Instruction Manual

Unique PMO Sanitary Mixproof Valve

ESE03232-ENUS3 2019-11

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 EC Declaration of Conformity

Revision of Declaration of Conformity 2009-12-29

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

PMO Mixproof Valve
Designation

Unique PMO
Type

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 97/23/EC 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

QHSE Manager, Quality, Health and safety & Environment		Annie Dahl
Title		Name
Kolding	2013-12-03	
Place	Date	Signature

2 Introduction

Thank you for purchasing an Alfa Laval product.

This manual has been provided to instruct you how to operate and service this product correctly and safely. Be sure to 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 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.

3.1 Follow Safety Directions

Read the manual thoroughly before working on equipment.

Leave all safety stickers on equipment and keep them maintained in legible condition. In the event that stickers become damaged or are missing, contact Alfa Laval for replacement.

Maintain equipment in good working condition.

3.2 Do Not Make Machine Modifications

Alfa Laval offers a full range of products to suit all your needs. Therefore, product modification is never necessary.

3.3 Keep Maintenance Safe

Replace damaged or worn parts immediately. Never allow old product, debris, or any lubricants to build up on equipment. Never operate unless equipment is in proper working order.

Before attempting to service the machine, disconnect all power and compressed air. Allow machine to come to a complete stop. Never service a machine while it is operating. Keep all limbs away from moving equipment. Be sure that product pressure has been relieved before beginning maintenance.

4 Installation

4.1 Unpacking

The valves should be unpacked immediately upon receipt from the factory and carefully inspected for damage that may be occurred during shipping. The equipment should also be checked against the bill of lading to make sure there are no shortages. Any damage or shortage should be reported to the carrier.

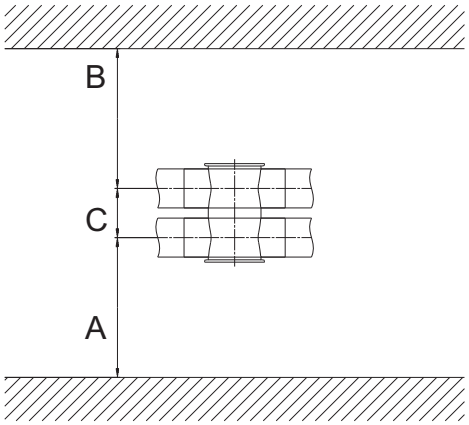
4.2 Locating

The valves are mounted directly into the product line. Care should be taken, however, to locate the valves in a place where they are easily reached for maintenance and disassembly.

4.3 Installing

Line Mounted Valve: The valves may be installed in lines that are firmly supported and capable of carrying the valve's weight. Mount valves vertically.

Clearances required for removal of actuator/plus assembly for repair.



		2"	2½"	3"	4"
A	Valve without external CIP connections	8¼"	10½"	10½"	12¾"
A	Valve with external CIP connections	10¼"	13-3/8"	13-3/8"	17-3/8"
C		3.02"	3.52"	4.02"	5.02"
*B	Valve without external CIP connections	41¾"	48½"	48½"	52¾"
*B	Valve with external CIP connections	47¼"	56-3/8"	56-3/8"	47¼"

*Include ThinkTop®

Max. Process Pressure	Max. Air Pressure
145 PSI - All Sizes	145 PSI - All Sizes
Min. Process Pressure	**Temperature Range**
Full Vacuum	23°F to 257°F

Materials

Product wetted steel parts:	Acid-resistant steel AISI 316L
Other steel parts:	Stainless steel AISI 304/304L
Product wetted parts:	NBR, HNBR, EPDM or FPM
Other Seals:	CIP Seals: EPDM
	Actuator seals: NBR
Finish:	int./ext. Polished Ra<32

Note: The Ra-values are only for the internal surfaces.

CIP solution flows for seat lift and spiral clean (viscosity and density similar to water)

	CV Values Unique PMO®			
	2”	2½”	3”	4”
Upper seat lift	2.95	4.37	4.37	6.47
Lower seat push	2.24	3.66	3.66	5.98
Sprindle CIP (Spiral Clean)	0.14	0.14	0.14	0.14
Upper/Lower External CIP (Spiral Clean)	0.34	0.34	0.34	0.34

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

$Q = Cv (\sqrt{\Delta p})$

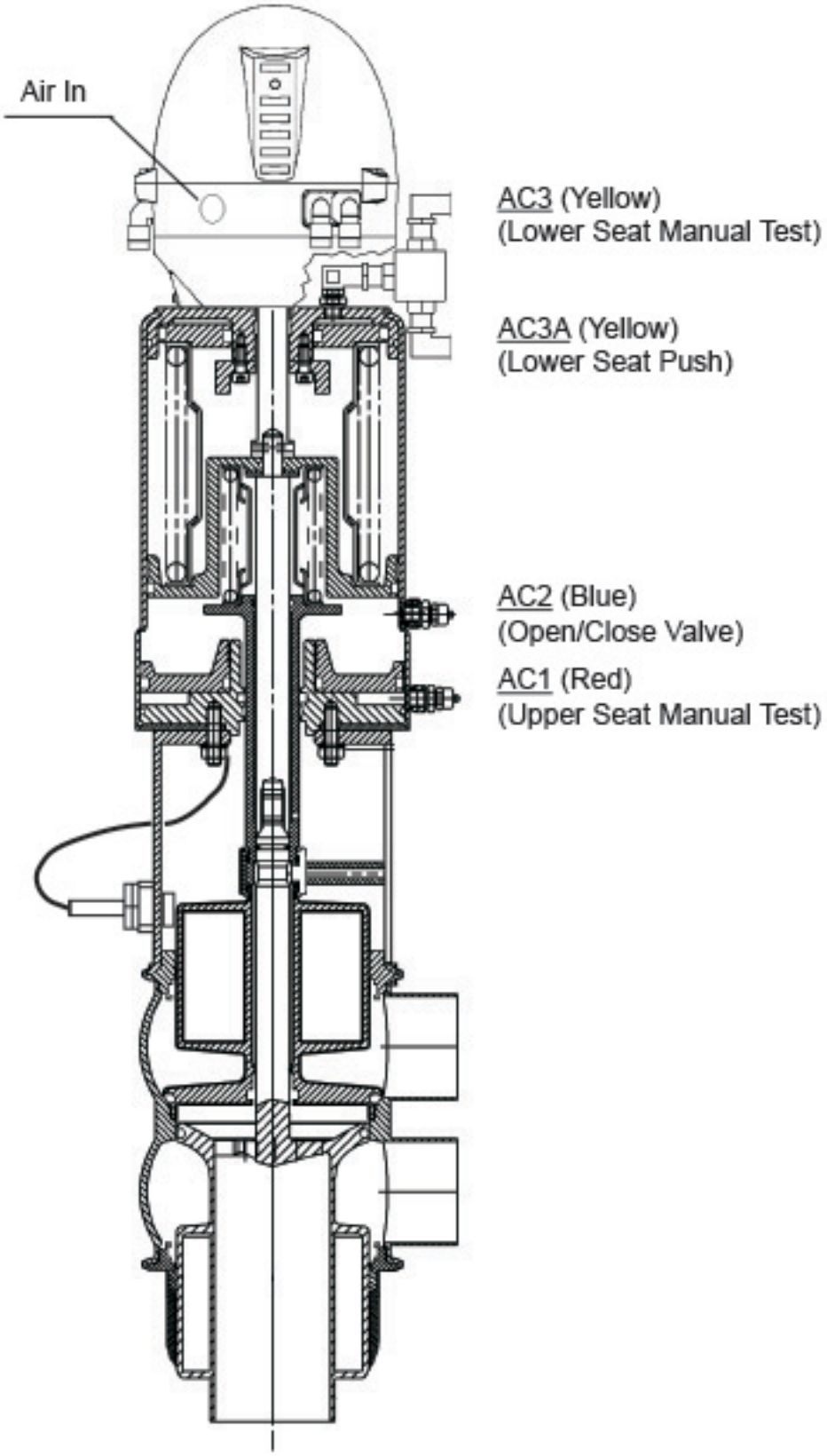
Where: Q = Flow in USGPM

Cv = Value from table above

* Δp = CIP pressure in PSI

*Note: Recommended minimum pressure for sprial clean is 29 PSI.

Valve Pneumatic Functions:



Valve Pneumatic Tubing Interconnect

The following charts indicate the pneumatic tubing interconnect between the air solenoids and the valve actuators.

Use the first chart if the solenoids are to be located in the ThinkTops.

Use the second chart if the solenoids are to be located in an external remote box.

Solenoids Located in ThinkTops:

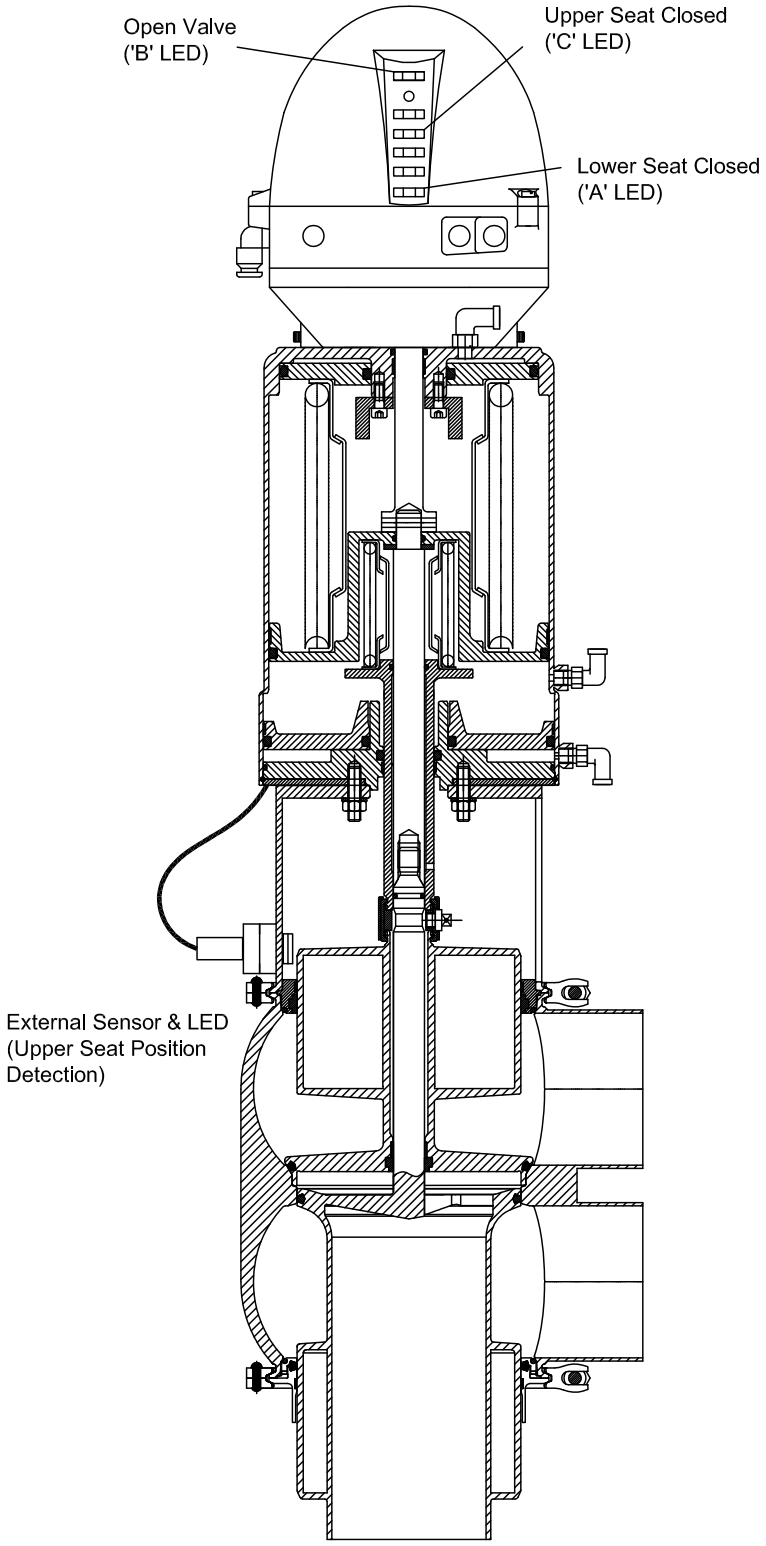
ThinkTop Fitting ID	Actuator Fitting ID	Air Hose Color
Air In	N/A	Green
Out-1A	AC2	Blue
Out-2	AC3A	Yellow

Solenoids Located in External Remote Boxes:

Remote Solenoid ID	Actuator Fitting ID	Air Hose Color
SV-1	AC2	Blue
SV-2	AC3A	Yellow

7 Position Indication

Valve Position Indication



8.1 ThinkTop®, 8-30 VDC #9613-6031-05 (0 Solenoid)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
9	+8-30 VDC	Power +
10	-Common	Power -
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (WHT)
26	Supply +	External Sensor (BRN)
27	Supply -	External Sensor (BLU)
	Not Used -	External Sensor (BLK)

8.2 ThinkTop®, 8-30 VDC #9613-6031-06 (1 Solenoid)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
6	Solenoid - 1	Output - Valve Open
9	+8-30 VDC	Power +
10	-Common	Power - *(Jump to 11)
11	Solenoid Com.	Power - *(Jump to 10)
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (WHT)
26	Supply +	External Sensor (BRN)
27	Supply -	External Sensor (BLU)
	Not Used -	External Sensor (BLK)

*One power supply, positive activation of solenoids.

8.3 ThinkTop®, 8-30 VDC #9613-6013-07 (2 Solenoids)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
6	Solenoid - 1	Output - Valve Open
7	Solenoid - 2	Output - Lower Seat Push
9	+8-30 VDC	Power +
10	-Common	Power - *(Jump to 11)
11	Solenoid Com.	Power - *(Jump to 10)
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (WHT)
26	Supply +	External Sensor (BRN)
27	Supply -	External Sensor (BLU)
	Not Used -	External Sensor (BLK)

*One power supply, positive activation of solenoids.

8.4 ThinkTop®, 8-30 VDC #9613-6013-07 (3 Solenoids)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
6	Solenoid - 1	Output - Valve Open
7	Solenoid - 2	Output - Lower Seat Push
8	Solenoid - 3	Output - Upper Seat Lift
9	+8-30 VDC	Power +
10	-Common	Power - *(Jump to 11)
11	Solenoid Com.	Power - *(Jump to 10)
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (WHT)
26	Supply +	External Sensor (BRN)
27	Supply -	External Sensor (BLU)
	Not Used -	External Sensor (BLK)

*One power supply, positive activation of solenoids.

8.5 ThinkTop®, 110 VAC #9634-0686-50 (0 Solenoid)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
9	110 VAC	Power +
10	-Common	Power -
	Ground	----------
1	Closed Valve	PLC Input - Valve Closed (Lower Seat)
2	Open Valve	PLC Input - Valve Open
3	Seat Lift - 1	PLC Input - Valve Closed (Upper Seat)
5	Status	PLC Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (Red w/BLK rings)
26	Supply +	External Sensor (Red w/WHT rings)

8.6 ThinkTop®, 110 VAC #9634-0686-51 (1 Solenoid)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
6	Solenoid - 1	Output - Valve Open
9	+110 VAC	Power +
10	-Common	Power - *(Jump to 11)
11	Solenoid Com.	Power - *(Jump to 10)
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (Red w/BLK rings)
26	Supply +	External Sensor (Red w/WHT rings)

*One power supply, positive activation of solenoids.

8.7 ThinkTop®, 110 VAC #9634-0686-52 (2 Solenoids)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
6	Solenoid - 1	Output - Valve Open
7	Solenoid - 2	Output - Lower Seat Push
9	110 VAC	Power +
10	-Common	Power - *(Jump to 11)
11	Solenoid Com.	Power - *(Jump to 10)
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (Red w/BLK rings)
26	Supply +	External Sensor (Red w/WHT rings)

*One power supply, positive activation of solenoids.

8.8 ThinkTop®, 110 VAC #9634-0686-53 (3 Solenoids)

Electrical Connection Chart

ThinkTop Term. No.	Function	Remarks
6	Solenoid - 1	Output - Valve Open
7	Solenoid - 2	Output - Lower Seat Push
8	Solenoid - 3	Output - Upper Seat Lift
9	110 VAC	Power +
10	-Common	Power - *(Jump to 11)
11	Solenoid Com.	Power - *(Jump to 10)
	Ground	----------
1	Closed Valve	Input - Valve Closed (Lower Seat)
2	Open Valve	Input - Valve Open
3	Seat Lift - 1	Input - Valve Closed (Upper Seat)
5	Status	Input - Optional
24	Seat Lift-1 (Upper) (Signal)	External Sensor (Red w/BLK rings)
26	Supply +	External Sensor (Red w/WHT rings)

*One power supply, positive activation of solenoids.

9.1 ThinkTop®, digital 8-30 or 110 VAC NO/NC

Features

Tolerance

The tolerance band is ±1.5 mm.

Built-In maintenance monitor

The unit can be preset to indicate when the time for maintenance of the valve has been reached. A status signal and flashing maintenance LED can be programmed to return after 3, 6, 9 or 12 months or more.

Other features

Another very important fact is that the setup is kept until programmed otherwise even during failure in the power supply.

The accurate sensor system enables indication of seat lift to be integrated in the top unit.

Materials

Plastic Parts: .....Nylon PA 12
Steel Part: .....Stainless steel AISI 304 and 316
Seals: .....Nitrile (NBR). EPDM rubber for SMP-EC activator stem

Technical data

Sensor accuracy: .....± 0,1 mm (0.0004 inch)
Distance to magnet: .....5 ± 3 mm (0.12 ± 0.2 inch)
Stroke length: .....0.1 - 80 mm (0.004 - 3.15 inch)

Electrical connection

Direct cable gland entry (hard wired) PG11 (Ø4 - Ø10mm) (Ø0.16 - Ø0.39 inch)

Terminals

The terminal row of the sensor unit is equipped with screw terminals for both internal as well as external cables and wires.The terminals are suitable for wires up to 0.75mm2 (AWG19).

Power supply - AC

The ThinkTop® is designed to be a part of the PLC's Input/ Output (I/O) system. It should be supplied from the same protected power supply as the other I/O devices. The I/O power supply should not be used for other kinds of loads.

The unit is reversed polarity and short circuit protected. The power supply must meet the requirements of EN 61131-2.

Supply voltage: .....8-30 or 100 - 126.5 VAC
Supply voltage nominal: .....24 or 110 VAC (+15%, -10%) - pr. EN 61131-2
Supply voltage absolute max: .....30 or 126.5 VAC
Supply voltage absolute min: .....8 or 100 VAC
Power consumption*: .....Max. 1.5 VA (8-30 VAC) or max. 2.0 VA (110 VAC (for sensor unit along) (Excluding current to the solenoids, external proximity switches and the PLC input current.)

* The initial current during power-on is higher. Typical values are 440 mARCS during 10 ms (the first half cycle) followed by 270 ms at 2 x normal steady state current.

The fulfilling of the UL requirements in UL508 requires that the unit is supplied by an isolating source complying with the requirements for class 2 power units (UL1310) or class 2 and 3 transformers (UL 1585).

9 Automation ThinkTop® Digital 8 - 30 VDC & 110 VAC PNP/NPN

Feedback ssignals

Output signals from the sensor unit to be connected digital interface (PLC).

Nominal voltage: .....Must match the selected type of ThinkTop®
Load current: .....50 mA Typical, 100 mA max.
Voltage drop: .....Typical 3V at 50 mA

External sensors

The external sensors are used for seat-lift supervision when seat-lift cannot be internally detected. The sensors get their supply voltage from the terminal row. The output signals from the sensors 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.

Supply voltage: .....Must match the selected type of ThinkTop®
Supply current: .....Max. 15 mA per sensor
Type of sensor: .....2 wire VAC (EN60947-5-2)
Cable length: .....Max. 3 m. (16.4 ft.)

Polarity

NO or NC function is selected with a jumper between terminals 12 and 13. Jumper present = NO. If changing to NC remove the jumper and make a power recycle. A power recycle is always required when changing this function.

ThinkTop®, Digital 8-30 or 110 VAC NO/NC

Solenoid valves

Up to 3 solenoid valves in each unit.

Type .....3/2 or 5/2 valve (only possible with one 5/2 valve)
Air supply .....300-900 kPa (3-9 bar) (43.5-130.5 PSI)
Filtered air, max. particles or dirt ...0.01 mm (0.0004 inch)
Max. oil content .....1.0 ppm
Max. water content. .....0.0075 kg/kg air. (0.02 lb/lb)
Throughput .....ø2.5 mm
Air restriction (throttle function) air inlet/outlet

Manual hold override.

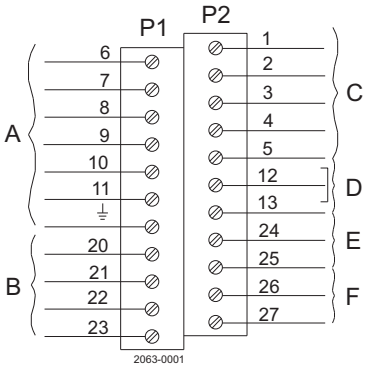
External air tube connection .....Ø6 mm or ¼"
Silencer/filter* .....Connection possible via Ø6 mm or ¼"
Nominal voltage .....24 or 110V
Nominal power. .....1.0 W
* Filter recommended in tropical regions

Micro environment demand specifications

Temperature		
Working:	-4°F to +185°F	IEC 68-2-1/2
Storage:	-40°F to +185°F	IEC 68-2-1/2
Temperature change:	-13°F to +158°F	IEC 68-2-14
Vibration	10-55 Hz, 0.7 mm 55-500 Hz, 10g 3 x 30 min, 1 octave/min	IEC 68-2-6
Drop test		IEC 68-2-32
Humidity		
Constant humidity:	+104°F, 21 days, 93% R.H.	IEC 68-2-3
Cyclic humidity:	+77°F/+131°F 12 cycles	IEC 68-2-30
(working)	93% R.H.	
Protection class	IP67	IEC 529
Input treshold		
Voltage/current:	Type 1 input requirements	EN 61131-2
Solenoid signals		
Isolation voltage	(1000 + 2 x 117) VAC ms/1 min	EN61131-2
EMC Directive	89/336/EEC	EN 50081-1, EN 50082-2
UL/CSA Approval	8-30 VAC 110 VAC	UL 508-E203255 UL 508-E203664

9 Automation ThinkTop® Digital 8 - 30 VDC & 110 VAC PNP/NPN

ThinkTop®, Digital 8-30 or 110 VAC NO/NC electrical connection



A Digital interface command signals
B Internal connections to solenoid 1-3
C Feedback signals to digital interface
D Jumper connections **)
E Incoming signals from external sensors
F Supply to external sensors

6 Solenoid 1
7 Solenoid 2
8 Solenoid 3
9 Supply ~
10 Supply ~
11 Solenoid common Earth
20 Solenoid common
21 Solenoid 1
22
23

1 Closed valve
2 Open valve
3 Seat-lift 1
4 Seat-lift 2
5 Status
12 NO/NC jumper
13 NO/NC jumper
24 Seat-lift 1 “upper” *)
25 Seat-lift 2 “lower” *)
26 Supply ~*) common ~
27 Earth

Note!

*) Terminals 24, 25, 26 and 27 can be used for external seat-lift sensors as well as for any digital input. Always use an external NO sensor.
Two external signals can be connected, they are associated with feedback signals 3 (seat-lift 1) and 4 (seat-lift 2). External sensor must always be a 8-30 or 110 VAC NO 2 wire sensor. Connect ~ common on terminal 26. The signals from the external sensors are associated as follows: sensor signal on terminal 24 (seat-lift 1) associated with feedback 3 (seat-lift 1), and sensor signal on terminal 25 (seat-lift 2) associated with feedback 4 (seat-lift 2).

**) Jumper present = NO. The selection NO/NC is done by the jumper. If changing the function a power recycle is necessary. Remember to isolate wires that are not in use.

***) Internal connections: Terminals for connection for the solenoids mounted internally in the control head. The number of solenoids actually mounted in the control head could be 0 - 3. The signals are taken directly from the terminal row.

Examples of connecting power supplies

One power for sensor system and solenoid valves:
Two power supplies, one for sensor system and one for the solenoid valves:

9.2 Installation

Step 1

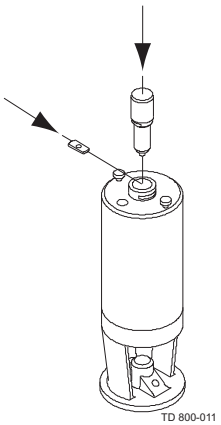
Always read the technical data thoroughly.

Always have the ThinkTop® electrically connected by authorised personnel.

Always install the ThinkTop® before valve or relay is in a safe position.

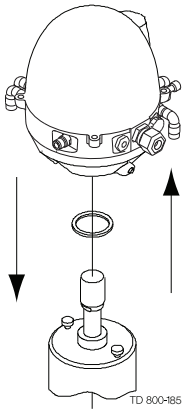
Step 2

1. Fit the air fittings on actuator if not mounted.
2. Fit the activator stem (magnet) and tighten **carefully** by hand.



Step 3

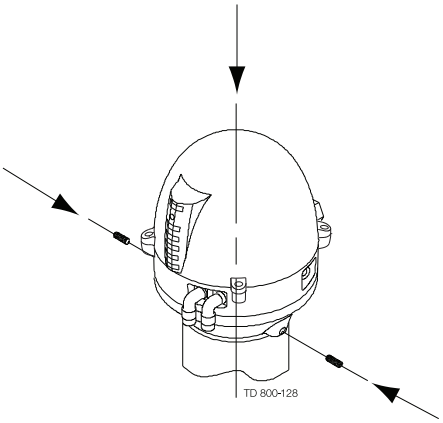
1. Place the ThinkTop on top of the actuator.
2. Make sure X-ring is mounted.



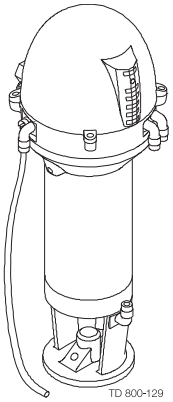
Step 4

1. Ensure that the unit is correctly mounted by **pressing** down on top of the ThinkTop.
2. Tighten the two Allen screws **carefully** (1.50 Nm).
3. Turn the actuator to have LEDs in a front view.

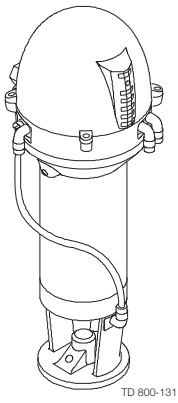
Note: After a relevant period of time after installation (e.g. two weeks) it is recommended to check that all connections are properly tightened.



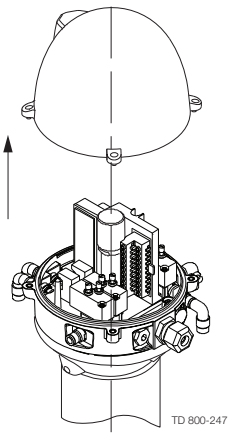
Step 5
Fit the ø6 mm (1/4") air tubes to ThinkTop.
(see drawing "Air connections" page).



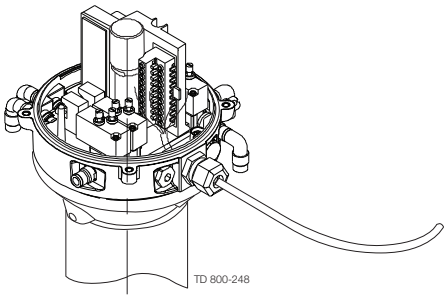
Step 6
Fit the air tubes to the actuator
(see drawing "Air connections" page).



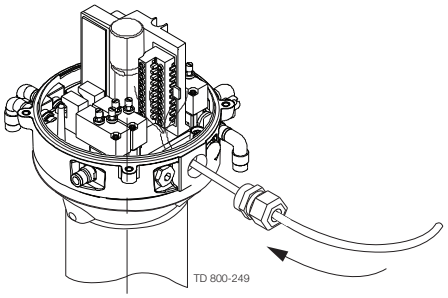
Step 7
Untighten the four screws and pull off cover of ThinkTop.



Step 8
1. Install cable (if not present) through the cable gland.
2. Connect the ThinkTop electrically.

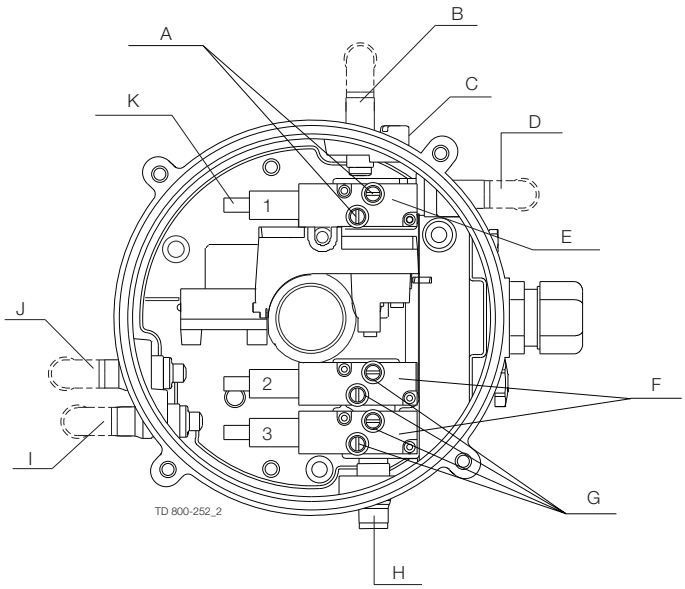


Step 9
Make sure the cable gland is completely tightened.



Step 10
Set up the ThinkTop (see setup diagram 28).

9.3 Air connection



A. Air restriction (throttle function) air inlet/outlet
B. Air out 1A
C. Air exhaust
D. Air out 1B (5/2 port solenoid valve only)
E. Solenoid 3/2 or 5/2
F. 3/2 solenoid valves only
G. Air restriction (throttle function) air inlet/outlet
H. Air in
I. Air out 3
J. Air out 2
K. Manual hold override

9.4 Setup diagram

ThinkTop® setup utilising IR keypad

General

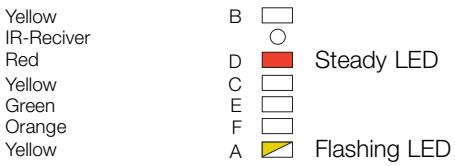
Flashing LED means no value set. Steady LED means value set as shown.

Default:	Step 2, factory-set tolerance band +/- 5 mm Step 3-8, disabled	
D LED:	Active during set-up:	Flashing in step 1 Steady in all other steps
	Or during operations, error condition:	Steady showing hardware fault, indication pin out of range Flashing showing software fault
Timeout:	A 60 sec. timeout is started as soon as any button(s) are released On timeout the setup is exited with no changes saved	
IR Keypad:	Remote distance 0-300 mm to ThinkTop®	

Symbols

[X] Push key on IR keypad with the same number

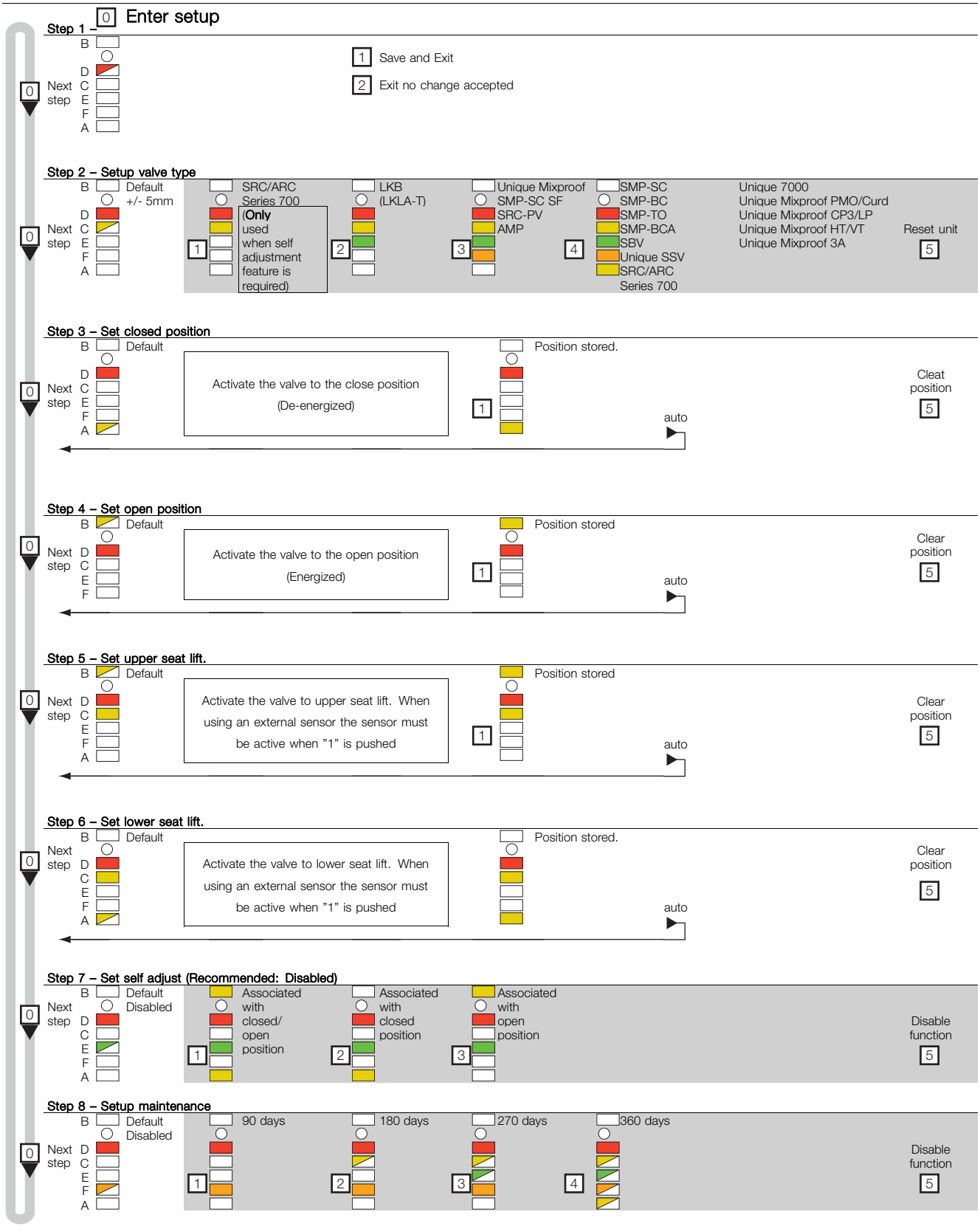
Simple representation of LED indication:



General commands in each step (except step 1):

[0]	Next step / skip step	(In step 3-6 the program automatically moves to the next step when a position is stored)
[5]	Clear / disable step	(In step 2 this resets the unit and sets the step 2-8 to default) (The command is accepted when all unit LED's flash briefly)

It is recommended to reset the unit before performing a setup.
Always check for correct signals after the setup.


0 Enter setup
Step 1 –
B
D
Next step 0
C
E
F
A
1 Save and Exit
2 Exit no change accepted
Step 2 – Setup valve type
B Default
+/- 5mm
D
Next step 0
C
E
F
A
1
SRC/ARC Series 700
(Only used when self adjustment feature is required)
2
LKB (LKLA-T)
3
Unique Mixproof
SMP-SC SF
SRC-PV
AMP
4
SMP-SC
SMP-BC
SMP-TO
SMP-BCA
SBV
Unique SSV
SRC/ARC Series 700
Unique 7000
Unique Mixproof PMO/Curd
Unique Mixproof CP3/LP
Unique Mixproof HT/VT
Unique Mixproof 3A
Reset unit 5
Step 3 – Set closed position
B Default
D
Next step 0
C
E
F
A
Activate the valve to the close position
(De-energized)
1
Position stored.
auto
Cleat position 5
Step 4 – Set open position
B Default
Next step 0
D
C
E
F
Activate the valve to the open position
(Energized)
1
Position stored
auto
Clear position 5
Step 5 – Set upper seat lift.
B Default
Next step 0
D
C
E
F
A
Activate the valve to upper seat lift. When using an external sensor the sensor must be active when "1" is pushed
1
Position stored
auto
Clear position 5
Step 6 – Set lower seat lift.
B Default
Next step 0
D
C
E
F
A
Activate the valve to lower seat lift. When using an external sensor the sensor must be active when "1" is pushed
Position stored.
auto
Clear position 5
Step 7 – Set self adjust (Recommended: Disabled)
B Default
Disabled
Next step 0
D
C
E
F
A
1
Associated with closed/ open position
2
Associated with closed position
3
Associated with open position
Disable function 5
Step 8 – Setup maintenance
B Default
Disabled
Next step 0
D
C
E
F
A
1
90 days
2
180 days
3
270 days
4
360 days
Disable function 5

ThinkTop® setup utilising local 'I' and 'II' keys

General

Default is:	Step 2, tolerance is +/- 5 mm Step 3-8, disabled	
Timeout:	A 60 sec. timeout is started as soon as any button(s) is released. On timeout the setup is exited with no changes saved.	
Flashing LED means no value set. Steady LED means value set as shown		
[D] LED:	Active during set-up:	Flashing in step 1 Steady in all other steps
	Or during operations, error condition:	Steady showing hardware fault, indication pin out of range Flashing showing software fault

General commands in each step (except step 1):

Ⓘ	Next step / skip step	(In step 3-6 the program automatically moves to the next step when a position is stored)
ⒾⒾ5s	Clear / disable step	(In step 2 this resets the unit to default) (The command is accepted when all unlit LED's flash briefly)

It is recommended to reset the unit before performing a setup.

Symbols

Ⓘ	Push local key "I"
ⒾⒾ	Push local key "II"
ⒾⒾ5s	Hold key "II" for 5 sec

Simple representation of LED indication:

Yellow	B	
IR-Reciver		
Red	D	Steady LED
Yellow	C	
Green	E	
Orange	F	
Yellow	A	Flashing LED


Enter setup
Step 1 –
Next step
Save and Exit
Exit no change accepted
Step 2 – Setup valve type
Default
+/- 5mm
SRC/ARC Series 700
(Only used when self adjustment feature is required)
LKB (LKLA-T)
Unique Mixproof SMP-SC SRC-PV AMP
SMP-SC SMP-BC SMP-TO SMP-BCA SBV Unique SSV SRC/ARC Series 700
Unique 7000
Unique Mixproof PMO/Curd
Unique Mixproof CP3/LP
Unique Mixproof HT/VT
Unique Mixproof 3A
Step 3 – Set closed position
Default
Activate the valve to the closed position
(De-energized)
Position stored
auto
Step 4 – Set open position
Default
Activate the valve to the open position
(Energized)
Position stored
auto
Step 5 – Set upper seat lift
Default
Activate the valve to upper seat lift. When using an external sensor the sensor must be active when "II" is pushed
Position stored
auto
Step 6 – Set lower seat lift
Default
Activate the valve to lower seat lift. When using an external sensor the sensor must be active when "II" is pushed
Position stored
auto
Step 7 – Set self adjust (Recommended: Disabled)
Default
Disabled
Associated with closed/ open position
Associated with closed position
Associated with open position
Step 8 – Setup maintenance
Default
Disabled
90 days
180 days
270 days
360 days
+90 days (Up to max. 18 years)

ThinkTop® Quick setup guide

Valve: Unique mixproof valve (with lower seat-lift)

Push:	I	- and wait until red LED flashes
Push:	I	
Push:	II	- hold for 5 sec (clear all stored parameters)
Push:	II	(red + yellow LED)
Push:	II	(red + yellow + green LED)
Push:	II	(red + yellow + green + orange LED)
	I	
Push:	II	- to approve valve closed
	Activate	Valve opens
Push:	II	- to approve valve is open
Push:	I	(no upper seat-lift)
Push:	Activate	Lower seat-lift active
Push:	II	- to approve
Push:	I	(no self adjustment)
Push:	I	(no maintenance)
Push:	II	Red LED flashes (save & exit by push)
	Setup done	

9.5 Fault finding

Below is stated the meaning of the LEDs' indications for fault finding in connection with the operation of the ThinkTop.

7.1.1 status LED (Red)

	Red flashing:	Unit in set-up mode or internal software fault. If internal software fault, re-programme unit.
Red	Red steady:	Unit in set-up mode or internal hardware fault. If internal hardware fault, check if magnet is in range and check correct wiring.
	Red steady:	No. communication between ThinkTop and the DeviceNet master, i.e. the bus is offline. If the Red LED is with random intervals and duration, it suggests that the bus is unstable, and the DeviceNet network should then be investigated. There are numerous issues that could lead to marginal operation of a network, bus load, voltage limits, impedance, termination, etc.

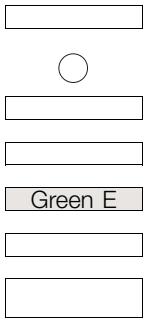
7.1.2 Maintenance time out

Yellow B	1. Orange flashing:	Time for maintenance has run out. The unit has been self-adjusted into a maintenance alert condition. Valve maintenance is strongly recommended. After maintenance: Disabling of maintenance/self-adjustment function is required before setting new position, however, it is strongly recommended to make a complete new set-up after valve maintenance.
Orange		
Yellow A	2. Orange steady, yellow flashing (A and/or B):	The unit has been self-adjusted into a maintenance alarm condition and the feedback is lost (a minimum of seal left). Valve maintenance is required. After maintenance: Disabling of the self-adjustment function is required before setting new position, however, it is strongly recommended to make a complete new set-up after valve maintenance.

NOTE! **The maintenance indicator lighting up, and an open or closed light flashing.....** =
Note the following:

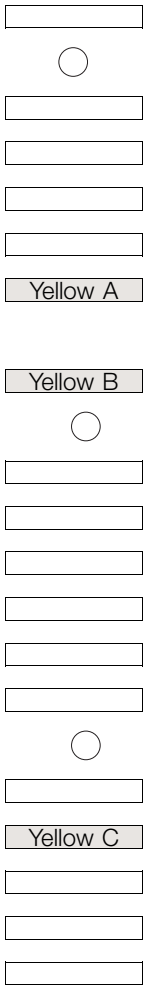
- Self-adjustment programme is only valid for SRC/ARC valves, do not use the programme for other valve types.
- Use tolerance/valve type 1.
- In conjunction with valve type change-over; 21, 22, 31 and 32, the open position must be defined as the upper sensor position (when the indication pin is in the highest position).
- A loose top, indication pin or sensor system can also generate the alert/alarm condition.
- Removing a ThinkTop with self-adjust activated, will immediately generate an alarm condition! If the ThinkTop has to be removed, not because of a valve maintenance issue, but for some other reasons, and you want to store the already adjusted data - disable the self-adjust function before removing the ThinkTop and enable it again once the ThinkTop is back on the actuator.
- After valve maintenance a disabling of the self-adjustment function is required before setting a new position, however, it is strongly recommended to make a complete new set-up (disable all functions in step 2 valve type - and make a complete new set-up).

7.1.3 Solenoid green LED always on



Green E	Condition: When using a ThinkTop 110VAC, the Green LED is always on, but the solenoids seems to operate properly.
	Possible cause: The off state voltage of the solenoid input is not sufficiently low.
	Corrective action: Make sure that the off state voltage is below 7V.

7.2 LED indication during normal operation



Yellow A	Yellow steady:	Position A (closed valve).
Yellow B	Yellow steady:	Position B (open valve).
Yellow C	Yellow steady:	Position C (seat lift 1-2 or external sensors).

Green	Green steady:	Solenoid valves energized.

Note! During set-up LED lights have different functions.

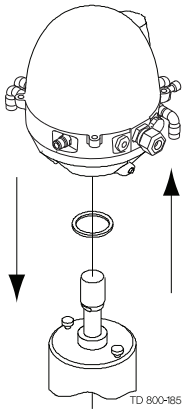
Study the instructions carefully. Handle scrap correctly. Always keep spare X-rings in stock.

9.6 Maintenance

Dismantling the ThinkTop®

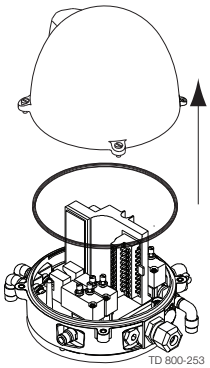
Step 1

1. Untighten the two Allen screws and remove the ThinkTop from the actuator.
2. Pull out X-ring (19) and replace it.



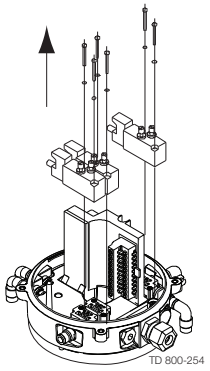
Step 2

1. Untighten the four screws.
2. Pull off cover of ThinkTop.
3. Remove X-ring (9) (grey).



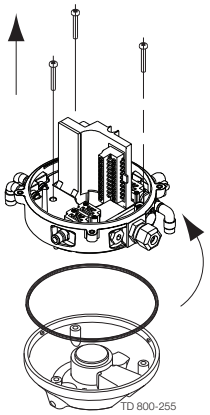
Step 3

1. Untighten screws.
2. Remove solenoid valves (up to three) and replace them with new ones.



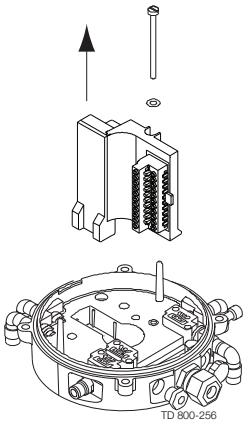
Study the instructions carefully. Handle scrap correctly. Always keep spare X-rings in stock.

Step 4
1. To dismantle the adapter (the lower part of the ThinkTop) from base (the middle part), unscrew the three screws.
2. Turn the lower part a little clockwise and pull.
3. Replace adapter if necessary.
4. Remove the black X-ring.

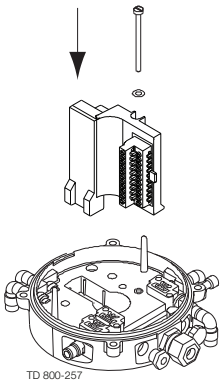


Note: Turn banjo connection!

Step 5
To remove the sensor unit untighten screw and pull out the sensor unit.



Assembling the ThinkTop®
Step 1
Place sensor unit in base and tighten screw (torque: 1 Nm).

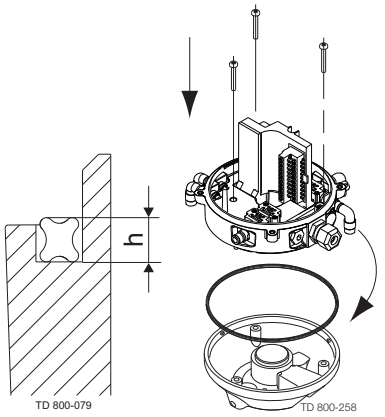


9 Automation ThinkTop® Digital 8 - 30 VDC & 110 VAC PNP/NPN

Study the instructions carefully. Handle scrap correctly. Always keep spare X-rings in stock.

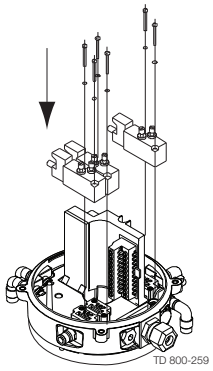
Step 2
1. Replace the black X-ring.
2. Assemble base with adapter by turning adapter slightly anticlockwise and tighten the four screws (1.9 Nm).

CAUTION!
Do NOT twist the X-ring in the groove!
The X-ring is not square; The highest (h) part must be placed as fig.

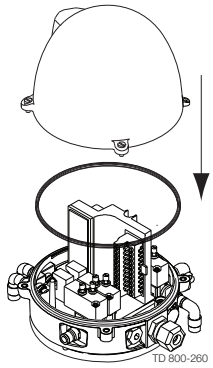


Note:
Turn banjo connection!

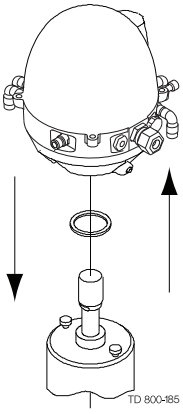
Step 3
1. Replace solenoid valves (up to three) with new ones.
2. Tighten screws (0.2 Nm).



Step 4
1. Replace the grey X-ring.
2. Replace cover of ThinkTop and tighten the four screws (0.6 Nm).

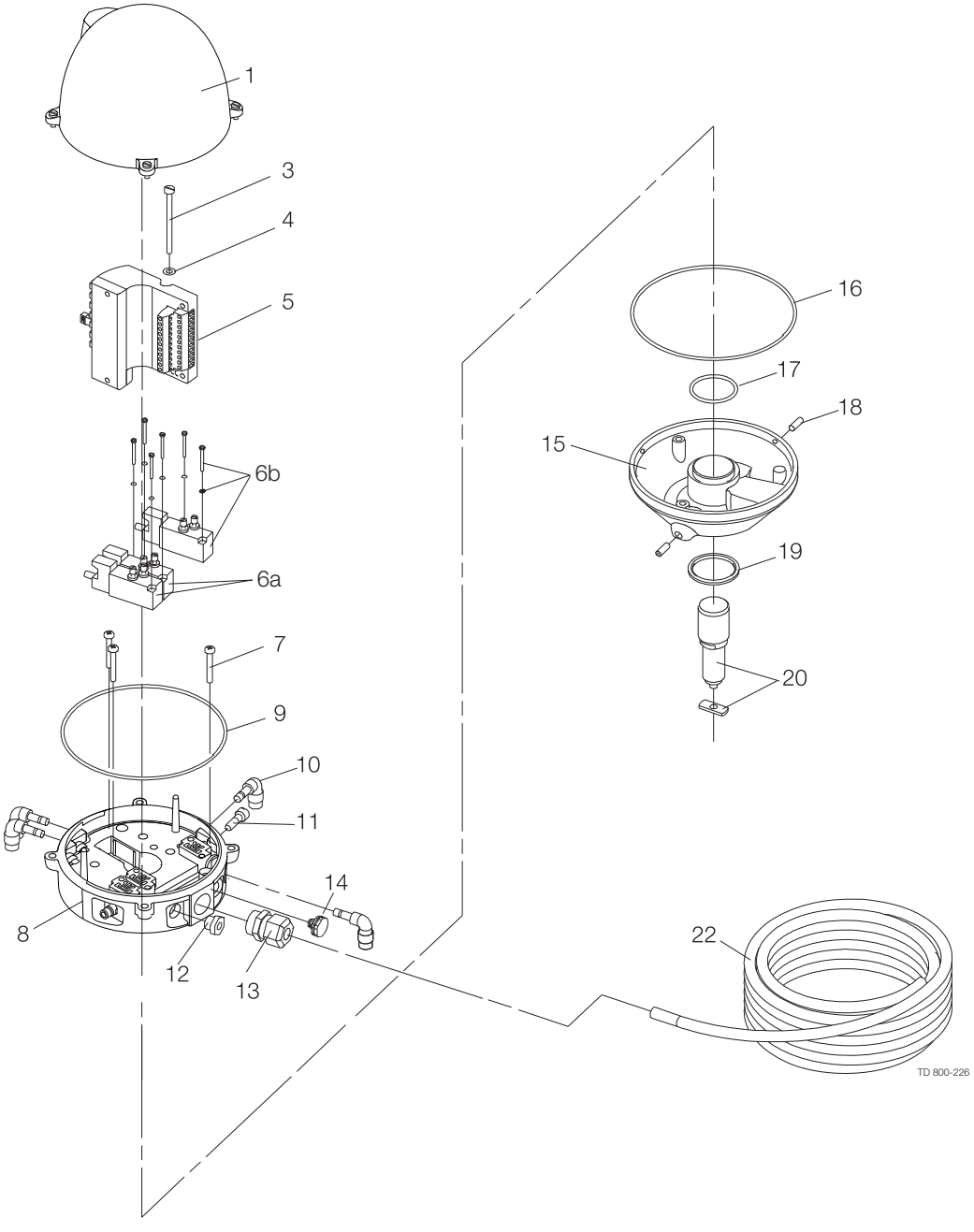


Step 5
1. Replace the black X-ring.
2. Mount ThinkTop on actuator.



Study the instructions carefully. Handle scrap correctly. Always keep spare X-rings in stock.

9.7 ThinkTop® spare parts



9 Automation ThinkTop® Digital 8 - 30 VDC & 110 VAC PNP/NPN

Study the instructions carefully. Handle scrap correctly. Always keep spare X-rings in stock.

Pos.	Qty.	Denomination	Unique PMO® Series Mixproof	¼" air connection
1a	1	Shell complete	9613427901	
3	1	Screw	9611993458	
4	1	Washer	9611993459	
5	1	Sensor unit digital 8-30 VDC PNP/NPN	9612562701	
5	1	Sensor unit digital 110 VAC NO/NC	9612562705	
6	1-3	Solenoid valve 3/2, 24 VDC	9611993324	
6	1-3	Solenoid valve 3/2, 110 VAC	9611993326	
7	3	PT screw	9611993457	
8	1	Base complete, 3/2, no solenoids (pos. 9, 12, 13, 14 included)		9613428201
8	1	Base complete, 3/2, 24 VDC, three solenoid (pos. 9, 10, 11, 12, 13, 14 included)		9613428211
8	1	Base complete, 3/2, 110VAC, three solenoids (pos. 9, 10, 11, 12, 13, 14 included)		9613428213
8	1	Base prepared for no solenoid		9612576101
9	1	Special X-ring	9613456401	
10	1	Air fitting		9611993433
11	1	Blow-off valve	9612563601	
12	1	Thread plug, PG7	9611993407	
13	1	Cable gland, PG11, 4-10mm	9611993517	
14	1	Gore vent high airflow	9611994722	
15	1	Adapter complete (pos. 17, 18, 19)	9612562101	
16	1	Special X-ring	9612999401	
17	1	O-ring	9611993350	
18	2	Allen screw	9611993409	
19	1	Special X-ring	9612569601	
20a	1	Indication pin complete	9612562301	
22	1	5m. flying PVC cable (12x0.5 mm2) digital	9611993627	
24	1	Air fitting incl. O-ring		9611993434

10.1 Recommended Cleaning - General

In order to be compliant with the Pasteurized Milk Ordinance (PMO), the Unique PMO Plus® Series mixproof valves shall be cleaned-in-place (CIP) with the following recommended procedures.

Milk, or milk products, shall be removed, or properly isolated, from the mixproof valves during CIP cleaning.

Each mixproof valve shall be properly operated, including seat lifting, during CIP cleaning to assure exposure to product contact surfaces.

10.2 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	Termperature Agent	Agent	Concentration
Warm Pre-Rinse	3 minutes continuous	100 - 110 °F	None	None
Hot Alkaline Wash	10 minutes continuous	160 °F	NAOH (sodium hydroxide)	.265 gal.+ 26.5 gal. water. (1%)
Cold Post Wash Rinse	3 minutes continuous	Cold	None	None
Cold Acidified Rinse	3 minutes continuous	Cold	NHO3 (nitric acid)	.18 gal. + .265gal. water. (.006%)

10.3 Valve pneumatic operation during Cleaning-In-Place

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.

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

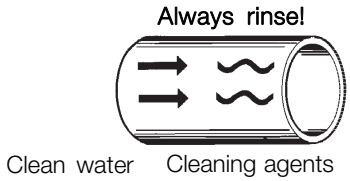
*Time stated is the actual opening time for the valve. Programmed duration is depended on the access to compressed air and response time from PLC.

Variations caused by compressed air are typically:

- Long compressed air supply hoses.
- Small ID on air supply hoses.
- Limited availability of compressed air.

Always rinse well with clean water after the cleaning.

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



10.4 Flow of Cleaning Solution Through Valve Vent Tube (example)

The table below approximates the flow of cleaning solution through the valve vent tube during lower seat push functions at 40 PSI CIP pressure.

(viscosity and density comparable to water)

Valve Size	Flow Per Second Through Vent Tube	Flow Every 2 Seconds Through Vent Tube
2"	31 Ounces	62 Ounces (.48 gal.)
2½"	49 Ounces	98 Ounces (.76 gal.)
3"	49 Ounces	98 Ounces (.76 gal.)
4"	81 Ounces	162 Ounces (1.3 gal.)

Note: Refer to section - 4" CIP Solution Flows for seat lift and spiral clean" to determine flows for CIP pressures other than 40 PSI shown above.

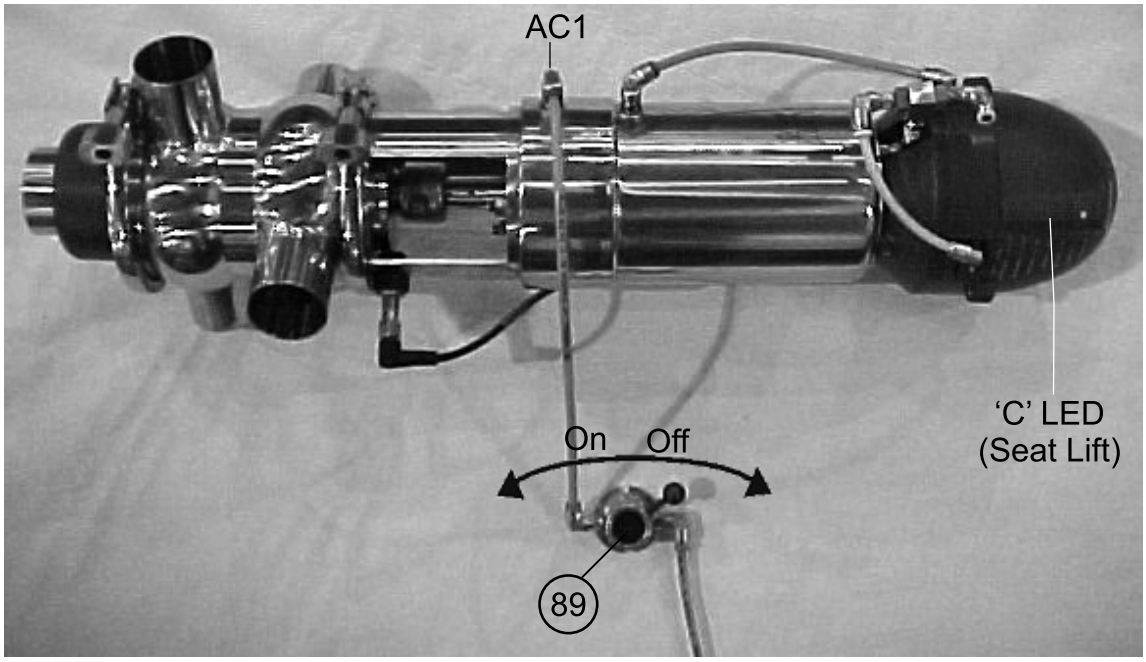
10.5 Guide Bearing Cleaning

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

See section, Maintenance, Re-Assembly Valve (points 1, 2, 5, 6, 23 and 24)

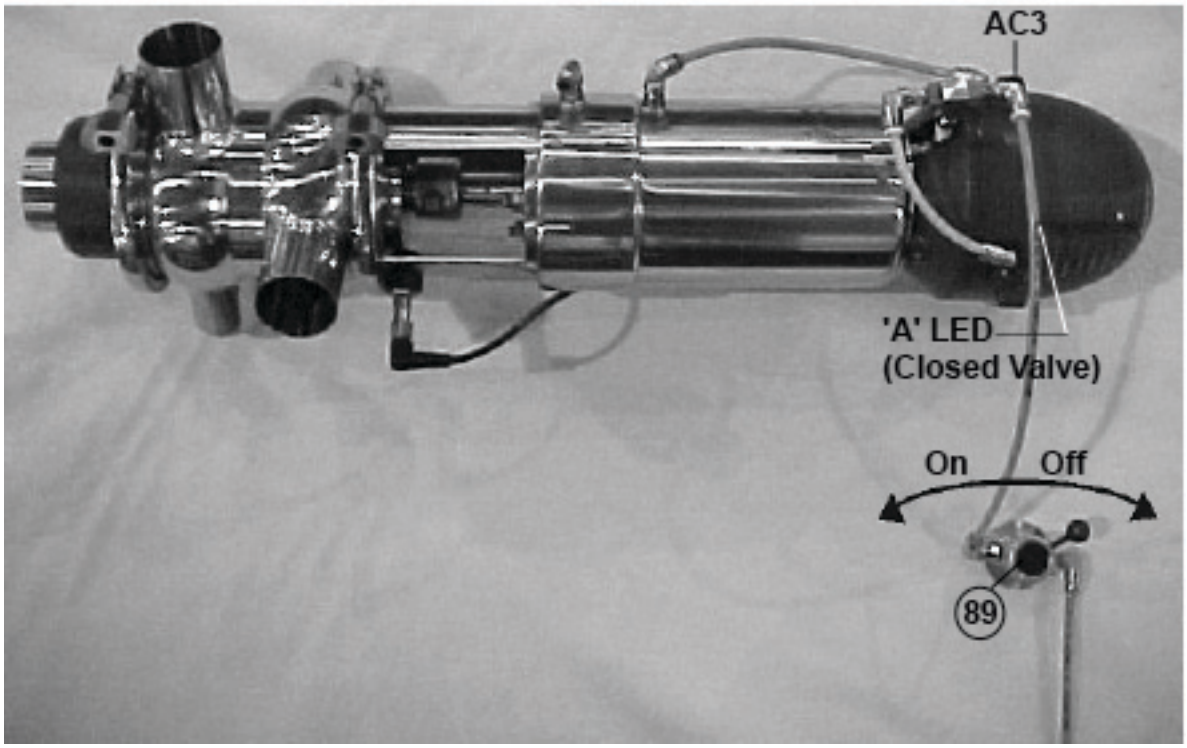
11 Valve Seat Position Indication

Test - 1
Upper Valve Seat Position Detection



1. Valve at rest (closed), position "C" LED (Seat Lift) on ThinkTop is illuminated.
2. Attach a manual air line to actuator air fitting AC1 using a 3-way air pilot switch (pos. 89).
3. Turn the air pilot switch to ON. (Open), "C" LED (Seat Lift) on ThinkTop not illuminated.
4. Turn the air pilot switch to Off (Closed), "C" LED (Seat Lift) on ThinkTop is illuminated.
5. Test complete. Remove manual air line.

Test - 2
Lower Valve Seat Position Detection

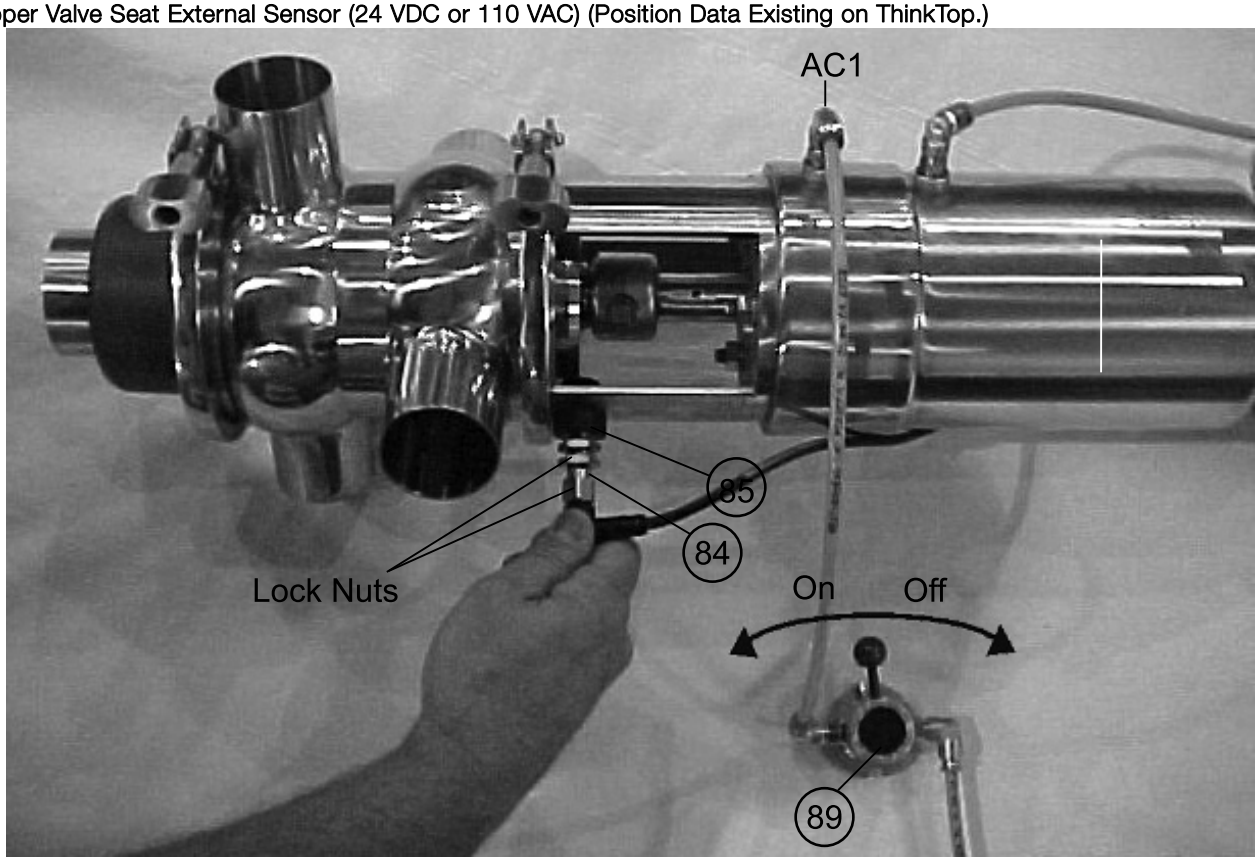


1. Valve at rest (closed), position "A" LED (Closed Valve) on ThinkTop is illuminated.
2. Attach a manual air line to actuator air fitting AC3 using a 3-way air pilot switch (pos. 89).
3. Turn the air pilot switch to ON. (Open), "A" LED (Closed Valve) on ThinkTop not illuminated.
4. Turn the air pilot switch to Off (Closed), "A" LED (Closed Valve) on ThinkTop is illuminated.
5. Test complete. Remove manual air line.

11 Valve Seat Position Indication

Adjustments

Upper Valve Seat External Sensor (24 VDC or 110 VAC) (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 a rest position.
2. Loosen sensor lock nut(s).
3. Turn the sensor (pos 84) clockwise to bottom of nylon plug (pos 85), (or, in some cases, until the sensor LED turns off.)
4. Turn the sensor (pos 84) 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 (pos 89).
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 lift de-activated. Sensor LED turns on.
9. Turn the air pilot switch ON and OFF several times to verify sensor LED actions as listed in steps 7 and 8 above.
10. Moderately tighten sensor lock nut(s).
11. Repeat step 9 when the valve is cold and re-adjust with valve hot if necessary.

Adjustments
Upper Valve Seat ThinkTop
(Set Position New on ThinkTop)
The following instructions can be completed while the valve is at room (ambient) temperature.

1. Enter new 'UPPER SEAT LIFT' position data to the ThinkTop memory in step 5 of the programming sequence using the 'I' and 'II' keys.
   Note: Data entry is done with the valve deactivated (Closed).
2. Adjust lateral sensor per instructions for 'UPPER VALVE SEAT EXTERNAL SENSOR' in this section.

Refer to "Electrical Connections/Instructions" in this manual for ThinkTop programming.

Adjustments
Lower Valve Seat ThinkTop
The following instructions can be completed while the valve is at room (ambient) temperature.

1. Delete the current 'CLOSED VALVE" position data from the ThinkTop memory using the 'I' and 'II' keys.
2. Enter new 'CLOSED VALVE' position data to the ThinkTop memory using the 'I' and 'II' keys.
3. Repeat 'Test - 2, Lower Valve Seat Position Detection' procedures to confirm adjustment.

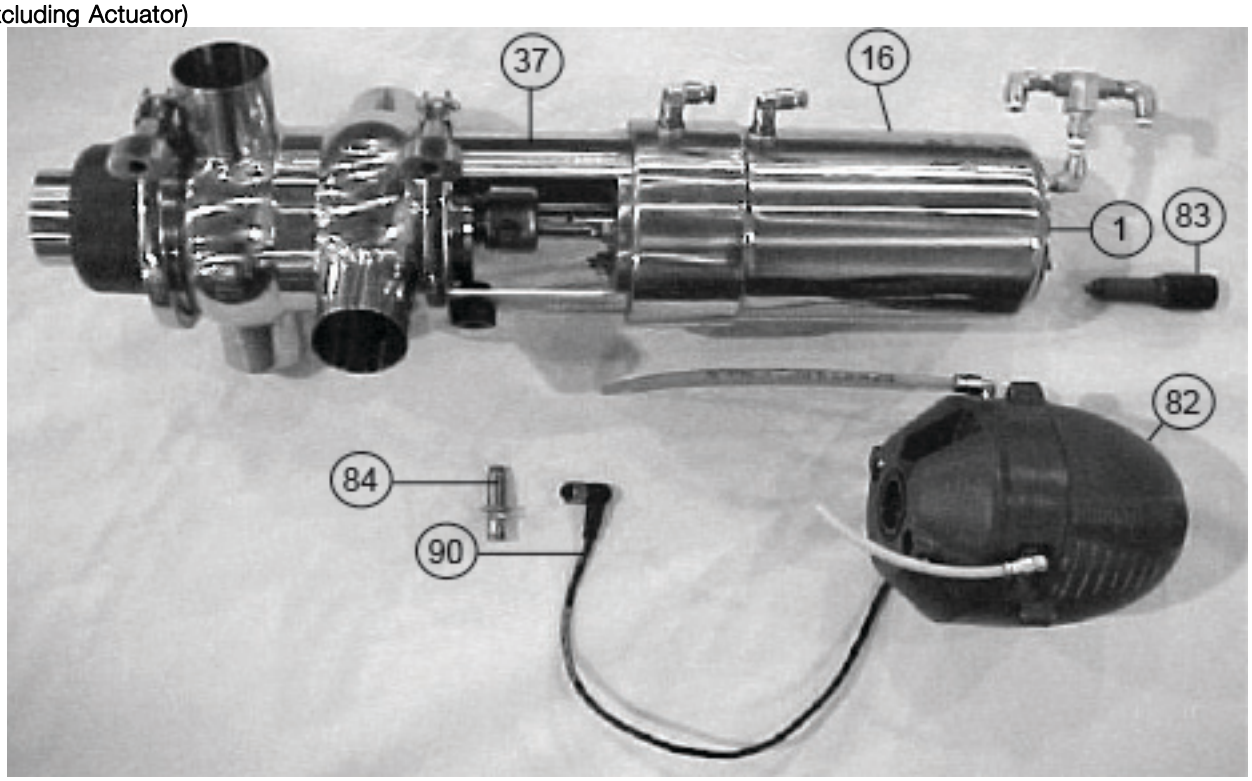
Refer to "Electrical Connections/Instructions" in this manual for ThinkTop programming.

Tools Required for Valve Service
- 16mm Wrench
- Strap Wrench
- 17mm Wrench
- 2.5mm Allen Wrench
- Small Knife
- Straight Pick
- Small Standard Screw Driver
- Air Pilot Switch (Pos.89)

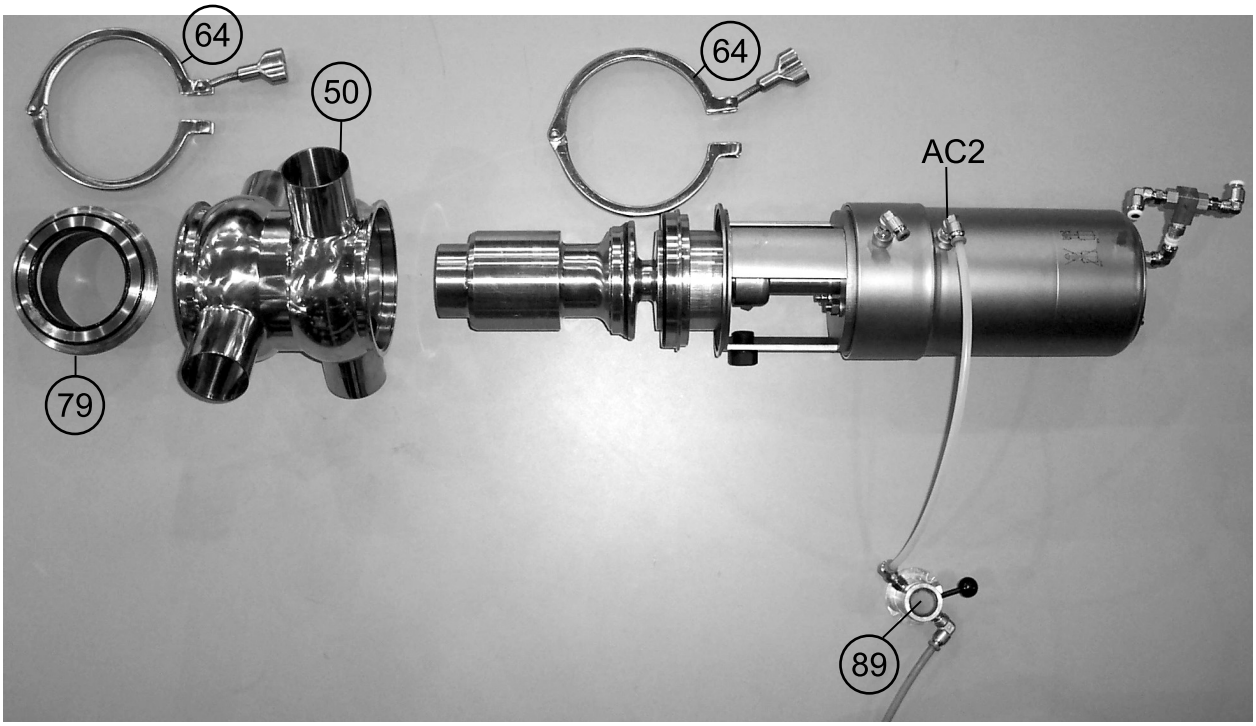
Tools Required for Actuator Service
- 13mm Wrench
- Long Stem Phillips Screw Driver (#2 Point)
- Plastic Hammer
- Small Blunt Face Punch
- Small Standard Screw Driver

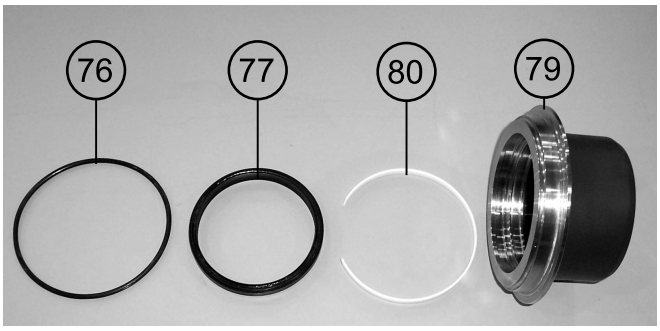
12.1 Dis-Assemble Valve (excluding actuator)

Dis-Assemble Valve
(Excluding Actuator)

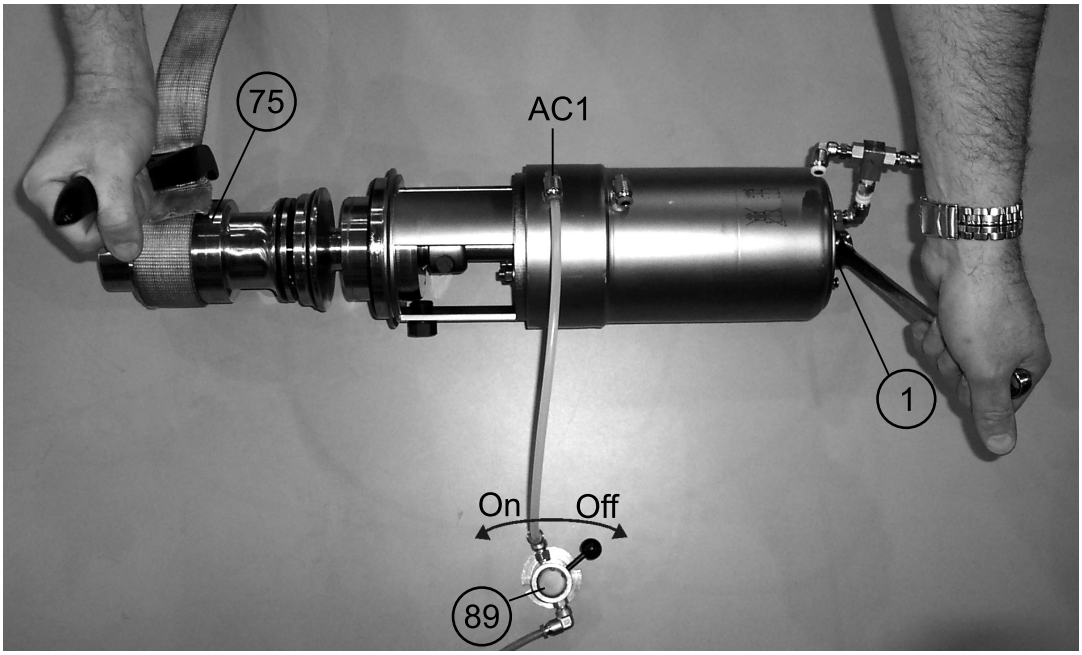


1. Remove ThinkTop (82).
2. Turn magnet (83) counter clockwise by hand and remove from upper actuator stem (1).
3. Turn nut on sensor cable (90) counter clockwise and remove.
4. Turn sensor (84) counter clockwise and remove.

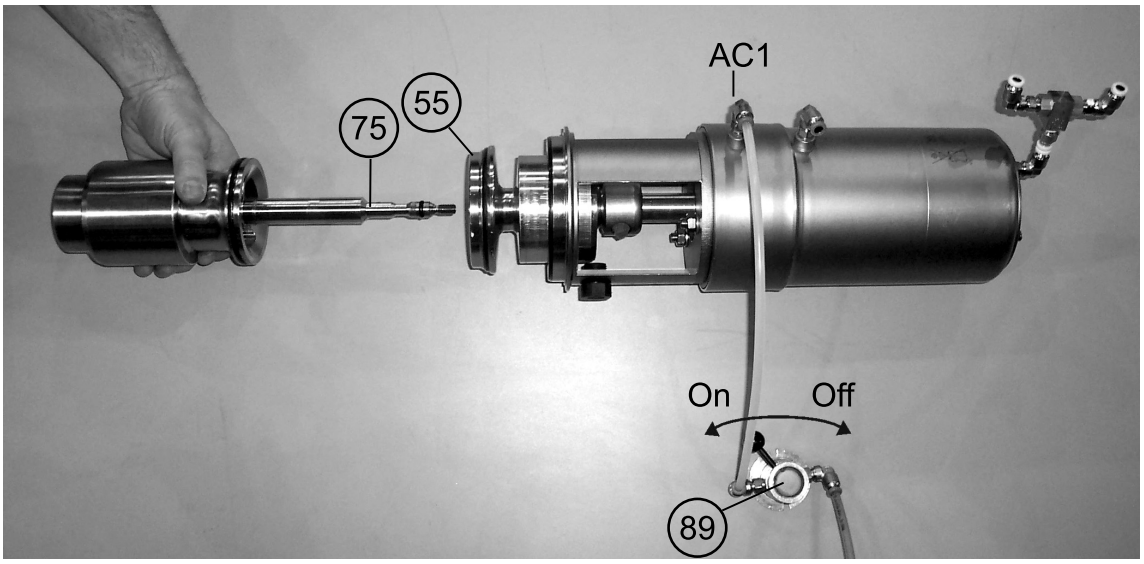




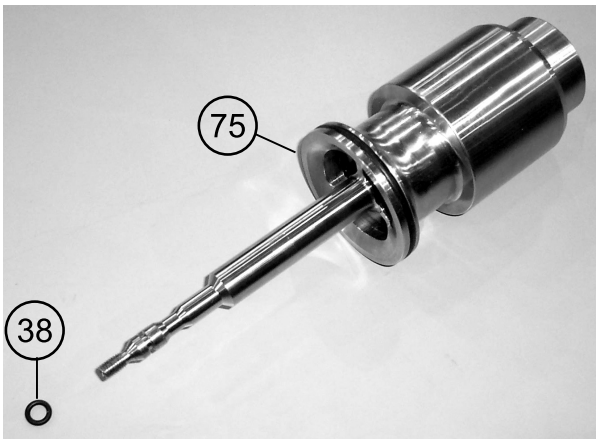
5. Supply compressed air to AC2 (blue ring).
6. Remove upper clamp (64).
7. Lift out the actuator together with the internal valve parts from the body (50).
8. Release compressed air.
9. Remove lower clamp (64).
10. Remove lower sealing element assembly (79).
11. Remove O-ring (76).
12. Remove lip seal (77).
13. Remove guide ring (80).



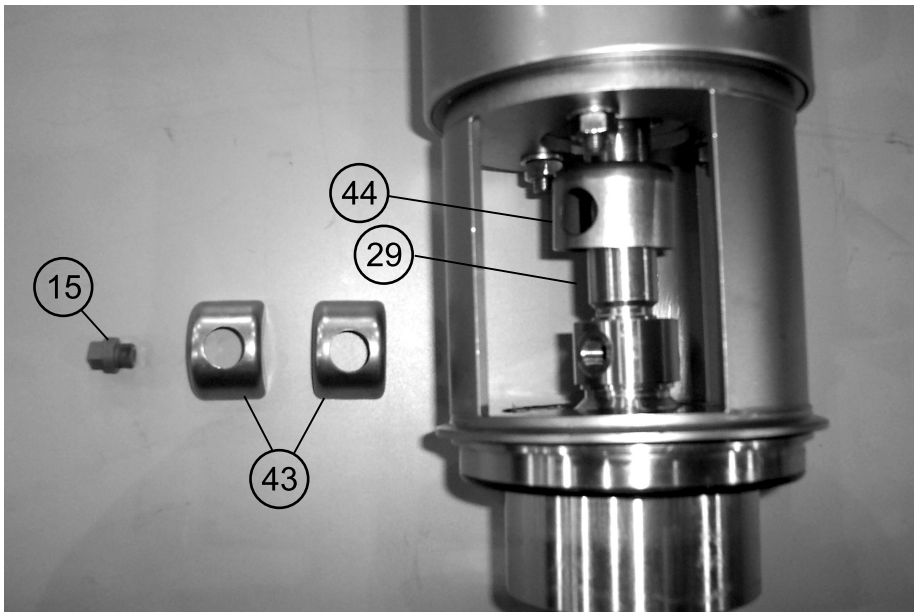
14. Supply compressed air to AC1 (Red Ring).
15. Loosen lower plug (75) counter clockwise using a strap wrench while counter holding upper actuator stem (1) with a 16mm wrench.



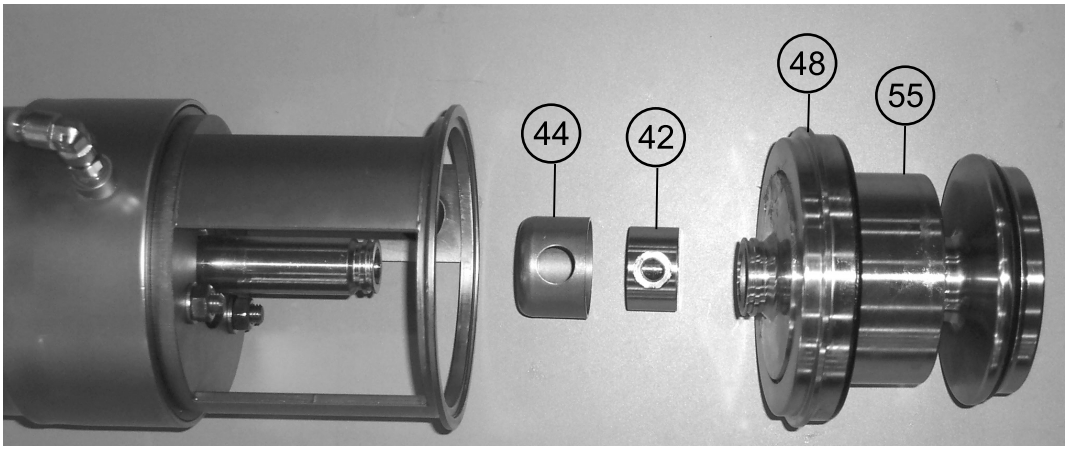
16. Turn counter clockwise by hand and remove lower plug (75).
17. Release compressed air.

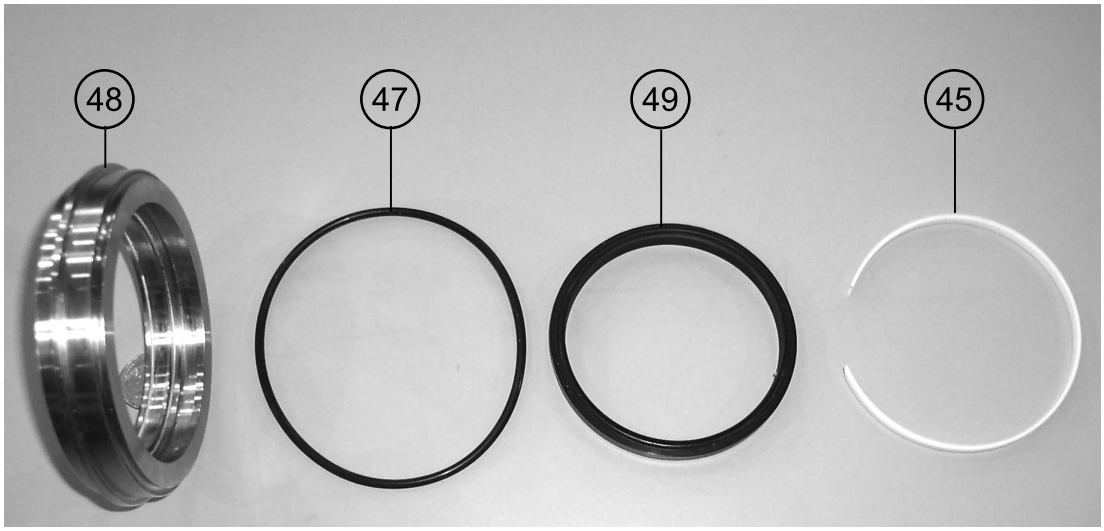


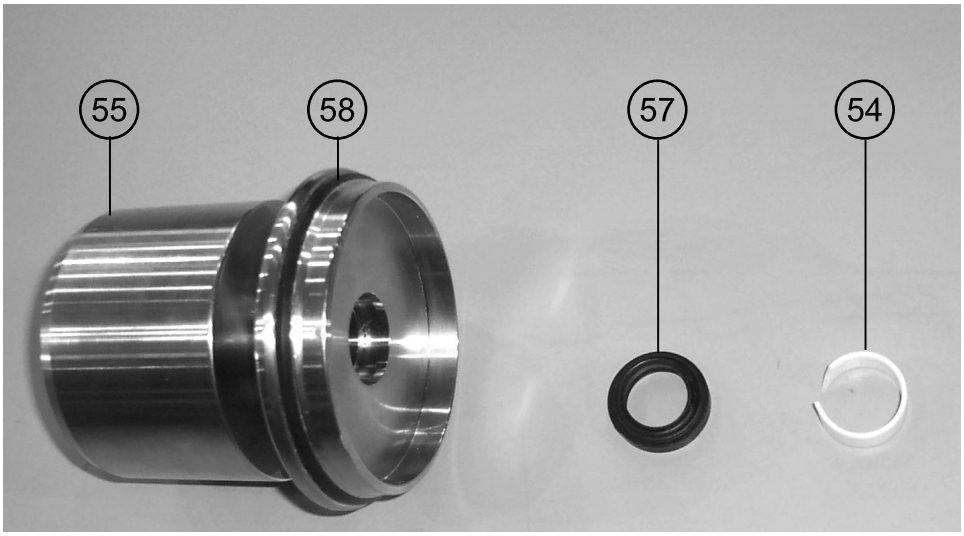
18. Remove O-ring (38) from lower plug stem (75).
19. Remove plug (15).



20. Slide lock (44) along piston rod (29).
21. Remove two clamps (43).
22. Pull upper plug (55), and upper sealing element (48) out.
23. Remove spindle liner (42).
24. Remove lock (44).



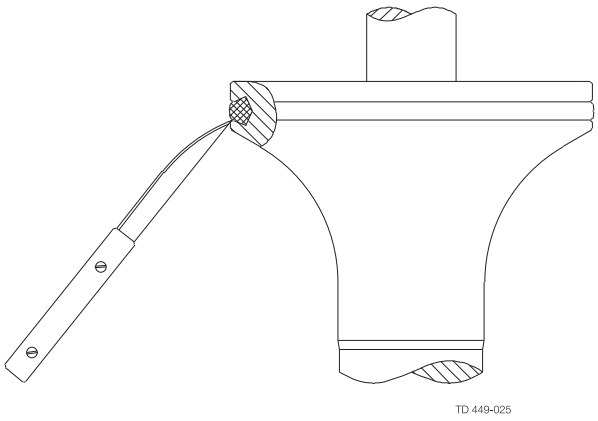




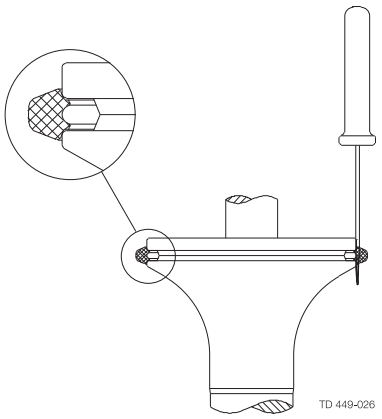
25. Remove O-ring (47).
26. Remove lip seal (49).
27. Remove guide ring (45).
28. Remove lip seal (57).
29. Remove guide ring (54).

12.2 Replacement of seal ring, lower plug

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

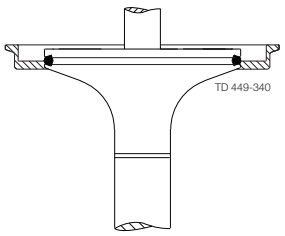


Step 2
Pre-mount seal ring as shown on drawing.
Rotate along circumference to fix gasket as shown in the picture.
Carefully lubricate sealings with acceptable soap or lubricant, before pre-mounting.

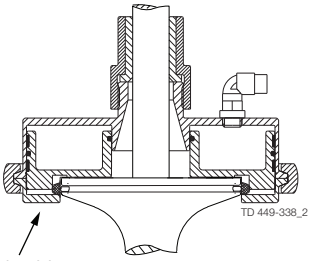


Step 3

Place lower tool part.

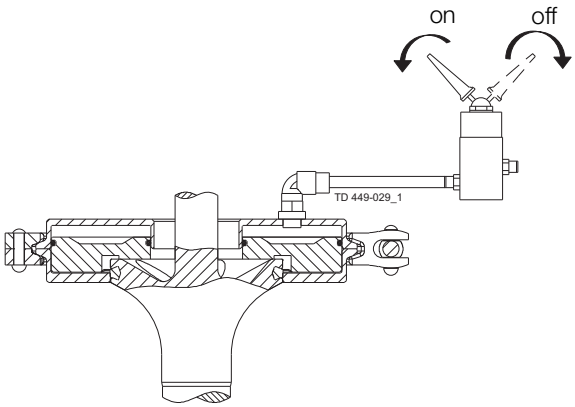


Step 4
1. Place upper tool part including piston.
2. Clamp the two tool parts together.

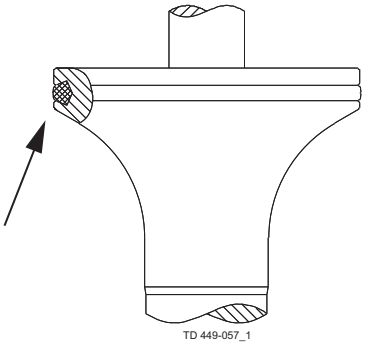


Tool marked with item number.

Step 5
1. Supply compressed air.
2. Release compressed air.
3. Remove tool parts.

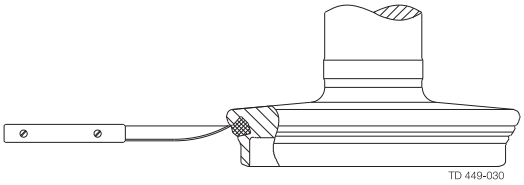


Step 6
Inspect the seal to ensure it does not twist in the groove, and press in the 4 outsticking points with a screwdriver!



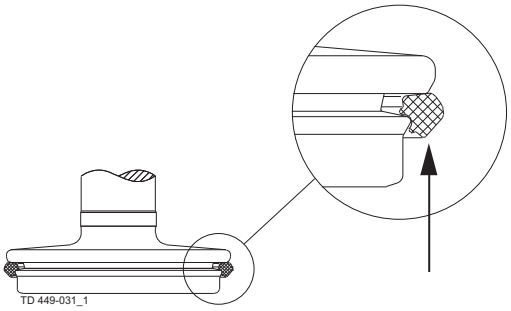
12.3 Replacement of seal ring, upper plug

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



Step 2

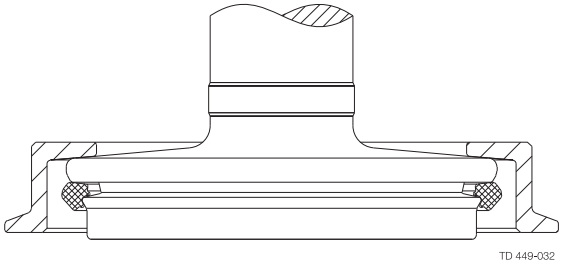
Pre-mount seal ring as shown on drawing.



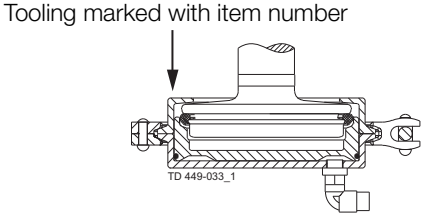
Carefully lubricate sealings with acceptable soap or lubricant, before pre-mounting.

Step 3

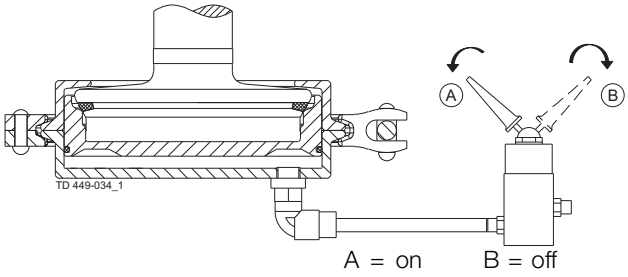
Place tool part 1.



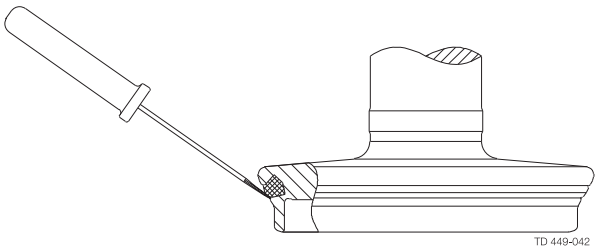
Step 4
1. Place tool part 2 including piston.
2. Clamp the two tool parts together.



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

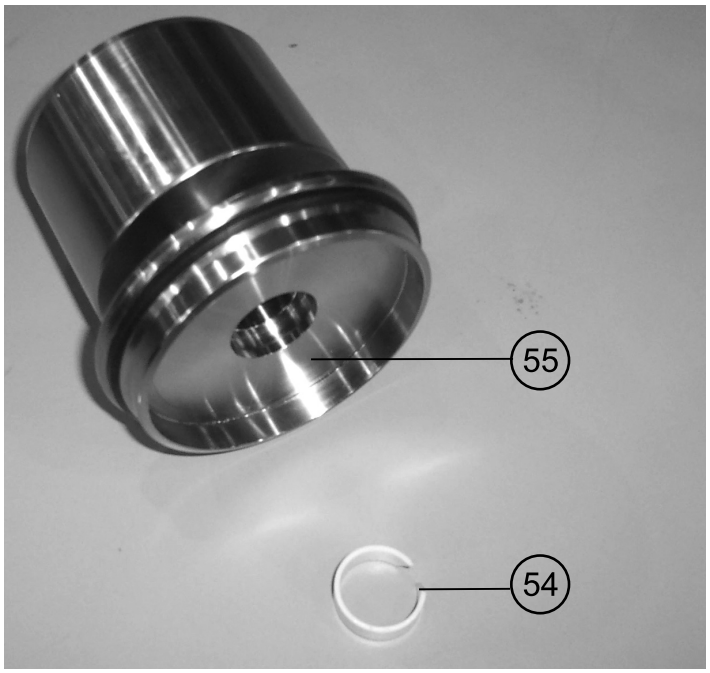


Step 6
1. Inspect the seal.
2. Release air at 3 different positions of the circumference.

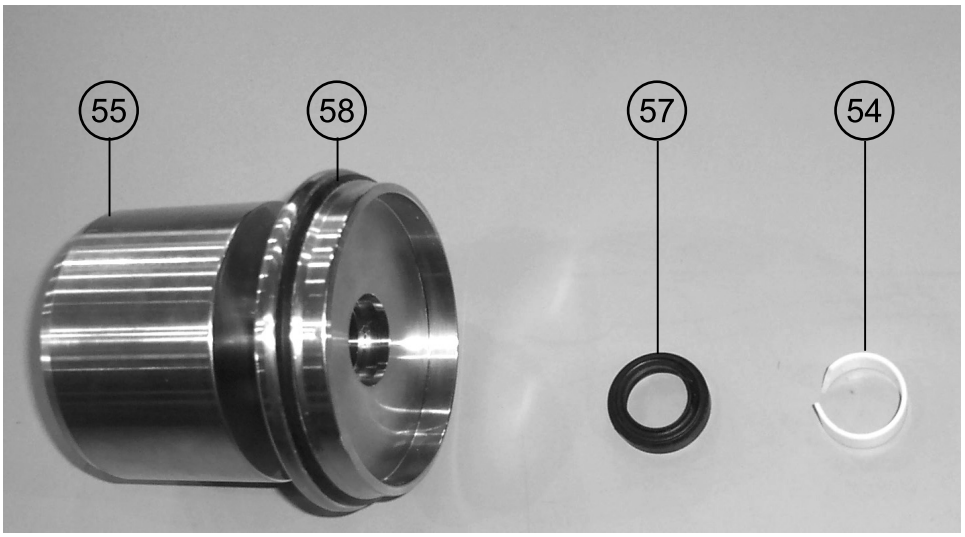


12.4 Re-Assemble Valve (excluding actuator)

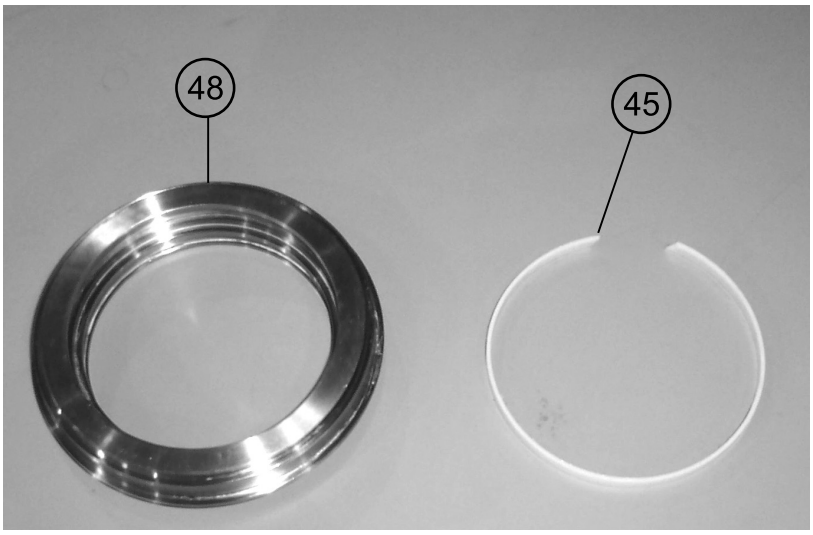
Re-Assemble Valve (Excluding Actuator)
Note:
* Lubricate seals with Kluber Paraliq GTE 703 or similar USDA H1 Approved lubricant (#022148-213).
** Lubricate threads with Kluber Paste UH1 84-201 or similar.



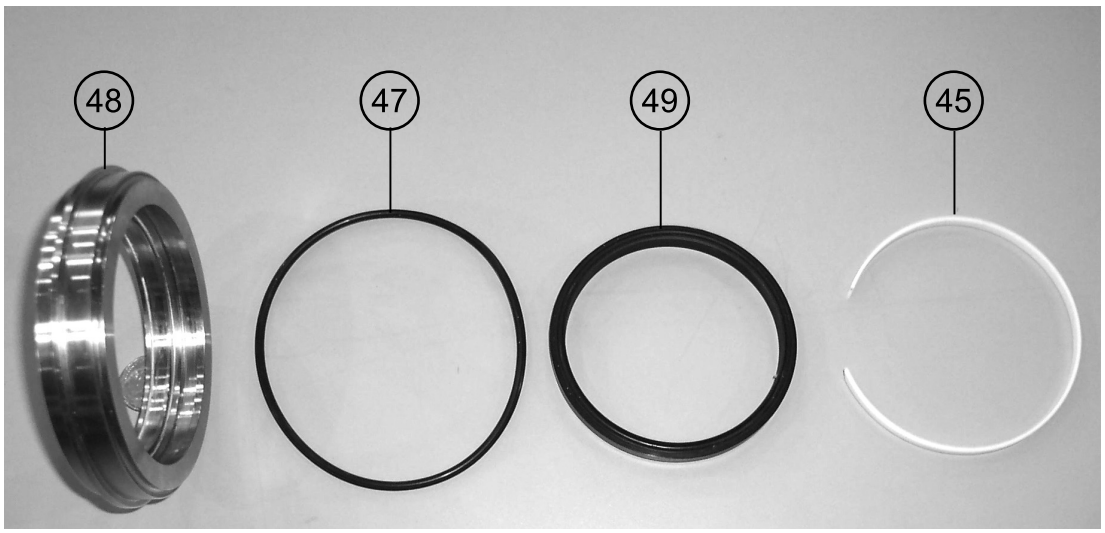
1. Hand clean and sanitize guide ring (54).
2. Hand clean and sanitize ID of upper plug stem (55).



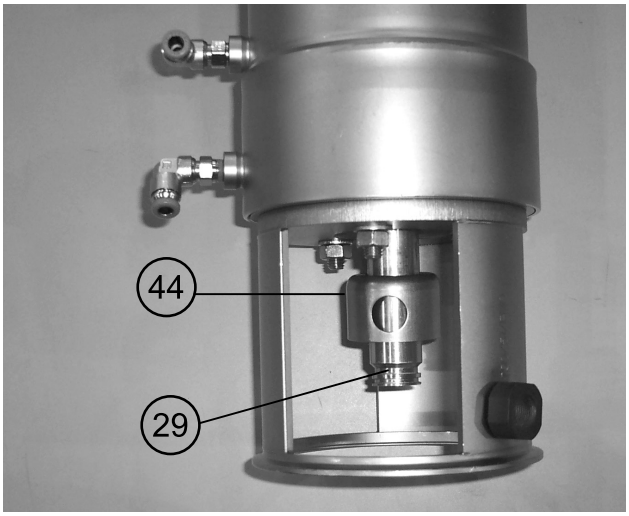
3. Install guide ring (54).
4. Install *lip seal (57).



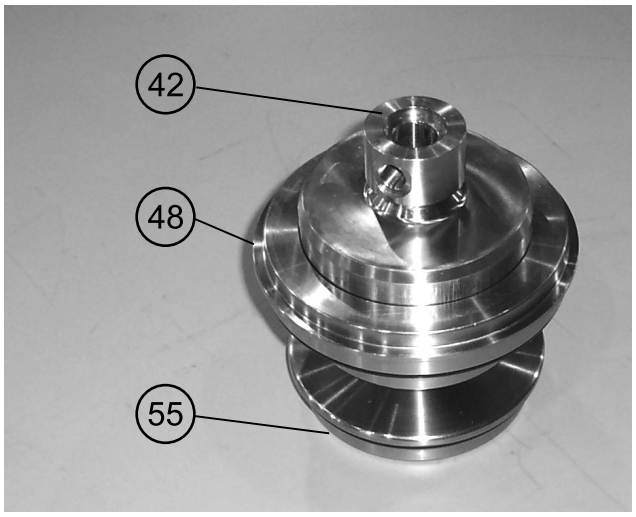
5. Hand clean and sanitize guide ring (45).
6. Hand clean and sanitize upper sealing element (48).
7. Install guide ring (45).



8. Install *lip seal (49).
9. Install *o-ring seal (47).

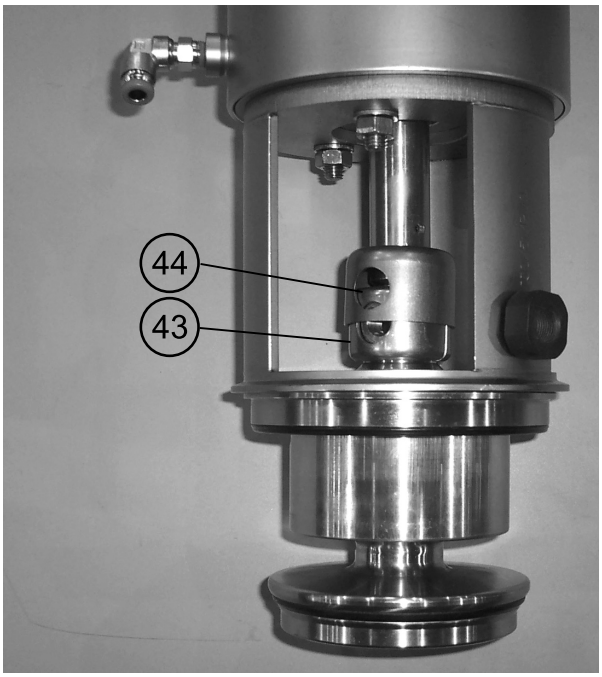


10. Install lock (44) onto piston rod (29).

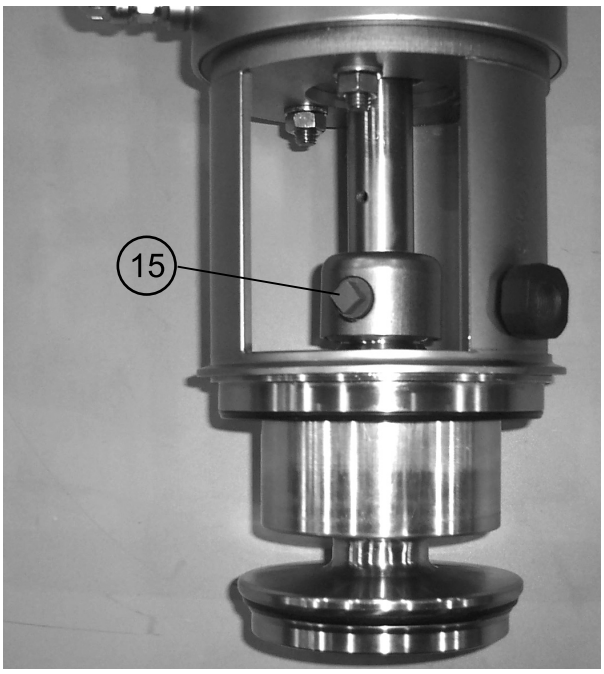


11. Slide upper sealing element (48) onto upper plug (55).
12. Install spindle liner (42) onto upper plug stem (55).

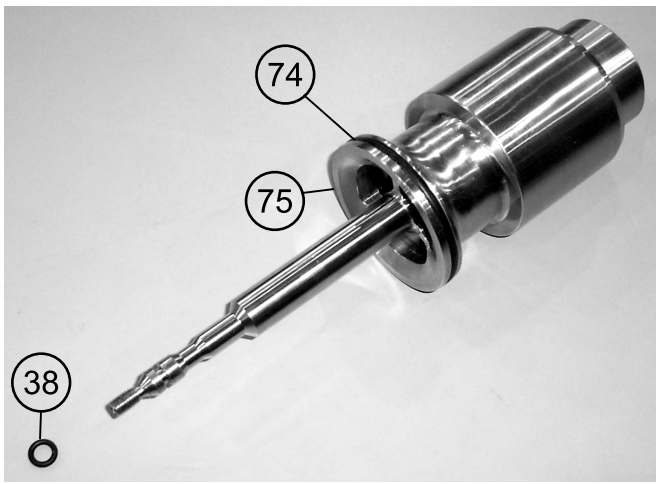
13. Fit upper plug (55), upper sealing element (48) and spindle liner (42) into intermediate piece (37).
14. Push upper plug (55) to fit spindle liner (42) tight against piston rod (29).

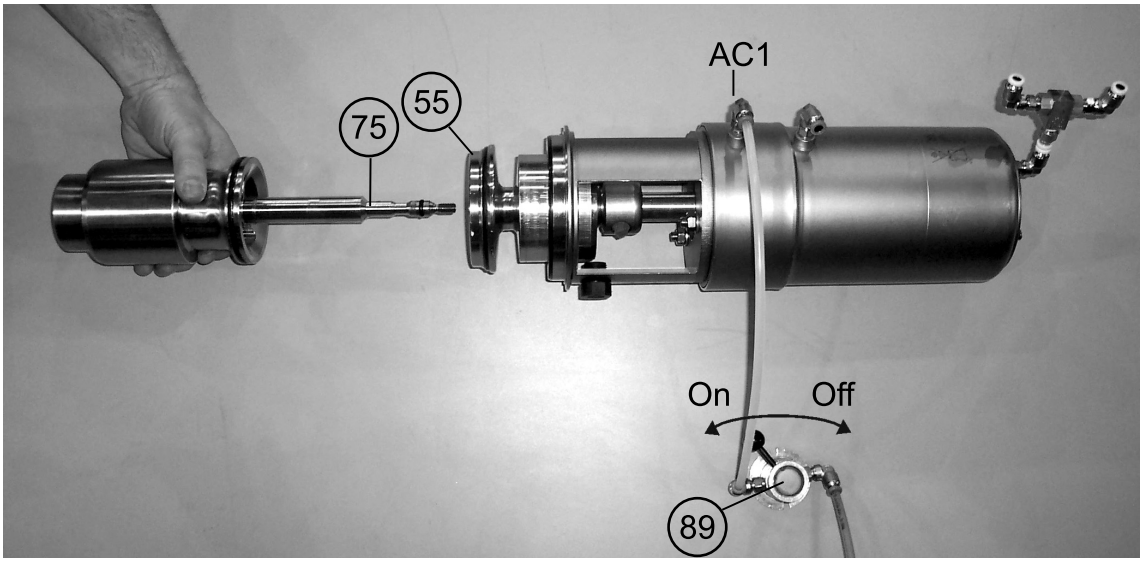


15. Install two clamps (43) Note: Align one clamp with female thread in spindle liner (42).
16. Slide lock (44) down over clamps (43) Note: Align holes.

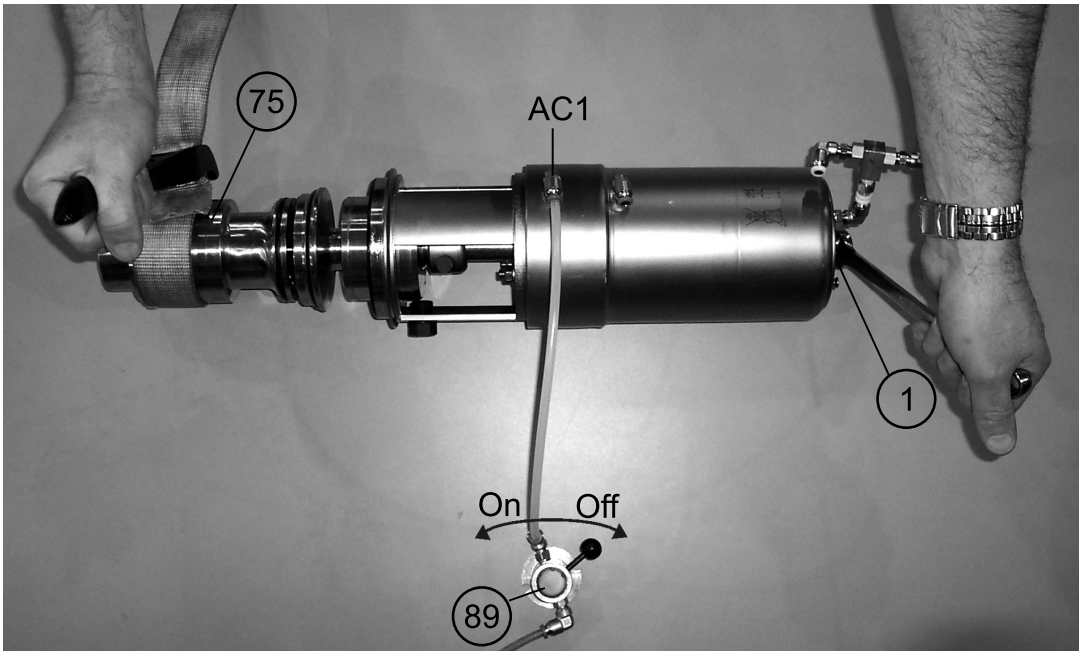


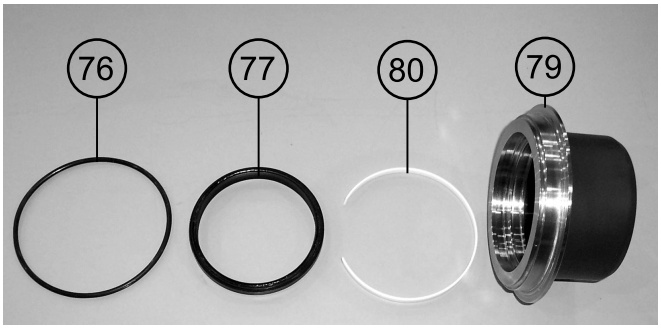
17. Install plug (15).
18. Install *O-ring (38).

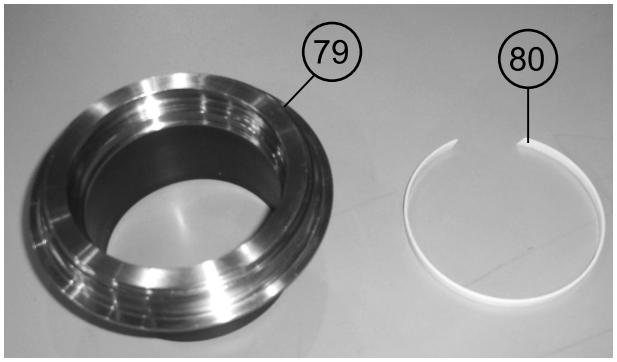




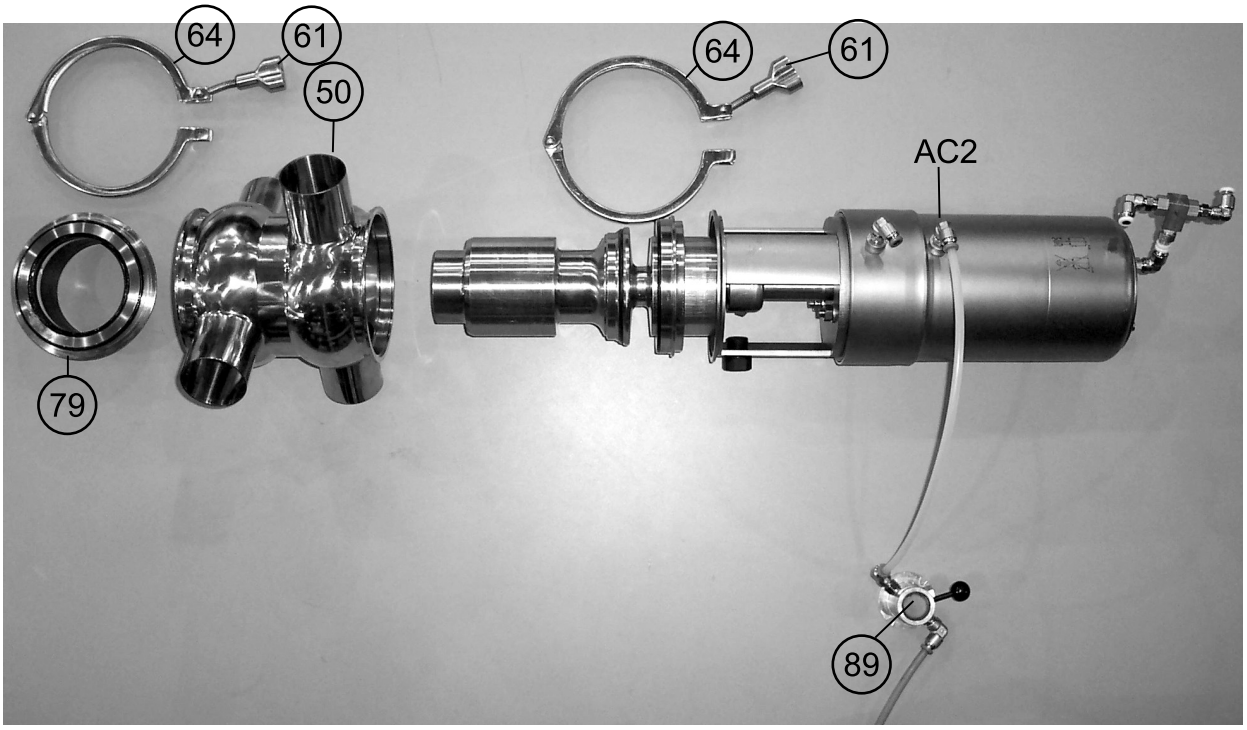
19. Supply compressed air to AC1 (Red Ring).
20. Fit **lower plug stem (75) into ID of upper plug (55) and turn clockwise to tighten by hand.
21. Tighten lower plug (75) clockwise using strap wrench while counter holding upper actuator stem (1) with a 16mm wrench.
22. Release compressed air.



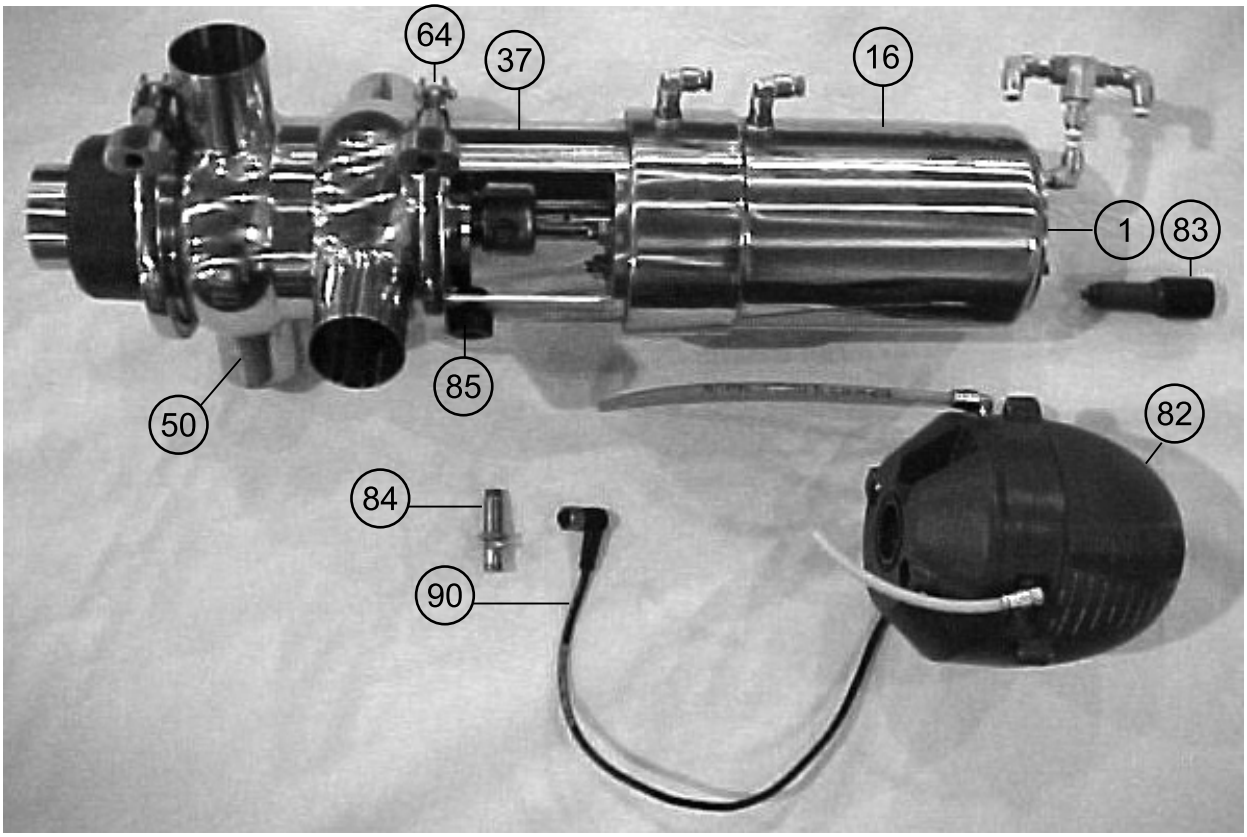




23. Hand clean and sanitize guide ring (80).
24. Hand clean and sanitize lower sealing element (79).
25. Install guide ring (80).
26. Install *lip seal (77).
27. Install *O-ring (76).
28. Install lower sealing element (79) onto body (50).
29. Fit and tighten lower clamp (64).



30. Supply compressed air to AC2 (Blue Ring).
31. Fit the actuator together with the internal valve parts into the valve body (50).
32. Fit and tighten upper clamp (64).
33. Release compressed air.



34. Turn sensor (84) clockwise into nylon plug (85) and tighten by hand.
35. Attach sensor cable (90) to sensor (84) and tighten by hand.
36. Turn magnet (83) clockwise into upper actuator stem (1) and tighten by hand.
37. Install ThinkTop (82) to cylinder (16).

12.5 Dismantling of Actuator

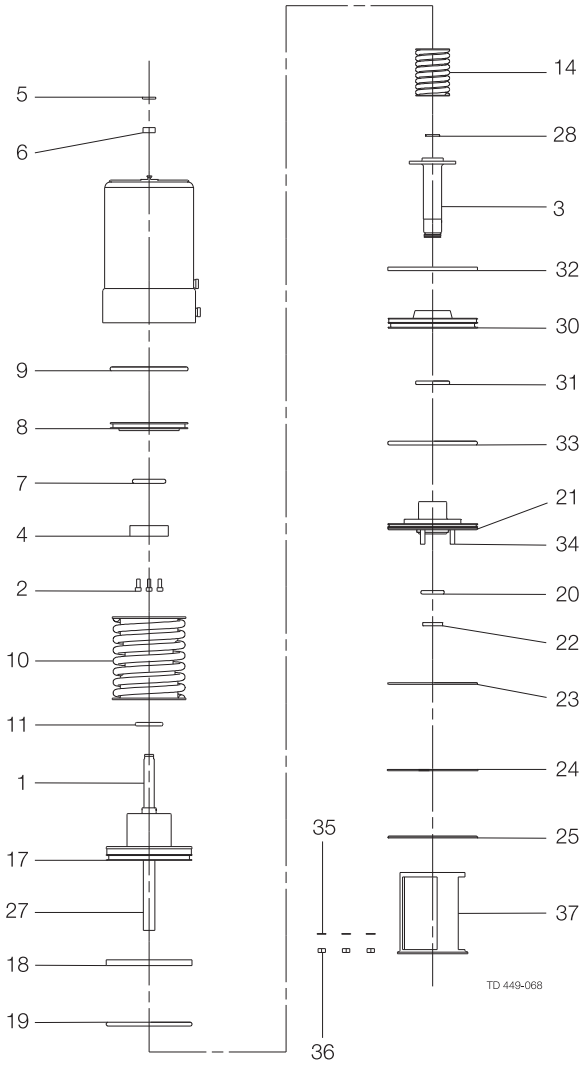
Dismantling of Actuator

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).

Note: 2½", 3", and 4" valves only

1. Unscrew screws (2).
2. Remove stop (4).
3. Remove upper piston (8). Remove O-rings (7 and 9).
4. Remove O-ring (5) and guide ring (6).

Dismantling of Actuator



12.6 Reassembly of Actuator

Reassembly of Actuator

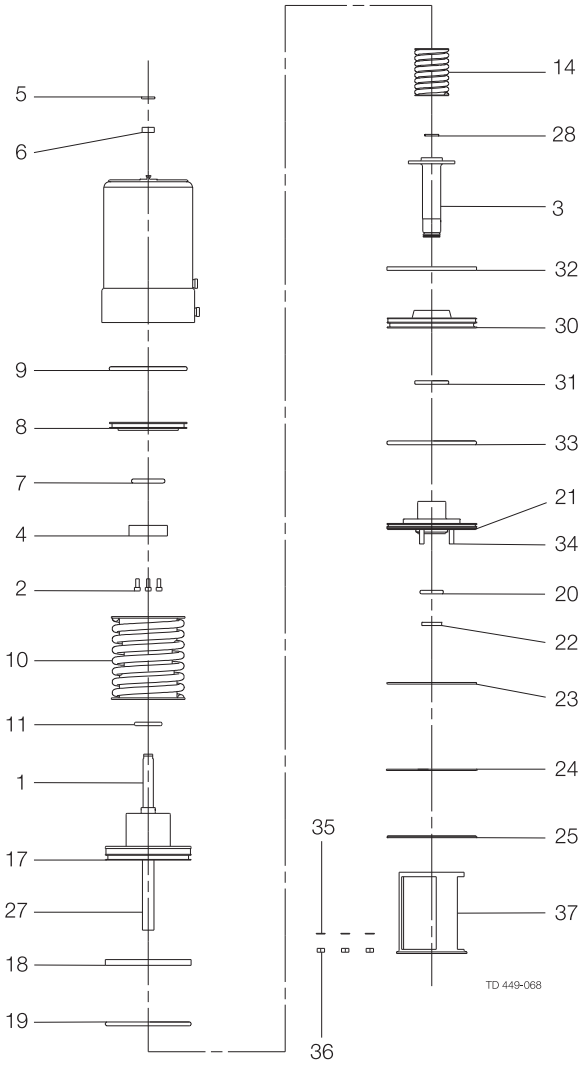
1. Fit guide ring (6) and O-ring (5).

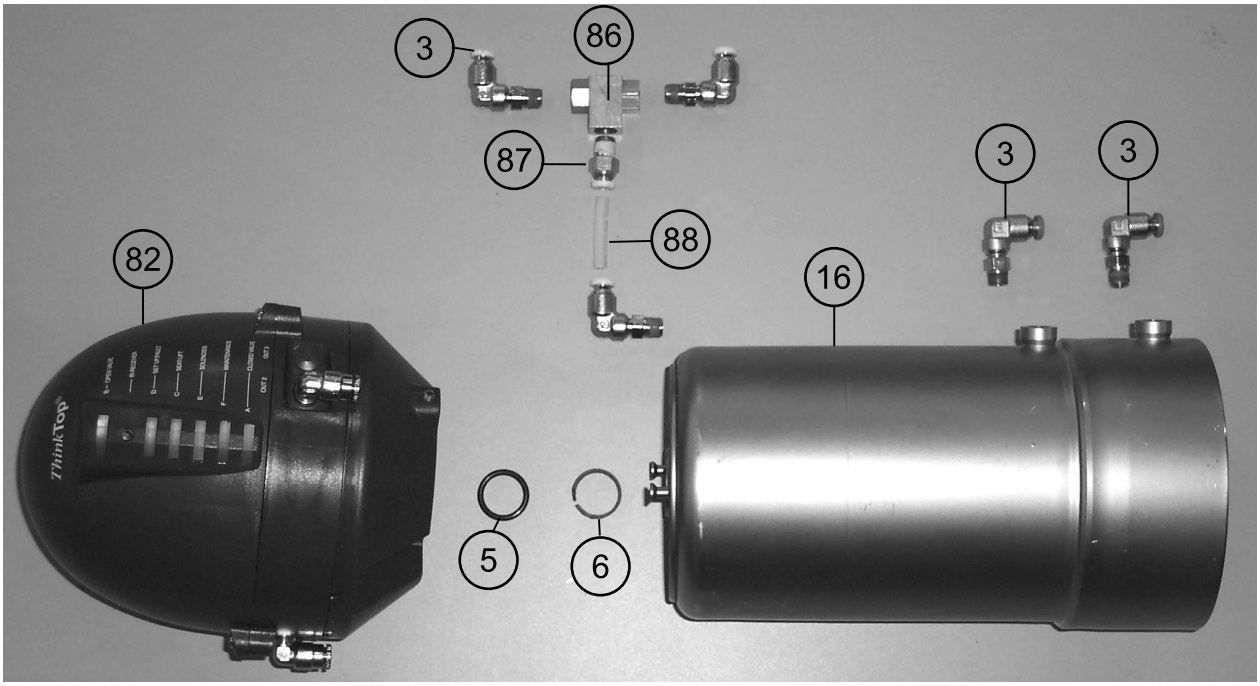
Note: 2½", 3", and 4" valves only

   1. Fit O-rings (7 and 9). Place upper piston (8).
   2. Fit stop (4).
   3. Tighten screws (2).

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

Reassembly of Actuator




3
86
87
88
3
3
82
16
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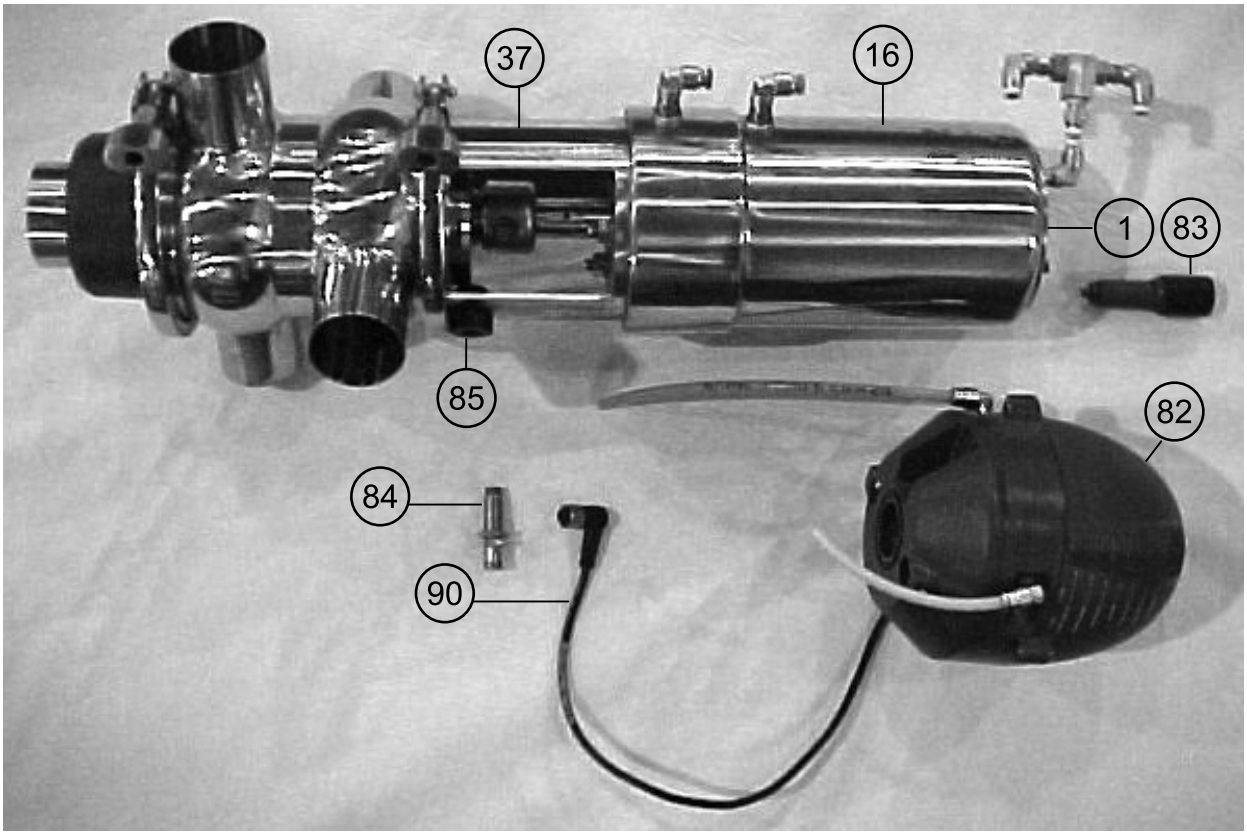
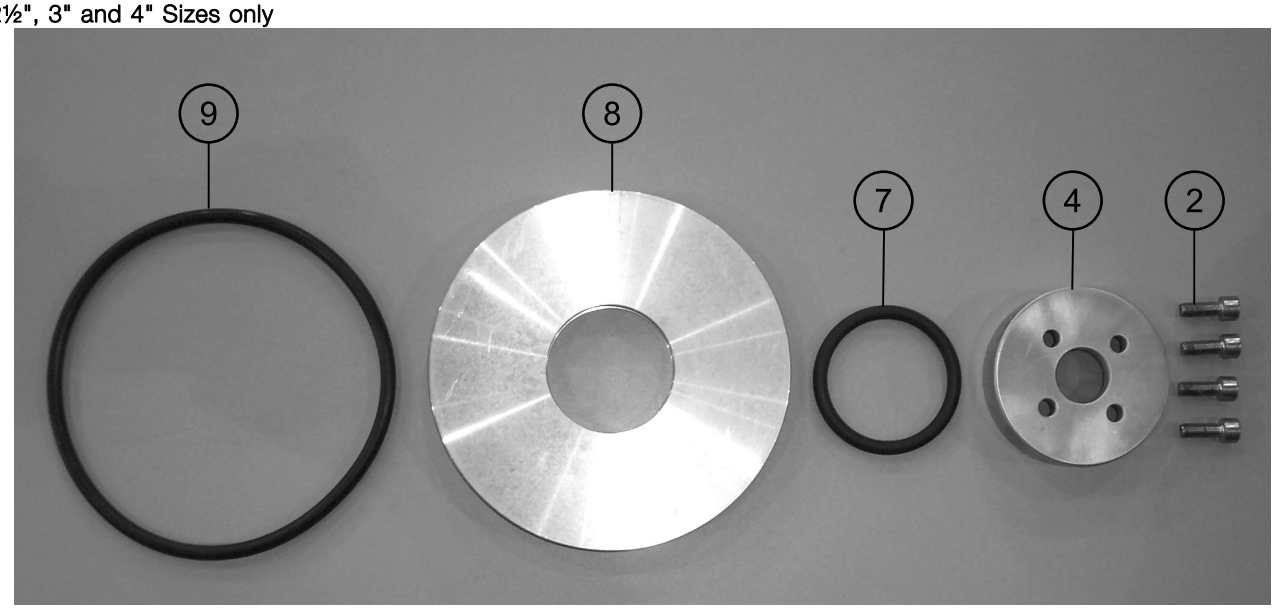
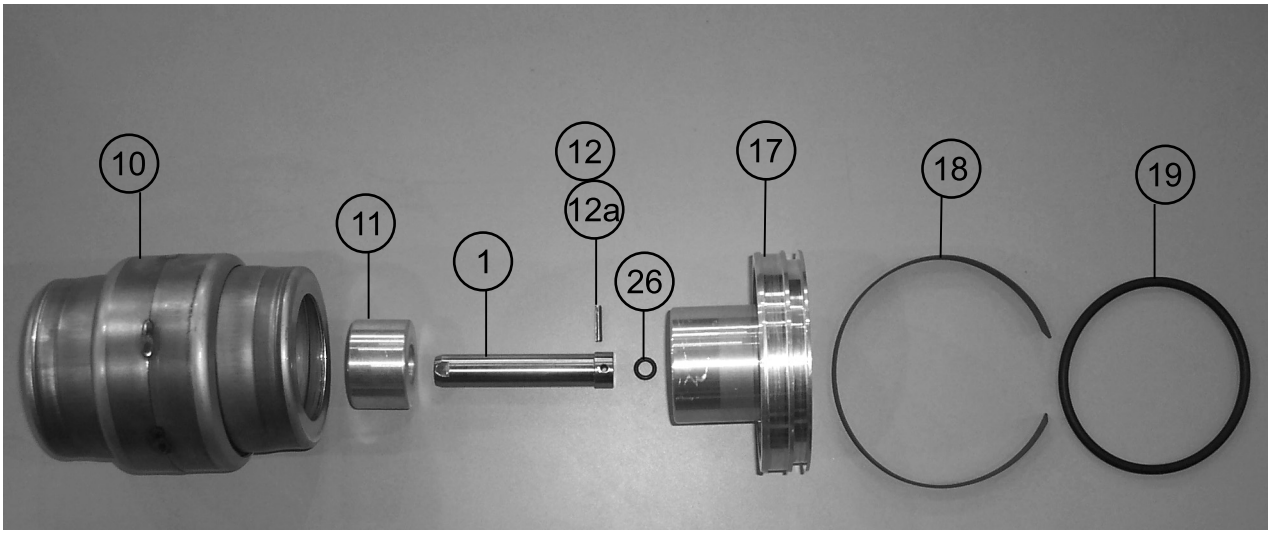
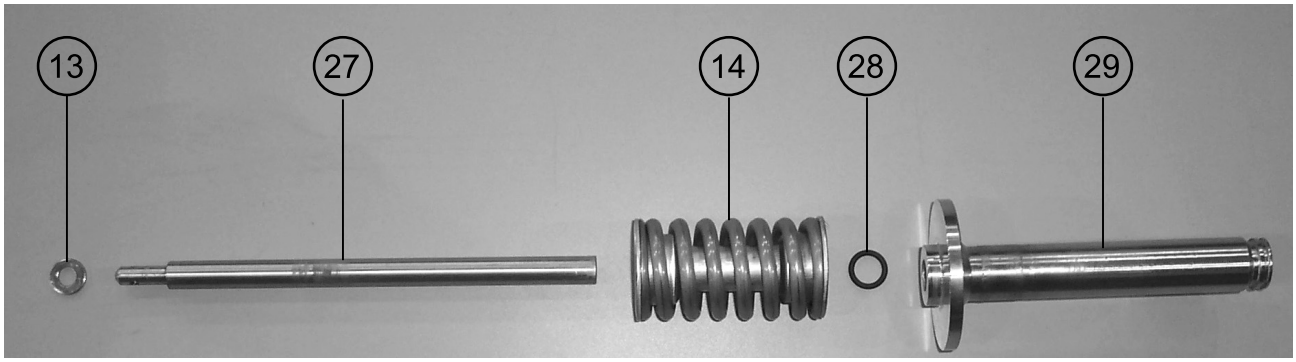
6

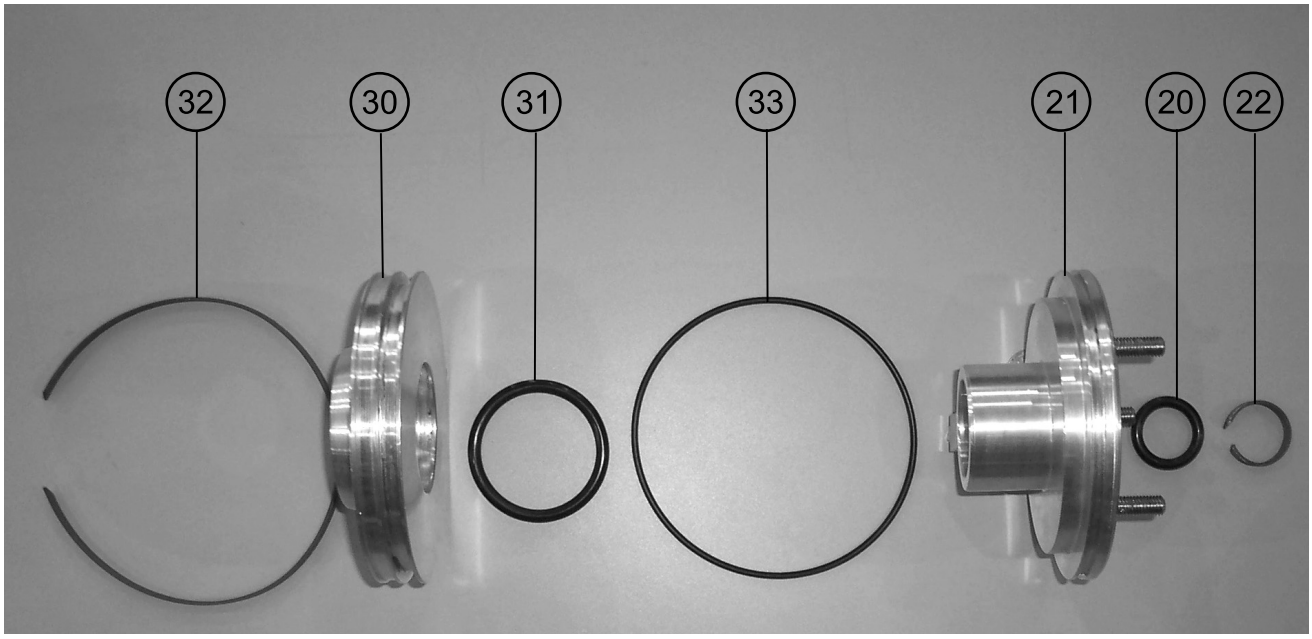

37
16
1
83
85
82
84
90

2½", 3" and 4" Sizes only





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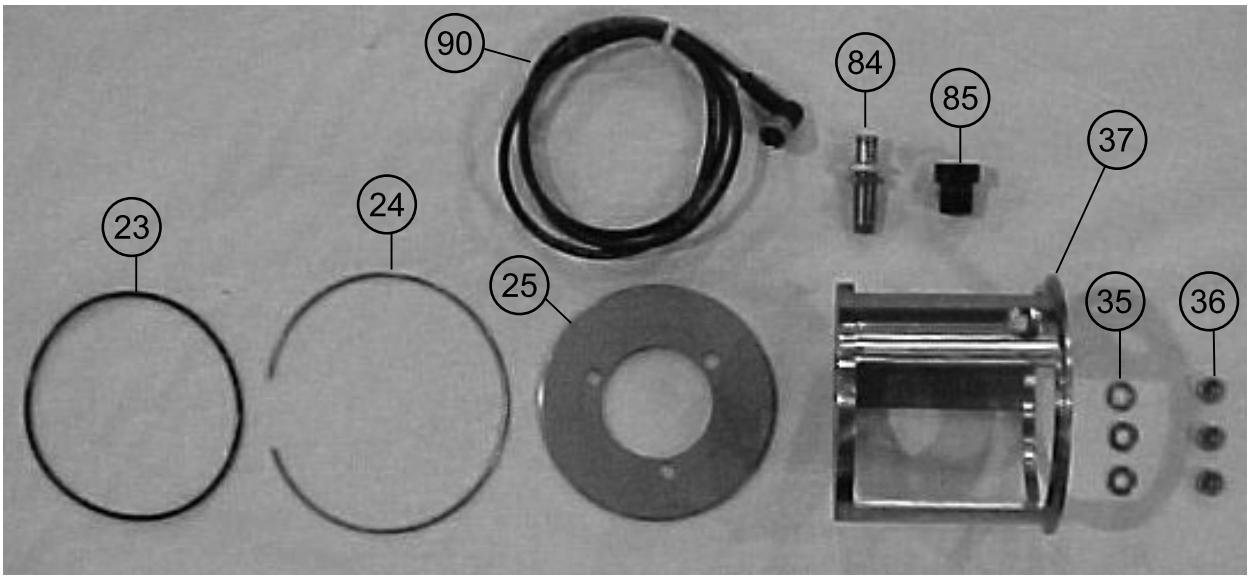
20
22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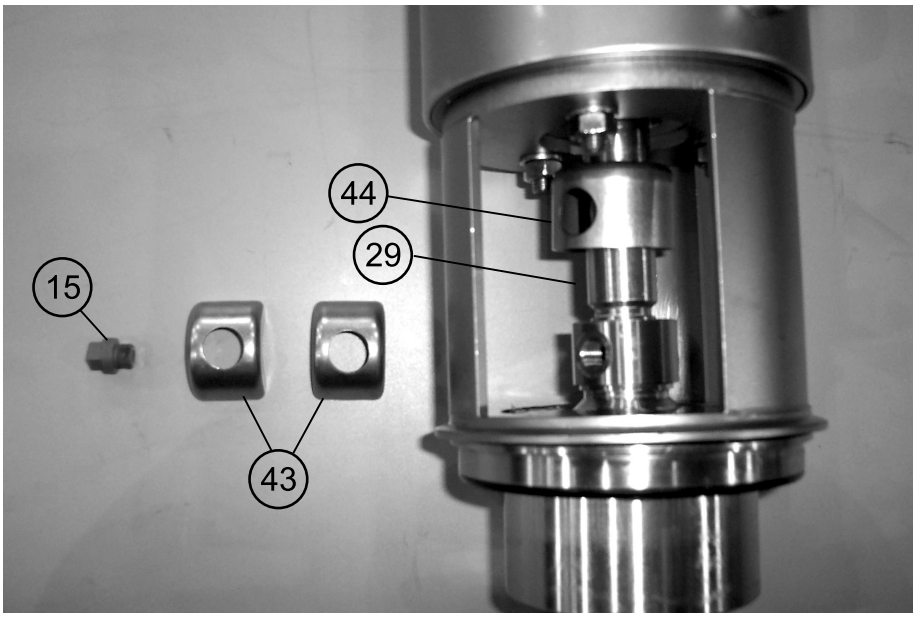
85
37
23
24
25
35
36


44
29
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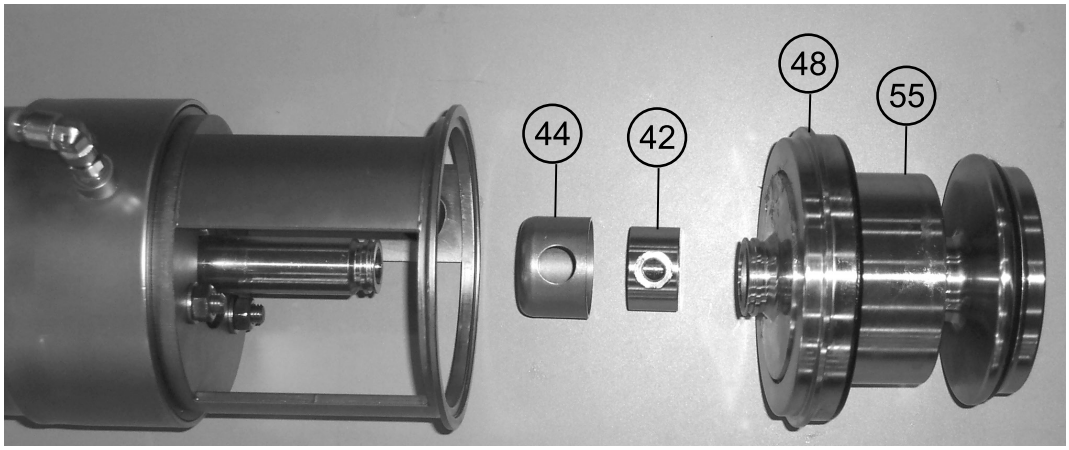
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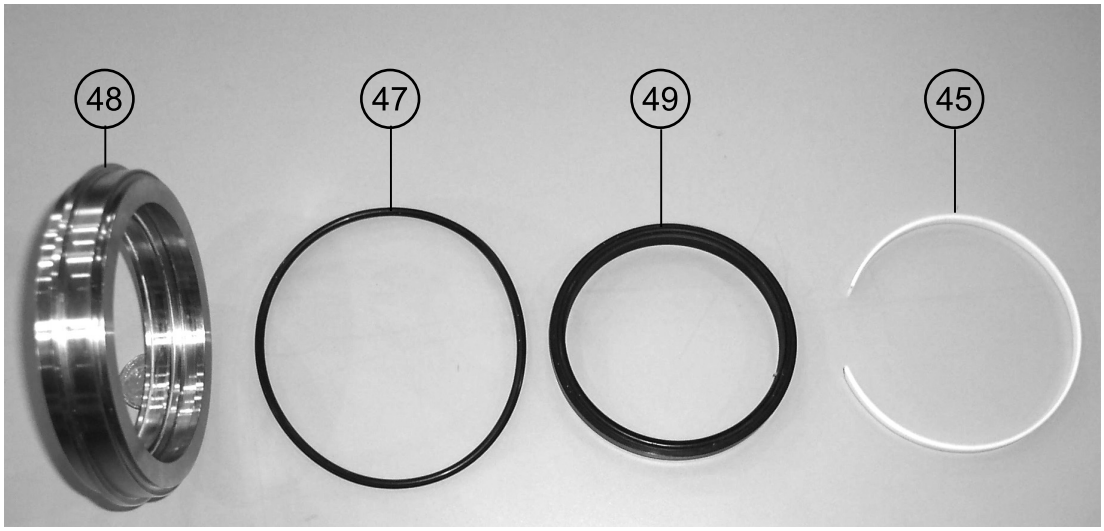
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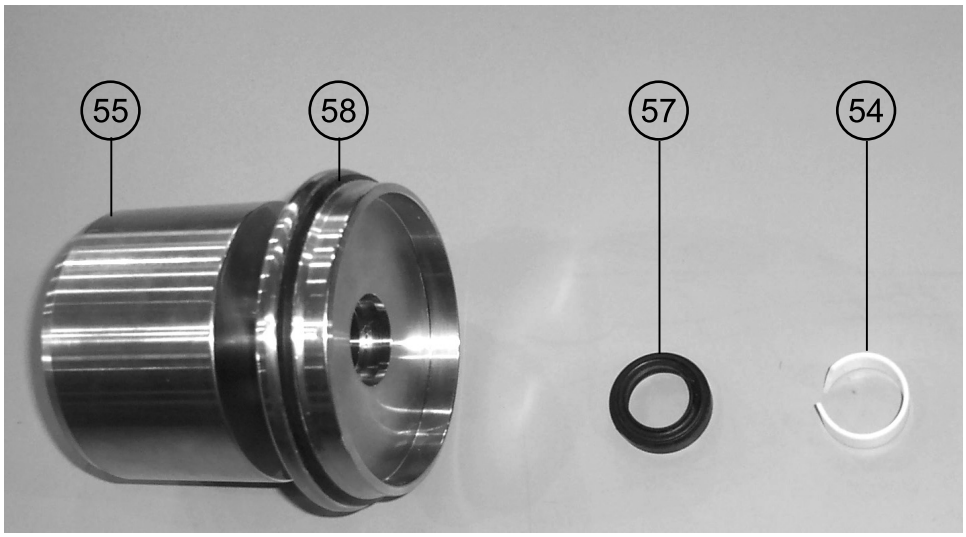
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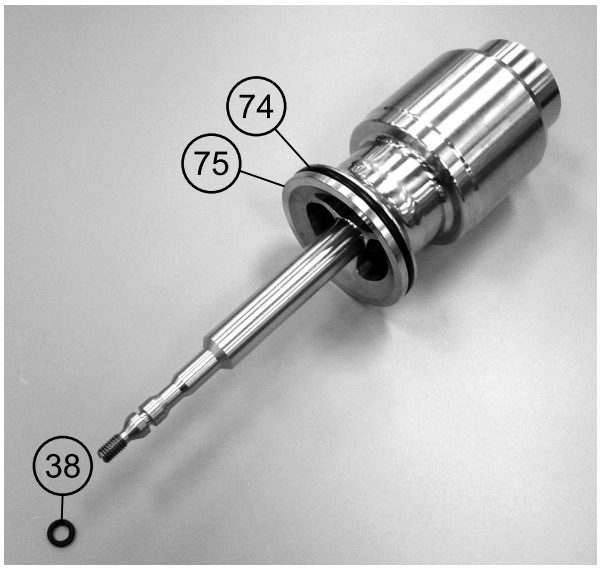
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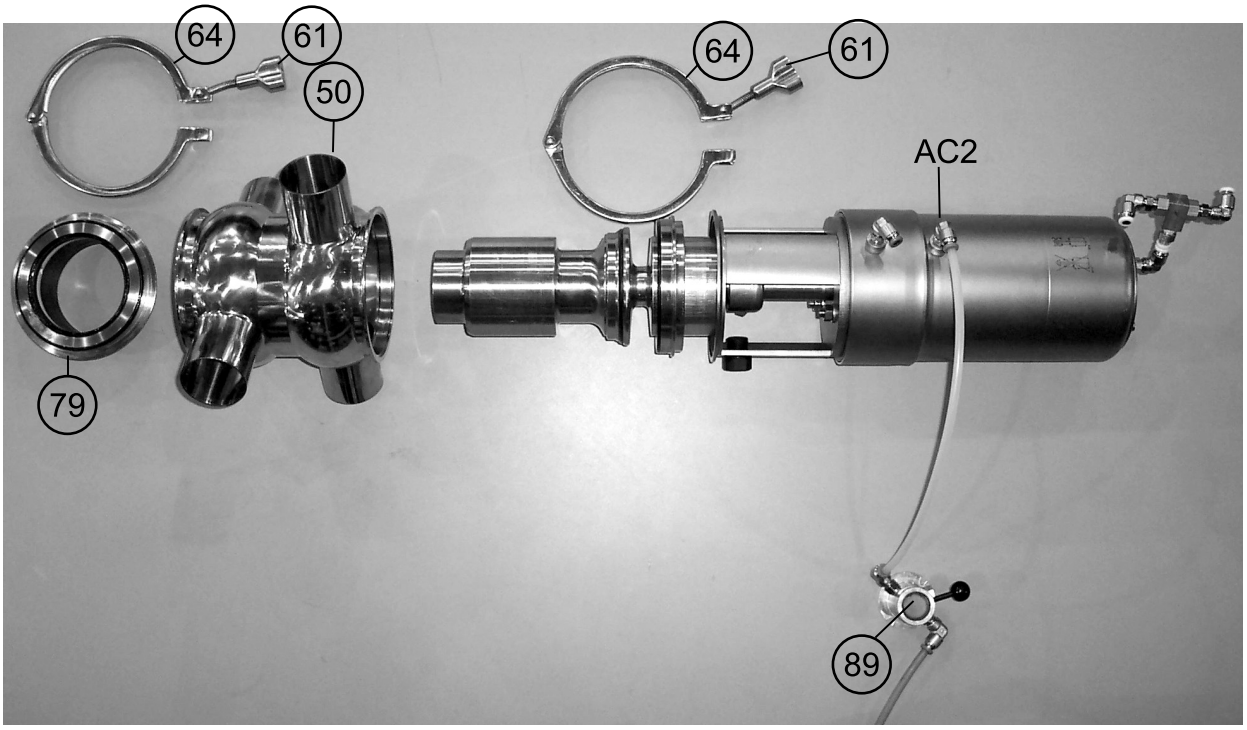
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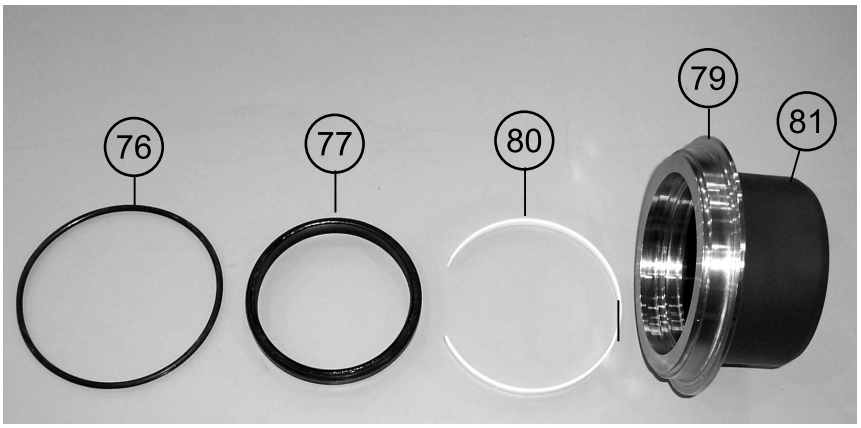
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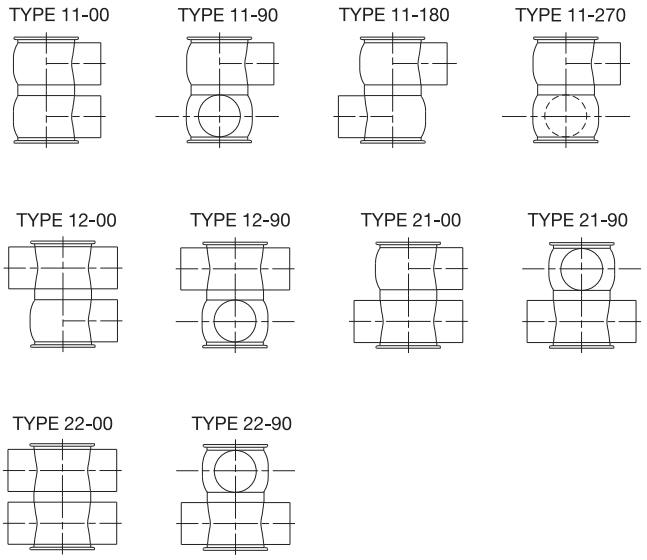
13.1 Part Numbers Chart

Parts list

Pos.	Qty	Denomination
1	1	Upper stem
2	4	Screw
3	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
12a	1	Pin
13	1	Washer
14	1	Spring assembly
15	1	Plug
16	1	Cylinder (3A marking)
17	1	Main piston
18	1	Guide ring, Turcite
19	1	O-ring, NBR
20	1	O-ring, NBR
21	1	Bottom
22	1	Guide ring, Turcite
23	1	O-ring, NBR
24	1	Retaining ring
25	1	Cover disk
26	1	O-ring, NBR
27	1	Inner stem
28	1	O-ring
29	1	Piston rod
30	1	Lower piston
31	1	O-ring, NBR
32	1	Guide ring, Turcite
33	1	O-ring, NBR
35	3	Washer
36	1	Nut
42	1	Spindle liner
43	2	Clamp
44	1	Lock
45	1	Guide ring, PTFE
48	1	Upper sealing element
54	1	Guide ring, PTFE
55	1	Upper plug

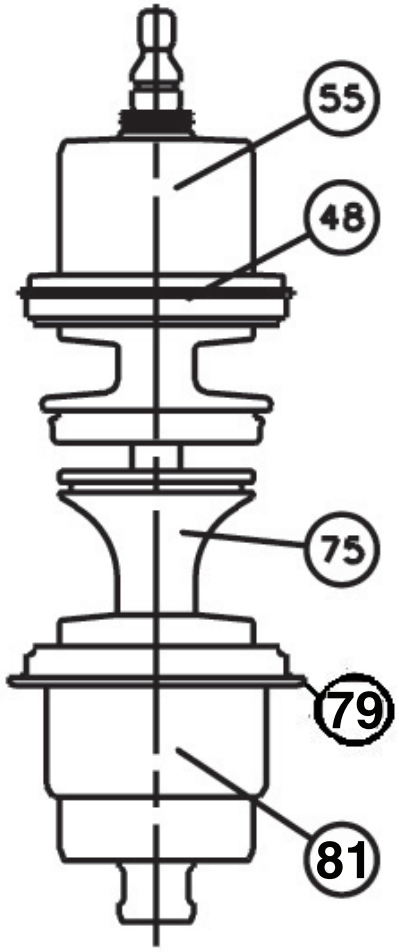
13.2 Valve Body



Parts list

Pos.	Qty	Denomination
37	1	Intermediate piece plus set-up 12
50	1	Valve body 11-00
	1	Valve body 12-00
	1	Valve body 21-00
	1	Valve body 22-00
	1	Valve body 11-90
	1	Valve body 12-90
	1	Valve body 21-90
	1	Valve body 22-90
	1	Valve body 11-180
	1	Valve body 11-270

13.3 Plug Set-Up 12



Parts list

Pos.	Qty	Denomination
61	2	Hexnut
64	2	Clamp without nut
75	1	Lower plug

Parts list

Pos.	Qty	Denomination
79	1	Lower sealing element
80	1	Guide ring, PTFE
*81	1	Cover

Service kits

Denomination	2"	2 1/2" and 3"	4"
NBR	9611-92-6016	9611-92-6017	9611-92-6018
EPDM	9611-92-6013	9611-92-6014	9611-92-6015
HNBR	9611-92-6022	9611-92-6023	9611-92-6024
FPM	9611-92-6033	9611-92-6034	9611-92-6035

13.4 ThinkTop Complete and Parts

Parts list

Pos.	Qty	Denomination
82	1	ThinkTop Complete
83	1	Magnet, ThinkTop
84	1	*Sensor
85	1	Nylon Plug
86	1	Shuttle Valve

Parts list

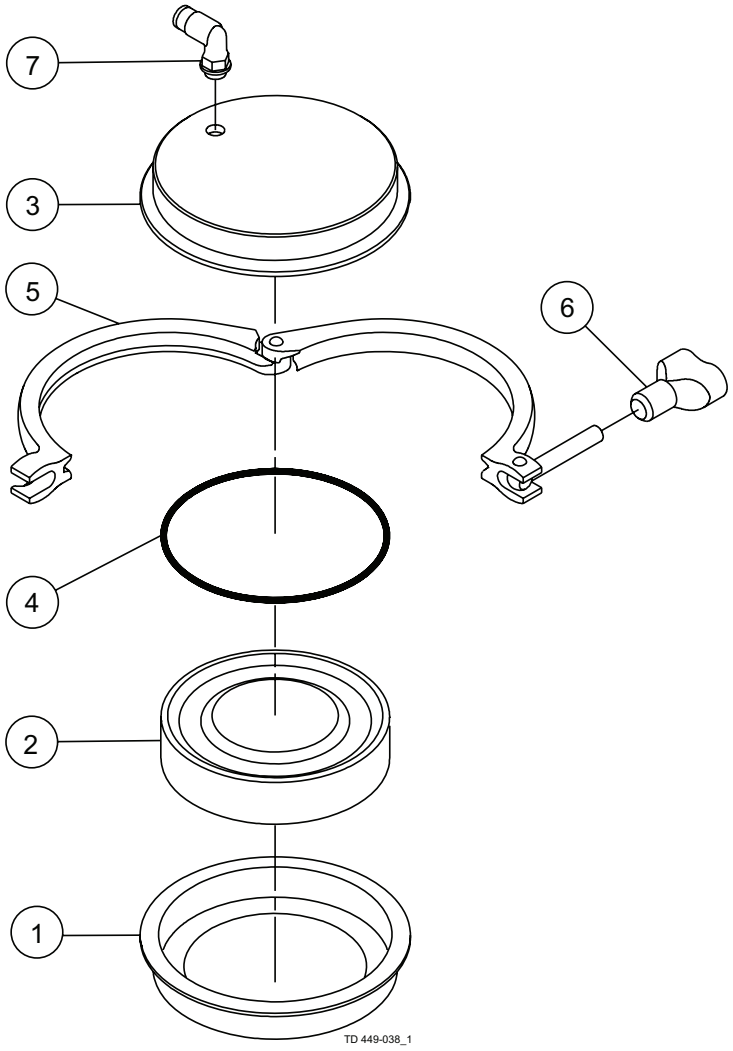
Pos.	Qty	Denomination
87	1	Air fitting (yellow ring)
88	1	Air tubing (yellow)
89	1	Air Pilot Switch
90	1	Cable

13.5 Wear Parts

Parts list

Pos.	Qty	Denomination
38	1	O-ring, EPDM
47	1	O-ring
49	1	Lip seal
56	1	Seal ring
57	1	Lip seal
74	1	Seal ring
76	1	O-ring
77	1	Lip seal

13.6 Axial Installation Tool

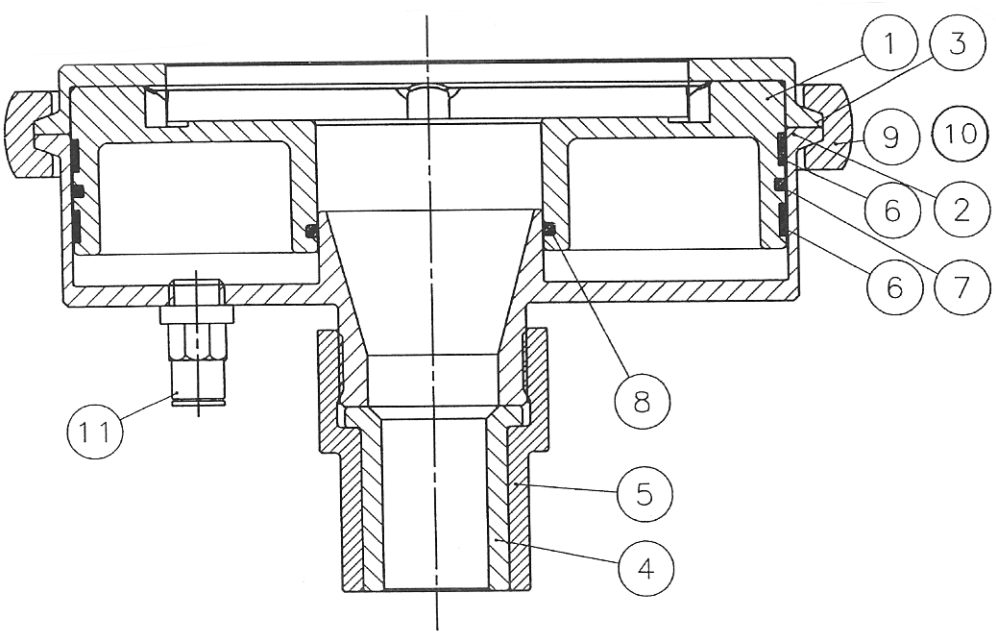


13 Parts List

Parts list

Pos.	Qty	Denomination
1	1	Lower Part
2	1	Piston
3	1	Upper part
4	1	O-ring, NBR
5	1	Clamp
6	1	Wing nut
7	1	Air fitting

13.7 Radial Installation Tool



13 Parts List

Parts list

Pos.	Qty	Denomination
1	1	Piston
2	1	Lower Part
3	1	Upper Part
4	1	Bushing
5	1	Guide
6	2	Guide ring
7	1	O-ring
8	1	O-ring
9	1	Clamp
10	1	Wing Nut
11	1	Air fitting

How to contact Alfa Laval
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