

APV DA4

DOUBLE SEAT MIX PROOF VALVE

FORM NO.: H337927 REVISION: GB-2

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.



EU Declaration of Conformity for Valves and Valve Manifolds

SPX Flow Technology Germany GmbH
Gottlieb-Daimler-Str. 13, D-59439 Holzwickede
herewith declares that the

**APV double seal and double seat valves of the series
SD4, SDT4, SDU4, SDMS4, SDMSU4, SDTMS4, SWcip4, DSV,
DA4, D4 SL, D4, DA3, DA3SLD, DE3, DEU3, DET3, DKR2, DKRT2, DKRH2**
in the nominal diameters DN 25 - 150, ISO 1" – 6" and 1 Sh5 - 6 Sh5

APV butterfly valves of the series SV1 and SVS1F, SV2 and SVS2F, SVL and SVSL
in the nominal diameters DN 25 - 100, DN 125 - 250 and ISO 1" – 4"

APV ball valves of the series KHI, KHV, BLV1
in the nominal diameters DN 15 – 100, ISO 1/2" – 4"

**APV single seat, diaphragm and spring loaded valves of the series
S2, SW4, SWhp4, SW4DPF, SWmini4, SWT4, SWS4, MF4, MS4, MSP4, AP/T1, CPV,
RG4, RG4DPF, RGMS4, RGE4, RGE4DPF, RGEMS4, PR2, PRD2, SI2, UF/R3, VRA/H**
in the nominal diameters DN 10 - 150, ISO 1/2" – 4" and 1 Sh5 - 6 Sh5

and the valve manifolds installed thereof

meet the requirements of the Directive 2006/42/EC.


For official inspections, SPX FLOW presents
a technical documentation according to Appendix VII of the Machinery Directive,
this documentation consisting of documents of the development and construction,
description of measures taken to meet the conformity and to correspond with
the basic requirements on safety and health, incl. an analysis of the risks,
as well as an operating manual with safety instructions.

The conformity of the valves and valve manifolds is guaranteed.

Authorised person for the documentation:
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January 2020



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Content	Page
1. General Terms	6
2. Safety	6
2.1 Symbols	
2.2 Safety Instructions	
3. Intended Use	7
4. Mode of Operation	8
4.1. General terms	
4.2. Valve in "closed" position	
4.3. Valve in "open" position	
5. Control Units / Valve Position Indication	10
5.1. Control unit and adapter	
5.2. Valve position indication	
6. Cleaning	11
6.1. Flow areas	
6.2. Seal surfaces and seat area	
6.3. Leakage chamber	
6.4. Cleaning recommendation	
6.5. Flushing quantity	
6.6. Cleaning of upper area	
6.7. Cleaning of lower area	
7. Installation and Commissioning	13
7.1. Welding Instructions	
8. Dimensions / Weights	14
9. Technical Data	15
9.1. General data	
9.2. Compressed air quality	
9.3. Kvs values	
9.4. Air consumption / Switching times	
9.5. Valve stroke / Opening cross section	
10. Maintenance	18
11. Service Instructions	19
11.1. Removal from the line system	
11.2. Removal of product-wetted parts	
11.3. Installation of product-wetted seals and assembly of the valve	
11.4. Installation of the valve insert	
12. Maintenance of Actuator	23
12.1 Removing the actuator screws	
12.2 Installing the seals and assembling the actuator	
13. Assembly Instructions and Tools for Seals	24
13.1. Lower shaft seal	
13.2. PTFE seal	
13.3. Seat seal	
13.4 Middle Seal	
14. Trouble Shooting	26
15. Spare Parts Lists	26
DA4 Inch and DIN designs	RN 502.047.01

1. General Terms

This instruction manual should be read carefully by the competent operating and maintenance personnel.

We point out that we will not accept any liability for damage or malfunctions resulting from the non-compliance with this instruction manual.

Descriptions and data given herein are subject to technical changes.

2. Safety

2.1 Symbols



Caution!

The technical safety symbol draws your attention to important directions for operating safety. You will find it wherever the activities described are bearing health hazards and risks for persons and / or material assets.



Important Note!

Critical technical information

2.2 Safety Instructions



Opening of the actuators and upper shafts is strictly forbidden. Danger to health and life!

Actuators and upper shafts which are no longer used and/or are defective must be disposed in professional manner.

Defective actuators and upper shafts must be returned to your SPX FLOW company for their professional disposal and free of charge for you.

Please address to your local SPX FLOW company.



- Never touch the valve or pipelines during hot liquid or sterilisation processes!



- Disconnect electric and pneumatic connections, e.g. before maintenance.



- Before any maintenance work, depressurize the line and cleaning system and discharge the lines if possible.

2. Safety



- Observe Service Instructions to ensure safe maintenance of the valve.



- Connections which are not used must be sealed by a plug!



- The safe discharge of the cleaning liquids must be ensured.



- The valves must be assembled, disassembled and reassembled only by persons who have been trained in the valves or by SPX FLOW service team members. If necessary, contact your local SPX FLOW representative.

3. Intended Use

The intended use as field of application of the double seat mix proof valve is the safe shut-off of pipeline sections and the separation of incompatible liquids in the food and beverage industries as well as in pharmaceutical and chemical applications.



Caution! The standard DA4 valve must not be used in explosive atmospheres.



Caution! Arbitrary, structural changes at the valves may affect safety as well as the intended functionality of the valves and are not permitted.

SPX FLOW Valves are intended for use in the food and beverage industries, as well as in pharmaceutical and chemical applications.

SPX FLOW Valves (without safety function) are allocated to Category 1 and are evaluated as per Conformity Assessment Module A of the Pressure Equipment Directive 2014/68/EU. According to Article 13, the following allocation applies for the fluids processed in the valves.

Product media – Fluid group 2 – valves in all dimensions.

CIP-cleaning liquids – Fluid group 1 – valves in the dimensions \leq DN100/4" can be used at temperatures up to 140 °C, valves in the dimensions $>$ DN100/4" at temperatures up to 100 °C.

Authorizations and External Approvals

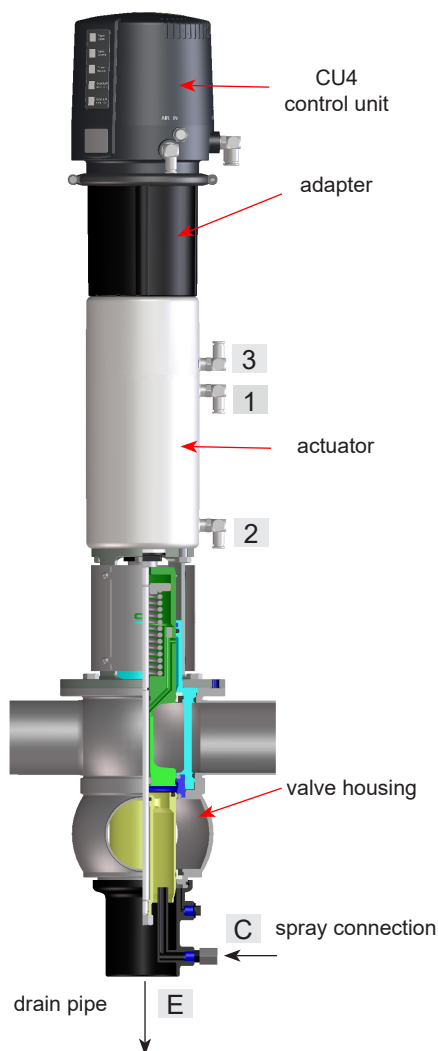
To view the certifications for this and other innovative SPX FLOW products, visit

<https://www.spxflow.com/en/apv/about-us/certifications/>

It is within the responsibility of the plant operator to evaluate and verify the suitability of SPX FLOW products for the intended purpose and service conditions, as well as to determine and follow the applicable laws for the intended applications and areas of application.

4. Mode of Operation

fig. 4.1



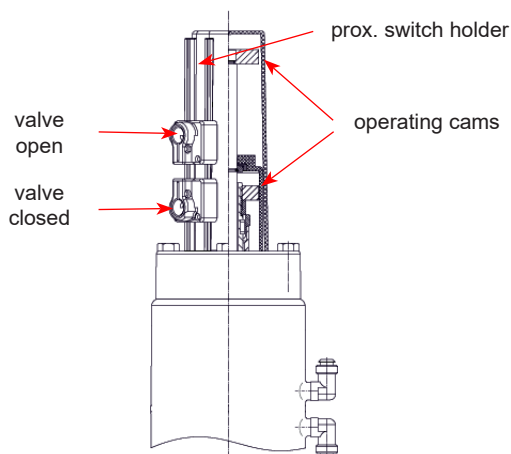
4.1. General terms

Due to its construction and mode of operation as well as to the use of high quality stainless steel and adequate seal materials, the DA4 double seat mix proof valve is suited for applications in the food and beverage industries as well as in pharmaceutical and chemical applications.

- The DA4 valve separates two line passages by two balanced and independently operating valve shafts with an intervening leakage chamber.
- The valve opens from the top to the bottom in a low-leakage design.
- Leakages are discharged via the drain pipe (E) in depressurized state.
- The pneumatic actuator opens the valve via the air connection (1). The spring force resets the valve into the "closed" safe position.
- The standard DA4 double seat mix proof valve is equipped with a CU43 control unit.
- Cleaning of the seat and shaft seal areas is controlled via the air connections.
2 = to lift upper shaft
3 = to lift lower shaft
- The spray connection (C) cleans the leakage chamber.
- As an option, the closed and open positions of the DA4 can be detected via proximity switches.

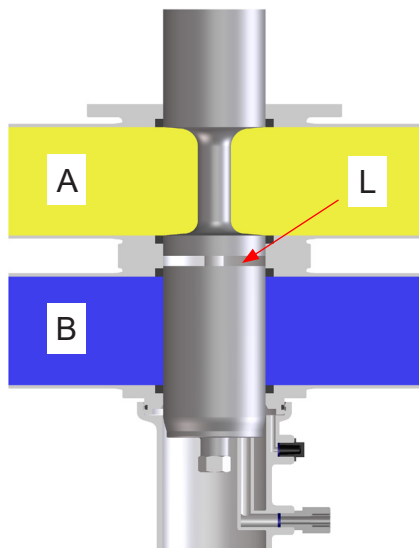
fig. 4.1.2.

DA4 with valve position indication



4. Mode of Operation

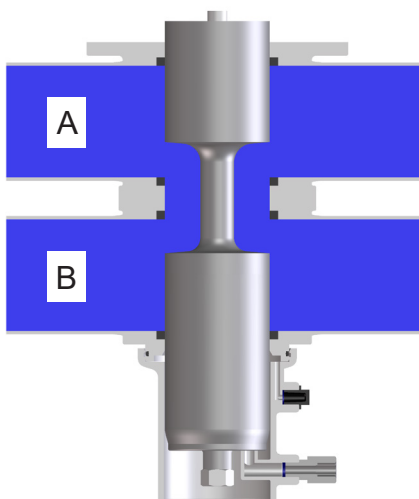
fig. 4.2.



4.2. Valve in "closed" position

The lower and upper valve shaft are in closed position and safely separate the different liquids A and B. The leakage chamber L, which is situated between the two valve shafts, provides for a free and depressurized discharge to the bottom. The valve shafts are balanced and protected against pressure hammer.

fig. 4.3.



4.3. Valve in "open" position

The upper valve shaft is pressed against the seal of the lower valve shaft by control of the actuator. First, the leakage chamber L is closed against the product chamber. Then the two valve shafts move downwards into the open position. The connection between the two pipelines A and B is established.

5. Control Units / Valve Position Indication

CU4 control unit



5.1. Control unit and adapter

An adapter is required to assemble the control unit on the DA4 valve.

The following different designs are available:

∅ Air connection	Designation	
	6 mm	1/4" OD
CU4 Control Unit		
Direct Connect	CU43-D4 Direct Connect H336955	CU43-D4 Direct Connect H336960
Direct Connect M12	CU43-D4-M12 Direct Connect M12 H341343	CU43-D4-M12 Direct Connect M12 H341352
AS-interface extended	CU43-D4 AS-i extended H336957	CU43-D4 AS-i extended H336962
AS-interface extended M12	CU43-D4-M12 AS-i extended M12 H338897	CU43-D4-M12 AS-i extended M12 H338901
AS-interface standard	CU43-D4 AS-i standard H338152	CU43-D4 AS-i standard H338153
AS-interface standard M12	CU43-D4-M12 AS-i standard M12 H338899	CU43-D4-M12 AS-i standard M12 H338903
Adapter	CU4 adapter D4 H337098	
CU4plus Control Unit		
AS-interface extended V1	CU43plus-D4-V1 AS-i extended V1 H338820	CU43plus-D4-V1 AS-i extended V1 H338824
AS-interface extended V1 M12	CU43plus-D4-V1-M12 AS-i extended V1 M12 H338865	CU43plus-D4-V1-M12 AS-i extended V1 M12 H338869
Adapter	CU4plus adapter D4 V1 H336441	

5.2. Valve position indication

Proximity switches to signal the closed and open position of the DA4 valve can be installed at the proximity switch holder.

We recommend using one of these standard types:

- three-wire proximity switch
- operating distance: 5 mm
- diameter: 11 mm
- operating voltage: 10–30 V DC
- pnp pulse-shifting, closing function
- "non-flush" installation

Recommendation:

- Proximity switch 24V DC, PNP, 11 mm DIA. (5 m cable): H16223
- Proximity switch 24V DC, PNP, 11 mm DIA. (cable box): H16432

If the customer decides to use valve position indicators other than those listed above, SPX FLOW cannot assume any liability for the functionality of the valve.

6. Cleaning

In the cleaning process of DA4 valves, distinction is made between three areas: Flow areas, Seal surfaces and seat area, and Leakage chamber.

6.1. Flow areas

The CIP-fluid cleans the upper and lower passages of the valve during CIP.

6.2. Seal surfaces and seat area

The seal surfaces of the upper area (upper shaft and seat seal) and the lower area (lower shaft and seat seal) are flushed and cleaned when the individual valve shafts are lifted during cleaning. The seat area and leakage chamber are also cleaned during this process.

6.3. Leakage chamber

CIP spraying cleans the leakage chamber. The cleaning connection is at item C in fig. 6.3.

CIP spraying does not produce pressure build-up in the leakage chamber. SPX FLOW recommends performing CIP-spraying in the closed valve position; however, it can also be done in the open valve position.

Under standard conditions 15 valves DN 40-100 / 1,5"-4" can be cleaned via one spray distribution line DN 25.

6.4. Cleaning recommendation

Cleaning steps	Seat lifting cycle	CIP spraying
pre-flushing	–	3 x 10 sec.
caustic flushing 80°C	3 x 5 sec.	3 x 10 sec.
intermediate flushing	2 x 5 sec.	2 x 10 sec.
acid flushing	3 x 5 sec.	3 x 10 sec.
subsequent flushing	2 x 5 sec.	2 x 10 sec.

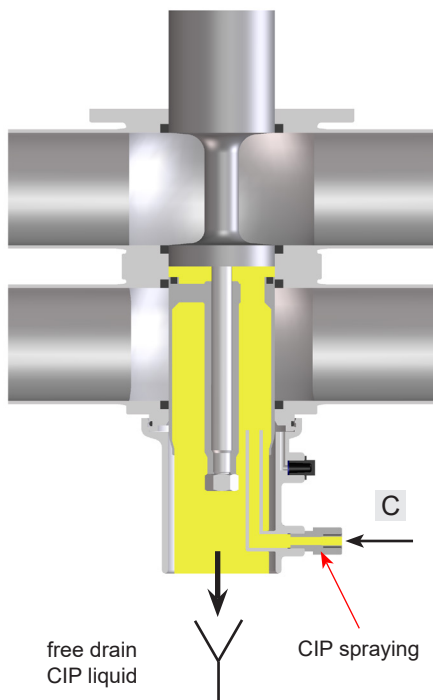
- The lifting cycles refer to a cleaning pressure of $p = 2\text{--}5$ bar.
- Depending on the pressure ratio, cleaning temperatures, cleaning steps and degree of soiling, different cycles must be adjusted.
- Flushing quantities per CIP spraying cycle:
DN 40-100/1,5-4" about 1,2 ltr/10s
- Cleaning pressure at CIP cleaning connection: min. 2 bar
max. 5 bar



Caution!

The cleaning liquid applied must be compatible with the respective seal material.

fig. 6.3.



6. Cleaning

6.5. Flushing quantity in ml per lifting cycle / 5 sec.

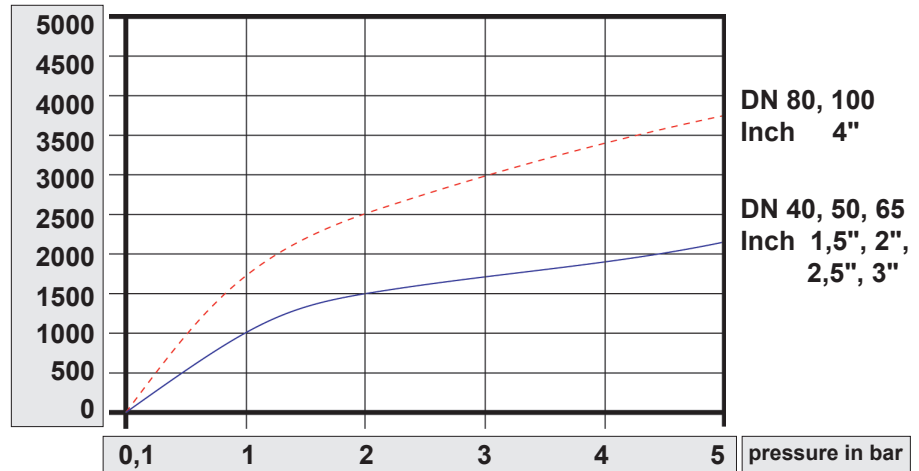
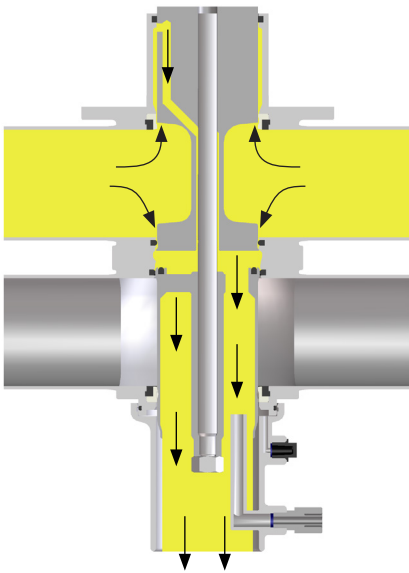


fig. 6.6.



6.6. Cleaning of upper area (fig. 6.6.)

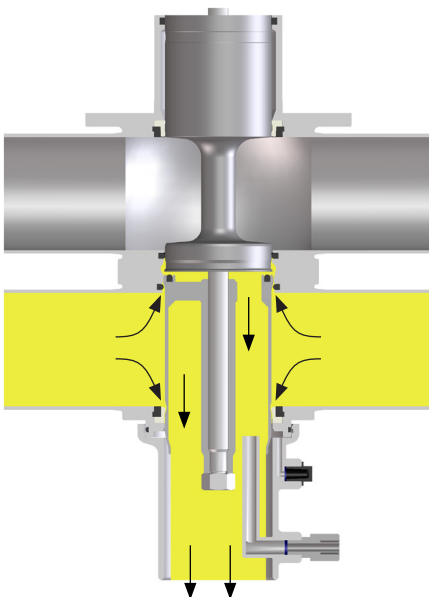
The upper valve shaft is lifted via connection (2), as shown in fig. 4.1 on page 8.

Through the lifting of the upper valve shaft, the cleaning fluid flushes over the upper seat seal and the upper valve seat into the leakage chamber and cleans this area. The cleaning fluid is drained off to the bottom in a depressurized state.

Simultaneously, the upper shaft seal and the outer surface of the upper valve shaft are cleaned. The cleaning fluid is guided into the leakage chamber and drained off to the bottom.

The lifting stroke is limited by a metallic stop.

fig. 6.7.



6.7. Cleaning of lower area (fig. 6.7.)

The lower valve shaft is lifted via connection (3), as shown in fig. 4.1 on page 8.

By lifting the lower valve shaft, the cleaning fluid flushes over the lower seat seal into the leakage chamber and cleans this area. The cleaning fluid is drained off to the bottom in a depressurized state.

Simultaneously, the lower shaft seal and the outer surfaces of the lower valve shaft are cleaned. The cleaning fluid is drained off to the bottom in a depressurized state.

The lifting stroke is limited by a metallic stop.

7. Installation and Commissioning

- The valve must be installed in vertical position to ensure that fluids can drain off freely from the valve housing and the leakage chamber.



Caution! Leakages and fluid losses from seat lifting and CIP spraying must be safely collected and drained!

- The valve housing can be welded directly into the pipeline (completely removable valve insert).



Note! Observe welding instructions.

- Observe heights of installation and dismantling!



Caution!
Before first startup:

- Actuate the valve by applying compressed air. The opening, closing and seat lifting processes must run smoothly.
- Check the function of the control unit or valve position indication.
- Check for possible leakages during commissioning. Replace defective seals.

7.1. Welding Instructions

- Before welding the valve, remove the valve insert from the housing.



Caution! Handle and store the valve insert carefully to avoid damaging the part.

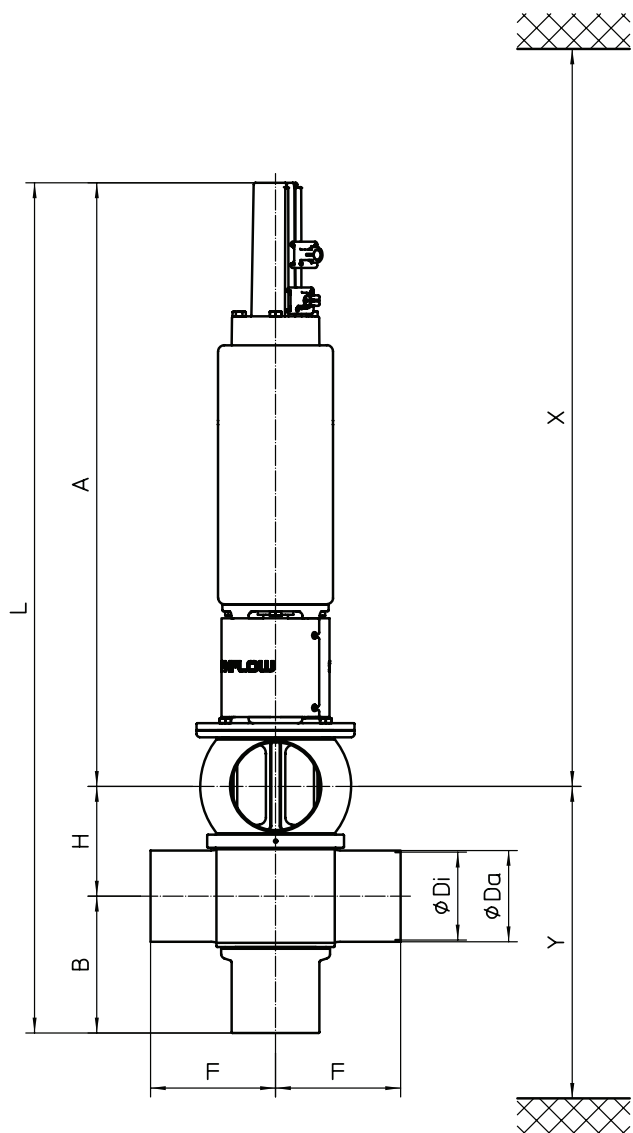
- It is not necessary to remove the lower shaft seal as it can be destroyed during removal.
- Welding should only be carried out by certified welders (DIN EN ISO 9606-1) (seam quality DIN EN ISO 5817).
- The welding of the valve housings must be undertaken in such a way that the valve body is not deformed.
- The preparation of the weld seam up to 3 mm thickness must be carried out as a square butt joint without air. Consider shrinkage!
- TIG orbital welding is recommended.



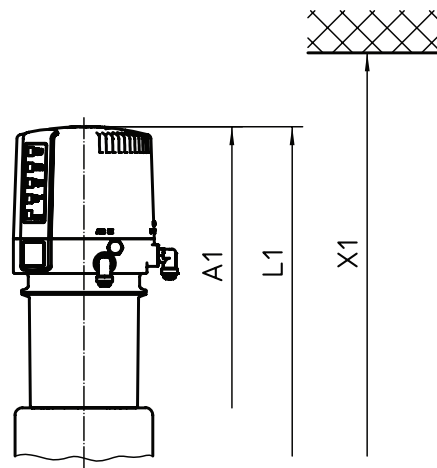
Caution! After welding the valve housing or mating flanges, and after performing any work on the piping, do not operate the valves until the corresponding areas of the installation and piping have been cleaned and welding residue has been removed. If the piping is not cleaned before operation, welding residue and dirt particles can settle in the valves and cause damage to the valves and seals.

- If these welding instructions are not followed, any resulting damage will not be covered by the warranty.
- Welding directives for aseptic applications shall be drawn from the AWS/ANSI Directives and EHEDG Guidelines.

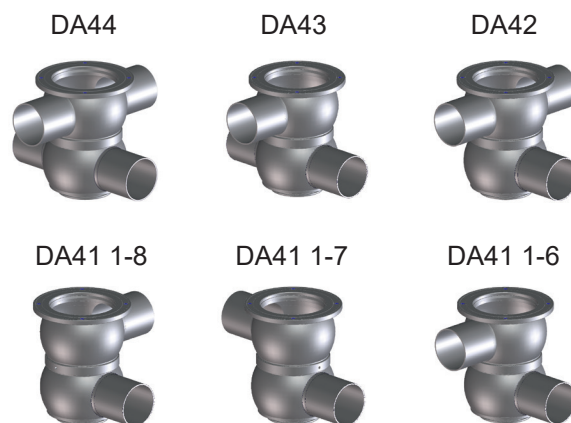
8. Dimensions / Weights



CU4 control unit



housing configuration



Dimensions in mm										install. dimen. min. in mm			weights in kg with CU
DN	A	A1	B	Ø Da	Ø Di	F	H	L	L1	X*	X1*	Y*	
40	589	672	120	41	38	125	63	772	855	810	895	200	16,5
50	593	676	126	53	50	125	75	794	877	840	925	218	17,6
65	601	684	134	70	66	125	91	826	909	880	965	242	18,7
80	678	761	146	85	81	142,5	106	930	1013	980	1070	274	18,8
100	688	771	156	104	100	142,5	125	969	1052	1035	1120	303	31,5
Inch													
1,5"	588	671	119	38,1	34,8	125	63	770	853	815	895	199	16,5
2"	594	677	125	50,8	47,6	125	75	794	877	845	925	217	17,6
2,5"	598	681	131	63,5	60,3	125	85,3	814,3	897,3	870	950	234	18,5
3"	604	687	137	76,1	72,9	125	97,9	838,9	921,9	900	980	252	18,8
4"	689	772	155	101,6	97,6	142,5	125	969	1052	1040	1120	302	31,5

*Minimum installation and valve insert removal dimensions

9. Technical Data

9.1. General data

Product-wetted parts	1.4404, 316L (DIN EN 10088)
Other parts	1.4301,304 (DIN EN 10088)
Seals standard options	EPDM/ PTFE compound HNBR/ PTFE compound FPM/ PTFE compound
Max. line pressure	10 bar
Max. operating temperature	135 °C EPDM, HNBR *FPM
Short-term load	140 °C EPDM, HNBR *FPM *no steam
Tightening torque for stop sleeve	10 Nm
Tightening torque for safety nuts at lower and upper valve shaft	40 Nm
Spray connection	PP (polypropylene)
Ø Cleaning connection DN 40–100/1,5-4"	8 x 1 mm
Ø Air connection	6 x 1 mm, 1/4" OD
Max. pneumatic air pressure	8 bar
Min. pneumatic air pressure	5 bar

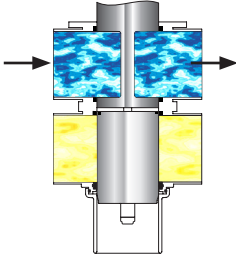
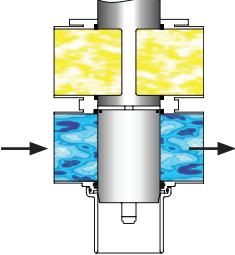
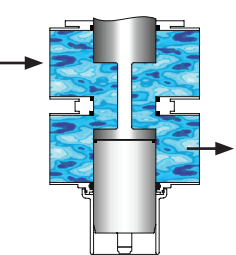
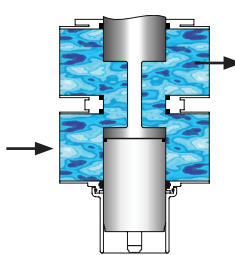
9.2. Compressed air quality

Quality class	acc. to DIN ISO 8573-1
Content of solid particles	quality class 3, max. size of solid particles per m ³ 10000 of 0,5 μm < d < 1,0 μm 500 of 1,0 μm < d < 5,0 μm
Content of water	quality class 3, max. dew point temperature -20°C For installations at lower temperatures or at higher altitudes, consider additional measures to reduce the pressure dew point accordingly.
Content of oil	quality class 1, max. 0,01 mg/m ³

The oil applied must be compatible with Polyurethane elastomer materials.

9. Technical Data

9.3. Kvs values in m³/hr

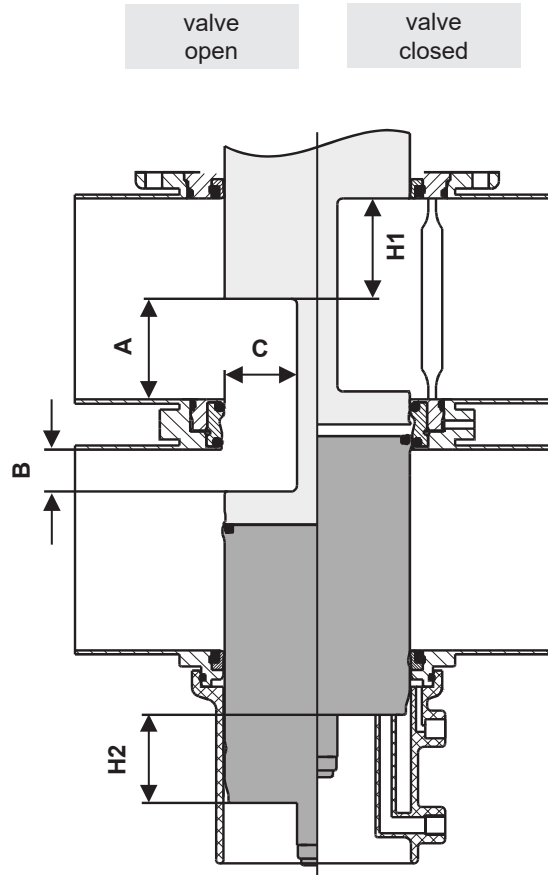
				
DN				
40	48	44	24	24
50	91	75	48	46
65	184	150	74	74
80	205	170	131	126
100	335	246	170	156
Inch				
1,5"	42	38	24	23
2"	83	71	46	46
2,5"	147	122	67	67
3"	183	160	83	82
4"	329	237	167	156

9.4. Air consumption / Switching times

		Air consumption at 5 bar			Switching times in seconds at 5 bar / CU43	
		Actuator	Seat lift actuator		Open	Closed
DN	Inch	NL/stroke valve open	NL/stroke upper seat lift	NL/stroke lower seat lift		
40	1,5"	1,7	3,4	0,3	1,5	1,8
50	2"	1,8	3,4	0,3	1,5	1,8
65	2,5"	2,0	3,4	0,3	1,7	2,0
	3"	2,0	3,4	0,3		
80	4"	3,7	7,7	0,4	2,6	3,3
100		3,7	7,7	0,4		

9. Technical Data

9.5. Valve stroke / Opening cross section



Dimensions in mm					
DN	A	B	C	stroke H1 upper shaft	stroke H2 lower shaft
40	4	5	21,2	34	28
50	11	10	21,2	39	33
65	21	16	21,2	45	39
80	31	21	35,2	50	44
100	50	21	35,2	50	44
Inch					
1,5"	4	5	21,2	34	28
2"	11	10	21,2	39	33
2,5"	15	16	21,2	45	39
3"	28	16	21,2	45	39
4"	50	21	35,2	50	44

10. Maintenance



Note!

The maintenance intervals are different depending on the application and must be determined by the operator performing regular checks.

- Compressed air is not required to remove the valve.



Caution!

Do not clean the valve with products containing abrasive or polishing substances. Abrasive and polishing agents are especially harmful to the upper and lower shaft.



Required tools for standard maintenance:

- 1 x wrench SW13, SW24, SW30, SW32
- 1 x wrench SW36
- 2 x wrench SW17
- 1 x Allen key SW3, SW6
- pick tool for O-ring and rubber seal removal
- disassembly and assembly tool for lower shaft seal, see page 24
- assembly tool for middle seal, see page 25
- 2 long M8 hex screws for safe removal of valve insert
- For valve maintenance SPX FLOW offers complete seal kits (see spare parts lists).



Caution!

The use of seal materials being compatible with the product, application and CIP liquids must be ensured. In case of doubt, contact your local SPX FLOW representative.

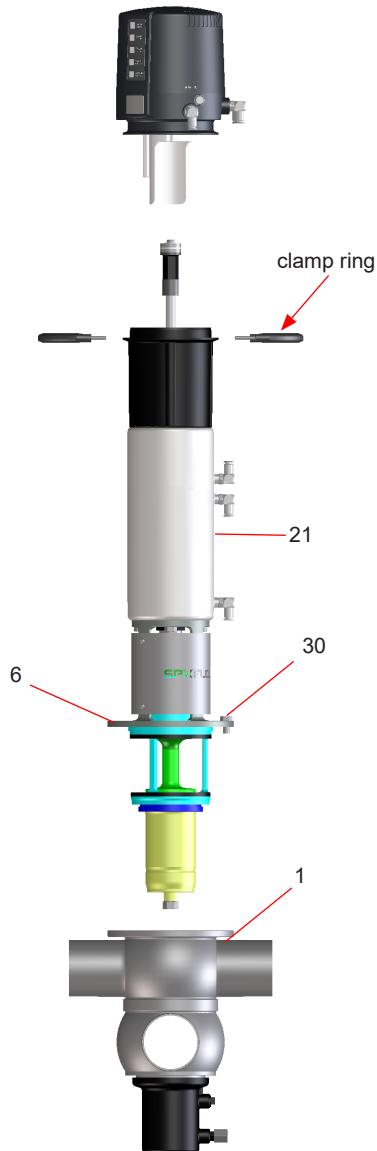
- For seal replacement instructions, see pages 20 and 21.
- Provide all seals with a thin layer of grease before their installation!
Recommendation:
Assembly grease for EPDM, HNBR and FPM (Viton)
0,75 kg/tin - ref.-No. 000 70-01-019/93; H147382
60 g/tube - ref.-No. 000 70-01-018/93; H147381
- Provide all screws and threaded parts with grease before their installation.
Recommendation: Klüber paste UH1 84-201
60 g/Tube - ref.-No. 000 70-01-016/93; H147379
Recommendation for actuator:
Pneumatic grease:
25 ml/tube - ref.-No. 000 70-01-008/93; H164725
- For valve assembly instructions, see page 21.

11. Service Instructions

The item numbers refer to the spare parts drawings
DIN and Inch designs: RN 502.047.01

For the Disassembly/Assembly tools, see chapter 13.

fig. 11.1.



11.1. Removal from the line system

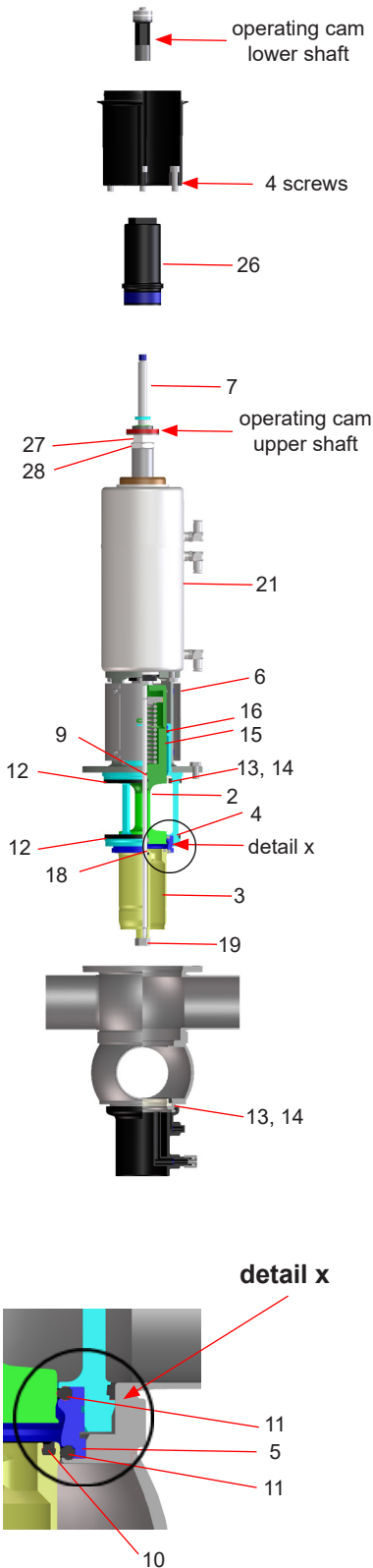


Caution!

1. Shut off the line pressure in the product and cleaning lines, and discharge the pipes if possible.
2. Remove the compressed air lines from the valve actuator (21).
3. Release the 2 screws at the clamp rings and lift the control unit off the adapter.
4. Design with proximity switch holder:
Release the screws at the proximity switch holder and lift off the proximity switch holder.
5. Remove the flange screws (30) in the yoke (6). For additional safety, replace two flange screws with longer screws that are partially threaded into the flange. Once these longer screws are in place, the other two flange screws can be safely removed.
6. Screw one flange screw (30) into the threaded bore of the yoke (6) to lift the complete valve insert. Do not remove the screw. It helps to re-install the valve insert.
7. Carefully lift the valve insert vertically out of the valve housing (1).

11. Service Instructions

fig. 11.2.

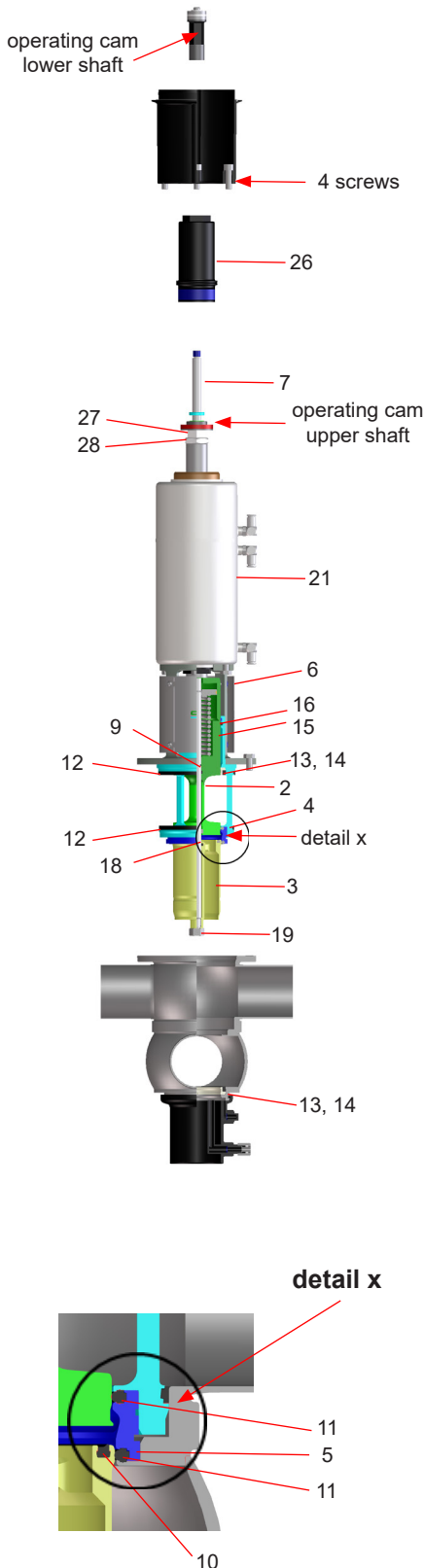


11.2. Removal of product-wetted parts

1. Remove the operating cam from the guide rod (7).
2. In order to take off the adapter, remove the 4 screws.
3. Remove the lower and upper housing seal (12) from the valve seat (4).
4. Release the lower safety nut (19). Hold the lower shaft (3) with an SW17 wrench to keep it from turning.
5. After removing the nut (19), lift off the lower shaft (3).
6. Place the point of the pick tool along the side of the middle seal (10) and pull it out of the groove. Take the quad ring (18) out of the groove.
7. Remove the stop screw (26).
8. Take the guide rod (7) out through the top of the actuator and remove the O-ring (9).
9. Remove the operating cam at the upper shaft.
10. Unscrew the safety nut (27). Hold up the lock washer (28) with a SW30 key to keep it from turning. Remove the lock washer.
11. Lift off the actuator (21) with yoke (6).
12. Press the upper valve shaft (2) with seat ring (5) to the bottom out of the valve seat (4).
13. Slide the seat ring (5) over the balancer of the upper valve shaft (2).
14. Remove the seat seals (11) from the grooves.
15. Removing the upper shaft seal (13, 14)
Place the point of a tool along the side of the seat seal (13) and pull it out of the valve seat, then remove the PTFE seal (14).
16. Remove the quad ring (15) and guide ring (16) from the groove of the valve seat (4).
17. Removing the lower shaft seal from the housing
Place the point of the disassembly tool along the side of the seat seal (13) and pull it out through the top of the housing. Then remove the PTFE seal (14) through the top of the housing, using the mandril of the assembly tool, see page 20.

11. Service Instructions

fig. 11.3.



11.3. Installation of product-wetted seals and assembly of the valve



Note! Make sure that all seals and bearing surfaces in the product area are slightly greased before their installation.

1. Install the lower shaft seal (13, 14) in the lower housing flange.
2. Place the quad ring (15) and the guide ring (16) in the valve seat (4).
3. Installing the upper shaft seal (13, 14) in the valve seat (4). Insert the PTFE ring (14), first. Then press the seat seal (13), the wide side to the front, into the groove between the PTFE seal (14) and the valve seat (4).
4. Install the upper and lower housing seals (12).
5. Press the upper and lower seat seal (11) into the seat ring (5).



Note! The seal shoulder must fit properly into the groove.

6. Slide the seat ring (5) (the larger diameter to the bottom) from the top over the balancer of the upper valve shaft (2).
7. Slide the valve seat (4) over the balancer of the upper valve shaft (2) in the same way.
8. Insert the upper valve shaft (2) with seat ring (5) and valve seat (4) through the yoke (6) and actuator (21) until it stops.
9. Align key and fasten the upper valve shaft (2) with the lock washer (28) and safety nut (27). Hold the lock washer with a SW30 wrench to keep the safety nut (27) from turning.

Tightening torque: $M_d = 40 \text{ Nm}$



Caution! Overtightening of the safety nut could result in thread damage on the upper shaft.

10. Screw the operating cam on the upper shaft.
11. Insert the middle seal (10) into the lower shaft (3) using the assembly tool (see page 21).
12. Assembling without the assembly tool:
Press the slightly greased seal into the groove at four locations. Then push in the four loops of seal with a blunt object. Vent the seal groove.
13. Insert the quad ring (18) in the lower shaft (3).
14. Install the O-ring (9) at the guide rod (7).
15. Ensure the key is secure on the guide rod. Slide in the guide rod (7) from the top through the actuator (21) until it stops.
16. Screw in the stop screw (26) until it stops.
Tightening torque $M_d = 10 \text{ Nm}$
The stop screw must be flush with the top of the piston.



Note! Check the position of the lower seat seal (11).

11. Service Instructions

fig. 11.4.

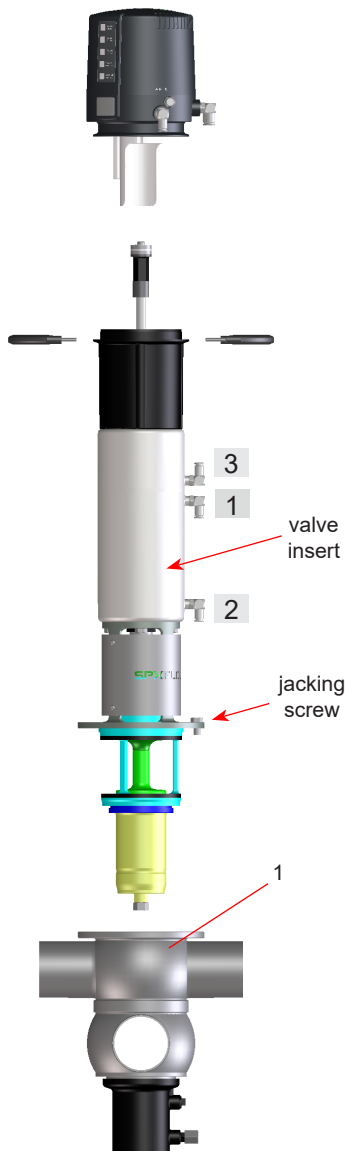
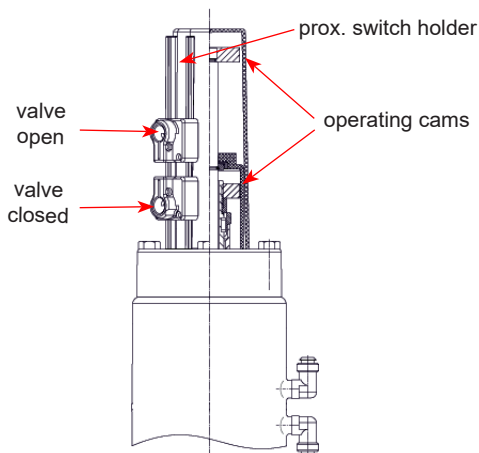


fig. 11.4.1.

DA4 with valve position indication



17. Slide the lower valve shaft (3) on the guide rod (7). Align key and fasten it with the safety nut (19).
Tightening torque: $M_d = 40 \text{ Nm}$
18. Fasten the adapter on the actuator with the 4 screws and ensure that the air fittings on the control unit will align properly with the air fittings on the DA4 valve.
19. Screw the operating cam on the guide rod (7).

11.4. Installation of the valve insert

1. Carefully place the valve insert in the valve housing (1) until the screw stops.
2. Remove the jacking screw and carefully press the valve insert into the housing (1).
3. Screw in the hex. screws (30) and fasten them crosswise.
4. Place the control unit on the adapter. Make sure that the control unit is centered on the adapter.
5. Place the clamp ring and fasten it with the screws.
6. Assemble the compressed air lines.
Air connection 1: to open valve
Air connection 2: to lift upper shaft
Air connection 3: to lift lower shaft
7. Check the valve position indicators

Closed valve position feedback – sensor 1 controlled

To adjust Hall sensor 1, ensure that the valve is in the closed position, the solenoid / manual override are not activated. Turn adjustment screw 3 into the required position. The LED "Valve Closed" lights up.

Open valve position feedback – sensor 2 controlled

To adjust Hall sensor 2, first activate the solenoid valve 1, either manually or electrically. Then turn adjustment screw 1, to adjust the open valve position and the corresponding feedback. When it reaches the required position, the LED "Valve Open" lights up.

Observe the switching hysteresis of the Hall effect sensors! Therefore, adjust the switch point of the sensors with overlap in order to permit small variations. We recommend additional $2 \times 360^\circ$ turns of the adjustment screw.

8. Design with proximity switch holder:
Set the proximity switch holder in position and fasten it with the screws. Check to see if the "Valve Closed" or "Valve Open" message appears. Re-position the proximity switch if required.

12. Maintenance of Actuator

fig. 12.1



The item numbers refer to the spare parts drawings
 DIN and Inch designs: RN 502.047.01

12.1 Removing the actuator screws

1. Remove yoke cover and yoke.
2. Unscrew the two actuator screws (20) with an SW36 socket wrench.
3. Remove the V-seals (24) and O-rings (23).

12.2 Installing the seals and assembling the actuator

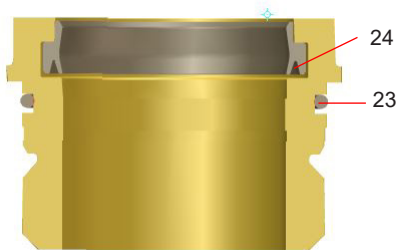
1. Install the slightly greased O-rings (23) and V-seals (24) in the actuator screws (20) (fig. 12.2). Check the correct installation position of the V-seal (24).

Recommendation for actuator:

Pneumatic grease
 (25 ml /tube - ref.-No. 000 70-01-008/93; H164725)

2. Place the assembly tool (H338580) on the end of the piston rod. Screw the actuator screws (20) with a socket wrench SW36 over the piston rod at both sides of the actuator and fasten them.
3. Re-install yoke and yoke cover.

fig. 12.2



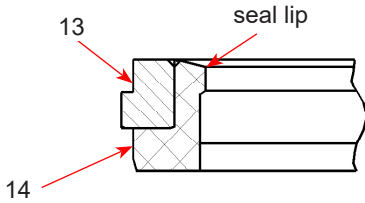
actuator screw

Assembly tool for actuator screw (H338580)

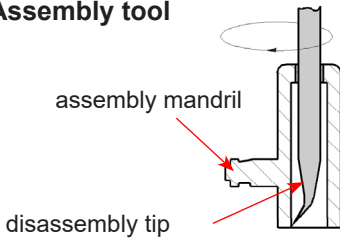


13. Assembly Instructions and Tools for Seals

Seal



Assembly tool



13.1. Lower shaft seal (pos. 13, 14)

For a simple disassembly and assembly of the lower shaft seal (13, 14) the universal tool (ref.-No. 000 51-13-100/17; H171889) can be used. This tool is especially recommended for valves of the small series (DN 40-65, 1,5"-3") as access to the lower shaft seal from the top is impossible as a result of the narrow seat.



Caution!

Do not damage the seal lip of the PTFE seal during assembly.

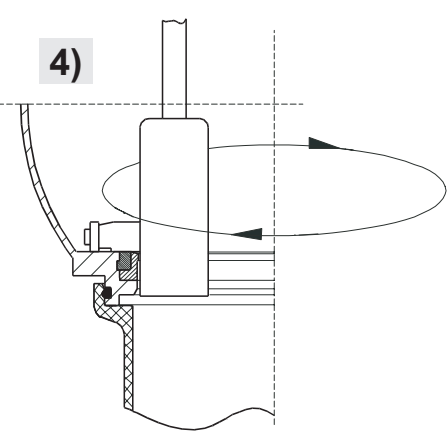
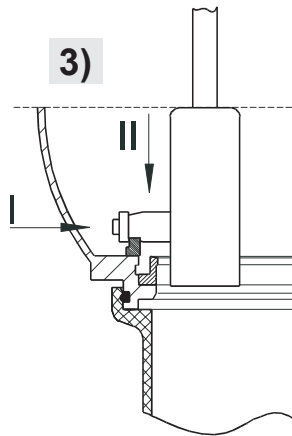
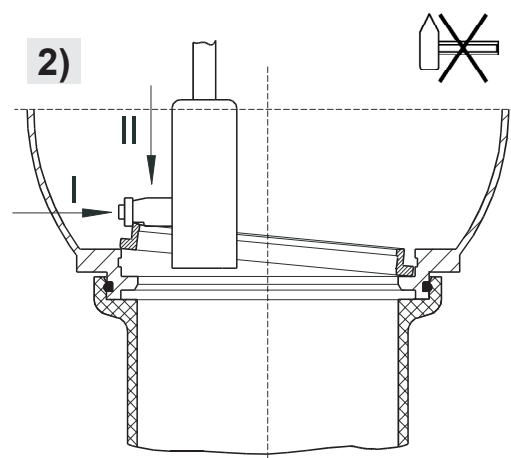
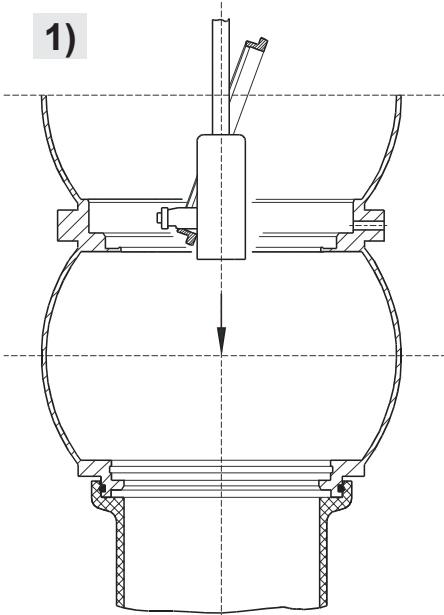
To avoid injuries the disassembly tip must be covered by the assembly mandril if not used.

13.2. PTFE seal (fig. 1, 2)

1. Press the PTFE ring (14) into an oval shape.
2. Introduce the PTFE ring (14) from the top using the assembly tool, the wide side to the front, through the intermediate ring of the housing into the lower housing (fig. 1).
3. Pull the PTFE ring (14) into a round shape with the assembly mandril (fig. 2/I) and press it into the groove. Do not knock or beat (fig. 2/II)!

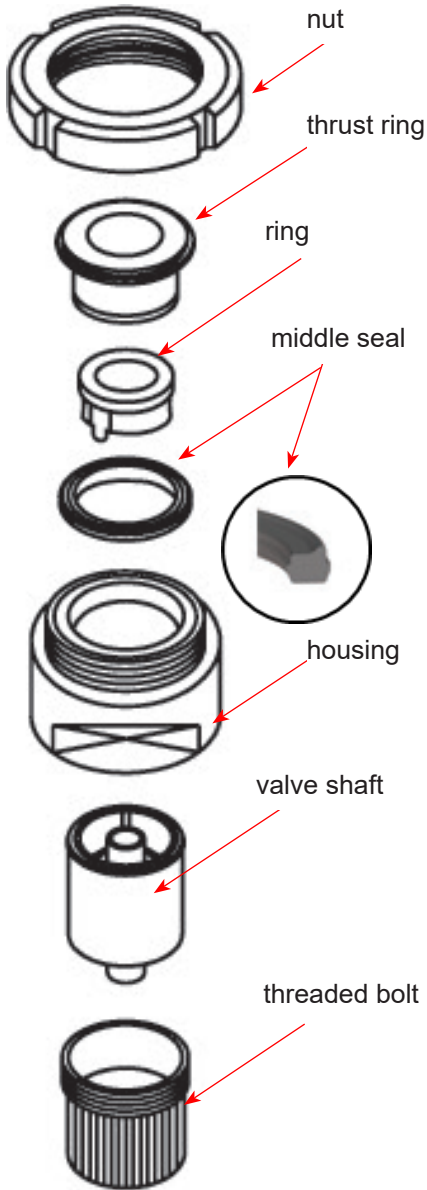
13.3. Seat seal (fig. 1, 3, 4)

1. Slightly grease the seal (13).
2. Use the assembly tool to insert the seat seal (13) from the top, the wide side to the front, through the intermediate ring of the housing into the lower housing ball (fig. 1).
3. Position the seat seal (13) using the groove of the assembly mandril (fig. 3/I).
4. Press in the seat seal (13) at one spot between the housing flange and the PTFE seal (14) (fig. 3/II).
5. Slide the assembly mandril around the seat seal (13) to insert the seal completely into the groove (fig. 4). Make sure the seat seal (13) fits evenly in the groove.



13. Assembly Instructions and Tools for Seals

13.4 Middle Seal



The assembly tool consists of:

- nut
- thrust ring
- ring with venting tip
- housing
- threaded bolt

Installation of the middle seal in the valve shaft

1. Insert the valve shaft into the housing making sure that the seal groove is in the housing.
2. Use the threaded bolt to clamp the shaft into the housing. Clamp the housing into a vice.
3. Slightly grease the middle seal with assembly grease. Then install the seal on the ring.
4. Insert the ring with the installed seat seal into the housing. Make sure that the venting tip is positioned in the seal groove.
5. Insert the thrust ring around the ring in the housing. Screw on the nut and tighten it with a hook spanner until it stops.
6. Release the nut. Take the ring and thrust ring off the housing.
7. Take the housing out of the vice. Take off the threaded bolt. Detach the valve shaft from the housing.

Make sure the middle seal fits evenly.

Assembly tool for middle seal			
DN	Inch	Designation	Reference number
40	1,5"	DA3 - 62	51 - 13 - 210/17 H207310
50	2"		
65	2,5" 3"		
80	4"	DA3 - 92	51 - 13 - 211/17 H207311
100			

14. Trouble Shooting

Failure	Valve position		Required seal replacement
	closed	open	
Leakage at upper housing flange	x	x	upper housing seal (12)
Leakage from the leakage bore between the connecting ports	x	x	lower housing seal (12) and seat seals (11)
Leakage from the yoke	x	x	upper shaft seal (13, 14) and seal of flushing chamber (15)
Leakage from the inside of the lower valve shaft	x		seat seals (11) and upper shaft seal (13, 14)
Leakage from the inside of the lower valve shaft		x	middle seal (10)
Leakage at the outside of the lower valve shaft (remove spray connection for this purpose)	x	x	lower shaft seal (13, 14)

The position numbers refer to the spare parts drawing.

15. Spare Parts Lists

The reference numbers of the spare parts for the different valve designs and sizes are included in the attached spare parts drawings with corresponding lists.

Please indicate the following data to place an order for spare parts:

- number of required parts
- reference number
- designation

Data are subject to change.

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Spare Parts list

Double seat mix proof valve DA4 1.5" - 4" ; DN 40 - 100

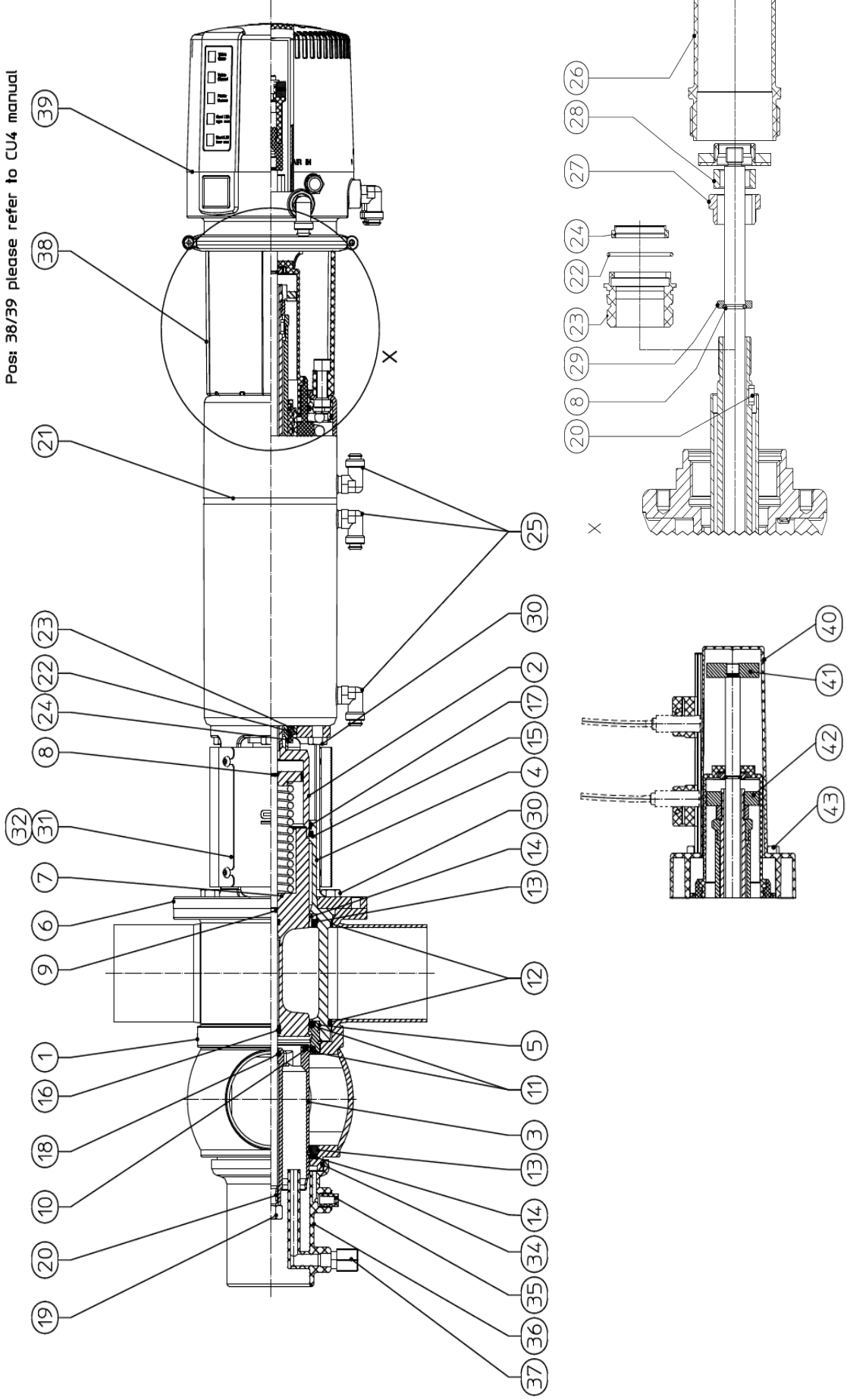
SPX FLOW

Date:	21.03.18	30.10.18	11.10.19	17.06.20
Name:	C.Keil	C.Keil	Size-Si.	C.Keil
Reviewed:				
Date:				
Name:				
Reviewed:				

Page 1 of 11

RN 502.047.01

Pos: 38/39 please refer to CU4 manual



Pos: 38/39 please refer to CU4 manual

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

Pos. Item	Quantity	Description	included to spare part (pos.)	Material	DN40		1.5"		DN50		2"		DN65		2.5"	
					Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.						
10	1	Middle seal		FPM					000 58-33-998/73 H332653							
	2	Seat seal		EPDM					000 58-33-044/93 H149618							
11	2	Seat seal		HNBR					000 58-33-044/33 H168900							
	2	Seat seal		FPM					000 58-33-044/71 H326355							
	2	Housing seal		EPDM					000 58-33-542/93 H77543							
12	2	Housing seal		HNBR					000 58-33-542/33 H170075							
	2	Housing seal		FPM					000 58-33-542/71 H326353							
	2	Seat seal		EPDM					000 58-33-493/93 H77515							
13	2	Seat seal		HNBR					000 58-33-493/33 H166678							
	2	Seat seal		FPM					000 58-33-493/71 H326354							
14	2	Shaft seal		PTFE					000 58-33-105/23 H335232							
15	1	Quad ring		EPDM					000 58-01-329/63 H150898							
16	1	Guide ring		Igildur A500					3A0 08-39-080/93 H320447							
17	1	Piston ring		Igildur A500					000 58-01-610/99 H334863							
18	1	Quad ring 12,37x2,62		EPDM					000 58-01-049/63 H311646							
19	1	Safety nut M10x1		A2					000 65-50-087/15 H118903							

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

Pos. Item	Quantity	Description	included to spare part (pos.)	Material	DN40		1.5"		2"		DN65		SPX FLOW
					Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.			
20	2	Square key DIN6885 - A - 3x3x10		A2									
21	1	Actuator	22, 23, 24	1.4301	000 29-02-198/17 H335475	000 29-02-199/17 H335474					000 29-02-200/17 H334430		
22	2	O-ring 30 x 2,5		NBR		000 58-06-113/83 H337897							
23	2	Actuator screw		Igildur J350		000 16-28-330/93 H334376							
24	2	V-seal		NBR		000 58-01-600/73 H334379							
25	3	W-union G1/8" Ø6mm		hard nickel-plated		000 08-60-750/93 H208825							
26	1	Stop screw		Grivory		000 16-28-340/39 H334382							
27	1	Lock washer D4		1.4301		000 67-03-030/12 H335172							
28	1	Safety nut D3		1.4301		000 65-50-137/15 H147640							
29	1	Thrust ring		1.4057		000 08-48-106/12 H123151							
30	8	Hex. screw M8 x 16		A2		000 65-01-081/15 H78772							
31	1	Yoke cover DA4	32	1.4301		000 16-40-221/00 H341315							
32	4	Savetix head screw M4 x 8 washer M4 as set		1.4301		000 65-06-010/12 H336707							
33													
34	1	O-ring		EPDM		000 58-06-295/64 H77039							
35	1	Venting plug G-1/8"		PE-Hard		000 08-74-014/93 H16507							

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

Pos. Item	Quantity	Description	included to spare part (pos.)	Material	DN40		1.5"		DN50		2"		DN65		SPX FLOW	
					Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	Reference no. Part no.						
36	1	Spray connection DE3		PP												
37	1	G-union 8x1-G1/8"		PVDF-black												
38	1	CU4 D4 adapter compl.		PA6.6 GF30 black												
	1	CU4plus D4 V1 adapter compl.		PA6.6 GF30 black												
	1	CU43 D4 DC ø6mm		PA 6.6 GF30 black												
	1	CU43 D4 M12 DC ø6mm		PA6.6 GF30 black												
39	1	CU43 D4 AS-i Ext. ø6mm		PA 6.6 GF30 black												
	1	CU43 D4 M12 AS-i Ext. ø6mm		PA6.6 GF30 black												
	1	CU43 D4 AS-i Std. ø6mm		PA 6.6 GF30 black												
	1	CU43 D4 M12 AS-i Std. ø6mm		PA6.6 GF30 black												
	1	CU43plus D4 V1 AS-i Ext. ø6mm		PA6.6 GF30 black												
	1	CU43plus D4 V1 M12 AS-i Ext. ø6mm		PA6.6 GF30 black												
40	1	Prox. Switch holder D4 compl.		PA 6.6 GF30 black												
41	1	Operating cam D4 top		1.4523 / 444FR												
42	1	Operating cam D4 bottom		1.4523 / 444FR												
43	4	Hex. screw M8x40		A2-70												

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

		Date:	21.03.18	11.10.19			SPX FLOW			
		Name:	C. Keil	Size-Si.						
		Reviewed:								
		Date:			Page	7	of	11		
		Name:			RN 502.047.01					
		Reviewed:								
Pos. Item	Quantity	Description	included to spare part (pos.)	Material	3"	DN80	DN100	4"	Reference no. Part no.	Reference no. Part no.
1	1	Housing	D41 1-6	1.4404	000 16-61-563/47 H337218	000 16-61-538/47 H337213	000 16-61-638/47 H337214	0001666166347 H337219		
	1	Housing	D41 1-7	1.4404	000 16-61-573/47 H337208	000 16-61-548/47 H337203	000 16-61-648/47 H337204	0001666167347 H337209		
	1	Housing	D41 1-8	1.4404	000 16-61-567/47 H337228	000 16-61-542/47 H337223	000 16-61-642/47 H337224	0001666166747 H337229		
	1	Housing	DA42	1.4404	000 16-62-573/47 H337051	000 16-62-548/47 H337046	000 16-62-648/47 H337047	000166267347 H337052		
	1	Housing	DA43	1.4404	000 16-63-673/47 H337061	000 16-63-548/47 H337056	000 16-63-648/47 H337057	000166367347 H337062		
	1	Housing	DA44	1.4404	000 16-64-573/47 H335514	000 16-64-548/47 H335845	000 16-64-648/47 H335848	000 16-64-67/347 H335851		
2	1	Upper valve shaft	16, 20, 28	1.4404	000 16-25-554/00 H341280	000 16-25-529/00 H341279	000 16-25-629/00 H341281			
3	1	Lower valve shaft		1.4404	000 16-25-553/42 H335372	000 16-25-528/42 H335373	000 16-25-628/42 H335374			
4	1	Valve seat		1.4404	000 16-37-814/43 H335366	000 16-37-815/43 H335367	000 16-37-816/43 H335368			
5	1	Seat ring		1.4404	000 16-00-832/42 H334441		000 16-00-833/42 H335872			
6	1	Yoke		1.4301	000 16-40-201/12 H335748		000 16-40-201/12 H335748			
7	1	Guide rod	8, 9, 19, 20	1.4404	000 16-25-563/00 H341309	000 16-25-538/00 H341308	000 16-25-638/00 H341310			
8	2	Retainer ring		1.4310		000 08-39-083/13 H14883				
9	1	O-ring 9.25 x 1.78		EPDM		000 58-06-029/64 H148388				
10	1	Middle seal		EPDM	000 58-33-998/93 H327602	000 58-33-997/93 H327985				
	1	Middle seal		HNBR	000 58-33-998/33 H332652	000 58-33-997/33 H332649				

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

		Date: 21.03.18		09.08.18		11.10.19		17.06.20		SPX FLOW	
		C.Keil		C.Keil		C.Keil		C.Keil			
		Reviewed:		Reviewed:		Reviewed:		Reviewed:			
		Date:		Date:		Date:		Date:		Page 8 of 11	
		Name:		Name:		Name:		Name:		RN 502.047.01	
		Reviewed:		Reviewed:		Reviewed:		Reviewed:			
Pos. Item	Quantity	Description	included to spare part (pos.)	Material	3" Reference no. Part no.	DN80 Reference no. Part no.	DN100 Reference no. Part no.	4" Reference no. Part no.	Reference no. Part no.	Reference no. Part no.	
10	1	Middle seal		FPM	000 58-33-998/73 H332653		000 58-33-997/73 H332648				
	2	Seat seal		EPDM	000 58-33-044/93 H149618		000 58-33-045/93 H149619				
11	2	Seat seal		HNBR	000 58-33-044/33 H168900		000 58-33-045/33 H168901				
	2	Seat seal		FPM	000 58-33-044/71 H326355		000 58-33-045/73 H153318				
	2	Housing seal		EPDM	000 58-33-542/93 H77543		000 58-33-642/93 H77583				
12	2	Housing seal		HNBR	000 58-33-542/33 H170075		000 58-33-642/33 H170074				
	2	Housing seal		FPM	000 58-33-542/71 H326353		000 58-33-642/73 H77582				
	2	Seat seal		EPDM	000 58-33-493/93 H77515		000 58-33-643/93 H77586				
13	2	Seat seal		HNBR	000 58-33-493/33 H166678		000 58-33-643/33 H166682				
	2	Seat seal		FPM	000 58-33-493/71 H326354		000 58-33-643/71 H336388				
14	2	Shaft seal		PTFE	000 58-33-105/23 H335232		000 58-33-305/23 H335934				
15	1	Quad ring		EPDM	000 58-01-329/63 H150898		000 58-01-238/63 H148387				
16	1	Guide ring		Iglidur A500		3A0 08-39-080/93 H320447					
17	1	Piston ring		Iglidur A500	000 58-01-610/99 H334863		000 58-01-612/99 H335702				
18	1	Quad ring 12,37x 2,62		EPDM		000 58-01-049/63 H311646					
19	1	Safety nut M10x1		A2		000 65-50-087/15 H118903					

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

		Date: 21.03.18		11.10.19		SPX FLOW				
		Name: C. Kell		Size-Si.						
		Reviewed:								
		Date:				Page 9 of 11				
		Name:				RN 502.047.01				
		Reviewed:								
Pos. Item	Quantity	Description	included to spare part (pos.)	Material	3" Reference no. Part no.	DN80 Reference no. Part no.	DN100 Reference no. Part no.	4" Reference no. Part no.	Reference no. Part no.	Reference no. Part no.
20	2	Square key DIN6885 - A - 3x3x10		A2	000 67-40-010/12 H335171					
21	1	Actuator	22, 23, 24	1.4301	000 29-02-200/17 H334430		000 29-02-210/17 H335883			
22	2	O-ring 30 x 2,5		NBR		000 58-06-113/83 H337897				
23	2	Actuator screw		Iglidur J350		000 16-28-330/93 H334376				
24	2	V-seal		NBR		000 58-01-600/73 H334379				
25	3	W-union G1/8" Ø6mm		hard nickel-plated		000 08-60-750/93 H208825				
26	1	Stop screw		Grivory		000 16-28-340/39 H334382				
27	1	Safety nut D3		1.4301		000 65-50-137/15 H147640				
28	1	Lock washer D4		1.4301		000 67-03-030/12 H335172				
29	1	Thrust ring		1.4057		000 08-48-106/12 H123151				
30	8	Hex. screw M8 x 16		A2		000 65-01-081/15 H78772				
31	1	Yoke cover DA4	32	1.4301	000 16-40-221/00 H341315		000 16-40-225/00 H341316			
32	4	Savetix head screw M4 x 8 washer M4 as set		1.4301		000 65-06-010/12 H336707				
33										
34	1	O-ring		EPDM	000 58-06-295/64 H77039		000 58-06-490/63 H77061			
35	1	Venting plug G-1/8"		PE-Hard		000 08-74-014/93 H16507				

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Spare parts list

Double seat mix proof valve DA4 1.5" - 4"; DN 40 - 100

		Date: 21.03.18		11.10.19		SPX FLOW			
		Name: C. Kell		Size-Si.					
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		Name:				RN 502.047.01			
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Pos. Item	Quantity	Description	included to spare part (pos.)	Material	3" Reference no. Part no.	DN80 Reference no. Part no.	DN100 Reference no. Part no.	4" Reference no. Part no.	Reference no. Part no.
36	1	Spray connection DE3		PP	000 09-40-114/93 H168321		000 09-40-115/93 H168322		
37	1	G-union 8x1-G1/8"		PVDF-black		000 08-63-003/13 H16388			
38	1	CU4 D4 adapter compl.		PA6.6 GF30 black		000 08-46-646/93 H16388			
	1	CU4plus D4 V1 adapter compl.		PA6.6 GF30 black		000 08-46-666/93 H336441			
39	1	CU43 D4 DC ø6mm		PA 6.6 GF30 black		000 08-45-381/93 H336955			
	1	CU43 D4 M12 DC ø6mm		PA6.6 GF30 black		000 08-45-571/93 H341343			
	1	CU43 D4 AS-i Ext. Ø6mm		PA 6.6 GF30 black		000 08-45-383/93 H336957			
	1	CU43 D4 M12 AS-i Ext. ø6mm		PA6.6 GF30 black		000 08-45-387/93 H338897			
	1	CU43 D4 AS-i Std. ø6mm		PA 6.6 GF30 black		000 08-45-385/93 H338152			
	1	CU43 D4 M12 AS-i Std. ø6mm		PA 6.6 GF30 black		000 08-45-391/93 H338899			
40	1	CU43plus D4 V1 AS-i Ext. ø6mm		PA6.6 GF30 black		000 08-45-556/93 H338820			
	1	CU43plus D4 V1 M12 AS-i Ext. ø6mm		PA6.6 GF30 black		000 08-45-341/93 H338865			
40	1	Prox. switch holder D4 compl.		PA 6.6 GF30 black		000 16-33-050/93 H336751			
41	1	Operating cam D4 top		1.4523 / 444FR		000 08-60-460/99 H334387			
42	1	Operating cam D4 bottom		1.4523 / 444FR		000 08-60-461/99 H334386			
43	4	Hex. screw M8x40		A2-70		000 65-01-086/15 H336675			

APV DA4

DOUBLE SEAT MIX PROOF VALVE



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