Operating manual:

Submersible motor pumps

Tegernsee
&
Tegernsee DIN 14425 – TP 4/1

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Table of contents

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1 General information

1.1 Version

The Tegernsee submersible pump is a single-stage centrifugal pump with a single-channel impeller which is driven by a directly fitted electric motor with type IP68 protection. The pump is equipped with a carrying handle, a water pressure-tight connection plug unit with an IP68 power plug, 20 m of power cable, a pressure-side Storz-B coupling, a pump foot with intake strainer and integrated flat intake channels. It can be deployed both immersed and submerged. The Tegernsee can be operated regardless of its position (standing up or lying down).

1.1.1 Marking of the pumps

Each Tegernsee pump is marked by a nameplate. The nameplate gives information about:

<table>
<tr><td colspan="6">Manufacturer CE</td></tr>
<tr><td colspan="4">Type designation</td><td colspan="2">Serial number</td></tr>
<tr><td>Voltage/ frequency</td><td>Electrical input</td><td>Protection class</td><td>Nominal rotation speed</td><td>Nominal current</td><td>Year of manufacture</td></tr>
<tr><td>Weight</td><td>Nominal head</td><td colspan="2">Nominal capacity</td><td>Max. immersion depth</td><td>Liquid temperature</td></tr>
</table>

1.1.2 Application

The Tegernsee submersible pump can be used to pump off clear and waste water and also waste water contaminated with solid matter and fibres from shafts, cellars or other flooded areas. The pump is designed for temporary mobile use. The use of cast iron waste water pumps is recommended for permanent stationary use and for fixed installations. The Tegernsee may not be deployed in explosive environments. Appropriate use also includes observing all instructions and information in this operating manual.

1.1.3 Pumped medium

The pumped medium may not exceed a maximum density of 1.1 kg/l. Dangerous media (e.g. flammable, explosive, poisonous, hot > 60°C) may not be conveyed with the pump. The pump can convey solid matter up to a grain size of 8 mm with the intake strainer fitted. The grain size can be increased to 40 mm if the intake strainer is removed. The pH value of the pumped medium must lie within the range between 5 and 8. No guarantee can be given for safe operation of the pump if the pH value of the medium exceeds or is lower than the given value. In case of borderline pH values, the material resistance must be additionally tested before using the pump.

1.2 The operating instructions

These operating instructions contain information and instructions so that you can work safely, properly and economically with the pump. Only if the contents of the operating instructions are understood and followed can

- hazards be avoided and
- the reliability and life of the pump be increased.

With the issue of these operating instructions, regulations and standards not named in them are not rescinded.

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1.2.1 Definition of terms

Several important terms are used in these operating instructions, which are defined as follows:

Owner/operator: The owner/operator is any natural or legal person, who uses the pump or on whose behalf the pump is used.

Pump: A pump is the complete submersible pump.

1.2.2 Marking of information and instructions

Important information and instructions in this instruction manual are marked with the following icons:

General hazard: Indicates safety instructions which absolutely must be complied with and which cannot be allocated to any of the following icons.

High voltage warning: Indicates an electric shock hazard

Safety-relevant information: Indicates instructions for safe working on and with the pump.

1.2.3 Explanation of symbols

CE symbol: With the CE marking the manufacturer, distributor or authorised EU representative declares in accordance with EU Regulation 765/2008, that “the product is in conformity with the applicable requirements set out in Community harmonisation legislation providing for its affixing”.

Symbol for hot surfaces: Warning sign "Hot surface" according to safety sign ASR A1.3:2013 and EN ISO 7010.
Sign for risk of injury and burns caused by hot surfaces.

Symbol for hand injuries: Warning sign "Hand injuries” according to BGV A8, ASR A1.3:2013 and DIN 4844. Sign for risks caused by a machine, these areas can lead to hand injuries

2 Safety instructions (General safety instructions as per VDMA 24292)

This operation manual gives basic instructions that should be followed carefully during installation, operation and maintenance. It is essential that this manual is carefully read by the responsible personnel/operator before assembly and commissioning. It is always to be kept available at the installation/usage site of the pump. Specific instructions inserted under the other main headings must be observed in addition to the general safety instructions under the main heading of Safety.

2.1 Qualifications of personnel

An authorized (certified) electrician and mechanic shall carry out all work. Scope of responsibility and supervision of the personnel must be exactly defined by the operator. If the staff does not have the necessary knowledge, they must be trained and instructed, which may be performed by the manufacturer or supplier on behalf of the operator, moreover, the operator is to make sure that the contents of the operating manual are fully understood by the personnel.

Minimum requirements for the operating personnel:

- Legal age
- Firefighter training in accordance with the fire service regulation 2 and additional instruction of the trained machinist or "Technical Assistance" course in accordance with fire service regulation 2 or
- basic training Level I (German THW) as a rescue worker

Minimum requirements for the personnel for electric maintenance and inspection works:

- Legal age
- Qualified electrician

2.2 Hazards in the event of non-compliance with the safety instructions

Non-compliance with the safety instructions may produce a risk to the personnel as well as to the environment and the machine and results in a loss of any right to claim damages or compensation. For example, non-compliance may involve the following hazards:

- Failure of important functions of the pump
- Failure of specified procedures of maintenance and repair
- Exposure of people to electrical, mechanical and chemical hazards
- Endangering the environment owing to hazardous substances being released

2.3 Safety regulations for owner/operator

All safety instructions contained in this manual, all relevant national and local health and safety codes and any other service and safety instructions issued by the owner shall be complied with.

2.4 Safety instructions relevant for operation

Always follow these safety instructions before using the pump:

Danger of electric shock:

- Portable DIN 14685-compliant (all parts) power generators or DIN 14686-compliant switch cabinets provide energy for the Tegernsee. If other energy sources are used for the Tegernsee for deployments other than by the fire service, a portable DIN VDE 0661 (VDE 0661)-compliant protective device must be used between the plug socket and the connecting plug.
- Protect plug-and-socket connections against moisture and increasing water levels in flood areas.
- When using the pump in swimming pools or ponds and the surrounding area DIN/VDE 0100 must be complied with.
- Hazards resulting from electricity are to be prevented (see for example, the national-specifications or the regulations of your local electricity supply company)

General danger

- In dry-well installation respectively in case of low-level pumping (in case of low water level) the motor housing heats up after a lengthy operating period. You must therefore only use the carrying handle to transport the pump and avoid direct contact with the motor housing. Always wear protective gloves too.
- When pumping hot fluids, the pump always becomes as hot as the pumped fluid. In this case you must only touch the pump if you are wearing suitable protective gloves.
- In pumping mode strong suction is produced at the intake area of the pump. It is therefore necessary to ensure that while the pump is running you never allow your hands, feet, loose clothing (e.g. ties) or jewelry (e.g. chains) to get into the area of the pump intake (suction side) or pump discharge (pressure side). There is risk of shearing injuries or getting tangled.
- The protection against contact (pump base) for moving parts (impeller) may not be removed if the machines are in operation. The pump itself may not be operated without the appropriate protection against contact.
- Any leakage of hazardous (e.g. explosive, toxic, hot) fluids (e.g. from the shaft seal) must be drained away so as to prevent any risk to persons or the environment. Statutory regulations are to be complied with.

Damage of the pump due to inappropriate use:

- Store the pump in dry rooms only. If kept dry and clean the pump can be stored down to a minimum temperature of –20°C. Highly super cooled pumps must be allowed to thaw to above 0 °C before being used, to prevent the formation of ice on immersion in the fluid to be pumped.
- Ensure that the place in which the pump is used is protected against frost.
- Always use the carrying handles to transport the pump.
- Only use the notch at the carrying handle to lower the pump using ropes. Never lower the pump by its power cable or a hose connected to the pump.

2.5 Safety instructions relevant for maintenance, inspection and assembly work

It shall be the user's responsibility to ensure that all maintenance, inspection and assembly work is performed by authorized and qualified personnel who have adequately familiarized themselves with the subject matter by studying this manual in detail. Any work on the machine shall only be performed when it is at stand-still, it is being imperative that the procedure for shutting down the machine described in this manual be followed (see chapter 4). Pumps and pump units which convey hazardous media must be decontaminated. All waste emissions such as used oil must be appropriately disposed of, oil spills must be cleaned up and emissions to the environment must be reported.
On completion of work all safety and protective facilities must be reinstalled and made operative again. Before restarting the points listed in chapter 4 must be noted and followed. Any modification may be made to the pump only after consultation with the manufacturer. Using spare parts and accessories authorized by the manufacturer is in interest of safety. Use of other parts may exempt the manufacturer from any warranty or compensation claims.

2.6 Unauthorized modes of operation

The reliability of the pump delivered will be only guaranteed if it is used in the manner intended, in accordance with this manual. The limit values specified in the data sheet must under no circumstances be exceeded. These installation and operation instructions do not supersede or exclude generally valid regulation and standards.

3 Technical data

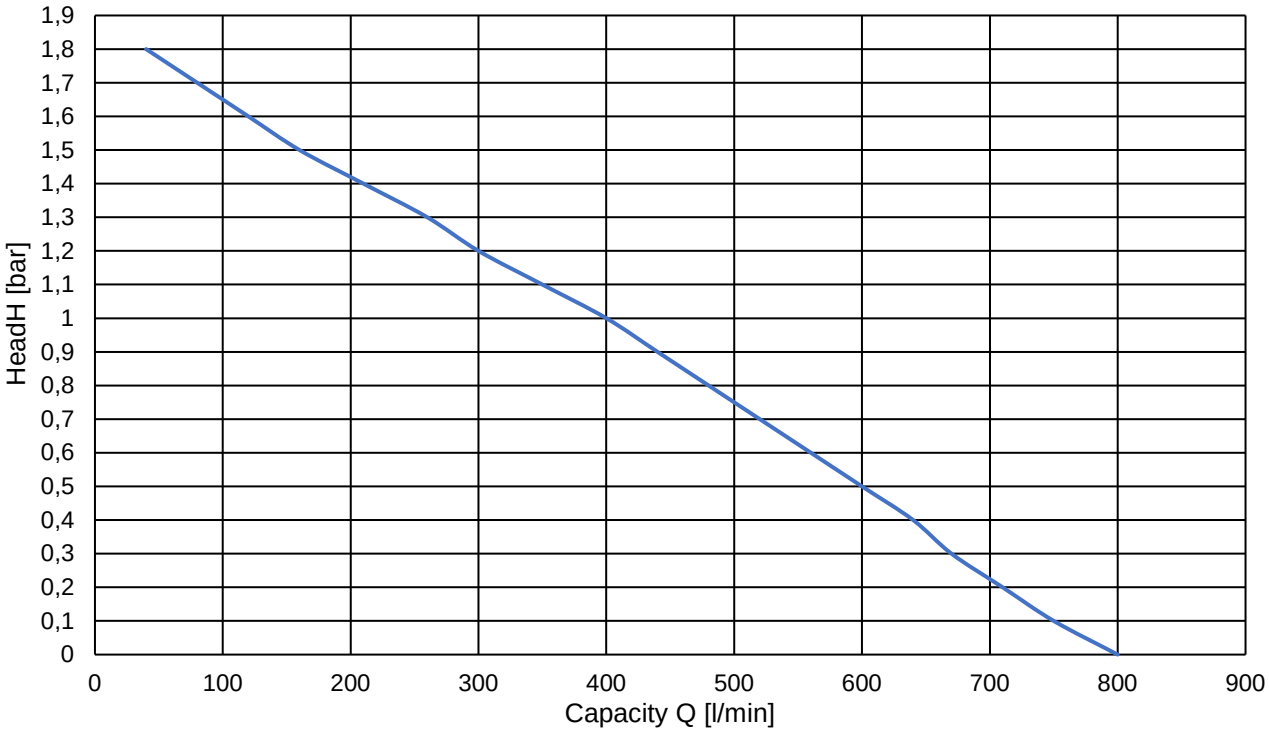
3.1 Electrical and technical data

	Tegernsee	**Tegernsee TP 4/1**
Coupling size	B-Storz/2”	
Max. solid passage	Ø 40 mm	Ø 8 mm with intake strainer Ø 40 mm without intake strainer
Fluid temperature	0° - 60°C submersed 0° - 40°C in dry conditions	
Weight including cable	25 kg	
Cable length	20 m	
Cable type	H07RN8-F	H07RN-F
Sound emission in 1 m	< 70 dB(A)	
Operating voltage	230 V	
Voltage tolerance	+/- 10%	
Frequency	50 Hz	
Protection class	IP 68	
Nominal current	8,0 A	
Electrical power input P1	1,8 kW	
pH-value	5 - 8	
Density pumping medium	≤ 1,1 kg/l	

3.2 Performance

Head H [bar]	0	0,2	0,4	0,6	0,8	1,0	1,2	1,4	1,6
Capacity Q [l/min]	800	710	640	560	480	400	300	210	120

3.3 Capacity-head table



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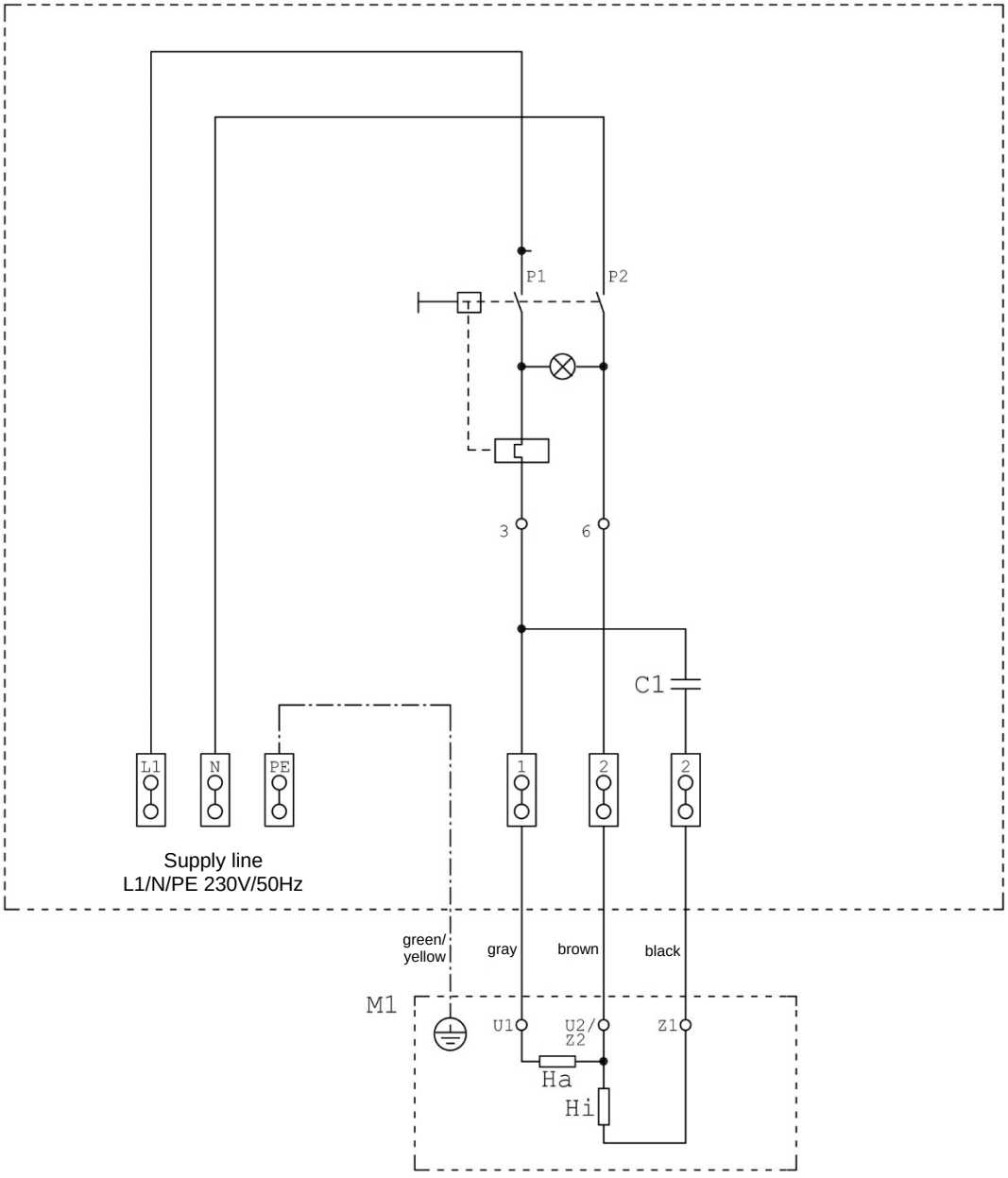
3.4 Materials

Type	Tegernsee	Tegernsee TP 4/1
Housing	Saltwater-proof aluminum alloy G-AlSi10Mg	
Impeller	Corrosion-free aluminum bronze G-CuAl10Ni	Cast iron EN-GJL-200
Shaft seal	Dry and endurance run suitable double mechanical seal SiC/SiC and SiC/carbon	
Carrying handle	Polyamide (PA6)	
Pump base	Polyacetal (POM)	
Intake side	No intake strainer	Detachable intake strainer Stainless steel 1.4301
Screws	Stainless steel 1.4301	

3.5 Wiring diagram



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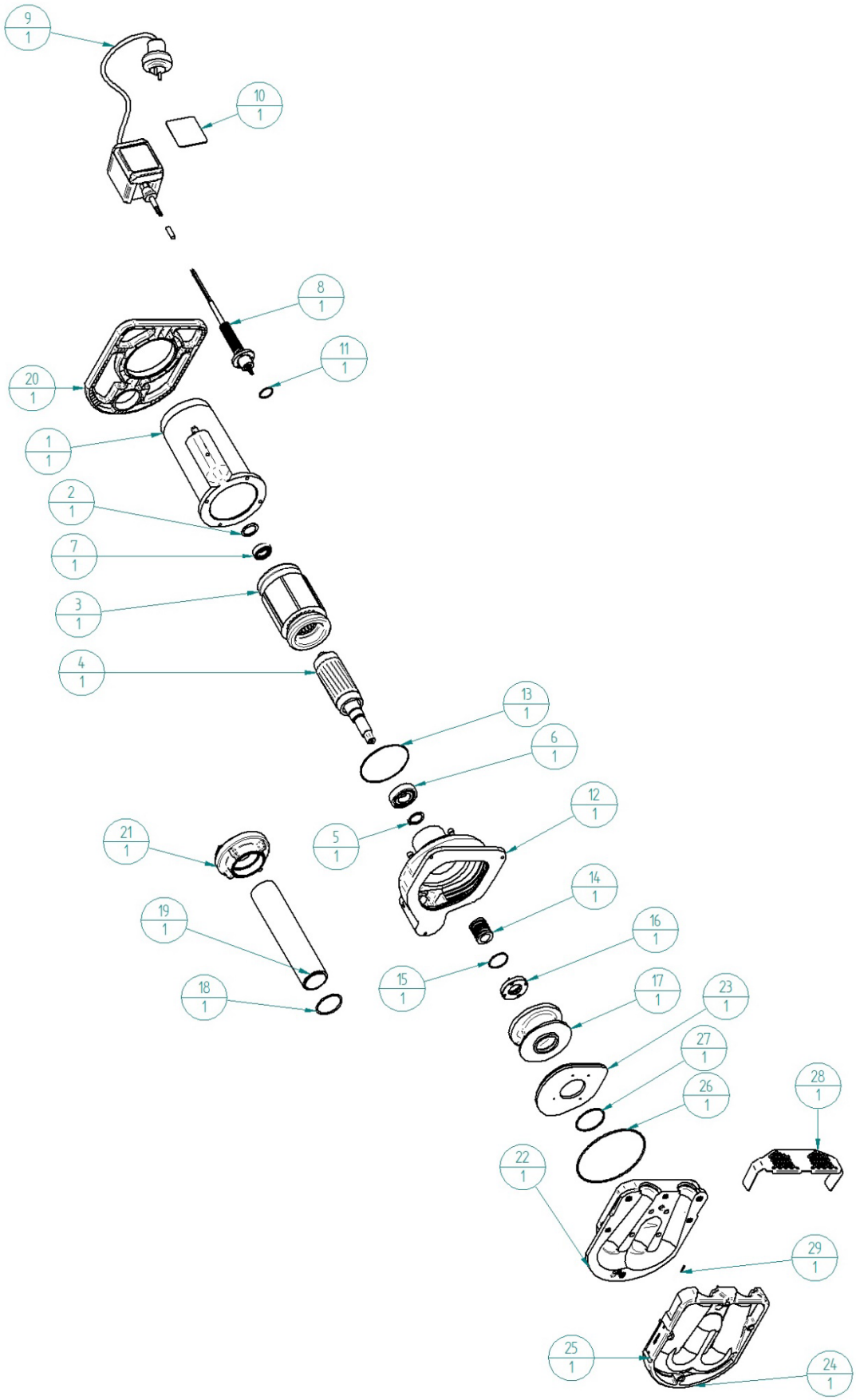
3.6 Exploded drawing



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3.7 Spare part list

Item	Qty	Description	Tegernsee TP 4/1	Tegernsee
			Item number	
1	1	Motor housing Tegernsee	320000535	
2	1	Compensating disc K2 for ball bearing	350001018	
3	1	Coil motor Tegernsee 230V P1=1,8kW	331000223	
4	1	Rotor motor Tegernsee 230V P1=1,8kW	331000224	
5	1	Shaft locking ring	340471004	
6	1	Ball bearing	350000918	
7	1	Ball bearing	350000695	
8	1	Power cable Tegernsee, 230V, D28	320001544	320000515
9	1	Motor protection unit Tegernsee IP68	350001155	
10	1	Front sheetTegernsee 100x60mm	230000032	
11	1	O-ring 28 x 2 NBR 70	350000705	
12	1	Spiral housing Tegernsee	320000536	
13	1	O-ring ø114x2 NBR 70	350001016	
14	1	Mechanical seal	350001227	
15	1	O-ring 42x2 mm NBR 70 Sh.	350000323	
16	1	Cover mechnical seal	320000400	
17	1	Impeller Tegernsee	320001543	320000537
18	1	O-ring ø52x4 NBR 70	350001017	
19	1	Pressure pipe Tegernsee	320000826	
20	1	Carrying handle Tegernsee	320000541	
21	1	B-Storz coupling, 2" female thread, aluminum	350000244	
22	1	Upper pump base Tegernsee, POM black	374000004	
23	1	Counter plate impeller Tegernsee	331000296	
24	1	Lower pump base Tegernsee, POM black	374000005	
25	1	Name plate Tegernsee	350001100	
26	1	O-ring 160x3 NBR 70 Sh.	350001146	
27	1	O-ring 64x2,5 NBR 70 Sh.	350001147	
28	1	Intake strainer Tegernsee	331000293	
29	1	Rope seal Tegernsee NBR 3mm 70 Sh	350001082	

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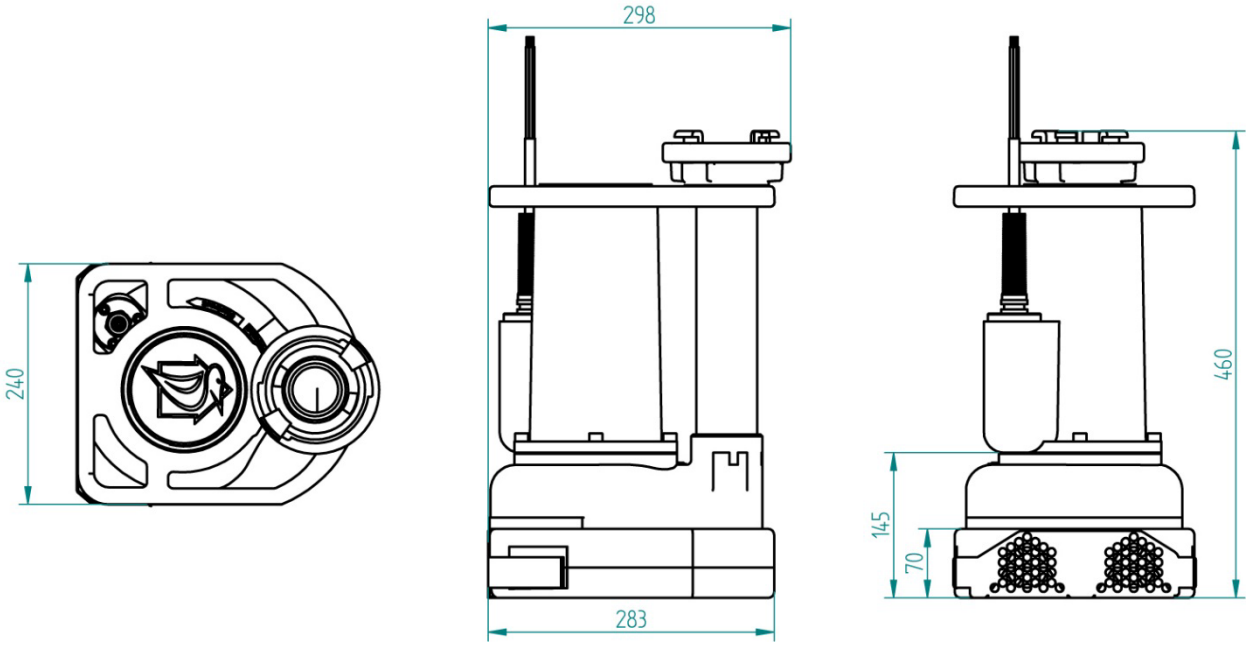
3.8 Dimensions



4 Operating the pump

Caution:
The pump may only be operated in compliance with the instructions and information of this operating manual.

Caution:
The pump is fitted with a thermal protection switch. Once the maximum operating temperature is exceeded, the thermal protection switch automatically shuts down the pump. If the temperature falls below the maximum operating temperature again, the pump starts up again immediately.

Caution:
Work on the pump may only be carried out after the pump has been switched off by removing the connecting plug from the plug socket. In addition, appropriate measures are to be taken to secure the pump against accidental restart.

Caution:
Portable DIN 14685-compliant (all parts) power generators or DIN 14686-compliant switch cabinets provide energy for the Tegernsee. If other energy sources are used for deployments other than by the fire service, a portable DIN VDE 0661 (VDE 0661)-compliant protective device must be used between the plug socket and the connecting plug.

Note:
Before starting the pump, check that the supplied voltage and frequency matches the information on the nameplate.

Danger from electric shock:
Bring electrical plug connections to a flood-proof area to protect them from water. Watch out for rising water levels in flood areas!

Caution:
For outdoor use, the provisions of EN 60204-1 must be observed.

Danger from electric shock:
No-one should be present inside the pumping medium when the pump is in operation. The pump may only be operated over residual current devices (RCD) with rated residual current of not more than 30 mA.

Caution:
The operating personnel must ensure that no third parties (e.g. spectators during demonstrations, residents affected by floods, voluntary helpers, curious onlookers, etc.) can stand in the pumped fluid and can never get into the area of the pump intake (suction side) or pump outlet (pressure side)

Caution:
In dry-well installation and/or in case of low-level pumping (in case of low water level) the motor housing heats up after a lengthy operating period. You must therefore only use the carrying handle to transport the pump and avoid direct contact with the motor housing. Always wear protective gloves too.

Caution:
The discharge hose must always be connected with coupling keys. The pump may only be started up if the discharge hose is connected.

Caution:
The suction on the intake side can cause long-fibred substances to be drawn in. Do not remove these during operation. Switch off the pump, secure it against accidental switching on and then remove the objects.

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4.1 Connecting plug unit

The Tegernsee is fitted with an IP68 water pressure-tight connecting plug unit with integrated motor protection switch and operating capacitor.
Portable DIN 14685-compliant (all parts) power generators or DIN 14686-compliant switch cabinets provide power. If other energy sources are used for the Tegernsee for deployments other than by the fire service, a portable DIN VDE 0661 (VDE 0661)-compliant protective device must be used between the plug socket and the connecting plug.

Connecting plug unit

The mains plug must be plugged into a 230V/50Hz earthed socket on the aforementioned energy sources to operate the pump. The green operating light on the motor protection switch is illuminated during pump operation. The green operating light switches off and the pump stops operating if the motor protection switch triggers (e.g. In case of viscous pumping medium or blocked impeller).

The connecting plug unit must be opened to restart the pump. First, remove the power plug and secure it against being reinserted inadvertently. Then press a suitable screwdriver vertically into the opening in the housing in the connecting plug unit.

The housing closure will open.

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Then open the housing.

Push the black reset button.

Close the housing again and then reinsert the power plug. If the motor protection switch triggers again, see points 7 and 6.3.

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4.2 Operating the pump

For safe working on and with the pump, the wearing of safety shoes and safety gloves is recommended, in order to prevent injury from crushing or cutting.

The Tegernsee TP 4/1 is fitted with an intake strainer with a grain size of 8 mm. The grain size can be increased to 40 mm as required by removing the intake strainer.

Each time when using the pump, also ensure the following points:

1. Before using the pump, it must be checked for damage to the plug, cable and motor protection housing.

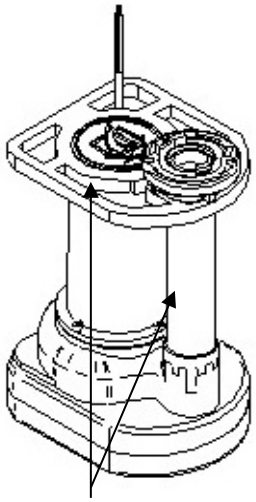
2. Transport the pump to the place of use.

Caution:
Always transport the pump with the handles provided for this purpose only.

Danger:
The PE pump base on the inlet side is used to protect the impeller from contact. The pump itself may not be operated without the appropriate contact protection.

3. To prevent reflow of the pumping medium in case of interrupted or finished pump operation, it is recommended to use the Tegernsee non-return flap (accessory) on the outlet side.

4. To achieve an optimum pumping power, it is strongly recommended to use a dimensionally stable spiral pressure hose (accessory) for the first 3-5 m of the pressure line. Mount this spiral hose to the outlet side of the non-return flap respectively the pump. A fire hose can now be connected to this spiral hose. Lay this at a suitable drain or collection tank. The end of the pressure hose must be adequately secured against impact. The fire hose should be laid without kinks where possible to achieve an optimum pumping power.



Tegernsee carrying handles

Tegernsee with non-return flap

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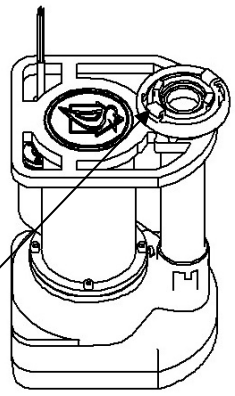
Danger:
Ensure that the pressure hose end is adequately secured and fixed. Otherwise, there is the risk of the hose end being hit when switching on the pump.

5. If the pump is to be lowered into a shaft, attach a suitable length of rope to the notch at the carrying handle.

Caution:
To lower the pump only the designated abseiling notch is used. Under no circumstances should the pump be lowered to the mains cable or the connected hoses.



6. Take care that the pump's power plug is removed and secured against being reinserted inadvertently.

7. Lower the pump on this rope into the liquid.

Danger from suspended loads:
When lowering the pump, ensure that no-one is under the pump in the shaft.

8. Make sure that the pump is standing safely.

Caution:
Only operate the pump via plug sockets which are secured with a residual current device (RCD) with a rate leakage current of not more than 30 mA. Each plug-in connection (socket, generator, etc..) must be fused with an overcurrent protective device with 16 A. The overcurrent protective device must at least have tripping characteristic B, characteristic C is recommended.

Danger from electrical shock:
Ensure that the network socket at the network socket connection is dry. Never carry out changes on the socket! The power socket is to be protected by a residual current device (RCD) with rated residual current of not more than 30 mA.

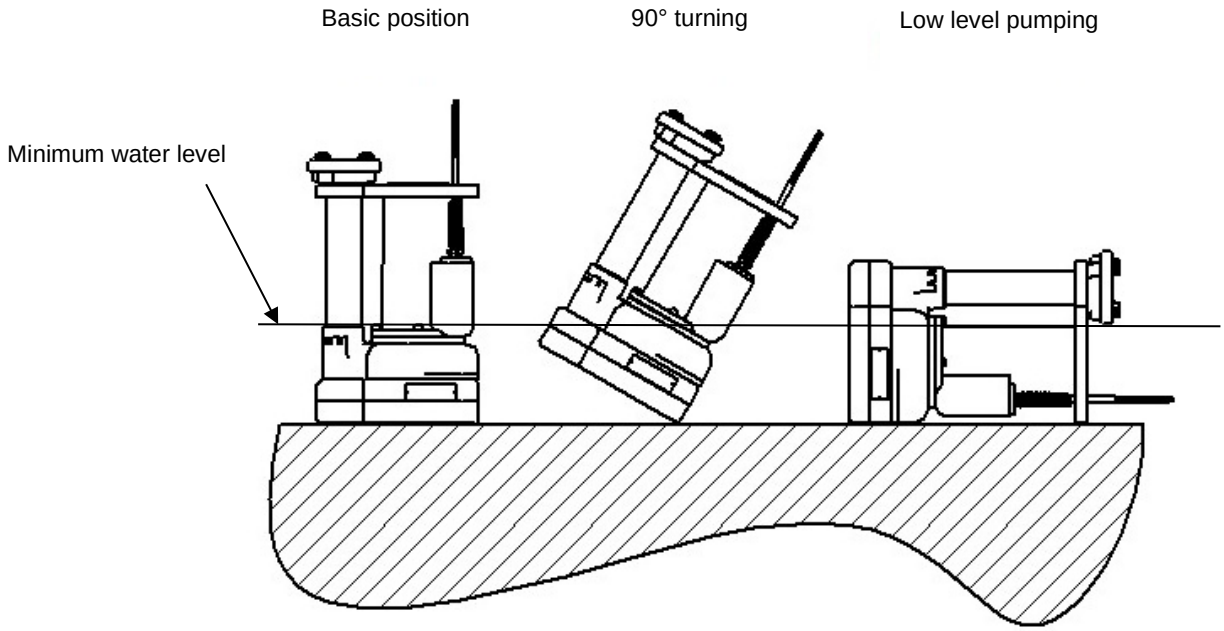
9. Switch the pump on by connecting it to a suitable power socket. The motor protection switch on the connecting plug unit lights up green. The pump should now pump with the defined pumping performance. Keep an eye on the pump starting pressure when switching on. The pump must move in the direction of the arrow when starting (see starting pressure arrow on the pump housing) whilst the impeller turns in the opposite direction (see arrow for direction of rotation).

Caution:
The plug and the motor protection switch must be easy to access during operation of the pump. They must always be supervised, so that they cannot be plugged in or unplugged or acknowledged, erroneously or accidentally.

10. The pump must be switched off by removing the mains plug as soon as the water level has dropped so far that the pump is sucking in air. If low-level pumping is to be carried out, only lower the liquid down to the minimum water level for low level pumping (upper edge of the spiral housing, see chapter 4.3).

11. Clean the pump with clear water after each use, particularly after using it with muddy liquid. In addition, let the pump run for about 10 minutes in a basin with clean water. The pump is to then be completely emptied. Finally let the pump run without pumped medium. In case of vibrations, eccentric pump running or grinding noises a customer service must be carried out in the factory.

4.3 Low-level pumping



If low-level pumping is to be carried out, the fluid is lowered down to the upper edge of the spiral housing. Now switch the pump off and turn it by 90° to pump the fluid up to a residual water level of a few millimeters.

If low-level pumping is to be carried out, the following points are to be observed:

1. Pump the medium according to section 4.1 of this user manual until the spiral housing becomes visible. (approx. 10-15 cm residual water level).

2. Switch the pump off by removing the mains plug. Secure the pump against accidental restarting.

Danger from electric shock:
Only carry out work on the pump when the pump is disconnected from the network by removing the network plug from the power supply. Prevent accidental restart of the pump by taking appropriate measures.

3. Turn the pump so that the intake openings face downwards.

4. Switch the pump back on by inserting the power plug.

5. If the intake openings get stuck on solids, first turn off the pump and remove the solids from the intake openings.

6. Pump the liquid until the pump intakes air. Switch the pump off again.

7. Clean the pump with clear water after each use, particularly after using it with muddy liquid. In addition, let the pump run for about 10 minutes in a basin with clean water. The pump is to then be completely emptied. Finally let the pump run without pumped medium. In case of vibrations, eccentric pump running or grinding noises a customer service must be carried out in the factory.

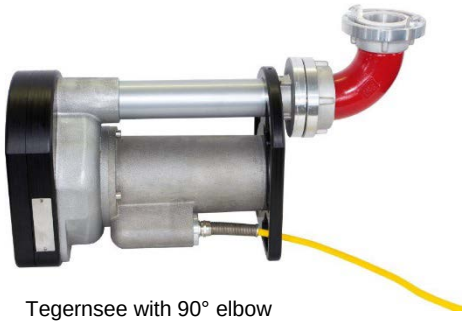
4.4 Low-level pumping at low water level

In case of low water level (< 10-15 cm) there is not enough water inside the spiral housing to do low-level pumping. For this first the pump has to be filled. Therefor the following points are to be observed:

1. Bring the pump into low-level pumping position (see section 4.3).

2. Mount a 90° elbow with B-Storz couplings on both sides to the outlet side of the pump.

3. Fill the pump with water until water drains off the inlet openings of the pump. Now the pump is sufficiently filled with water in order to start low-level pumping.



Tegernsee with 90° elbow

4. Mount a suitable pressure hose to the 90°elbow on the suction side of the pump and start the start pump as described in section 4.1 and 4.3 of this manual. It takes about 10-15 seconds until the pumps achieves its normal capacity.

4.5 Use of the pump with pluggable float switch

To operate the pump with pluggable float switch (optional accessory), first insert the pluggable switch into a socket which is protected by a residual current device (RCD) with rated residual current of not more than 30 mA and then connect the motor protection plug to the pluggable float switch. When operating the pump with float switch, also note the points listed under section "4.1 Use of the Pump". The following is also to be observed:

1. Mount the float switch on the cable lug in such a way that it cannot be sucked by the pump.

2. The float switch must only hang in the medium to the extent that it switches off shortly before the pump sucks air at the latest.

Pluggable float switch

4.6 Operation with emergency power generator

All Tegernsee pumps can be operated with 3 kVA DIN power generators. In the case of 3 kVA units wherever possible the pump should be connected to the unit directly (i.e. without an extension cable), as otherwise there is a risk of the unit stalling on switching on the pump.
With generators with higher power, extension cables can be used without restriction. The used extension cable must have a wire cross-section of at least 2.5 mm² or larger to keep the voltage drop in the cable as low as possible.

5 Accessory

The following accessories are available for the submersible motor pump Tegernsee:

- Accessory pack consisting of 3 m or 5 m PVC spiral hose, non-return flap and 90° elbow
- Non-return flap
- PVC spiral hoses
- PRCD safety switch
- Pluggable float switch
- 90°elbow with B-Storz couplings on both sides

In case of further questions please contact your local retailer.

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6 Service and Maintenance

It shall be the user's responsibility to ensure that all maintenance, inspection and assembly work is performed by authorized and qualified personnel who have adequately familiarized themselves with the subject matter by studying this manual in detail.
Any work on the machine shall only be performed when it is at stand-still, it is being imperative that the procedure for shutting down the machine described in this manual is be followed.
Pumps and pump units which convey hazardous media must be decontaminated. All waste emissions such as used oil must be appropriately disposed of, oil spills must be cleaned up and emissions to the environment must be reported. On completion of work all safety and protective facilities must be reinstalled and made operative again.

6.1 Pump cleaning and maintenance

Clean the pump with clear water after each use, particularly after using it with muddy liquid. In addition, let the pump run for about 10 minutes in a basin with clean water. The pump is to then be completely emptied. Finally let the pump run without pumped medium. In case of vibrations, eccentric pump running or grinding noises a customer service must be carried out in the factory.

6.2 Maintenance intervals

The pumps are completely maintenance-free. All components requiring lubrication are lifetime-lubricated. During the annual electrical test in accordance with DIN VDE 0701-0702 a trial run must also be performed to check the functional capability of the pump. In case of vibrations, eccentric pump running or grinding noises a customer service must be carried out in the factory. Also check the seals of the pump base for wear.

6.3 Dismantling the impeller/blockages

If blockages form in the spiral housing, the spiral housing and the impeller can be dismantled via the following steps:

1. Unscrew the four cylindrical screws with hexagon socket (M6) with which the PE pump base is screwed together and remove the lower part of the pump base.

2. Remove the three cylindrical screws with hexagon socket (M8) which connect the upper pump base with the spiral housing.

3. Remove the upper pump base from the spiral housing.

4. Remove the cylindrical screw with hexagon sockets (M8) from the impeller. Hold in place by using a mounting iron placed in the impeller opening. Open the screw anti-clockwise with a suitable spanner.

5. Remove the impeller from the shaft. if it is difficult to remove, take a conventional M10 screw and screw this on to the impeller (the thread is inside the impeller) until resistance can be felt. Continuing screwing to press the impeller away from the shaft. Then clean the polygon connection and check for damage.

6. Remove the blockage cause from the spiral housing and the impeller.

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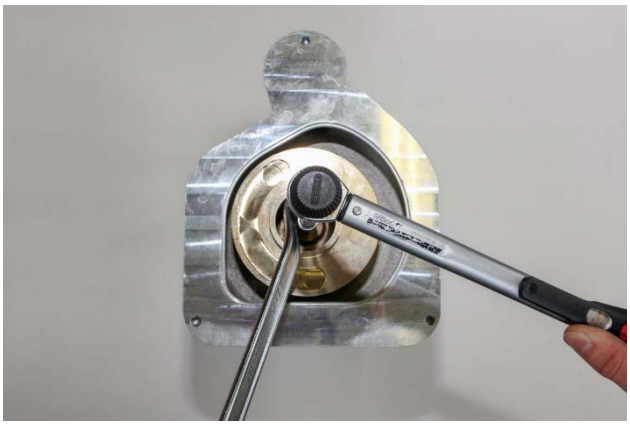
6.4 Assembling the impeller

When assembling the impeller, the following steps are to be taken:

1. Ensure the polygon connection (impeller and shaft) has been cleaned. Also clean the opening of the spiral housing in order to ensure a smooth mounting of the pump base including impeller counter plate.

2. Evenly place the impeller on the motor shaft and push it down until it stops.

3. Screw the impeller with the motor shaft using the cylindrical screw with hexagon sockets (M8). To fasten the screws, medium-strength screw locking (Loctite) is to be used. Please refer to Table 6.4.1 for the correct screw tightening torque.



4. Place the O-ring in the groove between the upper pump foot and the counter-plate.

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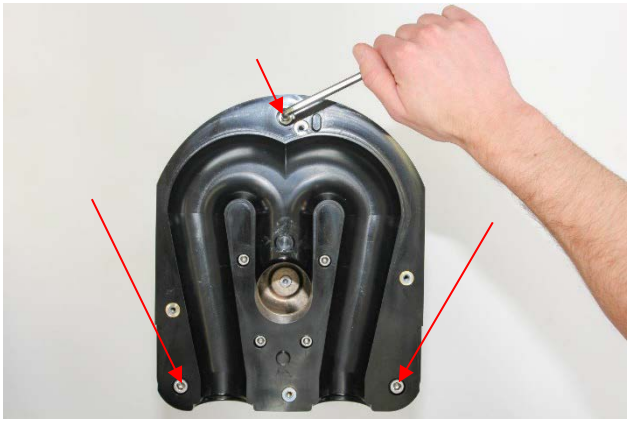
5. Insert the upper pump base with counter plate in the opening of the spiral housing until it stops. Screw the upper pump base with the spiral housing using the three cylindrical screws with hexagon socket (M8). To fasten the screws, medium-strength screw locking (Loctite) is to be used. Please refer to Table 6.4.1 for the correct screw tightening torque.



6. Make sure that the sealing cord in the lower pump base is positioned correctly in the recess.

7. Place the lower pump base on the already mounted upper pump base and screw them together using the four cylindrical screws with hexagon socket (M6). To fasten the screws, medium-strength screw locking (Loctite) is to be used. Please refer to Table 6.4.1 Screw tightening torque for the correct screw tightening torque.

8. Make sure that the pump base including all parts is fixed correctly.

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6.4.1 Screw tightening torques

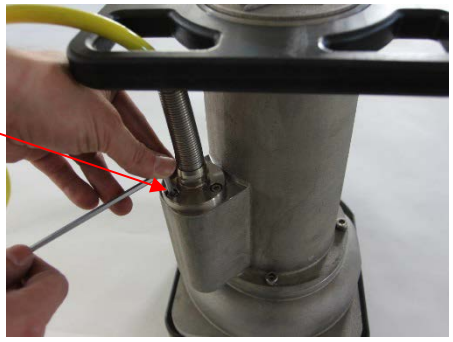
Screw	Screw connection	Tightening torque
M8	Impeller / shaft	18 Nm
M8	Upper pump base / spiral housing	34 Nm
M6	Upper pump base / lower pump base	12 Nm

6.5 Network cable and motor protection switch

The network cable may only be replaced by the manufacturer, its technical service or similar qualified personnel. Replace the O-ring on each opening of the cable screw connection.
In the event of a cable defect, the damaged cable can be replaced by a Spechtenhauser network cable in a few steps.

6.5.1 Dismantling of network cable

1. Remove the three cylindrical screws with the hexagon sockets (M5) from the housing.



2. Unplug the cable screw connection including plug and coupling from the housing. Open the connection cable plug and unplug the cable from the coupling.

6.5.2 Assembling the network cable

Assembly of the network cable is carried out in the reverse order of disassembly. Take care that the O-ring is replaced on each opening of the cable screw connection.

6.6 Motor

With all pumps, opening of the engine is not permitted. Repairs and maintenance on the motor may only be carried out by Spechtenhauser Customer Service or at the plant. In case of infringement, all claims for warranty and damages are lost.

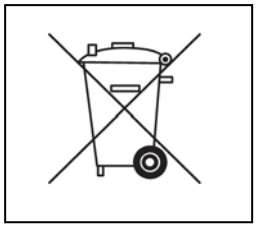
7 Malfunctions; causes and rectification

Problem	Cause	Remedy
Motor does not run	No power supply	Check the fuses, replace if necessary.
		Check the power cable for damage.
	Blown fuses	Replace fuses and locate the reason for their failure
Pump runs but gives no water	Pump or pressure line blocked	Clean the pump or the pressure line.
	Air in the pump	Vent the pump and the pressure line.
Pump gives insufficient water	Pressure loss in the system too high	Remove kinks in the pressure line.
	Head too high	Use or a more powerful pump.
	Pressure line blocked	Clean the pressure line
	Viscosity of the pumped medium too high	Dilute medium, if possible, otherwise cease operation and use a more powerful pump
Motor protection trips out	Viscosity of the pumped medium too high	Dilute medium, if possible, otherwise cease operation and use a more powerful pump
	Power input too high	Check the pump for blockages and remove if necessary.
	Motor temperature too high	Let the motor cool down. In case of repeated failure, the motor has to be checked by the Spechtenhauser service.
	Leaky motor	The motor has to be checked by the Spechtenhauser service.

In all further questions, please contact our customer service department.

8 Further information

8.1 Recycling the pump



Make the old pump unusable immediately.

- Unplug the pump and cut the power cable.

Do not discard of electrical appliances with household waste.

As specified in European Directive 2012/19/EU on old electrical and electronic appliances, used electrical goods must be collected separately and recycled ecologically.

Contact your local authorities or your nearest dealer for further information.

8.2 Guarantee

Our general conditions of business are applicable with regard to the guarantee.
Subject to change as a result of technical advances

8.3 Tests and approvals

Electrical tests must be performed in accordance with the provisions of safety regulations (BGV A3) and to DIN VDE 0701 Part 1 and Part 3. In accordance with DIN VDE 0702 these tests must be performed at regular intervals and after repairs and modifications.

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