

Operating Manual
DELTA SW4 - DN125-150
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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Single seat valves SW 41, SW42, SWE4 -	RN 01.054.809
Change-over valves SW 43, SW 44 -	RN 01.054.810

1. General Terms

This operating manual has to be read carefully and observed by the competent operating and service personnel.

We have to 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

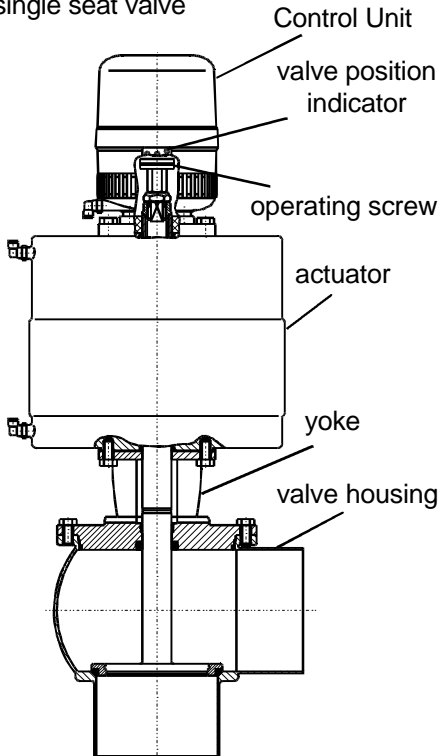
DANGER!



- 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.
- Disconnect electric and pneumatic connections.
- The line system must be depressurized before any maintenance work.
- **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!**
Valve design NC (normally closed): before releasing the housing screws, control the actuator with air to relieve the valve insert.
- The welded actuator is under spring load, do not open it by force.

3. Mode of Operation

single seat valve



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

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

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

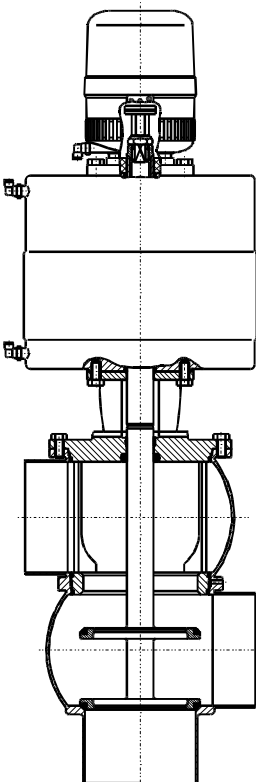
- Operation by pneumatic actuator with air connection, reset by spring force.
- By different assembly of the actuator, the following designs are possible:

NC: actuator normally closed

NO: actuator normally open

- The inner parts of the actuator are maintenance-free.
- The cleaning of the inner valve space is undertaken during CIP cleaning of the line system.
- The standard valve is equipped with a Control Unit DELTA CU 21 on top of the actuator for the pneumatic control of the valve.
- The yellow luminous diodes in the Control Unit indicate the position of the valve shaft.

change - over valve



4. Auxiliary Equipment

- The actuator can be equipped with a support for the valve feedback to indicate the valve position. Proximity switches to signal the limit position of the valve seat can be mounted to the support if required. We recommend to use one of our APV standard types: operating distance: 5 mm / diameter: 11 mm. If the customer decides to use a valve feedback other than APV type, we cannot take over any guarantee for a faultless function.

- **Control Unit**

The SW4 valve can be equipped with a Control Unit CU2.

The following different variants are possible:

	1 solenoid valve
standard CU ref.-No. :	CU 21 322 000 804 432
Valve Net Profibus ref.-No. :	CU 21 V 322 000 804 437
AS - Interface ref.-No. :	CU 21 AS - Interface 322 000 804 578

- An adapter is required to install the Control Unit on the SW4 valve.

adapter	
designation : ref.-No. :	CU 2 Adapter - SW4 - 125/150 000 08 - 48 - 362/93

5. Installation



- The installation of the valve must be undertaken in such a manner that liquids can drain off the valve housing and should be provided preferably in vertical position.
- The valve housings of single seat and change-over valves can be welded direct into the pipeline (valve insert completely dismantlable).
- **Attention:** Observe welding instructions.

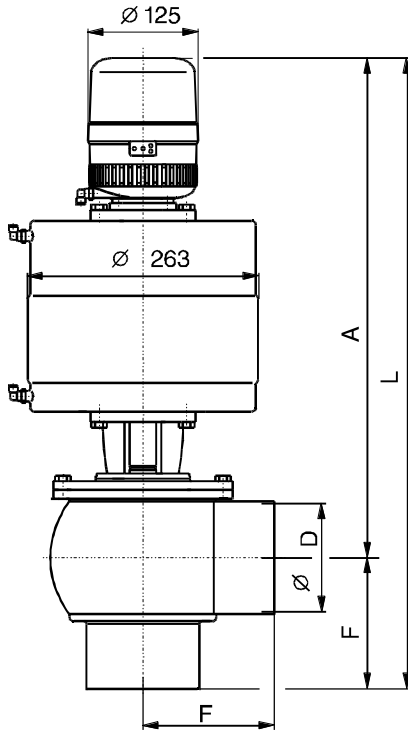
5.1 Welding Instructions

SW 4

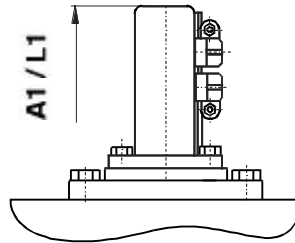
- Before welding of the valve, the valve insert must be dismantled from the housing. A careful handling without damage to the parts must be provided.
- Welding may only be carried out by certified welders (EN 287-1). (Seam quality EN 25817 "B").
- The welding of the valve housings must be undertaken in such a way that deformation strain cannot be transferred to the valve body.
- The preparation of the weld seam up to 3 mm thickness must be carried out in butt manner as a square butt joint without air. (Consider shrinkage!)
- TIG orbital welding should be aimed at!
- 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 nonobservance of these welding instructions is not subject to our guarantee.

6. Dimensions / Weights

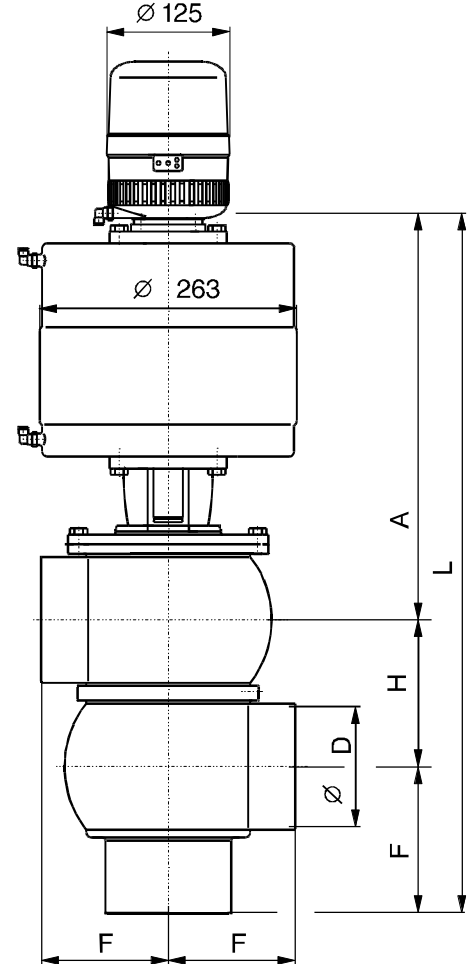
single seat valve
with
control - unit



proximity switch support



change - over valve
with
control - unit



weights in kg		
	DN 125	DN150
single seat valve	38,3	44,3
change-over valve	45,8	54,3

Dimensions in mm									
				single seat change - over valve with control - unit	single seat valve with control - unit	change - over valve with control - unit	single seat change - over valve with proximity switch support	single seat valve with proximity switch support	change - over valve with proximity switch support
DN	$\varnothing D$	F	H	A	L	L	A1	L1	L 1
125	125	150	150	572	722	872	512	662	812
150	150	150	175	584,5	734,5	909,5	524,5	674,5	849,5

7. Technical Data

product-wetted parts :	316 L, 1.4404
other parts :	1.4301
seals : standard :	EPDM
options :	FPM, VMQ, HNBR
actuators :	1.4301
max. operating temperature :	135°C EPDM, HNBR *FPM, *VMQ
short-term load :	140°C EPDM, HNBR *FPM, *VMQ *(no steam)
air connection (for hose) :	6x1mm
max. control air pressure :	10 bar
min. control air pressure :	6 bar

(Use dry and clean control air, only!)

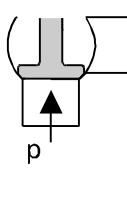
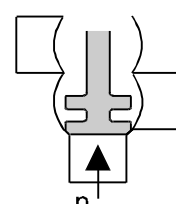
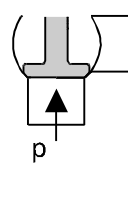
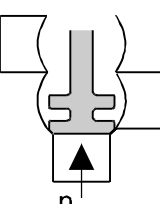
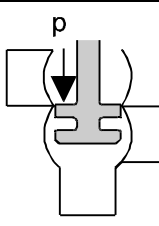
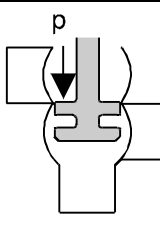
closing times for SW4 single seat and change-over valves

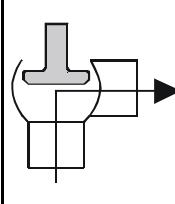
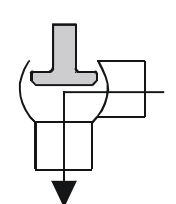
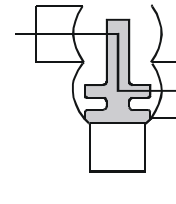
The opening and closing times of those valves equipped with a Control Unit can be adjusted by the operator.

closing times in sec. control pressure 6 bar		
	hose length	
DN	1m	10m
125	14	18
150	14	18

	stroke in mm	
	single seat valve	change - over valve
DN		
125	45	42
150	45	42

7. Technical Data

DELTA SW4 product pressure in (bar) at 6 bar control air pressure						
	single seat valve SW41NC basic adjustment	change - over valve SW43 NC lower seat	single seat valve SW41 NO with 6 bar air pressure	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
						
DN						
125	6,8		6,8		6,8	6,8
150	5,0		5,0		5,0	5,0

DELTA SW4 kvs - values in m ³ / h			
	single seat valves		change - over valves
			
DN			
125	362	820	348
150	516	1200	496

8. Maintenance

- The maintenance intervals depend on the application of the valve and should be determined by the operator himself carrying out regular checks.
- Tools required:
 - 1 x spanner SW17
 - 1 x spanner SW19
 - 2 x spanner SW24.
- Exchange of seals according to service instructions.
- Assembly of the valve and change of the valve design **NC or NO** according to service instructions.
- **All seals must lightly be greased before their installation!!!**

Recommendation:

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

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

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

or

APV-food-grade grease for VMQ

(1 kg /can - ref. No. 000 70-01-017/93)

(40 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.

Assembly tool for seat seal

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

assembly tool SW4	
DN	ref.No.:
125	000 51 - 13 - 116/17
150	000 51 - 13 - 117/17

9. Service Instructions

Single seat valves

DELTA SW 41, SW 42, SWE 41, SWE 42, SWE 43, SWE 44.

The item numbers refer to spare parts list RN 01.054.809 DN.

I. Disassembly from the line system

- a. Shut off line pressure and discharge lines if possible.
- b. Valve design NC: control actuator with air.



Do not reach for movable valve parts!
Risk of injury.

- c. Remove housing flange screws (5).



Attention: with valve design NC !

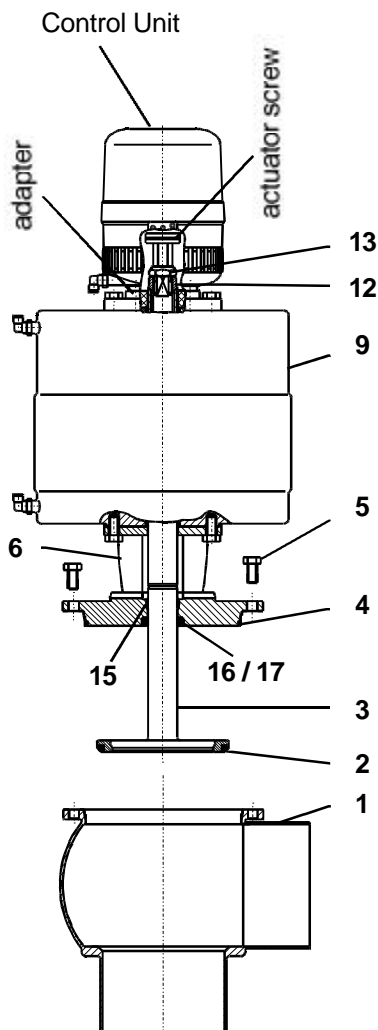
- d. Shut off compressed air and remove compressed air supply line.
- e. Take the valve insert out of the housing (1).

Attention: with valve design NC !

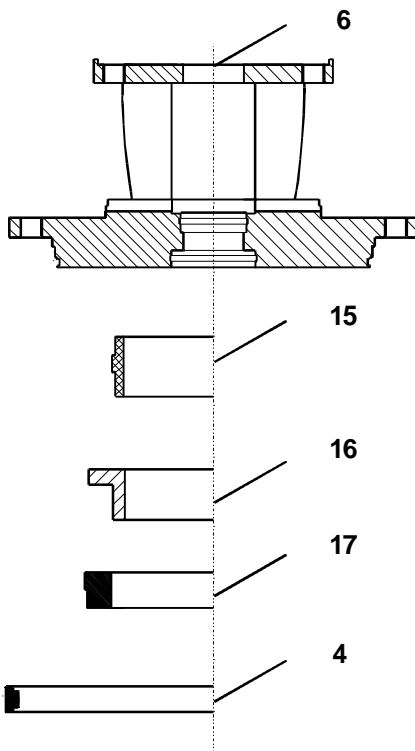
- f. Lift the valve insert by means of the housing flange screws and take it out of the housing.
- g. Remove the control unit from the actuator (9).
(Turn ring in anticlockwise direction.)

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

- a. Release the actuator screw from the guide rod.
Remove the control unit adapter.
- b. Remove the housing seals (4).
(assembly see 9.III.e.)
- c. Unscrew safety nut (13) by holding up the safety washer (12),
remove the safety washer.
- d. Pull valve shaft (3) out of the actuator (9),
remove seat seal (2).
(assembly see 9.III.c.)
- e. Release yoke (6) from actuator (9).
- f. Remove seat seal (17), shaft seal (16) and guide bush (15).
(assembly see 9.III.a.)



9. Service Instructions



III. Installation of seals and assembly of valve

The item numbers refer to spare parts list RN 01.054.809 DN.

- a. Put the guide bush (15) into the yoke (6). Insert the shaft seal (16) and press in the lightly greased seat seal (17).
See to the right position of installation.
- b. Mount the yoke (6) to the actuator (9).
- c. Insert seat seal (2) into the shaft (3). Use the APV assembly tool to install the seat seal, **see chapt. 10**. Grease seat seal only lightly before its installation.
If installed manually, vent the seal groove by means of a thin object between the seal and the groove wall.
- d. Slide the shaft (3) through the yoke (6) and the actuator (9), put on safety washer (12) and tighten it by safety nut (13).
Hold up the centering washer.
Tightening torque: 40 Nm.
- e. Lightly grease housing seal (4) and install it in the groove of the yoke flange.
- f. Install the control unit adapter on the actuator.
Screw actuator screw on the guide rod.

IV. Installation of valve

- a. Place the control unit on the adapter and secure it by the fastening ring.
- b. Connect compressed air supply.
- c. **Valve design NC: control actuator with air.**



Do not reach for movable valve parts!

Risk of injury by suddenly actuating valve.

- d. Carefully install the valve insert in the housing (1) and tighten the hexagon screws (5).
The housing seal (1) must not be damaged during the installation.
 - e. **Valve design NC: shut off compressed air.**
 - f. Check basic adjustment of the valve feedback.
- The shift points can be adjusted by turning the positioning screw in the control unit.

9. Service Instructions

Change-over valves DELTA SW 43, SW 44.

The item numbers refer to spare parts list RN 01.054.810 DN.

I. Disassembly from the line system

a. Shut off line pressure and discharge lines if possible.

b. Valve design NC: control actuator with air.

Do not reach for movable valve parts!
Risk of injury.

c. Remove housing flange screws (5).

Attention: with valve design NC !

d. Shut off compressed air and remove compressed air supply line.

e. Take the valve insert out of the housing (1).

Attention: with valve design NC !

f. Lift the valve insert by means of the housing flange screws and take it out of the housing.

g. Remove the control unit (14) from the actuator (9).
(Turn ring in anticlockwise direction.)

II. Dismantling of product-wetted parts

a. Release the actuator screw from the guide rod.
Remove the control unit adapter.

b. **Attention: Valve design NC: control valve with air.**

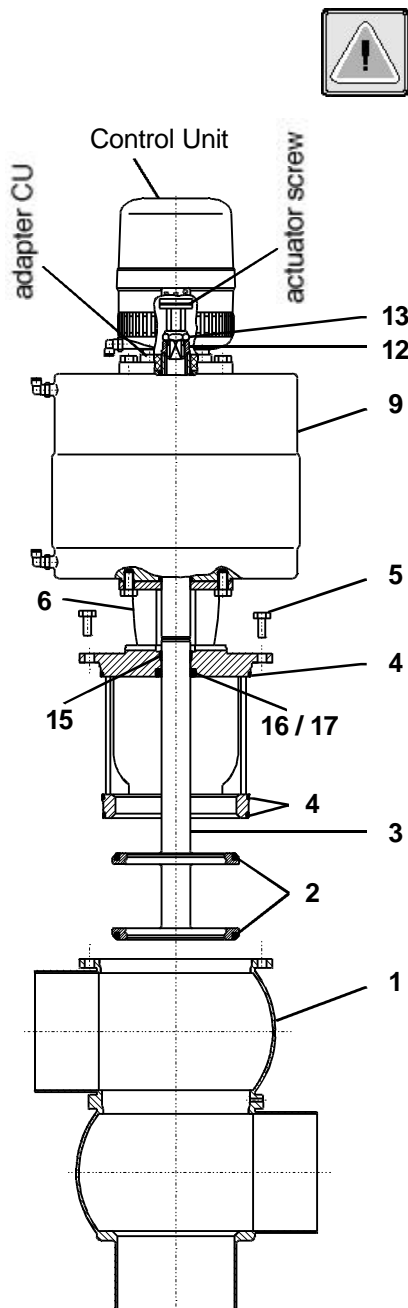
c. Unscrew safety nut (13) by holding up the safety washer (12),
remove the safety washer.

Attention: Valve design NC: shut off compressed air, and remove compressed air supply.

d. Pull valve shaft (3) out of the actuator and remove both seat seals (2).
(assembly see 9.III.c)

e. Release yoke (6) from actuator (9).

f. Remove housing seals (4), seat seal (17), shaft seal (16) and guide bush (15).



9. Service Instructions

III. Change-over valves DELTA SW 43, SW 44 Installation of seals and assembly of valve The item numbers refer to spare parts list RN 01.054.810 DN.



- a. Put the guide bush (16) into the yoke (6).
Insert the shaft seal (17) and press in the lightly greased seat seal (18).
See to the right position of installation.
- b. Mount the yoke (6) at the actuator (9).
- c. Insert seat seals (2) into the shaft (3). Use the APV assembly tool to install the seat seal, **see chapt. 10**. Grease seat seal only lightly before its installation.
If installed manually, vent the seal groove by means of a thin object between the seal and the groove wall.
- d. Lightly grease housing seals (4) and install them in the groove of the yoke flange.

Attention:

Valve design NC: control valve with air.

- e. Slide the shaft (3) through the yoke (6) and the actuator (9), put on safety washer (12) and tighten it by safety nut (13).
Hold up the centering washer.
Tightening torque: 40 Nm.

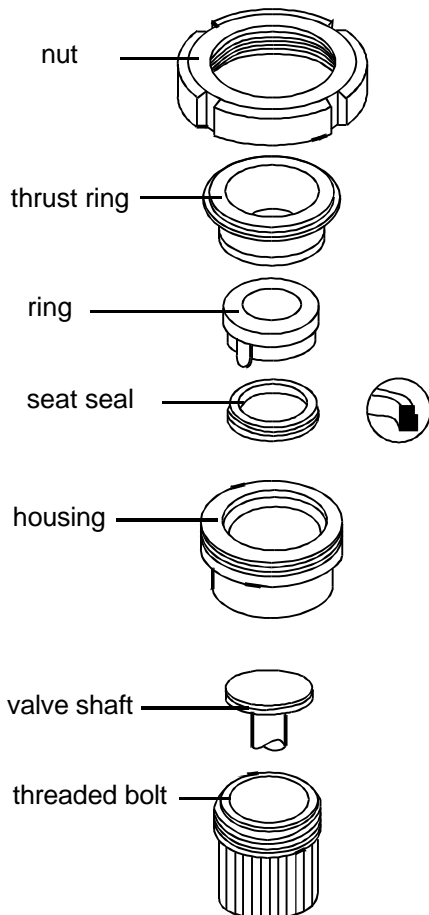
- f. **Attention: Valve design NC: control valve with air.**

- g. Install the control unit adapter on the actuator.
Screw actuator screw on guide rod.

IV. Installation of valve

- a. Place the control unit on the adapter and secure it by the fastening ring.
- b. Connect compressed air supply.
- c. **Valve design NC: control actuator with air.**
Do not reach for movable valve parts!
Risk of injury by suddenly actuating valve.
- d. Carefully install the valve insert in the housing (1) and tighten the hexagon screws (5).
The housing seals (4) must not be damaged during the installation.
- e. **Valve design NC: shut off compressed air.**
- f. **Check basic adjustment of the valve feedback.**
 - The shift points can be adjusted by turning the positioning screw in the control unit.

10. Assembly Tool



The assembly tool consists of:

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

Installation of seat seal in the valve shaft

1. Insert valve shaft in the housing in such a manner that the seal groove is in the valve housing.
2. Fix the shaft in the housing by means of the threaded bolt. Clamp the housing into a vise.
3. Lightly grease the seat seal with APV food-grade grease. Slide seal onto the ring with venting plug until it stops.
4. Insert the ring with the seat seal into the housing and press it down until it stops.
5. Insert the thrust ring into the housing. Screw on nut and tighten it by a hook spanner until it stops.
6. Release nut. Take ring and thrust ring out of the housing.
7. Take housing out of the vise, release threaded bolts. Take the valve shaft out of the housing.

Check the correct fit of the seat seal.

assembly tool SW4	
DN	ref.No.:
125	000 51 - 13 - 116/17
150	000 51 - 13 - 117/17

11. Trouble shooting

The item numbers refer to the spare parts drawings.

Valve designs
SW41 / SW42 / SW43 / SW44

- Valve leaks : Replace seat seal **(2)**.
Check line pressure:
safe line pressure, see chapt. 7.

- Leakage between housing and yoke flange : Replace housing seal **(4)**.

- Shaft passage in the yoke is untight : Replace guide bush **(15)**
shaft seal **(16)** and
seat seal **(17)**.

- Actuator does not work, air escapes permanently via the venting plug : Replace actuator **(9)**.

- Valve feedback is missing or unprecise : Undertake fine adjustment
according to manual of
Control Unit.

SW43 / SW44

- leakage from the leakage bore at the housing intermediate ring : Replace housing seal **(4)**.

12. Spare Parts Lists

(see annex)

BA SW125150 02
ID-No.: H 2 0 4 8 2 5
Translation of original manual



rev. 0



Your local contact:



APV
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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Ersatzteilliste: spare parts list:

Ventil SW41,SW42, SWE4-FS-CU und VSM
 Valve SW41,SW42, SWE4-FS-CU and PSH
 DN 125-150



APV Rosista GmbH
 D-59425 Urra
 Germany

Gezeichnet/ 21.06.01
 Geprüft/ Normgepr.

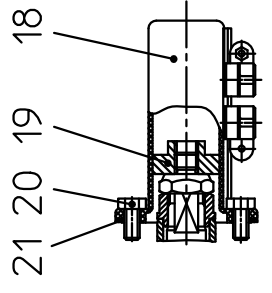
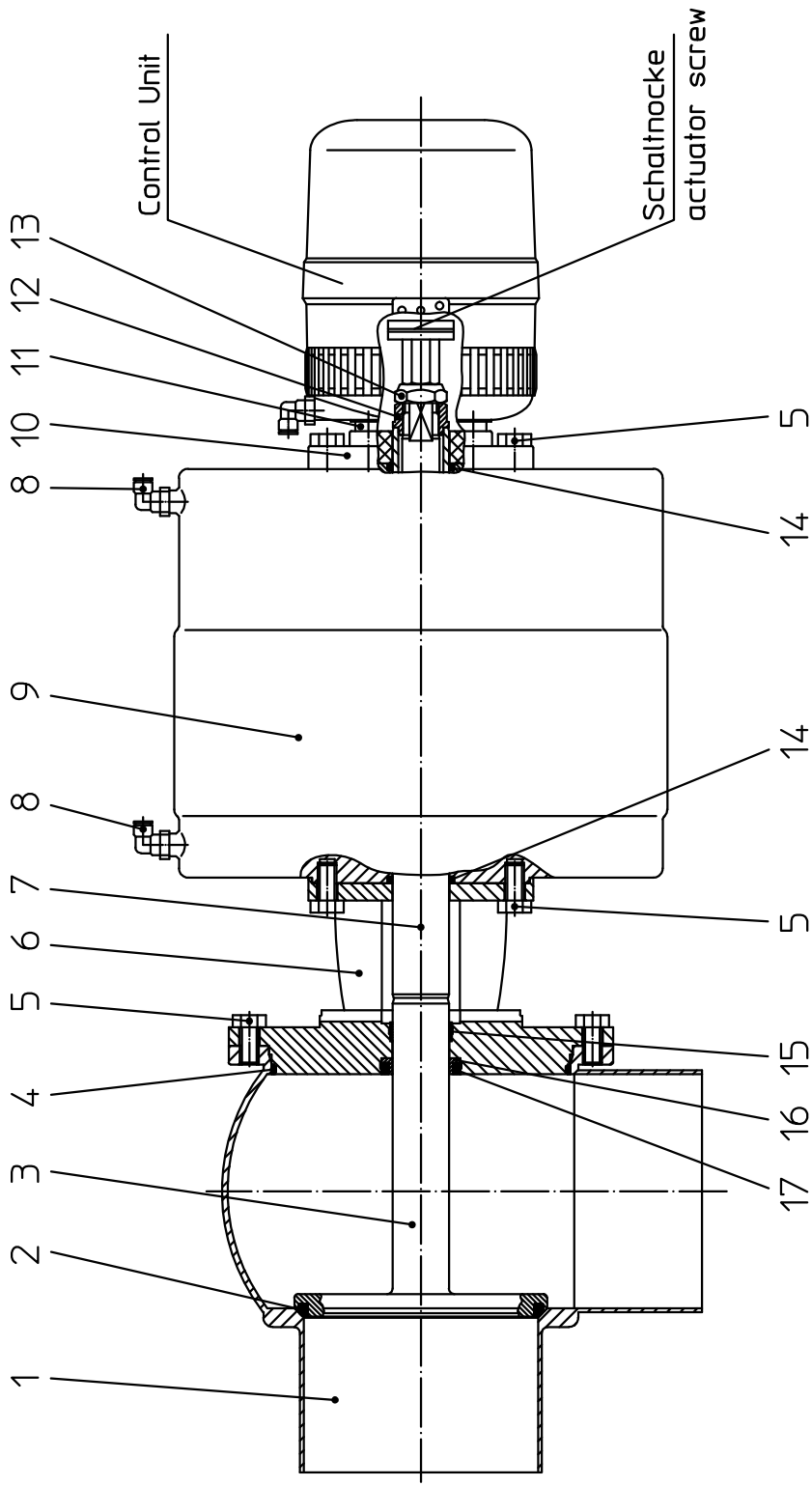
Besteht aus 3 Blatt Blatt 1

Datum 06/01
 Name Trytko

Name Trytko

RN 01.054.809

02/194



Es stehen verschiedene Dichtungswerkstoffe zur Verfügung.

The following seal materials are available

- * Dichtungswerkstoff: material seals:
- ../13-VMQ/Silicone
- ../33-HNBR
- ../73-FPM
- ../93-EPDM

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Ersatzteilliste: spare parts list:
 Ventil SW41,SW42, SWE4-FS-CU und VSM
 Valve SW41,SW42, SWE4-FS-CU and PSH
 DN 125-150

Blatt 2

Gezeichnet	21.06.01	Datum	21.06.01	Name	Trytko
Geprüft	04.07.01	Gezeichnet	21.06.01	Name	Trytko
Normgepr.		Geprüft	04.07.01	Name	Splithoff

RN 01.054.809



APV Rosista GmbH
 D-58425 Urra
 Germany

Pos. item	Benennung description	125		150		WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.
		WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.						
1	Gehäuse Housing	SW41		SW41		15-60-690/47	15-60-740/47				
1	Gehäuse Housing	SW42		SW42		15-61-690/47	15-61-740/47				
1	Gehäuse Housing	SWE41		SWE41		15-64-680/47	15-64-730/47				
1	Gehäuse Housing	SWE42		SWE42		15-65-680/47	15-65-730/47				
1	Gehäuse Housing	SWE43		SWE43		15-66-680/47	15-66-730/47				
1	Gehäuse Housing	SWE44		SWE44		15-67-680/47	15-67-730/47				
2	Tellerdichtung Seat seal	*		*		58-33-693/	58-33-743/				
3	Ven. Schaft Valve shaft	*		*		15-25-674/42	15-25-728/42				
4	Gehäusedichtung Housing seal	*		*		58-33-692/	58-33-742/				
5	Skt. Schraube Hex. screw					DIN EN 24017-M10x20-A2-70					
6	Laterne Yoke					15-40-968/47	15-40-969/47				
7	Zugstange Guide rod					15-26-055/12	=				
8	W-Verschraubung Angular union	G1/8 6x1				08-60-750/93	=				
9	Steuerkopf Actuator					15-32-055/17	=				
10	Deckel Steuerkopf Cover actuator					15-00-875/92	=				
11	CU2 Adapter CU2 adapter	SW4 125-150				08-48-362/93	=				
12	Sicherungsscheibe Lock washer					15-28-225/12	=				
13	Sicherungsmutter Stop nut					65-50-137/15	=				
14	O-Ring O-ring					OR 30,2x3 NBR 70 Shore A					
15	Führungsbuchse Bushing					08-01-065/23	=				

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APV Rosista GmbH
D-59425 Urra
Germany

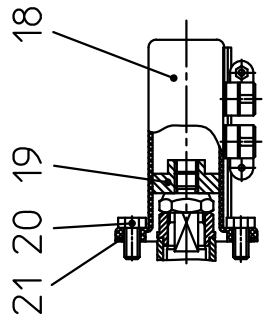
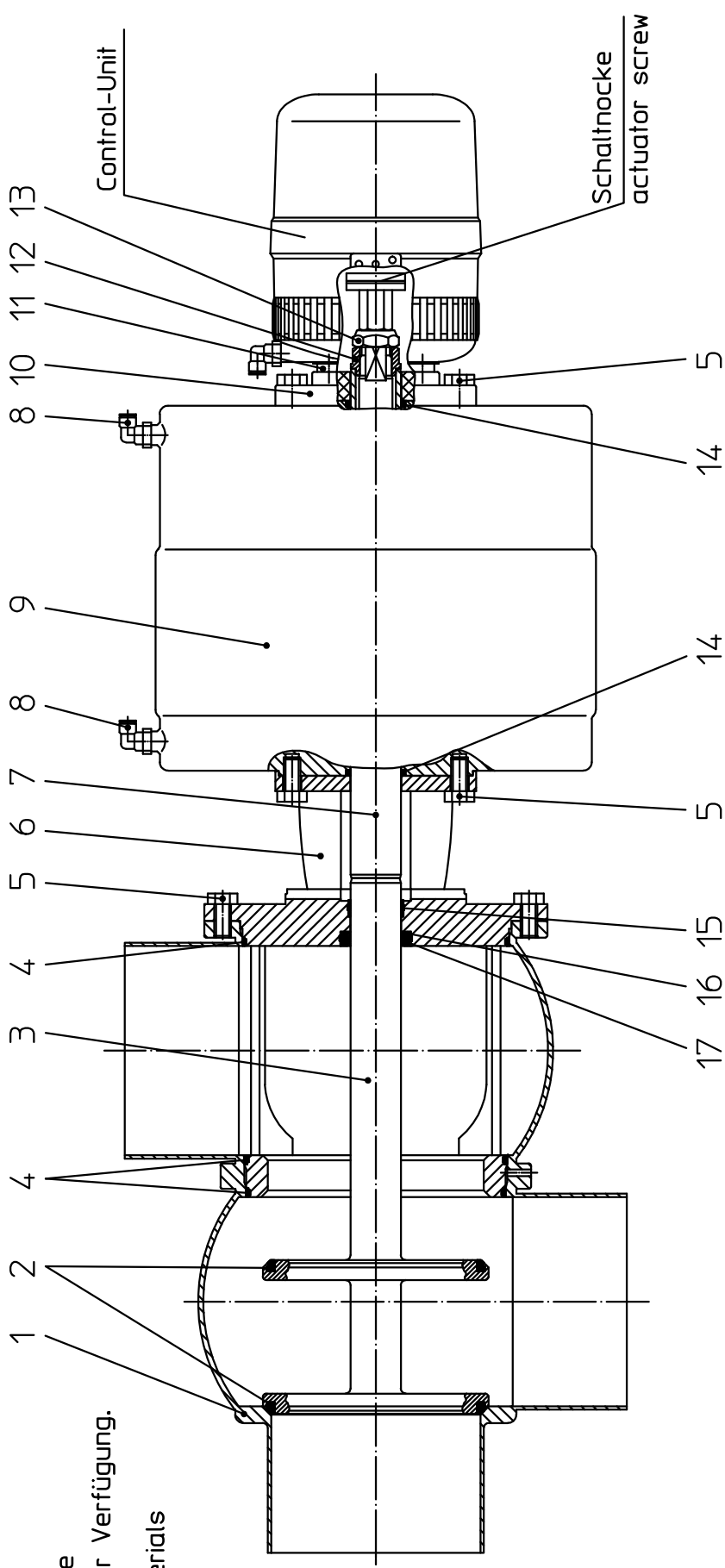
Gezeichnet	25.06.01	Name	Trytko
Geprüft			
Normgepr.			

Besteht aus 3 Blatt		Blatt 1	
Datum	06/01		
Name	Trytko		

DN 125-150

Ersatzteilliste: spare parts list:

Ventil SW43, SW44 FS-CU und VSM
Valve SW43, SW44 FS-CU and PSH



Es stehen verschiedene Dichtungswerkstoffe zur Verfügung.

The following seal materials are available

* Dichtungswerkstoff/

material seals:

- ../13-VMQ/Silicone
- ../33-HNBR
- ../73-FPM
- ../93-EPDM

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Ersatzteilliste: spare parts list:
 Ventil SW43, SW44 FS-CU und VSM
 Valve SW43, SW44 FS-CU and PSH
 DN 125-150

Blatt 2

Gezeichnet	25.06.01	Trytko	
Geprüft	04.07.01	Spielthoff	
Normgepr.			
Datum	06/01	11/02	05/04
Name	Trytko	Trytko	Trytko

RN 01.054.810



APV Rosista GmbH
 D-58425 Urra
 Germany

Pos. item	Benennung description	125		150		WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.
		WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.						
1	Gehäuse Housing SW43	15-62-690/47		15-62-740/47							
1	Gehäuse Housing SW44	15-63-690/47		15-63-740/47							
2	Tellerdichtung Seat seal *	58-33-693/		58-33-743/							
3	Ven. Schaft Valve shaft	15-25-679/42		15-25-729/42							
4	Gehäusedichtung Housing seal *	58-33-692/		58-33-742/							
5	Skt. Schraube Hex. screw	DIN EN 24017-M10x20-A2-70									
6	Laterne Yoke	15-40-970/47		15-40-971/47							
7	Zugstange Guide rod	15-26-055/12		=							
8	W-Verschraubung Angular union G1/8 6x1	08-60-750/93		=							
9	Steuerkopf Actuator	15-32-055/17		=							
10	Deckel Steuerkopf Cover actuator	15-00-875/92		=							
11	CU Adapter CU adapter SW4 125-150	08-48-362/93		=							
12	Sicherungsscheibe Lock washer	15-28-225/12		=							
13	Sicherungsmutter Stop nut	65-50-137/15		=							
14	O-Ring O-ring	OR 30,2x3 NBR 70 Shore A									
15	Führungsbuchse Bushing	08-01-065/23		=							
16	Schaftdichtung Shaft seal	58-33-154/23		=							
17	Tellerdichtung Seat seal *	58-33-393/		=							
18	Ventilstellungsmeldung (VSM) SW4 Proximity switch holder (PSH) SW4	15-33-932/93		=							
19	Schaltmocke Actuator screw	08-52-291/97		=							

