

ZETFON 300/310 DC

General Features

The ZÖLLNER ZETFON is a robust electrically operated whistle which is equally suitable for all types of inland and maritime navigation. The whistle operates on 24 V DC.

Essentials

- full compliance with the Colregs 1972
- type approved by all wellknown international authorities, certificates by the classification societies on request
- application:
 - vessels of 20 m but less than 75 m in length
 - land alarm, i.e. bunker stations, oil refineries, airports, powerplants, factories
- system voltage: 24V DC
- entirely made of best non-corrosion, seawater-resistant materials (no plastic!)



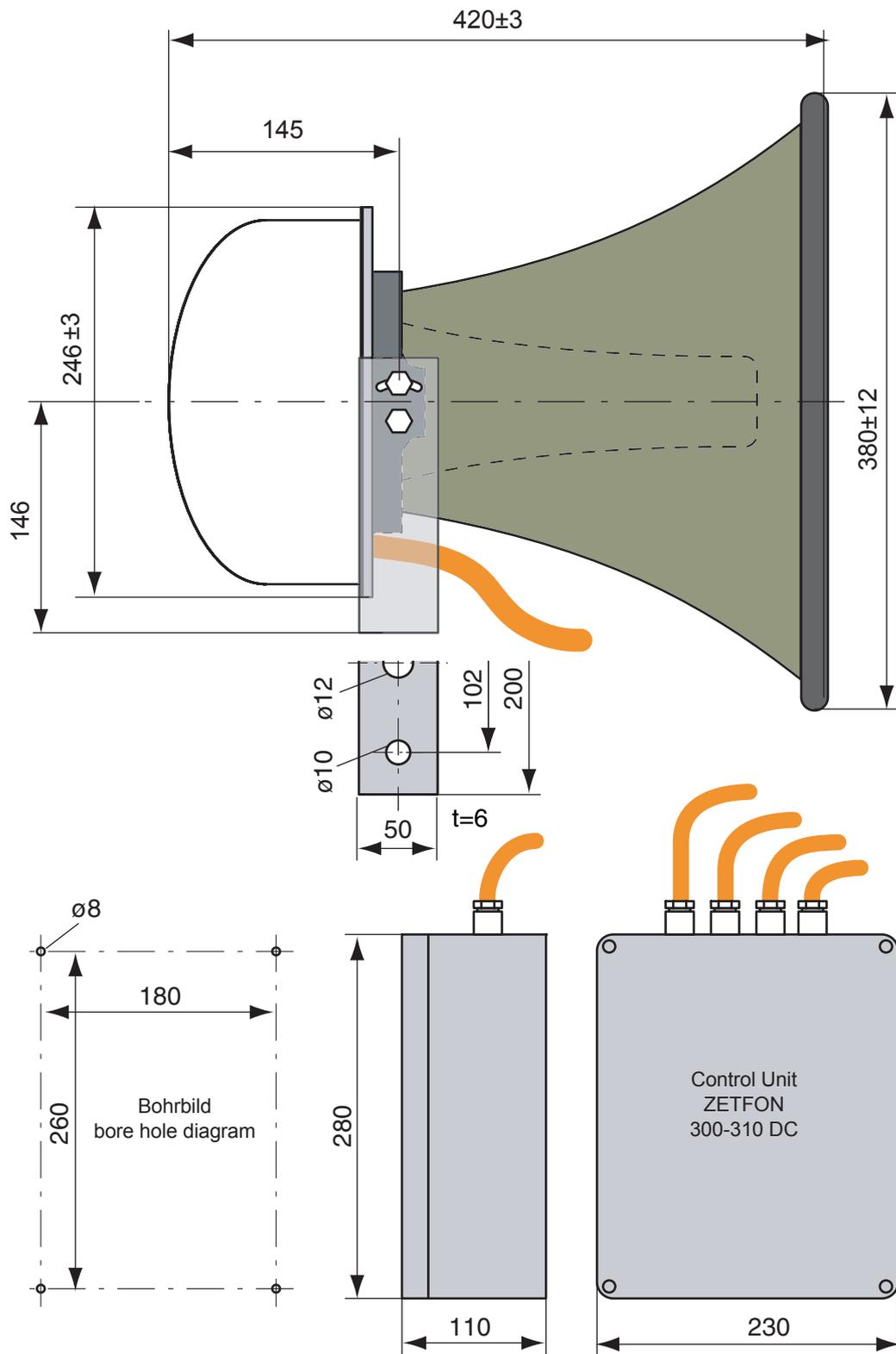
Sound Characteristics

- 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 310 Hz very advantageously ranks in the lower admissible range (250-700 Hz)

Advantages

- decades of experience
- best material and workmanship - made in Germany
- optional address facility (*with microphone attached to foghorn*)
- body heating for cold areas available on request
- control and amplifier unit provided with reverse polarity protection of supply voltage
- low power consumption of 300 W
- easy installation
 - only 4-core cable required for standard design
 - low weight
- easy exchange of all parts with onboard tools



| type | ship length [m] | voltage | cable gland [mm] max. | fundamental frequency [Hz] | sound intensity in 1/3rd-octave band level at 1 m distance | | max input when sounding [W] | body heating [W] | protection type | weight [kg] | type approval BSH(DHI) no. |
|-----------|-----------------|---------|-----------------------|----------------------------|--|---------------------|-----------------------------|------------------|-----------------|-------------|----------------------------|
| | | | | | dB(A) | mind. IMO 1/3rd oct | | | | | |
| 300/310DC | 20-<75 | 24V DC | ø15/ø18,8 | 310 | 131 | 130dB | 300 | 30 | IP 56 | 7+6,5 | 4615/6021225/09 |

General Features

The ZÖLLNER ZETFON is a robust electrically operated whistle which is equally suitable for all types of inland and sea navigation. It is entirely made of best non-corrosion, seawater-resistant materials.

The ZETFON 300/310 has been developed for ships from *20 m to less than 75 m* in length and may be used as a whistle with a fundamental frequency of *310 Hz*. It corresponds to annex III – technical details of sound signal appliances – of the international regulations for preventing collisions at sea (IMO 1972). The device may be used for both sea and inland navigation rules for ships of 20 m or more in length.

The ZETFON is adjusted to 15% continuous duty!

According to *rule 33(a)* of IMO 1972, a vessel of 12 m or more in length shall be equipped with a whistle and a bell. The signal intensity is *130 to 132 dB in 1/3rd-octave band* at 1 m distance from the ZETFON.

This signal unit has an optimum allround characteristic and also an especially wide frequency spectrum so that existing background noise levels can be penetrated.

The electronic signal set consists of:

a) 1 ZETFON 300/310

A robust cast aluminum console with terminal connection and cable glands, cover consisting of plastic material and aluminum horn.

- fundamental frequency: 310 Hz
- intensity in 1/3rd-octave band at 1 m distance: 130 – 132 dB

b) 1 Control and Amplifier Unit 300/310

Electronic sound generator and amplifier with reverse battery protection, installed in a weatherproof, vibration resistant sheet-steel casing with 3 cable glands (4 glands if the optional microphone is included).

- input: 24V DC
- maximum input: 300 Watt

Installation and Connection

1. The horn has to be installed with an inclination angle of 3° directed forward. The sound transmitter shall be positioned as high as possible to insure a good sound projection. At listening posts the sound pressure level should not be higher than 110 dB (A). The console should be designed in a size that enables a safe inspection.
2. The ZETFONS are fastened with 3 well secured stainless screws: 2x M8 and 1x M10
3. The electric connection should be done according to the attached connection diagram. Only flexible cable shall be used.
4. The fuses for the electric supply line leading to the control and amplifier unit must have the designation 16 Ampere feeble current.

Maintenance

The ZETFON operates almost maintenance-free. With decreasing performance the pressure chambers must be checked. The nominal value is *10 Ohm*.

Dismounting

Dismounting and mounting can easily be done with on-board tools. After removal from the mast, dismounting should be continued in the following manner:

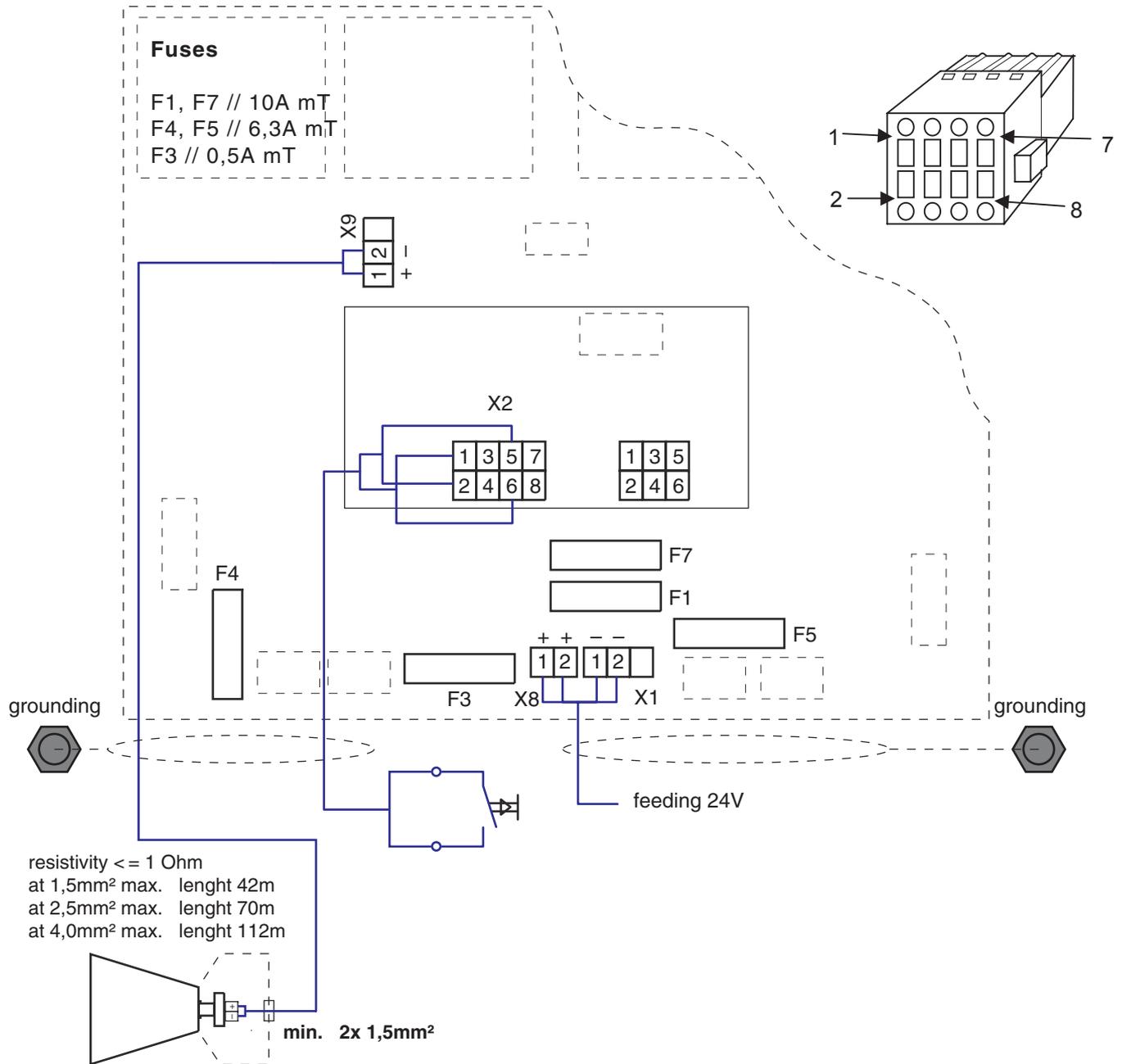
1. Unscrew the 6 fastening screws of the protective cover and remove the cover.
2. Exchange of the pressure chamber:
 - a) loosen the connectors
 - b) loosen the headless screws of the pressure chamber
 - c) unscrew pressure chamber 1 or 2 and replace it

Mounting

The mounting has to be done analogous in reversed order.

Heating

The ZETFON can also be delivered with a thermostat regulated body heating (24V 50 Watt). This is especially suggested in cold areas with temperatures below -20° C. For this heating device an additional 2-core cable is nessecary.



- X8 connection supply +;
terminal screw max. 2,5 mm²
- X8 , 1 supply + 24 V
- X8 , 2 supply + 24 V
- X1 connection supply -;
terminal screw max. 2,5 mm²
- X1, 1 supply GND
- X1, 2 supply GND
- X9 connection driver 1;
terminal screw max. 2,5 mm²;
resistivity ≤ 1 Ohm
- X9 , 1 + driver 1
- X9 , 2 - driver 1

- X2 connection release of signal; socket board
extension spring connection , 0,20 - 1,0 mm²
- X2 , 1 push-button 1 "Signal"
- X2 , 6 push-button 1 "Signal"
- X2 , 2 push-button 2 "Signal"
- X2 , 5 push-button 2 "Signal"
- X2 , 3 do not occupy
- X2 , 4 do not occupy
- X2 , 7 do not occupy
- X2 , 8 do not occupy

ZETFON 400/310 AC

General Features

The ZÖLLNER ZETFON is a robust electrically operated whistle which is equally suitable for all types of merchant vessels as well as luxury yachts. The whistle operates on 230V AC 1phase and 24V DC emergency supply.

Essentials

- full compliance with the Colregs 1972
- type approved by all wellknown international authorities, certificates by the classification societies on request
- application:
 - vessels of 20 m but less than 75 m in length
 - land alarm, i.e. bunker stations, oil refineries, airports, powerplants, factories
- system voltage: 230V AC 1phase plus 24V DC emergency supply
- entirely made of best non-corrosion, seawater-resistant materials (no plastic!)



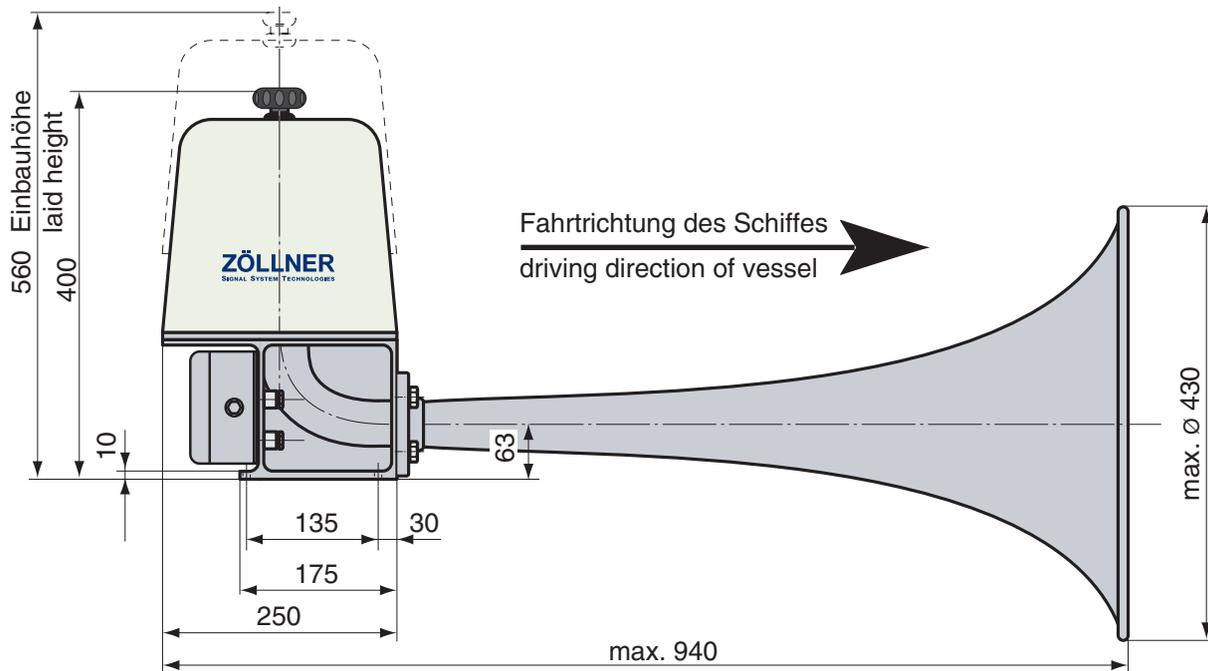
Sound Characteristics

- broad frequency spectrum with many higher harmonics
- signals with strong overtones for best penetration of background noise level

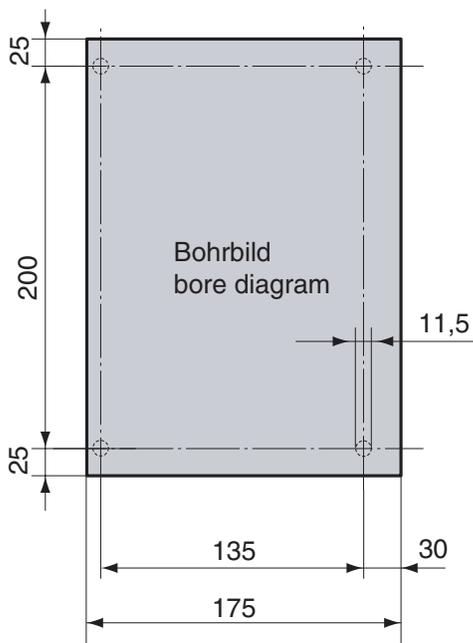
Even when a background noise covers the actual basic frequency the residual tone forms a parent frequency in the human hearing. Two or three harmonics are sufficient for the hearing to perceive the basic frequency.
- sound frequency of 310 Hz very advantageously ranks in the lower admissible range (250-700 Hz)

Advantages

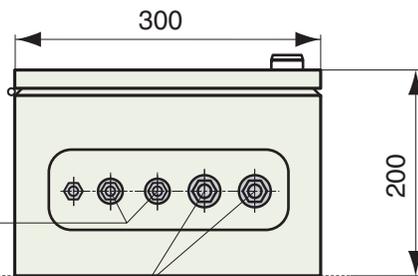
- *decades of experience*
- best material and workmanship - made in Germany
- *90 degrees bent aluminum sound horn allows optimum discharge of spray, flood, condensation water or melted snow*
- *standby heating to avoid condensed water*
 - body heating for cold areas available on request
- *control and amplifier unit provided with protection against cross-connection of terminals*
- *low power consumption of 500 W*
- *easy installation*
 - only one 2-core cable required for standard design
 - relatively low weight
- *simple but matured design*
 - easy exchange of all parts with onboard tools



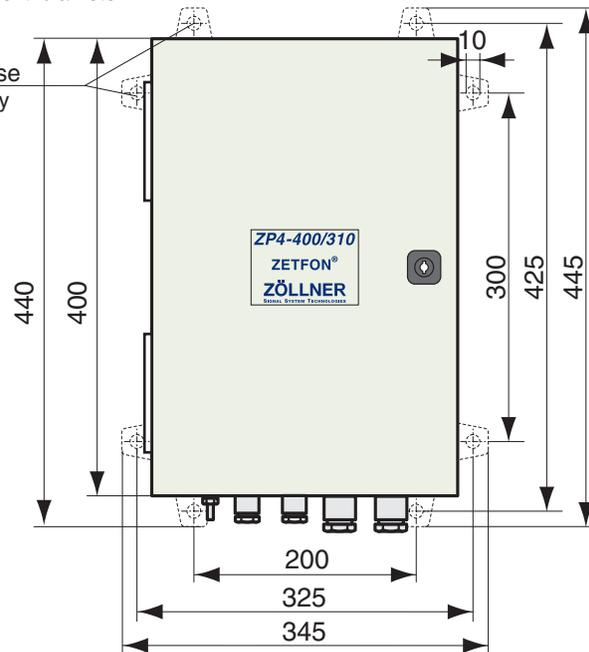
Schalt- und Verstärkereinheit ZP4
control and amplifier unit ZP4



Kabelverschraubung
 cable gland
 DIN 89280
 für $\varnothing 15$ außen
 for $\varnothing 15$ ext. diameter
 für $\varnothing 18,8$ außen
 for $\varnothing 18,8$ ext. diameter



wahlweise
 alternativly



Frequenz/frequency : ~310 Hz
 Schalldruckpegel:
 sound pressure level: 131dB/t 1m
 Gewicht/weight: 18kg

| type | ship length [m] | voltage | fundamental frequency [Hz] | sound intensity in 1/3rd-octave band level at 1 m distance | | max input sounding [W] | standby heating [W] | body heating [W] | type approval BSH (DHI) no. | protection type | weight [kg] |
|-----------|-----------------|-----------------|----------------------------|--|---------------------|------------------------|---------------------|------------------|-----------------------------|-----------------|-------------|
| | | | | dB(A) | mind. IMO 1/3rd oct | | | | | | |
| 400/310DC | 20-75 | 230V AC +24V DC | 310 | 131 | 130 | 500 | 20 | 100 | 49/26P/83 | IP 56 | 19,7+6,4 |

Subject to alteration!

The ZETFON 400/310 has been developed for ships of 20 m but less than 75 m in length and may be used as a whistle with a fundamental frequency of 310 Hz. It corresponds to Annex III – Technical Details of Sound Signal Appliances – of the International Regulations for Preventing Collisions at Sea (IMO 1972) and it applies to both ocean and inland navigation rules. According to these regulations the unit may be used on all vessels of 12 m or more in length.

The ZETFON is adjusted to a duty factor of 15%

According to Rule 33(a) of IMO 1972, a vessel of 12 m or more in length shall be equipped with a whistle and a bell. The signal intensity is 130 to 132 dB in 1/3rd-octave band at 1 metre in front of the ZETFON. This signal unit has an optimum allround characteristic and also an especially wide frequency spectrum so that existing background noise levels can be penetrated.

The electronic signal set comprises:

- a.) 1 ZETFON 400/310
aluminium diaphragm casing with electro-mechanic moving system and stainless steel diaphragm Ø 200, robust cast aluminium console with terminal box and cable glands, cover and aluminium horn
fundamental frequency: 305 Hz
intensity in 1/3rd octave band at 1 metre: 130-132 dB

- b.) 1 Control and Amplifier Unit ZP 4-400/310
electronic sound generator and amplifier with protection against cross-connection of terminals and special transformer, installed in a weather-proof, vibration-resistant sheet-steel casing, with 4 cable glands
input: 220/380/440 V 50/60 Hz (main supply)
24 V DC (emergency supply)
maximum input: 420 Watt (AC)
360 Watt (DC)

Installation and Connection

- 1.) The sound transmitter shall be positioned as high as practicable to insure a good sound projection. At listening posts the sound pressure level shall not exceeded 110 dB (A). The console should thus be designed in a size that a safe inspection is possible.
- 2.) The ZETFONS are fastened with 4 well secured stainless screws M10.
- 3.) The electric connection shall be carried out according to enclosed diagram. Only flexible cable shall be used.
- 4.) The fuses for the electric supply line leading to the control and amplifier unit must have the designation 6.3 Ampere (AC) and 16 Ampere (DC).

Maintenance

The ZETFON operates almost maintenance-free. Only during periods of shipyard refit, but every 24 months at the latest, the diaphragm and pressure springs should be controlled and exchanged, if necessary. A new diaphragm should be adjusted in a way that a pure, full sound is released.

Dismounting

Dismounting and mounting can be carried out with on-board tools without difficulty. After removal from the mast, dismounting shall be made in the following succession:

1. Unscrew fastening screws of protective cover and remove cover
2. Exchange of diaphragm
 - 2.1 Free the 8 nuts M8 for fastening the magnetic head to the arched piece of horn and disconnect the supply cables from the terminal strip. Then take off magnetic head from arched piece of horn.
 - 2.2 Free nut M8 from pestle (diaphragm centre), remove safety disk and diaphragm \varnothing 200.
 - 2.3 Make sure that the fitting disks required for correct adjustment of the diaphragm do not get lost.
3. Replacement of upper spring
 - 3.1 Proceed as described under 2.1
 - 3.2 Free the 4 hexagon nuts M12 for fastening the upper half of the magnetic head and remove upper half of magnetic head.
 - 3.3 Make sure that the fitting disks for adjusting the correct distance between swinging lever and magnetic core do not get lost.
 - 3.4 Replace springs.
4. Replacement of lower springs
 - 4.1 Proceed as described under 2. and 3.
 - 4.2 Free hexagon nut from pestle and extract swinging lever out of the lower half of magnetic head.
 - 4.3 Replace springs.
5. Replacement of tie rod of the swinging lever
- as described above -

Mounting

Naturally, mounting should be carried out in reverse succession. The distance between magnetic cores and swinging lever shall be approx. 0,8 mm. This distance is obtained by placing fitting disks on the stay bolts. When inserting the diaphragm make sure that the diaphragm is slightly bend inside (approx. 0,8 mm).

Heating

In order to guarantee perfect function at low temperatures and to prevent condensation of water it is possible to provide the ZETFON AC with an electric coil of heating. It is switched on and off by a contactor which is installed together with the required heating relay in the control and amplifier unit. No additional cable is needed for this heating.

The ZETFON can also be supplied with a thermostatic regulated body heating 220 V 100 Watt. This is especially advisable for use in areas with temperatures below 0°C. For this heating device an additional 2-core cable is necessary.

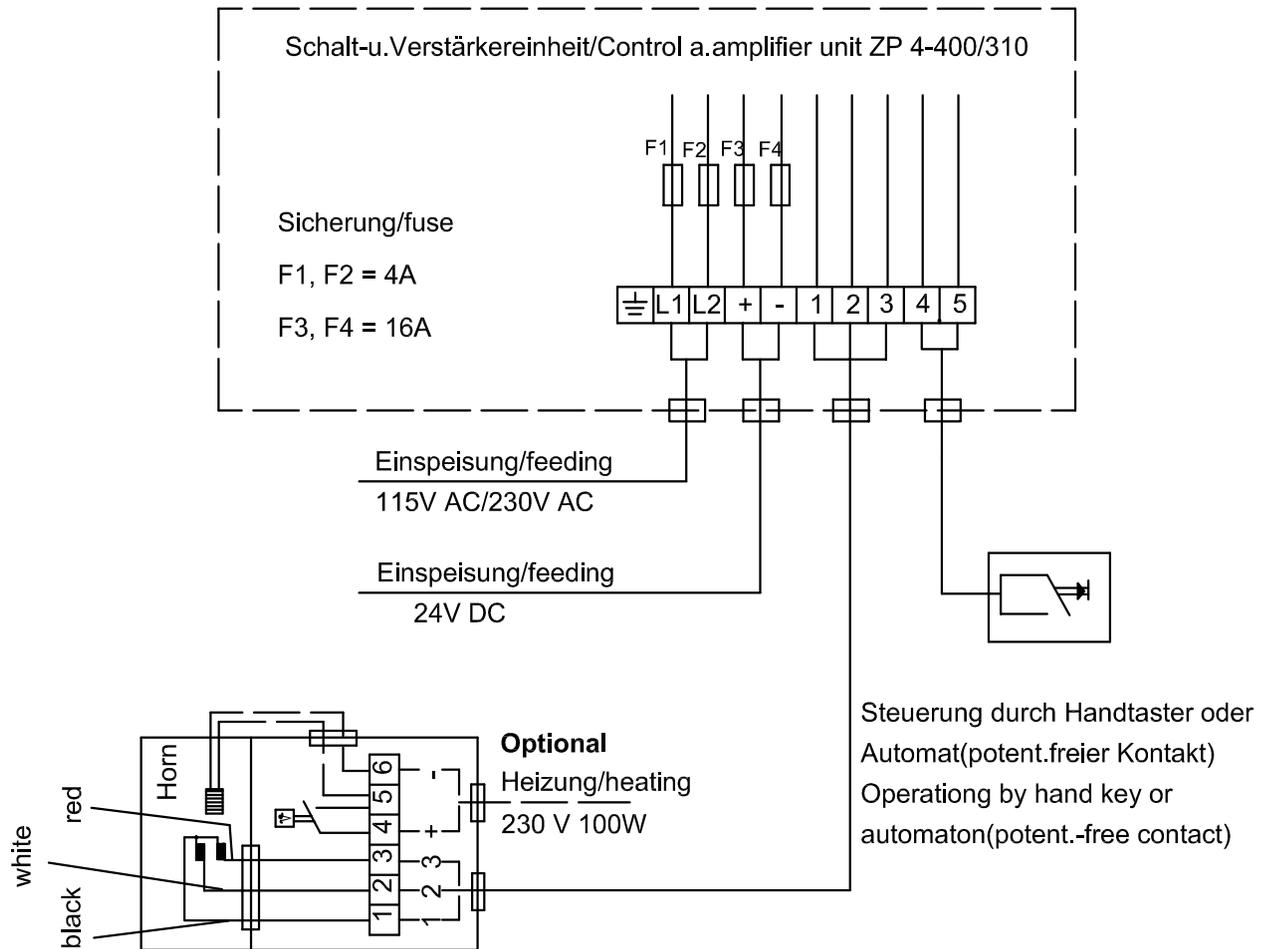
Adjustment of Frequency

The ZETFON operates with a fundamental frequency of 305 Hz +/- 3%. To adjust the electronics a digital frequency meter is connected to the test point P1 and test point P2. By turning the potentiometer R12 a frequency of 4880 Hz +/- 1% has to be adjusted.

At temperatures below 0°C a ZETFON 400/310 without heating may produce rattling noises. By regulating the frequency below 4880 Hz the sound can be adjusted. A heating has to be installed additionally.

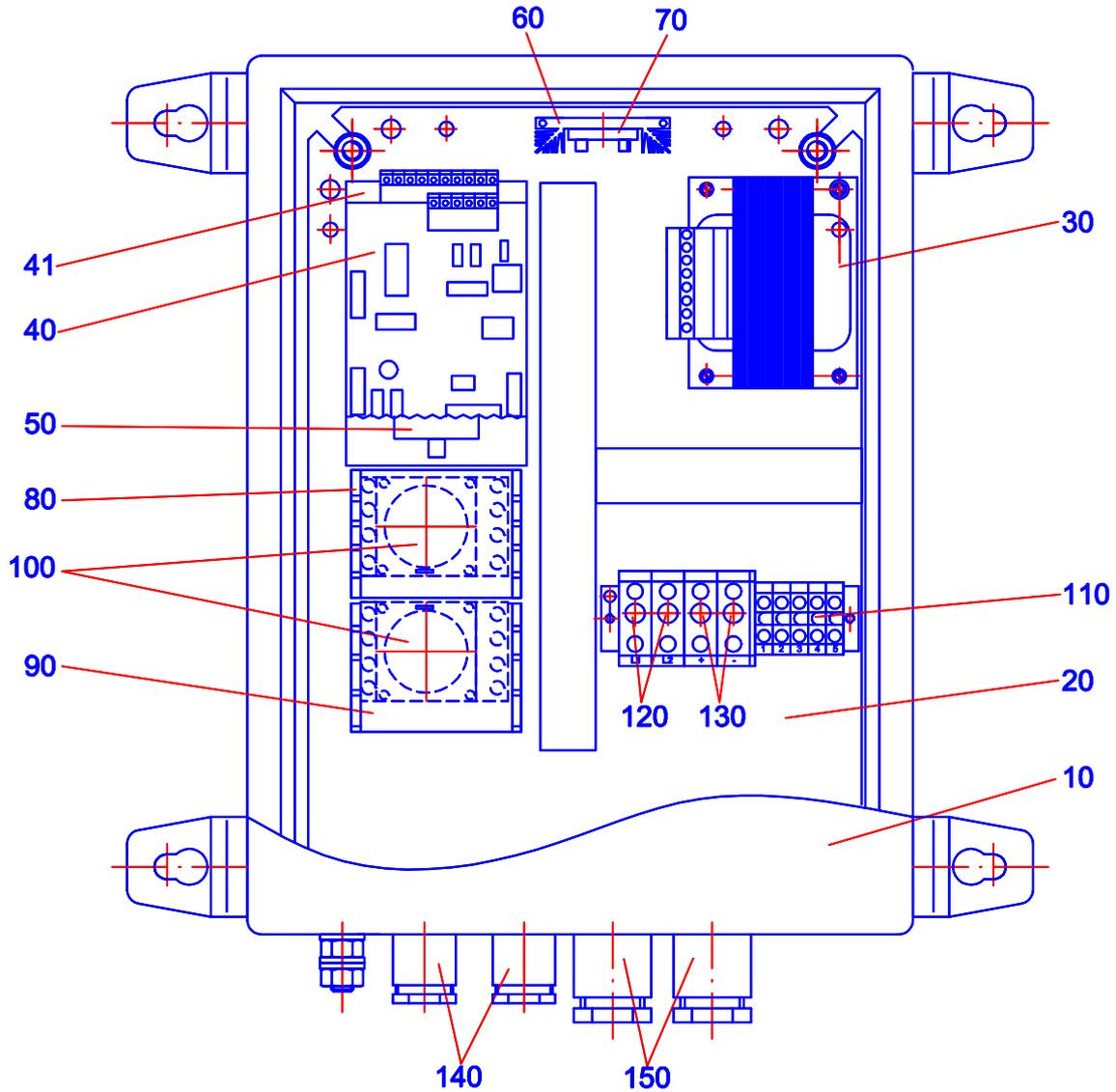
Trouble-Shooting

| | Failure | Checking | Proceeding |
|-----|-----------------------------------|---|--|
| 1.1 | no pure sound (rattling sound) | no mechanical faults can be found | regulate potentiometer R12 on the upper half of electric PC-board of control and amplifier unit by turning it with a screw driver to a pure sound at maximum sound level; then examine sound pressure level with an approved measuring unit, minimum 130 dB in 1/3 rd octave band at 1m |
| 1.2 | no pure sound (rattling sound) | check fit of diaphragm, diaphragm is broken | tighten diaphragm, exchange diaphragm |
| 1.3 | no pure sound | sound horn damaged or loose | new sound horn or fasten horn |
| 2.1 | sound too low | check springs in magnet head, springs are broken | exchange springs |
| 3.1 | no sound | take measurement if voltage at terminals R+Mp in control and amplifier unit is the same as stated on name plate and connecting diagram | eliminate fault in power supply |
| 3.2 | no sound | take measurement if there is voltage behind securing terminals R+Mp | use new fuses |
| 3.3 | no sound | check if relay contacts close when signal is released (by automaton or key) | check supply lines of keys |
| 3.4 | no sound or short circuit | check connecting cable from control and amplifier unit to horn; disconnect cable in control and amplifier unit (terminal 1,2 + 3); take measurement of core of terminal 1 with an ohmmeter against core 2 and 3; resistance must be < 10 Ω. | check cable connections on the ZETFON |



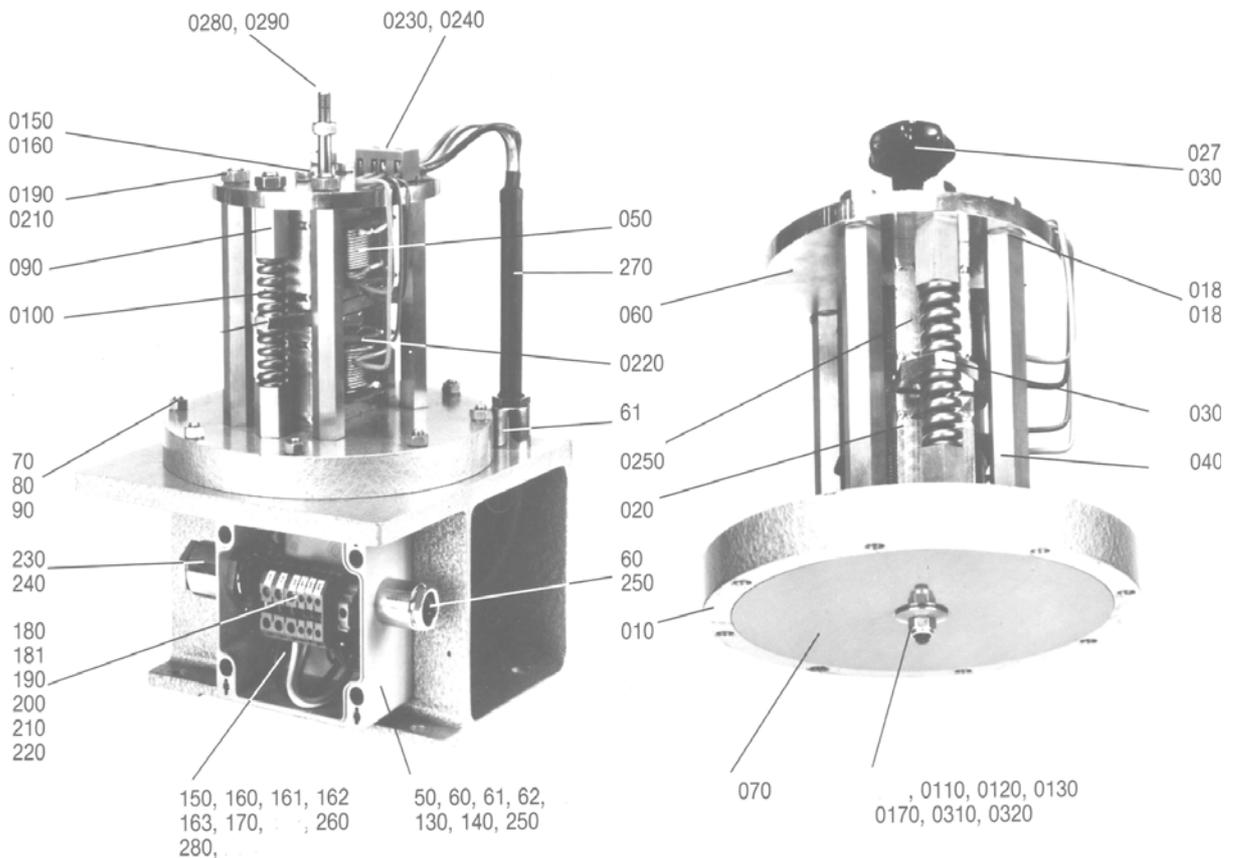
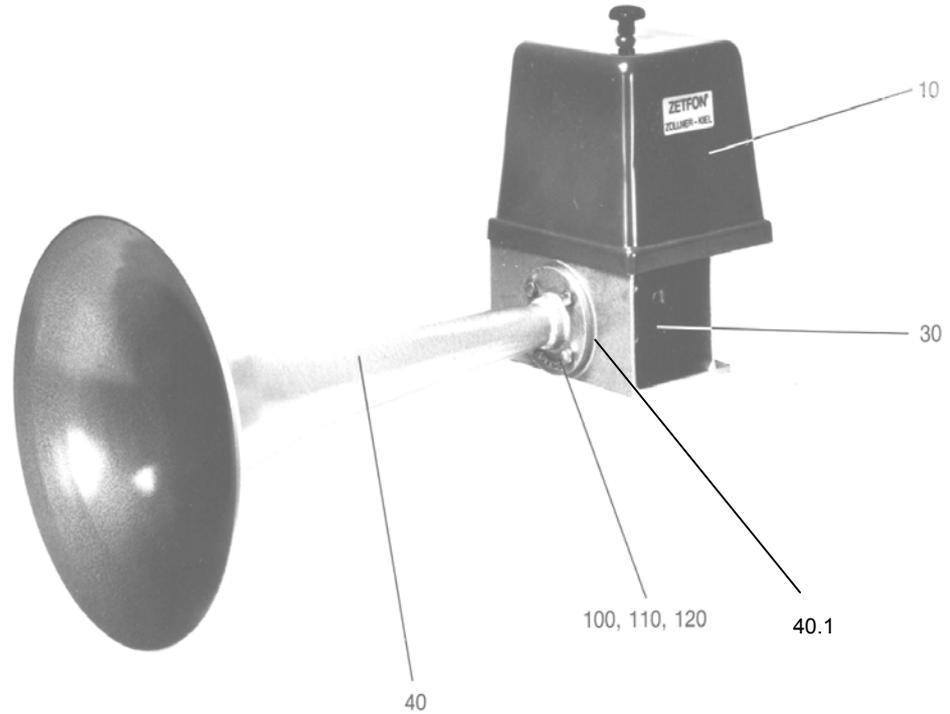
Das Kabel zwischen Steuerkasten und Horn sollte bei Längen bis 10m einen Querschnitt von 4mm², über 10 m einen Querschnitt von 6mm² haben.

Cables according to the rules of the corresponding classification societies. Up to a length of 10 m the cable between control box and horn should have a diameter of 4mm², longer than 10m the diameter should be 6mm².



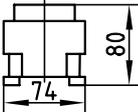
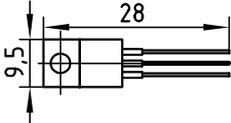
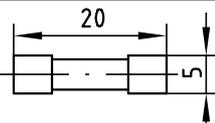
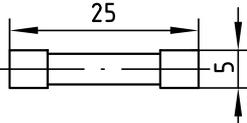
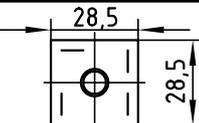
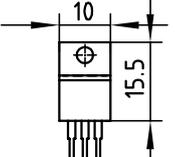
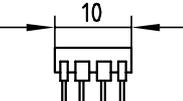
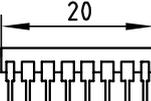
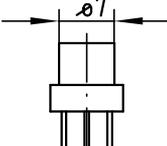
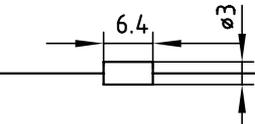
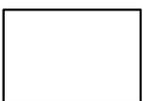
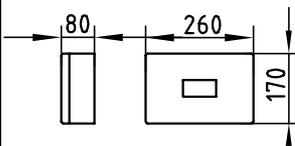
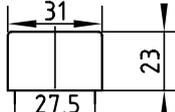
| Teil Item | Stck. Qty. | Bestell-Nr. Order No. | Techn. Daten Techn. Data | Bezeichnung | Designation |
|-----------|------------|-----------------------|--------------------------|----------------------|-----------------------|
| 10 | 1 | 8870029991 | 400x300x200 | Gehäuse | casing |
| 20 | 1 | 1906147 | 365x250x1,5 | Montageplatte | mounting plate |
| 30 | 1 | 680028343 | 290VA | Transformator | transformer |
| 40 | 1 | 0106830 | 150x85x2 | Steuerplatine | control pc-board |
| 41 | 1 | 0106831 | 160x85x2 | Kondensatorplatine | condenser-pc.b |
| 50 | 1 | 660320011 | Ø50x100 | Elko | elco |
| 60 | 1 | 29024750 | 75x65x20 | Kühlkörper | cooling body |
| 70 | 1 | 640005025 | 80V/25A | Brückengleichrichter | rectifier bridge |
| 80 | 1 | 630672250 | 24V/DC | Schütz | contactor |
| 90 | 1 | 630675250 | 230V/AC | Schütz | contactor |
| 100 | 2⊗ | 631172290 | | Zeitblock | time relay |
| 110 | 1 | 01707501-110 | | Klemmleiste kompl. | terminal clamb compl. |
| 120 | 2 | 683708904 | 4A | Sicherung | fuse |
| 130 | 2 | 683318016 | 16A | Sicherung | fuse |
| 140 | 2 | 677072415 | M24x1,5 | Kabelverschraubung | cable gland |
| 150 | 2 | 677072415 | M30x2 | Kabelverschraubung | cable gland |

⊗ Nur bei Ausführung mit Stillstandsheizung!
Only for execution with heating!



| Teil Part | Stück qty. | Abmessung dimensions | Ident-Nr. | Bennennung | designation |
|--------------|---------------|-------------------------|------------|----------------------|-----------------------|
| 10 | 1 | 250 x 250 x 230 | 0104842 | Haube | cover |
| 30 | 1 | 250 x 250 x 155 | 0104815 | Trichterbogen | arched piece of horn |
| 40 | 1 | ∅ 430 x 670 | 01040884 | Trichter | sound horn |
| 40.1 | 1 | ∅ 117/45x1,5 | 0104934 | Dichtung | gasket |
| 50* | 1 | 122 x 122 x 80 | 0104856 | Gehäuse | casing |
| 60* | 1 | M 24 x 1,5 | 677072417 | Kabelverschraubung | cable gland |
| 61* | 2 | Pg 13,5 | 6770601311 | Kabelverschraubung | cable gland |
| 70 | 8 | M 8 x 35 | 2046080351 | Stiftschraube | stud bolt |
| 80 | 8 | M 8 | 21034081 | Sechskantmutter | hexagon nut |
| 90 | 8 | 8x14,8x2 | 211300081 | Sicherungsscheibe | washer |
| 100 | 4 | M 10 x 35 | 2044100351 | Sechskantschraube | hexagon screw |
| 110 | 4 | M 10 | 21034101 | Sechskantmutter | hexagon nut |
| 120 | 4 | 10x18x2,2 | 211300101 | Sicherungsscheibe | washer |
| 130* | 4 | M 6 x 16 | 2002060161 | Zylinderkopfschraube | cylinder head screw |
| 140* | 4 | 6x11,8x1,6 | 211300061 | Sicherungsscheibe | washer |
| 160* | 1 | 24 V 30 W | 884410401 | Heizpatrone | heating element |
| 161* | 1 | 230 V 100 W | 884410400 | Heizpatrone | heating element |
| 163* | 1 | Pg 9 | 6770600901 | Kabelverschraubung | cable gland |
| 170* | 1 | 35/10° | 884602708 | Thermostat | thermostat |
| 180* | 3 | SAK 10 KrG | 621111002 | Anreih-Klemme | terminal |
| 181* | 3 | SAK 4 KrG | 621112832 | Anreih-Klemme | terminal |
| 190* | 2 | EWK1 | 621920616 | Endwinkel | limiting angle |
| 200* | 1 | AP 4 KrG | 621911792 | Abschlußplatte | stop plate |
| 210* | 1 | TS 32 | 677503212 | Tragschiene | bearing rail |
| 220* | 6 | | 677852266 | Bezeichnungsschild | name plate |
| 230* | 1 | M 30 x 2 | 677073027 | Kabelverschraubung | cable gland |
| 240* | 1 | M 30 x 2 | 677023027 | Gegenmutter | counter nut |
| 250* | 1 | M 24 x 1,5 | 677022417 | Gegenmutter | counter nut |
| 270* | 1 | | 670380302 | Kabel | cabel |
| 280* | 1 | ∅ 8x1 | 27030081 | PVC-Schlauch | PVC-hose |
| 010 | 1 | ∅ 230 x 25 | 0104837 | Grundplatte | base plate |
| 020 | 1 | E96 x 40 | 0104851 | Kernblechpaket | lamella pile |
| 030 | 1 | 160 Lg | 01049113 | Schwinganker kompl. | moving coil compl. |
| 040 | 4 | SW19 x 176 | 0104840 | Bolzen | bolt |
| 050 | 2 | EI96x40 | 0104845 | Spule | coil |
| 060 | 1 | ∅ 160 x 10 | 0104838 | Befestigungsplatte | fastening plate |
| 070 | 1 | ∅ 200 x 0,8 | 0104843 | Membrane | diaphragm |
| 090 | 4 | Skt 22x58 | 0104848 | Federbolzen | spring bolt |
| 0100 | 4 | ∅ 16/5 x 38 | 0104988 | Druckfeder | pressure spring |
| 0110 | 1 | ∅ 36/8,4x3 | 0104846 | Scheibe | washer |
| 0120 | 1 | ∅ 28/8,4x3,7 | 0104867 | Scheibe | washer |
| 0130 | 1 | VM 8 | 21037081 | Sicherungsmutter | safety nut |
| 0140 | 2 | M 8 x 25 | 2035080251 | Zylinderkopfschraube | cylinder head screw |
| 0150 | 2 | M 8 x 25 | 2044080251 | Sechskantschraube | hexagon screw |
| 0160 | 4 | 8x14,8x2 | 211300081 | Sicherungsscheibe | washer |
| 0170 | 1 | 8 x 14 x 0,25 | 2112808025 | Paßscheibe | washer |
| 0180 | 4 | 12 x 24 x 0,25 | 211281302 | Paßscheibe | washer |
| 0181 | 4 | 12 x 24 x 0,5 | 211281305 | Paßscheibe | washer |
| 0190 | 6 | M 12 | 21036121 | Sechskantmutter | hexagon nut |
| 0210 | 6 | 12x21x2,5 | 211300121 | Sicherungsscheibe | washer |
| 0220 | 2 | ∅ 4 x 71 | 214040712 | Splint | splint pin |
| 0230 | 1 | | 7342-0230 | Klemmleiste kompl. | terminal strip compl. |
| 0240 | 2 | M 5 x 6 | 2002050061 | Zylinderschraube | cylinder screw |
| 0250 | 1 | E96 x 40 | 0104853 | Kernblechpaket | lamella pile |
| 0270 | 1 | Y50/M10 | 57011050 | Sterngriff | star knob |
| 0280 | | M 10 x 50 | 2045100501 | Stiftschraube | stud bolt |
| 0290 | 1 | M 10 | 21034101 | Sechskantmutter | hexagon nut |
| 0300 | 1 | R 10 - 2,5 | 502101025 | O-Ring | O-ring |
| 0310 | 1 | 8 x 14 x 0,5 | 211280805 | Paßscheibe | washer |
| 0320 | 1 | 8 x 14 x 1 | 211280810 | Paßscheibe | washer |

* Nur bei Ausführung mit Heizung /only when provided with heating

| Stck. Qty. | Zeichnung Drawing | Benennung/techn.Daten Designation/techn.Data | Bestell-Nr. Order no. | Gewicht Weight |
|---------------|---|--|--------------------------|-------------------|
| 1 |  | Schütz contactor LC1D25BD 24VDC | 630672250 | |
| 1 |  | Thyristor thyristor 600V/25A T0-220 | 644925400 | |
| 2 |  | Sicherung fuse 16Amt ϕ 5x20 ohne Km | 68318016 | 0.001 |
| 2 |  | Schmelzeinsatz, mit Km fuse link 4A/450V AC ϕ 5x25 | 683708904 | |
| 1 |  | Brückengleichrichter bridge rectifier 80V/25A GI-Spez4Pins | 640005025 | |
| 1 |  | Spannungsregler voltage control LM340T-15x7815 T0-220 | 643010341 | 0.006 |
| 1 |  | Timer IC timer IC NE 555 DIL8 TTL-kompatibel | 641110555 | 0.005 |
| 1 |  | Digital-Baustein digital-component 4040 C-MOS DIL16 | 645524040 | 0.007 |
| 1 |  | Transistor transistor 2N1711 äquivalent 2N3019 T0-39 | 640521711 | 0.005 |
| 1 |  | Diode diode 1N4004 D015 | 640414004 | 0.001 |
| 1 |  | Klebeschild für Ersatzteile label for spare parts -4 52x74 PVC | 249104185 | |
| 1 |  | Ersatzteilkasten box for spare parts 170x260x80 ABS, grau | 887002000 | 0.300 |
| 1 |  | Folienkondensator foil capacitor 10 μ F \pm 10%/100V RM27,5 DIN44122 | 661410001 | |

ZETFON 400/310 DC

General Features

The ZÖLLNER ZETFON is a robust electrically operated whistle which is equally suitable for all types of merchant vessels as well as luxury yachts. The whistle operates on 24 V DC.

Essentials

- full compliance with the Colregs 1972
- type approved by all wellknown international authorities, certificates by the classification societies on request
- application:
 - vessels of 20 m but less than 75 m in length
 - land alarm, i.e. bunker stations, oil refineries, airports, powerplants, factories
- system voltage: 24V DC
- entirely made of best non-corrosion, seawater-resistant materials (no plastic!)

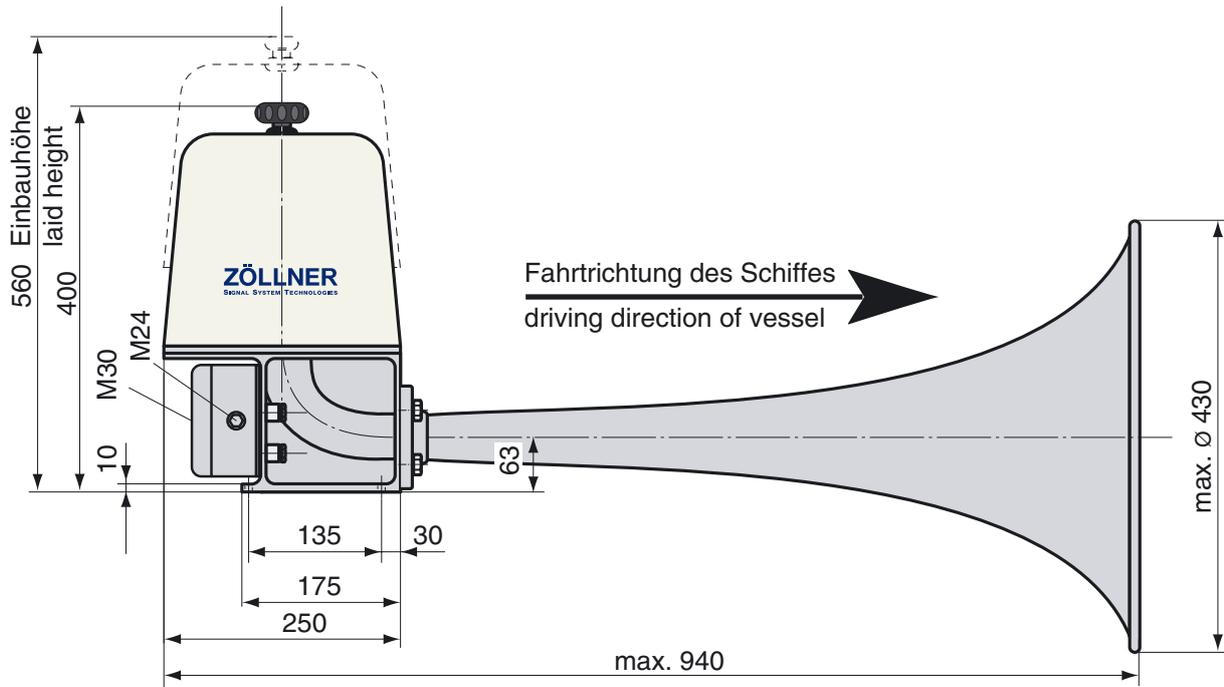


Sound Characteristics

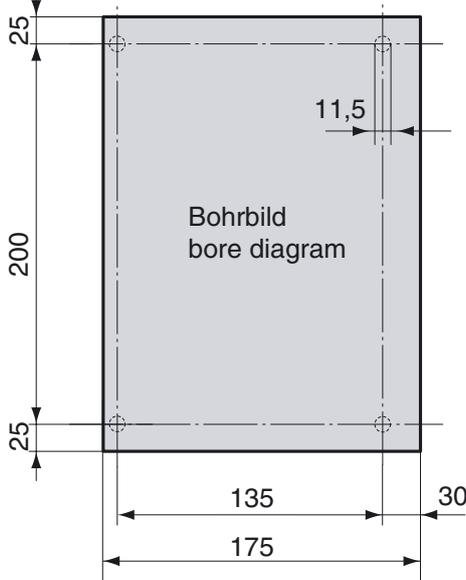
- broad frequency spectrum with many higher harmonics
- signals with strong overtones for best penetration of background noise level
Even when a background noise covers the actual basic frequency the residual tone forms a parent frequency in the human hearing. Two or three harmonics are sufficient for the hearing to perceive the basic frequency.
- sound frequency of 310 Hz very advantageously ranks in the lower admissible range (250-700 Hz)

Advantages

- *decades of experience*
- best material and workmanship - made in Germany
- *90 degrees bent aluminum sound horn allows optimum discharge of spray, flood, condensation water or melted snow*
- *body heating for cold areas available on request*
- *control and amplifier unit provided with protection against cross-connection of terminals*
- *low power consumption of 500 W*
- *easy installation*
 - *only one 2-core cable required for standard design*
 - *relatively low weight*
- *simple but matured design*
 - *easy exchange of all parts with onboard tools*

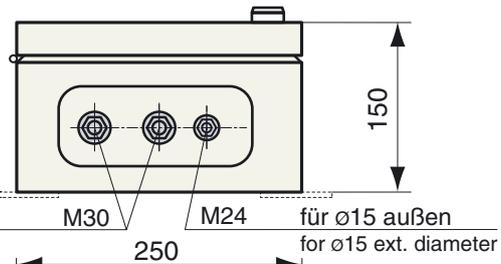


Schalt- und Verstärkereinheit ZP5
control and amplifier unit ZP5



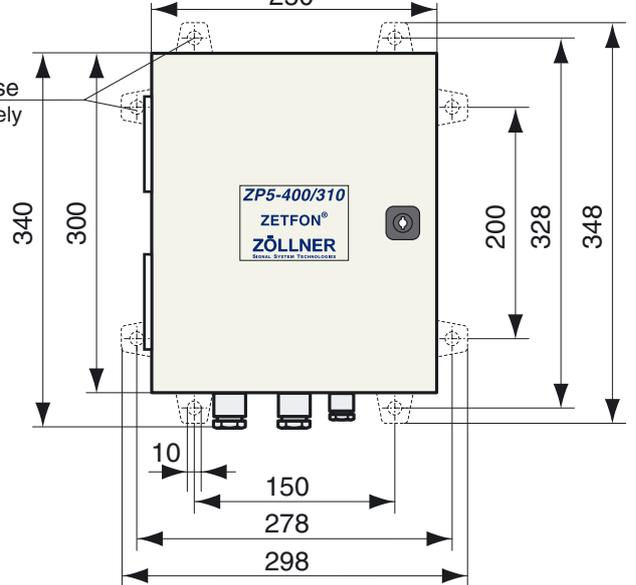
Kabelverschraubung
cable gland
DIN 89280

für $\varnothing 18,8$ außen
for $\varnothing 18,8$ ext. diameter



für $\varnothing 15$ außen
for $\varnothing 15$ ext. diameter

wahlweise
alternatively



Frequenz/frequency : ~310 Hz
Schalldruckpegel:
sound pressure level: 131dB/t 1m
Gewicht/weight: 18kg

| type | ship length [m] | voltage | fundamental frequency [Hz] | sound intensity in 1/3rd-octave band level at 1 m distance | | max input sounding [W] | body heating [W] | type approval BSH (DHI) no. | protection type | weight [kg] |
|---------------|--------------------|---------|----------------------------------|--|------------------------|------------------------------|------------------------|--------------------------------------|--------------------|----------------|
| | | | | dB(A) | mind. IMO 1/3rd oct | | | | | |
| 400/ 310DC | 20-75 | 24V DC | 310 | 131 | 130 | 500 | 30 | 49/26P/83 | IP 56 | 19,7+6,4 |

The ZETFON 400/310 has been developed for ships of 20 m but less than 75 m in length and may be used as a whistle with a fundamental frequency of 310 Hz. It corresponds to Annex III – Technical Details of Sound Signal Appliances – of the International Regulations for Preventing Collisions at Sea (IMO 1972) and it applies to both ocean and inland navigation rules. According to these regulations the unit may be used on all vessels of 12 m or more in length.

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

According to Rule 33(a) of IMO 1972, a vessel of 12 m or more in length shall be equipped with a whistle and a bell. The signal intensity is 130 to 132 dB in 1/3rd-octave band at 1 metre in front of the ZETFON. This signal unit has an optimum allround characteristic and also an especially wide frequency spectrum so that existing background noise levels can be penetrated.

The electronic signal set comprises:

- a.) 1 ZETFON 400/310
aluminium diaphragm casing with electro-mechanic moving system and stainless steel diaphragm Ø 200, robust cast aluminium console with terminal box and cable glands, cover and aluminium horn
fundamental frequency: 305 Hz
intensity in 1/3rd octave band at 1 metre: 130-132 dB
- b.) 1 Control and Amplifier Unit ZP 5-400/310
electronic sound generator and amplifier with protection against cross-connection of terminals and special transformer, installed in a weather-proof, vibration-resistant sheet-steel casing, with 3 cable glands
input: 24 V DC
maximum input:: 60 Watt

Installation and Connection

- 1.) The sound transmitter shall be positioned as high as practicable to insure a good sound projection. At listening posts the sound pressure level shall not exceeded 110 dB (A). The console should thus be designed in a size that a safe inspection is possible.
- 2.) The ZETFONS are fastened with 4 well secured stainless screws M10.
- 3.) The electric connection shall be carried out according to enclosed diagram. Only flexible cable shall be used.
- 4.) The fuses for the electric supply line leading to the control and amplifier unit must have the designation 16 Ampere feeble current.

Subject to alteration!

Maintenance

The ZETFON operates almost maintenance-free. Only during periods of shipyard refit, but every 24 months at the latest, the diaphragm and pressure springs should be controlled and exchanged, if necessary. A new diaphragm should be adjusted in a way that a pure, full sound is released.

Dismounting

Dismounting and mounting can be carried out with on-board tools without difficulty. After removal from the mast, dismounting shall be made in the following succession:

1. Unscrew fastening screws of protective cover and remove cover
2. Exchange of diaphragm
 - 2.1 Free the 8 nuts M8 for fastening the magnetic head to the arched piece of horn and disconnect the supply cables from the terminal strip. Then take off magnetic head from arched piece of horn.
 - 2.2 Free nut M8 from pestle (diaphragm centre), remove safety disk and diaphragm \varnothing 200.
 - 2.3 Make sure that the fitting disks required for correct adjustment of the diaphragm do not get lost.
3. Replacement of upper spring
 - 3.1 Proceed as described under 2.1
 - 3.2 Free the 4 hexagon nuts M12 for fastening the upper half of the magnetic head and remove upper half of magnetic head.
 - 3.3 Make sure that the fitting disks for adjusting the correct distance between swinging lever and magnetic core do not get lost.
 - 3.4 Replace springs.
4. Replacement of lower springs
 - 4.1 Proceed as described under 2. and 3.
 - 4.2 Free hexagon nut from pestle and extract swinging lever out of the lower half of magnetic head.
 - 4.3 Replace springs.
5. Replacement of tie rod of the swinging lever
- as described above -

Subject to alteration!

Mounting

Naturally, mounting should be carried out in reverse succession. The distance between magnetic cores and swinging lever shall be approx. 0,8 mm. This distance is obtained by placing fitting disks on the stay bolts. When inserting the diaphragm make sure that the diaphragm is slightly bend inside (approx. 0,5 mm).

Heating

The ZETFON can also be supplied with a thermostatic regulated body heating 24 V 30 Watt. This is especially advisable for use in areas with temperatures below 0°C. For this heating device an additional 2-core cable is necessary.

Adjustment of Frequency

The ZETFON operates with a fundamental frequency of 305 Hz +/- 3%. To adjust the electronics a digital frequency meter is connected to the test point P1 and test point P2. By turning the potentiometer R12 a frequency of 4880 Hz +/- 1% has to be adjusted.

At temperatures below 0°C a ZETFON 400/310 without heating may produce rattling noises. By regulating the frequency below 4880 Hz the sound can be adjusted. A heating has to be installed additionally.

Subject to alteration!

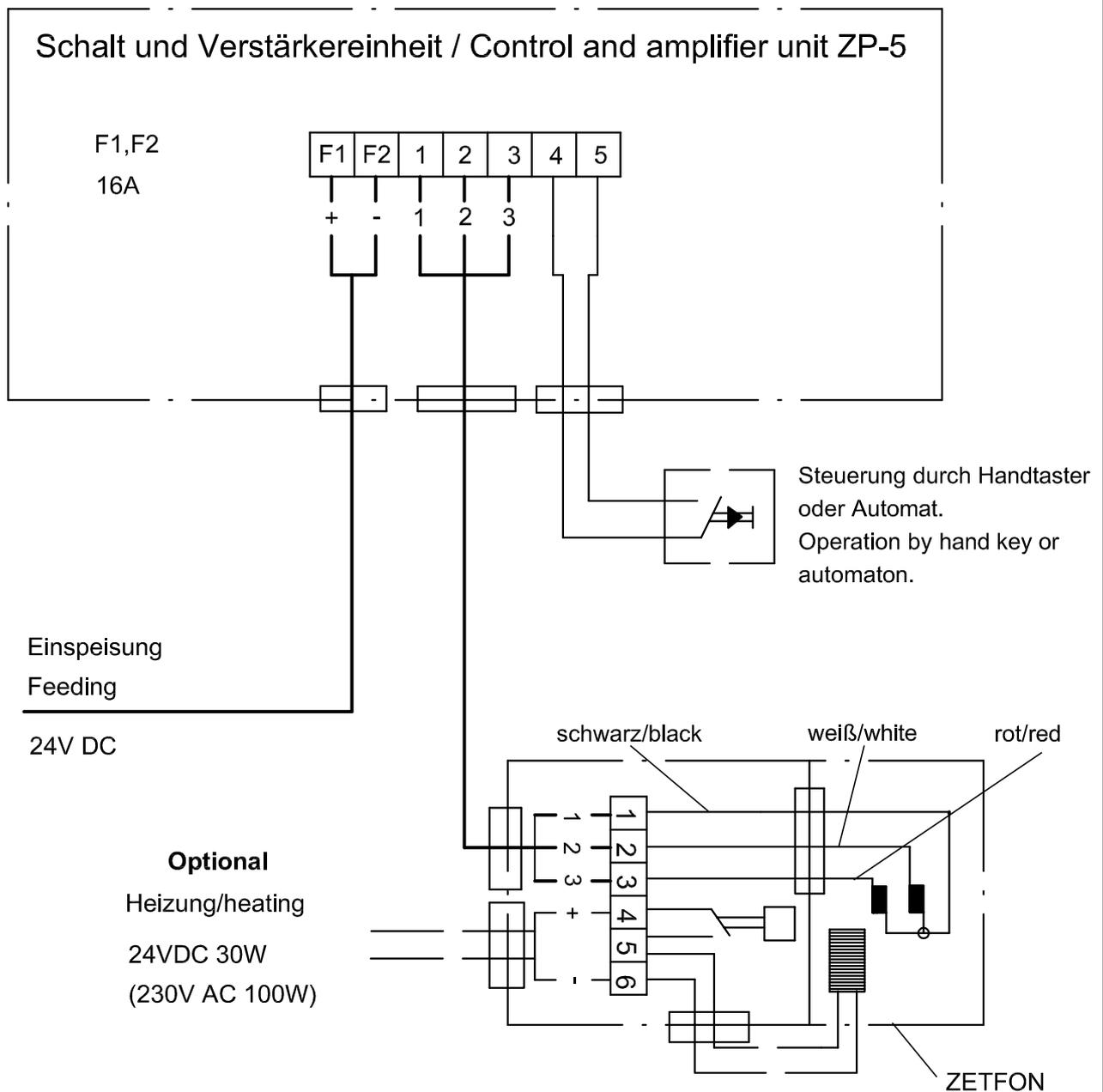
Trouble-Shooting

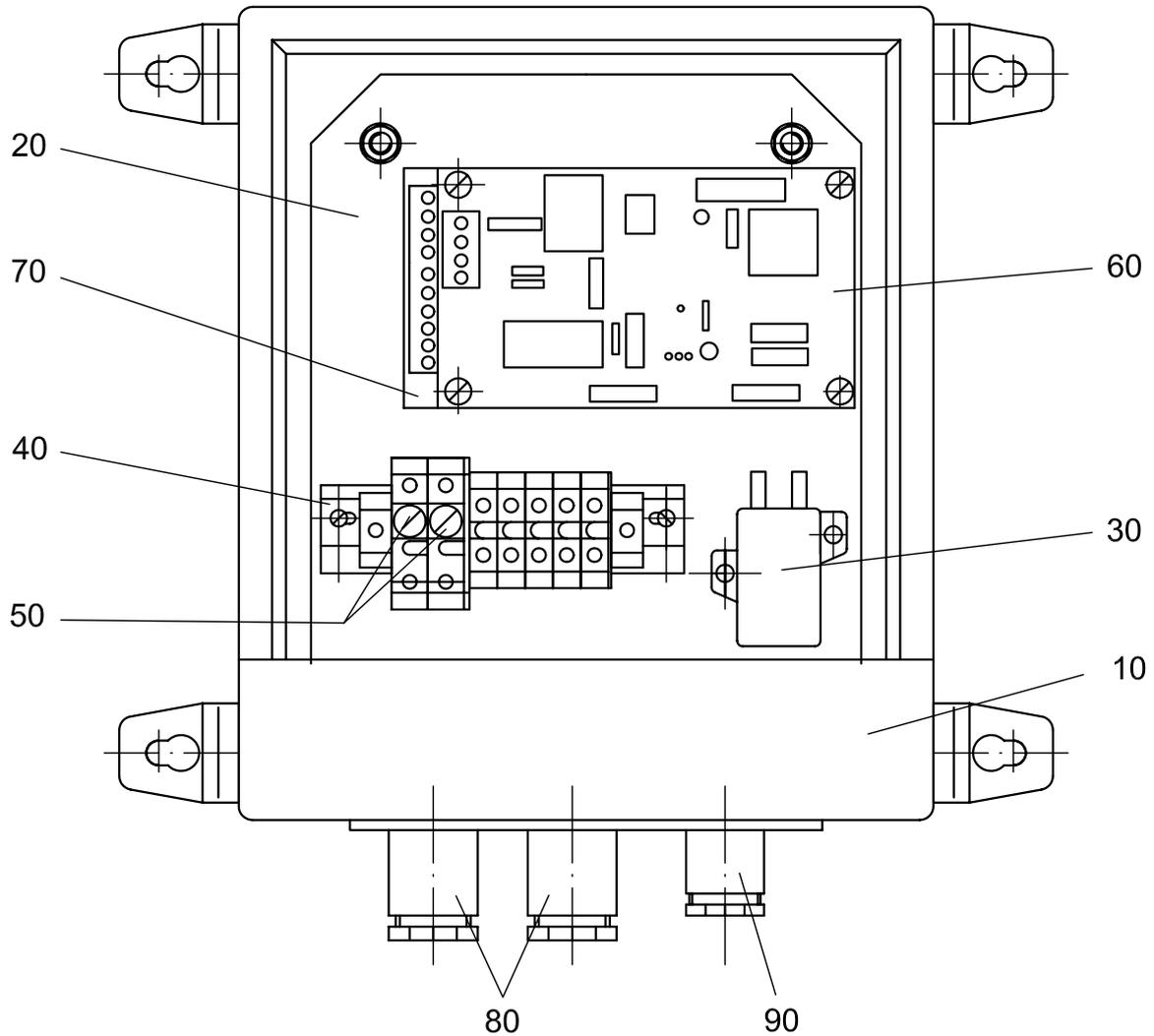
| | Failure | Checking | Proceeding |
|-----|-----------------------------------|---|--|
| 1.1 | no pure sound (rattling sound) | no mechanical faults can be found | regulate potentiometer R12 on the upper half of electric PC-board of control and amplifier unit by turning it with a screw driver to a pure sound at maximum sound level; then examine sound pressure level with an approved measuring unit, minimum 130 dB in 1/3 rd octave band at 1m |
| 1.2 | no pure sound (rattling sound) | check fit of diaphragm, diaphragm is broken | tighten diaphragm, exchange diaphragm |
| 1.3 | no pure sound | sound horn damaged or loose | new sound horn or fasten horn |
| 2.1 | sound too low | check springs in magnet head, springs are broken | exchange springs |
| 3.1 | no sound | take measurement if voltage at terminals R+Mp in control and amplifier unit is the same as stated on name plate and connecting diagram | eliminate fault in power supply |
| 3.2 | no sound | take measurement if there is voltage behind securing terminals R+Mp | use new fuses |
| 3.3 | no sound | check if relay contacts close when signal is released (by automaton or key) | check supply lines of keys |
| 3.4 | no sound or short circuit | check connecting cable from control and amplifier unit to horn; disconnect cable in control and amplifier unit (terminal 1,2 + 3); take measurement of core of terminal 1 with an ohmmeter against core 2 and 3; resistance must be < 10 Ω. | check cable connections on the ZETFON |

Subject to alteration!

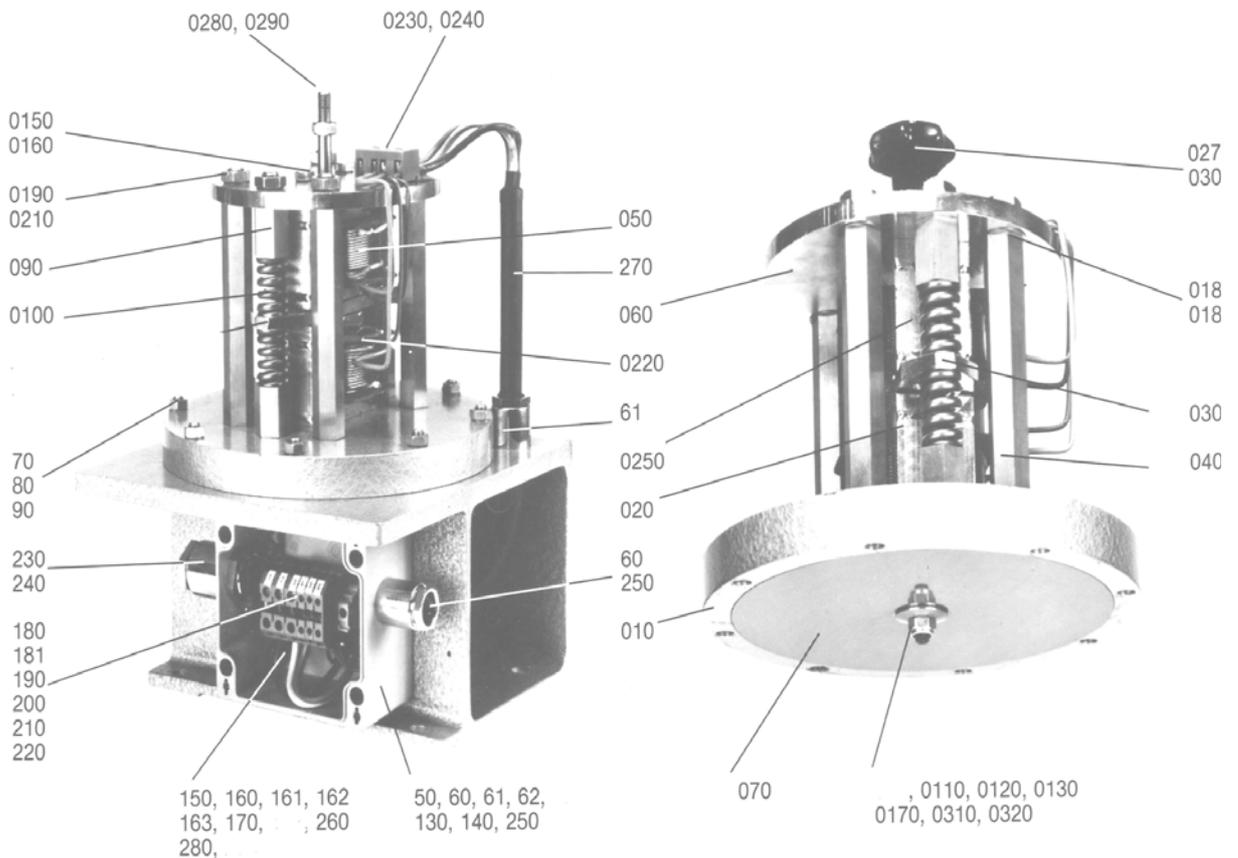
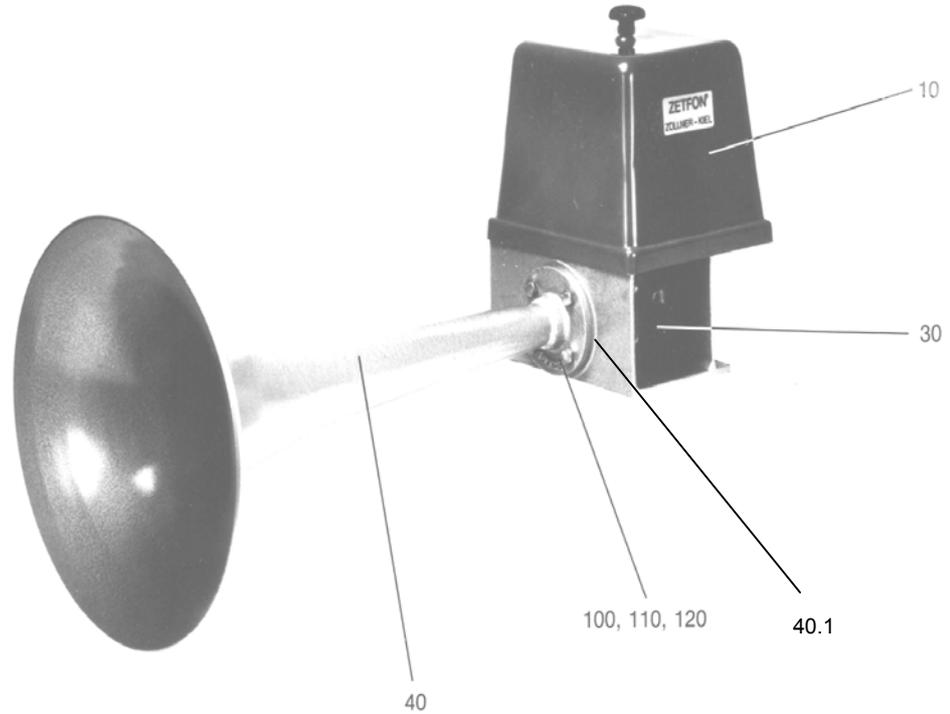
Das Kabel zwischen Steuerkasten und Horn sollte bei Längen bis 10m einen Querschnitt von 4mm², über 10 m einen Querschnitt von 6mm² haben.

Cables according to the rules of the corresponding classification societies. Up to a length of 10 m the cable between control box and horn should have a diameter of 4mm², longer than 10m the diameter should be 6mm².





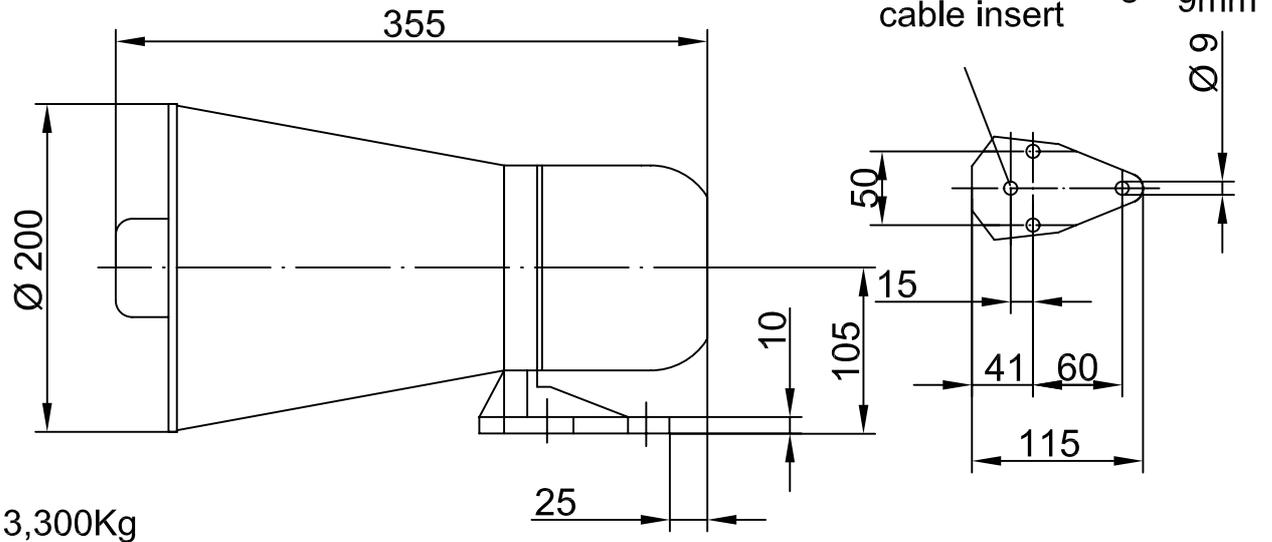
| Pos. Item | Stck. Qty | Bestell-Nr. Order-No. | Techn. Daten Techn. Data | Bezeichnung | Designation |
|-----------|-----------|-----------------------|--------------------------|---------------------|------------------|
| 10 | 1 | 8870029902 | 250x300x150 | Gehäuse | casing |
| 20 | 1 | 01905994 | 200x265x2 | Montageplatte | mountingplate |
| 30 | 1 | 63252300907 | V23009 24VDC | Relay | relais |
| 40 | 1 | 01707476-40 | | Klemmleiste, kompl. | terminal, compl. |
| 50 | 2 | 683318016 | 16A Ø 5x20 | Sicherung | fuse |
| 60 | 1 | 0106830 | | Steuerplatine | control pc-board |
| 70 | 1 | 0106831 | | Kondensatorplatine | condenser-pc.b |
| 80 | 2 | 677073002 | M30x2 | Verschraubung | cable gland |
| 80 | 2 | 677023020 | M30x2 | Gegenmutter | counter nut |
| 90 | 1 | 677072415 | M24x1,5 | Verschraubung | cable gland |
| 90 | 1 | 677022415 | M24x1,5 | Gegenmutter | counter nut |



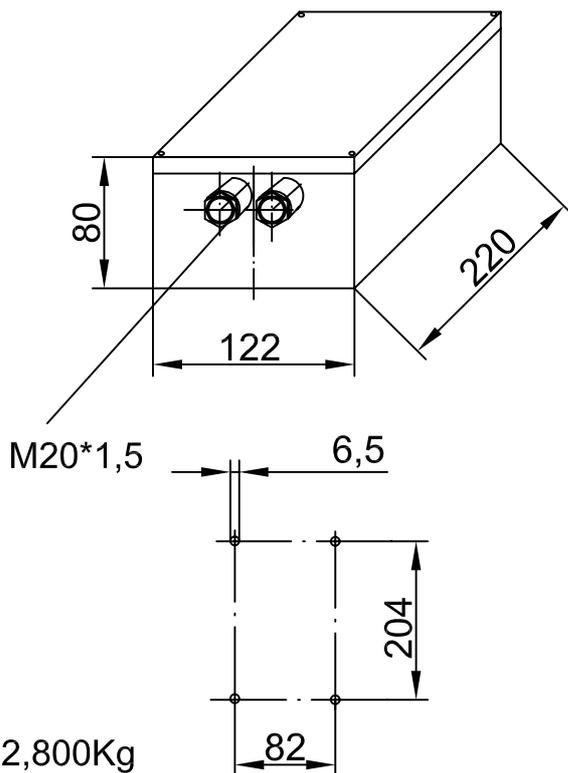
| Teil Part | Stück qty. | Abmessung dimensions | Ident-Nr. | Bennennung | designation |
|--------------|---------------|-------------------------|------------|----------------------|-----------------------|
| 10 | 1 | 250 x 250 x 230 | 0104842 | Haube | cover |
| 30 | 1 | 250 x 250 x 155 | 0104815 | Trichterbogen | arched piece of horn |
| 40 | 1 | ∅ 430 x 670 | 01040884 | Trichter | sound horn |
| 40.1 | 1 | ∅ 117/45x1,5 | 0104934 | Dichtung | gasket |
| 50* | 1 | 122 x 122 x 80 | 0104856 | Gehäuse | casing |
| 60* | 1 | M 24 x 1,5 | 677072417 | Kabelverschraubung | cable gland |
| 61* | 2 | Pg 13,5 | 6770601311 | Kabelverschraubung | cable gland |
| 70 | 8 | M 8 x 35 | 2046080351 | Stiftschraube | stud bolt |
| 80 | 8 | M 8 | 21034081 | Sechskantmutter | hexagon nut |
| 90 | 8 | 8x14,8x2 | 211300081 | Sicherungsscheibe | washer |
| 100 | 4 | M 10 x 35 | 2044100351 | Sechskantschraube | hexagon screw |
| 110 | 4 | M 10 | 21034101 | Sechskantmutter | hexagon nut |
| 120 | 4 | 10x18x2,2 | 211300101 | Sicherungsscheibe | washer |
| 130* | 4 | M 6 x 16 | 2002060161 | Zylinderkopfschraube | cylinder head screw |
| 140* | 4 | 6x11,8x1,6 | 211300061 | Sicherungsscheibe | washer |
| 160* | 1 | 24 V 30 W | 884410401 | Heizpatrone | heating element |
| 161* | 1 | 230 V 100 W | 884410400 | Heizpatrone | heating element |
| 163* | 1 | Pg 9 | 6770600901 | Kabelverschraubung | cable gland |
| 170* | 1 | 35/10° | 884602708 | Thermostat | thermostat |
| 180* | 3 | SAK 10 KrG | 621111002 | Anreih-Klemme | terminal |
| 181* | 3 | SAK 4 KrG | 621112832 | Anreih-Klemme | terminal |
| 190* | 2 | EWK1 | 621920616 | Endwinkel | limiting angle |
| 200* | 1 | AP 4 KrG | 621911792 | Abschlußplatte | stop plate |
| 210* | 1 | TS 32 | 677503212 | Tragschiene | bearing rail |
| 220* | 6 | | 677852266 | Bezeichnungsschild | name plate |
| 230* | 1 | M 30 x 2 | 677073027 | Kabelverschraubung | cable gland |
| 240* | 1 | M 30 x 2 | 677023027 | Gegenmutter | counter nut |
| 250* | 1 | M 24 x 1,5 | 677022417 | Gegenmutter | counter nut |
| 270* | 1 | | 670380302 | Kabel | cabel |
| 280* | 1 | ∅ 8x1 | 27030081 | PVC-Schlauch | PVC-hose |
| 010 | 1 | ∅ 230 x 25 | 0104837 | Grundplatte | base plate |
| 020 | 1 | E96 x 40 | 0104851 | Kernblechpaket | lamella pile |
| 030 | 1 | 160 Lg | 01049113 | Schwinganker kompl. | moving coil compl. |
| 040 | 4 | SW19 x 176 | 0104840 | Bolzen | bolt |
| 050 | 2 | EI96x40 | 0104845 | Spule | coil |
| 060 | 1 | ∅ 160 x 10 | 0104838 | Befestigungsplatte | fastening plate |
| 070 | 1 | ∅ 200 x 0,8 | 0104843 | Membrane | diaphragm |
| 090 | 4 | Skt 22x58 | 0104848 | Federbolzen | spring bolt |
| 0100 | 4 | ∅ 16/5 x 38 | 0104988 | Druckfeder | pressure spring |
| 0110 | 1 | ∅ 36/8,4x3 | 0104846 | Scheibe | washer |
| 0120 | 1 | ∅ 28/8,4x3,7 | 0104867 | Scheibe | washer |
| 0130 | 1 | VM 8 | 21037081 | Sicherungsmutter | safety nut |
| 0140 | 2 | M 8 x 25 | 2035080251 | Zylinderkopfschraube | cylinder head screw |
| 0150 | 2 | M 8 x 25 | 2044080251 | Sechskantschraube | hexagon screw |
| 0160 | 4 | 8x14,8x2 | 211300081 | Sicherungsscheibe | washer |
| 0170 | 1 | 8 x 14 x 0,25 | 2112808025 | Paßscheibe | washer |
| 0180 | 4 | 12 x 24 x 0,25 | 211281302 | Paßscheibe | washer |
| 0181 | 4 | 12 x 24 x 0,5 | 211281305 | Paßscheibe | washer |
| 0190 | 6 | M 12 | 21036121 | Sechskantmutter | hexagon nut |
| 0210 | 6 | 12x21x2,5 | 211300121 | Sicherungsscheibe | washer |
| 0220 | 2 | ∅ 4 x 71 | 214040712 | Splint | splint pin |
| 0230 | 1 | | 7342-0230 | Klemmleiste kompl. | terminal strip compl. |
| 0240 | 2 | M 5 x 6 | 2002050061 | Zylinderschraube | cylinder screw |
| 0250 | 1 | E96 x 40 | 0104853 | Kernblechpaket | lamella pile |
| 0270 | 1 | Y50/M10 | 57011050 | Sterngriff | star knob |
| 0280 | | M 10 x 50 | 2045100501 | Stiftschraube | stud bolt |
| 0290 | 1 | M 10 | 21034101 | Sechskantmutter | hexagon nut |
| 0300 | 1 | R 10 - 2,5 | 502101025 | O-Ring | O-ring |
| 0310 | 1 | 8 x 14 x 0,5 | 211280805 | Paßscheibe | washer |
| 0320 | 1 | 8 x 14 x 1 | 211280810 | Paßscheibe | washer |

* Nur bei Ausführung mit Heizung /only when provided with heating

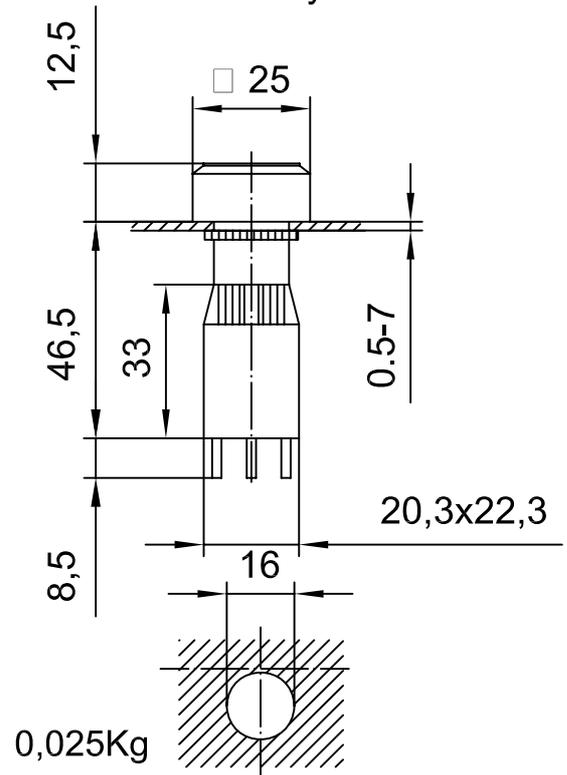
ZETFON 70s



Schalt-u.Verstärkereinheit ZP-8
Control-a.amplifier unit ZP-8



Einbau Leuchttaster 4676
Illuminated built-in key 4676



Einspeisung / feeding : 24V DC

Leistungsaufnahme /input for sounding : ca.100W

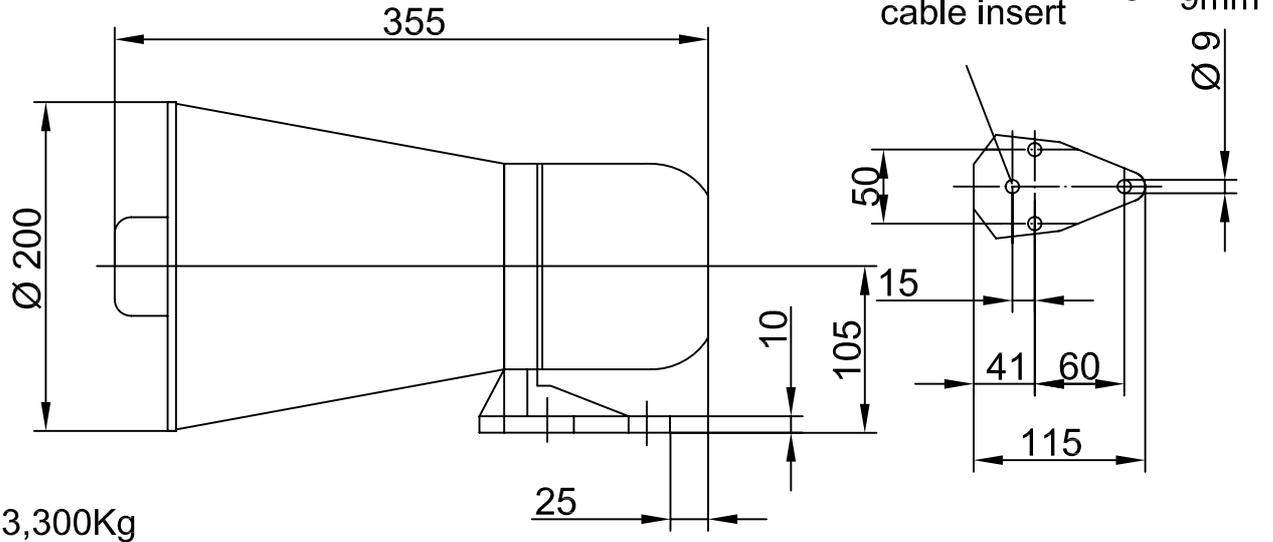
Schallpegel / sound level : >120dB(T) 1m

Grundfrequenz / sound frequency : 330Hz

Anbauanweisung : Das ZETFON 70s ist ca.3° nach vorne geneigt anzubauen!

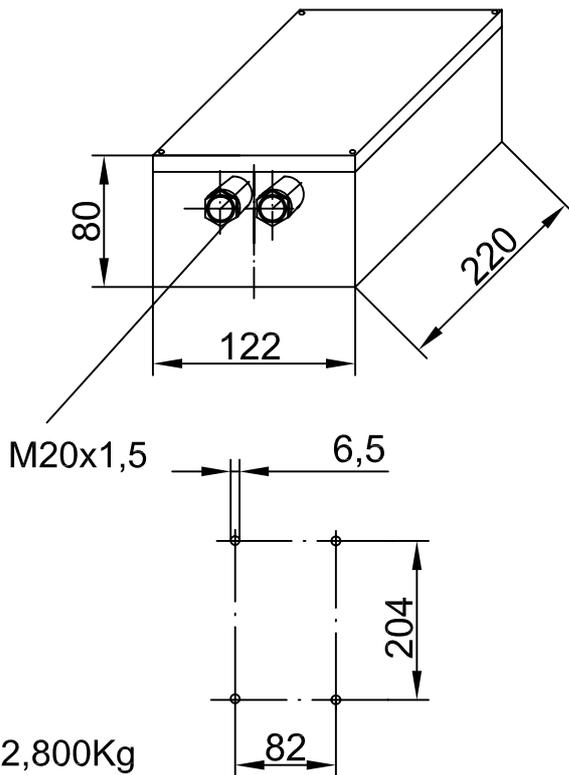
Direction for installation : The ZETFON 70s has to be installed bending
appr.3° to the front !

ZETFON 70s



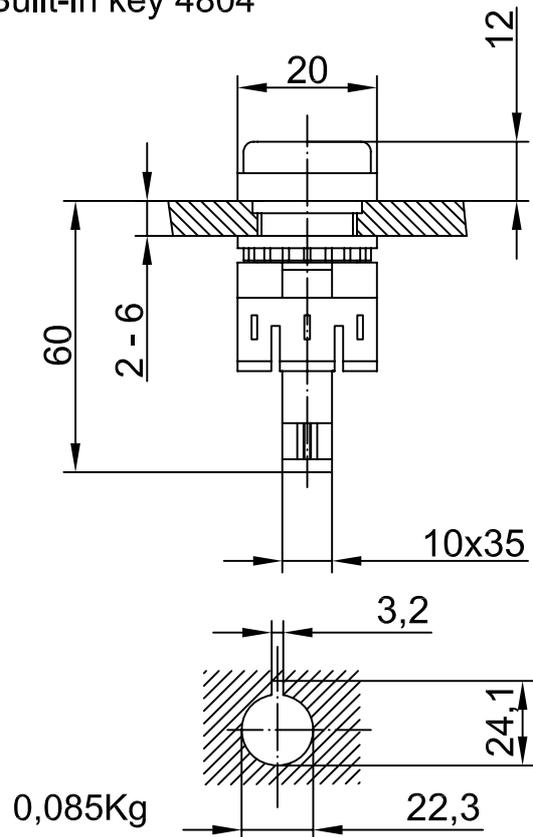
3,300Kg

Schalt-u.Verstärkereinheit ZP-7
Control-a.amplifier unit ZP-7



2,800Kg

Einbautaster 4804
Built-in key 4804



0,085Kg

Einspeisung / feeding : 12/24V DC

Leistungsaufnahme /input for sounding : ca.50W

Schallpegel / sound level : >120dB(T) 1m

Grundfrequenz / sound frequency : 660Hz

Anbauanweisung : Das ZETFON 70s ist ca.3* nach vorne geneigt anzubauen!
Direction for installation : The ZETFON 70s has to be installed bending
appr.3*to the front !