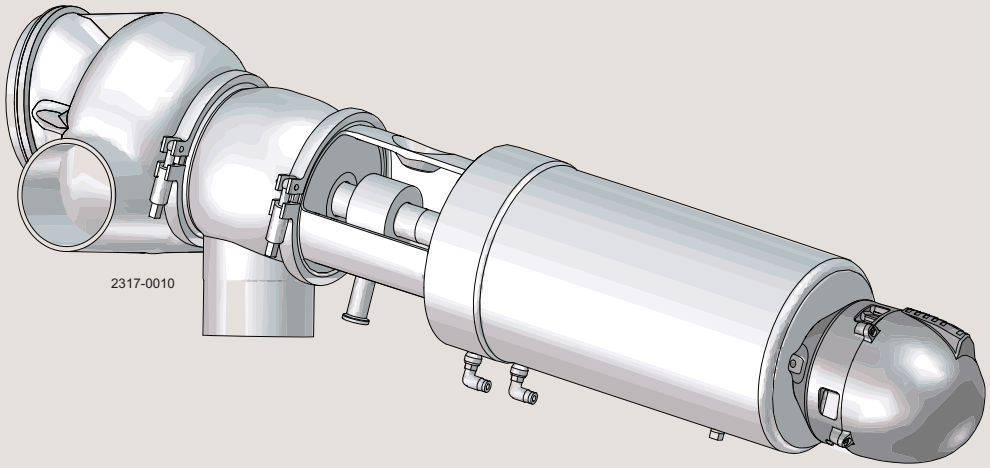
Instruction Manual

Unique Mixproof Horizontal Tank Valve - sizes 2½”, 3”, 4” and 6”



ESE02424-EN3 2019-06

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

1 Declaration of conformity

The Designated Company

Alfa Laval Kolding A/S
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Valve
Designation

Unique HT
Type

From serial number 1181354 - 9999999

is in conformity with the following directive with amendments:

- Machinery Directive 2006/42/EC
- Regulation (EC) No 1935/2004
- The valve is in compliance with the Pressure Equipment Directive 2014/68/EU and was subjected to the following assessment procedure Module A. Diameters ≥ DN125 may not be used for fluids group 1.

The person authorised to compile the technical file is the signer of this document

Global Product Quality Manager Pumps, Valves, Fittings and Tank Equipment		Lars Kruse Andersen
Title		Name
Kolding	2016-06-01	
Place	Date	Signature

CE

2 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 Inc. 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.

3 Safety

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

3.1 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.

3.2 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.

3.3 Safety precautions

Installation:

Always read the technical data thoroughly (see chapter 7.1 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 chapter 7.1 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 chapter 7.1 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

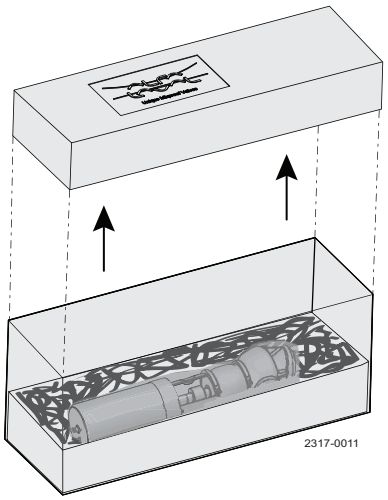
4 Installation

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.

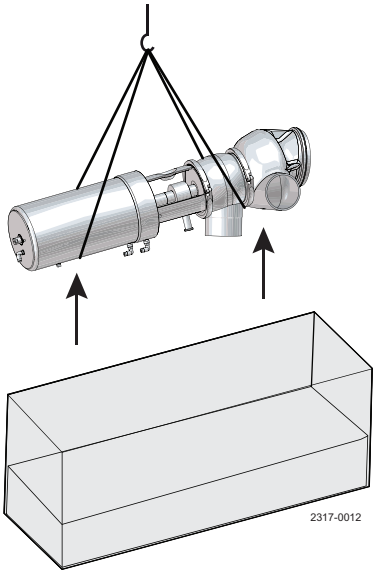
4.1 Unpacking/intermediate storage

Step 1
CAUTION!
Alfa Laval cannot be held responsible for incorrect unpacking.
Check the delivery for:
1. Complete valve
2. Delivery note
3. Warning label

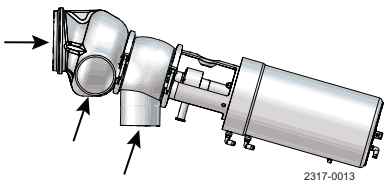
Step 2
Remove upper support



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

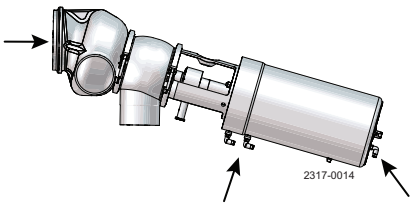


Step 4
Remove possible packing materials from the valve ports.



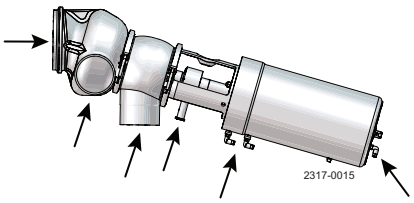
The instruction manual is part of the delivery.
Study the instructions carefully.
Fit the warning label supplied on the valve after installation so that it is clearly visible.

Step 5
Inspect the valve for visible transport damage.



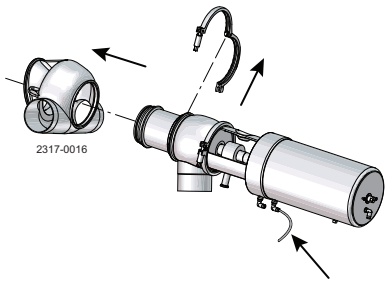
Inspection!

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



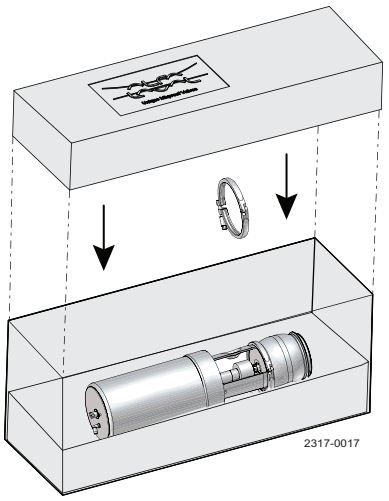
Caution!

Step 7
Disassemble according to illustrations 1 to 4
(please also see 6.2 Dismantling of valve (excluding actuator)).
1. Supply compressed air.
2. Remove clamp
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.



4.2 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

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.

4.3 General installation

Step 1

- Always read the technical data thoroughly (see 7.1 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!

- The leakage outlet must be turned downwards!

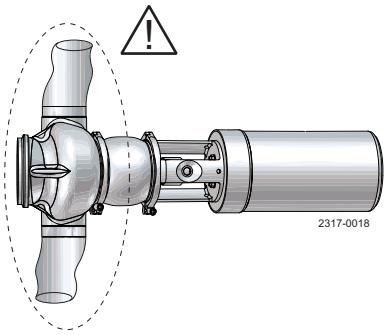
Step 2

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).

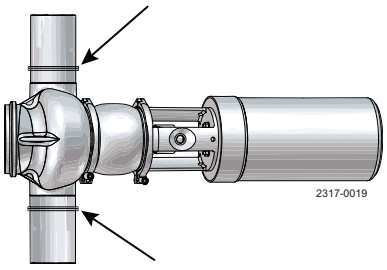
Risk of damage!



Step 3

Fittings
Ensure that the connections are tight.

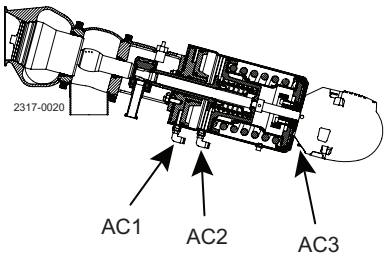
Remember seal rings!



Step 4

Valve Pneumatic Connections	
ThinkTop Fitting ID	Actuator Fitting ID
Out 1A	Air connection 2 (blue)
Out 2	Air connection 3 (yellow)
Out 3	Air connection 1 (red)

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



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

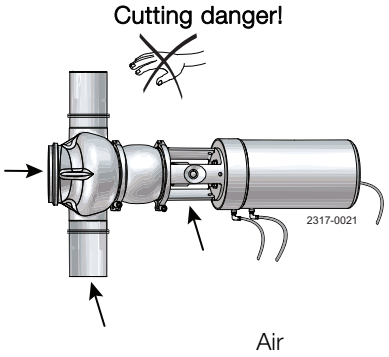
4 Installation

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.

4.4 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 (excluding actuator)

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.

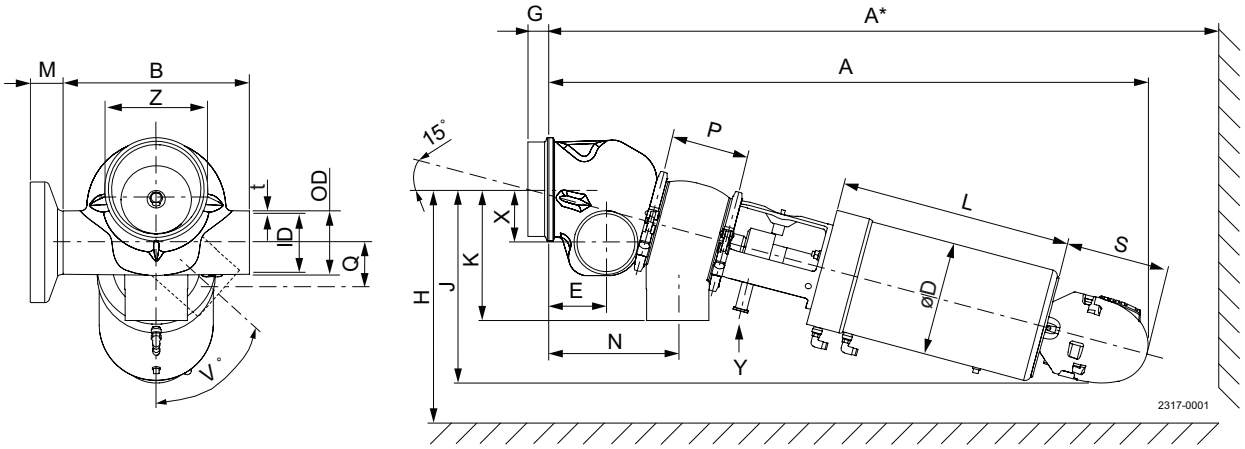
Step 3

Before welding the flange into the tank 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 120 mm below the valve (look at the specific built-in conditions).

Dimension (all measures in mm).



Size	2.5"	3"	4"	6" (75 mm) stroke	6" (59 mm) stroke
A	735	759	977	1088	1088
A*	867	904	1155	1329	1329
B	220	220	300	420	420
OD	63.5	76.1	101.6	154.2	154.2
ID	60.3	72.9	97.6	146.86	146.86
t	1.60	1.60	2.00	3.67	3.67
øD	186	186	186	186	186
E	70.9	77.2	92.2	129.5	129.5
F1	38	38	75	75	59
F2 (Tank plug)	10	10	10	10	10
G	15.9	15.9	38.1	44.5	44.5
H	281	291	364	423	423
J	246	252	317	359	359
K	153	158	215	307	307
L	252	252	379	379	379
N	152	170	210	283	283
P	89.3	101.9	126.6	180	180
Q	15.9	15.9	38.1	44.5	44.5
S	180	180	180	180	180
V°	0-67°	0-60°	0-53°	0-49°	0-53°
X	38.3	36.6	52.6	93.8	96.8
Y	3/4" clamp ferrule	3/4" clamp ferrule	3/4" clamp ferrule	3/4" clamp ferrule	3/4" clamp ferrule
Z	4"	4"	6"	10"	10"
M/Tri-clamp	21	21	21	38.56	38.56
Weight (kg)	13.0	14.2	43.1	87.6	87.6

Step 4

Assemble the valve in accordance with section 6.5 after welding.

Pay special attention to the warnings and clamp torque (see section 6.5).

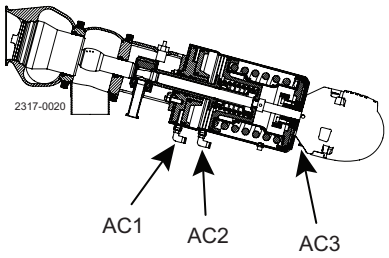
4 Installation

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.

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



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.

5.1 Operation

Step 1

⚠

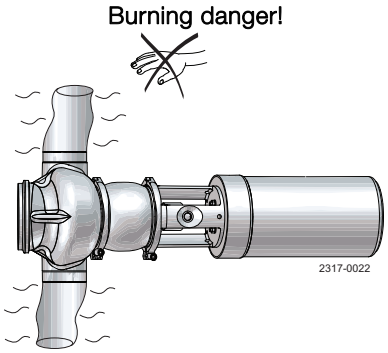
- **Always** read the technical data thoroughly (see chapter 7.1 Technical data).
- **Always** release compressed air after use.
- **Never** touch the clip assembly or the actuator piston rod if the actuator is supplied with compressed air (see the warning label).
- **Never** pressurise air connections (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.



5 Operation

Study the maintenance instructions carefully before replacing worn parts. - See “General Maintenance” section 4.1

5.2 Troubleshooting and repair

Problem	Cause/result	Remedy
Leakage at the vent port body (106)	- Particles between valve seats and plug seals (56/74) - Worn/damaged 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 6.5
Leakage at sealing element (110)/ balanced plug (94)	Worn/damaged 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) and (65) Leakage at spindle clamp (42)	- O-rings (76 and 47) and valve body too old/damaged - Loose clamp (64) or (65)	- Replace the O-rings - Change rubber grade - Tighten the clamp (max. 10 Nm)
CIP leakage	Worn O-rings (40/67) Damaged O-ring (39) Worn/damaged lip seal (57)	Replace the O-rings - Replace the O-ring - Replace the plug seals - Change rubber grade
Tank plug not returning to closed position	- Wrong rubber grade - Wrongly fitted gasket - Mounted incorrectly (see section 2.3)	- 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 2.3)	- Change rubber grade - Fit new gasket correctly - Correct installation

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.

5.3 Recommended cleaning

Step 1

Always handle lye and acid with great care.

Caustic danger!

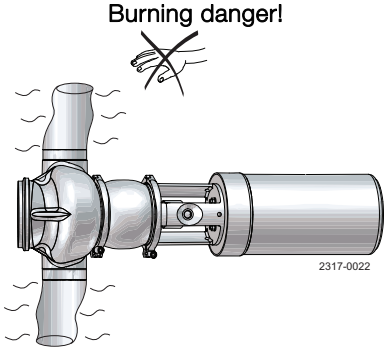
Always use rubber gloves!

Always use protective goggles!

Step 2

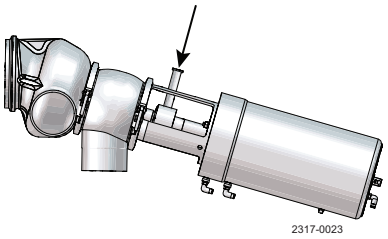
Never touch the valve or the pipelines when sterilising.

Burning danger!



Step 3

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



Step 4

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

1. 1% by weight NaOH at 70° C

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

2. 0.5% by weight HNO_3 at 70° C

0.7 l 53% HNO_3	+	100 l water	=	Cleaning agent.

Step 5

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

5 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 6
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.

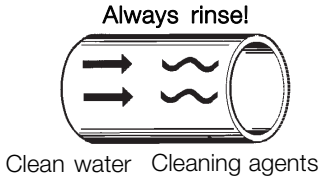
CIP event @ length	Valve function	Valve solenoid no.	Solenoid mode	Actual opening time	Number of lifts/push in each CIP step
Warm pre-rinse @ 3 minutes	Upper seat lift	3	Energized	*0.5 sec	3
	Lower seat lift	2	Energized	*0.5 sec	3
	SpiralClean vent	-	-	*0.5 sec	3
	OD cleaning	-	-	*5 sec	2
Hot alkaline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

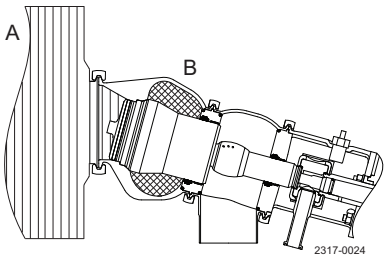
The valve is designed for cleaning in place (CIP).
Study the instructions carefully and pay special attention to the warnings!
NaOH = Caustic Soda.
HNO_3 = Nitric acid.

Step 7
Always rinse well with clean water after cleaning.
NOTE!
The cleaning agents must be stored/disposed of in accordance with current regulations/directives.



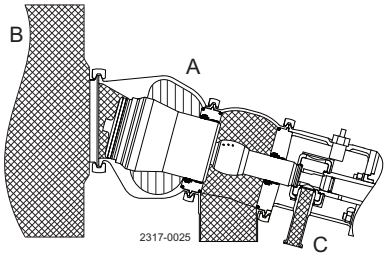
Step 8
1. Closed valve

A. = Product
B. = CIP



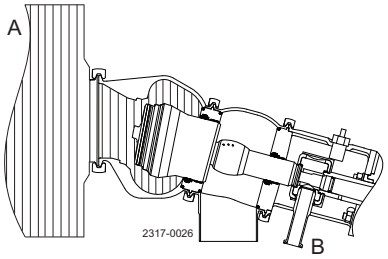
Step 9
2. Seat lift cleaning with tank plug (optional)

A. = Product
B. = CIP
C. = CIP out



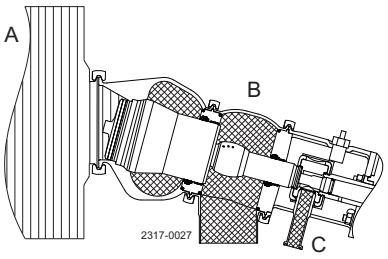
Step 10
3. Open valve

A. = Product
B. = Leakage dection



Step 11
4. Seat lift cleaning with balanced plug

A. = Product
B. = CIP
C. = CIP out



6 Maintenance

Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

6.1 General maintenance

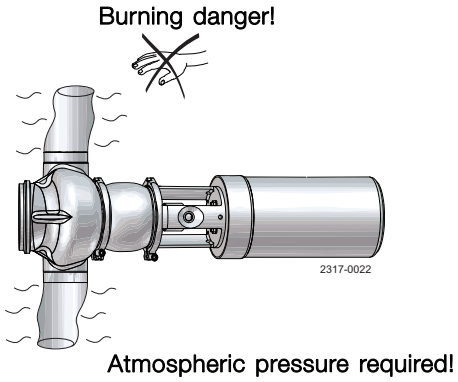
Step 1

- **Always** read the technical data thoroughly (see 7.1 Technical data).
- **Always** fit the seals correctly (risk of mixing).
- **Always** release the compressed air after use.
- **Always** remove the CIP connections, if supplied, before service.

Replace all product wetted seals every 12 months.
NOTE!
All scrap must be stored/disposed of in accordance with current regulations/directives.

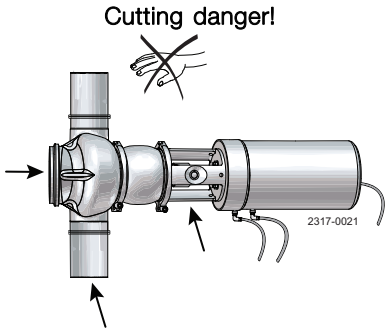
Step 2

- **Never** service the valve when it is hot.
- **Never** service the valve with valve/actuator under pressure
- **Never** service the valve with fluid in the tank.



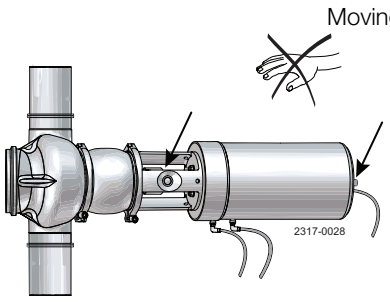
Step 3

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



Step 4

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



6 Maintenance

Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

Recommended spare parts: Service kits (see chapter 8)
Order service kits from the service kits section (see chapter 8)
Ordering spare parts: Contact the Sales Department.

	Valve rubber seals	Valve plug seals	Valve guide rings
Preventive maintenance	**Replace after 12 months(*)**	**Replace after 12 months(*)**	Replace when required
Maintenance after leakage (leakage normally starts slowly)	**Replace after production cycle**	**Replace after production cycle**	
Planned maintenance	- Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for inspection planning	- Regular inspection for leakage and smooth operation - Keep a record of the valve - Use the statistics for inspection planning	Replace when required
Lubrication	**When assembling** Klüber Paraliq or similar USDA H1 GTE 703 approved oil/grease (**) (suitable for EPDM).	**When assembling** Klüber Paraliq or similar USDA H1 GTE 703 approved oil/grease (**) (suitable for EPDM).	**None**

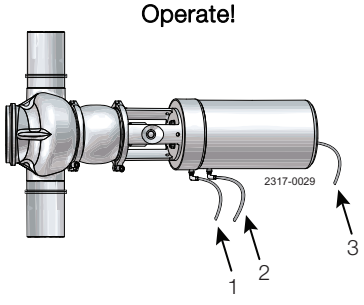
NOTE!
Lubricate thread in valve plug parts with Klüber Paste UH1 84-201 or similar.
(*) Depending on working conditions! Please contact Alfa Laval.
(**) All products wetted seals.

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

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 operates smoothly.

Pay special attention to the warnings!
1 = air connection 1 (AC1)
2 = air connection 2 (AC2)
3 = air connection 3 (AC3)

Operate!



6 Maintenance

Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

Tools required for valve service

- 2 x 16 mm Wrench
- Strap wrench - 19 mm and 13 mm
- 8 mm wrench
- 17 mm wrench
- 2.5 mm Allen wrench
- Small knife
- Straight pick
- Small standard screw driver
- Air pilot switch (pos. 102)

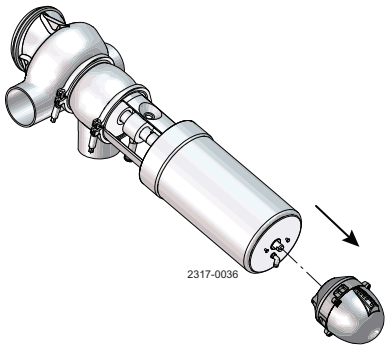
Tools required for actuator service

- 13 mm wrench
- Long stem Phillips screw driver (#2 point)
- Plastic hammer
- Small blunt face punch
- Small standard screw driver

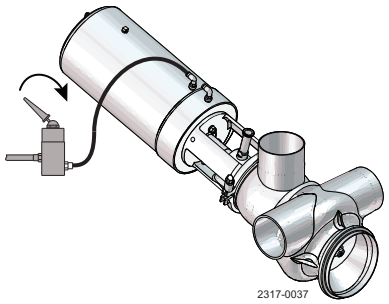
Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

6.2 Dismantling of valve (excluding actuator)

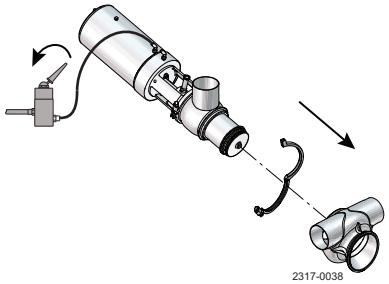
Step 1
Remove ThinkTop, if mounted.



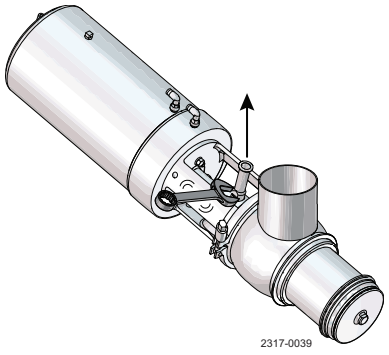
Step 2
Activate main stroke.



Step 3
1. Remove clamp.
2. Remove valve.
3. Release air.



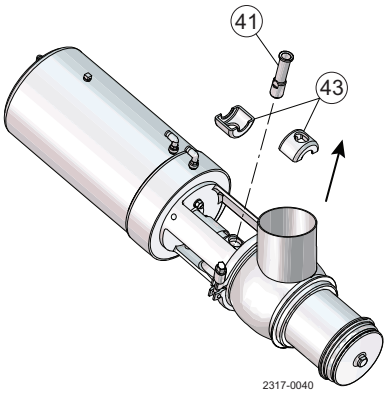
Step 4
Remove flushing pipe using 19 mm wrench.



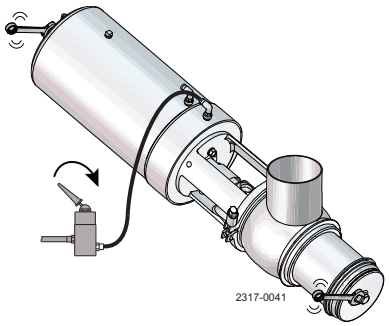
6 Maintenance

Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

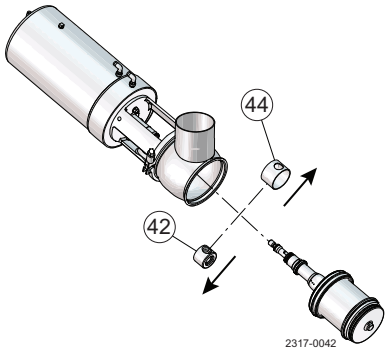
Step 5
Remove clamp rings (43).



Step 6
1. Activate upper seat lift.
2. Loosen tank plug by using two 16 mm wrenches.

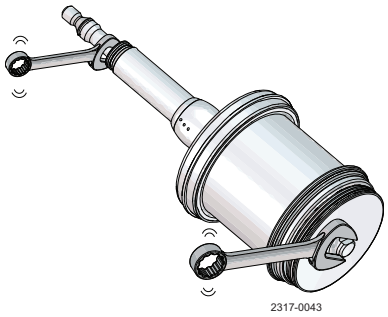


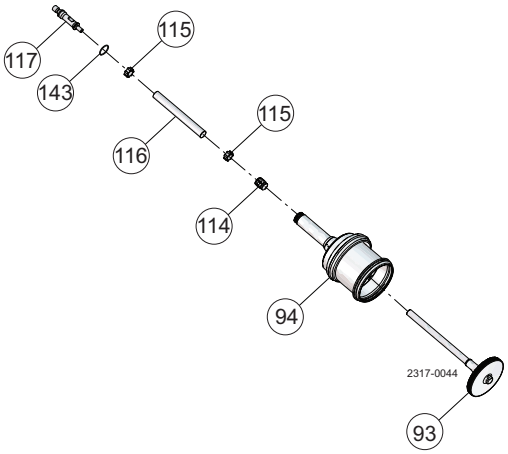
Step 7
1. Turn out tank plug by hand and remove plug assembly.
2. Remove spindle liner (42) and lock ring (44).



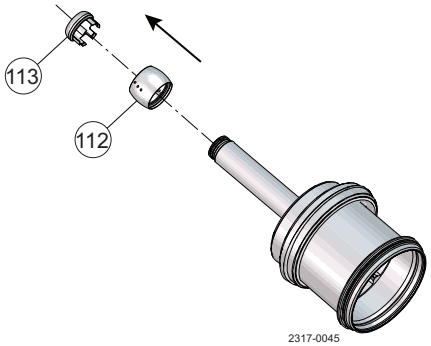
Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

Step 8
Remove upper stem (117) by using a 13 mm and a 16 mm wrench.

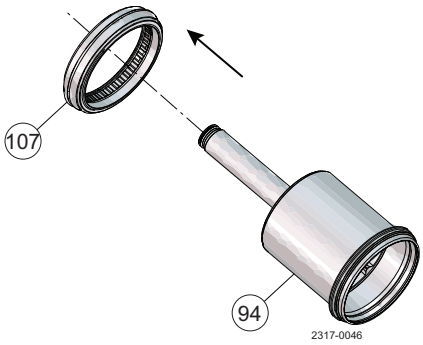




Step 9
Remove lock ring (113) and rotaing nozzle (112) by pulling upwards.



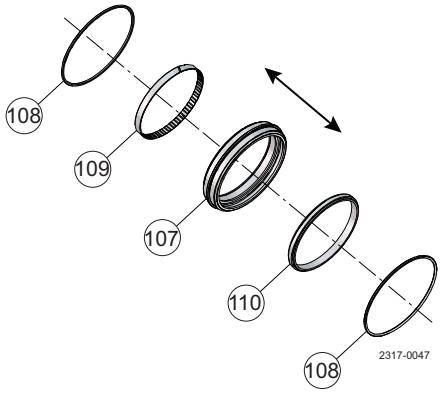
Step 10
Remove valve body sealing element (107).



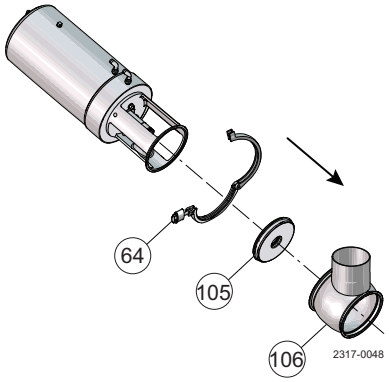
6 Maintenance

Maintain the valve/actuator regularly.
Study the instructions carefully and pay special attention to the warnings!
Always keep spare rubber seals and guide rings in stock. Store seals in closed bag.
The items refer to the parts list and service kits section.

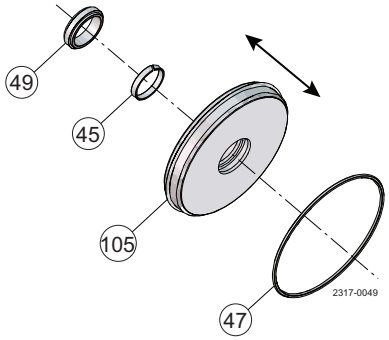
Step 11
Sanitise guide ring (109).
Remove O-rings (108) and lip seal (110).



Step 12
Remove clamp (64), vent body (106) and sealing element (105).



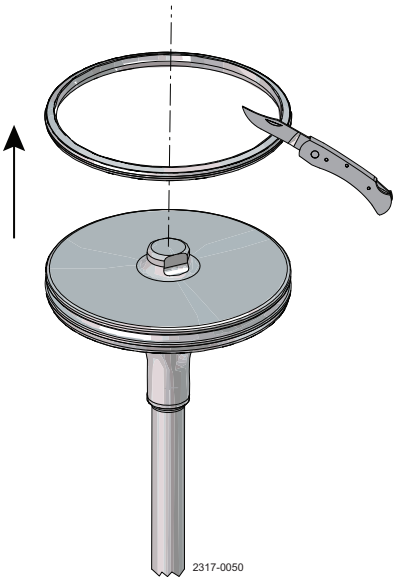
Step 13
Sanitise guide ring (45).
Remove O-ring (47) and lip seal (49).



Study the instructions carefully. Handle scrap correctly.

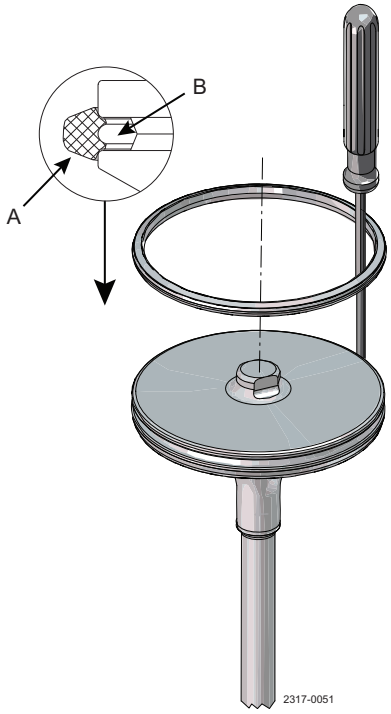
6.3 Replacement of seal ring, tank plug

Step 1
Cut and remove old seal ring (74) using a knife, screwdriver or similar. Be careful not to scratch the plug.

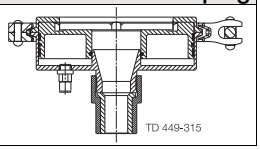


Step 2
Pre-mount seal ring as shown on drawing.
Rotate along circumference to fix gasket as shown in the picture

A. Do not lubricate behind the sealing
B. Carefully lubricate sealings with suitable lubricant, before pre-mounting



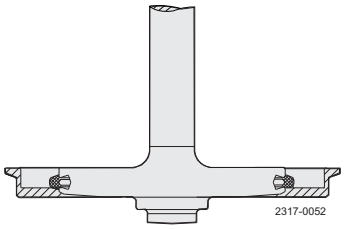
Step 3

Item No.				
2" + 2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø115.3	6" Seat ø206.1	Tool for radial sealing, tank plug
9614-0788-01	9614-0788-01	9614-0788-02	9614-0788-03	

6 Maintenance

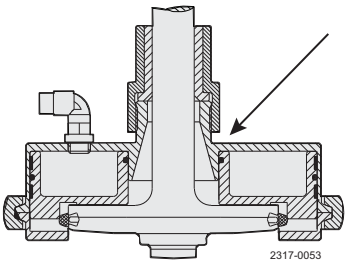
Study the instructions carefully. Handle scrap correctly.

Step 4
Place lower tool part.

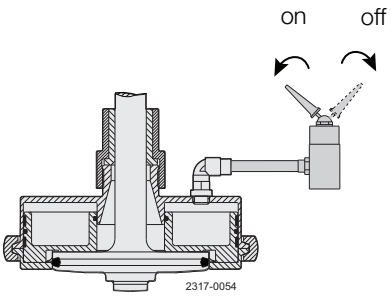


Step 5
1. Place upper tool part including piston.
2. Clamp the two tool parts together.

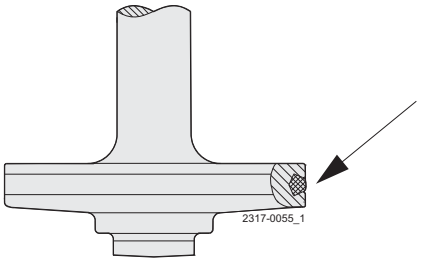
Tool marked with item number.



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



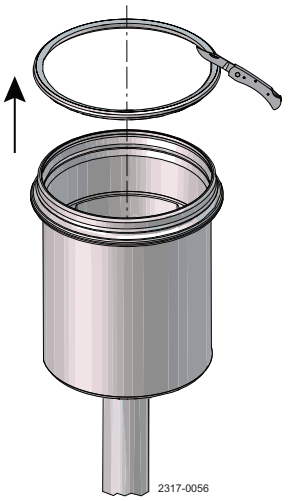
Step 7
Inspect the seal to ensure it does not twist in the groove, and press in the 4 outsticking points with a screwdriver.



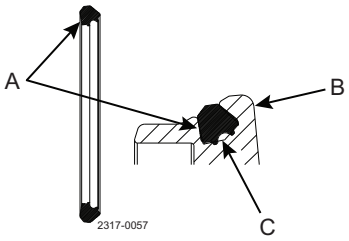
Study the instructions carefully. Handle scrap correctly.

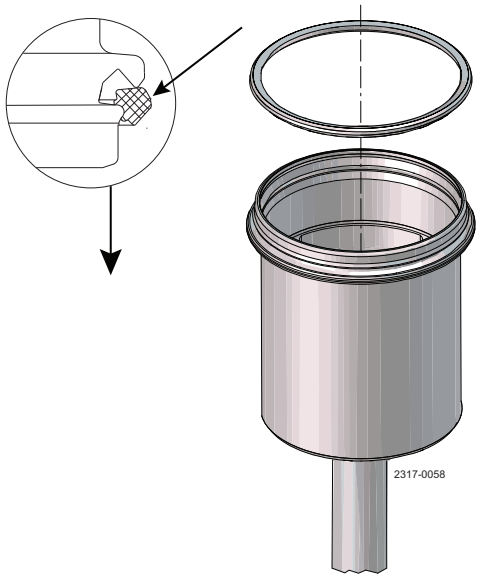
6.4 Replacement of seal ring, balanced plug

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.

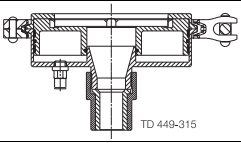




A. = Flat side of the sealing
B. = Balanced plug
C. = Do not lubricate behind the sealing.

Carefully lubricate sealings with suitable lubricant, before pre-mounting.

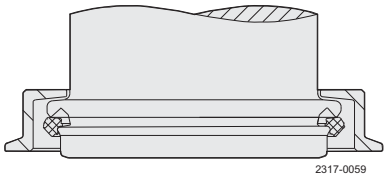
Step 3

Item No.				
2" + 2½" Seat ø81.3	3" Seat ø81.3	4" Seat ø115.3	6" Seat ø206.1	Tool for axial sealing, balanced plug
9613-0505-02	9614-0792-01	9613-0505-03	9613-0505-10	 TD 449-315

6 Maintenance

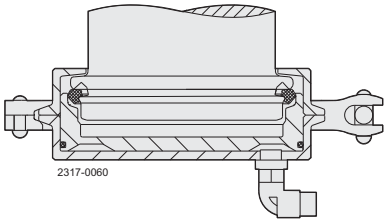
Study the instructions carefully. Handle scrap correctly.

Step 4
Place tool part 1.



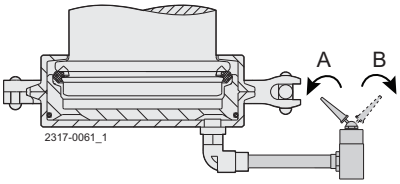
Step 5
1. Place tool part 2 including piston.
2. Clamp the two tool parts together.

Tooling marked with item number

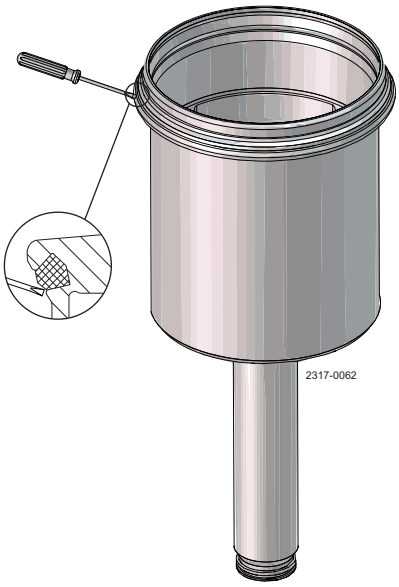


Step 6
1. Supply compressed air.
2. Release compressed air.
3. Rotate the tool 45° in relation to the plug.
4. Supply compressed air.
5. Release compressed air and remove tool.

A = on B = off



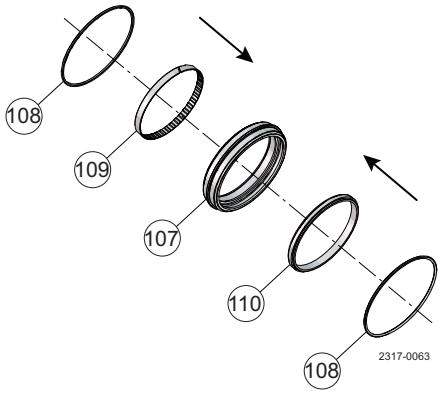
Step 7
1. Inspect the seal.
2. Release air at 3 different positions of the circumference.



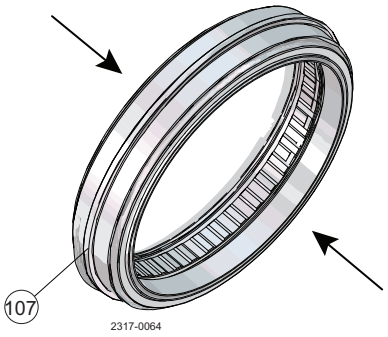
Study the instructions carefully. Handle scrap correctly.

6.5 Valve reassembly (excluding actuator)

Step 1
Assembling valve body sealing element:
Lubricate O-rings (108) and lip seal (110).



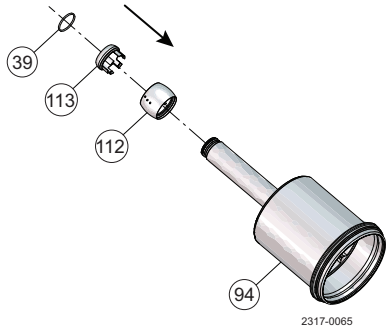
Step 2
Mount all components in sealing element (107).



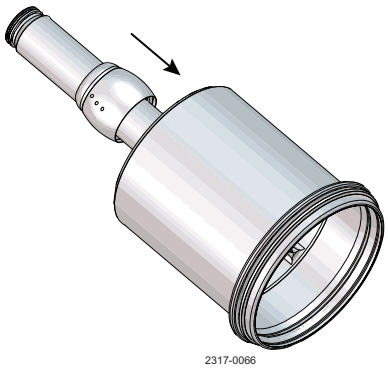
6 Maintenance

Study the instructions carefully. Handle scrap correctly.

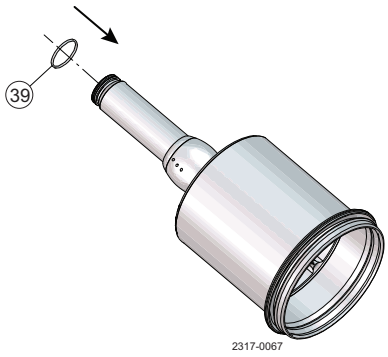
Mounting rotating nozzle (112 + 113) and O-ring (39) on balanced plug:



Step 3
Nozzle and lock ring slides over spindle.

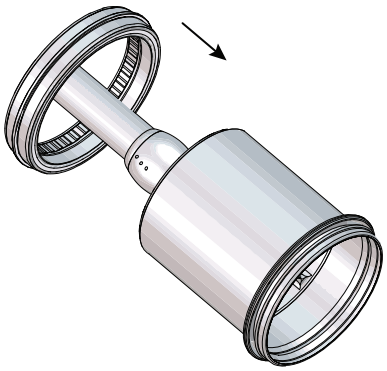


Step 4
Lubricate O-ring (39) and mount O-ring on balanced plug.



Study the instructions carefully. Handle scrap correctly.

Mounting valve body sealing element on balanced plug:
Step 5
Ensure sealing element is orientated so the white guide ring is upwards.



2317-0068

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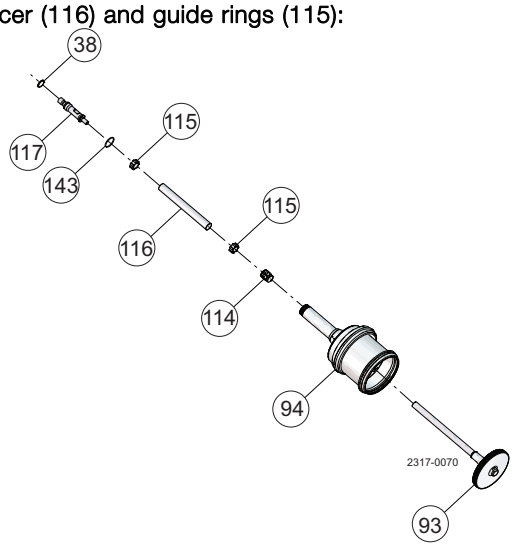
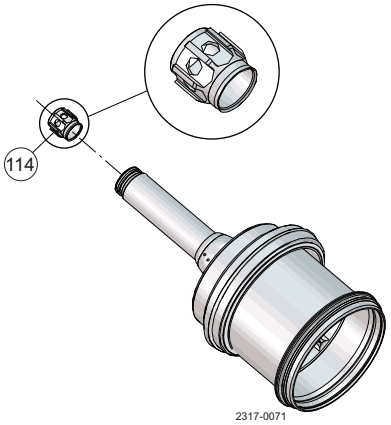
6 Maintenance

Study the instructions carefully. Handle scrap correctly.

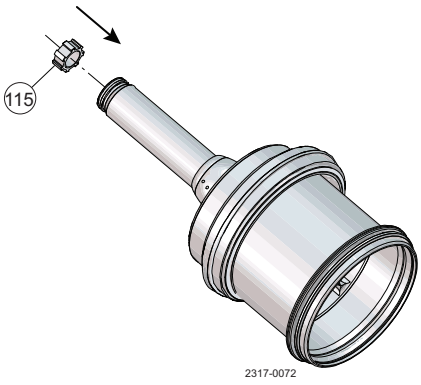
Mounting two-way nozzle (114), spacer (116) and guide rings (115):



Step 6
Insert nozzle, ensure that it is inserted as shown on picture.

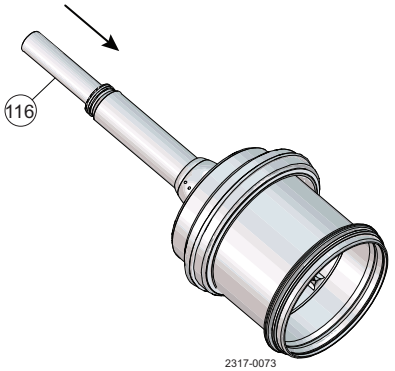


Step 7
Insert first guide ring (115).

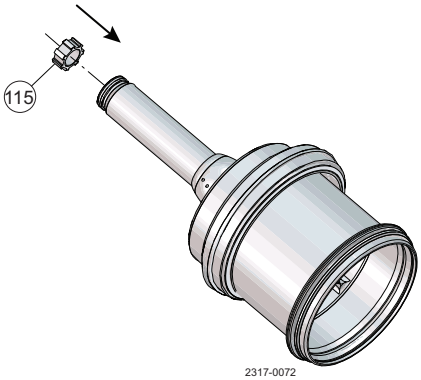


Study the instructions carefully. Handle scrap correctly.

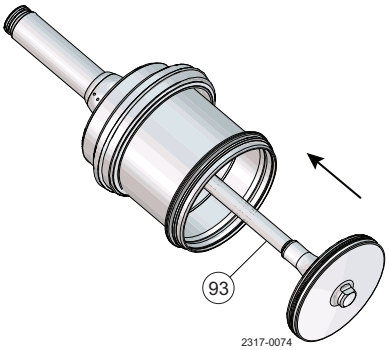
Step 8
Insert spacer (116).



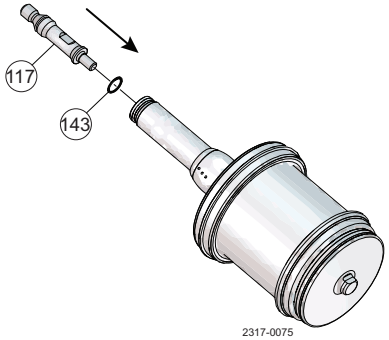
Step 9
Insert last guide ring (115).



Step 10
Insert tank plug (93) from the bottom of balanced plug.

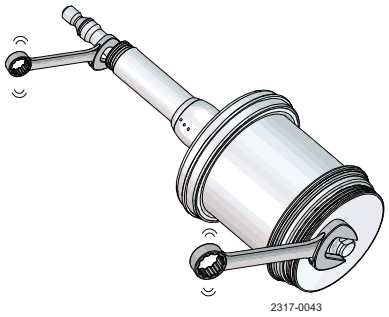


Step 11
Lubricate O-ring (143).
Mount O-ring in stem and mount stem for tank plug

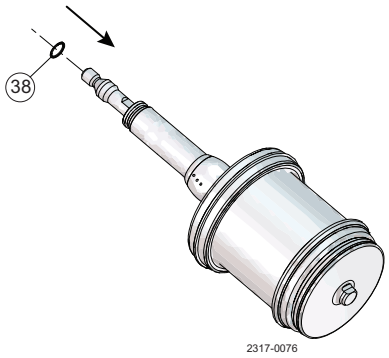


Study the instructions carefully. Handle scrap correctly.

Step 12
Tighten. Use a 13 mm and 16 mm wrench. Torque 20 Nm.



Step 13
Mount O-ring (38).

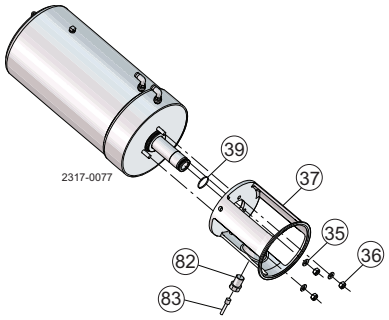


Study the instructions carefully. Handle scrap correctly.

Mounting yoke on actuator:

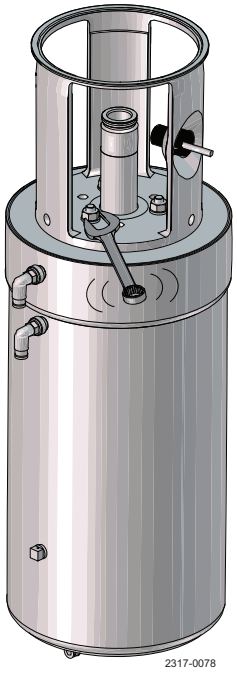
Step 14

Lubricate O-ring (39).



Step 15

1. Mount yoke (15) and the 3 nuts (36) and washers (35).
2. Use a 13 mm wrench. Tighten nuts to 12 Nm.
3. Mount O-ring (39) on actuator spindle.
4. Mount plastic bolt (82) and sensor (83) (if sensor is used).



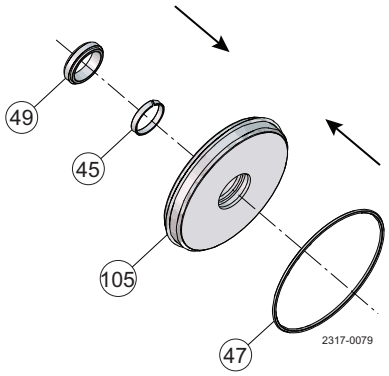
6 Maintenance

Study the instructions carefully. Handle scrap correctly.

Assembling vent body sealing element:

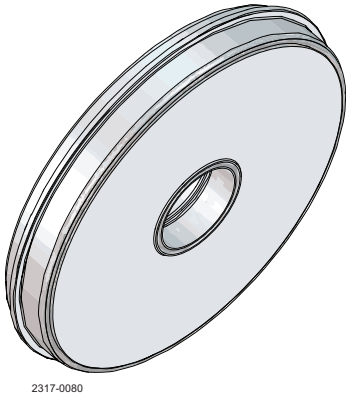
Step 16

Lubricate O-ring (47) and lip seal (49).



Step 17

Mount all components in sealing elements (105).

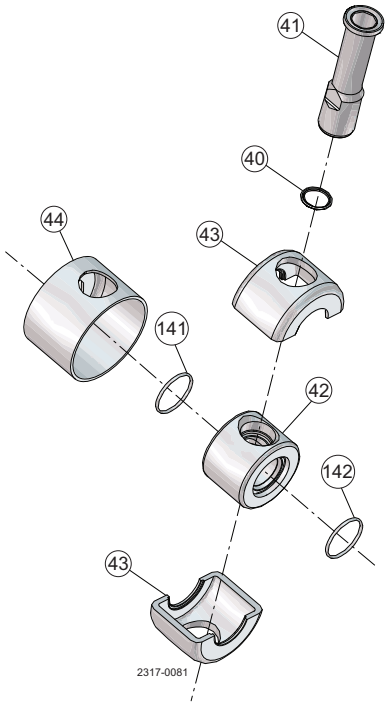


Study the instructions carefully. Handle scrap correctly.

Assembling valve:

Step 18

Lubricate O-rings (40 + 141 + 142).

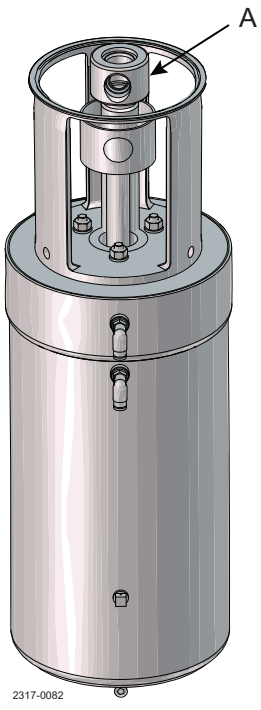


Step 19

Mount lock ring (44).

Mount spindle liner (42) with O-rings (141 + 142)

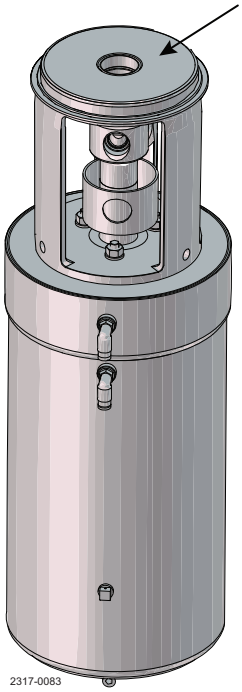
A. Spindle liner can be turned both ways except 6”



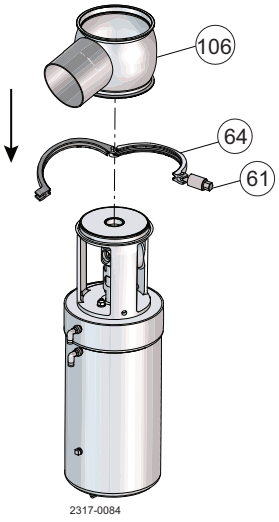
6 Maintenance

Study the instructions carefully. Handle scrap correctly.

Step 20
Place sealing element with O-ring and lip seal upwards.



Step 21
1. Mount vent body (106).
2. Mount clamp (64 + 61).

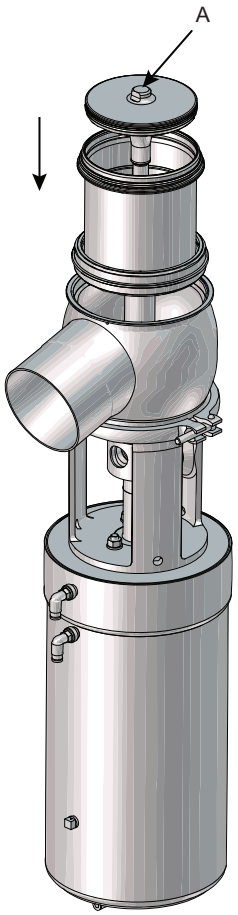


Study the instructions carefully. Handle scrap correctly.

Step 22

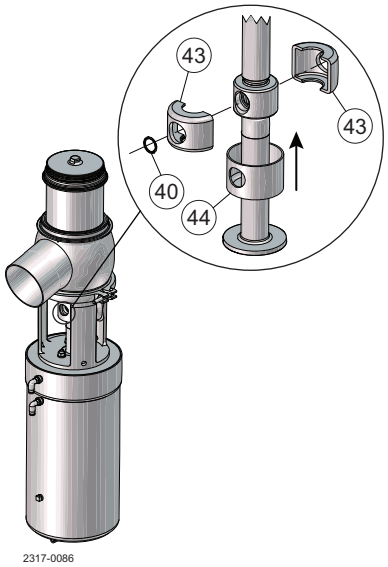
1. Activate compressed air on lower seat push (yellow air fitting placed on top of actuator).
2. Insert valve plug assembly through vent sealing element.
3. Tighten tank plug by hand.

A = tank plug



Step 23

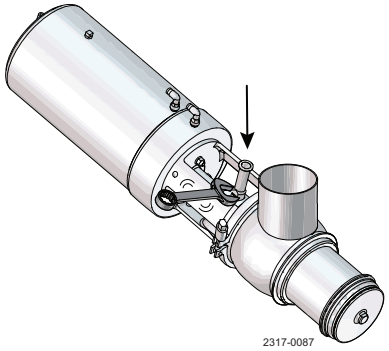
1. Mount clamp rings (43), ensure that hole in clamp and spindle liner are aligned.
2. Push up the lock ring (44).
3. Align hole in lock ring with the other holes.
4. Insert O-ring (40)



6 Maintenance

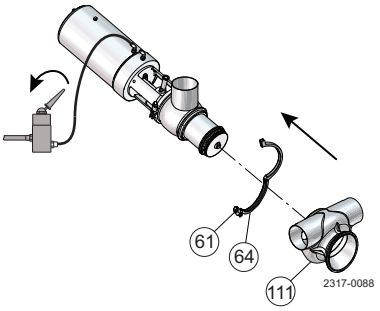
Study the instructions carefully. Handle scrap correctly.

Step 24
1. Mount flushing pipe (41), tighten with 19 mm wrench.
2. Deactivate lower seat push.



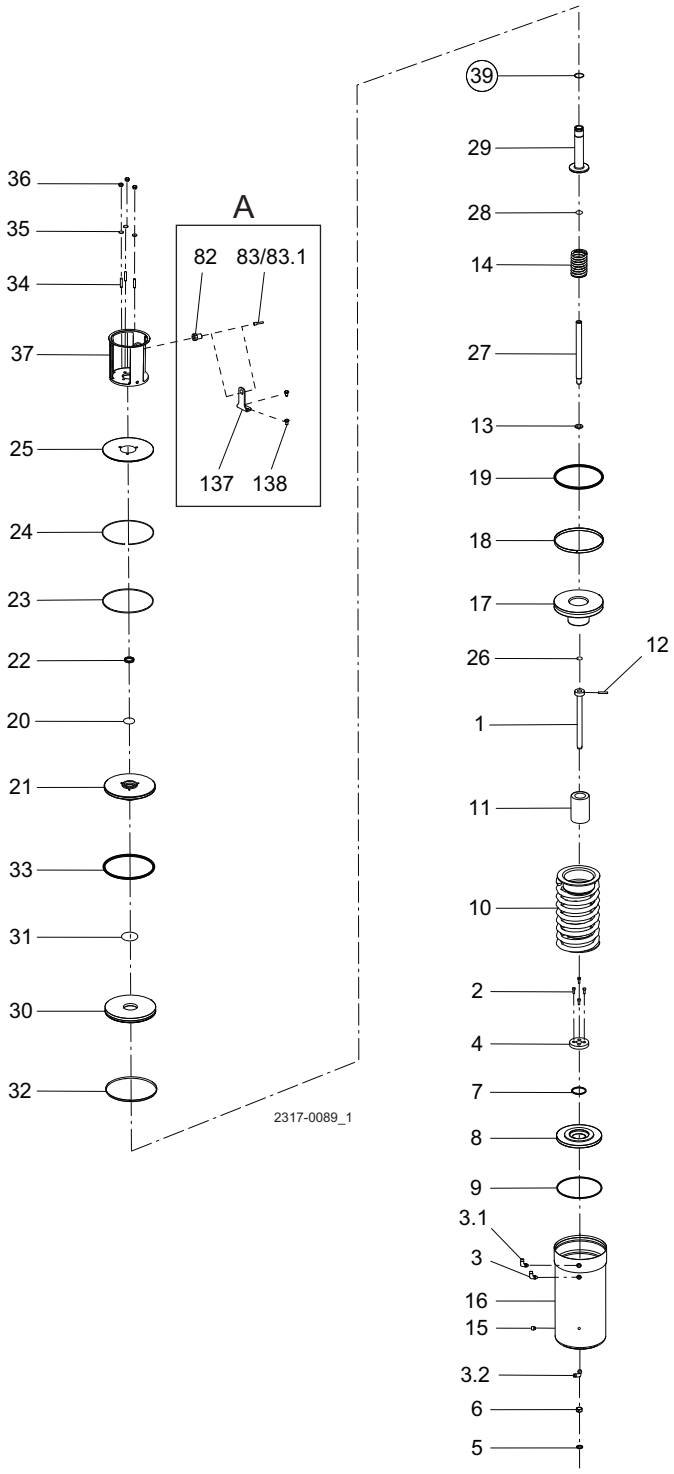
Step 25
Activate compressed air on main stroke. (Blue air fitting placed mid on actuator.

1. Mount valve body (111) and clamp (64 + 61).
2. Deactivate main stroke.



Study the instructions carefully. Handle scrap correctly.

6.6 Dismantling of actuator



A = Only for sensor

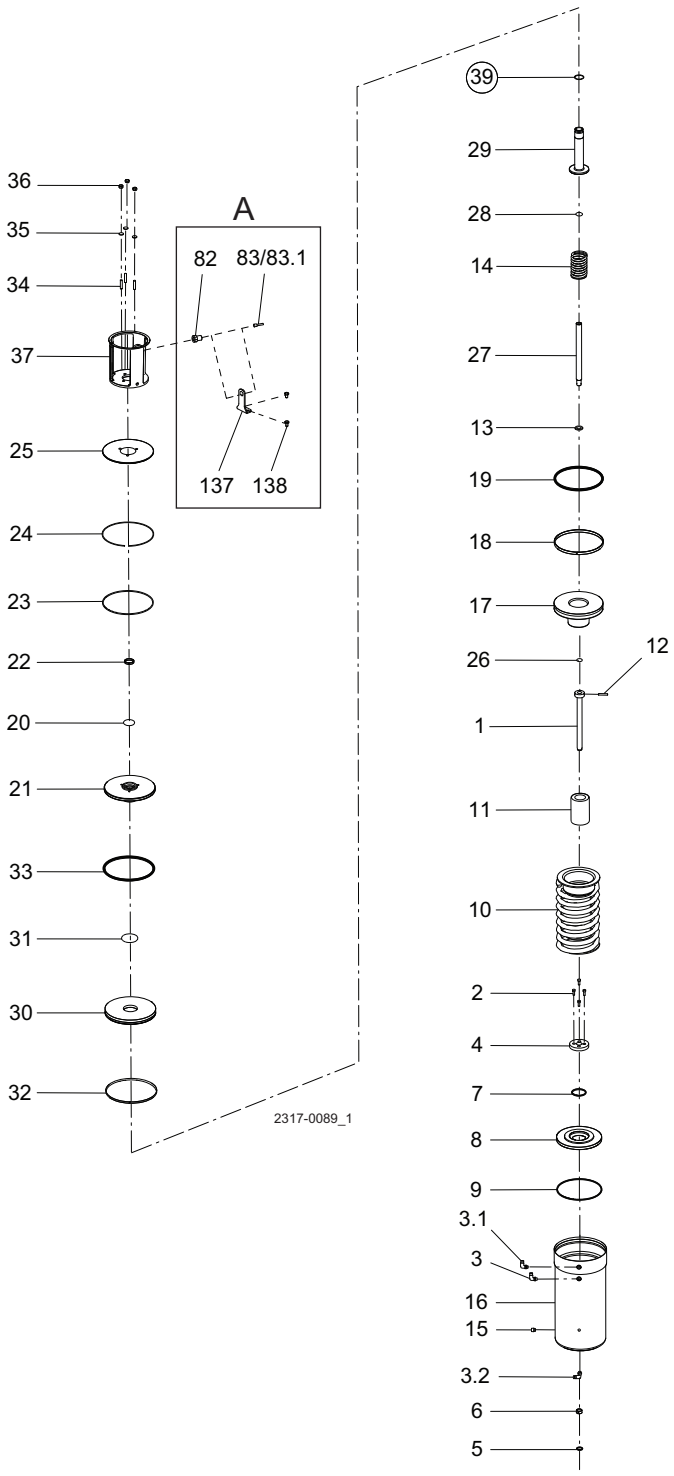
6 Maintenance

Study the instructions carefully. Handle scrap correctly.

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).
5. Remove piston rod (29), bottom (21) and lower piston (30).
6. Separate the three parts.
7. 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.
8. Remove spring assembly (14).
9. Remove inner stem (27), main piston (17) and distance spacer (11) if present. Remove guide ring (18) and O-ring (19).
10. Remove spring assembly (10).
11. Unscrew screws (2).
12. Remove stop (4).
13. Remove upper piston (8). Remove O-rings (7 and 9).
14. Remove O-ring (5) and guide ring (6).

Study the instructions carefully. Handle scrap correctly.

Actuator exploded view



A = Only for sensor

6 Maintenance

Study the instructions carefully. Handle scrap correctly.

6.7 Actuator re-assembly

1. Fit guide ring (6) and O-ring (5).
2. Fit O-rings (7 and 9). Place upper piston (8).
3. Fit stop (4).
4. Tighten screws (2).
5. Place spring assembly (10).
6. Fit O-ring (19) and guide ring (18). Mount distance spacer (11), main piston (17) and inner stem (27).
7. Fit spring assembly (14).
8. 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.
9. Fit piston rod (29), lower piston (30) and bottom (21).
10. Mount the three parts.
11. Fit retaining ring (24).
12. Fit cover disk (25).
13. Mount intermediate piece (37) on actuator.
14. Fit and tighten nuts (36) and washers (35).

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

7.1 Technical data

This Unique Mixproof HT Valve is specially designed for horizontal mounting on the side of a tank or as a space-saving alternative at the bottom of a cone-formed tank.

Based on the well proven and exceptionally versatile principle of the Unique Mixproof valves, this horizontal mixproof tank valve features many of the same components, such as the actuator, yoke and seals, and therefore the same spare parts.

Data	
Max. product pressure in pipeline:	1000 kPa (10 bar)
Min. product pressure:	Full vacuum
Temperature range:	-5°C to +125°C (depending on rubber quality)
Air pressure:	Max. 800 kPa (8 bar)

Size ISO/DIN		DN/OD 2½"	DN/OD 3"	DN/OD 4"	DN/OD 6"	Longstroke DN/OD 6"
Kv-value						
Upper Seat-lift	[m^3/h]	2.5	2.5	3.1	7.1	7.1
Lower Seat-lift (tank seat lift)	[m^3/h]	11.5	11.5	34.1	80.5	80.5
Air consumption						
Upper Seat-lift	*[n litre]	0.4	0.4	0.62	0.62	0.62
Lower Seat-lift	*[n litre]	0.13	0.13	0.21	0.21	0.21
Main Movement	*[n litre]	1.62	1.62	3.54	3.54	3.54
Kv-value - SpiralClean						
External CIP in leakage chamber	[m^3/h]	1.52	1.52	1.52	1.52	1.52

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

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

Q = CIP - flow (m^3/h).

Kv = Kv value from the above table.

Δ p = CIP pressure (bar).

Materials	
Product wetted steel parts:	1.4404 (316L)
Other steel parts:	1.4301 (304)
External surface finish:	Semi-bright (blasted)
Internal surface finish:	Bright (polished), Ra < 0.8 µm
Product wetted seals:	EPDM
Other seals:	CIP seals: EPDM
Actuator seals:	NBR
Guide strips:	PTFE

7 Technical data

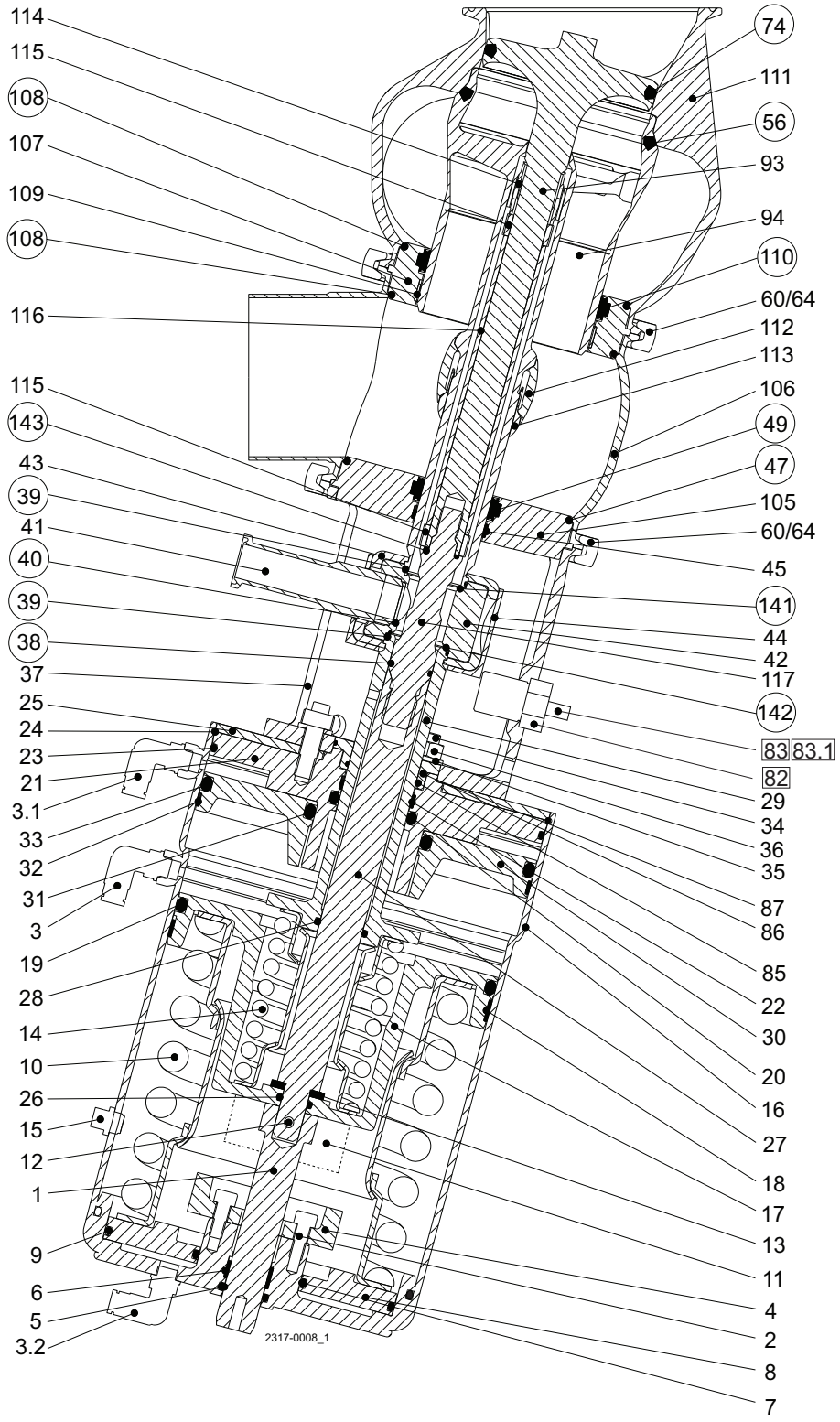
It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

Weight (kg)

Size	2.5”	3”	4”	6” (75 mm) stroke	6” (59 mm) stroke
Weight (kg)	1.6	1.3	2.1	2.9	5.0

8 Parts list

8.1 Wear parts



○ = wear parts

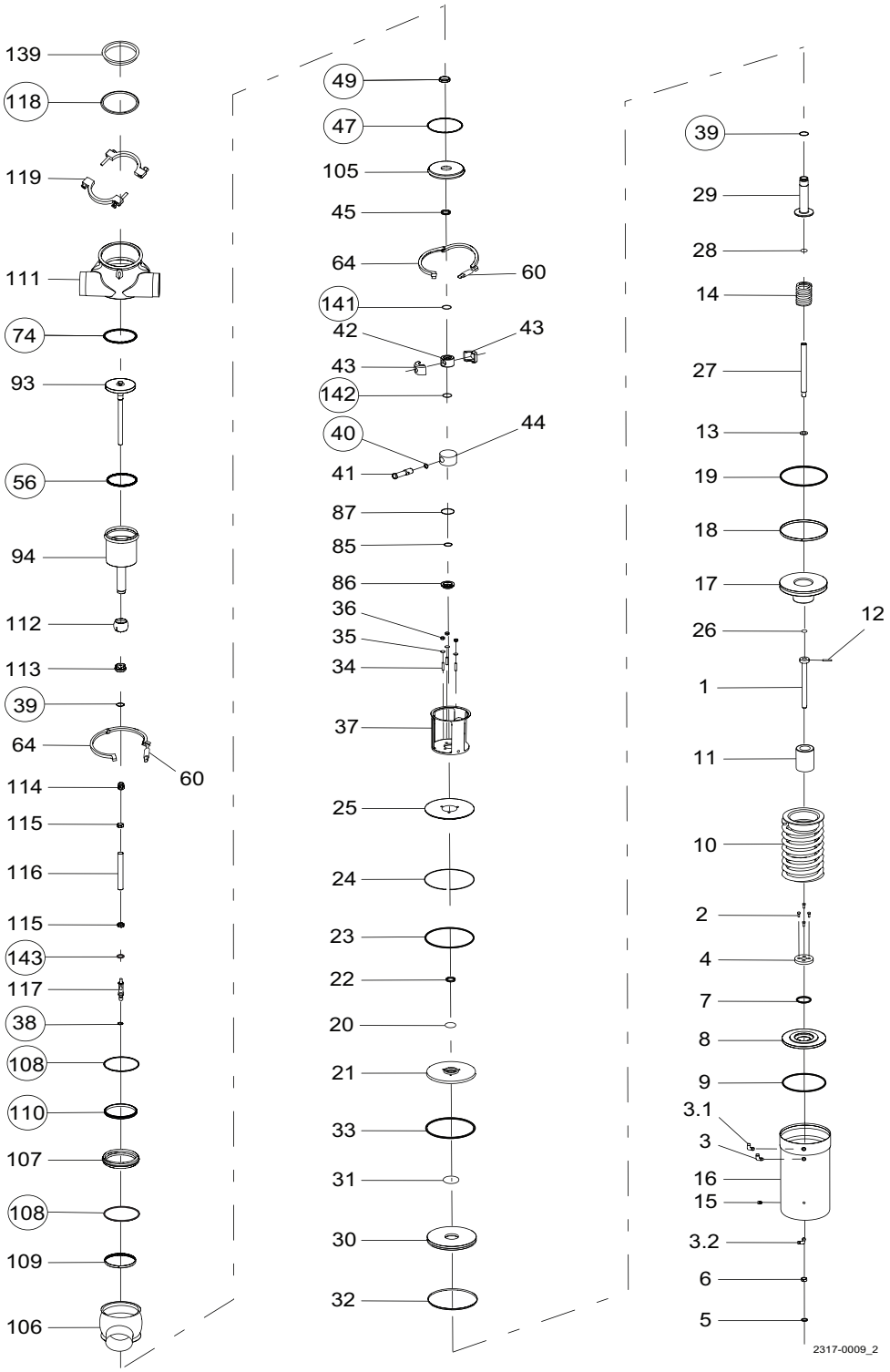
□ = sensor kit

Parts list

Pos.	Qty	Denomination
38	1	O-ring
39	2	O-ring
40	1	O-ring
47	1	O-ring
49	1	Lip seal
56	1	Seal ring
74	1	Seal ring
108	2	O-ring
110	1	Lip seal
118	1	Clamp packing
141	1	O-ring
142	1	O-ring
143	1	O-ring

8 Parts list

8.2 Parts



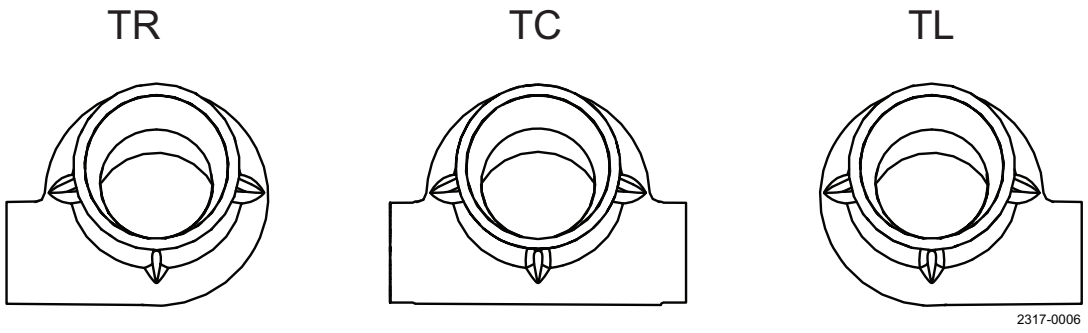
Parts list

Pos.	Qty	Denomination
		Cpl. Actuator
1	1	Upper stem
2	4	Screw
3	1	Air fitting
3.1	1	Air fitting
3.2	1	Air fitting
4	1	Stop for upper piston
5	1	O-ring, NBR
6	1	Guide ring, Turcite
7	1	O-ring, NBR
8	1	Upper piston
9	1	O-ring, NBR
10	1	Spring assembly
11	1	Distance spacer
12	1	Pin
13	1	Washer
14	1	Spring assembly
15	1	Plug
16	1	Cylinder
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

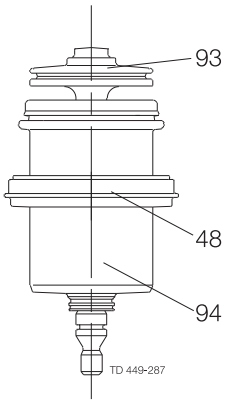
Parts list

Pos.	Qty	Denomination
30	1	Lower piston
31	1	O-ring, NBR
32	1	Guide ring, Turcite
33	1	O-ring, NBR
34	3	Bolt
35	2	Washer
35.1	1	Washer
36	3	Nut
41	1	Flushing tube
42	1	Spindle liner
43	2	Clamp
44	1	Lock
45	1	Guide ring, PTFE
60	2	Hexnut
64	2	Clamp without nut
85	1	O-ring
86	1	Plug for actuator
87	1	O-ring
93	1	Tank plug
94	1	Balance plug
105	1	Upper sealing element
107	1	Sealing element
109	1	Guide ring, PTFE
112	1	Rotating nozzle
113	1	Lockring rotating nozzle
114	1	Rotating nozzle
115	2	Guidering rotating nozzle
116	1	Pipe
117	1	Spindle
119	1	Clamp
139	1	Clamp ferrule

8.3 Service kits



Service kits



Parts list

Pos.	Qty	Denomination
37	1	Intermediate piece
106	1	Vent body
111	1	Valve body

Service kits

2½" + 3" *)

Service kit, EPDM 9611926881
Service kit, NBR 9611926882
Service kit, HNBR 9611926883
Service kit, FPM 9611926884

4"

Service kit, EPDM 9611926885
Service kit, NBR 9611926886
Service kit, HNBR 9611926887
Service kit, FPM 9611926888

6"

Service kit, EPDM 9611926889
Service kit, NBR 9611926890
Service kit, HNBR 9611926891
Service kit, FPM 9611926892

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