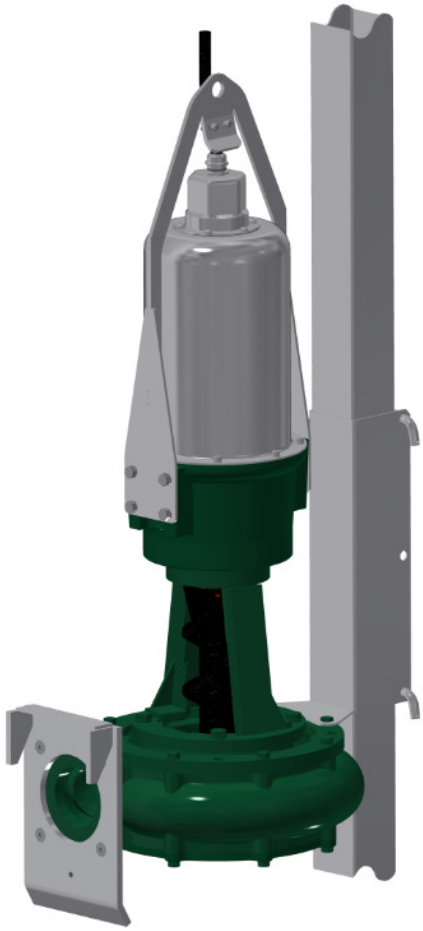
Stallkamp

OPERATING MANUAL

Submersible motor high-pressure pump

TMHP Type 3 M1804

BG 160 11.0/ 17.0/ 22.0 kW



Document no.: 8110301 Version: April 2018

Space for notes:

General notices

- **The technical specifications, measures and weights 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 MACHINERY DIRECTIVE 2006/42/EC (ORIGINAL, GERMAN VERSION)

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Product name: Submersible motor high-pressure pump TMHP Type 3 M1804

Type: TMHP-M1804, 11 kW; 17 kW or 22 kW

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

Machinery Directive 2006/42/EC

Including all amendments and compliant with the pertinent regulations of the directive on electromagnetic compatibility:

EMC Directive 2014/30/EU

The following harmonised standards have been applied:

EN ISO 12100: 2010, Safety of machinery – General principles for design

EN 809:2002-06-01, Pumps and pump units for liquids – Common safety requirements

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

EN 61000-6-1:2016-05, Electromagnetic compatibility (EMC) Part 6-1: Generic standards – Immunity for commercial environments

EN 61000-6-2:2006-03, Electromagnetic compatibility (EMC) Part 6-2: Generic standards – Immunity for industrial environments

Dinklage, dated 29. May 2019

Stallkamp
Erich Stallkamp ESTA GmbH
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In der Bahler Heide 4, Industriegeb. West

Erich Stallkamp ESTA GmbH, Dipl.-Ing. (FH) H. Ansorge (AL-TPR, Authorised representative for GL)

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

3 GENERAL INFORMATION

Our devices are developed according to the current state of technology, manufactured with great care and subject to a continual quality control. This 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 cost-effectively. It is necessary to observe the operating manual to ensure the reliability and long lifespan of the device and to avoid hazards.

The operating manual does not take local, on-site requirements into consideration; the operator is solely responsible for ensuring that these are observed, including by external installers.

3.1 Designation of notices in the operating manual

In the operating manual, safety instructions warning of dangers to persons are identified with the general hazard symbol according to DIN 4844-W9.

In the operating manual, warnings about electrical voltage are identified with the safety signs according to DIN 4844-W8.

All other notices which might restrict the functional reliability of the device or represent a danger for the machine if not observed are marked with the word:

ATTENTION!

This machine unit may not be operated beyond the values defined in the technical documentation with respect to pumped liquid, delivery flow rate, rotational speed, density, pressure, temperature as well as motor power or other instructions contained in the operating manual or contract documentation. If you have any queries, please consult the manufacturer.

The rating plate displays the most important operating data and the machine serial number. We request that this always be specified in the event of enquiries, subsequent orders and when ordering spare parts.

Provided that additional information or notices are required or in case of damage, please contact our local field sales employee or contact us directly.

3.2 Unauthorised conversion and spare part manufacture

Conversions and modifications to the devices and their machine units are only permissible with the explicit approval of the manufacturer. The use of non-"genuine spare parts" abrogates all liability.

4 SAFETY

This operating manual contains fundamental notices which must be observed during installation and operation as well as when performing maintenance work on the device.

It is therefore absolutely necessary that the installer as well as the responsible specialist personnel and operator read these instructions before installation and commissioning, and that they are continually available at the location where the machine is operated.

Not only the safety instructions in this operating manual must be observed, but also the warning signs and regulations of the respective professional association in the latest version.

4.1 Qualification of the personnel

The personnel performing the operation, maintenance, inspection and installation must be appropriately qualified 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 personnel fully understands the contents of the operating manual.

4.2 Dangers if the safety instructions are not observed

Failure to observe the safety instructions can endanger persons as well as the environment and the machine. Failure to observe the safety instructions results in the loss of all claims for damages.

Specifically, failure to observe instructions can, for example, result in the following dangers:

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

WARNING SIGNS

Observe all notice and warning signs. Dangerous gases can escape when stirring the manure.

DANGER OF POISONING!

If the manure is stored below slatted floors, the presence of persons in buildings during agitation is only permissible with sufficient ventilation. Therefore, windows and doors must be open and the ventilator set to 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 installation work

The operator has to ensure that all maintenance, inspection and installation work is carried out by authorised and qualified specialist 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 reattached or made functional.

5 GUARANTEE

This section 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 Stallkamp's general terms and conditions. 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 defect 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 device integrated in the product is correctly connected (temperature protection);
- ✓ that genuine Stallkamp parts are used.

5.2 Exclusion of liability

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

- A faulty configuration of the device on our part because of inadequate or incorrect information from the ordering party or operator.
- Failure to observe the safety instructions, regulations or the necessary requirements in this operating manual which apply according to German law.
- Installation, disassembly or repair of the device not in keeping with the regulations.
- Inadequate maintenance.
- Possible chemical, electrical or electrochemical influences.
- Wear.

Since maintenance 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 pumping medium 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 the device 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 modify the performance, specifications or configuration data without prior information.

6 PRODUCT DESCRIPTION FOR TMHP TYPE 3 M1804

6.1 General description

This operating manual applies to the standard model of the Stallkamp submersible motor high-pressure pumps.

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

Submersible motor high-pressure pump TMHP Type 3 M1804, consisting of:

- Stainless steel motor housing
- Oil filling in motor compartment with insulating oil
- Thermo-control with bimetallic switch per phase for overheating protection
- Cast iron pump housing coated with 2-component plastic lacquer
- Oil filling in oil chamber with hydraulic oil
- Pump impeller torque of 1,450 rpm
- 10m electric cable with special double-shell PU external sheath
- Stainless steel slide bearing including system to prove the capacitive level for guide rail 100 x 100 mm
- Maximum submersion depth 10 m
- Temperature of the pumping medium up to max. 50°C -> pumping without restrictions as long as motor is not running in overload range.
- Temperature of the pumping medium from 51°C to max. 70°C -> depending on the solid contents and the viscosity of the pumping medium; 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 exterior diameter is required.

6.2 Intended use

The pump is intended for the following applications:

- Pumping of manure in final storage sites, reception pits and manure canals;
- Pumping of bio-mass in biogas plants;
- Pumping of municipal 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 DM content of the manure (animal feed), the support height and distance and the diameter of the pipeline.

6.3 Technical data

Submersible motor high-pressure pump TMHP Type 3 M1804, consisting of:

- Pump type: TMHP Type 3 M1804
- Three phase motor: 400V, 50Hz, 3Ph, 1,450 rpm
- Protection category: IP68
- Insulating category: F = 155°C
- Motor power: 11.0; 17.0 and 22.0 kW
- Pump seal: 2 radial shaft seal rings
- Slide bearing: V2A stainless steel, 1.4301 for guide rail 100 x 100 mm
- Impeller: Plated, coated steel
- Shear-pin coupling: A shear-pin coupling is installed between the motor shaft and pump drive to protect the electrical motor!

6.4 Type plate TMHP Type 3 M1804

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

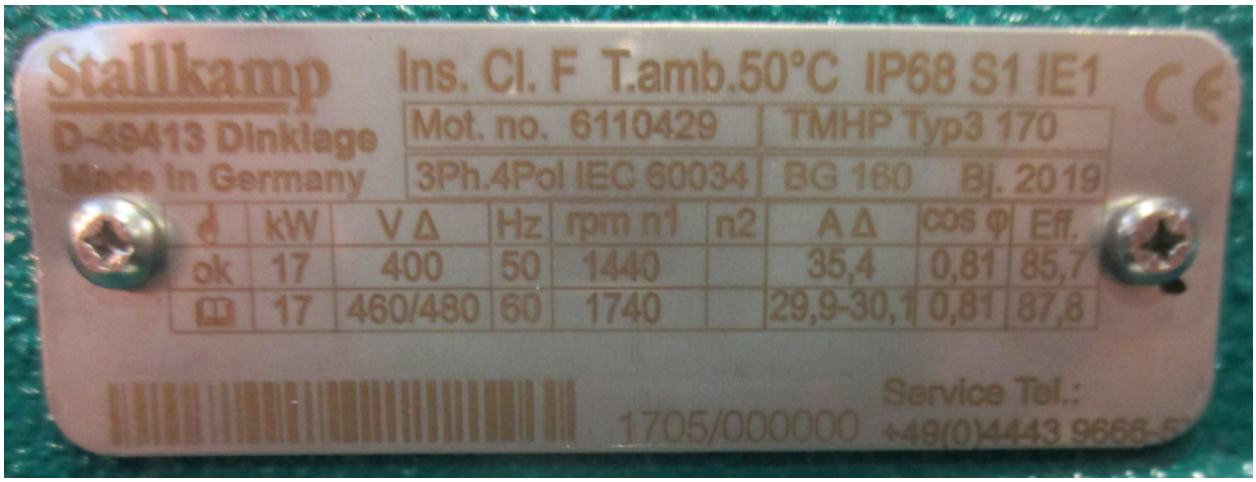


Fig. 1

Motor number: (e.g. 6110429)

Classification: (e.g. TMHP Type 3 170)

Performance data: (e.g. 17kW)

Year of manufacture: (e.g. 2019)

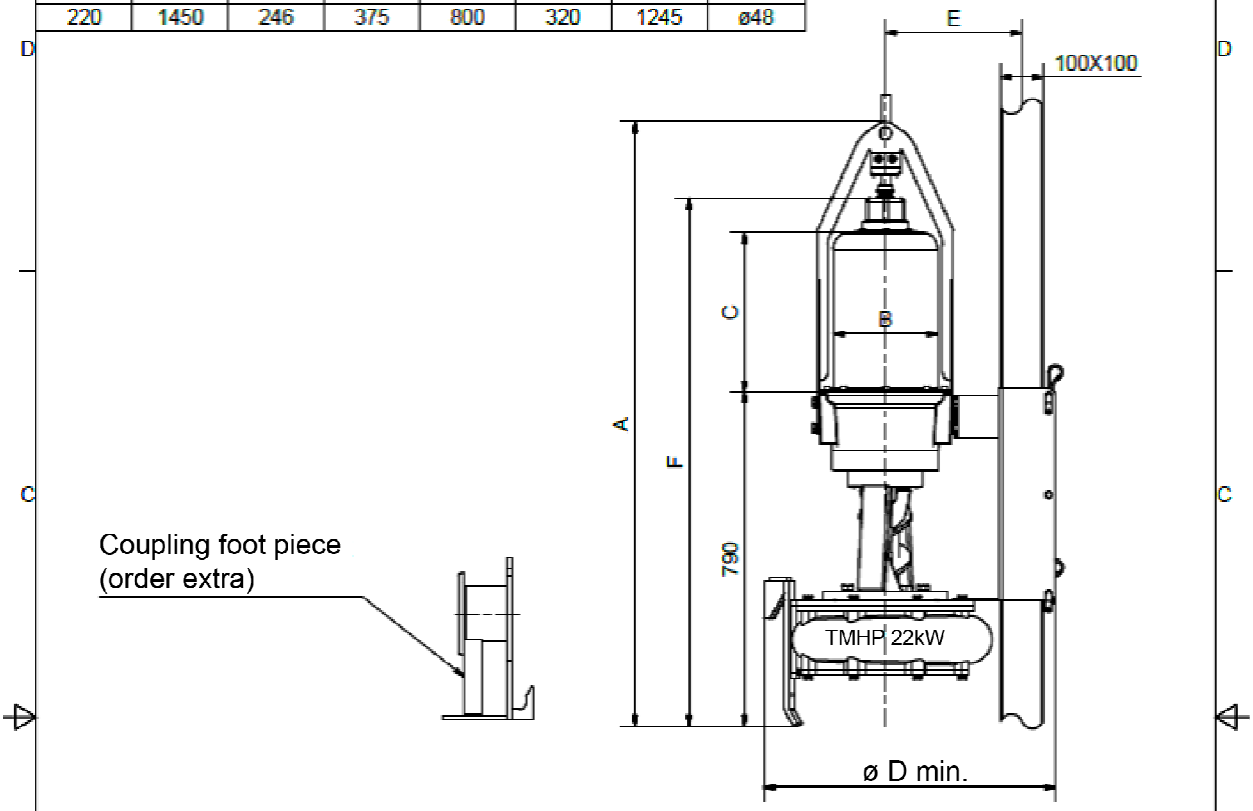
Stallkamp serial number: (e.g. 1705/000000)

In case of technical queries about the device, the above type plate data must be specified!

7 PERFORMANCE DATA AND DIMENSIONS TMHP TYPE 3 M1804

Dimensions of submersible motor high-pressure pump

TMHP	A	B	C	ø D	E	F	Ball passage
110	1450	246	260	800	320	1130	ø48
170	1450	246	310	800	320	1180	ø48
220	1450	246	375	800	320	1245	ø48



Performance data for submersible motor pump

Type	Motor power output kW	Start	Nominal current in A	Req. fuse	Rotational speed (rpm)	Max. pressure in bar	Flow rate in m³/h	Noise level dB (A)	Complete weight in kg
TMHP 110	11.0	Y / Δ	22.1	32A time-delay	1450	2.0	200	48	Approx. 260
TMHP 170	17.0	Y / Δ	33.0	50A time-delay	1450	3.2	300	48	Approx. 270
TMHP 220	22.0	Y / Δ	43.0	63A time-delay	1450	3.8	350	48	Approx. 280

-All performance data are based on clean water!

-Operating voltage 400 V/ 50Hz, protection category IP68!

-All measurements in mm!

-We reserve the right to make changes!

Performance data and dimensions

TMHP Type 3 M1804

28-0245-1 000 1 / 1 A3

8 MODEL TMHP TYPE 3 M1804

8.1 Cable connection

The cable connection compartment is completely sealed off from the surrounding liquid and towards the motor housing.

8.2 Motor

Three phase asynchronous motor as short circuit rotor at 50 Hz.

Continuous 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 thermal sensors 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 once annually.

8.5 Pump impeller

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

9 TRANSPORT AND STORAGE REGULATIONS FOR TMHP TYPE 3 M1804

The device must 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 other. This is absolutely essential when the device is not in use.

The device must be inspected before commissioning following a long period of standstill. 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 INSTALLING TMHP TYPE 3 M1804

10.1 Prior to commissioning: safety instructions

The following rules should fundamentally be observed to prevent accidents during maintenance and installation work:

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

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

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

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

(5) Examine lifting gear to ensure its fully satisfactory condition.

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

(7) Wear a 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

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

(2) Connect the pump's pressure connector up to the pressure line tightly so no pressure is lost.

(3) Commission the device with the wye-delta motor protection switch. Attention: Turn through to "Delta"!

The impeller turns anticlockwise when viewed from the pump inlet (from above) (**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 it 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 indicator – special equipment –

In the cases of leaks, i.e., if 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 the electrical cable

The electric 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 connection gland.

10.5 Cleaning the device

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

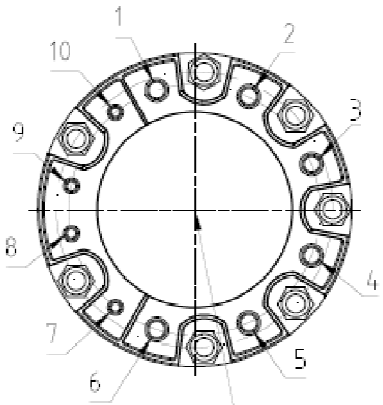
(2) The wye-delta motor protection switch must be fastened so that it is protected against moisture.

10.6 Wiring diagram for TMHP Type 3 M1804

ⓒ Depending on the model, black marking with no. or colour

Connection sequence to clamp ring	Cable designation on the supply cable		Connection description in motor
1	1	brown ⓒ	U1
2	2	black ⓒ	V1
3	3	grey ⓒ	W1
4	4	green ⓒ	W2
5	5	pink ⓒ	U2
6	6	white ⓒ	V2

Wire 2.5mm² or 4.0mm²



		Attention, only applies to: ⓐ
7 8	1 2 Wire 0.75mm² ⓒ (blue)	Thermal sensor with thermistor PTC 15°C (electronic evaluation system req.) ⓐ	TMR Type 3, 3i, 3M and 3D TMP / TMHP Type 3 ⓑ
9 10	3 4 Wire 0.75mm² shielded ⓒ (red)	Leakage display sensor if available (electronic evaluation system req.) ⓐ	TMR Type 3i
ⓐ 9 10	3 4 Wire 0.75mm² shielded ⓒ (red)	Temperature sensor Klixer bi-metal switch 150°C	TMR Type 3, 3M and 3D TMP / TMHP Type 3 ⓑ

Stat. change	Änderung	Date	Name
c	003	13/03/2019	Missal
b	002	05/09/2018	Missal
a	001	18/03/2016	Mingwen

Program number: –
Order number: –
Scale:
Material: –
Dimensions without tolerances in acc. with DIN ISO 2768-m medium
Part no.:

	Date	Name
Edited by:	02/03/2009	Kossebau
Checked by:	13/03/2019	Ansorge
Standard		

Name: Connection plan for TMR Type 3
TMP / TMHP Type 3 4-22kW

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Group: -
Type: -
Drg. no.: 25-0106
Index: 003
Sheet:
Sh.
EDV Nr. 25-0106.dwg

11 ELECTRICAL CONNECTION FOR TMHP TYPE 3 M1804

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 housing of the automatic wye-delta start-up is splash-proof according to IP65.

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

The use of 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. Performance data and dimensions TMHP Type 3 M1804**".

ATTENTION!

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

11.2 Direction test

The impeller turns anticlockwise when viewed from the pump intake (from above).

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 mains supply lines 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 electric cable must ***never*** be subjected to tensile loads, as this can cause damage to the unit or cause it to leak.

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

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

12 MAINTENANCE OF THE TMHP TYPE 3 M1804

The specified maintenance and inspection work must be performed regularly. These tasks may only be carried out by 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 pump impeller and the cable must be proven to be free of damage. In addition, the secure positioning of all screws and other fixing devices must be verified.

12.1.1 Recommendation: every 3 months

12.1.1.1 Check the power consumption at the amperemeter

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 Check 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 sub-assembly. Please contact our sales representative.

12.1.3 Recommendation: every 6 months

12.1.3.1 Check 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 Check the functioning of the monitoring devices

Every 4,500 operating hours or at least once annually, we recommend checking the monitoring devices in the scope of maintenance work. For these functional checks, the device must be cooled down to ambient temperature. The electrical power cords of the monitoring devices must be disconnected in the switch box. The temperature protection should be checked with a continuity measurement. If a leakage detection 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 Check the oil filling in the oil chamber

The oil filling in the oil chamber must be checked once 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 12.3 Changing the shaft seal on the TMHP Type 3 M1804**)

12.1.4.2 Checking 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 gears

Every 9,000 operating hours or at least once annually, we recommend checking the connection cable, shackles and lifting gear for damage and soiling in the scope of maintenance work. Deposits, blockages and adhering fibrous materials 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.

12.1.5 Recommendation at end of the lifespan

At the end of its lifespan, the pump can be disposed of normally as scrap. The oils should be removed in advance and disposed of as waste oil. The pump is composed of various metals: steel, aluminium, copper and stainless steel. Dismantling it into the metal groups considerably increases returns.

12.2 Changing the shaft coupling on the TMHP Type 3 M1804

If foreign bodies cause disruptions when operating the pump, there is a risk of the shaft coupling breaking. In this case, replacement of the shaft coupling SW60 is required; see spare parts list for "TMHP M1804 coupling kit" assemblies.

Disassembly: see 12.3: Disassembly, Point 2 to 6 and point 8 to 9

Installation: see 12.3: Installation, Point 3 to 4 and point 6 to 10

Then perform a functional test!

12.3 Changing the shaft seal on the TMHP Type 3 M1804

The following installation instructions refer to drg. no.: 28-0226

Before carrying out installation work on the pump, the power supply or voltage in the feed cable to the submersible motor high-pressure pump's switch box must be disconnected. Raise the pump out of the pit and clean it.

Disassembly:

1. Remove stainless steel plug ½" Pos. 26 and copper filling ring ½" Pos. 27 (release oil).
2. Remove lower lid Pos. 141 with 8 screws Pos. 142, remove sliding bearing Pos. 140 from the lid.
3. Untighten the nut in the impeller Pos. 138 (we recommend inserting a piece of wood between the impeller and the bearing lantern in order to block the impeller when untightening the nut), this pulls the sliding bearing Pos. 139 off the shaft end.
4. Pull the impeller Pos. 134 off downwards.
5. Check the true running of the pump shaft. If the true running deviates by >0.5 mm, the shear-pin coupling and if applicable also the pump shaft must be replaced.
6. Remove the distancers Pos. 133 for setting the gap.
7. Disassemble the intermediate ring Pos. 122 incl. bearing lantern and pump housing as a unit from the motor with the screws Pos. 123.
8. Remove stud bolt Pos. 121; unscrew pump shaft Pos. 120 with the left-handed thread from the shear-pin coupling SW60 Pos. 29.
9. Disassemble the shaft coupling SW60 Pos. 29 with screw Pos. 30 and remove the feather key Pos. 28.
10. Untighten and remove packing sleeve Pos. 20 incl. shaft seals using a hook spanner.
11. Remove the shaft protection tube Pos. 18.

Installation:

1. Glue packing sleeve Pos. 20 including shaft seal rings and shaft protection tube with O-ring at thread using Curil and assemble.
2. Insert feather key (Item 28).
3. Push on the shaft coupling SW60 Pos. 29 and install the screw Pos. 30. with Loctite 243.
4. Install pump shaft Pos. 120 on the left-handed thread with some Omnifit 230M and check true running. Then bore pump shaft and secure with stud bolt Pos. 121.
5. Install the intermediate ring Pos. 122 incl. bearing lantern and pump housing as a unit on the motor with the screws Pos. 123.
6. Push the distancers Pos. 133 on for setting the impeller gap.
7. Push on the impeller Pos. 134 and check the required clearance (1-2 mm), if applicable additionally install or remove the distancers Pos. 133.
8. Tighten the impeller up with the nut Pos. 138.
9. Install the cover below Pos. 141 with new sliding bearing Pos. 140 and screw Pos. 142.
10. Add 0.3 litres of Wibohyd EHF 46 oil.
11. Install the stainless steel plug ½" Pos. 26 with new copper filling ring ½" Pos. 27.
12. Carry out functional test.

12.4 Changing the pump impeller on the TMHP Type 3 M1804

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

Disassembly: see 12.3: Disassembly, Point 2 to 6

Installation: see 12.3: Installation, Point 6 to 10

Then perform a functional test!

13 NOTICES

13.1 Regulation of the professional association

The accident prevention regulations of the German Agricultural Professional Association stipulate the following 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 fences or coverings to prevent persons from falling in. If these are not deeper than 100 cm, other safety precautions suffice.

§ 2 Openings

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

(2) 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 accident victims.

§ 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 naked flames is not permitted.

(2) Entry for the recovery of an accident victim is only permissible if two other persons secure the entering person with a rope which is firmly anchored outside the tank.

§ 4 Tanks and canals for animal faeces

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

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

(3) If tanks 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 tanks and canals in buildings are furnished with agitators, pumping and rinsing plants, facilities for the removal of fermentation gases must be present which automatically switch on when the agitators, pumping and rinsing plants are taken into operation. They may only be switched off after conclusion of the work process. The gases conducted away must not endanger persons.

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

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

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

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

§ 5 Removal of animal faeces from tanks and canals

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

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

§ 6 Warning signs

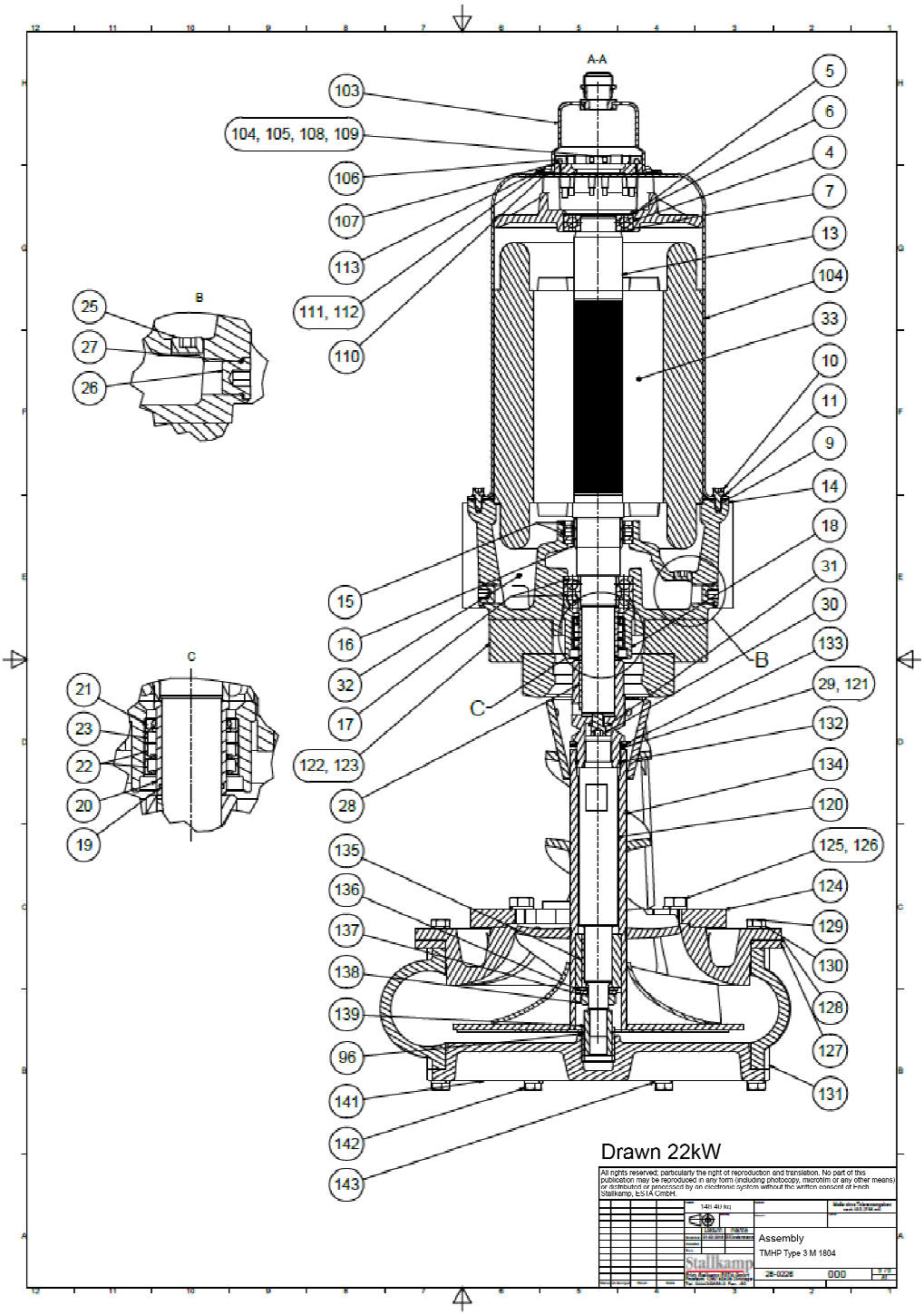
(1) Easily visible warning signs must be attached to openings of tanks and canals which indicate the danger of gases.

(2) Refer to the "Information Sheet with Notice, Warning, Mandatory, Prohibition and Rescue Signs" of the German Federal Association of Agricultural Professional Associations.

14 Spare parts list for the TMHP Type 3 M1804 BG 160

Stallkamp devices may only be repaired by specialists that have been trained by the manufacturer of this device (Erich Stallkamp ESTA GmbH). To access our spare parts price lists, please contact your sales representative.

15 Assembly drawing TMHP Type 3 M1804, 11.0–22.0 kW, BG 160



16 MAINTENANCE AND REVISION LIST

Each person must properly 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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