

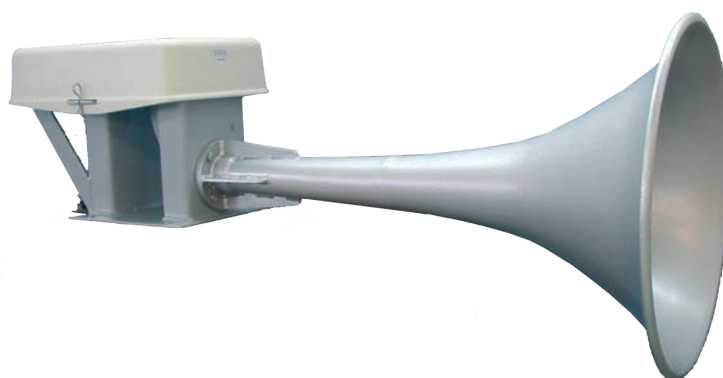
MAKROFON ZM200/90b-110b ZVE(E)H

General Features

The ZÖLLNER MAKROFON ZM200 is a diaphragm sound transmitter operating on compressed air. The signal is released by an electromagnet or manually using a hand pull-rope. To avoid the costly laying of a pull-rope, a second electromagnet for emergency voltage can be provided. A thermostat controlled anti-condensation heating keeps the sound horn and the operating valve free from condensed water and thus from ice. Typically the MAKROFON ZM200 will operate on air pressures between 7 and 40 bar. For electric release and operation of the heating a connection to AC 1phase or 24 V DC power supply is required.

Essentials

- full compliance with the Colregs 1972 Annex III
- type approved by all wellknown international authorities and classification societies
- application:
 - vessels of class I, 200 m or more in length
 - land alarm, i.e. bunker stations, oil refineries, airports, power plants, factories
- compressed air requirement: 7-40 bar free, dry air (carbonic acid etc. may also be used)
- system voltage: AC 1phase or 24 V DC



Sound Characteristics

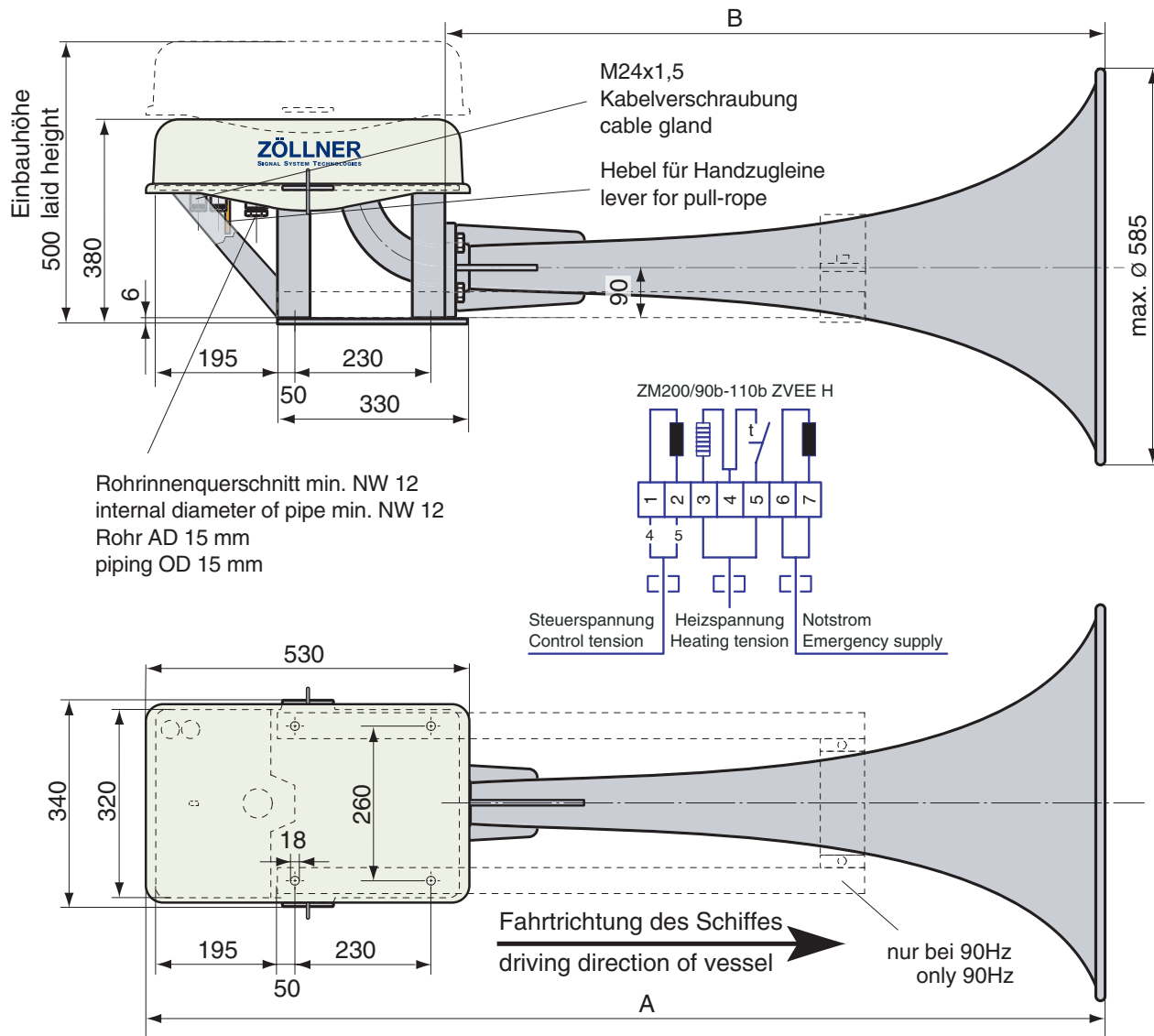
- broad frequency spectrum with many higher harmonics
- signals with strong overtones for best penetration of background noise level
Even when a background noise covers the actual basic frequency the residual tone forms a parent frequency in the human hearing. Two or three harmonics are sufficient for the hearing to perceive the basic frequency.
- sound frequency of 90/110 Hz very advantageously ranks in the lower admissible range (70-200 Hz)

Advantages

- *decades of experience*
- best material and workmanship - made in Germany
- *entirely made of best non-corrosion, seawater-resistant materials*
- *sound horn made of sheet-aluminum (not plastic!)*
- *simple but matured design, almost maintenance-free*
- *easy exchange of all parts with onboard tools*
- *easy installation*
 - *relatively low weight*

Positioning and installation

- Positioning as high as practicable on the vessel to reduce interception of the emitted sound by obstructions and to avoid hearing damage risk to the personnel.
- The sound pressure level of a vessel's own signal at listening posts must not exceed 110 dB(A).
- Installation - compressed air supply pipe preferably of copper with a filter (type F2) preceding the Makrofon operating valve. Supply pipe must be free from any dirt particles and moisture.



type	ship length [m]	fundamental frequency [Hz]	sound intensity at 1m		air pressure [bar]	air consumption free, dry air [l/sec]	air pipe connection	system voltage	heating [W]	dimensions [mm]		approx. weight [kg]	type approval BSH(DHI) no.
			dB Terz	min. IMO 1/3rd octave									
ZM200/110B	>200	110	143	143	7-40 bar	40-80	15 x 1,5	AC 1phase or 24 V DC	100	1570	1050	60	DHI/49/12P/01/81
ZM200/90B		90								1660	1140		

MAKROFON M125/130b-160b ZVE(E)(H)

General Features

The ZÖLLNER MAKROFON M125 is a diaphragm sound transmitter operating on compressed air. The signal is released by an electromagnet or manually using a hand pull-rope. To avoid the costly laying of a pull-rope, a second electromagnet for emergency voltage can be provided. A thermostat controlled anti-condensation heating keeps the sound horn and the operating valve free from condensed water and thus from ice. Typically the MAKROFON M125 will operate on air pressures between 7 and 40 bar. For electric release and operation of the heating a connection to AC 1phase or 24 V DC power supply is required.

Essentials

- full compliance with the Colregs 1972 Annex III
- type approved by all wellknown international authorities and classification societies
- application:
 - vessels of class II, 75 m but less than 200 m in length
 - land alarm, i.e. bunker stations, oil refineries, airports, power plants, factories
- compressed air requirement: 7-40 bar free, dry air (carbonic acid etc. may also be used)
- system voltage: AC 1phase or 24 V DC



Sound Characteristics

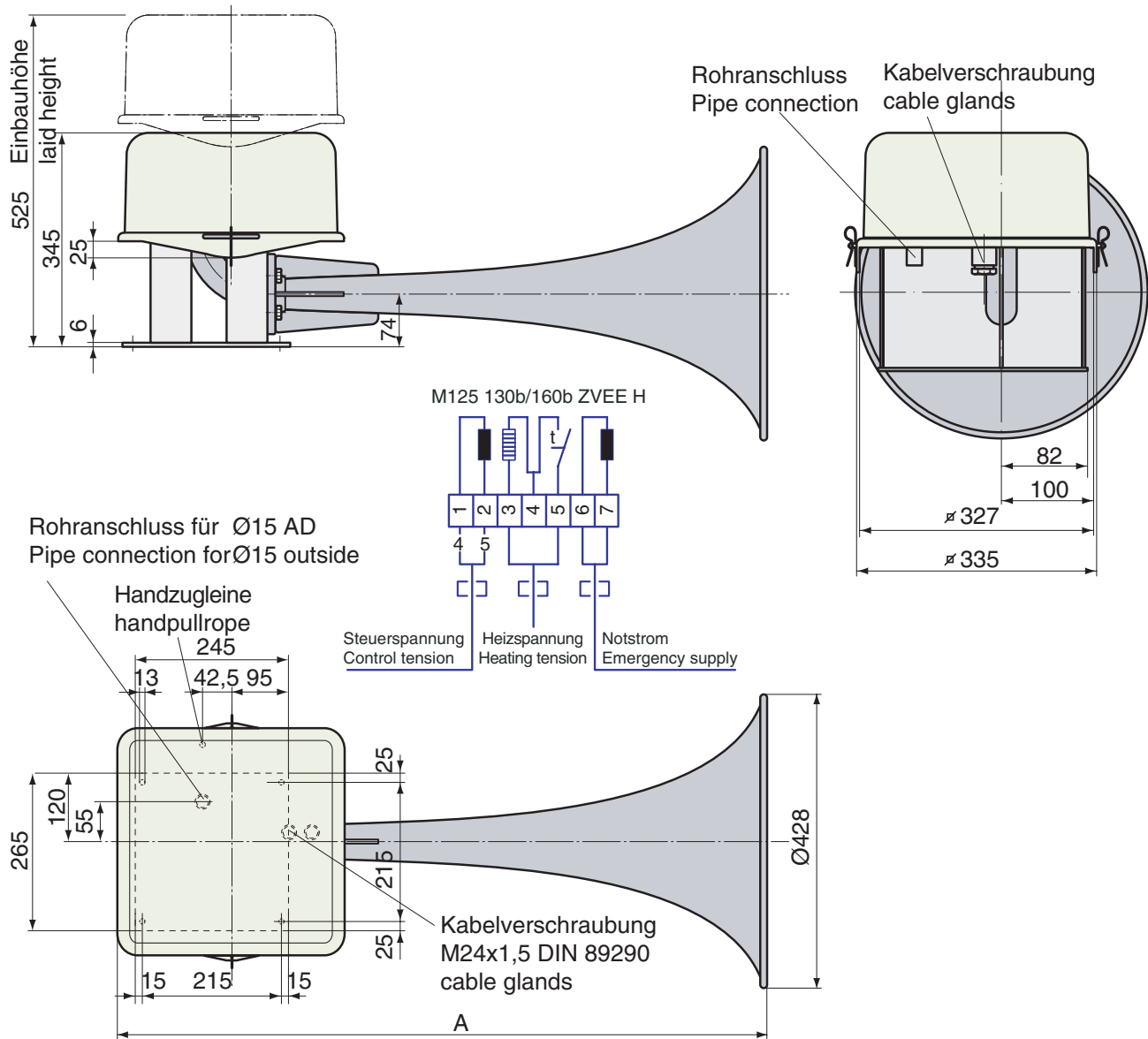
- broad frequency spectrum with many higher harmonics
- signals with strong overtones for best penetration of background noise level
Even when a background noise covers the actual basic frequency the residual tone forms a parent frequency in the human hearing. Two or three harmonics are sufficient for the hearing to perceive the basic frequency.
- sound frequency of 130/160 Hz very advantageously ranks in the lower admissible range (130-350 Hz)
- sound pressure level 138 dB in 1/3rd-octave band level at 1 m distance

Advantages

- *decades of experience*
- best material and workmanship - made in Germany
- *entirely made of best non-corrosion, seawater-resistant materials*
- *sound horn made of sheet-aluminum (not plastic!)*
- *simple but matured design, almost maintenance-free*
- *easy exchange of all parts with onboard tools*
- *easy installation*
- relatively low weight

Positioning and installation

- Positioning as high as practicable on the vessel to reduce interception of the emitted sound by obstructions and to avoid hearing damage risk to the personnel.
- The sound pressure level of a vessel's own signal at listening posts must not exceed 110 dB(A).
- Installation - compressed air supply pipe preferably of copper with a filter (type F2) preceding the Makrofon operating valve. Supply pipe must be free from any dirt particles and moisture.



type	ship length [m]	fundamental frequency	sound intensity at 1m		air pressure	air consumption free, dry air l/sec	air pipe connection	system voltage	heating [W]	dimensions A [mm]	approx weight [kg]	type approval BSH(DHI) no.
			dB Terz	min. IMO 1/3rd octave								
M125/160	75-200 m	160 Hz	140	138	7-40 bar	20-30	15x1,5	AC 1phase or 24 V DC	100	890	30	DHI/49/12P/01/81
M125/130		130 Hz	139	138						1090		

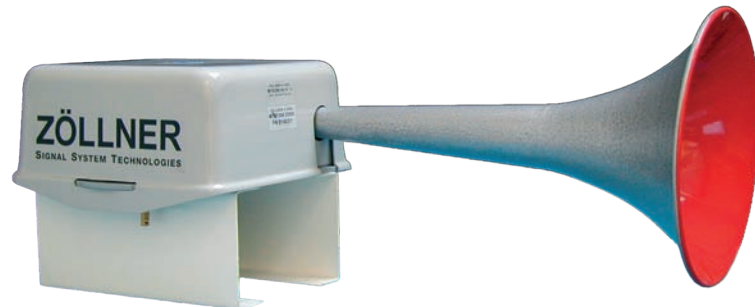
MAKROFON M75F/260-370 ZVE(E)(H)

General Features

The ZÖLLNER MAKROFON M75F is a diaphragm sound transmitter operating on compressed air. The signal is released by an electromagnet or manually using a hand pull-rope. To avoid the costly laying of a pull-rope, a second electromagnet for emergency voltage can be provided. A thermostat controlled anti-condensation heating keeps the sound horn and the operating valve free from condensed water and thus from ice. Typically the MAKROFON M75F will operate on air pressures between 6 and 40 bar. For electric release and operation of the heating a connection to AC 1phase or 24 V DC power supply is required.

Essentials

- full compliance with the Colregs 1972 Annex III
- type approved by all wellknown international authorities and classification societies
- application:
 - vessels of class II (M75F/260), 75 m but less than 200 min length
 - vessels of class III (M75F/370 and M75F/260), 20 m but less than 75 m in length
 - land alarm, i.e. bunker stations, oil refineries, airports, power plants, factories
- compressed air requirement: 6-40 bar free, dry air (carbonic acid etc. may also be used)
- system voltage: AC 1phase or 24 V DC



Sound Characteristics

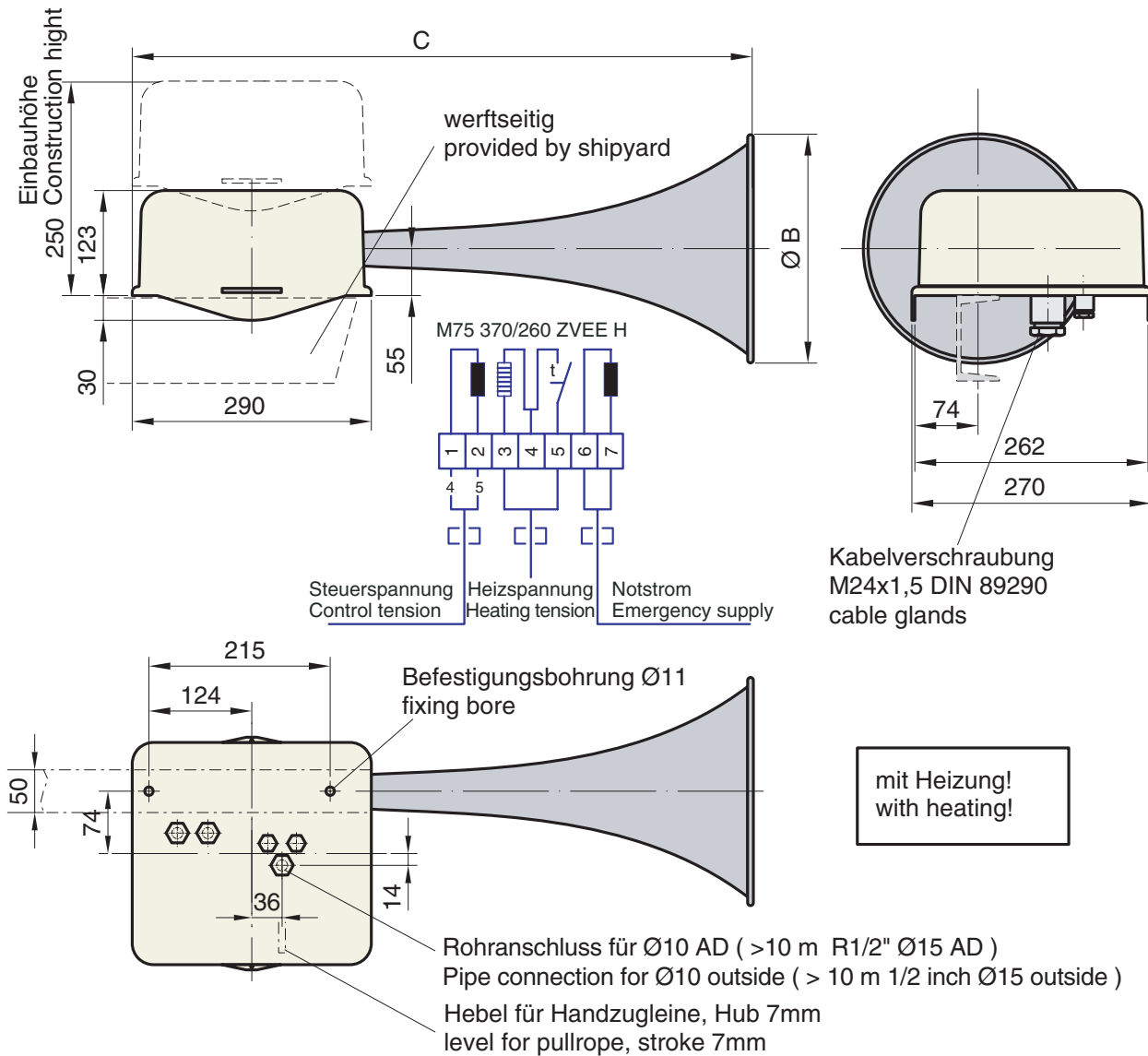
- broad frequency spectrum with many higher harmonics
- signals with strong overtones for best penetration of background noise level
Even when a background noise covers the actual basic frequency the residual tone forms a parent frequency in the human hearing. Two or three harmonics are sufficient for the hearing to perceive the basic frequency.
- sound frequency of 260/370 Hz very advantageously ranks in the lower admissible range (class II 130-350 Hz class III 250-700 Hz)
- sound pressure level (M75F/260):
138 dB in 1/3rd-octave band level at 1 m distance
(M75F/370):
132 dB in 1/3rd-octave band level at 1 m distance

Advantages

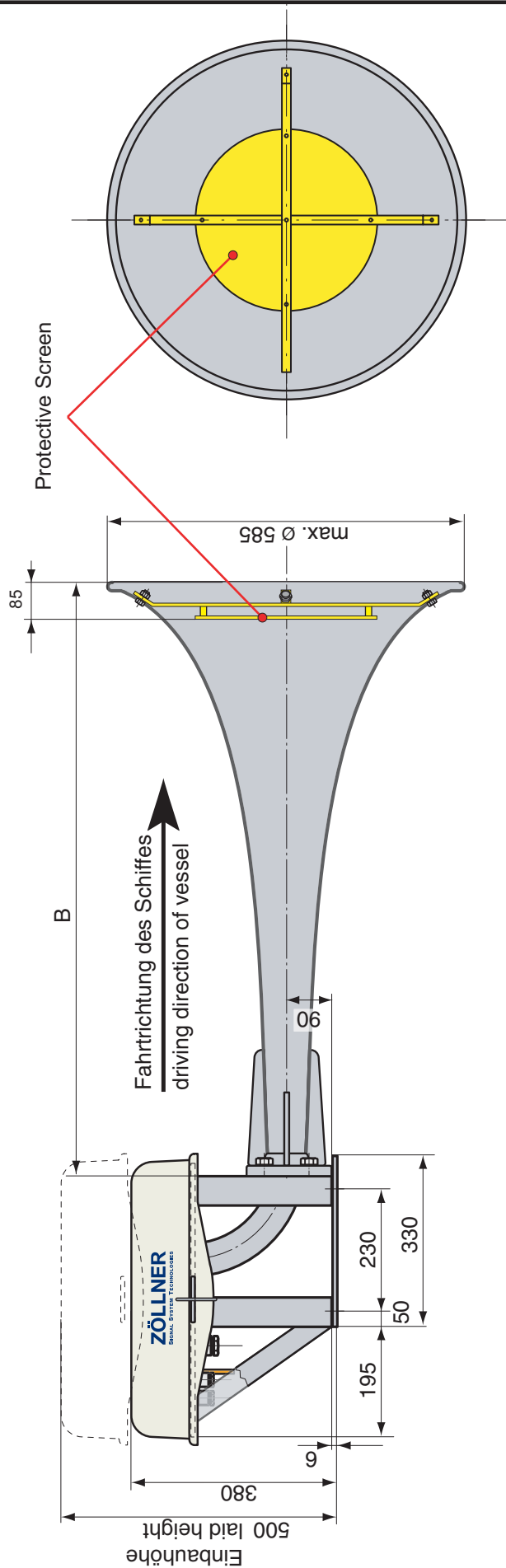
- *decades of experience*
- best material and workmanship - made in Germany
- *entirely made of best non-corrosion, seawater-resistant materials*
- *sound horn made of sheet-aluminum (not plastic!)*
- *simple but matured design, almost maintenance-free*
- *easy exchange of all parts with onboard tools*
- *easy installation*
 - *relatively low weight*

Positioning and installation

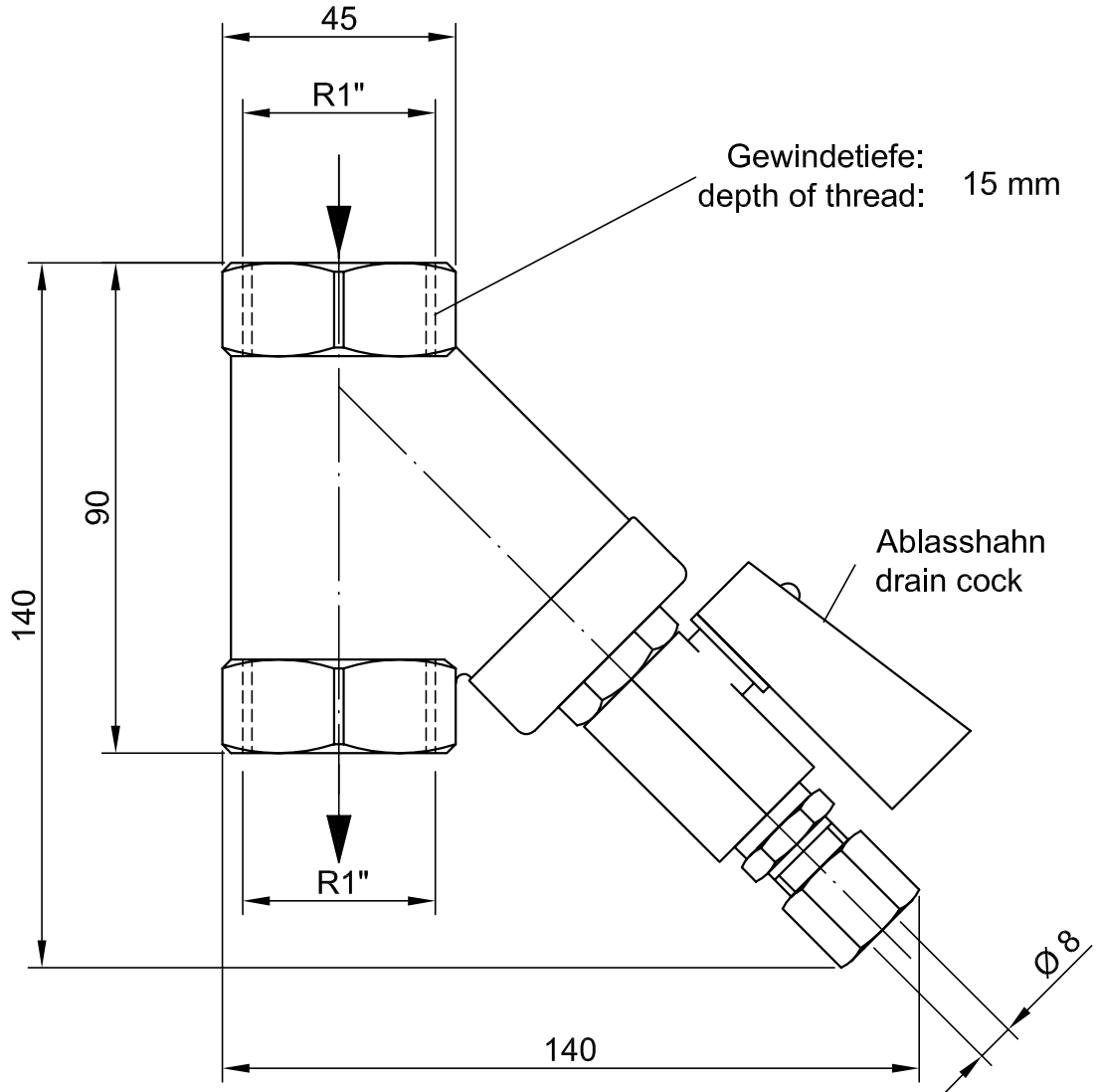
- Positioning as high as practicable on the vessel to reduce interception of the emitted sound by obstructions and to avoid hearing damage risk to the personnel.
- The sound pressure level of a vessel's own signal at listening posts must not exceed 110 dB(A).
- Installation - compressed air supply pipe preferably of copper with a filter (type F3) preceding the Makrofon operating valve. Supply pipe must be free from any dirt particles and moisture.



type	ship length [m]	fundamental frequency [Hz]	sound intensity at 1m		air pressure [bar]	air consumption free, dry air l/sec	air pipe connection [mm]	system voltage	heating [W]	dimensions [mm]		approx. weight [kg]	type approval BSH(DHI) no.
			dB Terz	min. IMO 1/3rd octave						B	C		
M75/370	20-<75	370	132	130						380	560	8	49/04P/78
M75/260	75-<200	260	138	130	6-40	8-12	10x1	AC 1phase or 24 V DC	100	550	730	8	49/04P/03/82
	20-<75												

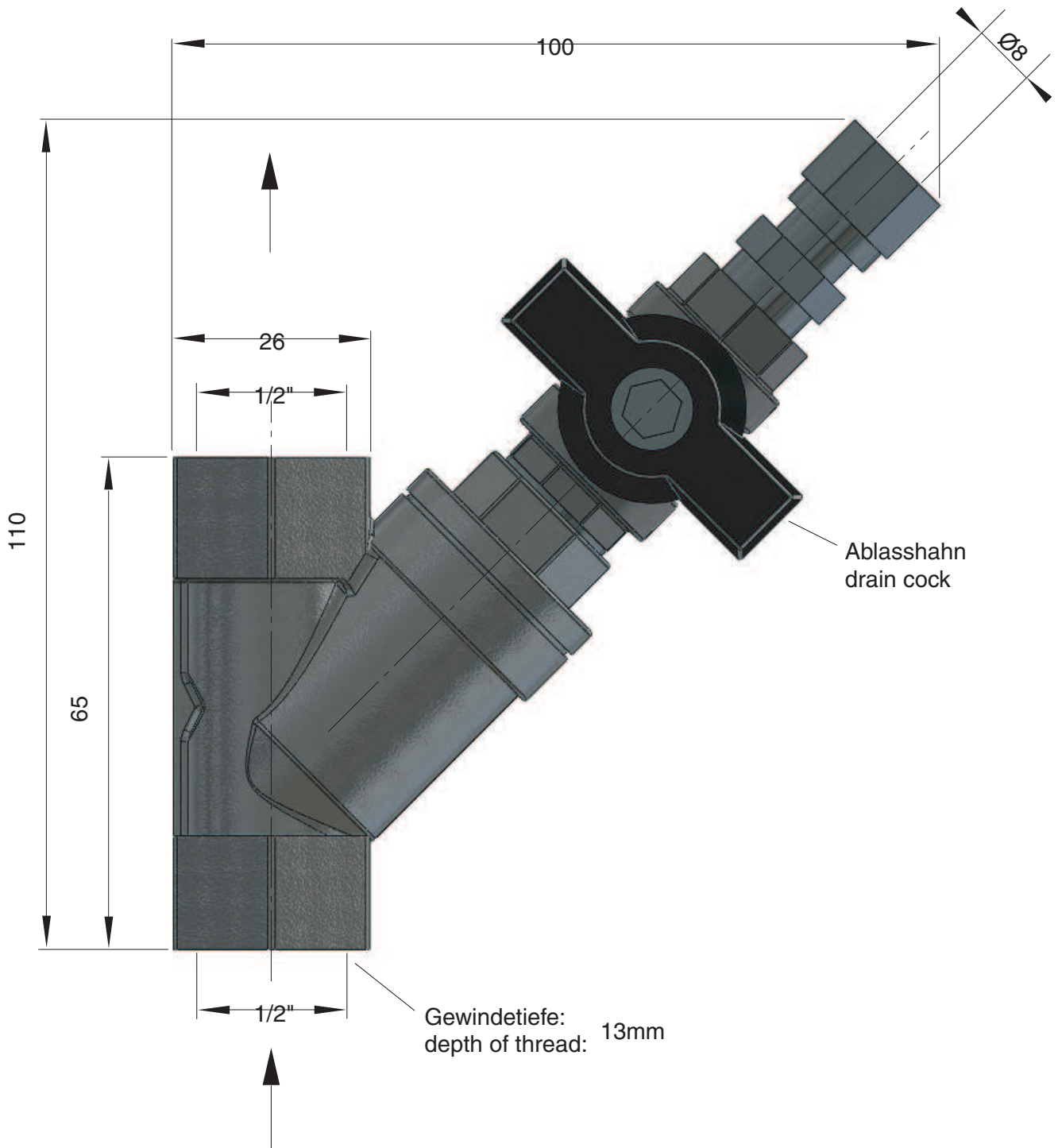


Änderung vorbehalten! Subject to alteration!



Nenndruck : 40 bar
nominal pressure:

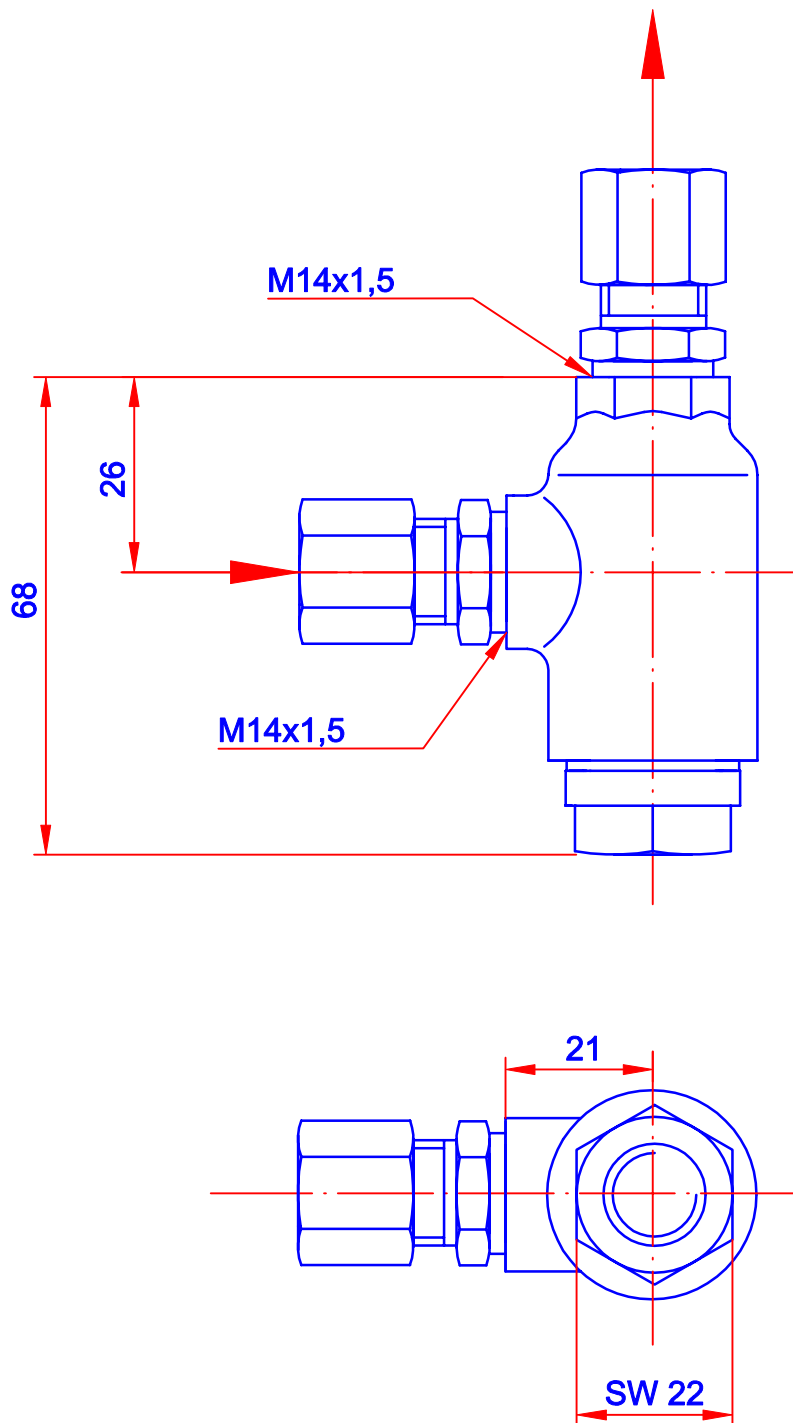
Gewicht : 1 kg
weight :



Nenndruck: 40 bar
nominal pressure:

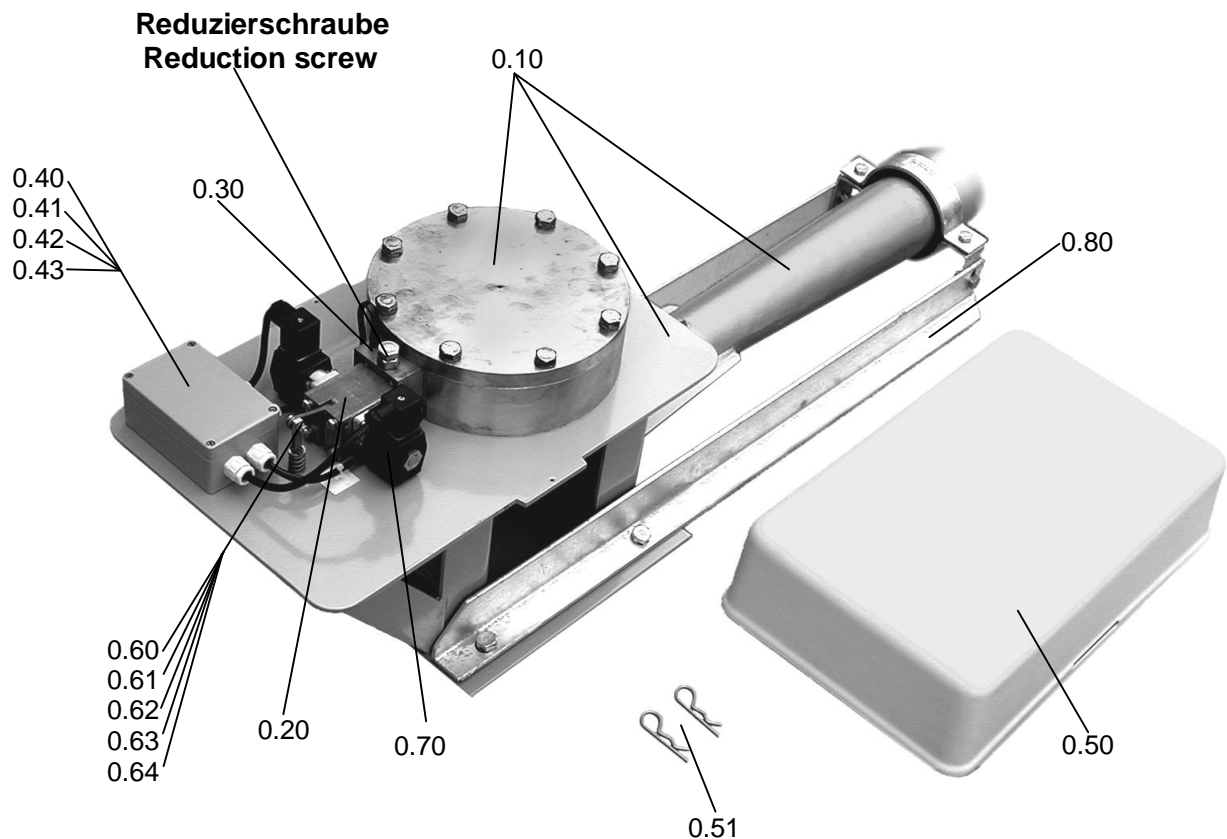
Gewicht: 0,4 kg
weight:

Änderung vorbehalten! Subject to alteration!



Nenndruck : 40 bar
nominal pressure:

Gewicht : 0,5 kg
weight :

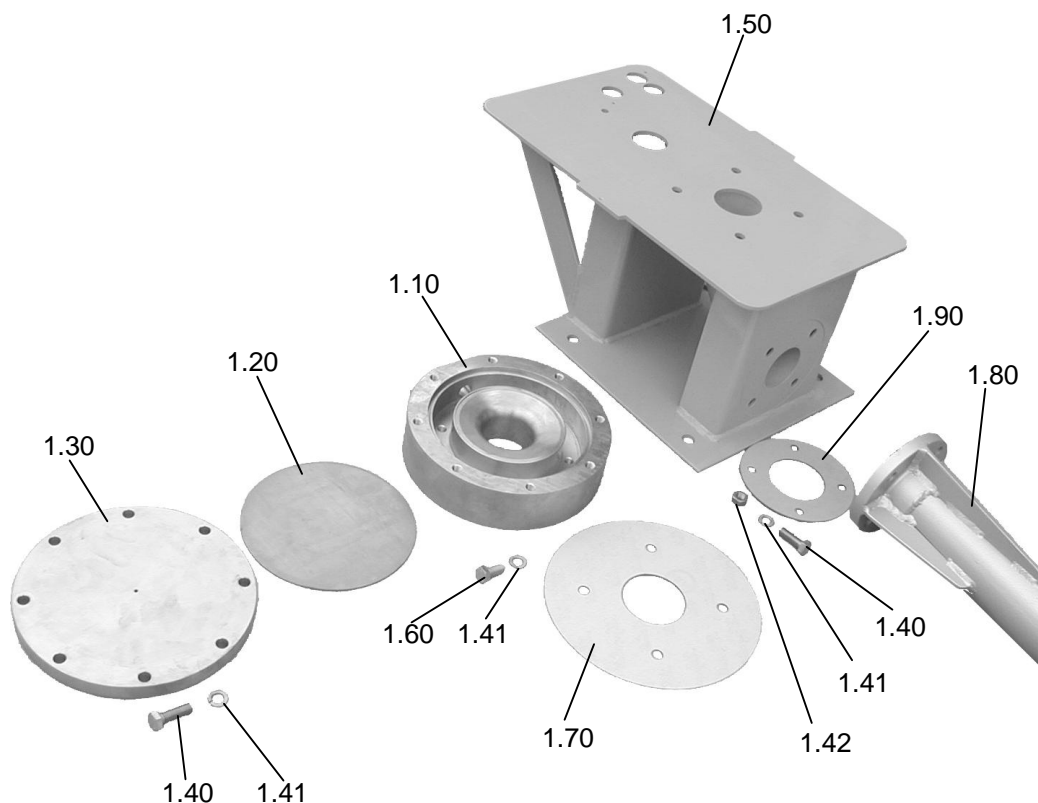


Makrofonanlage ZM 200/... b ZVE (E) H complete

Item	Qty	Techn. Data	Order No.	Bezeichnung	Designation
0.10	1	page 2	0104444	Makrofon 90 Hz kompl.	Makrofon 90 Hz compl.
0.10	1	page 2	01044441	Makrofon 110 Hz kompl.	Makrofon 110 Hz compl.
0.20	1	page 3/4	01042401	Ventileinheit ZVE	valve unit ZVE
0.20	1	page 3/4	01042402	Ventileinheit ZVEE	valve unit ZVEE
0.30	1	page 3/4	01044360	Anschlußflansch kompl.	connecting flange compl.
0.40	1	page 6	01043071	Anschlußk. ZVE H	connecting box ZVE H
0.40	1	page 6	01043073	Anschlußk. ZVEE H	connecting box ZVEE H
0.41	2	M4x16	2002040161	Zylinderschraube	cylinder screw
0.42	2	A 4,3	211310041	Sicherungsscheibe	washer
0.43	2	M4	21034041	Sechskantmutter	hexagon nut
0.50	1	525x325x145	0104437	Haube	cover
0.51	2	∅ 3x75	0104483	Federstecker	clamp
0.60	1	8x5x125	0104234	Zugstange	connecting rod
0.61	1	M5x20	2002050201	Zylinderschraube	cylinder screw
0.62	2	M5	21034051	Sechskantmutter	hexagon nut
0.63	1	4X16	210104161	Spannhülse	withdrawal sleeve
0.64	1	14x55	01703006	Druckfeder	pressure spring
0.70	1	page 3/4	017164	Magnetventil ZVE	magnet valve

Nur für ZM200/ 90 Hz / Only for ZM200/ 90 Hz

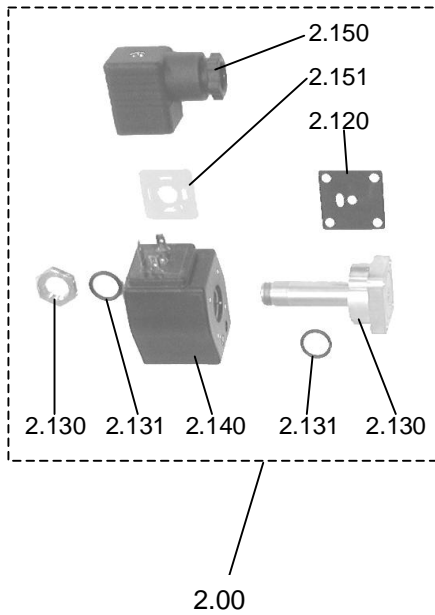
0.80	1	60x40x5x940	01047690	Trichterhalterung kompl.	sound horn hold. Device compl.
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Makrofon ZM200 /...b complete

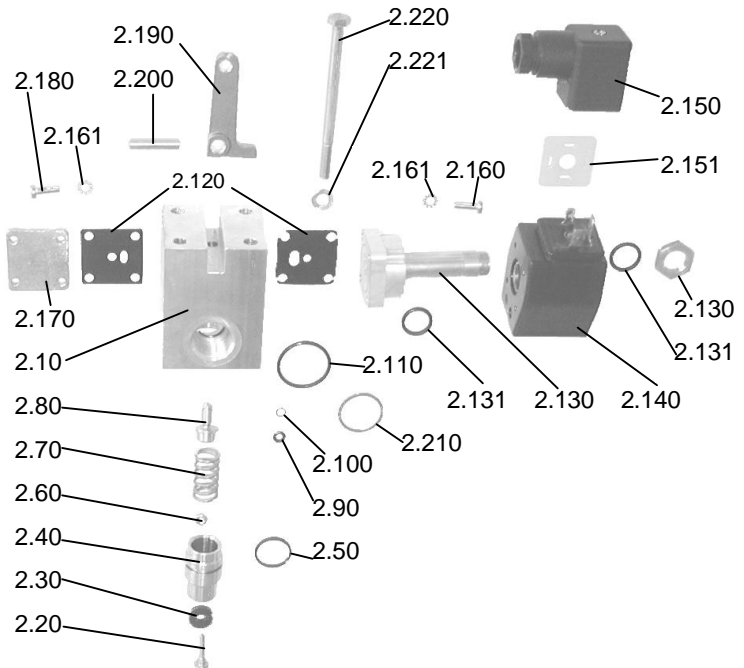
Item	Qty	Techn. Data	Order No.	Bezeichnung	Designation
1.10	1	Ø 250 x 60	0104572	Gehäuse	housing
1.20	1	Ø 200 x 2,4	889020241	Membrane	diaphragm
1.30	1	Ø 250 x 21	0104523	Gehäusedeckel	housing cover
1.40	12	M 12 x 35	2044120351	Sechskantschraube	hexagon screw
1.41	16	Ø 12 x 21 x 2,5	211300121	Scheibe	washer
1.42	4	M 12	21034121	Sechskantmutter	hexagon nut
1.50	1	520x320x260	0104435	Trichterbogen	bent piece of horn
1.60	4	M 12 x 25	2044120251	Sechskantschraube	hexagon screw
1.70	1	Ø 250/75 x 1	0104495	Dichtung	gasket
1.80	1	Ø 585 x 1140	0104577	Trichter 90Hz	sound horn 90Hz
1.80	1	Ø 585 x 1000	0104621	Trichter 110Hz	sound horn 110Hz
1.90	1	Ø 150/75 x 2	0105209	Dichtung	gasket

Order No.01042402 Valve unit ZVEE

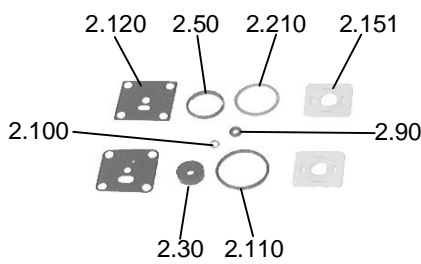
Order No. 017164
Magnet valve



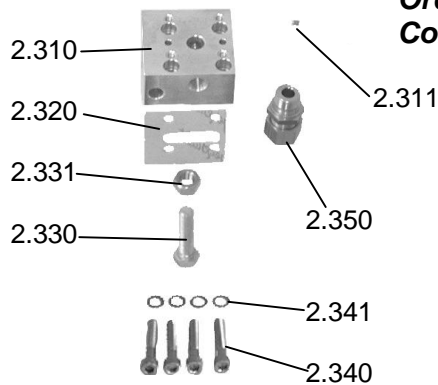
Order No. 01042401
ZVE Valve unit



Order No. 017142
Set of gasket



Order No. 01044360
Connecting Flange compl.



Ventileinheit/ Valve unit ZVE 01042401 / ZVEE 01042402

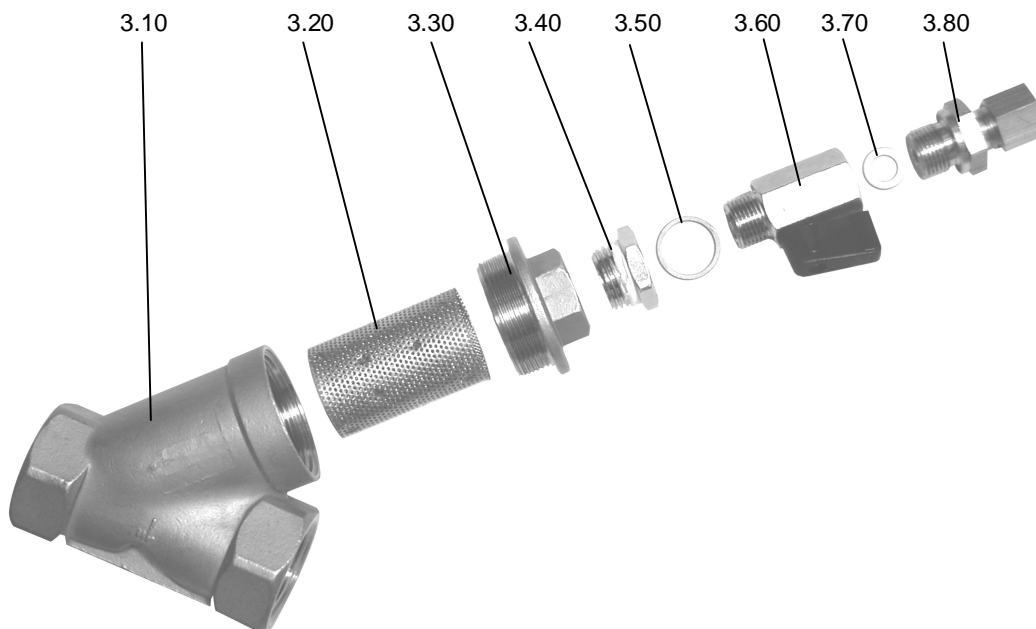
Teil Item	Stck. Qty.	Techn. Daten Techn. Data	Bestell-Nr. Order No.	Bezeichnung	Designation
2.00	1(2)		017164	Magnetventil (Spannung angeben)	Magnet valve (State voltage)
2.10	1	50x50x67	0104239	Gehäuse	Housing
2.20	1	M4x3x17	0103121	Linsenschraube	Fillister screw
2.30	1	Ø16x5.5x4	01703011	Dichtung	Gasket
2.40	1	Ø 22x36	0104181	Kolben	Piston
2.50	1	Ø22,1x18.2x2.2	0104488	Kolbenring	Piston ring
2.60	1	M4	21034041	Sechskantmutter	Hexagon nut
2.70	1	Ø13/2x28	0104311	Druckfeder	Pressure spring
2.80	1	Ø13,5x22	0104312	Entlüftungsbolzen	Vent bolt
2.90	1	R3.3x2.4	502100324	O-Ring	O-ring
2.100	1	R4x1	50210041	O-Ring	O-ring
2.110	1	R25x2.5	502102525	O-Ring	O-ring
2.120	2	32x32x0,5	0104486	Dichtung	Gaske
2.130	1(2)		520012404	Ankergehäuse	armature casing
2.131	2(4)	R12x2,5	5021012525	O-Ring	O-ring
2.140	1(2)		520.....	Magnetspule (Spannung angeben)	Magnet coil (State voltage)
2.150	1(2)	27x27x50	620374716	Kabeldose Pg 11	Cable box Pg 11
2.151	1(2)	27x27x1,5	620374756	Dichtung	Gasket
2.160	4(8)	M4x12	2002040121	Zylinderschraube	Cylinder screw
2.161	8	4.3	211310041	Scheibe	Washer
2.170	1(0)	32x32x4	0104545	Flansch	Flange
2.180	4(0)	M4x10	2002040101	Zylinderschraube	Cylinder screw
2.190	1	52x8x25	0104589	Hebel	Lever
2.200	1	6m6x24	212206025	Zylinderstift	Cylinder pin
2.210	1	A21x26x1.5	50302161	Dichtung	Gasket
2.220	4	M6x80	2043060801	Sechskantschraube	Hexagon screw
2.221	4	6x11,8x1,6	211310061	Scheibe	Washer

Anschlußflansch kompl./ Connecting Flange compl. 01044360

2.310	1	60x60x30	0104436	Anschlußflansch	Connecting flange
2.311	1	M4x5	2016040052	Gewindestift	set screw
2.320	1	60x60x1	0104446	Flanschdichtung	Flange gasket
2.330	1	M12x50	2044120501	Sechskantschraube	hexagon screw
2.331	1	M12	21034121	Sechskantmutter	Hexagon nut
2.340	4	M6x35	2035060351	Zylinderschraube	Cylinder screw
2.341	4	6x11,8x1,6	211300061	Sperrkantring	Washer
2.350	1	GE15-LR	267001830	Verschraubung	Screwed joint

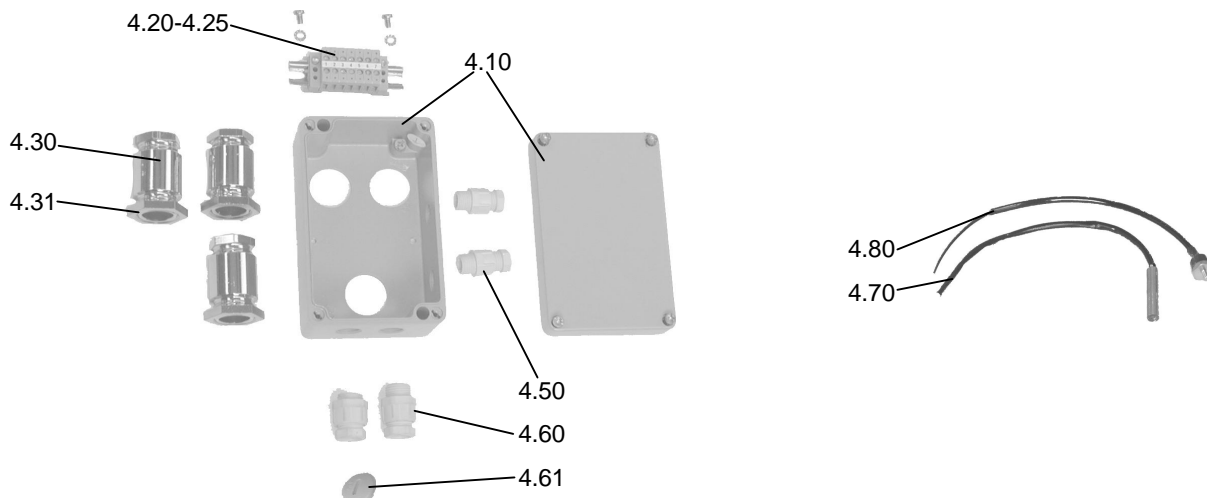
Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen für Ventile unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts for the valves!

**Order. No. 0104620
Filter F2****FILTER F2 complete 0104620**

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
3.10	1	Ø 85x75	884002201	Filtergehäuse mit Einsatz	Filter casing with insert
3.20	1	Ø 28x47	01906090	Filtereinsatz	Filter insert
3.30	1	R1"	0104622	Verschlußschraube	Screwed joint
3.40	1	R1/2"x3, 8"	26698050	Reduzierschraube	Bushing screw
3.50	1	A17x21x1,5	50301710	Dichtring	Packing ring
3.60	1	R3/8"/NW8	522641009	Kugelhahn	Ball valve
3.70	1	A8x14x1	50300840	Dichtring	Packing ring
3.80	1	GE8-LR3/8"	267000560	Verschraubung	Screwed joint

**Order. No. 01043071 ZVE H
01043073 ZVEE H
Connecting Box compl.**



Anschlusskasten/ Connect. Box complete ZVE H 01043071 / ZVEE H 01043073

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
4.10	1	125x80x54	0104951	Anschlußkasten	Connecting box
4.20	1	TS15	677501511	Tragschiene	Mounting rail
4.21	5(7)	MBK	626001019	Klemme	Terminal
4.22	2	E-MBK	626001637	Endhalter	Terminal clamp
4.23	2	M4x6	2002040061	Zylinderschraube	Cylinder screw
4.24	2	A4.3	211310041	Scheibe	Washer
4.25	1	SKS 5	626001213	Bezeichnungsschild	Name plate
4.30	2(3)	M24x1.5	677072417	Kabelverschraubung	Cable gland
4.31	2(3)	M24x1.5	677022417	Gegenmutter	Counter nut
4.50	2	M12x1,5	67706512	Kabelverschraubung	Cable gland
4.60	1(2)	M16x1,5	67706516	Kabelverschraubung	Cable gland
4.61	1(0)	M16x1,5	67706524	Blindstopfen	hole lock
4.70	1	10x40	8844104000	Heizpatrone 110/230 V AC/100W	Heating insert 110/230 V AC/100W
4.70	1	10x40	8844103000	Heizpatrone 24 V DC / 100W	Heating insert 24 V DC / 100W
4.80	1	2455RBV	8846027080	Thermostat	Thermostat

Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts !

Construction

The Makrofon consists of a brass casing. The sound is produced by a diaphragm which is chucked into the housing cover held by a cover screw.

The signal is released electrically by a magnet valve contained in the Makrofon's operating valve ZVE. A hand pull-rope or a second magnet valve serve as devices for emergency release.

The Makrofon including operating valve ZVE is suitable for pressure between 6 and 40 bar.

The Makrofon is adjusted to a duty factor of 15%!

Mounting

The Makrofon signal set must be positioned as high as possible. It is fastened with four screws M16 which have to be secured well. When laying the compressed air pipe for the ZÖLLNER Makrofon, a compressed air filter must be installed before the Makrofon valve. The filter must be fixed easily accessible in a temperature protected room, making sure that the condensation water cannot freeze up and that the filter can be cleaned at any time. The pipe between filter and Makrofon valve must be made of stainless material, e.g. copper.

It is essential to vent the pipe thoroughly before connection, in order to remove all foreign matter from the feeding main.

Maintenance

In case of sound disturbances, first of all it must be checked out if enough compressed air is flowing to the Makrofon with the valve open. Compressed air filter, operating valve and pipes must be cleaned.

After loosening the 8 fastening screws part 1.40 in the cover of the casing part 1.30, the diaphragm can be taken out.

The diaphragm is fixed by properly securing the fastening screws M12 after the cover of the casing has been inserted.

The correct amount of air is adjusted by turning the reduction screw part 2.330 relative to the air pressure.

At the same time all electric connections must be checked.

Adjustment of the reduction screw

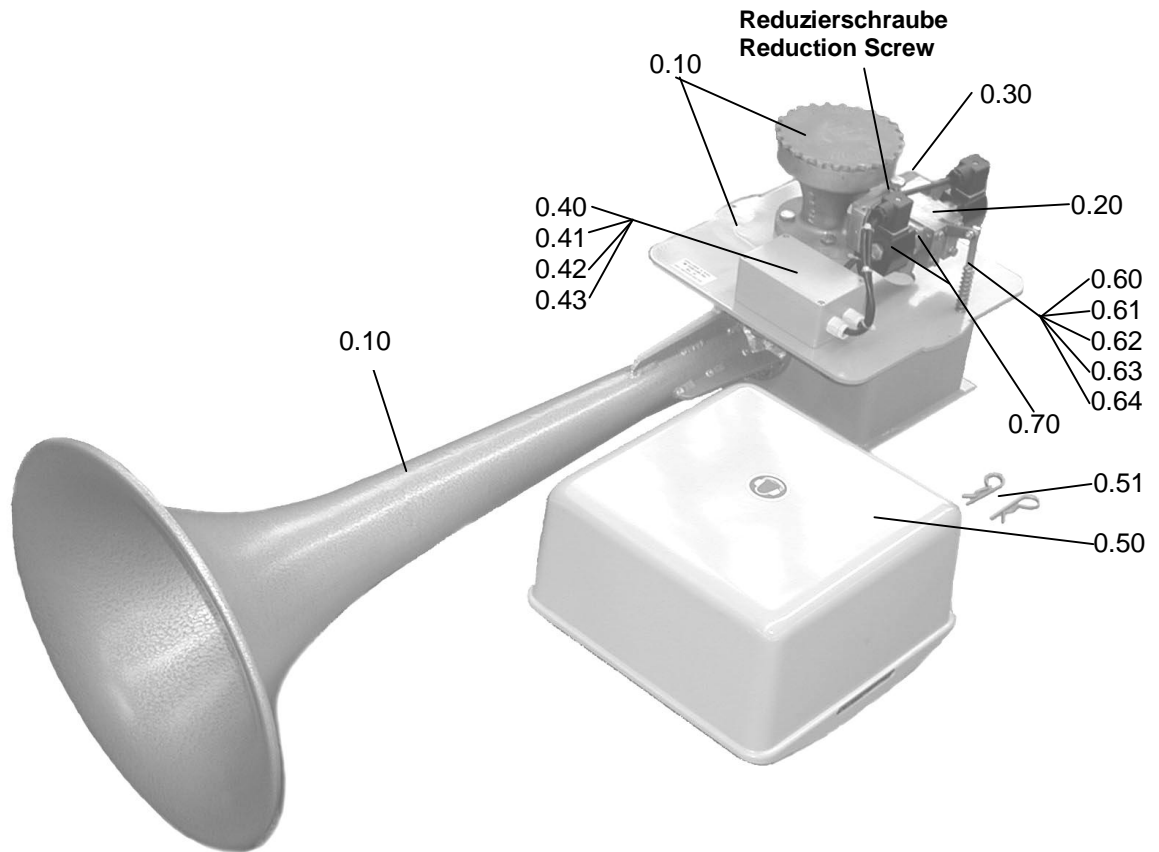
Before releasing the valve the first time, turn the reduction screw part 2.330 as far as possible into the flange T 2.310. Afterwards the sound of the signal is too low. With a higher pressure before the valve, turn the reduction screw out, moving it 1/2 to 1 1/2 times around. In case of lower pressure, move the reduction screw 2 to 4 times around.

Adjust the reduction screw in such a way that pure sound (without any scratching noise) is transmitted. After adjustment the reduction screw must be secured with the hexagon nut part 2.331.

Filter F 2

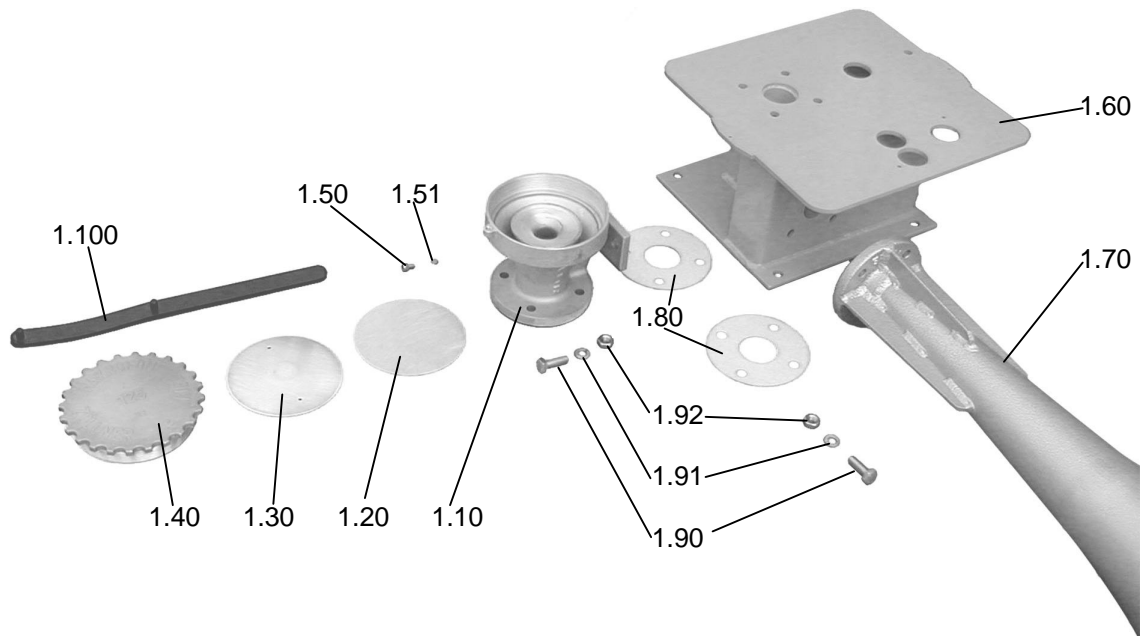
To clean the compressed air filter F 2, the cover screw, part 3.30 has to be unscrewed. Then the filter insert can be removed by flat pliers. Now the insert has to be rinsed with fuel and vented from inside with compressed air. Damaged filter inserts have to be replaced.

According to Annex III, paragraph 1(e) the sound pressure level of the vessel's own signal at listening posts shall not exceed 110 dB(A). This means that persons staying at a distance of less than 30 metres away from the Makrofon must wear ear muffs. Before a signal is released it must be assured that no person is right in front of the Makrofon.



Makrofonanlage M125 /... b ZVE (E) H complete

Item	Qty	Techn. Data	Order No.	Bezeichnung	Designation
0.10	1	page 2	0104356...	Makrofon M125/...b	Makrofon M125/...b
0.20	1	page 3/4	01042401	Ventileinheit ZVE	valve unit ZVE
0.20	1	page 3/4	01042402	Ventileinheit ZVEE	valve unit ZVEE
0.30	1	page 3/4	0104228	Anschlußflansch kompl.	connecting flange compl.
0.40	1	page 6	01043071	Anschlußk. ZVE H	connecting box ZVE H
0.40	1	page 6	01043073	Anschlußk. ZVEE H	connecting box ZVEE H
0.41	2	M4x16	2002040161	Zylinderschraube	cylinder screw
0.42	2	A 4,3	211310041	Sicherungsscheibe	washer
0.43	2	M4	21034041	Sechskantmutter	hexagon nut
0.50	1	324x175	0104252	Haube	cover
0.51	2	∅ 3x75	0104483	Federstecker	clamp
0.60	1	8x5x125	0104234	Zugstange	connecting rod
0.61	1	M5x20	2002050201	Zylinderschraube	cylinder screw
0.62	2	M5	21034051	Sechskantmutter	hexagon nut
0.63	1	4X16	210104161	Spannhülse	withdrawal sleeve
0.64	1	14x55	01703006	Druckfeder	pressure spring
0.70	1	page 3/4	017164	Magnetventil ZVE	magnet valve

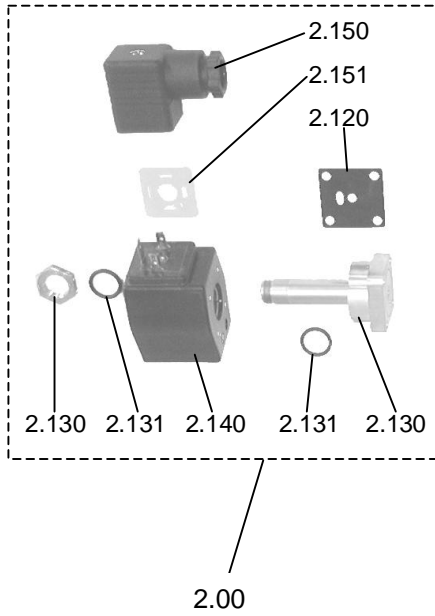


Makrofon M125 /...b

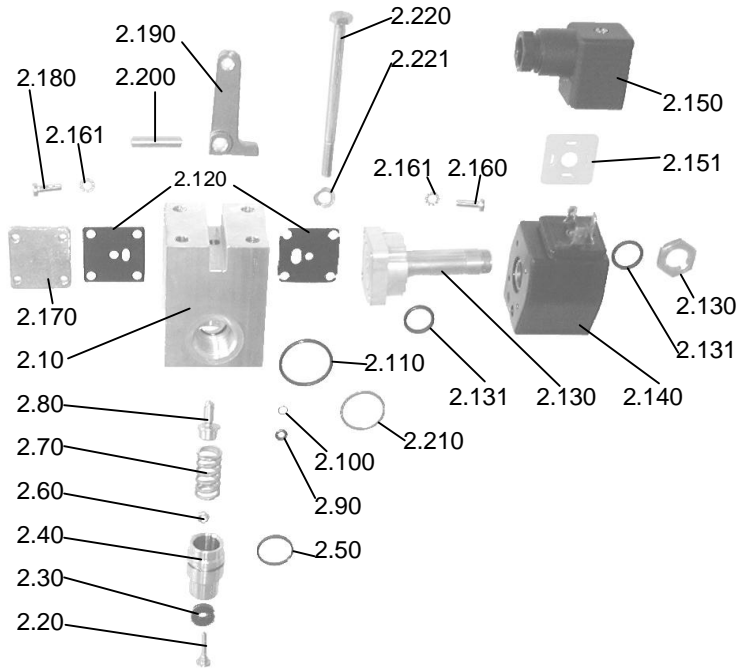
Item	Qty	Techn. Data	Order No.	Bezeichnung	Designation
1.10	1	138 x 123	0105545	Gehäuse	housing
1.20	1	∅ 125 x 1,4	889012141	Membrane	diaphragm
1.30	1	∅ 125 x 1,4	01127107	Dämpfungsplatte	pressure regulating disk
1.40	1	∅ 148 x 33	0105546	Deckelschraube	cover screw
1.50	1	M 6 x 10	2035060101	Zylinderschraube	cylinder head screw
1.51	1	6 11,8 x 1,6	211300061	Sicherungsscheibe	washer
1.60	1	344 x 325 x 165	0104309	Trichterbogen	arched pc. for sound horn
1.70	1	∅ 428 x 668	01040884	Trichter 160 Hz	sound horn 160 Hz
1.70	1	∅ 428 x 863	0104104	Trichter 130 Hz	sound horn 130 Hz
1.80	2	∅ 117/45 x 1,5	0104934	Dichtung	gasket
1.90	8	M 10 x 30	2044100301	Sechskantschraube	hexagon screw
1.91	8	M 10	21034101	Sechskantmutter	hexagon nut
1.92	8	10 x 18 x 2,2	211300101	Sicherungsscheibe	washer
1.100	1	M 125 St	0104764	Deckelschraubschlüssel	cover screw wrench

Order No.01042402 Valve unit ZVEE

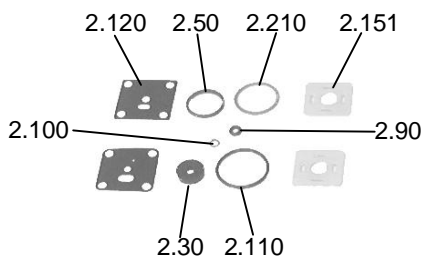
**Order No. 017164
Magnet valve**



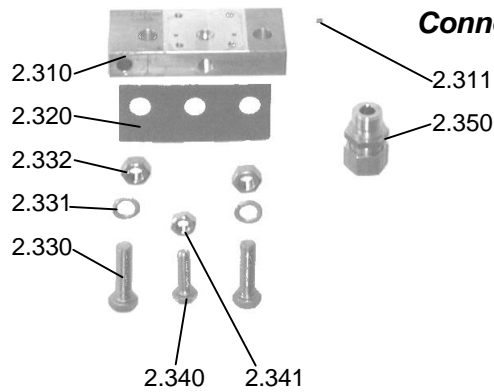
**Order No. 01042401
ZVE Valve unit**



**Order No. 017142
Set of gasket**



**Order No. 01042280
Connecting Flange compl.**



Ventileinheit/ Valve unit ZVE 01042401 / ZVEE 01042402

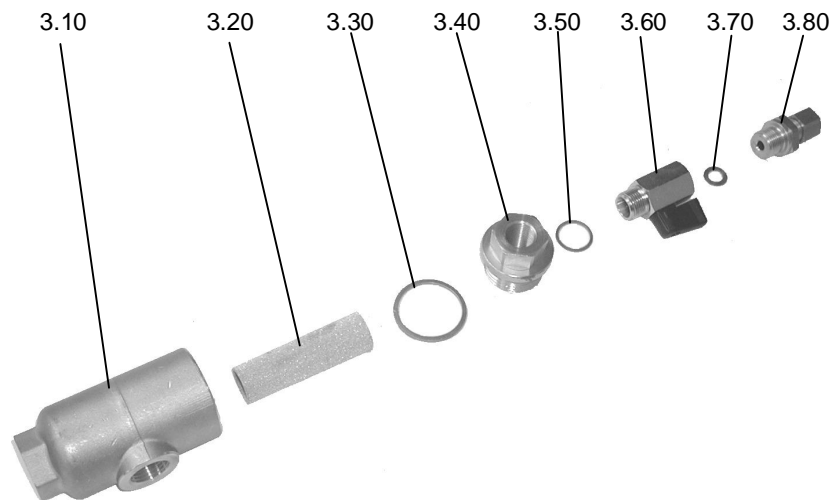
Teil Item	Stck. Qty.	Techn. Daten Techn. Data	Bestell-Nr. Order No.	Bezeichnung	Designation
2.00	1(2)		017164	Magnetventil (Spannung angeben)	Magnet valve (State voltage)
2.10	1	50x50x67	0104239	Gehäuse	Housing
2.20	1	M4x3x17	0103121	Linsenschraube	Fillister screw
2.30	1	Ø16x5.5x4	01703011	Dichtung	Gasket
2.40	1	Ø 22x36	0104181	Kolben	Piston
2.50	1	Ø22,1x18.2x2.2	0104488	Kolbenring	Piston ring
2.60	1	M4	21034041	Sechskantmutter	Hexagon nut
2.70	1	Ø13/2x28	0104311	Druckfeder	Pressure spring
2.80	1	Ø13,5x22	0104312	Entlüftungsbolzen	Vent bolt
2.90	1	R3.3x2.4	502100324	O-Ring	O-ring
2.100	1	R4x1	50210041	O-Ring	O-ring
2.110	1	R25x2.5	502102525	O-Ring	O-ring
2.120	2	32x32x0,5	0104486	Dichtung	Gaske
2.130	1(2)		520012404	Ankergehäuse	armature casing
2.131	2(4)	R12x2,5	5021012525	O-Ring	O-ring
2.140	1(2)		520.....	Magnetspule (Spannung angeben)	Magnet coil (State voltage)
2.150	1(2)	27x27x50	620374716	Kabeldose Pg 11	Cable box Pg 11
2.151	1(2)	27x27x1,5	620374756	Dichtung	Gasket
2.160	4(8)	M4x12	2002040121	Zylinderschraube	Cylinder screw
2.161	8	4.3	211310041	Scheibe	Washer
2.170	1(0)	32x32x4	0104545	Flansch	Flange
2.180	4(0)	M4x10	2002040101	Zylinderschraube	Cylinder screw
2.190	1	52x8x25	0104589	Hebel	Lever
2.200	1	6m6x24	212206025	Zylinderstift	Cylinder pin
2.210	1	A21x26x1.5	50302161	Dichtung	Gasket
2.220	4	M6x80	2043060801	Sechskantschraube	Hexagon screw
2.221	4	6x11,8x1,6	211310061	Scheibe	Washer

Anschlußflansch kompl./ Connecting Flange compl. 01042280

2.310	1	50x20x105	0104228	Anschlußflansch	Connecting flange
2.311	1	M4x5	2016040052	Gewindestift	set screw
2.320	1	105x50x1	0105498	Flanschdichtung	Flange gasket
2.330	2	M12x45	2044120451	Sechskantschraube	hexagon screw
2.331	2	12,5x21x2,5	211300121	Sperkantring	Washer
2.332	2	M12	21034121	Sechskantmutter	Hexagon nut
2.340	1	M10x40	2044100401	Sechskantschraube	Hexagon screw
2.341	1	M10	21034101	Sechskantmutter	Hexagon nut
2.350	1	GE 15 LR	267001830	Verschraubung	Screwed joint

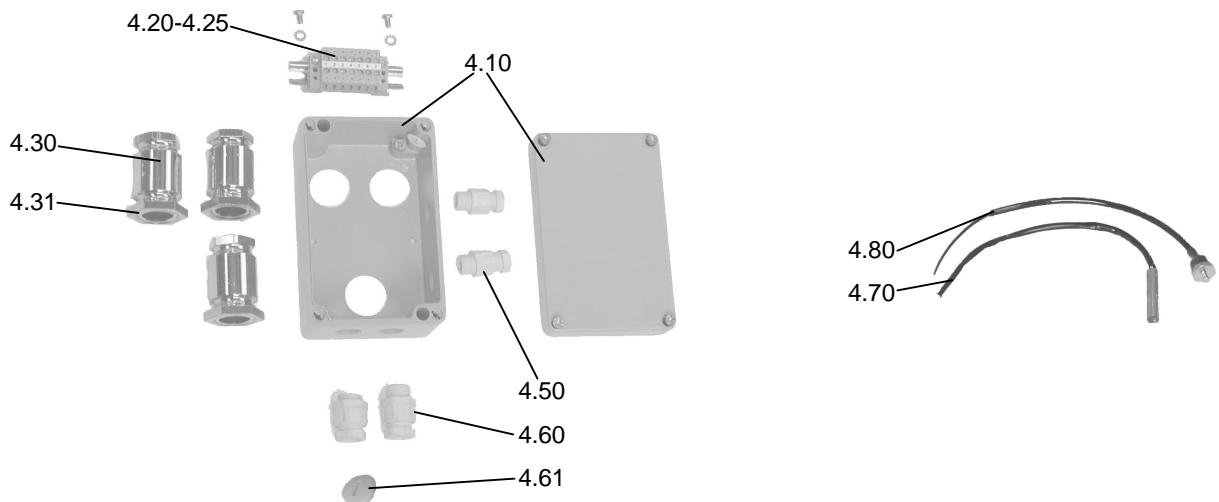
Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen für Ventile unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts for the valves!

Order. No. 0104932
Filter F3**FILTER F3 complete 0104932**

Item	Qty.	Designation	Techn. Data	Order No.	Bezeichnung
3.10	1	Ø 46x90	0104141	Filtergehäuse	Filter casing
3.20	1	Ø 21/17,2x70	0101672	Filtereinsatz	Filter insert
3.30	1	A33x39x2	50303392	Dichtring	Packing ring
3.40	1	R1"/R1/8"	0102437	Verschlußschraube	Cover screw
3.50	1	A17x21x1.5	50301710	Dichtring	Packing ring
3.60	1	R3/8"/NW8	522641009	Kugelhahn	Ball valve
3.70	1	A8x14x1	50300840	Dichtring	Packing ring
3.80	1	GE8-LR3/8"	267000560	Verschraubung	Screwed joint

**Order. No. 0104307 ZVE H
01043073 ZVEE H
Connecting Box compl.**



Anschlusskasten/ Connect. Box complete ZVE H 01043071 / ZVEE H 01043073

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
4.10	1	125x80x54	01043061	Anschlußkasten	Connecting box
4.20	1	TS15	67750511	Tragschiene	Mounting rail
4.21	5(7)	MBK	626001019	Klemme	Terminal
4.22	2	E-MBK	626001637	Endhalter	Terminal clamp
4.23	2	M4x6	2002040061	Zylinderschraube	Cylinder screw
4.24	2	A4.3	211310041	Scheibe	Washer
4.25	1	SKS 5	626001213	Bezeichnungsschild	Name plate
4.30	2(3)	M24x1.5	677072417	Kabelverschraubung	Cable gland
4.31	2(3)	M24x1.5	677022417	Gegenmutter	Counter nut
4.50	2	M12x1,5	67706512	Kabelverschraubung	Cable gland
4.60	1(2)	M16x1,5	67706516	Kabelverschraubung	Cable gland
4.61	1(0)	M16x1,5	67706524	Blindstopfen	hole lock
4.70	1	10x40	8844104000	Heizpatrone 110/230 V AC/100W	Heating insert 110/230 V AC/100W
4.70	1	10x40	8844103000	Heizpatrone 24 V DC / 100W	Heating insert 24 V DC / 100W
4.80	1	2455RBV	8846027080	Thermostat	Thermostat

Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts !

General

The ZÖLLNER Makrofons type M125/.b are compressed air driven diaphragm sounders of modern design. They are applied for releasing strong acoustic signals on vessels. Makrofons produce a great volume at low consumption of compressed air. The exactly tuned exponential horns produce sonorous, agreeable tones.

The Makrofon is adjusted to a duty factor of 15% !

Construction

The Makrofon type M125/...b consists of a brass casing, part 1.10; the sound is produced by the diaphragm, part 1.20, which is chucked by in the housing by the cover screw, part 1.40. The horn itself, part 1.70, is made of aluminum sheet and is flanged to the housing. The signal is released electrically by the operation valve unit ZVE, part 0.20; for emergency release you can choose between a pull-rope or a second magnet valve. The Makrofon can be supplied with or without heating device. The Makrofon with operating valve ZVE is applicable for pressure between 6 and 40 bar. For spare parts, please see the attached list.

Mounting

The Makrofon set is mounted as high as possible by 4 screws M12. All screw connections have to be well secured. The sound has to spread forward and, as far as possible, backward, too, without obstructions. The compressed air pipe should be made of copper. Before connection of the pipe it has to be cleaned from foreign substances by blowing through. The filter should be installed within a climate-safe room to keep the condensed water from freezing, and easy access should be ensured to allow cleaning at any time.

Maintenance

In case of sound disturbances, first of all it must be checked if enough compressed air is supplied to the Makrofon with the valve opened. In case air pressure is too high, please adjust the required pressure with the reduction valve. Compressed air filter and pipes are to be cleaned. The diaphragm, part 1.20, can be removed after loosening the cover screw, part 1.40. When mounting again, please be careful that the damping plate has to be inserted with the convex side facing the cover screw. To reach the correct restraint for the diaphragm, the cover screw has to be fastened tightly at first. Then it has to be recessed again while checking at the same time by operating the magnet valve at which position the Makrofon sounds loud and pure. After adjusting the cover screw has to be secured against twisting. Also the electrical connections should be checked.

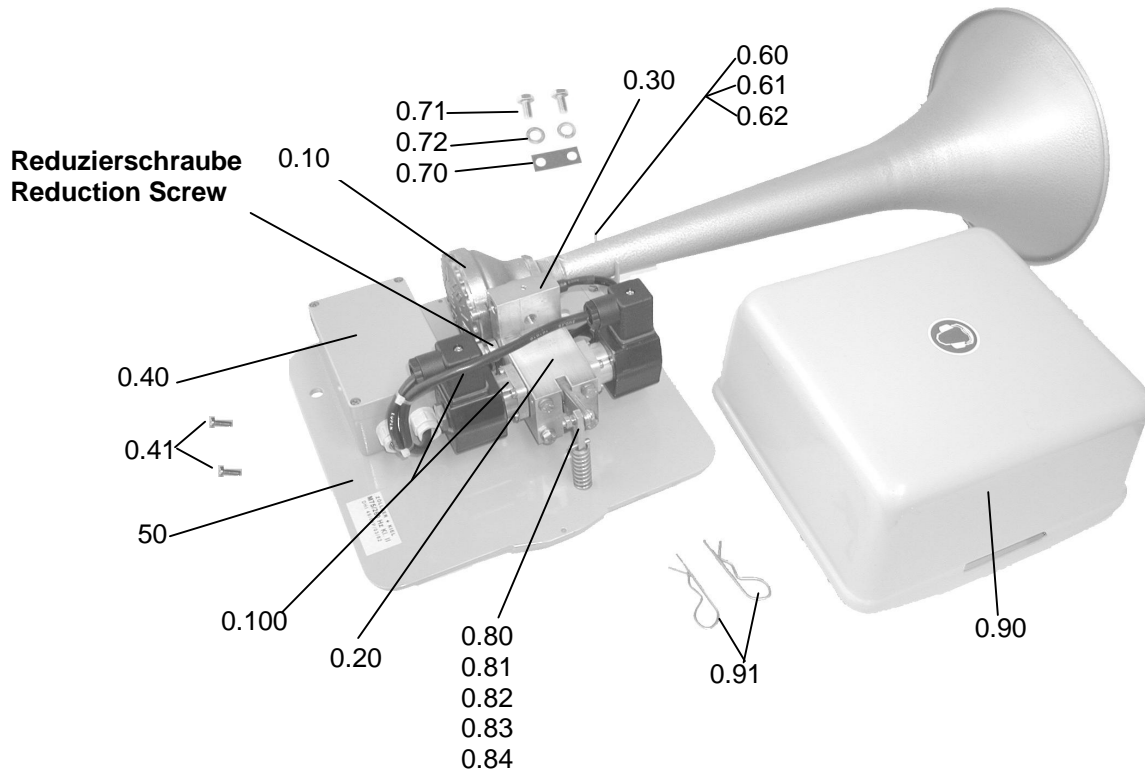
Adjustment of the reduction screw

Before releasing the valve the first time, turn the reduction screw part 2.340 as far as possible into the flange part 2.310. Afterwards the sound of the signal is too low. With a higher pressure before the valve, turn the reduction screw out, moving it $\frac{1}{2}$ to $1\frac{1}{2}$ times around. In case of lower pressure, move the reduction screw 2 to 4 times around. Adjust the reduction screw in such a way that pure sound (without any scratching noise) is transmitted. After adjustment the reduction screw must be secured with the hexagon nut part 2.341.

Filter F3

To clean the compressed air filter F3, the cover screw, part 3.40 has to be unscrewed. Then the filter insert can be removed by flat pliers. Now the insert has to be rinsed with fuel and vented from inside with compressed air. Damaged filter inserts have to be replaced.

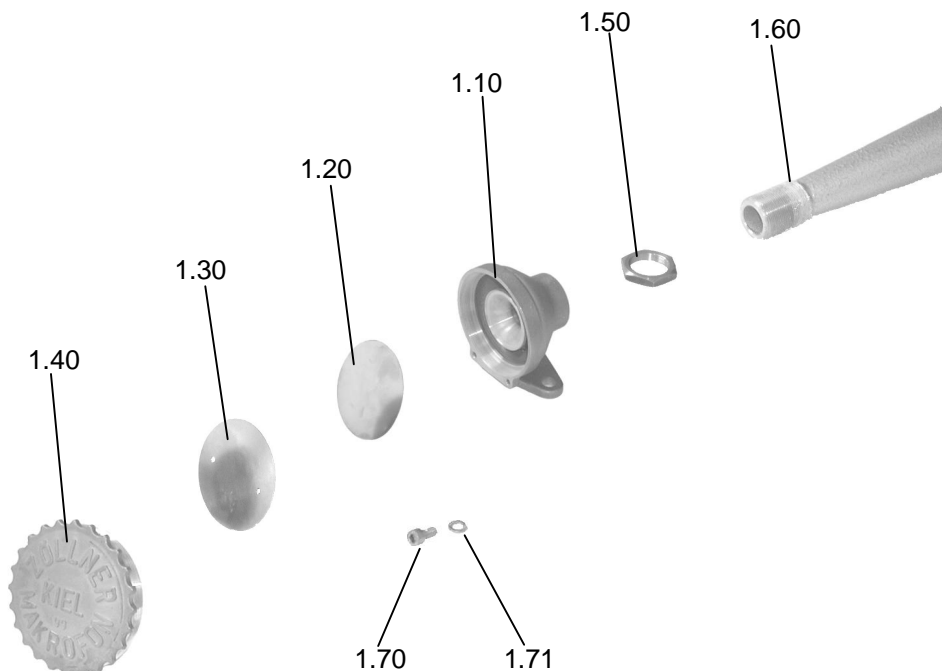
Order.No. 010429801 ZVE H
010429803 ZVEE H



Makrofonanlage M75F/260 ZVE (E) H complete 010429801/010429803

Item	Qty	Techn. Data	Order No.	Bezeichnung	Designation
0.10	1	page 2	0103144	Makrofon M75F/260	Makrofon M75F/260
0.20	1	page 3/4	01042401	Ventileinheit ZVE	valve unit ZVE
0.20	1	page 3/4	01042402	Ventileinheit ZVEE	valve unit ZVEE
0.30	1	page 3/4	01042920	Anschlußflansch kompl.	connecting flange compl.
0.40	1	page 6	0104307	Anschlußk. ZVE H	connecting box ZVE H
0.40	1	page 6	01043072	Anschlußk. ZVEEH	connecting box ZVEEH
0.41	2	M4x12	2002040121	Zylinderschraube	cylinder screw
0.50	1	260x280x5	0104302	Grundplatte	base plate
0.60	1	50x2	0104295	Halter	support
0.61	2	M4x8	2002040081	Zylinderschraube	cylinder screw
0.62	2	4,3	211310041	Scheibe	washer
0.70	1	50x20x1	0105151	Isolierplatte	isolated plate
0.71	2	M10x20	2044100201	Sechskantschraube	hexagon screw
0.72	2	10x18x2,2	211300101	Sicherungsring	safety ring
0.80	1	8x5x125	0104234	Zugstange	connecting rod
0.81	1	M5x20	2002050201	Zylinderschraube	cylinder screw
0.82	2	M5	21034051	Sechskantmutter	hexagon nut
0.83	1	4X16	210104161	Spannhülse	withdrawal sleeve
0.84	1	12x55	01703006	Druckfeder	pressure spring
0.90	1	265x285x150	0104277	Haube	cover
0.91	2	Ø 3x75	0104483	Federstecker	clamp
0.100	1	page 3/4	017164	Magnetventil ZVE	magnet valve

Order. No. 0103144
Makrofon compl.

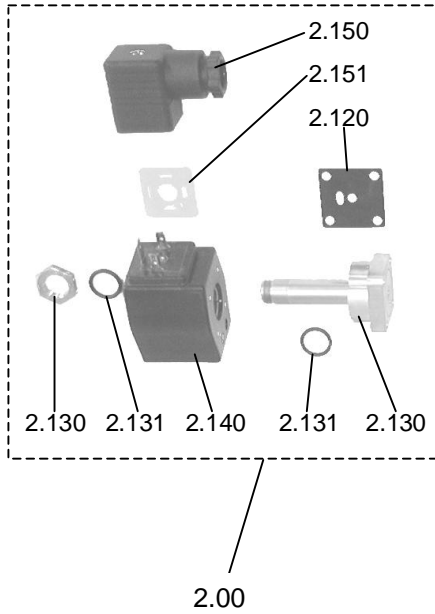


MAKROFON M75F/260Hz complete 0103144

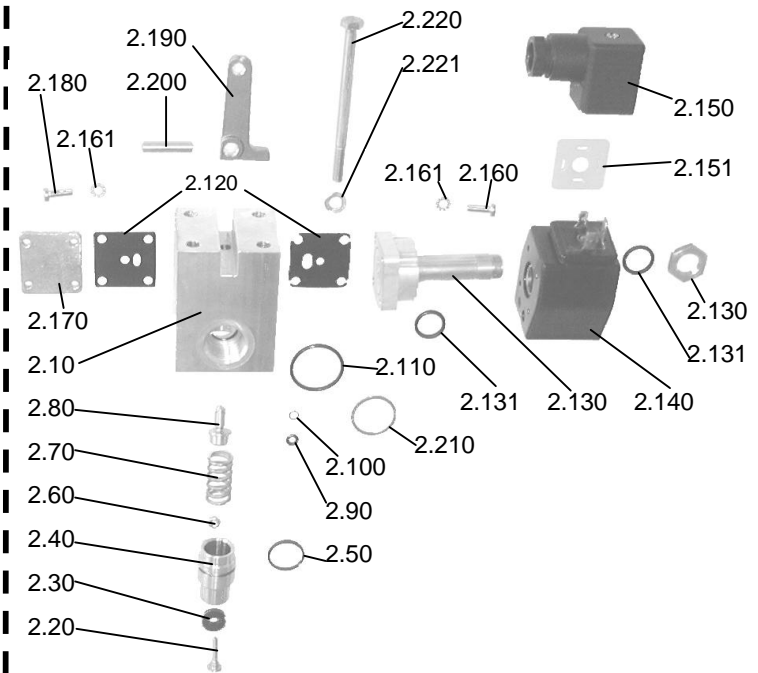
Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
1.10	1	Ø 84x57	0105139	Makrofongehäuse	Makrofon housing
1.20	1	Ø 75x0.4	889007040	Membrane	Diaphragm
1.30	1	Ø 75x0.8	0103689	Dämpfungsplatte	Pressure regul.disk
1.40	1	Ø 84x18	0105138	Deckelschraube	Cover screw
1.50	1	M32x1.5	0102940	Sechskantmutter	Hexagon nut
1.60	1	Ø 268x515	0103143	Trichter Stahl	Sound horn steel
1.60	1	Ø 268x515	01031433	Trichter Kupfer	Sound horn copper
1.70	1	M5x10	2035050101	Zylinderschraube	Cylinder screw
1.71	1	5x9,2x1,2	211300051	Sicherungsscheibe	Safety washer

Order No.01042402 Valve unit ZVEE

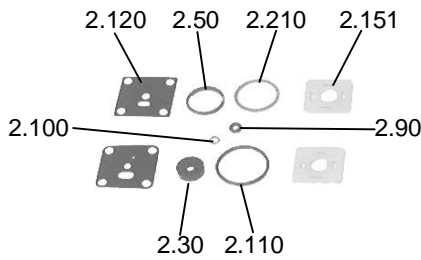
Order No. 017164
Magnet valve



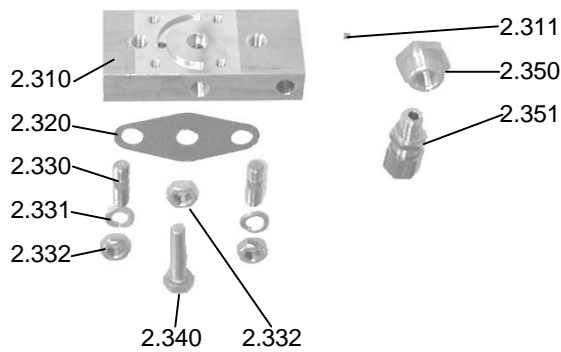
Order No. 01042401
ZVE Valve unit



Order No. 017142
Set of gasket



Order No. 01042920
Connecting Flange compl.



Ventileinheit/ Valve unit ZVE 01042401 / ZVEE 01042402

Teil Item	Stck. Qty.	Techn. Daten Techn. Data	Bestell-Nr. Order No.	Bezeichnung	Designation
2.00	1(2)		017164	Magnetventil (Spannung angeben)	Magnet valve (State voltage)
2.10	1	50x50x67	0104239	Gehäuse	Housing
2.20	1	M4x3x17	0103121	Linsenschraube	Fillister screw
2.30	1	Ø16x5.5x4	01703011	Dichtung	Gasket
2.40	1	Ø 22x36	0104181	Kolben	Piston
2.50	1	Ø22,1x18.2x2.2	0104488	Kolbenring	Piston ring
2.60	1	M4	21034041	Sechskantmutter	Hexagon nut
2.70	1	Ø13/2x28	0104311	Druckfeder	Pressure spring
2.80	1	Ø13,5x22	0104312	Entlüftungsbolzen	Vent bolt
2.90	1	R3.3x2.4	502100324	O-Ring	O-ring
2.100	1	R4x1	50210041	O-Ring	O-ring
2.110	1	R25x2.5	502102525	O-Ring	O-ring
2.120	2	32x32x0,5	0104486	Dichtung	Gasket
2.130	1(2)		520012404	Ankergehäuse	armature casing
2.131	2(4)	R12x2,5	5021012525	O-Ring	O-ring
2.140	1(2)		520.....	Magnetspule (Spannung angeben)	Magnet coil (State voltage)
2.150	1(2)	27x27x50	620374716	Kabeldose Pg 11	Cable box Pg 11
2.151	1(2)	27x27x1,5	620374756	Dichtung	Gasket
2.160	4(8)	M4x12	2002040121	Zylinderschraube	Cylinder screw
2.161	8	4.3	211310041	Scheibe	Washer
2.170	1(0)	32x32x4	0104545	Flansch	Flange
2.180	4(0)	M4x10	2002040101	Zylinderschraube	Cylinder screw
2.190	1	52x8x25	0104589	Hebel	Lever
2.200	1	6m6x24	212206025	Zylinderstift	Cylinder pin
2.210	1	A21x26x1.5	50302161	Dichtung	Gasket
2.220	4	M6x80	2043060801	Sechskantschraube	Hexagon screw
2.221	4	6x11,8x1,6	211310061	Scheibe	Washer

Anschlußflansch kompl./ Connecting Flange compl. 01042920

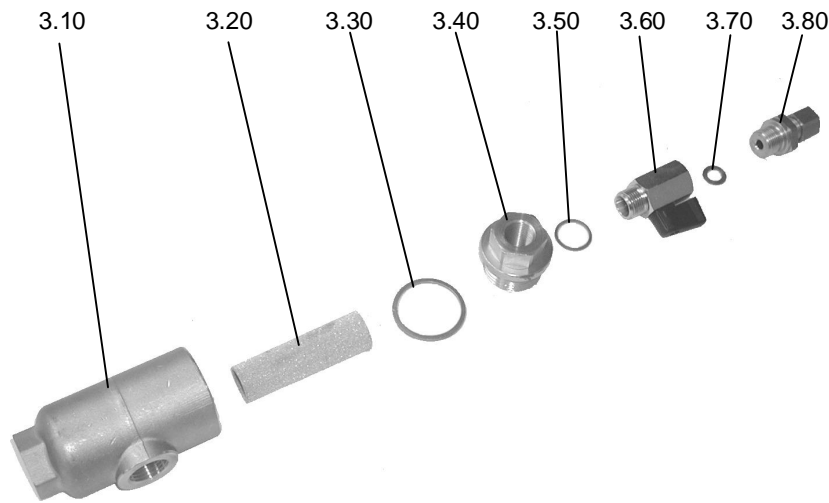
2.310	1	50x20x105	0104292	Anschlußflansch	Connecting flange
2.311	1	M4x5	2016040052	Gewindestift	set screw
2.320	1	84x40x1	017251171	Ovaldichtung	Oval gasket
2.330	2	M10x20	2046100201	Stiftschraube	Stud bo
2.331	2	10x18x2,2	2113100101	Scheibe	Washer
2.332	3	M10	21034101	Sechskantmutter	Hexagon nut
2.340	1	M10x40	2044100401	Sechskantschraube	Hexagon screw
2.350	1	R1/2"/M14x1.5	0105298	Reduzierschraube	Bushing screw
2.351	1	GE10-LR	267000941	Verschraubung	Screwed joint

Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen für Ventile unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts for the valves!

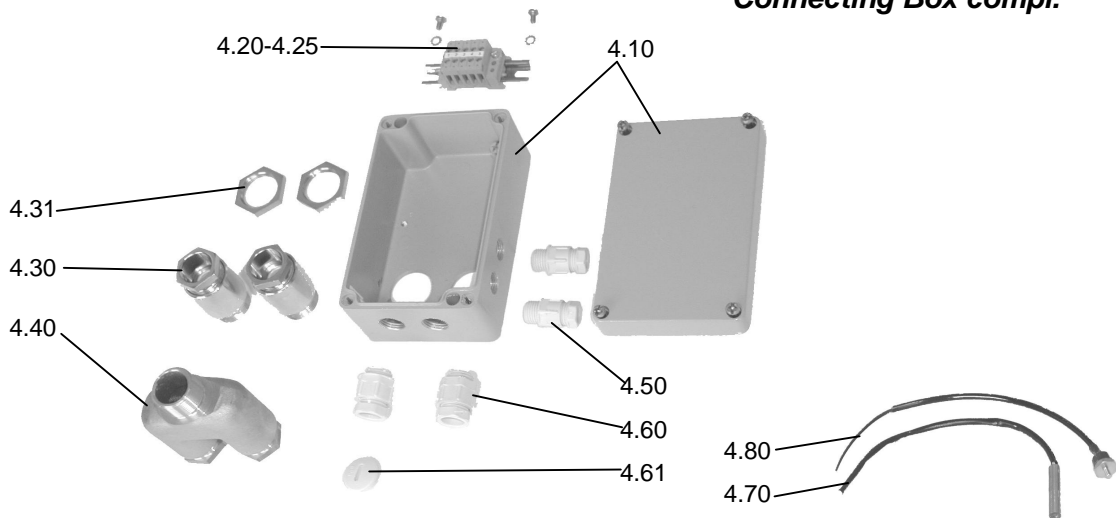
Order. No. 0104932

Filter F3

**FILTER F3 complete 0104932**

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
3.10	1	Ø 46x90	0104141	Filtergehäuse	Filter casing
3.20	1	Ø 21/17,2x70	0101672	Filtereinsatz	Filter insert
3.30	1	A33x39x2	50303392	Dichtring	Packing ring
3.40	1	R1"/R1/8"	0102437	Verschlußschraube	Cover screw
3.50	1	A17x21x1.5	50301710	Dichtring	Packing ring
3.60	1	R3/8"/NW8	522641009	Kugelhahn	Ball valve
3.70	1	A8x14x1	50300840	Dichtring	Packing ring
3.80	1	GE8-LR3/8"	267000560	Verschraubung	Screwed joint

Order. No. 0104307 ZVE H
01043072 ZVEE H
Connecting Box compl.



Anschlusskasten/ Connect. Box complete ZVE H 0104307 / ZVEE H 01043072

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
4.10	1	125x80x54	0104951	Anschlußkasten	Connecting box
4.20	1	TS15	67750511	Tragschiene	Mounting rail
4.21	5(7)	MBK	626001019	Klemme	Terminal
4.22	2	E-MBK	626001637	Endhalter	Terminal clamp
4.23	2	M4x6	2002040061	Zylinderschraube	Cylinder screw
4.24	2	A4.3	211310041	Scheibe	Washer
4.25	1	SKS 5	626001213	Bezeichnungsschild	Name plate
4.30	2	M24x1.5	677072417	Kabelverschraubung	Cable gland
4.31	2	M24x1.5	677022417	Gegenmutter	Counter nut
4.40	(1)	M24x1.5	677072420	Zwillingsstutzen	twin connect. holes
4.50	2	M12x1,5	67706512	Kabelverschraubung	Cable gland
4.60	1(2)	M16x1,5	67706516	Kabelverschraubung	Cable gland
4.61	1(0)	M16x1,5	67706524	Blindstopfen	hole lock 4.70 1
		10x40	8844104000	Heizpatrone	Heating insert
				110/230 V AC/100W	110/230 V AC/100W
4.70	1	10x40	8844103000	Heizpatrone	Heating insert
				24 V DC / 100W	24 V DC / 100W
4.80	1	2455RBV	8846027080	Thermostat	Thermostat

Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts !

Construction

The Makrofon consists of a brass casing. The sound is produced by a diaphragm which is chucked into the housing, held by a cover screw and a damping plate.

The signal is released electrically by a magnet valve contained in the Makrofon's operating valve ZVE. A hand pull-rope or a second magnet valve serve as devices for emergency release.

The Makrofon including operating valve ZVE is suitable for pressures between 6 bar and 40 bar.

The Makrofon is adjusted to a duty factor of 15% !

Mounting

The Makrofon signal set must be positioned as high as possible. It is fastened with two screws M 10 which have to be secured well. When laying the compressed air pipe for the ZÖLLNER Makrofon, a compressed air filter must be installed before the Makrofon valve. The filter must be fixed easily accessible in a temperature protected room, making sure that the condensation water cannot freeze up and that the filter can be cleaned at any time. The pipe between filter and Makrofon valve must be made of stainless material, e.g. copper.

It is essential to vent the pipe thoroughly before connection, in order to remove all foreign matter from the feeding main.

Maintenance

In case of sound disturbances, first of all it must be checked out if enough compressed air flows to the Makrofon with the valve opened.

Compressed air filter, operating valve and pipes must be cleaned.

After detaching the cover screw - part 1.40 - the diaphragm can be taken out. When assembling again, it is important first to insert the diaphragm and then the damping plate with its convex side showing to the cover screw. In order to achieve the correct restraint for the diaphragm, the cover screw must be tightened well. Then it is recessed again, checking out at the same time, by operating the magnet valve, at which position the Makrofon sounds loud and pure. After adjustment, the cover screw must be secured so that it cannot be twisted again.

The correct amount of compressed air is adjusted by means of the throttle screw - part 2.340 - depending on the air pressure.

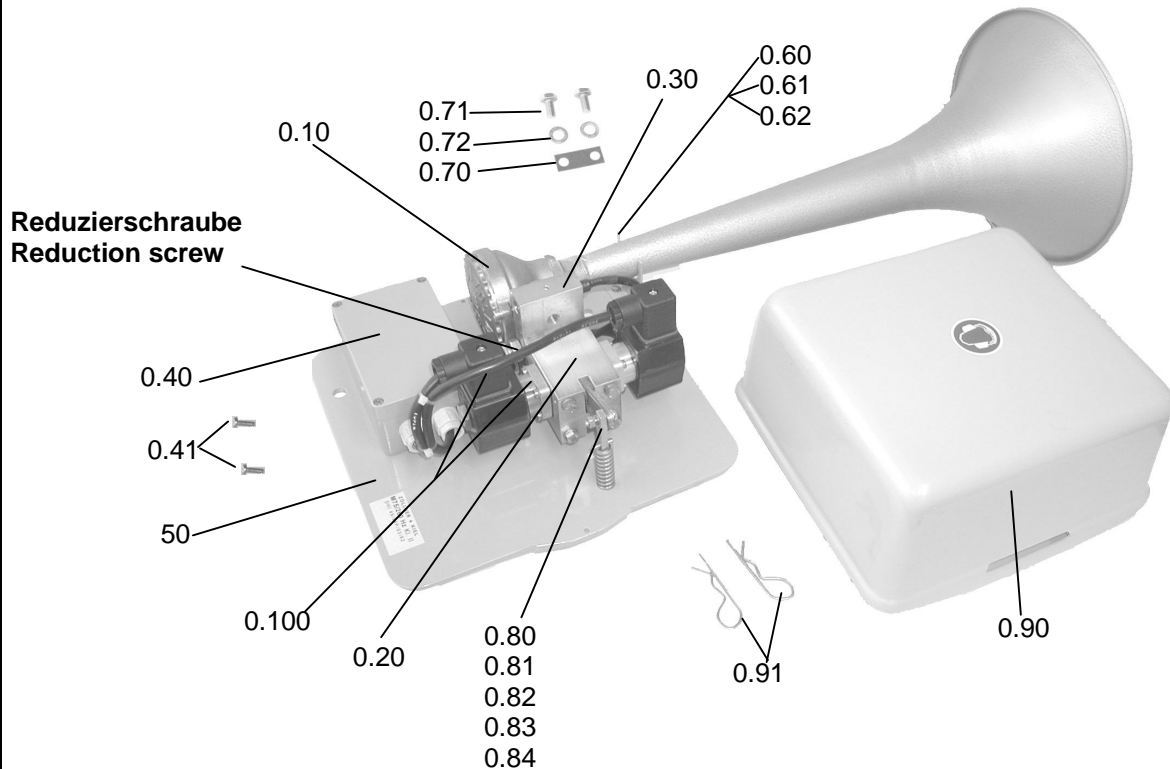
Filter F3

For cleaning the filter F 3, the cover screw - part 3.40 - must be unscrewed. Afterwards the filter insert - part 3.20 - can be extracted with flat pliers. The filter insert is rinsed in petrol and vented with compressed air from within.

Damaged filter inserts must be exchanged.

According to Annex III, paragraph 1(e) the sound pressure level of the vessel's own signal at listening posts shall not exceed 110 dB(A). This means that persons staying at a distance of less than 30 metres away from the Makrofon must wear ear muffs. Before a signal is released it must be assured that no person is right in front of the Makrofon.

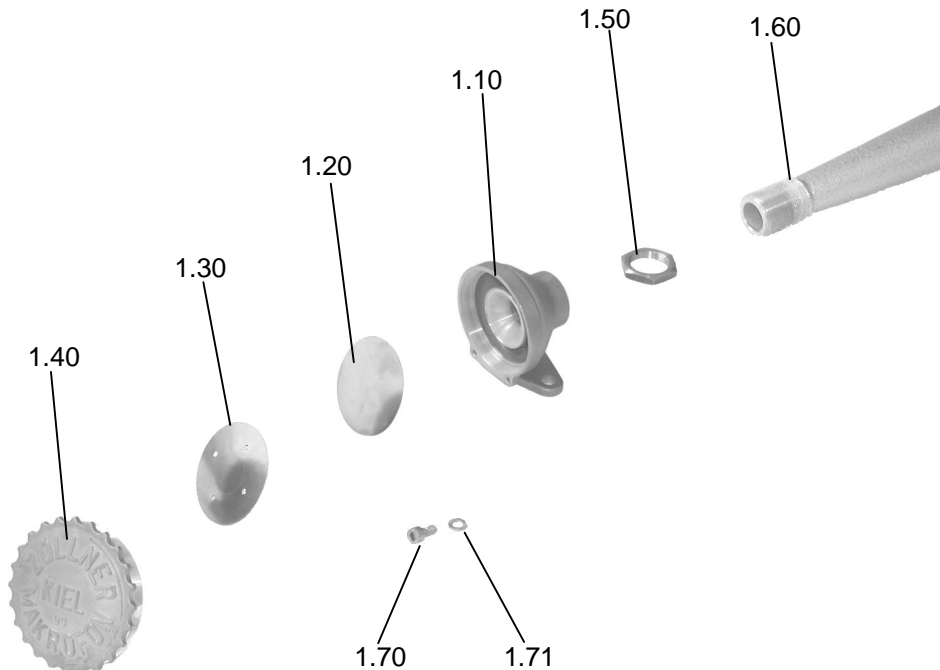
Order.No. 010429805 ZVE H
010429807 ZVEE H



Makrofonanlage M75F/370 ZVE (E) H complete 010429805 / 010429807

Item	Qty	Techn. Data	Order No.	Bezeichnung	Designation
0.10	1	page 2	0103695	Makrofon M75F/370	Makrofon M75F/370
0.20	1	page 3/4	01042401	Ventileinheit ZVE	valve unit ZVE
0.20	1	page 3/4	01042402	Ventileinheit ZVEE	valve unit ZVEE
0.30	1	page 3/4	01042920	Anschlußflansch kompl.	connecting flange compl.
0.40	1	page 6	0104307	Anschlußk. ZVE H	connecting box ZVE H
0.40	1	page 6	01043072	Anschlußk. ZVEEH	connecting box ZVEEH
0.41	2	M4x12	2002040121	Zylinderschraube	cylinder screw
0.50	1	260x280x5	0104302	Grundplatte	base plate
0.60	1	50x2	0104295	Halter	support
0.61	2	M4x8	2002040081	Zylinderschraube	cylinder screw
0.62	2	4,3	211310041	Scheibe	washer
0.70	1	50x20x1	0105151	Isolierplatte	isolated plate
0.71	2	M10x20	2044100201	Sechskantschraube	hexagon screw
0.72	2	10x18x2,2	211300101	Sicherungsring	safety ring
0.80	1	8x5x125	0104234	Zugstange	connecting rod
0.81	1	M5x20	2002050201	Zylinderschraube	cylinder screw
0.82	2	M5	21034051	Sechskantmutter	hexagon nut
0.83	1	4X16	210104161	Spannhülse	withdrawal sleeve
0.84	1	12x55	01703006	Druckfeder	pressure spring
0.90	1	265x285x150	0104277	Haube	cover
0.91	2	∅ 3x75	0104483	Federstecker	clamp
0.100	1	page 3/4	017164	Magnetventil ZVE	magnet valve

*Order. No. 0103695
Makrofon compl.*

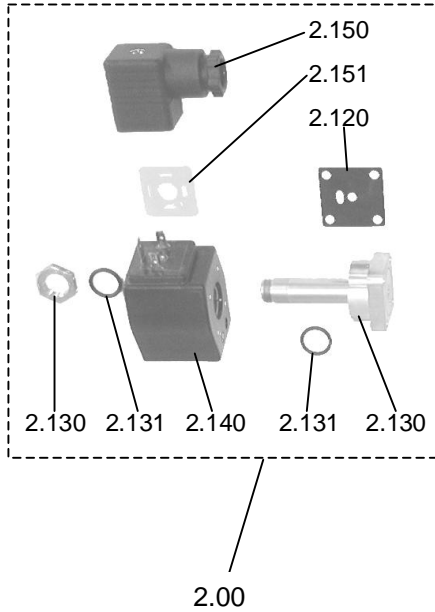


MAKROFON M75F/370Hz complete 0103695

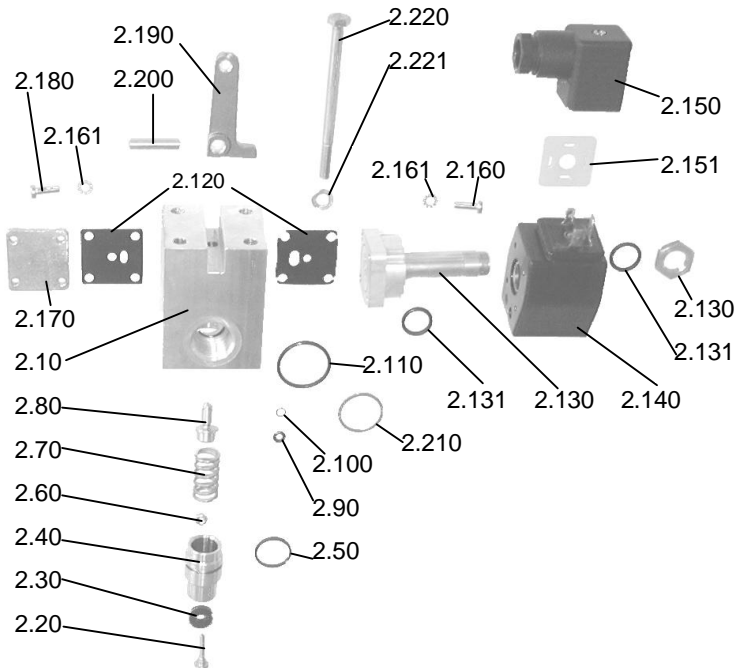
Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
1.10	1	Ø 84x57	0105139	Makrofongehäuse	Makrofon housing
1.20	1	Ø 75x0.4	889007040	Membrane	Diaphragm
1.30	1	Ø 75x0.8	0103688	Dämpfungsplatte	Pressure regul.disk
1.40	1	Ø 84x18	0105138	Deckelschraube	Cover screw
1.50	1	M32x1.5	0102940	Sechskantmutter	Hexagon nut
1.60	1	Ø 200x364	0102978	Trichter Stahl	Sound horn steel
1.60	1	Ø 200x364	01029783	Trichter Kupfer	Sound horn copper
1.70	1	M5x10	2035050101	Zylinderschraube	Cylinder screw
1.71	1	5x9,2x1,2	211300051	Sicherungsscheibe	Safety washer

Order No.01042402 Valve unit ZVEE

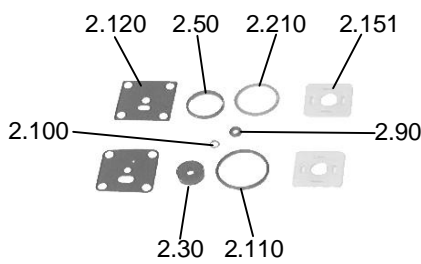
Order No. 017164
Magnet valve



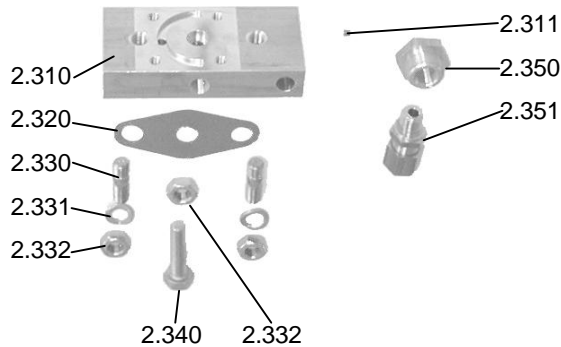
Order No. 01042401
ZVE Valve unit



Order No. 017142
Set of gasket



Order No. 01042920
Connecting Flange compl.



Ventileinheit/ Valve unit ZVE 01042401 / ZVEE 01042402

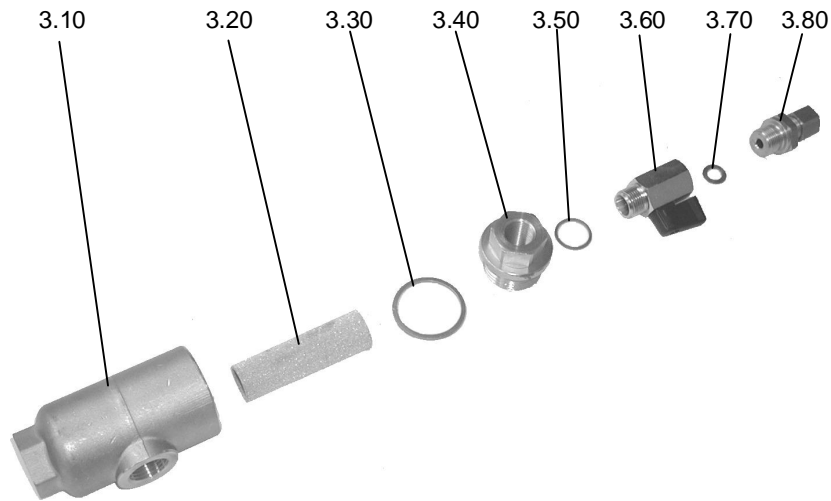
Teil Bezeichnung Item Qty.	Stck. Designation Techn. Data	Order No.	Techn. Daten	Bestell-Nr.
2.00	1(2)	017164	Magnetventil (Spannung angeben)	Magnet valve (State voltage)
2.10	1	50x50x67	Gehäuse	Housing
2.20	1	M4x3x17	Linsenschraube	Fillister screw
2.30	1	Ø16x5.5x4	Dichtung	Gasket
2.40	1	Ø 22x36	Kolben	Piston
2.50	1	Ø22,1x18.2x2.2	Kolbenring	Piston ring
2.60	1	M4	Sechskantmutter	Hexagon nut
2.70	1	Ø13/2x28	Druckfeder	Pressure spring
2.80	1	Ø13,5x22	Entlüftungsbolzen	Vent bolt
2.90	1	R3.3x2.4	O-Ring	O-ring
2.100	1	R4x1	O-Ring	O-ring
2.110	1	R25x2.5	O-Ring	O-ring
2.120	2	32x32x0,5	Dichtung	Gaske
2.130	1(2)		Ankergehäuse	armature casing
2.131	2(4)	R12x2,5	O-Ring	O-ring
2.140	1(2)		Magnetspule (Spannung angeben)	Magnet coil (State voltage)
2.150	1(2)	27x27x50	Kabeldose Pg 11	Cable box Pg 11
2.151	1(2)	27x27x1,5	Dichtung	Gasket
2.160	4(8)	M4x12	Zylinderschraube	Cylinder screw
2.161	8	4.3	Scheibe	Washer
2.170	1(0)	32x32x4	Flansch	Flange
2.180	4(0)	M4x10	Zylinderschraube	Cylinder screw
2.190	1	52x8x25	Hebel	Lever
2.200	1	6m6x24	Zylinderstift	Cylinder pin
2.210	1	A21x26x1.5	Dichtung	Gasket
2.220	4	M6x80	Sechskantschraube	Hexagon screw
2.221	4	6x11,8x1,6	Scheibe	Washer

Anschlußflansch kompl./ Connecting Flange compl. 01042920

2.310	1	50x20x105	0104292	Anschlußflansch	Connecting flange
2.311	1	M4x5	2016040052	Gewindestift	set screw
2.320	1	84x40x1	017251171	Ovaldichtung	Oval gasket
2.330	2	M10x20	2046100201	Stiftschraube	Stud bolt
2.331	2	10x18x2,2	2113100101	Scheibe	Washer
2.332	3	M10	21034101	Sechskantmutter	Hexagon nut
2.340	1	M10x40	2044100401	Sechskantschraube	Hexagon screw
2.350	1	R1/2"/M14x1.5	0105298	Reduzierschraube	Bushing screw
2.351	1	GE10-LR	267000941	Verschraubung	Screwed joint

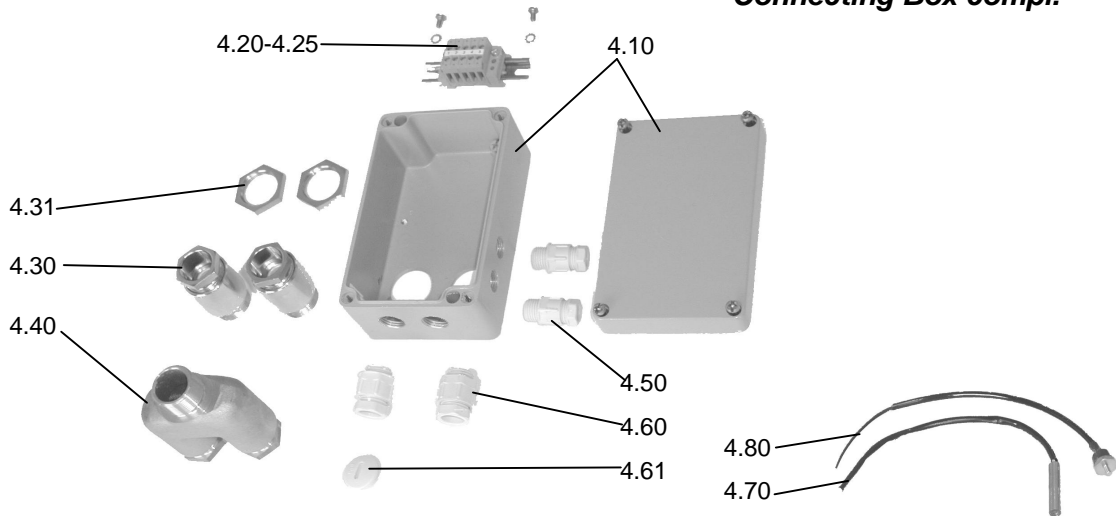
Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen für Ventile unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts for the valves!

Order. No. 0104932
Filter F3**FILTER F3 complete 0104932**

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
3.10	1	Ø 46x90	0104141	Filtergehäuse	Filter casing
3.20	1	Ø 21/17,2x70	0101672	Filtereinsatz	Filter insert
3.30	1	A33x39x2	50303392	Dichtring	Packing ring
3.40	1	R1"/R1/8"	0102437	Verschlußschraube	Cover screw
3.50	1	A17x21x1.5	50301710	Dichtring	Packing ring
3.60	1	R3/8"/NW8	522641009	Kugelhahn	Ball valve
3.70	1	A8x14x1	50300840	Dichtring	Packing ring
3.80	1	GE8-LR3/8"	267000560	Verschraubung	Screwed joint

**Order. No. 0104307 ZVE H
01043072 ZVEE H
Connecting Box compl.**



Anschlusskasten ZVE H complete 0104307/ZVEE H01043072

Item	Qty.	Techn. Data	Order No.	Bezeichnung	Designation
4.10	1	125x80x54	0104951	Anschlußkasten	Connecting box
4.20	1	TS15	67750511	Tragschiene	Mounting rail
4.21	5(7)	MBK	626001019	Klemme	Terminal
4.22	2	E-MBK	626001637	Endhalter	Terminal clamp
4.23	2	M4x6	2002040061	Zylinderschraube	Cylinder screw
4.24	2	A4.3	211310041	Scheibe	Washer
4.25	1	SKS 5	626001213	Bezeichnungsschild	Name plate
4.30	2	M24x1.5	677072417	Kabelverschraubung	Cable gland
4.31	2	M24x1.5	677022417	Gegenmutter	Counter nut
4.40	(1)	M24x1.5	677072420	Zwillingstutzen	twin connect. holes
4.50	2	M12x1,5	67706512	Kabelverschraubung	Cable gland
4.60	1(2)	M16x1,5	67706516	Kabelverschraubung	Cable gland
4.61	1(0)	M16x1,5	67706524	Blindstopfen	hole lock
4.70	1	10x40	8844104000	Heizpatrone 110/230 V AC/100W	Heating insert 110/230 V AC/100W
4.70	1	10x40	8844103000	Heizpatrone 24 V DC / 100W	Heating insert 24 V DC / 100W
4.80	1	2455RBV	8846027080	Thermostat	Thermostat

Stückzahlen in Klammern nur bei Ausführung mit 2 Ventilen!
Quantity in parenthesis only for type with 2 valves!

Bei Ersatzteilbestellungen unbedingt die Spannung angeben!
It is essential to state the voltage when ordering spare parts !

Construction

The Makrofon consists of a brass casing. The sound is produced by a diaphragm which is chucked into the housing, held by a cover screw and a damping plate.

The signal is released electrically by a magnet valve contained in the Makrofon's operating valve ZVE. A hand pull-rope or a second magnet valve serve as devices for emergency release.

The Makrofon including operating valve ZVE is suitable for pressures between 6 bar and 40 bar.

The Makrofon is adjusted to a duty factor of 15% !

Mounting

The Makrofon signal set must be positioned as high as possible. It is fastened with two screws M 10 which have to be secured well. When laying the compressed air pipe for the ZÖLLNER Makrofon, a compressed air filter must be installed before the Makrofon valve. The filter must be fixed easily accessible in a temperature protected room, making sure that the condensation water cannot freeze up and that the filter can be cleaned at any time. The pipe between filter and Makrofon valve must be made of stainless material, e.g. copper.

It is essential to vent the pipe thoroughly before connection, in order to remove all foreign matter from the feeding main.

Maintenance

In case of sound disturbances, first of all it must be checked out if enough compressed air flows to the Makrofon with the valve opened.

Compressed air filter, operating valve and pipes must be cleaned.

After detaching the cover screw - part 1.40 - the diaphragm can be taken out. When assembling again, it is important first to insert the diaphragm and then the damping plate with its convex side showing to the cover screw. In order to achieve the correct restraint for the diaphragm, the cover screw must be tightened well. Then it is recessed again, checking out at the same time, by operating the magnet valve, at which position the Makrofon sounds loud and pure. After adjustment, the cover screw must be secured so that it cannot be twisted again.

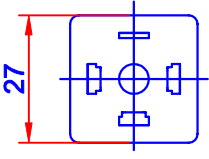
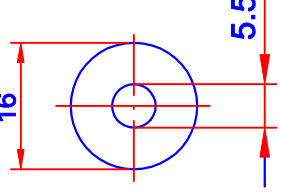
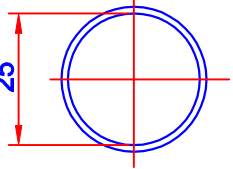
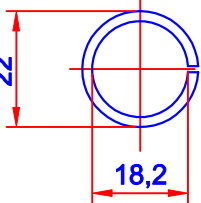
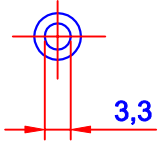
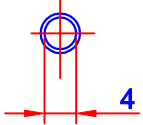
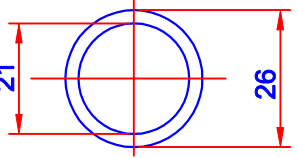
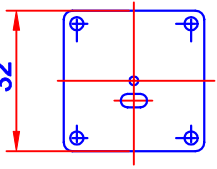
The correct amount of compressed air is adjusted by means of the throttle screw - part 2.340 - depending on the air pressure.

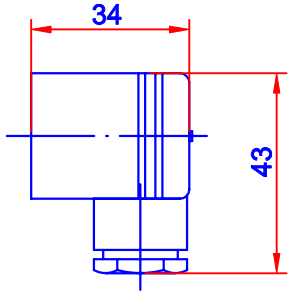
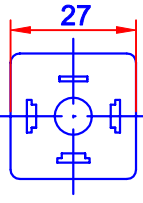
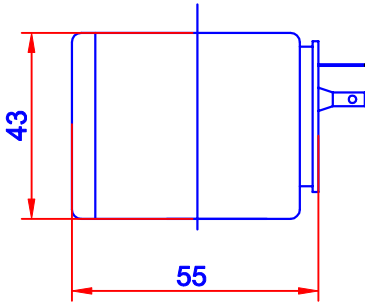
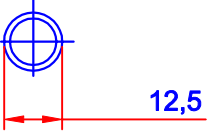
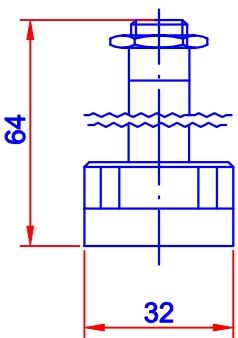
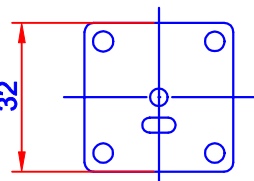
Filter F3

For cleaning the filter F 3, the cover screw - part 3.40 - must be unscrewed. Afterwards the filter insert - part 3.20 - can be extracted with flat pliers. The filter insert is rinsed in petrol and vented with compressed air from within.

Damaged filter inserts must be exchanged.

According to Annex III, paragraph 1(e) the sound pressure level of the vessel's own signal at listening posts shall not exceed 110 dB(A). This means that persons staying at a distance of less than 30 metres away from the Makrofon must wear ear muffs. Before a signal is released it must be assured that no person is right in front of the Makrofon.

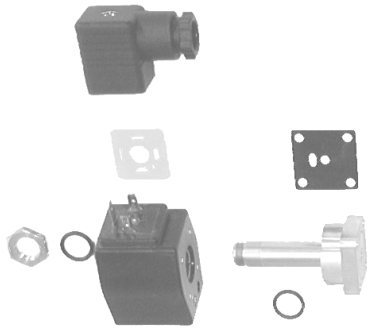
Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Bestell-Nr. Order no.	Gewicht Weight
1		Steckerdichtung gasket for plug 27x27x1,5 Perbunan	620374756	0.002
1		Dichtung gasket 16x5,5x4 Perbunan	01703011	0.002
1		O-Ring o-type ring 25x2,5 NBR	502102525	0.002
1		Kolbenring piston ring 22,1x18,2x2,2	0104488	0.002
1		O-Ring o-type ring 3,3x2,4 NBR	502100324	0.002
1		O-Ring o-type ring 4x1 NBR	50210041	0.002
1		Dichtring gasket A21x26x1,5 CU	50302161	0.002
2		Ventildichtung gasket for valve 32x32x0,5 Perbunan	0104486	0.002

Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Bestell-Nr. Order no.
1		Kabeldose cable box 34x43 , PG 11	620374716
1		Dichtung kabeldose gasket cable box 27x27x1.5 Perbunan	620374756
1		ZVE Spule ZVE coil 43 x 55	520113050 24V DC 520133060 115V AC 520133061 230V AC
2		O-Ring o-type ring 12,5x2,5 NBR	5021012525
1		ZVE Ankergehäuse ZVE armature casing 32x32x64	520012404
1		Ventildichtung gasket for valve 32x32x0,5 Perbunan	0104486

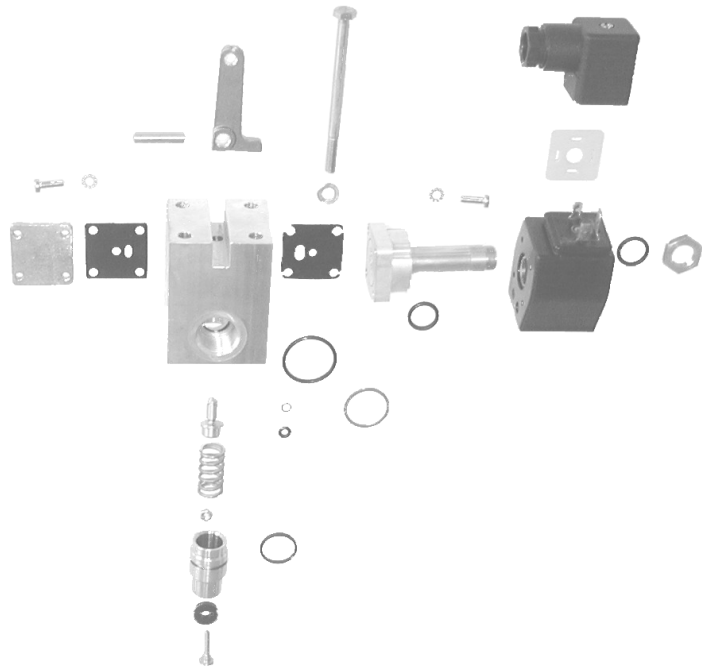
Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Bestell-Nr. Order no.	Gewicht Weight
1		Membrane M 75 F Diaphragm M75 F Ø75 X 0.4	8890077040	0.020 Kg
1		Membrane M 125 b Diaphragm M125 b Ø125 X 1.4	889012141	0.030 Kg
1		Membrane ZM 200 Diaphragm ZM 200 Ø200 X 2.4	889020241	0.630 Kg
1		ZVE Spule ZVE coil 43 x 55	520113050 24V DC 520133060 115V AC 520133061 230V AC	0.300 Kg

Order No. 01042402 Valve unit ZVEE

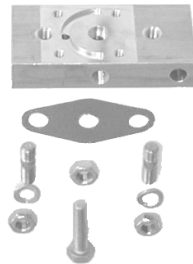
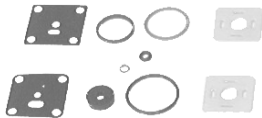
Order No. 017164
Magnet valve



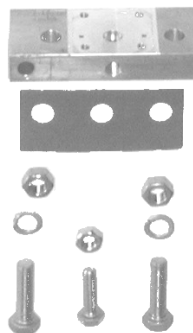
Order No. 01042401
ZVE Valve unit



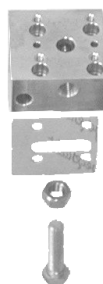
Order No. 017142
Set of gasket



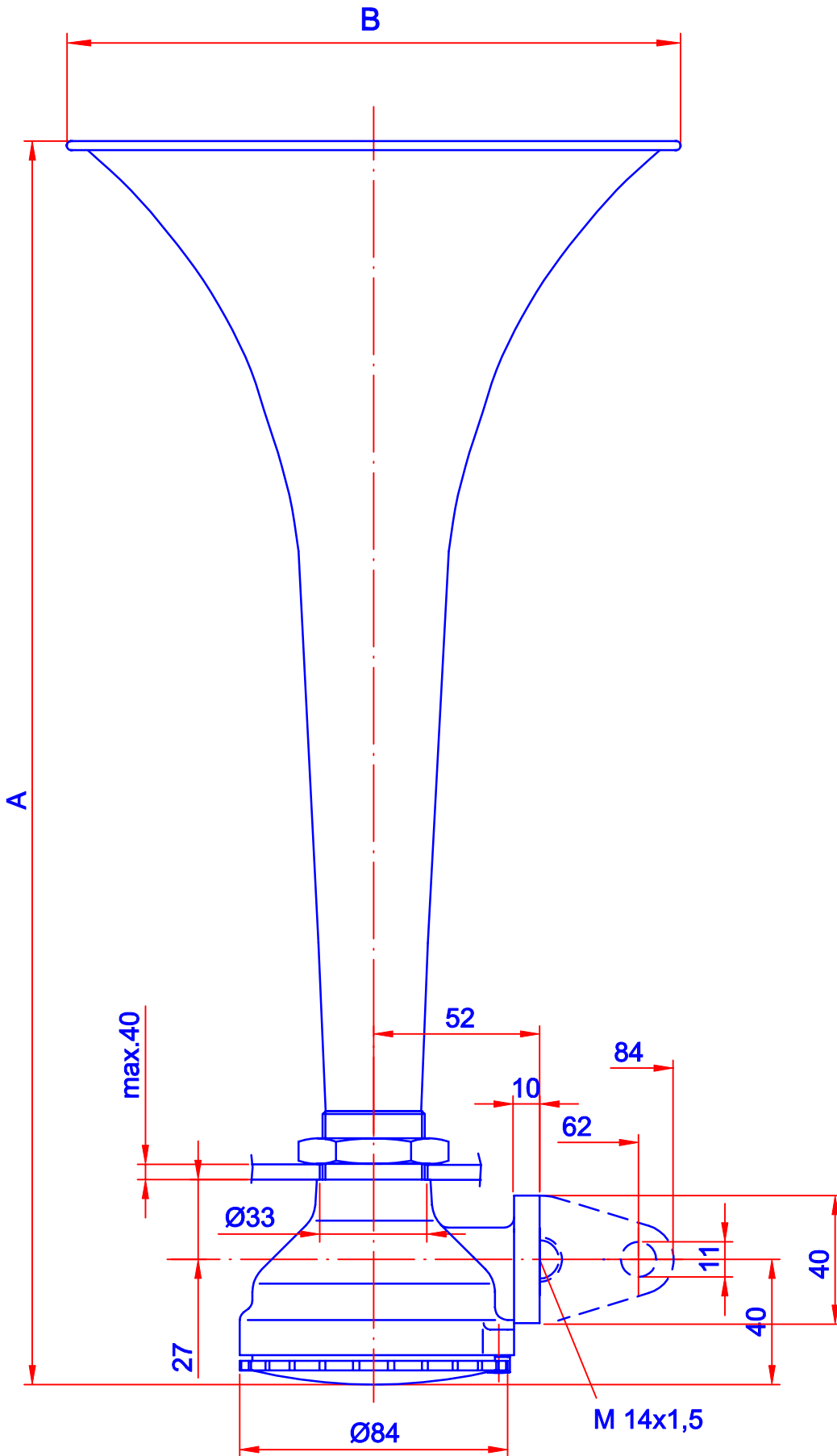
Connecting flange M75F
Order No. 01042920



Connecting flange M125/..b
Order No. 01042280



Connecting flange ZM 200
Order No. 01044360



Typ Type	Frequenz Frequency Hz	Schalldruckpegel Sound level dB/A 1m	Luftverbrauch air consumption l / sec.	Druckluft air pressure bar	Abmessung Dimension		Gewicht Weight kg
					A	B	
M75F/260	260	138-142	8-12	4-10	590	268	2,7
M75F/370	370	134-139	8-12	4-10	425	200	1,85