## MGE and MLE model J









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#### **Original service instructions**

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Read this document before starting service work on the product. Installation and service work must comply with local regulations and accepted codes of

good practice.

Observe the safety instructions in the installation and operating instructions for the product.

#### 1. Symbols used in this document

#### 1.1 Warnings against hazards involving risk of death or personal injury



#### CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.



#### WARNING



Indicates a hazardous situation which, if not avoided, could result in death or serious personal injury.

#### DANGER



Indicates a hazardous situation which, if not avoided, will result in death or serious personal injury.

#### 1.2 Other important notes



A blue or grey circle with a white graphical symbol indicates that an action must be taken.



If these instructions are not observed, it may result in malfunction or damage to the equipment.



Tips and advice that make the work easier.

#### 2. General information

These service instructions apply to MGE and MLE model J.



The installation and operating instructions for this product and for the system which it is part of must be available during service of the product.

Position numbers of parts (digits) refer to drawings and parts lists; position numbers of tools (letters) refer to section *5. Service tools.* 

Electrical parts must only be serviced by Grundfos or an authorised service workshop.

#### WARNING

Biological hazard

Death or serious personal injury - Use personal protective equipment if there is a risk

of getting into contact with the pumped liquid. Observe local regulations.

#### Before dismantling

#### WARNING

#### Electric shock

Death or serious personal injury

Switch off the power supply and make sure that it cannot be accidentally switched on. The power supply must be switched off for at least five

- minutes before you start working on the motor.
  Check that other pumps or sources do not force flow through the pump even if the pump is stopped. This will cause the motor to act like a generator, resulting in voltage on the terminals.
- Close the isolating valves, if fitted, and make sure that they cannot be accidentally opened.
- Before starting work on the product, let the product and pumped liquid cool off.

#### **During assembly**

• Lubricate and tighten screws and nuts according to sections 3. *Torques* and 4. *Secondary materials*.

#### After assembly

 If analog or digital inputs, the relay output or the CIM module has been removed from the functional module, check the communication with external units after service. See section 7.15 Configuring the controller.

#### 3. Torques

Pos.	Designation	Туре	Dimensions [mm]	Torque [Nm]
152		Tx25	12 x M5	3.5 - 4
178		Tx30	16/10 x 60	5-6*
181		Tx27		
185	_	Tx30	16 x M6	5-6
192	_	Tx30	14 x 6	5-6*
206	_	Tx30	M8	5-6
208	· -	Tx40	M5	4
251d	- Torx screw	Tx25	50 x M5	5-6*
268	_	Tx25	12 x M5	3.5 - 4
273a	_	Tx20	32 x M4	1 - 1.3
277a	_	Tx20	32 x M4	1 - 1.3
286	_	Tx40	21 x M7	2.2 - 2.7
288a	_	Tx20	M4	1 - 1.3
289a	-	Tx30	14 x 6	5-6
291	Union	M20	M20 x 1.5	1 - 1.3

Screws of new terminal boxes must be tightened to 7-8 Nm.

#### **Torques for terminals**

Terminal	Thread	Max. torque [Nm]
L1, L2, L3, L, N	M4	1.8
NC, C1, C2, NO	M2.5	0.5
1-26, A, Y, B	M2	0.5

#### 4. Secondary materials

Pos.	Designation	Quantity [kg]	Product number	
156c,d	Castrol I MX groaps	0.1	00014211	
159d,e	Castion LIMA grease	0.1	00RM4311	
153, 154	Mobil Unirex N3 grease	0.1	96747301	
156a,b	SKF anti-fretting agent LGAF 3E	0.1	96530559	
156a,b 150	Loctite 5512	-	-	



Pos.	Designation	For pos.	Further information
Stand	ard tools		
А	Screwdriver	156, 252b	Straight slot, 8 mm
В	Screwdriver	273b, 502	Straight slot, 3 mm
	Screwdriver	273a, 277a, 288a	Torx20
С	Screwdriver	152,181 268, 251d	Torx25 Torx27
	Screwdriver	178, 185, 192, 289a	Torx30
	Screwdriver	286	Torx40
D	Ratchet spanner with socket	J, K	17 mm
Е	Torque screwdriver	-	0.5 - 4 Nm
F+G	Torque wrench	-	4-20 Nm
Н	Bits kit	152, 178,181 185, 251d, 268, 273a, 277a, 286, 287a, 288a, 289a	Tx20, Tx25, Tx27, Tx30, Tx40
I	Plastic hammer or press	156	1300 N (axial force)
J	Soft jaws	-	For vice
ĸ	Locking-ring pliers, internal ring	187	Ø50-65 (62) mm
	Locking-ring pliers, external ring	188	Ø20-30 (25) mm
L	Antistatic service kit	-	96884939
М	Bearing heater	153, 154	
Specia	al tools		
	Punch D20	156c	98394718
	Punch D25	156c	98394719
N.I	Punch D30	156c	98394720
N	Punch D35	156c	99124636
	Punch D40	156c	99124641
	Punch D45	156c	99124643
0	Puller for bearing	153, 154	
Р	Puller for rotor	172	99110642
Q	Flange mounting tool for MGE 132/160	155	99110656

#### 6. Megging

An installation with MGE motors must not be megged as this may damage the built-in electronic parts. Motor windings may, however, be megged if the terminal box has been removed.



Never measure between two terminals.

- 1. Disconnect the power supply.
- 2. Remove the terminal box. See section 7.9 *Replacing the terminal box.*
- 3. Measure between terminals T1, T2, T3 and earth. As windings are star-connected, fault in a winding will show when measuring all terminals.
- 4. Replace the entire motor unit in case of fault. See also measurement of winding resistances in section *9.4 Power module*.
- 5. Fit the terminal box. See section 7.9 *Replacing the terminal box.*
- 6. Switch on the power supply.
- 7. Start the pump.

Max. test voltage	Max. leakage current [mA]
1000 VAC/1500 VDC	35

#### 7. Replacing hardware



Always use an antistatic service kit when handling electronic components. This will prevent static electricity from damaging components.

When unprotected, the component must be placed on the antistatic cloth.



Fig. 1 Antistatic service kit

#### 7.1 Replacing the terminal box cover

- 1. Loosen the four screws (251d) and remove terminal box cover (251b).
- 2. Clean the sealing faces of terminal box (251a) and the terminal box cover.
- 3. Fit the terminal box cover and cross-tighten the screws. Make sure that the position of the terminal box cover is correct in relation to the control panel (290).



The control panel can be turned 180 °.

#### 7.2 Replacing the battery

Applies only to the FM300 functional module.

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 Replacing the terminal box cover.
- Insert a screwdriver under the battery (273b) and prise the battery out of the isolation cover (277).



The old battery must be disposed off according to the battery directive (2006/66/EC).



#### Fig. 2 Removing the battery

4. Insert the new battery with the positive pole upwards.



The new battery must comply with the battery directive (2006/66/EC).

- 5. Press the battery home with a finger.
- 6. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.

#### 7.3 Fitting the antenna

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 *Replacing the terminal box cover.*
- 3. Remove the blanking plug (252b) from the terminal box.
- 4. Fit the union (291) in the terminal box.
- 5. Lead the antenna into the union from above and tighten the top part (close to the wire).
- 6. Click the antenna wire onto the control panel (290). The antenna wire is long enough to be fitted in both positions of the control panel.



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Make sure that the antenna wire is not sharply bent or pinched when you fit the terminal box cover.

7. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.

#### 7.4 Replacing the control panel

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 *Replacing the terminal box cover.*
- 3. Press and hold in the two locking tabs (fig. 3, A) while gently lifting the control panel (fig. 3, B, and 290).



**Fig. 3** Removing the control panel

- 4. Gently remove the plug for the control panel from the functional module (273).
- 5. Connect the plug for the new control panel to the functional module.
- 6. Turn the control panel to the desired position (0  $^\circ$  / 180  $^\circ$ ).



Do not twist the flat cable by more than 90  $^\circ.$ 

7. Position the control panel correctly on the four rubber pins (fig. 4, C). Make sure that the locking tabs (fig. 4, A) are placed correctly.



Fig. 4 Fitting the control panel

8. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.

#### 7.5 Replacing the CIM module

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 *Replacing the terminal box cover*.
- 3. Remove the plug connection for the CIM module.
- 4. Remove the cover (287) of the CIM module by pressing the locking tab (fig. 5, A) and lifting the end of the cover (fig. 5, B). Then lift the cover off the hooks (fig. 5, C).



English (GB)

**Fig. 5** Removing the cover of the CIM module

- 5. Remove the screw connecting the frame connection of the CIM module to the functional module.
- 6. Insert a screwdriver at the three plastic holders and loosen the CIM module from isolation cover (277). See fig. 6.
- 7. Gently lift the CIM module away from the isolation cover so that the connecting plug is not damaged.



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Fig. 6 Removing the CIM module

8. Fit the new CIM module by aligning it with the plastic holders and the connecting plug. Press home the module using your fingers.



Fig. 7 Align the CIM module with the connecting plug

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- 9. Fit the frame screw in the CIM module.
- 10. Fit the cover by leading the slits into the end with the plug connection and clicking the locking taps onto the isolation cover.
- 11. Press down the module using your fingers. Check that the plug has been pressed home.
- 12. CIM 250 and CIM 270: Put the FCC label on the terminal box.



Fig. 8 Position of FCC label

13. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.

#### 7.6 Replacing the isolation cover

The example below shows a three-phase motor.

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 *Replacing the terminal box cover.*
- 3. Remove the control panel (290) from the isolating cover (277). See section 7.4 *Replacing the control panel*.
- 4. Remove the CIM module (502) from the isolation cover. See section 7.5 Replacing the CIM module.
- Pull out the plug connections (266) using your fingers. See fig.
   9.
- 6. Remove the screw (277a) from the isolation cover.
- 7. You can now remove the isolation cover from the terminal box.



Fig. 9 Removing the plug connections

- 8. Fit the new isolation cover on the terminal box. Check that the isolation cover is not clamped.
- 9. Secure the isolation cover to the terminal box with the screw.
- 10. Push the plug connection into the relevant terminals. They are marked so that they only fit in the right socket of the functional module.
- 11. Fit the CIM module. See section 7.5 Replacing the CIM module.
- 12. Fit the control panel. See section 7.4 Replacing the control panel.
- 13. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.

#### 7.7 Replacing the functional module

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 Replacing the terminal box cover.
- 3. Remove the control panel (290) from isolating cover (277). See section 7.4 Replacing the control panel.
- Remove the CIM module (502) from the isolation cover. See section 7.5 Replacing the CIM module.
- 5. Remove the isolating cover (277). See section 7.6 *Replacing the isolation cover.*
- 6. Remove the spacer (286) and screws (273a).
- Gently lift the functional module (273) out of the power module so that the connecting plug (275a) is not damaged.
- 8. Pull the connecting plug out of the functional module (or power module). See fig. 10.



- TM05 6717 5012
- Fig. 10 Removing the connecting plug from the functional module
- 9. Insert the connecting plug into the new functional module with the long end towards the module. Lead it through the module and home.
- 10. Fit the functional module on the power module by means of the five screws. See the order of the screws on the functional module.
- 11. Fit the spacer on the module.
- 12. Gently push the connecting plug home.
- 13. FM300: Put the battery in the module.
- 14. Fit the isolation cover. See section 7.6 Replacing the isolation cover.
- 15. Fit the CIM module. See section 7.5 Replacing the CIM module.
- 16. Fit the control panel. See section 7.4 Replacing the control panel.
- 17. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.
- 18. Calibrate the functional module with the power module. See section 7.15 Configuring the controller.

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## 7.8 Replacing the power module

If the power module is replaced, the entire bottom of the terminal box must be replaced.

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 Replacing the terminal box cover.
- 3. Remove the control panel (290) from the isolating cover (277). See section *7.4 Replacing the control panel*.
- 4. Remove the CIM module (502) from the isolation cover. See section 7.5 *Replacing the CIM module*.
- 5. Remove the isolation cover. See section 7.6 *Replacing the isolation cover*.
- 6. Remove the functional module. See section 7.7 *Replacing the functional module*.
- 7. Pull out the plug connection (266).
- 8. Remove the screws (178) from the terminal box (251a) and gently lift the terminal box off the motor (150).
- 9. Fit the new terminal box on the motor. Make sure that the plug connections are aligned.
- 10. Cross-tighten the screws of the terminal box.
- 11. Fit the plug connection for power supply.
- 12. Fit the functional module. See section 7.7 *Replacing the functional module*.
- 13. Fit the isolation cover. See section 7.6 Replacing the isolation cover.
- 14. Fit the CIM module. See section 7.5 Replacing the CIM module.
- 15. Fit the control panel. See section 7.4 Replacing the control panel.
- 16. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.
- 17. Calibrate the functional module with the power module. See section 7.15 Configuring the controller.

## 7.9 Replacing the terminal box

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 Replacing the terminal box cover.
- 3. Disconnect all relevant wires.
- Remove the screws (178) from the terminal box (251a) and gently lift the terminal box off the motor (150).
- 5. Fit the new terminal box on the motor. Make sure that the plug connections are aligned.
- 6. Cross-tighten the screws of the terminal box.
- 7. Move relevant modules to the new terminal box according to the section above.
- 8. Connect all relevant wires.
- 9. Transfer data from the nameplate of the old terminal box to the nameplate of the new one.



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Fig. 11 Transferring data to new nameplate

10. Fit the terminal box cover. See section 7.1 Replacing the terminal box cover.

#### 7.10 Replacing the stator housing

- 1. Disconnect the power supply.
- 2. Remove the screws (178) and take the terminal box (251a and 251b) out of the stator housing (150).



Support the terminal box when you remove the motor.

- 3. Remove the stator housing according the service instructions of the system.
- 4. Install the stator housing in the system according to the service instructions of the system.
- 5. Fit the terminal box on the stator housing and cross-tighten the screws.

#### 7.11 Replacing the fan

- 1. Disconnect the power supply.
- 2. Remove the terminal box. See section 7.10 Replacing the stator housing.
- 3. Remove the screws (152) and lift off the fan cover (151).
- 4. Insert two screwdrivers close to the shaft and remove the fan (156).



Fig. 12 Removing the fan

- 5. Push the fan on the shaft. Alternatively, gently knock the fan onto the shaft (172) by means of a plastic hammer while holding the drive end of the shaft against a solid surface.
- 6. Fit the fan cover on stator housing (150) and tighten screws (152).
- 7. Fit the terminal box on the stator housing and cross-tighten the screws.

#### 7.12 Replacing the bearings (MGE 100 and below)

#### Dismantling

- 1. Disconnect the power supply.
- Remove the stator housing from the terminal box. See section 2. 7.10 Replacing the stator housing.
- Remove the fan. See section 7.11 Replacing the fan. 3.
- Remove the parallel key (172a) from the drive-end of the 4. shaft.
- Remove the gamma rings (159d and 159e) or seal rings (156c 5. and 156d) from the drive end and non-drive end of the shaft.
- 6. Fit the puller on the pump housing: Remove the eye bolts, place the puller and fit the eyebolts again to lock the puller in place.



- Fig. 13 Fitting the puller

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- 7. Remove the stay bolts (181).
- 8. Push the rotor out of the stator using the puller. OBS: Note the drain plug position



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- Fig. 14 Pushing the rotor out of the stator
- 9. Remove old sealant if any, from the stator seating and flange.

English (GB)

- 10. Wrap the rotor in a protective material, such as cardboard, to protect it from scratches.
- 11. Place the rotor on the vice. Do not tighten the vice on the rotor!



Fig. 15 Correct position of the rotor on the vice

12. Pull the flange from the rotor with a puller.



Fig. 16 Pulling the flange from the rotor

13. Remove the locking ring (188) from the shaft.





14. Remove the bearing (153) with a puller.



Fig. 18 Removing the bearing with a puller

#### Assembly

- 1. Place the rotor on a vice. Do not tighten the vice on the rotor!
- 2. Clean the bearing journal in the drive end with a clean cloth.
- 3. Heat the new bearing (153) to a temperature between 90 and 110 °C. Follow the instructions for the bearing and bearing heater.
- 4. Fit the heated bearing on the drive end of the shaft.



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#### CAUTION Hot surface

Minor or moderate personal injury - Use heat-resistant gloves.

- 5. Fit the locking ring (188) on the shaft.
- 6. Place the flange in the vice.
- 7. Clean the bearing seat with a clean cloth and lubricate the bearing seat with anti-fretting paste.
- 8. Fit the rotor in the flange.



Fig. 19 Fitting the rotor in the flange

9. Fit the locking ring (187) so that the bearing is held by the flange.



- Fig. 20 Fitting the locking ring for the bearing
- 10. Clean the bearing journal in the non-drive end with a clean cloth.
- 11. Heat the bearing (154) to a temperature between 90 and 110  $\,^\circ\text{C}.$
- 12. Fit the heated bearing (154) on the shaft (172).



Hot surface

Minor or moderate personal injury - Use heat-resistant gloves.

- 13. Remove the cardboard from the rotor when the bearings have cooled down.
- 14. Check that the corrugated spring (158) is correctly fitted in the stator housing.
- 15. Apply Loctite 5512 on the flange surface which seals against the stator.
- 16. Gently insert the stator onto the rotor.

#### CAUTION

#### Crushing of hands

Minor or moderate personal injury





Fig. 21 Fitting the stator on the rotor

- 17. Unscrew the puller to slowly insert the rotor into the stator. Press flange and stator together when the bearing (154) has engaged with the stator housing. Check that the drain hole of the flange faces downwards.
- 18. Cross-tighten the stay bolts (181). Torque: 5-6 Nm.
- 19. Remove the puller and fit the eye bolts (189) back on the motor.
- 20. Lubricate the shafts ends.
- 21. Fit the seal rings (156c and 156d) or the gamma rings (159d and 159e) on the drive end and non-drive end of the shaft. Use a punch.



Fig. 22 Fitting the seal rings or gamma rings

- 22. Fit the parallel key (172a) on the drive-end of the shaft.
- 23. Check that the shaft can rotate freely.
- 24. Fit the fan and cover. See section 7.11 Replacing the fan.
- 25. Fit the terminal box. See section 7.10 Replacing the stator housing.

### 7.13 Replacing the bearings (MGE 112, 132, 160)

#### Dismantling

- 1. Disconnect the power supply.
- 2. Remove the stator housing from the terminal box. See section 7.10 Replacing the stator housing.
- 3. Remove the fan. See section 7.11 Replacing the fan.
- Remove the parallel key (172a) from the drive-end of the shaft.
- Remove the gamma rings (159d and 159e) or the seal rings (156c and 156d) from the drive end and non-drive end of the shaft.
- 6. Remove the screws (206) from the non-drive end flange (156a).
- 7. Remove the non-drive end flange (156a).
- 8. Remove the corrugated spring (158) from the non-drive end of the shaft.
- 9. Remove the bearing (154) with a puller.



Fig. 23 Removing the bearing with a puller

- Remove the screws (208) holding the bearing plate from the drive end flange (156b).
- 11. Remove the screws (185) and nuts (208b) holding the drive end flange.
- 12. Remove the drive end flange (156b).
- 13. Remove the locking ring (188).





Fig. 24 Removing the locking ring for the bearing

14. Remove the bearing (153) with a puller.15. Remove the bearing cover (155).

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#### Assembly

- 1. Fit the O-rings (150b).
- 2. Clean the bearing journal in the non-drive end with a clean cloth.
- 3. Lubricate the bearing.



Fig. 25 Lubricating the bearing

- 4. Heat the new bearing (154) to maximum 110 °C. Follow the instructions of bearing and bearing heater.
- 5. Fit the heated bearing (154) on the shaft (172).



#### CAUTION Hot surface

Minor or moderate personal injury - Use heat-resistant gloves.

- Fit the corrugated spring (158) in the non-drive end flange (158a).
- 7. Fit the non-drive end flange (156a) on the stator housing.
- 8. Fit the washers (207a) and screws (206), and cross-tighten the screws.
- 9. Clean the bearing journal in the drive end with a clean cloth.
- 10. Lubricate the bearing.



Fig. 26 Lubricating the bearing

- 11. Fit the bearing cover (155).
- 12. Heat the new bearing (153) to a temperature between 90 and 110 °C.
- 13. Fit the heated bearing (153) on the shaft (172).



#### CAUTION Hot surface

Minor or moderate personal injury - Use heat-resistant gloves.

14. Fit the locking ring (188).

15. Fitting the locking ring

16. Fit the drive end flange (156b). Use a thin pin to align the holes of the bearing plates (155) with the holes of the flange.



Fig. 27 Aligning flange, bearing cover and stator housing

17. Use the flange mounting tool (Q) and nuts (208b) to fit the drive end flange home onto the stator housing. See fig. 28.



Fig. 28 Fit the flange home on stator housing

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- English (GB)
- 18. Remove the flange mounting tool and nuts. The flange should stay in place.
- 19. Fit the screws (185) and nuts (208b). Cross-tighten the screws. Torque: 5-6 Nm.
- 20. Fit the gaskets (208a) and screws (208) in the two available holes of the flange.
- 21. Remove the pin and fit the last gasket (208a) and screw (208)
- 22. Lubricate the shaft ends and fit the seal rings (156 c and 156d) or gamma rings (1159d and 159e). Use a punch.



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Fig. 29 Fitting the seal ring or gamma ring with a punch

- 23. Fit the parallel key (172a) on the drive-end of the shaft.
- $\label{eq:24.check} \mbox{ that the shaft can rotate freely.}$
- 25. Fit the fan and cover. See section 7.11 Replacing the fan.
- 26. Fit the terminal box. See section 7.10 Replacing the stator housing.

### 7.14 Replacing the IP66 gamma rings

- 1. Disconnect the power supply.
- 2. Remove the stator housing from the terminal box. See section *7.10 Replacing the stator housing*.
- 3. Remove the fan. See section 7.11 Replacing the fan.
- 4. Remove the key from the shaft.
- 5. Remove the gamma rings (159d) from the shaft (172).
- 6. Lubricate the new gamma ring (159d) and fit it on the drive end of the shaft.
- 7. Lift the motor so that the non-drive end of the shaft rests on a solid, vibration-free surface.
- Gently knock the ring home with the relevant punch. The distance between the flange (156b) and ring must be 0.8 to 1.3 mm.



The design of the punch ensures correct tolerances.



Fig. 30 Fitting the gamma ring on the drive end of the shaft

- 9. Support the motor so that it rests on the drive end of the shaft.
- Lubricate the new gamma ring (159e) and fit it on the non-drive end of the shaft.
- 11. Gently knock the ring home with the relevant punch. The distance between the stator housing (150) and ring must be 0.8 to 1.3 mm.



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- Fig. 31 Fitting the gamma ring on the non-drive end of the shaft
- 12. Fit the fan and cover. See section 7.11 Replacing the fan.
- 13. Fit the terminal box. See section 7.10 Replacing the stator housing.

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#### 7.15 Configuring the controller

The terminal box is configured from factory for the intended application and pump type. The configuration file number appears from the terminal box configuration label which is placed inside the terminal box. See fig. 32.



Fig. 32 Position of configuration label

If the terminal box, functional module or power module is replaced or mounted on another motor, it must be reconfigured. Use the PC Tool E-products for that purpose. To establish connection to the motor, use the Grundfos GO Remote MI 301 or PC Tool Link.

#### 7.15.1 Connection to motor by means of Grundfos GO Remote MI 301

Configuration can be done in three ways:

- Radio Scan
- Direct Connect
- IR Connect.



If the power supply to the pump is interrupted during configuration, the update will be lost.

This will, however, not damage the controller. Start from the beginning.

#### Equipment

- PC Tool E-products, version 14.00.00 or newer
- MI 301 (PN 98046408) with USB cable.

#### **IR Connect**

- 1. Switch on the power supply to the pump.
- 2. Connect MI 301 to the PC.
- 3. Start PC Tool. The first time the program is started, the message "No COM port selected" will be shown. Click [OK].



Fig. 33 No COM port selected

- 4. Select "Preferences" in the main menu under "Files".
- 5. Open the dropdown menu "Select interface" and select "MI 301". See fig. 34.



## Fig. 34 Selecting the user interface

- 6. Open the dropdown menu "Select port" and select the port "PCTool-Link". See fig. 34. Click [Apply].
- Point the MI 301 at the IR eye of the pump. The distance is maximum 20 cm. See fig. 35.



Fig. 35 IR connection via MI 301

8. Click [IR Connect]. See fig. 36. Wait while connection to the pump is established (10-20 seconds).

rect Connect	IR Connect
Unit Address	Connection State
2	Unlocked
	2 3

#### Fig. 36 IR Connect

9. To find the GSC file, see section 7.15.3 Configuration with the *PC Tool E-products*.

#### Radio Scan

- 1. Switch on the power supply to the pump.
- 2. Connect the MI 301 to the PC.
- 3. Place the MI 301 at a distance of maximum 10 metres from the pump.
- 4. Start PC Tool. The first time the program is started, the message "No COM port selected" will be shown. Click [OK].



Fig. 37 No COM port selected

- 5. Select "Preferences" in the main menu under "Files".
- Open the dropdown menu "Select interface" and select "MI 301". See fig. 38.

ommunication		
Local serial port		
Select interface	PCTool-Link	-
Select port	PCTool-Link	
Baud rate	Flipper	
	GENIeye	
Network serial serv	er	
Host name/IP addr	localhost	-
Port	49152	*
GP2P		V
hecksum	CRC16	Ŧ
roduct detection mode	Connection request	Ŧ
how detection dialog		5
dvanced		
	Colored and discrete sources and	-

Fig. 38 Selecting the user interface

- Open the dropdown menu "Select port" and select the port "PCTool-Link". See fig. 38. Click [Apply].
- Click [Radio Scan]. See fig. 39. Wait until connection has been established to the products the MI 301 can communicate with (10-20 seconds).



Fig. 39 Radio Scan

9. Mark the pump to be connected and click [Connect]. See figures 40 and 41.

Radio Scan	Direct Connect	IR Connect
Start Radio Scan when loaded	l	
Start Radio Scan when loader	I Unit Address	Connection State
Start Radio Scan when loaded	I Unit Address	Connection State

(	Wink	Stop Wink	Connect	
			0-01	

Fig. 41 Establish connection to the pump

10. Click the button for radio communication. See fig. 42. Status in PC Tool will change to "Connected". See fig. 43.

		S
n	ve	100
ĸ	11.	
٩		89.

Fig. 42 Connection via radio communication

Click [Con 41.

TM05 7037 0413

I

_	Click [Connect]	if the	pump i	is '	"Unlocked".	See	fig.
	41.						

TM05 7212 0713

TM05 7039 0412

Connect MI3	01	
Radio Scan	Direct Connect	IR Connect
Start Radio Scan when loaded Device Name	Linit Address	Connection State
Start Radio Scan when loaded Device Name (12) RedWolf	Unit Address	Connection State



11. Find the GSC file for the motor by means of section 7.15.3 Configuration with the PC Tool E-products.

#### **Direct Connect**

- 1. Switch on the power supply to the pump.
- 2. Connect the MI 301 to the PC.
- 3. Place the MI 301 at a distance of maximum 10 metres from the pump.
- 4. Start PC Tool. The first time the program is started, the message "No COM port selected" will be shown. Click [OK].



Fig. 44 No COM port selected

- 5. Select "Preferences" in the main menu under "Files".
- Open the dropdown menu "Select interface" and select "MI 301". See fig. 45.

ommunication		
Local serial port		
Select interface	PCTool-Link	-
Select port	PCTool-Link	_
Baud rate	Flipper	
	GENIeye	
Network serial serve	r	
Host name/IP addr.	localhost	7
Port	49152	w.
GP2P		N
necksum	CRC16	-
oduct detection mode	Connection request	-
iow detection dialog		ন
lvanced		
mmunication priority	Selected and direct connected	•

Fig. 45 Selecting the user interface

- Open the dropdown menu "Select port" and select the port "PCTool-Link". See fig. 45. Click [Apply].
- Click [Direct Connect]. See fig. 46. Wait until connection has been established to the products the MI 301 can communicate with (10-20 seconds).



Fig. 46 Direct Connect

9. Click the motor button for radio communication. Connection has now been established.



Fig. 47 Connection via radio communication

10. Find the GSC file for the motor by means of section 7.15.3 Configuration with the PC Tool E-products.

#### 7.15.2 Connection to motor via PC Tool Link

#### Equipment

- PC Tool E-products, version 14.00.00 or newer
- Grundfos PC Tool Link
- GENIbus cable (RS-485).

#### Procedure

- 1. Disconnect the power supply.
- 2. Remove the terminal box cover. See section 7.1 *Replacing the terminal box cover.*
- 3. Connect PC Tool Link to the GENIbus terminals on the motor by means of the GENIbus cable.



## TM05 7122 0513

#### Fig. 48 Connection of GENIbus

TM05 7037 0412

TM05 7212 0713

4. Connect the mains supply to the pump.

#### 7.15.3 Configuration with the PC Tool E-products

Find the desired configuration file in the PC Tool E-products in this way:

- 1. Start PC Tool.
- 2. Find the desired configuration file in the PC Tool E-products in one of these ways:
- Search by the configuration number. See fig. 49.
- Search on the basis of the application that MGE is part of.
- Choose the file position on the PC hard disk via the PC Tool E-products browser.

#### Searching by configuration number

Standa	Configuration I	gurat • (	ion		(II) Mat 3M Model I	, FUNC000151	10	1		Select "Standard configuration"
Appleation My Files			G	RUNDF nfgu ston file No	os·X		4	2	2. 5	Select "Number".
Configuration files	Voltage	Second	Discore	Citize information	Perception	Audiot	Search Now	3	3. E r	Enter a number or part of a number.
Configuration No. 95139309 95139394 95139394 96433955 96433955 96433955 96433955 96433955 96433957 964339575 964339575 964339575 964339575	voltage Row 300-400/ Row 300-400/	3600 (pm) 3600 (pm) 3600 (pm) 1800 (pm) 1800 (pm) 1800 (pm) 1500 (pm) 1500 (pm) 3000 (pm) 3000 (pm) 3000 (pm) 3000 (pm)	Power 15,0 kw 18,5 kw 11,0 kw 15,0 kw 15,0 kw 15,0 kw 15,0 kw 11,0 kw 15,0 kw 15,0 kw 10,5 kw 10,5 kw 22,0 kw	cesen in ormation Standard	Description Cont. 4(CC-5(DR-40)(3000)15(N Cont. 4(CC-5(DR-40)(3000)15, SN Cont. 4(CC-5(DR-40)(3000)15, SN Cont. 4(CC-5(DR-40)(3000)16, SN Cont. 4(CC-5(DR-40)(3000)15, SN Cont. 4(CC-5(DR-40)(	Profiled 2008-05-19 (0):58 2008-05-19 (0):18 2008-05-19 (0):18 2008-05-19 (0):18 2008-05-19 (0):51 2008-05-19 (0):51 2008-05-15 (1):14-10 2008-05-15 (1):15-10 2008-05-15 (1):15-10 2008-05-15 (1):51-50 2008-05-15 (1):51-50 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150 2008-05-150		5 5 80 80 80 80 80 80 80 80 80 80 80 80 80	4. C 5. S li 6. C	Click [Search now]. Select the configuration file in t ist of search results. Click [Send] to download the configuration file to the MGE.
) Moveor [PS]	1 (a) Sandard	configuratio	n [P6]	T) Custom configu	ration [F7]	Parameter L	(Sinit_) 6	A04 2563 2		Send

Fig. 49 Configuration of terminal box by searching for the GSC number

3. End PC Tool and remove MI 301.

#### 8. Lubricating the bearings

Lubricate the bearings through the grease nipples with a grease dispenser and high-temperature grease as specified on the bearing nameplate.

The display indicates the number of bearing relubrications that has been done since the last bearing replacement. For more information about the display, see the installation and operating instructions:



http://net.grundfos.com/qr/i/98246988

The factory-set interval between relubrications is stated on the bearing nameplate placed on the motor. The relubrication interval can be changed by a Grundfos service technician.

It is possible to relubricate the bearings five times according to the preset interval. When the preset interval has been reached after the fifth relubrication, a warning will be given to replace the bearings.

In the case of seasonal operation (motor is idle for more than six months of the year), we recommend that you lubricate the motor bearings when you take it out of operation.

It is important to relubricate the bearings as specified on the motor nameplate with mechanical data. If this interval is not observed, the bearing life will be reduced.

#### Reduced lubricating interval

The lubricating interval must be reduced in these situations:

- Dirty and dusty environments. Reduce the lubricating interval by a factor 0.75.
- Very moist environments. Reduce the lubricating interval by a factor 0.9.

If the environments are both dusty and moist, multiply the factors.

#### Grease type and quantity

See the bearing nameplate.



Never mix grease with thickeners, such as lithium-based grease with polycarbamide-based grease.

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#### 9. Fault finding

#### 9.1 General information

- 1. Check the mains supply to the pump.
- 2. Read fault messages by means of Grundfos Eye, Grundfos GO Remote, PC Tool or R100.



 If possible, test if the motor can run without load. Remove the coupling to the pump (if possible) and set the operating signal to maximum by means of PC Tool, Grundfos GO Remote or R100.

You can reset a fault indication in the following ways:

- When the fault cause has been eliminated and the pump is switched on, the pump will revert to normal duty.
- If the fault disappears by itself, the fault indication will automatically be reset.

The fault cause will be stored in the pump alarm or warning log.

#### Fault indications via Grundfos Eye

See the indication of motor status by means of Grundfos Eye and the contact positions of signal relays in the installation and operating instructions for the MGE motor.

#### Fault indications via Grundfos GO Remote

See the description of the Grundfos GO Remote control panel and possibilities of communication in the installation and operating instructions for the MGE motor.



Fig. 50 Alarms and warnings shown on the MI 201



Fig. 51 Alarm and warning log of the MI 201

For a detailed description the fault, see display "Assisted fault advice".



IMG\_0047

Fig. 52 Detailed fault description

#### Fault indications via R100

MG\_0041

R100 must be updated to be used for MGE model J. See the description of the R100 display and possibilities of communication in the installation and operating instructions for the MGE motor.

### 9.2 Fault indications

The fault indication below can be read by means of the number in brackets, as text or as status indications on the control panel, depending on the equipment available.

Grundfos Eye	Condition/cause	Re	medy
	External fault (3)		
	An external signal has reported an "External fault" to the digital input set up for this function.		eck the parameter or the unit reporting the ternal fault. Correct the fault.
	Too many restarts (4)		
	The pump has restarted to many times in connection with a fault that forced the	a)	Check the warning and alarm log for faults that caused to many restarts.
	pump to stop and restart automatically.		Replace the pump if the fault cannot be found.
	Overvoltage (32)		
	Supply voltage to the pump too high.	a)	Check that the power supply is within the specified range.
	Undervoltage (40)		
	Supply voltage to the pump too low.	a)	Check that the power supply is within the specified range.
flashing simultaneously.	Overload (49)		
	The motor is overloaded and has automatically reduced the speed and thus the pump performance.		Check that the viscosity and temperature of the pump liquid is within the limits for the pump. If not, change the properties of the liquid.
			Dismantle the pump, and remove any foreign matter or impurities preventing the pump from rotating.
			If none of the above causes are present, replace the pump.
	Blocked pump (51)		
	The pump is blocked.	a)	Dismantle the pump, and remove any foreign matter or impurities preventing the pump from rotating.
	Pump communication fault (10)		
	Communication fault between this pump and the other pumps of the multipump system.	a)	Check that all pumps of the multipump system have been correctly set up.
	Forced pumping (29)		
	Other pumps or sources force flow through the pump even if the pump is stopped.		Check the system for defective non-return valves and replace, if necessary. Check the system for correct position of non-return valves, etc.
One yellow indicator light permanently	Dry running (56, 57)		
	No water at the pump inlet or the water contains too much air.	a)	Prime and vent the pump before a new start-up. Check that the pump is operating correctly. If not, replace the pump.
	Internal fault (72, 83, 85, 155, 157, 163)	_	
	Internal fault in the pump electronics.	a)	Replace the functional module, power module or terminal box.

Grundfos Eye	Grundfos Eye Condition/cause Remedy		
	High motor temperature (65, 66)		
	The motor temperature is too high.	a)	Check that the ambient temperature is within the specified range.
		b)	Check that the pump is not covered by dust, dirt or other foreign matter which reduces the air cooling of the pump.
		c)	If none of the above causes are present,
	Internal communication fault (76)		
on.	Communication fault between different parts of the electronics.	a)	Replace the terminal box.
	Soft pressure buildup, timeout (215)		
	The system has been in the mode "soft pressure buildup" longer than the set time limit.	a)	Check the system for leakages.
	Replace the motor bearings (30)		
	The bearings must be replaced.		Follow the instructions for the pump. See section 7.12 <i>Replacing the bearings (MGE 100 and below)</i> .
	Internal sensor fault (88)		
	The pump is receiving a signal from the internal sensor which is outside the normal range.	a)	Check that the plug and cable are connected correctly to the sensor. The sensor is on the back of the pump housing.
		b)	Replace the sensor.
	Pt100/1000 sensor 1 (91) and 2 (175)		
	Pt100/1000 input 1 is receiving a signal which is outside the normal range.	a)	Check that the sensor resistance corresponds to approximately 100 or 1000 ohm. If not, replace the sensor.
		b)	Check the sensor cable for damage.
		c)	Check the cable connection at the pump and at the sensor. Correct the connection, if required.
		d)	Replace the sensor.
	Supply fault, 5 V (161)		
	Fault in the output voltage to sensor or potentiometer.	a)	Check the output voltage and wire to sensor or potentiometer.
	Supply fault, 24 V (162)		
One yellow indicator light rotating in	Fault in the output voltage.	a)	Check the output voltage and wire.
when seen from the non-drive end.	Signal fault, LiqTec-sensor (164)		
	The pump is receiving a signal from the LiqTec sensor which is outside the normal	a)	Check that the plug and cable are connected correctly to the sensor.
		b)	Replace the sensor.
	Signal fault, sensor 1 (165), 2 (166) and	3 (1	67)
	Analog input 1, 2 or 3 is receiving a signal which is outside the normal range.	a)	Check that the setup of the analog input corresponds to the sensor output as regards electrical characteristics $(0.5 - 3.5 V, 0.5 V, 0.10 V, 0.20 mA or 4-20 mA)$ . If not, change the setting, or replace the sensor with one that matches the setup.
		b)	Check the sensor cable for damage.
		c)	Check the cable connection at the pump and at the sensor. Correct the connection, if required.
		d)	Check if the sensor has been removed, but the input was not deactivated.
		e)	Replace the sensor.
	Limit 1 exceeded (190) and limit 2 excee	edec	i (191)
	Limit 1 or 2 has reached the limit for	a)	Identify and remove the fault cause.



warning/alarm.

#### 9.3 Functional module

#### WARNING

### Electric shock

Death or serious personal injury

- Do not touch the terminals of the power module as they are still live.
- Do not touch the relay RL1 as it may still be live.



Measuring equipment must be free of static electricity or have same potential as the motor before being used for measurement without isolation cover.

 The status diode of the functional module flashes 40-80 times/minute when the software is running correctly. See fig. 53. The functional module can only function if the power module is in operation, as the power module supplies voltage to the functional module. See section *9.3 Functional module*.

Status	Fault
Permanently on.	The microprocessor is frozen. The functional module is defective. See section 7.7 <i>Replacing the</i> <i>functional module</i> .
Light off.	The functional module is defective. See section 7.7 <i>Replacing the functional module</i> .
Flashing 40-80 times/minute.	The processor of the functional module is functional



Fig. 53 Status diode of functional module

2. If the light diode is flashing, the functional module is working correctly. The fault may then be in the control panel. See section 7.4 Replacing the control panel.

If the status diode of the functional module is off, check if the power module supplies voltage by measuring 8.5 VDC on the VFE plug connection between the functional module and the power module (see fig. 54, J15). If no voltage is measured, the connection between the modules or the power module is defective.

If the VFE voltage to the functional module is okay, check if the voltage between the reference point and the other measuring points is okay. The voltage values apply to an operating motor.



Fig. 54 Measuring voltage on the functional module



Use a correctly calibrated measuring instrument.

To measure the voltage listed in the table below, you must use the same reference point (ref.) seen on the figure above. Measure the DC voltage from e.g. "ref." to "1". The measure should be between 14.5 V and 15.7 V.

Dee	Control voltage [VDC]				
Pos.	Minimum	Nominal	Maximum		
VFE (J15)		8.5			
1	14.5	15.1	15.7		
2	4.8	5	5.2		
3	4.8	5	5.2		
4	3.2	3.3	3.4		
5	23	23.9	24.8		
6	4.8	5	5.2		
ref.		GND			

Replace the functional module if the voltage is not correct. See section 7.7 Replacing the functional module.

#### 9.3.1 Checking input and outputs



English (GB

Make a copy of motor settings.

#### Pt100/1000

Use a 100  $\Omega$  resistance and decide on the basis on the motor settings which value this resistance will show in the display when connected to the terminals instead of the Pt100/1000 sensor.

#### Analog input, Al

It is possible to measure on the analog input to determine if its function is correct.

During current state, a 292  $\Omega$  resistance in the input converts a current signal (e.g. 0-20 mA) from the sensor to a voltage signal for the processor.

Measure the voltage across the input and read the current in the circuit by means of Grundfos GO Remote or PC Tool. The current value must be equal to voltage divided with resistance.

Alternatively, a milliammeter can be connected in series with the circuit.



Fig. 55 Measuring on analog input

Next step is to test the input in voltage state. Change the setup of the input to voltage state (0-10 V). Fit a jumper between terminal 5 (+5 V) and the analog input. 5 V must now be read be means of PC Tool.



Fig. 56 Testing the input during voltage state

Change the setup of the input to current state and measure on the input using an ohmmeter. The resistance must be 292  $\Omega$ . In voltage state, the resistance is 122 k $\Omega$ .



Fig. 57 Measuring resistance in current and voltage state

#### Analog output, AO

The analog input is protected against short circuit and will shut down the signal in case of short circuit. If you suspect a short circuit, remove the load and compare the value read via PC Tool with the value measured by means of the measuring instrument. If the values are not identical, the module is defective.

#### Digital input, DI

See the settings of the input in PC Tool.

Connect the digital input to frame (GND) by means of an ammeter. The value measured must now be approximately 12 mA. Check that PC Tool shows a corresponding value.



Fig. 58 Testing the digital input

#### Digital output, DO/open collector, OC

See the settings of the output in PC Tool.

Measure the output. If the value in PC Tool differs from the value measured with the measuring instrument, remove the load. If the values still differ, the module is defective.

The voltage of an active output is approximately 5 V.



Fig. 59 Measuring voltage on the digital output

#### LiqTec sensor

TM05 7115 0613

Connect a new LiqTec sensor to check the input. Immerse the sensor into water and take it up. The motor must now report fault within 20 seconds.

#### Signal relay

See the settings of the output in PC Tool.

Check if the relay reacts to the signals of the controller according to the configuration of the controller.

#### CIM

Test the CIM module according to its manual.

#### Radio

If there are problems in the radio connection between Grundfos GO Remote and the motor, remove the terminal box cover. See section 7.1 *Replacing the terminal box cover*. Replace the control panel if there is still no connection. See section 7.4 *Replacing the control panel*.

#### Battery

Switch off power to the motor for a short period. When you switch on the power to the pump again, adjust the clock.

#### Control panel (HMI)

Check the flat cable to the functional module. Replace the control panel if the connection is correct, and it did not solve the problem.

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#### 9.4 Power module

#### WARNING



**Electric shock** Death or serious personal injury

Do not touch the terminals of the power module as they are still live.

Measuring equipment must be free of static electricity or have same potential as the motor before being used for measurement without isolation cover.

If reading of fault codes does not provide a clear answer as to whether the power module is functioning correctly, you can proceed as described below.

- 1. Check that the voltage to the module is within the limit values stated on the nameplate. Check all phases of a three-phase motor.
- 2. If there are signs of moisture in the terminal box, take necessary precautions to prevent similar faults.
- 3. Check the two status diodes of the power module by looking through dedicated holes in the PCB. Status diode "LED 5V" must be permanently on when connected to mains. Status diode "LED Micro controller" flashes when the functionality is correct. See the tables below.

It may be necessary to dim the light as the diode light is weak.

Status, single-phase	Fault
	<ul> <li>The microprocessor is frozen.</li> <li>No initialising message from the functional module.</li> </ul>
LED Micro controller is permanently on.	Switch the power supply off and on. If this does not solve the problem, replace the power module. See section 7.8 Replacing the power module.
LED Micro controller is off.	The power module is defective. See section 7.8 <i>Replacing the</i> <i>power module</i> .
The LED Micro controller is flashing 180 times/minute, and the LED 5V is permanently on.	The power module is functional.
The LED 5V is off.	The power module is defective. See section 7.8 <i>Replacing the</i> <i>power module</i> .
The LED Micro controller and LED 5V are flashing 40-80 times/minute.	Short circuit in the connection to the functional module or in the functional module.



Fig. 60 Status diode of power module, single-phase.

Status, three-phase	Fault
	<ul> <li>The microprocessor is frozen.</li> <li>No initialising message from the functional module.</li> </ul>
The LED Micro controller is permanently on.	Switch the power supply off and on. If this does not solve the problem, replace the power module. See section 7.8 Replacing the power module.
The LED Micro controller is off.	The power module is defective. See section 7.8 <i>Replacing the</i> <i>power module</i> .
The LED Micro controller is flashing 3 times per second.	The processor of the power module is functional.
LED 5V is permanently on.	The processor of the power module is functional.
LED 5V is off.	The power module is defective. See section 7.8 <i>Replacing the</i> <i>power module</i> .
LED 5V and LED Micro Controller are flashing simultaneously.	<ul> <li>Short circuit in the connection to the functional module.</li> <li>Short circuit in the functional module.</li> <li>The functional module is disconnected.</li> <li>The power module is defective.</li> </ul>



Fig. 61 Status diodes of power module, Type 1



4. Measure the DC voltage across the capacitors (GND and DC+) to ensure that the capacitors are not short-circuited. If the function is correct, the voltage must be ≥ 566 V (at a mains voltage of 400 V). See figures 63 and 64. If not, the module is defective.



Fig. 63 Status diodes of power module, Type 3



Fig. 64 Status diodes of power module, Type 4

#### 9.5 Winding resistance

As the motor is star-connected, the easiest way to measure the winding resistance is to measure across two phases. Measure at the coil temperatures stated in the table below. It may be necessary to let the motor cool off if it has been running or if it was stopped because of short circuit or overload.

#### Wiring diagram



Fig. 65 Wiring diagram



Fig. 66 Measure the winding resistance



Fig. 67 Measure the winding resistance

Ena			Туре
lish	Motor	Min <sup>-1</sup>	Ņ
(GB)		1500 2000	
		1300-2000	
	MGE 71, MLE 71	3000-4000	

		Туре		Min./max. resistance across tw [Ω]		
Motor	Min <sup>-1</sup>	Voltage [VAC]	Power [kW/hp]	20 °C	60 °C	80 °C
			0.25 / 0.33	12 / 14	13.8 / 16.2	14.8 / 17.3
	(==========	1 x 200-240	0.37 / 0.5	12 / 14	13.8 / 16.2	14.8 / 17.3
	1500-2000		0.25 / 0.33	40.5 / 47.5	46.8 / 55	50 / 58.7
		3 x 380-500	0.37 / 0.5	40.5 / 47.5	46.8 / 55	50 / 58.7
			0.25 / 0.33	3 / 3.6	3.5 / 4.1	3.8 / 4.4
		1 x 200-240	0.37 / 0.5	3 / 3.6	3.5 / 4.1	3.8 / 4.4
	0000 4000		0.55 / 0.75	3 / 3.6	3.5 / 4.1	3.8 / 4.4
MGE 71,	3000-4000		0.25 / 0.33	10.4 / 12.2	12 / 14.1	12.8 / 15.1
MLE 71		3 x 380-500	0.37 / 0.5	10.4 / 12.2	12 / 14.1	12.8 / 15.1
			0.55 / 0.75	10.4 / 12.2	12 / 14.1	12.8 / 15.1
			0.25 / 0.33	1.5 / 1.7	1.7 / 2	1.8 / 2.1
		1 x 200-240	0.37 / 0.5	1.5 / 1.7	1.7 / 2	1.8 / 2.1
	4000 5000		0.55 / 0.75	1.5 / 1.7	1.7 / 2	1.8 / 2.1
	4000-5900		0.25 / 0.33	4.6 / 5.4	5.3 / 6.2	5.7 / 6.7
		3 x 380-500	0.37 / 0.5	4.6 / 5.4	5.3 / 6.2	5.7 / 6.7
			0.55 / 0.75	4.6 / 5.4	5.3 / 6.2	5.7 / 6.7
		1 x 200 240	0.55 / 0.75	6.9 / 8.1	8 / 9.4	8.5 / 10
	1500-2000	1 X 200-240	0.75 / 1	4.3 / 5.1	5 / 5.9	5.3 / 6.3
		3 x 380 500	0.55 / 0.75	21.2 / 24.8	24.5 / 28.7	26.1 / 30.7
		3 X 360-500	0.75 / 1	13.5 / 15.9	15.6 / 18.4	16.7 / 19.6
	3000-4000	1 x 200-240	0.25 / 0.33	3 / 3.6	3.5 / 4.1	3.8 / 4.4
		T X 200-240	1.1 / 1.5	1.6 / 1.8	1.8 / 2.1	1.9 / 2.3
MGE 80, MLE 80		3 x 380-500	0.25 / 0.33	10.4 / 12.2	12 / 14.1	12.8 / 15.1
			1.1 / 1.5	5.3 / 6.3	6.2 / 7.2	6.6 / 7.7
	3400-4000	3 x 200-240	1.1 / 1.5	1.08 / 1.24	1.25 / 1.43	1.33 / 1.53
		1 x 200-240	0.75 / 1	1.5 / 1.7	1.7 / 2	1.8 / 2.1
	4000-5900		1.1 / 1.5	1.5 / 1.7	1.7 / 2	1.8 / 2.1
	4000-0000	3 x 380-500	0.75 / 1	4.6 / 5.4	5.3 / 6.2	5.7 / 6.7
		3 × 300-300	1.1 / 1.5	4.6 / 5.4	5.3 / 6.2	5.7 / 6.7
	1500-2000	3 x 380-500	1.1 / 1.5	8.9 / 10.5	10.3 / 12.1	11 / 12.9
		1 x 200-240	1.5 / 2	1.1 / 1.3	1.3 / 1.5	1.4 / 1.6
	3000-4000	3 4 200 500	1.5 / 2	3.8 / 4.4	4.4 / 5.1	4.7 / 5.5
		0 × 000 000	2.2 / 3	2.2 / 2.6	2.6 / 3	2.7 / 3.2
MGE 90, MLE 90	3400-4000	3 x 200-240	1.5 / 2	0.75 / 0.86	0.86 / 0.99	0.92 / 1.06
		0 X 200 210	2.2 / 3	0.90 / 1.04	1.04 / 1.20	1.11 / 1.28
		1 x 200-240	1.5 / 2	0.8 / 1	1 / 1.1	1 / 1.2
	4000-5900	3 x 380-500	1.5 / 2	2.4 / 2.8	2.8 / 3.2	3 / 3.5
			2.2 / 3	1.6 / 1.8	1.8 / 2.1	1.9 / 2.3
MGE 90	2000-2200	3 x 380-500	1.5 / 2	5.7 / 6.7	6.6 / 7.8	7.0 / 8.3
MLE 90		3 x 440-480	1.1 / 1.5			
MGE 100,	2000-2200	3 x 380-500	2.2 / 3.0	4.9 / 5.8	5.7 / 6.7	6.1 / 7.2
MLE 100		3 x 440-480				
MGE 100	2000-2200	3 x 380-500	3.0 / 4.0	3.5 / 4.1	4.0 / 4.8	4.3 / 5.1
MGE 112,	2000-2200	3 x 380-500	3.7 / 5.0	2.5 / 2.9	2.9 / 3.4	3.1 / 3.6
MLE 112		3 x 440-480				
	3000-4000	3 x 380-500	3.0 / 4.0	2.2 / 2.6	2.5 / 3.0	2.7 / 3.2
MGE 100		3 x 440-480				
	3400-4000	3 x 200-240	3.0 / 4.0	0.42 / 0.49	0.49 / 0.56	0.52 / 0.60

Туре				Min./max. re	esistance across [Ω]	two phases
Motor	Min <sup>-1</sup>	Voltage [VAC]	Power [kW/hp]	20 °C	60 °C	80 °C
	2000 4000	3 x 380-500	27/50	12/15	45/40	10/10
MGE 112, MI F 112	3000-4000	3 x 440-480	3.775.0	1.37 1.5	1.57 1.6	1.671.9
	3400-4000	3 x 200-240	3.7 / 5.0	0.29 / 0.34	0.34 / 0.39	0.36 / 0.42
	2000 4000	3 x 380-500	56/75	0.95/10	10/12	1.05/1.25
MGE 132 MLE 132	3000-4000	3 x 440-480	5.077.5	0.6571.0	1.071.2	1.05 / 1.25
	3400-4000	3 x 200-240	5.5 / 7.5	0.38 / 0.43	0.44 / 0.50	0.47 / 0.54
MGE 100	4000-5900	3 x 380-500	3.0 / 4.0	2.2 / 2.6	2.5 / 3.0	2.7 / 3.2
MGE 112,	4000-5900	3 x 380-500	3.7 / 5.0	1.3 / 1.5	1.5 / 1.8	1.6 / 1.9
MLE 112		3 x 440-480				
MGE 132,	4000-5900	3 x 380-500	5.6 / 7.5	0.05/11	1.1 / 1.3	1.2 / 1.4
MLE 132		3 x 440-480		0.0071.1		
MGE 132,	2000-2200	3 x 380-500	56/75	16/10	10/22	1.9 / 2.3
MLE 132		3 x 440-480	3.077.3	1.07 1.9	1.072.2	
MGE 132,	2000-2200	3 x 380-500	7.5 / 10.0	11/12	13/15	1.4 / 1.6
MLE 132		3 x 440-480		1.17 1.5	1.07 1.0	
MGE 132,	3000 4000	3 x 380-500	7 5 / 10 0	0.75 / 0.87	0.86 / 1.0	0.9 / 1.1
MLE 132	3000-4000	3 x 440-480	7.57 10.0			
MGE 160,	2000 4000	3 x 380-500	11.0 / 15	04/045	0.45 / 0.54	0.49 / 0.57
MLE 160	3000-4000	3 x 440-480	11.07 15	0.470.45		
MGE 132,	4000 5000	3 x 380-500	75/100	0.75 / 0.85	0.85/10	00/11
MLE 132	4000-3900	3 x 440-480	7.57 10.0	0.7570.65	0.0571.0	0.9/1.1
MGE 160,	4000 5000	3 x 380-500	11.0 / 15	0.45/0.52	0.52/0.6	0.55/0.65
MLE 160	4000-5900	3 x 440-480	11.07.15	0.45 / 0.53	0.52 / 0.6	0.0070.00

10. Exploded view







#### 11. Disposal

This product or parts of it must be disposed of in an environmentally sound way:

- 1. Use the public or private waste collection service.
- 2. If this is not possible, contact the nearest Grundfos company or service workshop.

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