



Waste-water submersible pump

ZPG 50

Operating instructions

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Declaration of conformity

Herewith we

ZEHNDER Pumpen GmbH
Zwönitzer Straße 19
D-08344 Grünhain-Beierfeld,

that the waste water-submersible pumps type **ZPG 50**
comply with the relevant regulations as follows:

- **EC Machinery Directive 2006/42/EG**
- **Electromagnetic compatibility 2014/30/EU**
- **Low Voltage Directive 2014/35 EU**

Applied harmonised standards, particularly

EN 60335-1:2012/A11:2014

EN 60335-2-41:2003/A2:2010

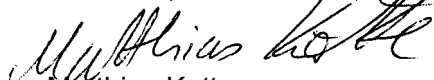
EN 809:1998/AC:2010

EN 55014-1:2006/A2:2011, EN 55014-2:1997/A2:2008

EN 61000-3-2:2014, EN 61000-3-3:2013

EN 61000-6-1:2007, EN 61000-6-2:2005, EN 61000-6-3/A1:2011, EN 61000-6-4/A1:2011

Grünhain, 22th December 2016



Matthias Kotte
Product Development

1. General aspects:

1.1 Affiliation

These operating instructions are valid for the waste-water submersible pumps **ZPG 50**

In case of non-observation to the operating manual - in particular the safety instructions - as well as unauthorised modification of the device or the installation of non-original spare parts the warranty claims will automatically become void. The manufacturer assumes no liability for any damage resulting from this!

As any other electrical appliance, this product can also fail due to missing main power or a technical defect. If a damage can occur as a result, an emergency power generator, a second system and/or a mains-independent alarm system should be planned according to the application. We as manufacturers will be happy to advise you also after the purchase. In case of defects or damages, please get in touch with your dealer.

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

Construction sizes: ZPG 50.1
ZPG 50.2
ZPG 50.3
ZPG 50.4

Status of the operating instructions: September 2012

1.2 Inquiries and purchase orders:

Please send your inquiries and orders to your specialist dealer.

1.3 Technical data:

Alternating current version	ZPG 50.1 W	ZPG 50.2 W	ZPG 50.3 W	ZPG 50.4 W
Nominal power P ₂ [KW]	0.55	0.75	1.1	1.1
Voltage U [V]	230	230	230	230
Frequency f [Hz]	50			
Nominal current input I [A]	5	6	8.2	8.2
Speed n [min. ⁻¹]	2800			
Maximum feed volume Q _{max} [m ³ /h]	21	23	26	29
Maximum pumping head H _{max} [m]	9.5	12	14	16
Max. medium temperature	40 °C, temporary 70 °C (3-5 min)			
Pressure connection (optionally)	R 2" / Flange DN 50			
Weight with cable [kg]	23			
Minimum liquid level	Bottom edge of motor housing			

Three-phase version	ZPG 50.1 D	ZPG 50.2 D	ZPG 50.3 D	ZPG 50.4 D
Nominal power P ₂ [KW]	0,55	0.75	1.1	1.5
Voltage U [V]	400	400	400	400
Frequency f [Hz]	50			
Nominal current input I [A]	2.3	2.8	3.0	3.5
Speed n [min. ⁻¹]	2800			
Maximum feed volume Q _{max} [m ³ /h]	21	23	26	29
Maximum pumping head H _{max} [m]	9.5	12	14	16
Max. medium temperature	40 °C, temporary 70 °C (3-5 min)			
Pressure connection (optionally)	R 2" / Flange DN 50			
Weight with cable [kg]	23			
Minimum liquid level	Bottom edge of motor housing			

Materials:

Motor housing	GG 20	Motor shaft.....	1.4021
Pump housing	GG 20	Seal carrier	GG 20
Bearing flange.....	GG 20	End-face mechanical seal.	SiC/AL2O3
Impeller	GG 20	Other seals	NBR (nitrile)
Bolts and nuts	A2		

1.4 Field of application

The waste-water submersible pumps of type **ZPG 50** serve to convey waste water of any kind, e.g. to drain shafts and collecting pits. They can also be used to convey rainwater.

The pumps are not approved for conveying waste waters containing faeces.

1.5 Accessories

The pumps in alternating current version **ZPG 50.1 W** to **ZPG 50.4 W** are equipped with 10 m cable and three-pin plug. Version "A" is equipped with a float switch.

The pumps in three-phase version **ZPG 50.1 D** to **ZPG 50.4 D** are delivered with 10 m cable and bare cable end. Here it is necessary to connect a three-phase current switch with motor protection.

To put up the pump, an installation set for portable use or a coupling device (stationary use) is required.

2. Safety:

(from: "VDMA standard sheet 24 292")

These operating instructions contain basic instructions which have to be observed during set-up, operation and maintenance. For this reason, these operating instructions must by all means be read before installation and commissioning by the installation technician as well as by the competent specialist staff / user, and must be permanently available at the location of the device.

Not only the general safety instructions mentioned in this main point on safety have to be observed, but also the special safety instructions mentioned in the other main points, for example for private use.

2.1 Labelling of instructions in the operating instructions

The safety instructions mentioned in these operating instructions, which may cause hazards for persons in case of non-observation, have been marked by the general danger symbol



Safety sign according to DIN 4844 - W 9,

in case of warning against electrical voltage with



Safety sign according to DIN 4844 - W 8

especially marked.

In case of safety instructions, the non-observation of which may cause hazards for the machine and its functions, the word "ATTENTION" is added

ATTENTION

Instructions attached directly to the machine, such as

- Rotation arrow
- Marks for fluid connections

must be definitely observed and kept in legible condition.

2.2 Qualification and training of staff

The staff for operation, maintenance, inspection and installation must have the corresponding qualification for this work. For this reason, the area of responsibility, the competency and the supervision of the staff has to be precisely defined by the company. If the staff does not have the necessary knowledge, the said has to be trained and instructed. If and when necessary, this may be carried out by the manufacturer / supplier on behalf of the machine operator. Moreover, the operator has to ensure that the content of the operating instructions is understood completely by the staff.

2.3 Hazards caused by non-observation of safety instructions

The non-observation of the safety instructions may endanger persons as well as the environment, and may have consequences for the environment and machine. The non-observation of the safety instructions will result in the loss of all claims for damages.

- In detail, the non-observation may cause the following hazards, **for example**:

- Failure of important functions of the machine/plant
- Malfunction of the mandatory methods of maintenance and repair
- Danger to persons caused by electrical, mechanical and chemical effects
- Danger to the environment caused by leakage of dangerous substances

2.4 Safety-conscious work

The safety instructions mentioned in these operating instructions, the existing national regulations on accident prevention as well as potential in-company work, operating and safety instructions of the user must be observed.

2.5 Safety instructions for user / operator

- If hot or cold machine parts could lead to hazards, these parts have to be protected against touch by the user.
- Touch protection for moving parts (such as coupling) must not be removed from the machine in operation.
- Leakage (of the shaft seal, for example) of hazardous material conveyed (e.g. explosive, toxic, hot) must be removed in such a way that no danger is caused to persons and the environment. Legal regulations have to be observed.
- Hazards caused by electric energy must be excluded (for details here, please refer to the country-specific regulations and the regulations of the local energy supply companies).

2.6 Safety instructions for maintenance, inspection and installation work

The user has to make sure that all maintenance, inspection and installation work is carried out by authorised and qualified specialist personnel only, who has sufficiently been informed by studying the operating instructions.

Basically, work on the machine may be carried out only at standstill. The procedure to shut down the machine described in the operating instructions must be observed by all means.

Pumps or pump assemblies, which convey media hazardous to health, must be decontaminated. Immediately after completing the work, all safety and protection devices have to be fitted again and/or have to be made functional again.

Before recommissioning, the points listed in the chapter on initial commissioning have to be observed.

2.7 Unauthorised modification and spare parts production

Modifications or changes to the machine shall be permissible only after consultation with the manufacturer. Original spare parts and accessories authorised by the manufacturer serve to ensure safety. The use of other parts may result in the loss of liability for the consequences that may occur.

2.8 Impermissible operating modes

The operational safety of the machine supplied is ensured only when used as intended according to Section 1 - General - of the operating instructions. The threshold values indicated in the data sheet must by no means be exceeded.

Note:

In order to avoid clogging of the pump, the waste water must not contain the following substances:

- **Solid substances, fibres, tar, and, cement, ash, coarse paper, paper handkerchiefs, cardboard, rubble, rubbish, slaughterhouse waste, greases, oils.**
- **Waste water with harmful substances (DIN 1986-100), e.g. greasy sewage water from commercial kitchens. The discharge may take place only via a grease separator according to Din 4040-1.**

3. Transport and intermediate warehousing

The pumps **ZPG 50** shall basically be lifted and/or transported by using the provided eyelet on the upper side or the handle. Under no circumstances may the pump be lifted using the supply cable.

For intermediate warehousing of the pumps, it is sufficient to store them in a cool, dry, frost-free and dark place.

4. Description

4.1 Motor

The pumps **ZPG 50** are equipped with an AC or three-phase asynchronous motor. By means of a thermal sensor that is integrated in the winding head, the AC motor is monitored in terms of too excessive heating. The winding head switches off the motor in case of overheating and switches it on after cooling has taken place. The robust, overdimensioned three-phase motor has to be monitored by a motor protection switch (accessory).

4.2 Pump

The pump housing and the recessed impeller are made of cast iron. The free ball passage is 45 mm. As pressure nozzle, the pumps have a flange DN 50 which is provided with an internal thread G2".

5. Installation



- Prior to any works on the unit, it has to be disconnected from the mains supply.
- The electric connections must not be exposed to moisture.

5.1 Electrics

The **alternating current version** of the pump is connected to a protective contact socket by means of the three-pin plug.



Dry-running of the pump must be avoided by suitable measures (level control).

Further electrical installation is not necessary.

The free cable end of the **three-phase current version** of the pump is marked as follows:

Green / yellow	(PE)	Protective conductor (grounding)
Black	(U1)	
Brown	(V1)	
Grey	(W1)	

The three wires U1, V1, W1 are connected to the mains via a thermal overload relay and a power contactor.



Dry-running of the pump must be avoided by suitable measures (level control).

Further electrical installation is not necessary.

5.2 Hydraulics

ATTENTION The waste-water submersible pump must be effectively protected against suction of air!

portable installation:

- Install the pump. While doing so, pay attention to a sufficient stability of the pump. (Possibly fix on the floor.)
- Connect pressure side optionally with flange DN 50 or with thread (the pump is equipped with an internal thread G2" and a flange DN 50).
- If a hose shall be installed on the pressure side, kinks must be avoided.
- Install supply cable without kinks, without tensile load and without abrasion points.

Set-up for shaft installation:

- Position the pipe tightener on the shaft inner rim and loosely fix with two screws.
- Sound out the position of the guide tube uptake of the coupling base, Align the coupling base on the shaft floor and mount using the supplied heavy-duty dowels.
- Install the pressure line and fittings stress-free.
- Put the guide tube 1 1/4" made of steel on the coupling base, saw off to correct length, put on the pipe tightener and finally screw on.
- Mount the coupling piece and chain to the pump, let down the pump on the chain (thread the guide tube into the coupling piece) and engage, hang up the chain at the pipe tightener to have it handy.
- Install supply cable without kinks, without tensile load and without abrasion points.

5.3 Level control

For automatic operation, the pumps **ZPG 50** must be controlled via a level control in such a way that falling of the water level below the minimum permissible level (bottom edge of motor housing) is avoided. Level control can take place by means of a float switch, for example, or by an other suitable method. The cut-in pressure of the pump should be selected in such a way that the pump is fully immersed into the water.

6. Commissioning

Check all connections for correct mounting again, set shut-off valve to passage and check the level control for correct function.

Controlling the direction of rotation takes place by means of visual check.

When switching on the pump, it must jolt counter-clockwise to the rotation arrow attached to the motor housing. The direction of rotation can be changed by reconnecting two of the three phases (U-V-W) in the switchgear.

When carrying out the test run, check the piping for tightness and newly caulk, if necessary.

7. Service, maintenance, repair



- Prior to carrying out any work on the plant, it has to be disconnected from the mains supply!

Maintenance consists of a check and cleaning of the pump housing. To do so, first loosen the Allen screws on the suction cover and remove the suction cover. After cleaning the pump, reinstall the suction cover.

ATTENTION

In case of wear and tear of the impeller (e.g. by abrasive media), wear and tear of the mechanical seal is also possible. Verification of the mechanical seal and motor as well as

the replacement of the electrical connecting cable should be carried out only by authorised customer services or the manufacturer's plant.

8. Malfunctions; causes and troubleshooting



- Before any work on the plant, the mains plug must be removed!

Malfunction	Cause	Troubleshooting
1. Motor does not rotate	- Supply voltage missing or wrong	- Check power supply
	- Faulty connection	- Correct connection
	- Defective power cable	- Replacement (customer service)
	- Defective / wrong capacitor	- Replacement (customer service)
	- Impeller blocked	- Clean
	- Activated motor protection (overheating, blockage, voltage error or other defect)	- Check, inform customer service
	- Control error / defective float switch	- Check, inform customer service
	- Motor defective	- Replacement (customer service)
2. Motor rotates, but does not convey	- Impeller clogged or worn	- Clean / replace
	- Check valve clogged	- Clean
	- Shut-off valve clogged / closed	- Clean / open
	- Pressure line clogged / hose kinked	- Clean / remove kinks
	- Intake socket clogged	- Clean
	- Direction of rotation incorrect	- Correction
	- Water shortage in the shaft	- Switch off / inform customer service
3. Motor switches off during start-up	- Voltage wrong or fluctuating	- Correction / customer service
	- Thermal protection incorrectly designed	- Check / customer service
	- Power consumption too high	- Customer service
4. Motor does not switch off	- Control error	- Customer service
	- Float switch wrong / defective	- Replacement / customer service

9. Warranty

As manufacturer, we provide for these pumps a warranty of 24 months from the date of purchase. The sales receipt is considered proof regarding the warranty. Within this warranty period, we will at our discretion, either by means of repair or replacement, correct free of charge all defects based on material or manufacturing defects of the unit.

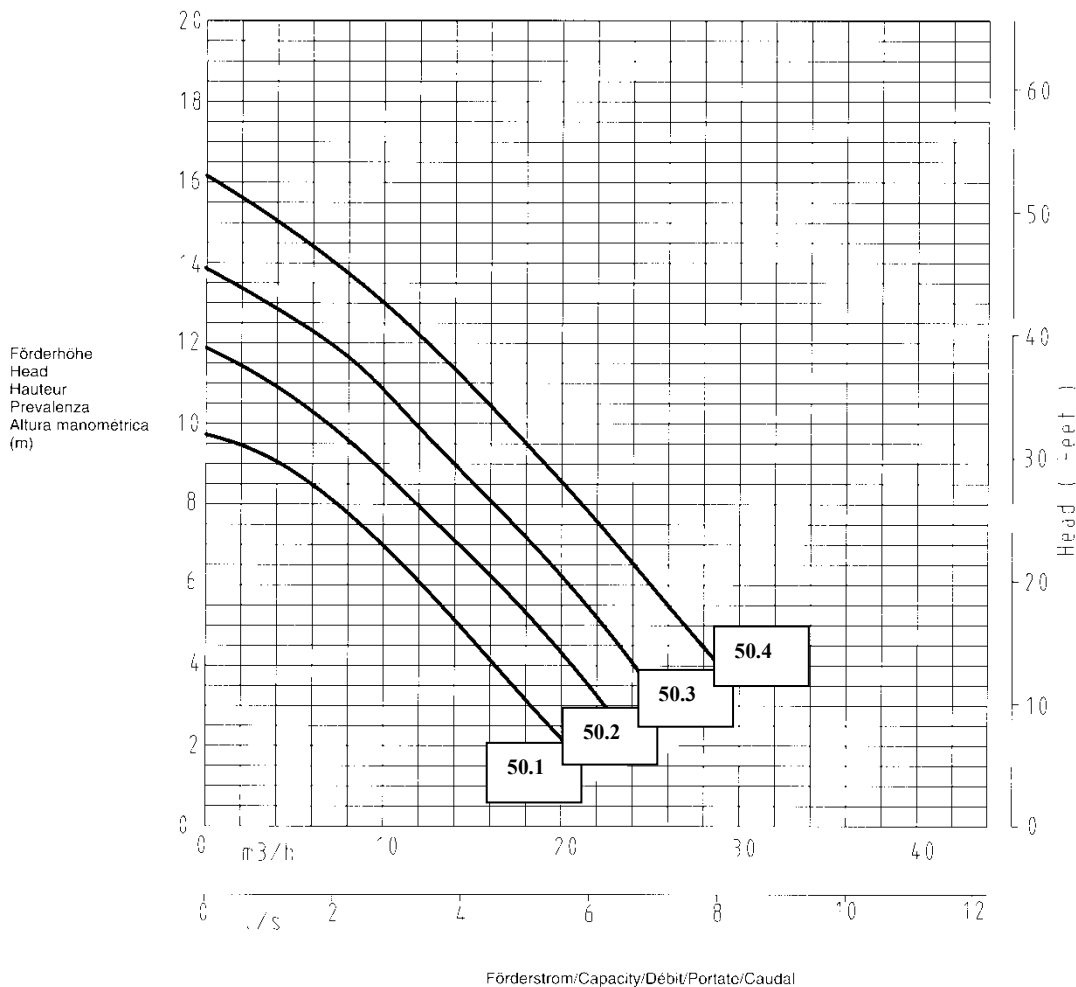
The warranty excludes all damage attributable to improper use or wear and tear. We do not assume any liability for consequential damages which occur due to a failure of the device.

10. Technical changes

We reserve the right to make technical changes in terms of progress.

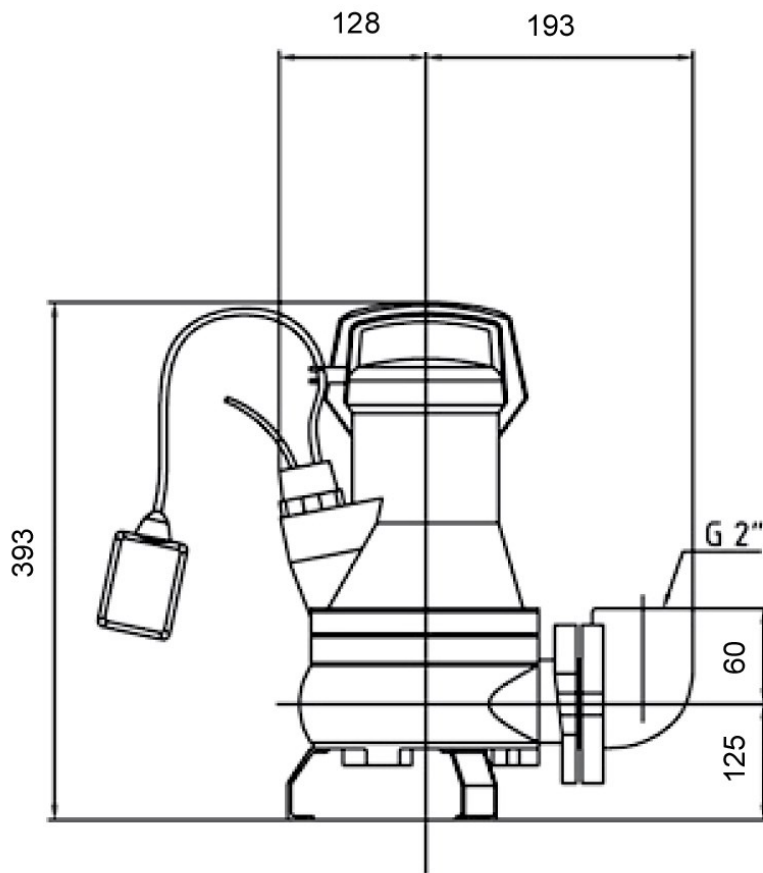
11. Characteristic curves

ZPG 50

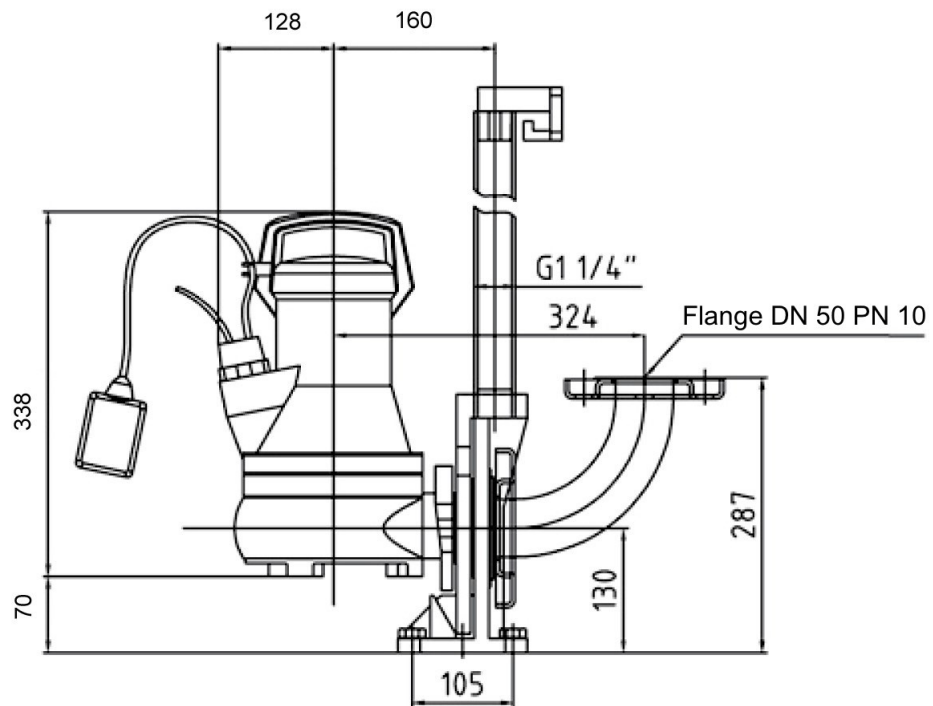


12. Assembly examples and dimensions

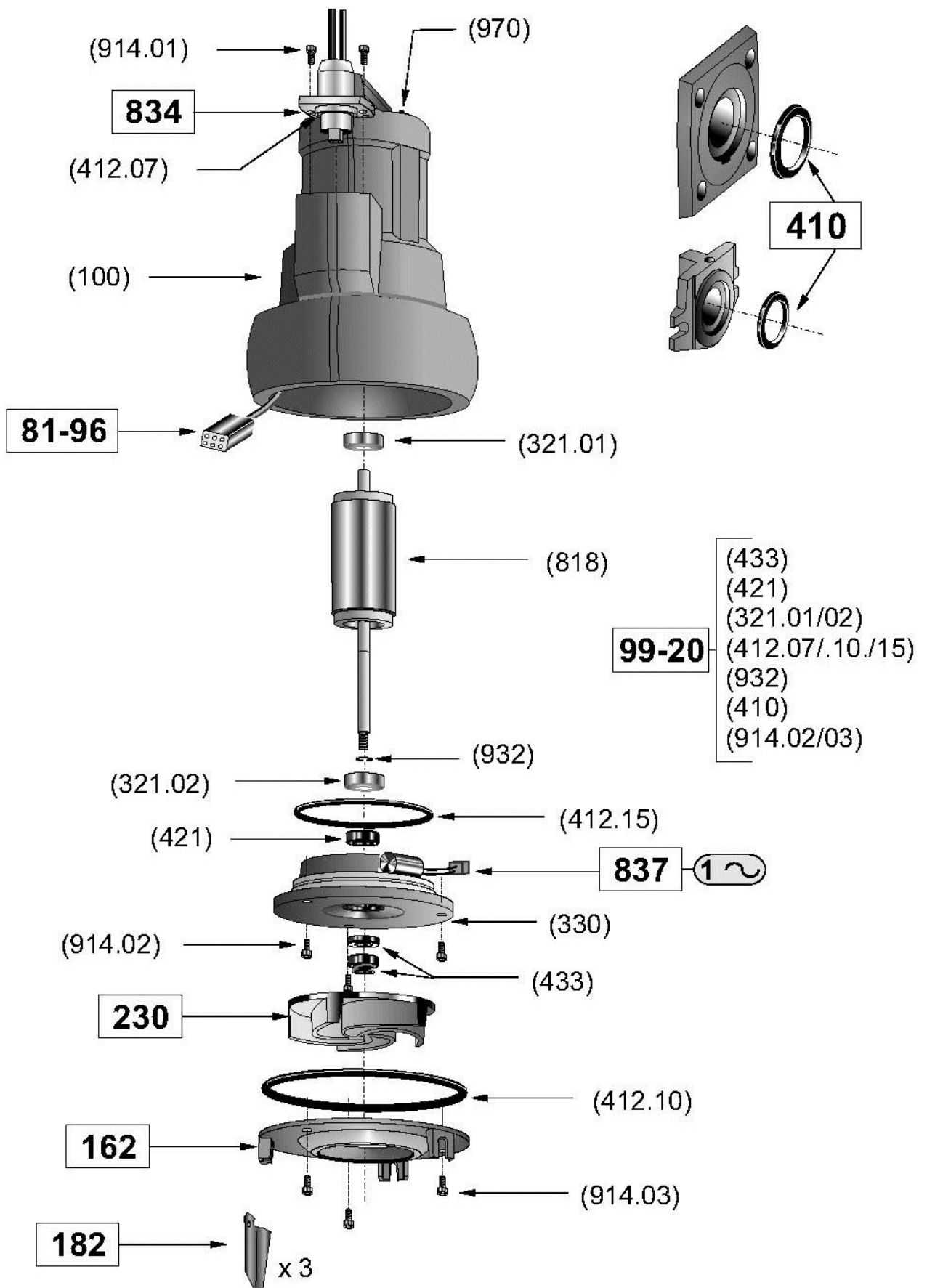
portable



stationary

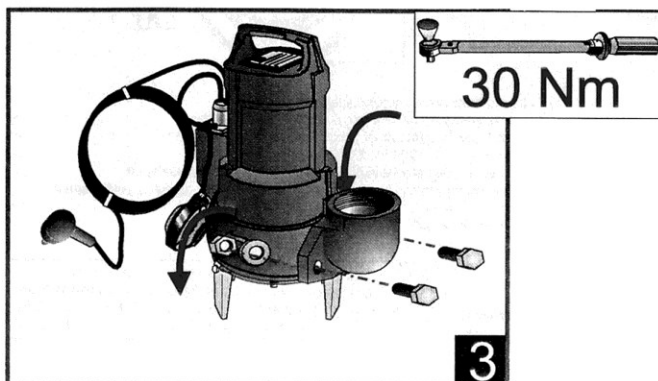
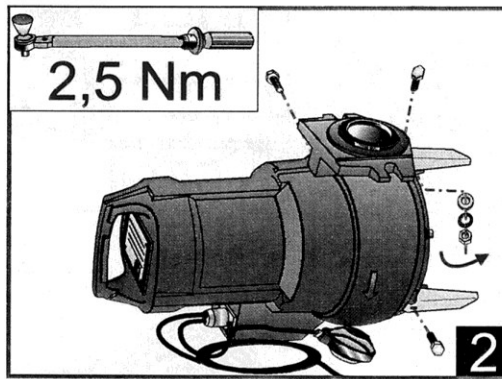
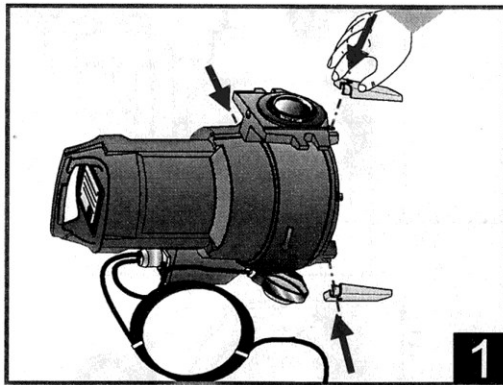
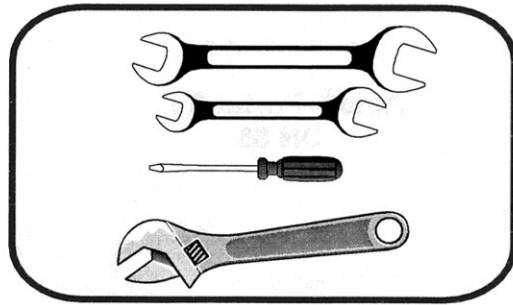
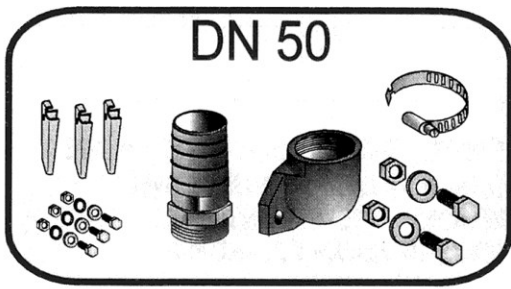


13. Explosive drawing and spare parts list



Item	Designation	Quantity
81-96	Plug for motor cable	
99-20	Gasket repair set	1
162	Suction cover incl. screws and gasket	1
182	Base for portable version (3-piece set)	1
230	Impeller	1
410	Profile gasket set	1
834	Cable bushing	1
837	Capacitor (only for alternating current version)	1

Attachment installation set, portable



Connection hose or piping

