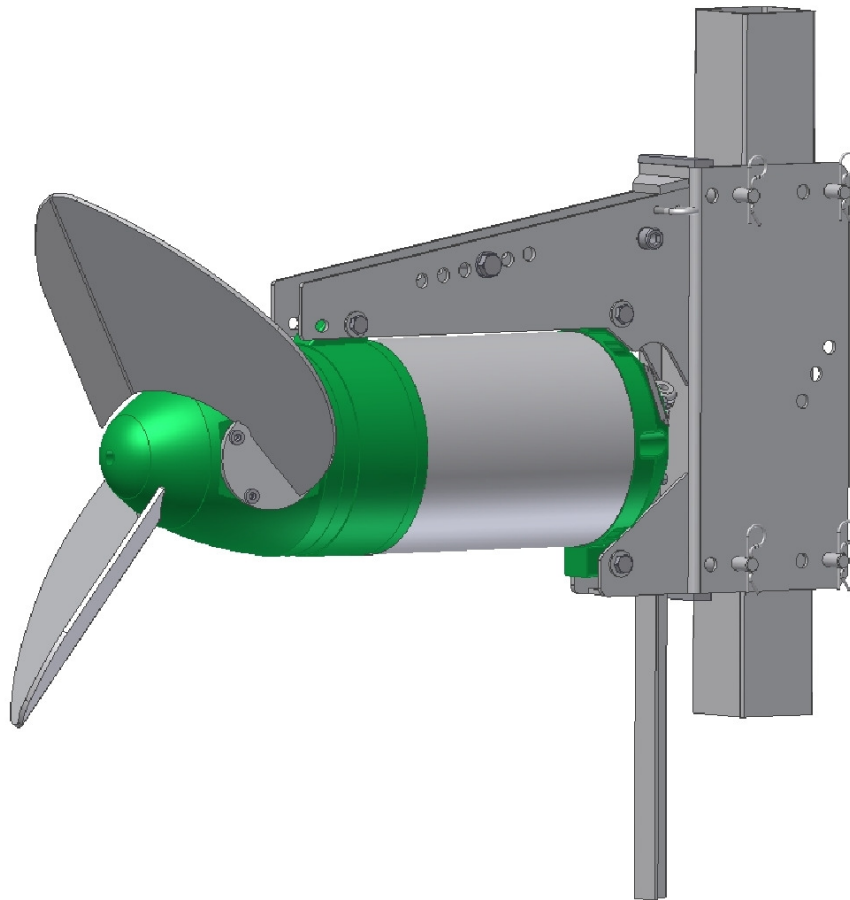




OPERATING MANUAL

Submersible Agitator type 2 model 2007 GL

BG132 4.0/ 5.5/ 7.5 kW
BG160 11.0/ 17.0/ 22.0 kW



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Document no.: 8160328 Version: January 2010

Space for notes:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

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

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Germany

Product name: Submersible agitator type 2 model 2007 GL

Type: TMR 4.0 kW; 5.5 kW; 7.5 kW; 11 kW; 17 kW; 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 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: 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 ESTA GmbH
D-49413 Dinklage-Germany
In der Bahler Heide 4, Industriegeb. West

Erich Stallkamp, Managing Director

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

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 service life 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 references 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 conveying liquid, delivery flow rate, speed, density, pressure, temperature as well as motor power output 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 purchasing spare parts.

Provided that additional information or notes 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 "original spare parts" abrogates all liability.

4 SAFETY

This operating manual contains fundamental information 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 qualified 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, servicing, maintenance 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 operating staff fully understands the contents of this 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 plant.
- Endangerment of persons due to electrical, mechanical, chemical or other exposure.
- Endangerment of the environment due to leakage of dangerous materials.

WARNING 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 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 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 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 Exemption from 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 and tear.

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 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 modify the performance, specifications or configuration data without prior information.

6 PRODUCT DESCRIPTION

6.1 General description

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

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

Submersible agitator TMR type 2 model 2007 GL comprising:

- Stainless steel crankcase
- Oil filling in motor compartment with insulating oil
- Thermo-control with bimetallic switch per phase for overheating protection
- Cast iron gearbox casing coated with 2-component plastic lacquer
- Oil filling in the gearbox with gearbox oil
- Single-stage planetary gear with impeller torque of 300 rpm
- 10m 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 agitated up to max. 50°C -> Agitation without restrictions as long as motor is not running in overload range.
- Temperature of medium being agitated from 51°C to max. 70°C -> Depending on the solid contents and the viscosity of the medium being agitated, in isolated cases the cooling of the agitator may not be sufficient. The motor is then switched off by the thermal protection switch. In this case, an agitator blade with a smaller external diameter is required.

6.2 Proper use

The agitator is intended for the following applications:

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

The agitator 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 agitation effect is dependent on the density and viscosity of the liquid as well as on the contents of the container and its shape. For larger containers, more than one agitator may prove necessary.

The agitator must not be employed outside the specified proper use.

6.3 Technical data

Submersible agitator TMR type 2 model 2007 GL comprising:

- Type of agitator: TMR type 2 model 2007 GL
- Threephase motor: 400 V, 50 Hz, 3 Ph, 1,450 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
- Gearbox seal: Slide ring sealing
- Guide slide bearing: Stainless steel, 1.4301 for guide rail 100 x 100 mm
- Impeller: Stainless steel, coated steel,

6.4 Type plate TMR type 2 model 2007 GL

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

Stallkamp sequential number



Figure 1

Type plate on TMR type 2 model 2007 GL with slide ring sealing

Serial no.

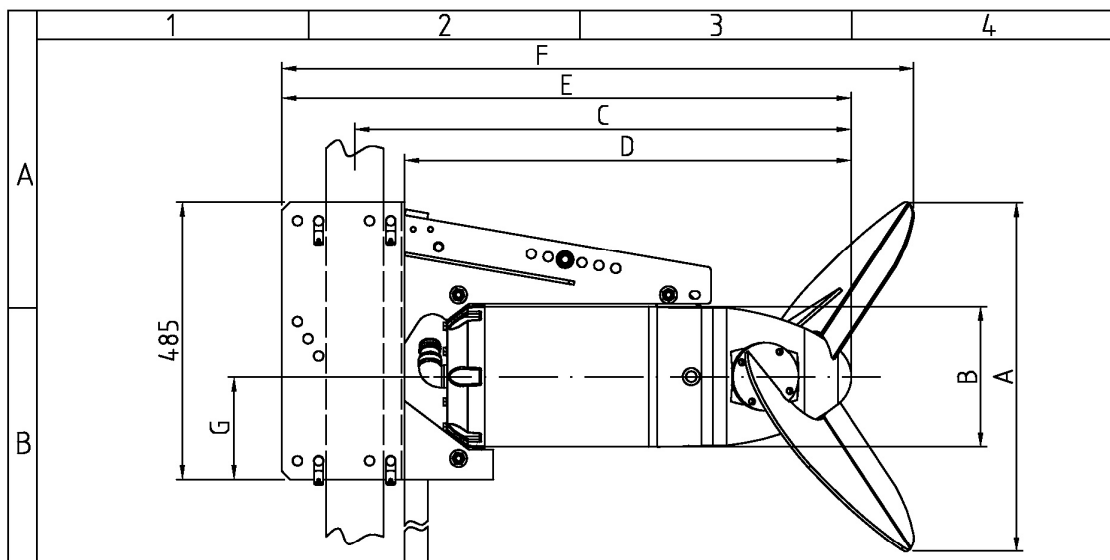
Protection category (here IP68)

Power consumption (here 11 kW)

The suffix "GL" stands for "Gleitringdichtung" (slide ring sealing)!

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

7 POWER DATA AND DIMENSIONS OF TMR TYPE 2 MODEL 2007



Dimensions Submersible motor mixer							
TMR	A	B	C	D	E	F	G
*030	240	220	595	540	665	---	---
040	500	210	775	685	900	955	198.5
055	530	210	790	700	915	980	198.5
075	600	210	825	735	950	1045	198.5
110	645	245	870	780	995	1090	179
170	720	245	915	825	1040	1145	179
220	745	245	980	890	1105	1215	179

* Structural shape deviating from the drawing

All dimensions can vary by 5mm

Subject to change without notice!

All dimensions in mm

Performance data Submersible motor mixer							
Type	Motor- output kW	Start	Nominal current A	Required fuse protection	Rotat. speed rpm Motor/propeller	Circulation performance m ³ /min	Weight in kg
TMR 030	3.0	direct	6.8	11A Träge	1450 / 1450	5.9	65
TMR 040	4.0	direct	9.0	16A Träge	1450 / 300	19.1	105
TMR 055	5.5	Y / Δ	11.4	20A Träge	1450 / 300	27.2	110
TMR 075	7.5	Y / Δ	16.0	25A Träge	1450 / 300	42.2	137
TMR 110	11.0	Y / Δ	22.1	32A Träge	1450 / 300	54.5	177
TMR 170	17.0	Y / Δ	33.0	50A Träge	1450 / 300	67.5	187
TMR 220	22.0	Y / Δ	43.0	63A Träge	1450 / 300	88.3	197

All propeller performances are based on pure water!

Operating voltage 400V / 50Hz, System of protection IP 68

-	-	-	-	Programmnummer —	Maßstab 1:10	Maße ohne Toleranzangaben nach DIN ISO 2768mitt				
-	-	-	-	Bestellnummer —	Werkstoff —	Teile-Nr. —				
-	-	-	-		Datum	Name	Benennung Performance data and dimensions of submersible II Mod.07			
-	-	-	-	Bearb.	11.02.2008	Kossebau				
-	-	-	-	Gepr.						
-	-	-	-	Norm						
-	-	-	-	Stallkamp						
-	-	-	-	Erich Stallkamp ESTA GmbH Postfach 1260 49408 Dinklage Tel. 04443/9666-0 Fax -60			Gruppe —	Type —	Index	Blatt
-	-	-	-	EDV Nr.103-558.dwg						
Zust.	Änderung	Datum	Name				Zeichnung-Nr.	103-558-engl.		

8 CONSTRUCTION TYPE

8.1 Cable connection

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

8.2 Motor

Threephase asynchronous motor as short circuit rotor at 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 agitator can be equipped with detectors: namely with a leakage detector for the detection of water in the oil.

8.4 Gearbox

The submersible agitator is equipped with a planetary gear between the motor and the agitator blade. This gear has an oil filling, which must be renewed after 24 months or 13,000 operating hours.

8.5 Blades

The agitators can be equipped with agitator blades made from steel or stainless steel. The size of the blades depends on the construction size and the power consumption of the motors. In special cases when an agitator is continuously running in the overload range, a smaller blade is required. The size-dependent input current must not be exceeded (see Point 7 Performance data).

9 TRANSPORT AND STORAGE REGULATIONS

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

If the agitator is not used for a long period of time, it must be protected against moisture and heat. The agitator blade 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 agitator 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 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 the submersible agitator

- (1) The agitator can only be operated with a suitable bracket (see lifting gear from the Stallkamp range).
- (2) Lower the agitator approximately 1 m into the liquid manure. There must be between approx. 30 and 60 cm of liquid above the agitator blade depending on the performance class of the agitator and the fluidity of the media being agitated. When in operation, the agitator must not create an eddy taking in air in the intake area.
- (3) Ensure that the rope of the lifting gear is taut at all times and that the electrical cable does not come into contact with the agitator blade. The depth stop on the guide slide bearing must not touch the bottom of the container while the agitator is in operation.
- (4) Collision check: Set the side lays of the wall bracket in such a way that the agitator blades do not touch the sides of the container (safety clearance min. 10 cm).
- (5) **ATTENTION:** To avoid accidents and damage to the agitator, all lifting and lowering or lateral swinging must only occur when the motor is turned off.
- (6) Commission the agitator with the star-triangle motor protection switch. Attention: turn through to "Star" (Dreieck)!
ATTENTION: Direction test, see Point 11.2.
- (7) The inclination of the device can be altered from the horizontal position (normal) using the adjustable guide slide bearing in the hole segment of the sliding block: 7° upwards; 7° downwards.
- (8) As standard, the agitator is protected by:
 - a) an overload protection in the switch box;
 - b) an overheating protection.

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

- (9) 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 agitator, the control lamp on the switch box lights up. If this is the case, lift the agitator out of the liquid and ascertain the reason for the disturbance.

10.4 Securing the electrical cable

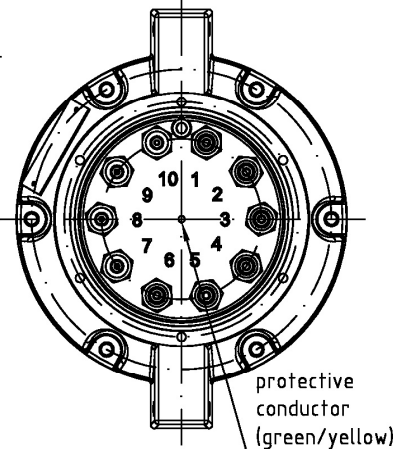
The electrical cable must be affixed to the rope with cable clips so that it is protected against damage from the agitator propeller. A rope clip must be mounted approx. 500 mm from the lower fastening point on the wire rope of the lifting gear. The first shackle should be attached to the lifting rope above this rope clip so that the cable does not enter the agitator blade if it slips. (See operating manual for lifting gear.)

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

10.5 Cleaning the submersible agitator

- (1) Pressure washers must not be used to clean the TMR.
- (2) The star-triangle motor protection switch must be fastened so that it is protected against moisture.

10.6 Connection plan TMR type 2 model 07 GL 4-22 kW with leakage display

	4	3	2	1
D	Connection marking at motor cover	Cable marking	Connection marking in motor	
	1	1	U1	
	2	2	V1	
	3	3	W1	
C	4	4	W2	
	5	5	U2	
	6	6	V2	
		Conductor 2.5mm ² bzw 4.0mm ²		
B	7	1	Thermal sensor	
	8	2	(Thermal time delay switch Break contact 1,6A)	
		Conductor 0.75mm ²	(Nominal current 1,6A)	
A	9	3	Sensor Leakage display	
	10	4	if available	
		Conductor 0.75mm ² shielded		

For TMR II Mod. 07 4.0kW – 22kW !

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-	-	-	-	Programmnummer	Maßstab	Maße ohne Toleranzangaben nach DIN ISO 2768 - m mittel
-	-	-	-	Bestellnummer	Werkstoff	Teil-Nr.
-	-	-	-	Datum	Benennung	
-	-	-	-	Bearb. 08.02.2008	Terminal connecting plan	
-	-	-	-	Gepr.	TMR II Mod. 07 4-22kW with Leakage display	
-	-	-	-	Norm	Gruppe -	Type -
-	-	-	-	Stallkamp	Zeichnung-Nr. 25-0095-engl.	Index
-	-	-	-	Erich Stallkamp ESTA GmbH		Blatt
-	-	-	-	Postfach 1260 49408 Dinklage		
-	-	-	-	Tel. 04443/9666-0 Fax -60		
Zust.	Änderung	Datum	Name	EDV Nr.25-0095.dwg		Bl

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 agitator is watertight according to IP68. The manual switch box is splash-proof according to IP54. The plastic chassis of the automatic star-triangle start-up is splash-proof according to IP54.

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

A motor protection device is a prerequisite.

The agitator 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 Power data and dimensions of TMR type 2 model 2007".

ATTENTION!

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

11.2 Direction test

The blade turns anticlockwise when viewed from the guide slide bearing. The agitator blade is a pusher propeller.

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 subjected to tensile loads, as this can cause damage to the agitator or cause it to leak.

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

When winching up the agitator, 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 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 agitator must be inspected for damage before every commissioning. In particular the agitator blade 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 6 months

12.1.1.1 Check the power consumption at the 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 agitator blade is required (see Point 8.5. Blade or contact our sales representative).

12.1.2 Recommendation: Every 12 months

12.1.2.1 Check the insulation resistance

At least every 12 months 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.

12.1.2.2 Check the functioning of the monitoring device

At least every 12 months 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. 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.

12.1.3 Recommendation: Every 24 months

12.1.3.1 Controlling the gearbox oil

The oil filling in the gearbox should be checked every 24 months. If oil is missing or contaminated with water or other media, the agitator must be taken out of operation immediately. In this case, the oil must be changed immediately and the front shaft seal must be exchanged. (See Point "12.2")

The shaft seal (slide ring sealing) is a wearing part and must be replaced at the latest every 13,000 operating hours when the agitator is in continuous operation in the scope of general repairs. The slide ring sealing is available as a complete sub-assembly. Please contact our sales representative.

12.1.3.2 Check the tightening torque of all screw connections

At least every 24 months 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)

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

Every 24 months 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.

12.1.4 Recommendation: After 13,000 operating hours – 18 months in continuous operation**12.1.4.1 General repairs**

Every 13,000 operating hours or after 18 months of continuous operation the agitator should be subjected to a general repair session. In this session, all wearing parts of the agitator must be replaced. Please contact our sales representative.

12.2 Changing the shaft seal on the TMR type 2 model 07 BG. 132 GL

The following installation instructions refer to drawing numbers: 103-626 and 103-625

Disassembly:

1. Remove the screw plug no. 49/1 incl. copper filling ring (release oil);
2. Remove filister head screw with internal hexagon no. 40;
3. Remove cover for hub no. 4;
4. Remove nut for gearbox shaft no. 5;
5. Remove the hub no. 3;
6. Remove the fitting key no. 48 and the spacers, if present;
7. Remove the race bracket no. 69;
8. Remove the race no. 68-1, O-ring no. 68-4, O-ring no. 68-6 and sinusoidal spring no. 68-3 from the race bracket;
9. Remove the spacer ring no. 71 incl. O-ring no. 68-6;
10. Remove the block ring with pin no. 68-2 incl. O-ring no. 68-5.

Installation:

1. Install the new block ring with pin no. 68-2 incl. new O-ring no. 68-5.
Attention: Observe the position of the pin and the hole!;
2. Install the old spacer ring no. 71 incl. new O-ring no. 68-6;
3. Install the new race no. 68-1, new O-ring no. 68-4, new O-ring no. 68-6 and new sinusoidal spring no. 68-3 in the old race bracket, (fix sinusoidal spring in race bracket with grease, install the slot on the sinusoidal spring on the race bracket);
4. Install the race bracket no. 69;
5. Affix the fitting key no. 48 and the spacers, if present;
6. Put on the hub no. 3;
7. Apply Omnifit adhesive to the nut for the gearbox shaft no. 5 incl. new O-ring no. 34 and install;
8. Seal cover for hub no. 4 with Sikabond T2 and install;
9. Install filister head screw with internal hexagon no. 40 with new seal no. 43;
10. Fill 1/2 litre BP Enersyn EP-XF220 synthetic gear oil in the gear;
11. Install the screw plug no. 49/1 with new copper filling ring.

12.3 Changing the shaft seal on the TMR type 2 model 07 BG. 160 GL

The following installation instructions refer to drawing numbers: 103-599 and 103-601

Disassembly:

1. Remove the screw plug no. 41/1 incl. copper filling ring (release oil);
2. Remove filister head screw with internal hexagon no. 34;
3. Remove cover for hub no. 4;
4. Remove nut for gearbox shaft no. 14;
5. Remove the hub no. 3;
6. Remove the fitting key no. 43 and the spacers, if present;
7. Remove the race bracket no. 69;
8. Remove the race no. 68-1, O-ring no. 68-4, O-ring no. 68-6 and sinusoidal spring no. 68-3 from the race bracket;
9. Remove the spacer ring no. 71 incl. O-ring no. 68-6;
10. Remove the block ring with pin no. 68-2 incl. O-ring no. 68-5.

Installation:

1. Install the new block ring with pin no. 68-2 incl. new O-ring no. 68-5.
Attention: Observe the position of the pin and the hole!;
2. Install the old spacer ring no. 71 incl. new O-ring no. 68-6;
3. Install the new race no. 68-1, new O-ring no. 68-4, new O-ring no. 68-6 and new sinusoidal spring no. 68-3 in the old race bracket, (fix sinusoidal spring in race bracket with grease, install the slot on the sinusoidal spring on the race bracket);
4. Install the race bracket no. 69;
5. Affix the fitting key no. 43 and the spacers, if present;
6. Put on the hub no. 3;
7. Apply Omnifit adhesive to the nut for the gearbox shaft no. 14 incl. new O-ring no. 30 and install;
8. Seal cover for hub no. 4 with Sikabond T2 and install;
9. Install filister head screw with internal hexagon no.34 with new seal no. 37;
10. Fill 1 litre BP Enersyn EP-XF220 synthetic gear oil in the gear;
11. Install the screw plug no. 41/1 with new copper filling ring.

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 openings, 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 naked flames 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 agitator and rinsing works are operating. 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 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 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 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, Warning, Prohibition and Rescue Signs" of the Federal Association of Agricultural Trade Associations.

14 SPARE PARTS LIST TMR TYPE 2 MODEL 07 BG 132
for TMP 4.0 – 7.5 kW
Drawing no.: 103-626

Position	Number	Description	Parts no.
1	1	Gearbox housing	7160818
2	1	Gearbox cover	7160022
3	1	Hub	7160819
4	1	Cover for hub	7160026
5	1	Nut for gearbox shaft	7160054
7	1	Planetary wheel only deliverable together with Pos. 10 (see Spare parts list - Construction groups)	7160041
9	1	Rotor with motor shaft 4.0 kW	7160553
	1	Rotor with motor shaft 5.5 kW	7160554
	1	Rotor with motor shaft 7.5 kW	7160555
10	1	Gearbox shaft only deliverable together with Pos. 7 (see Spare parts list - Construction groups)	7160037
14	2	Bolt for planetary gear 4.0 kW	7160047
	3	Bolt for planetary gear 5.5 kW	7160047
	4	Bolt for planetary gear 7.5 kW	7160047
15	1	Stainless steel cladding with stator 4.0 kW	7160092
	1	Stainless steel cladding with stator 5.5 kW	7160093
	1	Stainless steel cladding with stator 7.5 kW	7160094
17	2	Planetary gear 4.0 kW	7160045
	3	Planetary gear 5.5 kW	7160045
	4	Planetary gear 7.5 kW	7160045
20	1	Internal ring gear	7160039
21	1	Thrust ball bearing 6009	5180052
22	1	Thrust ball bearing 6912	5180051
23	1	Thrust ball bearing 6908	5180050
24	1	Thrust ball bearing 6008 DDUCM	5180020
25	2	Sliding bearings 2520 for 4.0 kW	5180056
	3	Sliding bearings 2520 for 5.5 kW	5180056
	4	Sliding bearings 2520 for 7.5 kW	5180056
31	1	Shaft seal ring FPM DIN 3760 50 x 72 x 7	5190070
32	1	Inner ring LR 45 x 50 x 25.5	5180058
33	1	Inner ring IR 100 x 110 x 30	5180060
34	1	O-ring 47.0 x 2.0 NBR 70	5190030
35	1	O-ring 132 x 3.0 NBR 72	5190036
40	1	Filister head screw M10 x 30 DIN 912 A2	5200060
43	1	Copper sealing ring M10 x 16 x 1 DIN 7603	5230059
44	6	DUBO – screw locking device M6	5320035
45	6	Cap nut M6 DIN 917 A2	5200095
46	1	Sikabond T2 50 ml	7160248
47	4	Dowel Ø 8.0 M6 x 50 DIN 7979	5260018
48	1	Fitting key 10.0 x 8.0 x 40.0 DIN 6885	5250056
49	1	Screw plug R ½" DIN 906	5220064
49/1	2	Screw plug DIN 908 with collar and internal hexagon 1/2" stainless steel (total height 18 mm)	5200261
49/1	2	Copper filling ring 21.0 x 26.0 x 2.0 (1/2")	5230077
49/2	1	Brass plug 1/8" no. 290	5500516
49/2	1	Copper filling ring 10 x 13.5 x 1.5 (1/8")	5230085
49/3	1	Screw plug R3/4" DIN 906 brass	5220065
50	1	Screw plug R ½" DIN 906 A2	5220063
51	1	Set screw M5x 12 DIN 914 A2	5200282
52	6	Thread rod M6 x 276 DIN 976 4.0 kW	5240027
	6	Thread rod M6 x 291 DIN 976 5.5 kW	5240028
	6	Thread rod M6 x 326 DIN 976 7.5 kW	5240029
54	1	Positioning ring 58 x 67 x 0.5	5250070
55	1	Sleeve for motor shaft	7160052
	½ l	Gear oil EP Enersyn EP-XF 220 (only for version without leakage detector)	5350024
	½ l	Liquid grease Aralub FDP 0 (only for version without leakage detector)	5350001
	2.4 l	Motor oil for 4.0 kW Shell Diala D insulating oil	5350015
	2.5 l	Motor oil for 5.5 kW Shell Diala D insulating oil	5350015
	2.6 l	Motor oil for 7.5 kW Shell Diala D insulating oil	5350015
60	1	Motor cover TMR 2 Mod.07 Bg.132	7160730
61	2	Dummy plug M20 x 1.5	7160742
62	8	Cable screw connection M20 x 1.5 / M6	6160361
63	1	Lid for motor cover TMR 2 model 07 BG.132	7160732

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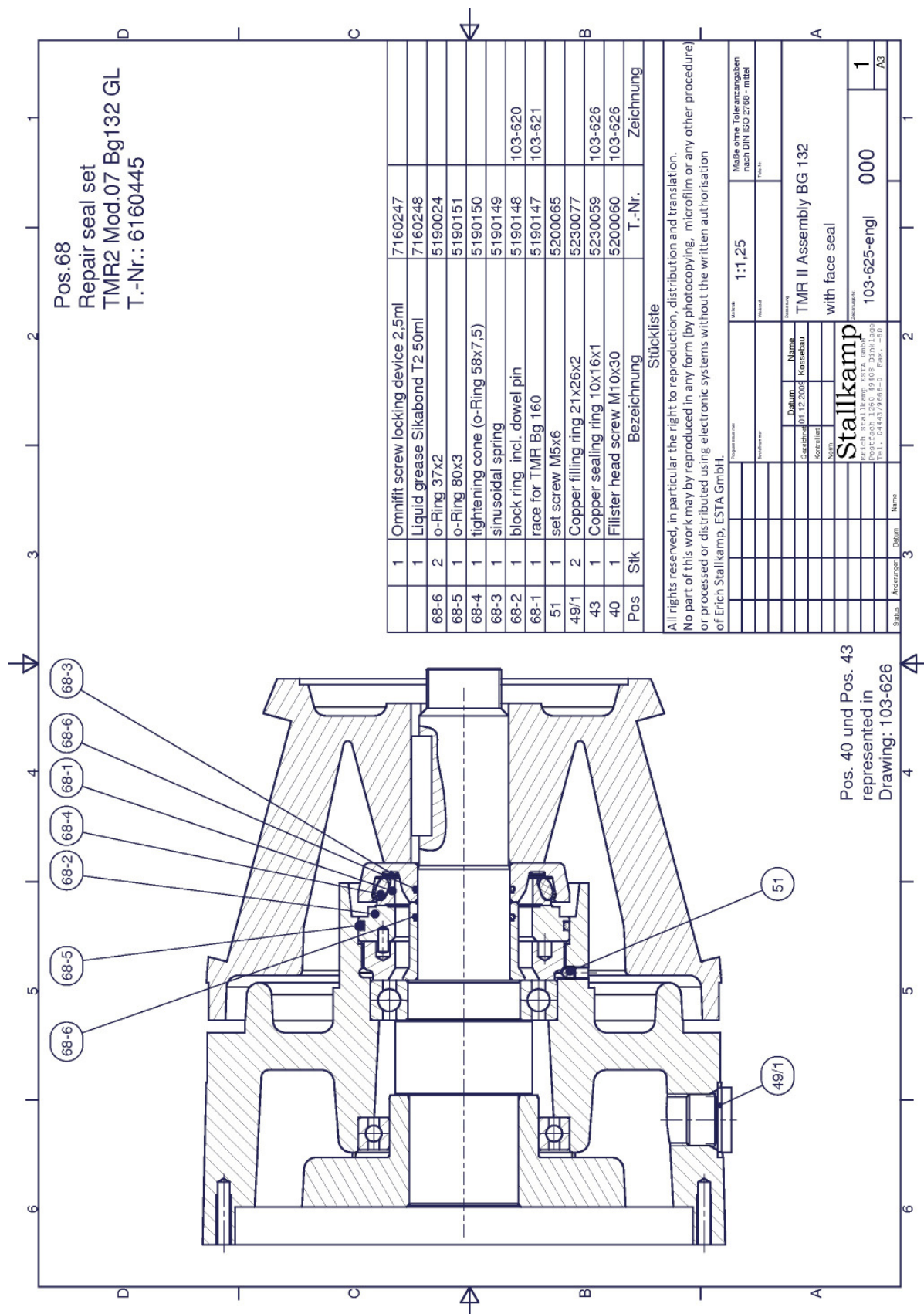
14.1 Spare parts list – Construction groups for TMR type 2 model 07 BG 132

for TMP 4.0 – 7.5 kW, BG 132

Drawing no.: 103-626 and 103-625

Position	Number	Description	Parts no.
	1	Repair seal set consisting of:	6160445
	1	5190147 race Pos. 68-1	
	1	5190148 block ring Pos. 68-2	
	1	5190149 sinusoidal spring Pos. 68-3	
	1	5190150 O-ring LR 58 x 7.5 HNBR Pos. 68-4	
	1	5190151 O-ring 80 x 3 HNBR Pos. 68-5	
	2	5190024 O-ring 37.0 x 2.0 NBR Pos. 68-6	
	1	Set screw DIN 914 A2 M5 x 12 Pos. 51	
	1	Copper sealing ring DIN 7603 M10 x 16 x 1 Pos. 43	
	1	Filister head screw M10 x 30 DIN 912 A2	
	1	5230077 copper filling ring 21 x 26 x 2 Pos. 49/1	
	50 ml	7160248 Liquid grease Sikabond T2 50 ml	
	2.5 ml	7160247 Omnifit screw locking device	
	1	Agitator blade set, steel, 4.0 kW	6160343
	1	Agitator blade set, stainless steel, 4.0 kW	6160344
	1	Agitator blade set, steel, 5.5 kW	6160345
	1	Agitator blade set, stainless steel, 5.5 kW	6160346
	1	Agitator blade set, steel, 7.5 kW	6160347
	1	Agitator blade set, stainless steel, 7.5 kW	6160348
	1	Planetary gear complete with gearbox shaft and bolt	
		4.0 – 5.5 kW 2-pitch	7160260
		7.5 kW 3-pitch	7160261
	8	Filister head screw M10 x 25 DIN 6912 A2	5200082
	8	Serrated washer 10.0 mm DIN 6798 A2 (for fastening the agitator blade)	5200157
	1	Electrical repair set for TMR 4.0 – 7.5 kW, working length = 10 m	6160387
		with clamping lid and cable, comprising:	
		Black electrical cable 7 x 2.5 + 2 x (2 x 7.5) = 11.50 m long	
		including cable lug, nuts, silicon tubing and shrink tubing	
		Clamping lid for TMR type 2 model 07 BG 132	
		Including stainless steel cable screw connection 1", O-ring and screws	
	1	Black electrical cable 7 x 2.5 + 2 x (2 x 7.5) = 11.50 m long	7160625
	1	Cable clamp with shackles for ELOKAB cable Ø 19 mm	6180108
	1	Off switch for 4.0 kW	5310017
	1	Star-triangle motor protection switch for 5.5 kW	5310006
	1	Star-triangle motor protection switch for 7.5 kW	5310009

14.3 Slide ring sealing for TMR type 2 model 07 BG 132 GL



15 SPARE PARTS LIST TMR TYPE 2 MODEL 07 BG 160
for TMR 11.0 – 22.0 kW
Drawing no.: 103-601

Position	Number	Description	Parts no.
1	1	Gearbox housing	7160792
2	1	Gearbox cover	7160021
3	1	Hub	7160793
4	1	Cover for hub	7160025
6	1	Rotor with motor shaft 11.0 kW	7160550
	1	Rotor with motor shaft 17.0 kW	7160551
	1	Rotor with motor shaft 22.0 kW	7160552
7	1	Gearbox shaft only deliverable together with Pos. 9 (see Spare parts list - Construction groups)	7160036
8	1	Internal ring gear	7160038
9	1	Planetary gear 11.0 kW only deliverable with Pos. 7 (")	7160262
	1	Planetary gear 17.0 kW & 22.0 kW only deliverable with Pos. 7 (")	7160263
10	3	Planetary gear 11.0 – 22.0 kW	7160044
11	3	Bolt for planetary gear	7160046
14	1	Nut for gearbox shaft	7160053
15	1	Screw R ¼ A2 DIN 906	5220063
16	1	Stainless steel cladding with stator 11.0 kW	6160037
	1	Stainless steel cladding with stator 17.0 kW	6160038
	1	Stainless steel cladding with stator 22.0 kW	6160039
20	1	Thread rod M8 x 355 11.0 kW	5240018
	6	Thread rod M8 x 400 17.0 kW	5240014
	6	Thread rod M8 x 460 22.0 kW	5240013
21	1	Thrust ball bearing 6009	5180052
22	1	Thrust ball bearing 6014	5180068
23	1	Thrust ball bearing 6208 LLU	5180010
24	1	Thrust ball bearing 6211	5180049
25	3	Sliding bearing PAP 3530 P10 11.0 – 22.0 kW	5180054
26	1	Shaft seal ring FPM DIN 3760 55 x 80 x 13	5190069
29	1	Inner ring LR 50 x 55 x 25	5180059
30	1	O-ring 65.0 x 2.0 NBR 70	5190102
34	1	Filister head screw M10 x 45 DIN 912 A2	5200061
36	6	Cap nut M8 DIN 1587 A2	5200096
37	1	Copper sealing ring 10 x 16 x 1 DIN 7603	5230059
38	6	DUBO- screw locking device M8 no. 208/102-PA6	5320036
39	1	Positioning ring 71 x 79 x 0.5 K3	5250071
40	1	Sikabond T2 50 ml	7160248
41	1	Screw plug ½" DIN 906	5220064
41/1	2	Screw plug DIN 908 with collar and internal hexagon 1/2" stainless steel (total height 18 mm)	5200261
41/1	2	Copper filling ring 21.0 x 26.0 x 2.0 (1/2")	5230077
41/2	1	Brass plug 1/8" no. 290	5500516
41/2	1	Copper filling ring 10 x 13.5 x 1.5 (1/8")	5230085
41/3	1	Screw plug R3/4" DIN 906 brass	5220065
43	1	Fitting key AB 16 x 10 x 32 DIN 6885	5250059
44	4	Dowel Ø 8.0 M6 x 50 DIN 7979	5260018
45	1	Set screw M6 x 16 DIN 914 A2	5200066
	1 l	BP Enersyn EP-XF220 gear oil (only for version without leakage detector)	5350024
	1 l	Aralub FDP 0 liquid grease (only for version without leakage detector)	5350001
	3.2 l	Motor oil for 11.0 kW Shell Diala D insulating oil	5350015
	3.4 l	Motor oil for 17.0 kW Shell Diala D insulating oil	5350015
	3.6 l	Motor oil for 22.0 kW Shell Diala D insulating oil	5350015
60	1	Motor cover TMR 2 model 07 BG 160	7160731
61	2	Dummy plug M20 x 1.5	7160742
62	8	Cable screw connections M20 x 1.5 / M6	6160361
63	1	Lid for motor cover TMR 2 model 07 BG 160	7160733
64	1	O-ring Ø 159 x 3	5190138
65	6	Spring ring DIN 127 A8 V2A	5200045
66	6	Hexagon head screw DIN933 M8 x 16 A2	5200000
67	1	Stainless steel cable screw connection 1"	5310337
68	1	Repair seal set slide ring sealing	6160429
69	1	Race bracket	7160794
70	1	Threaded bushing	7160795
71	1	Spacer bushing	7160796

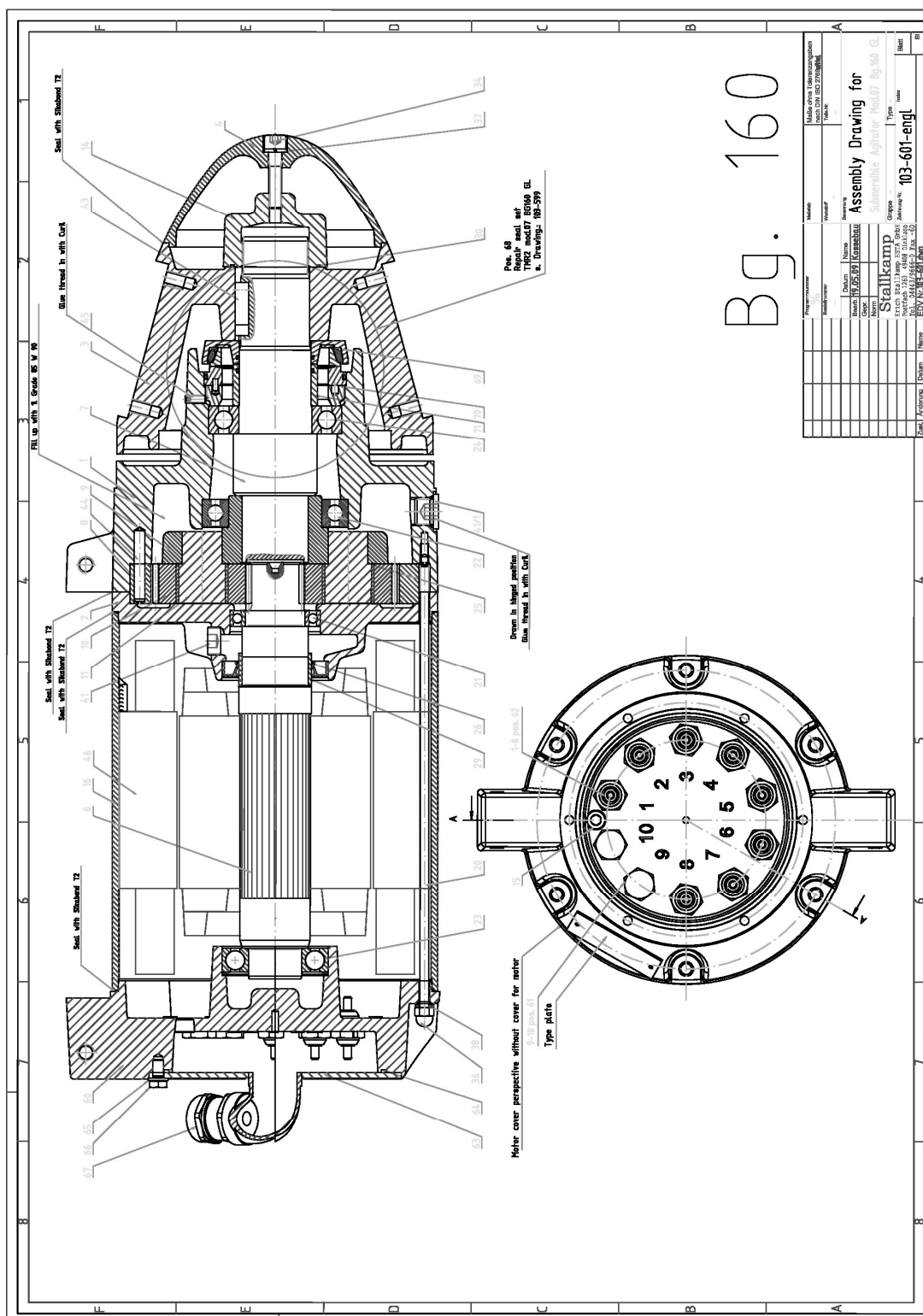
15.1 Spare parts list – Construction groups for TMR type 2 model 07 BG 160 GL

for TMR 11.0 – 22.0 kW, BG 160 GL

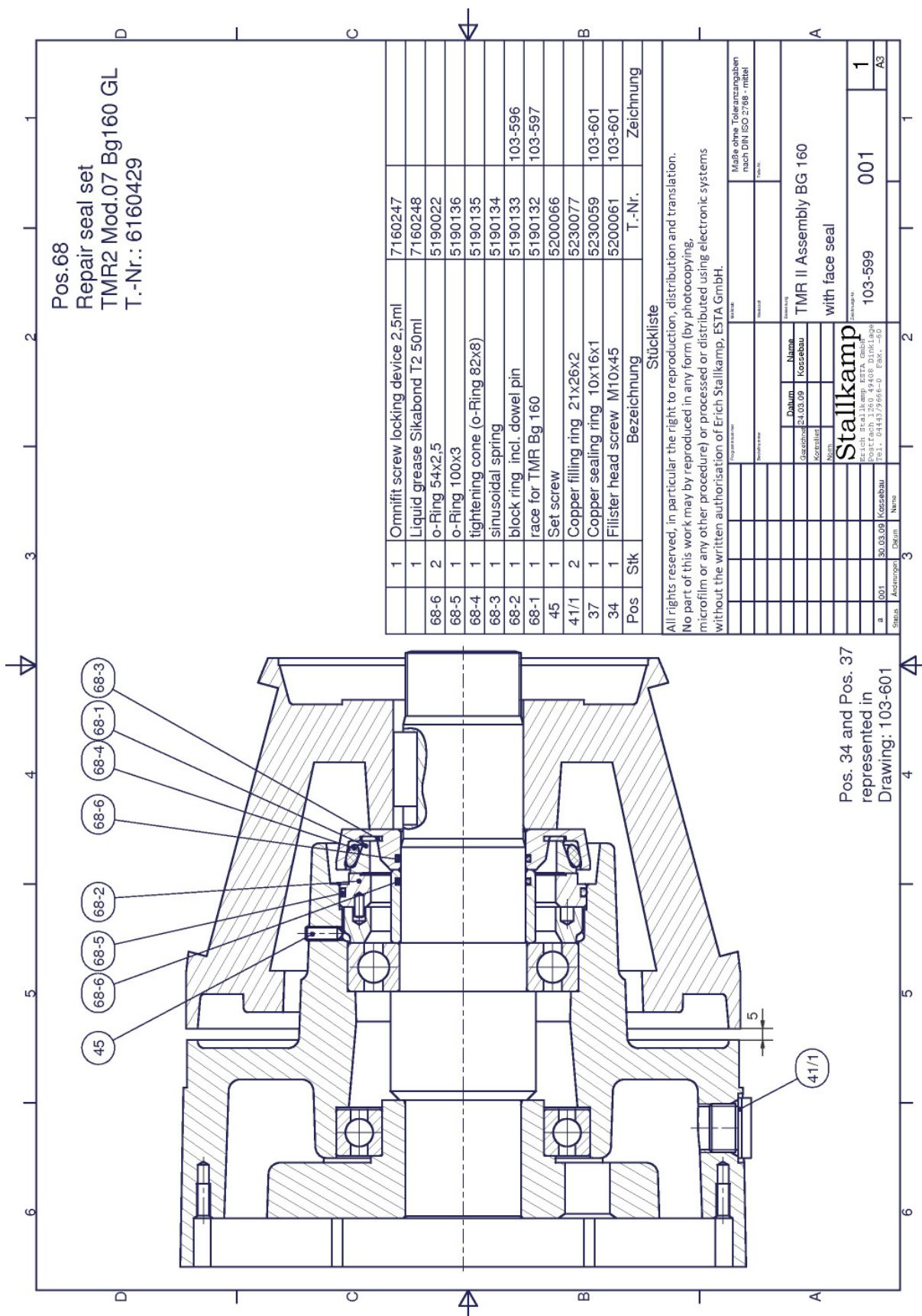
Drawing no.: 103-601 and 103-599

Position	Number	Description	Parts no.
	1	Repair seal set consisting of:	6160429
	1	5190132 race Pos. 68-1	
	1	5190133 block ring Pos. 68-2	
	1	5190134 sinusoidal spring Pos. 68-3	
	1	5190135 O-ring LR 82 x 8 HNBR Pos. 68-4	
	1	5190136 O-ring 100 x 3 HNBR Pos. 68-5	
	2	5190022 O-ring 54 x 2.5 NBR Pos. 68-6	
	1	5200066 Set screw M6 x 16 Pos. 45	
	1	5230059 Copper sealing ring M10 x 16 x 1 DIN7603 Pos. 37	
	1	5200061 Filister head screw M10 x 45 DIN 912 A2 Pos. 34	
	2	5230077 Copper filling ring 21 x 26 x 2 Pos. 41/1	
	50 ml	7160248 Liquid grease Sikabond T2 50 ml	
	2.5 ml	7160247 Omnifit screw locking device	
	1	Agitator blade set, Ø 610 mm, steel	6160349
	1	Agitator blade set, Ø 610 mm, stainless steel	6160350
	1	Agitator blade set, Ø 645 mm, steel	6160351
	1	Agitator blade set, Ø 645 mm, stainless steel	6160352
	1	Agitator blade set, Ø 720 mm, steel	6160353
	1	Agitator blade set, Ø 720 mm, stainless steel	6160354
	1	Agitator blade set, Ø 745 mm, steel	6160355
	1	Agitator blade set, Ø 745 mm, stainless steel	6160356
	1	Planetary gear complete with gearbox shaft and bolt	
		11 kW 2- pitch	7160262
		17 – 22 kW 3- pitch	7160263
	8	Filister head screw M10 x 25 DIN 6912 A2	5200082
	8	Serrated washer 10.0 mm DIN 6798 A2 (for fastening the agitator blade)	5200157
	1	Electrical repair set for TMR/TMP 11.0 kW, working length =10 m	6160388
		with clamping lid and cable, comprising:	
	1	Black electrical cable 7 x 2.5 + 2 x (2 x 7.5) = 11.50 m long	
		including cable lug, nuts, silicon tubing and shrink tubing	
	1	Clamping lid for TMR type 2 model 07 BG 160	
		Including stainless steel cable screw connection 1", O-ring and screws	
	1	Black electrical cable 7 x 2.5 + 2 x (2 x 7.5) = 11.50 m long	7160625
	1	Cable clamp with shackles for ELOKAB cable Ø 19 mm	6180108
	1	Electrical repair set for TMR/TMP 17.0 kW & 22.0 kW, working length =10 m	6160389
		with clamping lid and cable, comprising:	
	1	Black electrical cable 7 x 4 + 2 x (2 x 0.75) = 11.50 m long	
		including cable lug, nuts, silicon tubing and shrink tubing	
	1	Clamping lid for TMR type 2 model 07 BG 160	
		Including stainless steel cable screw connection 1", O-ring and screws	
	1	Black electrical cable 7 x 4 + 2 x (2 x 0.75) = 11.50 m long	7160631
	1	Cable clamp with shackles for ELOKAB cable Ø 21 mm	6180100
	1	Star-triangle motor protection switch for 11.0 kW	5310002
	1	Star-triangle motor protection switch for 17.0 kW	5310010
	1	Star-triangle motor protection switch for 22.0 kW	5310000

15.2 Assembly drawing TMR type 2 model 07 BG 160 GL



15.3 Slide ring sealing for TMR type 2 model 07 BG 160 GL



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.

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