SPXFLOW

INSTRUCTION MANUAL

# APV DELTA VRA

## VACUUM VALVE

FORM NO.: 170792 REVISION: UK-3

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


APV®

SPXFLOW®

# CE Declaration of Conformity
# UKCA Declaration of Conformity

We,

**DESIGN CENTER/MANUFACTURER:** **SPX Flow Technology Germany GmbH**
**Gottlieb-Daimler-Str. 13, D-59439 Holzwickede**

**MANUFACTURING FACILITY:** **SPX Flow Technology Poland sp. z o.o.**
**Rolbieskiego 2, 85-862 Bydgoszcz, Poland**

**AUTHORIZED REPRESENTATIVE: (for UKCA)** **SPX Flow Europe Ltd.**
**Building A, Compass House, Manor Royal**
**Crawley, RH10 9PY**

declare under our sole responsibility that the

**APV double seal and double seat valves** of the series
SD4, SDT4, SDU4, SDMS4, SDMSU4, SDTMS4, SWcip4, DSV, DA4, DA4 DPF, D4 SL, DU4 SL, DT4 SL, DP4 SL, D4, DA3, DA3SLD, DE3, DEU3, DET3, DKR2, DKRT2, DKRH2

**APV butterfly valves** of the series SV1, SVS1F, SV2, SVS2F, SVL, SVSL, SVE, SVSE

**APV ball valves** of the series BLV1

**APV single seat, diaphragm and spring loaded valves** of the series
S2, SW4, SWhp4, SW4DPF, SWmini4, SWT4, SWS4, MF4, MS4, MSP4, AP/T1, CPV, RG4, RG4DPF, RGMS4, RGE4, RGE4DPF, RGEMS4, PR2, PRD2, SI2, UF/R3, UF/R4, VRA/H

and the valve manifolds installed thereof

**meet the requirements of the Machinery Directive 2006/42/EC**
& EN ISO 12100-2010, DIN EN ISO 14159-2008-07, DIN EN 1672-2-2009-07.

Holzwickede, November 2022

ppa. B. Ariatabar

Dr.-Ing. Behdad Ariatabar, Design Center Lead - Valves

**meet the requirements of the Supply of Machinery (Safety) Regulations 2008 No. 1597**
& BS harmonized standards.

Crawley, November 2022

Ewout Roozendaal, Director Global Pricing

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## 1. General Terms

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

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

Descriptions and data given herein are subject to technical changes.

## 2. Safety Instructions

**DANGER!**

- The technical safety symbol draws your attention to important directions for operating safety. You will find it wherever the activities described are bearing risks of personal injury.
- Depressurize the line and cleaning system before any maintenance work!

**ATTENTION!**

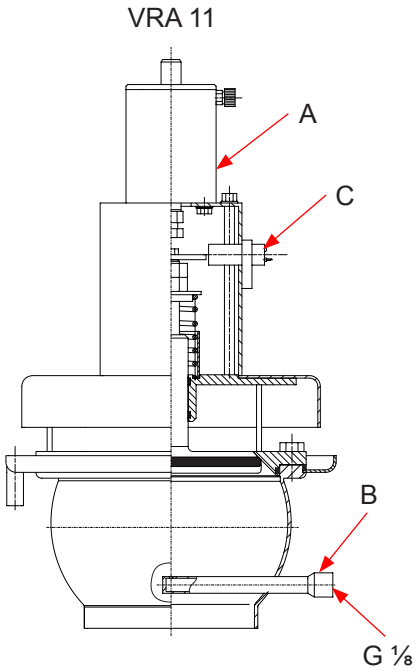
- Observe Service Instructions to ensure safe maintenance of the valve. Do not remove the lead seal! Failures can occur! We do not take over any responsibility in this case.

## 3. Intended Use

The intended use as field of application of the vacuum valve DELTA VRA is the protection against negative pressure in containers/tanks.

Arbitrary, constructive changes at the valve will influence safety as well as the intended functionality of the valve and are not permissible.

## 4. Mode of Operation




The VRA valve is used in applications in which equipment can be damaged by vacuum (e.g. in tanks or pipelines).

If a vacuum occurs, the valve opens by the valve seat being pulled down against spring force in order to relieve the vacuum in the system. The closing process is only released by the spring force if the vacuum does no longer exist.

## 5. Auxiliary Equipment

- Seat lift actuator (standard)

  The VRA valve is equipped with a seat lift actuator (A) which is used during the cleaning process and / or for remote functional control.

- Valve feedback

  A switch to indicate the closed or open position of the valve seat (ON/OFF) can be installed at the valve (C) on request.

- Cleaning device (standard)

  The valve is equipped with an integrated cleaning nozzle (B).

# 6. Cleaning

During the cleaning process, the product-wetted parts of the valve can be cleaned by the cleaning nozzle (B) in the housing. Additionally, the contact surfaces between the seat seal and the seat can be cleaned by lifting the seat. For this purpose, the seat lift actuator (A) is controlled in short intervals during the cleaning process.

# 7. Installation

The DELTA VRA valve must be installed in upright position as, otherwise, the valve function cannot be guaranteed. Moreover, liquids must be able to drain off the housing and the tray.

The valve housing can be welded in directly as the complete valve insert can be dismantled to the top.

**Attention: Observe welding instructions.**

## 7.1. Welding Instructions

**VRA**

- Before welding of the valve, the valve insert must be dismantled from the housing. Careful handling without damage to the parts must be provided.
- Welding may only be carried out by certified welders (DIN EN ISO 9606-1). (seam quality DIN EN ISO 5817).

  The welding of the valve housings must be undertaken in such a way that the valve body is not deformed.
- The preparation of the weld seam up to 3 mm thickness 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.

  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.

## 8. Maintenance

The maintenance intervals depend on the application and should be determined by the user carrying out regular checks.

- Exchange of seals according to service instructions.

- **All seals must lightly be greased before their installation!**

  **Recommendation:**
  **APV assembly grease for EPDM, HNBR, NBR und FPM (Viton)**
  (0,75 kg/ tin - ref.-No. 000 70-01-019/93; H147382)
  (60 g/ tube - ref.-No. 000 70-01-018/93; H147381)

  **oder**

  **APV assembly grease for VMQ (Silicone)**
  (0,6 kg/ tin - ref.-No. 000 70-01-017/93; H147380)
  (60 g/ tube - ref.-No. 000 70-01-016/93; H147379)

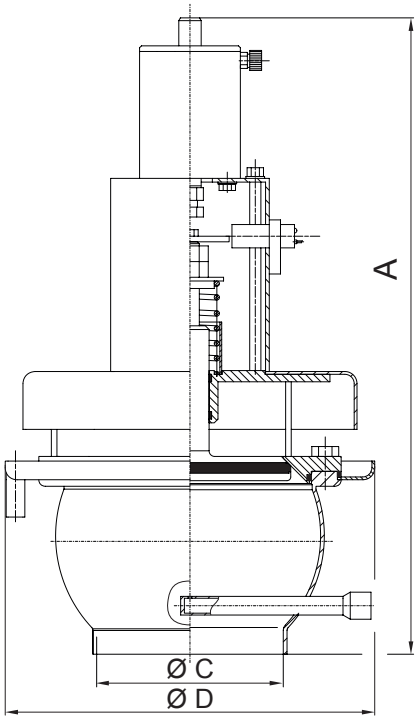
  ! Do not use grease containing mineral oil for EPDM seals.
  ! Do not use Silicone-based grease for Silicone seals.

- Assembly of the valve according to service instructions.

## 9. Materials

| | |
|---|---|
| Product-wetted parts: | 1.4404/1.4571<br>(DIN EN 10088) |
| Other parts: | 1.4301<br>(DIN EN 10088) |
| Seals: | standard design<br>EPDM / PTFE<br>option<br>VMQ, FPM |

## 10. Dimensions / Weights




| DN | dimensions in mm | | | weight |
|---|---|---|---|---|
| | A | Ø C | Ø D | kg |
| 50 | 310 | 50 | 127 | 3,3 |
| 100 | 340 | 100 | 198 | 5,4 |
| 150 | 420 | 150 | 277 | 8,4 |

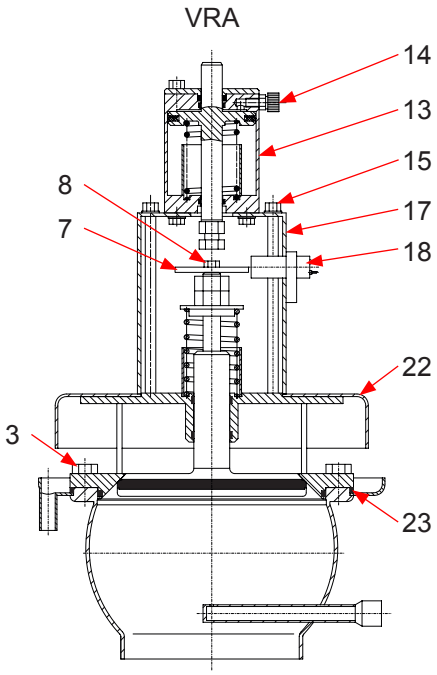
## 11. Technical Data

| | |
|---|---|
| max. line pressure | 10 bar |
| max. operating temperature | 135° C EPDM,<br>*VMQ, *FPM |
| short-term load | 140° C EPDM,<br>*VMQ, *FPM<br>*(no steam) |
| response pressure | 40 mm WC standard<br>adjustable from 35 mm WS<br>to 60 mm WC. |

(change of response pressure, see chapter 12.5)

| flow rates (m³/h) at a negative pressure of | | |
|---|---|---|
| | 100 mm WC | 200 mm WC |
| DN 50 | 39 | 80 |
| DN 100 | 215 | 317 |
| DN 150 | 324 | 943 |

# 12. Service Instructions



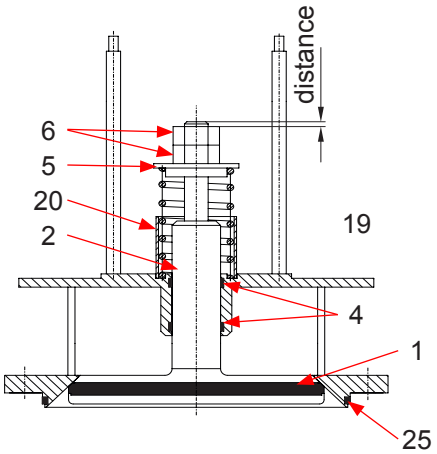

The item numbers refer to the spare parts drawing RN 01.113.

## 12.1 Dismantling from the line system

1. Shut off line pressure (product and cleaning line).

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

2. Remove pneumatic air for the seat lift actuator (13) at the connection (14).
3. Loosen clamp of feedback support and pull off proximity switch (18).
4. Loosen hexagon nuts (15) by means of a wrench SW 8 and lift the protective cover (17) with the seat lift actuator and the spray sheet (22).
5. Loosen the hexagon screws (3) by means of a wrench SW 13 or 17 and lift the valve insert.

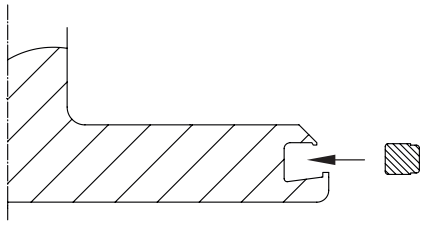



## 12.2. Dismantling of wear parts

1. Pull off O-ring (25).
2. Remove O-ring (23).
3. Loosen hexagon screw (8) by means of a wrench SW 8 and remove the disc (7).
4. Before loosening the hexagon nuts (6) by means of two wrenches SW 17, the exact distance from the upper edge of the shaft to the nut must be measured. This distance must be kept exactly during the installation in order not to change the preset response pressure.
5. Remove spring plate (5), spring (19) and bush (20).
6. Push off shaft (2).
7. Stick into the seat seal (1) with a peaked object and pull it off.
8. Dismantle guide bands (4).

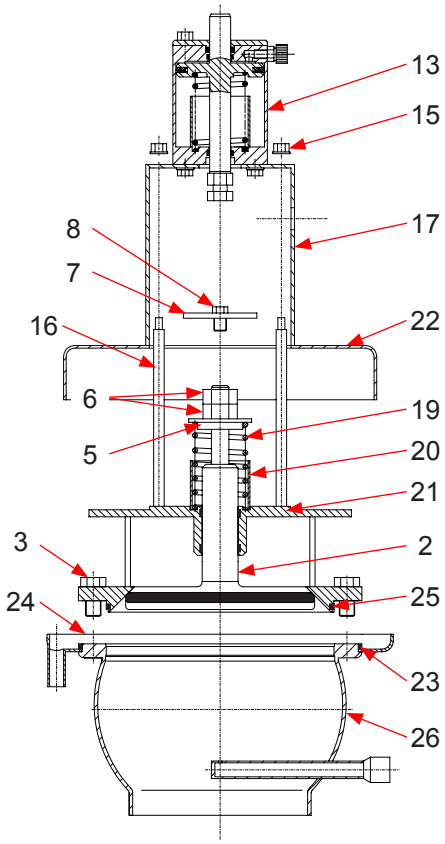
# 12. Service Instructions

## 12.3. Installation of seals and assembly of valve



1. Press the guide bands (4) into the yoke.
2. Before assembly of the valve shaft (2), the seat seal (1) must be inserted.

   Press the slightly greased seal at four spots, the wide side to the front, into the groove. At the four loops sticking out, the seal must be inserted into the groove, e.g. by means of a thin blunt screwdriver and strongly pressed into the groove by thumb. To ensure a uniform fit, the four loops are to be worked upon alternatively. Finally, the seal is smoothed by exerting strong pressure, e.g. by the handle of a screwdriver. The groove is vented by sticking between the groove edge and the seal inside down to the groove base by means of a thin blade. The correct fit of the seal must be checked after the installation.
3. Push the shaft (2) through the yoke (21).
4. Insert spring (19), bush (20) and spring plate (5).
5. Screw on hexagon nuts (8) and tighten them against one another.
6. Observe distance of installation (see 12.2.4).
7. Fix the disc (7) with the hexagon screw (8) at the shaft.
8. Place the spray sheet (22) and protective cover (17) together with the seat lift actuator (13) on the spacer (16) and tighten the parts by the discs (12) and hexagon nuts (15).
9. Insert O-ring (23) in the outlet (24) and the O-ring (25) in the yoke groove.




## 12.4. Installation of valve

1. Place the complete valve insert into the valve housing (26) and tighten it by the screws (3).
2. Install the pneumatic air line and the valve feedback.

# 12. Service Instructions

## 12.5. Change of response pressure

- The standard adjustment of the set pressure amounts to 40 mm WC.

**1.** Loosen the hexagon nut (15) and dismantle the protective cover (17) together with the seat lift actuator (13).

**2.** Loosen the hexagon nuts (6):

- By turning the lower nut (6) to the right, the response pressure can be reduced to max. 65 mm WC.

- By turning the lower nut (6) to the left, the response pressure can be reduced to min. 35 mm WC.

**3.** After re-adjustment, tighten the nuts (6) against one another and install the protective cover with the seat lift actuator.

## 13. Trouble Shooting

The item numbers refer to the spare parts drawing RN 01.113
Removal of failures see chapter 12. Service Instructions.

| Failure | Remedy |
|---|---|
| Leakage between housing and mating flange (below drain channel) | Replace o-ring (25). |
| Leakage at drain channel | Replace o-ring (23). |
| Leakage at the valve seat | Replace seat seal (1). |
| Seat lifting not possible | Check function of seat lift actuator or replace it completely. |
| Valve does not work | Check smooth running of the shaft, replace damaged parts. |

## 14. Spare Parts List

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 change

Ersatzteilliste: spare parts list

# Vakuumventil VRA11-IHP2
# mit Anlüftzylinder und Ventilstellungsmeldung
# Vacuum valve VRA11-IHP2
# with lifting device and proximity switch

| | | | | |
|---|---|---|---|---|
| Datum: | 20.7.92 | 10.7.17 | | |
| Name: | Trytko | Keil | | |
| Geprüft: | GOE/WB | GOE | | |

| | | | | |
|---|---|---|---|---|
| Datum: | | | | |
| Name: | | | | |
| Geprüft: | | | | |

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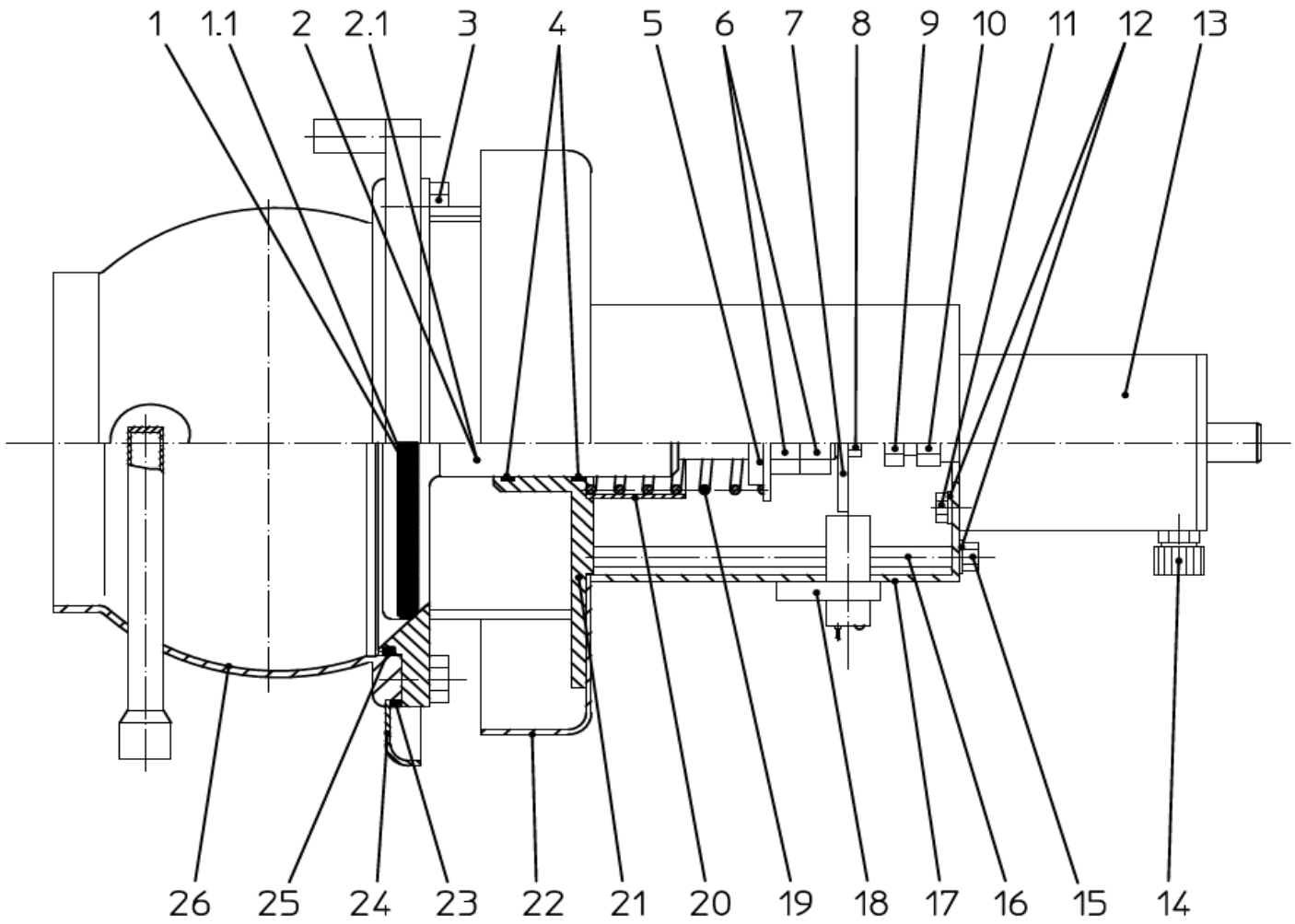
**RN 01.113**

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

Pos. 1 und 2 nur bei DN 150 gültig bis Juli 2007
Item. 1 and 2 only with DN 150 valid until July 2007
Pos. 1.1 und 2.1 nur bei DN 150 gültig ab Juli 2007
Item. 1.1 and 2.1 only with DN 150 valid from July 2007



Ersatzteilliste: spare parts list

# Vakuumventil VRA11-IHP2
# mit Anlüftzylinder und Ventilstellungsmeldung
# Vacuum valve VRA11-IHP2
# with lifting device and proximity switch

| | | | | |
|---|---|---|---|---|
| Datum: | 20.7.92 | 10.7.17 | | |
| Name: | Trytko | Keil | | |
| Geprüft: | GOE/WB | GOE | | |

| | | | | |
|---|---|---|---|---|
| Datum: | | | | |
| Name: | | | | |
| Geprüft: | | | | |

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**RN 01.113**

| pos. item | Menge quantity | Beschreibung description | Material material | DN 50 WS-Nr. ref.-no. | DN 100 WS-Nr. ref.-no. | DN 150 WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | Sitzdichtung * / Seatseal * | | 58-01-420/ | 58-01-619/ | 58-01-582/ | | | |
| 1.1 | 1 | Tellerdichtung * / Seat seal * | | | | 58-33-776/ | | | |
| 2 | 1 | Schaft / Shaft | | 15-22-447/ H30268 | 15-22-647/42 H137097 | 15-22-732/42 H320726 | | | |
| 2.1 | 1 | Schaft / Shaft | | | | 15-22-919/42 | | | |
| 3 | 4 | SKT. Schraube / Hex. Screw | A2-70 | 65-01-079/15 H78768 | 65-01-081/15 H78772 | 65-01-132/15 H78809 | | | |
| 4 | 2 | Führungsband / PTFE driving band | Turcite | 08-39-079/93 H14879 | | | | | |
| 5 | 1 | Federteller / Spring plate | 1.4301 | 21-55-384/12 H5335 | | 22-55-684/13 H54806 | | | |
| 6 | 2 | Skt. Mutter / Hex. Nut | A2-70 | 65-50-080/15 H79287 | | 65-50-101/15 H79298 | | | |
| 7 | 1 | Scheibe / Wascher | 1.4301 | 08-48-046/12 H15362 | | | | | |
| 8 | 1 | Skt. Schraube / Hex. Screw | A2-70 | 65-01-033/15 H78737 | | | | | |
| 9 | 1 | Skt. Schraube / Hex. screw | A2-70 | 65-01-085/15 H787778 | | | | | |
| 10 | 1 | Skt. Mutter / Hex. Nut | A2 | 65-50-060/15 H79281 | | | | | |
| 11 | 3 | Skt. Schraube / Hex. screw | A2-70 | 65-01-032/13 H78735 | | | | | |
| 12 | 5 | Scheibe / Wascher | 1.4301 | 67-01-014/13 H79587 | | | | | |
| 13 | 1 | Steuerkopf / Actuator | 1.4301 | 15-31-854/17 H32501 | | | | | |
| 14 | 1 | Verschraubung / Union | MS58 | 08-63-007/93 H16391 | | | | | |

Ersatzteilliste: spare parts list

# Vakuumventil VRA11-IHP2
# mit Anlüftzylinder und Ventilstellungsmeldung
# Vacuum valve VRA11-IHP2
# with lifting device and proximity switch

| | | | | |
|---|---|---|---|---|
| Datum: | 20.7.92 | 10.7.17 | | |
| Name: | Trytko | Keil | | |
| Geprüft: | GOE/WB | GOE | | |

| | | | | |
|---|---|---|---|---|
| Datum: | | | | |
| Name: | | | | |
| Geprüft: | | | | |

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**RN 01.113**

| pos. item | Menge quantity | Beschreibung description | Material material | DN 50 WS-Nr. ref.-no. | DN 100 WS-Nr. ref.-no. | DN 150 WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. |
|---|---|---|---|---|---|---|---|---|---|
| 15 | 2 | Skt. Mutter<br>Hex.Nut | A2 | 65-50-030/13<br>H79276 | | | | | |
| 16 | 2 | Distanzhalter<br>Spacer | 1.4301 | 08-49-185/12<br>H15627 | | 08-49-186/12<br>H15628 | | | |
| 17 | 1 | Schutzhaube<br>Cover | 1.4301 | 15-30-020/14<br>H137542 | | 15-30-021/14<br>H137552 | | | |
| 18 | 1 | Rückmeldung VSM komplett<br>Proximity switch complete | | 15-33-019/33<br>H326453 | | | | | |
| 19 | 1 | Feder<br>Spring | 1.4301 | 60-06-142/13<br>H78441 | 60-06-145/13<br>H78442 | 60-06-106/13<br>H78426 | | | |
| 20 | 1 | Distanzhülse<br>Spacer bush | 1.4301 | 09-89-462/12<br>H20331 | 09-89-465/12<br>H20334 | 09-89-474/12<br>H20338 | | | |
| 21 | 1 | Laterne<br>Yoke | 1.4404 | 15-40-780/47<br>H137113 | 15-40-783/47<br>H137100 | 15-40-785/47<br>H137147 | | | |
| 22 | 1 | Spritzblech<br>Sheet | 1.4301 | 15-30-966/17<br>H32181 | 15-30-963/17<br>H32175 | 15-30-968/17<br>H32185 | | | |
| 23 | 1 | O-Ring<br>O-Ring | EPDM | 58-06-490/63<br>H77061 | 58-06-690/63<br>H115986 | 58-06-822/63<br>H77095 | | | |
| 24 | 1 | Ablaufrinne<br>Outlet | 1.4301 | 15-30-957/17<br>H32163 | 15-30-960/17<br>H32169 | 15-30-962/17<br>H166368 | | | |
| 25 | 1 | O-Ring<br>O-ring | EPDM | 58-06-330/83<br>H77042 | 58-06-588/63<br>H153987 | 58-06-785/83<br>H77091 | | | |
| 26 | 1 | Gehäuse<br>Housing | 1.4404 | 21-80-427/47<br>H137011 | 21-80-627/47<br>H137472 | 21-80-727/47<br>H137124 | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Ersatzteilliste: spare parts list

# Vakuumventil VRA11-IHP2
# mit Anlüftzylinder und Ventilstellungsmeldung
# Vacuum valve VRA11-IHP2
# with lifting device and proximity switch

| | | | | |
|---|---|---|---|---|
| Datum: | 20.7.92 | 10.7.17 | | |
| Name: | Trytko | Keil | | |
| Geprüft: | GOE/WB | GOE | | |
| Datum: | | | | |
| Name: | | | | |
| Geprüft: | | | | |

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**RN 01.113**

| pos. item | Menge quantity | Beschreibung description | Material material | DN 50 WS-Nr. ref.-no. | DN 100 WS-Nr. ref.-no. | DN 150 WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. | WS-Nr. ref.-no. |
|---|---|---|---|---|---|---|---|---|---|
| | | Pos. 1, 4, 23, 25 nur im kompletten Dichtungssatz erhältlich<br>Item 1, 4, 23, 25 available as complete seal kits only | | | | | | | |
| | 1 | Dichtungssatz 1 (bei DN150 bis 7/2007)<br>Sealkit 1 (at DN150 till 7/2007) | FPM | 58-33-834/00<br>H77667 | 58-33-831/00<br>H77664 | 58-33-833/00<br>H77666 | | | |
| | 1 | Dichtungssatz 1 "<br>Sealkit 1 " | EPDM | 58-33-834/01<br>H155543 | 58-33-831/01<br>H153926 | 58-33-833/01<br>H169230 | | | |
| | 1 | Dichtungssatz 1 "<br>Sealkit 1 " | VMQ | 58-33-834/02 | 58-33-831/02 | 58-33-833/02<br>H325413 | | | |
| | 1 | Dichtungssatz 1 "<br>Sealkit 1 " | HNBR | 58-33-834/06<br>H325415 | 58-33-831/06 | 58-33-833/06<br>H325414 | | | |
| | 1 | Dichtungssatz 2 (bei DN150 ab 7/2007)<br>Sealkit 2 (at DN150 from 7/2007) | FPM | | | 58-33-845/00 | | | |
| | 1 | Dichtungssatz 2 "<br>Sealkit 2 " | EPDM | | | 58-33-845/01<br>H320727 | | | |
| | 1 | Dichtungssatz 2 "<br>Dichtungssatz 2 " | VMQ | | | 58-33-845/02 | | | |
| | 1 | Dichtungssatz 2 "<br>Sealkit 2 " | HNBR | | | 58-33-845/06 | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

# APV DELTA VRA

**VACUUM VALVE**

SPXFLOW


**SPX FLOW**

**Design Center**

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ISSUED 03/2017 - Translation of Original Manual