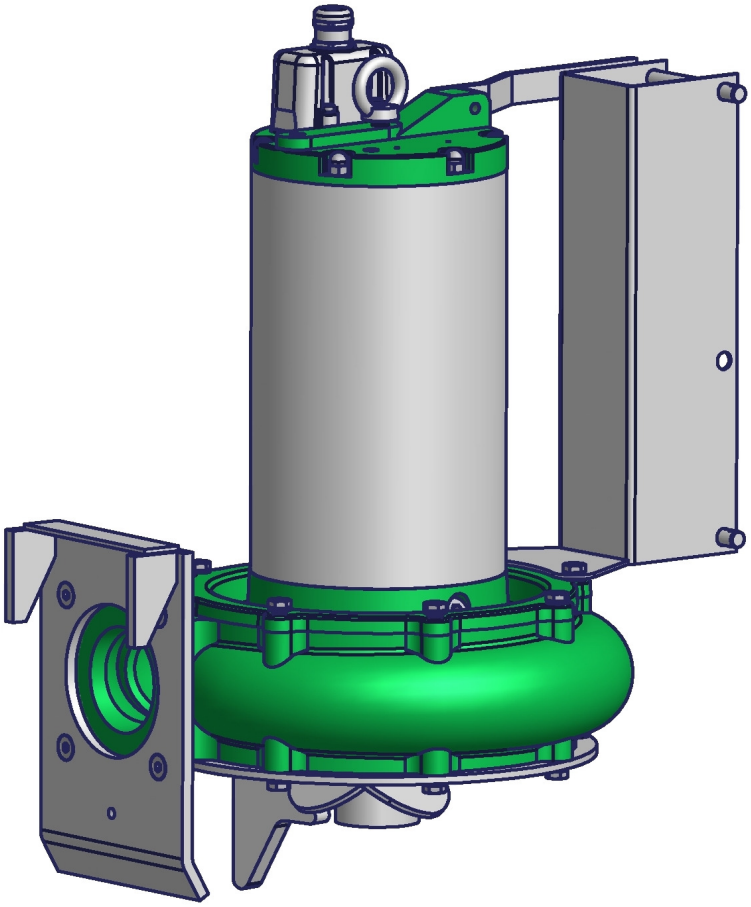
Stallkamp

OPERATING MANUAL

Submersible Motor Pump

type 2 model 2004

BG 132 4.0/ 5.5/ 7.5 kW
BG 160 11.0/ 17.0/ 22.0 kW



Document no.: 8110103 Version: January 2010

Space for notes:

General Remarks

- **The technical specifications, weights and measures are to be considered approximate and not binding.**
- **Pictures are for illustration purposes and can deviate from the actual product.**

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1 TABLE OF CONTENTS

2 DECLARATION OF CONFORMITY PURSUANT TO MACHINE DIRECTIVE 2006/42/EC (ORIGINAL, GERMAN VERSION)

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Product name: Submersible motor pump Type 2 Model 2004

Type: TMP 4.0kW; 5.5kW; 7.5kW; 11kW; 17kW; 22 kW

We hereby declare that the products listed above conform to the pertinent regulations of the EC Directive:

Machine Directive 2006/42/EG

including all amendments, and conform to the pertinent regulations of the Directive on electromagnetic compatibility:

EMC Directive 2004/108/EC.

The following harmonised standards have been applied:

EN ISO 12100-1:2003, Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology

EN ISO 12100-2:2003, Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles

EN 60204-1:2007-06, Safety of machinery - Electrical equipment of machines; Part 1 – Teil 1: General requirements

EN 61000-6-1:2007, Electromagnetic compatibility (EMC) Part 6-1: Generic standards – Immunity for commercial environments

EN 61000-6-2:2005, Electromagnetic compatibility (EMC) Part 6-2: Generic standards – Immunity for industrial environments

Dinklage, dated 17. September 2010

Erich Stallkamp, Managing Director

This declaration is not an assurance of characteristics in the sense of the law on product liability. The safety instructions provided in the product documentation are to be observed. If any conversions or modifications are made to the product, this declaration shall lose its validity with immediate effect.

3 GENERAL

Our devices are developed according to the current state of technology, manufactured with great care and subject to a continual quality control. The current Operating Manual should help you to get to know the device and to employ its proper operational possibilities.

The Operating Manual contains important notices in order to operate the device safely, appropriately and economically. It is necessary to observe the Operating Manual to ensure the reliability and longevity of the device ands avoid hazards.

The Operating Manual does not take the local on-site requirements into consideration; the operator is solely responsible for observing these, also for ensuring the observance on the party of any external assembly personnel.

3.1 Designation of notices in the Operating Manual

In the Operating Manual, safety references about causes of endangerment to persons are designated with the general hazard symbol according to DIN 4844-W9.

In the Operating Manual, warnings about electrical voltage are designated with the safety signs according to DIN 4844-W8 .

All other notices whose disregard might restrict the functional reliability of the device or represent a danger for the machine are marked with the word:

ATTENTION!

This machine unit may not be operated beyond the values defined in the technical documentation with respect to conveying liquid, delivery flow rate, speed, density, pressure, temperature as well as motor power output or other directives contained in the Operating Manual or contract documentation. If necessary, consult the manufacturer.

The rating plate designates the most important operating data and the machine serial number. We request that this always be specified in the event of inquiries, subsequent orders and for purchasing spare parts.

Provided that additional information or notes are required or in case of damage, please contact our field sales employees responsible for you, or get in touch with us directly.

3.2 Unauthorised conversion and spare part manufacture

Modifications and changes on the devices and their aggregates are only permissible with explicit approval of the manufacturer. The use of non "original spare parts" abrogates any liability.

4 SAFETY

This Operating Manual contains fundamental information to be observed for installation, operation and servicing the device.

It is therefore absolutely necessary to read these instructions before assembly and commissioning by the installer as well as for the responsible qualified personnel and operator, and must continually be available on location where the machine is operated.

Not only the safety instructions in this Operating Manual must be observed, but also the warning signs and provisions of the respective professional association in the latest version.

4.1 Qualification of the personnel

The personnel for the operation, servicing, inspection and assembly must have the appropriate qualification for this work.

Area of responsibility, competence and the monitoring of the personnel must be precisely regulated by the operator. If the necessary skills are not available to the personnel, then they should be appropriately trained and instructed.

Furthermore the operator must ensure that the operating staff fully understands the contents of this Operating Manual.

4.2 Dangers in case of non-observance of the safety instructions

Disregarding the safety instructions can lead to an endangerment of persons as well as to the environment and the machine. The disregard of safety instructions results in the loss of every claim for restitution of damages.

Specifically, disregard can for instance result in the following endangerment as a consequence:

- Failure of important functions of the device or plant.
- Endangerment of persons due to electrical, mechanical, chemical and other exposure.
- Endangerment of the environment due to leakage of dangerous materials.

WARNINGS SIGNS

Observe all notices and warning signs. Dangerous gases can escape when agitating the liquid manure.

DANGER OF POISONING!

If the liquid manure is stored below slatted floors, the presence of persons in buildings during agitation is only permissible with sufficient ventilation. Therefore window and doors should be open and the ventilator set on full power.

4.3 Safety-conscious work

Observe all safety instructions presented in this Operating Manual, the existing national regulations for accident prevention as well as possible internal work, operation and safety regulations of the company at all times.

Safety instructions for the operator and attendant:

- ✓ If hot or cold machine parts can pose a hazard, then these parts must be protected on-site against contact.
- ✓ Contact protection for moving parts may not be removed while the machine is in operation.
- ✓ Any leakage of dangerous materials must be conducted away so that there is no endangerment to persons and environment. Observe statutory provisions.

4.4 Safety instructions for maintenance, inspection and assembly work

The operator has to ensure that all service, inspection and assembly work is carried out by authorised and qualified personnel.

Fundamentally, all work on the machine can only be carried out when the machine is at a standstill.

Directly after completion of the work, all safety and protection equipment must be re-attached or made functional.

5 GUARANTEE

This chapter contains the general particulars for the guarantee. Contractual agreements are always treated with priority and are hereby not rescinded. The period of guarantee is a component of the general terms of business of Stallkamp. Agreements deviating from this must be specified in writing in the order confirmation.

5.1 General

Stallkamp is obligated to repair every defect to products sold by Stallkamp under the condition:

- ✓ that it is a quality failure of the material, manufacture or design,
- ✓ that the defect is reported in writing to Stallkamp or the Stallkamp representative within the period of the guarantee,
- ✓ that the product is employed exclusively in the specified operating conditions described in the Operating Manual and employed for the intended purpose,
- ✓ that the monitoring apparatus included in the product is correctly connected (temperature protection),
- ✓ that genuine Stallkamp parts are used.

5.2 Exemption from liability

No guarantee or liability is assumed for damage to the device if one or several of the following points is the case:

- A faulty configuration of the device on our part because of inadequate or false declaration of the ordering party or operator.
- The non-compliance to the safety instructions, regulations or the necessary requirements in this Operating Manual which apply according to German law.
- Assembly, disassembly or repair of the device not in keeping with the regulations.
- Inadequate servicing.
- Possibly chemical, electrical or electrochemical influences,
- Wear and tear.

Since servicing has an influence on the safety and functional capability of the device, it is an integral component of the guarantee. The operator of the device is obligated to have the manufacturer himself or a service approved by the manufacturer perform maintenance work according to the regulations of the manufacturer, including the necessary changing of oil and the repair and replacement of wearing parts. The operator is thus obligated to maintain a maintenance and revision list, which facilitates monitoring of the mandatory inspection and maintenance work (see Point 16 Maintenance and revision list)

We expressly emphasise that this device is a fluid flow engine in which the protective coating is exposed to constant wear from the abrasive contents of the medium being pumped and should consequently be classed as a wearing part. Wear, damage and secondary damages which result from external influences on the protective coating are expressly excluded from the guarantee. The use of devices and/or the field of application and reliability for the application must be verified by the operator and does not form part of the guarantee.

The liability of Stallkamp thereby excludes any liability for personal damages, material damages or financial losses.

The manufacturer reserves the right to change the performance, specifications or configuration data without pre-information.

6 PRODUCT DESCRIPTION

6.1 General description

This operating manual applies to the standard model of the Stallkamp submersible motor pump.

The pump may only be operated when completely submersed if used in explosive environments.

Submersible motor pump TMP type 2 model 2004 comprising:

- Stainless steel crank case
- Oil filling in motor compartment with insulating oil
- Thermo-control with bimetallic switch per phase for overheating protection
- Cast iron pump chassis coated with 2-component plastic lacquer
- Oil filling in oil chamber with hydraulic oil
- Pump impeller torque of 1450 rpm
- 6m electrical cable with special double-shell PU external sheath
- Stainless steel guide slide bearing including depth stop for guide rail 100 x 100 mm
- Maximum submersion depth 10 m
- Temperature of medium being pumped up to max. 50°C -> Pumping without restrictions as long as motor is not running in overload range.
- Temperature of medium being pumped from 51°C to max. 70°C -> Depending on the solid contents and the viscosity of the medium being pumped, in isolated cases the cooling of the pump may not be sufficient. The motor is then switched off by the thermal protection switch. In this case, a pump impeller with a smaller external diameter is required.

6.2 Applications

The pump is intended for the following applications:

- Pumping of liquid manure in final storage sites, pre-lagoons and liquid manure canals;
- Pumping of biomass in biogas plants;
- Pumping of sludge in treatment plants;
- Pumping of industrial waste water in industrial plants.

The pump has been designed with a wide variety of fields of application in mind in which a high flow rate is required proportional to the power consumption.

The flow rate (volume flow rate in m^3/h) is dependent on the density and viscosity of the liquid, the type and the dry matter content of the liquid manure (animal feed), the pumping height and distance and the diameter of the pipeline.

6.3 Technical data

Submersible motor pump TMP type 2 model 2004 comprising:

- Pump type: Type 2 model 2004
- Threephase motor: 400 V, 50 Hz, 3 Ph, 1450 rpm
- Protection category IP68
- Insulating category: F=155°C
- Motor power output: 4.0; 5.5; 7.5; 11.0; 17.0 and 22.0 kW
- Pump seal: 4 radial shaft seal rings
- Guide slide bearing: V2A, 1.4301 for guide rail 100 x 100 mm
- Propeller: Plated, coated steel

6.4 Type plate TMP type 2 model 2004

The type plate displays the most important power and specification data:

Stallkamp sequential number

Figure 1

Type plate on TMP type 2 model 2004

Serial no.

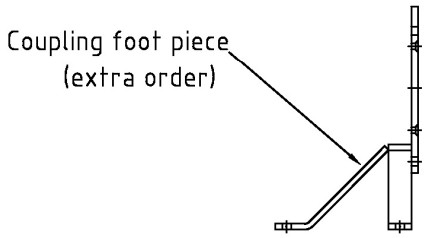
Protection category (here IP68)

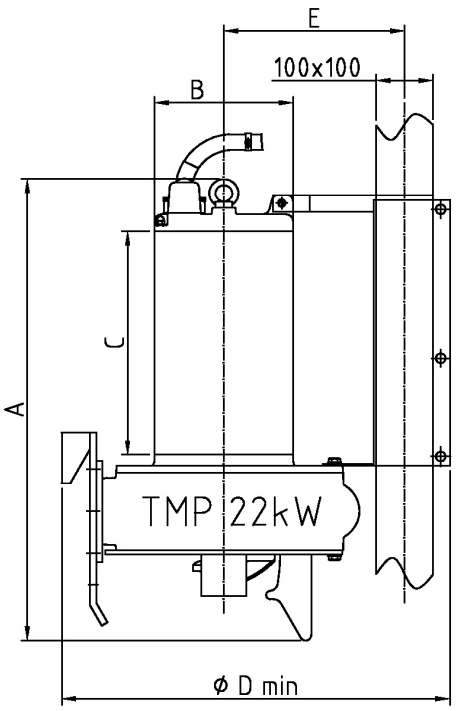
Power consumption (here 11 kW)

Year of manufacture (here 0509, which stands for May 2009)

7 POWER DATA AND DIMENSIONS OF TMP

Dimensions supmersible motor pump					
TMP	A	B	C	Ø D	E
040	665	210	242	700	275
055	680	210	257	700	275
075	715	210	292	700	275
110	710	245	286	800	320
170	755	245	331	800	320
220	820	245	396	800	320





Performance data submersible motor pump								
Type	Motor-output kW	Start	Nominal current in A	Required protection	Rotation speed rpm	Pressure max. in bar	Delivery rate m³/h	Weight compl. kg
TMP 040	4.0	direct	9.0	16A Inertia	1450	....	....	ca.120
TMP 055	5.5	Y / Δ	11.4	20A Inertia	1450	0.8	130	ca.140
TMP 075	7.5	Y / Δ	16.0	25A Inertia	1450	1.2	180	ca.160
TMP 110	11.0	Y / Δ	22.1	32A Inertia	1450	1.5	312	ca.180
TMP 170	17.0	Y / Δ	33.0	50A Inertia	1450	1.9	354	ca.190
TMP 220	22.0	Y / Δ	43.0	63A Inertia	1450	2.3	408	ca.200

All performance data are based on pure water!
Operating voltage 400V / 50Hz, System of protection IP 68

All dimensions in mm

Right for modification reserved

-				Programmnummer –		Ma?stab 1:10		Ma?e ohne Toleranzangaben nach DIN ISO 2768 – mittel	
-									
-				Bestellnummer –		Werkstoff –		Teile-Nr.	
-									
-					Datum	Name	Benennung		
-				Bearb.	28.09.2004	ANSORGE	Performance data & dimensions		
-				Gepr.			Submersible motor pump Mod. 2004		
-				Norm					
-				Stallkamp			Gruppe -	Type -	
-				Erich Stallkamp ESTA GmbH Postfach 1260 49408 Dinklage Tel. 04443/9666-0 Fax -60			Zeichnung-Nr. 28-0040-engl		Blatt
Zust.	?nderung	Datum	Name	EDV Nr. Z005137.dwg					Bl

8 CONSTRUCTION TYPE

8.1 Cable connection

The cable connection compartment is completely sealed off from the surrounding liquid and towards the crank case.

8.2 Motor

3-phase asynchronous motor as short circuit rotor with 50 Hz.

Permanent operation or intermittent operation with max. 6 evenly distributed activations per hour. The stator is insulated according to class F (155°C). The motor has been designed in such a way that in the case of nominal voltage deviations up to +/- 5% it can still attain an unchanged nominal output. With regard to the danger of overheating, +/- 10% deviations in the nominal voltage are allowed, provided that the motor is not running at full load the whole time. The difference between the individual phases must not exceed 2%.

8.3 Monitoring device

Three series-connected temperature sensors are installed in the stator winding. These will start reacting at 150°C.

ATTENTION! The temperature sensing switches must always be connected.

The device can be equipped with detectors: namely with a leakage detector for the detection of water in the oil.

8.4 Oil chamber

The device is equipped with an oil chamber between the motor and the pump impeller. This oil chamber contains an oil filling, which must be checked annually.

8.5 Pump impeller

The devices are equipped with tungsten carbide-plated steel impellers. The size of the impeller depends on the construction size and the power consumption of the motors. In special cases when a pump is permanently running in the overload range, a smaller impeller is required.

9 TRANSPORT- AND STORAGE REGULATIONS

The device has to be transported in a lying position. Ensure that the machine is not unable to roll.

If the device is not used for a long period of time, it must be protected against moisture and heat. The impeller should be turned from time to time (approx. every two months) to ensure that the sealing surfaces do not adhere to each another. This is absolutely essential when the device is not in use.

The device must be inspected before being recommissioned after not being used for a long period of time. It is particularly important to verify that the cable entry points and seals are not damaged in any way.

The directions under Point "**4. Safety**" must be observed.

10 INSTALLATION

10.1 Prior to commissioning: safety instructions

The following rules should fundamentally be observed to prevent accidents during service and assembly work:

(1) Never work alone. The danger of drowning and suffocation must not be underestimated.

(2) Check whether sufficient oxygen is available and no poisonous gases exist.

(3) Before welding work or use of electrical tools, check whether there is a danger of explosion.

(4) Pay attention to the danger of electrical accidents.

(5) Examine lifting equipment to ensure their fully satisfactory condition.

(6) Ensure an adequate shutoff at the place of work, e.g. cordoning trellis

(7) Wear hardhat, safety glasses and safety footwear.

(8) Keep a first-aid kit ready.

Otherwise observe the health and safety regulations as well as the prevailing governmental regulations.

10.2 Commissioning the submersible motor pump

(1) The device can only be operated with a suitable bracket (see: lifting gear from the Stallkamp range). Lower the device completely into the liquid manure, making sure that the rope of the lifting gear is taut at all times and that the electrical cable does not enter the area of the impeller.

(2) Connect the pump's pressure connector up to the pressure main pressure-tightly.

(3) Commission the device with the star-triangle motor protection switch. Attention: Turn through to "Star" (Dreieck)!

The impeller turns clockwise when viewed from the pump inlet (from below) (see 11.2 Impeller direction test).

(4) As standard, the device is protected by:
a) An overload protection in the switch box
b) an overheating protection.

In case of an overload or of overheating, the device is switched off by a motor protection switch. If the device was switched off as a result of overheating, under no circumstances should you try to restart by pressing the switch repeatedly.

A cooling phase of approx. half an hour must be maintained in order to avoid damage occurring to the motor winding. In some cases, it may be possible to restart the device after approx. 5 minutes, although the motor winding is still partly hot. Even in these cases, it is still important to maintain the cooling phase of approx. half an hour.

ATTENTION: The motor of the device must always remain fully immersed in the liquid to ensure that sufficient cooling is guaranteed at all times.

(5) The secure positioning of all screws and connections must be verified.

10.3 Leakage display – special equipment -

In the cases of leaks, i.e., if liquid manure or other foreign liquid enters the device, the control lamp on the switch box lights up. The unit switches off after approx. half an hour. If this is the case, lift the device out of the liquid and ascertain the reason for the disturbance.

10.4 Securing of the electrical cable

The electrical cable must be affixed to the rope with cable clips so that it is protected against damage from the impeller.

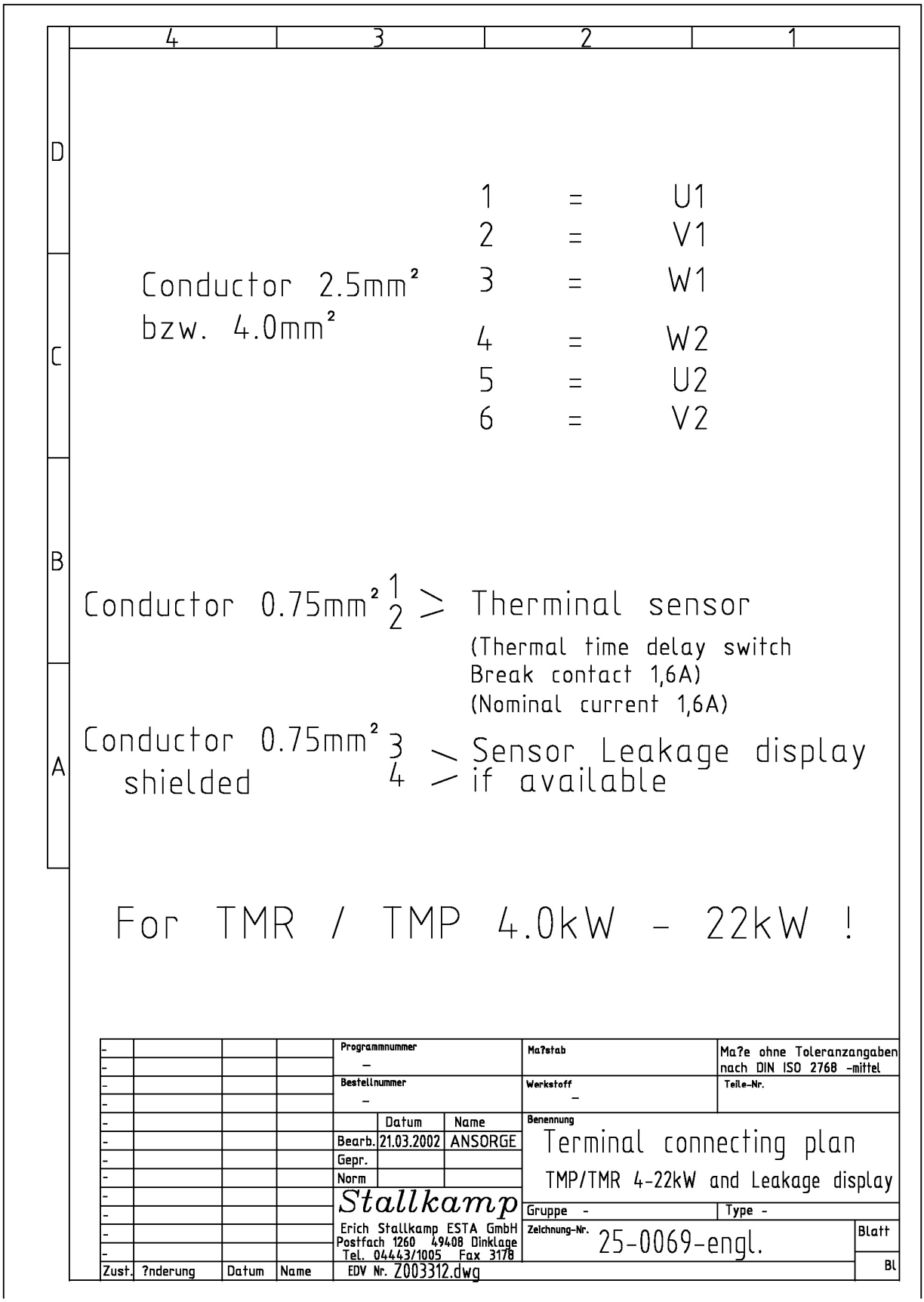
Important: When raising and lowering the device, always pay attention to the correct guidance of the electrical cable as it could otherwise be damaged by the impeller or the cable screw connections.

10.5 Cleaning the device

(1) Pressure washers must not be used to clean the device.

(2) The star-triangle motor protection switch must be fastened so that it is protected against moisture.

10.6 Connection plan TMP/TMR 4-22 kW and leakage display



11 ELECTRICAL CONNECTION

11.1 Electrical connection and protection of the electrical motor

The electrical connection may only be carried out by a certified electrician. The VDE regulations (German Association for Electrical, Electronic & Information Technologies) must be observed. Compare the existing voltage with the specifications on the motor's manufacturer's plate and select the appropriate circuit.

The device is watertight according to IP68. The manual switch box is splash-proof according to IP40. The plastic chassis of the automatic star-triangle start-up is splash-proof according to IP65.

The technical connection conditions of the local power authorities must be observed during connection.

A motor protection device is a prerequisite.

The device must be properly connected to the mains supply (pay attention to serviceable protective conductors) and check whether the feed cable is properly protected. The respective power consumption of the motor in amperes is shown on the motor's type plate. See Point "**7.** "

ATTENTION!

The switch box must be protected from moistures at all times!

11.2 Impeller direction test

The impeller turns clockwise when viewed from the pump inlet (from below).

The direction can be tested by turning the device on and off again rapidly.

If the direction is incorrect, swap any two of the phases L1, L2 and L3 of the feeder in the switch box!

The electrical installation may only be carried out by a certified electrician.

(in accordance with the VDE regulation or national regulations)

IMPORTANT!!

The electrical cable must ***never*** be subject to tensile loads, as this can cause damage to the unit or cause it to leak.

Ensure that the electrical cable is always taut and does not droop during operation.

When winching up the device, the electrical cable must also be pulled up as it could otherwise be damaged.

12 MAINTENANCE

The specified maintenance and inspection work must be performed regularly. These tasks may only be carried out be trained, qualified and authorised personnel. The operator of the device is obligated to have the manufacturer himself or a service approved by the manufacturer perform maintenance work according to the regulations of the manufacturer, including the necessary changing of oil and the repair and replacement of wearing parts. The operator is thus obligated to maintain a maintenance and revision list, which facilitates monitoring of the mandatory inspection and maintenance work (see Point 16. Maintenance and revision list)

12.1 Maintenance intervals

The device must be inspected for damage before every commissioning. In particular the impeller and the cable must be proven to be free of damage. In addition, the secure positioning of all screws and other fastening devices must be verified.

12.1.1 Recommendation: Every 3 months

12.1.1.1 Power consumption check at ammeter

Power consumption is constant during normal operation. Occasional current fluctuations are caused by the consistency of the medium being pumped/agitated. If a constantly increased power consumption is measured, a smaller impeller is required (see Point 8.5. Pump impeller or contact our sales representative).

12.1.2 Recommendation: Every 6 months in continuous operation

12.1.2.1 Checking the shaft seal

The shaft seal is a wearing part and must be replaced at the latest every 4,500 operating hours when the device is in continuous operation. The shaft seal is available as a complete component. Please contact our sales representative.

12.1.3 Recommendation: Every 6 months

12.1.3.1 Checking the insulation resistance

Every 4,500 operating hours or at least once annually we recommend measuring the insulation resistance of the motor winding in the scope of maintenance work. If the insulation resistance is not attained moisture can enter the motor. The device must not be recommissioned. Please contact our sales representative.

12.1.3.2 Monitoring device functional check

Every 4,500 operating hours or at least once annually we recommend checking the monitoring device in the scope of maintenance work. For these functional checkst he device must be cooled down to ambient temperature. The electrical power cords of the monitoring devices must be disconnected in the switch box. Firstly, the temperature protection should be checked with a continuity measurement. If a leakage detector is installed, it should be tested with an ohmmeter. If you identify any defects, please contact our sales representative.

12.1.4 Recommendation: Every 12 months

12.1.4.1 Checking the oil filling in the oil chamber

oil filling in the oil chamber must be checked annually. If oil is missing or contaminated with water or other media, the device must be taken out of operation immediately. In this case, the oil must be changed immediately and the front shaft seals must be exchanged. (See Point "12.2 Exchanging the shaft seal on the TMP Bg. 132/160

12.1.4.2 Check the tightening torque of all screw connections

Every 9,000 operating hours or at least once annually we recommend checking the secure positioning of the screw connections in the scope of maintenance work. The tightening torques for stainless steel screws in Nm for different thread sizes are shown below:

(M8 = 18 Nm, M10 = 33 Nm, M12 = 57 Nm, M16 = 135 Nm, M20 = 150 Nm)

12.1.4.3 Visual inspection and cleaning of the connection cable and lifting gear

Every 9,000 operating hours or at least once annually we recommend checking the connection cable, schackles and lifting gear for damage and soiling in the scope of maintenance work. Deposits, blockafes and adhering fibrous marerials must be removed. In addition, the insulation on the connection cable must be inspected for damage, such as scratches, tears, blistering or crushed areas. Damaged components must be exchanged immediately. Please contact our sales representative.

12.2 Exchanging the shaft seal on the TMP Bg. 132/160

The following assembly instructions refer to Zg. no.: 28-0035/1 and 28-0034/1

Before carrying out installation work on the pump, the power supply or voltage in the feed cable to the submersible motor pump's switch box must be disconnected.

Raise the pump out of the pit and clean it.

Disassembly:

1. Remove brass plug ½" no. 903.1 and copper filling ring ½" no. 411 (release oil).
2. Pull of protection cap no. 002 and untighten nut no. 920.1 (we recommend inserting a piece of wood between the impeller and the lid of the feeder in order to block the impeller when untightening the nut).
3. Disassemble the lid of the pump feeder no. 162.
4. Pull the impeller no. 233 off downwards.
5. Remove the fitting key no. 940.
6. Remove the spacers no. 551.2, if present.
7. Remove the distancers no. 551.1.
8. Untighten and remove packing sleeve no. 441 using a hook spanner.
9. Remove sleeve for motor shaft no. 524.2.

Assembly:

1. Glue packing sleeve no. 441 including shaft seal rings at thread using Curil and assemble.
2. Carefully slide in sleeve for motor shaft no.524.2 and O-ring no. 412.
3. Slide on the distancers no. 551.1.
4. Screw on the spacers no. 551.2, if present.
5. Insert the fitting key no. 940.
6. Slide on the impeller no. 233.
7. Assemble the lid of the pump feeder no. 162.
8. Check that the gap between the impeller no. 233 and the lid of the pump feeder no. 162 is 1-2 mm; if necessary, additionally mount or remove the distancers no. 551.2 as of point 3.
9. Slide on the disk no. 550.1.
11. Screw on a new lock nut no. 920.1.
12. Put on protective cap no, 002.
13. Fill in oil (Wibohyd EHF 46), BG 132 = 0.4 l; BG 160 = 0.4 l.
14. Mount new brass plug ½" no. 903.1 and new copper filling ring ½" no. 411.
15. Carry out functional test.

12.3 Changing the pump impeller in the submersible motor pump

If power consumption is too high when operating the pump, a smaller impeller must be installed.

Disassembly: see 12.2: Disassembly, point 2 to 4

Assembly: see 12.2: Installation, point 6 to 11

Then perform a functional test!

13 NOTES

13.1 Regulation of the professional association

The following accident prevention regulations of the Agricultural Professional Association can be found in Paragraph 2.8 under "Special Provisions for Pits and Canals":

Paragraph 2.8

§ 1 Protection against falling in

(1) Pits, ditches, canals, wells and other similar pits in the house and courtyard area must be protected with railings or coverings to prevent persons falling in. If these are not deeper than 100 cm, other safety precautions can suffice.

§ 2 Openings

(2) If removal and entries etc. are opened, it must be guaranteed that persons and objects cannot fall in.

(3) Pits and canals that are customarily entered must have facilities which permit risk-free entry. The openings of these pits and canals must be dimensioned in such a way to allow the rescue of any casualties.

§ 3 Entry

(1) Before entry and during the presence in pits and canals, ensure that sufficient respiratory air is present and that plant facilities are reliably protected against being switched on. The handling of open fire is not permitted.

(2) Entry for the recovery of an accident victim is only permissible if two other persons secure the entry with a cable which is firmly anchored outside the container.

§ 4 Container and canals for animal faeces

(1) For containers and canals in the open air, it must be guaranteed by suitable measures that fermentation gas cannot flow into the buildings.

(2) Closed containers in the open air must have vent openings on opposite lying sides.

(3) If containers and canals are found in the buildings - also under slatted floors – it must be guaranteed that fermentation gases are conducted away from the buildings.

(4) If containers and canals in the buildings are furnished with agitating, pumping and rinsing plants, facilities for the removal of fermentation gases must be present which automatically switch on when the agitating pump and rinsing works are operating. They may only be switched off after conclusion of the work process. The gases conducted away may not endanger persons.

(5) Canals must be so designed to avoid any unnecessary whirling up of the faeces.

(6) Operating states for agitating, pumping and rinsing etc. equipment must be built up over the floor.

(7) Closed rooms in which there are operating stands may not have openings to the containers and canals.

(8) Operation instructions must be permanently attached to the operating stands.

§ 5 Removal of animal faeces from containers and canals

(1) No smoking and no open fires are allowed in the immediate proximity of removal openings during agitating and removal of faeces.

(2) In the buildings in which there are open containers and canals, the presence of persons and animals during agitating and removal is only permissible with sufficient ventilation.

§ 6 Warning signs

(1) Easily visible warning signs must be attached to openings of containers and canals which indicate the danger of the gases.

(2) Refer to the "Information Sheet with Notice, Warnings Directives, Prohibitions and Rescue Signs" of the Federal Association of Agricultural Trade Associations.

14 LIST OF SPARE PARTS BG 132

for TMP 4.0 – 7.5 kW **Zg.-no.: 28-0035/1**

Position	Number	Description	Parts no.
002	1	Hexagonal protecting cap for SW 30	5320009
102	1	Volute casing	7180196
162	1	Pump lid Ø150	6100363
213	1	Drive shaft deliverable only with rotor 818	
		4.0kW	7110363
		5.5kW	7110364
		7.5kW	7110365
233	1	Counterclockwise impeller	
		4.0kW	6180111
		5.5kW	6180050
		7.5kW	6180051
320	2	Angular ball bearing SKF 7208 BECB	5180040
321	1	Thrust ball bearing 6008 2 RS	5180020
40-10	1	Liquid sealing Sikabond T2	5480007
40-20	2,5 ml	Liquid sealing Curil sealing mass	5380020
411	1	Copper filling ring ½"	5230077
412	1	O-ring 30.3x2.4	5190025
421.1	1	Shaft seal ring FPM DIN 3760 50x72x7	5190070
421.2	3	Radial shaft seal ring 40x60x10 B2SL	5190005
421.3	1	Radial shaft seal ring 40x62x6 BABSL0,5	5190007
441	1	Packing sleeve	7110031
524.1	1	Inner ring LR 45x50x25,5	5180058
524.2	1	Sleeve for lower bearing	7110032
550.1	1	Washer 21,0mm	5250120
551.1	1	Spacer disk Ø58	7110033
551.2	a)	spacer disk a) according to requirements	
		0.5	7110128
		1.0	7110129
		1.5	7110130
551.3	1	Positioning ring 58x67x0,5	5250070
811	1	Motor housing high grade steel cladding only deliverable with stator 813	6160033
		4.0kW	7160056
		5.5kW	7160059
		7.5kW	7160060
812	1	Motor housing lid	7160028
813	1	Stator packet only deliverable with high grade steel cladding 811	
		4.0kW	7160099
		5.5kW	7160100
		7.5kW	7160101
818	1	Deliverable with shaft 213	
		4.0kW	5280039
		5.5kW	5280040
		7.5kW	5280041
82-10	1	Shrink tubing	7160253
82-20	10	Cable clamp with shackle	6180108
822	1	Motor flange TMP BG 132	7110361
824	1	Cable black 4,0-11,0 kW & 17 kW <7,5m cable length	7160482
833	1	Terminal box	7110417
834.1	c)	Leak-proof threaded cable connector c) depending on drive	5310263
834.2	b)	Screw connection Skintop b) depending on drive	5310228
900	1	Lifting eye bolt DIN 580 M12	5200108
901.1	16	Hexagon bolt DIN 933 M12x25	5200029
903	2	Screw plug DIN 906 R1/2"	5220064
903.1	1	Brass plug ½"	5260052
903.2	1	Screw plug R1/4"	5220063
905	6	Threaded pick-up M6	
		4.0kW	5240044
		5.5kW	5240045
		7.5kW	5240043
914.1	4	Filister head screw DIN 912 M6x30	5200056
920.1	1	Nut DIN 985 M20x1.5	5230033
920.2	6	Cap nut DIN 1587 M6	5200095
930	6	Screw locking device M6	5230035
930.1	16	securing split-ring lock washer DIN 128 A12	5200047

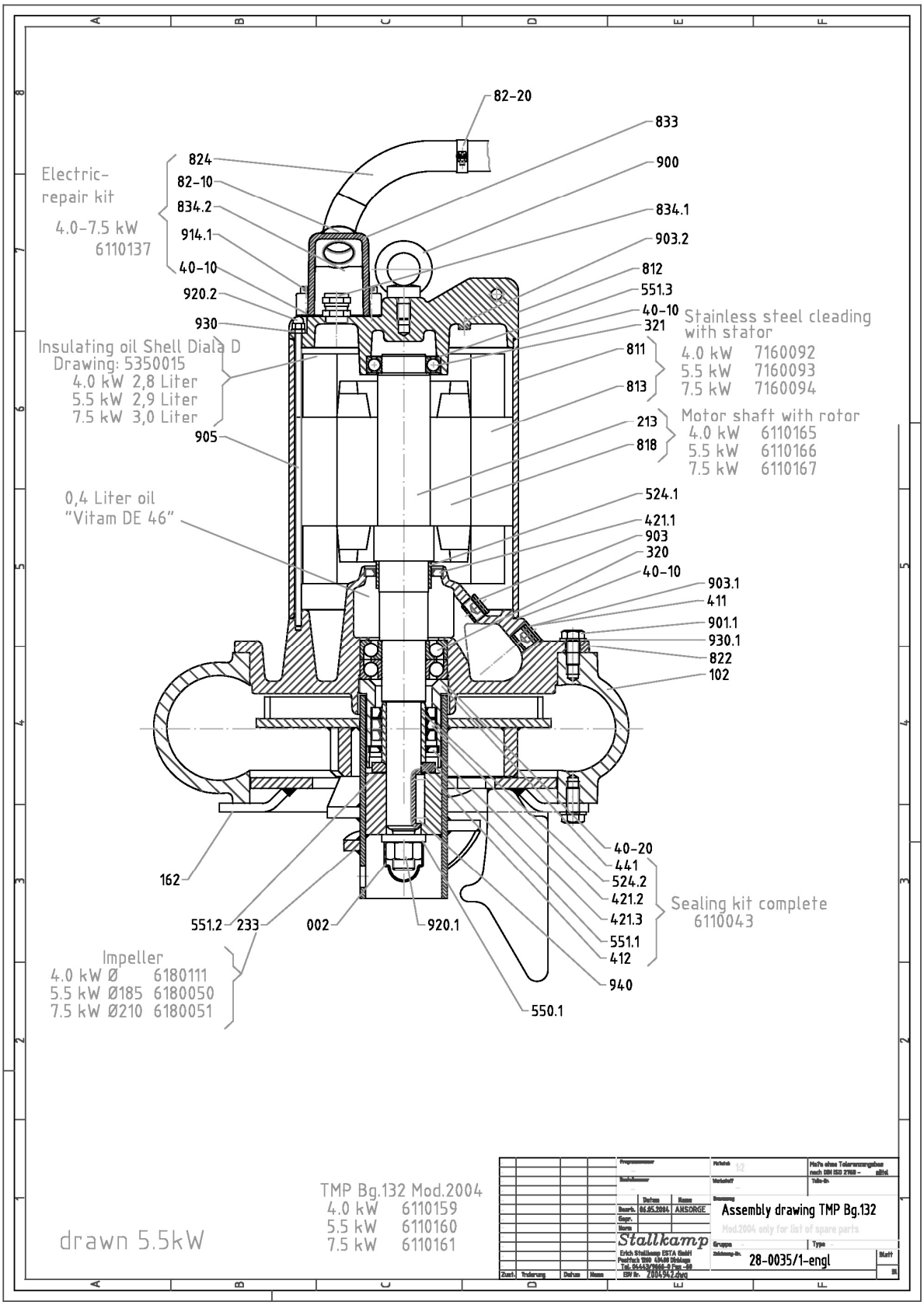
940	1	Sunk key DIN 6885 AB 10x8x40	5250144

List of spare parts - construction groups

for TMP 4.0 – 7.5 kW, BG 132 **Zg.-no.: 28-0035/1**

Position	Number	Description	Parts no.
		Repair -gasket set consisting of:	6110043
	1	Packing sleeve Pos. 441	7110031
	3	Radial shaft seal ring 40x60x10 Pos. 421.2	5190005
	1	Radial shaft seal ring 40x62x6 Pos. 421.3	5190007
	1	Sleeve	7110032
	1	O-ring 30,3x2,4 Pos. 412	5190025
	1	Spacer disk Ø58 Pos. 551.1	7110033
	1	Sleeve for lower bearing Pos. 524.2	7110032
	1	Liquid sealing Curil 50g Pos. 40-20	5380020
		High grade steel cladding with stator Pos. 811 & 813	
	1	For 4.0 kW	7160092
	1	For 5.5 kW	7160093
	1	For 7.5 kW	7160094
		Motor shaft with rotor Pos. 213 & 818	
	1	For 4:0 kW	6110165
	1	For 5.5 kW	6110166
	1	For 7:5 kW	6110167
		Electric repair set with cable for 4.0-11.0 kW u. 17.0 kW < 7.5m cable length	6110137
	1	E-cable black 7x2, 5+2x(2x0.75) Pos. 824	7160482
	1	Screw connection Skintop Pos. 834.2	5310228
	4	Filister head screw M6x30 Pos. 914.1	5200056
	2	Shrink tubing 45-12/60 Pos. 82-10	7160253
	1	Omnifit liquid sealing 2.5 ml	7160247
	1	Liquid sealing Sikabond T2 50 ml Pos. 40-10	7160248
		Cable clamp with shackle for cable-Ø19 mm Pos. 82-20	6180108
		Motor protection switch for 4.0 kW	6160000
		Star-triangle motor protection switch f. 5.5 kW	6160002
		Star-triangle motor protection switch f. 7.5 kW	6160004

Assembly drawing TMP BG 132



15 LIST OF SPARE PARTS BG 160

for TMP 11.0 – 22.0 kW, **Zg.-no.: 28-0034/1**

Position	Number	Description	Parts no.
002	1	Hexagonal protecting cap for SW 30	5320009
102	1	Volute casing	7180197
162	1	Pump lid Ø180	6100366
213	1	Drive shaft only deliverable with rotor 818	
		11kW	7110028
		17kW	7110029
		22kW	7110030
233	1	Counterclockwise rotating blading	
		11kW	6180053
		17kW	6180055
		22kW	6180056
320	2	Angular ball bearing SKF 7208 BECB	5180040
321	1	Thrust ball bearing 6208 2 RS	5180010
40-10	1	Liquid sealing Sikabond T2	5480007
40-20	2,5 ml	Liquid sealing Curil sealing mass	5380020
411	1	Copper filling ring ½"	5230077
412	1	O-ring 30.3x2.4	5190025
421.1	1	shaft seal ring EPM DIN 3760	5190069
421.2	3	Radial shaft seal ring 40x60x10 B2SL	5190005
421.3	1	Radial shaft seal ring 40x62x6 BABSL0.5	5190007
441	1	Packing sleeve	7110031
524.1	1	Inner ring IR 45x55x22	5180057
524.2	1	Sleeve for lower bearing	7110032
550.1	1	Washer 21.0mm	5250120
551.1	1	spacer disk Ø58	7110033
551.2	a)	spacer disk a) if required	
		0.5	7110128
		1.0	7110129
		1.5	7110130
551.3	1	Positioning ring 71x79x0,6	5250071
811	1	Motor housing high grade steel cladding only with Stator 813 lieferbar	
		11kW	6160033
		17kW	6160034
		22kW	6160035
812	1	Motor housingdeckel	7160027
813	1	Stator packet only deliverable with high grade steel cladding 811	
		11kW	7160096
		17kW	7160097
		22kW	7160098
818	1	Rotor only deliverable with shaft 213	
		11kW	5280033
		17kW	5280034
		22kW	5280035
82-10	1	Shrink tubing	7160253
82-20	10	Cable clamp with shackle	
		11-17kW	6180108
		22kW	6180100
822	1	Motor flange TMP BG 160	7110362
824	1	Cable black 11,0 – 17,0 kW & 22kW	
		11-17kW	7160482
		22kW	7160483
833	1	Terminal box	7110417
834.1	c)	Leak-proof threaded cable connector c) depending on drive	5310062
834.2	b)	Screw connection Skintop b) depending on drive	5310228
900	1	Lifting eye bolt DIN 580 M16	5200181
901.1	16	Hexagon bolt DIN 933 M12x25	5200029
903	2	Screw plug DIN 906 R1/2"	5220064
903.1	1	Brass plug ½"	5260052
903.2	1	Screw plug ¼"	5220063
905	6	Threaded pick-up M8	
		11kW	5240023
		17kW	5240022
		22kW	5240021

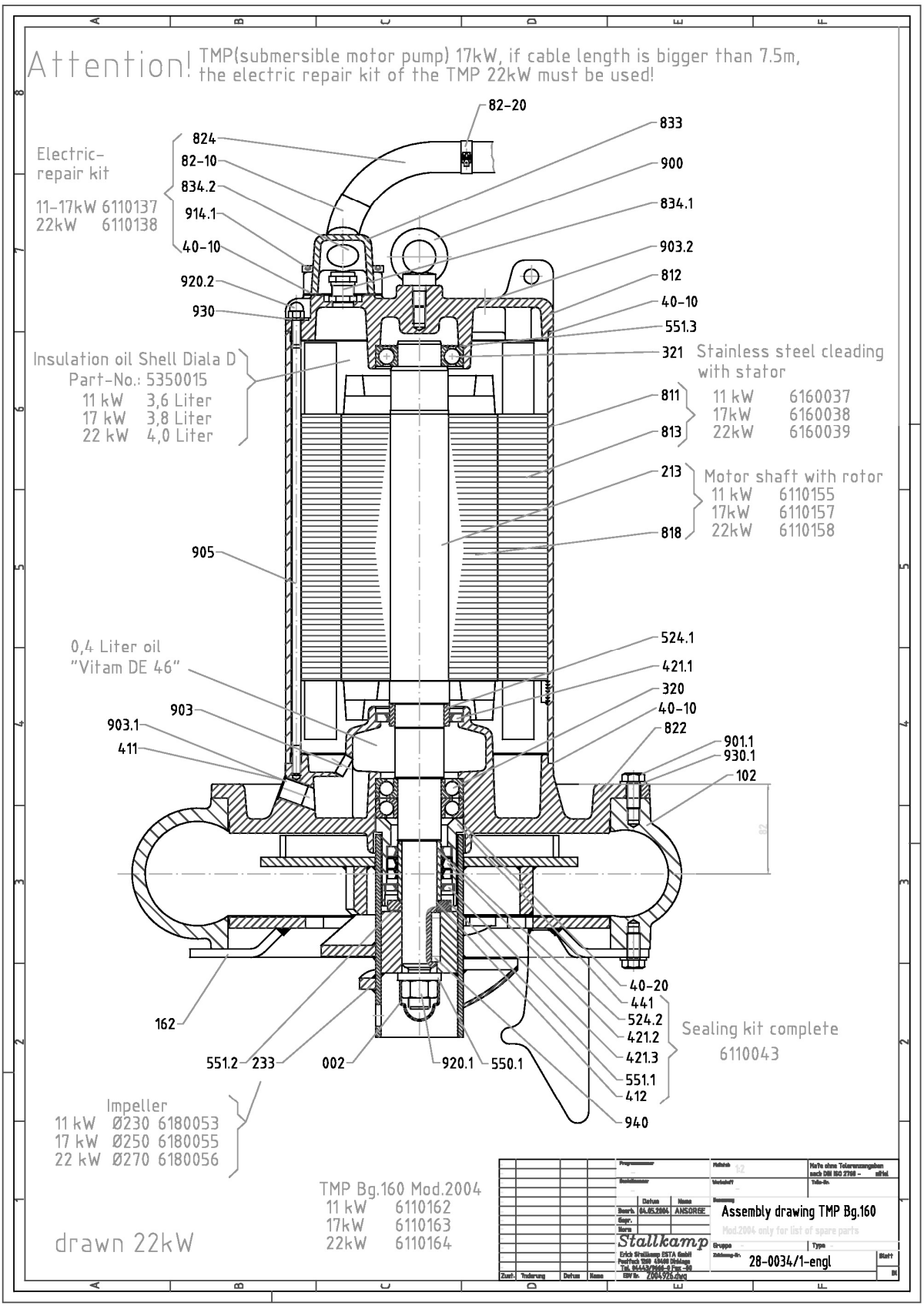
914.1	4	Filister head screw DIN 912 M6x30	5200056
920.1	1	Nut DIN 985 M20x1.5	5230033
920.2	6	Cap nut DIN 1587 M8	5200096
930	6	Screw locking device M8	5230036
930.1	16	Securing split-ring lock washer DIN 128 A12	5200047
940	1	Sunk key DIN 6885 AB 10x8x40	5250144

List of spare parts - Construction groups

for TMP 11.0 – 22.0 kW, BG 160 **Zg.-no.: 28-0034/1**

Position	Number	Description	Parts no.
	$	Repair -gasket set consisting of:	6110043
	1	Packing sleeve Pos. 441	7110031
	3	Radial shaft seal ring 40x60x10 Pos. 421.2	5190005
	1	Radial shaft seal ring 40x62x6 Pos. 421.3	5190007
	1	Sleeve	7110032
	1	O-ring 30,3x2,4 Pos. 412	5190025
	1	Spacer disk Ø58 Pos. 551.1	7110033
	1	Sleeve for lower bearing Pos. 524.2	7110032
	1	Liquid sealing Curil 50g Pos. 40-20	5380020
		High grade steel cladding with stator pos. 811 & 813	
	1	For 11.0 crankshaft	6160037
	1	For 17.0 crankshaft	6160038
	1	For 22.0 crankshaft	6160039
		Motor shaft with rotor Pos. 213 & 818	
	1	For 11.0 crankshaft	6110155
	1	For 17.0 crankshaft	6110157
	1	For 22.0 crankshaft	6110158
		Electric repair set with cable for 4,0-11,0 kW u. 17,0 kW < 7,5m cable length	6110137
	1	E-cable black 7x2, 5+2x(2x0,75) Pos. 824	7160482
	1	Screw connection Skintop Pos. 834.2	5310228
	4	Filister head screw M6x30 Pos. 914.1	5200056
	2	Shrink tubing 45-12/60 Pos. 82-10	7160253
	1	Omnifit liquid sealing 2.5 ml	7160247
	1	Liquid sealing Sikabond T2 50 ml Pos. 40-10	7160248
		Electric repair set with cable for 17.0 and 22.0 kW > 7.5m cable length	6110138
	1	E-cable black 7x4+2x(2x0.75) Pos. 824	7160483
	1	Screw connection Skintop Pos. 834.2	5310228
	4	Filister head screw M6x30 Pos. 914.1	5200056
	2	Shrink tubing 45-12/60 Pos. 82-10	7160253
	1	Omnifit liquid sealing 2.5 ml	7160247
	1	Liquid sealing Sikabond T2 50 ml Pos. 40-10	7160248
		Cable clamp with shackle f. cable-Ø19 mm Pos. 82-20	6180108
		Cable clamp with shackle f. cable-Ø21 mm Pos. 82-20	6180100
		Star-triangle motor protection switch f. 11.0 crankshaft	6160006
		Star-triangle motor protection switch f. 17.0 crankshaft	6160008
		Star-triangle motor protection switch f. 22.0 crankshaft	6160009

Assembly drawing TMP BG 160



16 MAINTENANCE AND REVISION LIST

Each person must clearly correctly enter all maintenance and revision work in the list and confirm it with his or her own signature and that of the person responsible.

This list must be submitted to the supervisory bodies of the professional association, the TÜV and the manufacturer on request.

Maintenance/revision on device with the machine no.	Notes	Date	Signature of installer	Signature of person responsible

Maintenance/revision on device with the machine no.	Notes	Date	Signature of installer	Signature of person responsible

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