APV
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Operating Manual

DELTA DFplus2

Double Seat 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

Table of Contents :		Page :

UK

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.

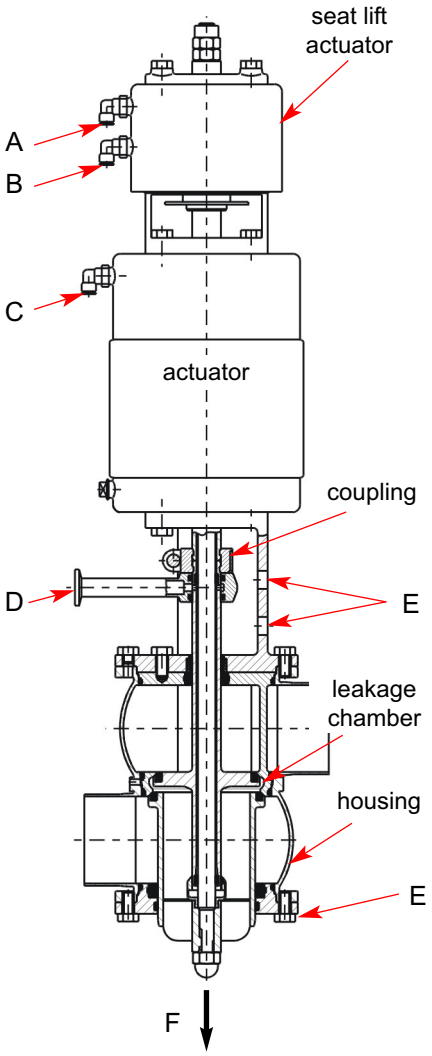
Descriptions and data given herein are subject to technical changes.

2. Safety Instructions

DANGER!

- The line and cleaning system must be depressurized before any maintenance work.
- Electric and pneumatic connections must be separated.
- Risk of injury by sudden valve actuation!
- Observe service instructions to ensure safe maintenance of the valve.
- During valve actuation and during shaft lifting, operating leakages spirt out to the bottom!
- Cleaning connections which are not used must be sealed by a plug.
- The spring actuator is under spring load, do **not** open it!

3. Mode of Operation

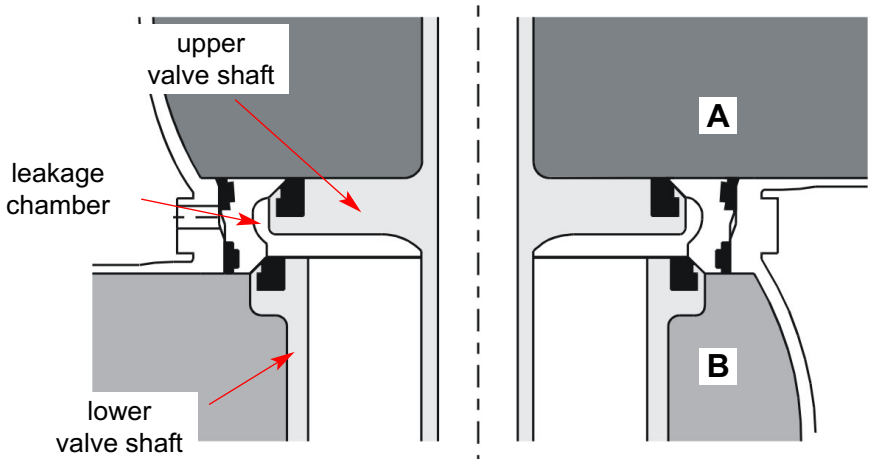


Due to its construction and mode of operation as well as to the use of high-quality stainless steel and adequate seal materials, the double seat valve DFplus2 is suited for the food and beverage industries as well as for pharmaceutical and chemical applications.

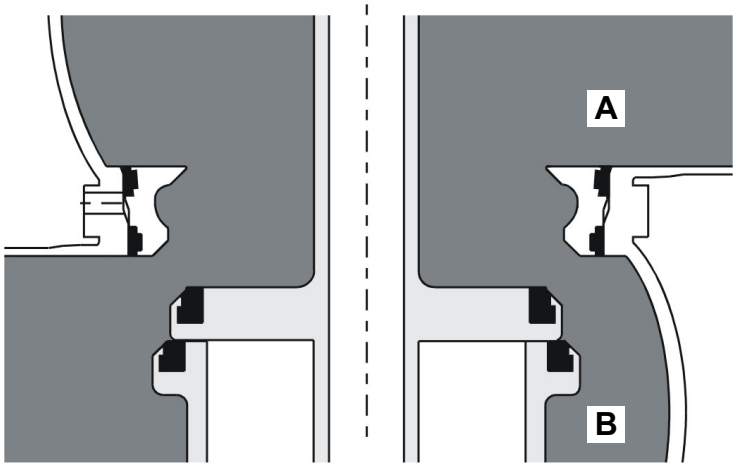
- The valve opens from the top to the bottom.
- Separation of two line sections by two valve disks with intermediate flushable leakage chamber. Cleaning connection at **(D)** with ½" clamp connection.
- Double sealing function by two independently acting seals.
- Any leakages at the valve seats are discharged at **(F)** in depressurized state.
- Valve feedback switches can be installed at **(E)**.
- Actuation by pneumatic actuator with air connection at **(C)**. Reset by spring force.
- The double seat valve is generally mounted in the actuator design "fail-up" (air-to-lower, spring-to-raise). With air failure, the valve moves into the safety limit position **"closed"**.
- For seat cleaning purposes a seat lift actuator can be mounted on the actuator.
- **Seat lift actuator**
  connection **A** = **lifting of lower valve seat**
  connection **B** = **lifting of upper valve seat**

3. Mode of Operation

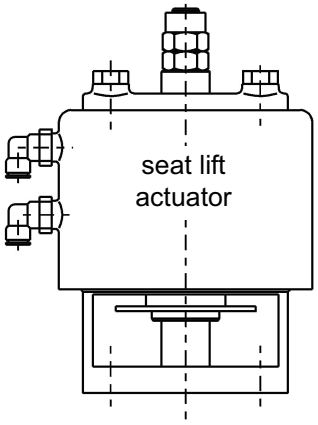
Valve in closed position
The upper and lower valve shaft are closed by spring force. The different liquids **A** and **B** are safely separated from one another.
The leakage chamber which is situated between the two valve shafts, provides for a free and depressurized drain to the bottom.



Valve in open position
The upper valve shaft is pressed against the seal of the lower valve shaft and out of its seat by control of the actuator. At the same time, the leakage chamber is closed against the product chamber. The two valve shafts move to the bottom into the open position. Pipelines **A** and **B** are connected.



4. Auxiliary Equipment



Seat lift actuator

- If necessary for reasons of process technology or hygiene, the DFplus2 valve can be equipped with a seat lift actuator. The upper and lower valve seats can be lifted individually by the seat lift actuator. Through the lifting of the individual valve seats the seal surfaces and the leakage chamber are cleaned.

Valve feedback (standard)

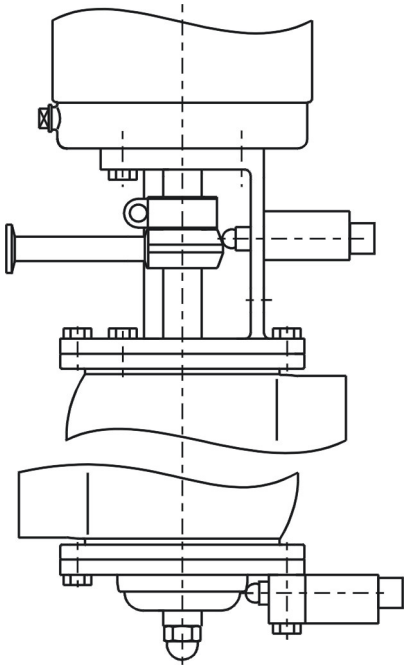
- Switches to signal the limit position of the closed and open valve position can be installed in the yoke area if requested. We recommend our APV standard types.

  Operating distance: 5 mm / diameter: 11 mm.
  If the customer decides to use valve feedback switches other than APV type, we cannot take over the liability for any malfunctions.

Valve feedback according to PMO

- The limit position of the upper and lower valve shafts can be interrogated individually.

valve feedback
PMO



- Switches to signal the limit position can be mounted in the yoke area or at the housing cover if requested.

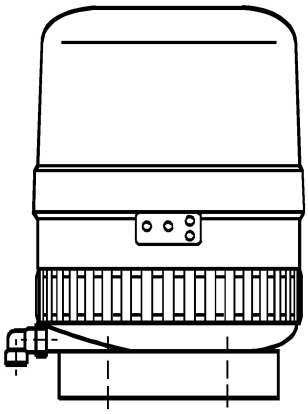
The following feedback kits are available:

1. Inquiry of upper and lower valve shaft closed.
   Prox. switch kit DFplus2 — 24 VDC closed
   ref-No.: 000 - 08 - 60 - 415/93

2. Inquiry of upper and lower valve shaft closed as well as valve open.
   Prox. switch kit DFplus2 — 24 VDC closed + open
   ref-No.: 000 - 08 - 60 - 416/93

4. Auxiliary Equipment

control unit
DELTA CU3



Control Unit

- The assembly of a CU3 Control Unit on the DFplus2 valve is possible.
- For the assembly of a control unit on the actuator or seat lift actuator corresponding adapters are required.

Different designs are available:

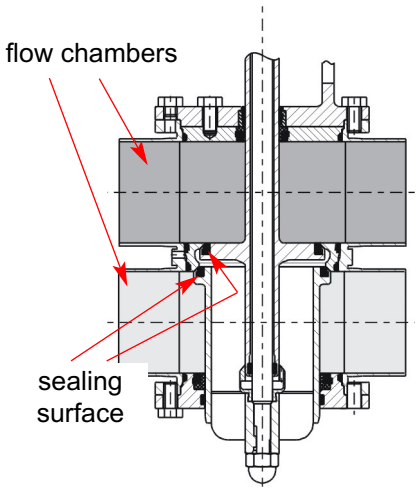
Standard Control Unit + Adapter
(inquiry of valve position open and closed)

	1 solenoid valve (EMV) (without seat lifting)	3 solenoid valves (EMV) (with seat lifting)
Direct Connect 24V ref-No.:	**CU31 Direct Connect 16 - 31 - 260/93**	**CU33 Direct Connect 16 - 31 - 263/93**
Device Net ref-No.:	**CU31 Device Net 16 - 31 - 264/93**	**CU33 Device Net 16 - 31 - 267/93**
AS - Interface ref-No.:	**CU31 AS - Interface 16 - 31 - 268/93**	**CU33 AS - Interface 16 - 31 - 271/93**
adapter ref-No.:	**CU Adapter D2 08 - 48 - 429/93**	**CU33 Adapter DFplus2 16 - 00 - 205/93**
		+ proximity switch holder 2 x ref-No.: 15 - 33 - 914/83

Control Unit according to PMO + Adapter
(inquiry of upper and lower valve shaft closed)

	1 solenoid valve (EMV) (without seat lifting)	3 solenoid valves (EMV) (with seat lifting)
Direct Connect 24V ref-No.:	**CU31 Direct Connect** 16 - 31 - 786/93	**CU33 Direct Connect** 16 - 31 - 804/93
Device Net ref-No.:	**CU31 Device Net** 16 - 31 - 785/93	**CU33 Device Net** 16 - 31 - 805/93
AS - Interface ref-No.:	**CU31 AS - Interface** 16 - 31 - 787/93	**CU33 AS - Interface** 16 - 31 - 806/93
Adapter ref-No.:	**CU31 Adapter DFplus2** 16 - 00 - 204/93	**CU33 Adapter DFplus2** 16 - 00 - 205/93

5. Cleaning

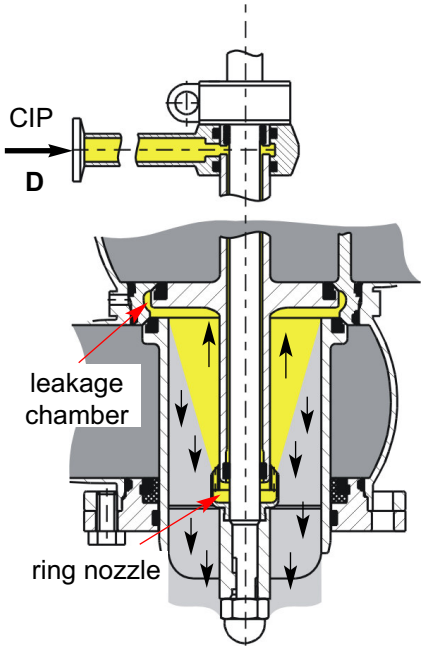


With the cleaning of the DFplus2 valves it is necessary to distinguish between three areas:

The flow area
The upper and lower passages are cleaned by the flowing cleaning liquid during the cleaning of the connected pipelines.

The seal surfaces in the seat area
The seat seals **(7)** and **(5)** are cleaned through valve actuation and lifting of the individual valve seats during the cleaning of the resepective passage. The seal surfaces are flushed and cleaned by the cleaning liquid.

The leakage chamber
The cleaning of the leakage chamber is effected by CIP spraying. Cleaning connection **(D)**.



Spraying does not produce pressure built-up in the leakage chamber and should preferably be undertaken in closed valve position. The flow of the cleaning liquid provides for perfect hygienic cleaning of the leakage chamber.

Under standard conditions 15 valves 1,5" to 4" can be cleaned via one 1" spray distribution line.
10 valves can be cleaned via one 1” spray distribution line.

Cleaning recommendation:

Cleaning step	seat lifting	CIP spraying
Pre-flushing	————	3 x 10 sec.
Caustic flushing 80° C	3 x 5 sec.	3 x 10 sec.
Intermediate flushing	2 x 5 sec.	2 x 10 sec.
Acid flushing	3 x 5 sec.	3 x 10 sec.
Final flushing	2 x 5 sec.	2 x 10 sec.

5. Cleaning

- **Cleaning liquid quantity per CIP spraying cycle:**
  1,5” - 6” about 5 - 10l/min
- **Cleaning pressure at CIP cleaning connection:**
  min. 3 bar / max. 5 bar

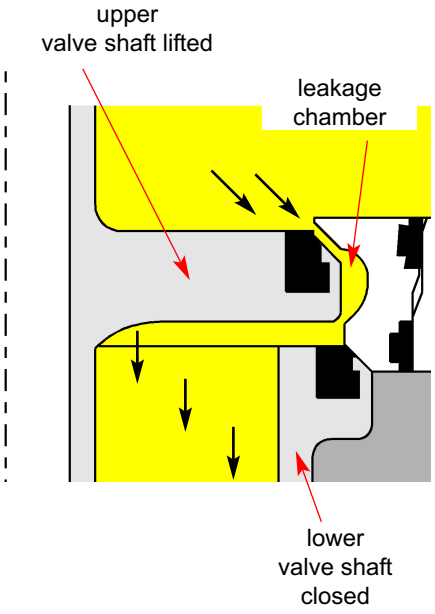
* The seat lift cycles refer to a cleaning pressure of p = 3 - 5 bar.

* The cleaning liquid quantity must be determined by the operator who adjusts the opening stroke.

- **Assembly and adjustment of the seat lift actuator see operating manual: seat lift actuator double-seat valves D2 / DFplus2**

* Depending on the pressure ratio, cleaning temperatures, cleaning steps and degree of soiling, cleaning parameters must be changed to suit.

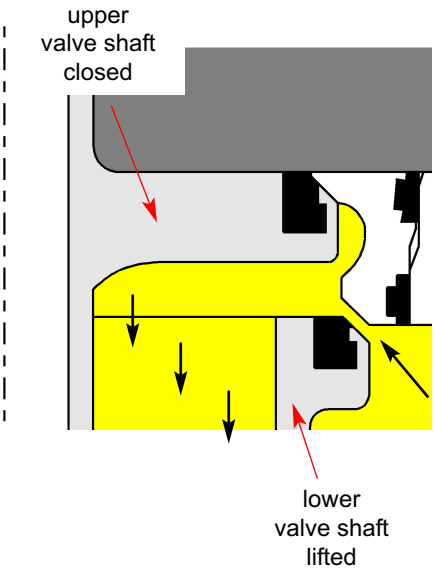
* **with optimum use of the seat lift actuator.**



<u>Seat lifting in the upper area</u>
The upper valve shaft is lifted via the connection **(B)** at the seat lift actuator.

By lifting of the upper valve shaft, cleaning liquid flows over the upper seat seal into the leakage chamber and cleans this area.

The cleaning liquid is drained at the inner pipe of the lower valve shaft to the bottom.



<u>Seat lifting in the lower area</u>
The lower valve shaft is lifted via the connection **(A)** at the seat lift actuator.

By lifting of the lower valve shaft, cleaning liquid flows over the lower seat seal into the leakage chamber and cleans this area.

The cleaning liquid is drained at the inner pipe of the lower valve shaft to the bottom.

6. Installation

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

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

- Heights of installation and dismantling **(see section 7)**.

Attention: Observe welding instructions.

6.1 Welding Instructions

- Before welding of the valve, dismantle the valve insert from the housing. Remove the housing cover **(1)** with seals.
  A 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 housing must be undertaken in such a way that the valve body is not deformed.

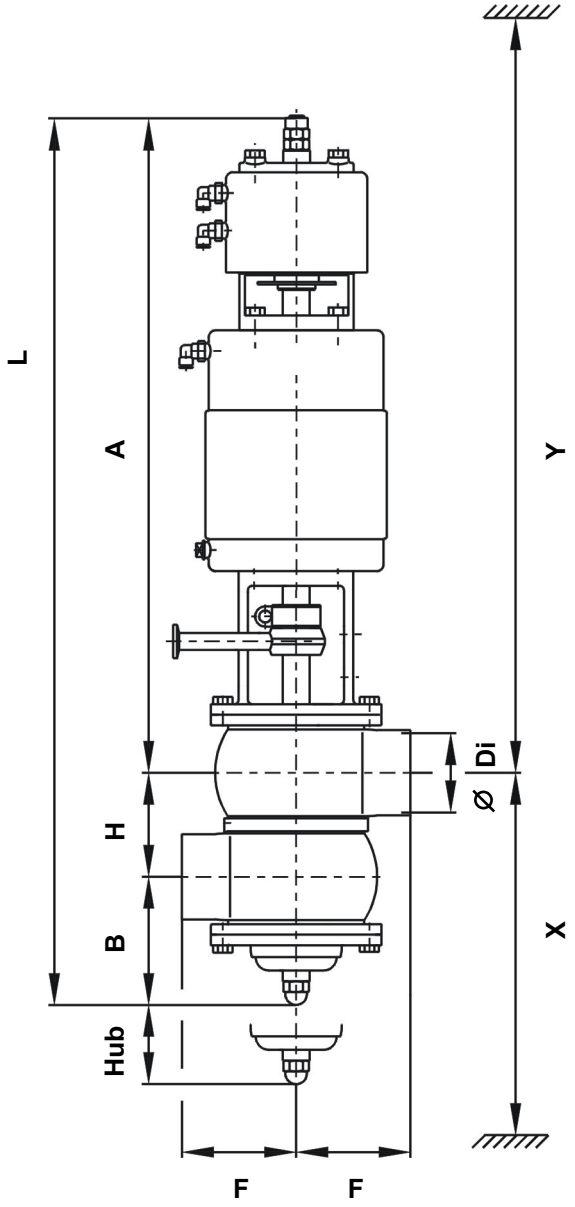
- The preparation of the weld seam up to 3 mm thickness should be carried out as a sqare butt joint without air.
  (Consider shrinkage!)

- TIG orbital welding is best!

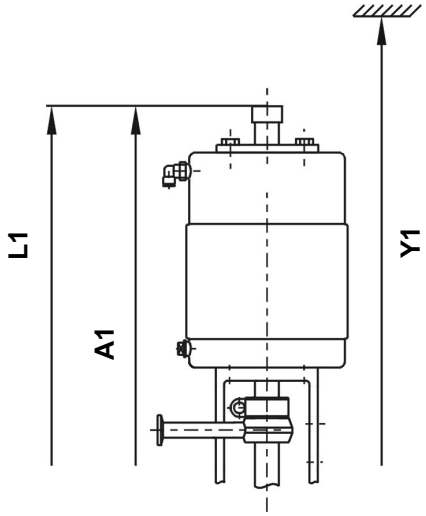
- After welding of the housing or of the mating flanges and after work at the pipelines, the corresponding parts of the installation or pipelines must be cleaned from welding residues and soiling. If these cleaning instructions are not observed, welding residues and dirt particles can settle in the valve and cause damage.

- Any damage resulting from the non-observance of these welding instructions is not subject to our guarantee.

7. Dimensions / Weights



dimensions in mm



installing dimensions in mm			
	X	Y	Y1
1,5”	260	660	560
2”	270	690	590
2,5”	300	720	620
3”	310	760	660
4”	350	830	730
6”	450	1040	930

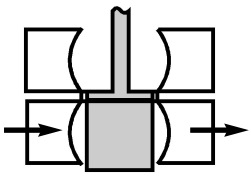
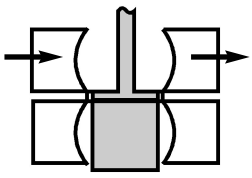
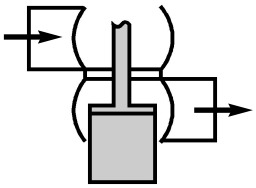
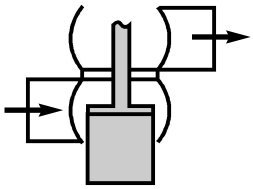
inch	weights in kg	
	without seat lift actuator	with seat lift actuator
1,5”	8,4	11,1
2”	9,7	12,4
2,5”	14,5	17,2
3”	16,5	19,2
4”	24,7	28,2
6”	51,0	57,0

inch	A	A1	B	⌀Di	F	H	L	L1	stroke upper shaft	stroke lower shaft
1,5”	474	375	81	34,9	67	51,9	607	508	28	24
2”	481	382	87	47,6	72	64,6	633	534	28	24
2,5”	487	388	96	60,3	85	77,3	660	561	28	24
3”	493	394	100	72,9	100	88,9	683	584	28	24
4”	506	407	118	97,6	120	114,6	739	640	28	24
6”	608	794	136	146,9	150	170	914	803	42	38

UK

8. Technical Data

Max. line pressure	**: 5 bar**
Max. operating temperature	**: 135°C EPDM, HNBR** ***FPM, *VMQ**
Short-term load	**: 140°C EPDM, HNBR** ***FPM, *VMQ**
	*** no steam**
tightening torque of safety nut at upper valve shaft	**: 40Nm**
CIP - connection	**: 1/2" clamp connection**
- throughput during cleaning :	**3bar / 5 - 10 l/min**
Air connection (for hose)	**: 1/4" OD**
Max. pneumatic air pressure	**: 10 bar**
Min. pneumatic air pressure	**: 6 bar**
(Use dry and clean air only)	

kvs - values for DELTA DFplus 2 valves in m3/h				
				
1,5"	37	51	22	26
2"	64	84	44	50
2,5"	111	185	77	75
3"	154	240	106	105
4"	340	440	177	168
6"	800	1050	440	456

8. Technische Daten

Quantity of operating leakages of DFplus2 valves		
3 bar line pressure in upper valve housing fluid: water t = 20°C, figures in litre		
inch	valve open	valve closed
1,5”	0,15l	0,35l
2”	0,2l	0,4l
2,5”	0,22l	0,55l
3”	0,24l	0,66l
4”	0,4l	1,3l
6”	0,9l	1,5l

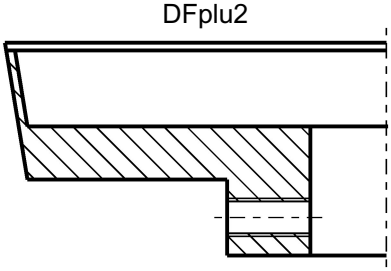
Standard design: actuator and seat lift actuator				
inch	actuator	air consumption actuator in NL / stroke	seat lift actuator	air consumption seat lift actuator in NL / stroke
1,5”	D 100 - 22	2,3	Ø 100	0,8
2”	D 100 - 22	2,3	Ø 100	0,8
2,5”	D 125 - 22	3,5	Ø 100	0,8
3”	D 150 - 22	5,0	Ø 100	0,8
4”	D 180 - 22	7,0	Ø 125	1,2
6”	D 255 - 22	20,0	Ø 180	2,2

9. Materials

Housing, valve seat, shafts	**1.4571, 1.4404**
Actuator, yoke, guide rod, screws, operating cam	**1.4301**
Seals: standard:	**EPDM/ PTFE**
optional:	**HNBR, FPM, VMQ**
Air connections:	**PA 6.6**

10. Maintenance

centering arbor
DFplu2

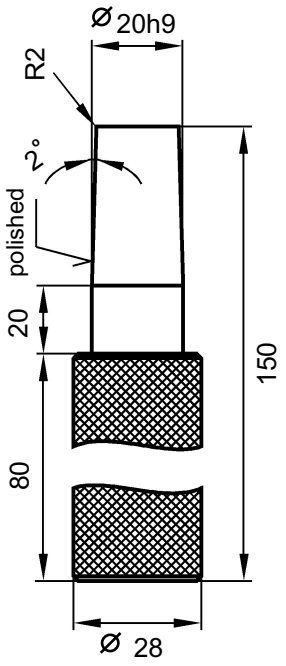


- The maintenance intervals are different depending on the application and should be determined by the operator carrying out temporary checks.

- Replacement of seals, see service instructions.
  Use seal kits according to spare parts list.

- For the installation of the upper and lower seat seal assembly tools are respectively available **(see 13)**.

- **Assembly aid:**
  Centering arbor: To install the valve insert in the valve housing, use the centering arbor in 4" dimension **(ref-No.: 51 - 13 - 725/93)** in 6" dimension **(ref-No.: 51 - 13 - 726/93)**.



assembly arbor

Assembly arbor: The valve seat is positioned during assembly with the valve yoke by the assembly arbor.
(The assembly arbor canbe manufactured by the customer, see illustration).

- Required tools:
* plastic tip hammer
* scribing iron (for seal removal)
* 1 x wrench SW10
* 1 x wrench SW13
* 2 x wrench SW17

- Assembly of the valve, see service instructions.

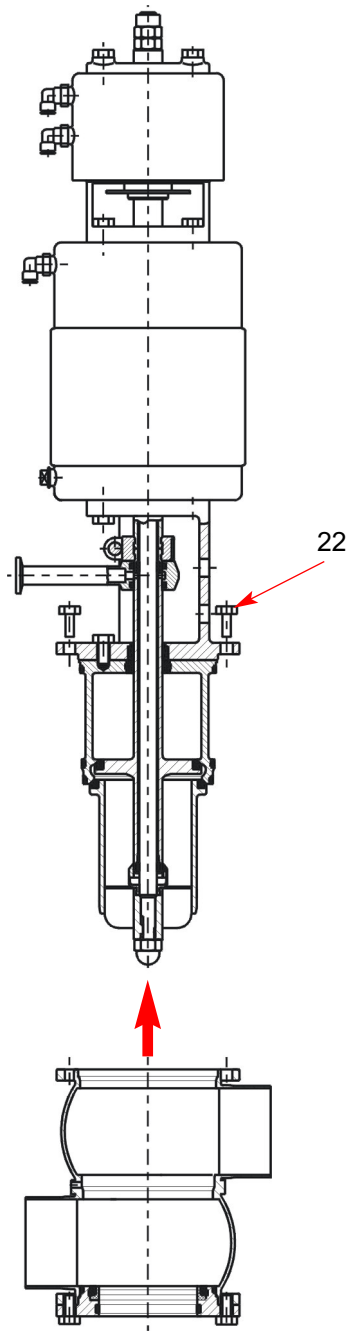
- **All seals must be provided with a thin layer of grease.**

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)
or
APV food-grade grease for VMQ (Silicone)
(0,6 kg /tin - ref.-No. 000 70-01-017/93)
(60 g /tube - ref.-No. 000 70-01-016/93)

Use only those greases being suited for the respective seal material.

! Do not use grease on mineral oil basis for EPDM seals.
! Do not use Silicone-based grease for Silicone seals.

11. Service Instructions



The item numbers refer to the spare parts drawings **inch: RN 01.053.80-1.**

11.1 Dismantling from the line system

a. Disconnect pneumatic and electric connections.

b. Shut off line pressure in the product and cleaning lines.

c. Dismantle the cleaning line.

d. Release the clamp screw of the feedback support and unplug the switch. (If a feedback is not installed, omit **11.1.d**).

- Detach the control unit from the **actuator / seat lift actuator**. (Turn the ring in anticlockwise direction.)

e. Remove the flange screws **(22)**.

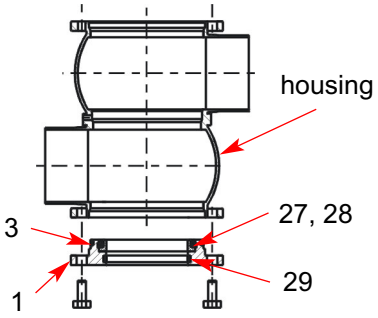
f. Screw one flange screw into the threaded bore of the valve yoke, thus lifting the complete valve insert.

g. Carefully lift the valve insert out of the valve housing.

! Attention: **Do not damage the valve seat or the lower valve shaft.**

- Finally remove the flange screw.

11. Service Instructions



11.2 Dismantling of seals (service)

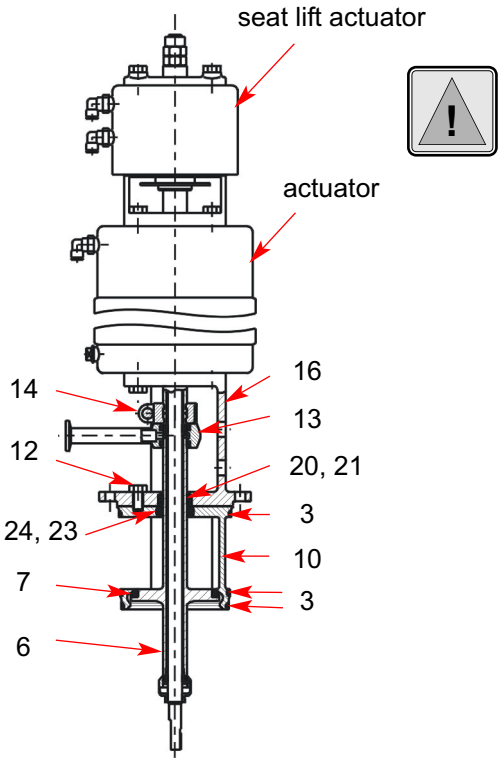
The item numbers refer to the spare parts drawings **inch: RN 01.053.80-1.**

11.2.1 Dismantling of housing cover (1)

a. Remove the housing cover **(1)** from the housing.

b. Remove the housing seal **(3)**, guide band **(29)**, shaft seal **(28)** and seat seal **(27)**.

11.2.2 Dismantling of valve insert



a. Control the valve with a compressed air pressure of min. 4 bar. Drive the valve into open position.

Attention: **Risk of injury by sudden valve actuation. Do not touch movable parts.**

b. Screw off the safety nut **(30)**. Hold up the lower valve shaft **(4)** with a wrench SW17 to prevent it from turning.

c. Pull off the lower valve shaft **(4)**.
Prick a pointed tool into the lower seat seal **(5)** and pull it out of the groove.

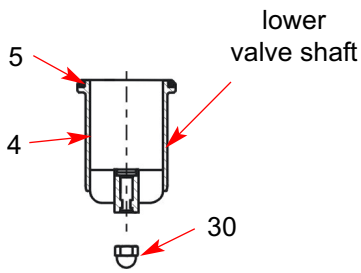
d. Release the clamp screw of the coupling **(14)** and remove the complete coupling.

e. Cut off pneumatic air pressure.

f. Pull off the upper valve shaft **(6)**.
Prick a pointed tool into the upper seat seal **(7)** and pull it out of the groove.

g. Attention: **If the valve is equipped with a seat lift actuator, the actuator must be dismantled, at first.**
- **Release the hex. screws and remove them.**

Valve without seat lift actuator:
- **Remove the yellow cap from the actuator rod.**



h. Press the guide rod out to the top.
Use a rubber mallet to facilitate the work.

i. Remove the operating cam **(13)**. Remove the o-ring **(19)**.

j. Remove the hex. screw **(12)**. Remove the valve seat **(10).** Dismount the upper shaft seal **(23)**, seat seal **(24)** and the housing seals **3 x (3)**.
Remove the guide bushes **(20, 21)** from the yoke.

11. Service Instructions

fig. 1

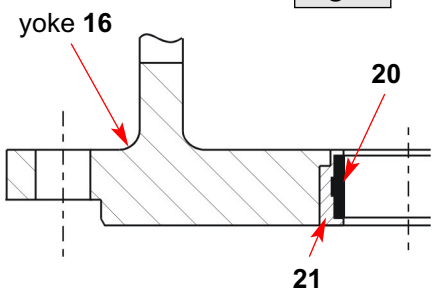


fig. 2

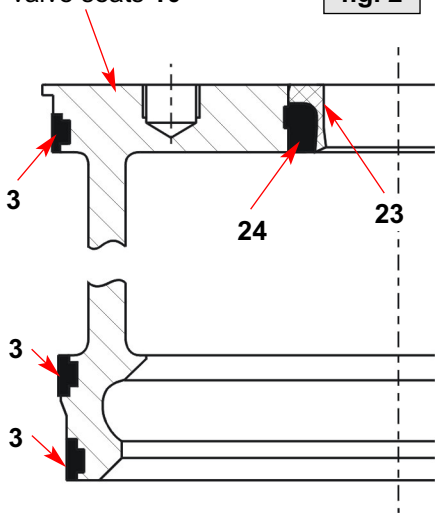
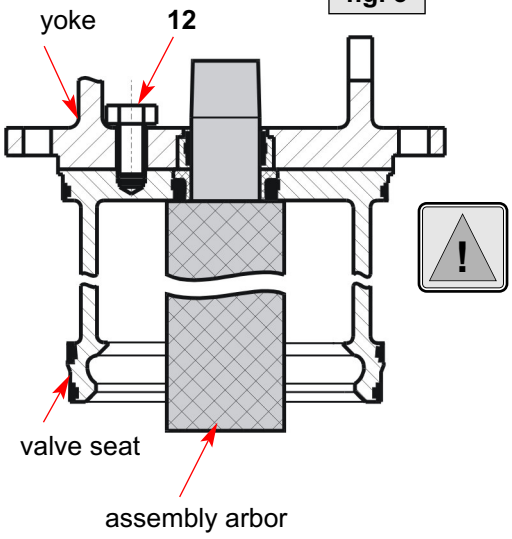


fig. 3



11.3 Installation of seals and assembly of valve
The item numbers refer to the spare parts drawings
inch: RN 01.053.80-1

11.3.1 Assembly of valve insert

a. Insert the guide bush **(20)** into the metal guide bush **(21)**. Place the guide bush **(21)** in the yoke **(16) (see fig. 1)**.

b. Insert the slightly greased o-rings **(19)** into the operating cam **(13)**.

c. Provide the upper shaft seal **(23)**, seat seal **(24)** and housing seals **(3)** with a thin grease layer.
Install the upper shaft seal and seat seal in the valve seat **(10)**.
Insert the housing seals **(3)** via the valve seat into the grooves.
Check the even fit of the seals **(see fig. 2)**.

d. Press the valve seat **(10)** against the yoke **(16)** and fix the assembly with the hex. screw **(12)**. Position the valve seat with the assembly arbor **(see fig. 3).** Tighten the hex. screw **(12)**.

e. Install the upper seat seal **(7)** in the upper valve shaft **(6)** according to service instructions **(see 13.)**.

f. Carefully knock the upper valve shaft **(6)** with a rubber mallet through the guide bush.
Place the operating cam **(13)**. Press the upper valve shaft into the valve seat until it stops.

g. Push in the guide rod **(8)** with the threaded part ahead from the top through the actuator **(31)** , through the operating cam **(13)** and through the yoke **(16)** unti it stops.

h. Attention:
To connect the upper shaft **(6)** with the actuator **(24)**, compressed air of **"min. 4 bar"** is required for the next step.

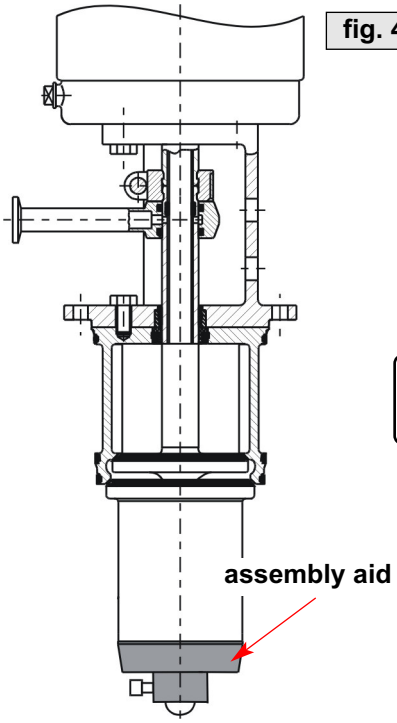
i. Drive the valve into **"open position"** by pneumatic air supply.

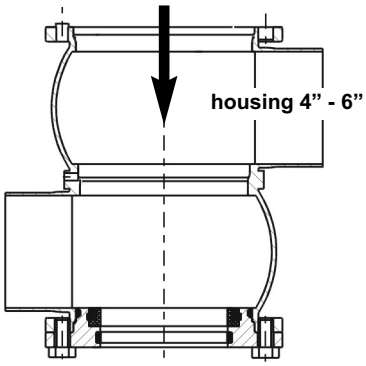
j. Connect the two shaft ends with the coupling clamp **(14)**.

- Attention:
During fastening the distance tube must be between the two coupling halves.
The coupling screw must not slew into the feedback area.

11. Service Instructions

fig. 4





k. Insert the lower seat seal **(5)** into the lower valve shaft **(4)** according to service instructions **(see 13.)**.

l. Push the lower valve shaft **(30)** via the guide rod **(8)** against the valve disk.

m. Tighten the safety nut **(30)** on the guide rod **(8)** until stop.
Tightening torque = 40 Nm.

***** **Cut off pneumatic air.**

Danger: **Do not touch movable parts!**
Risk of injury by closing of the valve!

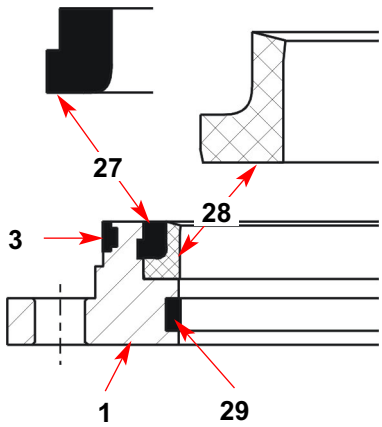
Attention: Only for **valve dimension 4"and 6”** is the centering arbor required for the installation of the valve insert in the housing.
(centering arbor 4”: ref-No.: 51 - 13 - 725/93
centering arbor 6”: ref-No.: 51 - 13 - 726/93).

- Fasten the centering arbor with the inner hex. screw at the lower valve shaft **(see fig. 4)**.

n. Press the yellow cap on the actuator rod.

- If the DFplus2 valve is equipped with a seat lift actuator, mount the seat lift actuator.
Fasten the seat lift actuator with the hex. screws on the actuator.

fig. 5



11.3.2 Assembly of housing cover

a. Slightly grease the lower shaft seal **(28)**, seat seal **(27)**, guide band **(29)** and housing seal **(3)**.
Install the shaft seal **(28)** at first and then the seat seal **(27)** in the housing cover **(1)**.
Insert the guide band **(29)** and the housing seal **(3)**.
Check the even fit of the seals **(see fig. 5)**.

b. Fasten the housing cover **(1)** with the hex. screws in the housing.

11. Service Instructions

11.3.3 Assembly of valve insert in the housing

a. Introduce the complete valve insert carefully in the valve housing **(1)**. The centering pin positions the yoke flange.

b. Tighten the hex. screws **(22)** crosswise.

c. Fasten the hex. screw **(11)** M8 x 6 mm in the open threaded bore of the yoke flange.

d. Mount the pneumatic air and cleaning lines.

e. Installation of valve feedback
Fine adjustment:
Push in the feedback switches until stop.
Fine adjustment:
By slight displacing motion of the switch, the shift point can be adjusted if necessary.
Observe the luminous diode at the switch during adjustment.

- Fix the switch with the clamp screws.

12. Actuator

Attention: **Actuator is under spring force.**
Do not open it.

(The item numbers refer tot the spare parts drawing **RN 01.053.22.**)

I. **Replacement of o-rings**
(Remove the valve yoke and the seat lift actuator (if necessary) from the actuator.) Disassembly as described in 11.1 and 11.2.

a. Dismantle the lower actuator o-ring **(2)**.

b. Remove the hex. screws and lift off the cover **(3)**.
(If the valve is equipped with a seat lift actuator, it can be omitted.)

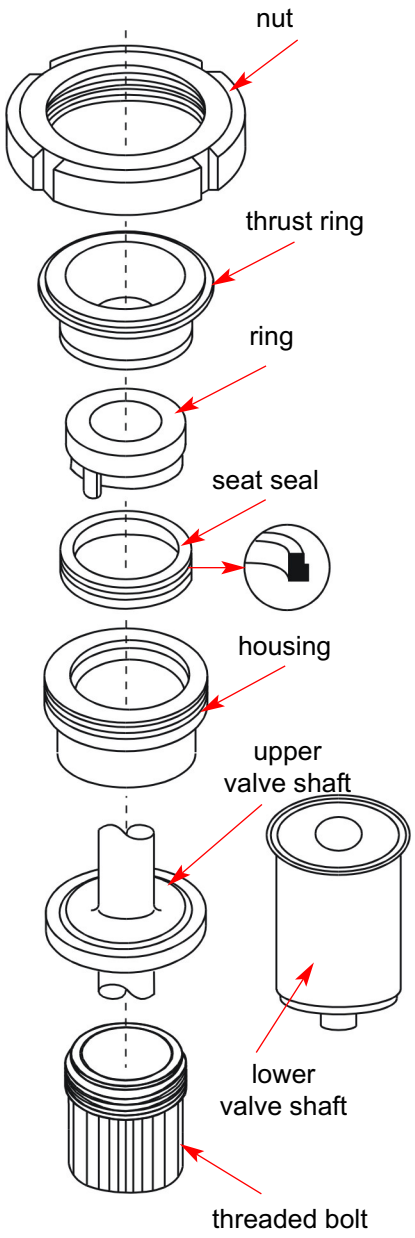
c. Dismantle the upper actuator o-ring **(2)**.

II. **Assembly of actuator**

a. On both sides of the actuator, slide a greased o-ring **(2)** via the piston rod into the groove on the face.

b. Push the actuator cover **(6)** over the piston rod (air supply side) and fasten it with the screws **(5)**.
(If the valve is equipped with a seat lift actuator, it can be omitted.)

13. 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 the 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. Slightly grease the seat seal with APV food-grade grease. Slide the 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 the nut and tighten it by a hook spanner until it stops.
6. Release the nut. Take the ring and thrust ring out of the housing.
7. Unclamp the housing , release the threaded bolts. Take the valve shaft out of the housing.

Check the even fit of the seat seal.

Assembly tool for upper seat seal	
inch	**ref.-No.:**
1,5”	000 - 51 - 13 - 111/17
2”	000 - 51 - 13 - 112/17
2,5”	000 - 51 - 13 - 113/17
3”	000 - 51 - 13 - 121/17
4”	000 - 51 - 13 - 115/17
6”	000 - 51 - 13 - 117/17

Assembly tool for lower seat seal	
inch	**ref.-No.:**
1,5”	000 - 51 -13 - 135/17
2”	000 - 51 - 13 - 136/17
2,5”	000 - 51 - 13 - 137/17
3”	000 - 51 - 13 - 138/17
4”	000 - 51 - 13 - 140/17

14. Detection of Seal Damage

Failure	Remedy
Valve closed and pressure in upper housing	
Leakage between housing and yoke flange	**Replace housing seal (3), shaft seal (23), seat seal (24).**
Leakage at the upper valve shaft in the yoke area	**Replace shaft seal (23), seat seal (24) and guide bushes (20, 21).**
Leakage from the leakage chamber of the lower valve shaft	**Replace seat seal (7). Check function of control of seat lift actuator.**
Leakage from the leakage bore	**Replace housing seals (3).**
Valve closed and pressure in lower housing	
Leakage between housing and housing cover **(1)**	**Replace housing seals (3).**
Leakage at the outside surface of the lower valve shaft	**Replace shaft seal (28), seat seal (27) and guide band (29).**
Leakage from the leakage chamber of the lower valve shaft	**Replace seat seal (5).**
Leakage from the leakage bore	**Replace housing seals (3).**
Valve open	
Leakage from the leakage chamber of the lower valve shaft	**Replace seat seal (5).**
Leakage from the leakage bore	**Replace housing seals (3).**
Actuator	
Air escapes from the actuator rod	**Replace O-ring (2) at the actuator top.**
Actuator does not work (air escapes permanently from the venting plug)	**Replace the complete actuator.**
Valve feedback	
Feedback is missing	**Carry out fine adjustment.**

15. Spare Parts Lists

(see annex)

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

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

- number of required parts
- reference number
- designation.

Data are subject to change.

BA DFplus2 002
ID-No.: H 2 0 7 6 1 7

UK

Translation of original manual

Rev. 1

WHERE IDEAS MEET INDUSTRY

Your local contact:

APV
Zechenstraße 49
D-59425 Unna

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

Ersatzteilliste: spare parts list:

Doppelsitzventil DFplus2 FS-A12 1,5-6 zoll

Double seat valve DFplus2 FS-A12 1,5-6 inch

Besteht aus 4 Blatt Blatt 1

	Datum	Name
Gezeichnet	25.04.02	Trytko
Geprüft	23.05.02	Spliethoff
Normgepr.		

Datum	04/02	07/02	02/03	12/04
Name	Trytko	Trytko	Trytko	Trytko

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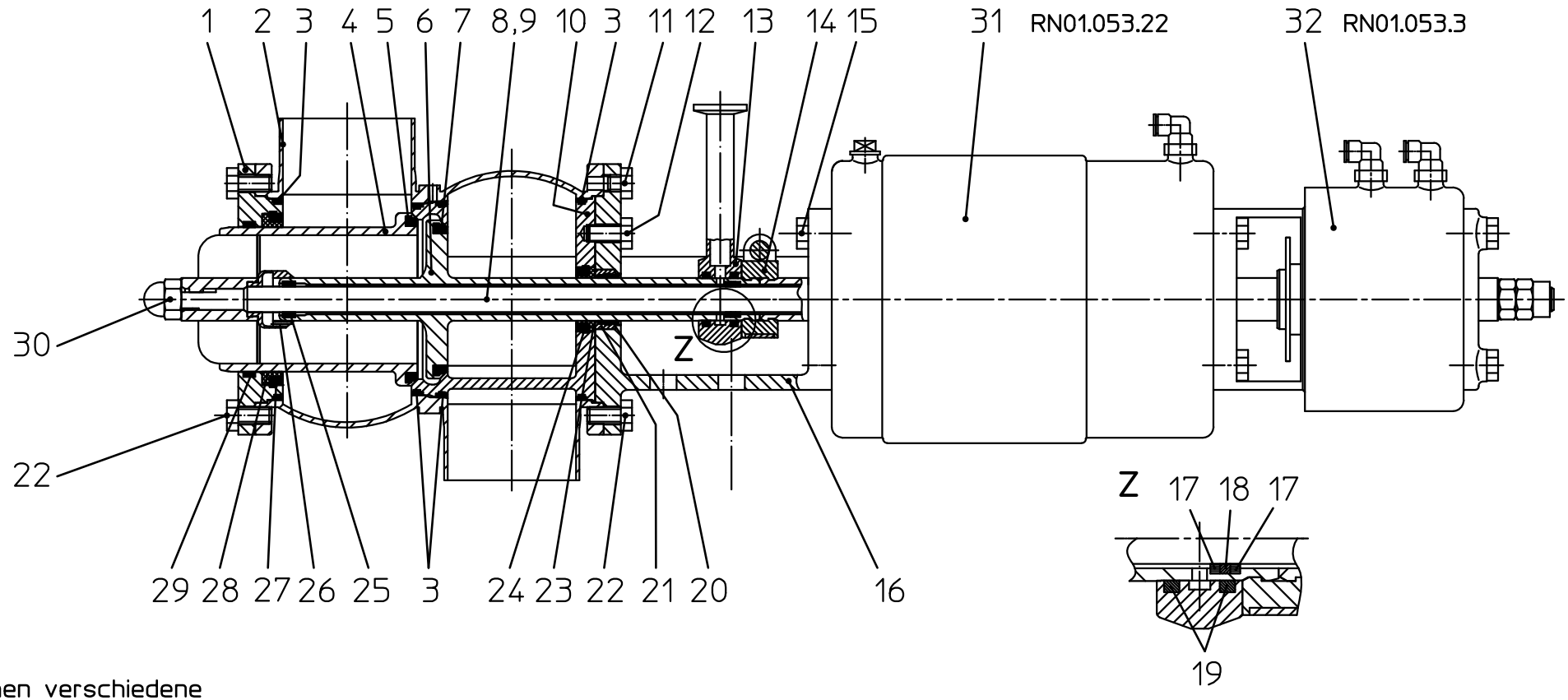
Germany

RN 01.053.80-1



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

Gehäusedichtung /housing seal
Bei VMQ wird die HNBR-Gehäusedichtung eingesetzt.
For VMQ take the HNBR-housing seal.

Ersatzteilliste: spare parts list:

Doppelsitzventil DFplus2 FS-A12 1,5-6 zoll

Double seat valve DFplus2 FS-A12 1,5-6 inch

Blatt 2

	Datum	Name
Gezeichnet	25.04.02	Trytko
Geprüft	23.05.02	Splieth
Normgepr.		

Datum	04/02	10/03	12/04	07/07
Name	Trytko	Trytko	Trytko	Trytko

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.80-1

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	Gehäusedeckel Housing cover		3A0 15-00-290/42	3A0 15-00-291/42	3A0 15-00-292/42	3A0 15-00-293/42	3A0 15-00-294/42	3A0 15-00-295/42	
2	1	Gehäuse DF21 1+2S Housing		3A0 16-41-230/43	3A0 16-41-231/43	3A0 16-41-232/43	3A0 16-41-233/43	3A0 16-41-234/43	3A0 16-41-235/43	
	1	Gehäuse DF22 1+2+3S Housing		3A0 16-42-230/43	3A0 16-42-231/43	3A0 16-42-232/43	3A0 16-42-233/43	3A0 16-42-234/43	3A0 16-42-235/43	
	1	Gehäuse DF23 1+2+3S Housing		3A0 16-43-230/43	3A0 16-43-231/43	3A0 16-43-232/43	3A0 16-43-233/43	3A0 16-43-234/43	3A0 16-43-235/43	
	1	Gehäuse DF24 1+2+3+4S Housing		3A0 16-44-230/43	3A0 16-44-231/43	3A0 16-44-232/43	3A0 16-44-233/43	3A0 16-44-234/43	3A0 16-44-235/43	
3	4	Gehäusedichtung * Housing seal		58-33-392/	58-33-442/	58-33-492/	58-33-567/	58-33-642/	58-33-742/	
4	1	Schaft unten Lower valve shaft		3A0 16-22-985/42	3A0 16-22-986/42	3A0 16-22-987/42	3A0 16-22-988/42	3A0 16-22-989/42	3A0 16-22-991/42	
5	1	Tellerdichtung-Schaft unten * Seat seal for lower shaft		58-33-143/	58-33-193/	58-33-496/	58-33-571/	58-33-646/	58-33-746/	
6	1	Schaft oben Upper valve shaft		16-22-858/42	16-22-859/42	16-22-860/42	16-22-562/42	3A0 16-22-984/42	3A0 16-22-990/42	
7	1	Tellerdichtung-Schaft oben * Seat seal for upper shaft		58-33-393/	58-33-443/	58-33-493/	58-33-568/	58-33-643/	58-33-743/	
8	1	Zugstange Guide rod		16-23-890/42	16-23-891/42	16-23-892/42	16-23-893/42	16-23-894/42	16-23-896/42	
9	1	Sprengring Retainer ring		08-39-083/13	=	=	=	=	=	
10	1	Ventilsitz Valve seat		3A0 16-37-423/43	3A0 16-37-473/43	3A0 16-37-523/43	3A0 16-37-573/43	3A0 16-37-673/43	3A0 16-37-798/43	
11	1	Skt. Schraube Hex. screw		DIN EN 24017-M8x6-A2-70					DIN EN 24017-M10x6-A2-70	
12	1	Skt. Schraube Hex. screw		DIN EN 24017-M8x16-A2-70					DIN EN 24017-M8x20-A2-70	
13	1	Schaltnocke Operating cam		3A0 08-60-231/13	=	=	=	=	=	
14	1	Kupplung Coupling		08-52-110/13	=	=	=	=	=	
15	4	Skt. Schraube Hex. screw		DIN EN 24017-M8x14-A2-70						
16	1	Laterne Yoke		3A0 16-40-415/13	3A0 16-40-465/13	3A0 16-40-515/13	3A 016-40-565/13	3A0 16-40-665/13	3A0 16-40-710/13	
17	2	Stützring Support ring		3A0 58-01-048/93	=	=	=	=	=	

Ersatzteilliste: spare parts list:

Doppelsitzventil DFplus2 FS-A12 1,5-6 zoll

Double seat valve DFplus2 FS-A12 1,5-6 inch

Blatt 3

	Datum	Name
Gezeichnet	25.04.02	Trytko
Geprüft	23.05.02	Splieth off
Normgepr.		

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.80-1

Datum	04/02	07/02	02/03	10/03	12/04	03/06	07/07	06/08	
Name	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	Trytko	

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.
18	1	O-Ring OR 12,37-2,62 O-ring		58-06-041/64	=	=	=	=	=	
19	2	O-Ring O-ring		58-06-078/64	=	=	=	=	=	
20	1	Führungsbuchse 20x9 Bushing		3A0 08-01-178/23	=	=	=	=	=	
21	1	Führungsbuchse Bushing		08-01-181/12	=	08-01-179/12	=	=		
22	8	Skt. Schraube Hex. screw		DIN EN 24017-M8x16-A2-70				DIN EN 24017-M10x16-A2-70	DIN EN 24017-M10x18-A2-70	
23	1	Schaftdichtung Shaft seal		3A0 58-33-151/23	=	=	=	=	=	
24	1	Tellerdichtung * Seat seal		58-33-293/	=	=	=	=	=	
25	1	Führungsring Guide ring		3A0 08-39-080/93	=	=	=	=	=	
26	1	Ringdüse Ring jet		09-40-065/33	=	=	=	=	=	
27	1	Tellerdichtung * Seat seal		58-33-443/	58-33-109/	58-33-543/	58-33-543/	58-33-643/	58-33-693/	
28	1	Schaftdichtung Shaft seal		3A0 58-33-200/23	3A0 58-33-201/23	3A0 58-33-202/23	3A0 58-33-203/23	3A0 58-33-204/23	3A0 58-33-205/23	
29	1	Führungsband PTFE driving band		3A0 08-39-293/93	3A0 08-39-294/93	3A0 08-39-266/93	3A0 08-39-295/93	3A0 08-39-296/93	3A0 08-39-160/93	
30	1	Hutmutter Hat nut		DIN 1587-M10x1-Ri-A1-50						
31	1	Steuerkopf- komplett Actuator- complete		3A0 16-31-031/13	=	3A0 16-31-056/13	3A0 16-31-078/13	3A0 16-31-106/13	3A0 16-31-156/13	
32	1	Anlüftzylinder A12 Lifting device		3A0 16-30-034/13	=	=	=	3A0 16-30-043/13	3A0 16-30-048/13	

Ersatzteilliste: spare parts list:

Doppelsitzventil DFplus2 FS-A12 1,5-6 zoll

Double seat valve DFplus2 FS-A12 1,5-6 inch

Blatt 4

	Datum	Name
Gezeichnet	25.04.02	Trytko
Geprüft	23.05.02	Spliethoff
Normgepr.		

Datum	04/02	12/04	06/08
Name	Trytko	Trytko	Trytko

APV Rosista GmbH
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Germany

RN 01.053.80-1

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.
		Pos. 3, 5, 7, 17, 18, 19, 20, 23, 24, 25, 27, 28, 29 nur im kompletten Dichtungssatz erhältlich Pos. 3, 5, 7, 17, 18, 19, 20, 23, 24, 25, 27, 28, 29 available es complete seal kits only								
	1	Dichtungssatz Seal kit FPM		58-34-850/00	58-34-851/00	58-34-852/00	58-34-853/00	58-34-854/00	58-34-855/00	
	1	Dichtungssatz Seal kit EPDM		58-34-850/01	58-34-851/01	58-34-852/01	58-34-853/01	58-34-854/01	58-34-855/01	
	1	Dichtungssatz Seal kit VMQ		58-34-850/02	58-34-851/02	58-34-852/02	58-34-853/02	58-34-854/02	58-34-855/02	
	1	Dichtungssatz Seal kit HNBR		58-34-850/06	58-34-851/06	58-34-852/06	58-34-853/06	58-34-854/06	58-34-855/06	

Ersatzteilliste: spare parts list:

Steuerzylinder für Doppelsitzventil DFplus2

Pneumatic actuator for double valve DFplus2

Besteht aus 2 Blatt Blatt 1

	Datum	Name
Gezeichnet	02.05.02	Trytko
Geprüft		
Normgepr.		

Datum	05/02
Name	Trytko

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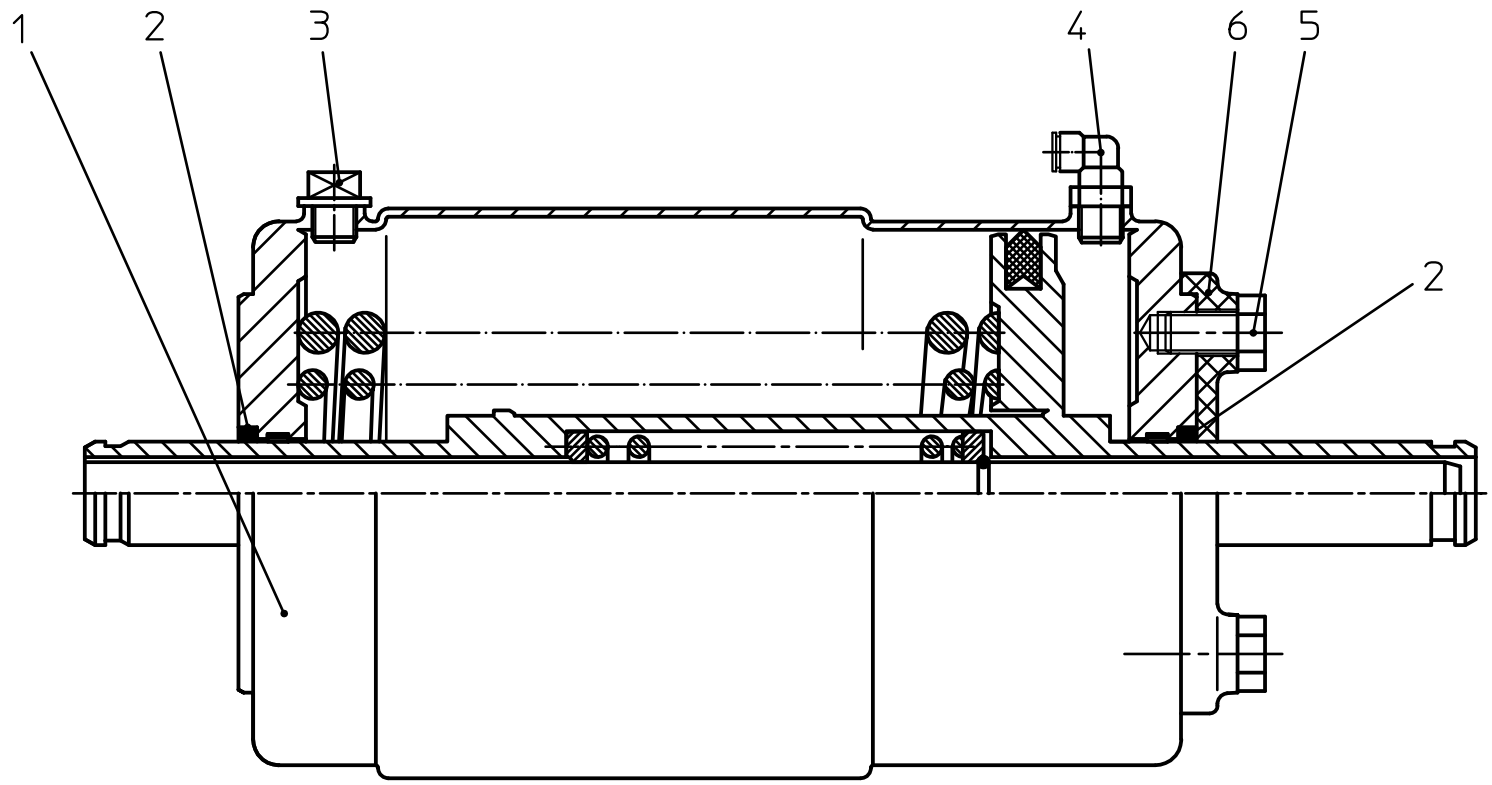
Germany

RN 01.053.22



Ersatzteilliste: spare parts list:

Steuerzylinder für Doppelsitzventil DFplus2

Pneumatic actuator for double valve DFplus2

Blatt 2

	Datum	Name
Gezeichnet	02.05.02	Trytko
Geprüft	21.05.02	Splieth off
Normgepr.		

Datum	05/02	10/03	12/04
Name	Trytko	Trytko	Trytko

APV Rosista GmbH
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Germany

RN 01.053.22

Pos. item	Menge quantity	Ausführung/ design	100-22	125-22	150-22	180-22	255-22			
		Benennung/ description	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	Steuerzylinder-komplett Actuator complete	3A016-31-031/13	3A016-31-056/13	3A016-31-078/13	3A016-31-106/13	3A016-31-156/13			
1	1	Steuerzylinder-Schweißteil Welding part of actuator	3A016-31-027/13	3A016-31-052/13	3A016-31-077/13	3A016-31-102/13	3A016-31-152/13			
2	2	O-Ring 20,2-3 O-ring	58-06-078/83	=	=	=	=			
3	1	Entlüftungsstopfen G1/8" Venting plug	08-60-005/93	=	=	=	=			
4	1	G1/8" W-Verschraubung 1/4" OD G1/8" Union	08-60-811/93	=	=	=	=			
5	4	Skt. Schraube Hex. screw	DIN EN 24017-M8x14-A2-70							
6	1	Deckel Cover	16-00-043/93	=	=	=	=			

Ersatzteilliste: spare parts list:

Anlüftzylinder

Seat lifting device

Besteht aus 2 Blatt Blatt 1

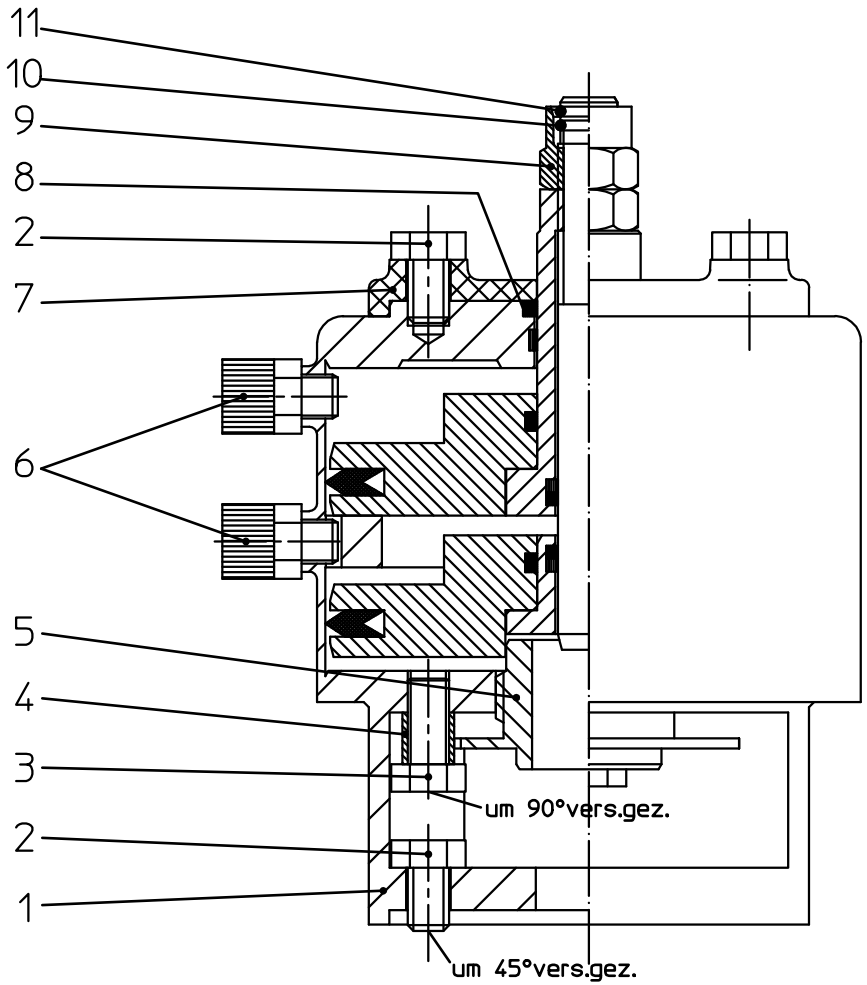
	Datum	Name
Gezeichnet	11.9.92	Trytko
Geprüft	11.9.92	WB
Normgepr.		

Datum	9/92	01/00	10/02							
Name	Trytko	Trytko	Trytko							

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.3

Ausführung / design :
000 16-30-.../17
1.4301-außen matt-glänzend
-external surface satin finish
3A0 16-30-.../13
1.4301-außen 3A-blank
-external surface 3A- shift



Ersatzteilliste: spare parts list:

Anlüftzylinder

Seat lifting device

Blatt 2

	Datum	Name
Gezeichnet	11.9.92	Trytko
Geprüft	11.9.92	WB
Normgepr.		

Datum	9/92	01/00	10/02	10/03	12/04				
Name	Trytko	Trytko	Trytko	Trytko	Trytko				

APV Rosista GmbH
D-59425 Unna
Germany

RN 01.053.3

Pos. item	Menge quantity	Ausführung/ design	ø100	ø125	ø180		ø100	ø125	ø180	
		Benennung/ description	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	Anlüftzylinder Seat lifting device	16-30-013/17	16-30-038/17	16-30-063/17		3A016-30-034/13	3A016-30-043/13	3A016-30-048/13	
1	1	Anlüftzylinder-Schweißteil Welding part of lifting device	16-30-011/17	16-30-036/17	16-30-061/17		3A016-30-033/13	3A016-30-042/13	3A016-30-047/13	
2	8	Skt. Schraube Hex. screw	DIN EN 24017-M8x14-A2-70				DIN EN 24017-M8x14-A2-70			
3	1	Skt. Schraube Hex. screw	DIN EN 24017-M8x16-A2-70				DIN EN 24017-M8x16-A2-70			
4	1	Distanzrohr Distance tube	09-89-622/13	=	=		09-89-622/13	=	=	
5	1	Stellschraube Setting screw	16-28-044/13	=	16-28-045/13		16-28-044/13	=	16-28-045/13	
6	2	Verschraubung Union G1/8	08-63-010/93	=	=		08-63-086/93	=	=	
7	1	Deckel Cover	16-00-043/93	=	=		16-00-043/93	=	=	
8	1	O-Ring O-ring 20,2-3	58-06-078/83	=	=		58-06-078/83	=	=	
9	1	Skt. Mutter Hex. nut M12x1	65-50-701/17	=	=		65-50-701/17	=	=	
10	1	Sprengring Retainer ring	08-39-083/13	=	=		08-39-083/13	=	=	
11	1	O-Ring O-ring 7,3-2,4	58-06-015/73	=	=		58-06-015/73	=	=	