Operating and Maintenance Instructions for

Air Release Valve Set HaVent® PN 16 for Potable Water
Order No. 993-00

- QUICK GUIDE -

Flange connection variant

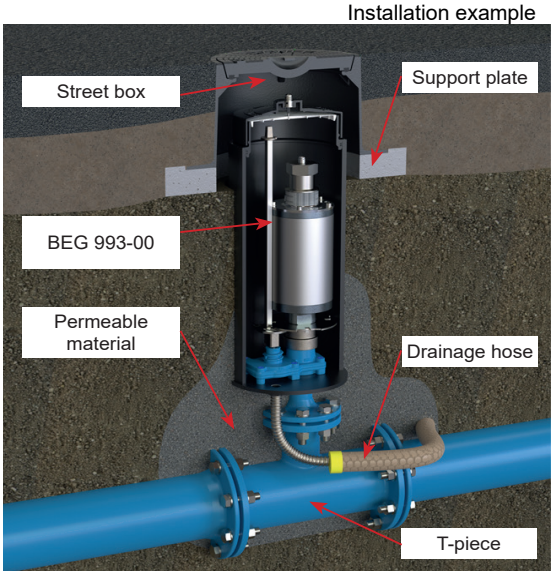
Connection variant BAIO® spigot end

Table of Contents

1. Intended Use / Product Description

Medium:	Potable water
Operating temperature:	0° to 40°C
Operating range:	0 - 16 bar
Material:	see parts list
Connection variants:	Flange DN50, DN80 BAIO® spigot end DN80
Pipe cover depth:	1.0 m, 1.25 m, 1.5 m, 1.75 m

Installation example



The air release valve set (ARVS) consists of a shaft with a shut-off device and an air release valve (ARV). Thanks to its compact design, the ARVS replaces
elaborate, maintenance-intensive shaft structures. Removing the replacement valve assembly allows simple servicing, avoiding the hazards associated with entering shafts.
The shaft cover is fitted with an integrated insect screen.

Installing a drainage hose Order No. 490-04 together with permeable backfill is recommended.

The air release valve HaVent® with rolling-diaphragm technology is ideally suited both for releasing and admitting large volumes of air while filling and draining the pipeline, and for venting large volumes of air within the operating range. The ARV operates continuously from 0 to 16 bar and seals perfectly even in a depressurized state. No minimum response pressure is required.
The rolling-diaphragm sealing principle has a pressure-surge-dampening effect. Thanks to its high venting capacity, the ARV also provides effective vacuum protection.

The shut-off unit contained in the ARVS can be opened and closed using a valve key Order No. 341-00. When the shut-off unit is closed, the ARV is automatically brought to a depressurized state. Manual pressure relief before servicing is not required, since the compressed air contained in the ARV can escape via the shut-off unit's automatic drainage function.

Before installation, the ARVS can be continuously shortened on site by up to 100 mm (see item 3.5).
A shaft extension is possible on site using accessory Order No. 993-04 (see item 3.6).

Max. venting capacity: 700 m³/h (when filling the pipeline)
Air release/admission cross-section: 1,500 mm²
Operating vent cross-section: 200 mm²

The applicable standards and codes of practice, accident prevention regulations, and the requirements of the relevant trade associations must be observed and complied with during laying, installation, and maintenance.
Laying, installation, and maintenance may only be carried out by suitably qualified personnel.

Product marking ARV inside:

HaVent

Nennweite / Size:
BEG

Druckstufe:
max. pressure:
PN16
250 psi
Gehäuse/Body:
Edelstahl
stainless steel
European standard:
EN 1074-4
DVGW_W
Herstelljahr:
Year of manufacture:
xxx
Seriennummer:
Serial No.:
xxx

Made in Germany

Product marking ARVS outside:

Be- und Entlüftungsgarnitur

DN xx

Flansch / BAIO-Spitzende

DN 2“
Havent

PN 0 - 16 bar

Gesamtlänge: xxx

Baujahr: xxx

Art.Nr. xxx

Made in Germany

2. Installation

2.1 General

Air release valves and valve sets are installed at high points, at changes in pipe gradient, on falling sections, on long gently falling or horizontal pipe runs, upstream and downstream of control valves, and downstream of pumps.

Detailed planning guidance for new installations and retrofits can be found in the technical information for planners on air release valves and valve sets, as well as in the current DVGW code of practice W334.
The ARV or ARVS must be mounted on a vertical outlet directly on the pressure pipeline. The need for a vent dome per DVGW code of practice W334 must be checked. A laterally offset arrangement of air release valves/valve sets must be avoided.

Installation must be carried out in a depressurized state. A distinguishing feature is the option to tap and commission the ARVS under pressure using the appropriate accessories (see item 3.7).

2.2 Installing the ARVS onto the Pipeline

	Connection variant flange: 2x open-end wrench SW 24

Flange connection:
When installing the ARVS into the pipeline, the applicable DVGW or DWA regulations for making a flange connection must be observed.

BAIO® connection:
When installing the ARVS with BAIO® spigot end into the pipeline, the BAIO® laying instructions must be observed.

For Hawle air release valve sets with vertical BAIO® spigot end, a dirt and anti-rotation guard Order No. 490-05 must always be used between the spigot end and the BAIO® socket. In addition to securing against accidental unlocking, this also protects against contamination.

2.3 Drainage Bed
In the drainage area, a bed of permeable material (particle size > 5 mm) should be installed to absorb the residual water produced during closing while also preventing the assembly from being undermined by water.
Installing a drainage hose Order No. 490-04 together with permeable backfill is recommended.

2.4 Drainage Hose Order No. 490-04

The drainage hose collects and slowly discharges the splash water that occurs inside the ARVS (produced during venting) and the residual water that occurs when removing the valve. It also prevents possible root ingrowth.
The drainage hose consists of a flexible drainage pipe, d 50 mm, wrapped in filter fleece, with a matching connection to the valve's drain fitting.
Thanks to its large surface area, the collected splash water/residual water is released evenly.
The filter fleece reduces the ingress of fine-grained soil material via the drainage hose into the interior of the ARVS.

Recommended for use with:
- „fine-grained“ soils
- installation situations where silting into the housing is expected (groundwater)

Assembly:
See the operating instructions “Drainage Hose Order No. 490-04”

2.5 Shortening

	Assembly tool (see Accessories) Order No. 993-02 Cordless screwdriver or Phillips screwdriver PH2 Tool for shortening the PE shaft pipe Angle grinder with cutting disc for stainless steel Spindle grease, e.g. Order No. 600 000 0015 Manual deburring tool or file

Before installation, the ARVS can be continuously shortened on site by up to 100 mm as follows:

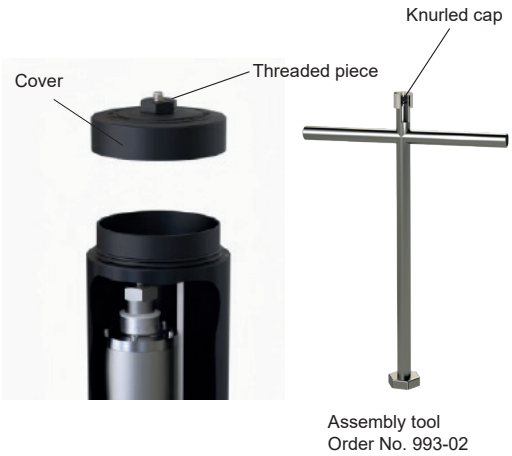
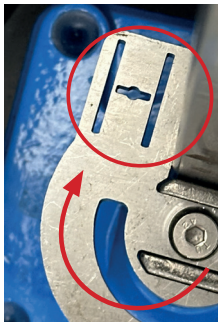
1.	Remove the cover (1) using the assembly tool Order No. 993-02. To do so, place the assembly tool onto the hexagon of the cover and, using the tool's knurled cap, screw it clockwise onto the threaded piece (2) as far as it will go. Pull the cover (1) upward with the assembly tool. This releases the cover's snap-fit connections.	
2.	Remove the four sheet metal screws (4) from the transition ring (3) in the shaft pipe (9) and lift off the transition ring.	

Image 1: Shut-off unit (10) open:	**Image 2: Shut-off unit (10) closed:**	**Image 3: Replacement valve assembly (6) locked:**	**Image 4: Replacement valve assembly (6) unlocked:**
			

3.	Shut-off unit(10) with the valve key Order No. 341-00 by turning it a half turn (180°) clockwise (Image 2), and remove the key rod (8) (Image 3). Place the assembly tool onto the end cap (7) of the replacement valve assembly (6) and screw it on clockwise using the knurled cap. Unlock the replacement valve assembly by turning it counterclockwise (Image 4).
4.	Remove the complete replacement valve assembly (6) and set it aside protected from dirt.
5.	Shorten the shaft pipe (9) as needed using a suitable tool, up to max. 100 mm. Make sure the cut is straight!

6.	Deburr the inside of the shaft pipe using a manual deburring tool or file.
7.	Shorten the key rod (8) at the plain end accordingly, using an angle grinder with a cutting disc for stainless steel, and deburr it.
8.	Reinsert the transition ring (3), fit the four screws (4), and tighten flush.
9.	Refit the replacement valve assembly (6) and lock it by turning clockwise. Insert the key rod (8) and open the shut-off unit (10) with the valve key Order No. 341-00, turning it a half turn (180°) counterclockwise.
10.	Fit the cover (1). The snap-fit connection must engage.

2.6 Shaft Extension Order No. 993-04

Using the shaft extension (standard version, see Accessories), the ARVS can be extended on site at a later date by up to 250 mm.

Further extensions (custom-made) available on request.

Assembly:
See the operating instructions “Shaft Extension for ARVS 993-00 Order No. 993-04”

2.7 Subsequent Tapping of the Pipeline through the Air Release Valve Set

The air release valve set can be fitted onto the main pipe using a tapping saddle and subsequently tapped under pressure. For this, use, for example, the Hawle tapping saddle 359-01 for cast iron, steel, or AC pipe, or the HAKU tapping saddle Order No. 523-00 for PE or PVC pipe. For information on the respective tapping saddle, see the separate operating and maintenance instructions.

The applicable standards and codes of practice, accident prevention regulations, and the requirements of the relevant trade associations must be observed and complied with during the tapping process.

For a detailed description of the special functions, see the full version of the operating and maintenance instructions.

3. Commissioning and Pressure Test

	Assembly tool (see Accessories) Order No. 993-02 Valve key (see Accessories) Order No. 341-00

Image 1: Shut-off unit (10) open:

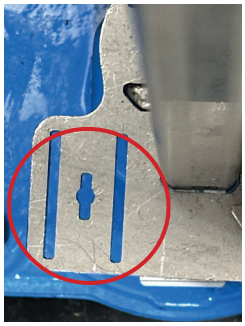


Image 2: Shut-off unit (10) closed:

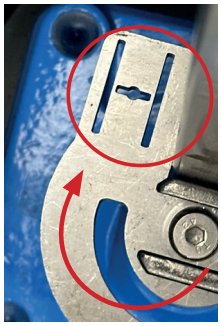


Image 3: Replacement valve assembly (6) locked:

Image 4: Replacement valve assembly (6) unlocked:

3.1 Commissioning

For commissioning, the line must be filled and pressurized.

CAUTION: To avoid pressure surges, the maximum filling speed must be limited to 0.25 m/s per DVGW W334.

Note: During start-up venting, a small amount of splash water is expelled through the valve.

Flushing before commissioning is recommended to remove any possible dirt accumulation at the high point of the pipeline (left column).
Alternatively, commissioning can also be carried out without flushing (right column).

Commissioning with Flushing and Sampling Assembly		**Commissioning without Flushing CAUTION: malfunction due to dirt ingress is possible!**	
1.	Remove the cover (1) using the assembly tool Order No. 993-02. To do so, place the assembly tool onto the hexagon of the cover and, using the tool's knurled cap, screw it clockwise onto the threaded piece (2) as far as it will go. Pull the cover (1) upward with the assembly tool. This releases the cover's snap-fit connections.	**1.**	Remove the cover (1) using the assembly tool Order No. 993-02. To do so, place the assembly tool onto the hexagon of the cover and, using the tool's knurled cap, screw it clockwise onto the threaded piece (2) as far as it will go. Pull the cover (1) upward with the assembly tool. This releases the cover's snap-fit connections.
2.	Shut-off unit(10) with the valve key Order No. 341-00 by turning it a half turn (180°) clockwise (Image 2), and remove the key rod (8) (Image 3). Place the assembly tool onto the end cap (7) of the replacement valve assembly (6) and screw it on clockwise using the knurled cap. Unlock the replacement valve assembly by turning it counterclockwise (Image 4).		
3.	Remove the complete replacement valve assembly (6) and set it aside protected from dirt.		
4.	Fit the flushing and sampling assembly Order No. 993-05 and lock it onto the shut-off unit (10) by turning clockwise. If necessary, connect a hose to the C coupling of the flushing and sampling assembly.		
5.	Insert the key rod (8) and open the shut-off unit (10) with the valve key Order No. 341-00, turning it a half turn (180°) counterclockwise. Slowly open the ball valve on the flushing and sampling assembly.		
6.	Fill the line (filling speed per DVGW W334, max. 0.25 m/s!).	**2.**	Fill the line (filling speed per DVGW W334, max. 0.25 m/s!)
7.	Air, or an air/water mixture with possible contamination, will emerge. Continue flushing until only clear water emerges.	**3.**	Air, or an air/water mixture, is expelled.
8.	Close the ball valve on the flushing and sampling assembly very slowly (risk of water hammer!). Shut-off unit(10) with the valve key Order No. 341-00 by turning it a half turn (180°) clockwise (Image 2).	**4.**	Once filling is complete, the ARV closes automatically. **CAUTION:** if the ARV does not close, suspended sol ids from the line may have collected in the ARV. Carry out serv cing (item 5) .
9.	Carry out the pressure test as described below: - Item 4.2.1 (4 and 6-8): pressure test of the pipeline with the flushing and sampling assembly fitted and the shut-off unit open. - Item 4.2.2: pressure test of the fitted ARV.	**5.**	Carry out the pressure test per item 4.2

3.2 Pressure Test

3.2.1 Pressure Test of the Pipeline

The pressure test of the pipeline with the ARVS fitted in the open pipe trench must be carried out per the current standards/codes of practice.

CAUTION: The pressure test must be carried out with the replacement valve assembly (6) taken out of service!

It is recommended to carry out the pressure test with the flushing and sampling assembly fitted and the shut-off unit open (left column). Test pressure observing the maximum operating pressures per the DVGW code of practice.

If a pressure test is carried out against a closed shut-off unit, the procedure is described in the right column. Test pressure observing the maximum operating pressures per the DVGW code of practice.

Pressure test with flushing and sampling assembly fitted and shut-off unit (10) open		**Pressure test against closed shut-off unit (10)**	
1.	Remove the cover (1) using the assembly tool Order No. 993-02. To do so, place the assembly tool onto the hexagon of the cover and, using the tool's knurled cap, screw it clockwise onto the threaded piece (2) as far as it will go. Pull the cover (1) upward with the assembly tool. This releases the cover's snap-fit connections.	**1.**	Remove the cover (1) using the assembly tool Order No. 993-02. To do so, place the assembly tool onto the hexagon of the cover and, using the tool's knurled cap, screw it clockwise onto the threaded piece (2) as far as it will go. Pull the cover (1) upward with the assembly tool. This releases the cover's snap-fit connections.
2.	Close the shut-off unit (10) with the valve key Order No. 341-00 by turning it a half turn (180°) clockwise (Image 2), and remove the key rod (8) (Image 3). Place the assembly tool onto the end cap (7) of the replacement valve assembly (6) and screw it on clockwise using the knurled cap. Unlock the replacement valve assembly by turning it counterclockwise (Image 4).	**2.**	Close the shut-off unit (10) with the valve key Order No. 341-00 by turning it a half turn (180°) clockwise (Image 2), and remove the key rod (8) (Image 3). Place the assembly tool onto the end cap (7) of the replacement valve assembly (6) and screw it on clockwise using the knurled cap. Unlock the replacement valve assembly by turning it counterclockwise (Image 4).
3.	Remove the complete replacement valve assembly (6) and set it aside protected from dirt.	**3.**	Remove the complete replacement valve assembly (6) and set it aside protected from dirt.
4.	Unscrew the elbow, ball valve, and C coupling from the flushing and sampling assembly Order No. 993-05, seal the thread with a suitable sealant, and screw on a blanking cap (to be provided by the customer).		
5.	Fit the flushing and sampling assembly Order No. 993-05 and lock it onto the shut-off unit (10) by turning clockwise.		
6.	Carry out the pressure test per the current standards/codes of practice. **CAUTION**:Test pressure observing the maximum operating pressures per the DVGW code of practice.	**4.**	Carry out the pressure test per the current standards/codes of practice. **CAUTION**:Test pressure observing the maximum operating pressures per the DVGW code of practice
7.	After a successful pressure test, unlock the flushing and sampling assembly by turning it counterclockwise and remove it. Refit the replacement valve assembly (6) and lock it by turning clockwise. Insert the key rod (8) and open the shut-off unit (10) with the valve key Order No. 341-00, turning it a half turn (180°) counterclockwise. A brief “venting spurt” may be noticeable here.	**5.**	After a successful pressure test, refit the replacement valve assembly (6), which was taken out of service, and lock it by turning clockwise. Insert the key rod (8) and open the shut-off unit (10) with the valve key Order No. 341-00, turning it a half turn (180°) counterclockwise. A brief “venting spurt” may be noticeable here.
8.	Carry out the pressure test of the fitted ARV per item 4.2.2.	**6.**	Carry out the pressure test of the fitted ARV per item 4.2.2.

CAUTION: in the event of persistent water leakage, servicing must be carried out, see item 5 .

3.2.2 Pressure Test of the Fitted ARV

After the pressure test of the pipeline (item 4.2.1) or after successful servicing, an additional pressure test of the ARV must also be carried out, observing the maximum operating pressures per the DVGW code of practice.

If a flushing and sampling assembly was used for commissioning:
Remove the key rod (8), unlock the flushing and sampling assembly by turning counterclockwise, and remove it. Refit the replacement valve assembly (6) and lock it by turning clockwise. Insert the key rod (8) and open the shut-off unit (10) with the valve key Order No. 341-00, turning it a half turn (180°) counterclockwise. A brief “venting spurt” may be noticeable here.

After the pressure test, fit the cover (1). The snap-fit connection must engage.

Close the lid of the street box.

4. Maintenance and Servicing

ARVS must be serviced at least once a year, per DVGW code of practice W400-3. Depending on water composition, it may be necessary to shorten the service intervals. Regular inspections increase the operational reliability of the ARVS.

For cleaning, we recommend using lukewarm water. Before refitting, all components must be disinfected using a disinfectant approved for use with potable water. The manufacturer's instructions must be observed.

Foreign particles flushed into the valve housing (e.g. swarf from tapping) as well as deposits from iron- and manganese-containing or suspended-solids-containing water can impair the proper sealing function.

CAUTION: ARVS must be taken out of service before servicing. Servicing must be carried out in a depressized state.
For servicing and maintenance work, the complete replacement valve assembly must **always** be removed from the ARVS housing.

For detailed instructions on maintenance and servicing, including the full servicing procedure and spare parts, see the full version of the operating and maintenance instructions.

5. Special Functions

Item	Order No./ Art. No.		ex works	can be retrofitted on site
5.1	993-01	Hand-tighten the flood guard	**X**	**X**
5.2	993 990 0900 - 993 990 0903	Ventilation Only	**X**	
5.3	009 878 1570	Closing Aid	**X**	**X**

For a detailed description of the special functions, see the full version of the operating and maintenance instructions.

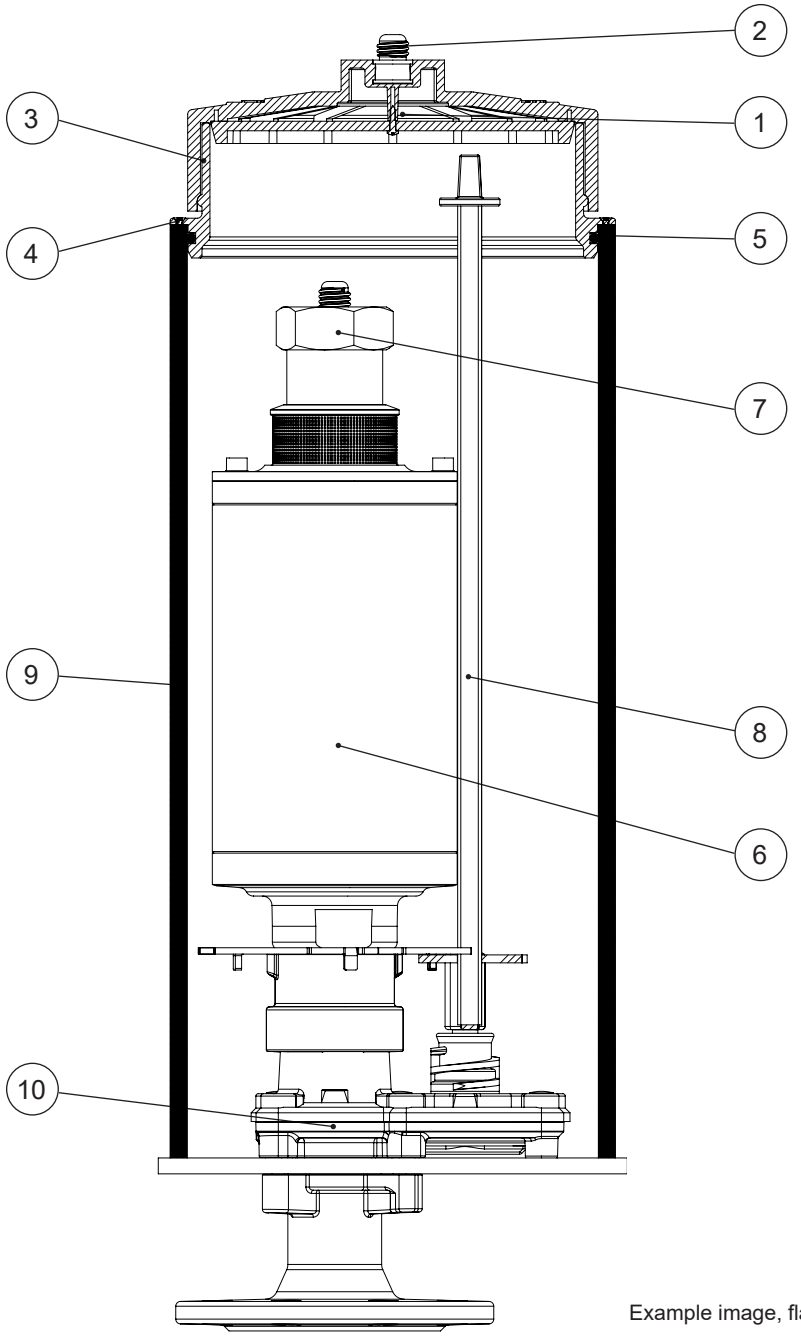
6. Further Information

If required, please request our detailed technical information on air release valves.

If you have any questions or require further information, please contact:
Hawle Deutschland Armaturen GmbH
- Application Engineering -
Liegnitzer Str. 6 -
83395 Freilassing
Phone: +49 (0)8654 6303-0
E-mail: info@hawle.de
Internet: www.hawle.de

Air Release Valve Set HaVent® PN 16 Order No. 993-00

Parts List

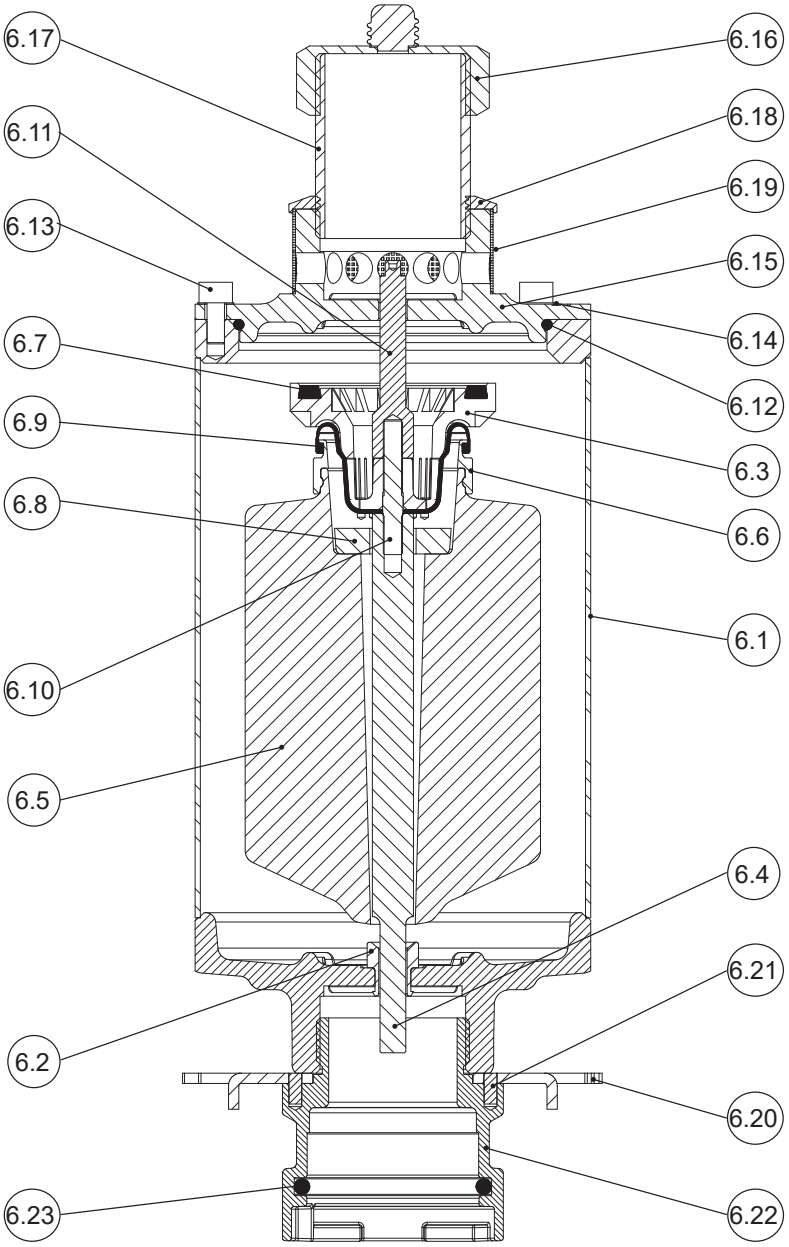


Example image, flange connection variant

No.	Qty.	Short Description	Material
1	1	Cover for assembly with insect screen	PE
2	1	Threaded piece Rd20x1/8" DIN405	Stainless steel
3	1	Transition ring Cover	PE
4	4	Sheet metal screw 3.9x32	Stainless steel
5	1	O-ring 245x6	NBR
6	1	Replacement valve assembly see separate parts list	
7	1	End cap	Stainless steel
8	1	Key rod	Square tube: stainless steel Key socket: cast steel
9	1	shaft pipe	PE
10	1	Shut-off unit - Spigot end DN80 - Flange DN50 - Flange DN80	Housing: GJS-400, Hawle epoxy powder coating Spindle, plug-disc drive, plug disc: stainless steel Seals: EPDM

Replacement Valve Assembly HaVent® PN 16 for Air Release Valve Set Order No. 993-00

Parts List



No.	Qty.	Short Description	Material
6.1	1	Housing	Stainless steel
6.2	1	Locking sleeve	POM
6.3	1	Valve cage	POM
6.4	1	Guide rod	POM
6.5	1	Float	PP
6.6	1	Rolling diaphragm adapter	POM
6.7	1	Flat gasket	EPDM
6.8	1	Spacer washer	POM
6.9	1	Rolling diaphragm	EPDM
6.10	1	Grub screw M8x30	Stainless steel
6.11	1	Valve cage guide	POM
6.12	1	O-ring 116x4	EPDM
6.13	5	Hex socket screw M8x16	Stainless steel
6.14	5	Shim washer	Stainless steel
6.15	1	Remove the	Stainless steel
6.16	1	End cap	Stainless steel
6.17	1	Pipe section	Stainless steel
6.18	1	Screw ring, strainer	POM
6.19	1	Strainer sleeve	Stainless steel
6.20	1	Cam disc	Stainless steel
6.21	1	Cylindrical pin	Stainless steel
6.22	1	Connection sleeve	Stainless steel
6.23	1	O-ring 66x6	EPDM