APV
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Operating Manual

DELTA DE3

Double Seat Mixproof Valve

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

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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

ppa. Baumbach

Manager Research and Development

Content :

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 of operating safety. You will find it wherever the activities described are bearing risks of personal injury.
- Disconnect electrical and pneumatic connections.
- Depressurize the line and cleaning system and discharge the lines, if possible, before any maintenance work.
- Observe Service Instructions to ensure safe maintenance of the valve.
- Connections which are not used must be sealed by a plug.
- A safe discharge of the cleaning liquids must be ensured.
- The valve must only be assembled, disassembled and reassembled by persons who have been trained in APV valves or by APV service team members. If necessary, contact your local APV representative.
- Welded actuators are preloaded by spring force.

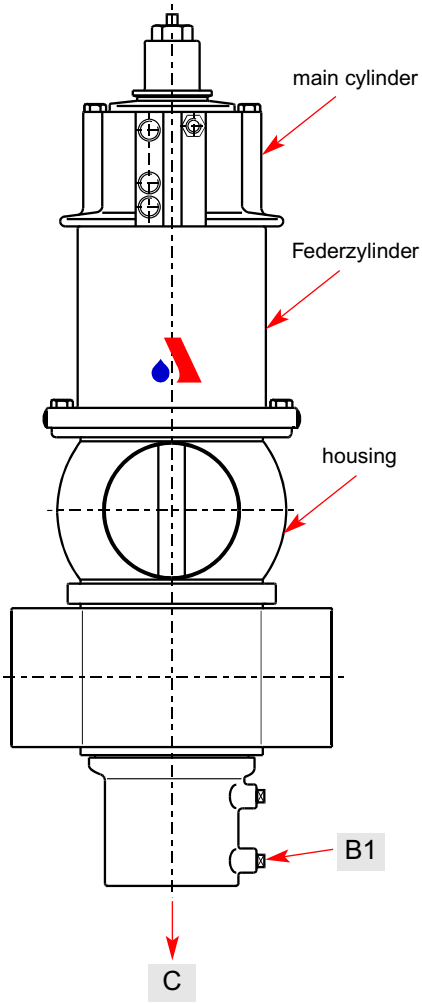
Opening of the actuators is strictly forbidden.
Danger to life!

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



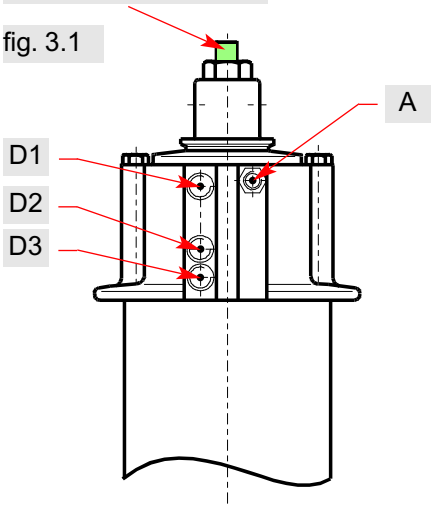
3.1 General Terms

Due to its construction and mode of operation as well as to the use of high quality stainless steel and adequate seal materials, the double-seat mixproof valve DELTA DE3 is suited for applications in the food and beverage industries as well as in the pharmaceutical and chemical industries.

- The valve opens from the top to the bottom in low leakage operation (unpressurized drain of fluid residues via the annular cleaning gaps in the seat area).
- Separation of two line passages by two balanced and independently operating valve slides with intervening leakage chamber. Flushing connection at **(B1)**.
- Double sealing function by two seals acting independently of one another.
- Arising leakages at the seat seals are discharged at **(C)** in depressurized state.
- Proximity switches can be installed as valve position indicators. **(Fig. 3.1)**
  D1 = valve position "closed"
  D2 = valve position "open" (only with DN 40 - 50 , 1,5" - 2")
  D3 = valve position "open" (only with DN 65 to 150, 2,5" - 6")
- Operation by pneumatic actuator with air connection at **(A)**. Reset by spring force into the safety limit position "closed".
- Maintenance-free actuator.
- Optical indication of the valve position at the actuator.

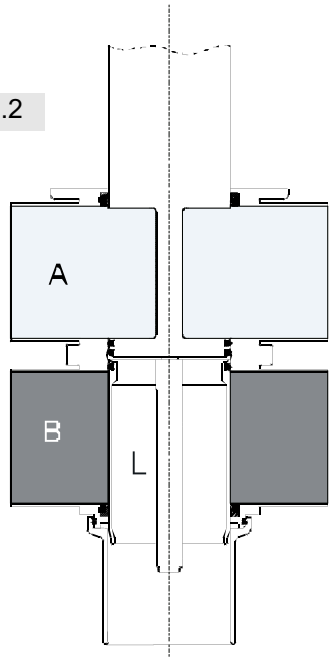
optical indication of valve position

fig. 3.1



3. Mode of Operation

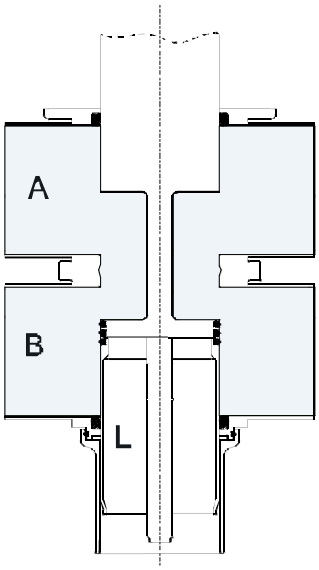
fig. 3.2



3.2 Valve in "closed" position (fig 3.2)

The lower and upper valve shafts are closed by spring force and safely separate the different fluids **A** and **B**. The leakage chamber **L** which is situated between the two valve shafts, provides for a free and absolutely depressurized discharge to the bottom. The valve shafts are balanced and, thus, safe against pressure hammers.

fig. 3.3

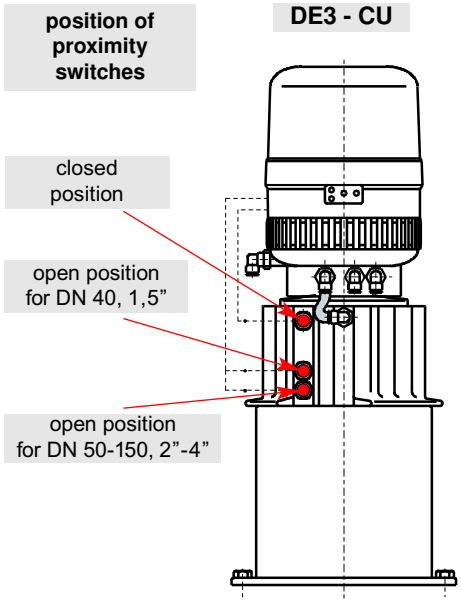


3.3 Valve in "open" position (fig 3.3)

During the opening process, the leakage chamber **L** is closed against the product area and the pipelines **A** and **B** are connected. In open valve position, the valve shafts are also balanced and, thus, safe against pressure hammers.

4. Auxiliary Equipment

fig. 4.1



4.1 Valve position indication

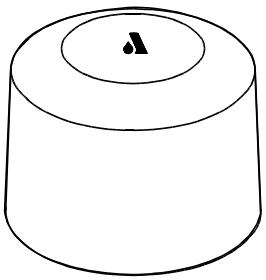
Proximity switches to signal the limit position of the valve shafts can be installed at the actuator if requested **(fig. 4.1)**.

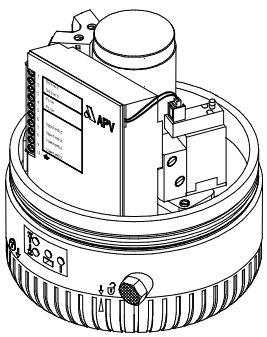
We recommend to use our APV standard types:
operating distance: 5 mm / diameter: 11 mm
If the customer decides to use valve position indicators other than APV type, we cannot take over any liability for a faultless function.

4.2 Control Unit

The installation of a CU3 control unit on a DE3 valve is possible. Start-up, assembly and dismantling of the different designs are described in the corresponding operating manual.

4.2 Control Unit





The following different designs are available:

	1 soleniod valve (EMV)
Direct Connect ref.-No.:	CU31 DE3 Direct Connect 16-31-234/93
Profibus ref.-No.:	CU31 - DE3 Profibus 08-45-003/93
Device Net ref.-No.:	CU31 DE3 Device Net 16-31-242/93
ASInterface ref.-No.:	CU31 DE3 ASInterface 2.1 08-45-022/93

- For the installation of the control unit on the DE3 valve an adapter is required.

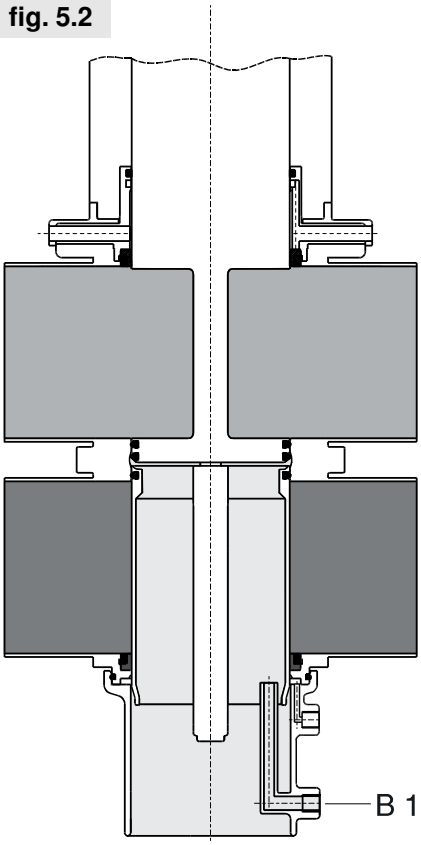
	1 soleniod valve (EMV)
designation: ref.-No.:	CU21 - adapter DA3 / DE3 08-48-424/93

5. Cleaning

With the cleaning of DELTA DE3 valves, one has to distinguish between three areas:

5.1 The flow areas
The upper and lower passages are cleaned by the passing cleaning liquid during the cleaning of the connected pipelines.

fig. 5.2



5.2 The lekage chamber (fig. 5.2)
The cleaning of the leakage chamber is undertaken by CIP spraying. CIP cleaning connection **(B1)**.

! CIP must generally be undertaken.

The spraying does not produce pressure build-up in the leakage chamber and can be carried out in closed and in open valve position.

The conduct of the cleaning liquid provides for a perfect cleaning of the whole leakage chamber.

Under normal conditions
15 valves DN 40 - 100, 1,5" - 4"
10 valves DN 125 - 150, 6” can be cleaned
via one spray distribution line DN 25.

5.2.1 Cleaning recommendation for interval and spraying liquid under normal operating conditions and with common CIP liquids.

cleaning step	CIP spraying
pre-flushing	3 x10 sec.
caustic flushing 80 °C	3 x10 sec.
intermediate flushing	2 x10 sec.
acid flushing	3 x10 sec.
subsequent flushing	2 x10 sec.

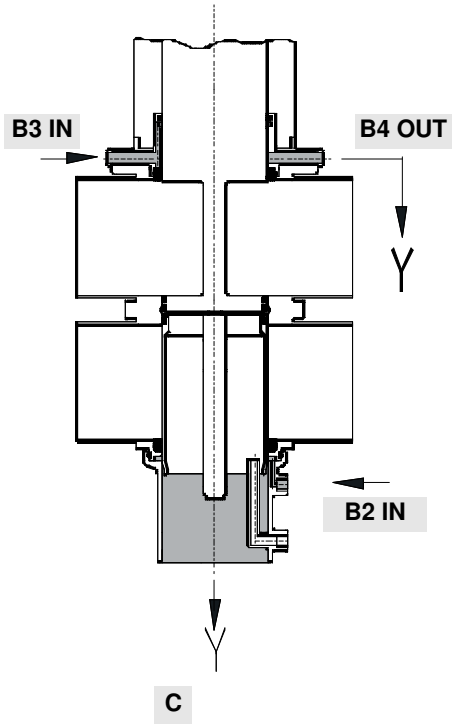
- Depending on the pressure ratio, cleaning temperatures and the degree of soiling, different cycles must be adjusted.

5.2.2 Flushing quantities
per CIP cycle: DN 40 - 100, 1,5” - 4” **ca. 1,2ltr/10s**
per CIP cycle: DN 125 - 150, 6” **ca. 5ltr/10s**

5.2.3 Cleaning pressure at CIP cleaning connection: min. 2 bar. max. 5 bar.

5. Cleaning

fig. 5.3



5.3 Shaft surfaces outside the flow passages (option)

The DE3 valve provides for those areas of the upper and lower shaft stem which are not subject to cleaning, to be flushed **(fig. 5.3)**.

Shaft flushing is recommended with sensible products to increase product safety and the service life of seals.

The connection of the flushing device is done according to the pattern described on the left via push-in flushing connections.

Assembly instruction for shaft flushing: see chapter 13.

5.3.1 Flushing and sterilisation of shaft surfaces

The following flushing liquids are permissible:

- hot water (slightly sour to avoid lime residues) : **max. 85° C**
- common CIP liquids : **max. 80° C**
- supply pressure at CIP cleaning connection : **min. 1 bar. max. 3 bar.**
- flushing quantity per CIP cycle **:** **ca. 1,2 ltr./10s**
  cleaning period : **30s**
- interval : **1x / day (e.g. with milk)**
- depending on product and operating frequency : **1x / week (e.g. with beer)**
- Under normal conditions
  15 valves DN 40 - 100, 1,5” - 4”
  10 valves DN 125 - 150, 6”
  can be cleaned via one spray distribution line DN 25.

The free discharge of cleaning liquids and steam must be ensured.
The upper and lower shaft flushing may only be carried out if product is not imminent in the appertaining part of the housing.

5.3.2 Installation of the hose for cleaning liquids:

upper shaft flushing	Identification on spring cylinder
cleaning liquid supply **B3** cleaning liquid discharge **B4**	**in** **out**
lower shaft flushing	
cleaning liquid supply **B2** cleaning liquid discharge **C**	**at drain pipe**

6. Installation

- The valve must be installed in vertical position. Fluids are, therefore, freely drainable from the valve housing and the leakage chamber.

- Valve housings can be welded direct into the pipelines (completely dismantable valve insert).

- **Attention:** Observe welding instructions.

- Heights of installation and dismantling (see chapter 7).

6.1 Welding Instructions

DE3

- Before welding of the valve, the valve insert must be dismantled from the housing. Careful handling to avoid damage to the parts is necessary (see 11.1). It is not necessary to remove the lower shaft seal as it can be destroyed during dismantling.

- 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.

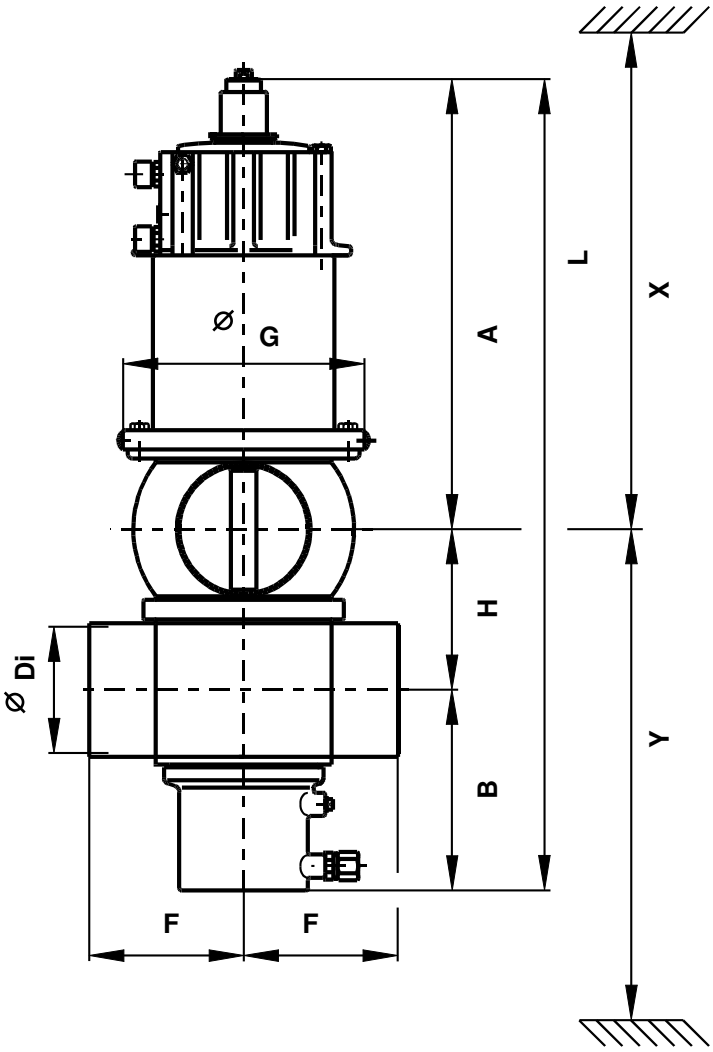
- The preparation of the weld seam up to 3 mm thickness shall be carried out as a square butt joint without air. (Consider shrinkage!)

- TIG orbital welding is best!

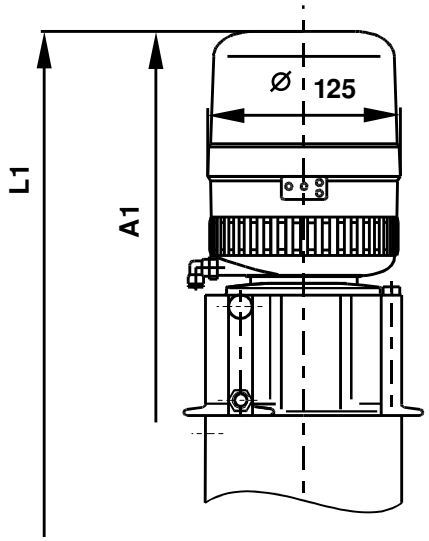
- After welding of the valve housing or of the mating flanges and after work at the pipelines, the corresponding parts of the installation and pipelines must be cleaned from welding residues and soiling before operation of the valves to avoid damage to the valves and seals.
  If these cleaning instructions 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.

7. Dimensions / Weights



Control Unit DELTA CU3

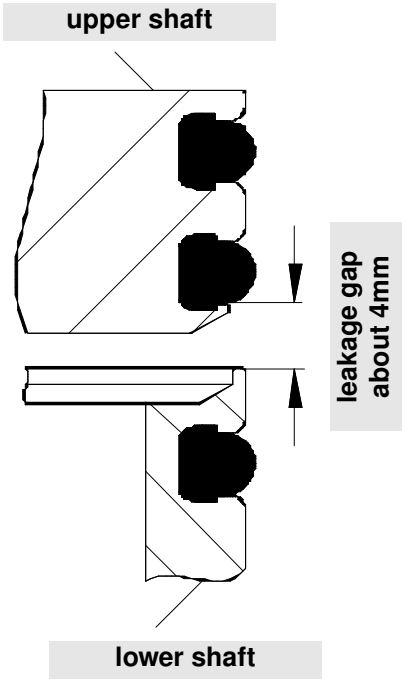


dimensions in mm

DN	A	A1	B	Ø Di	F	Ø G	H	L	L1	installation dimensions min. in mm X	installation dimensions min. in mm Y	weight in kg
40	304	428	120	38	100	163	63	487	611	552	200	10,1
50	310	434	126	50	100	163	75	511	635	572	218	10,2
65	318	442	134	66	100	163	91	543	667	592	242	10,4
80	340	464	146	81	120	188	106	593	717	673	274	14,6
100	350	474	156	100	120	188	125	631	755	703	303	15,5
125	420	544	176	125	150	230	150	745	869	740	342	30,8
150	480	704	189	150	150	264	175	844	1068	971	392	----
inch												
1,5”	305	429	118	34,9	100	163	63	487	611	552	197	10,1
2”	311	435	125	47,6	100	163	75	511	635	572	216	10,2
2,5”	315	439	131	60,3	100	163	91	531	655	592	233	10,4
3”	321	445	137	72,9	100	163	106	555	679	622	251	10,5
4”	351	475	155	97,6	120	188	125	631	755	703	301	15,5
6”	481	705	188	146,9	150	264	175	844	1068	971	391	---

8. Technical Data

fig.8

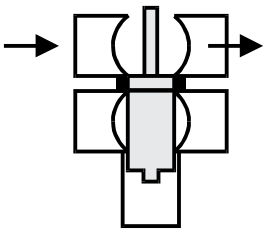
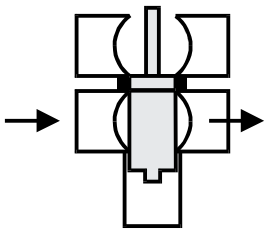
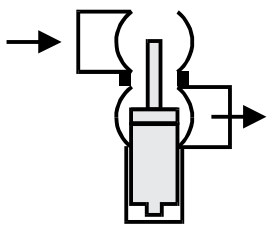
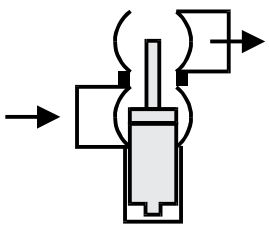


max. line pressure	**: 10 bar**
max. operating temperature	**: 135°C EPDM, HNBR**
short - term temperature	**: 140°C EPDM, HNBR**
tightening torque of stop screw at lower valve shaft	**: 25Nm**
tightening torque of safety nut at upper and lower valve shaft	**: 40Nm**
leakage gap between upper and lower valve shaft **fig. 8** (check after stop screw being screwed in)	**: ca. 4mm**
cleaning connection (for hose)	
DN 40 - 100, 1,5" - 4"	**: 8x1mm**
DN 125 - 150, 6"	**: 10x1mm**
air connection (for hose)	**: 6x1mm**
max. pneumatic air pressure	**: 10 bar**
min. pneumatic air pressure	**: 6 bar**

(Use dry and clean air only)

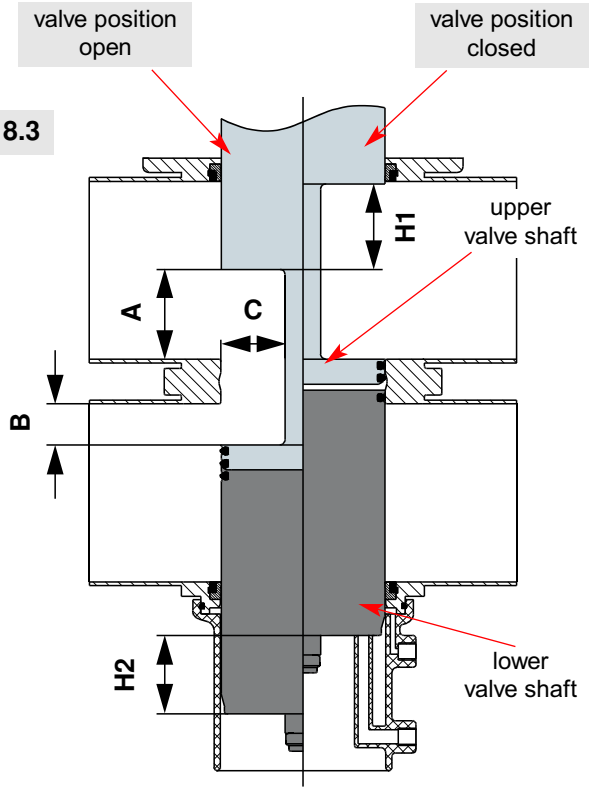
8.1	air consumption actuator in NL / stroke	closing times in sec. hose length	
DN / inch		**1m**	**10m**
40 / 1,5"	**0,9**	1,5	2,5
50 / 2"	**1,1**	1,5	2,5
65 / 2,5"	**1,3**	1,5	2,5
3"	**1,3**	1,5	2,3
80	**2,3**	3,0	4,0
100 / 4"	**2,3**	3,0	4,0
125	**4,0**	5,0	6,0
150 / 6"	**6,4**	8,0	9,0

8. Technical Data

8.2	kvs - values in m ³/ h			
				
DN				
40	57	46	23	25
50	120	95	42	45
65	219	148	69	78
80	296	200	120	130
100	505	320	164	170
125	800*	500*	300	330
150	1200*	700*	360	380
inch				
1,5”	47	40	21	24
2”	100	73	43	46
2,5”	170	122	59	66
3”	213	160	71	80
4”	490	294	150	160
6”	1150*	670*	340	360

*** no measuring value**

fig. 8.3



8.3 table to fig. 8.3
dimensions in mm

DN	A	B	C	stroke H1 upper shaft	stroke H2 lower shaft
40	6,5	5	21,2	30	26
50	11,5	12	21,2	37	33
65	21,5	18	21,2	43	39
80	31,5	23	36,2	48	44
100	50,5	23	36,2	48	44
125	69,5	29	42,7	54	50
150	86,5	37	54,7	62	58
inch					
1,5”	6,5	5	21,2	30	26
2”	11,5	12	21,2	37	33
2,5”	15,5	18	21,2	43	39
3”	27,6	18	21,2	43	39
4”	50,5	23	36,2	48	44
6”	86,5	37	54,7	62	58

9. Materials

product-wetted parts	1.4571, 1.4404
other parts	1.4301
seals:	
standard	EPDM/PTFE
option	HNBR/PTFE
actuator	PA 12 GF 30
shaft bearing	PPS
spray connection	PP GF30

10. Maintenance

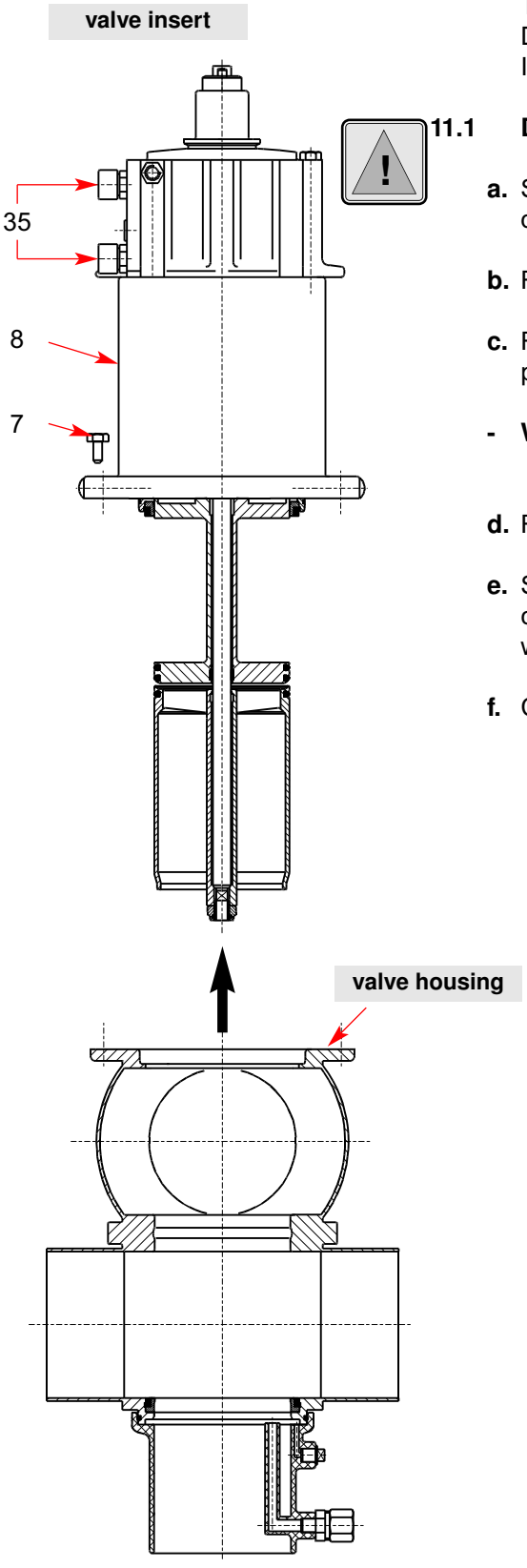
- The maintenance intervals depend on the application and should be determined by the user carrying out regular checks.
- Compressed air is not required to dismantle the valve.
- Tools required:
- 1 x spanner SW13
- 2 x spanner SW17
- 2 x spanner SW24
- disassembly and assembly support for the lower shaft seal ref.-No. 000 51-13-100/17
- Replacement of seals according to Service Instructions. The customer is recommended to hold spare seals on stock. For valve maintenance APV supplies complete seal kits including seal grease (pl. see spare parts lists).
- The valve must not be cleaned with products containing abrasive or polishing substances. Especially the valve shafts must not be cleaned with such agents under any circumstances. Damage of the valve shaft can produce leakages.
- Assembly of the valve according to Service Instructions.
- **All seals must be provided with a thin layer of grease before their installation. (see lubrication chart)**

  Recommendation:
  APV food-grade-grease for EPDM, HNBR and FPM
  (0,75 kg /tin - ref.-No. 000-70-01-019/93)
  (60 g /tube - ref.-No. 000-70-01-018/93)

! **Do not use grease on mineral oil basis for EPDM seals.**

Recommendation for the actuator:
APV pneumatic grease
(25 ml /tube) - ref.-No. 000-70-01-008/93)

11. Service Instructions



The item numbers refer to the spare parts drawings
DIN design: **RN 01.053.71**
Inch design: **RN 01.053.71-2**

11.1 Dismantling from the piping system

a. Shut off the line pressure in the product and cleaning lines, discharge the pipes if possible.

b. Remove the pneumatic air line and the flushing connection lines.

c. Release the nut of the proximity switch holder **(35)** and pull off the proximity switch.

- **With CU design:** Take off the control unit by turning the safety ring.

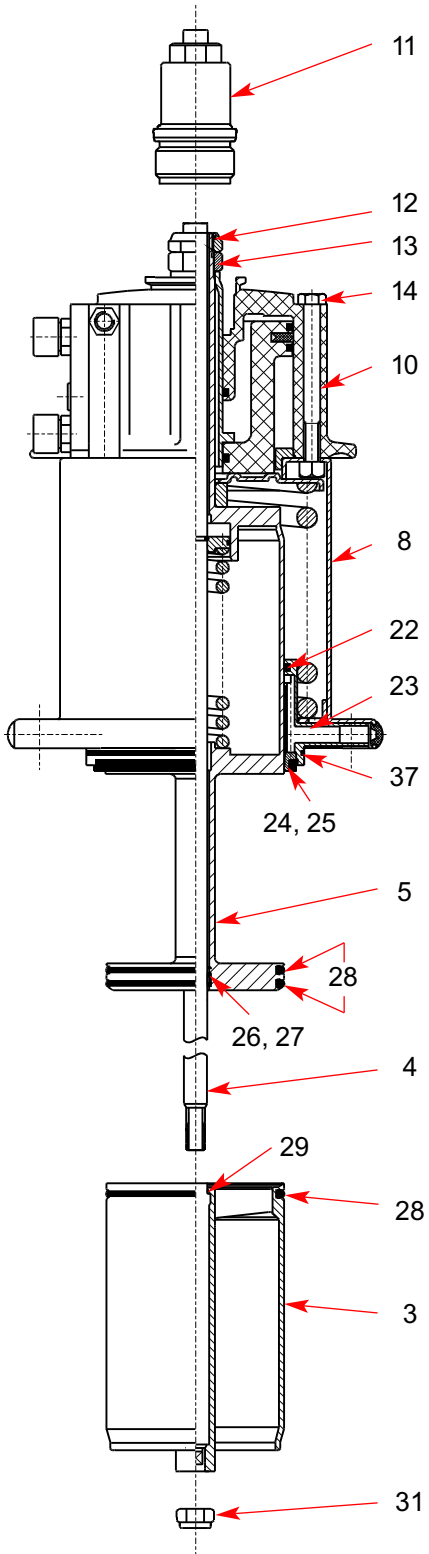
d. Remove the hex. screws **(7)** at the spring cylinder **(8)**.

e. Screw in one flange screw into the threaded bore of the spring cylinder to lift the complete valve insert. Do not remove the screw which will help to re-install the valve insert.

f. Carefully lift the valve insert vertically out of the valve housing.

11. Service Instructions

11.2 Dismantling of product-wetted parts (service)



- **With CU design:** Release the 4 inner hex. screws and take off the CU adapter.

a. Screw off the stop screw **(11)**.

b. Release the lower safety nut **(31)**. Hold up the lower shaft **(3)** with a spanner SW17 to prevent it from turning.

c. Having removed the nut **(31)**, pull the lower shaft **(3)** off the guide rod **(4)**.

d. Dismantling of seals from the lower shaft **(3).** Stick into the lower seat seal **(28)** with a peaked object and pull the seal out of the groove. Pull the o-ring **(29)** out of the groove.

e. Pull off the guide rod to the top.

f. Remove the safety nut **(12)**. Holding up the safety disc **(13)** with a spanner SW24 prevents the upper shaft **(5)** from turning.

g. Lift off the main cylinder **(10)** with spring cylinder **(8)** and shaft bearing **(23)** (maintenance of spring cylinder, see **11.3**).

h. Dismantling of seals from the upper shaft **(5).** Stick into the upper and middle seat seal with a peaked object und pull them out of the groove. Afterwards, lift the two supporting rings **(26)** and the quadring (**27)** off the groove.

i. Dismantling of seals from the shaft bearing **(23).** Remove the upper shaft seal **(24, 25)** from the groove. Take the quadring **(22)** and o-ring **(37)** out of the groove.

j. Dismantling of lower shaft seal **(24, 25)** from the housing. Take the metallic tip of the dismantling tool to stick into the elastomer seal **(25)** from the top and pull the seal off to the top. Then, take the tip of the assembly tool to pull the PTFE seal **(24)** off to the top through the housing.

11. Service Instructions

11.3 Maintenance of main cylinder

Dismantle the actuator, main cylinder (10) and spring cylinder (8) from the valve insert as described in 11.2 a.-g.

11.3.1 Disassembly of main cylinder and dismantling of seals

a. Remove the fastening screws **(14)**.
- Remove the main cylinder **(10)** from the spring cylinder.

b. Press the piston rod out of the main cylinder.
Remove the cover and the piston with piston rod.

c. Draw the piston rod out of the piston.

d. Remove the quadring in the piston and in the main cylinder.

e. Remove the piston seal.

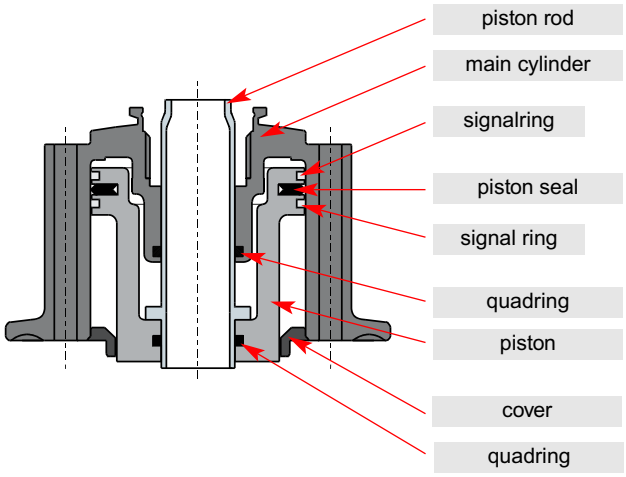
f. Clean the main cylinder, cover, piston rod and piston.

11.3.2 Installation of seals and assembly of main cylinder

a. Slightly grease the quadrings and the piston seal.
Use appropriate pneumatic grease.
- **Recommendation for actuator (main cylinder):**
APV pneumatic grease:
(25 ml tube - ref.-No. 000 70-01-008/93)

b. Insert the quadrings and the piston seal.

c. Assembly to be undertaken in reverse order to the procedure described in 11.3.1.



11. Service Instructions

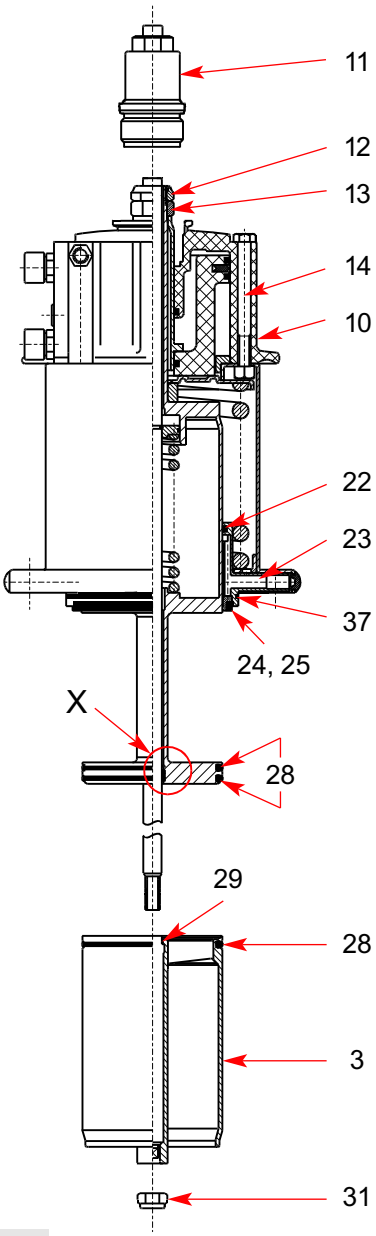
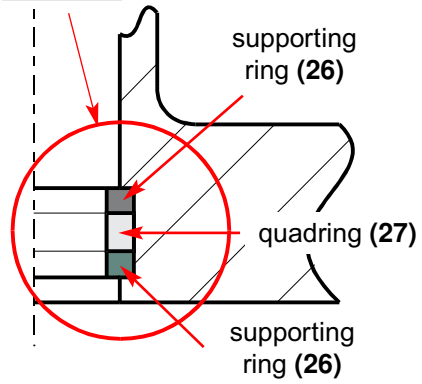


fig. X



11.4 Installation of product-wetted seals and assembly of the DELTA DE3 valve

All seals and guides can be serviced.
Attention: **See to all seals and bearing surfaces in the product area being carefully greased before their assembly.**
(see Lubrication Chart: RN 260.086-1)

a. Install the lower shaft seal **(24, 25)** in the lower housing flanges **(see page 18)**.

b. Install the quadring **(22)** and o-ring **(37)** in the shaft bearing **(23)**.

c. Afterwards insert the first supporting ring **(26),** then the quadring **(27)** and then the second supporting ring **(26)** into the upper shaft **(see fig. X)**

d. Install the o-ring **(29)** in the lower shaft **(3).**

e. Insert the 3 seat seals **(28)** into the grooves of the upper and lower shafts.
(see page 20 Service Instructions for Seat Seals)
(seals are symmetric).

f. Slide the upper shaft through the shaft bearing and the actuator. Screw up the upper shaft and actuator with the safety nut **(12)** and safety disc **(13).**
Tightening torque: Md = 40 Nm

g. Installation of the upper shaft seal **(24, 25).**
First of all, slide the PTFE-ring **(24)** over the seat of the upper shaft and place it in the open groove of the shaft bearing **(23).** Then press the elastomer ring **(25)** with the wide side to the front into the groove.

h. Push in the guide rod **(5)** from the top until it stops.

i. Fasten the stop screw **(11)** until stop.
Tightening torque: Md = 25 Nm

j. Slide the lower valve shaft **(3)** on the guide rod.
Fasten the valve shaft with the safety nut **(31).**
Tightening torque: Md = 40 Nm

Attention: Check the leakage gap **(4 mm)** between the upper and lower valve shaft **(see page 10)**.

- **CU design:** Place the CU adapter and fasten it with the 4 inner hexagon screws.

11. Service Instructions

11.5 Installation of valve insert

a. Carefully place the valve insert in the valve housing until the screw stops.

b. Remove the pulling screw and carefully press the valve insert into the housing.

c. Screw in the screws **(7)** and tighten them crosswise.

d. CU design: Place the control unit and fasten it with the safety ring.

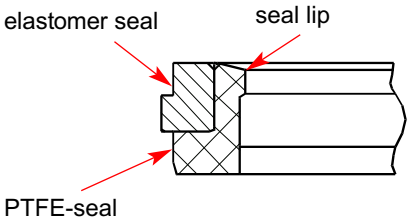
e. Install the pneumatic air and cleaning lines.

f. Install the valve position indicator.
Release the union nut and slide the proximity switches into the socket until they stop.

g. Tighten the proximity switches with nut.

12. Disassembly and Assembly Tool
(for lower shaft seal, pos. 24, 25)

Seal 24, 25



assembly tool

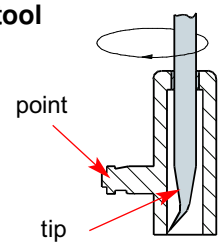
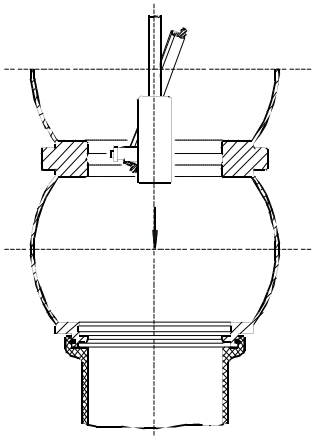


fig. 1



For a simple dismantling and installation of the lower shaft seal, the combi tool (ref.-No. 000 51-13-100/17) should be used. Support of this tool is especially recommended for valves of the small series (DN 40 - 65, 1.5" - 3") for the lower shaft seal cannot be reached from the top as a result of the narrow seat.

CAUTION!
Do not damage the seal lip of the PTFE seal during assembly.
To prevent injuries, the disassembly point, if not used, must be covered by the assembly tip.

1) Assembly of the PTFE seal (fig. 1, 2)

a) Press the PTFE ring into an oval shape.
b) Introduce the PTFE ring, the wide side to the front, from the top through the housing intermediate ring into the lower housing by means of the assembly tool **(fig. 1)**.
c) Round off the PTFE by means of the assembly tip **(fig. 2 / I)** and press it into the groove. Do not strike or beat **(fig. 2 / II)**.

2) Assembly of the elastomer seal (fig. 1, 3, 4)

a) Lightly grease the seal.
b) Introduce the elastomer, the wide side to the front, from the top through the housing intermediate ring into the lower housing by means of the assembly tool **(fig. 1)**.
c) Fix the seal by means of the locating groove of the assembly tip **(fig. 3 / I)**.
d) Press in the elastomer at one spot between housing flange and PTFE **(fig. 3 / II)**.
e) Pull the seal completely into the groove by passing around it with the assembly tip **(fig. 4)**. Check if the elastomer seal is evenly installed in the groove.

fig. 2

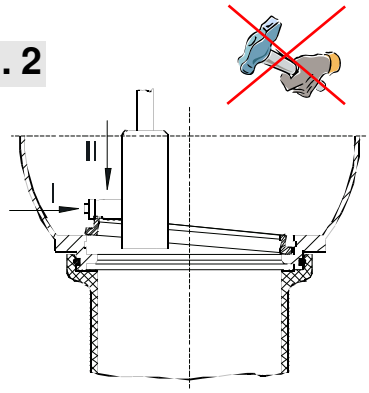


fig. 3

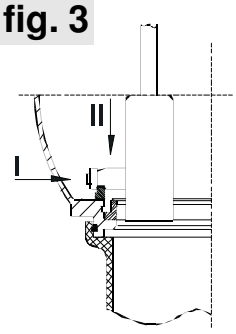
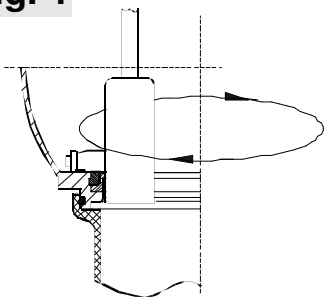
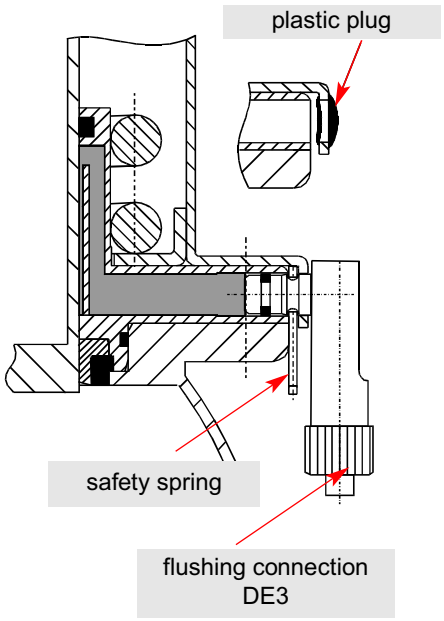


fig. 4



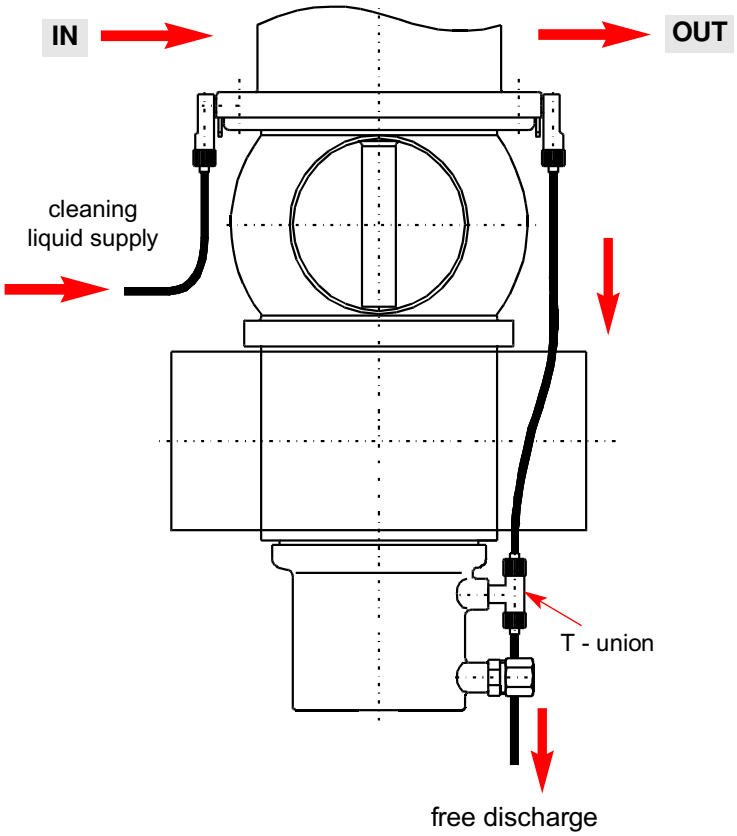
13. Service Instructions for Shaft Flushing

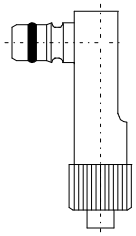


- Remove the plastic plug.
- Insert the plug connections and secure them with the safety spring.
- Insert and fix the supply hose for cleaning liquids in the plug connection.
  Identification: **IN**
- Insert and fix the discharge hose for cleaning liquids in the plug connection.
  Identification: **OUT**
- Screw the T-union into the drain pipe and hose it.
- Check the passage of the cleaning liquid.

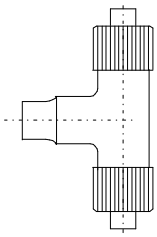
Assembly kit for shaft flushing complete
DN40 - 100 , 1,5”-4” : ref.No.: 000 - 34 - 12 - 299/99
DN125 - 150, 6” : ref.No.: 000 - 34 - 18 - 299/99

Consisting of:



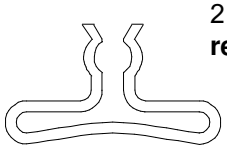


DN 40 - 150 / 1,5” - 6”
2 x flushing connection DE3
ref.No.: 000 - 16 - 38 - 070/93



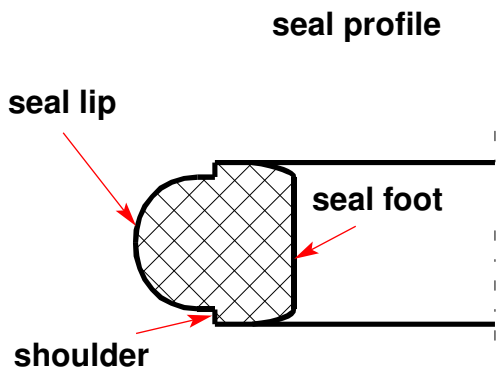
DN 40 - 100 / 1,5”- 4”
1 x T - union 8-1/8”-8
ref.No.: 000 - 08 - 63 - 371/93

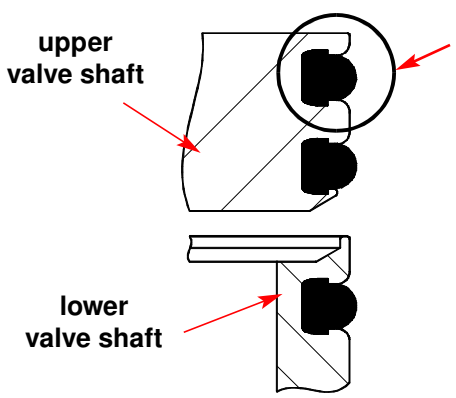
DN 125 - 150, 6”
1 x T - union 8-1/4”-8
ref.No.: 000 - 08 - 63 - 372/93



DN 40 - 150, 1,5” - 6”
2 x safety spring DE3
ref.No.: 000 - 67 - 03 - 015/03

14. Service Instructions for the Installation of Seat Seals

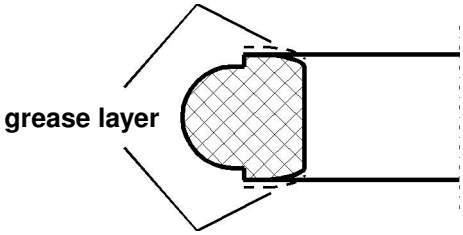




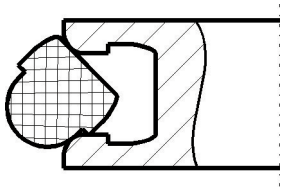
Attention: Shoulder of the seal must be placed evenly in the seal groove.

(fig. X)

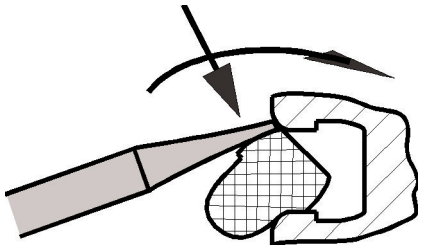
1. **Provide the seal shoulder with a thin layer of grease.**



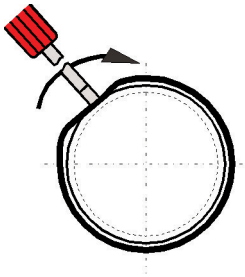
2. Insert the seat seal into the valve shaft; see to an even inclined position of the seal.



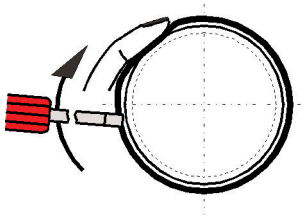
3. Press the seal circumferentially into the groove by means of an assembly tool (use screw driver with round edges).
Place the assembly tool at the upper seal shoulder. To get an even fit of the seal, proceed step by step:



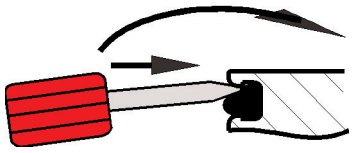
3.1 Press a short part of the seal into the groove.



3.2 Fix the seal - already pressed in - by your finger (to prevent loops). Use the assembly tool to press a short part of the seal into finger direction. Install the seal in the groove circumferences.



4. Press the assembly tool between the seal shoulder and the groove edge (both sides). Proceed around the circumferences. Then proceed around the circumferences of the lower seal shoulder. This is to vent the seal groove and to lock the seal shoulder.



15. Detection of Seal Damage

Failure	*Remedy*
Leakage at upper housing flange	**Replace upper shaft seal (24, 25).**
Leakage at the drain pipe	**Remove the drain pipe (1) to verify the leakage.**
Leakage at the outside of the lower valve shaft	**Replace lower shaft seal (24, 25).**
Valve closed and pressure in upper housing	
Leakage from the leakage chamber of the lower valve shaft.	**Replace upper seat seal (28).**
Valve closed and pressure in lower housing Remove spray connection.	
Leakage from the leakage chamber of the lower valve shaft.	**Replace lower seat seal (28).**
Valve open	
Leakage from the leakage chamber of the lower valve shaft.	**Replace middle seal (28).**

! ***When damaged seals are changed, generally all seals should be replaced. For valve service actions APV supplies complete seal kits (see spare parts lists).***

16. 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.

Subject to changes.

BA DE3 0000002
ID-No.: H 1 7 0 7 3 1

UK

Translation of original manual

rev. 4

WHERE IDEAS MEET INDUSTRY

Your local contact:

APV
Zechenstraße 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.

02/94

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 DN 40-150

Double seat valve DE3 DN 40-150

Besteht aus 4 Blatt Blatt 1

	Datum	Name
Gezeichnet	3.6.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	6/97	7/98	01/00	01/01	10/01	03/03	01/05	07/05	
Name	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	

APV Rosista GmbH
D-59425 Unna
Germany

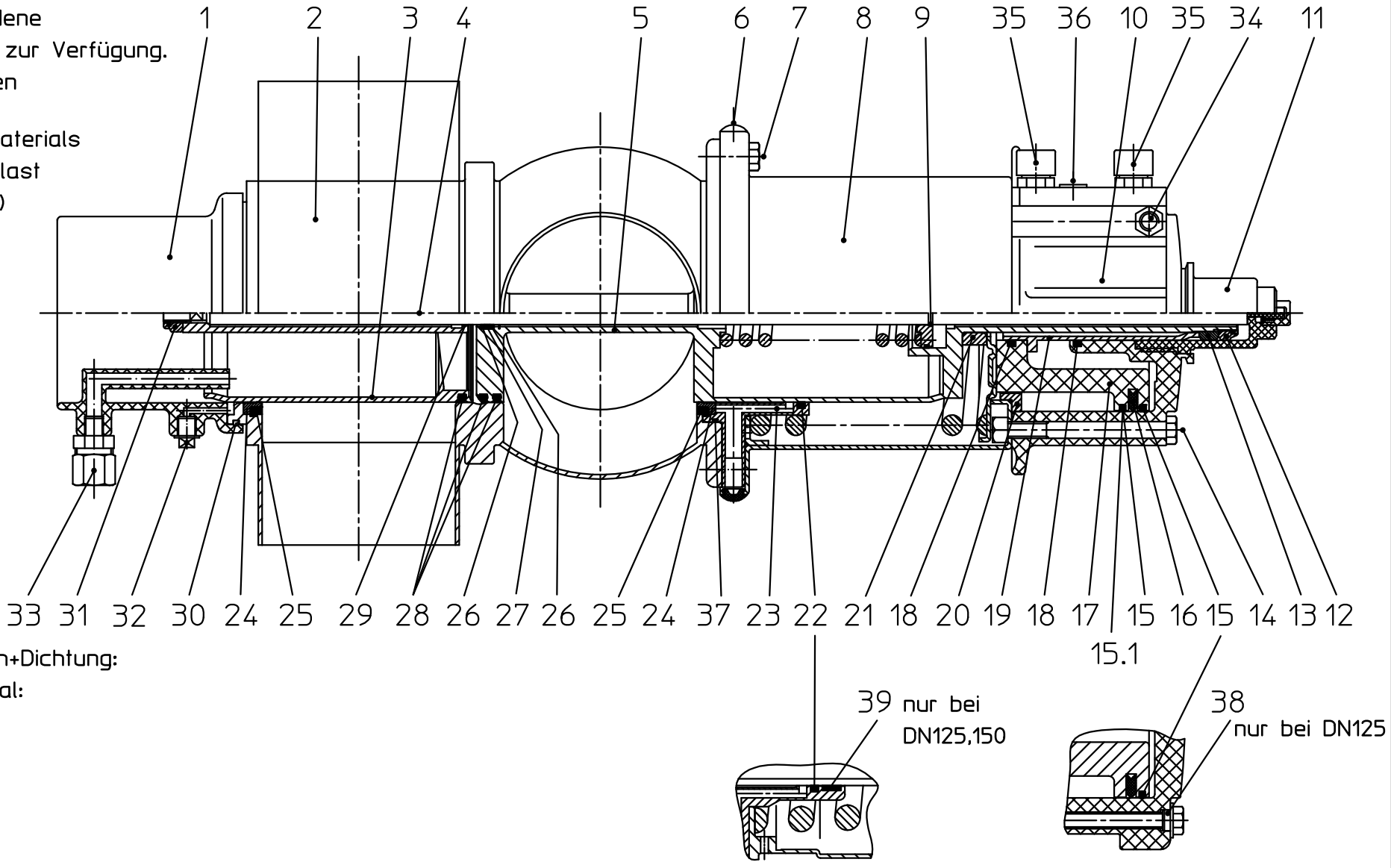
RN 01.053.71

Es stehen verschiedene Dichtungswerkstoffe zur Verfügung. Bitte WS-Nr. ergänzen

The following seal materials are available (fill in last two digits of ref.-no.)

*Dichtungswerkstoff:
material seals:

../33-HNBR
../73-FPM
../93-EPDM



**Werkstoff metallisch+Dichtung:
material metallic+seal:

../29-HNBR 1.4404
../59-EPDM 1.4404
../69-FPM 1.4404

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 DN 40-150

Double seat valve DE3 DN 40-150

Blatt 2

	Datum	Name
Gezeichnet	3.6.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	6/97	01/00	05/00	01/01	03/03	07/05
Name	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.71

Pos. item	Menge quantity	Benennung description	DN 25 WS-Nr. ref.-no.	40 WS-Nr. ref.-no.	50 WS-Nr. ref.-no.	65 WS-Nr. ref.-no.	80 WS-Nr. ref.-no.	100 WS-Nr. ref.-no.	125 WS-Nr. ref.-no.	150 WS-Nr. ref.-no.
1	1	Spritzanschluß Cip connection		09-40-114/93	=	=	09-40-115/93	=	09-40-117/93	09-40-118/93
2	1	Gehäuse DE31 1+2S Housing		16-66-376/47	16-66-426/47	16-66-476/47	16-66-526/47	16-66-626/47	16-66-676/47	16-66-726/47
	1	Gehäuse DE32 1+2+3S Housing		16-67-376/47	16-67-426/47	16-67-476/47	16-67-526/47	16-67-626/47	16-67-676/47	16-67-726/47
	1	Gehäuse DE33 1+2+3S Housing		16-68-376/47	16-68-426/47	16-68-476/47	16-68-526/47	16-68-626/47	16-68-676/47	16-68-726/47
	1	Gehäuse DE34 1+2+3+4S Housing		16-69-376/47	16-69-426/47	16-69-476/47	16-69-526/47	16-69-626/47	16-69-676/47	16-69-726/47
3	1	Schaft unten Lower valve shaft		16-21-377/42	16-21-427/42	16-21-477/42	16-21-527/42	16-21-627/42	16-21-677/42	16-21-727/42
4	1	Zugstange Guide rod		16-24-398/42	16-24-448/42	16-24-498/42	16-24-548/42	16-24-648/42	16-24-698/42	16-24-748/42
5	1	Schaft oben Upper valve shaft		16-21-376/42	16-21-426/42	16-21-476/42	16-21-526/42	16-21-626/42	16-21-676/42	16-21-726/42
6	2	Blindstopfen Blind plug		08-74-030/93	=	=	=	=	=	=
7	4	Skt. Schraube Hex. screw		DIN EN 24017-M8x25-A2-70					DIN EN 24017 -M8x28-A2-70	DIN EN 24017 M10x30-A2-70
8	1	Federzylinder Spring actuator		16-30-250/12	=	=	16-30-251/12	=	16-30-772/12	16-30-774/12
9	1	Sprengring Retainer ring		08-39-083/13	=	=	=	=	=	=
10	1	Hauptzylinder Main actuator		16-30-244/93	=	=	16-30-245/93	=	16-30-243/93	16-30-246/93
11	1	Anschlagschraube stop sleeve		16-28-704/93	=	=	=	=	=	=
12	1	Sicherungsmutter Stop nut		65-50-137/15	=	=	=	=	=	=
13	1	Sicherungsscheibe Lock washer		67-03-001/15	=	=	=	=	=	=
14	4	Skt. Schraube Hex. screw		DIN EN 24017-M8x85-A2-70			DIN EN 24017-M8x90-A2-70			DIN EN 24017 M10x105-A2-70
15		Signalring Signal ring		2x 16-02-020/17	=	=	1x 16-02-021/17	=	1x 16-02-022/17	1x 16-02-023/17
15.1		Signalring DE3-92-II Signal ring					1x 16-02-016/57	=		
16	1	Kolbendichtung Piston seal		PKK1-82 58-01-760/83	=	=	PKK1-102 58-01-761/83	=	PKK1-127 58-01-762/83	PKK1-152 58-01-763/83

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 DN 40-150

Double seat valve DE3 DN 40-150

Blatt 3

	Datum	Name
Gezeichnet	3.6.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	6/97	03/03	05/04	07/05
Name	Trytko	Trytko	Trytko	Trytko

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.71

Pos. item	Menge quantity	Benennung description	DN 25 WS-Nr. ref.-no.	40 WS-Nr. ref.-no.	50 WS-Nr. ref.-no.	65 WS-Nr. ref.-no.	80 WS-Nr. ref.-no.	100 WS-Nr. ref.-no.	125 WS-Nr. ref.-no.	150 WS-Nr. ref.-no.
17	1	Kolben Piston		16-29-124/93	=	=	16-29-125/93	=	16-29-127/93	16-29-128/93
18	2	Quadring Quadring Q 4216-N7004		58-01-236/83	=	=	=	=	=	=
19	1	Kolbenstange Piston shaft		16-29-130/12	=	=	16-29-131/12	=	16-29-132/12	16-29-133/12
20	1	Deckel HZyl. Cover for main actuator		16-24-127/93	16-24-126/93	16-24-124/93	16-24-125/93	=	16-24-128/93	16-24-129/93
21	1	Distanzhülse Spacer bush		16-28-230/12	=	=	=	=		
22	1	Quadring Quadring Q 4230-E7502		58-01-329/64	=	=	58-01-238/64	=	58-01-240/83	58-01-791/63
23	1	Schaftlager Shaft bearing		16-28-212/93	=	=	16-28-213/93	=	16-28-369/12	16-28-368/42
24	2	Schaftdichtung Shaft seal		58-33-016/23	=	=	58-33-017/23	=	58-33-140/23	58-33-018/23
25	2	Tellerdichtung Seat seal *		58-33-493/	=	=	58-33-643/	=	58-33-693/	58-33-743/
26	2	Stützring Support ring		58-01-048/23	=	=	=	=	=	=
27	1	Quadring Quadring Q 4112-N7004		58-01-049/93	=	=	=	=	=	=
28	3	Sitzdichtung Seat seal *		58-33-132/	=	=	58-33-133/	=	58-33-135/	58-33-134/
29	1	O-Ring O-ring OR-12x1		58-06-040/63	=	=	=	=	=	=
30	1	O-Ring O-ring		69x3 58-06-295/63	=	=	100x3 58-06-490/63	=	115x3 58-06-555/63	135x3 58-06-655/63
31	1	Sicherungsmutter Self-locking nut M10x1		65-50-087/15	=	=	=	=	=	=
32	1	Entlüftungsstopfen Venting plug		G1/8 08-60-005/93	=	=	=	=	G1/4 08-60-007/93	=
33	1	G.Verschraubung Straight union		8x1 G1/8 08-63-003/13	=	=	=	=	10x8 G1/4 08-63-006/13	=
34	1	Verschraubung Union EG 6x1 G1/8		08-60-750/93	=	=	=	=	=	=
35	2	Initiatorhalterung Mounting block		15-33-918/93	=	=	=	=	=	=
36	1	Verschlußkappe Cap 11,1x5		08-05-066/93	=	=				

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 DN 40-150

Double seat valve DE3 DN 40-150

Blatt 4

	Datum	Name
Gezeichnet	3.6.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	6/97	01/00	01/01	10/01	03/03	01/05	04/05	07/05	
Name	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.71

Pos. item	Menge quantity	Benennung description	DN 25 WS-Nr. ref.-no.	40 WS-Nr. ref.-no.	50 WS-Nr. ref.-no.	65 WS-Nr. ref.-no.	80 WS-Nr. ref.-no.	100 WS-Nr. ref.-no.	125 WS-Nr. ref.-no.	150 WS-Nr. ref.-no.
37	1	O-Ring O-ring		74x2 58-06-332/73	=	=	105x2 58-06-503/73	=	125x2 58-06-589/73	150x2 58-06-691/63
38	4	Buchse Bushing							08-01-127/12	
39	1	Führungsband PTFE driving band							08-39-189/93	08-39-289/93
	1	Ventileinsatz ** Valve insert		16-36-382/	16-36-432/	16-36-482/	16-36-532/	16-36-632/	16-36-682/	16-36-607/
		Pos. 23, 24, 25, 26, 27, 28, 29, 37, 39 nur im kompletten Dichtungssatz erhältlich item. 23, 24, 25, 26, 27, 28, 29, 37, 39 available as complete seal kits only								
	1	Dichtungssatz FPM Seal kit		58-34-660/00	=	=	58-34-663/00	=	58-34-691/00	58-34-695/00
	1	Dichtungssatz EPDM Seal kit		58-34-660/01	=	=	58-34-663/01	=	58-34-691/01	58-34-695/01
	1	Dichtungssatz HNBR Seal kit		58-34-660/06	=	=	58-34-663/06	=	58-34-691/06	58-34-695/06
	1	Anbauteile für den Umbau der Ventile für die obere Schaftspülung Mounting kit for reconstruction of valves for upper shaft flushing		34-12-299/99	=	=	=	=	34-12-298/99	=

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 1,5-6 zoll

Double seat valve DE3 1,5-6 inch

Besteht aus 4 Blatt Blatt 1

	Datum	Name
Gezeichnet	4.7.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	7/97	7/98	01/00	01/01	10/01	03/03	01/05	07/05	
Name	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	

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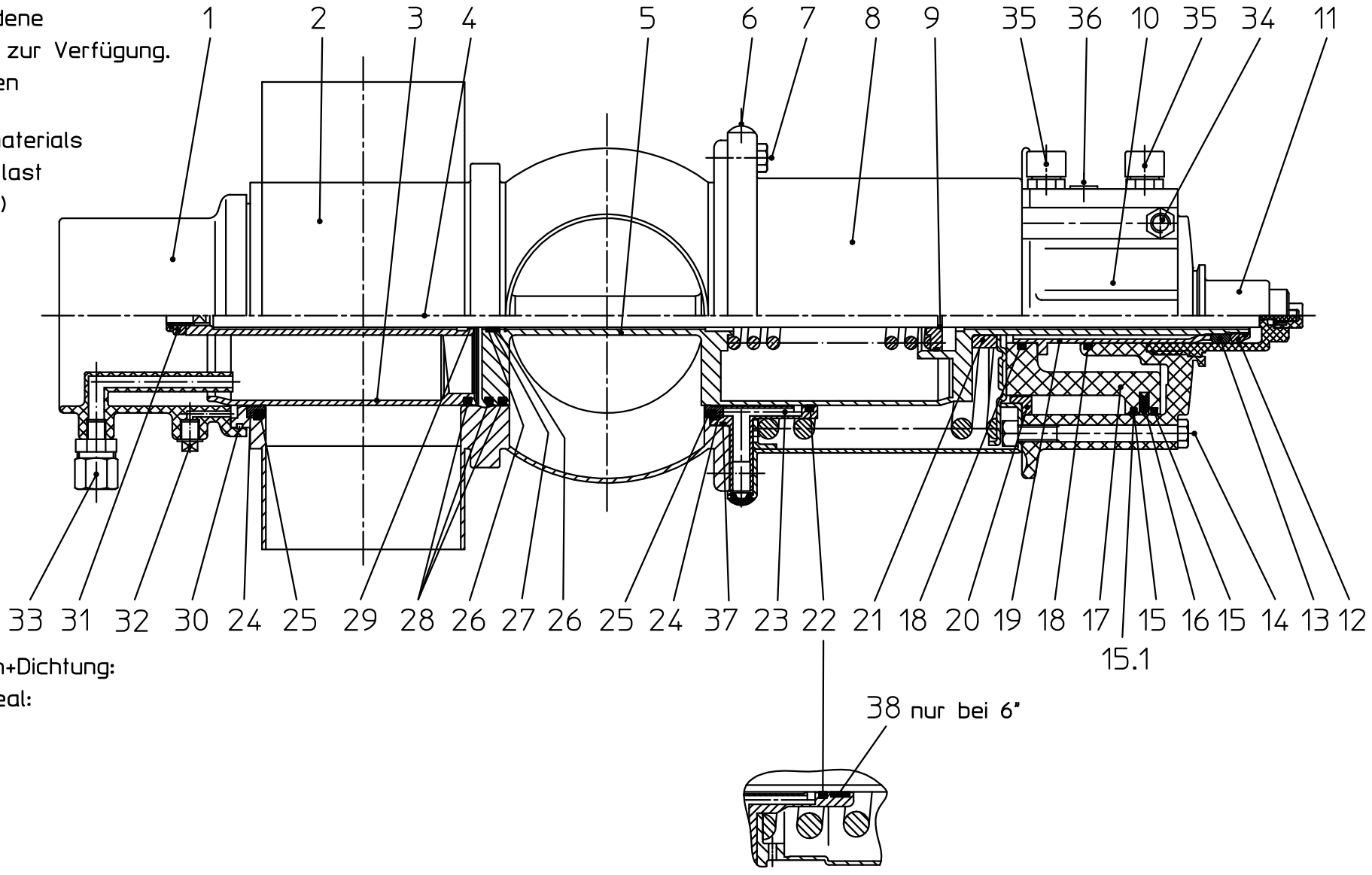
Es stehen verschiedene Dichtungswerkstoffe zur Verfügung. Bitte WS-Nr. ergänzen

The following seal materials are available (fill in last two digits of ref.-no.)

* Dichtungswerkstoff:
material seals:

../33-HNBR
../73-FPM
../93-EPDM



** Werkstoff metallisch+Dichtung:
material metallic+seal:

../29-HNBR 1.4404
../59-EPDM 1.4404
../69-FPM 1.4404

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 1,5-6 zoll

Double seat valve DE3 1,5-6 inch

Blatt 2

	Datum	Name
Gezeichnet	4.7.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	7/97	01/00	01/01	03/03	07/05				
Name	Trytko	Trytko	Trytko	Trytko	Trytko				

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Germany

RN 01.053.71-2

Pos. item	Menge quantity	Benennung description	1" WS-Nr. ref.-no.	1,5" WS-Nr. ref.-no.	2" WS-Nr. ref.-no.	2,5" WS-Nr. ref.-no.	3" WS-Nr. ref.-no.	4" WS-Nr. ref.-no.	6" WS-Nr. ref.-no.	WS-Nr. ref.-no.
1	1	Spritzanschluß Cip connection		09-40-114/93	=	=	=	09-40-115/93	09-40-118/93	
2	1	Gehäuse DE31 1+2S Housing		16-66-401/47	16-66-451/47	16-66-501/47	16-66-551/47	16-66-651/47	16-66-776/47	
	1	Gehäuse DE32 1+2+3S Housing		16-67-401/47	16-67-451/47	16-67-501/47	16-67-551/47	16-67-651/47	16-67-776/47	
	1	Gehäuse DE33 1+2+3S Housing		16-68-401/47	16-68-451/47	16-68-501/47	16-68-551/47	16-68-651/47	16-68-776/47	
	1	Gehäuse DE34 1+2+3+4S Housing		16-69-401/47	16-69-451/47	16-69-501/47	16-69-551/47	16-69-651/47	16-69-776/47	
3	1	Schaft unten Lower valve shaft		16-21-377/42	16-21-427/42	16-21-502/42	16-21-552/42	16-21-627/42	16-21-727/42	
4	1	Zugstange Guide rod		16-24-398/42	16-24-448/42	16-24-523/42	16-24-573/42	16-24-648/42	16-24-748/42	
5	1	Schaft oben Upper valve shaft		16-21-376/42	16-21-426/42	16-21-501/42	16-21-551/42	16-21-626/42	16-21-726/42	
6	2	Blindstopfen Blind plug		08-74-030/93	=	=	=	=	=	
7	4	Skt. Schraube Hex. screw		DIN EN 24017-M8x25-A2-70					DIN EN 24017 M10x30-A2-70	
8	1	Federzylinder Spring actuator		16-30-250/12	=	=	=	16-30-251/12	16-30-774/12	
9	1	Sprengring Retainer ring		08-39-083/13	=	=	=	=	=	
10	1	Hauptzylinder Main actuator		16-30-244/93	=	=	=	16-30-245/93	16-30-246/93	
11	1	Anschlagschraube stop sleeve		16-28-704/93	=	=	=	=	=	
12	1	Sicherungsmutter Stop nut		65-50-137/15	=	=	=	=	=	
13	1	Sicherungsscheibe Lock washer		67-03-001/15	=	=	=	=	=	
14	4	Skt. Schraube Hex. screw		DIN EN 24017-M8x85-A2-70				DIN EN 24017 -M8x90-A2-70	DIN EN 24017 M10x105-A2-70	
15		Signalring Signal ring		2x 16-02-020/17	=	=	=	1x 16-02-021/17	1x 16-02-023/17	
15.1		Signalring DE3-92-II Signal ring						1x 16-02-016/57		
16	1	Kolbendichtung Piston seal		PKK1-82 58-01-760/83	=	=	=	PKK1-102 58-01-761/83	PKK1-152 58-01-763/83	

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 1,5-6 zoll

Double seat valve DE3 1,5-6 inch

Blatt 3

	Datum	Name
Gezeichnet	4.7.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	7/97	05/04	07/05							
Name	Trytko	Trytko	Trytko							

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.71-2

Pos. item	Menge quantity	Benennung description	1" WS-Nr. ref.-no.	1,5" WS-Nr. ref.-no.	2" WS-Nr. ref.-no.	2,5" WS-Nr. ref.-no.	3" WS-Nr. ref.-no.	4" WS-Nr. ref.-no.	4" WS-Nr. ref.-no.	WS-Nr. ref.-no.
17	1	Kolben Piston		16-29-124/93	=	=	=	16-29-125/93	16-29-128/93	
18	2	Quadring Quadring Q 4216-N7004		58-01-236/83	=	=	=	=	=	
19	1	Kolbenstange Piston shaft		16-29-130/12	=	=	=	16-29-131/12	16-29-133/12	
20	1	Deckel HZyl. Cover for main actuator		16-24-127/93	16-24-126/93	16-24-124/93	=	16-24-125/93	16-24-129/93	
21	1	Distanzhülse Spacer bush		16-28-230/12	=	=	=	=		
22	1	Quadring Quadring Q 4230-E7502		58-01-329/64	=	=	=	58-01-238/64	58-01-791/63	
23	1	Schaftlager Shaft bearing		16-28-212/93	=	=	=	16-28-213/93	16-28-368/42	
24	2	Schaftdichtung Shaft seal		58-33-016/23	=	=	=	58-33-017/23	58-33-018/23	
25	2	Tellerdichtung Seat seal *		58-33-493/	=	=	=	58-33-643/	58-33-743/	
26	2	Stützring Support ring		58-01-048/23	=	=	=	=	=	
27	1	Quadring Quadring Q 4112-N7004		58-01-049/93	=	=	=	=	=	
28	3	Sitzdichtung Seat seal *		58-33-132/	=	=	=	58-33-133/	58-33-134/	
29	1	O-Ring O-ring OR 12x1		58-06-040/63	=	=	=	=	=	
30	1	O-Ring O-ring		69x3 58-06-295/63	=	=	=	100x3 58-06-490/63	135x3 58-06-655/63	
31	1	Sicherungsmutter Self-locking nut M10x1		65-50-087/15	=	=	=	=	=	
32	1	Entlüftungsstopfen Venting plug G1/8		08-60-005/93	=	=	=	=	=	
33	1	G.Verschraubung Straight union 8x1 G1/8		08-63-003/13	=	=	=	=	=	
34	1	Verschraubung Union EG 6x1 G1/8		08-60-750/93	=	=	=	=	=	
35	2	Initiatorhalterung Mounting block		15-33-918/93	=	=	=	=	=	
36	1	Verschlußkappe Cap 11,1x5		08-05-066/93	=	=	=			

Ersatzteilliste: spare parts list:

Doppelsitzventil DE3 1,5-6 zoll

Double seat valve DE3 1,5-6 inch

Blatt 4

	Datum	Name
Gezeichnet	4.7.97	Trytko
Geprüft	23.7.97	Fischer
Normgepr.	30.7.97	Plümper

Datum	7/97	01/00	01/01	10/01	03/03	01/05	04/05	07/05	
Name	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	

APV Rosista GmbH
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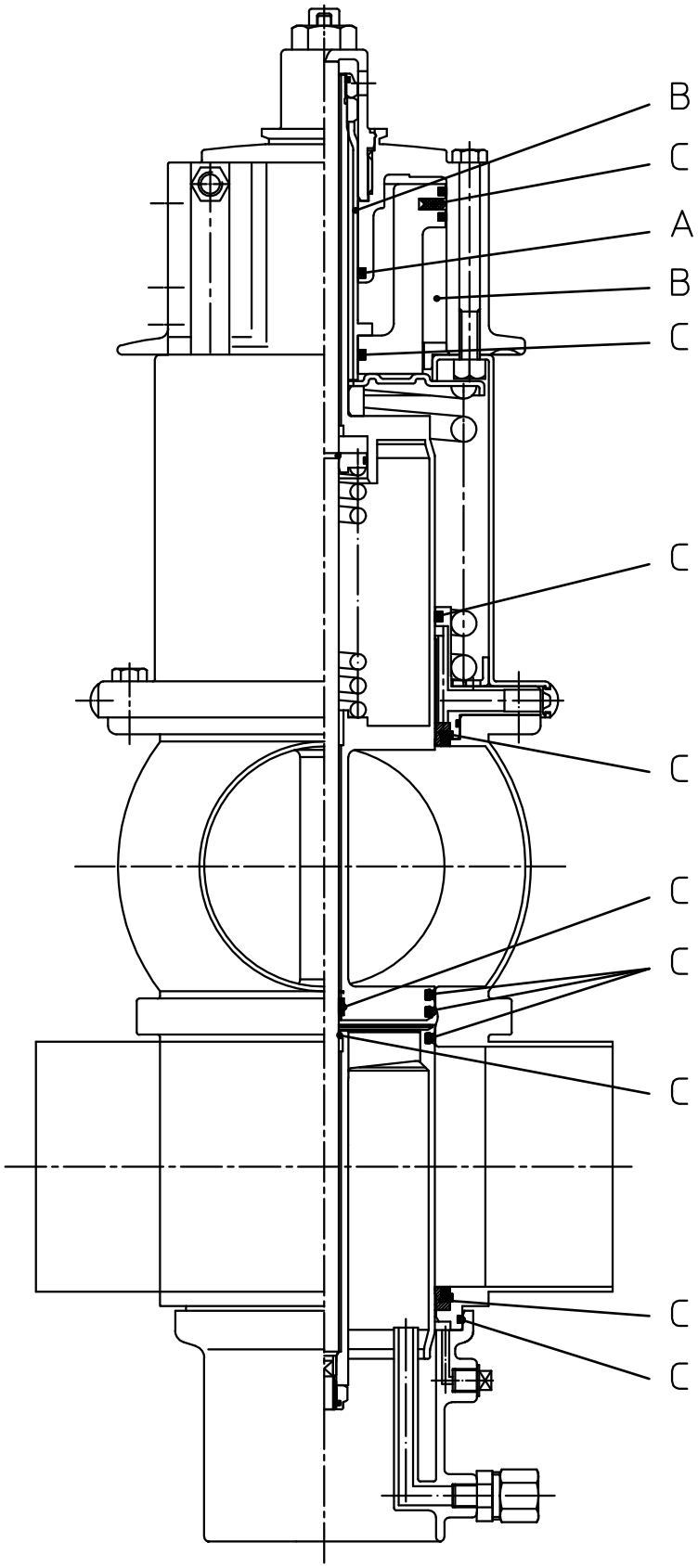
Germany

RN 01.053.71-2

Pos. item	Menge quantity	Benennung description	1" WS-Nr. ref.-no.	1,5" WS-Nr. ref.-no.	2" WS-Nr. ref.-no.	2,5" WS-Nr. ref.-no.	3" WS-Nr. ref.-no.	4" WS-Nr. ref.-no.	6" WS-Nr. ref.-no.	WS-Nr. ref.-no.
37	1	O-Ring O-ring		74x2 58-06-332/73	=	=	=	105x2 58-06-503/73	150x2 58-06-691/63	
38	1	Führungsband PTFE driving band							08-39-289/93	
	1	Ventileinsatz ** Valve insert		16-36-382/	16-36-432/	16-36-507/	16-36-557/	16-36-632/	16-36-607/	
		Pos. 22, 24, 25, 26, 27, 28, 29, 37, 38 nur im kompletten Dichtungssatz erhältlich item. 22, 24, 25, 26, 27, 28, 29, 37, 38 available as complete seal kits only								
	1	Dichtungssatz FPM Seal kit		58-34-660/00	=	=	=	58-34-663/00	58-34-695/00	
	1	Dichtungssatz EPDM Seal kit		58-34-660/01	=	=	=	58-34-663/01	58-34-695/01	
	1	Dichtungssatz HNBR Seal kit		58-34-660/06	=	=	=	58-34-663/06	58-34-695/06	
	1	Anbauteile für den Umbau der Ventile für die obere Schaftspülung Mounting kit for reconstruction of valves for upper shaft flushing		34-12-299/99	=	=	=	=	34-12-298/99	

10/95



Actuator parts:

Grease: Autol Top 2000
25 ml tube. ref.-No.:70-01-008/93

A - bearing surface and dynamic seal with continuous coating.

B - surface of cylinder and rod with continuous coating.

C - lightly grease seals for installation.

Parts in contact with product:

Grease: for EPDM and Viton
Klüber Paraliq GTE 703
0,75 kg can ref.-No.: 70-01-019/93
60 g tube ref.-No.: 70-01-018/93.

C A U T I O N !

Avoid grease residues in product area.

Grease all screws and threads before installation.
Recommendation: Klüber Grease UH1 84-201

Datum:	23.7.98	26.01.00										
Name:	Trytko	Trytko										
geprüft:	Fi / Pl											

DE3 Lubrication Chart

APV Rosista GmbH
D-59425 Unna
Germany

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