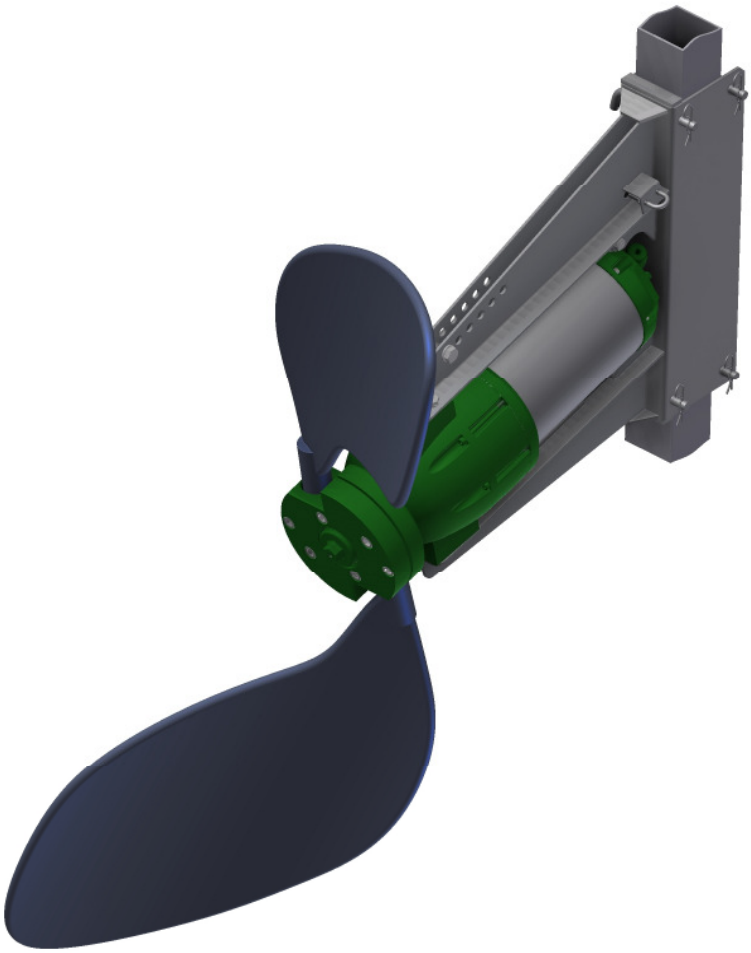
Stallkamp

OPERATING MANUAL

Large impeller agitator
GFR type 2 M1204
BG 132 4.0 / 5.5/ 7.5 kW



Document no.: 8160397 Version: October 2012

Space for notes:

General information

- **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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Product name: Large impeller agitator Type 2 M1204

Type: GFR 4.0 kW; 5.5 kW; 7.5 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. October 2014

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 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 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, 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 operating staff 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 plant.
- 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 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 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 assembly work

The operator has to ensure that all maintenance, inspection and installation work is carried out by authorized 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 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 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 15 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 large impeller agitators.

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

Large impeller agitator GFR type 2 model 2012 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
- Three-stage planetary gear with impeller torque of 27 rpm
- 10m electrical cable with special double-shell PU external sheath
- Stainless steel guide slide bearing 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 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 tank and its shape. For larger tanks, more than one agitator may prove necessary. The agitator propeller must be completely immersed. Unilateral propeller loads, e.g., floating and/or sinking layers, are not permitted

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

6.3 Technical data

Large impeller agitator GFR type 2 model 2012 comprising:

- Type of agitator: GFR type 2 M1204
- 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 and 7.5
- Gearbox seal: Slide ring sealing
- Guide slide bearing: Stainless steel, 1.4301 for guide rail 100 x 100 mm
- Impeller: PU with steel reinforcement

6.4 Type plate GFR type 2 M1204

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

Stallkamp sequential number

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

Figure 1

Type plate on GFR type 2 M1204 with slide ring sealing

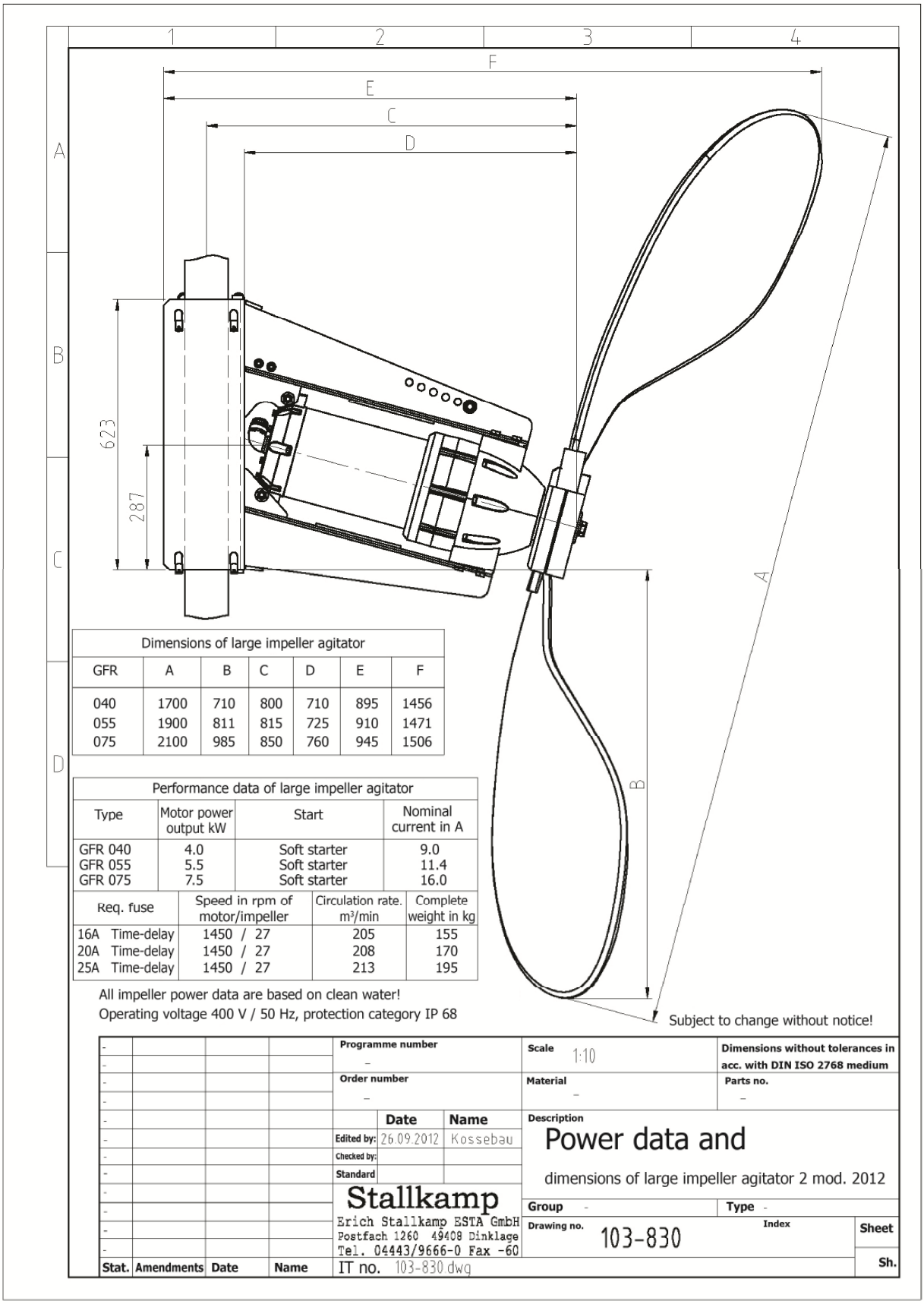
Serial no.

Protection category (here IP68)

Power consumption (here 11 kW)

The suffix "GL" stands for "Gleitring-dichtung" (slide ring sealing)!

7 POWER DATA AND DIMENSIONS OF GFR TYPE 2 M1204



Dimensions of large impeller agitator						
GFR	A	B	C	D	E	F
040	1700	710	800	710	895	1456
055	1900	811	815	725	910	1471
075	2100	985	850	760	945	1506

Performance data of large impeller agitator			
Type	Motor power output kW	Start	Nominal current in A
GFR 040	4.0	Soft starter	9.0
GFR 055	5.5	Soft starter	11.4
GFR 075	7.5	Soft starter	16.0

Req. fuse	Speed in rpm of motor/impeller	Circulation rate. m³/min	Complete weight in kg
16A Time-delay	1450 / 27	205	155
20A Time-delay	1450 / 27	208	170
25A Time-delay	1450 / 27	213	195

All impeller power data are based on clean water!
Operating voltage 400 V / 50 Hz, protection category IP 68

Subject to change without notice!

Stat.	Amendments	Date	Name
-			

Programme number: –
Order number: –
Scale: 1:10
Dimensions without tolerances in acc. with DIN ISO 2768 medium
Material: –
Parts no.: –

	Date	Name
Edited by:	26.09.2012	Kossebau
Checked by:		
Standard		

Description: Power data and dimensions of large impeller agitator 2 mod. 2012

Stallkamp
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Group: - Type: -
Drawing no.: 103-830 Index: Sheet
IT no. 103-830.dwg Sh.

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 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 are equipped with large PU impellers with steel reinforcement. 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 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 the large impeller agitator

(1) The agitator can only be operated with a suitable bracket (see lifting gear from the Stallkamp range).

(2) Lower the agitator approximately 2 m into the liquid manure. **There must be between approx. 60 and 100 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. Unilateral agitator blade loads caused by floating and/or sinking layers are not permitted!**

(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 tank 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 tank (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) Start the agitator with the **soft starter or frequency converter with a set start-up ramp of 20 seconds**. **ATTENTION:** Direction test, see Point 11.2.

(7) The tilt of the device is preset to 15° 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 agitator was switched off as a result of overheating, under no circumstances should you try to restart the 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 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.

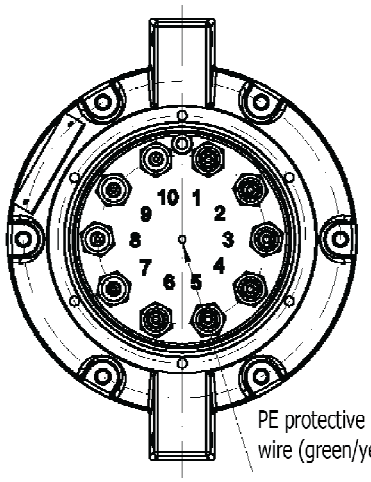
10.5 Cleaning the large impeller agitator

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

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

10.6 Connection plan GFR type 2 M1204 4.0-7.5 kW with leakage dis play

Connection designation on the motor cover	Cable designation on the supply cable		Connection designation in the motor
1	1	Lead 2.5 mm² / 4.0 mm²	U1
2	2		V1
3	3		W1
4	4		W2
5	5		U2
6	6		V2
7	1	Lead 0.75 mm²	Thermal sensor (bimetallic switch opener 0-230V) (Nominal current 1.6A)
8	2		
9	3	Lead 0.75 mm² shielded	Sensor for leakage display if present
10	4		



For TMR II mod. 07 4.0 kW - 22 kW!

Programme number		Scale	Dimensions without tolerances in acc. with DIN ISO 2768 – medium
Order number		Material	Parts no.
Edited by: 08.02.2008 Kusserau		Description	Wiring diagram for TMR II mod. 07
Checked by:			4-22kW with leakage display
Standard		Group -	Type
Stallkamp		Drawing no. 25-0095	Sheet Sh.
Erich Stallkamp ESTA GmbH Postfach 260 45408 Dinklage Tel. 04443/1005 Fax 3178		IT no. 25-0095.dwg	

Stat. | Amendments | Date | Name

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 delta-wye 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 GFR"

ATTENTION!

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

11.2 Direction test

The blade turns clockwise 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 15 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 GFR type 2 M1204 BG 132

The following installation instructions refer to drawing numbers: 103-813-1 and 103-813-2

Disassembly:

1. Remove the lower screw plug no.31 incl. copper filling ring no. 32 (release oil).
2. Remove top part of hub no. 4 incl. agitator blade.
3. Remove nut for gearbox shaft no. 5.
4. Remove bottom part of hub no. 3 incl. O-ring no. 34.
5. Remove the fitting key no. 48 and the spacers, if present.
6. Remove the race bracket no. 69.
7. 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.
8. Remove the spacer ring no. 71 incl. O-ring no. 68-6.
9. 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. Warning: Pay attention to the position of the pin and the hole. The block ring must lie flush!
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. Replace bottom part of hub no.3 with new O-ring no. 34.
7. Apply Omnifit adhesive to the nut for the gearbox shaft no. 5 incl. new O-ring no. 72 and install;
8. Replace top part of hub no. 4 incl. agitator blade. Caution: Pay attention to the position of the blades.
9. Fill 2 litre BP Enersyn EP-XF220 synthetic gear oil in the gear;
10. Install the screw plug no. 31 with new copper filling ring no. 32.

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

(1) If removal and entries 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 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 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 gas cannot flow into the buildings.

(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 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 stations for agitating, pumping and rinsing, etc., equipment 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 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 GFR TYPE 2 M1204 BG 132

for GFR 4.0 – 7.5 kW Drawing no.: 103-813-1

Item	Piece(s)	Description	Art. no.
1	1	Gearbox housing	7160816
2	1	Gearbox cover	7160983
3	1	Bottom part of hub	7160984
4	1	Top part of hub	7160985
5	1	Nut for gearbox shaft	7160053
6	1	Intermediate housing	7160606
7	1	Planetary wheel only deliverable together with Pos. 10 (see Spare parts list - Construc-tion groups)	7160876
8	1	Intermediate flange	7160976
9	1	Rotor with motor shaft 4.0 kW	
	1	Rotor with motor shaft 5.5 kW	
	1	Rotor with motor shaft 7.5 kW	6160631
10	1	Gearbox shaft only deliverable together with Pos. 7 (see Spare parts list - Construction groups)	7160875
11	1	Planetary gear on motor side	7160675
14	3	Bolt for planetary gear 4.0 kW	7160690
	3	Bolt for planetary gear 5.5 kW	7160690
	3	Bolt for planetary gear 7.5 kW	7160690
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	3	Planetary gear 4.0 kW	7160671
	3	Planetary gear 5.5 kW	7160671
	3	Planetary gear 7.5 kW	7160671
18	1	Motor cover	7160730
20	1	Internal ring gear	7160038
21	1	Thrust ball bearing 6014	5180068
22	1	Thrust ball bearing 6908	5180050
23	1	Thrust ball bearing 6908 DDUCM	5180020
24	1	Thrust ball bearing 6211	5180049
25	3	Permaglide PAP 3530 P10 for 4.0 kW	5180054
	3	Permaglide PAP 3530 P10 for 5.5 kW	5180054
	3	Permaglide PAP 3530 P10 for 7.5 kW	5180054
26	6	Permaglide 1815 P10	5180106
27	1	Internal ring gear T=72	7160678
28	3	Pinion shaft T=18	7160674
29	3	Pinion T=51	7160677
30	1	Pinion shaft	7160877
31	1	Screw plug G1/2" DIN 908 A2	5200261
32	1	Copper filling ring 21.0x26.0x2.0	5230077
33	2	Inner ring LR 45 x 50 x 25.5	5180058
34	1	O-ring 89.5 x 3.0 NBR 70	5190027
34/1	1	O-ring 65x2 NBR 70	5190102
35	1	O-ring 130x3.0 NBR 72	5190120
36	2	Paper seal for output side of intermediate housing	5190112
40	6	Filister head screw M8-120 DIN 912 A2	5200255
41	6	Filister head screw M16 x 50 DIN 912 A2	5200301
43	6	DUBO – screw locking device M6	5320035
44	6	Cap nut M6 DIN 917 A2	5200095
45	1	Sikabond T2 50 ml	7160248

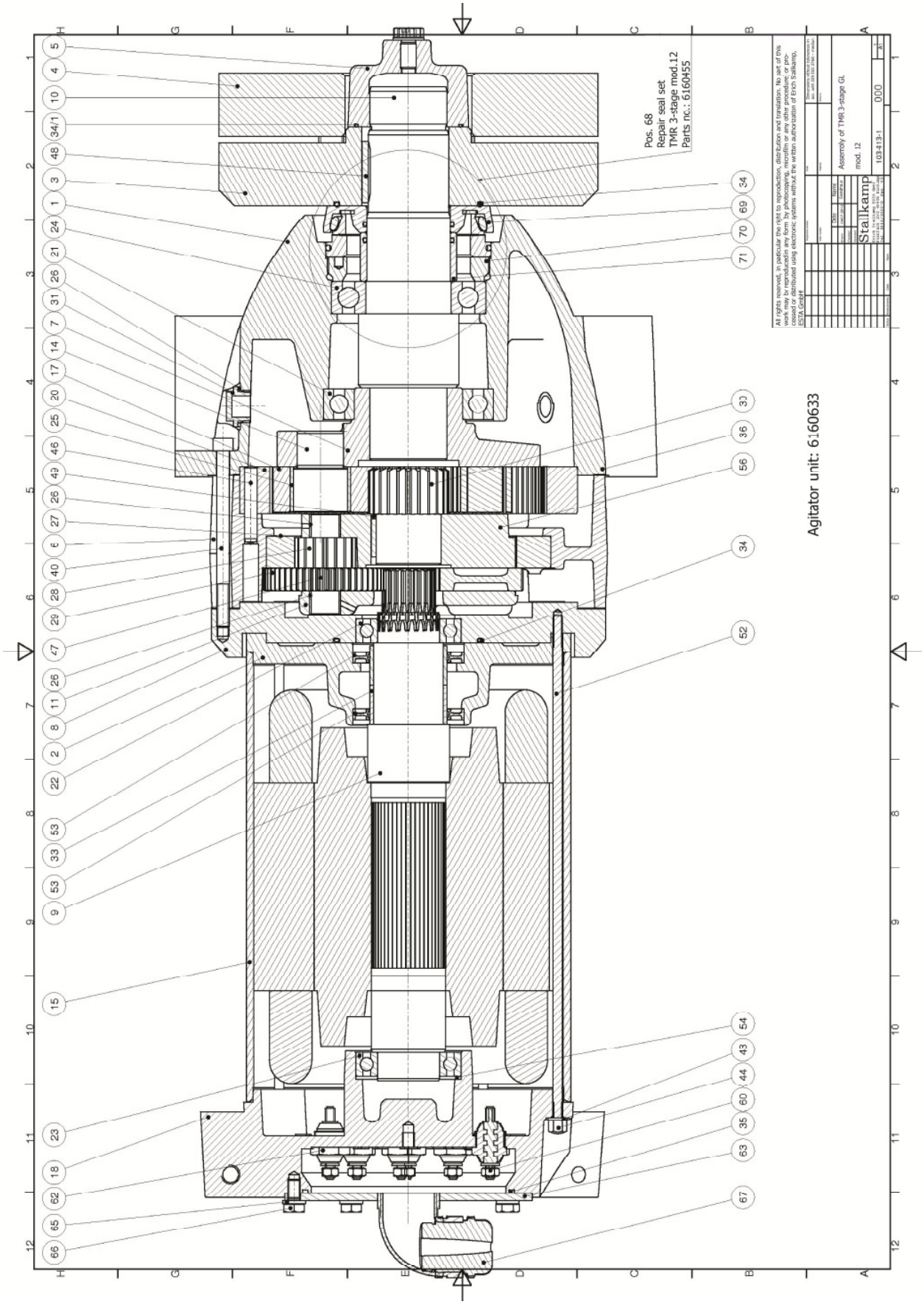
46	4	Dowel Ø 8.0 M6 x 50 DIN 7979	5260018
46/1	2	Pin	5230090
47	3	Fitting key 6.0x6.0x14.0 DIN 6885 A	5250124
48	1	Fitting key DIN 6885 AB 16x10x40	5250059
49	1	Fitting key 10x8x25 DIN 6885 A	5250167
49/1	2	Fitting key 8x7x25	5250058
50	1	Screw plug R 1/4" DIN 906 A2	5220063
51	1	Set screw M5x 12 DIN 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
53	2	Shaft seal ring FPM DIN 3760 50x72x7 Double lip seal type VIBD-50	5190070
54	1	Positioning ring 58 x 67 x 0.5	5250070
	2 L	EP Enersyn EP-XF 220 gear oil (only for version without leakage detector)	5350024
	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
56	1	Planetary carrier	7160878
60	8	Hexagon head nut M6	5200085
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.132	7160732
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"	5310392
68	1	Repair seal set slide ring sealing	6160455
69	1	Race bracket	7160794
70	1	Threaded bushing	7160795
71	1	Spacer bushing	7160796
72	1	Allen screw M10x20	5200002

14.1 Spare parts list – Construction groups for GFR type 2 M1204 BG 132

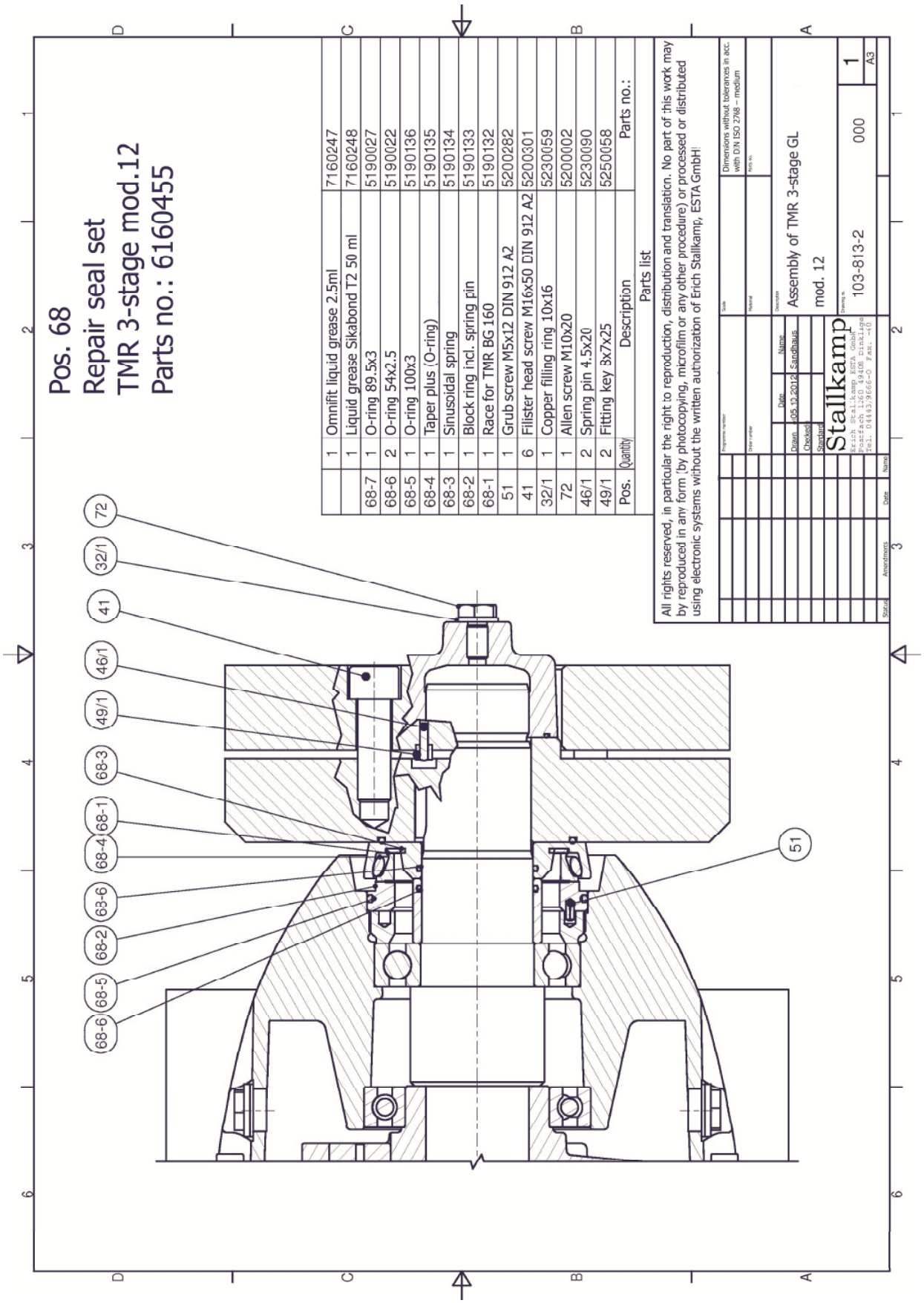
for GFR 4.0 – 7.5 kW, BG 132 Drawing no.: 103-813-2			
Item	**Piece(s)**	**Description**	**Art. no.**
68	1	Repair seal set consisting of:	6160455
	1	68-1 Race	5190132
	1	68-2 Block ring with pin	5190133
	1	68-3 Sinusoidal spring	5190134
	1	68-4 O-ring LR 58 x 7.5 HNBR	5190135
	1	68-5 O-ring LR 80x3 HNBR	5190136
	2	68-6 O-ring 37.0x2.0 NBR	5190022
	1	32 Copper filling ring 21x26x2	5230077
	1	32/1 Copper filling ring 10x16x1	5230059
	50ml	Liquid grease Sikabond T2 50 ml	7160248
	2.5 ml	Omnifit screw locking device	7160247
	1	Planetary gear complete with gearbox shaft and bolt 4 to 7.5 kW	6160541

	1 Pair	Propeller type III/95 Ø 2,600 mm 17° set angle, material: Baydur plastic	5480075
	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	Automatic soft starter for 4.0 kW	6100621
	1	Automatic soft starter for 5.5 kW	6100621
	1	Automatic soft starter for 7.5 kW	6100622

14.2 Assembly drawing for GFR type 2 M1204 BG 132



14.3 Slide ring sealing for GFR type 2 M1204 BG 132



15 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 respon-sible

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

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