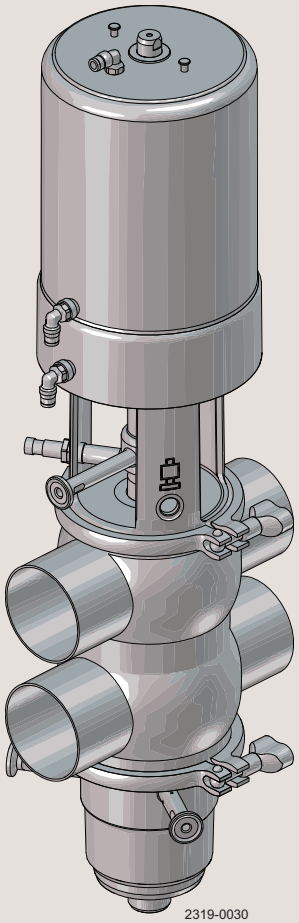
Instruction Manual

Unique Mixproof CP-3



ESE02710-ENUS5 2022-03

Original manual

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

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1 Introduction

Thank you for purchasing an Alfa Laval product.

This manual has been provided to instruct you in how to operate and service this product correctly and safely. Make sure that you follow all directions and instructions; failure to do so could result in personal injury or equipment damage.

This manual should be considered part of this product and should remain with it at all times for reference. (If you sell it, please be sure to include this manual with it.) Warranty is provided as part of Alfa Laval's commitment to our customers who operate and maintain their equipment as this manual dictates. Failure to do so may result in loss of warranty.

Where defects appear on the product during the warranty period, Alfa Laval will take back the product and correct the problem. Should the equipment be modified or not kept in the manner prescribed within this manual, the warranty will become null and void.

2 Safety

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

2.1 Important information

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.
This Instruction manual is designed to provide the user with the information to perform tasks safely for all phases in the lifetime of the product supplied.

The user shall always read the safety section first. Hereafter the user can skip to the relevant section for the task to be carried out or for the information needed.

This is the complete manual for the supplied product.

Operators
The operators shall read and understand the instruction manual for the supplied product.

Maintenance personnel
The maintenance personnel shall read and understand the instruction manual.
The maintenance personnel or technicians shall be skilled within the field required to carry out the maintenance work safely.

Trainees
Trainees can perform tasks under the supervision of an experienced employee.

People in general
The public shall not have access to the supplied product.

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.

2.2 Warning signs

General warning: 

Caustic agents: 

Cutting danger: 

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

2.3 Safety precautions

Installation:

Always read the technical data thoroughly (see section 7 Technical data)
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 warning label)
Never stick your fingers through the valve ports if the actuator is supplied with compressed air

Operation:

Always read the technical data thoroughly (see section 7 Technical data)
Never touch the clip assembly or the actuator piston rod when the actuator is supplied with compressed air (see warning label)
Never pressurise air connections (AC1, AC3) simultaneously as both valve plugs can be lifted (can cause mixing)
Never touch the valve or the pipelines when processing hot liquids or when sterilising.
Never throttle the leakage outlet
Never throttle the CIP outlet, if supplied

Always handle lye and acid with great care

Maintenance:

Always read the technical data thoroughly (see section 7 Technical data)
Always fit the seals correctly
Always release compressed air after use
Always remove the CIP connections, if supplied, before service.
Never service the valve when it is hot
Never pressurise the valve/actuator when the valve is serviced
Never stick your fingers through the valve ports if the actuator is supplied with compressed air
Never touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air (see warning label)

Never service the valve with valve and pipelines under pressure

Transportation:

Always ensure that compressed air are released
Always ensure that all connections is disconnected before attempting to remove the valve from the installation
Always drain liquid from valves before transportation
Always used predesigned lifting points if defined
Always ensure sufficient fixing of the valve during transportation - if specially designed packaging material is available, it must be used

2 Safety

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

STORAGE

Ideally, as a guide Alfa Laval recommend:

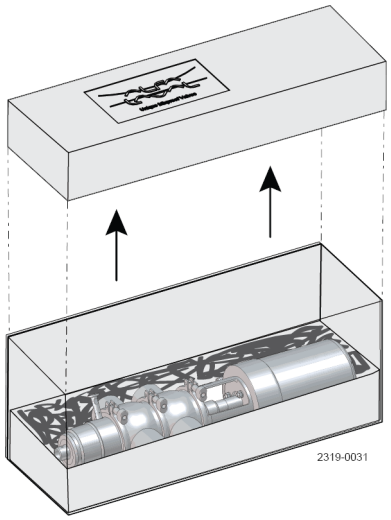
- Store supplied product as supplied in original packaging
- Port opening should be protected against any ingress
- Bare steel (not stainless) should be lightly oiled/greased
- Store in a clean, dry place without direct sunlight or UV light
- Temperature range -5 to 40°C
- Relative humidity less than 60%
- No exposure to corrosive substances (also air contained).

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 clearly visible.

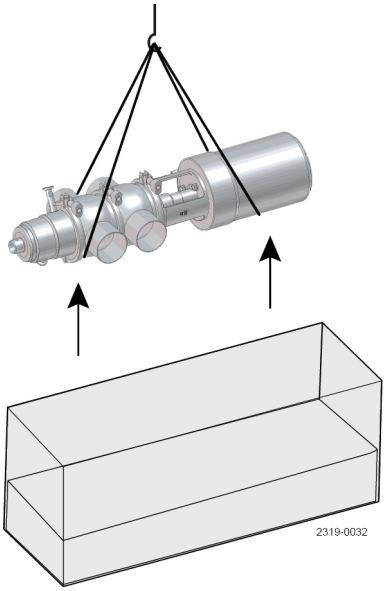
3.1 Unpacking/intermediate storage

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



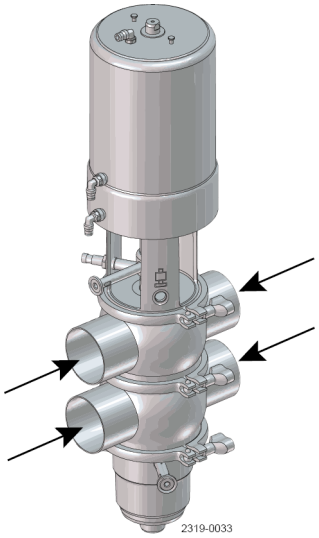
Step 3
Lift out the valve.
NOTE!
Please note weight of valve as printed on box.



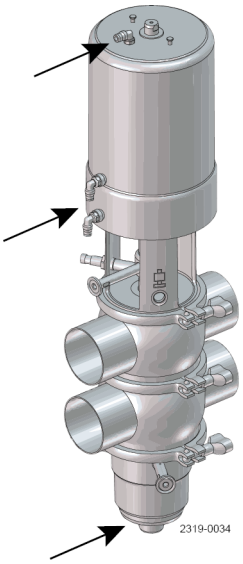
3 Installation

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 clearly visible.

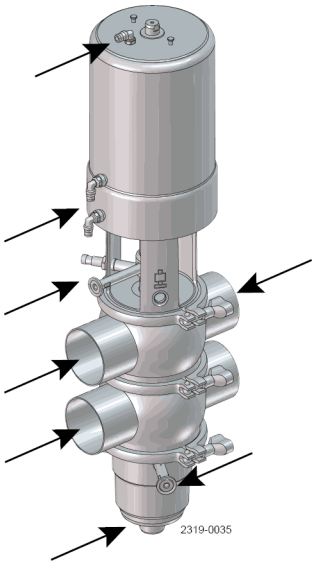
Step 4
Remove possible packing materials from the valve ports.



Step 5
Inspect the valve for visible transport damage.



Step 6
Avoid damaging the air connections, the leakage outlet, the valve ports and the CIP connections.

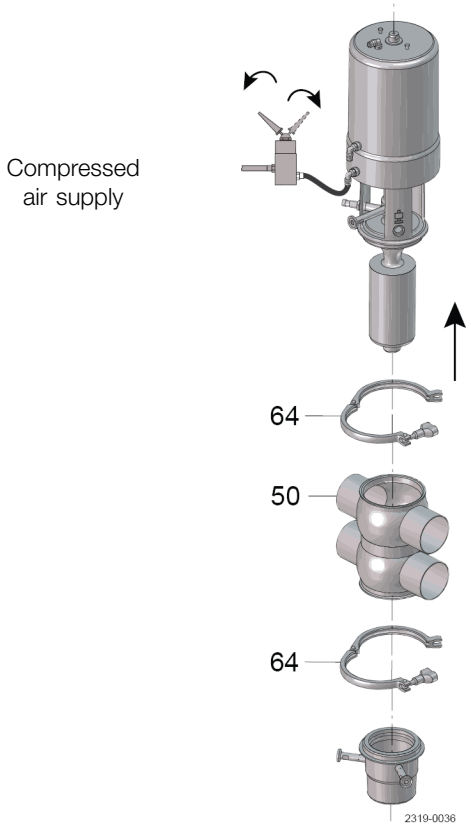


The instruction manual is part of the delivery.
Study the instructions carefully.
Fit the warning label supplied on the valve after installation so that it is clearly visible.

Step 7

Disassemble according to illustrations
(please also see 6.2 Dismantling of valve).

1. Supply compressed air.
2. Remove upper clamp (64).
3. Release compressed air.
4. Lift out actuator with plugs.



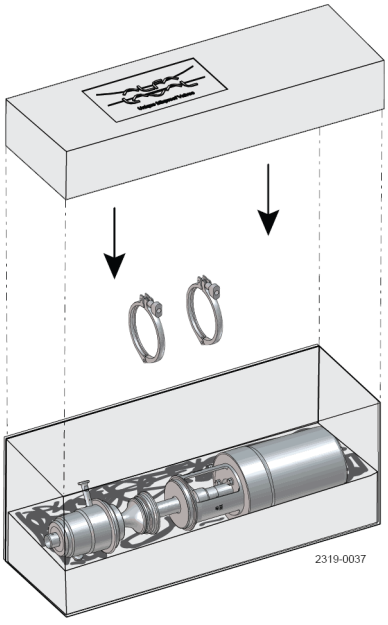
Step 8

While valve body is welded, it is recommended to store the valve safely in the box together with valve parts.

1. Place actuator and valve parts in the box.
2. Add supports.
3. Close, re-tape and store the box.

ADVICE!

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



3 Installation

3.2 Recycling

• Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps
- Wood and cardboard boxes can be re-used, 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 wearing parts in the machine are replaced
- All metal parts should be sent for material recycling
- Worn out or defective electronic parts should be sent to a licensed handler for material recycling
- Oil and all non-metal wear parts must be disposed off in accordance with local regulations

• Scrapping

- At the end of use, the equipment must be recycled according to the relevant, local regulations. Besides the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in a proper manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company

3.3 General installation

Step 1

- Always read the technical data thoroughly (see section 7 Technical data).
- 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 clearly visible.
- Alfa Laval cannot be held responsible for incorrect installation

NOTE!

- Mount valves vertically, or as close to vertical as possible having the leakage outlet turned downwards.

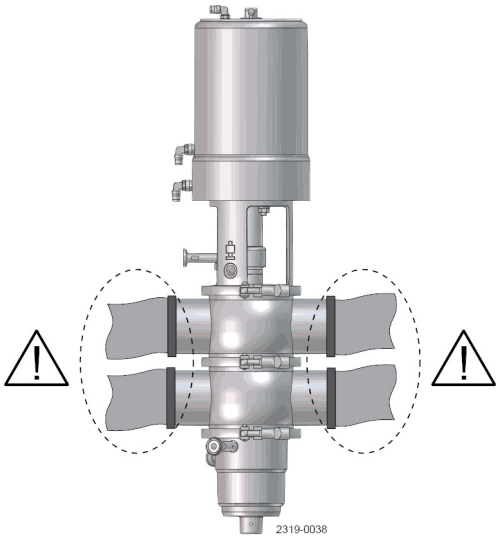
Step 2

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

Pay special attention to:

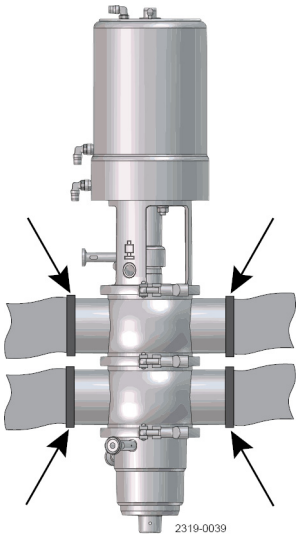
- Vibrations
- Thermal expansion of the tubes (especially at long tube lengths)
- Excessive welding
- Overloading of the pipelines

NOTE!
Please follow Alfa Laval installation guidelines (literature code ESE00040).



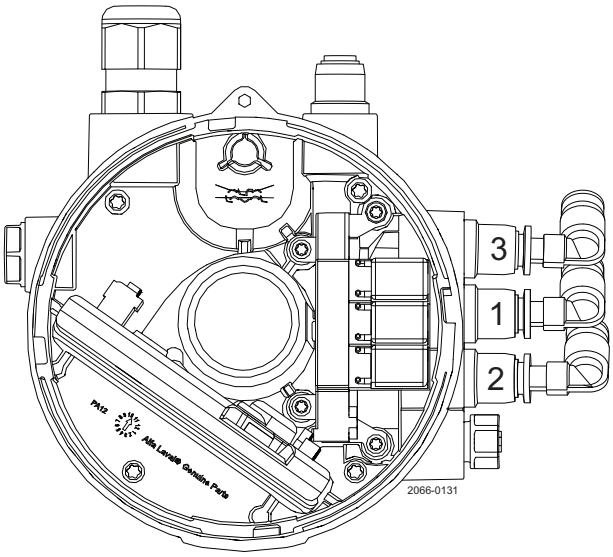
Study the instructions carefully and pay special attention to the warnings!
The valve has ends for welding as standard but can also be supplied with fittings.

Step 3
Fittings
Ensure that the connections are tight.

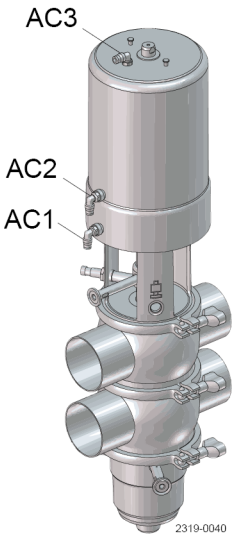


Remember seal rings!

Step 4



1 = Air out 1
2 = Air out 2
3 = Air out 3



AC1 = Air connection 1 (blue) upper seat push
AC2 = Air connection 2 (white) open/close
AC3 = Air connection 3 (yellow) lower seat push

Valve pneumatic connections		
Colors	**ThinkTop fitting ID**	**Actuator fitting ID**
White	Out 1	AC 2
Yellow	Out 3	AC 3
Blue	Out 2	AC 1

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

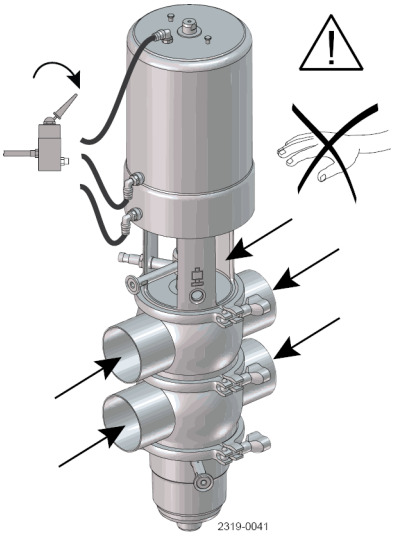
3 Installation

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.

3.4 Welding

Step 1

Never stick your fingers in the operating parts of the valve if the actuator is supplied with compressed air.



Step 2
Dismantle the valve in accordance with the description of dismantling the valve, see 6.2 Dismantling of valve

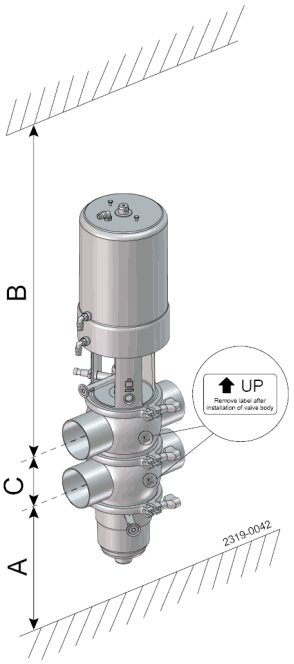
Step 3

Before welding the valve into the pipe line please note:

1. Maintain the minimum clearances "A" so that the actuator with the internal valve parts can be removed - please see later on in this section!

If there is a risk of foot damage, Alfa Laval recommends leaving a distance of 4.7” below the valve (look at the specific built-in conditions).

Size	1½”	2”	2½”	3”	4”	6”
A	7.9”	10.4”	11.8”	11.8”	17.2”	14.76”
B	31.9”	34.3”	40.2”	40.2”	49.2”	55.9”
C	2.4”	2.9”	3.4”	3.9”	4.7”	6.9”



Note!
If ThinkTop is mounted, add 7.1” to B measurement.
The measurement C can always be calculated by the formula C = ½ID $_{upper}$ + ½ID $_{lower}$ + 1”

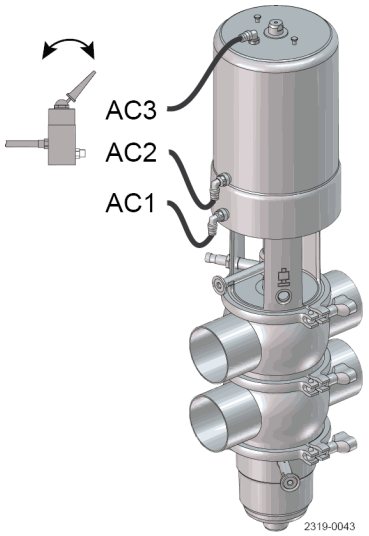
Step 4
Assemble the valve in accordance with section 6.5 Assembly of valve after welding.
Pay special attention to the warnings and clamp torque (see section 6.5 Assembly of valve).

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.

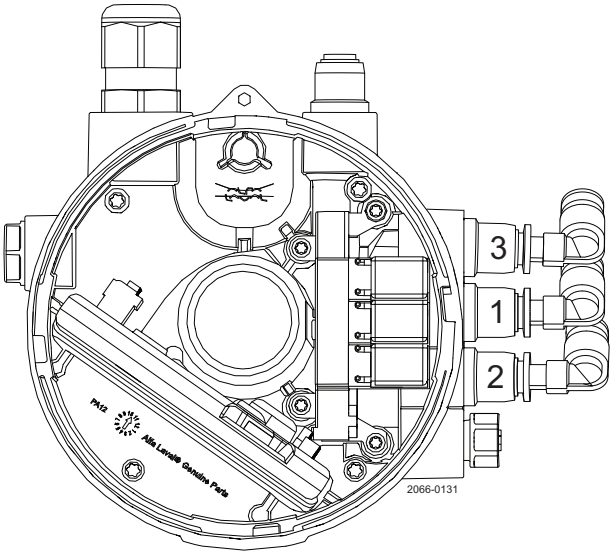
Step 5
Pre-use check:
1. Supply compressed air to air connection 1, 2 and 3 one by one.
2. Operate the valve several times to ensure that it runs smoothly.

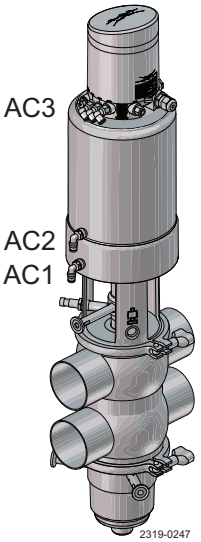
Pay special attention to the warnings!

AC1 = Air connection 1 (blue) upper seat push
AC2 = Air connection 2 (white) open/close
AC3 = Air connection 3 (yellow) lower seat push



3.5 Pneumatic functions





1 = Air out 1
2 = Air out 2
3 = Air out 3

AC1 = Air connection 1 (blue) upper seat push
AC2 = Air connection 1 (white) open/close
AC3 = Air connection 3 (yellow) lower seat push

Valve pneumatic connections		
Color	ThinkTop Fitting ID	Actuator Fitting ID
White	Out 1	AC 2
Yellow	Out 3	AC 3
Blue	Out 2	AC 1

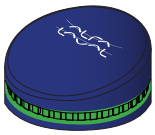
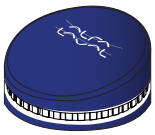
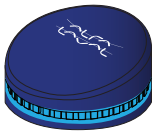
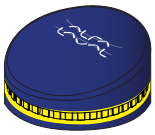
3 Installation

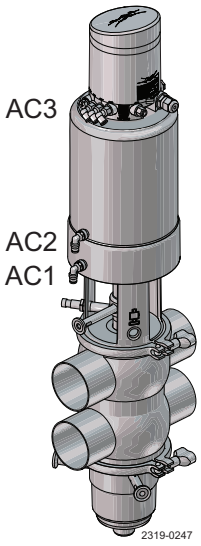
Study the instructions carefully and pay special attention to the warnings!
The valve has ends for welding as standard.
Weld carefully/aim at stressless welding to avoid deformation on sealing areas.
Check the valve for smooth operation after welding.

3.6 Valve position indication

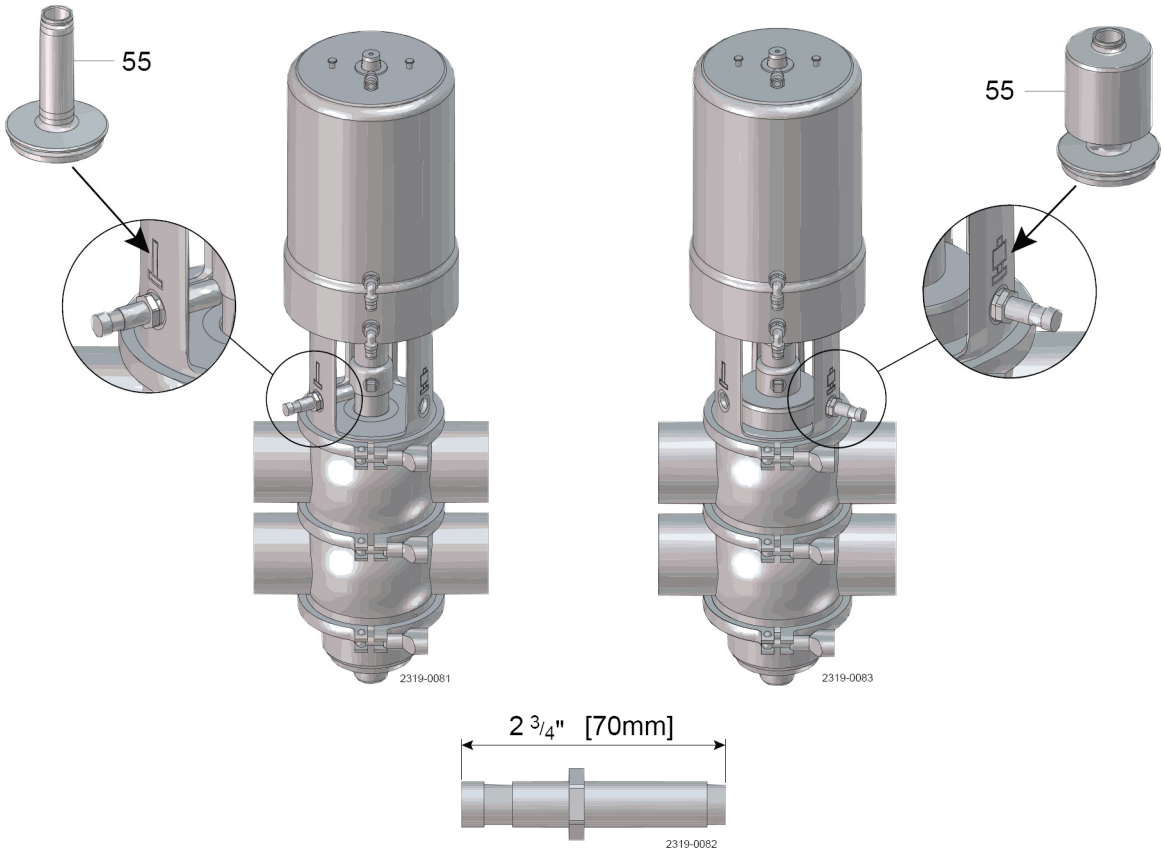
LED indication

ThinkTop features a 360-degree light guide. When the sensor target is within the respective setup position band, the corresponding colour lights up.

Valve position						
		 2066-0133	 2066-0134	 2066-0135	 2066-0136	
ThinkTop Mode	Actuator	All De-energised	Main valve open Energised	Upper seat lift Energised	Lower seat push Energised	Between
	Factory setting	Green flashing	White flashing	Blue flashing	Yellow flashing	Off
	Operation	Green	White	Blue	Yellow	Off
	Not OK	Green/red flashing	White/red flashing	Blue/red flashing	Yellow/red flashing	Red flashing



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.



External sensor

Note!
If using external sensor, the sensor must be active/activated when performing a setup routine of the control head.

Supply voltage:	Must match the selected type of ThinkTop®.
Supply current:	Max. 15 mA per sensor.
Type of sensor:	3 wire VDC PNP (EN60947-5-2).
Sensor cable length:	Max. 118 1/8"

Further information can be found in the ThinkTop instruction manual and product leaflet.

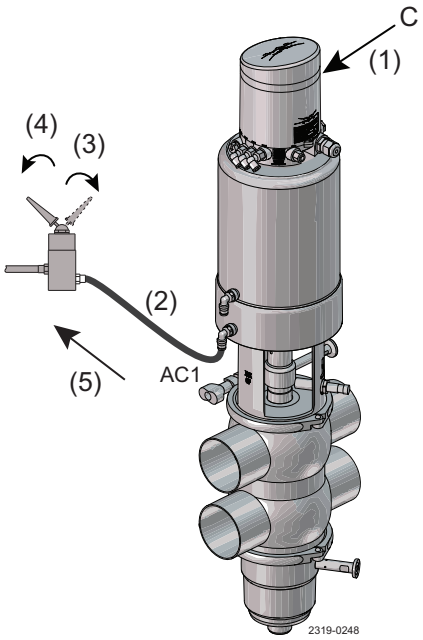
3 Installation

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.

3.7 Adjustment of indication

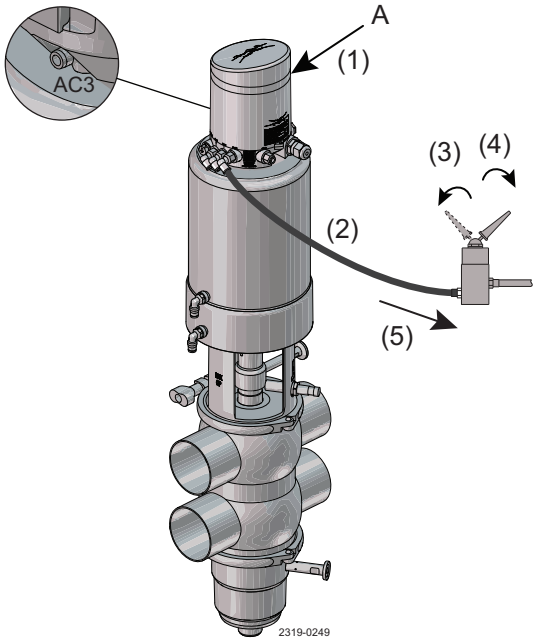
Test 1 - Upper valve seat, position detection

1. Valve at rest (closed) position
   Green LED on ThinkTop is illuminated.
2. Attact a manual air line to actuator air fitting AC1 using a 3-way air pilot switch.
3. Turn the air pilot switch to ON (open).
   Blue LED on ThinkTop is illuminated
4. Turn the air pilot switch to OFF (closed).
   Green LED on ThinkTop is illuminated.
5. Test complete. Remove manual air line.



Test 2 - Lower valve seat, position detection

1. Valve at rest (closed) position.
   Green LED on ThinkTop is illuminated.
2. Attact a manual air line to actuator air fitting AC3 using a 3-way air pilot switch.
3. Turn the air pilot switch to ON (open).
   Yellow LED on ThinkTop is illuminated
4. Turn the air pilot switch to OFF (closed).
   Green LED on ThinkTop is illuminated.
5. Test complete. Remove manual air line.



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.

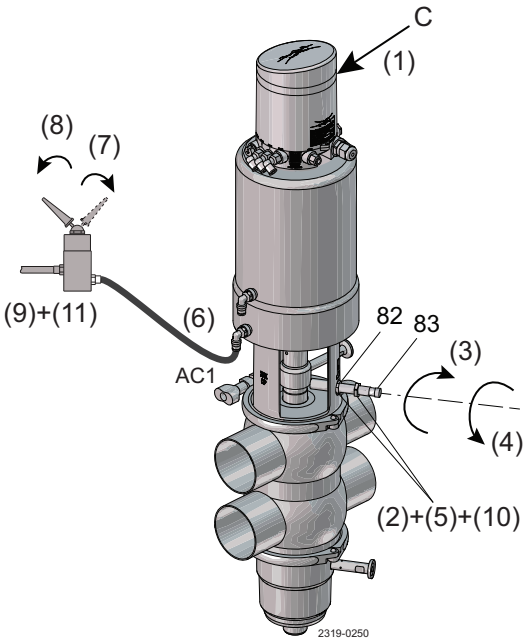
Adjustments

Upper valve seat external sensor (24VDC)

(position data existing on ThinkTop)

The following instructions should be made while the valve is hot from CIP cleaning. (worst case)

1. Valve is in rest position.
2. Loosen sensor lock nut(s).
3. Turn the sensor (83) clockwise to bottom of nylon plug (82), (or in some cases, until the sensor LED turns off).
4. Turn the sensor (83) counter clockwise until the sensor LED turns on, (or approximately one full turn from bottom of plug).
5. Lightly tighten sensor lock nut(s).
6. Attach a manual air line to actuator fitting AC1 using a 3-way air pilot switch.
7. Turn the air pilot switch to ON (open). Upper seat lift activated. Sensor LED turns off.
8. Turn the air pilot switch to OFF (closed). Upper seat lidt deactivated. Sensor LED turns on.
9. Turn the air pilot switch ON and OFF several times to verify sensor LED attions as listed in steps 7 and 8 above.
10. Moderately tighten sensor lock nut.
11. Repeat step 9 when the valve is cold and readjust with valve hot if necessary.



3 Installation

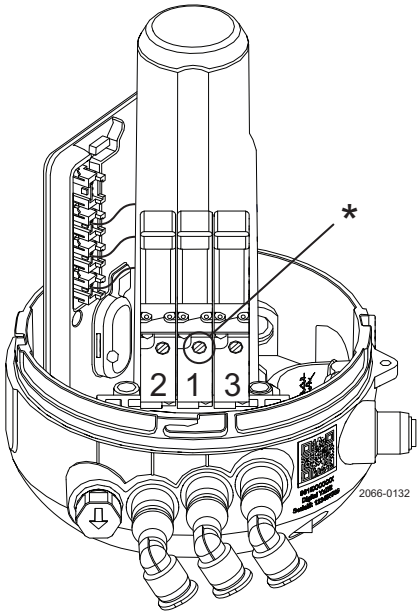
Study the instructions carefully and pay special attention to the warnings!
The valve has ends for welding as standard.
Weld carefully/aim at stressless welding to avoid deformation on sealing areas.
Check the valve for smooth operation after welding.

3.8 Regulatory inspection

Test 3
Regulatory inspection, confirm control system seat lifting interlock during an operating, active CIP circuit

Description of components to be used for this test:

1. ThinkTop® (blue control module located on top of the air actuator)
2. Compressed air solenoids (when furnished inside ThinkTop®**) see page 33 for top view of solenoid layout inside ThinkTop®.
   a. Solenoid-1, valve full open. (Note: not used for this test procedure)
   b. Solenoid-2, upper seat lift activation.
   c. Solenoid-3, lower seat push activation.



1. = Solenoid 1
2. = Solenoid 2
3. = Solenoid 3

* = Manual hold override

Test procedure listed as follows:

1. Select a valve for interlock testing.
2. Decide if the cleaning solution will flow through the mixproof valve upper or lower body as part of the CIP cleaning circuit for the test.
3. Start the appropriate CIP circuit. (WARNING: be sure that there is no risk of mixing product with cleaning solution when conducting this test!!)
4. The CIP supply pump, or source of CIP solution pressure, should now be operating.
5. Remove the cover lid from the Think Top.

Move to step 6 or 7 below:

6. If cleaning solution is flowing through the valve upper body, push and hold the silver manual air pilot button on solenoid number 3 (lower seat push). If control system interlock is correct, the CIP supply pump, or source of CIP solution pressure, will be de-activated. Release manual air pilot button to end this test.
7. If cleaning solution is flowing through the valve lower body, push and hold the silver manual air pilot button on solenoid number 2 (upper seat lift). If the control system interlock is correct, the CIP supply pump, or source of CIP solution pressure, will be de-activated. Release manual air pilot button to end this test.
8. If the control system does NOT de-activate the cleaning solution pressure source as described in either 6 or 7 above, the control system should be shut down for evaluation, and correction, to the interlock functions written in the PLC logic.

** If solenoids are located in a remote enclosure (not inside Think Top), the above test procedures are to be conducted in exactly the same method. Selection of the proper solenoids for testing are to be determined using the assistance of plant operating personnel.

The valve is 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.

4.1 Operation

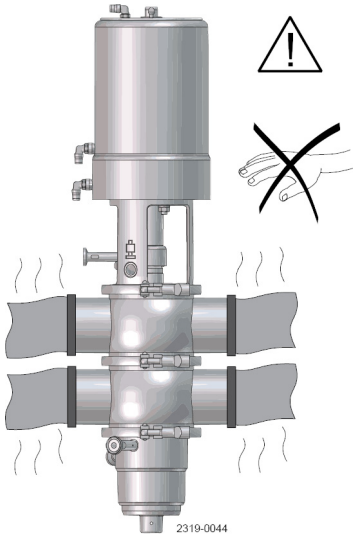
Step 1

- **Always** read the technical data thoroughly (see section 7 Technical data).
- **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 sterilising.



4 Operation

The valve is designed for cleaning in place (CIP).
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic soda.
HNO_3 = Nitric acid.

4.2 Recommended cleaning

Step 1

Always handle lye and acid with great care.

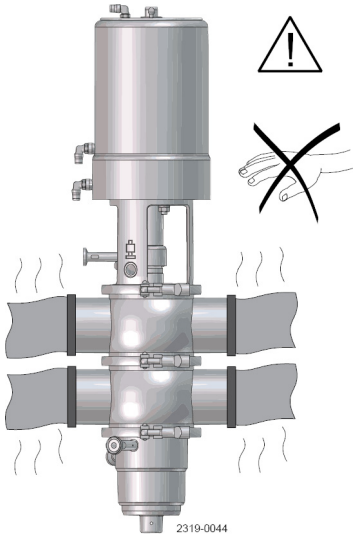
Caustic danger!

Always use rubber gloves!

Always use protective goggles!

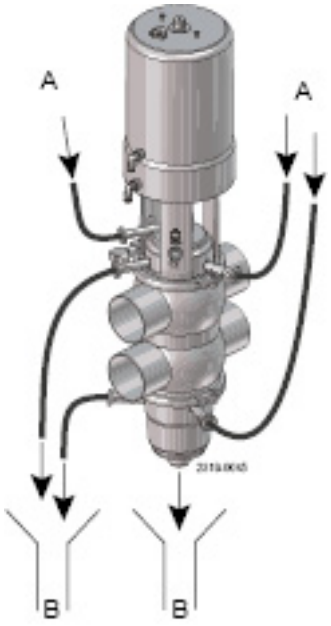
Step 2

Never touch the valve or the pipelines when sterilising.



Step 3

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



Step 4

1. Avoid excessive concentration of the cleaning agent
   ⇒ **Dose gradually!**
2. Adjust the cleaning flow to the process
   Milk sterilisation/viscous liquids
   ⇒ **Increase the cleaning flow!**

The valve is designed for cleaning in place (CIP).
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic soda.
HNO_3 = Nitric acid.

Step 5
Recommended cleaning - general
In order to be compliant with the Sanitary 3A Standard 85-03, the Unique Mixproof CP-3 valves shall be cleaned-in-place (CIP) with the following recommended procedures.

Each mixproof valve shall be properly operated, including seat lifting, during CIP cleaning to assure exposure to product contact surfaces.
Alfa Laval offers the option of cleaning the leakage chamber by utilizing the SpiralClean nozzle during the CIP Cleaning.
The SpiralClean nozzle is accessed through the external inlet located at the Intermediate piece.
The CIP through the SpiralClean nozzle can be controlled by an external valve. Minimum recommended CIP pressure 29 psi.

Alfa Laval offers the option of cleaning the OD of the upper and lower valve plug shaft(s) by utilizing the CIP sealing elements.
The CIP of the valve shaft(s) has an external inlet and outlet positioned on the sealing elements. Minimum recommended CIP pressure 29 psi.
The CIP through the SpiralClean nozzle can be controlled by an external valve(s).
Alfa Laval recommends that OD cleaning of the valve plug shafts is only performed during CIP of the valve. For example: If only the upper portion of the valve body is cleaned while there is product present in the lower portion of the valve body. OD cleaning should only be performed on the upper plug.

Step 6
Recommended cleaning - specific
The chart below provides reference to cleaning solution agents, temperature and exposure times necessary during circulation to achieve good cleaning results.
All data shown is required for each valve during cleaning. Use clean water, free from chlorides, for mixing with chemical cleaning agents.

CIP Event	Exposure Time	Temperature	Agent	Concentration
Warm pre-rinse	3 minutes continuous	100 – 110 °F	None	None
Hot alkaline wash	10 minutes continuous	160 °F	NaOH (Sodium hydroxide)	1%
Cold post wash	3 minutes continuous	Cold	None	None
Cold acidified rinse	3 minutes continuous	Cold	$EHNO_3$(Nitric acid)	0.006%

4 Operation

The valve is designed for cleaning in place (CIP).
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic soda.
HNO_3 = Nitric acid.

Step 7
Valve pneumatic operation during in-place cleaning
Each valve seat shall be lifted during the length of the cleaning cycle.
Seat lift durations shall not exceed 10 seconds.

These pneumatic functions include:

1. Upper valve seat lift (takes place during cleaning of upper valve body)
2. Lower valve seat push (takes place during cleaning of lower valve body)

The following chart presents an overview of these functions together with the recommended time durations at 21psi (1.5 bar) CIP pressure. It is recommended to do seat lift/push in the middle of each step in the CIP sequence.

CIP event @ length	Valve function	Valve solenoid no.	Solenoid mode	Actual opening time	Number of lifts/push in each CIP step
Warm pre-rinse @ 3 minutes	Upper seat lift	2	Energized	*0.5 sec	1
	Lower seat lift	3	Energized	*0.5 sec	1
	SpiralClean vent	-	-	*5 sec	3
	OD cleaning	-	-	*5 sec	2
Hot alkaline wash @ 10 minutes	Upper seat lift	2	Energized	*0.5 sec	2
	Lower seat lift	3	Energized	*0.5 sec	2
	SpiralClean vent	-	-	*5 sec	3
	OD cleaning	-	-	*5 sec	2
Cold post wash @ 3 minutes	Upper seat lift	2	Energized	*0.5 sec	1
	Lower seat lift	3	Energized	*0.5 sec	1
	SpiralClean vent	-	-	*5 sec	3
	OD cleaning	-	-	*5 sec	2
Cold acidified rinse @ 3 minutes	Upper seat lift	2	Energized	*0.5 sec	1
	Lower seat lift	3	Energized	*0.5 sec	1
	SpiralClean vent	-	-	*5 sec	3
	OD cleaning	-	-	*5 sec	2
Final rinse @ 3 minutes	Upper seat lift	2	Energized	*0.5 sec	1
	Lower seat lift	3	Energized	*0.5 sec	1
	SpiralClean vent	-	-	*5 sec	3
	OD cleaning	-	-	*5 sec	2

*Time stated is the actual opening time for the valve. Programmed duration is depended on the access to compressed air and response time from PLC.
Variations caused by compressed air are typically:

- Long compressed air supply hoses.
- Small ID on air supply hoses.
- Limited availability of compressed air.
- Some products may require additional number of seat lifts/pushes.
- Duration of seat lift/push depend on available CIP pressure.

The valve is designed for cleaning in place (CIP).
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic soda.
HNO_3 = Nitric acid.

Step 8
Consumption cleaning fluids

The table below approximates the flow of cleaning solution through the valve vent tube during seat lift functions, SpiralClean of vent and CIP of OD valve plug shafts at a CIP pressure of 21 psi (1,5 bar).

Valve size	Seat lift seat push	C_V (gpm/psi)	Gallons per sec. (21psi)	Duration	Activations during each CIP event
1½" – 2"	Seat lift Seat push	2.9 2.2	0.235 0.168	0.5 sec	3
2½" – 3"	Seat lift Seat push	3.6 4.3	0.275 0,328	0.5 sec	3
4"	Seat lift Seat push	5.3 4.9	0,405 0,374	0.5 sec	3
6"	Seat lift Seat push	6.0 5.3	0,458 0,405	0.5 sec	3
SpiralClean 1½" to 6"	-	0.14	0,011	0.5 sec	3
CIP OD valve plug 1½" - 2"	-	0.29	0,0222	5 sec	2
CIP OD valve plug 2½" - 6"	-	0.34	0,026	5 sec	2

The following formula is used to estimate CIP flow during seat lifts:

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

Where Q is Flow in USGPM.
C_V is taken from the table above.
Δp is the CIP pressure in PSI.

Step 9
Guide rings cleaning

When the valves are removed for replacement of wetted parts and / or sealing elastomers, it is important to remove, and hand clean, the PTFE guide rings (positions 45, 54, 80 and 98) and their seating groves before placing the valves back into service. See section 6.5 Assembly of valve

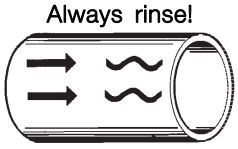
Step 10

Always rinse well with clean water after cleaning.

NOTE!

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

Always rinse!



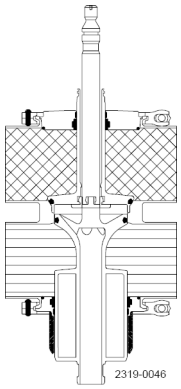
Clean water Cleaning agents

4 Operation

The valve is designed for cleaning in place (CIP).
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic soda.
HNO_3 = Nitric acid.

Step 11

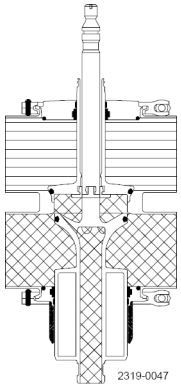
Seat-cleaning cycles:
Pay special attention to the warnings!
1. Closed valve



CIP

Product

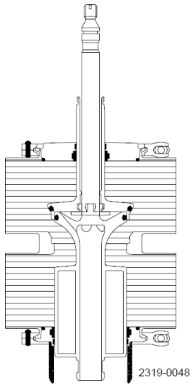
2. Cleaning through lower line



Product

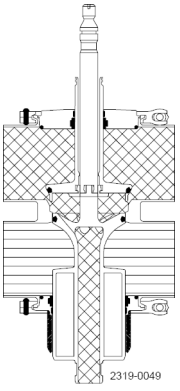
CIP

3. Open valve



Product

4. Cleaning through upper line



CIP

Product

Study the maintenance instructions carefully before replacing worn parts. - See section 6.1 General maintenance

4.3 Troubleshooting and repair

Problem	Cause/result	Repair
Leakage between sealing element (79 or 96/97) and lower plug (75)	Worn/product affected o-rings/ lip seal (76/77/78/95)	- Replace the o-rings/lip seal - Change rubber grade - Lubricate correctly
Leakage at the leakage outlet	- Particles between valve seats and plug seals (56/74) - Worn/product affected plug seal rings (56/74) - Plug not assembled correctly	- Remove the particles - Check the plug seals - Replace the plug seals - Change rubber grade - Assemble plug, see section 6.3 Lower plug, replacement of radial seal and section 6.4 Upper plug, replacement of axial seal
Leakage at sealing element (48)/upper plug (55)	Worn/product affected o-rings/lip seal (38/39/46/49)	- Replace the o-rings/lip seal - Change rubber grade - Clean and if necessary replace guide ring (45)
Leakage at clamp (64)	- Too old/product affected o-rings (76 and 47) (and 52 if clamped valve body) - Loose clamp (64)	- Replace the o-rings - Change rubber grade - Tighten the clamp
CIP leakage	Worn o-rings (40/67/71/144/145)	Replace the o-rings
Leakage at spindle clamp (43)	Damaged o-ring (39) Worn/product affected lip seal (57) or spray nozzle (58)	- Replace the o-ring - Replace the plug seals - Change rubber grade
Lower plug not returning to closed position	- Wrong rubber grade - Wrongly fitted gasket - Mounted incorrectly (see section 6.3 Lower plug, replacement of radial seal)	- Change rubber grade - Fit new gasket correctly - Correct installation
Plug returns with uneven movements (slip/stick effect)	- Wrong rubber grade - Wrongly fitted gasket - Mounted incorrectly (see section 6.3 Lower plug, replacement of radial seal)	- Change rubber grade - Fit new gasket correctly - Correct installation

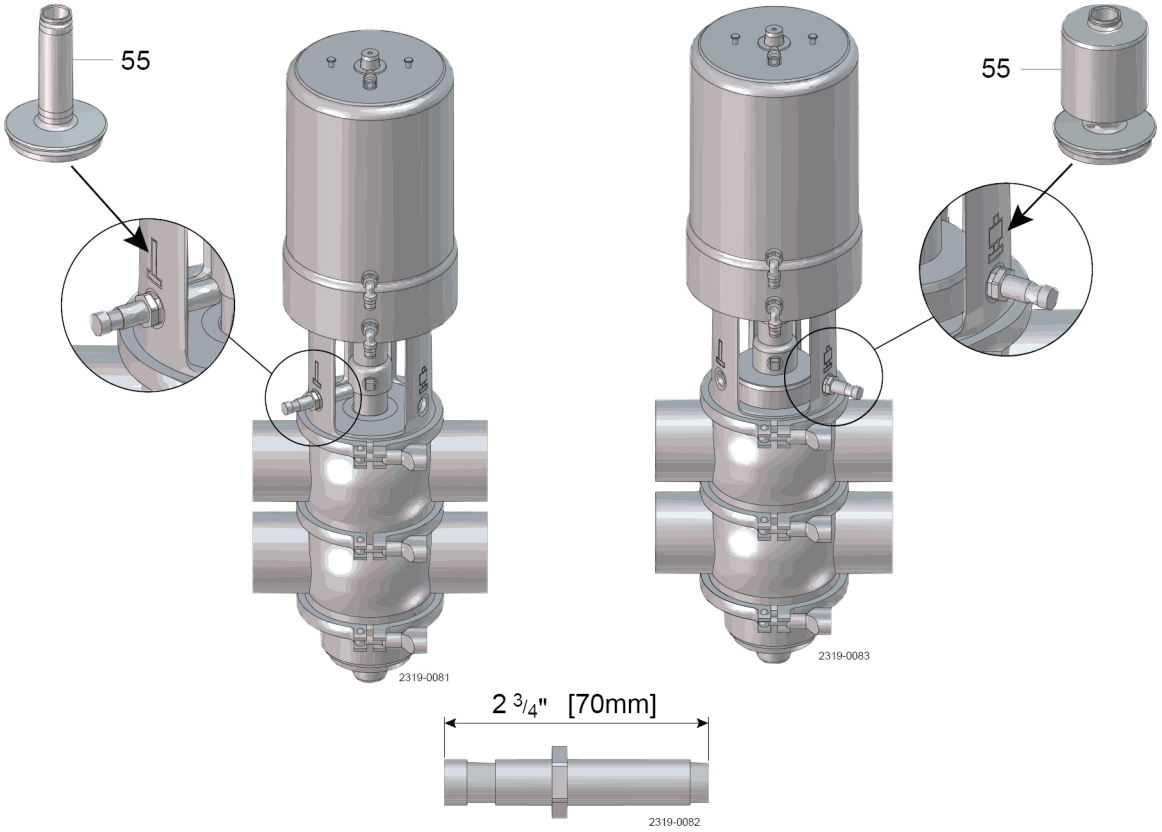
5 Automation

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

5.1 Specifications

External sensor

The external sensor is used for seat-lift supervision when seat-lift can not be internally detected.
The sensor gets its supply voltage from the terminal row. The output signals from the sensor are connected to two inputs on the terminal row on the internal sensor unit.
If the actual setup is set for internal seat-lift, the corresponding external signal is not used, otherwise the external signal logically controls the corresponding feedback to the PLC (Programmable Logic Controller).



External sensor

Note!

If using external sensor, the sensor must be active/activated when performing a setup routine of the control head.

Supply voltage:	Must match the selected type of ThinkTop®.
Supply current:	Max. 15 mA per sensor.
Type of sensor:	3 wire VDC PNP (EN60947-5-2).
Sensor cable length:	Max. 118 1/8"

Further information can be found in the ThinkTop instruction manual and product leaflet.

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

6.1 General maintenance

Recommended spare parts: service kits (see 8 Parts list and service kits)
Order service kits from the service kits section, see 8 Parts list and service kits
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**	Replace when required
Planned maintenance	- regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statestics for planning of inspections	- Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for planning of inspections	
Lubrication	**When assembling** Alfa Laval Silicon based Food-grade Lubricant USDA H1 approved grease	**When assembling** Alfa Laval Silicon based Food-grade Lubricant USDA H1 approved grease	**None**

Note!
Lubricate thread in valve plug parts with Alfa Laval Lubricant or similar.
(*) Depending on working conditions! Please contact Alfa Laval.
(**) All product 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 Alfa Laval Lubricant.
- To avoid possible black remains on position number 1 and 29. Alfa Laval recommends Alfa Laval Lubricant for these two positions.

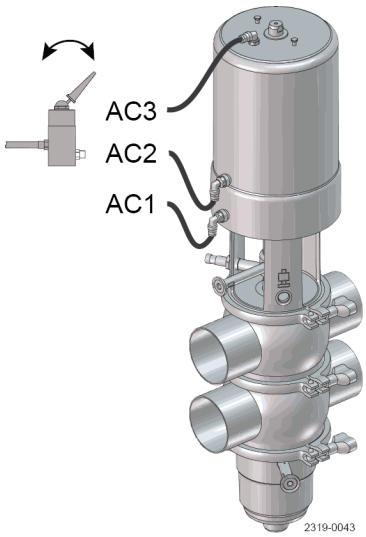
6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

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!



The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

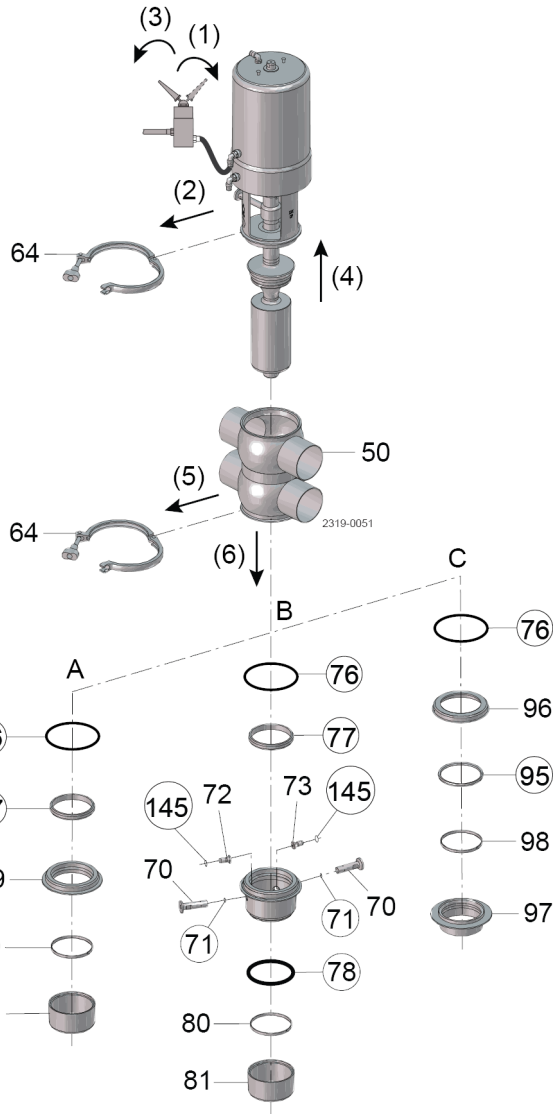
6.2 Dismantling of valve

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 (A, B or C).

Note!
Release compressed air.

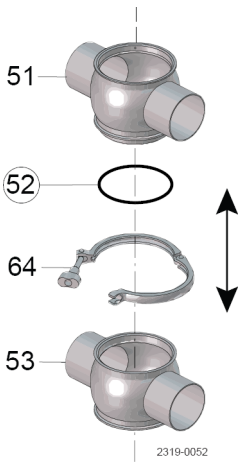


A
Dismantling of lower sealing element
1. Pull out o-ring (76) and lip seal (77).
2. Remove guide ring (80).

B
Dismantling of lower sealing element, balanced with CIP OD balancer
1. Pull out o-ring (76) and lip seal (77).
2. Remove o-ring (78).
3. Remove guide ring (80).
4. Screw out flushing tubes (70).
5. Remove o-rings (71).
6. Remove o-rings (145) and nozzles (72 + 73).

C
Dismantling of lower sealing element, flush OD balancer
1. Remove upper part of sealing element (96)
2. Pull out o-ring (76) and lip seal (95).
3. Remove guide ring (98) from lower part of sealing element (97).

Step 1A - Only applicable when bodies are clamped.
1. Remove clamp (64)
2. Remove valve body (51)
3. Take away o-ring (52) from upper body (51)



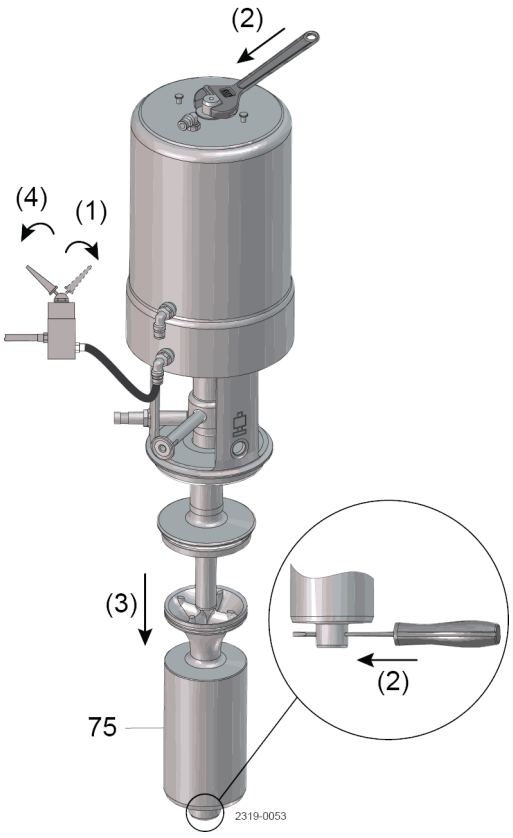
6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

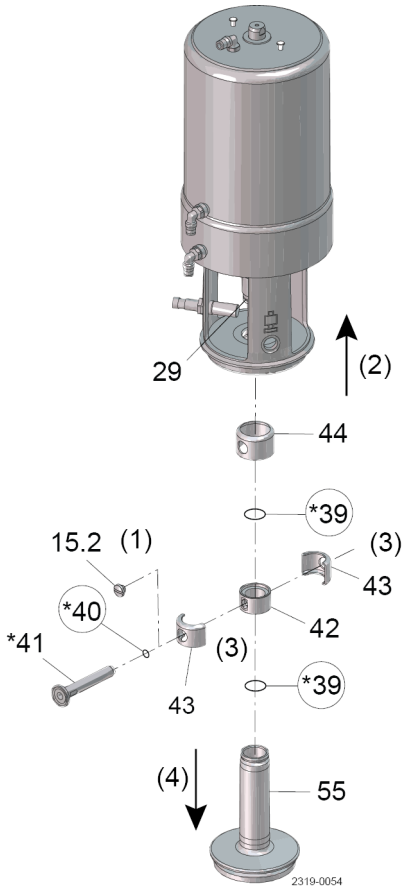
Step 2
1. Supply compressed air for air connection AC1.
2. Loosen lower plug (75) while counterholding upper stem (1).
3. Remove the plug.
4. Release compressed air.

Note: For replacement of seal ring (74), please see section 6.3 Lower plug, replacement of radial seal.

1 = on
4 = off



Step 3
Remove coupling system and upper plug according to illustrations (1-4)
1. **No SpiralClean in leakage chamber**:
   A. Unscrew plug (15)
   SpiralClean in leakage chamber:
   A. Unscrew flushing tube (41).
   B. Remove o-ring (40)
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 (42) is free of both piston rod and upper plug.
   SpiralClean in leakage chamber: Remove both o-rings (39) on valve plug (55) and piston rod (29)



The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

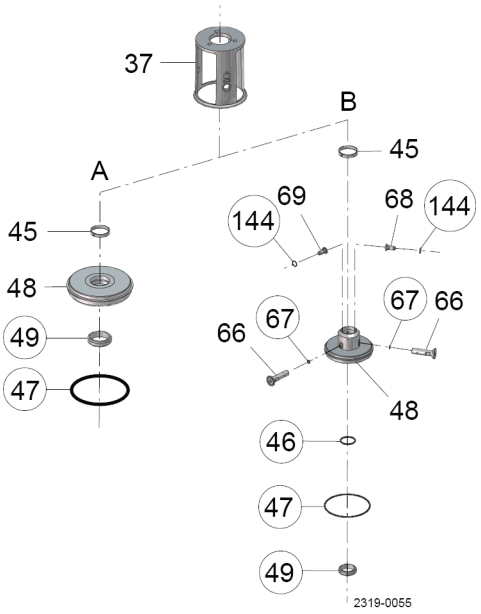
Step 4

A
Dismantling of upper sealing element

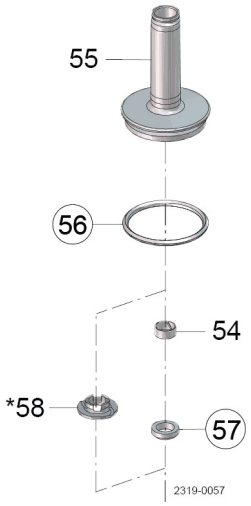
1. Remove sealing element (48) from intermediate piece (37).
2. Pull out o-ring (47) and lip seal (49) from sealing element (48)
3. Remove guide ring (45).

B
Dismantling of upper sealing element, CIP OD spindle/balance

1. Screw out flushing tubes (66).
2. Remove o-rings (67)
3. Remove o-rings (144) and nozzles (69 + 68).
4. Remove sealing element (48) from intermediate piece (37)
5. Pull out o-ring (47) and lip seal (49) from sealing element (48).
6. Remove o-ring (46)
7. Remove guide ring (45).



Step 5
Remove lip seal (57) and guide ring (54) (or spray nozzle (58) if valve is supplied with SpiralClean in leakage chamber. For removal and replacement of seal ring (56), please see section 6.4 Upper plug, replacement of axial seal

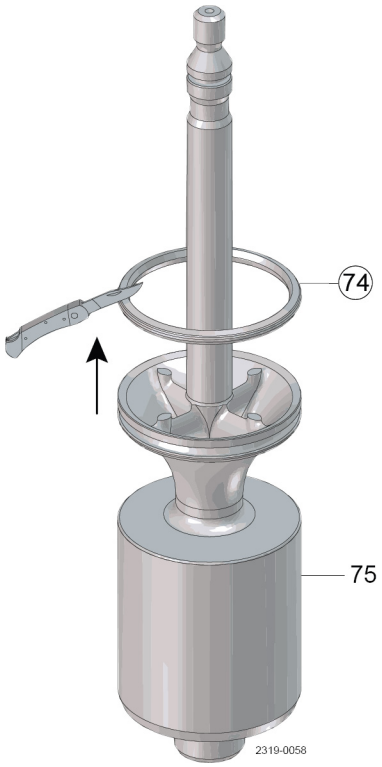


6 Maintenance

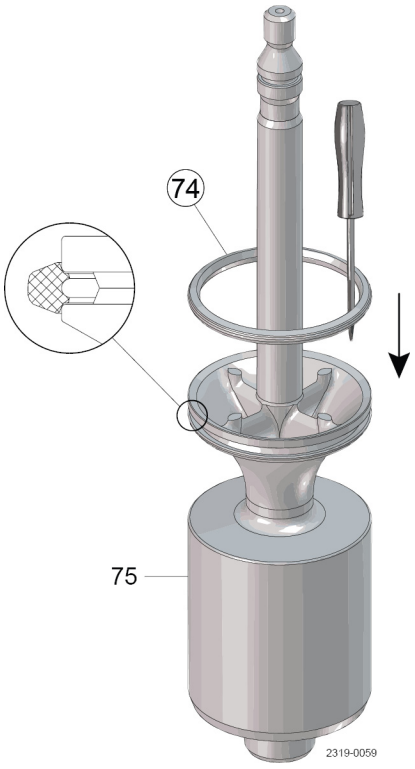
The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

6.3 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.

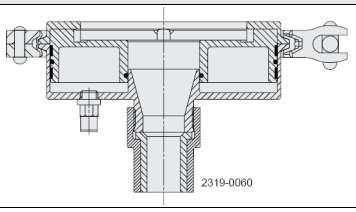


Step 2
Pre-mount seal ring as shown on drawing.
Rotate along circumference to fix sealing as shown in the picture.
Carefully lubricate sealings with suitable soap or lubricant (Alfa Laval Lubricant), before pre-mounting.

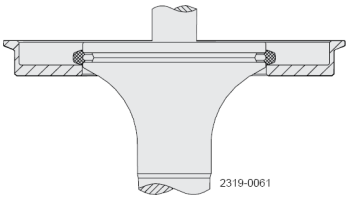


The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

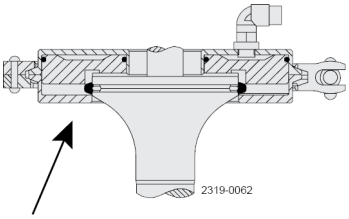
Step 3

Item no.	Item no.	Item no.	Item no.	
1½" + 2"	2½" + 3"	4"	6"	Tool for radial sealing, lower plug
9613-4260-01	9316-4260-02	9613-4260-03	9613-4260-04	

Step 4
Place lower tool part.

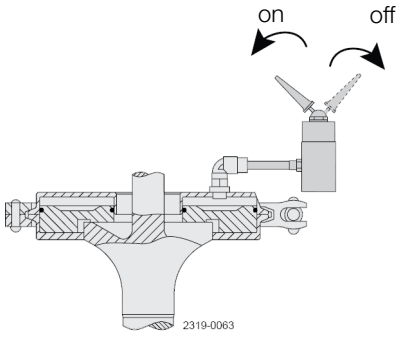


Step 5
1. Place upper tool part including piston.
2. Clamp the two tool parts together.



Tool marked with item number.

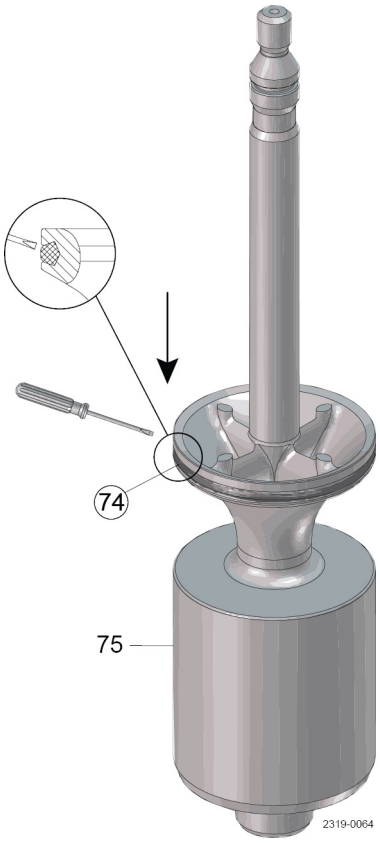
Step 6
1. Supply compressed air.
2. Release compressed air.
3. Remove tool parts.



6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

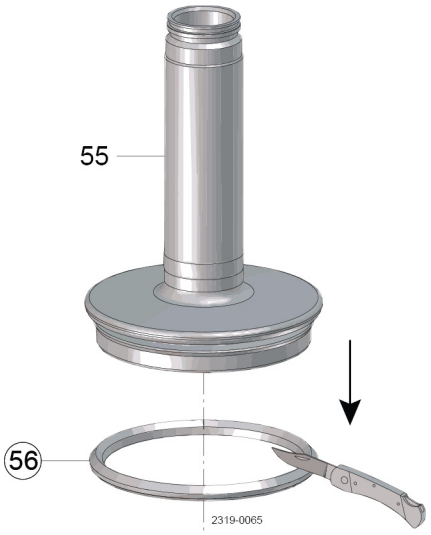
Step 7
Inspect the seal to ensure it does not twist in the groove, and press in the 4 outsticking points with a screwdriver



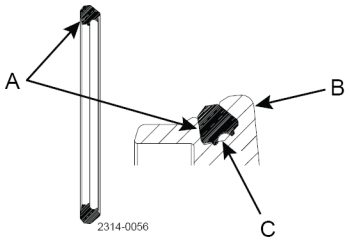
The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

6.4 Upper plug, replacement of axial seal

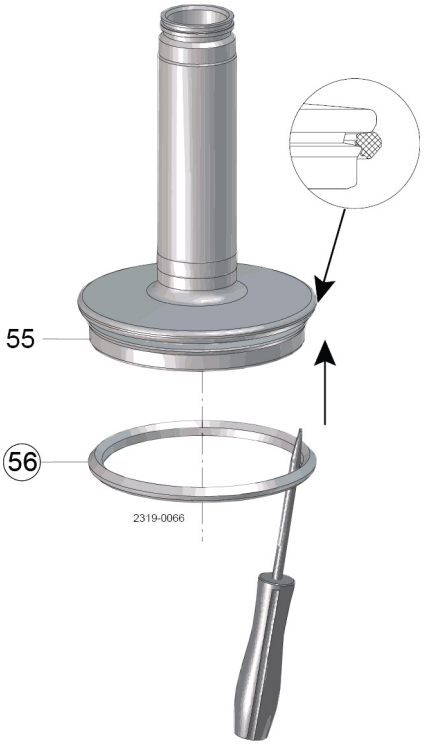
Step 1
Remove old seal ring (56) using a knife, screwdriver or similar. Be careful not to scratch the plug.



Step 2
Pre-mount seal ring as shown on drawing.



A = Flat side of the sealing
B = Balanced plug
C = Do not lubricate behind the sealing

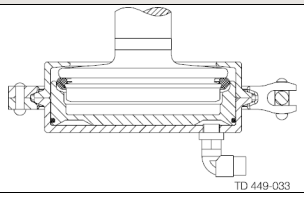


Carefully lubricate sealings with suitable soap or lubricant (Alfa Laval Lubricant), before pre-mounting.

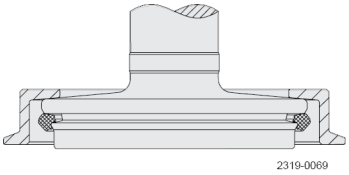
6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

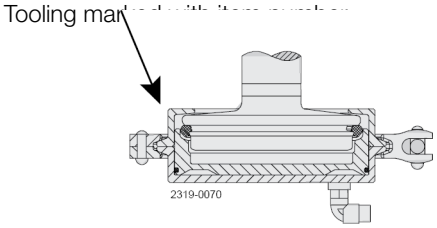
Step 3

Item no.	Item no.	Item no.	Item no.	
1½" + 2"	2½" + 3"	4"	6"	Tool for axial sealing, upper plug
9613-0505-01	9613-0505-02	9613-0505-08	9613-0505-03	

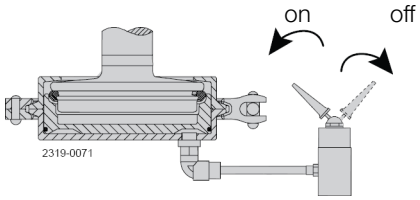
Step 4
Place tool part 1.



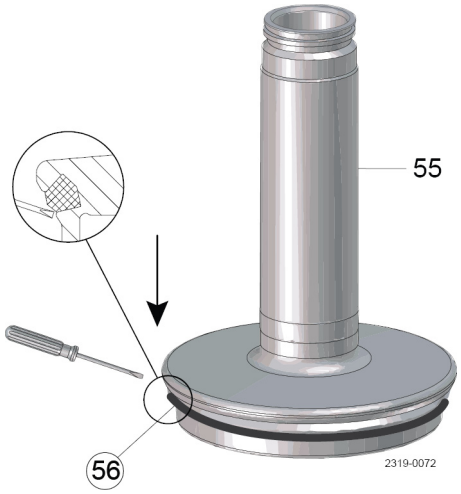
Step 5
1. Place tool part 2 including piston.
2. Clamp the two tool parts together.



Step 6
1. Supply compressed air.
2. Release compressed air.
3. Rotate the tool 45° in relation to the plug.
4. Supply compressed air.
5. Release compressed air and remove tool.



Step 7
1. Inspect the seal.
2. Release air at 3 different positions of the circumference.

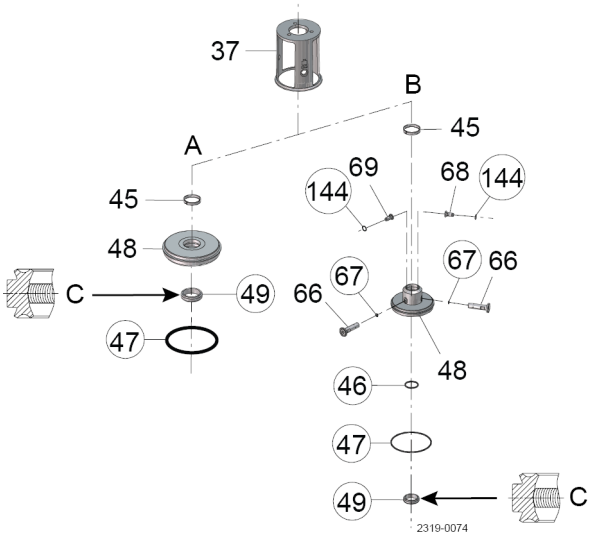


The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

6.5 Assembly of valve

Step 1
A
Assembly of upper sealing element
1. Fit o-ring (47) (do not twist), and lip seal (49) in upper sealing element (48) (Lubricate with Alfa Laval Lubricant).
   NOTE: The o-ring should be gently pressed into the groove.
2. Fit guide ring (45) in upper sealing element.
3. Fit upper sealing element in intermediate piece (37).

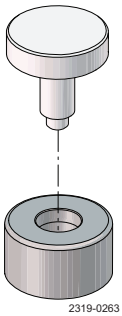
B
Assembly of upper sealing element, CIP OD spindle/balancer
1. Fit o-ring (47) (do not twist), lip seal (49) and o-ring (46) in upper sealing element (48) (lubricate with Alfa Laval Lubricant)
   NOTE: The o-ring should be gently pressed into the groove.
2. Fit guide ring (45) in upper sealing element.
3. Fit upper sealing element in intermediate piece (37).
4. Place o-rings (67+144) and mount flushing tubes (66). Be sure to align nozzles (68 + 69) towards recess.



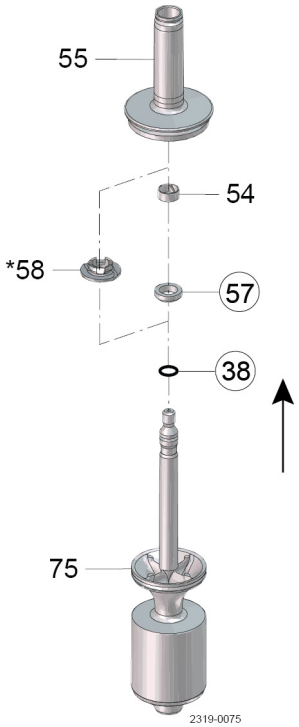
C = Lubricate with Alfa Laval Lubricant on ID

Step 2
1. Place guide ring (54) and lip seal (57) in upper plug or nozzle (58) by SpiralClean in leakage chamber.
2. Mount o-ring (38) in lower plug.
3. 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.

Note:
For Valve Sizes DN/OD 38 &/ DN40 & DN/OD51 & DN50:
Lip seal (57) can optionally be mounted with special tool, please contact Alfa Laval.



Mounting tool for lip seal item # 8010017878



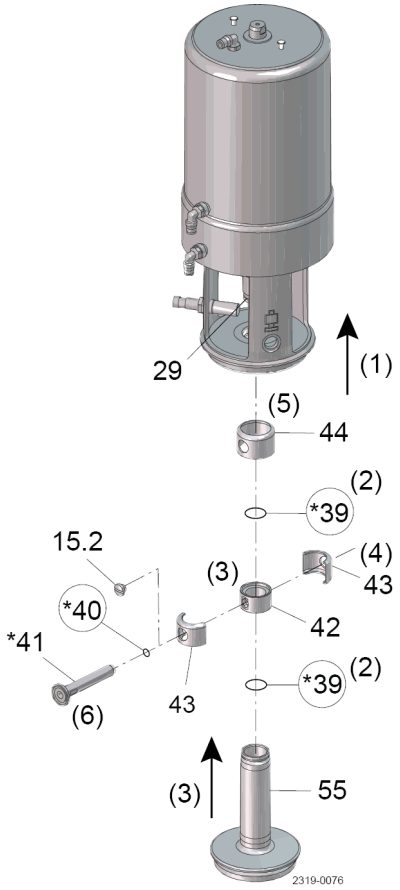
6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

Step 3

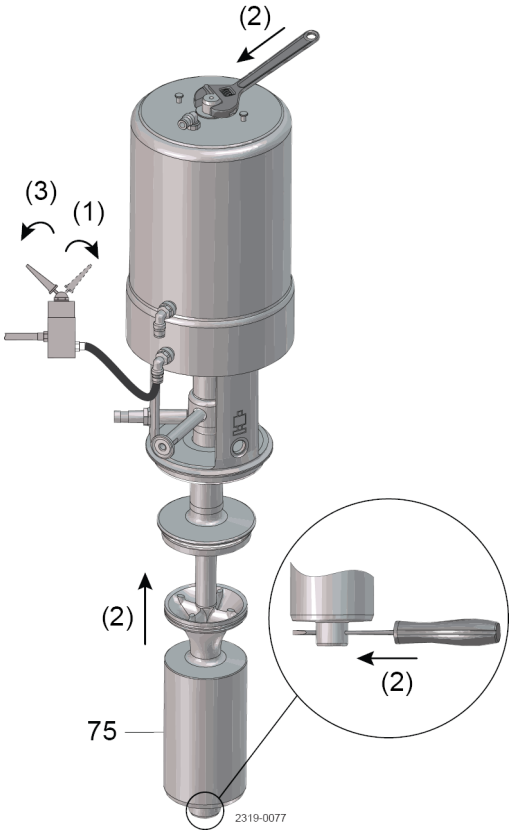
Place coupling system and upper plug according to illustrations.

1. Push lock (44) up over piston rod (29).
2. If SpiralClean in leakage chamber: place o-rings (39) in groove on upper plug (55) and piston rod (29).
3. Place spindle liner (42) on piston rod (29). Fit upper plug (55).
4. Mount clamps (43) on spindle liner (42).
5. Fit lock (44).
6. Fit plug (15) or flushing tube (41) and o-ring (40) if SpiralClean in leakage chamber.



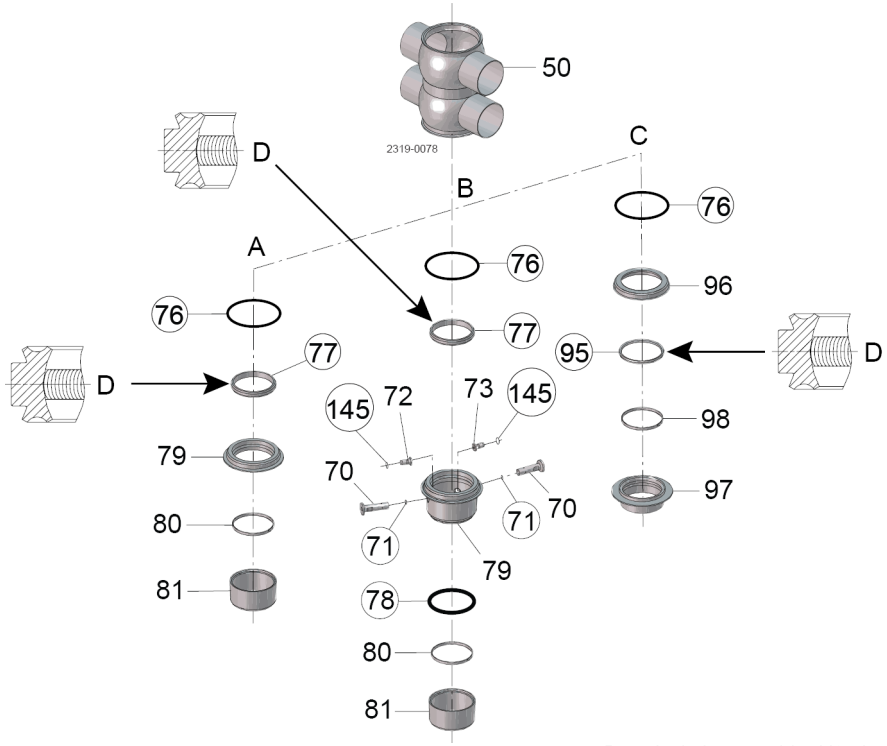
Step 4

1. Supply compressed air for air connection AC1
2. Insert lower plug (75) and tighten
3. Release compressed air



The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

Step 5



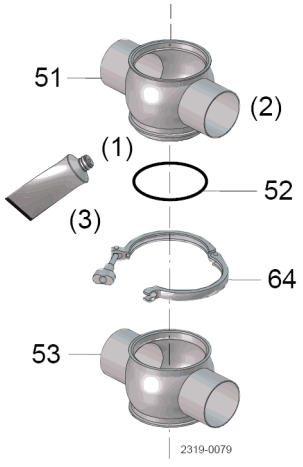
D = Lubricate with Alfa Laval Lubricant on ID

A - Assembly of lower sealing element
1. Fit lip seal (77) and o-ring (76) (do not twist the o-ring) and press it gently into the groove (lubricate with Alfa Laval Lubricant)
2. Fit guide ring (80) into sealing element (79)

B - Assembly of lower sealing element with CIP OD balancer
1. Fit o-ring (76) (do not twist), lip seal (77) and o-ring (78) in lower sealing element (lubricate with Alfa Laval Lubricant).
   Note! The o-ring (76) should be gently pressed into the groove.
2. Fit guide ring (80) in lower sealing element.
3. Place o-rings (71+ 145) and mount flushing tubes (70). Be sure to align nozzles (72 + 73) towards recess.

C - Assembly lower sealing element with flush OD balancer
1. Fit o-ring (76) (do not twist the o-ring) in upper part of sealing element (lubricate with Alfa Laval Lubricant).
   Note! The o-ring should be gently pressed into the groove.
2. Place guide ring (98) in lower part of sealing element (97).
3. Fit lip seal (95) in sealing element (97).
4. Place upper part of sealing element (96) on top of lower part of sealing element (97).

Step 5B
Only applicable when bodies are clamped
1. Fit o-ring (52) into groove in upper body (51)
   Lubricate with Alfa Laval Lubricant)
2. Mount upper body (51) in lower (53)
3. Fit and tighten clamp (64), greasing of clamp and clamp nut recommended.
   (Maximum torque for clamp not 10Nm/7,4 lbf-ft)



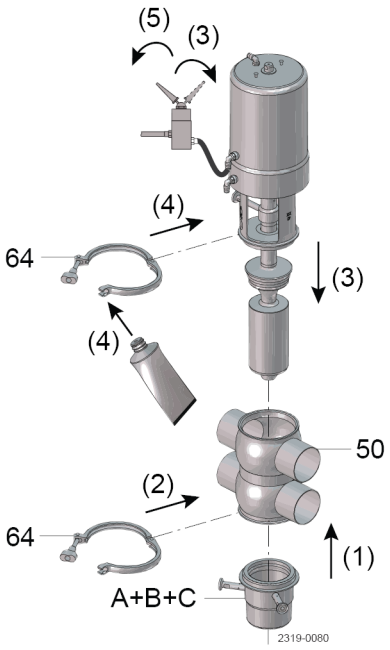
6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

Step 6
- **Never** stick tour 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 (A, B or C)
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). Lubricating of clamp and clamp nut recommended!
   (Maximum torque for clamp nut: 10Nm/7.4 lbf-ft)
5. Release compressed air.

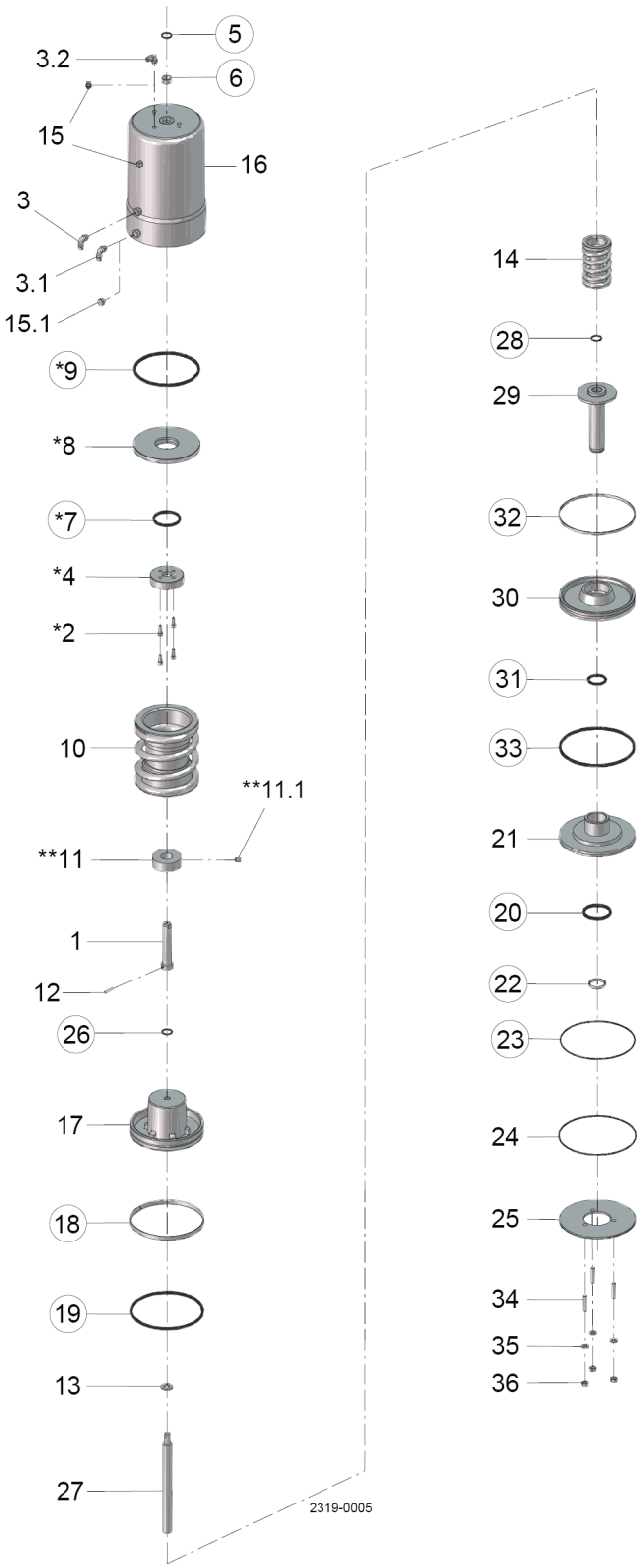
Note!
Supply compressed air before mounting the valve.



6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

6.6 Dismantling of actuator



The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

Step 1
1. Dismantle the valve in accordance with instructions in section 6.1 General maintenance
   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 and screw (11/11.1) (only on 1½" and 2").
   Remove guide ring (18) and o-ring (19)
2. Remove spring assembly (10).

Step 5
Note! Not on actuator 1½" and 2"

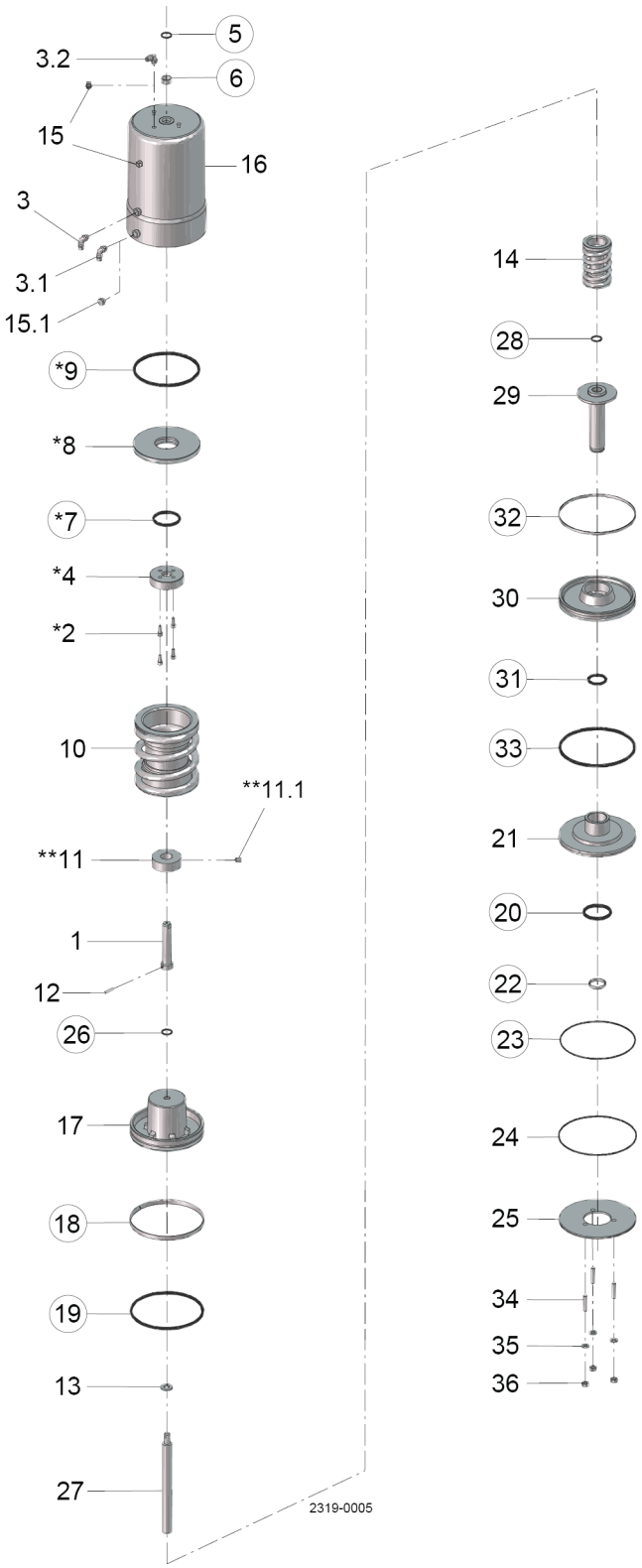
1. Unscrew screws (2) (are glued!).
2. Remove stop (4).
3. Remove upper piston (8). Remove o-rings (7 and 9).

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

6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

6.7 Assembly of actuator



The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

Step 1
Please see drawing when reassembling according to steps 2 to 6 on this page.
Note! The actuator is maintenance free but repairable.

Step 2
1. Fit guide ring (6) and o-ring (5).

Step 3
Note! Not on actuator 1½" and 2"
1. Fit o-rings (7 and 9). Place upper piston (8).
2. Fit stop (4).
3. Tighten screws (2). (Secure with glue)

Step 4
1. Place spring assembly (10).
2. Fit o-ring (19) and guide ring (18). Mount distance spacer (11) and screw (11.1) (only on 1½" and 2"), main piston (17) and inner stem (27).

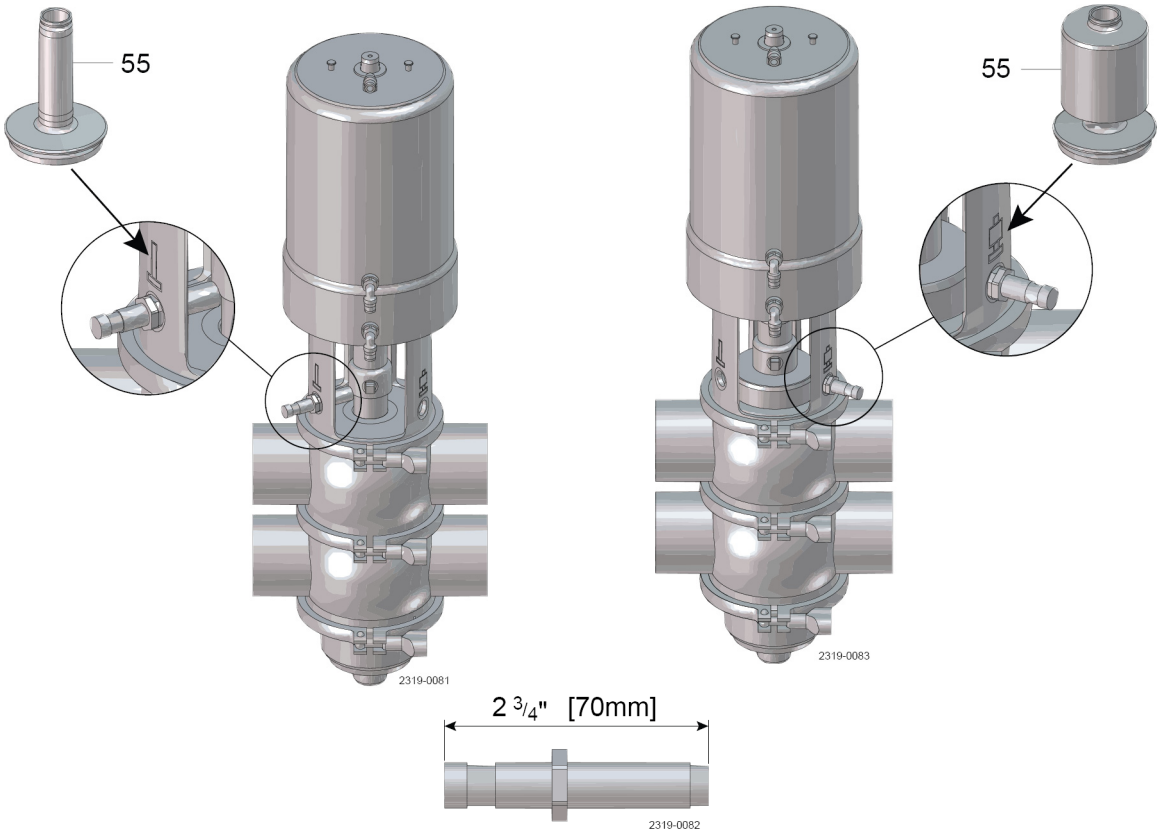
Step 5
1. Fit spring assembly (14).
2. Fit o-ring (28) in piston rod, fit o-rings (33 and 31) and guide ring (32) in lower piston and fit o-rings (20, 22 and 23) in bottom.
3. Fit piston rod (29), lower piston (30) and bottom (21).
4. Mount the three parts.

Step 6
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).

6 Maintenance

The valve is designed so that internal leakages do not result in the products becoming mixed.
Internal leakage in the valve is externally visible.
Study the instructions carefully.
Always keep spare rubber seals and guide rings in stock. Check the valve for smooth operation after service.

Placement of external sensor and sensor type



External sensor

Note!
If using external sensor, the sensor must be active/activated when performing a setup routine of the control head.

Supply voltage:	Must match the selected type of ThinkTop®.
Supply current:	Max. 15 mA per sensor.
Type of sensor:	3 wire VDC PNP (EN60947-5-2).
Sensor cable length:	Max. 118 1/8"

Further information can be found in the ThinkTop instruction manual and product leaflet.

7.1 Technical data

Data	
Max. product pressure	145 psi
Min. product pressure	Full vacuum
Recommended min. pressure for SpiralClean	29 psi
Temperature range	23°F - 257°F (Depending on rubber quality)
Air pressure	116 psi
Materials	
Product wetted steel parts	Acid-resistant steel AISI 316
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 bright (polished) Ra < 0.8 (32 µ")/external matt (blasted Ra < 1.6/64µ") Internal/external bright (internal polished) Ra < 0.8 (32 µ")

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

Recommended minimum pressure for SpiralClean: 30 psi/flow rate 4.2 gpm

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

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

Q = CIP - flow (gpm)
Cv = Cv value from the above table
Δp = CIP pressure (psi)
Assumption: density = 1

Size	1½"	2"	½"	3"	4"	6"
Cv-value - upper seat-lift [gpm/psi]	2.9	2.9	4.3	4.3	5.3	6.3
Cv-value - lower seat-lift [gpm/psi]	2.2	2.2	3.6	3.6	4.9	6.1
Air consumption - upper seat-lift *[cubic inches]	12	12	24	24	38	38
Air consumption - lower seat-lift *[cubic inches]	6.7	6.7	8	8	13	13
Air consumption - main movement *[cubic inches]	52	52	99	99	170	170
Cv-value SpiralClean - spindle CIP [gpm/psi]	0.14	0.14	0.14	0.14	0.14	0.14
Cv-value SpiralClean - external CIP of leakage chamber [gpm/psi]	0.29	0.29	0.34	0.34	0.34	0.34

For further information concerning cleaning of the valve, please see section 4.2 Recommended cleaning, step 5, 6, 7 & 8.

Noise
5¼ Ft above the exhaust the noise level of a valve actuator will be approximately 77db(A) without noise damper and approximately 72 db(A) with damper - Measured at 102 psi air-pressure.

Safety check

A visual inspection of any protective device (shield, guard, cover or other) on the supplied product shall be carried out at least every 12 months.

If the protective device is lost or damaged, especially when this leads to deterioration of safety performance, it shall be replaced.

The fixing of the protective device should only be replaced with fixings of the same or an equivalent type.

Inspection acceptance criteria:

- It should not be possible to reach moving parts originally protected by a protective device.
- The protective device must be securely mounted.
- Ensure that screws for the protective device are securely tightened.

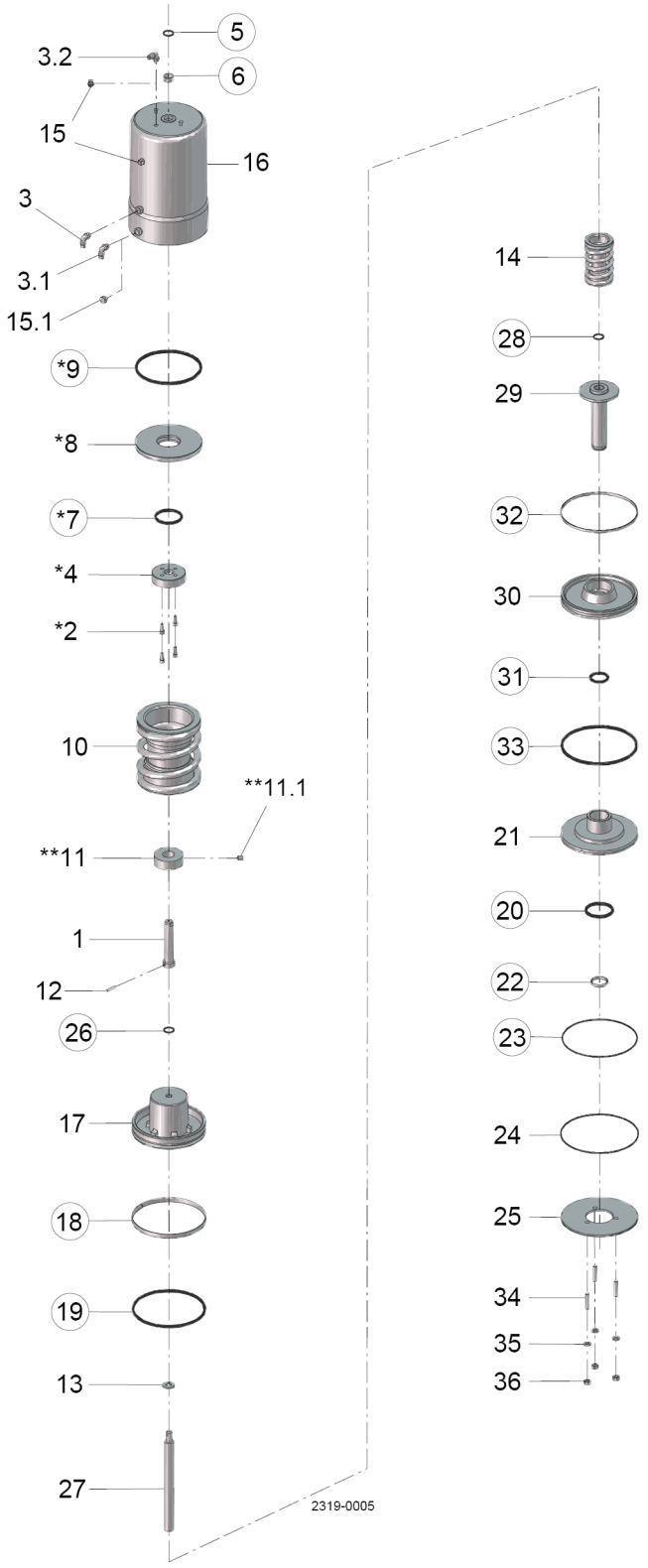
Procedure in case of non-acceptance:

- Fix and/or replace the protective device.

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.1 Actuator



◯ = acuator service kit
* = not used in actuator 1½" - 2"
** = not used in actuator 2½", 3", 4 and 6"

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
1		1	Upper stem
2		4	Screw
3		1	Kit, air fitting and label
3.1		1	Kit, air fitting and label
3.2		1	Kit, air fitting and label
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
11.1		1	Screw
12		1	Pin
13		1	Washer
14		1	Spring assembly
15		2	Plug
15.1		1	Plug
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

Service kits

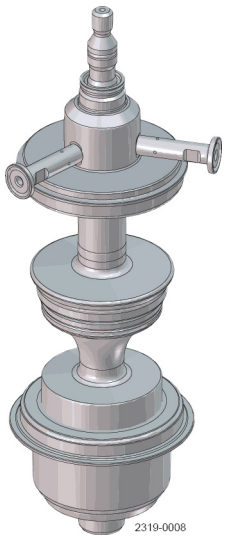
	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
Service kits							
□	Actuator service kit	9611926414	9611926414	9611926415	9611926415	9611926416	9611926416

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

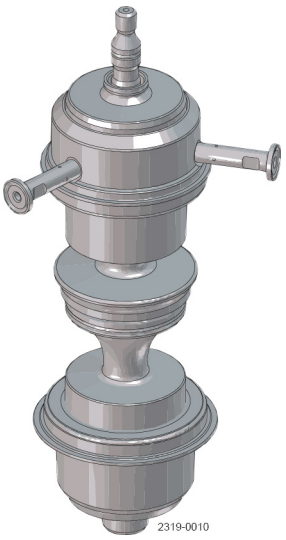
8.2 Plug setup overview

Plug setup 3



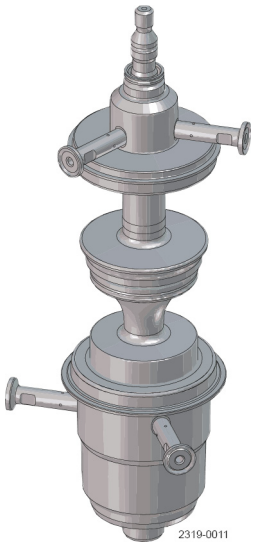
Upper: Unbalanced with SpiralClean OD spindle
Lower: Balanced (blue bottom)
See page 58

Plug setup 4



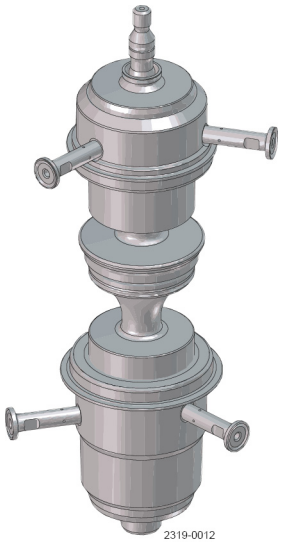
Upper: Balanced with SpiralClean OD balancer
Lower: Balanced (blue bottom)
See page 62

Plug setup 5



Upper: Unbalanced with SpiralClean OD spindle
Lower: Balanced with SpiralClean OD balancer (blue bottom)
See page 66

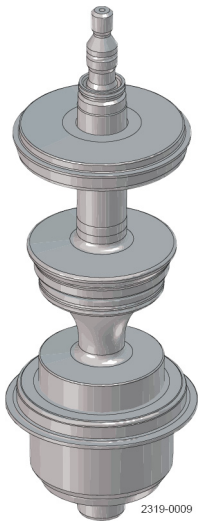
Plug setup 6



Upper: Balanced with SpiralClean OD balancer
Lower: Balanced with SpiralClean OD balancer (blue bottom)
See page 70

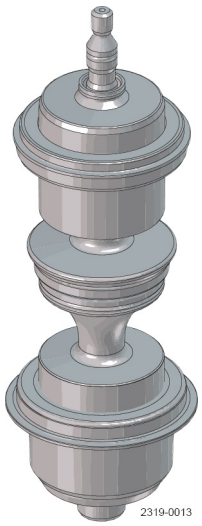
For spare parts please refer to spare parts catalogue.

Plug setup 11



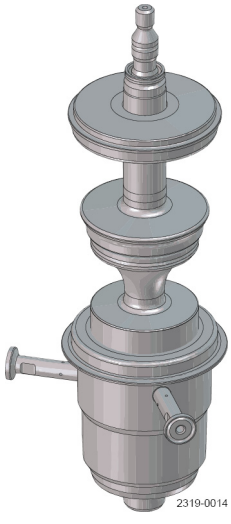
Upper: Unbalanced
Lower: Balanced (blue bottom)
See page 74

Plug setup 12



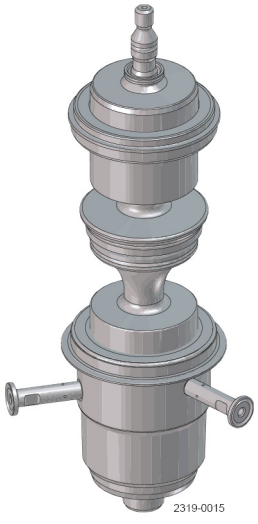
Upper: Balanced
Lower: Balanced (blue bottom)
See page 78

Plug setup 13



Upper: Unbalanced
Lower: Balanced with SpiralClean OD balancer (blue bottom)
See page 82

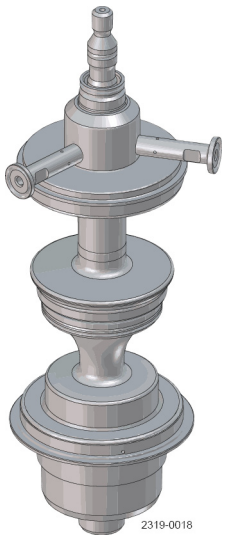
Plug setup 14



Upper: Balanced
Lower: Balanced with SpiralClean OD balancer (blue bottom)
See page 86

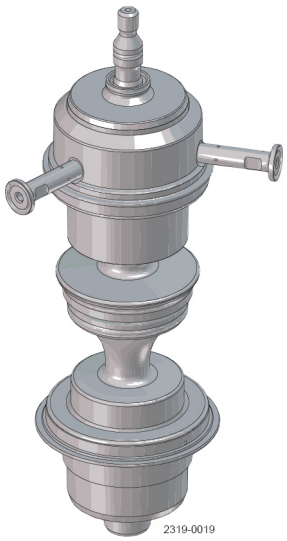
For spare parts please refer to spare parts catalogue.

Plug setup 17



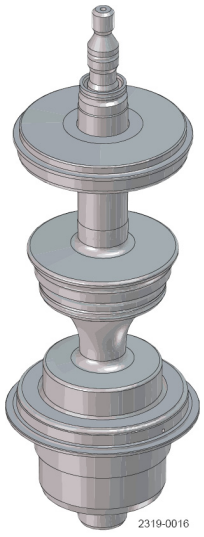
Upper: Unbalanced with SpiralClean OD spindle
Lower: Flush OD Balancer (steel bottom)
See page 90

Plug setup 18



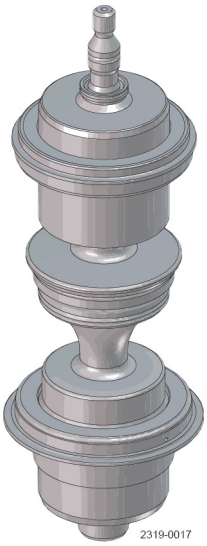
Upper: Balanced with SpiralClean OD balancer
Lower: Flush OD Balancer (steel bottom)
See page 94

Plug setup 19



Upper: Unbalanced
Lower: Flush OD Balancer (steel bottom)
See page 98

Plug setup 20

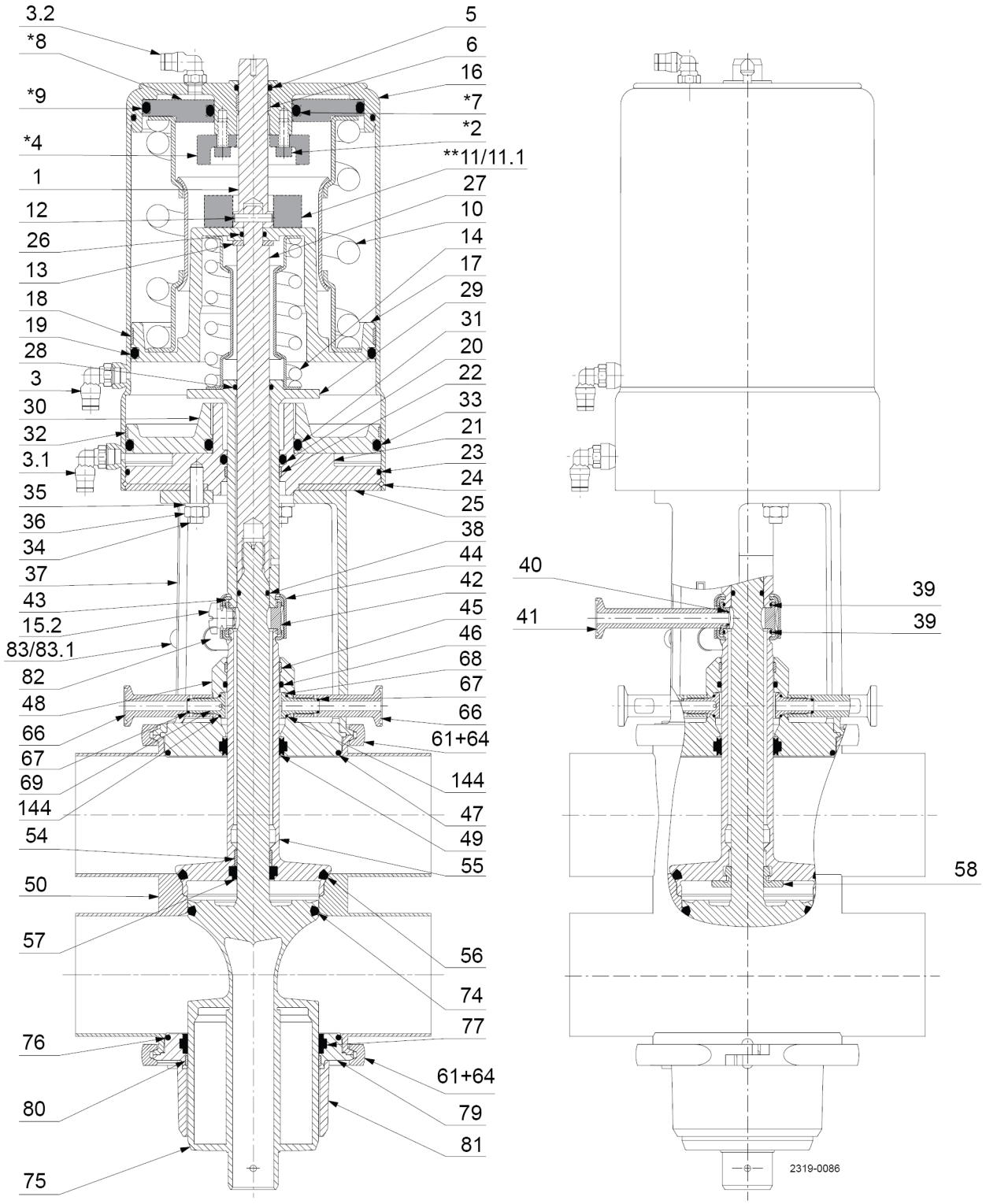


Upper: Balanced
Lower: Flush OD Balancer (steel bottom)
See page 102

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.3 Plug setup 3



without SpiralClean in leakage chamber

with SpiralClean in leakage chamber

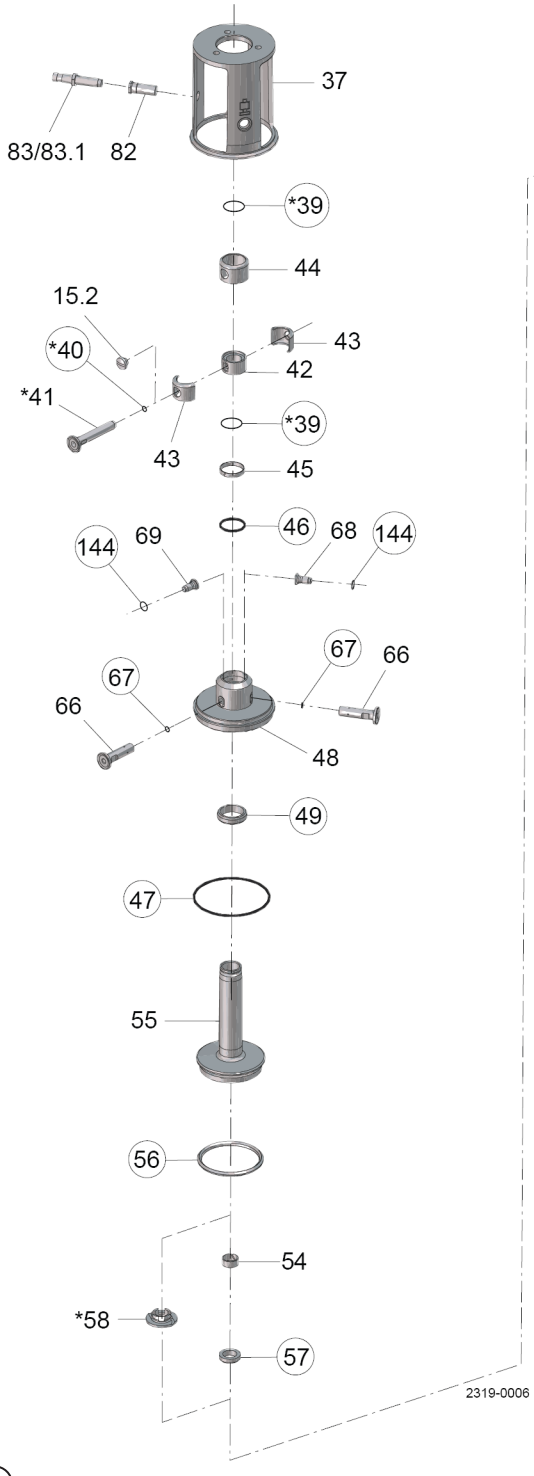
= Parts not used in all actuators

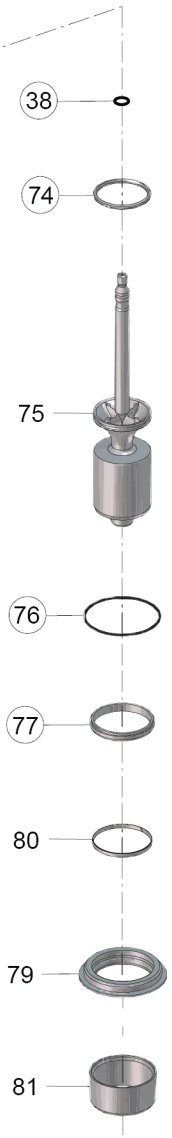
* = Not used in 1½" and 2"

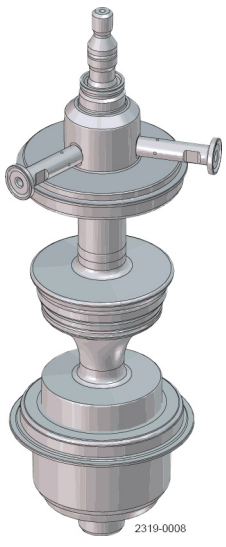
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.







◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
46	♦	1	O-ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
66		2	Flushing tube
67	♦	2	O-ring
68		1	Drain
69		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82		1	Bolt for indication
83		1	Sensor for indication
83.1		1	Cable for sensor for indication
144	♦	2	O-ring

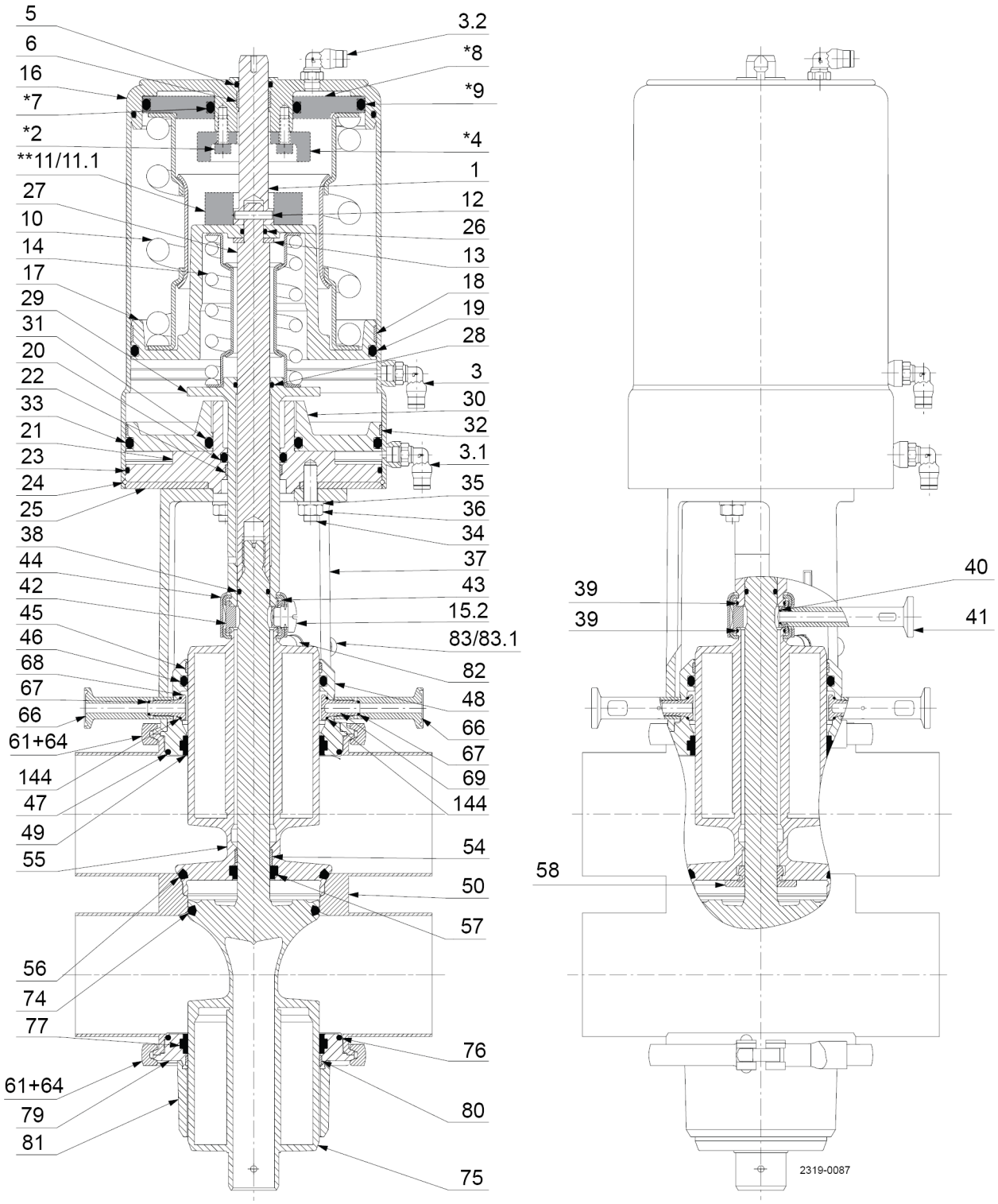
Service kits

	Denomination	2" seat ø53.3	2½" seat ø81.3	3" seat ø81.3	4" seat ø100.3	6" seat ø115.3
♦	Service kit, EPDM	9611928001	9611928005	9611928005	9611928009	9611928013
♦	Service kit, NBR	9611928002	9611928006	9611928006	9611928010	9611928014
♦	Service kit, FPM	9611928003	9611928007	9611928007	9611928011	9611928015
♦	Service kit, HNBR	9611928004	9611928008	9611928008	9611928012	9611928016

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.4 Plug setup 4



without SpiralClean in leakage chamber

with SpiralClean in leakage chamber

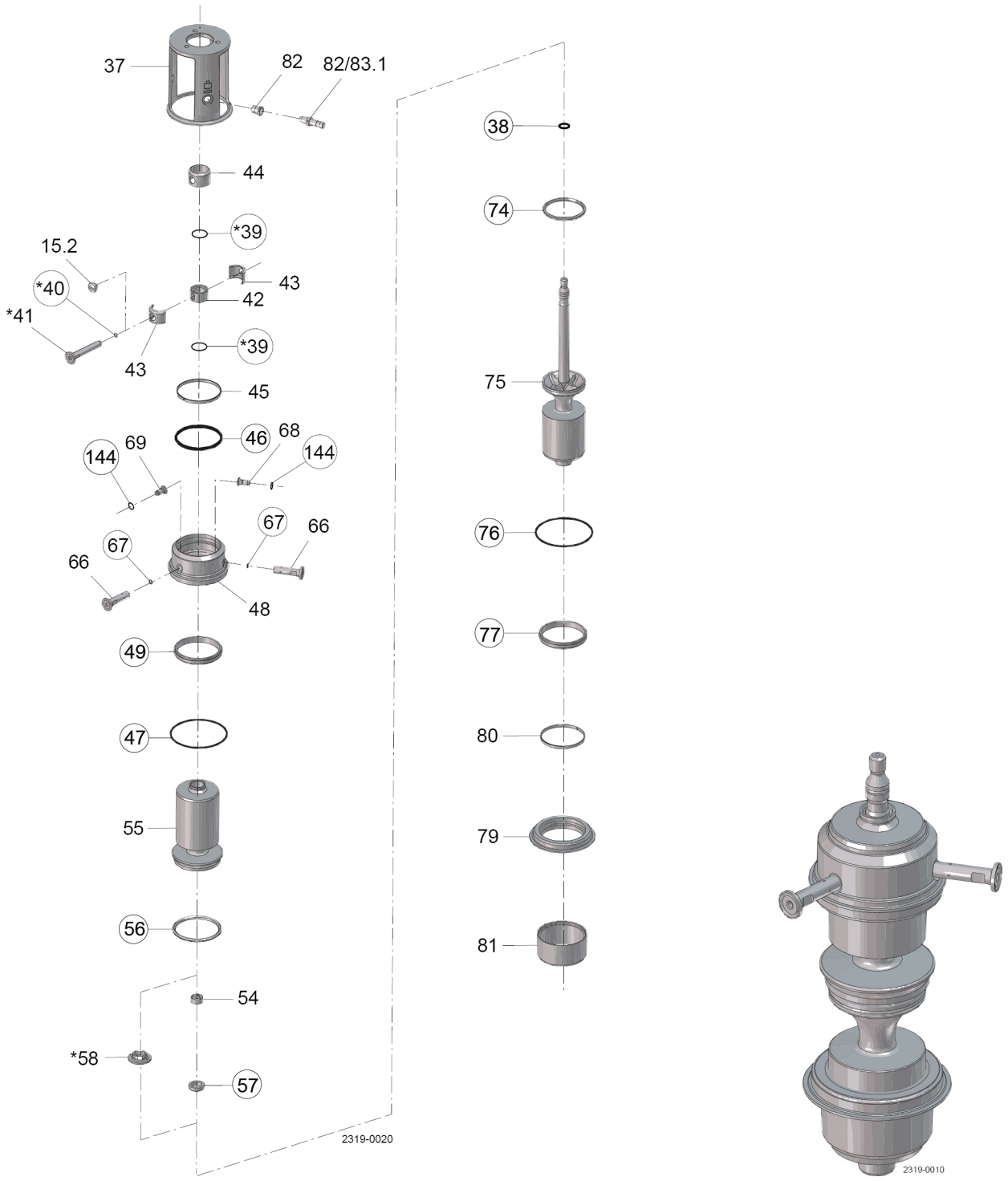
= Parts not used in all actuators

* = Not used in 1½" and 2"

** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.



◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
46	♦	1	O-ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
66		2	Flushing tube
67	♦	2	O-ring
68		1	Drain
69		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82	Δ	1	Bolt for indication
83	Δ	1	Sensor for indication
83.1		1	Cable for sensor for indication
144	♦	2	O-ring

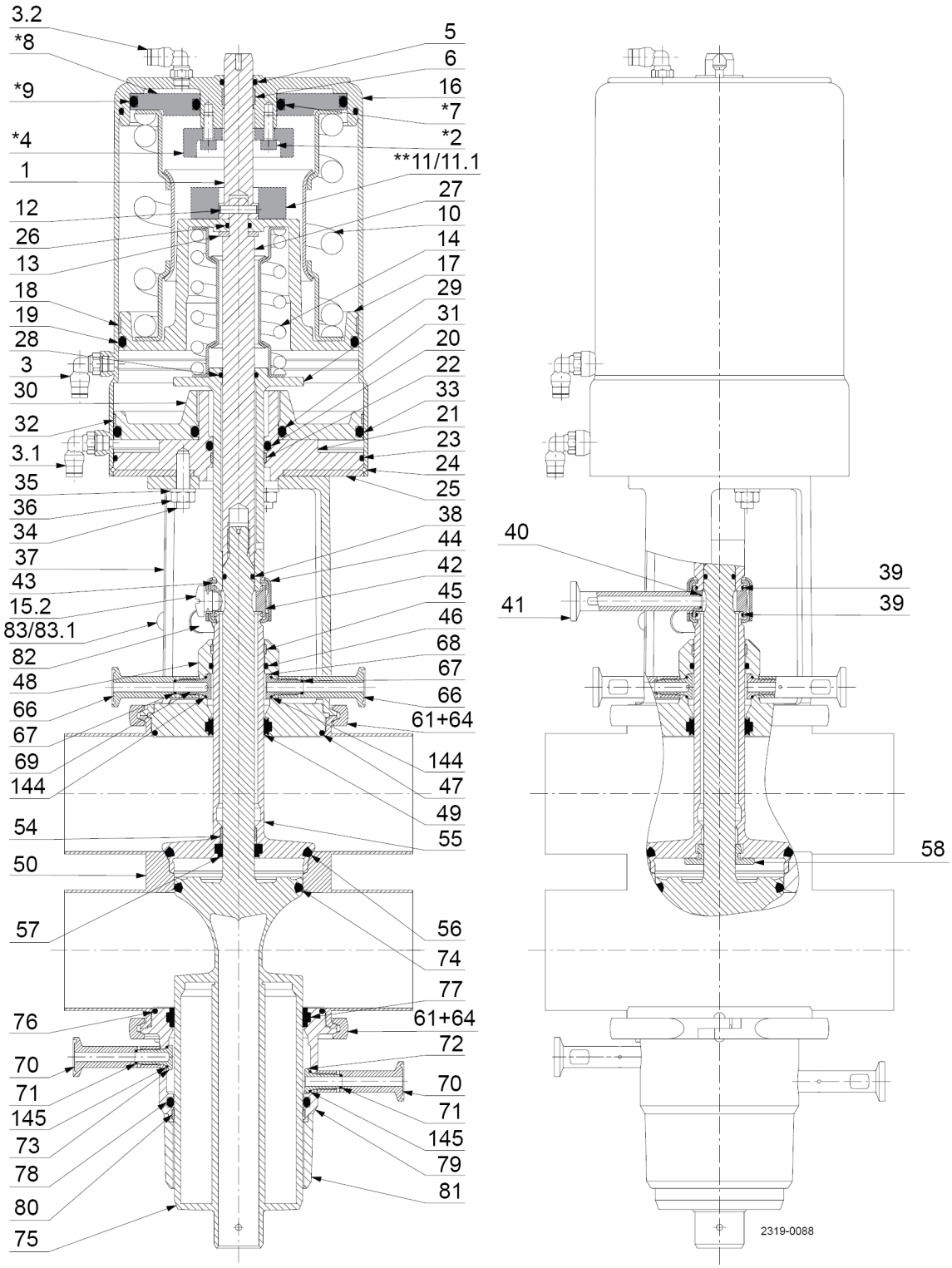
Service kits

	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928017	9611928021	9611928025	9611928025	9611928029	9611928033
♦	Service kit, NBR	9611928018	9611928022	9611928026	9611928026	9611928030	9611928034
♦	Service kit, FPM	9611928019	9611928023	9611928027	9611928027	9611928031	9611928035
♦	Service kit, HNBR	9611928020	9611928024	9611928028	9611928028	9611928032	9611928036

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.5 Plug setup 5



without SpiralClean in leakage chamber

with SpiralClean in leakage chamber

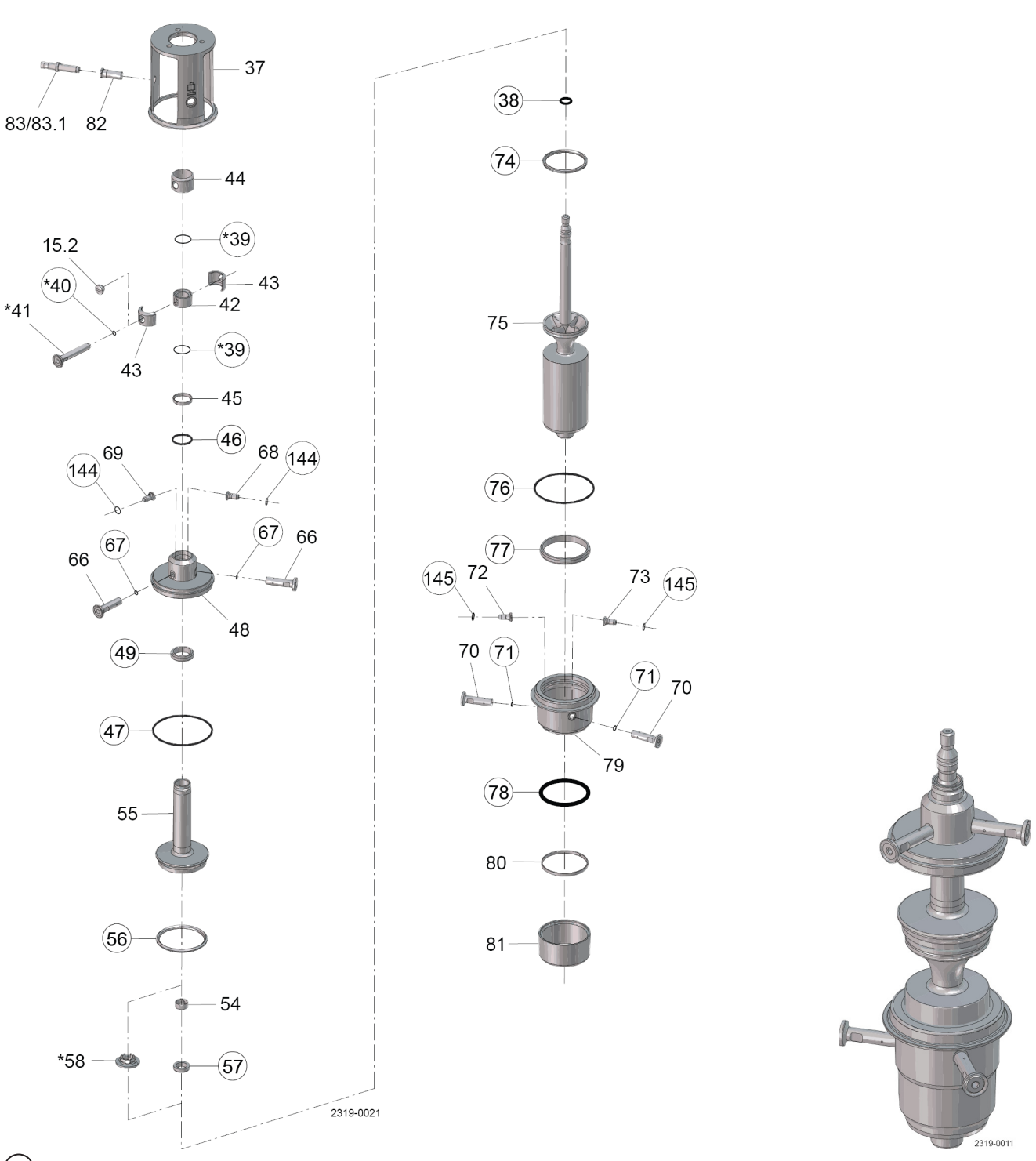
= Parts not used in all actuators

* = Not used in 1½" and 2"

** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.



◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
46	♦	1	O-ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
66		2	Flushing tube
67	♦	2	O-ring
68		1	Drain
69		1	Nozzle
70		2	Flushing tube
71	♦	2	O-ring
72		1	Drain
73		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
78	♦	1	O-ring
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82		1	Bolt for indication
83		1	Sensor for indication
83.1		1	Cable for sensor for indication
144	♦	2	O-ring
145	♦	2	O-ring

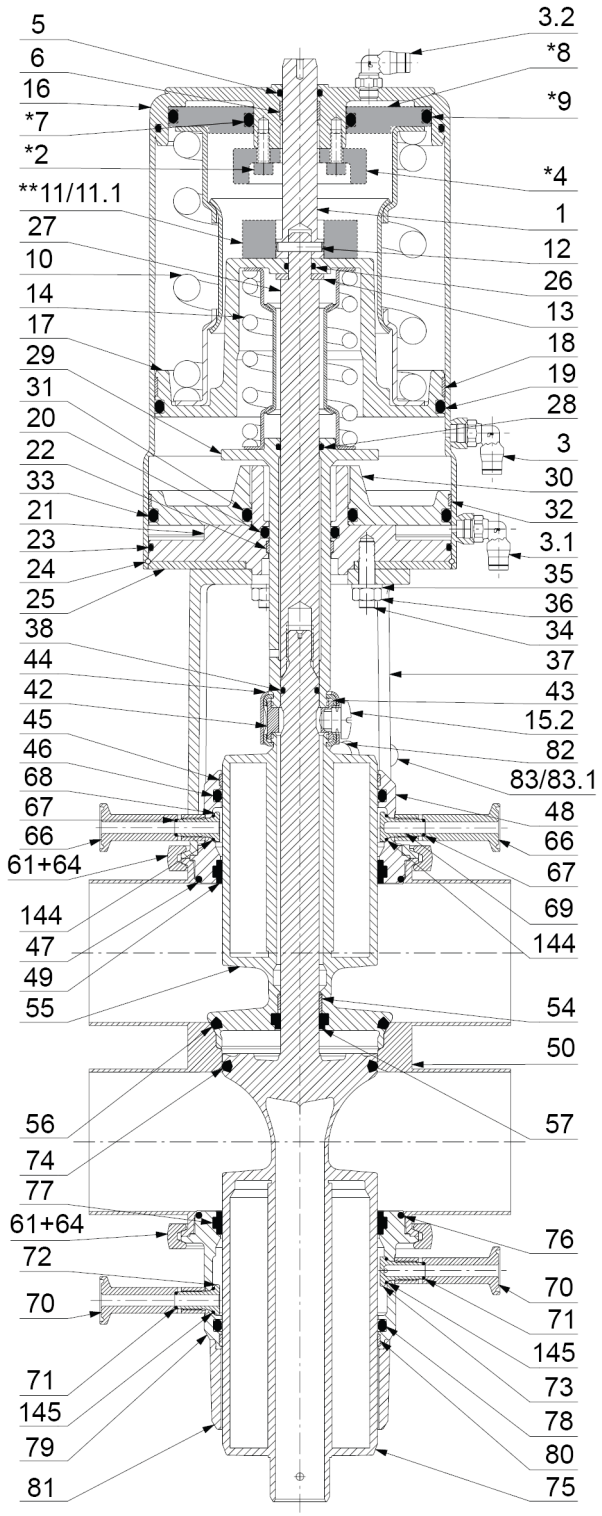
Service kits

	Denomination	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928037	9611928041	9611928041	9611928045	9611928049
♦	Service kit, NBR	9611928038	9611928042	9611928042	9611928046	9611928050
♦	Service kit, FPM	9611928039	9611928043	9611928043	9611928047	9611928051
♦	Service kit, HNBR	9611928040	9611928044	9611928044	9611928048	9611928052

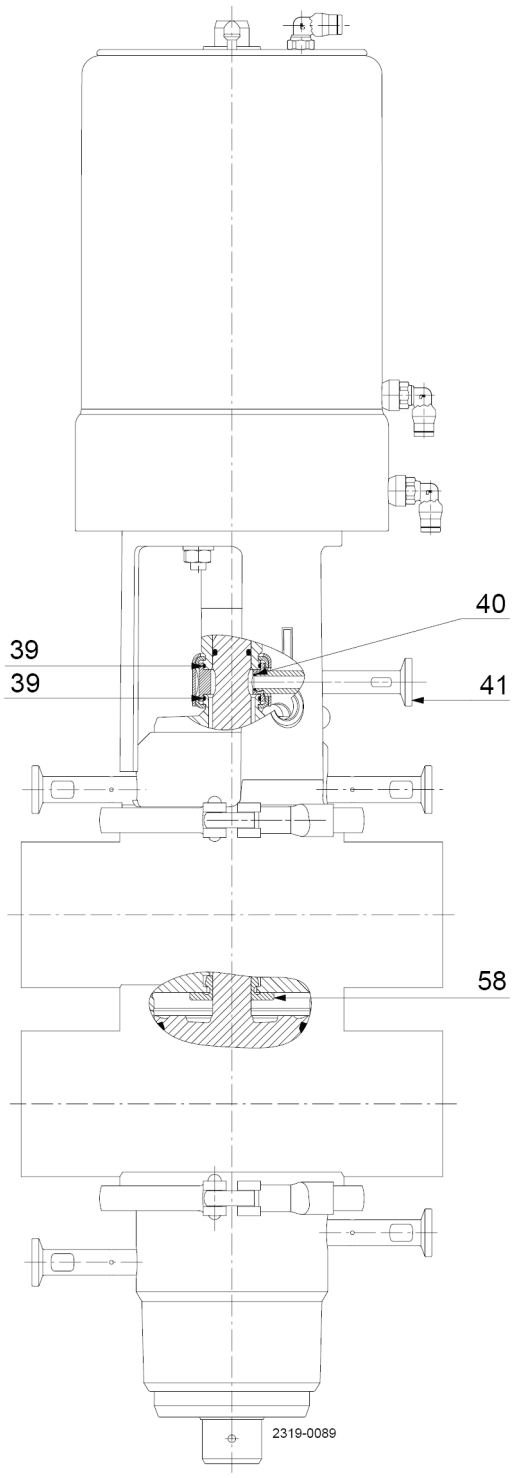
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.6 Plug setup 6



without SpiralClean in leakage chamber

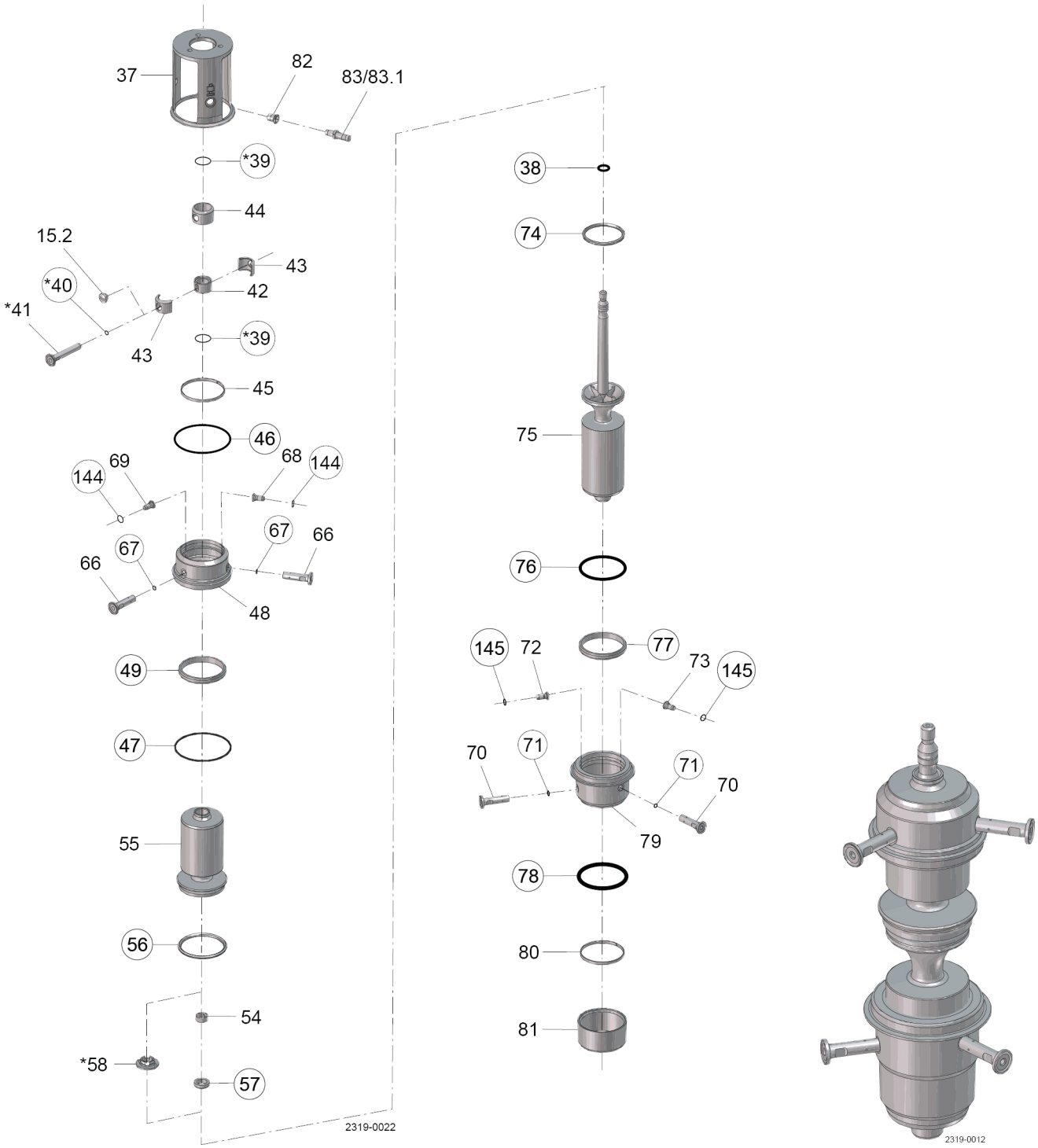


with SpiralClean in leakage chamber

= Parts not used in all actuators
* = Not used in 1½" and 2"
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.



◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
46	♦	1	O-ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
66		2	Flushing tube
67	♦	2	O-ring
68		1	Drain
69		1	Nozzle
70		2	Flushing tube
71	♦	2	O-ring
72		1	Drain
73		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
78	♦	1	O-ring
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82	Δ	1	Bolt for indication
83	Δ	1	Sensor for indication
83.1		1	Cable for sensor for indication
144	♦	2	O-ring
145	♦	2	O-ring

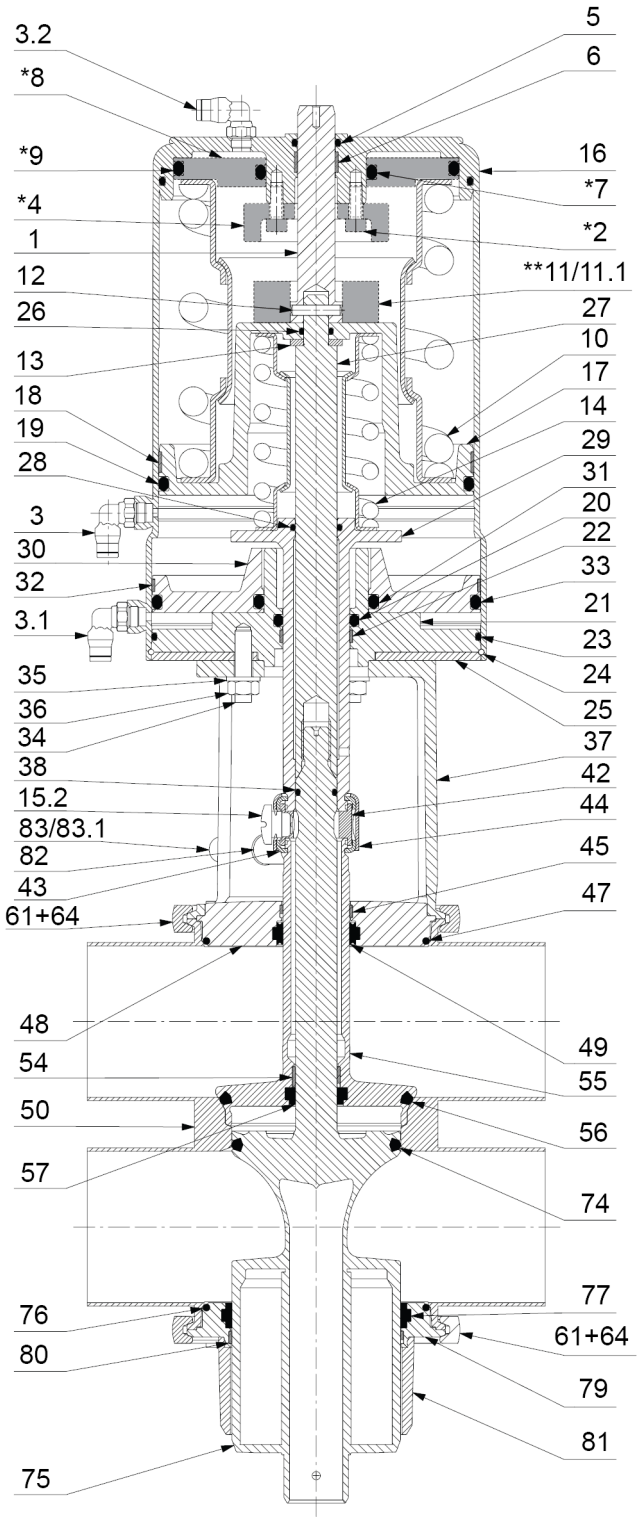
Service kits

	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928053	9611928057	9611928061	9611928061	9611928065	9611928069
♦	Service kit, NBR	9611928054	9611928058	9611928062	9611928062	9611928066	9611928070
♦	Service kit, FPM	9611928055	9611928059	9611928063	9611928063	9611928067	9611928071
♦	Service kit, HNBR	9611928056	9611928060	9611928064	9611928064	9611928068	9611928072

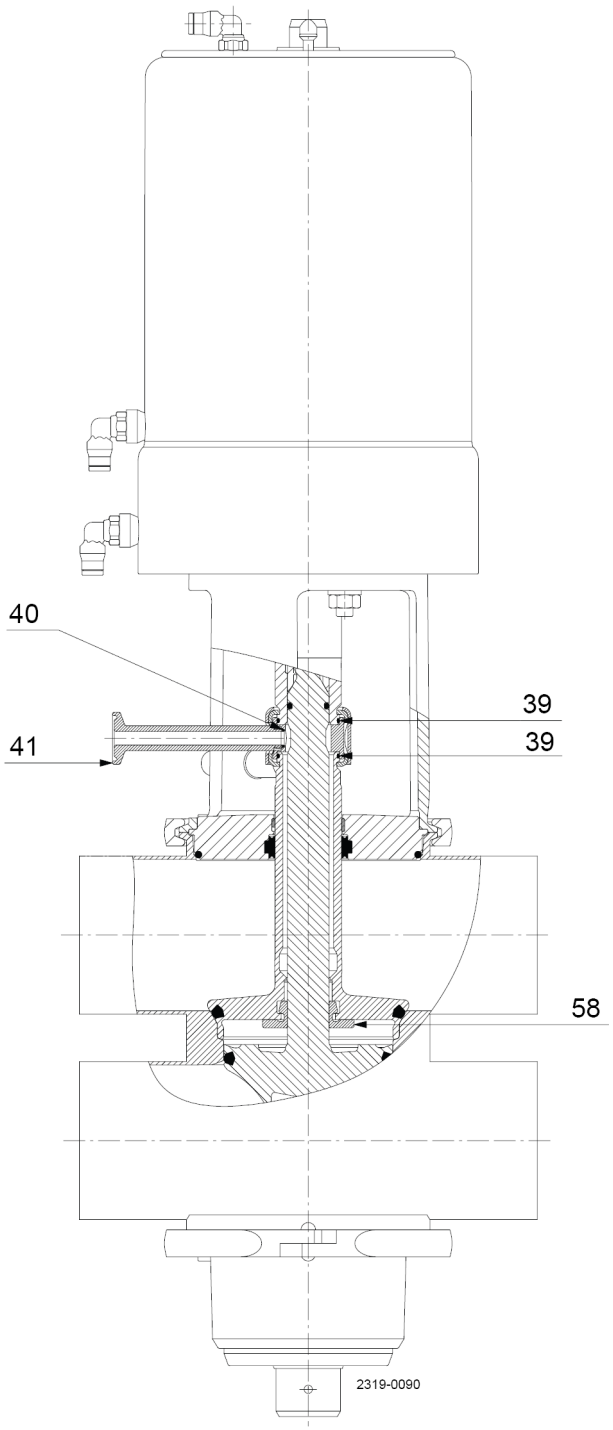
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.7 Plug setup 11



without SpiralClean in leakage chamber



with SpiralClean in leakage chamber

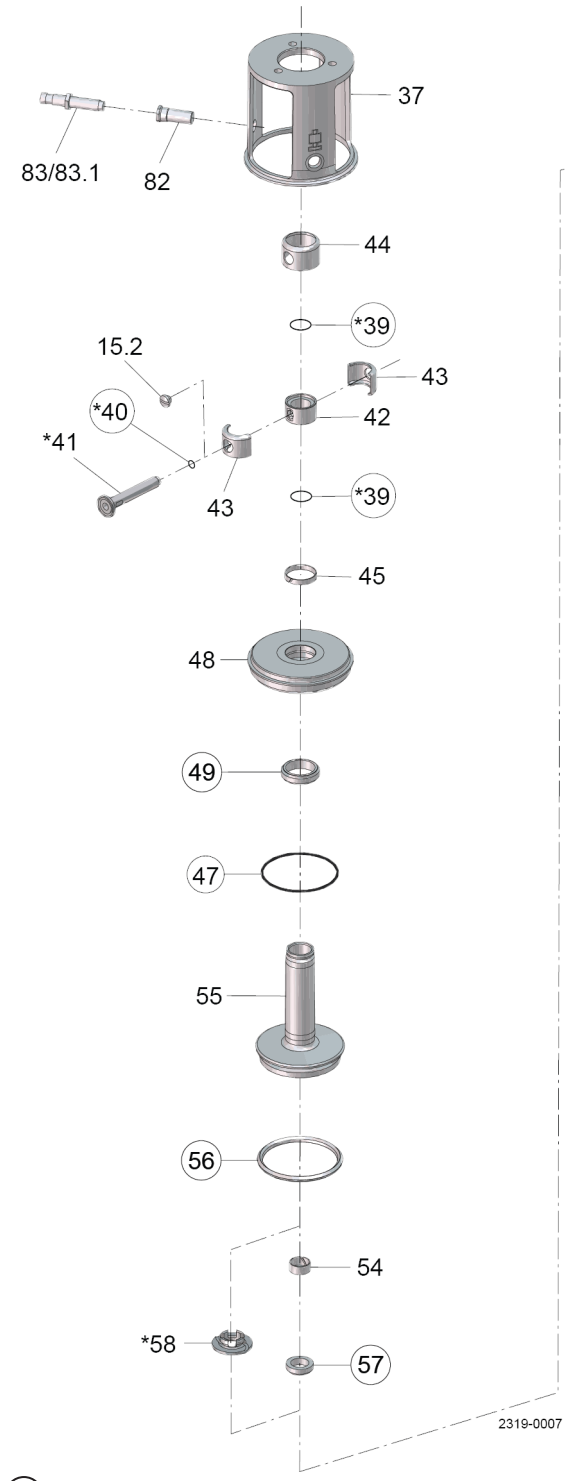
= Parts not used in all actuators

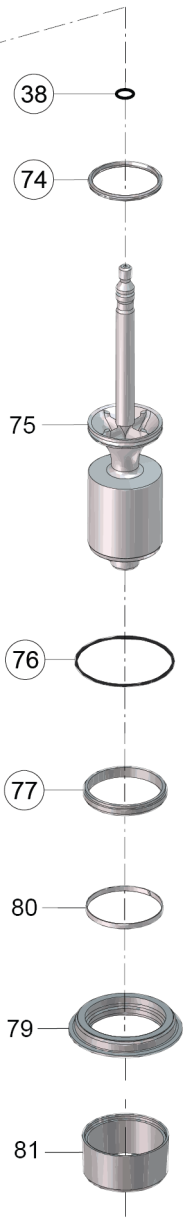
* = Not used in 1½" and 2"

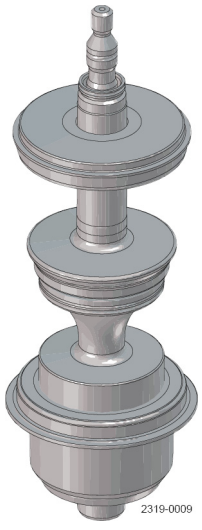
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.







◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82		1	Bolt for indication
83		1	Sensor for indication
83.1		1	Cable for sensor for indication

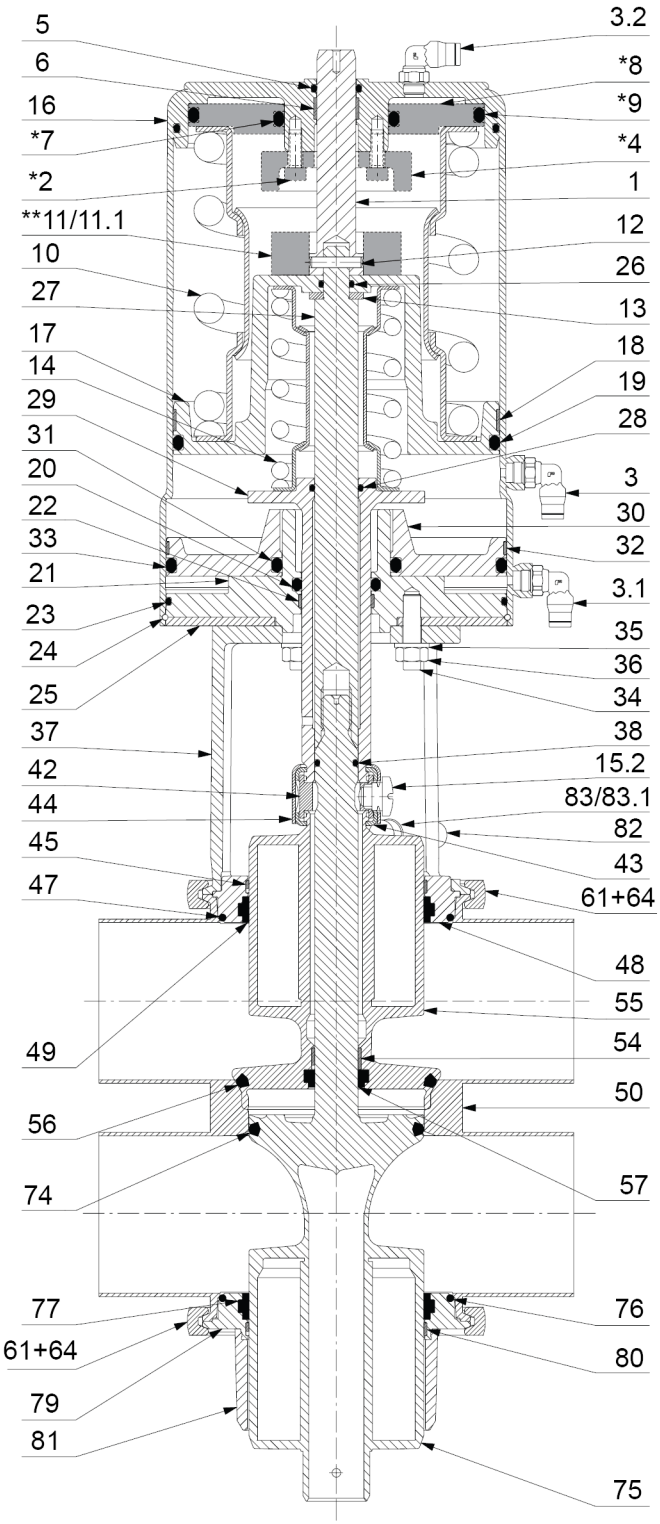
Service kits

	Denomination	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928073	9611928077	9611928077	9611928081	9611928085
♦	Service kit, NBR	9611928074	9611928078	9611928078	9611928082	9611928086
♦	Service kit, FPM	9611928075	9611928079	9611928079	9611928083	9611928087
♦	Service kit, HNBR	9611928076	9611928080	9611928080	9611928084	9611928088

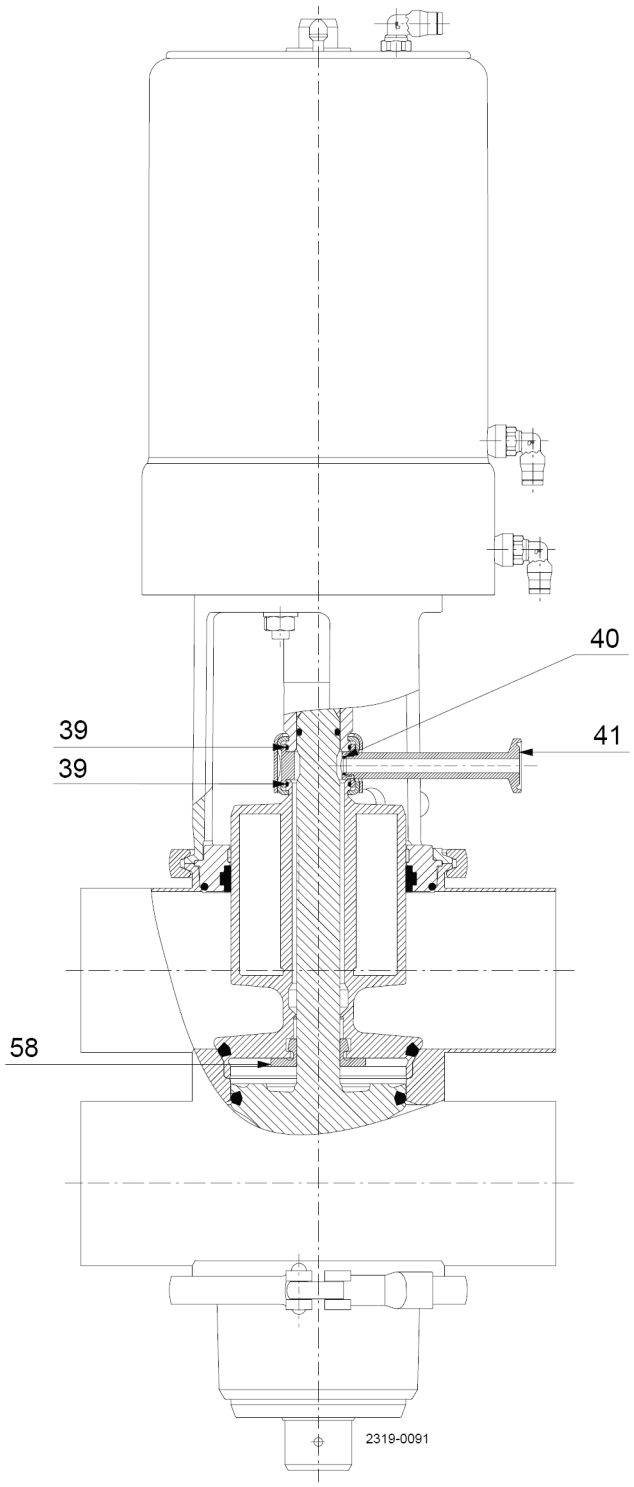
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.8 Plug setup 12



without SpiralClean in leakage chamber

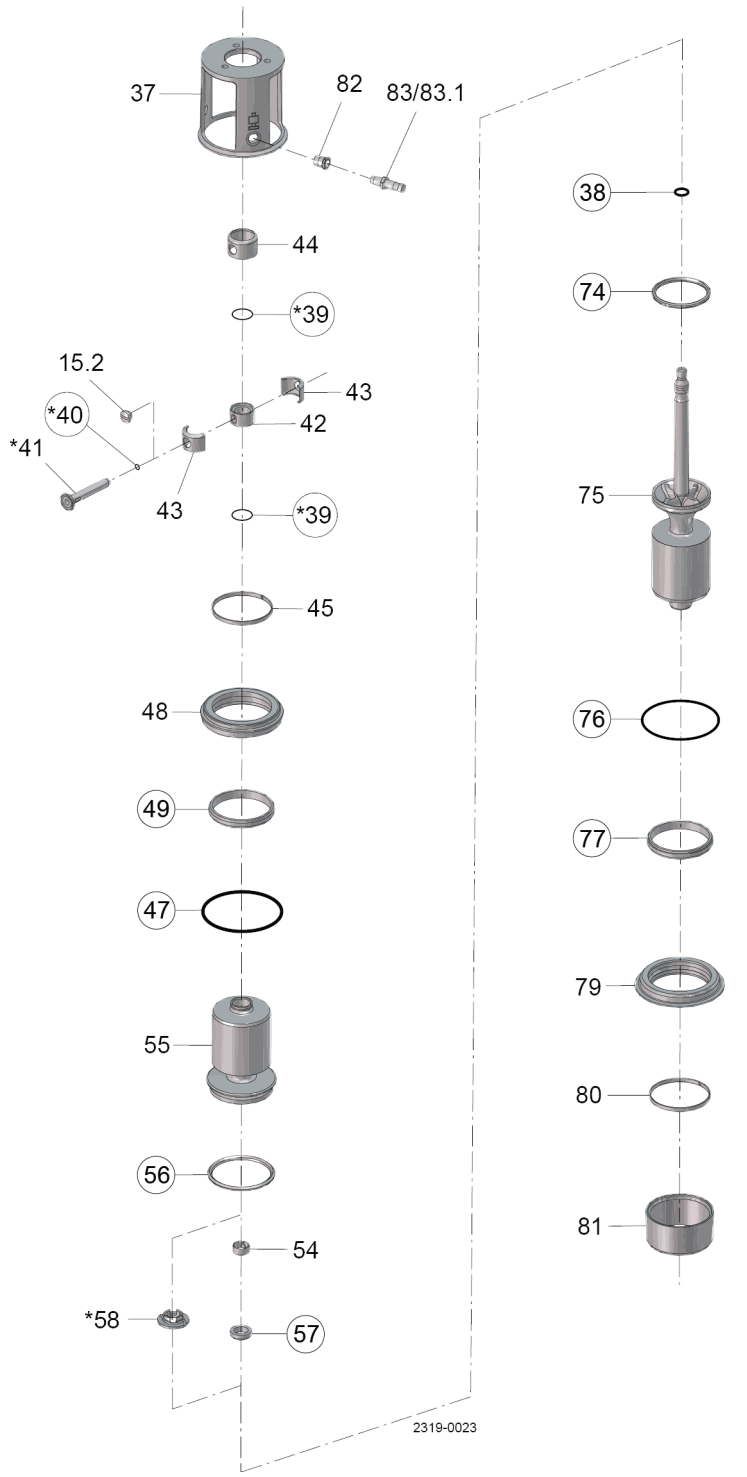


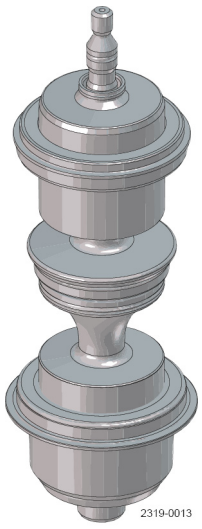
with SpiralClean in leakage chamber

= Parts not used in all actuators
* = Not used in 1½" and 2"
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.





◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82	Δ	1	Bolt for indication
83	Δ	1	Sensor for indication
83.1		1	Cable for sensor for indication

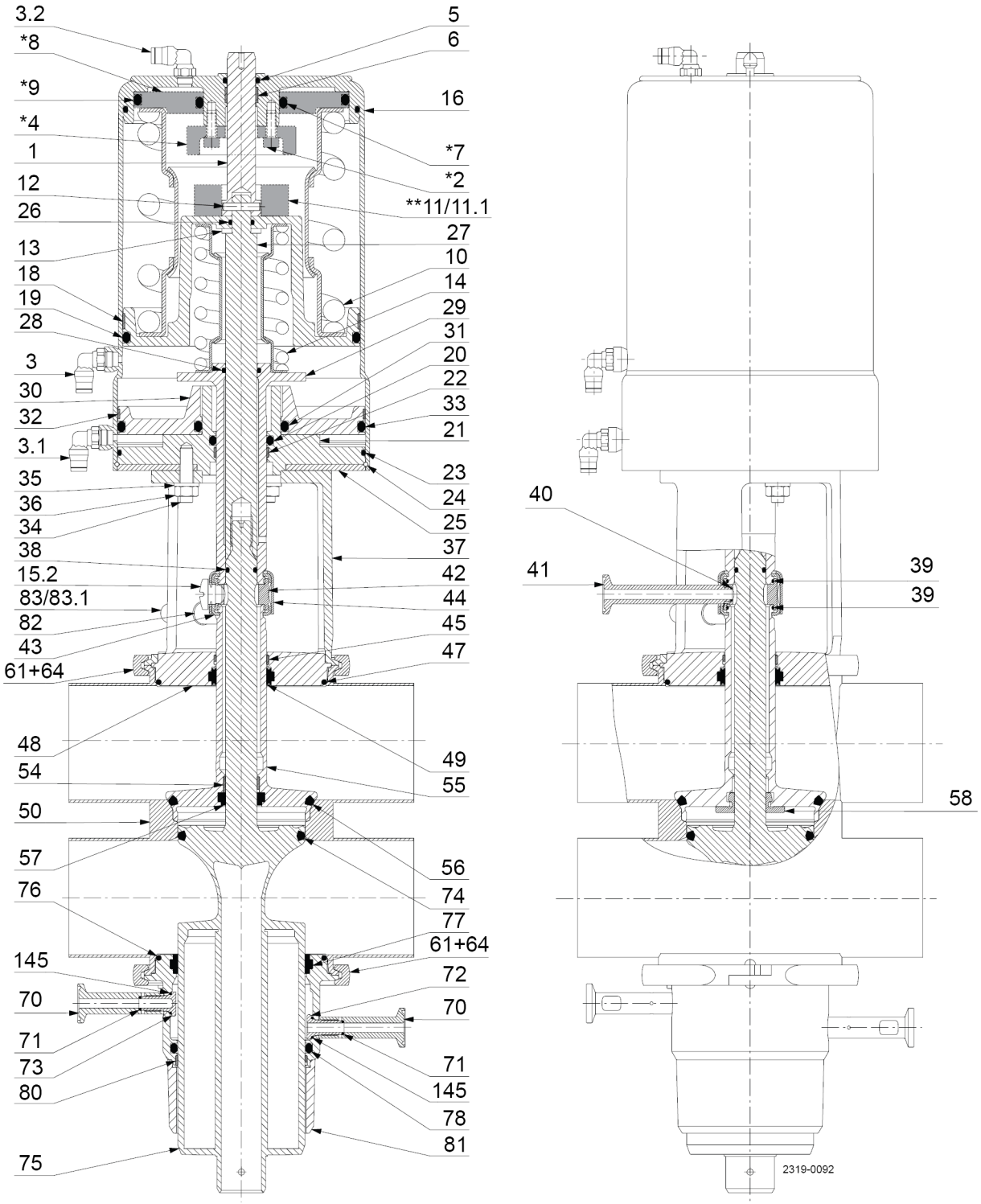
Service kits

	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928089	9611928093	9611928097	9611928097	9611928101	9611928105
♦	Service kit, NBR	9611928090	9611928094	9611928098	9611928098	9611928102	9611928106
♦	Service kit, FPM	9611928091	9611928095	9611928099	9611928099	9611928103	9611928107
♦	Service kit, HNBR	9611928092	9611928096	9611928100	9611928100	9611928104	9611928108

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.9 Plug setup 13



without SpiralClean in leakage chamber

with SpiralClean in leakage chamber

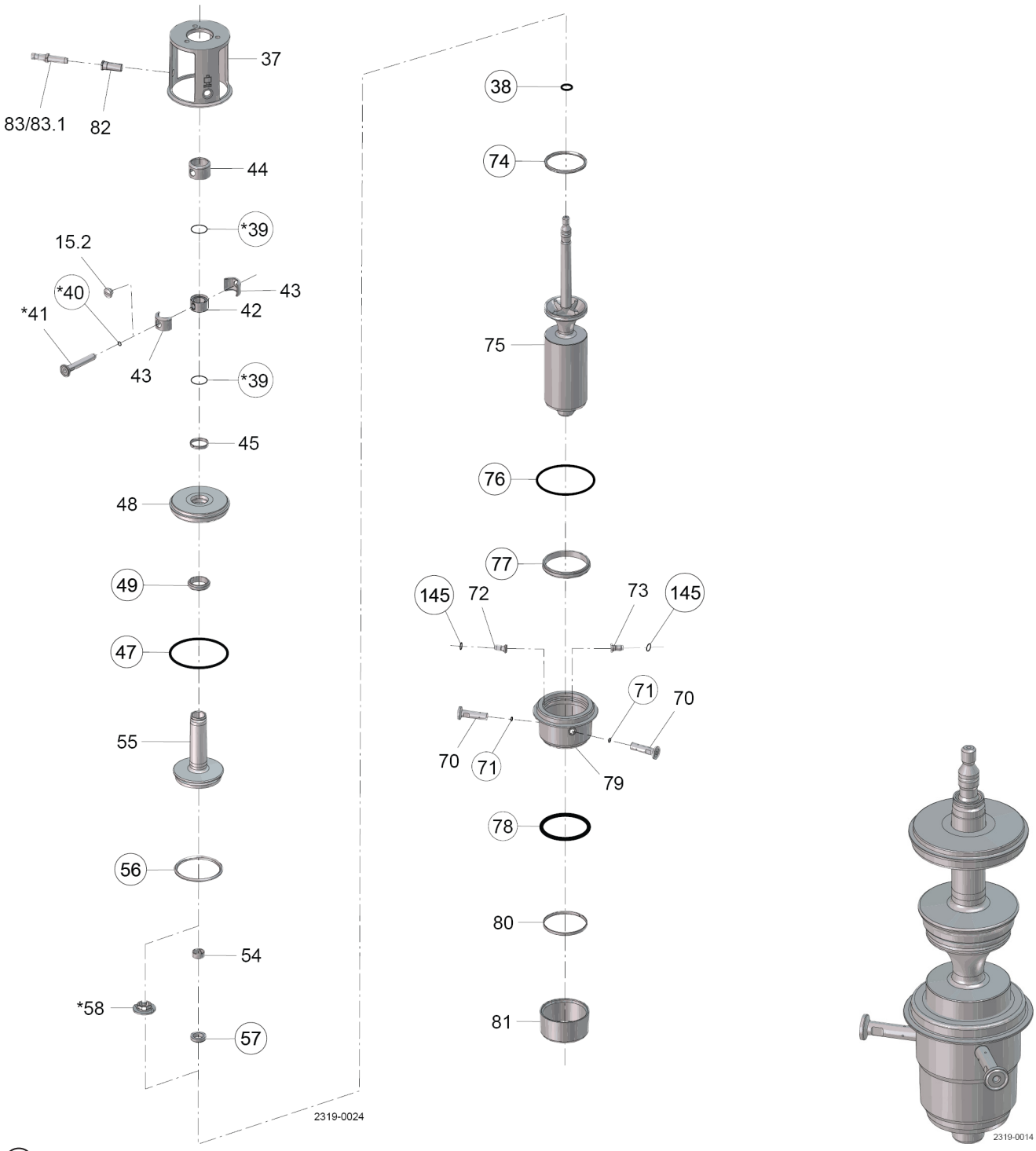
= Parts not used in all actuators

* = Not used in 1½" and 2"

** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.



◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
70		2	Flushing tube
71	♦	2	O-ring
72		1	Drain
73		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
78	♦	1	O-ring
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82		1	Bolt for indication
83		1	Sensor for indication
83.1		1	Cable for sensor for indication
145	♦	2	O-ring

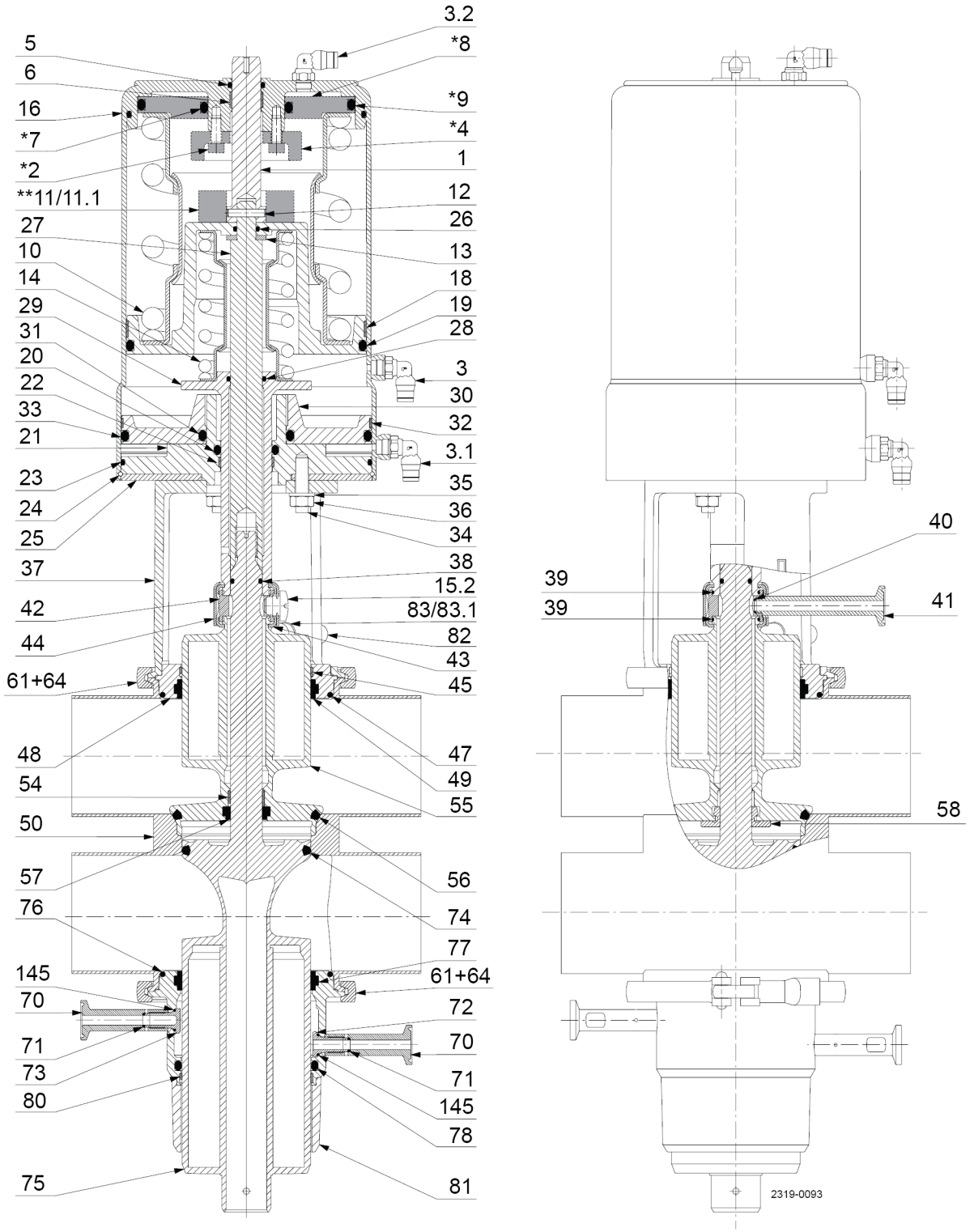
Service kits

	Denomination	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928109	9611928113	9611928113	9611928117	9611928121
♦	Service kit, NBR	9611928110	9611928114	9611928114	9611928118	9611928122
♦	Service kit, FPM	9611928111	9611928115	9611928115	9611928119	9611928123
♦	Service kit, HNBR	9611928112	9611928116	9611928116	9611928120	9611928124

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.10 Plug setup 14



without SpiralClean in leakage chamber

with SpiralClean in leakage chamber

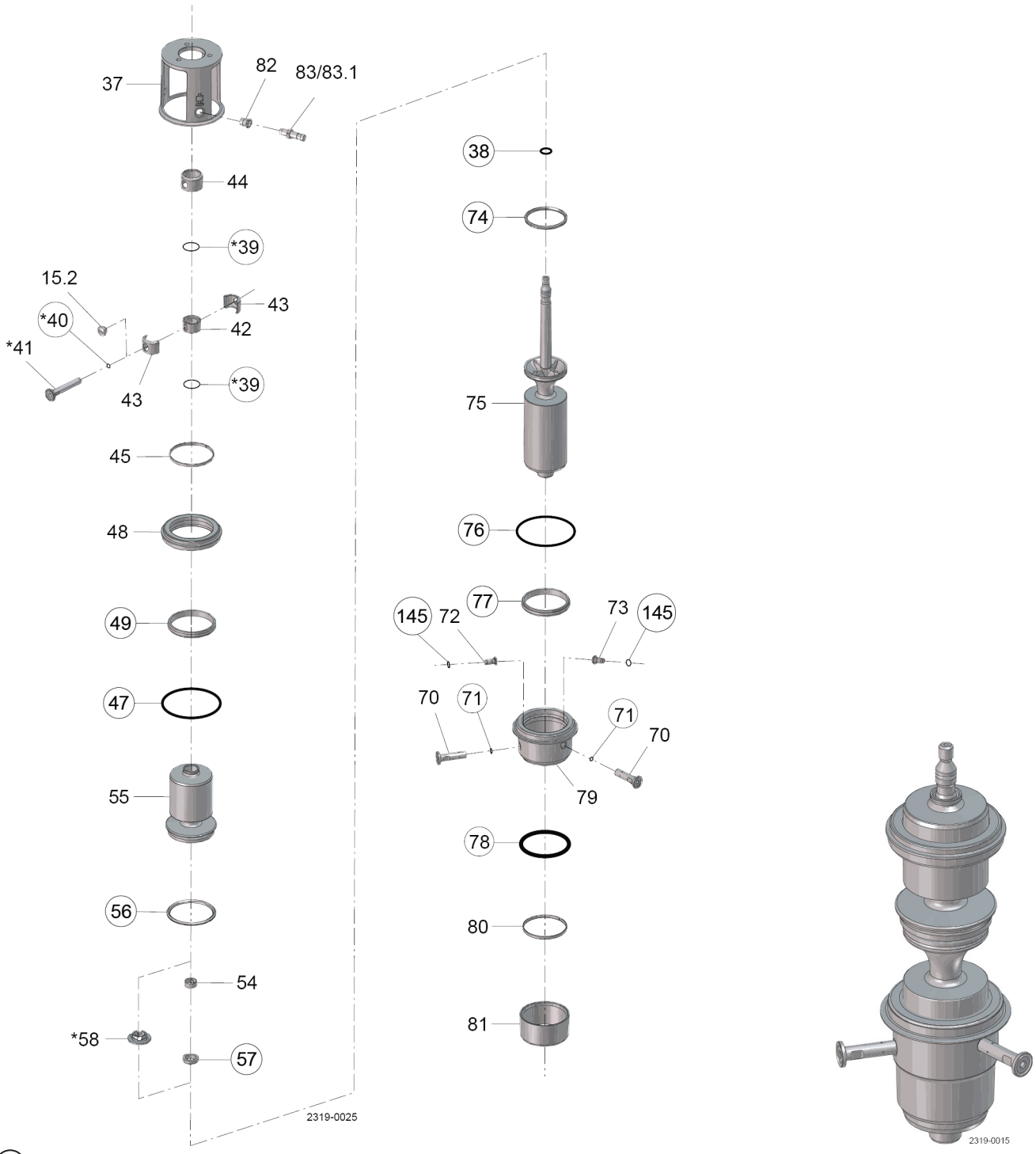
= Parts not used in all actuators

* = Not used in 1½" and 2"

** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.



◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
70		2	Flushing tube
71	♦	2	O-ring
72		1	Drain
73		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
77	♦	1	Lip seal
78	♦	1	O-ring
79		1	Lower sealing element
80		1	Guide ring
81		1	Cover
82	Δ	1	Bolt for indication
83	Δ	1	Sensor for indication
83.1		1	Cable for sensor for indication
145	♦	2	O-ring

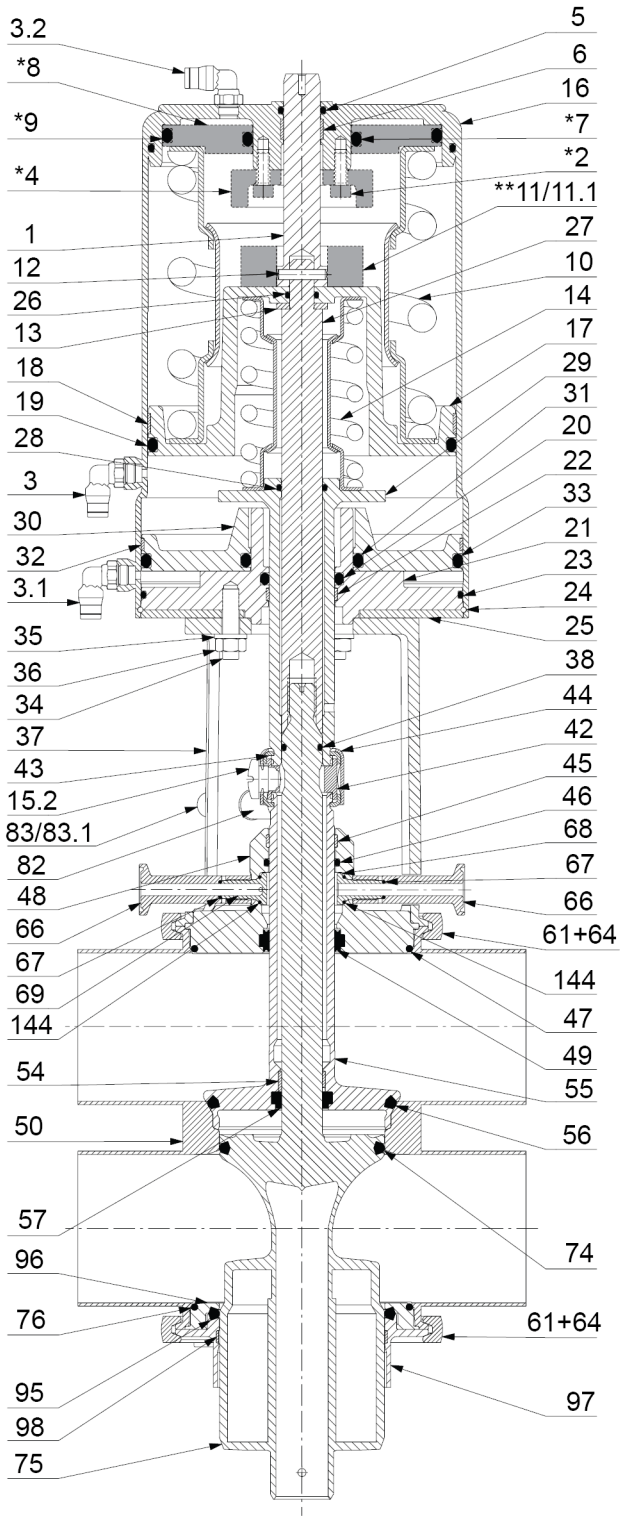
Service kits

	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928017	9611928021	9611928025	9611928025	9611928029	9611928033
♦	Service kit, NBR	9611928018	9611928022	9611928026	9611928026	9611928030	9611928034
♦	Service kit, FPM	9611928019	9611928023	9611928027	9611928027	9611928031	9611928035
♦	Service kit, HNBR	9611928020	9611928024	9611928028	9611928028	9611928032	9611928036

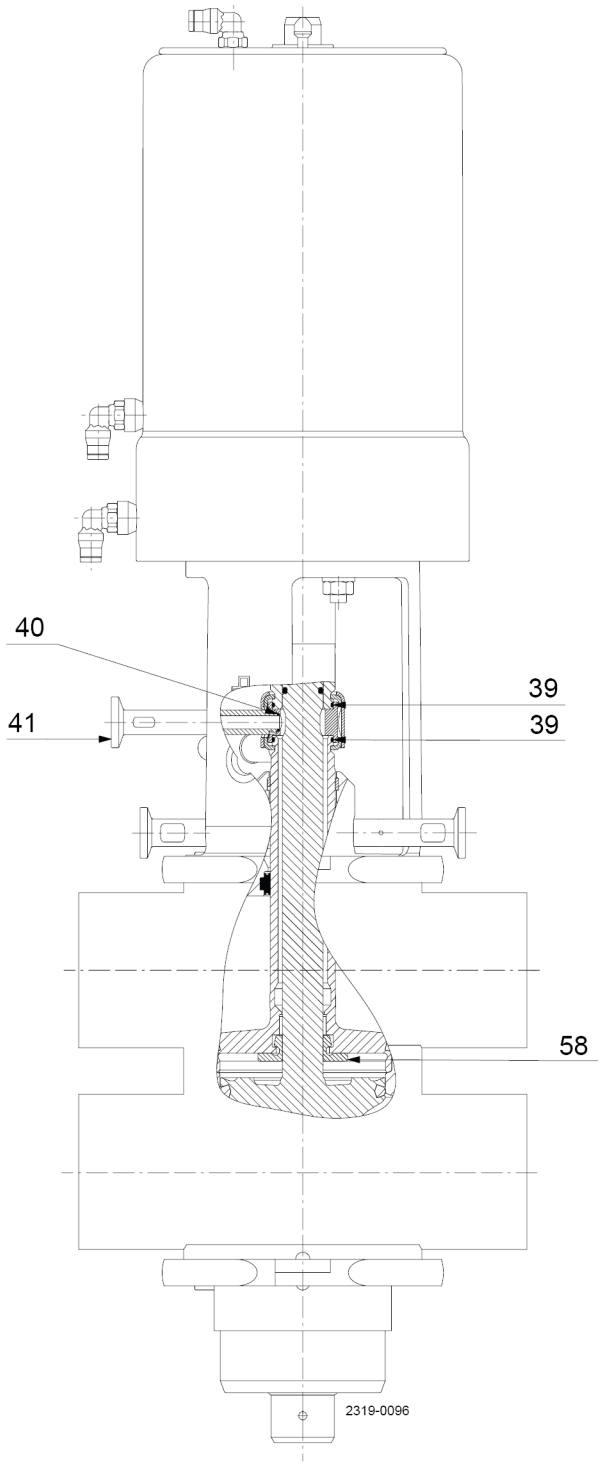
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.11 Plug setup 17



without SpiralClean in leakage chamber

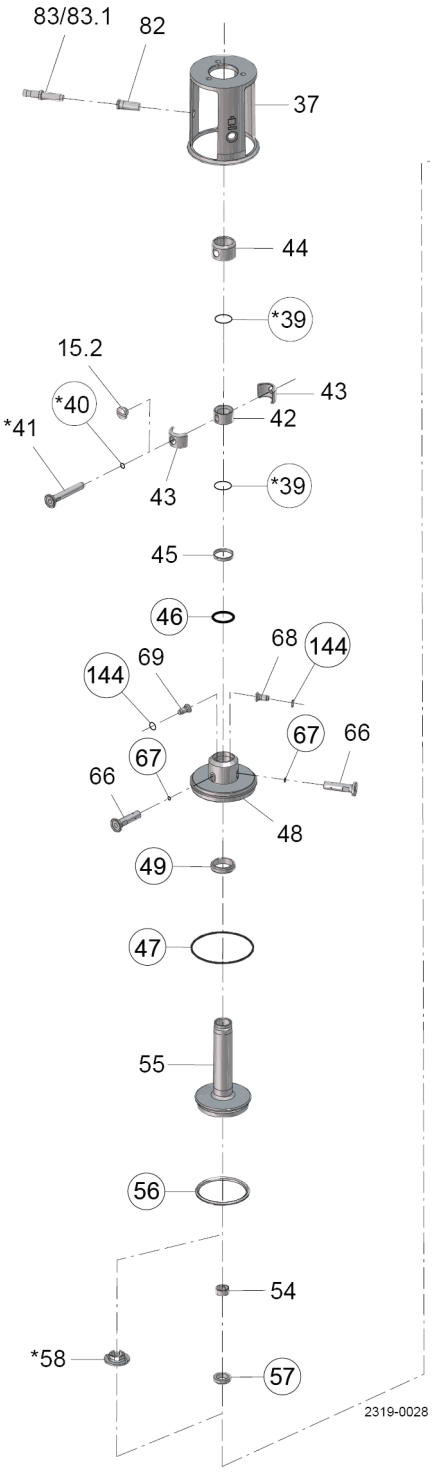


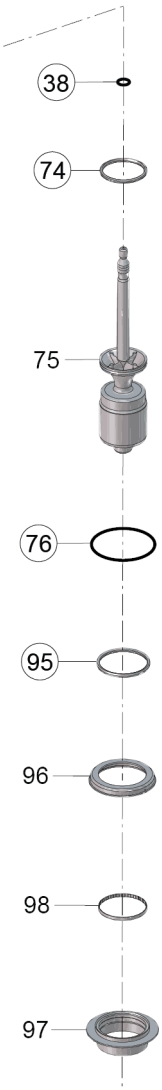
with SpiralClean in leakage chamber

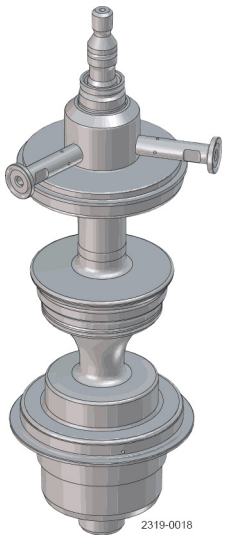
= Parts not used in all actuators
* = Not used in 1½" and 2"
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.







◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
46	♦	1	O-ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
66		2	Flushing tube
67	♦	2	O-ring
68		1	Drain
69		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
82		1	Bolt for indication
83		1	Sensor for indication
83.1		1	Cable for sensor for indication
95	♦	1	Special lip seal
96		1	Lower sealing element
97		1	Lower sealing element
98		1	Guide ring, Turcite
144	♦	2	O-ring

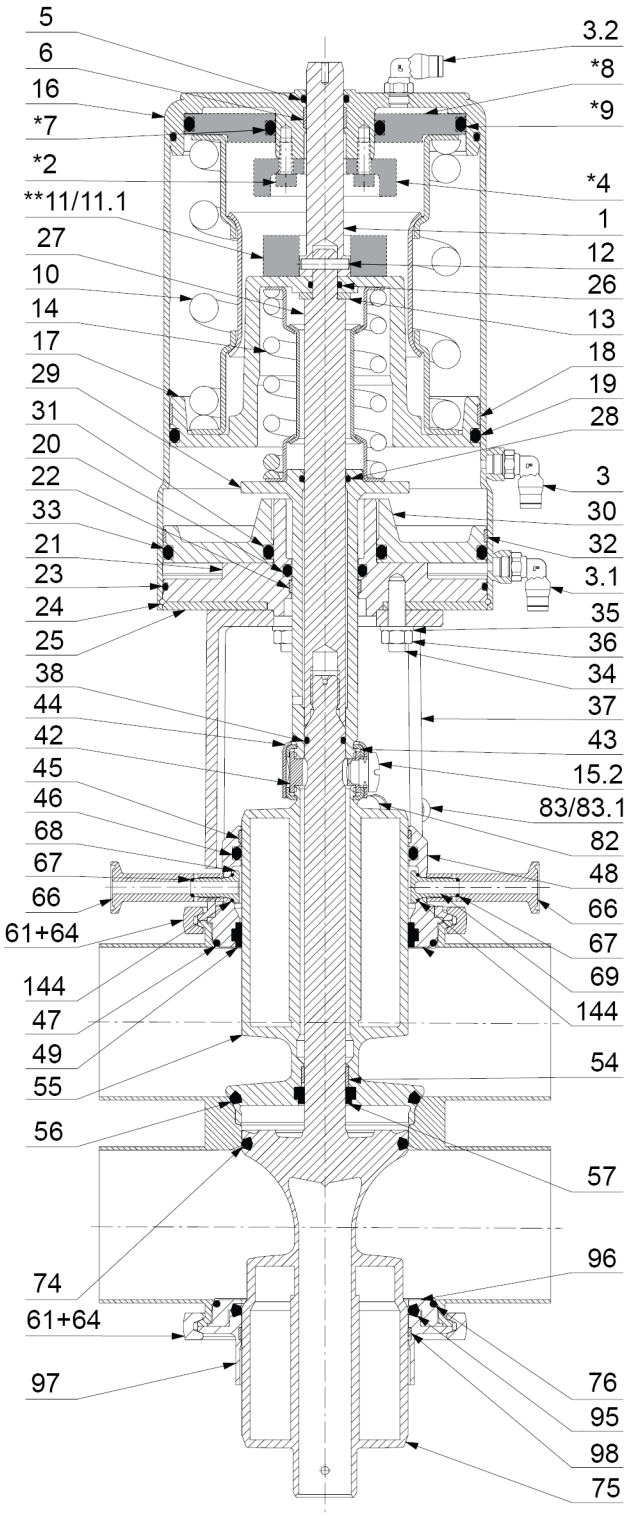
Service kits

	Denomination	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928221	9611928225	9611928225	9611928229	9611928233
♦	Service kit, NBR	9611928222	9611928226	9611928226	9611928230	9611928234
♦	Service kit, FPM	9611928223	9611928227	9611928227	9611928231	9611928235
♦	Service kit, HNBR	9611928224	9611928228	9611928228	9611928232	9611928236

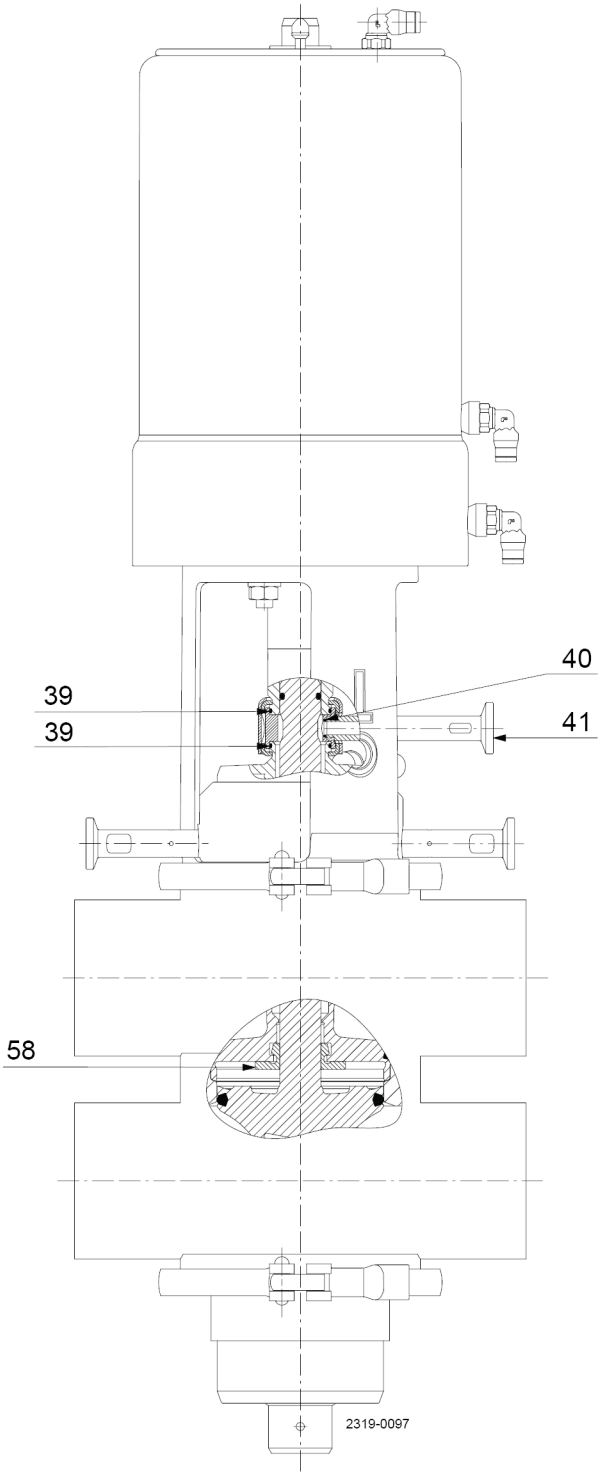
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.12 Plug setup 18



without SpiralClean in leakage chamber

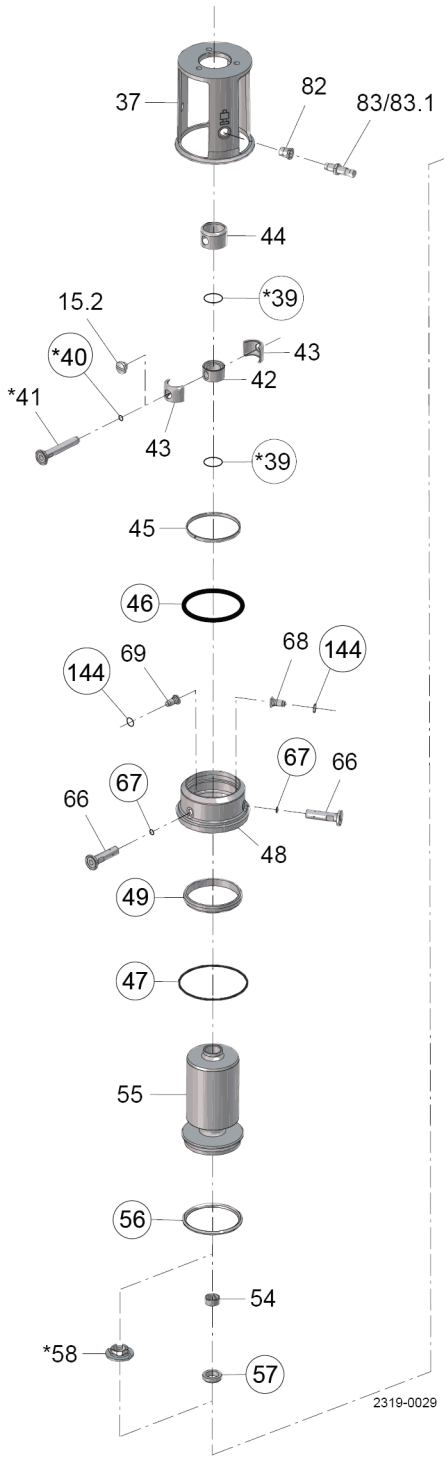


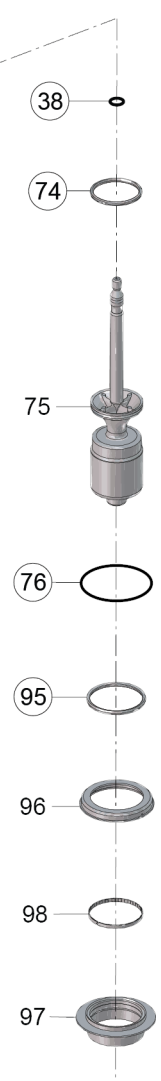
with SpiralClean in leakage chamber

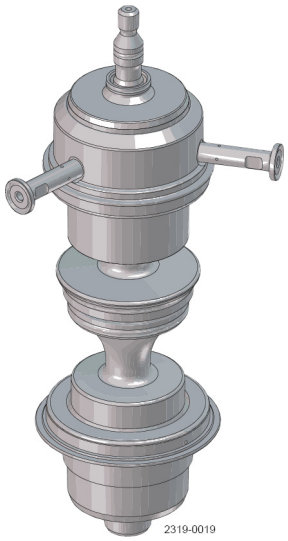
= Parts not used in all actuators
* = Not used in 1½" and 2"
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.







○ = wear parts

* = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
46	♦	1	O-ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
66		2	Flushing tube
67	♦	2	O-ring
68		1	Drain
69		1	Nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
82	Δ	1	Bolt for indication
83	Δ	1	Sensor for indication
83.1		1	Cable for sensor for indication
95	♦	1	Special lip seal
96		1	Lower sealing element
97		1	Lower sealing element
98		1	Guide ring, Turcite
144	♦	2	O-ring

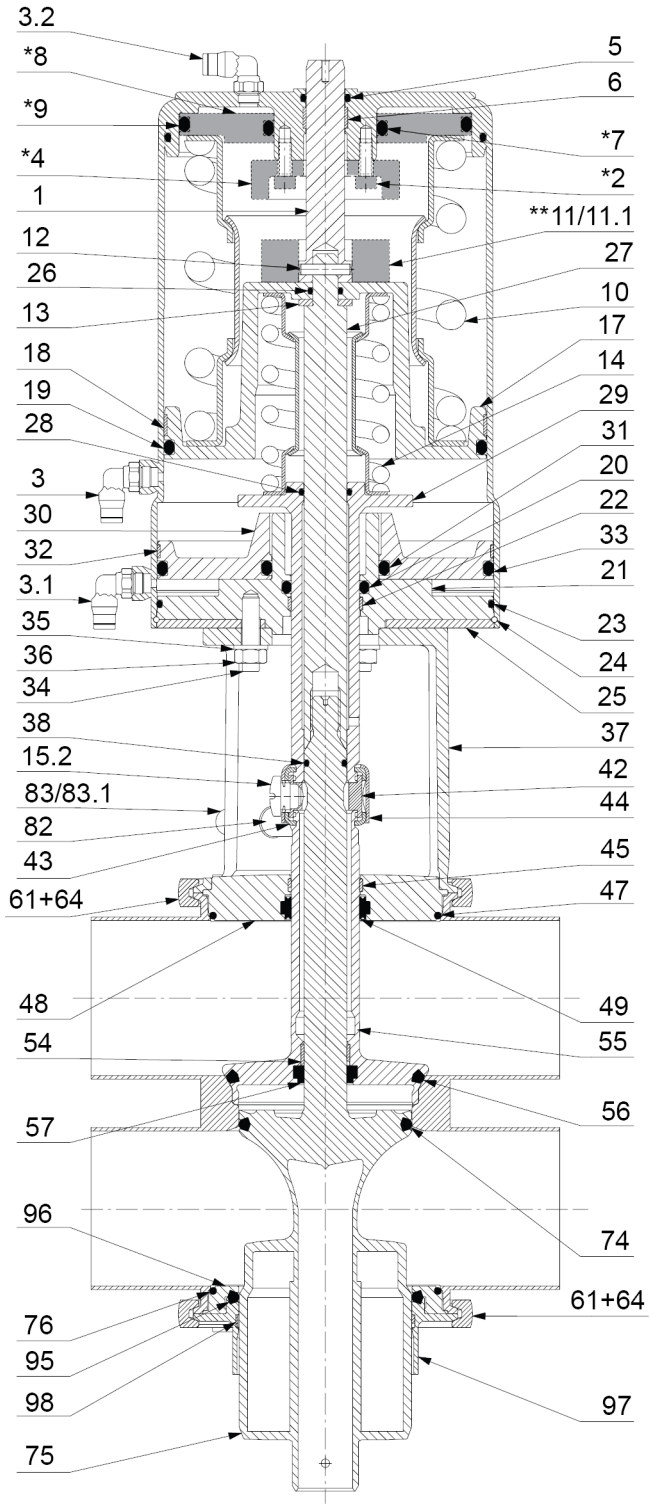
Service kits

	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928237	9611928241	9611928245	9611928245	9611928249	9611928253
♦	Service kit, NBR	9611928238	9611928242	9611928246	9611928246	9611928250	9611928254
♦	Service kit, FPM	9611928239	9611928243	9611928247	9611928247	9611928251	9611928255
♦	Service kit, HNBR	9611928240	9611928244	9611928248	9611928248	9611928252	9611928256

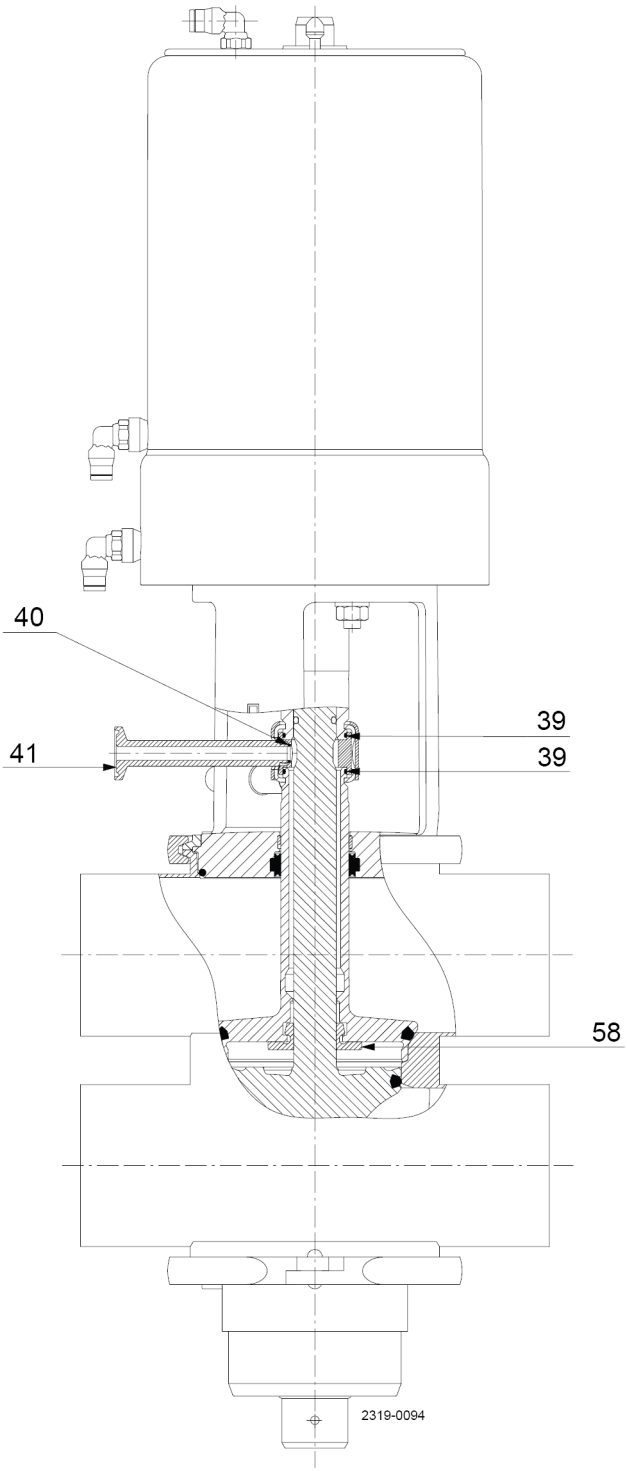
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.13 Plug setup 19



without SpiralClean in leakage chamber

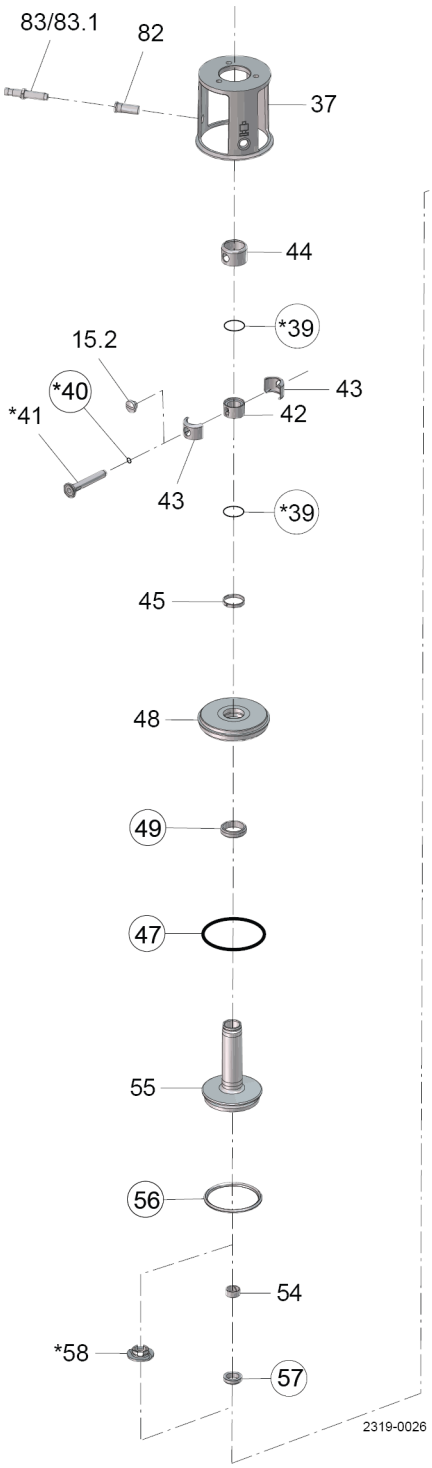


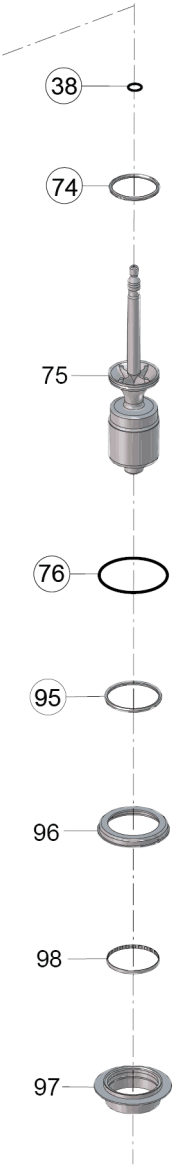
with SpiralClean in leakage chamber

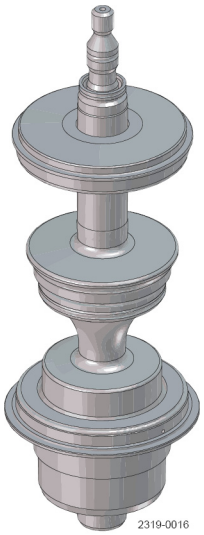
= Parts not used in all actuators
* = Not used in 1½" and 2"
** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.







◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
74	♦	1	Seal ring
75		1	Lower plug
76	♦	1	O-ring
82		1	Bolt for indication
83		1	Sensor for indication
83.1		1	Cable for sensor for indication
95	♦	1	Special lip seal
96		1	Lower sealing element, upper part
97		1	Lower sealing element, lower part
98		1	Guide ring, Turcite

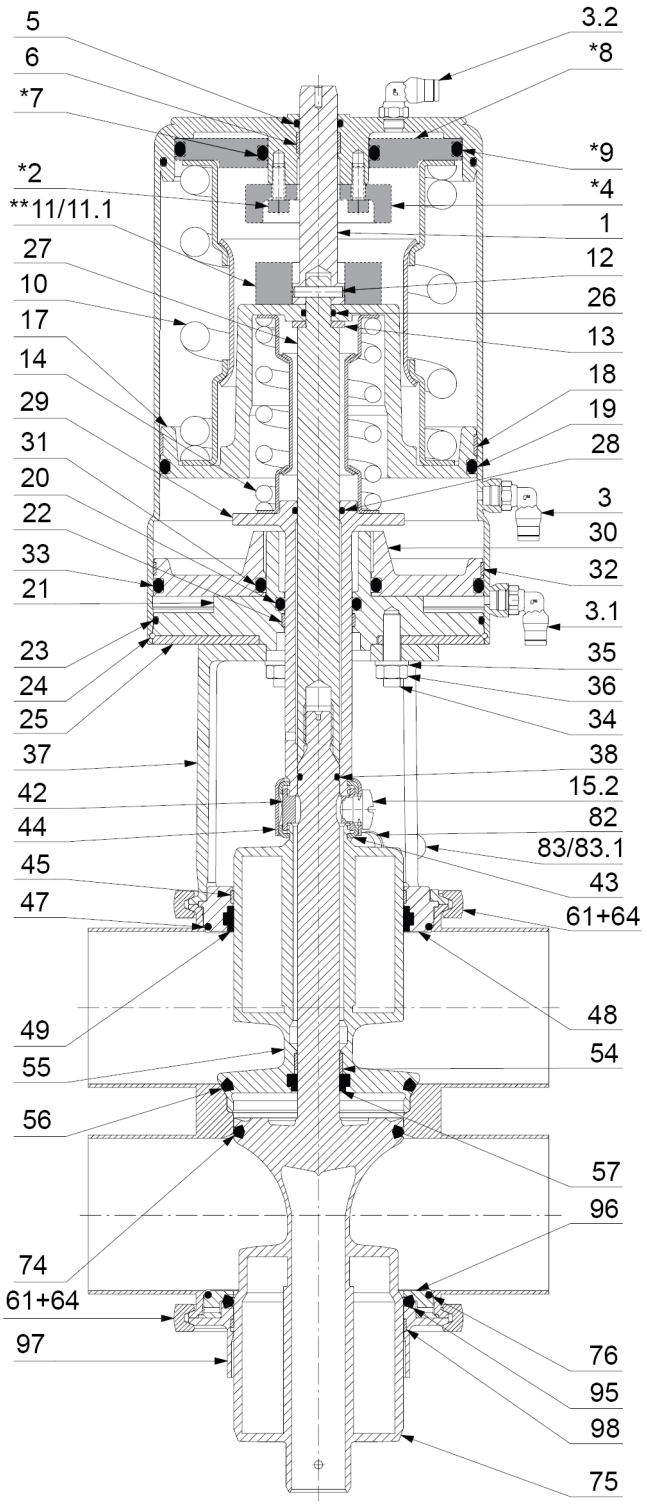
Service kits

	Denomination	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928257	9611928261	9611928261	9611928265	9611928269
♦	Service kit, NBR	9611928258	9611928262	9611928262	9611928266	9611928270
♦	Service kit, FPM	9611928259	9611928263	9611928263	9611928267	9611928271
♦	Service kit, HNBR	9611928260	9611928264	9611928264	9611928268	9611928272

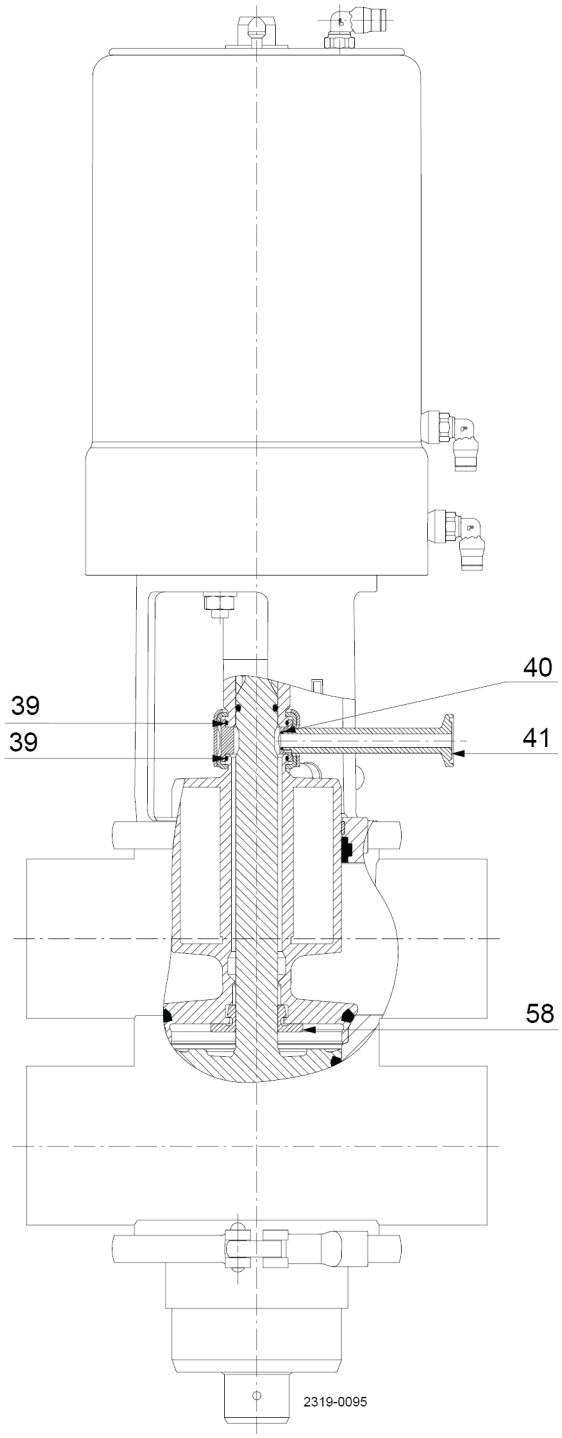
8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

8.14 Plug setup 20



without SpiralClean in leakage chamber



with SpiralClean in leakage chamber

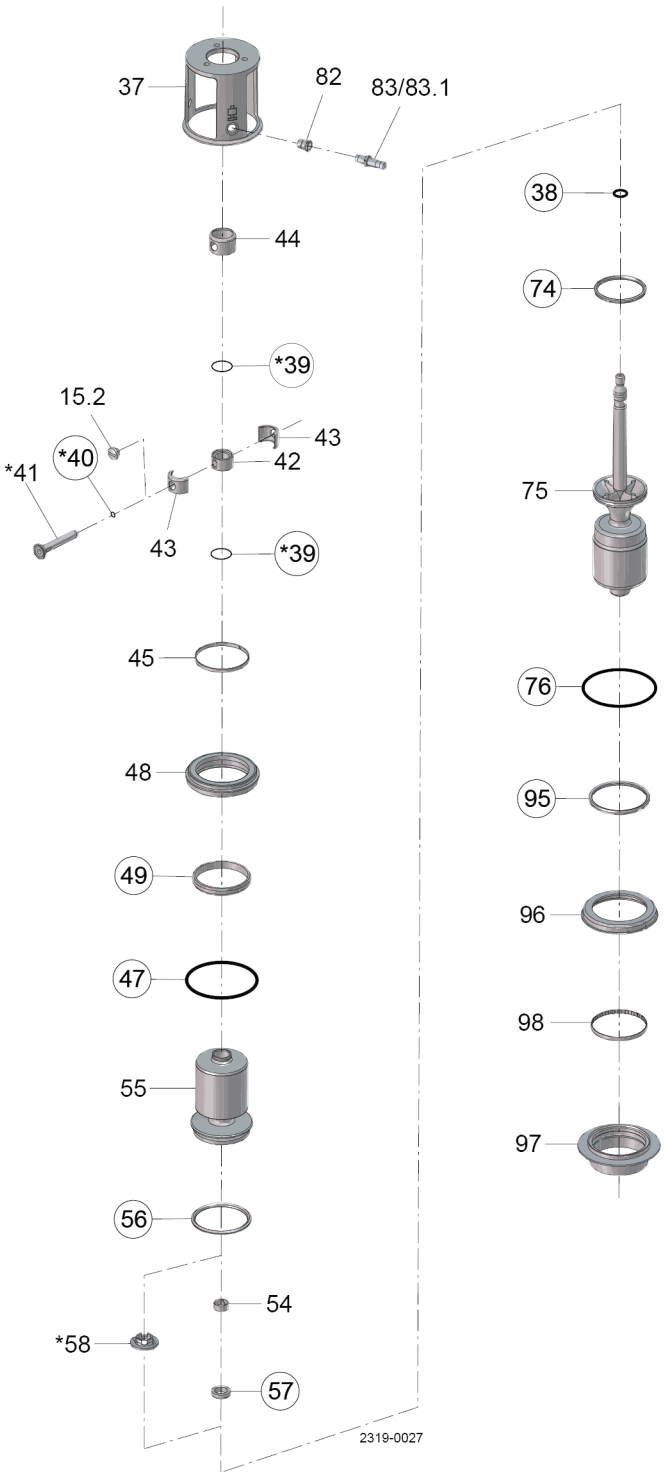
= Parts not used in all actuators

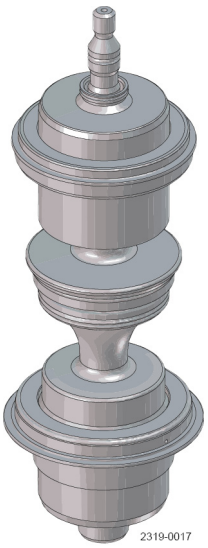
* = Not used in 1½" and 2"

** = Not used in 2½", 3", 4" and 6"

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.





◯ = wear parts

✶ = with SpiralClean in leakage chamber

For spare parts please refer to spare parts catalogue.

Parts list

Pos.		Qty	Denomination
15.2		1	Plug
37		1	Intermediate piece
38	♦	1	O-ring
39		2	O-ring
40		1	O-ring
41		1	Flushing tube
42		1	Spindle liner
43		2	Clamp
44		1	Lock
45		1	Guide ring
47	♦	1	O-ring
48		1	Upper sealing element
49	♦	1	Lip seal
52		1	O-ring
54		1	Guide ring
55		1	Upper plug
56	♦	1	Seal ring
57	♦	1	Lip seal
58		1	Spray nozzle
75		1	Lower plug
76	♦	1	O-ring
82	Δ	1	Bolt for indication
83	Δ	1	Sensor for indication
83.1		1	Cable for sensor for indication
95	♦	1	Special lip seal
96		1	Lower sealing element, upper part
97		1	Lower sealing element, lower part
98		1	Guide ring, Turcite

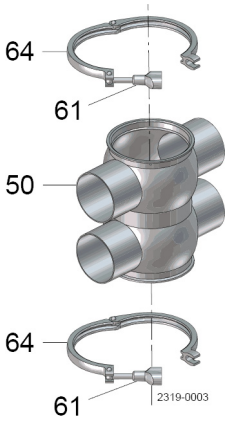
Service kits

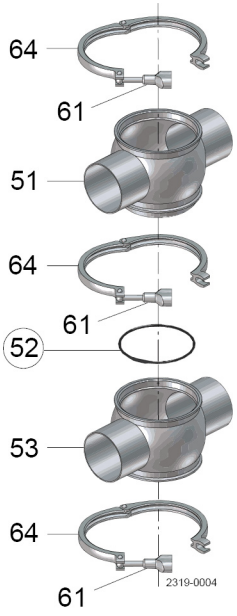
	Denomination	1½" Seat ø53.3	2" Seat ø53.3	2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3
♦	Service kit, EPDM	9611928273	9611928277	9611928281	9611928281	9611928285	9611928289
♦	Service kit, NBR	9611928274	9611928278	9611928282	9611928282	9611928286	9611928290
♦	Service kit, FPM	9611928275	9611928279	9611928283	9611928283	9611928287	9611928291
♦	Service kit, HNBR	9611928276	9611928280	9611928284	9611928284	9611928288	9611928292

8 Parts list and service kits

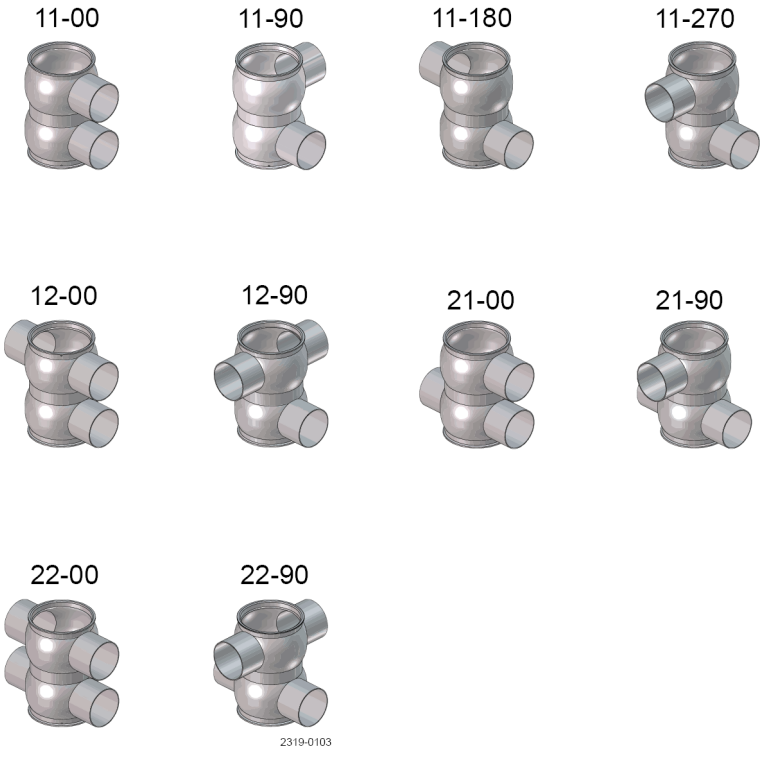
For spare parts please refer to spare parts catalogue.

8.15 Valve body





Body combination - welded bodies



For spare parts please refer to spare parts catalogue.

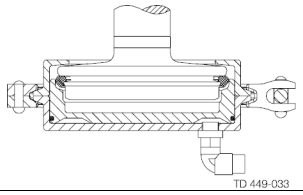
Parts list

Pos.	Qty	Denomination
50	1	Valve body
51	1	Valve body, upper
52	1	O-ring
53	1	Valve body, lower
61	2	Wingnut
64	2	Clamp without nut

8 Parts list and service kits

For spare parts please refer to spare parts catalogue.

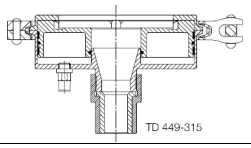
8.16 Axial installation tool (upper plug)

Item No.	Item No.	Item No.	Item No.	
1½" + 2" Seat ø53.3	2½" + 3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3	Tool for axial sealing, upper plug
9613050501	9613050502	9613050508	9613050503	

For spare parts please see spare parts catalogue.

For spare parts please refer to spare parts catalogue.

8.17 Radial installation tool (lower plug)

Item No.	Item No.	Item No.	Item No.	
1½" + 2" Seat ø53.3	2½" + 3" Seat ø81.3	4" Seat ø100.3	6" Seat ø115.3	Tool for radial sealing, lower plug
9613426001	9613426002	9613426003	9613426004	

For spare parts please see spare parts catalogue.

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