

APV DELTA CPV

CONSTANT PRESSURE DIAPHRAGM VALVE

FORM NO.: H200281 REVISION: UK-3

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



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: SPX Flow Europe Ltd.
(for UKCA) 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.

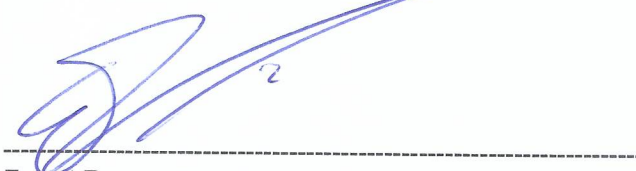
Holzwickede, November 2022



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.

For design reasons, the technical operating ranges of the valve with regard to operating pressures and temperatures have to be kept.

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



- Before any maintenance of the valve, the line system in which the constant pressure valve is installed, and the air supply must be depressurized.



- Any leakages arising at the diaphragm are carried off via the leakage drain. Leakages must be drained off safely and without risks (e.g. through a funnel). Leakages must be visibly detectable.

Attention!

Observe Service Instructions to ensure safe maintenance of the valve!

3. Intended Use

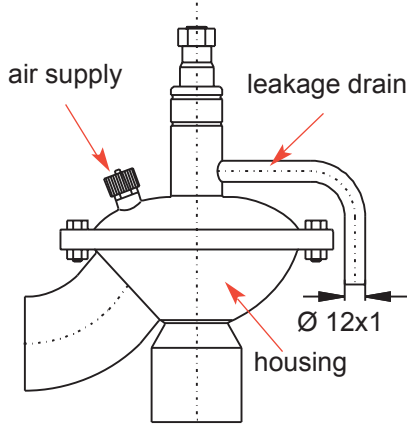
The intended use as field of application of the CPV valve is to keep process pressures constant in process plants.

Arbitrary, structural changes at the valve may affect safety as well as the intended functionality of the valve and are not permissible.

Authorizations and External Approvals:

3-A Sanitary Standards, Inc.

4. Application and Mode of Operation



The CPV constant pressure diaphragm valve forms part of the pneumatically operated pressure regulating valves and pressure holding valves which keep process pressures constant in process technological plants of the food and beverage as well as of the pharmaceutical and chemical industries (e.g. application of separators, pasteurizers and UHT plants, fillers, etc.).

The effective principle of pressure keeping is based on the diminution and enlargement of the free flow section at the valve seat by the valve shaft which is connected with the regulating diaphragm.

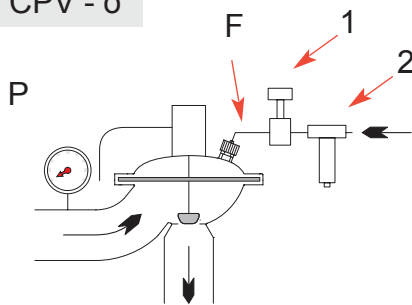
The actuation of CPV valves is effected by compressed air at (F). Compressed air supply is to be undertaken via a regulating valve for control air (fine pressure reducer) with integrated aeration. The product pressure should be controllable by a measuring unit.

Recommendation:

1 = fine pressure reducer - type Manostat, 40 mbar - 8 bar

2 = filter - $\approx 50 \mu\text{m}$

CPV - o



Valve variant **CPV-o** provides for a constant pressure regulation before the valve. (**o = open**)

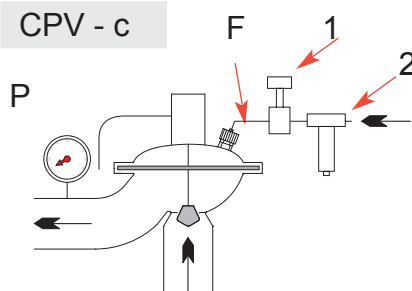
It opens with increasing product pressure and closes with decreasing pressure.

Valve variant **CPV-c** provides for a constant pressure regulation behind the valve. (**c = closed**)

It closes with increasing product pressure and opens with decreasing pressure.

Thus, the set value adjusted is kept at a constant level. Through the use of the product / air diaphragm, intermixing can be prevented in case of diaphragm rupture due to wear. Leakages are indicated immediately via the leakage drain.

CPV - c



5. Cleaning

Cleaning of the CPV valves is undertaken with pipeline cleaning.

The following has to be considered for the different valve variants.

Δp of about 3bar must be kept.

Cleaning CPV-o:

- At a max. CIP line pressure up to 3 bar, the valve is not controlled with pneumatic air. The valve moves into open position.
- If the max. CIP line pressure of 3 bar is exceeded, the valve **must be controlled with pneumatic air pressure**, e.g. ... $P_{CIP} = 5 \text{ bar}$, $P_{air} = 2 \text{ bar}$.

Cleaning CPV-c:

- Supply pneumatic air to produce a pressure difference of about 3 bar. The valve moves into open position, e.g. ... $P_{CIP} = 2 \text{ bar}$, $P_{air} = 5 \text{ bar}$.

6. Installation

The CPV constant pressure diaphragm valve is installed as corner valve in such a way that liquids can drain off in depressurized state. The installation position must provide for self-draing of the valve.

All valves are equipped with weld ends.

- **Attention!** Observe welding instructions!

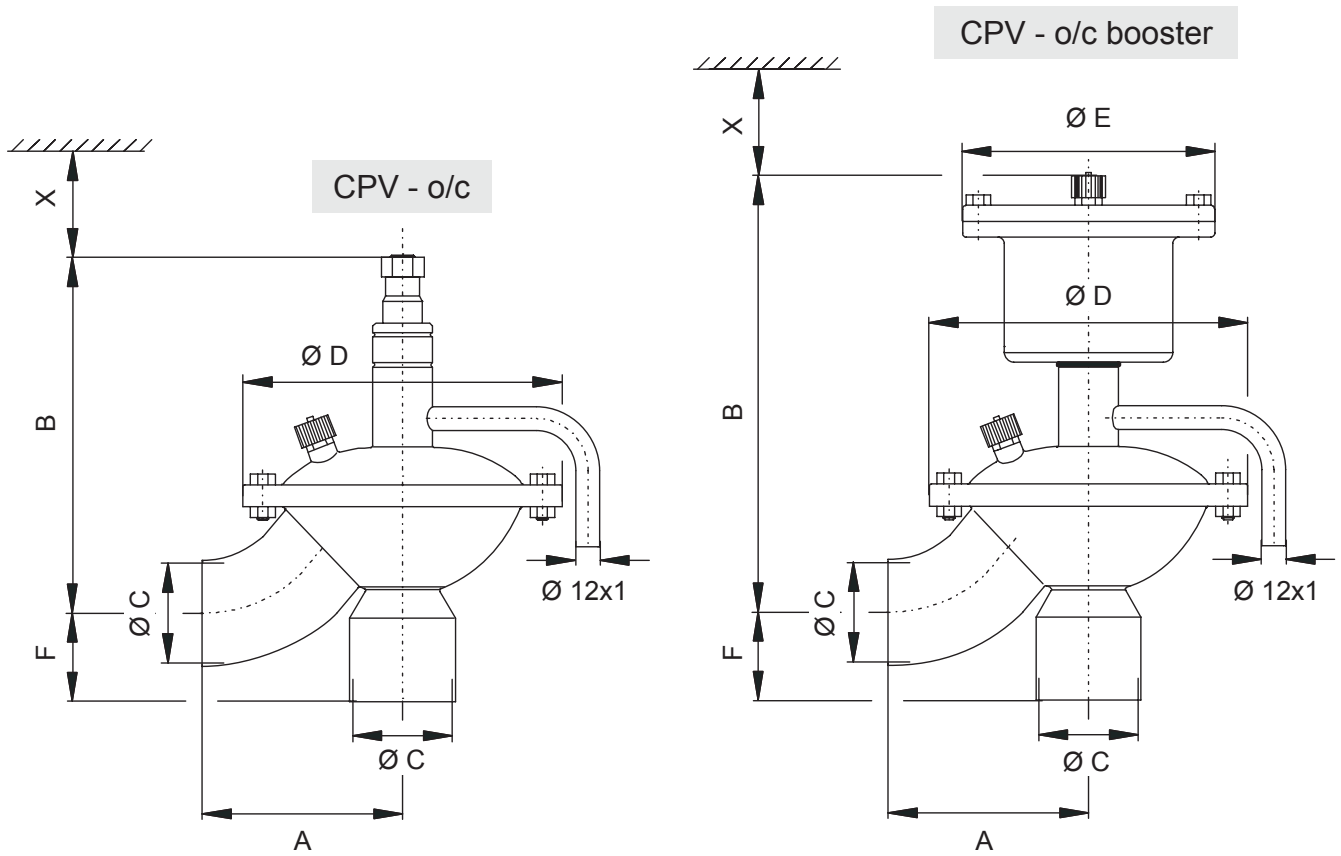
7. Installation

7.1 Welding Instructions

CPV

- Before welding of the valves, the valve insert must be dismantled from the housing. See to a careful handling to avoid damage to the parts.
- 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 effected in such a way that deformation strain cannot be transferred from the outside to the valve body.
- The preparation of the weld seam up to 3 mm wall thickness must be carried out in butt manner as a square butt joint without air. Consider shrinkage!
- TIG orbital welding is best.
- After welding of the valve housings or of the mating flanges and after work at the pipelines, the corresponding parts of the installation or pipelines must be cleaned from welding residues and soiling. If these cleaning instructions are not observed, welding residues and dirt particles can settle in the valve and cause damage.
- Any damage resulting from the nonobservance of these welding instructions is not subject to our guarantee.
- Welding directives for aseptic application shall be drawn from the AWS/ANSI Directives and EHEDG Guidelines.

8. Dimensions / Weights



	DN	ref.-No.	A	B	Ø C	Ø D	Ø E	F	inst. dimension X in mm	weight in kg
CPV-o	50	20-16-444/..	95	190	50	160		50	80	2,3
CPV-c	50	20-16-445/..	95	190	50	160		50	80	2,3
CPV-o booster	50	20-16-446/..	95	230	50	160	130	50	80	4,2
CPV-c booster	50	20-16-447/..	95	230	50	160	130	50	80	4,2
CPV-o	2"	20-16-469/..	95	190	47,6	160		50	80	2,3
CPV-c	2"	20-16-470/..	95	190	47,6	160		50	80	2,3
CPV-o booster	2"	20-16-471/..	95	230	47,6	160	130	50	80	4,2
CPV-c booster	2"	20-16-472/..	95	230	47,6	160	130	50	80	4,2

8. Technical Data

8.1. General terms

Operating pressure:	7 bar
Max. control air pressure for CPV:	6 bar
Max. control air pressure for CPV with booster:	4 bar
Operating temperature:	135°C
short-term:	140°C
Air connections:	G1/8"

8.2. Compressed air quality

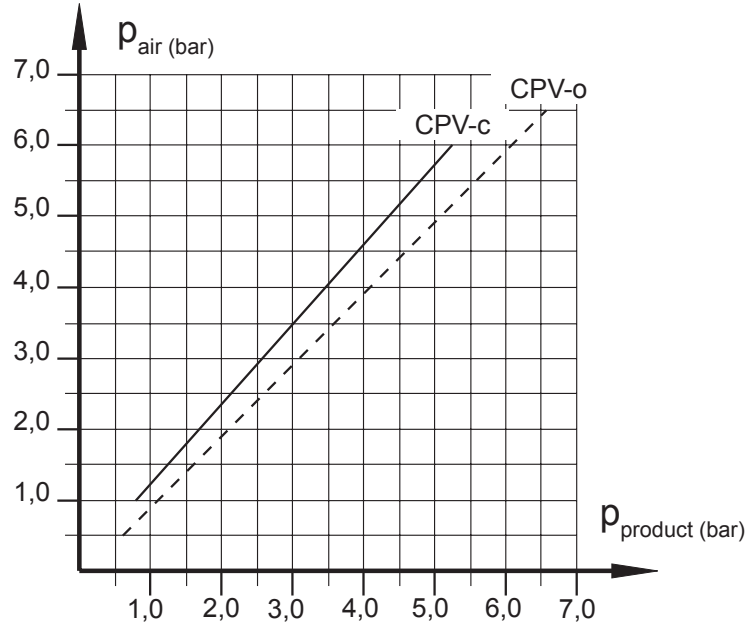
Quality class according to DIN ISO 8573-1

- content of solid particles:	quality class 3, max. size of solid particles per m ³ 10000 of 0,5 µm < d < 1,0 µm 500 of 1,0 µm < d < 5,0 µm
- content of water:	quality class 3, max. dew point temperature -20°C For installations at lower temperatures or at higher al- titudes, additional measures must be considered to reduce the pressure dew point accor- dingly.
- content of oil:	quality class 1, max. 0,01 mg/m ³

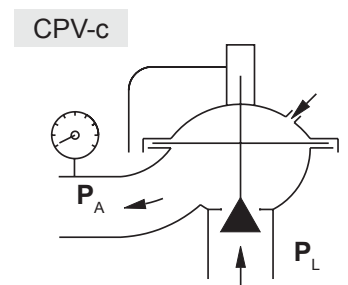
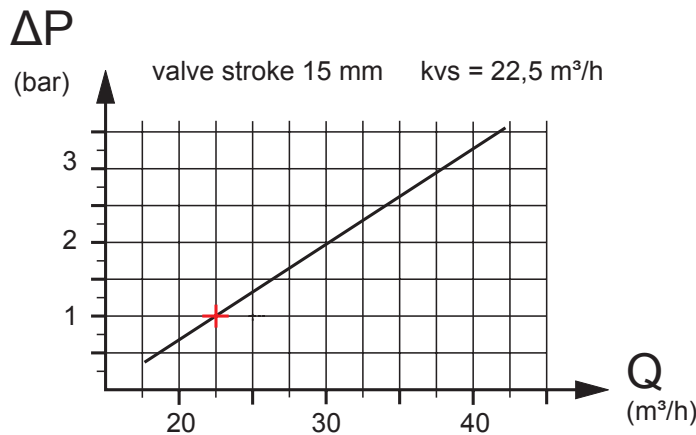
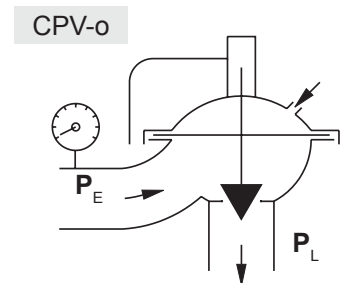
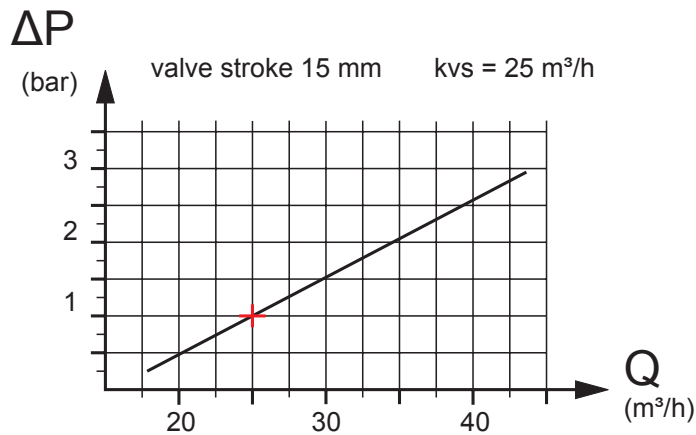
The oil applied must be compatible with Polyurethane elastomer materials.

8. Technical Data

8.3. Pressure ratio diagram (air/product)



8.4. Pressure loss curve CPV



9. Materials

Housing, intermediate piece and cover out of stainless steel:

1.4404

(DIN EN 10088)

Screws:

1.4301

(DIN EN 10088)

Seals:

standard design EPDM

Diaphragms:

**composite material
TFM / EPDM**

10. Maintenance

The maintenance intervals depend on the corresponding application (product, temperature) and are to be determined by the operator himself carrying out temporary checks.

The following maintenance recommendation must be verified on the basis of the individual operating conditions. As the valves are often used in hot applications or are subject to operating frequencies of more than 30,000 cycles per year, we recommend half-yearly preventive maintenance.

Replacement of seals according to Service Instructions.

All seals must be greased well before their installation.

The diaphragm must be greased well at the product-averted side, only!

Recommendation:

APV assembly grease for EPDM

0.75 kg tin - ref.No. 00070-01-019/03; H147382

60 g tube - ref.No. 00070-01-018/93; H147381

Attention!

Do not use grease containing mineral oil for EPDM seals.

Assembly of the valve according to Service Instructions.

11. Service Instructions

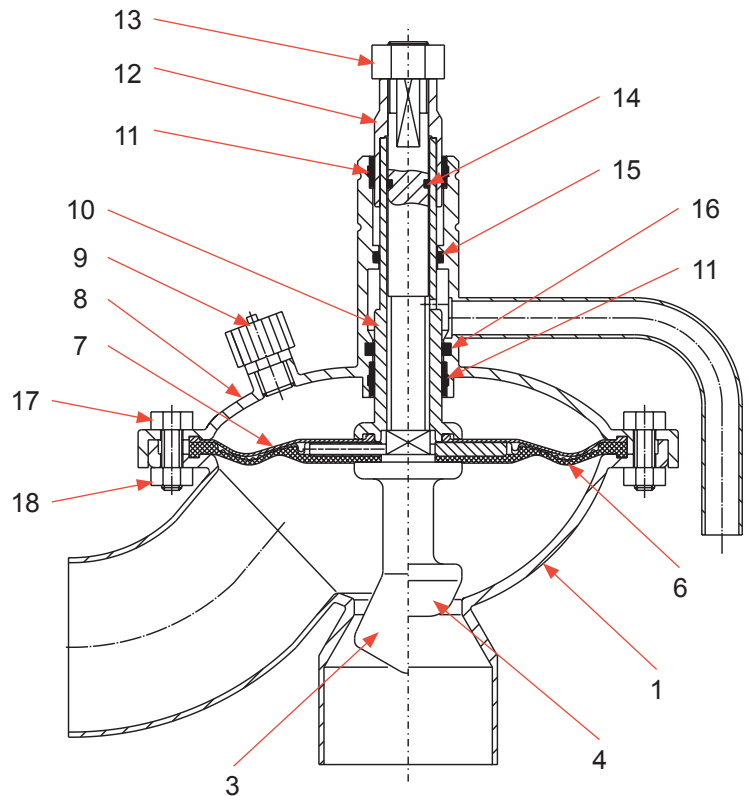
The item numbers refer to the spare parts drawings (DIN design: RN 01.177).

11.1. Disassembly from the line system

1. Depressurize the product and air lines.
2. Dismantle the air supply at (9).
3. Loosen the nuts (18) and remove the hexagon screws (17).
4. Lift the valve insert off the housing (1).

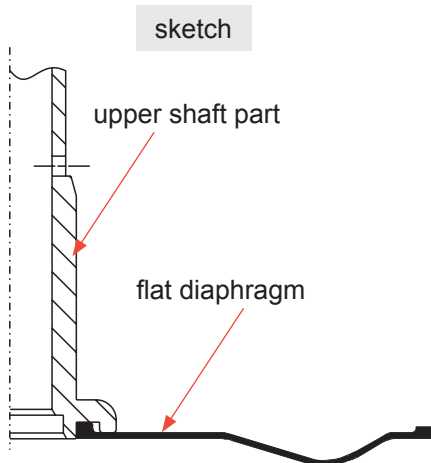
11.2. Dismantling of wear parts

1. Hold against the stop sleeve (12) by a spanner SW 17 and loosen the hexagon nut (13) by a spanner SW 19.
2. Remove the shaft (3 or 4) with diaphragm (6, 7) and upper shaft (10) to the bottom from the housing cover (8).
3. Remove the stop sleeve (12) to the top from the housing cover.
4. Remove the two guide bushings (11) and the o-rings (15, 16) from the housing cover (8).
5. Remove the o-ring (14) from the shaft (3 or 4).



11. Service Instructions

11.3. Installation of seals and assembly of valve



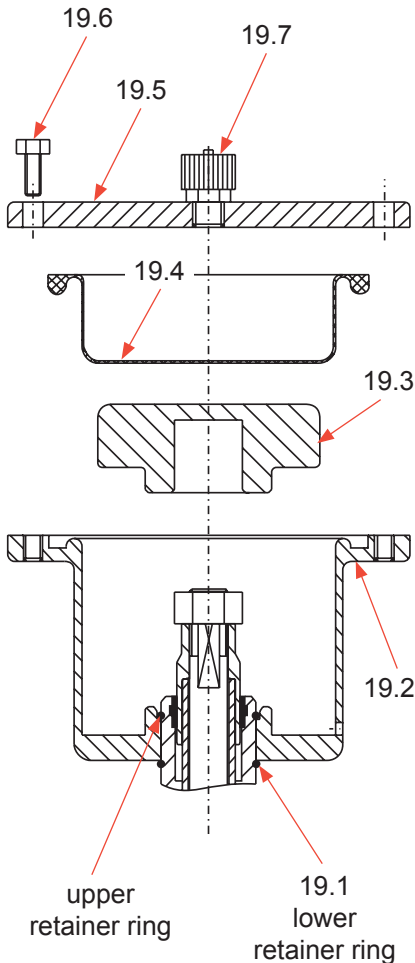
1. Insert the o-ring (14) into the groove of the shaft (3 or 4).
2. Insert the guide bushings (11) and the o-ring (15, 16) into the housing cover (8).
3. Grease the elastomer side of the disc diaphragm (6) well. Pin the disc diaphragm with the Teflon-coated side to the front on the shaft (3 or 4).
4. Press the flat diaphragm (7) into the upper shaft (10) (see sketch) and place it on the shaft.
5. Push the upper part of the shaft completely with diaphragm and shaft into the housing cover.
6. Insert the stop sleeve (12) into the shaft bearing.
7. Screw on the hexagon nut (13). Hold against the stop sleeve (12) by a spanner SW 17 and tighten the hexagon nut with a spanner SW19.
8. Place the housing cover (8) on the housing (1). Before assembly see to the housing groove for the diaphragm being **free of fat and clean**.
9. Tighten the housing cover and the housing with the screws (17) and nuts (18) provided.
10. Fix the air supply line.

11. Service Instructions

11.4. Dismantling of booster

The item numbers refer to the spare parts drawings **RN 01.177**.

1. Depressurize the product line and air supply line.
2. Dismantle the air supply line (9, 19.7).
3. Remove the hexagon screws (19.6).
4. Remove the housing cover (19.5), diaphragm (19.4) and piston (19.3).
5. Press the lower retainer ring (19.1) to the bottom and out of the groove.
6. Slide the booster housing to the bottom und remove the upper retainer ring.
7. Remove the booster housing to the top.



11.5. Assembly of booster

1. Install the lower retainer ring up to the leakage drain pipe via the groove of the shaft bearing.
(The retainer ring must not lock in the groove.)
2. Place the booster housing (19.2) via the hexagon nut (13).
3. Insert the upper retainer ring into the groove.
4. Slide the booster housing to the top until it locks in the upper retainer ring.
5. Push the lower retainer ring via the shaft bearing to the top. The retainer ring must lock in the groove. (The booster housing is firmly connected with the upper housing.)
6. Insert the piston (19.3) and diaphragm (19.4). Place the housing cover on the diaphragm and press the two parts together. The diaphragm must distinctly lock in the groove.
7. Tighten the housing cover.

11.6. Reconstruction of valve variants CPV-o to CPV-c and vice versa

In order to change the mode of operation of the valve, just the valve shaft (3 or 4) has to be replaced.

See dismantling of wear parts, see item 11.2.

12. Trouble Shooting

Failure	Remedy
Product leakage from the leakage drain	Replace the disc diaphragm (6).
Air leakage from the leakgae drain	Check and replace flat diaphragm (7) and o-rings (15, 16).

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

13. 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:

- required number of parts
- reference number
- designation.

Data are subject to change.

Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhalts nicht gestattet, soweit nicht schriftlich zugestanden. Verstößt verpflichtet zum Schadensersatz und kann strafrechtliche Folgen haben. (Paragraph 18 UWG, Paragraph 106 UrhG). Eigentum und alle Rechte, auch für Patenterteilung und Gebrauchsmusterantragung, vorbehalten. SPX FLOW, Germany

Ersatzteilliste: spare parts list

Druckhalteventil mit Booster Constant-pressure valve with booster CPV-c Booster, CPV-o Booster

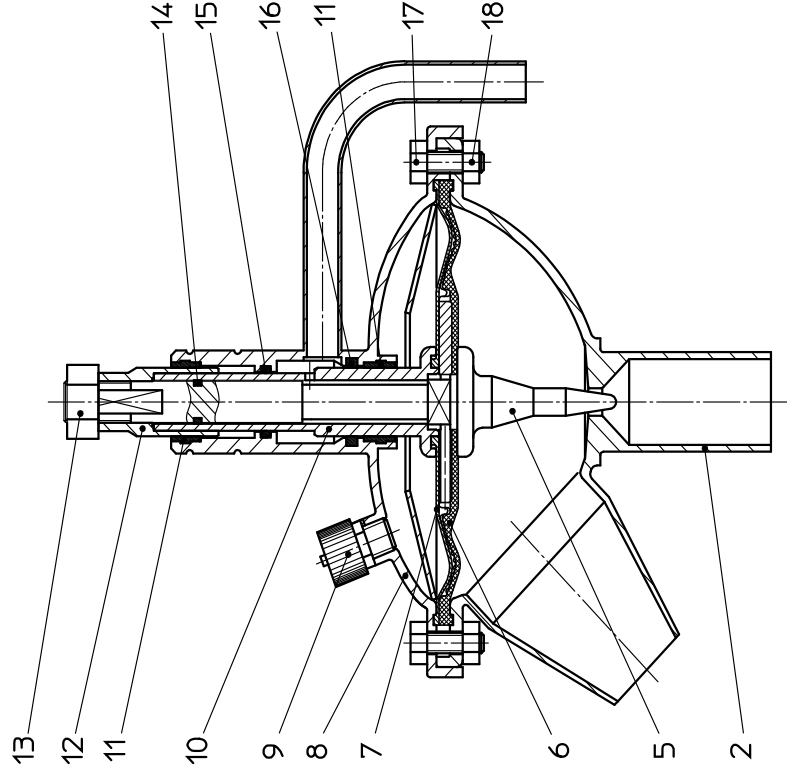
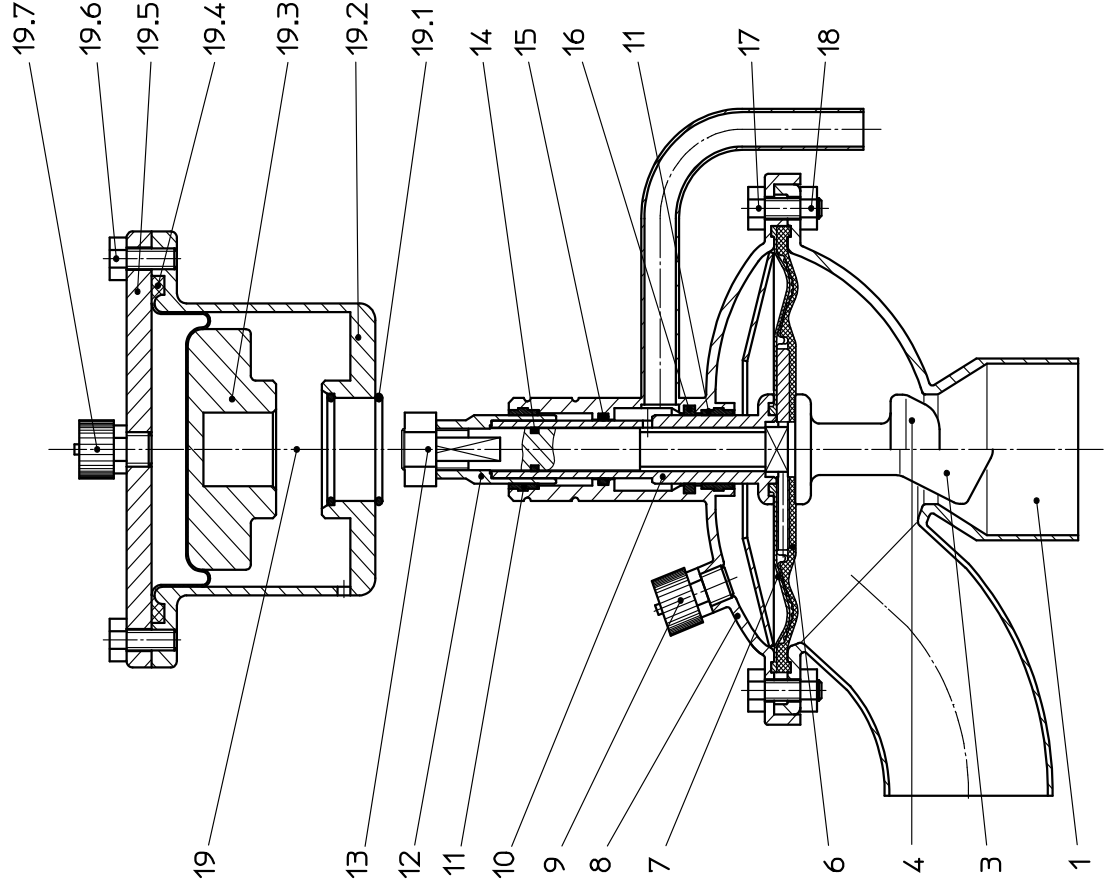


Datum: 13.04.16
Name: Trytko
Geprüft: Schulz

06.07.17
Sender
Goebel

Blatt 1 von 3

RN 01.177



Datum:	13.04.16	06.07.17
Name:	Trytko	Sender
Geprüft:	Schulz	Goebel
Datum:		
Name:		
Geprüft:		

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Ersatzteilliste: spare parts list

**Druckhalteventil mit Booster
Constant-pressure valve with booster
CPV-c Booster, CPV-o Booster**

Datum:	13.04.16
Name:	Trytko
Geprüft:	
Datum:	
Name:	
Geprüft:	



Blatt 2 von 3

RN 01.177

pos. item	Menge quantity	Beschreibung description	Material	DN25/8		DN50	2"		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	1	Gehäuse CPV Housing CPV	1.4404			21-08-175/47 H180970			21-08-176/47 H202262		
2	1	Gehäuse CPVXO Housing CPVXO	1.4404	21-08-201/47 H317742							
3	1	Schaft CPV-c Valve shaft CPV-c	1.4404			21-22-180/42 H178452			21-22-180/42 H178452		
4	1	Schaft CPV-o Valve shaft CPV-o	1.4404			21-22-185/42 H178453			21-22-185/42 H178453		
5	1	Schaft CPVXO Valve shaft CPVXO	1.4404	21-22-187/42 H317744							
6	1	Tellermembrane Disk membrane	EPDM WS287 / 64	58-23-010/93 H207149		58-23-010/93 H207149			58-23-010/93 H207149		
	1	Tellermembrane Disk membrane	TFM / EPDM WS287	58-23-010/23 H174403		58-23-010/23 H174403			58-23-010/23 H174403		
7	1	Flachmembrane Flat membrane	EPDM WS287 / 64	58-23-030/94 H174511		58-23-030/94 H174511			58-23-030/94 H174511		
8	1	Gehäusedeckel Housing lid	1.4404	21-20-180/47 H178457		21-20-180/47 H178457			21-20-180/47 H178457		
9	1	Verschraubung Union	Kunststoff	08-63-010/93 H16394		08-63-010/93 H16394			08-63-010/93 H16394		
10	1	Schaft oberteil Upper valve shaft	1.4301	21-21-180/12 H178449		21-21-180/12 H178449			21-21-180/12 H178449		
11	2	Führungsbuchse Bushing	PTFE 25% Kohle	08-01-178/23 H207154		08-01-178/23 H207154			08-01-178/23 H207154		
12	1	Anschlaghülse Stop sleeve	1.4404	08-05-180/44 H201934		08-05-180/44 H201934			08-05-180/44 H201934		
13	1	Skt. Mutter selbstsich. Hex. lock nut	1.4404	65-50-105/15 H112376		65-50-105/15 H112376			65-50-105/15 H112376		
14	1	O-Ring O-ring	EPDM FDA-konform	58-06-029/64 H148388		58-06-029/64 H148388			58-06-029/64 H148388		
15	1	O-Ring O-ring	EPDM FDA-konform	58-06-055/64 H76934		58-06-055/64 H76934			58-06-055/64 H76934		

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Ersatzteilliste: spare parts list

Druckhalteventil mit Booster Constant-pressure valve with booster CPV-c Booster, CPV-o Booster

Datum: 13.04.16
Name: Trytko
Geprüft:



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RN 01.177

pos. item	Menge quantity	Beschreibung description	Material	DN25/8	WS-Nr. ref.-no.	WS-Nr. ref.-no.	WS-Nr. ref.-no.	2"	WS-Nr. ref.-no.	WS-Nr. ref.-no.
16	1	O-Ring O-ring	EPDM FDA-konform	58-06-078/64 H121794	58-06-078/64 H121794	58-06-078/64 H121794	58-06-078/64 H121794			
17	8	Skt. Schraube Hex. screw	A2	65-01-057/13 H78753	65-01-057/13 H78753	65-01-057/13 H78753	65-01-057/13 H78753			
18	8	Skt. Mutter Hex. nut	A2	65-50-040/13 H79278	65-50-040/13 H79278	65-50-040/13 H79278	65-50-040/13 H79278			
19	1	Booster CPV Komplett Booster CPV complete	1.4301	16-30-205/17 H178787	16-30-205/17 H178787	16-30-205/17 H178787	16-30-205/17 H178787			
19.1	2	Sprengtring Retainer ring	1.4310	08-39-225/13 H201977	08-39-225/13 H201977	08-39-225/13 H201977	08-39-225/13 H201977			
19.2	1	Gehäuse Housing	1.4301	21-08-185/17 H178810	21-08-185/17 H178810	21-08-185/17 H178810	21-08-185/17 H178810			
19.3	1	Kolben Piston	PA-12 schwarz	15-29-090/93 H178816	15-29-090/93 H178816	15-29-090/93 H178816	15-29-090/93 H178816			
19.4	1	Rollmembrane Roller membrane	50	58-23-040/14 H179797	58-23-040/14 H179797	58-23-040/14 H179797	58-23-040/14 H179797			
19.5	1	Deckel Cover	1.4301	16-24-120/17 H178815	16-24-120/17 H178815	16-24-120/17 H178815	16-24-120/17 H178815			
19.6	6	Skt. Schraube Hex. screw	A2	65-01-056/13 H78751	65-01-056/13 H78751	65-01-056/13 H78751	65-01-056/13 H78751			
19.7	1	Verschraubung Union	Kunststoff	08-63-010/93 H16394	08-63-010/93 H16394	08-63-010/93 H16394	08-63-010/93 H16394			
Pos. 6, 7, 11, 14, 15, 16 nur im kompletten Dichtungssatz erhältlich Item 6, 7, 11, 14, 15, 16 available as complete seal kits only										
		Dichtungssatz Seal kit	EPDM / TFM	58-34-625/01 H200075	58-34-625/01 H200075	58-34-625/01 H200075	58-34-625/01 H200075			
		Dichtungssatz Seal kit	EPDM / gewebeverstärkt	58-34-625/07 H315338	58-34-625/07 H315338	58-34-625/07 H315338	58-34-625/07 H315338			

APV DELTA CPV

CONSTANT PRESSURE
DIAPHRAGM VALVE

SPXFLOW

SPX FLOW

Design Center

Gottlieb-Daimler-Straße 13
D-59439 Holzwickede, Germany
P: (+49) (0) 2301-9186-0
F: (+49) (0) 2301-9186-300

SPX FLOW

Production

Stefana Rolbieskiego 2
PL- Bydgoszcz 85-862, Poland
P: (+48) 52 566 76 00
F: (+48) 52 525 99 09

SPX FLOW reserves the right to incorporate the latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this manual, are provided for your information only and should not be relied upon unless confirmed in writing. Please contact your local sales representative for product availability in your region.

For more information visit www.spxflow.com.

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