

# **Operating Instructions**

## **ERHARD Air Valve**

**For sewage**

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These operating instructions must always be used in combination with operating instructions BA01E001!

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## 1 Description of Product and Mode of Operation

### 1.1 Air Valve

DN	PN	Prod. No.
200	10	6916 ....
80 – 200	16	6925 ....

Pressures:

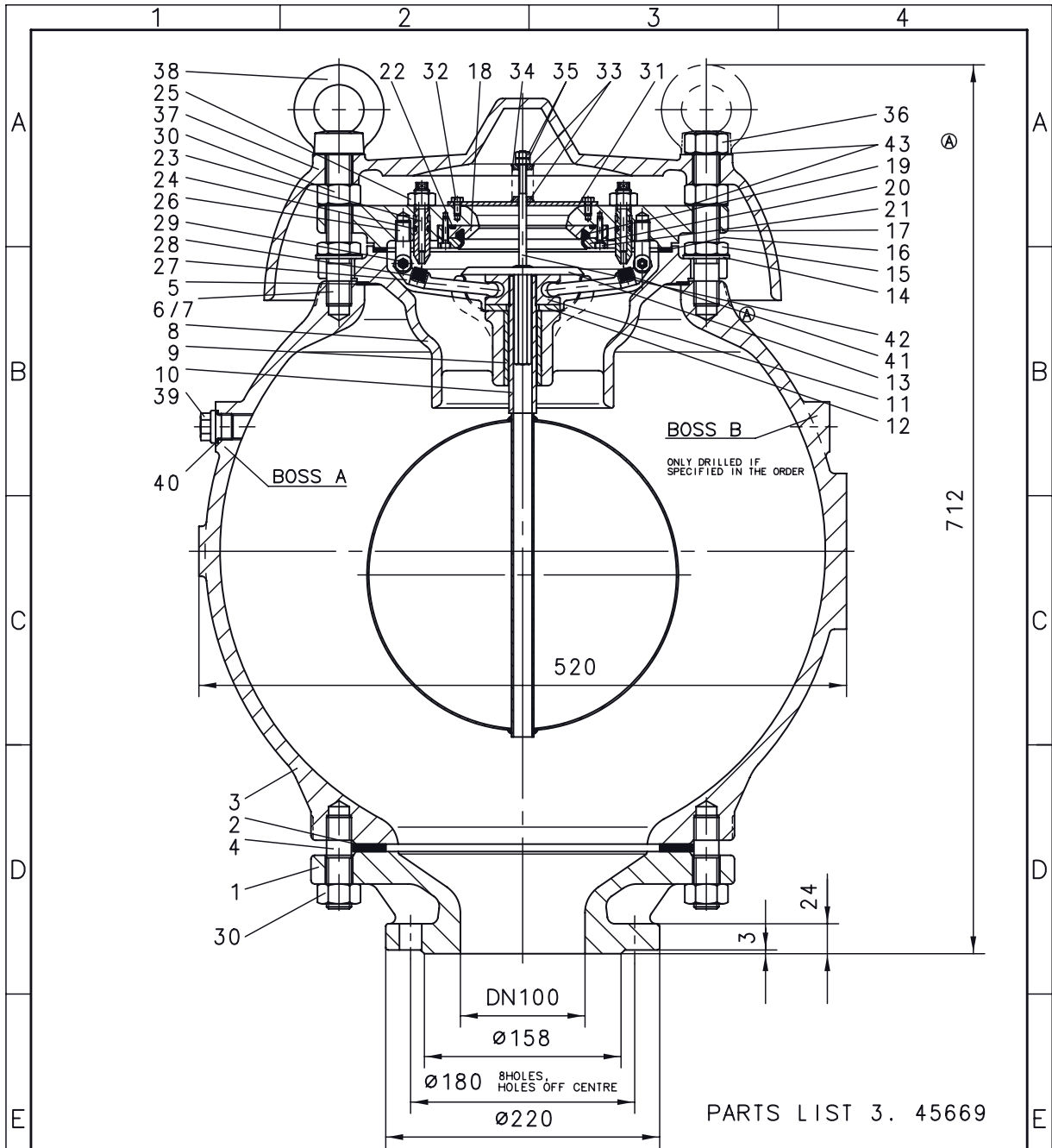
PN	PFA [bar]	PMA [bar]	PEA [bar]	Hydr. test press. in bars for		Admissible working pressure at working temperature Water      Gas up to 70° C up to 70 °
				Body	Seat	
10	10	12	17	15	10	0,1 - 10
16	16	20	25	24	16	0,1 - 16

The ERHARD Air Valves for Sewage are tested at the works of manufacture for strength and tightness according to DIN 3230.

### 1.2 Design Features

Drawing and parts list (corresponds to drawing 4E103257)

# Operating Instructions for ERHARD Air Valve



A		1		Scheiben hinzu, Maß 710 in 712		02.12.03		GS			
PASSMASS		ABMASSE		AENDERUNG		TAG		NAME			
ARBEITSPAUSEN		<b>ERHARD-ARMATUREN</b>								ERHARD GMBH & CO D-89522 HEIDENHEIM AN DER BRENZ	
WERKSTUECKKANTEN NACH DIN 6784 OBERFLAECHE NACH DIN ISO 1302 Ra IN um		2001		TAG		NAME UND ZEICHEN		SCHUTZVERMERK NACH DIN 34 BEACHTEN		<b>CAD</b> DIESE ZEICHNUNG DARF NUR AM BILDSCHIRM GEAENDERT WERDEN	
ALLGEMEINTOLERANZEN NACH DIN ISO 2768 T.1-m BOHRUNGEN: PLUS-TOLERANZ WELLEN: MINUS-TOLERANZ		GEZ.		26.03.		AER/MAIER/BU		MIKROFILM DATUM			
ALLGEMEINTOLERANZEN FUER FORM UND LAGE NACH DIN ISO 2768 T2. TOLERANZKLASSE K FUER GUSSROHTEILE UND ELASTO- MERE ZUSAEZTLICHE ANGABEN WERKSTOFF NACH STUECKLISTE		TEK-1		ROHTEIL-ZCHNG.		FERTIGTEIL-ZCHNG.		MODELL-NR.		<b>4E103257</b>	
		MASS-STAB		BENENNUNG		1:4		ZEICHNUNGS-NR.			
		<b>AIR VALVE</b>				<b>PN10/16 DN100 FOR SEWAGE</b>					
		ERSATZ FUER GL.NR.V.17.5.83				URSPRUNG 4.105484,1. 25876					

# Operating Instructions for ERHARD Air Valve

1	2	3	4	5	6
43	8	WASHER SCHEIBE 21x34x1	21x34x1	STAINLESS STEEL 1.4571	970 GR. 320S17
42	1	SPECIAL STUD BOLT SPEZIAL STIFTSCHRAUBE	M5/M6X100 M5/M6X100	STAINLESS STEEL 1.4571	970 GR. 320S17
41	2	CYL NOTCHED PIN ZYL KERBSTIFT	2X16 2X16	DIN 1473 DIN 1473	STAINLESS STEEL 1.4305
40	1	SEALING RING DICHRING	C21X26 C21X26	COPPER-FILLED CU GEFUELL	970 GR. 303S21 COPPER WITH FILLING MATERIAL
39	1	SCREW PLUG VERSCHLUSSSCHRAUBE	ER1/2 ER1/2	DIN 910 DIN 910	STAINLESS STEEL A4
38	2	RING NUT RING-MUTTER	M20 M20	DIN 582 DIN 582	STEEL C12
37	1	BONNET SCHALE		SPECIAL CAST IRON EN-JL1040 (0.6125)	1452 GR. 220
36	2	HEX NUT 6KT MUTTER	M20 M20	DIN 934 DIN 934	STAINLESS STEEL A2
35	2	HEX NUT 6KT MUTTER	M6 M6	DIN 934 DIN 934	STAINLESS STEEL A4
34	1	SPRING DRUCKFEDER	1X17X54 1X17X54	STAINLESS STEEL 1.4310.07	970 GR. 316S16
33	2	SPRING PLATE FEDERTELLER		STAINLESS STEEL 1.4571	970 GR. 320S17
32	2	HEXAGON BOLT SECHSKANTSCHRAUBE	M5X10 M5X10	DIN 933 DIN 933	STAINLESS STEEL A4
31	1	GUIDE FUHRUNGSSTEG	12X3X120 12X3X120	STAINLESS STEEL 1.4541	970 GR. 321S12
30	16	HEX NUT 6KT MUTTER	M20 M20	DIN 934 DIN 934	STAINLESS STEEL A2
29	2	FITTING SCREW WITH NUT PASSSCHRAUBE MIT MUTTER	M4 M4		STAINLESS STEEL A4
28	2	SEAL DICHTUNG	ø10X9 ø10X9		PERBUNAN PERB 60
27	2	LEVER HEBEL			POM POM
26	2	EYEBOLT GABELSCHRAUBE	M12X18 M12X18		STAINLESS STEEL 1.4571
25	2	HEX NUT 6KT MUTTER	M12 M12	DIN 934 DIN 934	STAINLESS STEEL A4
24	2	O-RING O-RING	8X3 8X3		PERBUNAN PERB 80
23	2	VENTING SCREW ENTLUFTUNGSSCHRAUBE	M12X60X4 M12X60X4		STAINLESS STEEL 1.4571
22	1	O-RING O-RING	110X3 110X3		PERBUNAN PERB 80
21	4	SOCKET-HEAD CAP SCREW ZYL INDERSCHRAUBE	M4X20 M4X20	DIN 912 DIN 912	STAINLESS STEEL A4
20	1	CLAMPING RING KLEMMRING	136X98X8 136X98X8		POM POM
19	1	V-RING V-RING	95 S 95 S		PERBUNAN PERB 60
18	1	FASTENING RING HALTERING	136X70X11 136X70X11		POM POM
17	1	BODY COVER GEHAEUSE-DECKEL			SPECIAL CAST IRON EN-JL1040 (0.6125)
16	1	GASKET FLACHDICHTUNG	218X238X3 218X238X3		PERBUNAN PERB 80
15	2	HEX NUT 6KT MUTTER	BM20 BM20	DIN 439 DIN 439	STAINLESS STEEL A2
14	2	WASHER SCHEIBE	B 21 B 21	DIN 125 DIN 125	STAINLESS STEEL 1.4571
13	1	VALVE DISC VENTILTELLER GESCHW			STAINLESS STEEL 1.4571
12	1	GASKET FLACHDICHTUNG	26X60X5 26X60X5		PERBUNAN PERB 80
11	1	RING GEWINDERING	M22X1 M22X1		POM POM
10	1	FLOAT SCHWIMMERKUGEL	250 250		STAINLESS STEEL 1.4571
9	1	BUSH BUCHSE	AB 23X60 AB 23X60		POM POM
8	1	INSERT FUHRUNGSEINSATZ			SPECIAL CAST IRON EN-JL1040 (0.6125)
7	4	STUD BOLT STIFTSCHRAUBE	M20X80 M20X80	DIN 938 DIN 938	STAINLESS STEEL A2
6	4	STUD BOLT STIFTSCHRAUBE	M20X120 M20X120	DIN 938 DIN 938	STAINLESS STEEL A2
5	1	GASKET FLACHDICHTUNG	250X268X2 250X268X2		SYNTHETIC FIBRES FA-1
4	8	STUD BOLT STIFTSCHRAUBE	M20X55 M20X55	DIN 938 DIN 938	STAINLESS STEEL A2
3	1	BODY GEHAEUSE			SPECIAL CAST IRON EN-JL1040 (0.6125)
2	1	GASKET DICHTUNG	200 200	DIN 2690 DIN 2690	PERBUNAN/STEEL NBR/STEEL
1	1	INLET GEHAEUSEEINLAUF			SPECIAL CAST IRON EN-JL1040 (0.6125)
ITEM QTY. POS. STCK	DENOMINATION BENENNUNG			MATERIAL WERKSTOFF	BS MATERIAL

* AT DN150 STEEL BEI DN150 STAHL	E Pos. 43 hinzu D Werkstoff EN-JL1040 ergbnzt C INNENTEILE IN 1.4571 BZW. A4, IT OE IN FA-1 B POS. 32 IN 6KT SCHR GEANDERT, ANW. 02433 A *-BEMERKUNG HINZU
	02.12.03 GS 21.11.01 GS 19.10.93 AER 13.09.93 AER 02.04.93 JR
	TAG NAME
<b>PASSMASS ABMASSE</b>	<b>ÄNDERUNG</b>
ARBEITSPAUSEN	ERHARD-ARMATUREN
WERKSTUECKKANTEN NACH DIN 6784	JOHANNES ERHARD, H. WALDENMAIER ERBEN SUEDEDEUTSCHE ARMATURENFABRIK GMBH & CO D-89502 HEIDENHEIM AN DER BRENZ
OBERFLAECHEN NACH DIN ISO 1302 Ra in µm	1993 TAG NAME UND ZEICHEN GEZ. 17.02. JR/MAIER H.
FREI-MASSTOLERANZEN NACH DIN 7168-M	SCHUTZVERMERK NACH DIN 34 BEACHTEN
BOHRUNGEN: PLUS-TOLERANZ WELLEN: MINUS-TOLERANZ FUER GUSSRHEILE UND ELA- STOMERE ZUSAEZTLICHE ANGABEN	FREIGABE TEK-1 ROHTEIL-ZOHNG. MSS-STAB BENENNUNG
WERKSTOFF NACH STUECKLISTE	MIKROFILM DATUM FERTIGTEIL-ZOHNG.
	MODELL-NR. ZEICHNUNGS-NR.
	<b>STUECKLISTE</b> ZU BEV ABWASSER
	3. 45669
	ERSATZ FUER GL.NR.V.09.03.83 URSPRUNG

### 1.3 Performance and Mode of Operation

Air Valves (BEV) are installed at high points of water delivery lines, in front and/or behind valves, behind considerably enlarged cross sections, behind throttling points and downstream of feeding pumps. They are used for preventing disturbing air accumulations in water lines, to permit complete filling and emptying of a pipeline, to limit depression and to evacuate gases (air) accumulated during operation under pressure. We recommend to control filling and emptying of the pipeline additionally by means of manual valves (avoiding filling surge or depression).

#### 1.3.1 Pipeline in depressurized condition

When pipelines are depressurized and not filled with liquid, all nozzles of the valve are open.

#### 1.3.2 Filling the pipeline

When the pipeline is being filled with liquid, the air is pushed in front of the liquid column and can evacuate freely through the nozzles. The air rate evacuated depends on the pressure upstream of the valve. When – during filling - the liquid column reaches the floating point of the float, the float rises with the liquid level and thus the main nozzle in the middle is closed by the valve disc, both smaller nozzles by means of the rubber plugs mounted on the operating lever. The working pressure acting on the valve seat should be larger than 0.4 bars in order to ensure tight closure.

**Limits to be observed:** For safety reasons, the max. admissible water hammer should be limited to  $p = 3$  bars when closing the air valve. In basic design, this valve is set for an air outlet rate of the main nozzle of  $Q_n \leq 20$  l/s.

#### 1.3.3 Evacuating air under full working pressure

When - due to accumulating air - the liquid level drops at full operating pressure, the float drops as soon as the floating point is reached. At the same time, the operating levers of the smaller nozzles are moved downwards and the air can flow out. In this case, the air flow rate depends on the working pressure referring to the smaller nozzles. However, the liquid column has to flow continuously.

Due to air evacuation, the liquid level in the valve rises, moving the float upwards which will close the small nozzles again. During this process the large valve disc loosely supported in the float tube remains in closed position due to the differential pressure (working pressure / atmospheric pressure).

### 1.3.4 Emptying the pipeline

When the pipeline pressure drops to or below atmospheric pressure during operation, the nozzles open, caused by the sinking liquid level and air is sucked in through the nozzles. The air inflow rate is subject to the depression arising in the pipeline.

**Limits to be observed:**  $v_{\max.} = 50$  m/s referring to the free venting cross section, this means an air inlet rate of approx.  $Q_R = 310$  l/s.

### 1.4 Intended Use

Thanks to its design, the Air Valve can be used as described in Operating Instructions BA01E001, point 1.2.2.

### 1.5 Admissible Mode of Operation

This valve design is suitable for sewage water.

In case of hot flow medium, there is the risk of burns. The valve has to be heat-insulated by the user.



## 1.6 Inadmissible Modes of Operation

Do not exceed the temperature limits of the flow medium.  
Do not exceed the working-pressure limits.  
Do not apply more than the nominal pressure on the closed valve.  
In all risky areas and for all risky activities where there is a risk of injury,  
a personal protective equipment has to be used!



**Warning**

**Follow the applicable safety regulations  
according to VGB 9a and wear the required  
personal protective equipment.  
Risk of injury!**



Sicherheitsgurt  
anlegen

Put on safety belt



Atenschutz  
benutzen

Use respiratory equipment

## 1.7 Installation into the Pipeline – Mounting

The Air Valves are to be installed in a chamber or a building at the summits (high points) of the pipeline. The Air Valve has to be installed in exactly vertical position. Inclined position leads to malfunctions: the float jams in the guides.

The user has to install an isolating and inspection valve as well as a pressure relief device between pipeline and Air Valve. Before installation, check pipeline for impurities and foreign bodies and clean it if necessary (flush through the inspection valve).

We recommend to use steel-reinforced rubber seals as gaskets.

Screw the Air Valve onto the pipeline in a uniform manner avoiding torsion.

## 1.8 Initial Operation

The Air Valve is slowly filled with water through the inspection valve. After a working pressure of more than 0.4 bar is reached, the valve should be drop-tight to the outside.



Open the inspection valve completely and fix it in this position (e.g. by removing the handwheel). Under these conditions, the Air Valve is ready for operation.

### 1.9 Operation and Application

#### 1.9.1 Change of the air rate

In basic design, the valve is set in such a way that air evacuates from all nozzles when the pipeline is being filled. If the air rate in the main nozzle rises to approx. 20 l/s, the pressure acting on the valve disc (13) increases in such a way that the main nozzle is closed.

This limit value can be changed.

For this purpose, the bonnet (37) must be dismantled. Unscrew the hexagon nuts (36).

#### 1.9.2 Limiting the air rate passing through the main nozzle:

- Loosen hexagon nuts (35)
- Use distance h from drawing **4E129420** according to requested air rate
- Turn lower hexagon nuts (35) to the right until reaching distance h. Lock the hexagon nuts (35)
- Screw on bonnet (37) and hexagon nuts (36)

#### Example:

At a height of  $h = 3\text{mm}$  the valve disc closes at approx. 4.5 l/s

#### 1.9.3 Valve shall not evacuate air through the main nozzle: (damping of water hammer)

- Turn the hexagon nuts (35) downwards until the valve disc (13) touches the V-ring (19). Distance  $h = 0$

In case of depression the valve disc opens and permits air to enter through the valve cross section of the main nozzle.

#### 1.9.4 Valve shall only close in case of increased air rate:

- Remove pressure spring (34). In this case, the valve disc only closes at an air rate of  $Q_n \geq 80\text{ l/s}$ .

#### 1.9.5 Re-adjustment of air outlet screws (23)

- Close isolating valve below the air valve or make pipe section pressureless.
- Screw off hexagon screws (36). Remove bonnet (37).
- Loosen hexagon nuts (25), turn air outlet screws (23) to the left until reaching the stop

## Operating Instructions for ERHARD Air Valve








- Let water flow in slowly until it penetrates through the bores of the air outlet screws.
- Turn air outlet screws (23) to the right until attaining tight closure.
- Hold air outlet screws (23) in this position and lock by means of hexagon nuts (35).

## 2 Maintenance

ERHARD Air Valves are virtually maintenance-free. However, their performance and tightness should be checked regularly at least once a year according to DVGW print W 392.

**Before working on the Air Valve, shut the inspection valve and evacuate pressure through the pressure relief device. Only then, the upper part of the valve may be dismantled.**

For flow medium "water", the recommended lubricant is Klüber Unisilikon L641.  
For flow medium " water", silicone-free design, the recommended lubricant is Klüber Synth VR 69-252.

 <b>Warning</b>	<p><b>WARNING</b></p> <p><b>Before carrying out maintenance work on the valve, any pressurised pipeline has to be made pressureless and to be secured against re-starting!</b></p> <p><b>After finishing the maintenance work, any connection has to be checked for tightness and tight fitting.</b></p>	
 <b>Danger</b>	<p><b>DANGER</b></p> <p><b>In case of penetration of dangerous liquids, substances, gases, and steams, immediately the plant has to be shut down, the responsible supervisor must be informed and appropriate repair work has to be carried out.</b></p> <p><b>The personal protective equipment according to the rules of the employer's liability insurance association must be used. Depending on the flow medium, there is the risk of poisoning , causticization, scalding, and danger due to biological and microbiological substances as well as the risk of fire and explosion!</b></p>	    

### **3 Possible failures, causes and repair**

<b>Inspection of External Condition</b>	<b>Measures</b>
Impurities on the valve	clean
Impurities near the valve	clean
Corrosion	Remove the rust. Renew the corrosion protection.
Internal condition	
Impurities on internal parts	clean
Valve nozzles	blow out / poke through
Check nozzle	it must float being approx. 2/3 submerged in water
Check seals	Replace if necessary

Parts list for drawing **3. 45669**

Air Valve for sewage

Wearing parts:       Set 1 (every 2 years)

Item 16 gasket  
19 V-ring  
22 O-ring  
27 lever  
28 seal

Spare parts:         Set 2 (every 5 years)

Item 10 float  
11 threaded ring  
12 gasket

**Note :**       The wearing parts and spare parts depend on the corresponding application.

h mm	Qn l/s	h mm	Qn l/s
1	1.5	8	12
2	3	9	13.5
3	4.5	10	15
4	6	11	16.5
5	7.5	12	18
6	9	13	19.5
7	10.5	14	20

PASSMASSE	ABMASSE	ZUST.	AENDERUNG	TAG	NAME
ABWEISPAUSEN					
WERKSTUECKKANTEN NACH DIN 6784		2000	ERHARD - ARMATUREN		
OBERFLAECHE NACH DIN ISO 1302 Rg IN µm		GEZ.	ERHARD GMBH & CO		
BOHRUNGEN: PLUS-TOLERANZ		11.10.	D-89522 HEIDENHEIM AN DER BRENZ		
WELLEN: MINUS-TOLERANZ		OP	SCHUTZVERMERK NACH		
ALLGEMEINTOLERANZEN FUER FORM		ROHTEIL-ZCHNG.	DIN 34 BEACHTEN		
UND LAGE NACH DIN ISO 2768 T2.		MASS-STAB	MIKROFILM DATUM		
TOLERANZKLASSE K		1:1	FERTIGTEIL-ZCHNG.		
FUER GUSSROHTEILE UND ELASTO-		BENENNUNG AIR VALVE			
MERE ZUSATZLICHE ANGABEN		SETTING OF VALVE DISC			
WERKSTOFF NACH STUECKLISTE		ERSATZ FUER	MODELL-NR.		
			ZEICHNUNGS-NR.		
			4E129420		
			URSPRUNG 4. 93438		