

ZET-Horn 70 AC

General Features

The ZÖLLNER ZET-Horn was the first piston type whistle on the world market driven by an AC 3phase motor. An essential component is the piston inside the cylinder driven by an AC 3phase motor via connecting rod, crankshaft and gearwheels. The piston oscillates at a certain frequency which makes the air inside the sound projector vibrate in resonance to produce a clean sound audible over a wide range.



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 70 Hz very advantageously ranks in the lower admissible range (70-200Hz)
- sound pressure level 143 dB in 1/3rd octave band at 1 m distance

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
- system voltage: AC 3phase/control box AC 1ph.
- entirely made of best non-corrosion, seawater-resistant materials
 - gearwheels made of wear-resistant upgraded steel (no plastic!)

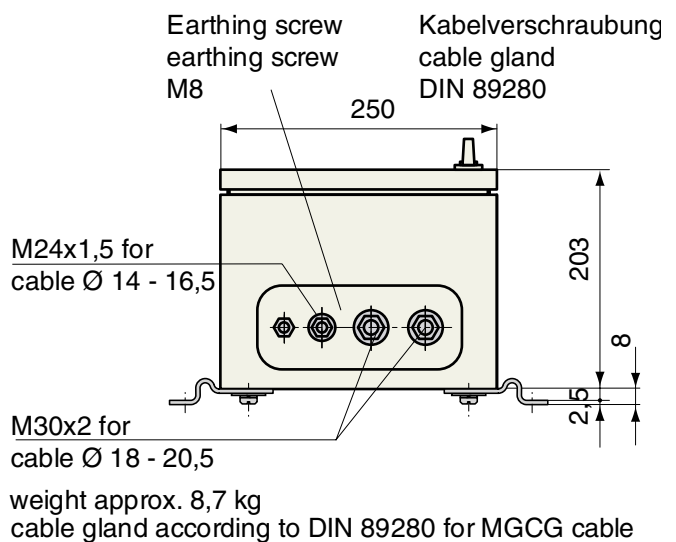
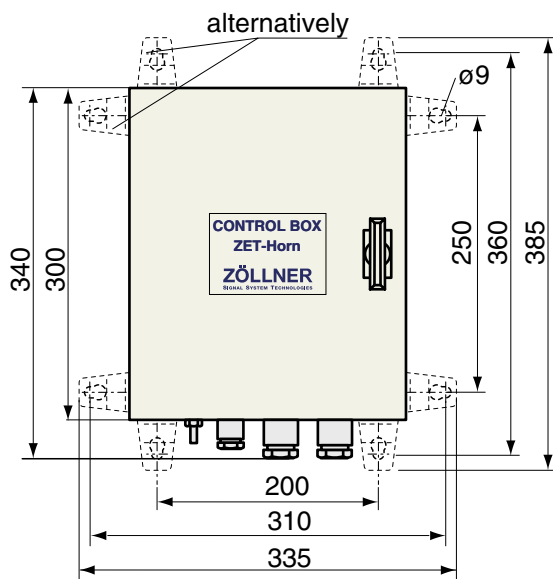
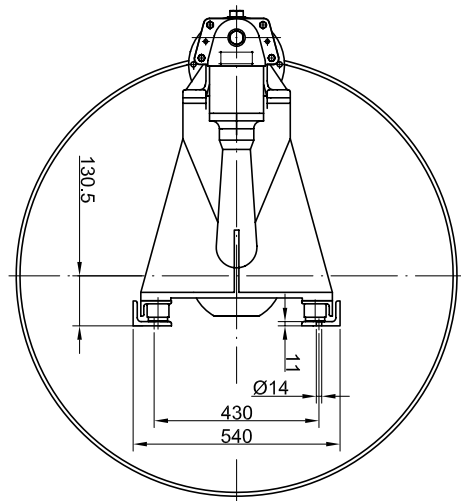
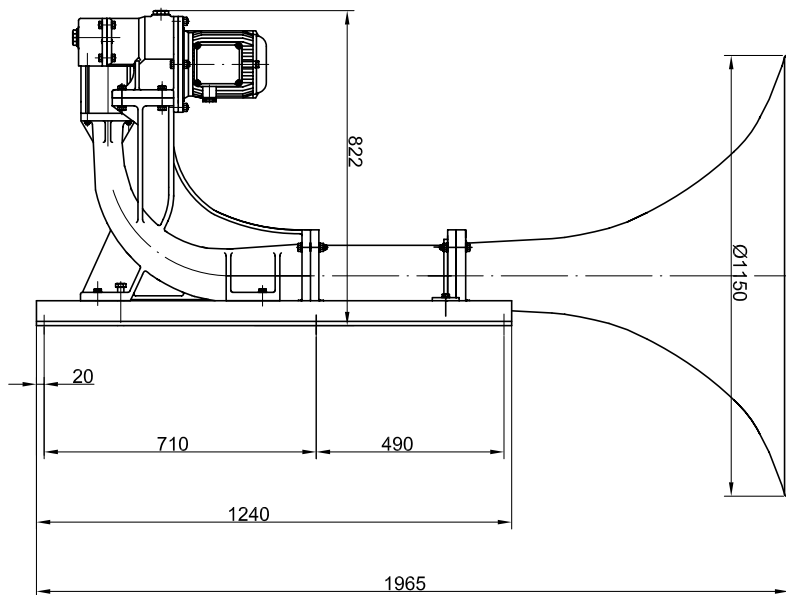
Advantages

- decades of experience
- best material and workmanship - made in Germany
- entirely made of best non-corrosion, seawater-resistant materials
- simple but matured design
 - easy exchange of all parts with onboard tools
 - steady lubrication with standard grease (no oil!)
- cylinder suspended vertically for optimum discharge of spray, flood, condensation water or melted snow
- motor heating to avoid condensed water included as a standard,
 - no additional cable required!
- easy installation
 - only one three-core cable required for connection to board mains!
 - relatively low weight
 - not affected by voltage and frequency fluctuations of board mains

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).



Standard control box (supply voltage 380 / 440 V - control voltage 115 / 220 V) - other voltages on request

type	ship length [m]	current frequency		cable gland [mm] max.	fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance		motor output [kW]	motor heating upto [W]	type approval BSH no.	protection type	weight [kg]
		50Hz	60Hz			dB(A)	min. IMO 1/3rd oct					
70AC	>200	../5	../6	Ø15/ Ø18,8	70	146	143 dB	5,5	250	4615/6020392/09	IP 56	130

Subject to alteration!

ZET-Horn 90/110 AC

General Features

The ZÖLLNER ZET-Horn was the first piston type whistle on the world market driven by an AC 3phase motor. An essential component is the piston inside the cylinder driven by an AC 3phase motor via connecting rod, crankshaft and gearwheels. The piston oscillates at a certain frequency which makes the air inside the sound projector vibrate in resonance to produce a clean sound audibel over a wide range.



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 ore more in length
 - land alarm, i.e. bunker stations, oil refineries, airports, power plants, factories
- system voltage: AC 3phase/control box AC 1ph.
- entirely made of best non-corrosion, seawater-resistant materials
 - gearwheels made of wear-resistant upgraded steel (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 90 Hz / 110 Hz very advantageously ranks in the lower admissable range (70-200Hz)
- sound pressure level 143 dB in 1/3rd octave band at 1 m distance

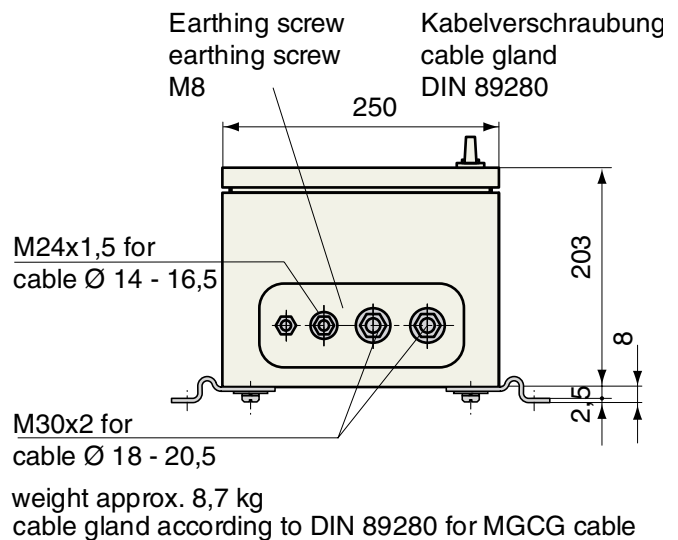
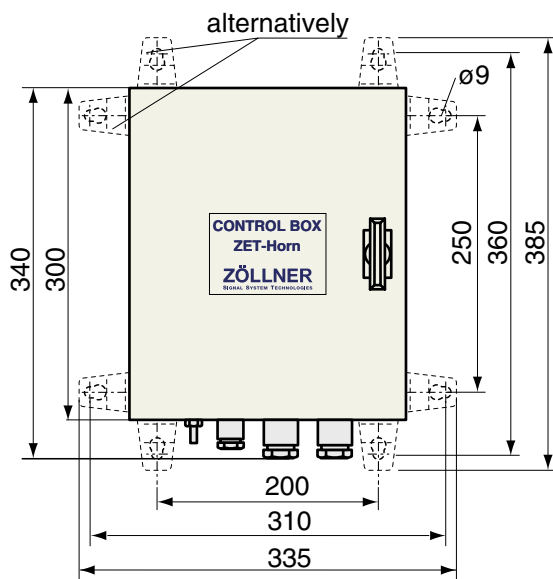
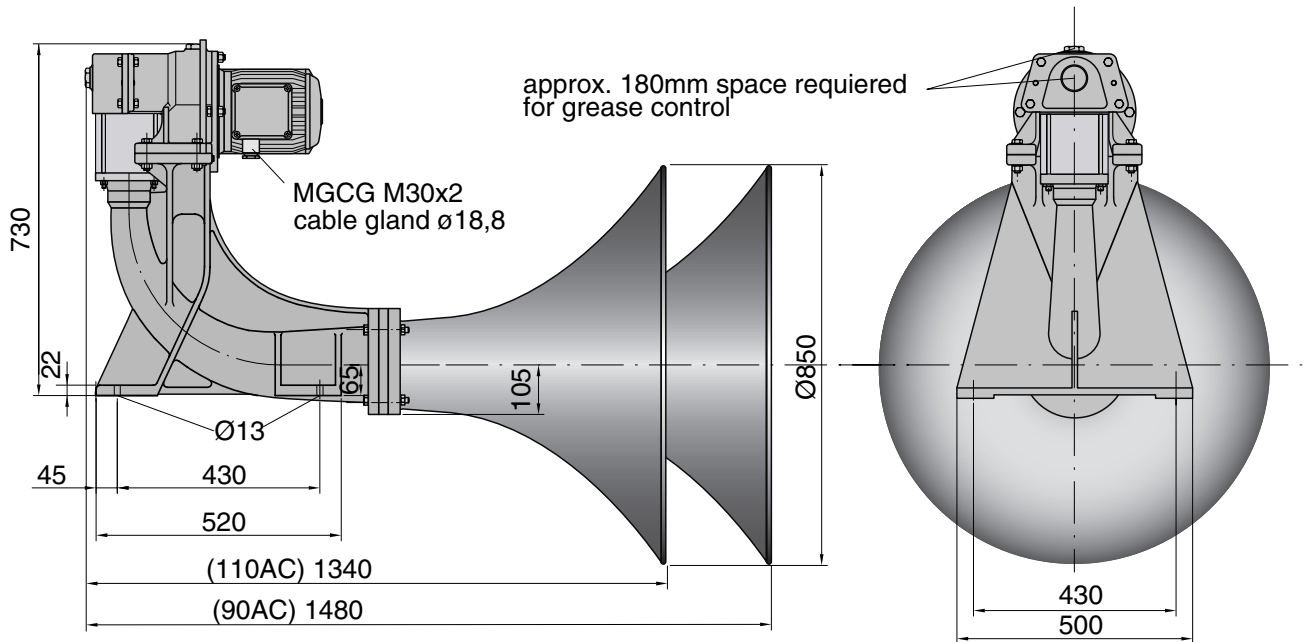
Advantages

- *decades of experience*
- *best material and workmanship - made in Germany*
- *entirely made of best non-corrosion, seawater-resistant materials*
- *simple but maturated design*
 - *easy exchange of all parts with onboard tools*
 - *steady lubrication with standard grease (no oil!)*
- *cylinder suspended vertically for optimum discharge of spray, flood, condensation water or melted snow*
- *motor heating to avoid condensed water included as a standard,*
 - *no additional cable required!*
- *easy installation*
 - *only one three-core cable required for connection to board mains!*
 - *relatively low weight*
 - *not affected by voltage and frequency fluctuations of board mains*

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).

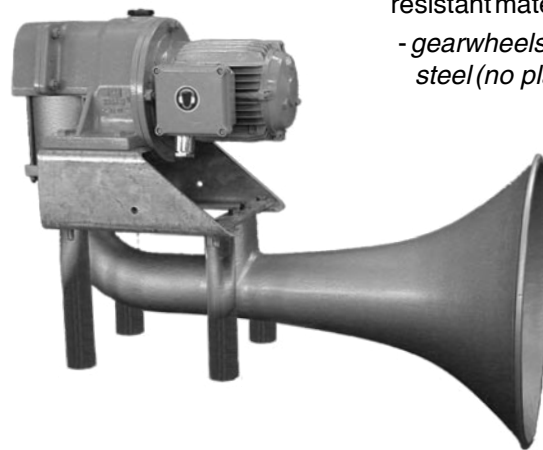


type	ship length [m]	current frequency		cable gland [mm] max.	fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance		motor output [kW]	motor heating upto [W]	type approval BSH(DHI) no.	protection type	weight [kg]
		50Hz	60Hz			dB(A)	min. IMO 1/3rd oct					
90AC	>200	.. /5	.. /6	ø15/ ø18,8	90	146	143 dB	5,5	250	4615/6021094/09	IP 56	92
110AC	>200	.. /5	.. /6		110	143	143 dB	5,5	250	4615/6021095/09	IP 56	90

ZET-Horn 131/141 AC

General Features

The ZÖLLNER ZET-Horn was the first piston type whistle on the world market driven by an AC 3phase motor. An essential component is the piston inside the cylinder driven by an AC 3phase motor via connecting rod, crankshaft and gearwheels. The piston oscillates at a certain frequency which makes the air inside the sound projector vibrate in resonance to produce a clean sound audibel over a wide range.



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
 - special design for arctic class available
 - special military design available
 - land alarm, i.e. bunker stations, oil refineries, airports, power plants, factories
- system voltage: AC 3phase/control box AC 1ph.
- entirely made of best non-corrosion, seawater-resistant materials
 - gearwheels made of wear-resistant upgraded steel (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 130 Hz / 140 Hz very advantageously ranks in the lower admissable range (130-350 Hz)
- sound pressure level 138 dB in 1/3rd octave band at 1 m distance

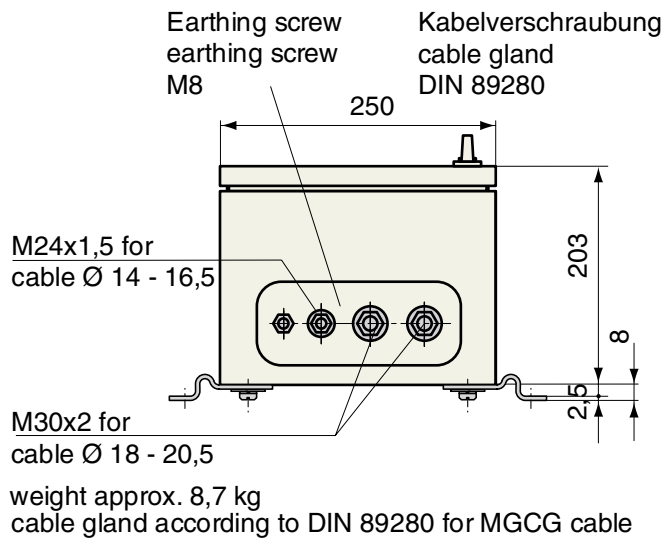
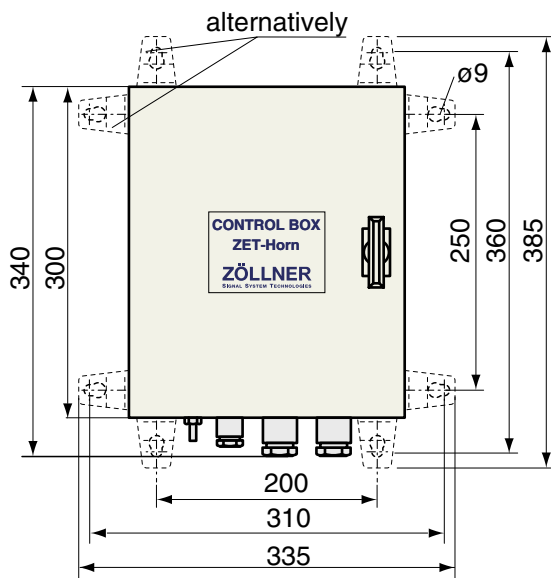
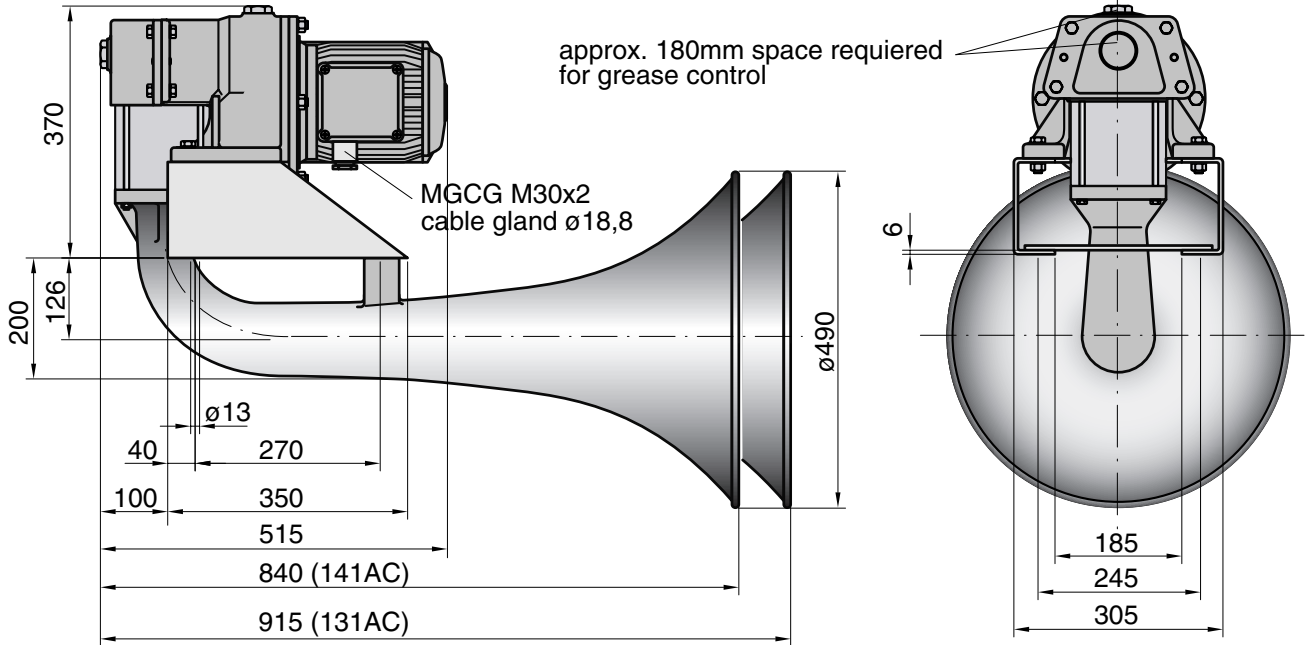
Advantages

- decades of experience
- best material and workmanship - made in Germany
- simple but matured design
 - easy exchange of all parts with onboard tools
 - steady lubrication with standard grease (no oil!)
- cylinder suspended vertically to allow optimum discharge of spray, flood, condensation water or melted snow
- motor heating to avoid condensed water included as a standard,
 - no additional cable required!
- easy installation
 - only one three-core cable required for connection to board mains!
 - relatively low weight
- not affected by voltage and frequency fluctuations of board mains

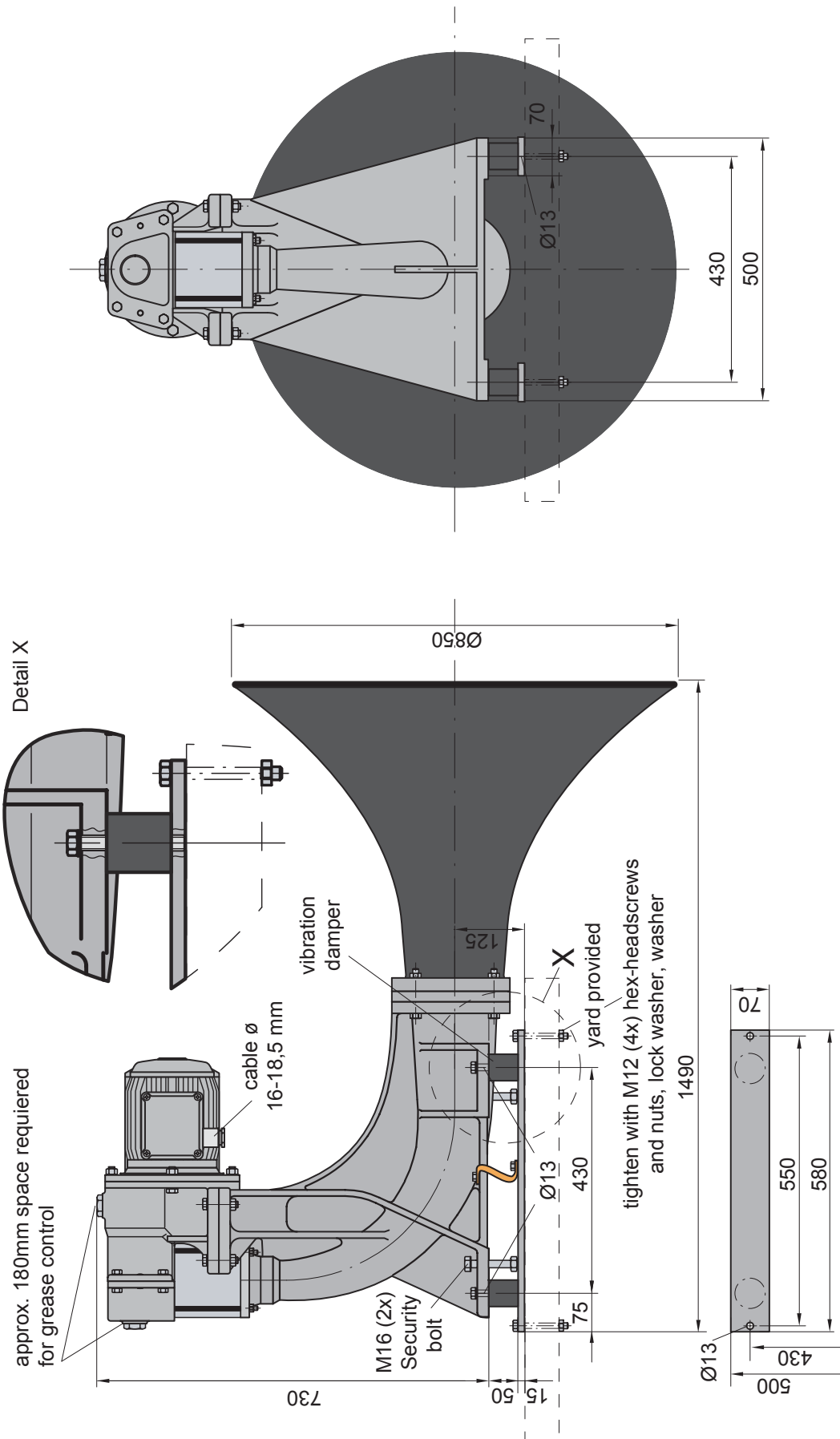
Positioning and installation

- 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.

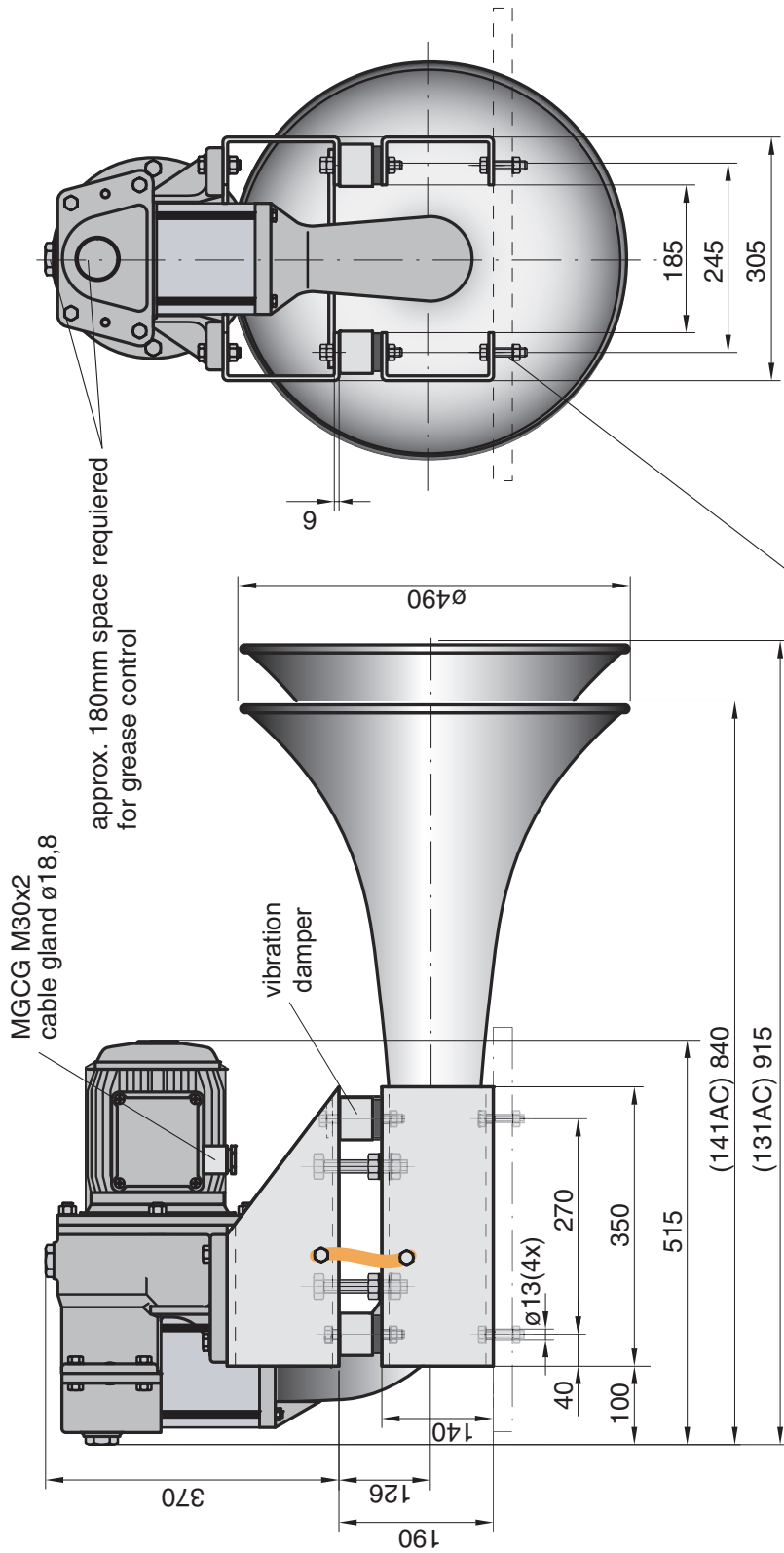
- The sound pressure level of a vessel's own signal at listening posts must not exceed 110 dB(A).



type	ship length [m]	current frequency		cable gland [mm] max.	fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance		motor output [kW]	motor heating up to [W]	type approval BSH(DHI) no.	protection type	weight [kg]
		50Hz	60Hz			dB(A)	min. IMO 1/3rd oct					
141AC	75-200	..5	..6	Ø15/Ø18,8	140	143	138 dB	5,5	250	4615/6021097/09	IP 56	62
131AC	75-200	..5	..6	Ø15/Ø18,8	130	144	138 dB	5,5	250	4615/6021096/09	IP 56	62

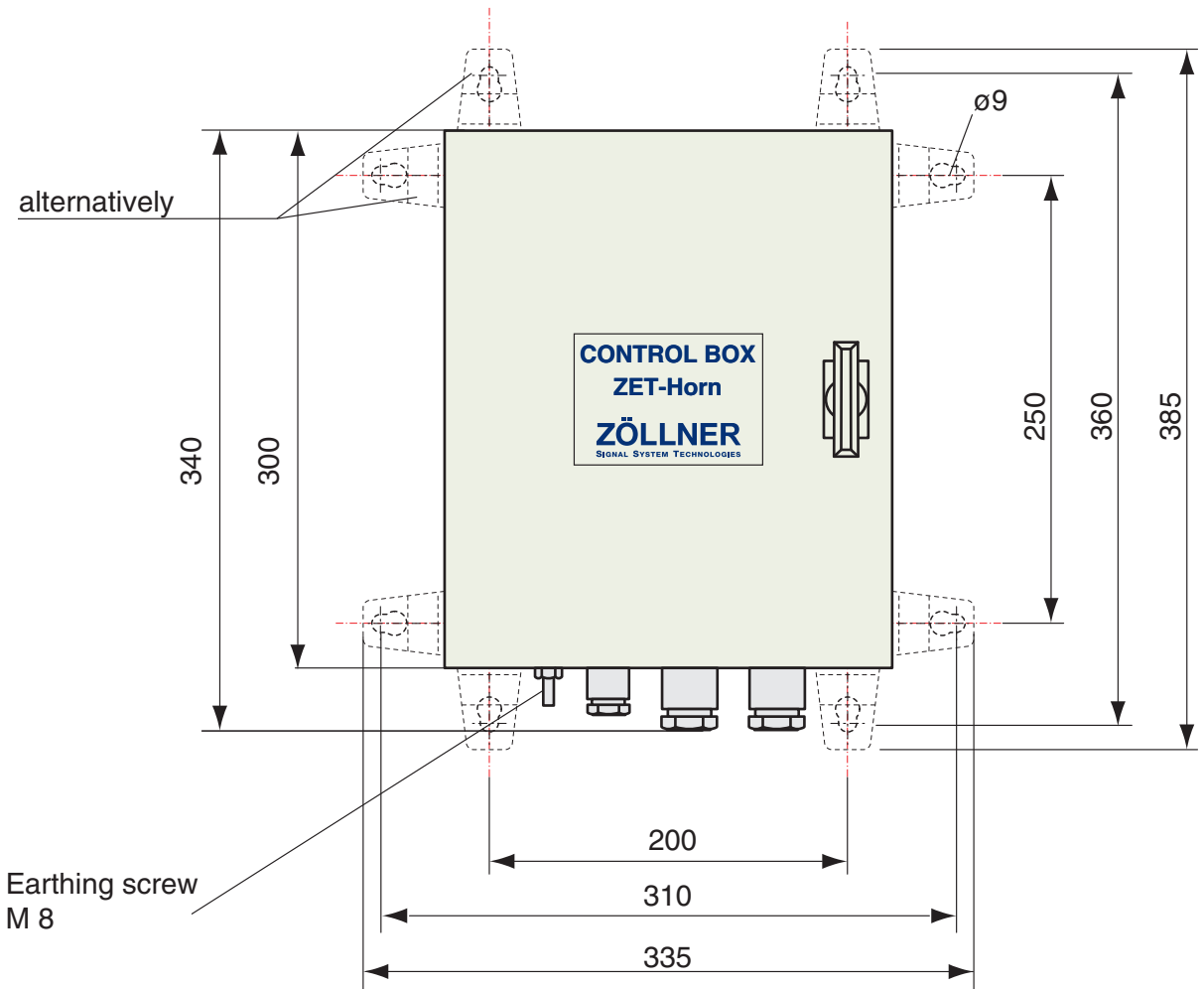
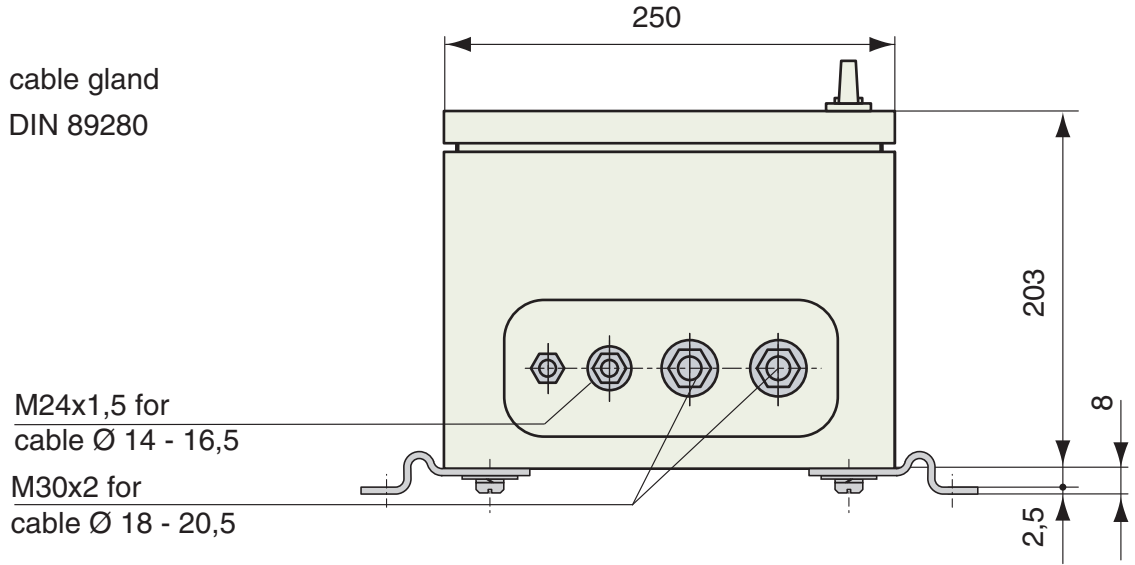


type	ship length [m]	current frequency	fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance	motor output [kW]	motor heating up to [W]	type approval BSH(DHI) no.	protection type	weight [kg]
90AC	>200	50Hz ..1/5 60Hz ..1/6	90	dB(A) 146 min. IMO 1/3rd oct 143 dB	5,5	250	4615/6021094/09	IP 56	92

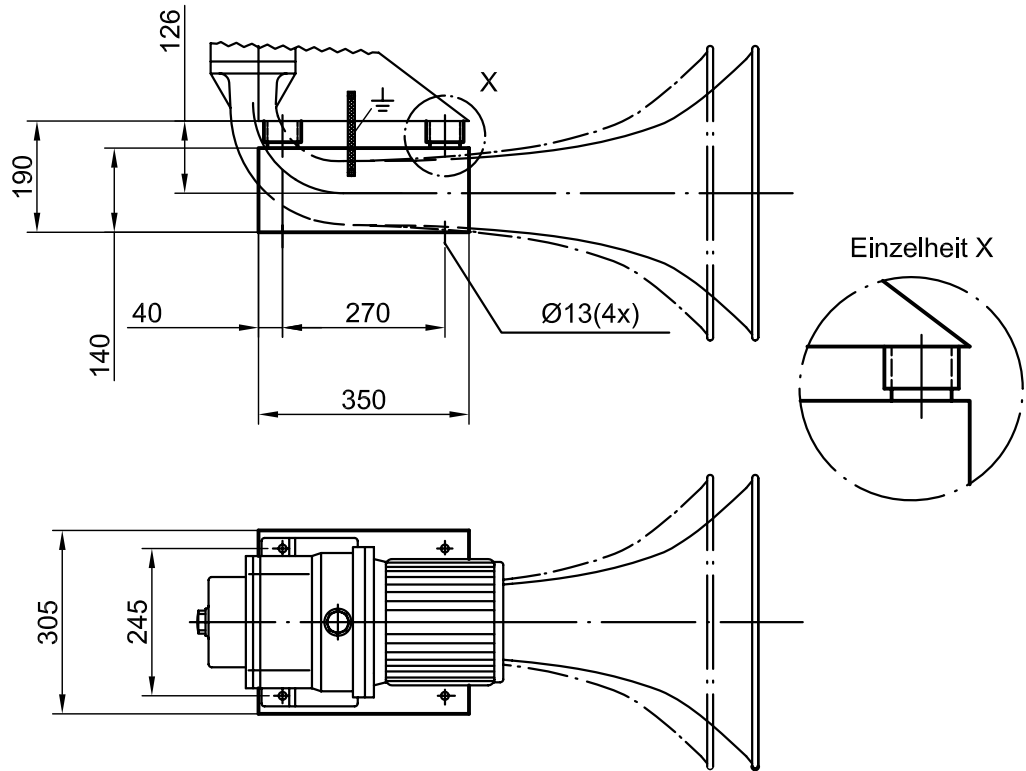


yard provided tighten with M12(4x) hex-headscrews and nuts, lock washer, washer

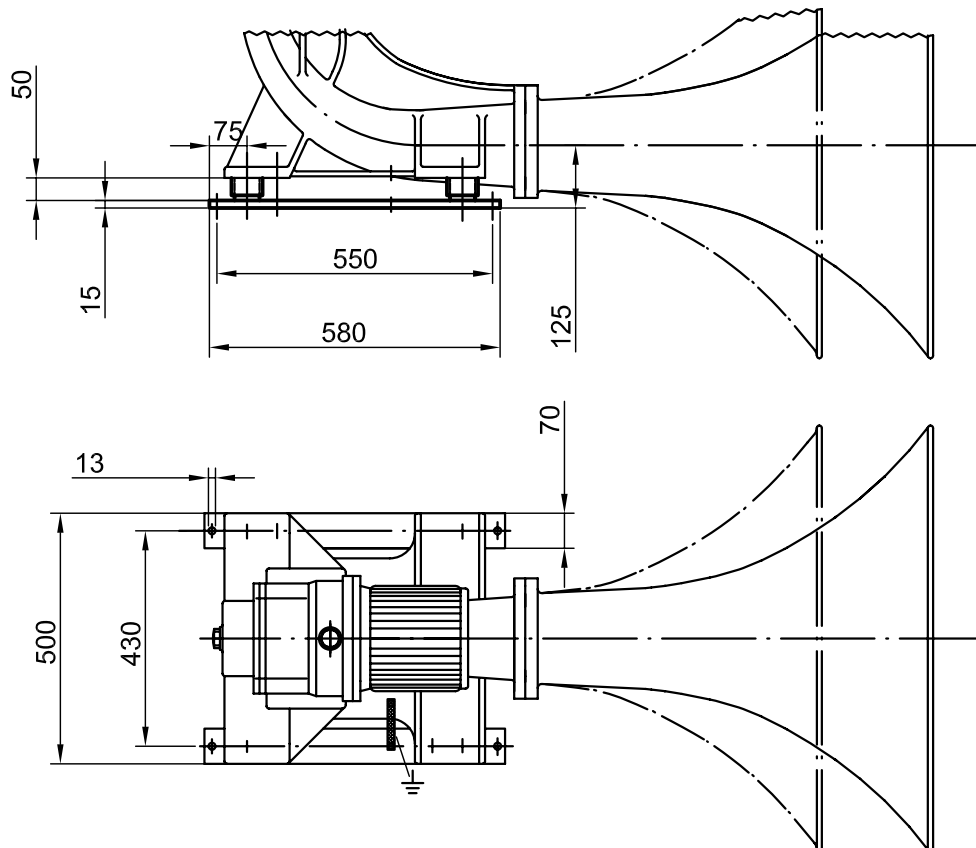
type	ship length [m]	current frequency		fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance		motor output [kW]	motor heating up to [W]	type approval BSH(DHI) no.	protection type	weight [W]
		50Hz	60Hz		dB(A)	min. IMO 1/3rd oct					
141AC	75-200	..5	..6	140	143	138 dB	5,5	250	49/01/78	IP 56	72
131AC	75-200	..5	..6	130	144	138 dB	5,5	250	49/01P/01/78	IP 56	72



141 AC
131 AC

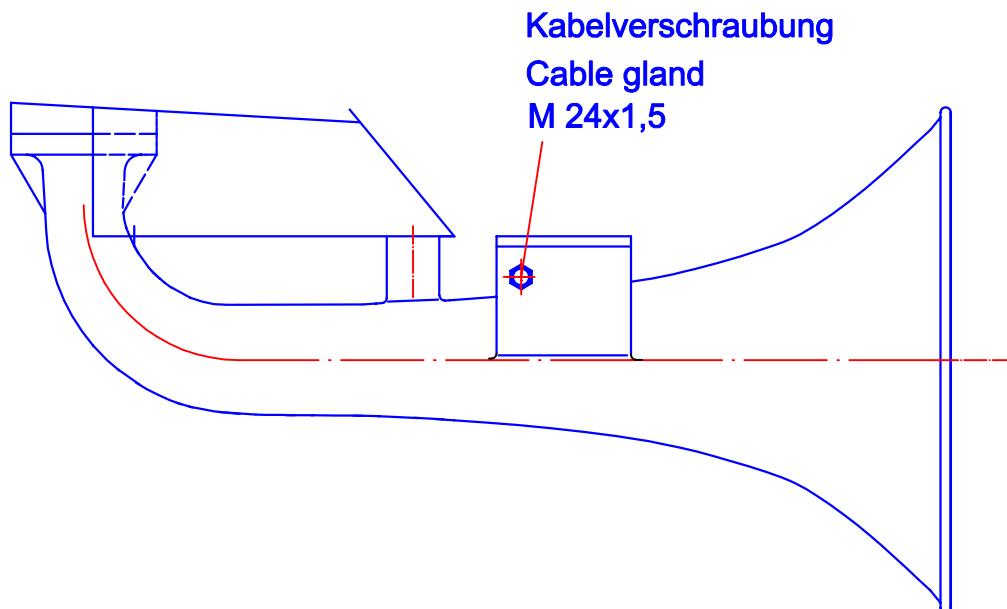


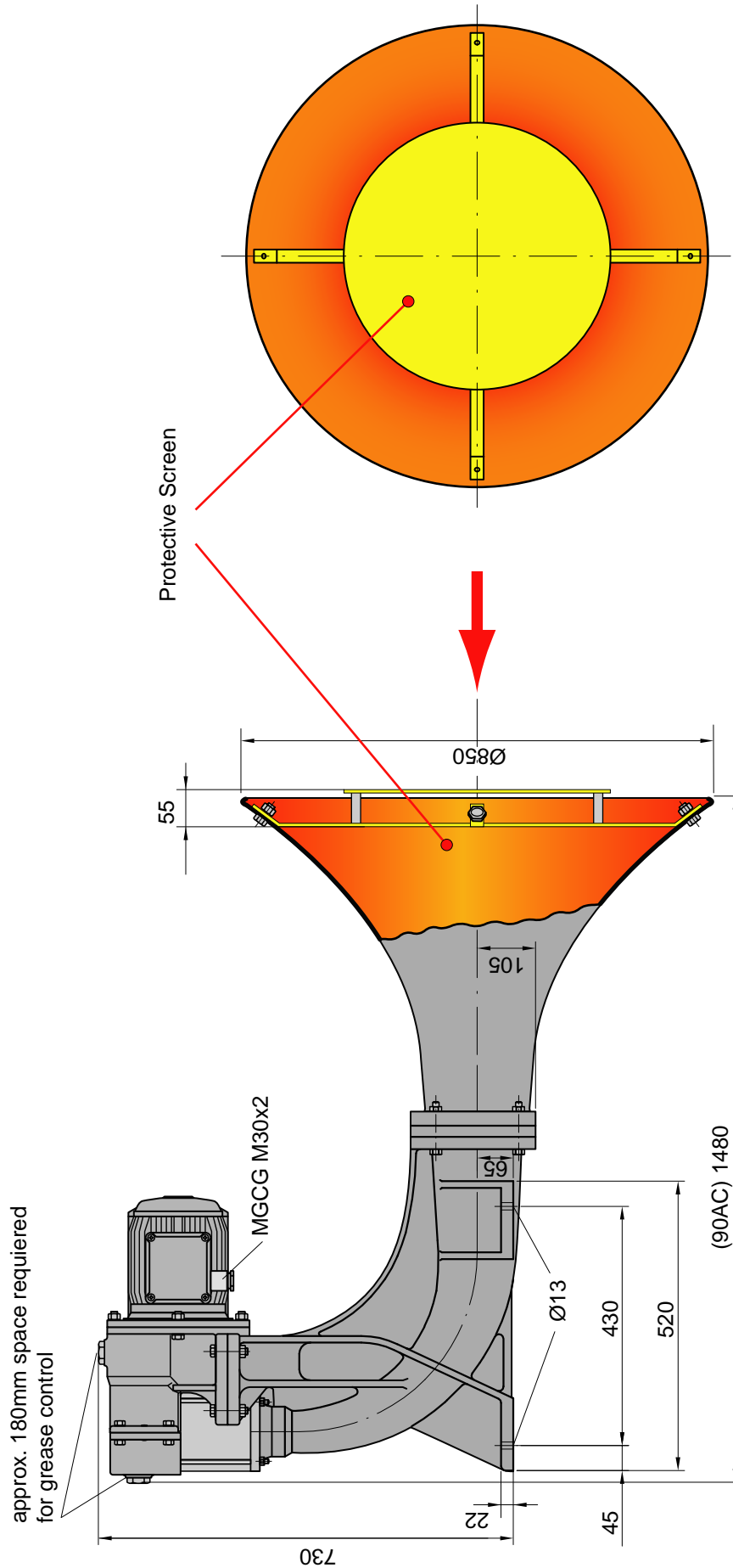
110 AC
90 AC



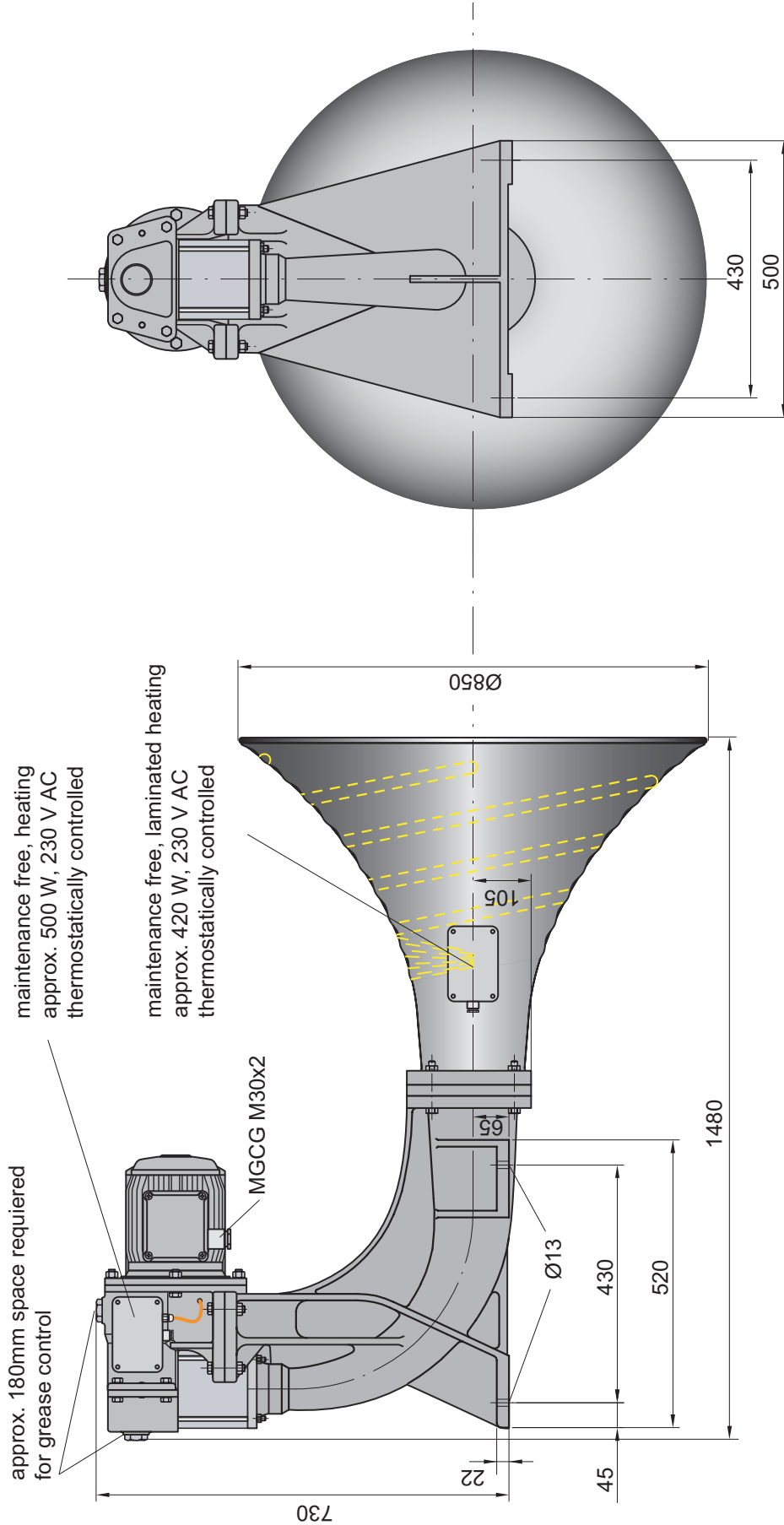
Zet-Horn 141 AC
Zet-Horn 131 AC

Heizung/heating
1,7 KW bei 440V60Hz
1,3 KW bei 380V50Hz



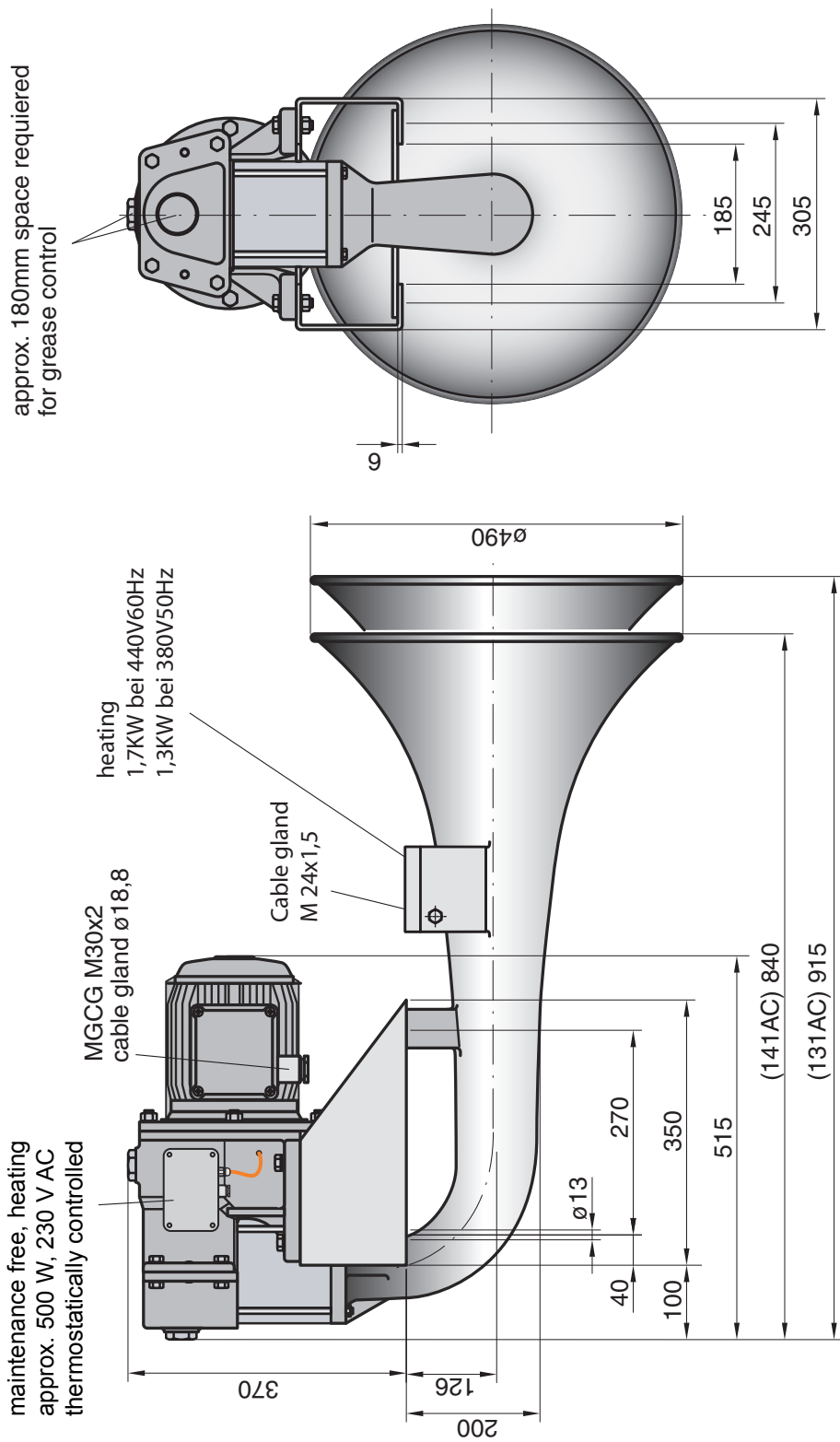


Änderung vorbehalten! Subject to alteration!



type	ship length [m]	current frequency		fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance		motor output [kW]	motor heating up to [W]	type approval BSH(DHI) no.	protection type	weight [kg]
		50Hz	60Hz		dB(A)	min. IMO 1/3rd oct					
90AC	>200	..5	..6	90	146	143 dB	5,5	250	49/02P/01/78	IP 56	92

Änderung vorbehalten! Subject to alteration!



type	ship length [m]	current frequency		fundamental frequency [Hz]	sound intensity in 1/3rd-octave band level at 1 m distance		motor output [kW]	motor heating up to [W]	type approval BSH(DHI) no.	protection type	weight [W]
		50Hz	60Hz		dB(A)	min. IMO 1/3rd oct					
141AC	75-200	..5	..6	140	143	138 dB	5,5	250	4615/6021097/09	IP 56	62
131AC	75-200	..5	..6	130	144	138 dB	5,5	250	4615/6021096/09	IP 56	62

Subject to alteration!

1. General remarks

ZÖLLNER Zet-Horns are available for voltages from 230-460 Volts/ 50 or 60 Hz AC 3phase. Special voltages can be delivered on request.

The essential component of the Zet-Horn is the piston which, driven by an AC 3phase motor over a direct tooth-wheel gear, crankshaft and connecting rod, oscillates at a fixed frequency.

The sympathetic vibrations caused by the oscillating piston produce a pure tone with a wide audibility range. The motor which is flange-mounted to the casing has a powerful starting torque and will start immediately when signals are released.

The gear system is of plain, solid design: The tooth wheels are made of highly alloyed, wear resistant tool steel; the cylinder is made of corrosion-resistant material with its bearing surface accurately hardened and ground. The one-piece crankshaft allows easy assembly with standard on-board tools. Grease will guarantee reliable lubrication. To provide faultless operation also at extremely low temperatures and to avoid condensation water an electric motor heating can be applied.

The Zet-Horn is adjusted to a duty factor of 15%!

2. Motor protection

The minimum protection of the Zet-Horn motors should be a thermic over-current relay (bi-metal). Other methods of motor protection are also possible.

Fuses and cables have to be provided by the shipyard according to classification societies and other standards. Only apply 35 ampère time-lag fuses.

3. Installation and Connection

1. The sound horns have to be installed **as high as practicable** to obtain an optimal sound emission and make sure that sound intensity does not exceed 110 dB (A) at the listening posts. **The console should be designed large enough to provide a safe possibility for inspection.**

2. The Zet-Horns are fixed by 6 well secured M12 screws.

3. Electrical connections have to be laid according to the producers' wiring diagram. It is important to use only flexible cables.

4. Maintenance

Generally, there is no maintenance required for the Zet-Horn. Only the lubrication grease has to be checked at intervals of about 3 to 6 months. Normally, the grease has to be exchanged in 5-year intervals; but when found dirty it must be replaced immediately.

The connection rod bearing is lubricated automatically through the crankshaft bore. Additionally, there is a grease nipple (**510**) at the crankshaft (**110**) extensions.

Lubrication of the big-end bearing can also be effected through an aperture of casing B (**20**). This aperture is plugged by screw plug (**490**).

On one side of the Zet-Horn casing, close to the tooth wheels, there is another grease nipple **(21)**. At intervals of about 3 to 6 months, the red screw plug **(22)** has to be opened and grease (Aral Aralub FDP 00 or equivalent) has to be filled in above the grease nipple.

To exchange the grease proceed as follows:

a. **Zet-Horn 70 AC**

1. Loose cables from motor **(10)**.
2. Remove screws **(550)** between casing **(20,30)** and carriers **(530,531)**.
3. Remove nuts **(480)** between cylinder **(380)** and sound horn **(560)**.

In the vessel's workshop, the motor has to be detached from the casing by unscrewing screws **(60)** and nuts **(80)**. Make sure that the motor remains in overhead position. Now, exchange the grease (approx. 1.450 cm³). At this opportunity, also check tooth-wheels and crankshaft bearings. In addition, check state of piston ring and wrist pin and exchange them if they are worn out.

5. Disassembly

If good tools are provided on board disassembly and reassembly of the Zet-Horn will not cause any trouble. After the Zet-Horn has been taken down from the mast proceed as follows to disassemble:

1. Loosen screws **(550)** – between casing and arched piece of horn (carriers) – and nuts **(480)** and carefully lift the whole gear system.
2. Pull off cylinder **(380)** after removal of nuts **(480)**.
3. Loosen hexagon screws **(700)** from nuts **(710)** and carefully remove front of casing.
4. In order to pull off the whole connection rod bearing, first, detach the safety ring **(360)** with appropriate pliers and then remove the thrust washer **(801)**. Now use a take-off tool to remove the complete needle bearing with inside and outside rings **(310,320,330)**, thrust washer **(800)** and the still fixed connection rod **(290)**.
5. Use a work bench to carefully press outside bearing ring **(330)** out of the connection rod **(290)**. Before reassembling the Zet-horn again, make sure that the needle bearing with inside and outside rings **(310,320,330)** and thrust washer **(800,801)** are replaced by new parts.
6. To disassemble the crankshaft, remove safety ring **(280)**, unscrew hexagon screws **(150)** and take off lid **(140)** and locking plate **(160)**. Now pull off tooth-wheel **(130)**. Use a mallet to expel the crankshaft. Pull off the bearings.
7. Each time the Zet-Horn is disassembled, the DU-type bushes and discs **(420 and 430)** between connecting rod, piston and wrist pin have to be checked. Basically, it is the best to always exchange these parts.
The piston rings **(441)** also have to be checked and exchanged when necessary.

6. Reassembly

To reassemble, reverse procedures as described above:

First, press ball bearing **(250)** on crankshaft **(110)** and fix it with support disc **(260)** and safety ring **(270)**. Then, press on ball bearing **(220)**.

To assemble connecting rod, also use work bench. At first, the rear washer **(800)** and the inside bearing rings **(310)** are pushed on to the crankshaft journals. When mounting the inside bearing rings, make sure that the bores are exactly above the crankshaft journal groove.

The outside bearing ring **(330)** has to be pushed into the connecting rod and has to be fixed in its exact centre. Now, assemble the needle bearing cages **(320)**. (The spaces between needles and cage have to be filled manually with the a.m. ARAL (or equal) grease.) After the connecting rod with the outside bearing ring **(330)** has been pushed on the bearing cages put on washer **(801)** and fix it with the safety ring **(360)**. It must still be possible to turn the washer by hand.

Before the complete crankshaft is pushed into the casing **(20)**, which possibly can be done by a mallet, check if the smaller safety ring **(240)** is exactly positioned in its groove. After the crankshaft has been inserted, fit in the bigger safety ring **(280)** carefully.

Finally, screw grease nipple **(510)** in the crankshaft and fill the crankshaft bore with grease. Lubrication of the connecting rod bearing will then be self-acting.

7. Maximum Sound Volume

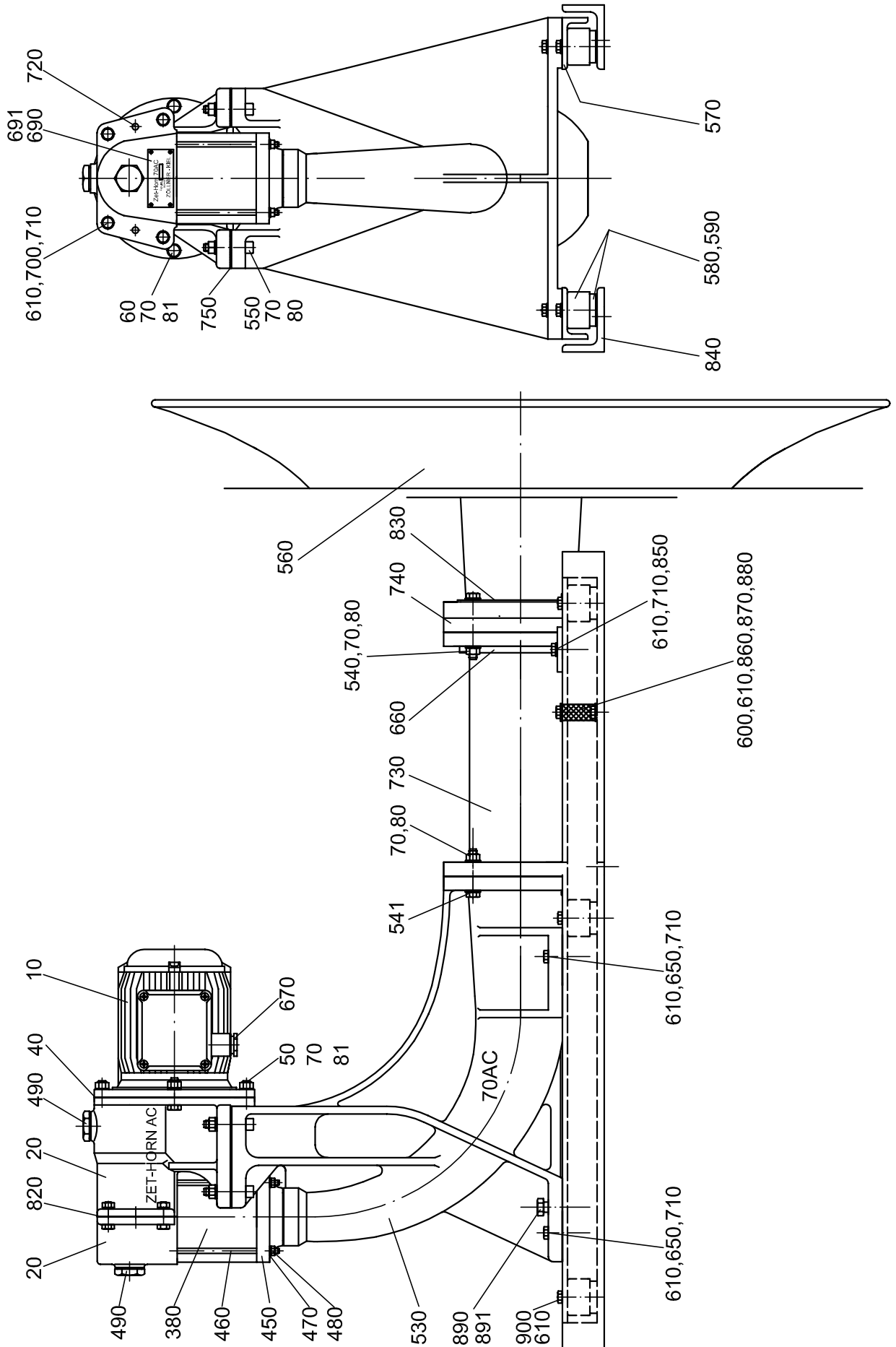
Maximum volume will only be achieved with the power frequency the Zet-Horn has been laid out for. A change by +/- 2 Hz won't have any influence on the volume. Voltage variations of +/- 20 % will not affect the Zet-horn's sound intensity either. All Zet-Horns have been adjusted by the company. Should there be complaints concerning volume it will be necessary to state board main frequency with operating and non-operating Zet-Horn. Both values as well as the Zet-Horn's serial no. which you will find on the type plate **(690)** have to be reported to the producer.

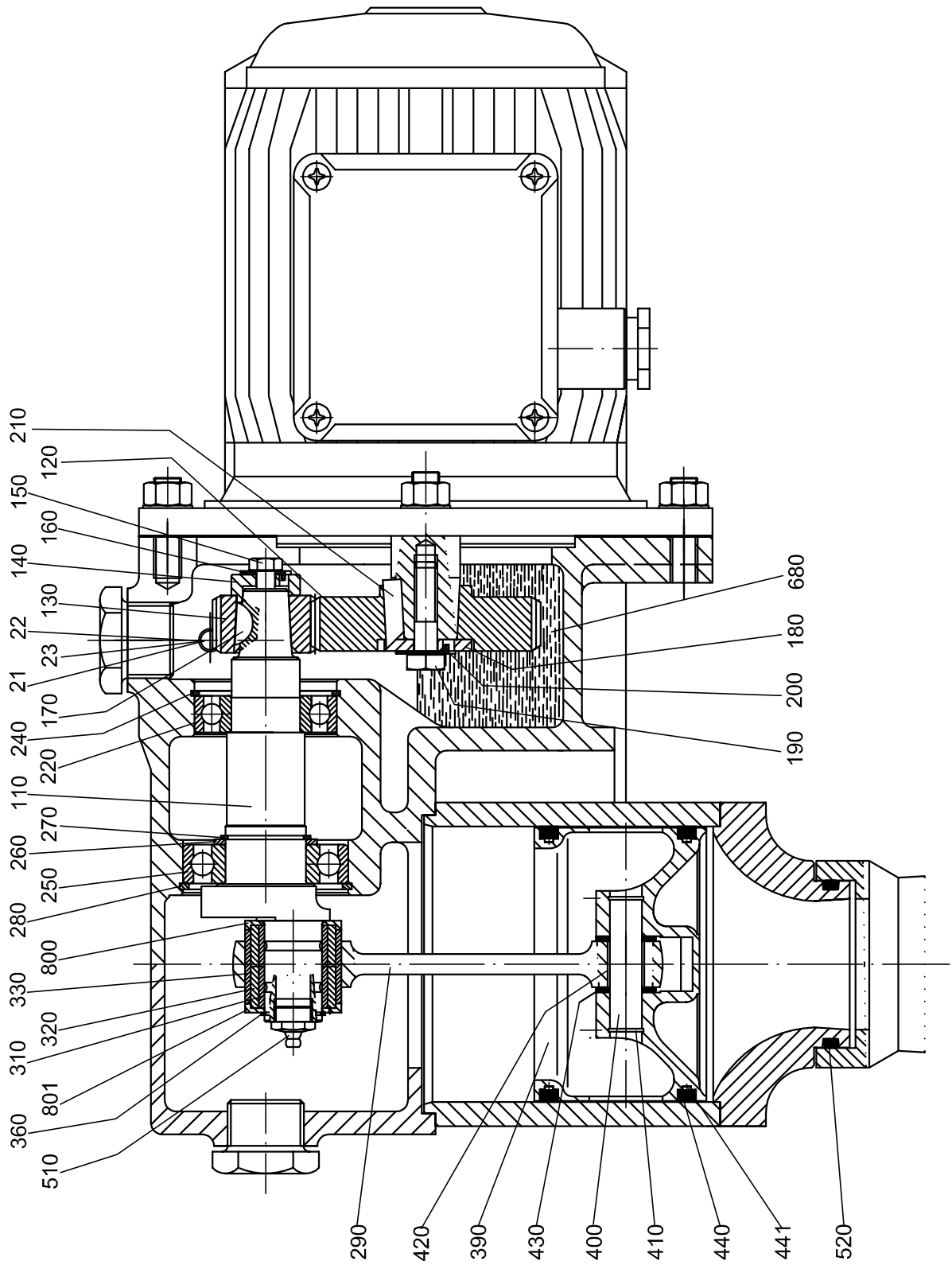
8. Heating

An electric motor heating ensures the Zet-Horn's faultless operation also at low temperatures and avoids condensation water. The heating is controlled by the motor contactor, which is installed in the Zet-Horn's switch-box, together with the heating relay and the required transformer. Vessels of the "Arctic Class" can additionally be equipped with an extra heating for the horn to avoid deposits of snow and ice.

<u>Fault</u>	<u>Fault Diagnoses</u>	<u>Elimination</u>
1. No sound	No power supply	Switch on power supply
2. No sound	Fuses 35 A of the main control panel defective	Renew fuses eliminate fault
3. No sound	No tension of 440 V AC 60 Hz (380 V AC 50 Hz) at the terminals L1, L2, L3 and of the control unit 4476	Check cabeling and fuses and eliminate fault
4. No sound	Contacts of the contactor panel (01707327) do not close when pressing the button for sound signals	1) Examine cabeling and signal automaton if there is no tension of 230 V AC/ 110 V AC at the terminal board contactors e1+2 in the control unit 2) If there are 230 V AC/ 110 V AC before but not behind the contactors renew fuses 3) Contacts still do not close, switch in the bimetal relay T20 manually 4) Contacts still do not close, exchange contactor paneIT30
5. No sound	Contacts of the contactor panel (01707327) do not close when pressing the button for sound signals	If there is no tension of 440 V AC 60 Hz (380 V AC 50 Hz) at the terminals U,V,W exchange bi-metal relay. Examine key connections.
6. No sound	Control unit is not defective but no tension at the terminals U, V, W.	Examine cables and cable connections.
7. No sound	Control unit and cables are not defective but the motor is	Exchange motor

<u>Fault</u>	<u>Fault Diagnoses</u>	<u>Elimination</u>
8. No clear sound	Check Zet-Horn power plant and piston	Disassemble Zet-Horn and renew defective parts
9. Sound pressure level too low	Check present sound frequency	Adjust sound frequency of the ship's network at 60 Hz -1 Hz, +1,5 Hz (50 Hz-1 Hz, +1,5 Hz)





Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten techn. data
10	803690230	1	Drehstrommotor	AC-motor	5.5 kW
20	01036380	1	Gehäuse A + B	casing A + B	
21	556154101	1	Schmiernippel	grease nipple	AM 10x1
22	20941011	1	Verschlußschraube	screw plug	M 10x1
23	2433000	1	Schmiernippelkappe	grease nipple cap	GPN 1300 Form B
40	0104487	1	Flanschdichtung	flange gasket	250/130/ x0.5
50	2046120301	2	Stiftschraube	stud bolt	M 12x30
60	2044120401	2	Sechskantschraube	hexagon screw	M 12x40
70	211300121	16	Sicherungsscheibe	washer	∅ 12x21x2,5
80	21037121	12	Sicherungsmutter	safety nut	VM 12
81	21034121	4	Sechskantmutter	hexagon nut	M 12
110	01906120	1	Kurbelwelle	crankshaft	188.5 lg
120	01906140	1	Zahnrad	gear wheel	60Hz/34
130	01906141	1	Zahnrad	gear wheel	60Hz/41
121	01906142	1	Zahnrad	gear wheel	50Hz/30
131	01906143	1	Zahnrad	gear wheel	50Hz/44
140	0103530	1	Sicherungsdeckel	washer	∅ 30x12
150	0103952	1	Sechskantschraube	hexagon screw	M 8x50
160	254208	1	Sicherungsblech	locking plate	8.4
170	22006075	1	Scheibenfeder	fitting key	6x7.5
180	0102817	1	Zahnradzscheibe	gear wheel disk	∅ 40x5
190	2043100406	1	Sechskantschraube	hexagon screw	M 10x40
200	254210	1	Sicherungsblech	locking plate	10.5
210	0103044	1	Paßfeder	fitting key	A 10x8x30
220	251062061	1	Rillenkugellager	ball bearing	6206-2RS1
240	2572062	1	Sicherungsring	safety ring	J 62x2
250	251062071	1	Rillenkugellager	ball bearing	6207-2RS1
260	253304525	1	Stützscheibe	support disk	SS 35x45x2.5
270	2571035	1	Sicherungsring	safety ring	A 35x1.5
280	2572072	1	Sicherungsring	safety ring	J 72x2.5
290	0104117	1	Pleuelstange	connecting rod	145 lg
310	251900300	2	Innenring	inside bearing ring	IR 25x30x18
320	251900200	2	Nadelkäfig	needle bearing cage	K 30x37x18
330	251900393	1	Lageraußenring	outside bearing ring	AR 37x42x32
360	2571025	1	Sicherungsring	safety ring	A 25x1.2
380	0105039	1	Zylinder	cylinder	∅141/120x129
390	0104362	1	Kolben	piston	∅ 120x75
400	885514562	1	Kolbenbolzen	wrist pin	∅ 14x56
410	2580014	2	Sprengtring	safety ring	A 14x1.2
420	381001420	1	DU-Buchse	DU-type bush	14x16x20
430	381001415	2	DU-Anlaufscheibe	DU-guard plate	14x26x1,5
440	0105069	2	Kolbenring mit	piston ring with	∅ 120/110x8
441	0104757	2	Wellfeder	spring	∅ 109,2
450	0103526	1	Trichterflansch	flange of horn	∅130x59
460	0104546	4	Gewindestange	tie rod	M 8x175
470	21130081	4	Sicherungsscheibe	washer	8x14,8x2
480	21037081	4	Sicherungsmutter	safety nut	VM 8
490	20983325	2	Verschlußschraube	screw plug	R 1"
510	55615436	1	Schmiernippel H1	grease nipple	R 3/8"

Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten Techn. data
520	50210655	1	O-Ring	o-ring	Ø65x5
530	0103527	1	Trichterbogen	arched piece of horn	
540	2043121101	4	Sechskantschraube	hexagon screw	M 12x110
541	2043120601	4	Sechskantschraube	hexagon screw	M 12x60
550	2035120601	4	Zylinderschraube	cylinder screw	M 12x60
560	01906158	1	Trichterendstück	mouth of horn	70 AC
570	01906134	2	Verbindungswinkel	connecting angle	80x40x1160
580	0103783	6	Schwingmetall	vibration absorber	Ø50x45
590	0103389	6	Schwingmetallkappe	absorber cap	57x62x35
600	2044100251	1	Sechskantschraube	hexagon screw	M 10x25
610	211300101	19	Sicherungsscheibe	washer	10x18x2,2
650	2044100401	4	Sechskantschraube	hexagon screw	M10x40
660	01906139	2	Halter Verbindungswinkel	holder connecting angle	
670	677073002	1	Kabelverschraubung	cable gland	MGCG M 30x2
680	933003700	1000g	Getriebefett	gear grease	Aral Aralub
690	2491906212	1	Typenschild	name plate	110x40
691	2122703061	4	Kerbnagel	grooved drive stud	3x6
700	20441100351	6	Sechskantschraube	hexagon screw	M 10x35
710	21037101	7	Sicherungsmutter	safety nut	VM 10
720	212210025	2	Zylinderstift	locking bolt	10m6x24
730	01906138	1	Zwischenstück	intermediary	
740	0103658	3	Distanzring	distance ring	Ø240x150x20
750	0103748	2	Dämpfungsplatte	damping plate	161x60x2
800	0105260	1	Anlaufscheibe	thrust washer	Ø 42x6
801	0105320	1	Anlaufscheibe	thrust washer	Ø 42x6
820	0104120	1	Gehäusedichtung	casing gasket	
830	01906087	2	Unterlegblech	support sheet	Bl.4
840	01906135	2	Befestigungswinkel	fastening angle	
850	2044100301	2	Sechskantschraube	hexagon screw	M10x30
860	21034101	2	Sechskantmutter	hexagon nut	M10
870	672024125	1	Masseband	earthing strap	
880	2044100161	1	Sechskantschraube	hexagon screw	M10x16
890	2043160901	2	Sechskantschraube	hexagon screw	M16x90
891	21034161	2	Sechskantmutter	hexagon nut	M16
900	2044100201	6	Sechskantschraube	hexagon screw	M10x20

Wenn Sie Ersatzteile bestellen, geben Sie bitte an:
 Schiffsname-Bauwerft-Baur.-ZET-HORN Seriennummer!

When ordering spare parts, please indicate:
 Name of ship-shipbuilder-hull no.-ZET-HORN serial no.!

1. General remarks

ZÖLLNER Zet-Horns are available for voltages from 230-460 Volts/ 50 or 60 Hz AC 3phase. Special voltages can be delivered on request.

The essential component of the Zet-Horn is the piston which, driven by an AC 3phase motor over a direct tooth-wheel gear, crankshaft and connecting rod, oscillates at a fixed frequency.

The sympathetic vibrations caused by the oscillating piston produce a pure tone with a wide audibility range. The motor which is flange-mounted to the casing has a powerful starting torque and will start immediately when signals are released.

The gear system is of plain, solid design: The tooth wheels are made of highly alloyed, wear resistant tool steel; the cylinder is made of corrosion-resistant material with its bearing surface accurately hardened and ground. The one-piece crankshaft allows easy assembly with standard on-board tools. Grease will guarantee reliable lubrication. To provide faultless operation also at extremely low temperatures and to avoid condensation water an electric motor heating can be applied.

The Zet-Horn is adjusted to a duty factor of 15%!

2. Motor protection

The minimum protection of the Zet-Horn motors should be a thermic over-current relay (bi-metal). Other methods of motor protection are also possible.

Fuses and cables have to be provided by the shipyard according to classification societies and other standards. Only apply 35 ampère time-lag fuses.

3. Installation and Connection

1. The sound horns have to be installed **as high as practicable** to obtain an optimal sound emission and make sure that sound intensity does not exceed 110 dB (A) at the listening posts. **The console should be designed large enough to provide a safe possibility for inspection.**

2. The Zet-Horns are fixed by 4 well secured M12 screws.

3. Electrical connections have to be laid according to the producers' wiring diagram. It is important to use only flexible cables.

4. Maintenance

Generally, there is no maintenance required for the Zet-Horn. Only the lubrication grease has to be checked at intervals of about 3 to 6 months. Normally, the grease has to be exchanged in 5-year intervals; but when found dirty it must be replaced immediately.

The connection rod bearing is lubricated automatically through the crankshaft bore. Additionally, there is a grease nipple **(510)** at the crankshaft **(110)** extensions.

Lubrication of the big-end bearing can also be effected through an aperture of casing B **(20)**. This aperture is plugged by screw plug **(490)**.

On one side of the Zet-Horn casing, close to the tooth wheels, there is another grease nipple (21). At intervals of about 3 to 6 months, the screw plug (22) has to be opened and grease (AVIANAT 0 EP or equivalent) has to be filled in underneath the grease nipple.

To exchange the grease proceed as follows:

a. Zet-Horn 141AC/131AC

1. Loose cables from motor (10).
2. Remove screws (550) between the both casingparts (20) and carriers (531,531.1).
3. Remove nuts (480) between cylinder (380) and sound horn (560).

b. Zet-Horn 110AC/90AC

1. Loosen cables from motor (10).
2. Remove screws (550) between the both casingparts (20) and arched piece of horn (530).
3. Remove nuts (480) between cylinder (380) and flange of horn (450).

In the vessel's workshop, the motor has to be detached from the casing by unscrewing screws (60) and nuts (80). Make sure that the motor remains in overhead position. Now, exchange the grease (approx. 0.800 cm³). At this opportunity, also check tooth-wheels and crankshaft bearings. In addition, check state of piston ring and wrist pin and exchange them if they are worn out.

5. Disassembly

If good tools are provided on board disassembly and reassembly of the Zet-Horn will not cause any trouble. After the Zet-Horn has been taken down from the mast proceed as follows to disassemble:

1. Loosen screws (550) – between casing and arched piece of horn (carriers) – and nuts (480) and carefully lift the whole gear system.
2. Pull off cylinder (380) after removal of nuts (480).
3. Loosen hexagon screws (700) from nuts (710) and carefully remove front of casing.
4. In order to pull off the whole connection rod bearing, first, detach the safety ring (360) with appropriate pliers and then remove the thrust washer (801). Now use a take-off tool to remove the complete needle bearing with inside and outside rings (310,320,330), thrust washer (800) and the still fixed connection rod (290).
5. Use a work bench to carefully press outside bearing ring (330) out of the connection rod (290). Before reassembling the Zet-horn again, make sure that the needle bearing with inside and outside rings (310,320,330) and thrust washer (800,801) are replaced by new parts.
6. To disassemble the crankshaft, remove safety ring (280), unscrew hexagon screws (150) and take off lid (140) and locking plate (160). Now pull off tooth-wheel (130). Use a mallet to expel the crankshaft. Pull off the bearings.
7. Each time the Zet-Horn is disassembled, the DU-type bushes and discs (420 and 430) between connecting rod, piston and wrist pin have to be checked. Basically, it is the best to always exchange these parts.
The piston rings (441) also have to be checked and exchanged when necessary.

6. Reassembly

To reassemble, reverse procedures as described above:

First, press ball bearing **(250)** on crankshaft **(110)** and fix it with support disc **(260)** and safety ring **(270)**. Then, press on ball bearing **(220)**.

To assemble connecting rod, also use work bench. At first, the rear washer **(800)** and the inside bearing rings **(310)** are pushed on to the crankshaft journals. When mounting the inside bearing rings, make sure that the bores are exactly above the crankshaft journal groove.

The outside bearing ring **(330)** has to be pushed into the connecting rod and has to be fixed in its exact centre. Now, assemble the needle bearing cages **(320)**. (The spaces between needles and cage have to be filled manually with the a.m. Aral (or equal) grease.) After the connecting rod with the outside bearing ring **(330)** has been pushed on the bearing cages put on washer **(801)** and fix it with the safety ring **(360)**. It must still be possible to turn the washer by hand.

Before the complete crankshaft is pushed into the casing **(20)**, which possibly can be done by a mallet, check if the smaller safety ring **(240)** is exactly positioned in its groove. After the crankshaft has been inserted, fit in the bigger safety ring **(280)** carefully.

Finally, screw grease nipple **(510)** in the crankshaft and fill the crankshaft bore with grease. Lubrication of the connecting rod bearing will then be self-acting.

7. Maximum Sound Volume

Maximum volume will only be achieved with the power frequency the Zet-Horn has been laid out for. A change by +/- 2 Hz won't have any influence on the volume. Voltage variations of +/- 20 % will not affect the Zet-horn's sound intensity either. All Zet-Horns have been adjusted by the company. Should there be complaints concerning volume it will be necessary to state board main frequency with operating and non-operating Zet-Horn. Both values as well as the Zet-Horn's serial no. which you will find on the type plate **(690)** have to be reported to the producer.

8. Heating

An electric motor heating ensures the Zet-Horn's faultless operation also at low temperatures and avoids condensation water. The heating is controlled by the motor contactor, which is installed in the Zet-Horn's switch-box, together with the heating relay and the required transformer. Vessels of the "Arctic Class" can additionally be equipped with an extra heating for the horn to avoid deposits of snow and ice.

<u>Fault</u>	<u>Fault Diagnoses</u>	<u>Elimination</u>
1. No sound	No power supply	Switch on power supply
2. No sound	Fuses 35 A of the main control panel defective	Renew fuses eliminate fault
3. No sound	No tension of 440 V AC 60 Hz (380 V AC 50 Hz) at the terminals L1, L2, L3 and of the control unit 4476	Check cabling and fuses and eliminate fault
4. No sound	Contacts of the contactor panel (01707327) do not close when pressing the button for sound signals	1) Examine cabling and signal automaton if there is no tension of 230 V AC/ 110 V AC at the terminal board contactors e1+2 in the control unit 2) If there are 230 V AC/ 110 V AC before but not behind the contactors renew fuses 3) Contacts still do not close, switch in the bimetal relay T20 manually 4) Contacts still do not close, exchange contactor panel T30
5. No sound	Contacts of the contactor panel (01707327) do not close when pressing the button for sound signals	If there is no tension of 440 V AC 60 Hz (380 V AC 50 Hz) at the terminals U, V, W exchange bi-metal relay. Examine key connections.
6. No sound	Control unit is not defective but no tension at the terminals U, V, W.	Examine cables and cable connections.
7. No sound	Control unit and cables are not defective but the motor is	Exchange motor

Fault

Fault Diagnoses

Elimination

8. No clear sound

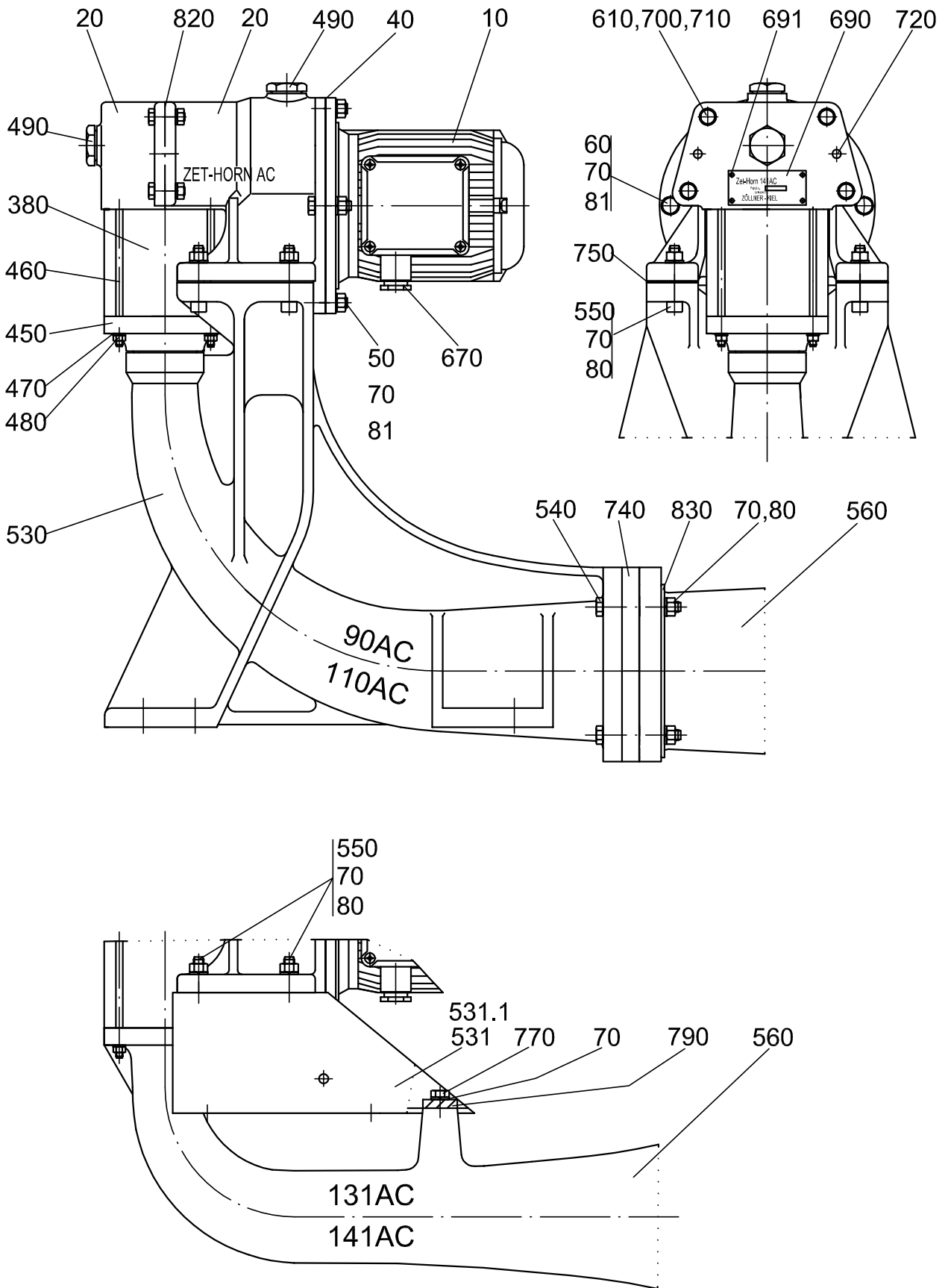
Check Zet-Horn power plant and piston

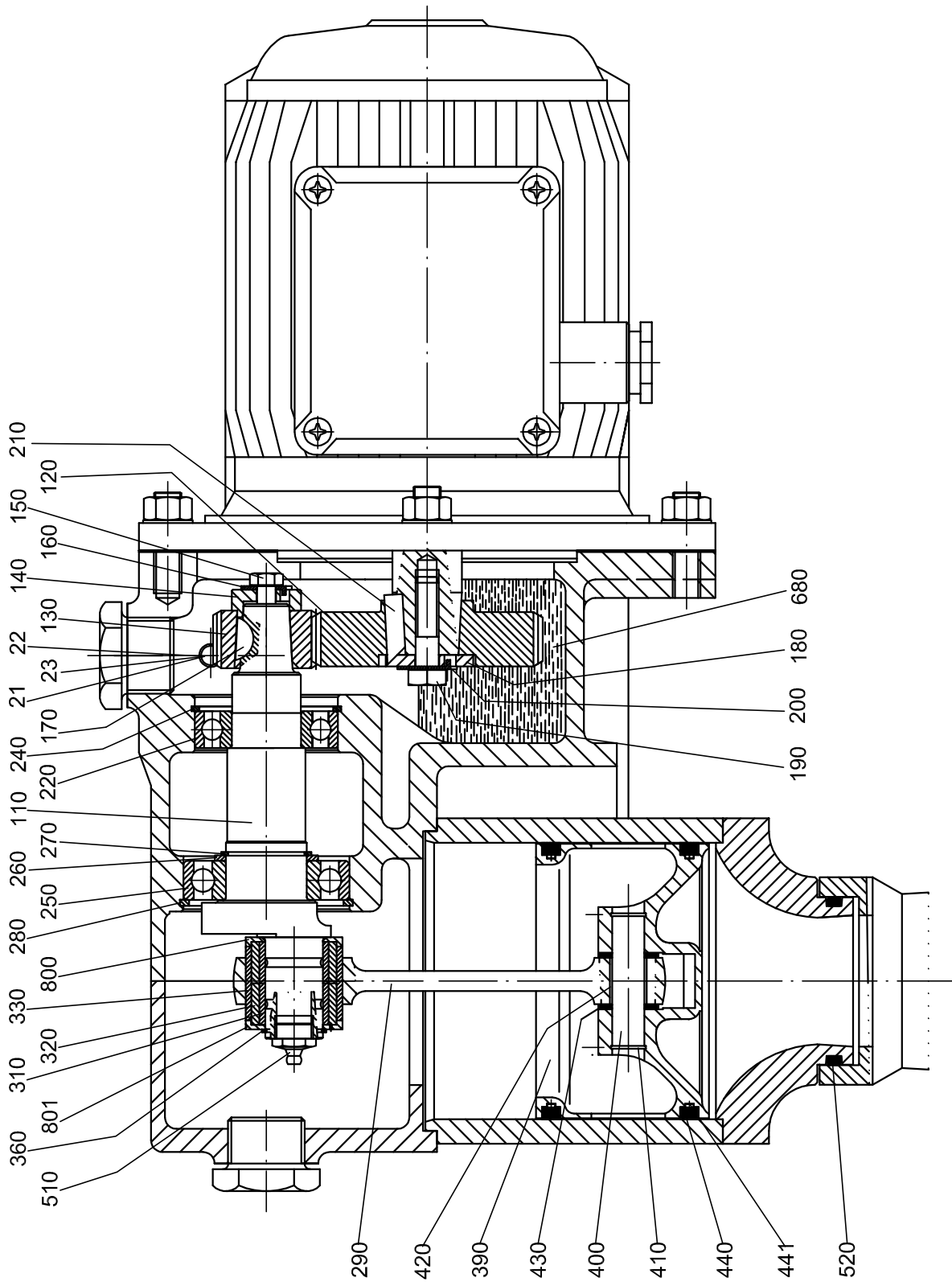
Disassemble Zet-Horn and renew defective parts

9. Sound pressure level too low

Check present sound frequency

Adjust sound frequency of the ship's network at 60 Hz -1 Hz, +1,5 Hz (50 Hz-1 Hz, +1,5 Hz)





Zet-Horn AC

Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten techn. data
10	803690230	1	Drehstrommotor	AC-motor	5.5 kW
20	01036380	1	Gehäuse A + B	casing A + B	
21	556154101	1	Schmiernippel	grease nipple	AM 10x1
22	20941011	1	Verschlußschraube	screw plug	M 10x1
23	2433000	1	Schmiernippelkappe	grease nipple cap	GPN 1300
40	0104487	1	Flanschdichtung	flange gasket	250/130/ x0.5
50	2046120301	2	Stiftschraube	stud bolt	M 12x30
60	2044120401	2	Sechskantschraube	hexagon screw	M 12x40
70	211300121	12	Sicherungsscheibe	washer	∅ 12x21x2,5
80	21037121	8	Sicherungsmutter	safety nut	VM 12
81	21034121	4	Sechskantmutter	hexagon nut	M12
110	0104122	1*	Kurbelwelle 141/131AC	crankshaft	188.5 lg
110	0104124	1⊗	Kurbelwelle 90/110AC	crankshaft	188,5 lg
120	01...	1	Zahnrad	gear wheel	
130	01...	1	Zahnrad	gear wheel	
140	0103530	1	Sicherungsdeckel	safety cap	∅ 30x12
150	0103952	1	Sechskantschraube	hexagon screw	M 8x50
160	254208	1	Sicherungsblech	locking plate	∅8.4
170	22006075	1	Scheibenfeder	fitting key	6x7.5
180	0102817	1	Zahnradzscheibe	gear wheel disk	∅ 40x5
190	2043100406	1	Sechskantschraube	hexagon screw	M 10x40
200	254210	1	Sicherungsblech	locking plate	∅10.5
210	0103044	1	Paßfeder	fitting key	A 10x8x30
220	251062061	1	Rillenkugellager	ball bearing	6206-2RS1
240	2572062	1	Sicherungsring	safety ring	J 62x2
250	251062071	1	Rillenkugellager	ball bearing	6207-2RS1
260	253304525	1	Stützscheibe	support disk	SS 35x45x2.5
270	2571035	1	Sicherungsring	safety ring	A 35x1.5
280	2572072	1	Sicherungsring	safety ring	I 72x2.5
290	0104117	1	Pleuelstange	connecting rod	145 lg
310	251900300	2	Innenring	inside bearing ring	IR 25x30x18
320	251900200	2	Nadelkäfig	needle bearing cage	K 30x37x18
330	251900393	1	Lageraußenring	outside bearing ring	AR 37x42x32
360	2571025	1	Sicherungsring	safety ring	A 25x1.2
380	0105039	1	Zylinder	cylinder	∅ 120
390	0104362	1	Kolben	piston	∅ 120
400	885514562	1	Kolbenbolzen	wrist pin	∅ 14x56
410	2580014	2	Sprengring	safety ring	A 14x1
420	381001420	1	Buchse	bush	∅14x16x20
430	381001415	2	Anlaufscheibe	guard plate	∅14x26x1,5
440	0105069	2	Kolbenring mit	piston ring with	∅ 120/110x8
441	0104757	2	Expanderfeder	spring	∅120
450	0103526	1⊗	Trichterflansch	flange of horn	∅130x59
460	0104546	4	Gewindestange	tie rod	M 8x175
470	211300081	4	Sicherungsscheibe	washer	∅8x14,8x2
480	21037081	4	Sicherungsmutter	safety nut	VM 8
490	20983325	2	Verschlußschraube	screw plug	R1"

Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten Techn. data
510	55615436	1	Schmiernippel	grease nipple	R 3/8"
520	50210655	1⊗	O-Ring	o-ring	∅65x5
530	0103527	1⊗	Trichterbogen	arched piece of horn	M1.2825
531	0105211	1*	Träger rechts	carrier right	U140x265
531.1	0105212	1*	Träger links	carrier left	U140x265
540	2043120901	4⊗	Sechskantschraube	hexagon screw	M12x90 f.110AC
540	2043121101	4⊗	Sechskantschraube	hexagon screw	M12x110 f.90AC
550	2035120601	4⊗	Zylinderschraube	cylinder screw	M 12x60
550	2044120401	4*	Sechskantschraube	hexagon screw	M 12x40
560	0103676	1⊗	Trichterendstück 110AC	mouth of horn	∅850x592
560	0103642	1⊗	Trichterendstück 90AC	mouth of horn	∅850x814
560	0103773	1*	Trichter 141AC	horn	∅490x835
560	0104242	1*	Trichter 131AC	horn	∅490x910
610	211300101	4	Sicherungsscheibe	washer	∅10x18x2,2
670	677073002	1	Kabelverschraubung	cable gland	MGCG M 30x2
680	9330037002	0.8 kg	Getriebefettfüllung	gear grease	AVIANAT 0 EP
690	24910	1	Typenschild	name plate	110x40
691	2122703061	4	Kerbnagel	grooved drive stud	∅3x6
700	2044100351	4	Sechskantschraube	hexagon screw	M 10x35
710	21037101	4	Sicherungsmutter	safety nut	VM 10
720	212210025	2	Zylinderstift	locking bolt	10m6x24
740	0103658	1⊗	Distanzring	distance ring	∅240x150x20
750	0103748	2⊗	Dämpfungsplatte	damping plate	161x60x2
770	2044120301	2*	Sechskantschraube	hexagon screw	M12x30
790	01042721	1*	Halteschiene	support bar	40x10x280
800	0105260	1	Anlaufscheibe	thrust washer	∅ 42x4
801	0105320	1	Anlaufscheibe	thrust washer	∅ 42x4
820	0104120	1	Gehäusedichtung	casing gasket	229/127x0,25
830	01906087	2⊗	Unterlegblech	sheet	Bl.4

* nur/only 131AC/141AC

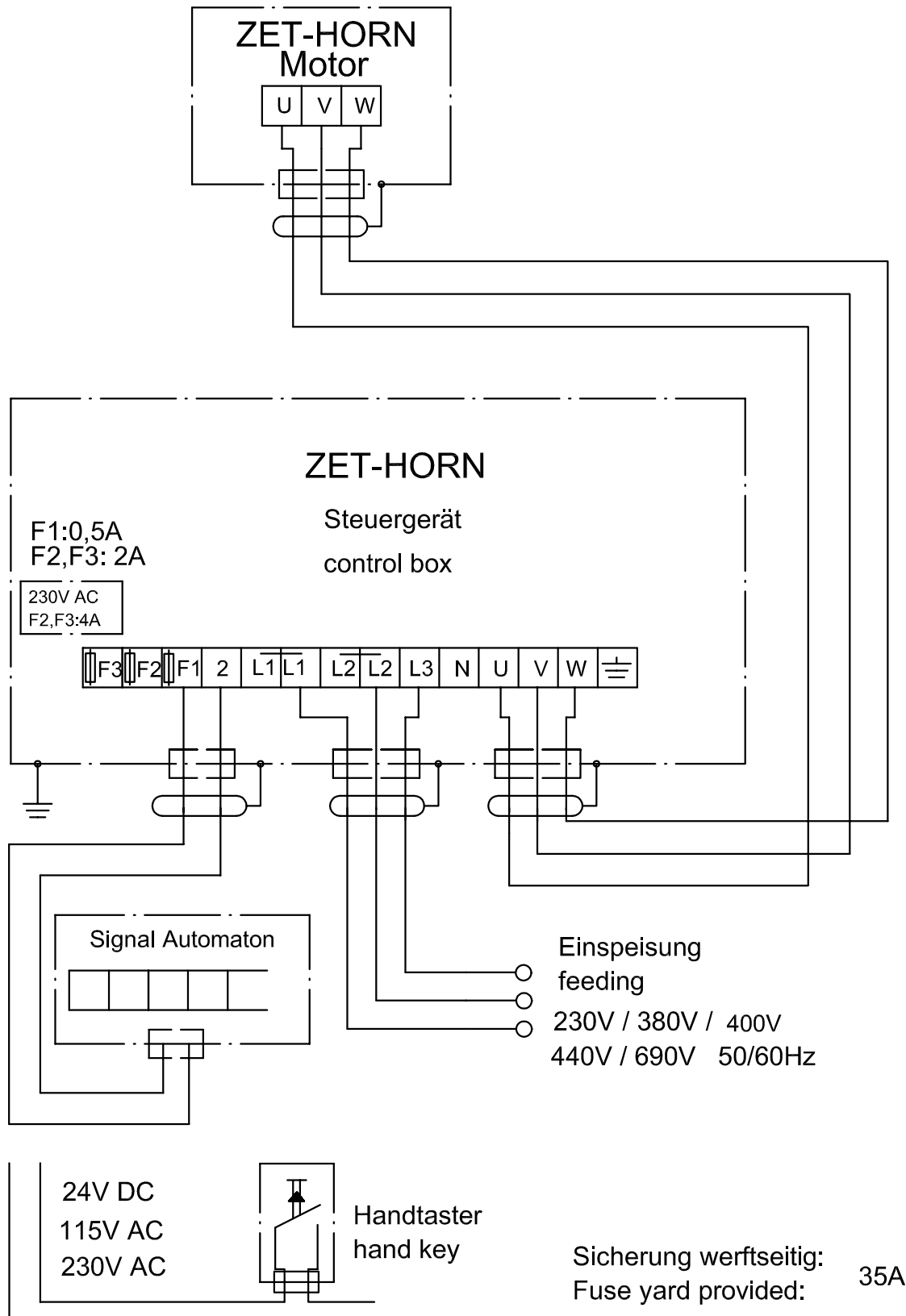
⊗ nur/only 90AC/110AC

Zahnräder nur paarweise austauschen !
Gear weels must always be exchanged as pairs !

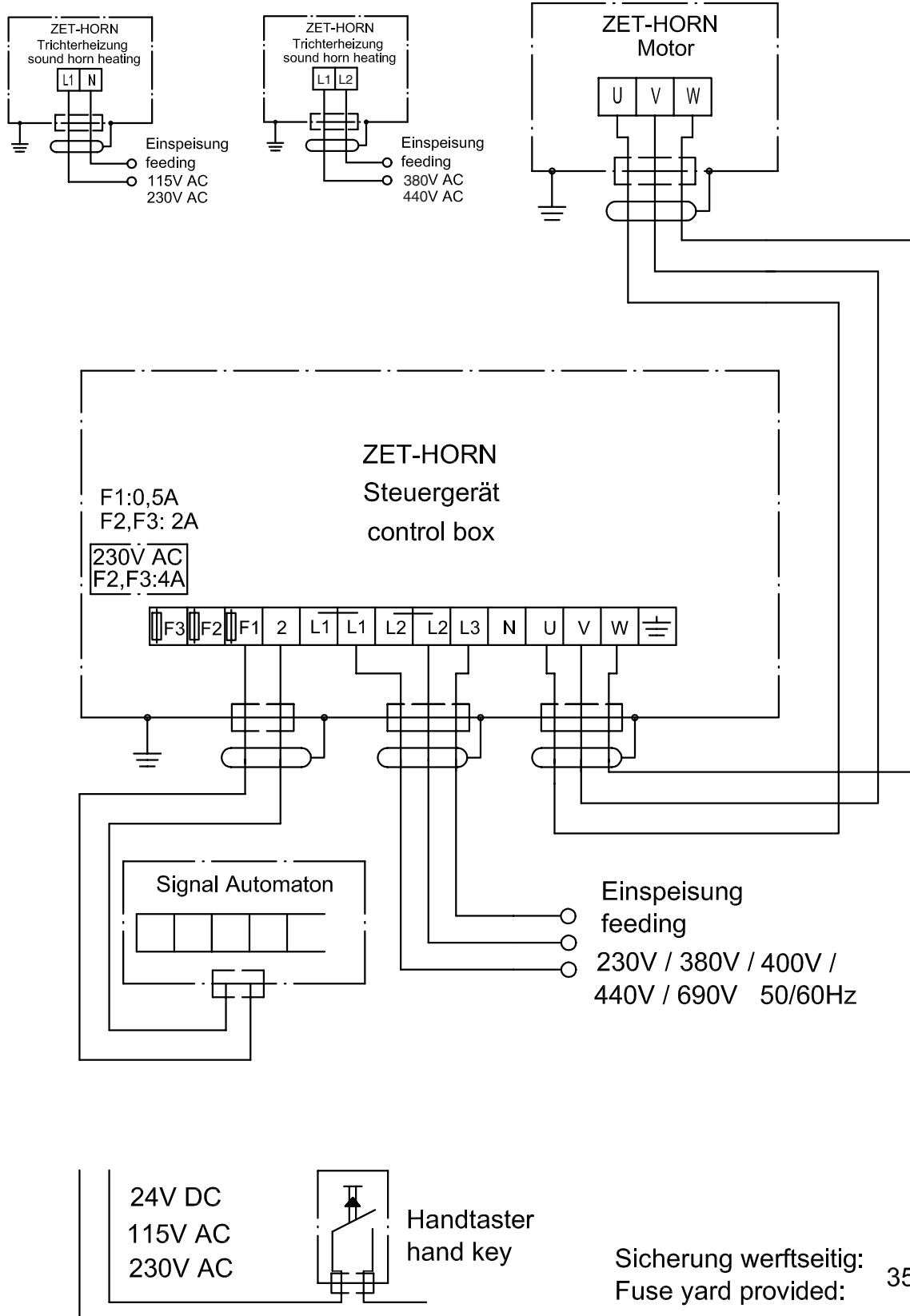
Gehäuse A+B können nur zusammen ausgetauscht werden !
Casing A+B must always be exchanged together !

Bei Ersatzteilbestellung geben Sie bitte an:
Schiffsname / Bau Werft / Bau Datum / Zet-Horn Fabriknummer.

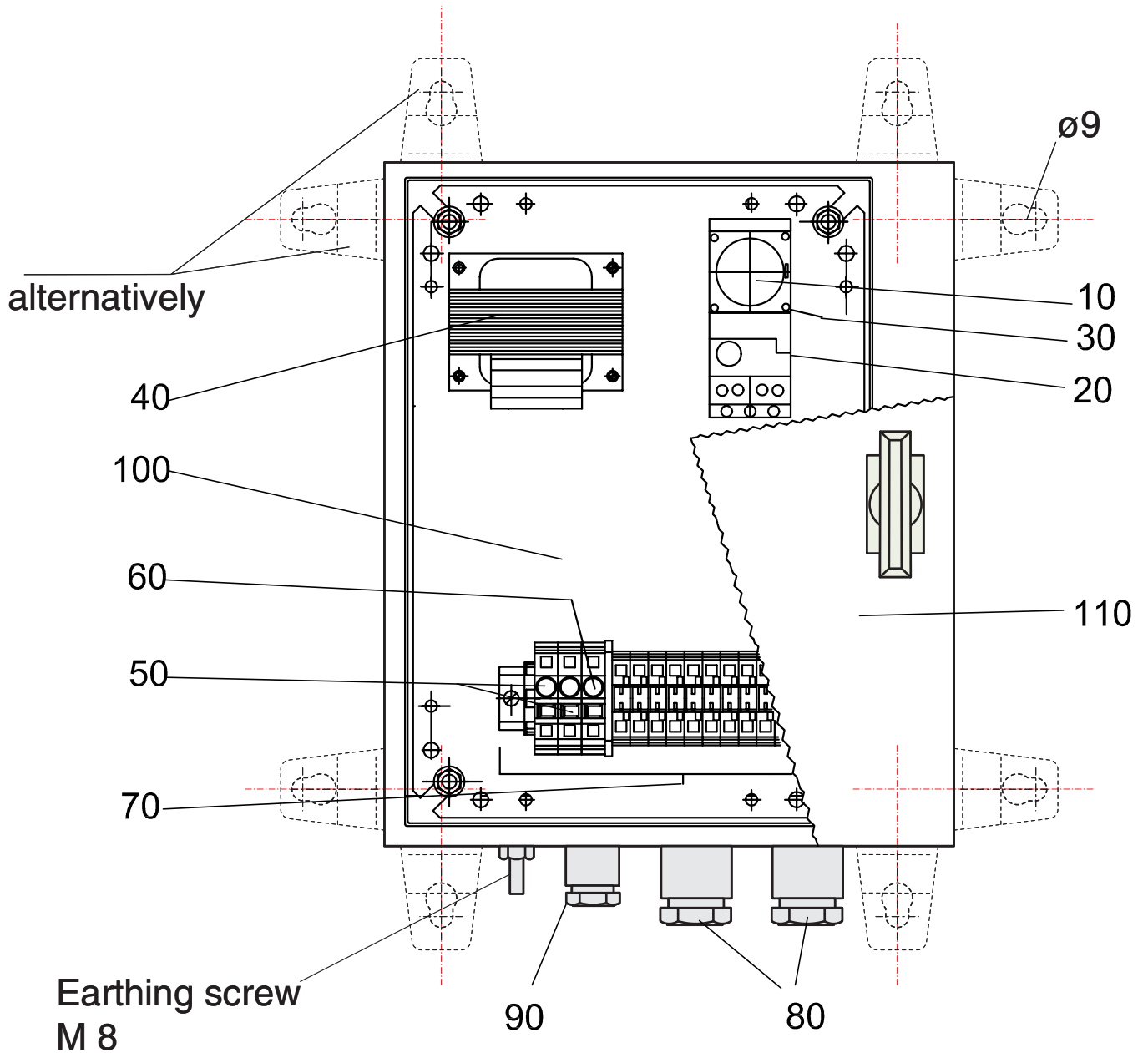
When ordering spare parts please indicate:
Name of ship / shipbuilder / building date / hull no. / Zet-Horn serial no.



Tasterleitungen verdreht oder abgeschirmt verlegen!
Lay cables for signal keys twisted or screened!



Tasterleitungen verdreht oder abgeschirmt verlegen!
Lay cables for signal keys twisted or screened!

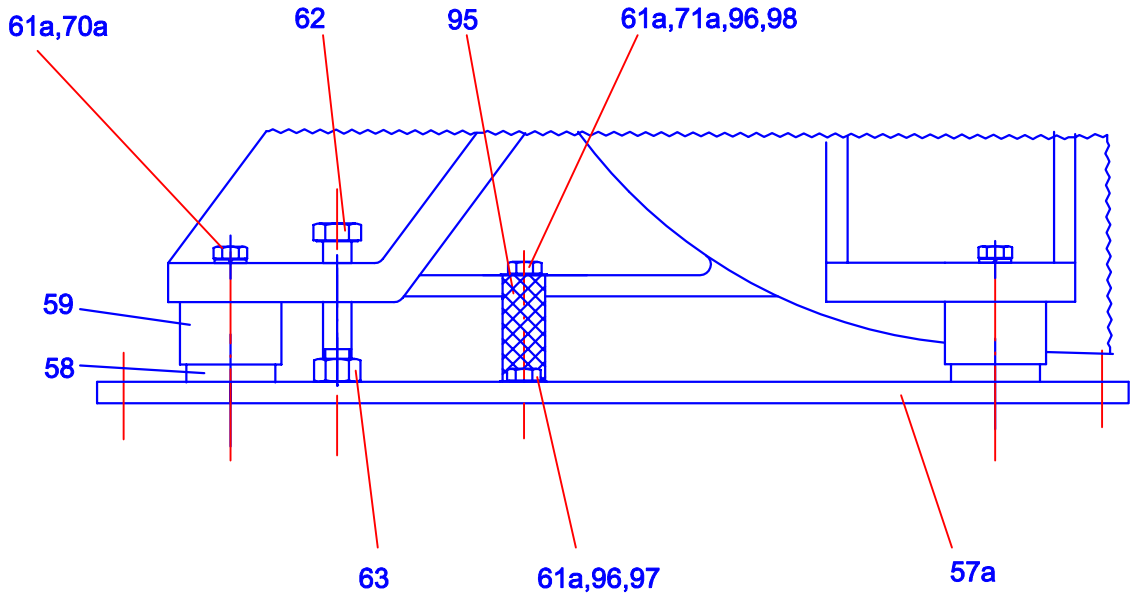


Teil item	Stck. Qty.	Bestell-Nr. Order-No.	techn.Daten techn. data	Bezeichnung Designation	Designation
10	1	631172210	0,1-30s	Zeitblock	time relay
20	1	630471319	12-18A	Bi-Metall Relais	bi-metall relay
30	1	630676181	LC1-D180	Schütz	contactor
40	1	68001044563	100VA	Transformator	transformer
50	2	683708902	2A	Sicherung	fuse
60	1	683701105	0,5A	Sicherung	fuse
70	1	7327-70		Klemmleiste, kompl.	terminal, compl.
80	2	677073002	M30x2	Versch., kompl.	cable gland, compl.
90	2	677072415	M24x1,5	Versch., kompl.	cable gland, compl.
100	1	01907237	200x265x2	Montageplatte	mounting plate
110	1	88700293252	300x250x200	Gehäuse	housing

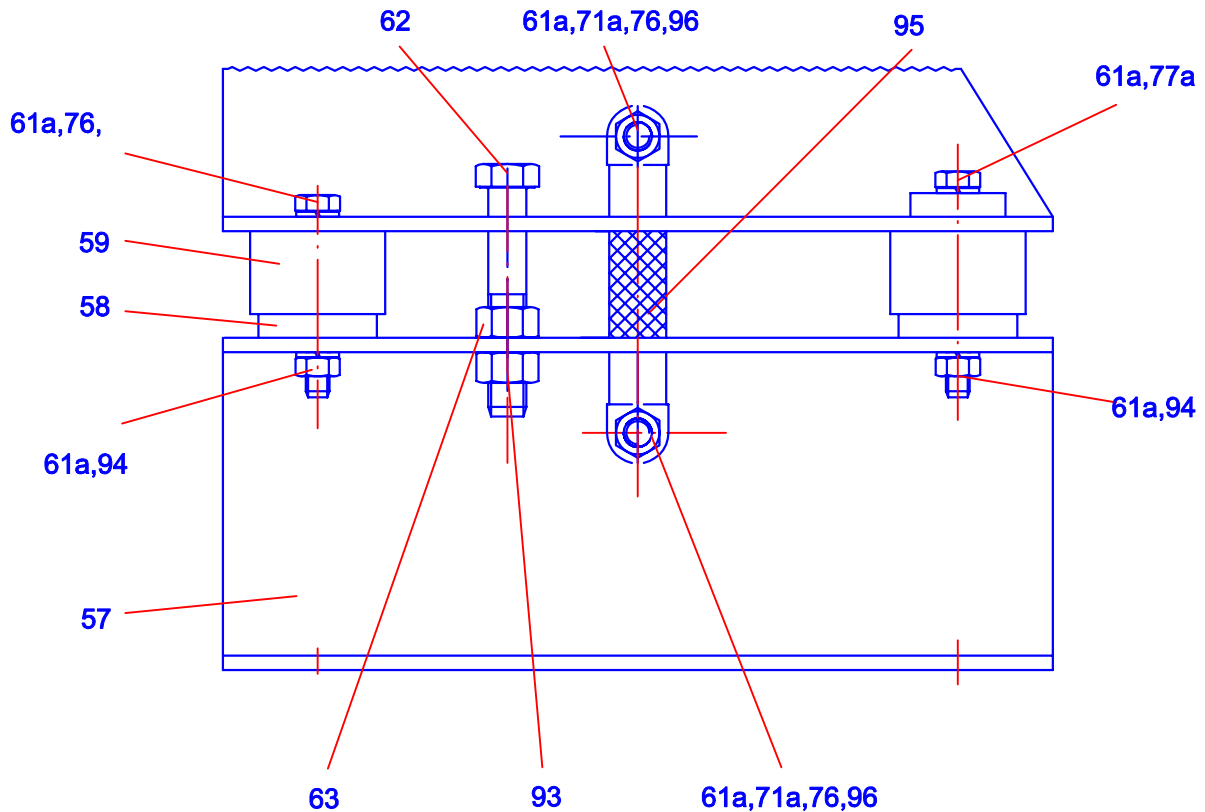
Änderung vorbehalten! Subject to alteration!

Ergänzung zur Betriebsanleitung 01808503.09
Supplement to operating manual 01808503.09

Zet-Horn 110AC/90AC



Zet-Horn 141AC/131AC



Ergänzung zur Betriebsanleitung 01808503.09
Supplement to operating manual 01808503.09

Zet-Horn 110AC/90AC

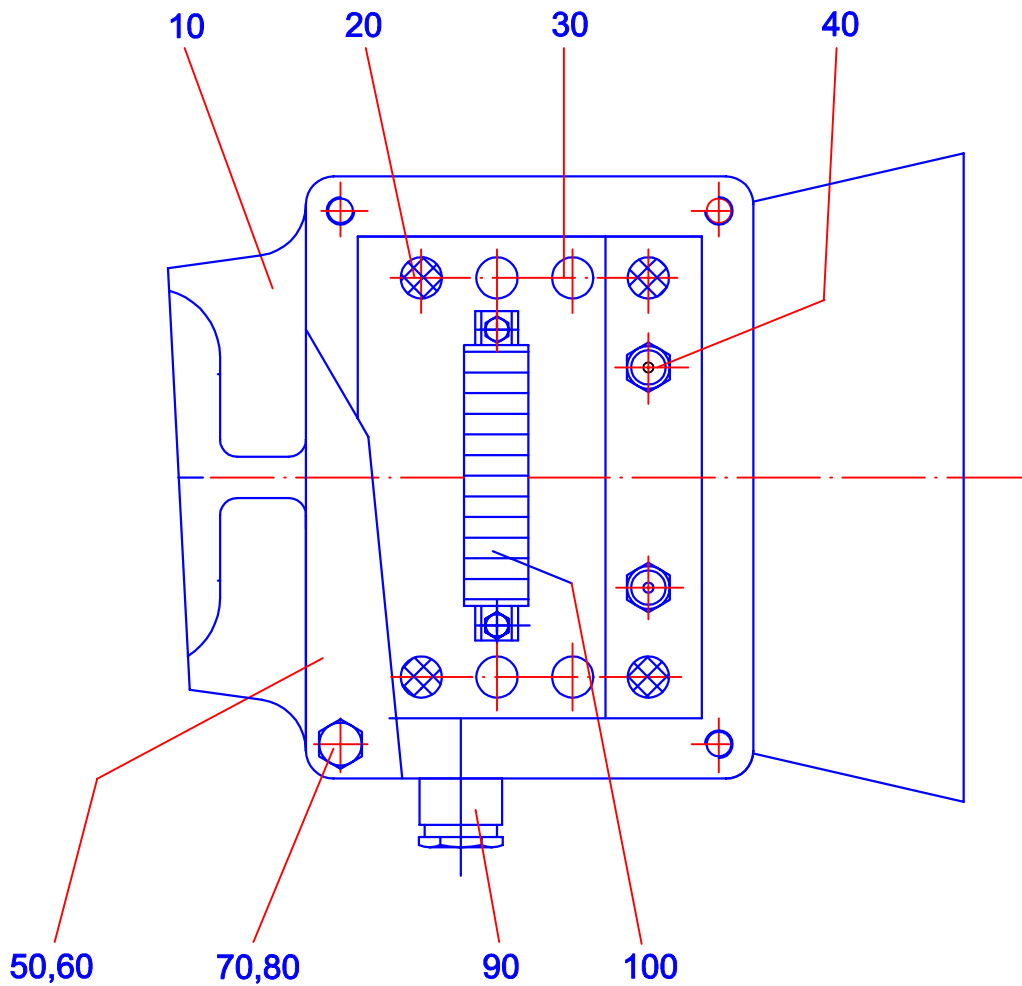
Pos. Item	Stck. Qty	Bestell-Nr. Order-No.	Techn. Daten Techn. Data	Bezeichnung	Designation
57a	2	0103643	70x12x580	Befestigungsschiene	fastening rail
58	4	0103783	Ø50x45	Schwingmetall	rubber metall
59	4	01906307	Ø54x35	Schutzkappe	safety cap
61a	6	211300101	10x18x2,2	Sicherungsscheibe	safety washer
62	2	2043160901	M16x90	Sechskantschraube	hexagon screw
63	2	21034161	M16	Sechskantmutter	hexagon nut
70a	4	2044100351	M10x35	Sechskantschraube	hexagon screw
71a	1	21034101	M10	Sechskantmutter	hexagon nut
95	1	672024125	24x150	Masseband	earthing strip
96	2	211100101	10,5	Sicherungsscheibe	safety washer
97	1	2044100161	M10x16	Sechskantschraube	hexagon screw
98	1	2044100251	M10x25	Sechskantschraube	hexagon screw

Zet-Horn 141AC/131AC

Pos. Item	Stck. Qty	Bestell-Nr. Order-No.	Techn. Daten Techn. Data	Bezeichnung	Designation
57	2	0105213	U140x350	Träger	support
58	4	0103783	Ø50x45	Schwingmetall	rubber metall
59	4	01906307	Ø54x35	Schutzkappe	safety cap
61a	10	211300101	10x18x2,2	Sicherungsscheibe	safety washer
62	2	2043160801	M16x80	Sechskantschraube	hexagon screw
63	2	21034161	M16	Sechskantmutter	hexagon nut
71a	2	21034101	M10	Sechskantmutter	hexagon nut
76	4	2044100201	M10x20	Sechskantschraube	hexagon screw
77a	2	2044100301	M10x30	Sechskantschraube	hexagon screw
93	2	21037161	VM16	Sicherungsmutter	safety nut
94	4	21037101	VM10	Sicherungsmutter	safety nut
95	1	672024125	24x150	Masseband	earthing strip
96	2	211100101	10,5	Sicherungsscheibe	safety washer

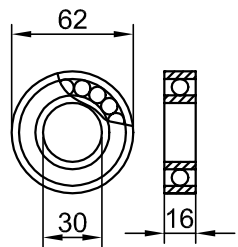
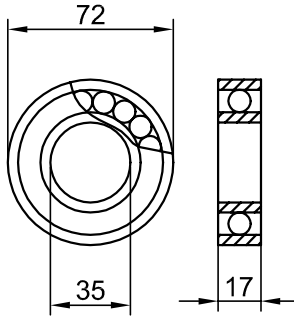
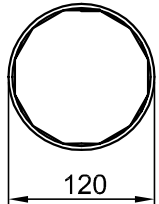
Die beiden Sicherungsschrauben M16 Pos.62,sorgen für die Verankerung des Zet-Horns,falls die Schwingmetalle beschädigt sein sollten und dürfen nicht entfernt werden!

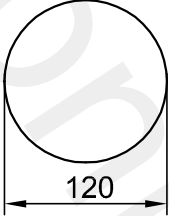
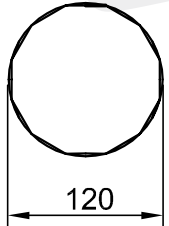
The two safety srews M16 item 62 keep the Zet-Horn fixed when the rubber metall connections are damaged.They must not taken away!



Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten techn. data
10	0104505	1	Trichter 141AC	sound horn 141AC	Ø490x835
10	0104508	1	Trichter 131AC	sound horn 131AC	Ø490x910
20	884410400	4	Heizstab 100W	heating bar 100 W	Ø10x40
30	884410800	4	Heizstab 400W	heating bar 400 W	Ø10x80
40	884604024	2	Thermostat	thermostat	M5x8
50	0104502	1	Deckel	lid	130x180x8
60	0104940	1	Dichtung	gasket	155x130x2
70	2044080251	4	Sechskantschr.	Hexagon screw	M8x25
80	211300081	4	Scheibe	washer	8x14,8x2
90	677072415	1	Kabelverschr.	Cable gland	24x1,5
100	01707471-100	1	Klemmleiste	terminal strip	


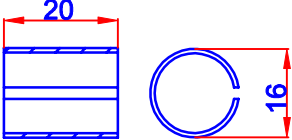
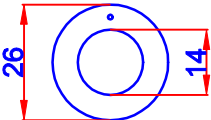
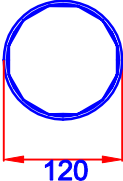
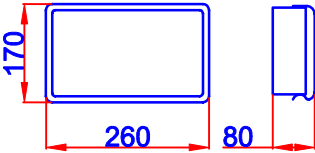
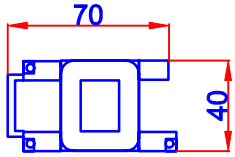
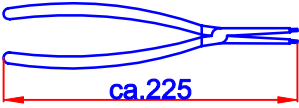
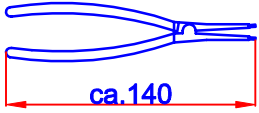
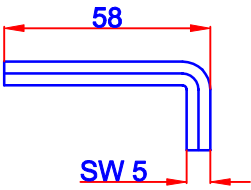
*Bei Ersatzteilbestellung unbedingt Seriennummer und Spannung angeben!
 It is essential to state the serial number and voltage when ordering spare parts!*

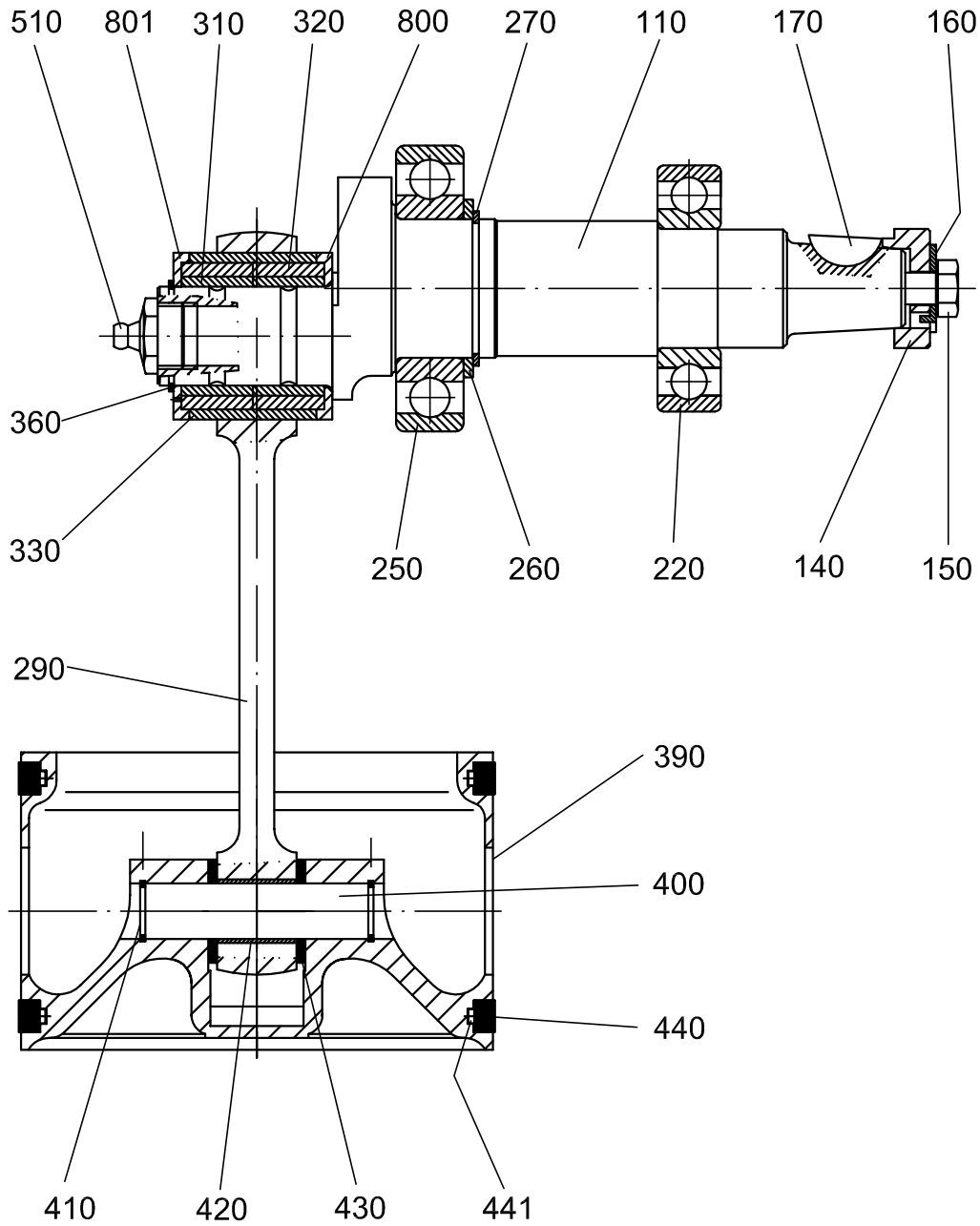
Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Teil Nr. Part no.	Bestell-Nr. Order no.	Gewicht Weight
1		Rillenkugellager ball bearing 6206-2 RS1	8503-220	251062061	0,200
1		Rillenkugellager ball bearing 6207-2 RS	8503-250	251062071	0,280
2		Kolbenring m.Wellfeder piston ring with spring Ø120/110x8	8503-440 -441	0105069 0104757	0,075

Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Teil Nr. Part no.	Bestell-Nr. Order no.	Gewicht Weight
2		Kolbenring piston ring	8503-440	0105069	0,035
2		Wellfeder spring	8503-441	0104757	0,035

Änderung vorbehalten! Subject to alteration!

Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Teil Nr. Part no.	Bestell-Nr. Order no.	Gewicht Weight
1		Rillenkugellager ball bearing 6206-2 RS1	8503-220	251062061	0,200
1		Sicherungsring safety ring J62x2	8503-240	2572062	0,010
1		Rillenkugellager ball bearing 6207-2 RS1	8503-250	251062071	0,280
1		Sicherungsring safety ring A35x1,5	8503-270	2571035	0,005
2		Innenring inside bearing ring IR 25x30x18	8503-310	251900300	0,035
2		Nadelkäfig needle bearing cage K 30x37x18	8503-320	251900200	0,035
1		Aussenring outside bearing ring AR 37x42x32	8503-330	251900393	0,080
2		Anlaufscheibe thrust washer Ø 42x4	8503-800 -801	0105260 0105320	0,025 0,025

Stck. Qty.	Zeichnung Drawing	Benennung/techn.Daten Designation/techn.Data	Teil Nr. Part no.	Bestell-Nr. Order no.	Gewicht Weight
1		Sicherungsring safety ring A 25x1,2	8503-360	2571025	0,002
1		Buchse bush 14x16x20	8503-420	381001420	0,010
2		Anlaufsscheibe guard plate Ø14x26x1,5	8503-430	381001415	0,010
2		Kolbenring m.Wellfeder piston ring with spring Ø120/110x8	8503-440 -441	0105069 0104757	0,075
1		Ersatzteilkasten box for spare parts 170x260x80		887002000	0,300
1		Ersatzspule für Schaltschütz spare colle for contactor Spannung angeben ! State Voltage !		630686180	0,085
1		Montagezange für Sicherungsring innen pliers for mounting internal safety ring I 3		9017003	0,184
1		Montagezange für Sicherungsring aussen pliers for mounting external safety ring A 1		9018001	0,085
1		Innensechskantschlüssel allen key SW 5		900205	0,025

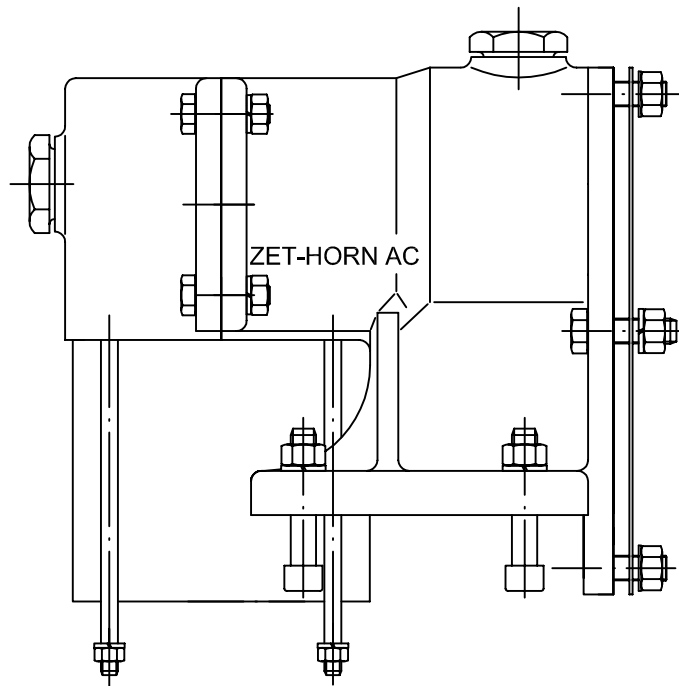


Order No.:

Typ 90/110AC 01414385.1

Typ 131/141AC 01414385.2

Typ 130AC 01414385.3



Bei Bestellung geben Sie bitte an:
 Zet Horn Typ-Seriennummer-Bauwerft-

When ordering parts please indicate:
 Zet-Horn type-Serial No.- shipbuilder-

Bestell Nr. / Order No.:

Zet-Horn (141,131,110,90) AC : 0107301

Pos. Nr. entsprechend Betriebsanleitung 01808503 !
 Part No. see under operating instructionen 01808503 !

Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten techn. data
20	01036380	1	Gehäuse A + B	casing A + B	
21	556154101	1	Schmiernippel	grease nipple	AM 10x1
22	20941011	1	Verschlusschraube	screw plug	M 10x1
23	2433000	1	Schmiernippelkappe	grease nipple cap	GPN 1300
40	0104487	1	Flanschdichtung	flange gasket	250/130/x0.5
50	2046120301	2	Stiftschraube	stud bolt	M 12x30
60	2044120401	2	Sechskantschraube	hexagon screw	M 12x40
70	211300121	4	Sicherungsscheibe	washer	Ø 12x21x2,5
81	21034121	4	Sechskantmutter	hexagon nut	M12
240	2572062	1	Sicherungsring	safety ring	l 62x2
280	2572072	1	Sicherungsring	safety ring	l 72x2.5
380	0105039	1	Zylinder	cylinder	Ø141/ 120
460	0104546	4	Gewindestange	tie rod	M 8x175
470	211300081	4	Sicherungsscheibe	washer	Ø8x14,8x2
480	21037081	4	Sicherungsmutter	safety nut	VM 8
490	20983325	2	Verschlusschraube	screw plug	R1"
610	211300101	4	Sicherungsscheibe	washer	Ø10x18x2,2
680	933003700	1.15 kg	Getriebefett	gear grease	Aral Aralub FDB 00
690	24910	1	Typenschild	name plate	110x40
691	2122703061	4	Kerbnagel	grooved drive stud	Ø3x6
700	2044100351	4	Sechskantschraube	hexagon screw	M 10x35
710	21037101	4	Sicherungsmutter	safety nut	VM 10
720	212210025	2	Zylinderstift	locking bolt	10m6x24
820	0104120	1	Gehäusedichtung	casing gasket	229/127x0,25

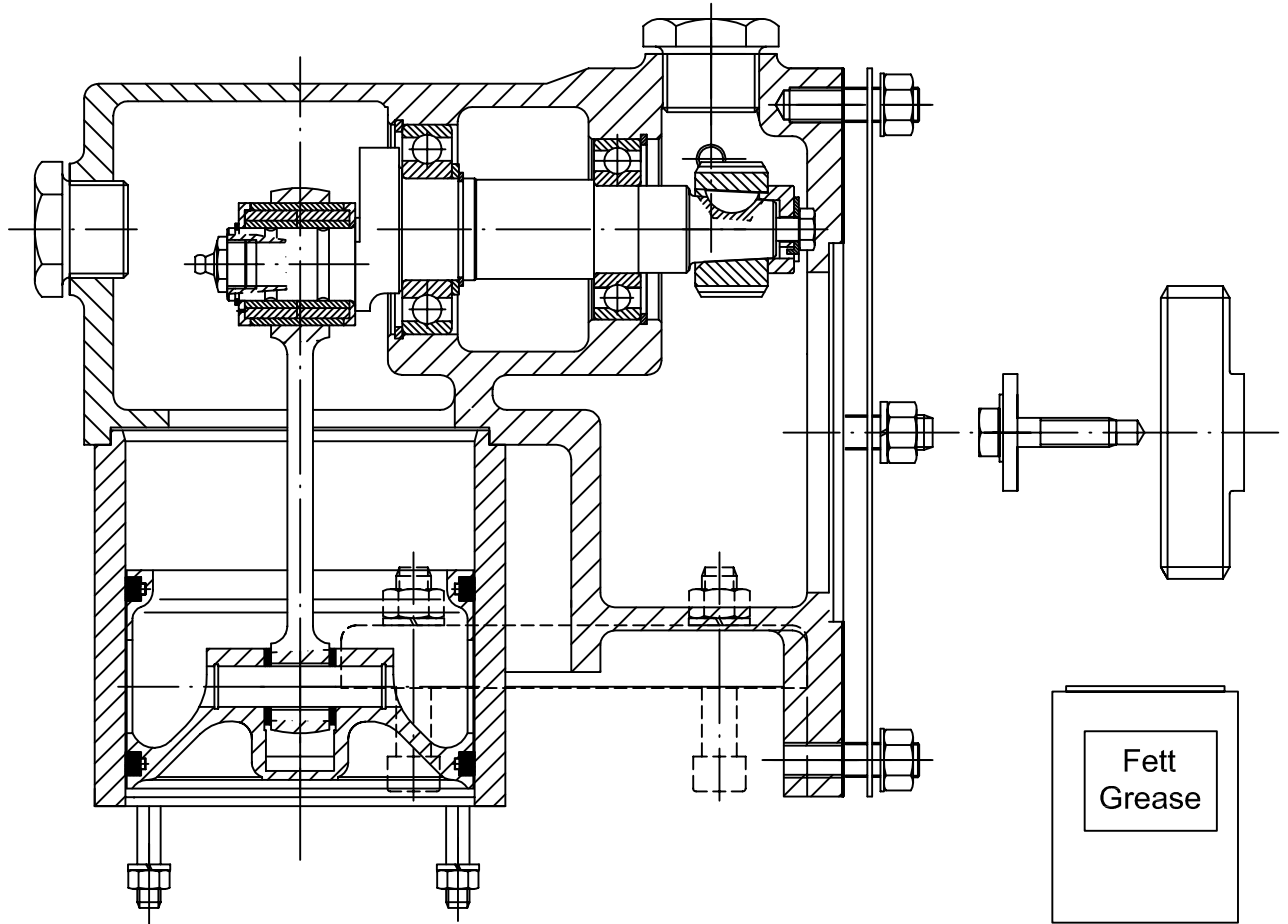
Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten techn. data
110	0104122	1	Kurbelwelle 131/141AC	crankshaft	188.5 lg
110	0104124	1	Kurbelwelle 90/110AC	crankshaft	188,5 lg
110	0104123	1	Kurbelwelle 130AC	crankshaft	188,5 lg
140	0103530	1	Sicherungsdeckel	washer	Ø 30x12
150	0103952	1	Sechskantschraube	hexagon screw	M 8x50
160	254208	1	Sicherungsblech	locking plate	8.4
170	22006075	1	Scheibenfeder	fitting key	6x7.5
220	251062061	1	Rillenkugellager	ball bearing	6206-2RS1
250	251062071	1	Rillenkugellager	ball bearing	6207-2RS1
260	253304525	1	Stützscheibe	support disk	SS 35x45x2.5
270	2571035	1	Sicherungsring	safety ring	A 35x1.5
290	0104117	1	Pleuelstange	connecting rod	145 lg
310	251900300	2	Innenring	inside bearing ring	IR 25x30x18
320	251900200	2	Nadelkäfig	needle bearing cage	K 30x37x18
330	251900393	1	Lageraußenring	outside bearing ring	AR 37x42x32
360	2571025	1	Sicherungsring	safety ring	A 25x1.2
390	0104362	1	Kolben	piston	Ø 120
400	885514562	1	Kolbenbolzen	wrist pin	Ø 14x56
410	2580014	2	Sprengring	safety ring	A 14x1
420	381001420	1	Buchse	type bush	Ø14x16x20
430	381001415	2	Anlaufscheibe	guard plate	Ø14x26x1,5
440	0105069	2	Kolbenring mit	piston ring with	Ø 120/110x8
441	0104757	2	Expanderfeder	spring	Ø 120
510	55615436	1	Schmiernippel	grease nipple	R 3/8"
800	0105260	1	Anlaufscheibe	thrust washer	Ø 42x4
801	0105320	1	Anlaufscheibe	thrust washer	Ø 42x4

Bei Bestellung geben Sie bitte an:

Zet-Horn Typ – Fabriknummer – Bauwerft –

When ordering part please indicate:

Zet-Horn type – Serial no. – shipbuilder –



Bei Bestellung geben Sie bitte an:

Zet Horn Typ-Seriennummer-Bauwerft-

When ordering parts please indicate:

Zet-Horn type-Serial No.- shipbuilder-

Bestell Nr. kompl. / Order No.compl. :

Zet-Horn 141 AC : 0104270 149

Zet-Horn 131 AC : 0104270 139

Zet-Horn 110 AC : 0104270 119

Zet-Horn 90 AC : 0104270 099

Zet-Horn AC

 Pos. Nr. entsprechend Betriebsanleitung 01808503 !
 Part No. see under operating instructions 01808503 !

Teil part	Ident-Nr.	Stck. Qty.	Bezeichnung	Description	Techn. Daten techn. data
20	01036380	1	Gehäuse A + B	casing A + B	Mod.2954/55G
21	556154101	1	Schmiernippel	grease nipple	AM 10x1
22	20941011	1	Verschlussschraube	screw plug	M 10x1
23	2433000	1	Schmiernippelkappe	grease nipple cap	GPN 1300
40	0104487	1	Flanschdichtung	flange gasket	250/130/ x0.5
50	2046120301	2	Stiftschraube	stud bolt	M 12x30
60	2044120401	2	Sechskantschraube	hexagon screw	M 12x40
70	211300121	8	Sicherungsscheibe	washer	Ø 12x21x2,5
81	21034121	4	Sechskantmutter	hexagon nut	M12
110	0104122	1*	Kurbelwelle 141/131AC	crankshaft	188.5 lg
110	0104124	1⊗	Kurbelwelle 90/110AC	crankshaft	188,5 lg
120	01...	1	Zahnrad	gear wheel	
130	01...	1	Zahnrad	gear wheel	
140	0103530	1	Sicherungsdeckel	safety cap	Ø 30x12
150	0103952	1	Sechskantschraube	hexagon screw	M 8x50
160	254208	1	Sicherungsblech	locking plate	Ø8.4
170	22006075	1	Scheibenfeder	fitting key	6x7.5
180	0102817	1	Zahnradzscheibe	gear wheel disk	Ø 40x5
190	2043100406	1	Sechskantschraube	hexagon screw	M 10x40
200	254210	1	Sicherungsblech	locking plate	Ø10.5
220	251062061	1	Rillenkugellager	ball bearing	6206-2RS1
240	2572062	1	Sicherungsring	safety ring	J 62x2
250	251062071	1	Rillenkugellager	ball bearing	6207-2RS1
260	253304525	1	Stützscheibe	support disk	SS 35x45x2.5
270	2571035	1	Sicherungsring	safety ring	A 35x1.5
280	2572072	1	Sicherungsring	safety ring	I 72x2.5
290	0104117	1	Pleuelstange	connecting rod	145 lg
310	251900300	2	Innenring	inside bearing ring	IR 25x30x18
320	251900200	2	Nadelkäfig	needle bearing cage	K 30x37x18
330	251900393	1	Lageraußenring	outside bearing ring	AR 37x42x32
360	2571025	1	Sicherungsring	safety ring	A 25x1.2
380	0105039	1	Zylinder	cylinder	Ø 120
390	0104362	1	Kolben	piston	Ø 120
400	885514562	1	Kolbenbolzen	wrist pin	Ø 14x56
410	2580014	2	Sprengring	safety ring	A 14x1
420	381001420	1	Buchse	bush	Ø14x16x20
430	381001415	2	Anlaufscheibe	guard plate	Ø14x26x1,5
440	0105069	2	Kolbenring mit	piston ring with	Ø 120/110x8
441	0104757	2	Expanderfeder	spring	Ø120
450	0103526	1⊗	Trichterflansch	flange of horn	Ø130x59
460	0104546	4	Gewindestange	tie rod	M 8x175
470	211300081	4	Sicherungsscheibe	washer	Ø8x14,8x2
480	21037081	4	Sicherungsmutter	safety nut	VM 8
490	20983325	2	Verschlussschraube	screw plug	R1"
510	55615436	1	Schmiernippel	grease nipple	R 3/8"
520	50210655	1⊗	O-Ring	o-ring	Ø65x5
610	211300101	4	Sicherungsscheibe	washer	Ø10x18x2,2
680	933003700	1.000 kg	Getriebefett	gear grease	Aral Alarub FDP 00
690	24910	1	Typenschild	name plate	110x40
691	2122703061	4	Kerbnagel	grooved drive stud	Ø3x6
700	2044100351	4	Sechskantschraube	hexagon screw	M 10x35
710	21037101	4	Sicherungsmutter	safety nut	VM 10
720	212210025	2	Zylinderstift	locking bolt	10m6x24
800	0105260	1	Anlaufscheibe	thrust washer	Ø 42x4
801	0105320	1	Anlaufscheibe	thrust washer	Ø 42x4
820	0104120	1	Gehäusedichtung	casing gasket	229/127x0,25

* nur/only 131AC/141AC

⊗ nur/only 90AC/110AC