

MGE, MLE Model J

With Safe Torque Off (STO) functionality

Service instructions



MGE, MLE Model J

English (GB)

Service instructions	4
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English (GB) Service instructions

Original service instructions

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1. General information



Read this document before you start service work on the product. Service work must comply with local regulations and accepted codes of good practice.

Observe the safety instructions for the product.

Related information

2. *Torques*

3. *Secondary materials*

4. *Service tools*

9. *Configuring the drive*

1.1 Hazard statements

The symbols and hazard statements below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



DANGER

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



WARNING

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



CAUTION

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

The hazard statements are structured in the following way:



SIGNAL WORD

Description of the hazard

Consequence of ignoring the warning

- Action to avoid the hazard.

1.2 Notes

The symbols and notes below may appear in Grundfos installation and operating instructions, safety instructions and service instructions.



Observe these instructions for explosion-proof products.



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



A red or grey circle with a diagonal bar, possibly with a black graphical symbol, indicates that an action must not be taken or must be stopped.



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



Tips and advice that make the work easier.

1.3 Safety information for working on the product

These service instructions apply to MGE and MLE model J motors.



The safety 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 the section about 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.



WARNING

Hot surface

Death or serious personal injury

- Do not touch the product while it is running. Allow surfaces to cool before servicing.



CAUTION

Sharp element

Minor or moderate personal injury

- When servicing the product, wear protective gloves to avoid cutting your hands on sharp edges.



CAUTION

Cold surface

Minor or moderate personal injury

- Make sure that no one can accidentally come into contact with cold surfaces. Wear protective gloves.

Component compatibility for the Safe Torque Off (STO) functionality

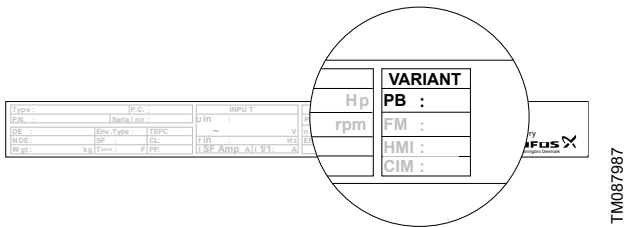


The Safe Torque Off (STO) safety function cannot be retrofitted to older motors.

For full feature level on the individual functional modules, it is important to choose the right component combination. For STO functionality Generation 2 power boards are required. See the below tables.

Incompatible combination	
Generation 1 power boards	Functional module
PB331	FM110
PB341	FM310
PB351	FM311
PB361	
Compatible combination	
Generation 2 power boards	Functional module
PB332	FM110
PB342	FM310
PB352	FM311
PB362	

You can identify the fitted power board by means of the motor nameplate:



Before dismantling

DANGER
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.
 - Tighten the cable glands to the recommended torques.
 - Connect the product to protective earth and provide protection against indirect contact in accordance with local regulations.
- 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 the sections about torques and 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.

2. Torques

Pos.	Designation	Type	Dimensions [mm]	Torque [Nm]
152	Torx screw	T×25	12 × M5	3.5 - 4
178		T×30	16/10 × 60	5-6 ¹⁾
181		T×25	M5 × 233	4.5 - 6
		T×30	M6 × 233	5 - 7
185		T×30	16 × M6	5-6
192		T×30	14 × 6	5-6 ¹⁾
206		T×30	M8	5-6
208		T×40	M5	4
251d		T×25	50 × M5	5-6 ¹⁾
268		T×25	12 × M5	3.5 - 4
273a		T×20	32 × M4	1 - 1.3
275c ²⁾		T×20	M4 × 14	0.2 - 0.6 and 0.8 - 1.1
275c ³⁾		T×25	M5 × 16	0.8 - 1.2 and 2.5 - 3.5
275d		T×20	M4 × 12	1 - 1.3
277a		T×20	32 × M4	1 - 1.3
286	Hex spacer	Hex 8	M7 × 20	2.2 - 2.7
288a	Torx screw	T×20	M4	1 - 1.3
289a		T×30	14 × 6	5-6

1) Screws of new terminal box lower parts must be tightened to 6.5 - 7 Nm.

2) Frame sizes 90, 100, 112 and 132 with stay bolt assembly of stator house.

3) Frame sizes 132 and 160 with short bolt assembly of stator house.

Torques for terminals

Terminal	Thread size	Maximum torque [Nm]
L1, L2, L3, L, N	M4	2.2
PE	M5	6
NC, C1, C2, NO	M3	0.5
DI1, DI2, DI3, DI4, AI1, AI2, AI3, AO1, PT1, PT2, LT1, LT2, GND, 24V, 5V, TX, RX, A, Y, B, S24, ST1, ST2	M3	0.5

Related information

[1. General information](#)

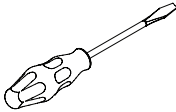
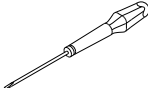
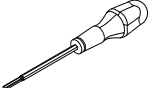
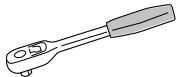
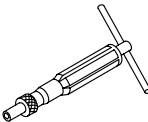
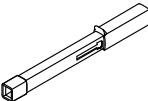
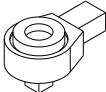
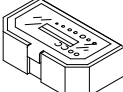
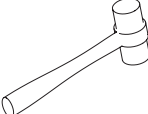
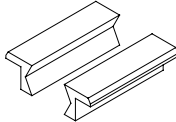
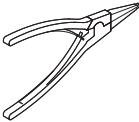
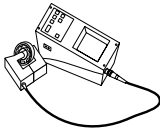
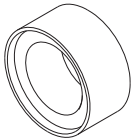
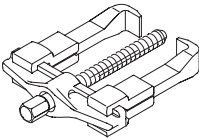
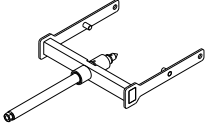
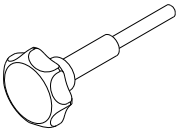
3. Secondary materials

Pos.	Designation	Quantity [kg]
156c,d	Castrol LMX grease	0.1
159d,e		
153, 154	Mobil Unirex N3 grease	0.1
156a,b	SKF anti-fretting agent LGAF 3E	0.1
156a,b	Loctite 5512	-
150		

Related information

[1. General information](#)

4. Service tools

Standard tools		
A	B	C
		
D	E	F
		
G	H	I
		
J	K	L
		
M	N	
		
Special tools		
O	P	Q
		
R		
		

Designation	Description	Pos.	Technical data
Standard tools			
A	Screwdriver	156, 252b	Straight slot, 8 mm
B	Screwdriver	273b, 502	Straight slot, 3 mm
C	Screwdriver	273a, 277a, 288a	Torx20
	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
E	Torque screwdriver	-	0.5 - 4 Nm
F+G	Torque wrench	-	4-20 Nm
H	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
K	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
M	Bearing heater	153, 154	
N	Digital scope meter	-	CAT III / 1000 V 96770121
Special tools			
O	Punch D20	156c	98394718
	Punch D25	156c	98394719
	Punch D30	156c	98394720
	Punch D35	156c	99124636
	Punch D40	156c	99124641
	Punch D45	156c	99124643
P	Puller for bearing	153, 154	
Q	Puller for rotor	172	99197365
R	Flange mounting tool for MGE 132/160	155	99110656

Related information[1. General information](#)

5. 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.
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 the section on the power board.
5. Fit 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

Related information

[8.8 Replacing the terminal box](#)

[11.4 Power board](#)

6. Functionality test for the Safe Torque Off (STO) function

If the power board or the functional module is replaced, a functionality test must be performed to ensure that the Safe Torque Off (STO) function operates correctly and provides the required function.

Check that the wiring complies with the wiring requirements.

Perform the following test to ensure that Safe Torque Off (STO) is functional:

1. Connect the external STO signals.
All 3 signals (S24, ST1, ST2) need to be shorted on the STO connector.
2. Switch on power to the product.
3. Start the motor.
If the motor doesn't run, the STO functionality is not working.
4. Open the STO signals (remove the jumper from the STO connector) and the motor will coast to a stop.



If the motor does not stop, then most probably the wrong power board version has been fitted.



The STO signal allows the motor to run, and has a safe failure fraction of 1, meaning that any failure in the STO signal on the functional module results in a safe state and the motor cannot produce torque.

7. Lifting the product



WARNING **Back injury**

Death or serious personal injury

- Use lifting equipment and follow local regulations when lifting the product.



WARNING **Falling objects**

Death or serious personal injury

- Use lifting equipment rated for the weight of the product.



CAUTION **Crushing of feet**

Minor or moderate personal injury

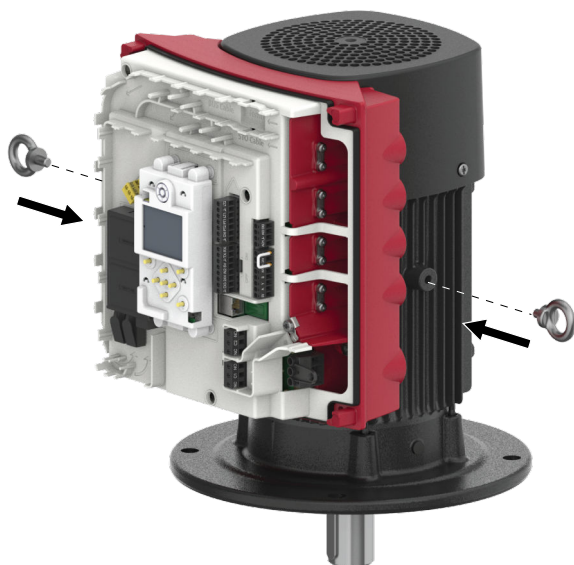
- Wear safety shoes when moving the product.



The lifting brackets and/or eyebolts on the terminal box must only be used to lift the terminal box alone.

7.1 Lifting the complete motor unit

1. Disconnect the power supply.
2. Remove the terminal box cover (251b).
3. Dismantle the power cables from the terminals (L1, L2, L3, PE) and pull them through the cable gland.
4. Fit 2 eye bolts (R) to the motor.



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5. Attach a hook from a crane or similar lifting equipment to the eye bolts, and gently lift the complete motor unit.



TM087853

8. Replacing hardware



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

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



Antistatic service kit

8.1 Replacing the terminal box cover

1. Loosen the four screws (251d) and remove the terminal box cover (251b).
2. Clean the sealing faces of the 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 operating panel (290).



The operating panel can be turned 180°.

Related information

[8.2 Replacing the operating panel](#)

[8.3 Replacing the CIM module](#)

[8.4 Replacing the isolation cover](#)

[8.5 Replacing the battery](#)

[8.6 Replacing the functional module](#)

[8.7 Replacing the power board](#)

[8.8 Replacing the terminal box](#)

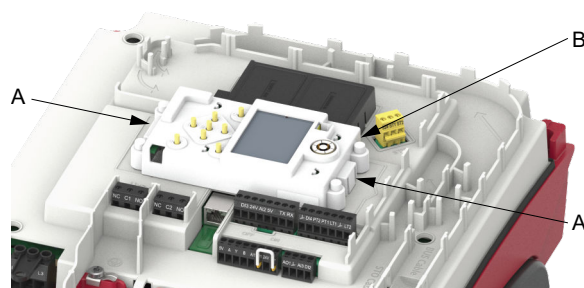
[9.1 Connection to the drive by means of Grundfos GO Link using Ethernet connection](#)

[9.2 Connection to the drive by means of Grundfos GO Link using PC-Tool Link](#)

[11.3.1 Checking inputs and outputs](#)

8.2 Replacing the operating panel

1. Disconnect the power supply.
2. Remove the terminal box cover (251b).
3. Press and hold in the two locking tabs (A) while gently lifting the operating panel (B, pos. no. 290).

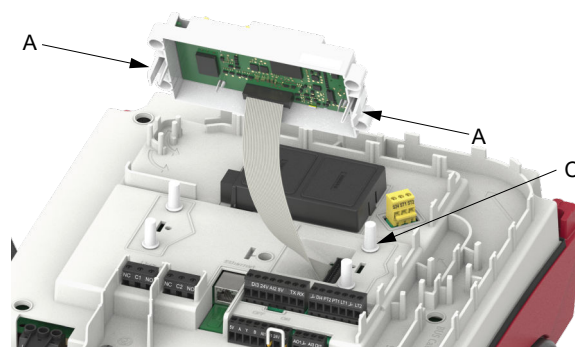


4. Gently remove the plug for the operating panel from the functional module (273).
5. Connect the plug for the new operating panel to the functional module.
6. Turn the operating panel to the desired position (0° / 180°).



Do not twist the flat cable by more than 90°.

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



8. Fit the terminal box cover.

Related information

[8.1 Replacing the terminal box cover](#)

[8.4 Replacing the isolation cover](#)

[8.5 Replacing the battery](#)

[8.6 Replacing the functional module](#)

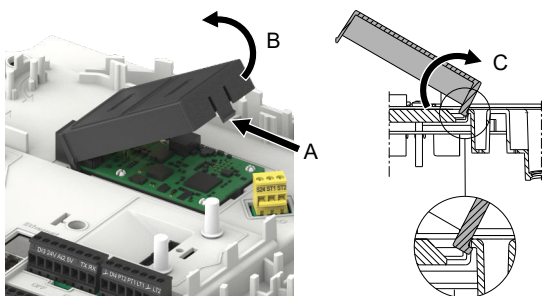
[8.7 Replacing the power board](#)

[11.3 Functional module](#)

[11.3.1 Checking inputs and outputs](#)

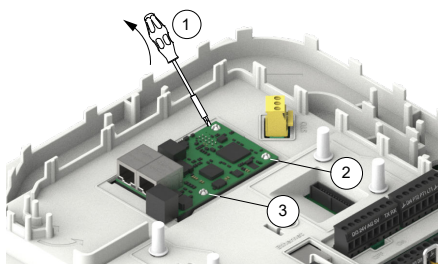
8.3 Replacing the CIM module

1. Disconnect the power supply.
2. Remove the terminal box cover (251b).
3. Remove the plug connection for the CIM module (502).
4. Remove the cover of the CIM module (287) by pressing the locking tab (A) and lifting the end of the cover (B). Then lift the cover off the hooks (C).



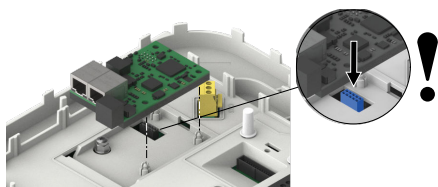
TM087823

5. Remove the screw (287a) connecting the frame connection of the CIM module to the functional module (273).
6. Insert a screwdriver at the three plastic holders and loosen the CIM module from the isolation cover (277).
7. Gently lift the CIM module away from the isolation cover so that the connecting plug is not damaged.



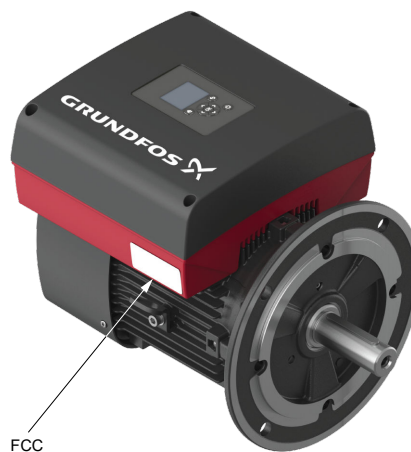
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8. Fit the new CIM module by aligning it with the plastic holders and the connecting plug. Press home the module using your fingers.



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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 tabs onto the isolation cover.
11. Press down the module using your fingers. Check that the plug has been pressed home.
12. If the module is supplied with an FCC label, fix the label on the terminal box.



13. Fit the terminal box cover.

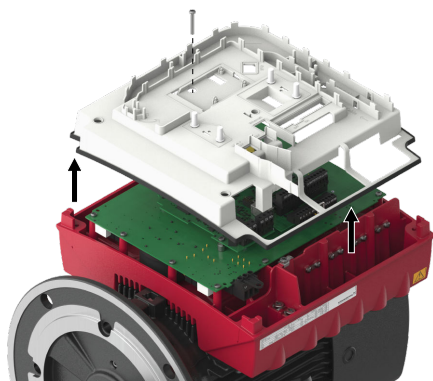
Related information

- [8.1 Replacing the terminal box cover](#)
- [8.4 Replacing the isolation cover](#)
- [8.5 Replacing the battery](#)
- [8.6 Replacing the functional module](#)
- [8.7 Replacing the power board](#)

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8.4 Replacing the isolation cover

1. Disconnect the power supply.
2. Remove the terminal box cover.
3. Remove the operating panel (290) from the isolating cover (277).
4. Remove the CIM module (502) from the isolation cover.
5. Pull out the plug connections (266) using your fingers.
6. Remove the screw (277a) from the isolation cover.
7. You can now remove the isolation cover from the terminal box.



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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.
12. Fit the operating panel.
13. Fit the terminal box cover.

Related information

- [8.1 Replacing the terminal box cover](#)
- [8.2 Replacing the operating panel](#)
- [8.3 Replacing the CIM module](#)
- [8.5 Replacing the battery](#)
- [8.6 Replacing the functional module](#)
- [8.7 Replacing the power board](#)

8.5 Replacing the battery

1. Disconnect the power supply.
2. Remove the terminal box cover.
3. Remove the operating panel (290) from the isolation cover (277).
4. Remove the CIM module (502) from the isolation cover.
5. Remove the isolation cover (277).
6. Remove the battery (273b) from the functional module (273).



The old battery must be disposed of according to the battery directive 2006/66/EC.

Related information

- [8.1 Replacing the terminal box cover](#)
- [8.2 Replacing the operating panel](#)
- [8.3 Replacing the CIM module](#)
- [8.4 Replacing the isolation cover](#)

8.6 Replacing the functional module



The Safe Torque Off (STO) safety function cannot be retrofitted to older motors. See the section on component compatibility.

1. Disconnect the power supply.
2. Remove the terminal box cover.
3. Remove the operating panel (290) from isolation cover (277).
4. Remove the CIM module (502) from the isolation cover.
5. Pull out the plug connections (266) using your fingers.
6. Remove the isolation cover (277).
7. Remove the spacer (286) and screws (273a).
8. Gently lift the functional module (273) out of the power board so that the connecting plug (275a) is not damaged.
9. Pull the connecting plug out of the functional module (or power board).
10. Insert the connecting plug into the new functional module with the long end towards the module. Lead it through the module and home.
11. Fit the functional module on the power board by means of the five screws. See the order of the screws on the functional module.
12. Fit the spacer on the module.
13. Gently push the connecting plug home.
14. Fit the isolation cover.
15. Push the plug connections into the relevant terminals. They are marked so that they only fit in the right socket of the functional module.
16. Perform a functionality test of the Safe Torque Off (STO) function. See the section on performing the functionality test.
17. Fit the CIM module.
18. Fit the operating panel.
19. Fit the terminal box cover.

Related information

- [8.1 Replacing the terminal box cover](#)
- [8.2 Replacing the operating panel](#)
- [8.3 Replacing the CIM module](#)
- [8.4 Replacing the isolation cover](#)
- [8.7 Replacing the power board](#)
- [9. Configuring the drive](#)
- [11.3 Functional module](#)

8.7 Replacing the power board

If the power board is to be replaced, the entire lower part of the terminal box must be replaced.

1. Disconnect the power supply.
2. Remove the terminal box cover.
3. Remove the operating panel (290) from the isolation cover (277).
4. Remove the CIM module (502) from the isolation cover.
5. Remove the isolation cover.
6. Remove 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.
13. Fit the isolation cover.
14. Fit the CIM module.
15. Fit the operating panel.
16. Fit the terminal box cover.

Related information

- [8.1 Replacing the terminal box cover](#)
- [8.2 Replacing the operating panel](#)
- [8.3 Replacing the CIM module](#)
- [8.4 Replacing the isolation cover](#)
- [8.6 Replacing the functional module](#)
- [9. Configuring the drive](#)
- [11.4 Power board](#)

8.8 Replacing the terminal box

1. Disconnect the power supply.
2. Remove the terminal box cover.
3. Disconnect all relevant wires.
4. 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.

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
178	Screw	251a	Terminal box	266	Plug connection	277	Isolation cover	290	Operating panel
502	CIM module	503	Functional module	504	Isolation cover	505	Operating panel	506	Terminal box cover
507	Plug connection	508	Functional module	509	Isolation cover	510	Operating panel	511	Terminal box cover
512	Plug connection	513	Functional module	514	Isolation cover	515	Operating panel	516	Terminal box cover
517	Plug connection	518	Functional module	519	Isolation cover	520	Operating panel	521	Terminal box cover
522	Plug connection	523	Functional module	524	Isolation cover	525	Operating panel	526	Terminal box cover
527	Plug connection	528	Functional module	529	Isolation cover	530	Operating panel	531	Terminal box cover
532	Plug connection	533	Functional module	534	Isolation cover	535	Operating panel	536	Terminal box cover
537	Plug connection	538	Functional module	539	Isolation cover	540	Operating panel	541	Terminal box cover
542	Plug connection	543	Functional module	544	Isolation cover	545	Operating panel	546	Terminal box cover
547	Plug connection	548	Functional module	549	Isolation cover	550	Operating panel	551	Terminal box cover
552	Plug connection	553	Functional module	554	Isolation cover	555	Operating panel	556	Terminal box cover
557	Plug connection	558	Functional module	559	Isolation cover	560	Operating panel	561	Terminal box cover
562	Plug connection	563	Functional module	564	Isolation cover	565	Operating panel	566	Terminal box cover
567	Plug connection	568	Functional module	569	Isolation cover	570	Operating panel	571	Terminal box cover
572	Plug connection	573	Functional module	574	Isolation cover	575	Operating panel	576	Terminal box cover
577	Plug connection	578	Functional module	579	Isolation cover	580	Operating panel	581	Terminal box cover
582	Plug connection	583	Functional module	584	Isolation cover	585	Operating panel	586	Terminal box cover
587	Plug connection	588	Functional module	589	Isolation cover	590	Operating panel	591	Terminal box cover
592	Plug connection	593	Functional module	594	Isolation cover	595	Operating panel	596	Terminal box cover
597	Plug connection	598	Functional module	599	Isolation cover	600	Operating panel	601	Terminal box cover
602	Plug connection	603	Functional module	604	Isolation cover	605	Operating panel	606	Terminal box cover
607	Plug connection	608	Functional module	609	Isolation cover	610	Operating panel	611	Terminal box cover
612	Plug connection	613	Functional module	614	Isolation cover	615	Operating panel	616	Terminal box cover
617	Plug connection	618	Functional module	619	Isolation cover	620	Operating panel	621	Terminal box cover
622	Plug connection	623	Functional module	624	Isolation cover	625	Operating panel	626	Terminal box cover
627	Plug connection	628	Functional module	629	Isolation cover	630	Operating panel	631	Terminal box cover
632	Plug connection	633	Functional module	634	Isolation cover	635	Operating panel	636	Terminal box cover
637	Plug connection	638	Functional module	639	Isolation cover	640	Operating panel	641	Terminal box cover
642	Plug connection	643	Functional module	644	Isolation cover	645	Operating panel	646	Terminal box cover
647	Plug connection	648	Functional module	649	Isolation cover	650	Operating panel	651	Terminal box cover
652	Plug connection	653	Functional module	654	Isolation cover	655	Operating panel	656	Terminal box cover
657	Plug connection	658	Functional module	659	Isolation cover	660	Operating panel	661	Terminal box cover
662	Plug connection	663	Functional module	664	Isolation cover	665	Operating panel	666	Terminal box cover
667	Plug connection	668	Functional module	669	Isolation cover	670	Operating panel	671	Terminal box cover
672	Plug connection	673	Functional module	674	Isolation cover	675	Operating panel	676	Terminal box cover
677	Plug connection	678	Functional module	679	Isolation cover	680	Operating panel	681	Terminal box cover
682	Plug connection	683	Functional module	684	Isolation cover	685	Operating panel	686	Terminal box cover
687	Plug connection	688	Functional module	689	Isolation cover	690	Operating panel	691	Terminal box cover
692	Plug connection	693	Functional module	694	Isolation cover	695	Operating panel	696	Terminal box cover
697	Plug connection	698	Functional module	699	Isolation cover	700	Operating panel	701	Terminal box cover
702	Plug connection	703	Functional module	704	Isolation cover	705	Operating panel	706	Terminal box cover
707	Plug connection	708	Functional module	709	Isolation cover	710	Operating panel	711	Terminal box cover
712	Plug connection	713	Functional module	714	Isolation cover	715	Operating panel	716	Terminal box cover
717	Plug connection	718	Functional module	719	Isolation cover	720	Operating panel	721	Terminal box cover
722	Plug connection	723	Functional module	724	Isolation cover	725	Operating panel	726	Terminal box cover
727	Plug connection	728	Functional module	729	Isolation cover	730	Operating panel	731	Terminal box cover
732	Plug connection	733	Functional module	734	Isolation cover	735	Operating panel	736	Terminal box cover
737	Plug connection	738	Functional module	739	Isolation cover	740	Operating panel	741	Terminal box cover
742	Plug connection	743	Functional module	744	Isolation cover	745	Operating panel	746	Terminal box cover
747	Plug connection	748	Functional module	749	Isolation cover	750	Operating panel	751	Terminal box cover
752	Plug connection	753	Functional module	754	Isolation cover	755	Operating panel	756	Terminal box cover
757	Plug connection	758	Functional module	759	Isolation cover	760	Operating panel	761	Terminal box cover
762	Plug connection	763	Functional module	764	Isolation cover	765	Operating panel	766	Terminal box cover
767	Plug connection	768	Functional module	769	Isolation cover	770	Operating panel	771	Terminal box cover
772	Plug connection	773	Functional module	774	Isolation cover	775	Operating panel	776	Terminal box cover
777	Plug connection	778	Functional module	779	Isolation cover	780	Operating panel	781	Terminal box cover
782	Plug connection	783	Functional module	784	Isolation cover	785	Operating panel	786	Terminal box cover
787	Plug connection	788	Functional module	789	Isolation cover	790	Operating panel	791	Terminal box cover
792	Plug connection	793	Functional module	794	Isolation cover	795	Operating panel	796	Terminal box cover
797	Plug connection	798	Functional module	799	Isolation cover	800	Operating panel	801	Terminal box cover
802	Plug connection	803	Functional module	804	Isolation cover	805	Operating panel	806	Terminal box cover
807	Plug connection	808	Functional module	809	Isolation cover	810	Operating panel	811	Terminal box cover
812	Plug connection	813	Functional module	814	Isolation cover	815	Operating panel	816	Terminal box cover
817	Plug connection	818	Functional module	819	Isolation cover	820	Operating panel	821	Terminal box cover
822	Plug connection	823	Functional module	824	Isolation cover	825	Operating panel	826	Terminal box cover
827	Plug connection	828	Functional module	829	Isolation cover	830	Operating panel	831	Terminal box cover
832	Plug connection	833	Functional module	834	Isolation cover	835	Operating panel	836	Terminal box cover
837	Plug connection	838	Functional module	839	Isolation cover	840	Operating panel	841	Terminal box cover
842	Plug connection	843	Functional module	844	Isolation cover	845	Operating panel	846	Terminal box cover
847	Plug connection	848	Functional module	849	Isolation cover	850	Operating panel	851	Terminal box cover
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857	Plug connection	858	Functional module	859	Isolation cover	860	Operating panel	861	Terminal box cover
862	Plug connection	863	Functional module	864	Isolation cover	865	Operating panel	866	Terminal box cover
867	Plug connection	868	Functional module	869	Isolation cover	870	Operating panel	871	Terminal box cover
872	Plug connection	873	Functional module	874	Isolation cover	875	Operating panel	876	Terminal box cover
877	Plug connection	878	Functional module	879	Isolation cover	880	Operating panel	881	Terminal box cover
882	Plug connection	883	Functional module	884	Isolation cover	885	Operating panel	886	Terminal box cover
887	Plug connection	888	Functional module	889	Isolation cover	890	Operating panel	891	Terminal box cover
892	Plug connection	893	Functional module	894	Isolation cover	895	Operating panel	896	Terminal box cover
897	Plug connection	898	Functional module	899	Isolation cover	900	Operating panel	901	Terminal box cover
902	Plug connection	903	Functional module	904	Isolation cover	905	Operating panel	906	Terminal box cover
907	Plug connection	908	Functional module	909	Isolation cover	910	Operating panel	911	Terminal box cover
912	Plug connection	913	Functional module	914	Isolation cover	915	Operating panel	916	Terminal box cover
917	Plug connection	918	Functional module	919	Isolation cover	920	Operating panel	921	Terminal box cover
922	Plug connection	923	Functional module	924	Isolation cover	925	Operating panel	926	Terminal box cover
927	Plug connection	928	Functional module	929	Isolation cover	930	Operating panel	931	Terminal box cover
932	Plug connection	933	Functional module	934	Isolation cover	935	Operating panel	936	Terminal box cover
937	Plug connection	938	Functional module	939	Isolation cover	940	Operating panel	941	Terminal box cover
942	Plug connection	943	Functional module	944	Isolation cover	945	Operating panel	946	Terminal box cover
947	Plug connection	948	Functional module	949	Isolation cover	950	Operating panel	951	Terminal box cover
952	Plug connection	953	Functional module	954	Isolation cover	955	Operating panel	956	Terminal box cover
957	Plug connection	958	Functional module	959	Isolation cover	960	Operating panel	961	Terminal box cover
962	Plug connection	963	Functional module	964	Isolation cover	965	Operating panel	966	Terminal box cover
967	Plug connection	968	Functional module	969	Isolation cover	970	Operating panel	971	Terminal box cover
972	Plug connection	973	Functional module	974	Isolation cover	975	Operating panel	976	Terminal box cover
977	Plug connection	978	Functional module	979	Isolation cover	980	Operating panel	981	Terminal box cover
982	Plug connection	983	Functional module	984	Isolation cover	985	Operating panel	986	Terminal box cover
987	Plug connection	988	Functional module	989	Isolation cover	990	Operating panel	991	Terminal box cover
992	Plug connection	993	Functional module	994	Isolation cover	995	Operating panel	996	Terminal box cover
997	Plug connection	998	Functional module	999	Isolation cover	1000	Operating panel	1001	Terminal box cover



10. Fit the terminal box cover.

Related information

- [5. Megging](#)
- [8.1 Replacing the terminal box cover](#)

TM057828

8.9 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.

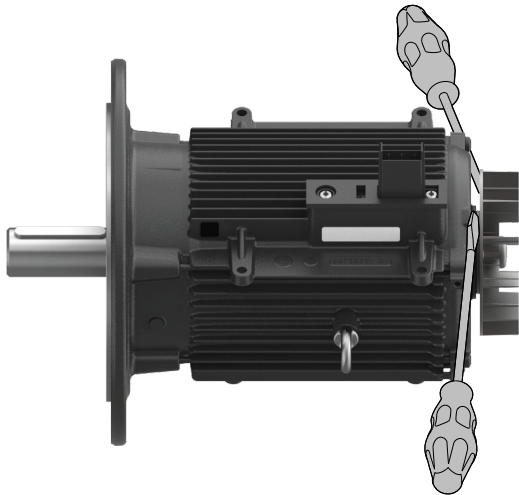
- 3. Remove the stator housing according the service instructions of the system.
- 4. Install the stator housing in the system according to the service instructions of the system.
- 5. Fit the terminal box on the stator housing and cross-tighten the screws.

Related information

- [8.10 Replacing the fan](#)
- [8.11.1 Dismantling](#)
- [8.12.1 Dismantling](#)
- [8.13 Replacing the IP66 gamma rings](#)

8.10 Replacing the fan

- 1. Disconnect the power supply.
- 2. Remove the terminal box.
- 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).



TM087829

- 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 the stator housing (150) and tighten the screws (152).
- 7. Fit the terminal box on the stator housing and cross-tighten the screws.

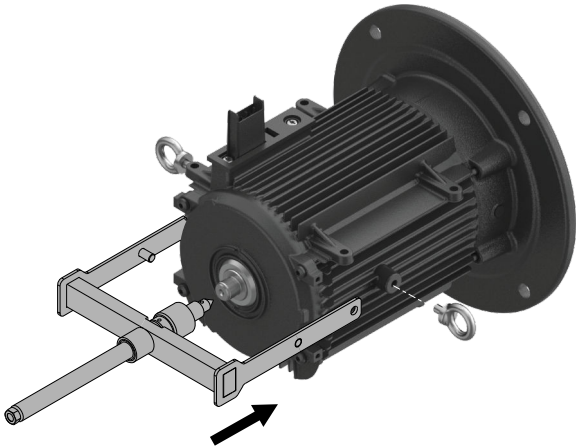
Related information

- [8.9 Replacing the stator housing](#)
- [8.11.1 Dismantling](#)
- [8.12.1 Dismantling](#)
- [8.13 Replacing the IP66 gamma rings](#)

8.11 Replacing the bearings on motors with stay bolt assembly

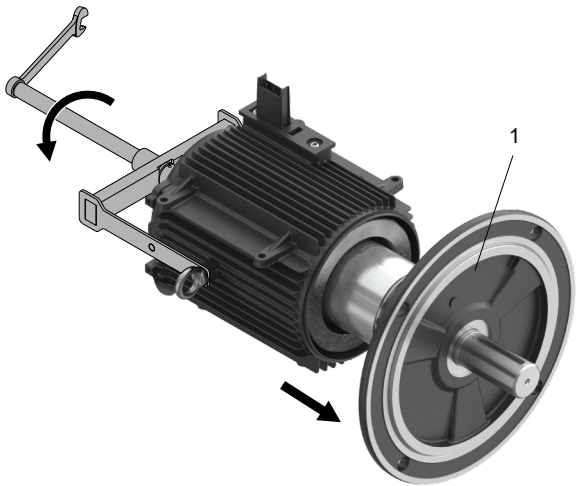
8.11.1 Dismantling

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



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

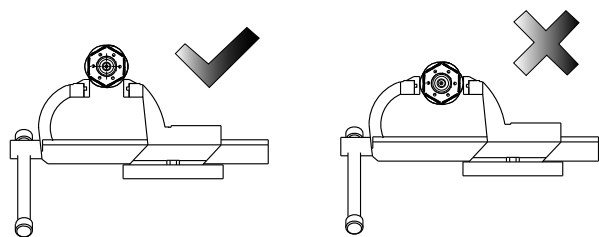


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Pos.	Description
1	Drainhole

- 9. Remove old sealant if any, from the stator seating and flange.
- 10. Wrap the rotor in a protective material, such as cardboard, to protect it from scratches.

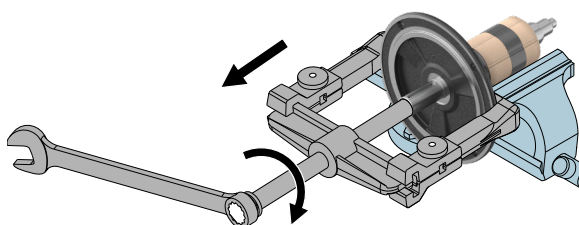
11. Place the rotor on the vice. Do not tighten the vice on the rotor!



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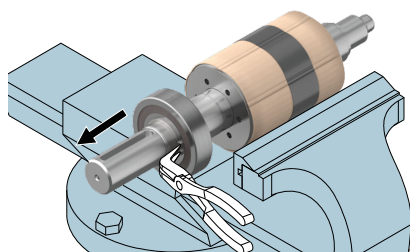
Correct position of the rotor on the vice

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



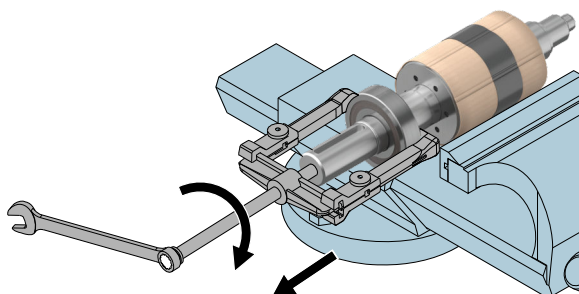
TM087832

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



TM087833

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



TM087834

Related information

[8.9 Replacing the stator housing](#)

[8.10 Replacing the fan](#)

8.11.2 Assembly



CAUTION Hot surface

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



CAUTION Crushing of hands

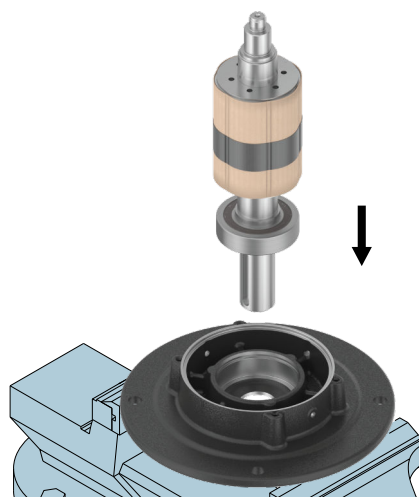
Minor or moderate personal injury
- Watch your fingers when you insert the rotor, as the magnet will pull rotor and stator together with big force.

1. Place the rotor on a vice.



Do not tighten the vice on the rotor.

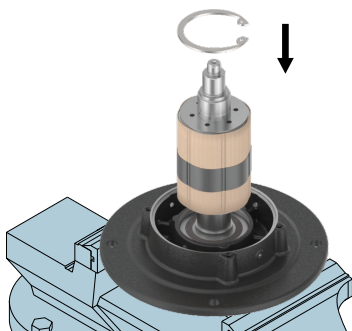
2. Clean the bearing journal in the drive end with a clean cloth.
3. Heat the new bearing (153) to a temperature between 90 and 110 °C. Follow the instructions for the bearing and bearing heater.
4. Fit the heated bearing on the drive end of the shaft.
5. Fit the locking ring (188) on the shaft.
6. Place 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.



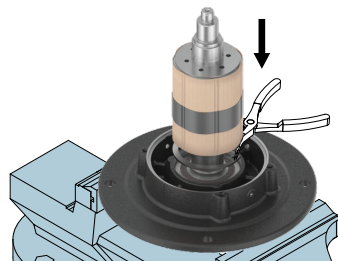
TM087835

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

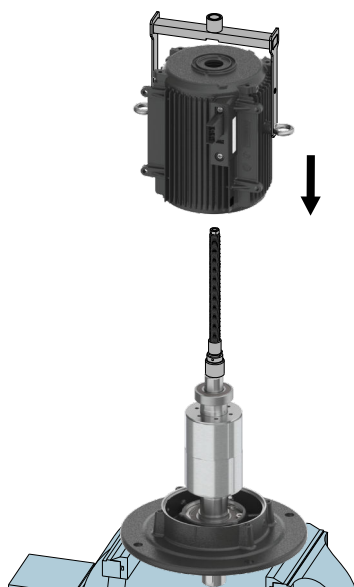
a.



b.

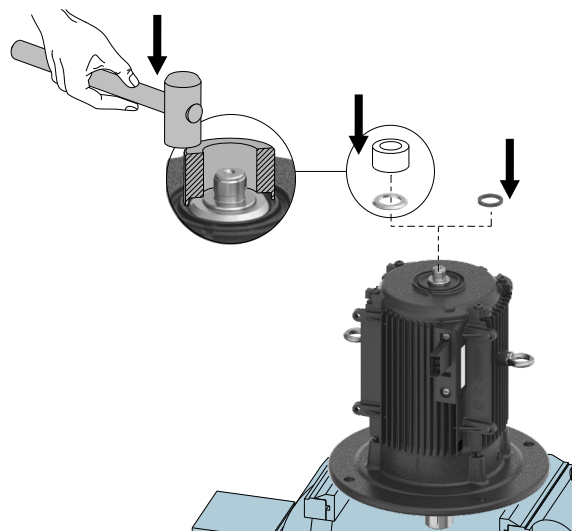


10. Clean the bearing journal in the non-drive end with a clean cloth.
11. Heat the bearing (154) to a temperature between 90 and 110 °C.
12. Fit the heated bearing (154) on the shaft (172).
13. Remove the cardboard from the rotor when the bearings have cooled down.
14. Check that the corrugated spring (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.



17. Unscrew the puller to slowly insert the rotor into the stator. Press the flange and the 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 staybolts (181).
19. Remove the puller and fit the eyebolts (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.

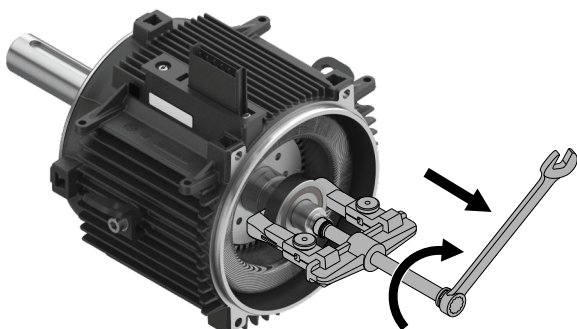


22. Fit the parallel key (172a) on the drive-end of the shaft.
23. Check that the shaft can rotate freely.
24. Fit the fan and cover.
25. Fit the terminal box.

8.12 Replacing the bearings on motors with short bolt assembly

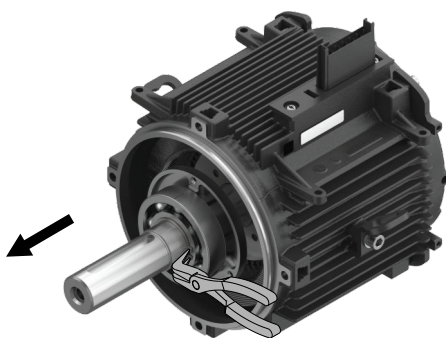
8.12.1 Dismantling

1. Disconnect the power supply.
2. Remove the stator housing from the terminal box.
3. Remove the fan.
4. Remove the parallel key (172a) from the drive end of the shaft.
5. 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.



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10. 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).



TM087841

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

Related information

[8.9 Replacing the stator housing](#)

[8.10 Replacing the fan](#)

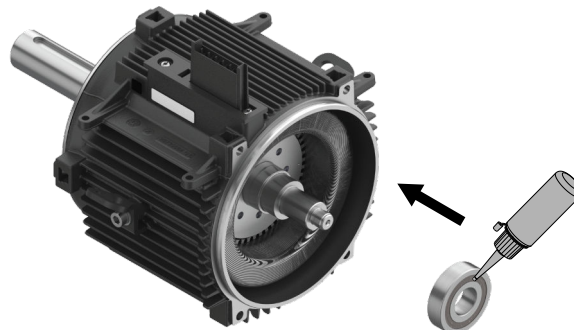
8.12.2 Assembly



CAUTION Hot surface

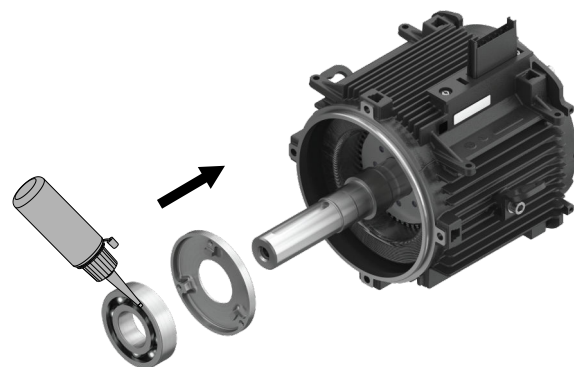
Minor or moderate personal injury
- Use heat-resistant gloves.

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



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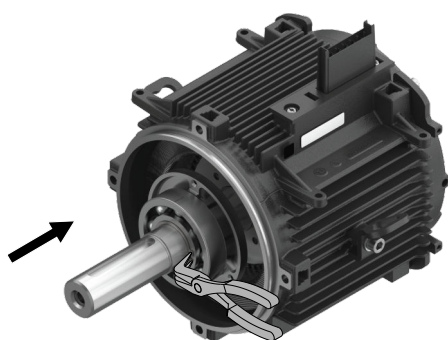
4. Heat the new bearing (154) to maximum 110 °C. Follow the instructions of bearing and bearing heater.
5. Fit the heated bearing (154) on the shaft (172).
6. Fit the corrugated spring (158) in the non-drive end flange (156a).
7. Fit the non-drive end flange (156a) on the stator housing.
8. Fit the washers (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.



TM087843

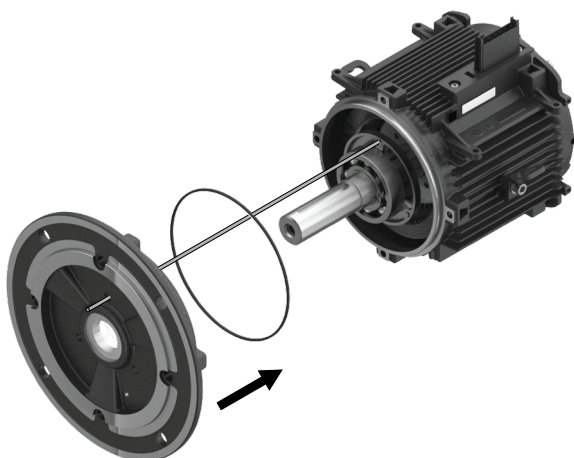
11. Fit the bearing cover (155).
12. Heat the new bearing (153) to a temperature between 90 and 110 °C.
13. Fit the heated bearing (153) on the shaft (172).

14. Fit the locking ring (188).



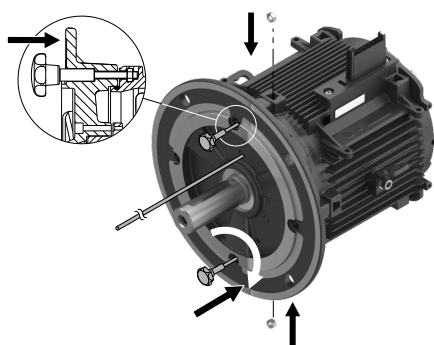
TM087844

15. 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.



TM087845

16. Use the flange mounting tool (Q) and nuts (208b) to fit the drive-end flange home onto the stator housing.



TM087846

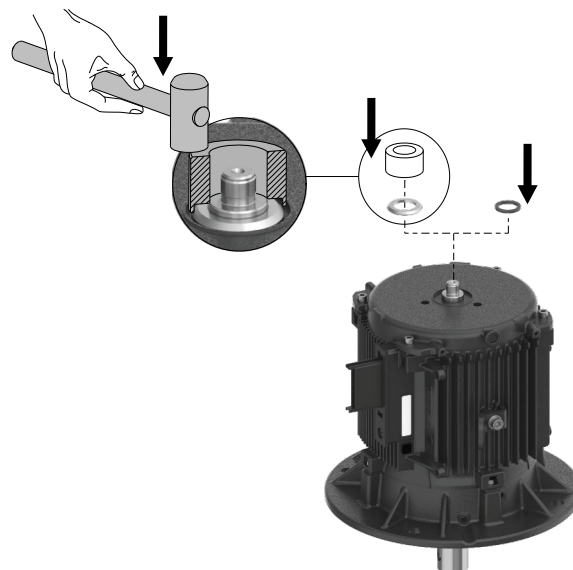
17. Remove the flange mounting tool and nuts. The flange must stay in place.

18. Fit the screws (185) and nuts (208b). Cross-tighten the screws.

19. Fit the gaskets (208a) and screws (208) in the two available holes of the flange.

20. Remove the pin and fit the last gasket (208a) and screw (208).

21. Lubricate the shaft ends and fit the seal rings (156c and 156d) or gamma rings (159d and 159e). Use a punch.



TM087847

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.

25. Fit the terminal box.

8.13 Replacing the IP66 gamma rings

1. Disconnect the power supply.

2. Remove the stator housing from the terminal box.

3. Remove the fan.

4. Remove the parallel key (172a) from the shaft.

5. Remove the gamma rings (159d) from the shaft (172).

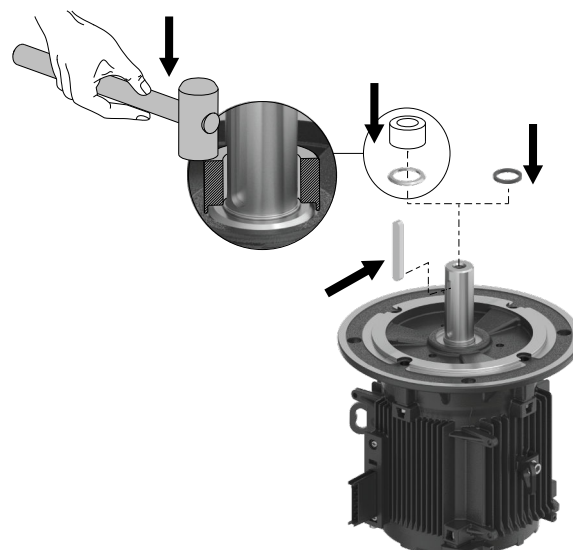
6. Lubricate the new gamma ring (159d) and fit it on the drive end of the shaft.

7. Lift the motor so that the non-drive end of the shaft rests on a solid, vibration-free surface.

8. 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.



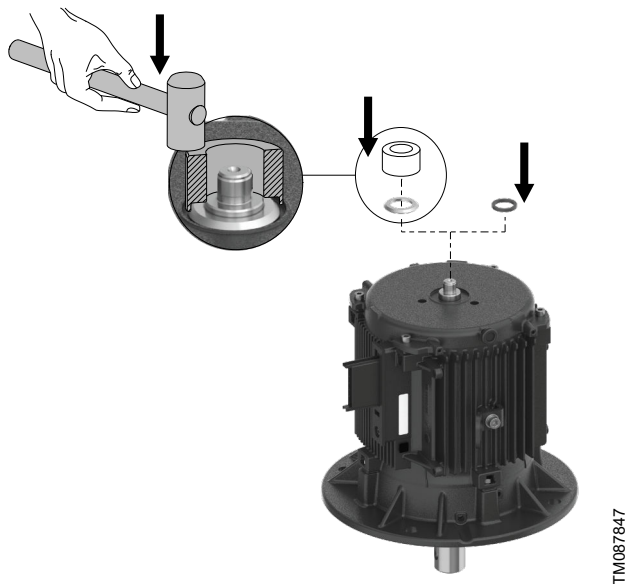
The design of the punch ensures correct tolerances.



TM087848

9. Fit the parallel key (172a), if any, on the shaft.

10. Support the motor so that it rests on the drive end of the shaft.
11. Lubricate the new gamma ring (159e) and fit it on the non-drive end of the shaft.
12. 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.



13. Fit the fan and cover.
14. Fit the terminal box.

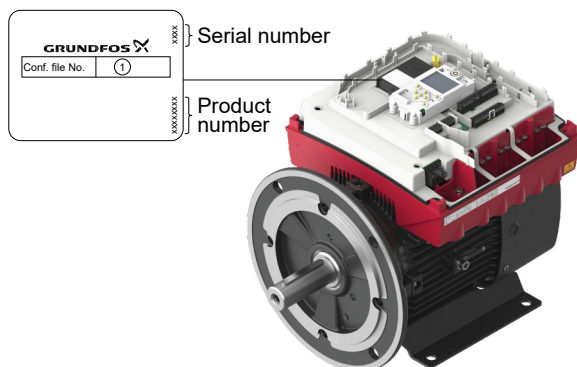
Related information

[8.9 Replacing the stator housing](#)

[8.10 Replacing the fan](#)

9. Configuring the drive

The drive is configured from factory for the intended application and pump type. The configuration file number can be found on the drive configuration label which is placed inside the drive. See the below figure.



TM087849

Position of the configuration label

If the drive, functional module or power board is replaced or mounted on another motor, it must be reconfigured.

Use Grundfos GO Link or Grundfos GO for that purpose. To establish connection to the motor, use Bluetooth, Ethernet, PC-Tool Link or Grundfos MI301.

Related information

- 1. [General information](#)
- 8.6 [Replacing the functional module](#)
- 8.7 [Replacing the power board](#)

9.1 Connection to the drive by means of Grundfos GO Link using Ethernet connection

Equipment

- Grundfos GO Link, version 01.02.00 or newer
- Cat. 5 Ethernet cable

Procedure

1. Remove the terminal box cover.
See the section on replacing the terminal box cover.
2. Connect a laptop to the Ethernet connector in the terminal box by means of the Ethernet cable.
3. Open Grundfos GO Link and connect to the pump.

Related information

- 8.1 [Replacing the terminal box cover](#)

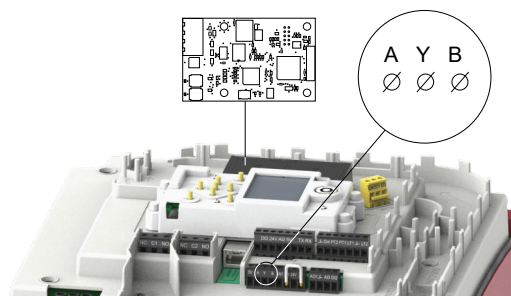
9.2 Connection to the drive by means of Grundfos GO Link using PC-Tool Link

Equipment

- Grundfos GO Link, version 01.02.00 or newer
- Grundfos PC Tool Link
- GENIbus cable (RS-485).

Procedure

1. Remove the terminal box cover.
See the section on removing the terminal box cover.
2. Connect PC Tool Link to the GENIbus terminals on the motor by means of the GENIbus cable. Connect directly to AYB terminals (ensure that AYB terminals are set to GENI and not Modbus) or AYB terminals on a CIM50 card (Multi-E/multipump systems).



TM087851

Connection of GENIbus

3. Open Grundfos GO Link and connect to the pump.

Related information

- 8.1 [Replacing the terminal box cover](#)

9.3 Connection to the drive by means of Grundfos GO Link using MI301

Equipment

- Grundfos GO Link, version 01.02.00 or newer
- Grundfos MI301

Procedure

1. Turn on the MI301.
2. Open Grundfos GO Link and connect to the pump using either **Direct connect** or **Radio scan**.

9.4 Connection to the drive by means of Grundfos GO via Bluetooth (BLE)

Equipment

- Grundfos GO app
- iOS or Android device

Procedure

1. Open the Grundfos GO app and connect to the pump using Bluetooth.

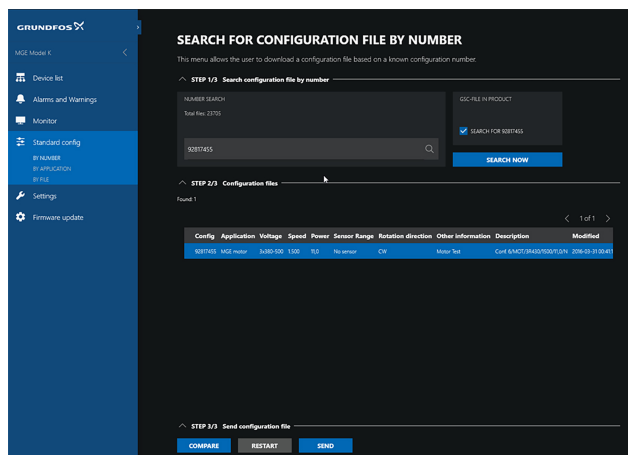
9.5 Configuring the drive using Grundfos GO Link



The GO Link configuration must only be carried out by service technicians trained in the task and possessing at least Service Engineer level access.

1. Select **Standard config > By number**
2. Fill in the number from the sticker inside the drive and select **Search**.
3. Select the file in the list and click **Send**.

The drive is now configured with default data and is now ready to be set for the specific installation.



TM085845

10. Maintenance

10.1 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 section on motor bearing monitoring.

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.

10.1.1 Motor bearing monitoring

Use this function to select whether or not you want to monitor the motor bearings.

You can make the following settings:

- **Active**
- **Not active**

When the function is set to **Active**, a counter in the controller starts counting the running hours of the bearings. The running hours are calculated on the basis of the motor speed. When a predefined limit is reached, a warning indicates that the bearings must be replaced or relubricated.



If you change the function to **Not active**, the counter continues to count. However, no warning is given when it is time to replace the bearings. If you change the function to **Active** again, the accumulated running hours are used to recalculate the replacement time.

11. Fault finding

11.1 General information

- 1. Check the mains supply to the pump.
- 2. Read fault messages by means of Grundfos Eye, Grundfos GO, Grundfos GO Link or the graphical operating panel, if fitted.



Make a copy of motor settings.

- 3. 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 Grundfos GO Link, Grundfos GO or the operating panel.

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.

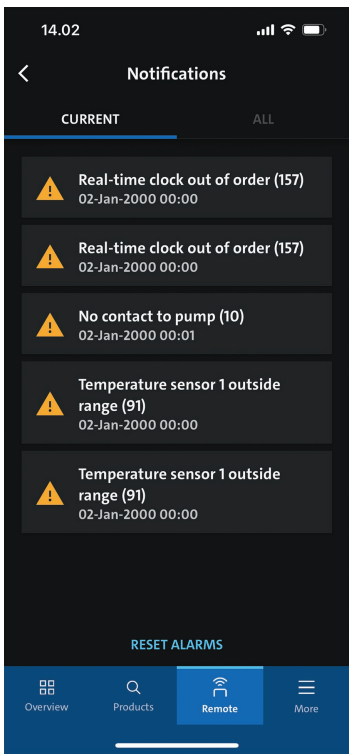
The fault cause will be stored in the pump alarm or warning log.

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, MLE motor.

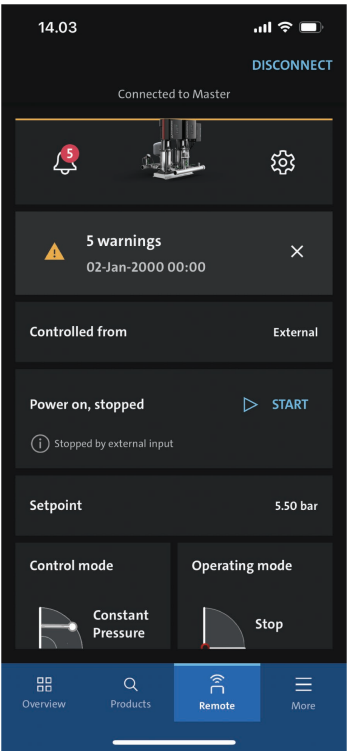
Fault indications via Grundfos GO

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



Alarms and warnings shown in Grundfos GO

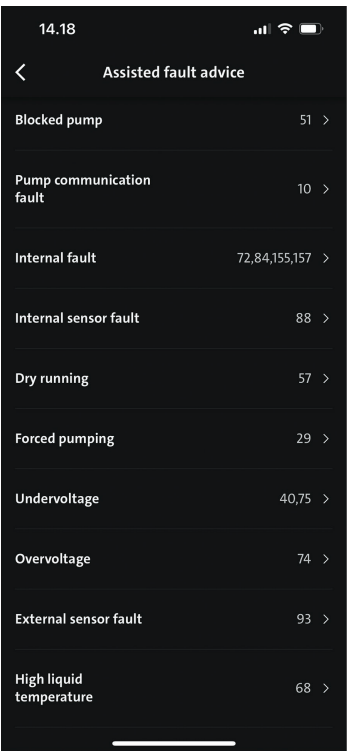
TM086061



TM086060

Alarm and warning log of Grundfos GO

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



TM086062

Detailed fault description

11.2 Fault and warning signals

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

Grundfos Eye	Cause	Remedy
 Two opposite red indicator lights flashing simultaneously. (Alarm indication)	External fault (3)	
	An external signal reports an external fault to the digital input set for this function.	- Check the parameter or the unit reporting the external fault. - Correct the fault.
	Too many restarts (4)	
	The pump restarts too many times due to a fault that forces the pump to stop and restart automatically.	- Check the warning and alarm log for faults that caused too many restarts. - Replace the pump if the fault cannot be found.
	Overvoltage (32)	
	The supply voltage to the pump is too high.	Make sure that the power supply is within the specified range.
	Undervoltage (40)	
	The supply voltage to the pump is too low.	Make sure that the power supply is within the specified range.
	Undervoltage transient from mains supply (41)	
	The supply voltage to the pump shows signs of voltage drops.	Make sure that the power supply is within the specified range and check the power quality.
	Overload (49)	
	The motor is overloaded and has automatically reduced the speed, thereby reducing the pump performance.	- Check if the viscosity and temperature of the pump liquid is within the limits for the pump. If not, change the properties of the liquid. - Disassemble the pump, and remove any foreign objects 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.	Disassemble the pump, and remove any foreign objects or impurities preventing the pump from rotating.
	STO Active Indication (62)	
	The Safe Torque Off (STO) function are activated by an external device.	- This might not be an alarm situation. The pump might be stopped on purpose due to the activation of STO by an external device. - Verify STO functionality according to the STO manual.

TM053839



One yellow indicator light permanently on.
(Warning indication)

TM053836

Grundfos Eye	Cause	Remedy
	Pump communication fault (10)	
	There is a communication fault between this pump and the other pumps of the multi-pump system.	Make sure that all pumps of the multi-pump system are correctly set.
	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, for example, non-return valves.
	Dry running (56, 57)	
	There is no water at the pump inlet, or the water contains too much air.	- Prime and vent the pump before a new startup. - Check if the pump operates correctly. If not, replace the pump.
	Internal fault (72, 83, 85, 155, 157, 163)	
	There is an internal fault in the pump electronics.	Replace the functional module, power board or terminal box.
	High motor temperature (65, 66)	
	The motor temperature is too high.	- Make sure that the ambient temperature is within the specified range. - Make sure that the pump is not covered by dust, dirt or other foreign objects which reduce the air cooling of the pump. - If none of the above causes are present, replace the motor.
	Internal communication fault (76)	
	There is a communication fault between different parts of the electronics.	Replace the terminal box.
	Soft pressure buildup, timeout (215)	
	The system is in the mode "soft pressure buildup" longer than the set time limit.	Check the system for leakages.

Grundfos Eye	Cause	Remedy
 One yellow indicator light rotating in the direction of rotation of the motor when seen from the non-drive end. (Warning indication)	Replace the motor bearings (30)	
	The bearings are worn.	Replace the bearings. Follow the instructions for the pump. See the relevant section on bearing replacement in the service instructions.
	Internal sensor fault (88)	
	The pump receives a signal from the internal sensor which is out of the normal range.	- Check that the plug and cable are connected correctly to the sensor. The sensor is on the back of the pump housing. - Replace the sensor.
	Pt100/1000 sensor 1 (91) and 2 (175)	
		Check if the sensor resistance is approximately 100 or 1000 ohm. If not, replace the sensor.
	Pt100/1000 input 1 receives a signal which is out of the normal range.	- Check the sensor cable for damage. - Check the cable connection of the pump and the sensor. Correct the connection, if required. - Replace the sensor.
	Supply fault, 5 V (161)	
	Fault in the output voltage to the sensor or potentiometer.	Check the output voltage and wire to the sensor or potentiometer.
	Supply fault, 24 V (162)	
	Fault in the output voltage.	Check the output voltage and wire.
TM053833	Signal fault, LiqTec-sensor (164)	
	The pump receives a signal from the LiqTec sensor which is out of the normal range.	- Check if the plug and cable are connected correctly to the sensor. - Replace the sensor.
	Signal fault, sensor 1 (165), 2 (166) and 3 (167)	
	Analog input 1, 2 or 3 receives a signal which is out of the normal range.	- Check if 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. - Check the sensor cable for damage. - Check the cable connection of the pump and the sensor. Correct the connection, if required. - Check if the sensor is removed, but the input is not deactivated. - Replace the sensor.
	Limit 1 exceeded (190) and limit 2 exceeded (191)	
	Limit 1 or 2 reaches the limit for warning or alarm.	Identify and remove the fault cause.

11.3 Functional module

WARNING

Electric shock

Death or serious personal injury



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

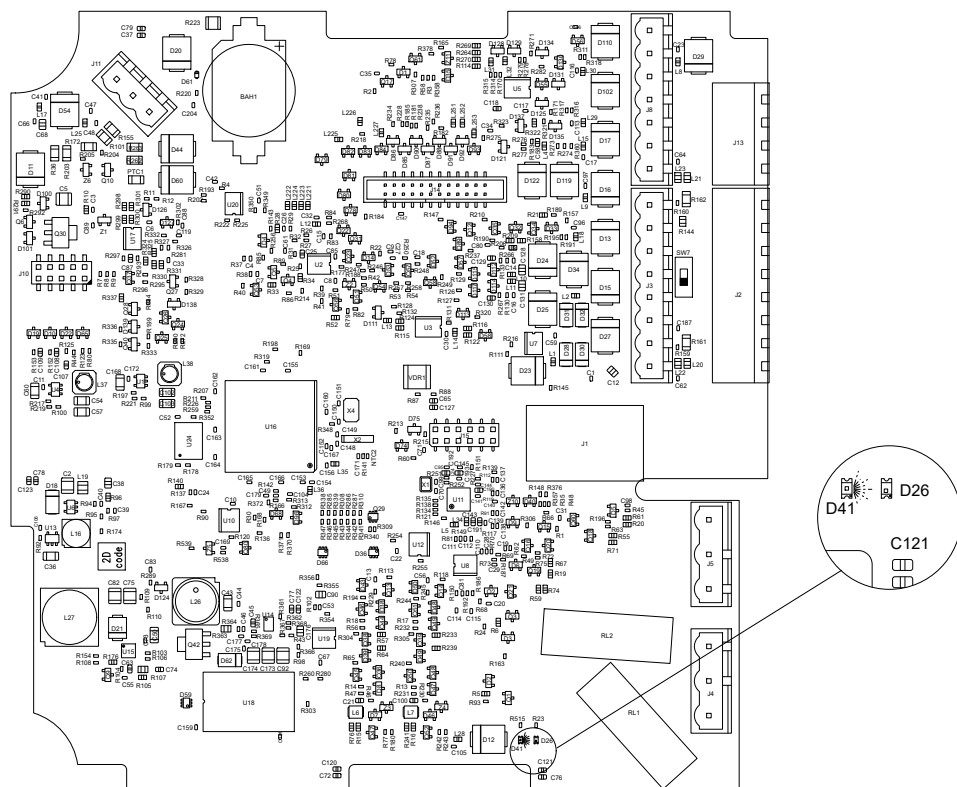


Measuring equipment must be free of static electricity or have the same potential as the motor before being used for measurement without isolation cover.

The status diode of the functional module flashes 150 times/minute when the software is running correctly. See the figure below.

The functional module can only function if the power board is in operation, as the power board supplies voltage to the functional module.

Status	Fault
Permanently on	The microprocessor is frozen. The functional module is defective.
Light off	The functional module is defective.
Flashing 150 times/minute	The processor of the functional module is functional

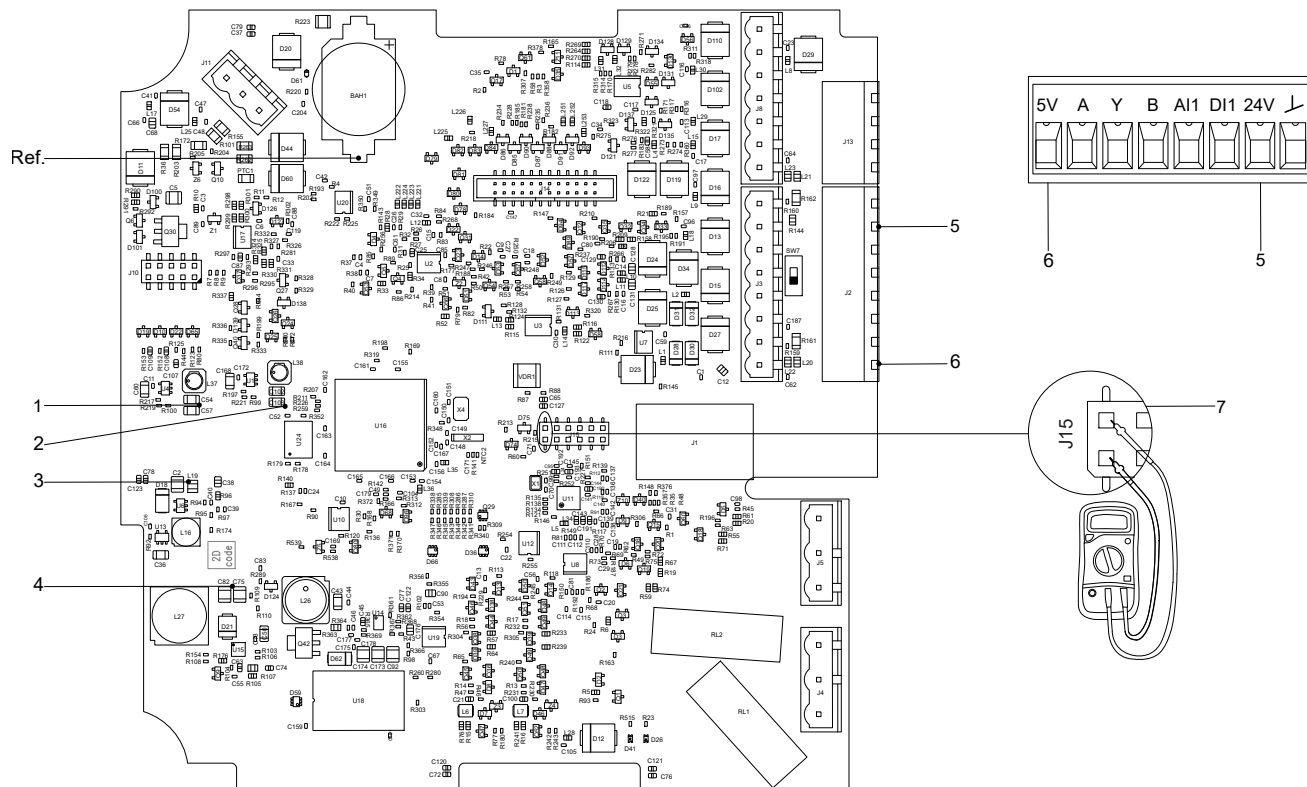


Status diode of functional module

If the light diode is flashing, the functional module is working correctly. The fault may then be in the operating panel.

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



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, for example, "Ref." to "3". The measure should be between 14.5 and 15.7 V.

Pos.	Control voltage [VDC]		
	Minimum	Nominal	Maximum
VFE (J15)		8.5	
1	4.8	5	5.2
2	3.2	3.3	3.4
3	14.5	15.1	15.7
4	4.8	5	5.2
5	23	23.9	24.9
6	4.8	5	5.2
7		VFE	
Ref.		GND	

Replace the functional module if the voltage is not correct.

Related information

[8.2 Replacing the operating panel](#)

[8.6 Replacing the functional module](#)

11.3.1 Checking inputs and outputs



Make a copy of the motor settings.

Pt100/1000

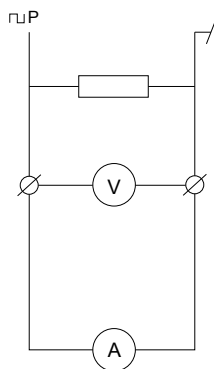
Use a 100 Ω resistance and decide on the basis of the motor settings which value this resistance will show in the display when connected to the terminals instead of the Pt100/1000 sensor.

Analog input, AI

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

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

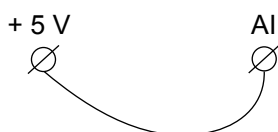
Measure the voltage across the input and read the current in the circuit by means of Grundfos GO or PC Tool. The current value must be equal to voltage divided with resistance. Alternatively, a milliammeter can be connected in series with the circuit.



TM057115

Measuring on analog input

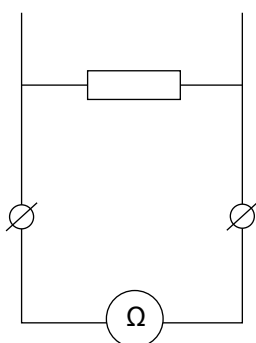
Next step is to test the input in voltage state. Change the setup of the input to voltage state (0-10 V). Fit a jumper between terminal 5 (+5 V) and the analog input. 5 V must now be read by means of the PC Tool.



TM057116

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 Ω . In voltage state, the resistance is 122 k Ω .



TM057117

Measuring resistance in current and voltage state

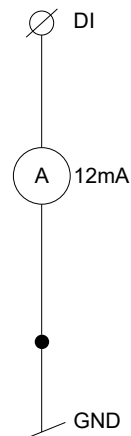
Analog output, AO

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.



TM080068

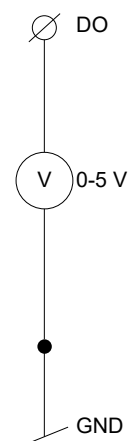
Testing the digital input

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.



TM080069

Measuring voltage on the digital output

LiqTec sensor

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 and the motor, remove the terminal box cover. See the section on replacing the terminal box cover. Replace the operating panel if there is still no connection.

Battery

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

Operating panel (HMI)

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

Related information

[8.1 Replacing the terminal box cover](#)

[8.2 Replacing the operating panel](#)

11.4 Power board

WARNING Electric shock



Death or serious personal injury

- Do not touch the terminals of the power board 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.

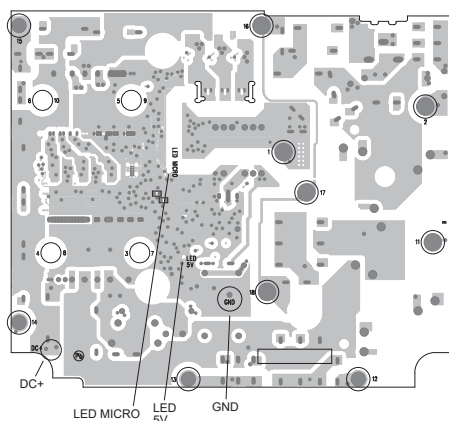
If reading of fault codes does not provide a clear answer as to whether the power board is functioning correctly, you can proceed as described below.

1. Check that the voltage to the power board 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 board 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.



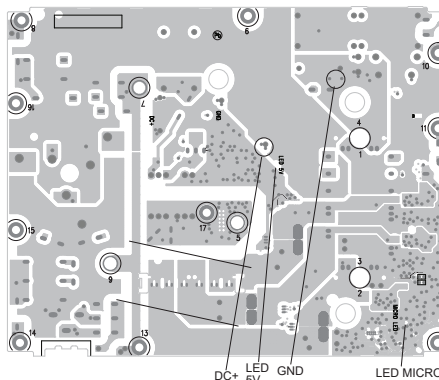
It may be necessary to dim the light as the diode light is weak.

Status, three-phase	Fault
The LED Micro controller is permanently on.	• The microprocessor is frozen. • No initialising message from the functional module.
	Switch the power supply off and on. If this does not solve the problem, replace the power board.
The LED Micro controller is off.	The power board is defective.
The LED Micro controller is flashing with a constant frequency.	The processor of the power board is functional.
LED 5V is permanently on.	The processor of the power board is functional.
LED 5V is off.	The power board is defective.
LED 5V and LED Micro Controller are flashing simultaneously.	• Short circuit in the connection to the functional module. • Short circuit in the functional module. • The functional module is disconnected. • The power board is defective.



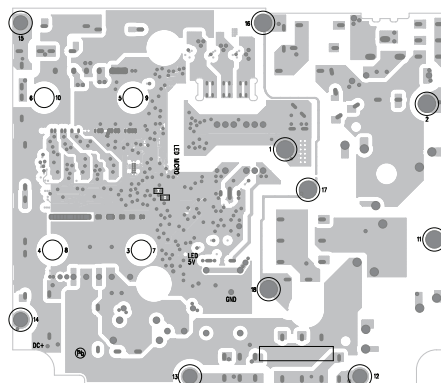
Status diodes of the power board, Type 1

TM087759

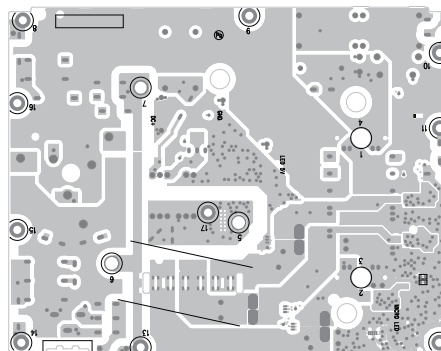


Status diodes of the power board, Type 2

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 the figures on status diode of functional module and status diodes of power board, Type 4. If not, the power board is defective.



Status diodes of the power board, Type 3



Status diodes of the power board, Type 4

Related information

[5. Megging](#)

[8.7 Replacing the power board](#)

TM087760

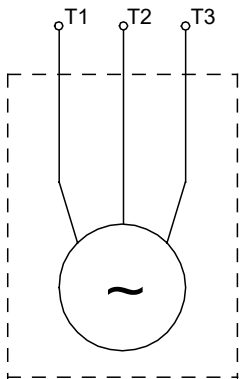
TM087805

TM087806

11.5 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.

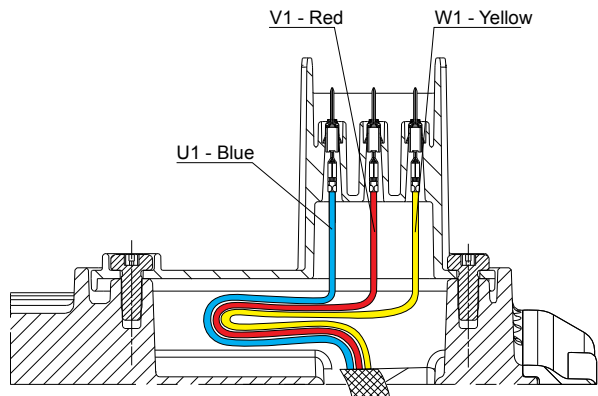
Wiring diagram



TM057025

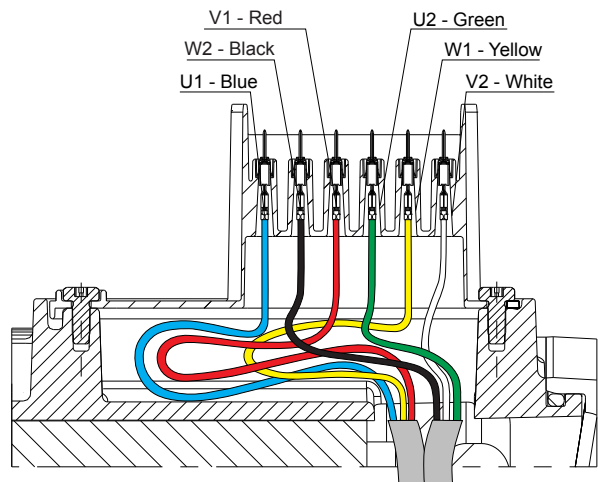
Wiring diagram

Pos.	Description
T1	U1
T2	V1
T3	W1



TM067722_COLOUR

Measuring the winding resistance, frame sizes 90, 100, 112 and 132

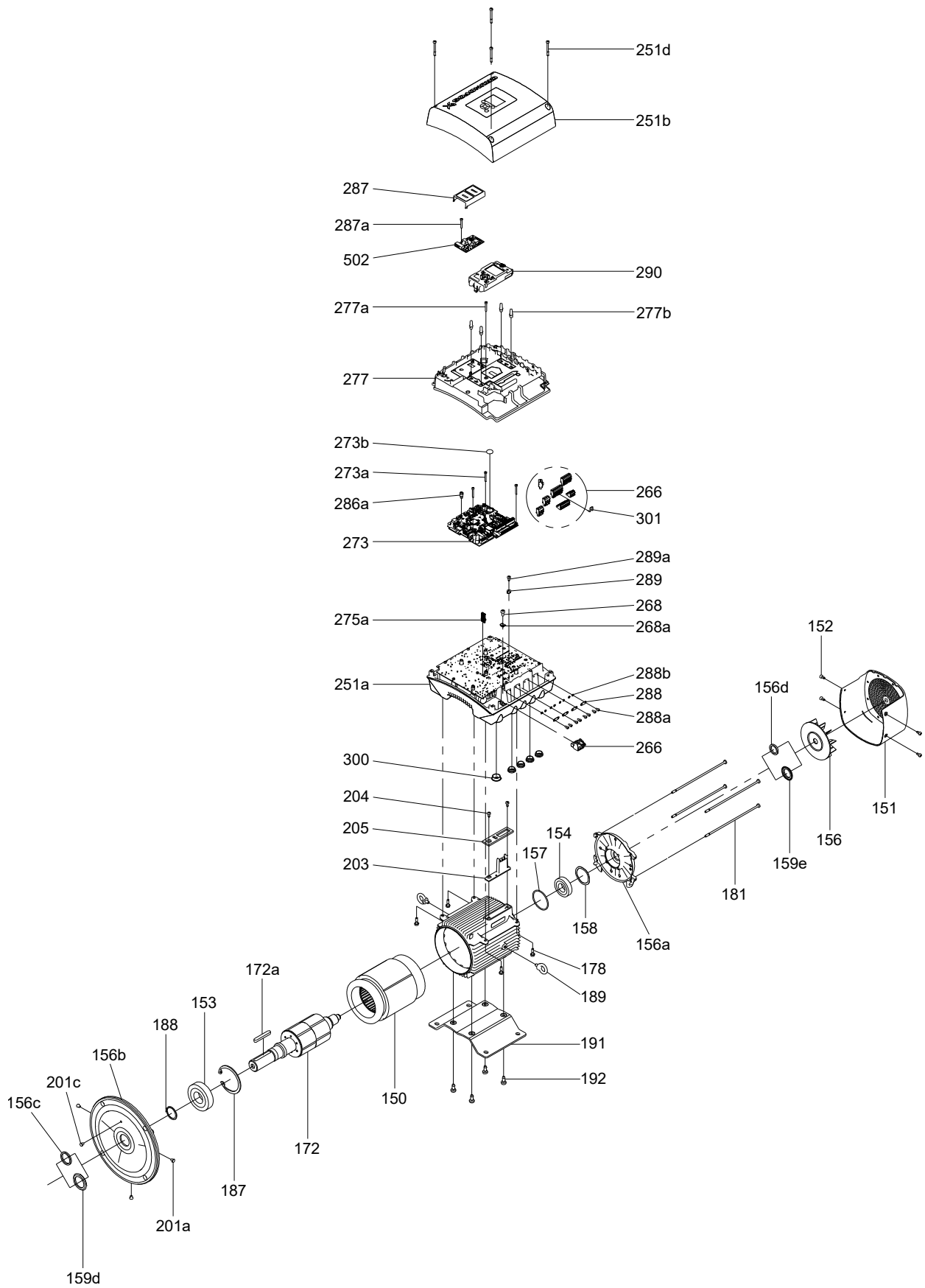


TM067723_COLOUR

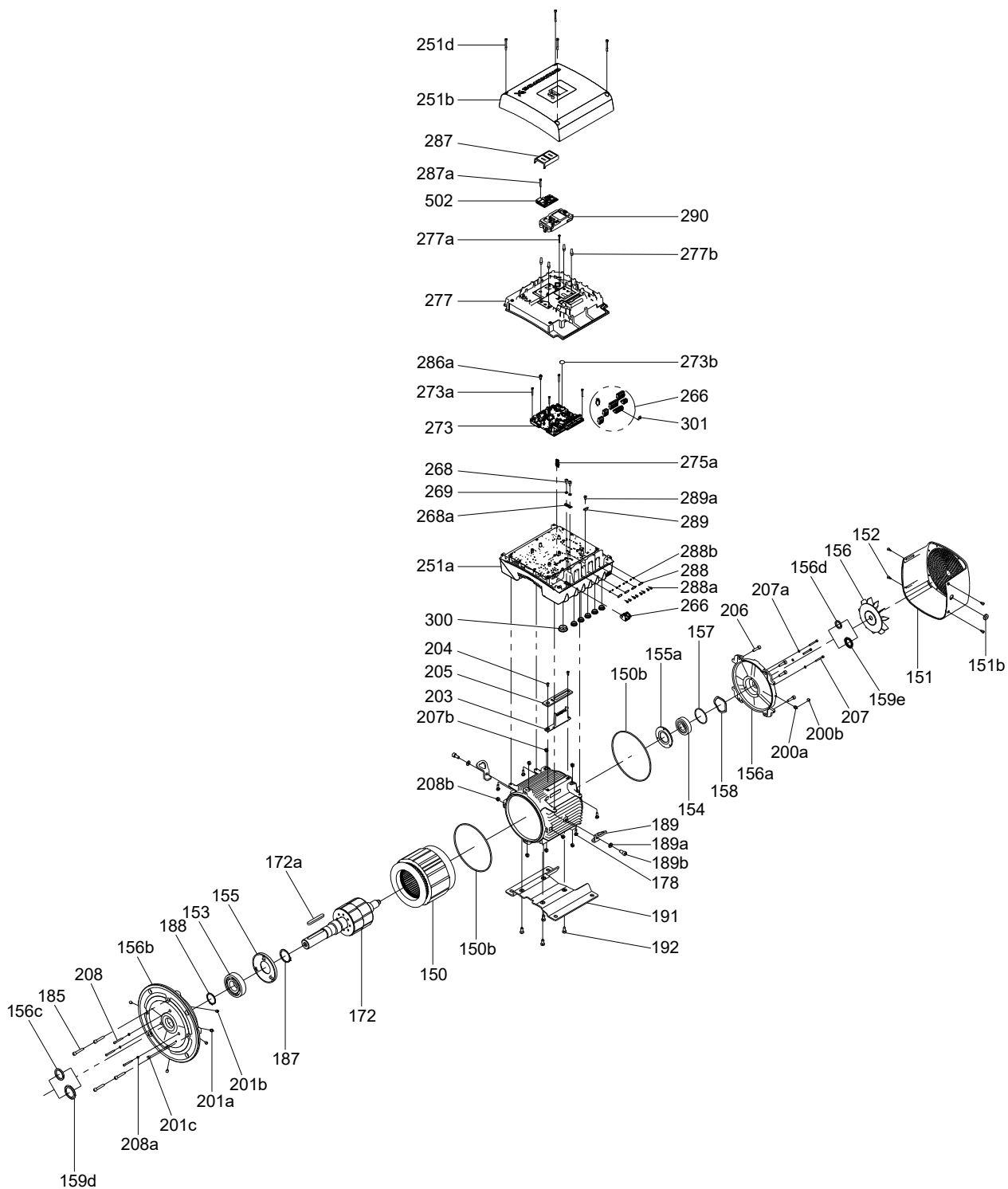
Measuring the winding resistance, frame sizes 132 and 160

Type				Min./max. resistance across two phases [Ω]		
Motor	Min ⁻¹	Voltage [VAC]	Power [kW/hp]	20 °C	60 °C	80 °C
MGE 90, MLE 90	3400-4000	3 × 200-240	1.5 / 2	0.75 / 0.86	0.86 / 0.99	0.92 / 1.06
			2.2 / 3	0.90 / 1.04	1.04 / 1.20	1.11 / 1.28
MGE 100, MLE 100	2000-2200	3 × 380-500	2.2 / 3.0	4.9 / 5.8	5.7 / 6.7	6.1 / 7.2
		3 × 440-480				
MGE 100	2000-2200	3 × 380-500	3.0 / 4.0	3.5 / 4.1	4.0 / 4.8	4.3 / 5.1
MGE 112, MLE 112	2000-2200	3 × 380-500	3.7 / 5.0	2.5 / 2.9	2.9 / 3.4	3.1 / 3.6
		3 × 440-480				
MGE 100	3000-4000	3 × 380-500	3.0 / 4.0	2.2 / 2.6	2.5 / 3.0	2.7 / 3.2
		3 × 440-480				
	3400-4000	3 × 200-240	3.0 / 4.0	0.42 / 0.49	0.49 / 0.56	0.52 / 0.60
MGE 112, MLE 112	3000-4000	3 × 380-500	3.7 / 5.0	1.3 / 1.5	1.5 / 1.8	1.6 / 1.9
		3 × 440-480				
	3400-4000	3 × 200-240	3.7 / 5.0	0.29 / 0.34	0.34 / 0.39	0.36 / 0.42
MGE 132 MLE 132	3000-4000	3 × 380-500	5.6 / 7.5	0.85 / 1.0	1.0 / 1.2	1.05 / 1.25
		3 × 440-480				
	3400-4000	3 × 200-240	5.5 / 7.5	0.38 / 0.43	0.44 / 0.50	0.47 / 0.54
MGE 100	4000-5900	3 × 380-500	3.0 / 4.0	2.2 / 2.6	2.5 / 3.0	2.7 / 3.2
MGE 112, MLE 112	4000-5900	3 × 380-500	3.7 / 5.0	1.3 / 1.5	1.5 / 1.8	1.6 / 1.9
		3 × 440-480				
MGE 132, MLE 132	4000-5900	3 × 380-500	5.6 / 7.5	0.95 / 1.1	1.1 / 1.3	1.2 / 1.4
		3 × 440-480				
MGE 132, MLE 132	2000-2200	3 × 380-500	5.6 / 7.5	1.6 / 1.9	1.8 / 2.2	1.9 / 2.3
		3 × 440-480				
MGE 132, MLE 132	2000-2200	3 × 380-500	7.5 / 10.0	1.1 / 1.3	1.3 / 1.5	1.4 / 1.6
		3 × 440-480				
MGE 132, MLE 132	3000-4000	3 × 380-500	7.5 / 10.0	0.75 / 0.87	0.86 / 1.0	0.9 / 1.1
		3 × 440-480				
MGE 160, MLE 160	3000-4000	3 × 380-500	11.0 / 15	0.4 / 0.45	0.45 / 0.54	0.49 / 0.57
		3 × 440-480				
MGE 132, MLE 132	4000-5900	3 × 380-500	7.5 / 10.0	0.75 / 0.85	0.85 / 1.0	0.9 / 1.1
		3 × 440-480				
MGE 160, MLE 160	4000-5900	3 × 380-500	11.0 / 15	0.45 / 0.53	0.52 / 0.6	0.55 / 0.65
		3 × 440-480				

12. Exploded view



Frame sizes 90, 100, 112 and 132 with stay bolt assembly of stator house



Frame sizes 132 and 160 with short bolt assembly of stator house

TN087627

13. Disposing of the product

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.
3. Dispose of the waste battery through the national collective schemes. If in doubt, contact your local Grundfos company.



The crossed-out wheellie bin symbol on a product means that it must be disposed of separately from household waste. When a product marked with this symbol reaches its end of life, take it to a collection point designated by the local waste disposal authorities. The separate collection and recycling of such products will help protect the environment and human health.

See also end-of-life information at www.grundfos.com/product-recycling.

Argentina

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