



Submersible Sewage Pump – cast iron



ZF

Operating instruction

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Declaration of conformity

The Manufacturer **ZEHNDER Pumpen GmbH**
Zwönitzer Straße 19
D-08344 Grünhain-Beierfeld

Hereby declares that the Pump type ZF
are in Conformity to the following specifications:

- **Directive 89/37/CEE (Machine Security)**
- **Directive 89/336/CEE (Electromagnetic compatibility)**
- **Directive 73/23/CEE (Low Voltage)**

and with the

- **European Standard**
- **EN 809**
- **EN 292/1**
- **EN 292/2**
- **EN 60335-1**
- **EN 60335-2**

Grünhain-Beierfeld, February 20th, 2005

Matthias Kotte
Product Development

1.0 General:

1.1 Application

This operating instruction is valid for submersible pumps, range **ZF**.

Non-compliance with the operating instruction – in particular with the safety instruction – as well as non-manufacturer modification or use of non-original spare parts will result in loss of guaranty coverage. The manufacturer accepts no liability for damage or injury resulting from incorrect use of equipment!

Manufacturer: ZEHNDER Pumpen GmbH
Zwönitzer Straße 19
08344 Grünhain-Beierfeld

Production date: The production date is printed on top of the housing

| | | |
|---------------|---------|--------|
| Types: | ZF 80.1 | ZF 101 |
| | ZF 80.2 | ZF 104 |
| | ZF 80.3 | ZF 105 |
| | ZF 80.4 | ZF 110 |

Date of instruction: November 2004

1.2 Inquiries and orders:

Please pass your inquiries and orders to your specialist shop or retail trader.

1.3 Technical Data:

| | ZF 80.1 | ZF 80.2 | ZF 80.3 | ZF 80.4 | ZF 100 | ZF 104 | ZF 105 | ZF 110 |
|--|---------|---------|---------|---------|--------|--------|--------|--------|
| P₁ [KW] Input power P1 | 1,5 | 2,2 | 3,3 | 4,0 | 4,0 | 4,0 | 5,5 | 7,5 |
| Power U [V] | 400 | | | | | | | |
| Frequenz f [Hz] | 50 | | | | | | | |
| Input current I [A] | 4,2 | 5,5 | 8,4 | 10,0 | 9,0 | 9,0 | 12,7 | 16,5 |
| speed [min⁻¹] | 1400 | | | | | | | |
| Max. capacity Q_{max} [m³/h] | 80 | 105 | 115 | 130 | 120 | 140 | 160 | 165 |
| Max. head H_{max} [m] | 8 | 11 | 14 | 17 | 10 | 13 | 18 | 22 |
| Max. Temperature t_{max} [°C] | 40 | | | | | | | |
| Outlet size | DN 100 | | | | | | | |
| weight [kg] | 84 | 86 | 88 | 90 | 112 | 142 | 146 | 155 |

1.4 Areas of application

The submersible pumps type ZF can be used in water with light contamination including suspended matters (no stones) up to a solid size of max. 80 mm, but can not be used for waste water including any faeces!

2.0 Safety:

(from:“VDMA-Einheitsblatt 24 292“)

This operating instruction includes general points to be followed at installation, operation and service. Therefore this operating instruction must be read by the mechanic and / or operator before installation and operation and must always be kept next to the pump.

Not only those points mentioned at this paragraph safety shall be followed, also all addition safety advises noted at other paragraphs, for example for private usage / operation.

2.1 Marking of information in the operation instruction:

In this operating instruction general danger symbols are used and in case of non-compliance damages and risks to the pump or to the operator may occur.



Danger symbol in accordance with DIN 4844 - W 9

For warning regarding electrical current the following symbol is used



Danger symbol in accordance with DIN 4844 - W 8

For all safety advises where damages to the pump or their function may occur in case of non-compliance the word **Caution!** is indicated in the text.

Any advises fitted to the machine directly, as for example - symbol for direction of turns
- symbol for fluid-connection
must be followed and have to be kept in a proper and always readable condition.

2.2 Personal qualification and training of operator

Every operator/personnel/people doing maintenance, inspection or service must have a qualification for this kind of work. Their responsibility, competence and surveillance must be under control of the person running the machine. In case that related personnel is not having the necessary knowledge they must be trained in accordance. If necessary this training can be done by the manufacturer/supplier of the machine and must be ordered in accordance. Furthermore the person running the machine must guarantee that all personnel understands the total contents of this operating instruction.

2.3 Dangerous arising due to non-compliance with safety advice

Ignoring of security instructions can lead to danger of personnel and to the environment as well as causing possible damage to the equipment. Non-compliance with security instruction can lead to the loss of right to claim damages.

Non-compliance with security instructions can lead for example to:

- Breakdown in important functions of the equipment
- Breakdown in prescript methods for maintenance and upkeep
- Danger of injury from electrical, mechanical or chemical sources
- Environmental damage resulting from leaks of environmentally dangerous substances

2.4 Safety conscious work

These safety instructions, as well as the national safety requirements and extra internal company precautions or such laid down by the owner of the equipment must be observed.

2.5 Safety information for the owner / operator

- Any parts of the machine which could be a possible source of hot or cold burns should be covered.
- Covering for moving parts (e.g. couplings) should not be removed while the machine is in use.
- Leak out of dangerous substances (e.g. explosives, poisons, hot liquids) have to be handled in such a way that no danger to persons or the environment may occur. Legal requirements must be observed.
- Danger resulting from electrical current must be prevented (for more information consult the specification of VDE or your local electricity board).

2.6 Safety information for maintenance, inspection and fitting

The owner must ensure that all maintenance, inspection and fitting work is carried out by qualified and authorized personnel who are familiar with the operating instructions for equipment. In general all maintenance work must be carried out while the equipment is not in operation. The instructions for turning off the equipment contained in these operating instruction must be observed.

Pumps and units which carry hazardous materials must be decontaminated.

Immediately after completion of the work all safety and protection coverings should be reinstalled and / or switched on.

Before switching the equipment on again the points covered in the section concerning first use of the equipment should be consulted.

2.7 Non-manufacturer modifications and spare parts production

Modifications or changes to the pump are only allowed after consulting the manufacturer. Original spare parts and accessories authorized by the manufacturer should be used to ensure safety. The use of other parts may lead to loss of liability.

2.8 Unauthorized usage

The safety of the delivered pump is only guaranteed by usage according to the section one (1) General of the instructions. The listed maximum ratings as per specification should under no circumstances be exceeded.

3.0 Description

The pumps are equipped with robust three-phase motors; the sealing between pump housing and motor is made by two mechanical seals.

All pumps are fitted with a 10 m main supply cable. The standard voltage is 400 V / 50 Hz three-phase.



- **This appliance must be connected to an earthed outlet.**
- **Never carry the pump at the cable, nor lower it in the water at the cable nor pull it out of the water at the cable. A damaged power-cable must be replaced immediately by a qualified electrician. Danger of personal injury by electrical shock if operated with a damaged cable!**
- **If the power connections is not made obligatory by a FI-personal protection switch we recommend a separate protection switch at the socket.**



Caution!

- Usage of pump at swimming pools or ponds is just allowed, if an installation that fully complies with DIN VDE 0100/part 702 is made. In case of any doubts please contact your local qualified electrician.

4.0 Installation and commencement of operation



- Before installing and starting please check the pump for possible damages (f.e. during transport) to prevent personal injury by electrical shock!

5. Electric

| | | | |
|--------------|------|---|--|
| green/yellow | (PE) | - | protection-leader |
| | (U1) | } | engine (U2, V2, W2 only for ZF 105 und ZF 110) |
| | (V1) | | |
| | (W1) | | |
| | (U2) | | |
| | (V2) | | |
| | (W2) | | |
| | (T1) | - | temperature - switch T1 |
| | (T2) | - | temperature - switch T1+T2 |
| | (T3) | - | temperature - switch T2 |

6.0 Service /maintenance



- Always disconnect from power before starting any service work!

Maintenance is done by checking and cleaning the pumpbody.

Caution!

In case that impeller wears out (for example caused by abrasive medium) also a wear out of the mechanical seal or lip seal is possible. Any test of mechanical seal and motor and any replacement of electrical wires / cables should only be made by authorized service points or by the manufacturer.

7.0 Technical modification

..... without prior notice!

8.0 Warranty

As manufacturer we cover a warranty period of 24 month on material and workmanship for all pumps from the date of purchase.

Purchase date to be proved by related bill.

Within the warranty period compensation based on faults in material or caused by manufacturer is done by repair or by replacement of the pump upon manufacturers decision.

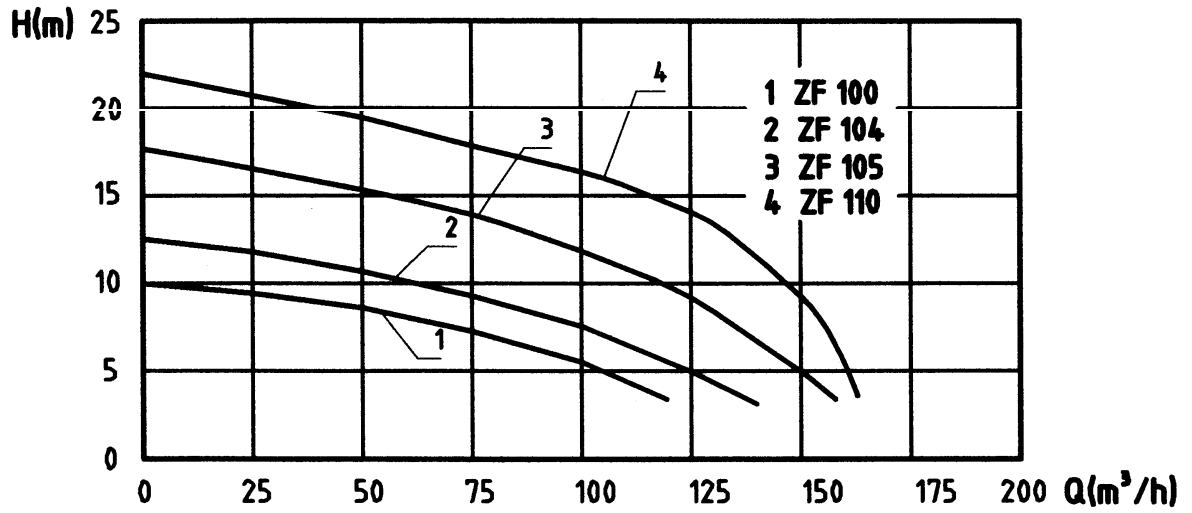
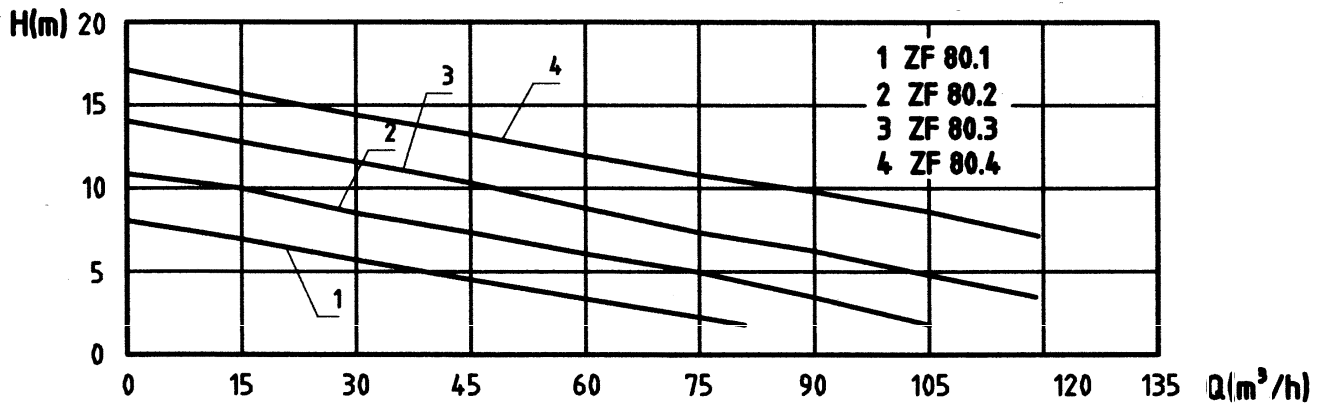
Exceptions for warranty are damages that occur of improper use or wear (impeller, mechanical seal and lip seal).

Furthermore any warranty ceases when any work / repair (apart from what is mentioned in paragraph 5) is done at the pump.

Consequential damages are not covered by the manufacturer.

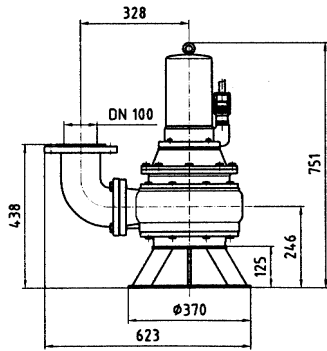
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9. Characteristics

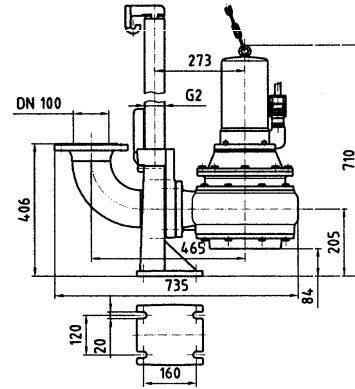


10. Dimensions

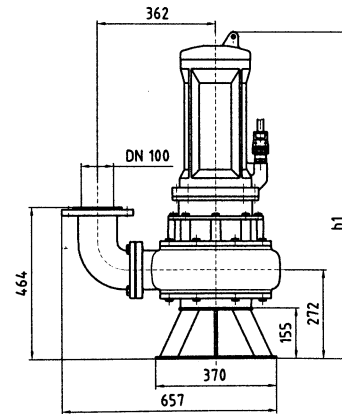
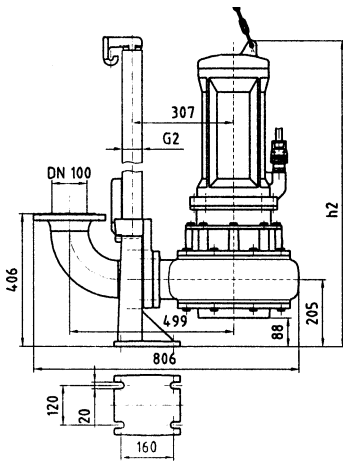
Dimensions including base support ZF 80



Dimensions with flange coupling system ZF 80



Dimensions including base support ZF 100-110 Dimensions with flange coupling system ZF 100-110

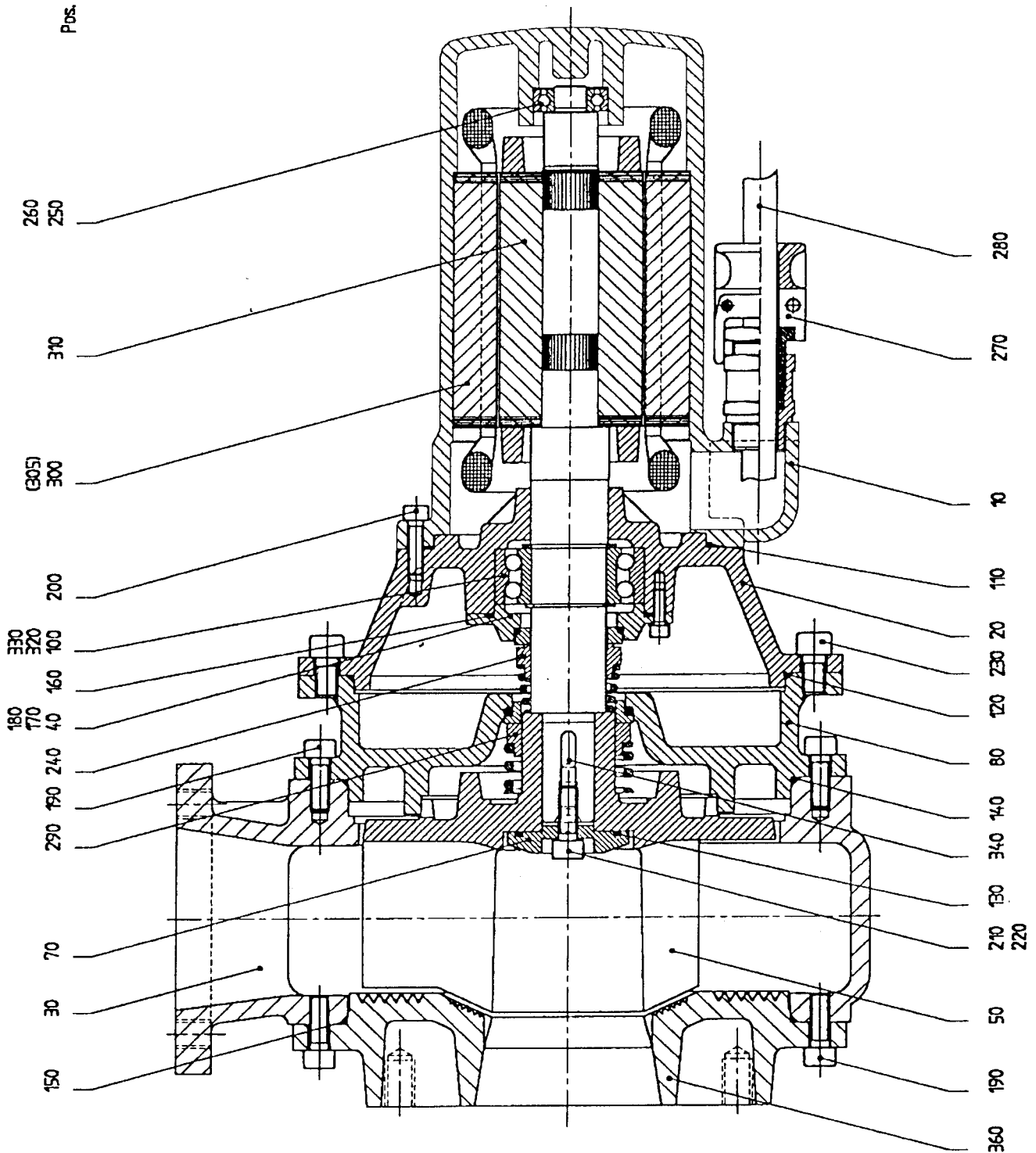


| ZF | h 1 | h 2 |
|-----|------|-----|
| 100 | 815 | 750 |
| 104 | 815 | 750 |
| 105 | 1003 | 936 |
| 110 | 1003 | 936 |

11. spare part-list

11.1 ZF 80

Pos. 90; 91;
350; 370; 380; (390)
nicht gezeichnet



ZF 80

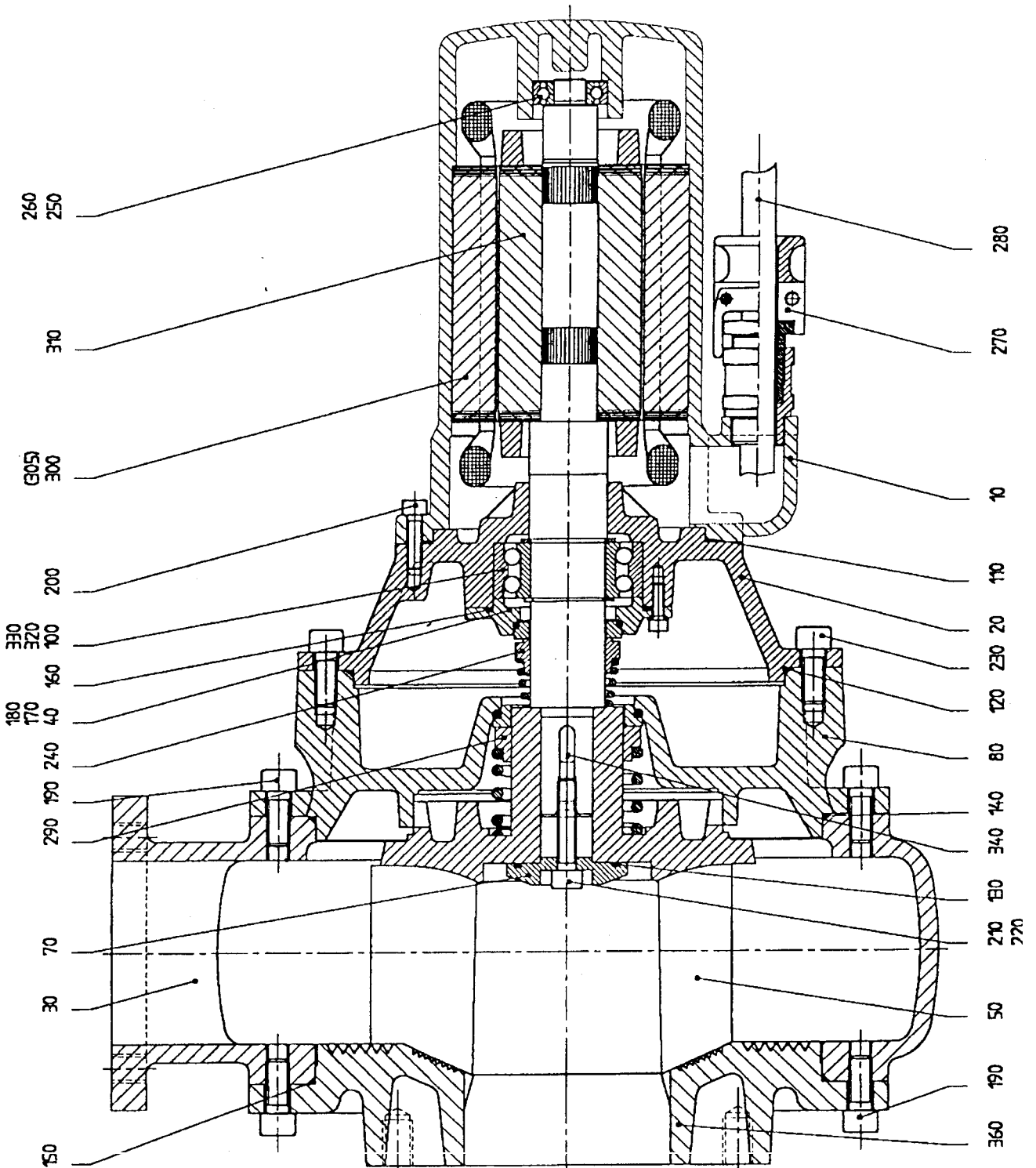
| Pos. | Stck. | Benennung | Artikel-Nr. |
|------|-------|---|-------------|
| 20 | 1 | Lagerschild | 120126 |
| 30 | 1 | Pumpengehäuse | ZE 1384 |
| 40 | 1 | Lagerdeckel ZF | 120102 |
| 50 | 1 | Lauftrad D=184 mm ZF 80.1 | 120134b |
| 50 | 1 | Lauftrad D=184 mm ZF 80.2 | 120134c |
| 50 | 1 | Lauftrad D=184 mm ZF 80.3 | 120134d |
| 50 | 1 | Lauftrad D=184 mm ZF 80.4 | 120134e |
| 70 | 1 | Lauftradkappe | 120127 |
| 80 | 1 | Dichtungsträger | 120128 |
| 90 | 1 | Verschlußstopfen G 3/8" | 140025 |
| 100 | 1 | Schrägkugellager 3208 | 120104 |
| 110 | 1 | O-Ring 147x3 | 140019 |
| 120 | 1 | O-Ring 230x3 | 120135 |
| 130 | 1 | O-Ring 50x3 | 80114 |
| 140 | 1 | O-Ring 236x3 | 120131 |
| 150 | 1 | O-Ring 236x3 | 120131 |
| 160 | 1 | O-Ring 80x3 | 120108 |
| 170 | 3 | Innensechskantschraube M 6x20-vz | 297012 |
| 180 | 3 | Zahnscheibe A 6,4 | 120110 |
| 190 | 16 | Sechskantschraube M 10x30-vz | ZE1237 |
| 200 | 8 | Innensechskantschraube M 8x30-A2 | 120112 |
| 210 | 1 | Sechskantschraube M 10x30-vz | ZE1237 |
| 220 | 1 | Dichtscheibe Cu 10x20x2 mm | 145013 |
| 230 | 8 | Sechskantschraube M 12x25-vz | ZE1403 |
| 240 | 1 | Gleitringdichtung Ø 40 | 60040 |
| 250 | 1 | Kugellager 6203-2RS1 | 140076 |
| 260 | 1 | Wellfeder | 120116 |
| 270 | 1 | Kabeleinführungsstutzen PG 21 | 141012 |
| 280 | 1 | E-Kabel, 10 m | 141011 |
| 290 | 1 | Gleitringdichtung Ø 50 | 60050 |
| 320 | 1 | Sicherungsring A 40x1,75 | 120121 |
| 330 | 1 | Stützscheibe 40x50x2 | 120122 |
| 340 | 1 | Paßfeder A 8x7x50 | 120133 |
| 350 | 1 | Ringschraube m 8-C15 | 140049 |
| 360 | 1 | Deckel QSHE 101Z-3Z | ZE1129 |
| | | | |
| | 1,8 l | Ölfüllung Dichtungsträger 1,8 l | 14009 |
| | | | |
| | 1 | Motorgehäuse mit Stator 1,5 kW-400 V Ex * | 120167.1 |
| | 1 | Motorgehäuse mit Stator 2,2 kW-400 V Ex * | 120167.2 |
| | 1 | Motorgehäuse mit Stator 3,3 kW-400 V Ex * | 120167.3 |
| | 1 | Motorgehäuse mit Stator 4,0 kW-400 V Ex * | 120137.4 |
| | 1 | Motoreinheit 1,5 kW-400 V Ex ** | 120157ME |
| | 1 | Motoreinheit 2,2 kW-400 V Ex ** | 120152ME |
| | 1 | Motoreinheit 3,3 kW-400 V Ex ** | 120155ME |
| | 1 | Motoreinheit 4,0 kW-400 V Ex ** | 120153ME |

* inkl. 10m Anschlußkabel

** ohne Dichtungsträger, Lauftrad und Pumpengehäuse

11.2 ZF 100-104 Ex

Pos. 350; 370; 380; 390
nicht gezeichnet

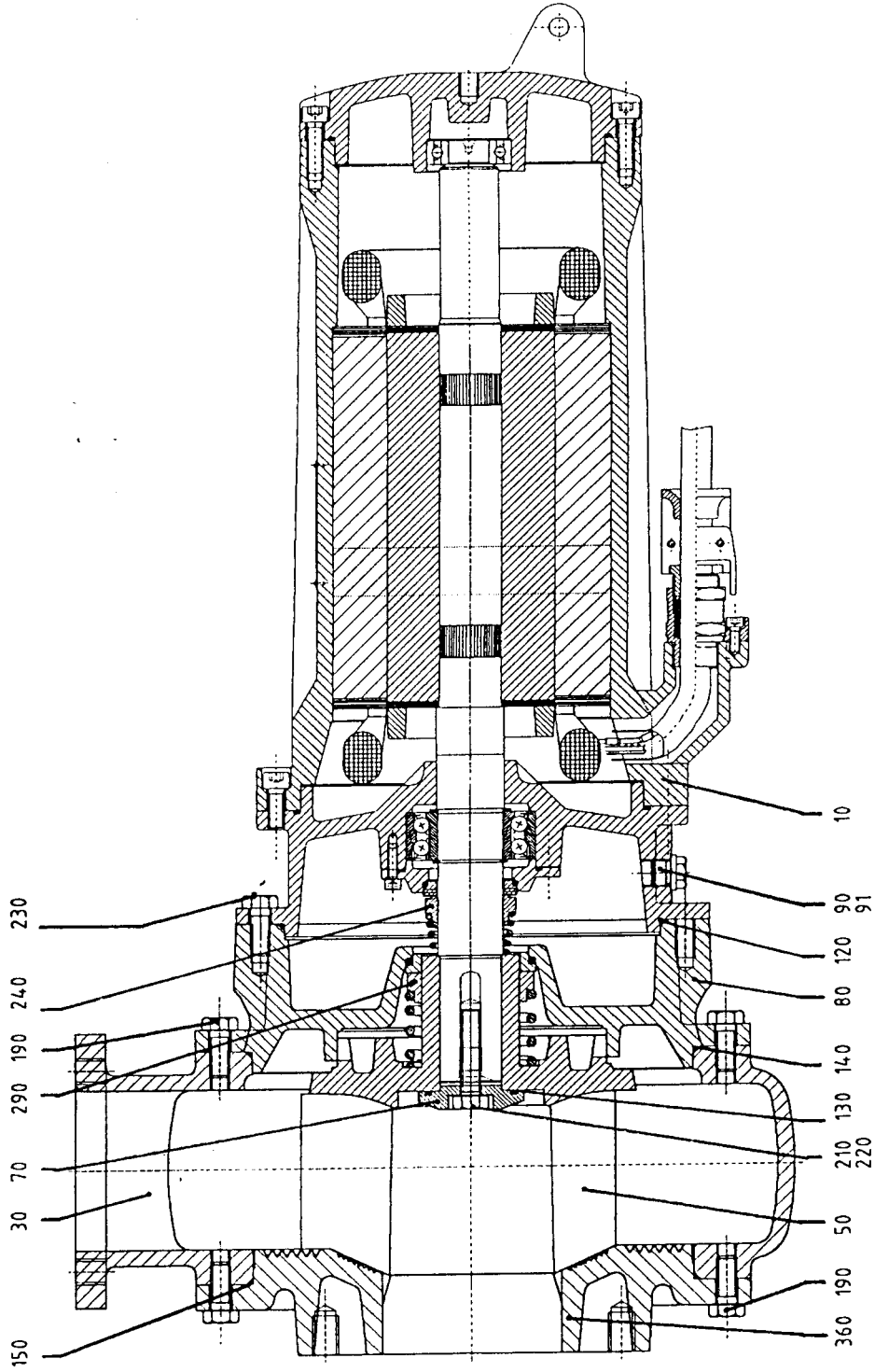


ZF 100-104

| Pos. | Stck. | Benennung | Artikel-Nr. |
|-------------|--------------|--|--------------------|
| 10 | 1 | Motoreinheit 4 kW 400 V (ZF 100/104)** | 120153ME |
| 20 | 1 | Lagerschild | 120126 |
| 30 | 1 | Pumpengehäuse | ZE 1138 |
| 40 | 1 | Lagerdeckel ZF | 120102 |
| 50 | 1 | Laufgrad D=190 mm ZF 100 | 120138a |
| 50 | 1 | Laufgrad D=210 mm ZF 104 | 120138c |
| 70 | 1 | Laufgradkappe | 120127 |
| 80 | 1 | Dichtungsträger | ZE1537 |
| 90 | 1 | Verschlußstopfen G 3/8" | 140025 |
| 100 | 1 | Schräggugellager 3208 | 120104 |
| 110 | 1 | O-Ring 147x3 | 140019 |
| 120 | 1 | O-Ring 230x3 | 120135 |
| 130 | 1 | O-Ring 50x3 | 80114 |
| 140 | 1 | O-Ring 270x3 | 120139 |
| 150 | 1 | O-Ring 270x3 | 120139 |
| 160 | 1 | O-Ring 80x3 | 120108 |
| 170 | 3 | Innensechskantschraube M 6x20-vz | 297012 |
| 180 | 3 | Zahnscheibe A 6,4 | 120110 |
| 190 | 16 | Sechskantschraube M 12x30-vz | ZE1516 |
| 200 | 8 | Innensechskantschraube M 8x30-A2 | 120112 |
| 210 | 1 | Sechskantschraube M 10x50-vz | 800.016 |
| 220 | 1 | Dichtscheibe Cu 10x20x2 mm | 145013 |
| 230 | 8 | Sechskantschraube M 12x30-vz | ZE1516 |
| 240 | 1 | Gleitringdichtung Ø 40 | 60040 |
| 250 | 1 | Kugellager 6203-2RS1 | 140076 |
| 260 | 1 | Wellfeder | 120116 |
| 270 | 1 | Kabeleinführungsstutzen PG 21 | 141012 |
| 280 | 1 | E-Kabel, 10 m | 141011 |
| 290 | 1 | Gleitringdichtung Ø 60 | 60060 |
| 320 | 1 | Sicherungsring A 40x1,75 | 120121 |
| 330 | 1 | Stützscheibe 40x50x2 | 120122 |
| 340 | 1 | Paßfeder A 8x7x50 | 120133 |
| 350 | 1 | Ringschraube m 8-C15 | 140049 |
| 360 | 1 | Deckel QSHE 100Z-3Z | 120141 |
| | | | |
| | 2,2 l | Ölfüllung Dichtungsträger 2,2 l | 14009 |

** ohne Dichtungsträger, Laufgrad und Pumpengehäuse

11.3 ZF 105-110 Ex



ZF 105-110 Ex

| Pos. | Stck. | Benennung | Artikel-Nr. |
|------|-------|---|-------------|
| 10 | 1 | Motoreinheit 5,5 kW 400 V Ex (ZF 105)** | I1736 |
| 10 | 1 | Motoreinheit 7,5 kW 400 V Ex (ZF 110)** | I1559 |
| 30 | 1 | Pumpengehäuse | ZE 1138 |
| 50 | 1 | Laufgrad D=230 mm ZF 105 | 120142a |
| 50 | 1 | Laufgrad D=250 mm ZF 110 | 120142b |
| 70 | 1 | Laufgradkappe | 120143 |
| 80 | 1 | Dichtungsträger | ZE1537 |
| 90 | 1 | Verschlußstopfen G 3/8" | 140025 |
| 91 | 1 | Dichtring 17x22x1,5 Cu | 140030 |
| 120 | 1 | O-Ring 230x3 | 120135 |
| 130 | 1 | O-Ring 50x3 | 80114 |
| 140 | 1 | O-Ring 270x3 | 120139 |
| 150 | 1 | O-Ring 270x3 | 120139 |
| 190 | 16 | Sechskantschraube M 12x30-vz | ZE1516 |
| 210 | 1 | Sechskantschraube M 12x55-A2 | ZE1745 |
| 220 | 1 | Dichtscheibe Cu 20x13,5x2 mm | 145013 |
| 230 | 8 | Sechskantschraube M 12x30-vz | ZE1516 |
| 240 | 1 | Gleitringdichtung Ø 40 | 60040 |
| 290 | 1 | Gleitringdichtung Ø 60 | 60060 |
| 360 | 1 | Deckel QSHE 100Z-3Z | 120141 |
| | | | |
| | 2,2 l | Ölfüllung Dichtungsträger 2,2 l | 14009 |

** ohne Dichtungsträger, Laufgrad und Pumpengehäuse