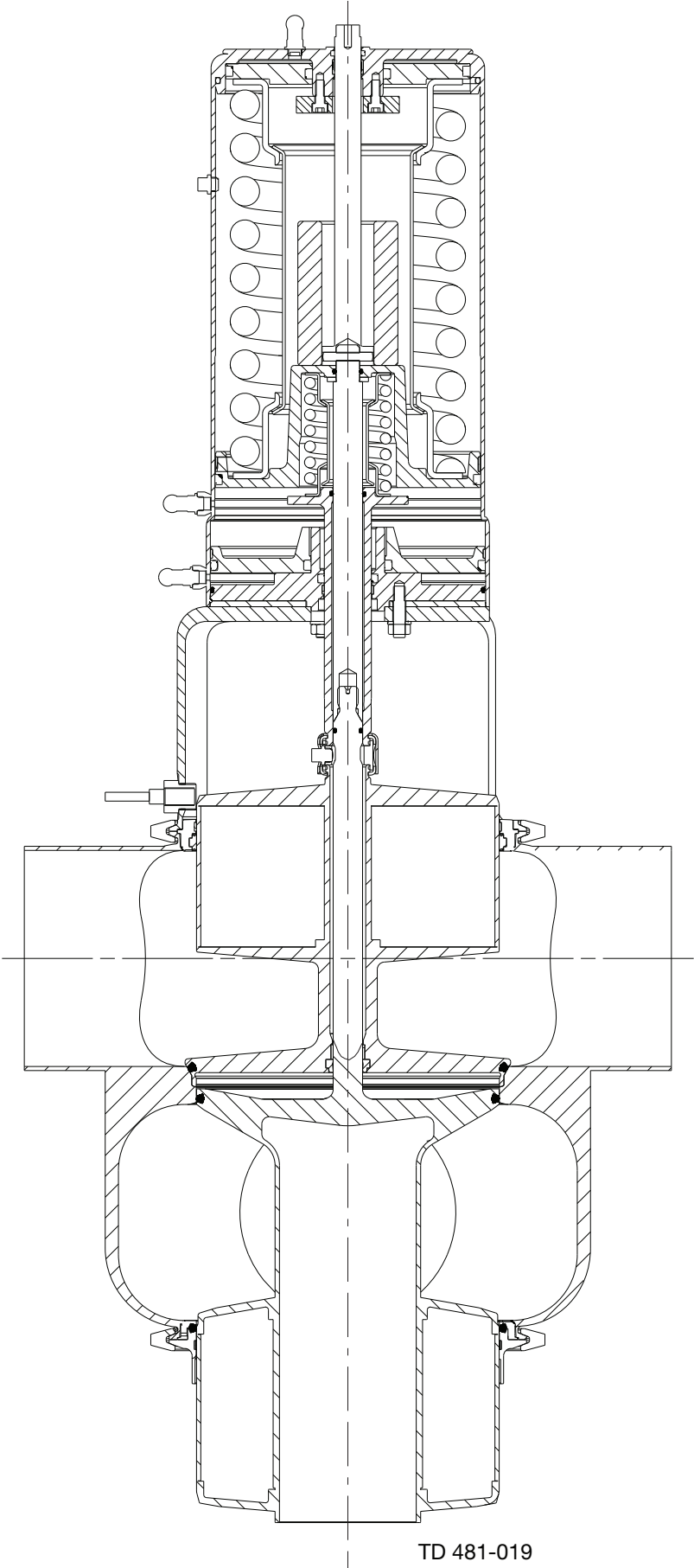
Pos	Qty	Denomination
		Cpl. Actuator
1	1	Upper stem
2	4	Screw
3	1	Air fitting , blue
3.1	1	Air fitting , red
3.2	1	Air fitting , yellow
3.3	1	Air fitting , blue
4	1	Stop for upper piston
5	1	O-ring, NBR
6	1	Guide ring, Turcite
7	1	O-ring, NBR
8	1	Upper piston
9	1	O-ring, NBR
10	1	Spring assembly
11	1	Distance spacer
12	1	Pin
13	1	Washer
14	1	Spring assembly
15	3	Plug
16	1	Cylinder (3A marking)
17	1	Main piston
18	1	Guide ring, Turcite
19	1	O-ring, NBR
20	1	O-ring, NBR
21	1	Bottom
22	1	Guide ring, Turcite
23	1	O-ring, NBR
24	1	Retaining ring
25	1	Cover disk
26	1	O-ring, NBR
27	1	Inner stem
28	1	O-ring
29	1	Piston rod
30	1	Lower piston
31	1	O-ring, NBR
32	1	Guide ring, Turcite
33	1	O-ring, NBR
34	3	Bolt
35	3	Washer 4
36	3	Nut
42	1	Spindle liner
43	2	Clamp
44	1	Lock
45	1	Guide ring, PTFE
48	1	Upper sealing element
54	1	Guide ring, PTFE
55	1	Upper plug
61	2	Wingnut
64	2	Clamp without nut
75	1	Lower plug
82	1	Bolt for indication
83	1	Sensor for indication
83.1	1	Cable for sensor for indication
84	1	Plate for sensor for indication
96	1	Lower sealing element, upper part
97	1	Lower sealing element, lower part
98	1	Guide ring, Turcite
120	1	Lock ring
121	1	O-ring, NBR
122	2	Guide ring
123	1	O-ring, NBR
124	1	Piston
125	2	O-ring, NBR
126	1	Cylinder
127	1	Upper stem, cpl.
128	1	Bushing
129	1	O-ring
130	1	O-ring
131	1	Guide ring
132	1	Inner piston
133	1	O-ring
134	2	O-ring
135	1	Screw
136	1	Lock ring

Service kits

Denomination	
PMO 4"	
Service kit, NBR	9611-92-6865
Service kit, EPDM.....	9611-92-6866
Service kit, HNBR.....	9611-92-6867
Service kit, FPM.....	9611-92-6868

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

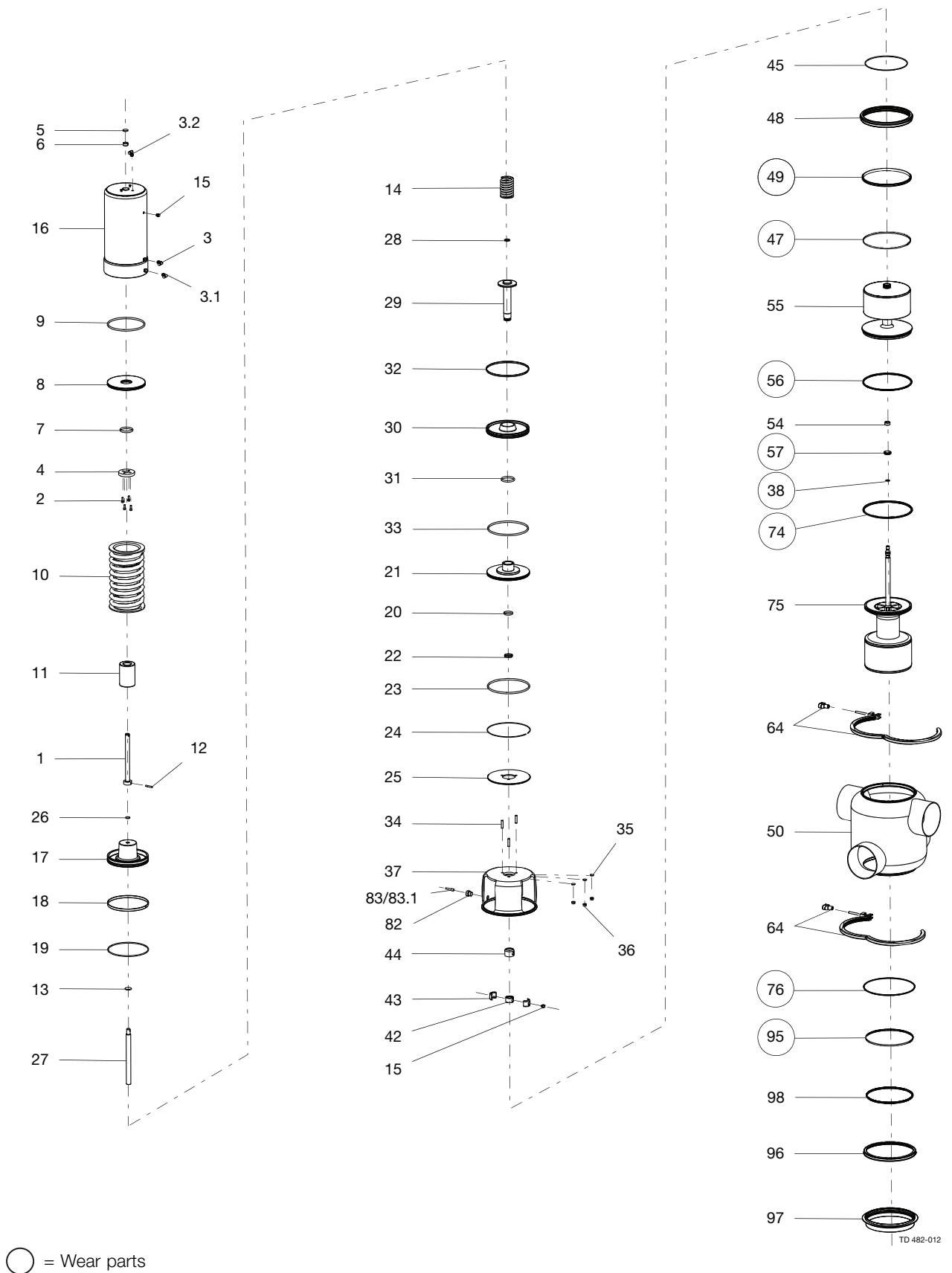
6.4 Unique Mixproof LP-F Valve - 6"



TD 481-019

6 Parts list and Service Kits

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



6 Parts list and Service Kits

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

Parts list

Pos	Qty	Denomination
		Cpl. Actuator
1	1	Upper stem
2	4	Screw
3	1	Air fitting , blue
3.1	1	Air fitting , red
3.2	1	Air fitting , yellow
4	1	Stop for upper piston
5	1	O-ring, NBR
6	1	Guide ring, Turcite
7	1	O-ring, NBR
8	1	Upper piston
9	1	O-ring, NBR
10	1	Spring assembly
11	1	Distance spacer
12	1	Pin
13	1	Washer
14	1	Spring assembly
15	2	Plug
16	1	Cylinder (3A marking)
17	1	Main piston
18	1	Guide ring, Turcite
19	1	O-ring, NBR
20	1	O-ring, NBR
21	1	Bottom
22	1	Guide ring, Turcite
23	1	O-ring, NBR
24	1	Retaining ring
25	1	Cover disk
26	1	O-ring, NBR
27	1	Inner stem
28	1	O-ring
29	1	Piston rod
30	1	Lower piston
31	1	O-ring, NBR
32	1	Guide ring, Turcite
33	1	O-ring, NBR
34	3	Bolt
35	3	Washer
36	3	Nut
42	1	Spindle liner
43	2	Clamp
44	1	Lock
45	1	Guide ring, PTFE
48	1	Upper sealing element
54	1	Guide ring, PTFE
55	1	Upper plug
61	2	Wing nut
64	2	Clamp without nut
75	1	Lower plug
82	1	Bolt for indication
83	1	Sensor for indication
83.1	1	Cable for sensor for indication
84	1	Plate for sensor for indication
96	1	Lower sealing element, upper part
97	1	Lower sealing element, lower part
98	1	Guide ring, Turcite

Service kits

Denomination	
PMO 6"	
Service kit, NBR	9611-92-6857
Service kit, EPDM.....	9611-92-6858
Service kit, HNBR.....	9611-92-6859
Service kit, FPM.....	9611-92-6860

How to contact Alfa Laval

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Please visit www.alfalaval.com to access the information directly.

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