

Operating Manual

DELTA SW4

Single Seat and Change-over Valve



Read and understand this manual prior to operating or servicing this product.



Declaration of Conformity for Valves and Valve Manifolds

APV Rosista GmbH, Zechenstr. 49, D-59425 Unna-Königsborn
as manufacturer with sole responsibility declares that the

**double seat valves of the series D2, SD4, SDT4, SDM4, SWcip4, DSV,
DA3, DE3, DEU3, DET3, DKR2, DKRT2, DKRH2**
in the nominal diameters DN 25 - 150, 1" - 6" and 1 Sh5 - 6 Sh5

butterfly valves of the series SV1 and SVS 1 F
in the nominal diameters DN 25 - 100, DN 125 - 250 and 1" - 4"

ball cocks of the series KH, KHV
in the nominal diameters DN 15 - 100

**single seat, diaphragm and spring loaded valves of the series
S2, SW4, SWmini4, SWT4, M3, MF3, M4, MF4, MP4, MS4, AP1, APT1, CPV, RG4,
RGM4, RGE4, RGEM4, PR2, PR3, PR4, SI2, UF3, VRA, VRAH**
in the nominal diameters DN 10 - 150, 1/2" - 4" and 1 Sh5 - 6 Sh5


and the valve manifolds installed thereof

meet the requirements of the Directives 89/392/EEC (amendment 93/44/EEC),
replaced by 98/37/EC and GSG - 9.GSGV.

For official inspections, APV Rosista GmbH presents
a technical documentation according to appendix V 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 remaining risks
as well as an operating manual with safety instructions.

The conformity of the valves and valve manifolds is guaranteed.

D-59425 Unna-Königsborn, June 04, 2008
APV Rosista GmbH



Manager Research and Development

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1. General Terms

This operating 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 operating manual.

Descriptions and data given herein are subject to technical changes.

2. Safety Instructions



- **DANGER!**
- The technical safety symbol draws your attention to important directions for operating safety. You will find it wherever the activities described are bearing risks of personal injury.
- Separate electric and pneumatic connections.
- **Depressurize** the line system before any maintenance work. Clean the valve if possible and drain residual liquids.



- **Do not reach into the open valve.**
Risk of injury by suddenly operating valve. In dismantled state there is the risk of bruising at movable parts of the valve.
- Observe Service Instructions to ensure safe maintenance of the valve.
- **Attention!**
With valve design NC (normally closed): Before releasing the housing clamp connection, the valve insert must be relieved by controlling the actuator.
- **Attention!**
Welded actuators are preloaded by spring force.



**Opening of the actuators is strictly forbidden.
Danger to life!**

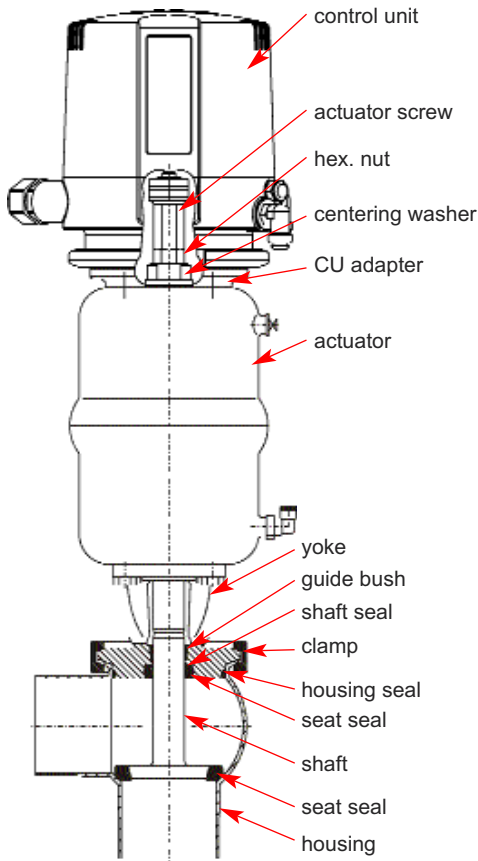
Actuators which are no longer used and / or defective must be disposed in professional manner.

Defective actuators must be returned to your APV Solutions & Services company for their professional disposal and free of charge for you.

Please address to your local APV representative.

3. Mode of Operation

Single seat valve



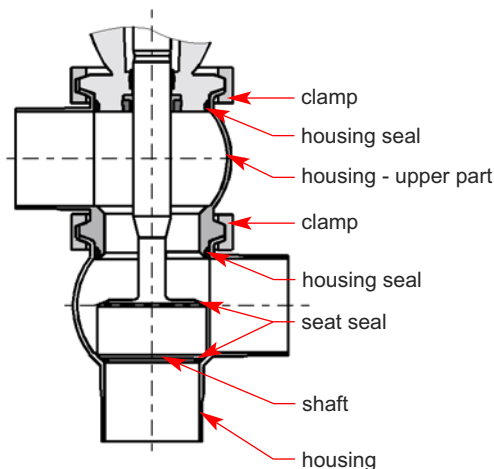
Single seat and change-over valves DELTA SW4 have been developed for use in the brewing and beverage, dairy and food industries as well as for chemical and pharmaceutical applications.

The valves are designed for universal applications and stand out for their increased mechanical reliability and absolute ease of service.

The field of application of the DELTA SW4 - valve is to shut off and to change over line sections.

- Operation by pneumatic actuator with air connection, reset by spring force.
- By different assembly of the actuator, the following designs are possible:
 - NC:** actuator normally closed / air-to-raise, spring-to-lower
 - NO:** actuator normally open / air-to-lower, spring-to-raise
- The inner parts of the actuator need not be serviced.
- The cleaning of the inner valve is undertaken during CIP cleaning of the line system.
- The standard SW4 valve is equipped with a control unit DELTA CU 41 Direct Connect.
- The luminous diodes in the control unit indicate the position of the valve shaft.

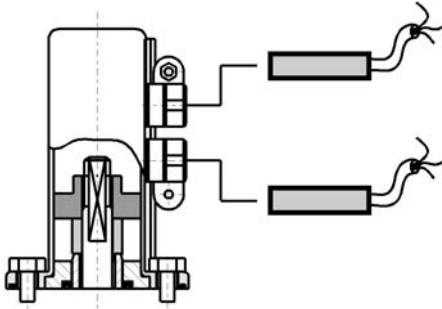
Change-over valve



4. Auxiliary Equipment

fig. 4.1.

valve position indication



4.1. Valve position indication (fig. 4.1.)

- Alternatively to the Control Unit, proximity switch holders (PSH) for the valve position indication can be mounted on the actuator. Proximity switches to signal the limit position of the valve seat can be installed at the proximity switch holder if required.

We recommend to use our APV standard type:

Three-wire proximity switch

Operating distance: 5mm / diameter: 11mm

Operating voltage: 10 - 30 V DC

pnp positive switching, closing function

Installation „non-flush“

Using a valve position indicator other than APV, we cannot accept any liability for a faultless function.

fig. 4.2.

CU3 Control Unit



CU4 Control Unit



4.2 Control Unit (fig. 4.2.)

For the start-up as well as assembly and disassembly of the different designs please use the respective manual.

The following different designs are available:

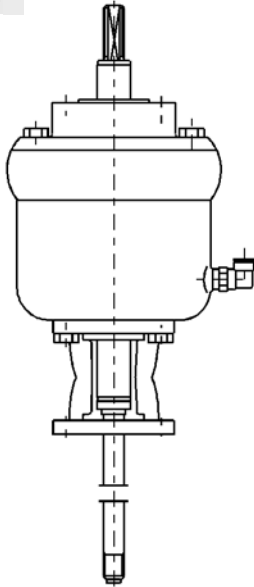
Direct Connect reference number:	CU41-S-Direct Connect 08 - 45 - 100/93; H320460
Profibus reference number:	CU31-Profibus 08 - 45 - 001/93; H315495
Device Net reference number:	CU31 Device Net 16 - 31 - 240/93; H209422
AS-Interface 2.1 reference number:	CU31 AS-interface 2.1 08 - 45 - 020/93; H315507

- An adapter is required to install the control unit on the SW4 valve.

Benennung: reference number:	CU3 - adapter SW4 / M4 08-48-480/93; H315806
Benennung: reference number:	CU4-S-adapter for DN25/1"-100/4" 08-48-600/93; H320474

4. Auxiliary Equipment

fig. 4.3.



4.3. Stroke limitation SW4 / M4 (fig. 4.3.)

The pneumatic stroke limitation provides for the continuous adjustment of the total valve stroke of 0 - 100%. The pneumatic stroke limitation is installed on the actuator.

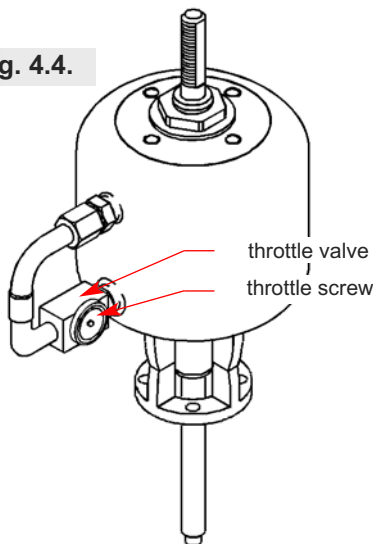
- The valve disc can be in three different positions: **open, throttled and closed.**
- The stroke limitation can only be applied with valve design NC (FS) = normally closed.

To operate the pneumatic stroke limitation a separate control is required.

The control unit CU43-S-2 Hall sensors - Direct Connect can be used for this purpose.

Control Unit + Adapter	
Designation:	CU43-S-2 Hall sensors - Direct Connect
reference number:	000 08-45-106/93; H320466
Designation:	CU4-S-adapter complete
reference number:	000 08-48-600/93; H320474

fig. 4.4.



4.4. Oil dampening cylinder (fig. 4.4.)

The oil dampening cylinder provides for a slow opening and closing of the valve (to prevent pressure hammers in the line system). The oil dampener is installed between the actuator and the Control Unit.

- Function:
A throttling valve presses the oil from one chamber of the dampening cylinder into the second chamber of the cylinder during the switching process. By adjustment of the throttling screw, the required delay can be variably adjusted.

4.5 SW4 variants

The SW4 range contains the following designs:

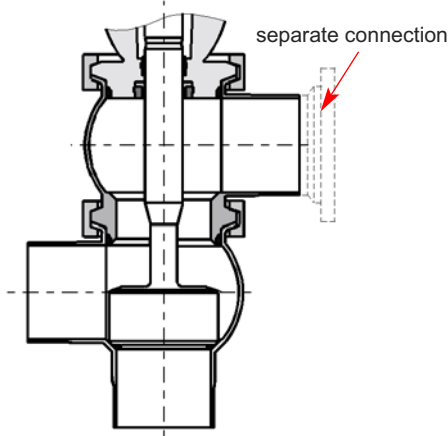
- DELTA SW4 - DN125-150
- DELTA SW4 with manual actuation
- DELTA SWT4 - tank outlet valve
- DELTA SW4 - long stroke version
- DELTA SW4 -DPF (with steam chamber)
- DELTA SWR4 (with modulating cone).

Corresponding manuals are available for the different designs.

5. Installation

fig. 5.

change-over valve



- The installation of the valve must be undertaken in such a manner that fluids can drain off the valve housing and should be provided preferably in vertical position.
- **Single seat valve :** The valve housing can be welded direct into the pipeline (completely dismantable valve insert).
- **Change-over valve :** Through a flange or clamp connection, the upper housing of change-over valves is detachable from the pipeline. (see fig. 5).
- **Attention :** **Observe Welding Instructions.** (see chapter 5.2)

5.1 Connections:

Besides the housings with weld ends, the following connections are alternatively available:

- male part to DIN 11851
- male part IDF / ISS to ISO 2853
- male part RJT to BS 4825-5
- male part SMS
- male part to DS 722
- flange connection FGN1 DIN
- flange connection FGN1 Zoll
- clamp connection to DIN 32676
- clamp connection to ISO 2852

5. Installation

5.2. Welding Instructions

Shut-off valve:

- Before welding of the valve, the valve insert must be dismantled from the housing. Careful handling to avoid damage to the parts is necessary.

Change-over valve:

- Before welding of the valves, the valve insert must be dismantled from the housing. The lower housing seal must be removed. Careful handling to avoid damage to the parts is necessary.
- Welding should only be carried out by certified welders (EN 287-1). (Seam quality EN 25817 "B").
- 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 best!
- After welding of the valve housings or of the mating flanges and after work at the pipelines, the corresponding parts of the installation or pipelines must be cleaned from welding residues and soiling. If these cleaning instructions are not observed, welding residues and dirt particles can settle in the valve and cause damage.
- Any damage resulting from the non-observance of these welding instructions is not subject to our guarantee.

6. Dimensions / Weights

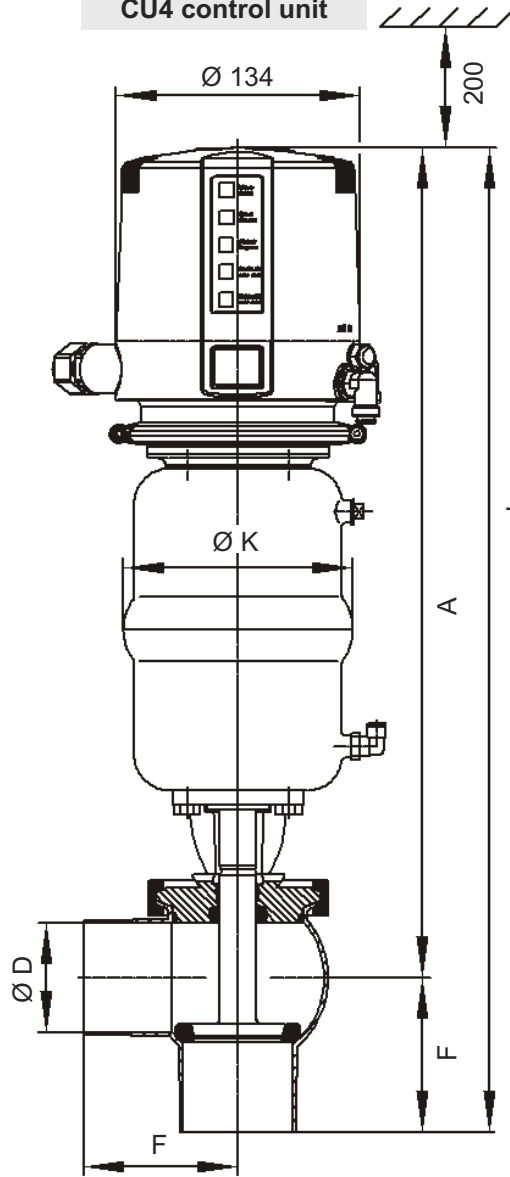
6.1. Single seat valve

housing design

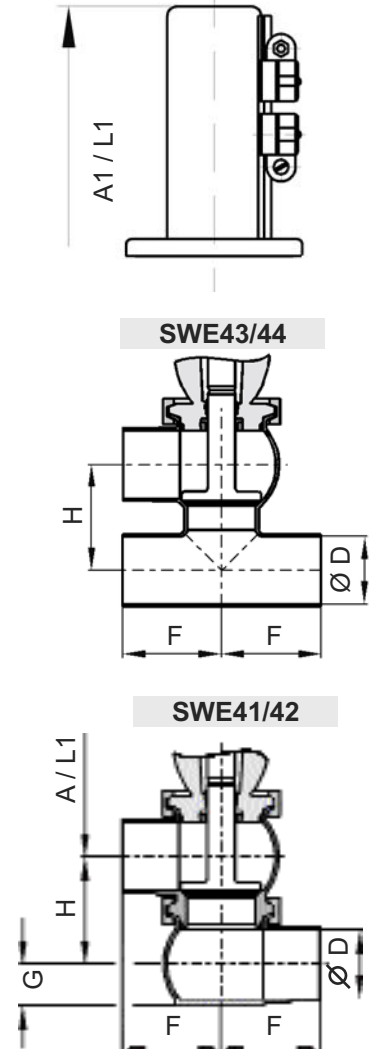


dimensions in mm

single seat valve with
CU4 control unit



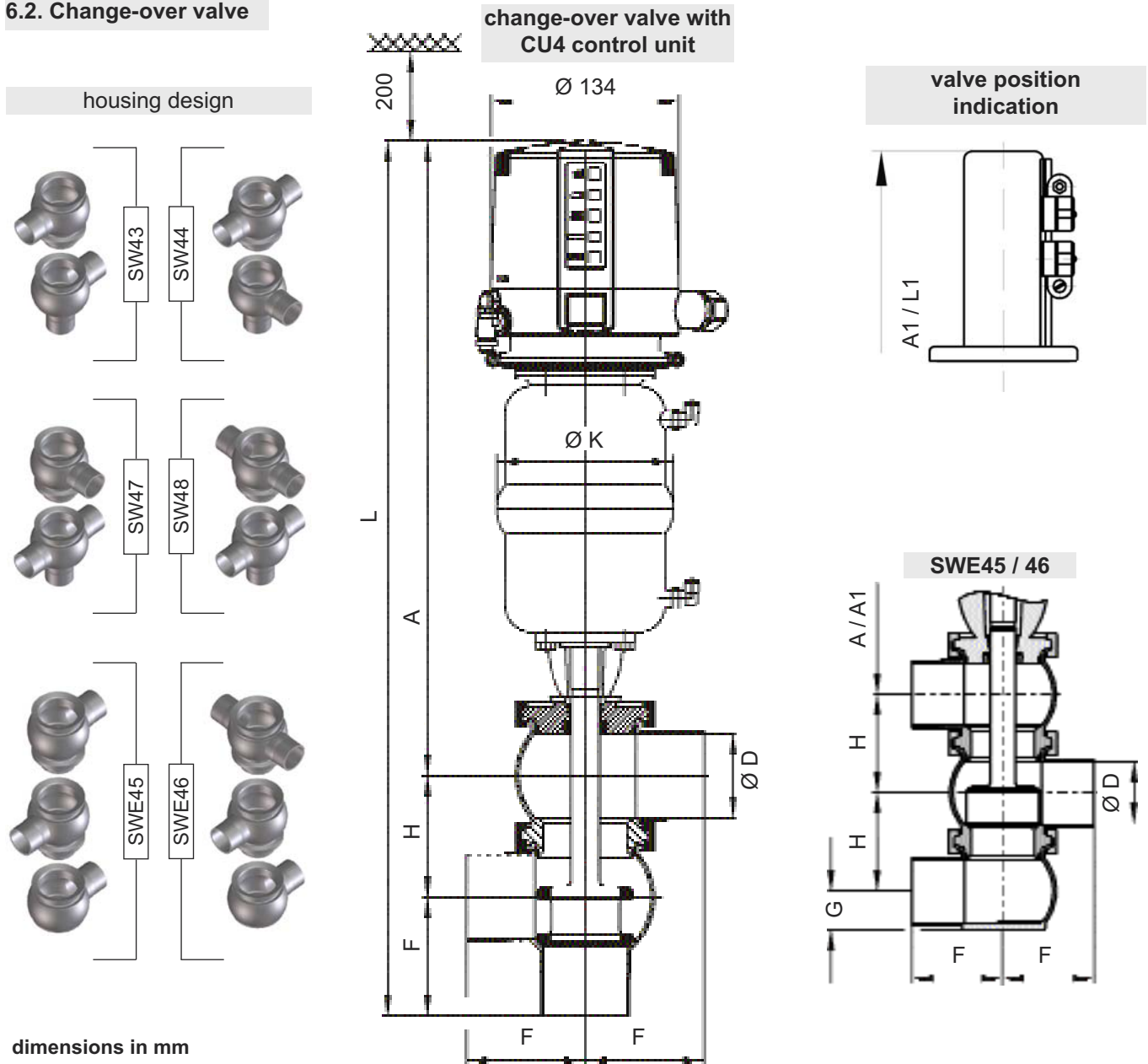
valve position
indication



DN	A	L	Ø D	F	G	H	Ø K	A1	L1	weight in kg
25	410	460	26	50	18	54	86	338	442	5
40	414	481	38	67	24	66	86	342	475	5
50	451	523	50	72	32	78	126	379	529	7
65	459	544	66	85	40	94	126	387	566	7
80	512	610	81	98	47,5	109	189	440	647	13
100	522	633	100	111	57	128	189	450	689	15
Inch										
1"	408	458	22,6	50	16,3	50,6	86	336	437	5
1,5"	412	479	34,9	67	22,5	62,9	86	340	470	5
2"	450	522	47,6	72	30,8	75,6	126	378	526	7
2,5"	456	541	60,3	85	37,2	88,3	126	384	557	7
3"	507	605	72,9	98	43,5	100,9	189	435	626	13
4"	520	631	97,6	111	55,8	125,6	189	448	685	15

6. Dimensions / Weights

6.2. Change-over valve



DN	A	L	Ø D	F	G	H	Ø K	A1	L1	weight in kg
25	410	460	26	50	18	54	86	338	442	6
40	414	481	38	67	24	66	86	342	475	6
50	451	523	50	72	32	78	126	379	529	8
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4"	520	631	97,6	111	55,8	125,6	189	448	685	17

7. Technical Data

7.1. General data

product-wetted parts:	316 L, 1.4404
other parts:	1.4301
seals: standard:	EPDM
option:	HNBR, VMQ, HNBR
max. product pressure:	10 bar
max. operating temperature:	135°C EPDM, HNBR *FPM, *VMQ
short-term load:	140°C EPDM, HNBR *FPM, *VMQ *(no steam)
air connection (for hose) :	6 x 1mm
max. pneumatic air pressure:	8 bar
min. pneumatic air pressure:	6 bar

(Use dry and clean pneumatic air, only.)

7.2. Specification of compressed air quality

compressed air quality: quality class acc. to DIN/ISO 8573-1

content of solid particles: **quality class 3**
max. size of solid particles per m³
10000 of 0,5µm <d<1,0µm
500 of 1,0µm <d<5,0µm

content of water: **quality class 4**
max. dew point temperature + 3°C
For installations at lower temperatures or at higher altitudes, additional measures must be considered to reduce the pressure dew point accordingly.

content of oil: **quality class 1**
max. 0,01mg/m³

(The oil applied must be compatible with Polyurethane elastomer materials.)

7. Technical Data

7.3. Closing times for single seat and change-over valve DELTA SW4

The opening and closing times of the valves equipped with a control unit can be determined by adjusting the throttle screw at the solenoid valve.

Closing times in sec. Pneumatic air 6 bar			
		hose length in meter	
DN	Inch	1m	10m
25	1"	1	2
40	1,5"	1	2
50	2"	3	4
65	2,5"	3	4
80	3"	5	6
100	4"	5	6

7.4. DELTA SW4 Valve stroke in mm

DN	Inch	single-seat valve SW41, SW42 SWE41, 42, 43, 44	change-over valve SW43, SW44 SWE45, 46
25	1"	12	9
40	1,5"	25	22
50	2"	28	25
65	2,5"	28	25
80	3"	28	25
100	4"	28	25

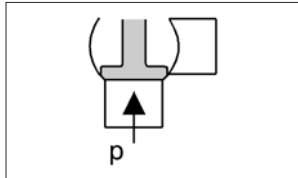
7.5. DELTA SW4 Pneumatic air consumption at 6 bar control pressure

actuator	per stroke NL
Ø 74mm	1,0
Ø 110mm	2,1
Ø 165mm	4,5

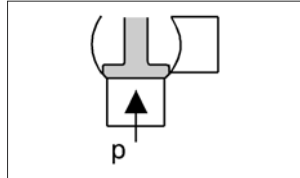
7. Technical Data

7.6. DELTA SW4 calculatory product pressure in (bar) at 6 bar control air pressure

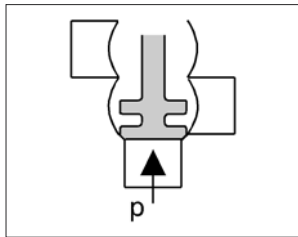
single seat valve
SW41 FS



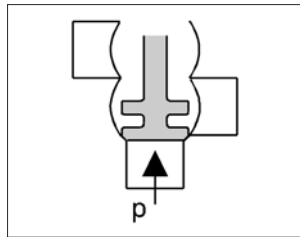
single seat valve
SW41 NO with
6 bar air pressure



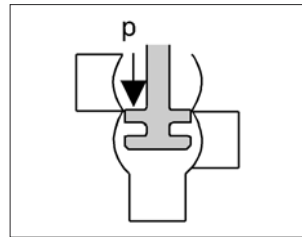
change-over valve
SW43 NC
lower seat



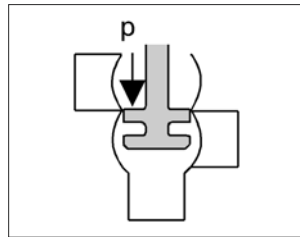
change-over valve
SW43 NO with
6 bar air pressure



change-over valve
SW43 NC upper seat
with 6 bar air pressure



change-over valve
SW43 NO
upper seat



		Ø actuator in mm		
DN	Inch	Ø 74	Ø 110	Ø 165
25	1"	11,7		
40	1,5"	5,0	12,5	
50	2"	2,8	7,6	19,6
	2,5"	2,0	5,4	13,8
65		1,7	5,0	11,7
	3"		3,8	9,9
80			3,1	7,9
100	4"		2,1	5,3

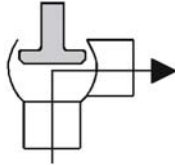
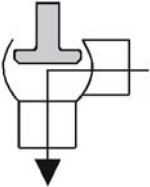
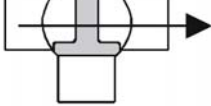
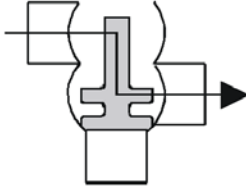
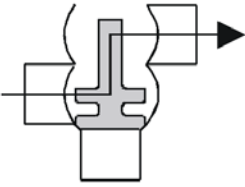
Ø actuator in mm		
Ø 74	Ø 110	Ø 165
11,2		
5,4	11,2	
3,4	7,1	16,8
2,4	5,0	11,9
2,0	5,0	10,0
	3,6	8,5
	2,9	6,8
	1,9	5,0

Ø actuator in mm		
Ø 74	Ø 110	Ø 165
20,3		
6,9	14,4	
4,0	8,3	19,5
2,7	5,5	13,1
2,2	5,0	10,9
	3,8	9,1
	3,0	7,2
	2,0	5,0

Ø actuator in mm		
Ø 74	Ø 110	Ø 165
21,2		
6,0	16,0	
3,3	8,8	22,8
2,2	6,0	15,3
1,8	5,0	12,7
	4,1	10,6
	3,3	8,4
	2,1	5,5

7. Technical Data

7.7. DELTA SW4 kvs - values in m³ / h

	SW41, 42 SWE41, 42 SWE43, 44	SW41, 42 SWE41, 42 SWE43, 44	SW42 SWE42 SW44	SW43, 44 SW47, 48	SW43, 44 SW47, 48
					
DN					
25	20	21	28	14	13
40	45	53	60	33	31
50	92	85	120	58	51
65	159	159	215	100	89
80	201	209	350	160	137
100	302	325	540	245	212
Inch					
1"	16	18	26	10	10
1,5"	38	45	57	30	28
2"	83	77	118	54	49
2,5"	133	133	185	87	76
3"	176	176	300	137	114
4"	292	310	530	225	210

8. Maintenance

- The **maintenance intervals** depend on the corresponding application and are to be determined by the operator himself carrying out **temporary checks**.
- The valve must not be cleaned with products containing abrasive or polishing material.
Especially the valve shaft must not, under any circumstances, be cleaned with such agents.
Damage of the valve shaft can lead to leakages.



- Required tools :
 - 1x wrench SW13
 - 1x wrench SW17
 - 1x wrench SW19
 - 1x wrench SW30
 - assembly tool for seat seal (see chapter 12.)
- Exchange of seals is done according to service instructions. A customer stock keeping of spare seals is recommended. For the valve service we supply complete seal kits including seal grease (see spare parts lists).
- Assembly of the valve and change of the valve design **NC or NO** according to service instructions.
- **Slightly grease all seals before their installation !!!!!**

Recommendation:

APV food-grade-grease for EPDM, HNBR, FPM and NBR

(0,75 kg/tin - ref.-No. 000 70-01-019/93)

(60 g/tube - ref.-No. 000 70-01-018/93)

or

APV food-grade-grease for VMQ

(0,6 kg/tin - ref.-No. 000 70-01-017/93)

(60 g/tube - ref.-No. 000 70-01-016/93)

- !!! Do **not use** grease containing **mineral oil** for **EPDM** seals.
- !!! Do **not use Silicone-based** grease for **VMQ** seals.

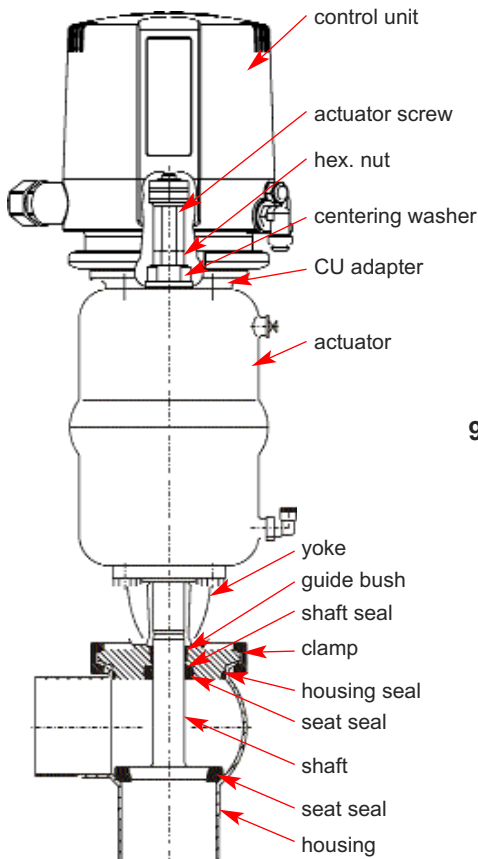
9. Service Instructions - Single Seat Valve

Single seat valves

DELTA SW41, SW42, SWE41, SWE42, SWE43, SWE44

9.1. Disassembly from the line system

single seat valve



1. Shut off line pressure and drain lines if possible.

2. **Valve design NC: Control actuator with air!**



**Do not touch movable valve parts!
Risk of injury.**

3. Detach clamp and lift valve insert off the housing.

4. Shut off compressed air and remove compressed air supply.

5. Take control unit off the actuator.

9.2. Dismantling of wear parts (product-wetted parts)

1. Remove housing seal.

2. Release actuator screw from the guide rod.
Remove the CU adapter.

3. Release the safety nut by holding the centering washer.
Remove the centering washer.

4. Pull the valve shaft out of the actuator.
Remove the seat seal.

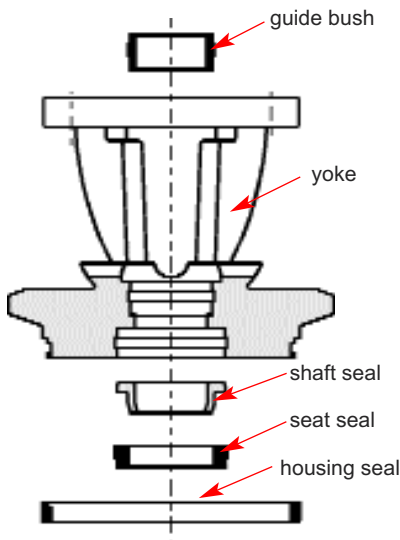
5. Unscrew the yoke from the actuator.

6. Detach the seat seal, shaft seal and guide bush.

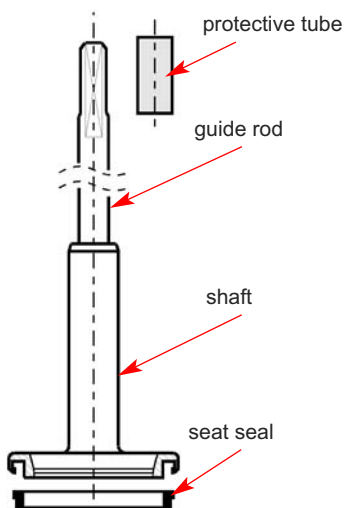
9. Service Instructions - Single Seat Valve

9.3. Installation of seals and assembly of valve


fig. 9.3.1.



1. Insert the guide bush into the yoke. Afterwards, insert the shaft seal and press in the slightly greased seat seal (see fig. 9.3.1.). **See to the correct installing position.**
2. Install the yoke at the actuator.
3. Insert the seat seal into the shaft. Use the assembly tool to install the seat seal (see **chapter 12**). Grease the seat seal only slightly before its installation. In case of manual installation, vent the seal groove with a thin object between the seal and groove wall.
4. Install the protective tube via the thread of the guide rod. Slide the shaft through the yoke and actuator, place centering washer and tighten it with the safety nut. Hold up the centering washer during this process. **Tightening torque 40 Nm.**
5. Slightly grease the housing seal and place it in the groove of the yoke.
6. Install the adapter for the control unit on the actuator. Apply a drop of a screw locker (e.g. type: Loctite semi-solid) in the area of the threaded bore of the actuator screw. Fasten actuator screw on the guide rod.



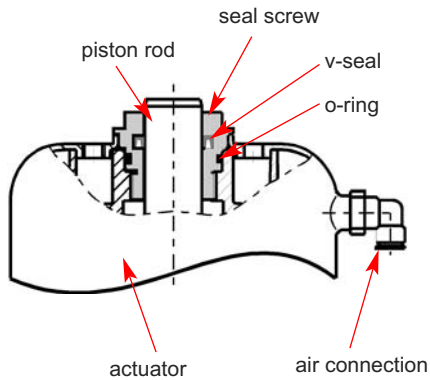
9.4. Assembly of valve

1. Fasten the control unit.
 2. Connect compressed air supply.
 3. **Valve design NC:** **Control actuator with air.**
- 

Do not touch movable valve parts!
Risk of injury by sudden valve operation.
4. Place the valve insert carefully into the housing and fasten the clamp. The housing seal must not be damaged during the installation.
 5. **Valve design NC:** **Shut off compressed air.**
 6. **Check the basic adjustment of the valve position indication.**
 - The shift points can be adjusted by turning the positioning screw in the control unit.

10. Service Instructions - Actuator

10.1. Maintenance of actuator



1. Remove the air hoses from the actuator.
2. Remove inner hex. screws from the adapter of the control unit.
3. Unscrew the two seal screws with a spanner SW30 while holding up the actuator with a strap wrench.

10.2. Installation of seals and assembly of actuator

1. Install the greased o-rings and v-seals in the seal screws (**fig. 10.2**)
See to the correct installing direction of the v-seal.
2. Slide the seal screws over the piston rod at both sides of the actuator and tighten them.
3. Fasten the adapter for the Control Unit and the yoke on the actuator.

Attention: Observe position of adapter.

Attention: Consider the required valve design **NC** or **NO** during the installation of the adapter and yoke.
NC = normally closed / air-to-raise, spring-to-lower
NO = normally open / air-to-lower, spring-to-raise

4. Fasten the air hoses.

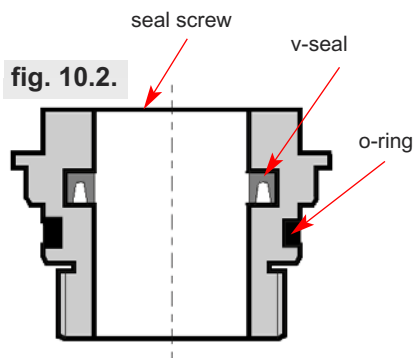
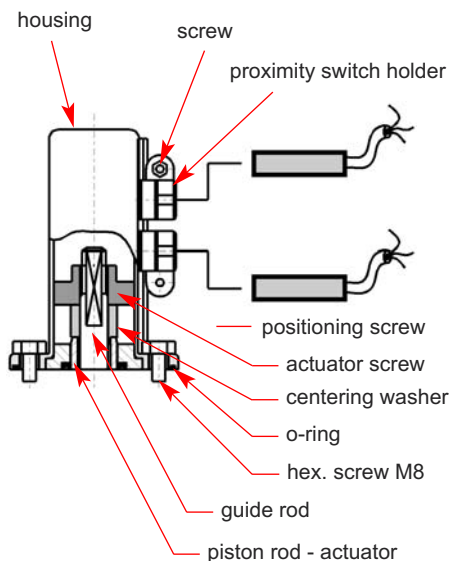


fig. 10.3.

10.3. Actuator with valve position indicator Assembly of holders (**fig. 10.3.**)



1. Install the **actuator screw** on the actuator.
2. Provide the housing with the o-ring.
3. Fasten the housing by means of the 4 hex. screws M8 on the actuator.
4. Release the screws at the proximity switch holder and insert the corresponding proximity switches. Then fasten the screws.
5. Place the actuator in one limit position.
6. Place the corresponding proximity switch in the corresponding position. Release the positioning screw and move the holder until the corresponding signal is indicated. Then continue the movement by 2 to 3 mm to secure indication. Fasten the positioning screw.
7. Place the actuator in the other limit position and carry out positioning of the second proximity switch.

11. Service Instructions - Change-over Valve

11.1. Disassembly from the line system

1. Shut off line pressure and drain lines if possible.
2. Release connection between the upper housing globe and the connected line.

3. **Valve design NC:** Control actuator with air.



Do not touch movable valve parts!
Risk of injury.

4. Remove the lower clamp.
5. Lift the valve insert together with the upper housing off the lower housing.

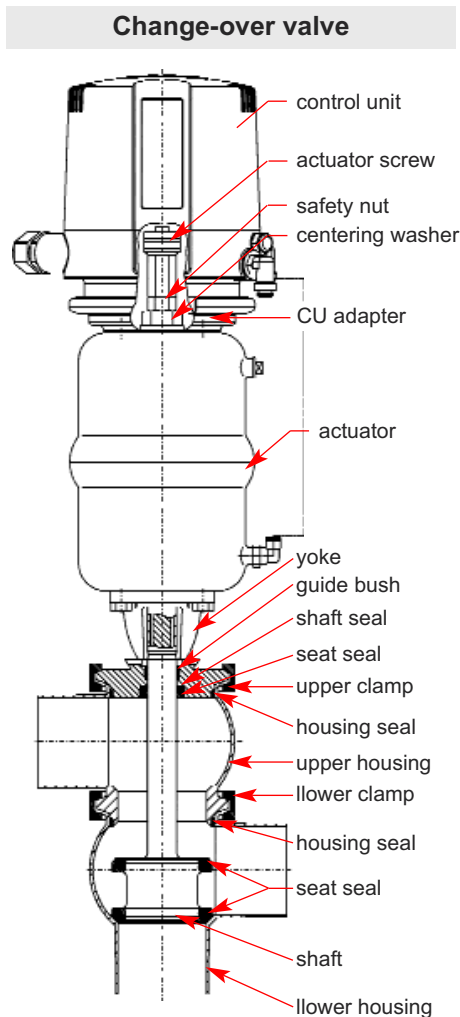
6. **Attention:** **Valve design NC:**
Shut off compressed air and remove compressed air supply.

7. Take control unit from the actuator.

11.2. Dismantling of product-wetted parts

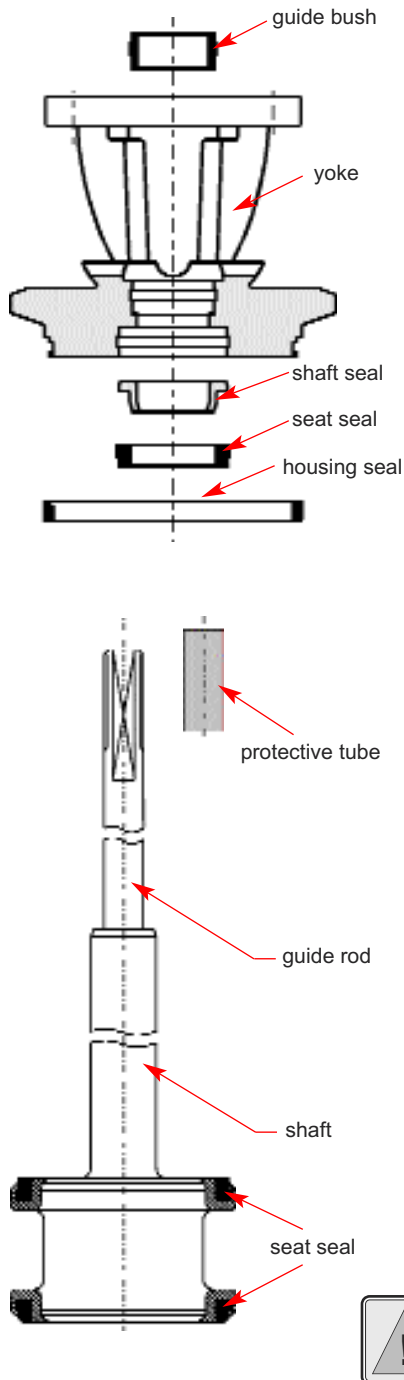
1. Unscrew the actuator screw from the guide rod.
Dismantle adapter of control unit.
2. **Attention:** **Valve design NC:**
Control valve with pneumatic air.
3. Unscrew the safety nut, while holding up the centering washer. Remove the centering washer.
Attention: **Valve design NC:**
Shut off valve with pneumatic air.
4. Take the shaft out of the actuator and remove the seat seals.
5. Detach the upper clamp and upper housing.
Remove the two housing seals.
6. Unscrew the yoke from the actuator.
7. Take off seat seals, shaft seal and guide bush.

Service of actuator, see section 10.1



11. Service Instructions - Change-over Valve

fig. 11.3.1.



11.3. Installation of seals and assembly of valve

1. Insert the guide bush into the yoke. Then place the shaft seal, press in the slightly greased seat seal.
See to the correct installing position.
2. Install the yoke at the actuator.
3. Insert the seat seal in the shaft. Use the APV assembly tool to install the seat seal, see chapter 12. Grease the seat seal only slightly before its installation. In case of manual installation, vent the seal groove with a thin object between seal and groove wall.
4. Slightly grease the housing seals and install them in the grooves of the yoke and of the upper housing. Fasten the upper housing at the yoke by means of the clamp.

**Attention: Valve design NC:
Control the valve with air.**

5. Slide the protective tube over the thread of the guide rod. Slide the shaft through the upper housing, yoke and actuator. Place the centering washer and tighten the safety nut. Hold up the safety washer during this process.
Tightening torque 40 Nm.

**6. Attention: Valve design NC:
Shut off pneumatic air.**

7. Install the control unit adapter on the actuator. Apply a drop of a screw locker (e.g. type: Loctite semi-solid) in the area of the threaded bore of the actuator screw. Screw the actuator screw on the guide rod.

11.4. Installation of valve

1. Place the control unit on the adapter and fasten it.
2. Connect the compressed air supply.
3. **Valve design NC: Control the actuator with air.**

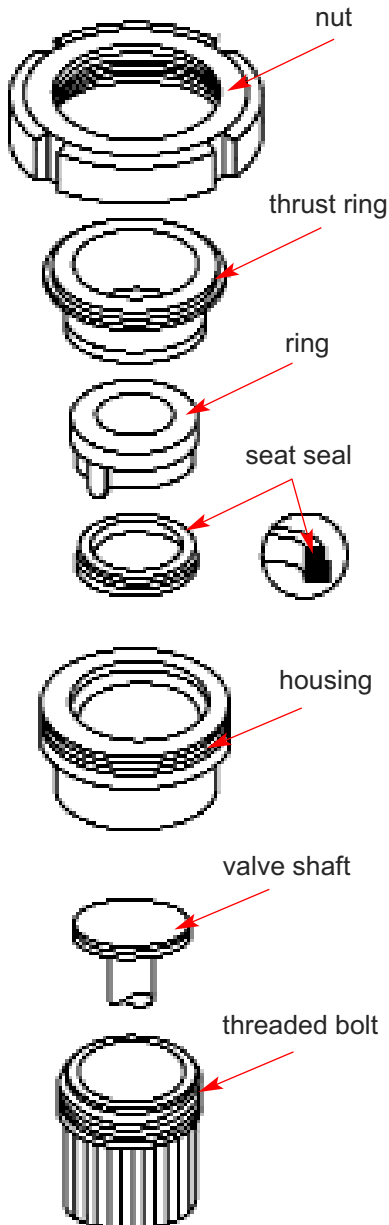
**Do not touch movable valve parts!
Risk of injury by sudden valve operation.**

4. Place the valve insert carefully into the lower housing and fasten the lower clamp. The housing seals must not be damaged during the installation.

5. Valve design NC: Shut off compressed air.

6. **Check the basic adjustment of the valve position indicator.**
 - The shift points can be adjusted by turning the positioning screws.

12. Assembly Tool



The assembly tool consists of:

- nut
- thrust ring
- ring with venting nose
- housing
- threaded bolt.

Installation of the seat seal in the valve shaft

1. Insert the valve shaft into the housing in such a way that the seal groove is in the housing.
2. Clamp the shaft into the housing by means of the threaded bolt. Clamp the housing into a vice.
3. Slightly grease the seat seal with APV food-grade grease. Then install the seal on the ring with the venting nose until it stops.
4. Introduce the ring with the installed seat seal into the housing and press it down until it stops sensibly.
5. Insert the thrust ring into the housing. Screw on the nut and tighten it with a hook spanner until it stops.
6. Release the nut. Take ring and thrust ring off the housing.
7. Take housing out of the vice, take off the threaded bolt. Detach the valve shaft from the housing.

Check the even fit of the seat seal.

Assembly tool for seat seal

To simplify the installation of the seat seal, the following assembly tools are available:

DN	Inch	reference number; ID No.
25	1"	000 51-13-110/17; H179465
40	1,5"	000 51-13-111/17; H179466
50	2"	000 51-13-112/17; H179467
	2,5"	000 51-13-120/17; H179468
65		000 51-13-113/17; H179469
	3"	000 51-13-121/17; H179470
80		000 51-13-114/17; H179471
100	4"	000 51-13-115/17; H179472

13. Reconstruction of Actuator

At SW4 valves, the size of the actuator can be changed.

Observe the respective line pressure, see table page 12, to increase or decrease the actuator sizes (Ø 74 mm, Ø 110 mm, Ø 165 mm).

13.1 Reconstruction of actuator Disassembly

1. Disassembly is carried out as described in chapter 9. for single seat valves and in chapter 10. for change-over valves.
2. To change the actuator size, the respective guide rod (4) must be replaced.
Clamp the valve disc in a vice.



Attention: **The valve disc must not be damaged (use protective cheeks or cleaning rags).**
Even inferior damage at the shaft rod can lead to leakages.



3. Turn the guide rod (4) out of the shaft by means of the centering washer (3) and a wrench SW17.

Assembly of actuator

1. Turn the respective guide rod into the shaft to the actuator.
Tightening torque 40 Nm
2. Further assembly is undertaken in reverse order.

14. Trouble Shooting

<i>Failure</i>	<i>Remedy</i>
Valve closed and pressure in upper housing	
Valve is untight.	Replace seat seals. Check line pressure: permissible line pressure see 7.
Leakage in the area of the clamp.	Replace housing seals.
Leakage at the upper valve shaft in the area of the valve yoke.	Replace shaft seal, seat seal and guide bush.
Actuator	
Air escapes from the actuator rod.	Replace complete seal screw for actuator.
Actuator does not work (air escapes permanently from the venting plug.)	Replace complete actuator.
Valve position indication	
Feedback is missing.	Carry out fine adjustment.

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.

To order a complete new SW4 valve, please use the the corresponding ordering sheet.

**DELTA SW4 - VALVE PROGRAMME
ORDERING SHEET FOR SW4 VALVES WITH FITTINGS**

BA SW4 0000002

ID-No.: H170733

Translation of original operating manual



rev. 3



Your local contact:



APV, An SPX Brand,
Zeichenstraße 49
D-59425 Unna

Phone: +49(0) 23 03/ 108-0 Fax: +49(0) 23 03 / 108-210

For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.apv.com.

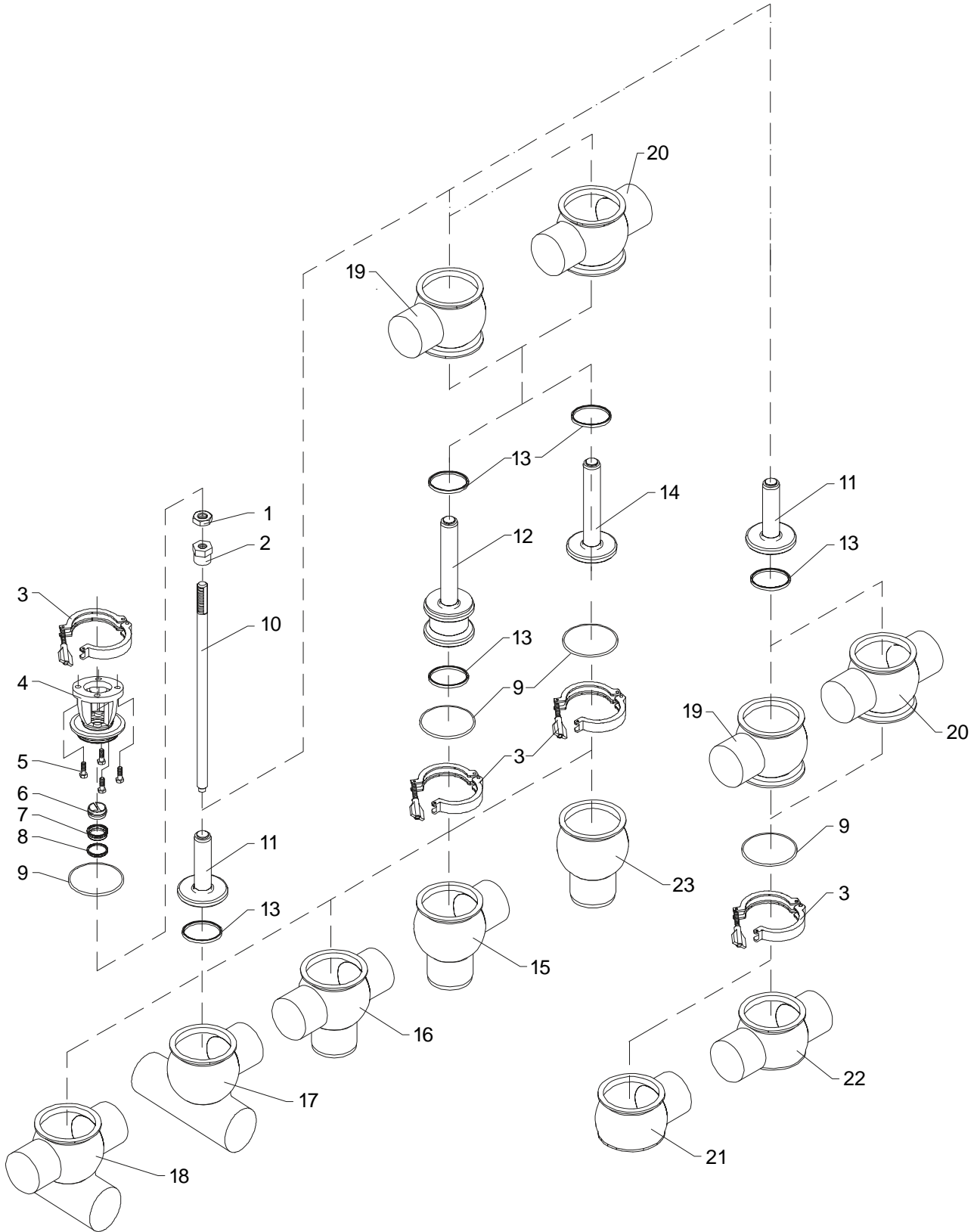
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15.1 Ventilgehäuse / Valve bodies

DN



15.1 Ventilgehäuse / Valve bodies

DN

Pos.	Stk./Qty.	Benennung	Description	DN25	DN40	DN50	DN65	DN80	DN100	
				Ws.-Nr. / Part No.						
1	1	Skt. Mutter	Nut	65-50-101/15	65-50-101/15	65-50-101/15	65-50-101/15	65-50-101/15	65-50-101/15	
2	1	Zentrierscheibe	Center washer	15-28-940/12	15-28-940/12	15-28-940/12	15-28-940/12	15-28-940/12	15-28-940/12	
3	1-2	Gelenkklemme	Clamp	42-40-287/12	42-40-387/12	42-40-437/12	42-40-487/12	42-40-537/12	42-40-637/12	
4	1	Laterne	Yoke	15-40-960/47	15-40-961/47	15-40-962/47	15-40-963/47	15-40-966/47	15-40-967/47	
5	4	Skt. Schraube	Screw	DIN EN 24017-M8x16-A2-70						DIN EN 24017-M8x20-A2-70
6	1	Führungsbuchse	Bushing	08-01-178/23	08-01-178/23	08-01-178/23	08-01-178/23	08-01-178/23	08-01-178/23	
7	1	Schaftdichtung	Shaft seal	58-33-150/26	58-33-150/26	58-33-150/26	58-33-150/26	58-33-150/26	58-33-150/26	
8	1	Tellerdichtung*	Seat seal	58-33-293/**	58-33-293/**	58-33-293/**	58-33-293/**	58-33-293/**	58-33-293/**	
9	1-2	Gehäusedichtung*	Housing seal	58-33-267/**	58-33-292/**	58-33-124/**	58-33-442/**	58-33-492/**	58-33-127/**	
10	1	Zugstange	Guide rod	15-23-850/12	15-23-850/12	15-23-851/12	15-23-851/12	15-23-852/12	15-23-852/12	
11	1	Schaft SW41	Shaft SW41	15-25-278/42	15-25-378/42	15-25-428/42	15-25-478/42	15-25-528/42	15-25-628/42	
12	1	Schaft SW43	Shaft SW43	15-25-279/42	15-25-379/42	15-25-429/42	15-25-479/42	15-25-529/42	15-25-629/42	
13	1-2	Tellerdichtung*	Seat seal	58-33-293/**	58-33-393/**	58-33-443/**	58-33-493/**	58-33-543/**	58-33-643/**	
14	1	Schaft SWT4	Shaft SWT4	15-25-280/42	15-25-380/42	15-25-430/42	15-25-480/42	15-25-530/42	15-25-630/42	
15	1	Gehäuse SW41	Housing SW41	15-60-290/47	15-60-390/47	15-60-440/47	15-60-490/47	15-60-540/47	15-60-640/47	
16	1	Gehäuse SW42	Housing SW42	15-61-290/47	15-61-390/47	15-61-440/47	15-61-490/47	15-61-540/47	15-61-640/47	
17	1	Gehäuse SWE43	Housing SWE43	15-66-280/47	15-66-380/47	15-66-430/47	15-66-480/47	15-66-530/47	15-66-630/47	
18	1	Gehäuse SWE44	Housing SWE44	15-67-280/47	15-67-380/47	15-67-430/47	15-67-480/47	15-67-530/47	15-67-630/47	
19	1	Geh.-Oberteil SW43	Hous.-upp. part SW43	15-62-001/47	15-62-002/47	15-62-003/47	15-62-004/47	15-62-005/47	15-62-006/47	
20	1	Geh.-Oberteil SW44	Hous.-upp. part SW44	15-63-001/47	15-63-002/47	15-63-003/47	15-63-004/47	15-63-005/47	15-63-006/47	
21	1	Geh.-Untert. SWE41	Hous.-low part SWE41	15-60-100/47	15-60-101/47	15-60-102/47	15-60-103/47	15-60-104/47	15-60-105/47	
22	1	Geh.-Untert. SWE48	Hous.-low part SWE48	15-65-281/47	15-65-381/47	15-65-431/47	15-65-481/47	15-65-531/47	15-65-631/47	
23	1	Kugelring SW41	Ball ring SW41	15-60-090/47	15-60-091/47	15-60-092/47	15-60-093/47	15-60-094/47	15-60-095/47	

** /33: HNBR; /73: FPM (Viton); /93: EPDM; /13: VMQ**

 *** Wenn die Tellerdichtung in VMQ ist, wird die Gehäusedichtung (Pos.9) in HNBR eingesetzt.
 When seat seals are made of VMQ (silicone), the body seal (pos. 9) is to be made of HNBR

 * Dichtungssatz für SW41 + SW42 / SWE43+ SWE44
 Seal kit for SW41 + SW42 / SWE43+ SWE44

Pos.	Stk./Qty.	Benennung	Description	DN25	DN40	DN50	DN65	DN80	DN100
				Ws.-Nr. / Part No.					
	1	Dichtungssatz FPM	Seal kit FPM	58-34-700/00	58-34-701/00	58-34-702/00	58-34-703/00	58-34-704/00	58-34-705/00
	1	Dichtungssatz EPDM	Seal kit EPDM	58-34-700/01	58-34-701/01	58-34-702/01	58-34-703/01	58-34-704/01	58-34-705/01
	1	Dichtungssatz VMQ	Seal kit VMQ	58-34-700/02	58-34-701/02	58-34-702/02	58-34-703/02	58-34-704/02	58-34-705/02
	1	Dichtungssatz HNBR	Seal kit HNBR	58-34-700/06	58-34-701/06	58-34-702/06	58-34-703/06	58-34-704/06	58-34-705/06

 * Dichtungssatz für SWE41 + SWE42
 Seal kit for SWE41 + SWE42

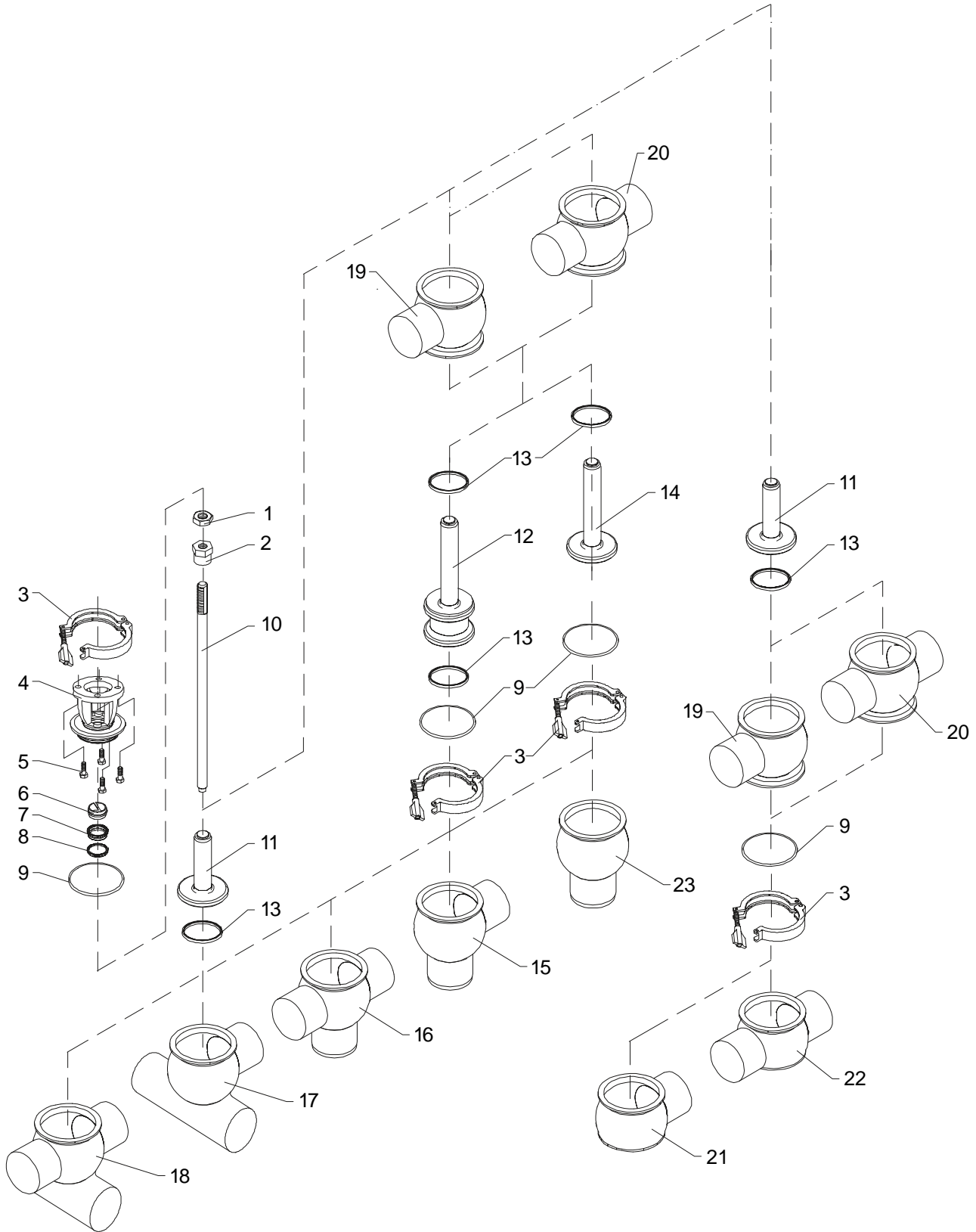
Pos.	Stk./Qty.	Benennung	Description	DN25	DN40	DN50	DN65	DN80	DN100
				Ws.-Nr. / Part No.					
	1	Dichtungssatz FPM	Seal kit FPM	58-34-715/00	58-34-716/00	58-34-717/00	58-34-718/00	58-34-719/00	58-34-720/00
	1	Dichtungssatz EPDM	Seal kit EPDM	58-34-715/01	58-34-716/01	58-34-717/01	58-34-718/01	58-34-719/01	58-34-720/01
	1	Dichtungssatz VMQ	Seal kit VMQ	58-34-715/02	58-34-716/02	58-34-717/02	58-34-718/02	58-34-719/02	58-34-720/02
	1	Dichtungssatz HNBR	Seal kit HNBR	58-34-715/06	58-34-716/06	58-34-717/06	58-34-718/06	58-34-719/06	58-34-720/06

 * Dichtungssatz für SW43 + SW44
 Seal kit for SW43 + SW44

Pos.	Stk./Qty.	Benennung	Description	DN25	DN40	DN50	DN65	DN80	DN100
				Ws.-Nr. / Part No.					
	1	Dichtungssatz FPM	Seal kit FPM	58-34-730/00	58-34-731/00	58-34-732/00	58-34-733/00	58-34-734/00	58-34-735/00
	1	Dichtungssatz EPDM	Seal kit EPDM	58-34-730/01	58-34-731/01	58-34-732/01	58-34-733/01	58-34-734/01	58-34-735/01
	1	Dichtungssatz VMQ	Seal kit VMQ	58-34-730/02	58-34-731/02	58-34-732/02	58-34-733/02	58-34-734/02	58-34-735/02
	1	Dichtungssatz HNBR	Seal kit HNBR	58-34-730/06	58-34-731/06	58-34-732/06	58-34-733/06	58-34-734/06	58-34-735/06

15.2 Ventilgehäuse / Valve bodies

Zoll / inch



15.2 Ventilgehäuse / Valve bodies

Zoll / inch

Pos.	Stk./Qty.	Benennung	Description	1"	1,5"	2"	2,5"	3"	4"	
				Ws. - Nr. / Part No.						
1	1	Skt. Mutter M12	Nut M12	65-50-101/15	65-50-101/15	65-50-101/15	65-50-101/15	65-50-101/15	65-50-101/15	
2	1	Zentrierscheibe SW4	Center washer SW4	15-28-940/12	15-28-940/12	15-28-940/12	15-28-940/12	15-28-940/12	15-28-940/12	
3	1-2	Gelenkklemme	Clamp	42-40-287/12	42-40-387/12	42-40-437/12	42-40-487/12	42-40-537/12	42-40-637/17	
4	1	Laterne	Yoke	15-40-960/47	15-40-961/47	15-40-962/47	15-40-964/47	15-40-965/47	15-40-967/47	
5	4	Skt. Schraube	Screw	DIN EN 24017-M8x16-A2-70				DIN EN 24017-M8x20-A2-70		
6	1	Führungsbuchse	Bushing	08-01-178/23	08-01-178/23	08-01-178/23	08-01-178/23	08-01-178/23	08-01-178/23	
7	1	Schaftdichtung	Shaft seal	58-33-150/23	58-33-150/23	58-33-150/23	58-33-150/23	58-33-150/23	58-33-150/23	
8	1	Tellerdichtung*	Seat seal	58-33-293/**	58-33-293/**	58-33-293/**	58-33-293/**	58-33-293/**	58-33-293/**	
9	1-2	Gehäusedichtung*	Housing seal	58-33-267/**	58-33-292/**	58-33-124/**	58-33-125/**	58-33-126/**	58-33-127/**	
10	1	Zugstange	Guide rod	15-23-850/12	15-23-850/12	15-23-851/12	15-23-851/12	15-23-852/12	15-23-852/12	
11	1	Schaft SW41	Shaft SW41	15-25-303/42	15-25-403/42	15-25-453/42	15-25-503/42	15-25-553/42	15-25-653/42	
12	1	Schaft SW43	Shaft SW43	15-25-304/42	15-25-404/42	15-25-454/42	15-25-504/42	15-25-554/42	15-25-654/42	
13	1-2	Tellerdichtung*	Seat seal	58-33-293/**	58-33-393/**	58-33-443/**	58-33-109/**	58-33-568/**	58-33-643/**	
14	1	Schaft SWT4	Shaft SWT4	15-25-305/42	15-25-405/42	15-25-455/42	15-25-505/42	15-25-555/42	15-25-655/42	
15	1	Gehäuse SW41	Housing SW41	15-60-315/47	15-60-415/47	15-60-465/47	15-60-515/47	15-60-565/47	15-60-665/47	
16	1	Gehäuse SW42	Housing SW42	15-61-315/47	15-61-415/47	15-61-465/47	15-61-515/47	15-61-565/47	15-61-665/47	
17	1	Gehäuse SWE43	Housing SWE43	15-66-305/47	15-66-405/47	15-66-455/47	15-66-505/47	15-66-555/47	15-66-655/47	
18	1	Gehäuse SWE44	Housing SWE44	15-67-305/47	15-67-405/47	15-67-455/47	15-67-505/47	15-67-555/47	15-67-655/47	
19	1	Geh.-Oberteil SW43	Hous.-upp. part SW43	15-62-010/47	15-62-011/47	15-62-012/47	15-62-013/47	15-62-014/47	15-62-015/47	
20	1	Geh.-Oberteil SW44	Hous.-upp. part SW44	15-63-010/47	15-63-011/47	15-63-012/47	15-63-013/47	15-63-014/47	15-63-015/47	
21	1	Geh.-Untert. SWE41	Hous.-low.part SWE41	15-60-110/47	15-60-111/47	15-60-112/47	15-60-113/47	15-60-114/47	15-60-115/47	
22	1	Geh.-Untert. SWE48	Hous.-low.part SWE48	15-65-306/47	15-65-406/47	15-65-456/47	15-65-506/47	15-65-556/47	15-65-656/47	
23	1	Kugelring SW41	Ball ring SW41	15-60-083/47	15-60-084/47	15-60-085/47	15-60-086/47	15-60-087/47	15-60-088/47	

** /33: HNBR; /73: FPM (Viton); /93: EPDM; /13: VMQ**

*** Wenn die Tellerdichtung in VMQ ist, wird die Gehäusedichtung (Pos.9) in HNBR eingesetzt.
When seat seals are made of VMQ (silicone), the body seal (pos. 9) is to be made of HNBR

* Dichtungssatz für SW41 + SW42 / SWE43+ SWE44
Seal kit for SW41 + SW42 / SWE43+ SWE44

Pos.	Stk./Qty.	Benennung	Description	1"	1,5"	2"	2,5"	3"	4"
				Ws. - Nr. / Part No.					
	1	Dichtungssatz FPM	Seal kit FPM	58-34-700/00	58-34-701/00	58-34-702/00	58-34-710/00	58-34-711/00	58-34-705/00
	1	Dichtungssatz EPDM	Seal kit EPDM	58-34-700/01	58-34-701/01	58-34-702/01	58-34-710/01	58-34-711/01	58-34-705/01
	1	Dichtungssatz VMQ	Seal kit VMQ	58-34-700/02	58-34-701/02	58-34-702/02	58-34-710/02	58-34-711/02	58-34-705/02
	1	Dichtungssatz HNBR	Seal kit HNBR	58-34-700/06	58-34-701/06	58-34-702/06	58-34-710/06	58-34-711/06	58-34-705/06

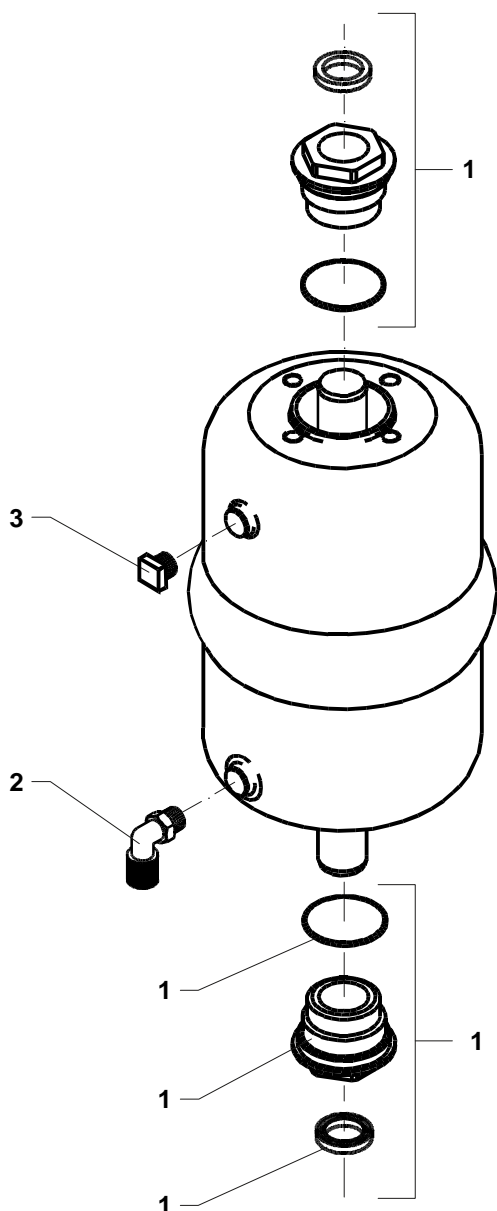
* Dichtungssatz für SWE41 + SWE42
Seal kit for SWE41 + SWE42

Pos.	Stk./Qty.	Benennung	Description	1"	1,5"	2"	2,5"	3"	4"
				Ws. - Nr. / Part No.					
	1	Dichtungssatz FPM	Seal kit FPM	58-34-715/00	58-34-716/00	58-34-717/00	58-34-725/00	58-34-726/00	58-34-720/00
	1	Dichtungssatz EPDM	Seal kit EPDM	58-34-715/01	58-34-716/01	58-34-717/01	58-34-725/01	58-34-726/01	58-34-720/01
	1	Dichtungssatz VMQ	Seal kit VMQ	58-34-715/02	58-34-716/02	58-34-717/02	58-34-725/02	58-34-726/02	58-34-720/02
	1	Dichtungssatz HNBR	Seal kit HNBR	58-34-715/06	58-34-716/06	58-34-717/06	58-34-725/06	58-34-726/06	58-34-720/06

* Dichtungssatz für SW43 + SW44
Seal kit for SW43 + SW44

Pos.	Stk./Qty.	Benennung	Description	1"	1,5"	2"	2,5"	3"	4"
				Ws. - Nr. / Part No.					
	1	Dichtungssatz FPM	Seal kit FPM	58-34-730/00	58-34-731/00	58-34-732/00	58-34-740/00	58-34-741/00	58-34-735/00
	1	Dichtungssatz EPDM	Seal kit EPDM	58-34-730/01	58-34-731/01	58-34-732/01	58-34-740/01	58-34-741/01	58-34-735/01
	1	Dichtungssatz VMQ	Seal kit VMQ	58-34-730/02	58-34-731/02	58-34-732/02	58-34-740/02	58-34-741/02	58-34-735/02
	1	Dichtungssatz HNBR	Seal kit HNBR	58-34-730/06	58-34-731/06	58-34-732/06	58-34-740/06	58-34-741/06	58-34-735/06

15.3 Steuerkopf / Actuator

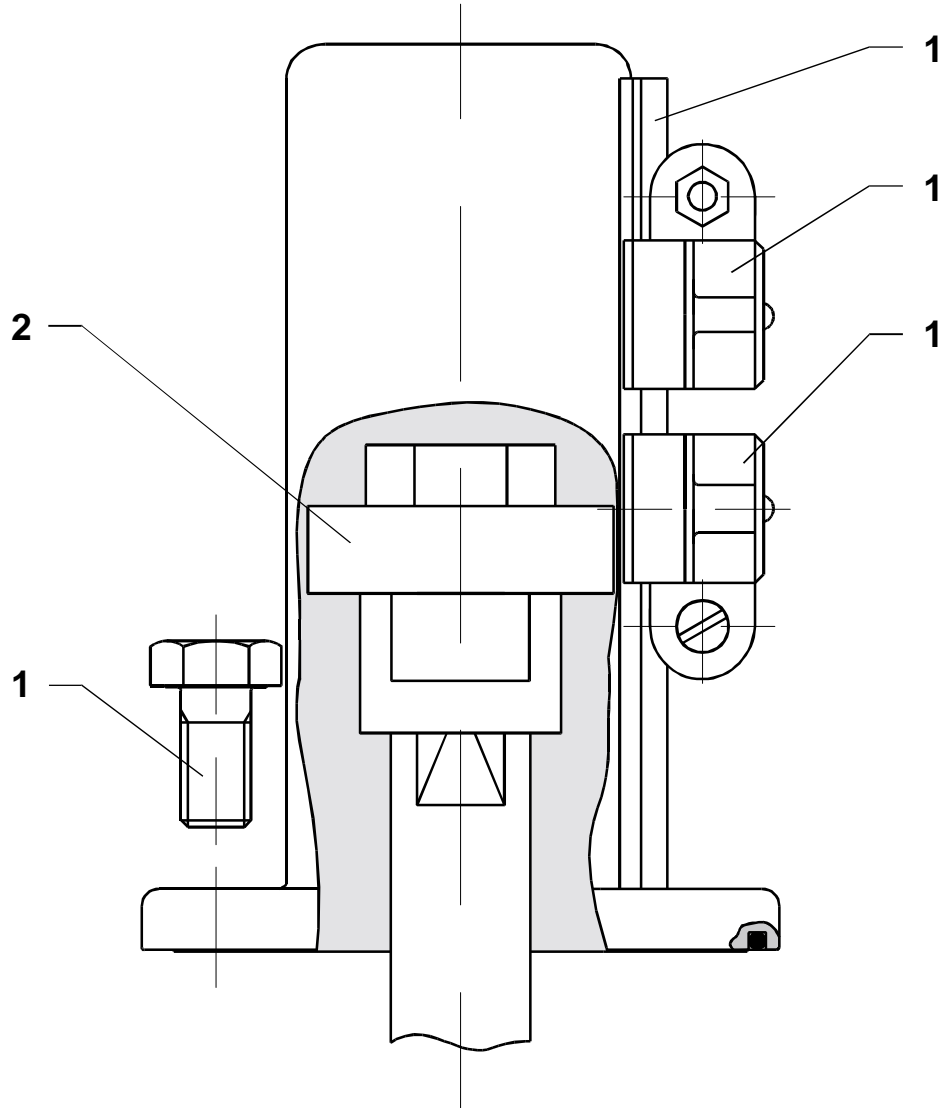


Pos.	Stk./Qty.	Benennung	Description	Ø74	Ø110	Ø165
				Ws.-Nr. / Part No.		
-	-	Steuerkopf kpl.	Actuator complete	15-32-050/17	15-32-051/17	15-32-052/17
-	-	Steuerkopf kpl. - Luft/Luft	Actuator complete Air/Air	15-32-085/17	15-32-086/17	15-32-087/17
1	2	Dichtungsschraube mit O-ring und V-Dichtung	Seal bearing with O-ring and V-seal	15-28-845/93	15-28-845/93	15-28-845/93
2*	1-2	Winkelverschraubung G1/8"	Elbow Connector G1/8"	08-60-750/93	08-60-750/93	08-60-750/93
3	1	Stopfen	Plug	08-60-005/93	08-60-005/93	08-60-005/93

* Der Steuerkopf kpl. und Steuerkopf kpl. Luft / Luft ist standardmäßig mit 2 x Winkelverschraubungen ausgerüstet.

* The actuator cpl. and actuator cpl. air/ air is designed with 2 x Elbow connector by standard.

15.4 Ventilstellungsmeldung mit Initiatorenhalterung Proximitybox with switch holder



Pos.	Stk./Qty.	Benennung	Description	DN 25 / 1"	DN 40 - 100 / 1,5" - 4"
				Ws.-Nr. / Part No.	
1	1	Ventilstellungsmeldung kpl.	Complete Proximitybox	15-33-932/93	15-33-932/93
2	1	Schaltnocke	Actuator screw	08-52-290/97	08-52-291/97

DELTA SW4 - VALVE PROGRAMME

ORDERING SHEET FOR SW4 VALVES WITH FITTINGS

Date & order number: _____

Customer & contact person: _____

Delivery address: _____

FAX number: _____



VALVE TYPE & SIZE: _____ Quantity: _____

Function: Valve Normally Closed / NC Valve Normally Open / NO

Elastomer Type: EPDM HNBR FPM VMQ (Silicone)

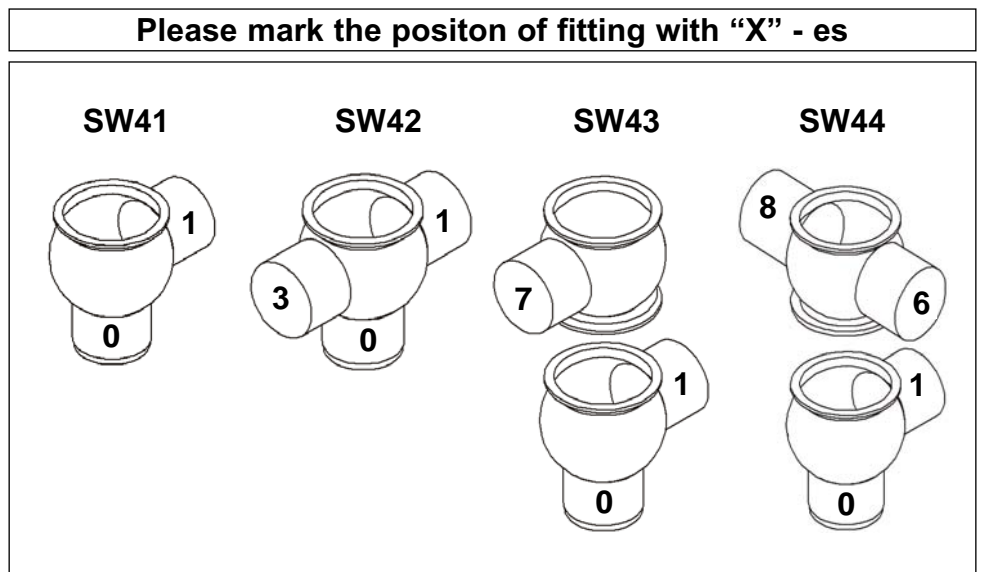
Surface:

Standard outside blasted inside blank <input type="checkbox"/>	outside blasted inside polished Ra<0,8 µm <input type="checkbox"/>	outside polished inside polished Ra<0,8 µm <input type="checkbox"/>
-----------------------------------------------------------------------------	--------------------------------------------------------------------------	---------------------------------------------------------------------------

 outside blank inside Ra<0,8 µm <input type="checkbox"/>	 outside blasted inside Ra<0,8 µm <input type="checkbox"/>
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Control Unit: Direct Connect AS-Interface
 Profibus Device Net
 or Proximity switch holder (without Control Unit)

FITTINGS		
	Male Part	Complete Union
Clamp ISO 2852		
Clamp DIN 32676		
BS 4825.5 RJT		
ISO 2853 IDF		
DIN 11851		
SMS (ISO)		
DS (ISO)		
Flanges	FN1	FGN1



Comments: _____