

Installation
Operation &
Maintenance

GES Drive Manual





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Read the instructions supplied with the hoist before installation and commissioning.



Keep the instructions in a safe place for future reference.

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1 Instructions

The GES drive installation, operation and maintenance manuals are included with the shipment of the unit. The drive warning labels and markings.



Read all the instructions supplied before installing and commissioning the drive.



Keep the instructions in a safe place for future reference.

1.1 Symbols and abbreviations

The following symbols are used in the instructions:



Warning!



Caution

2 Safety instructions

2.1 Safety instructions for preparing to install the drive



Follow these instructions when preparing to install the drive:

- Ensure that installation personnel are competent and qualified, and they are provided with adequate instructions for carrying out the installation work.
- Check for any dimensional nonconformances in the drawings, instructions, parts and structural measurements.
- Beware of other moving machinery - such as machines, other cranes and automatic doors - in the installation and servicing area. The installation area must be arranged so that operation of other equipment in the area does not endanger installation work (or *vice versa*).
- Prevent unauthorized persons and bystanders from walking in or under the work site.

2.2 Safety instructions for installing and operating the drive



Follow these instructions when installing the drive:

- Use proper safety equipment to prevent objects from falling when working in high places.
- Ensure that machinery and equipment cannot start up accidentally and cannot moved during installation and servicing.
- Keep the installation and servicing locations and walkways leading to them, clean and tidy.



Follow these instructions when operating the drive:

- The useful lifetime of the drive depends heavily on whether the machinery is properly suited for the environment and the crane duty group classification. Do not use the drive for other than the duty group classification for which it was designed or selected.
- When traveling, make sure that the moving parts do not collide with objects or people.
- If the drive is accidentally impacted in a collision, check the tightness of the mounting bolts and the operation of the motor, brake, and gear. Check the traveling motions and pay special attention to any abnormal noises that would indicate damage in the gear-train.



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- If defects have been noticed in the drive, carry out the necessary inspections and repair work. Be sure that the drive operates properly before you start to use it again.
- Avoid short, jerky motions. Unnecessary short starts will cause the motor to overheat quickly.
- Do not change the size of the fuses provided in the controls. A qualified electrician should carry out all electrical work.

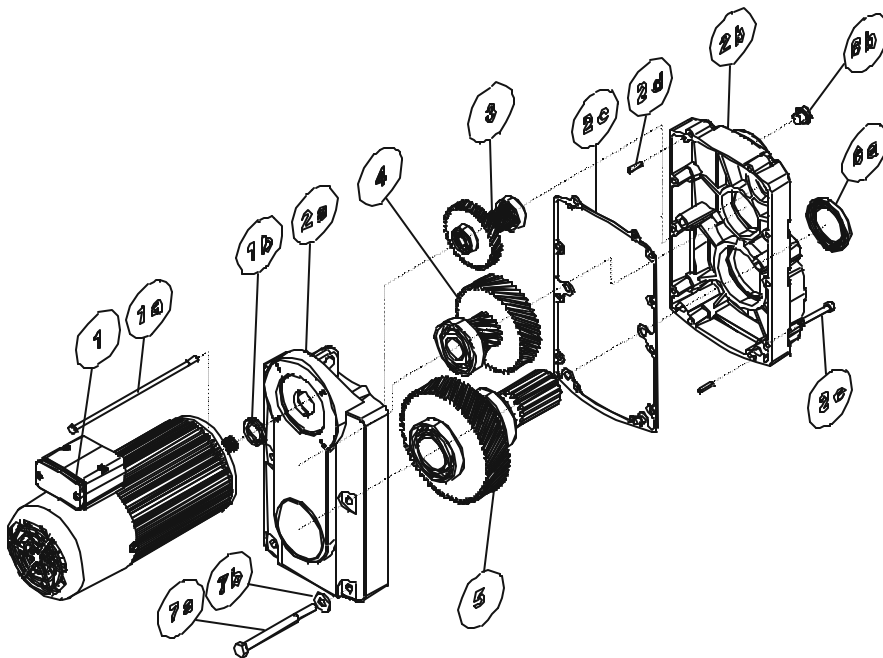
2.3 Safety instructions for servicing the drive



Follow these instructions when servicing the drive:

- Carry out regular inspections and preventive maintenance in compliance with the instructions. Keep a record of inspections and servicing. Regular servicing and inspection procedures are necessary for the safe and efficient operation of the drive. In uncertain or unusual cases, contact the supplier of the drive.
- Pay special attention to the operation of the brake. It is essential that safety devices work correctly and are in full operating order.
- Use trained service personnel for servicing the drive. The person servicing the drive must be competent for the task and must be familiar with the servicing and inspection instructions.
- Use only genuine spare parts approved by the manufacturer of the drive.

3 GES Drive



- 1 Motor with drive pinion
- 1a Motor mounting bolt
- 1b Motor shaft seal
- 2a Gear cover
- 2b Gear housing
- 2c Gasket
- 2d Aligning pins
- 2e Gear mounting bolts
- 3 First intermediate shaft set (gear shaft, wheel and bearings)
- 4 Second intermediate shaft set
- 5 Secondary shaft set
- 6a Secondary shaft sealing
- 6b Breather plug
- 7a Mounting bolt
- 7b Washer



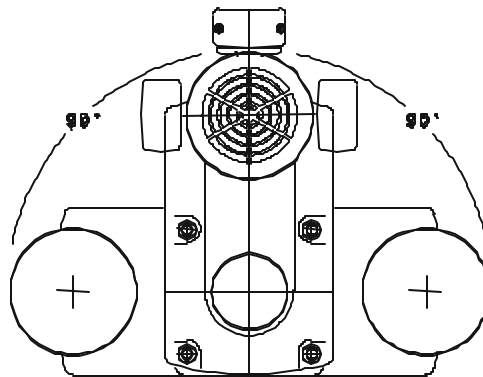
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3.1 General

The drives are designed to perform the traveling movement of the crane or trolley. The drive is not suitable for hoisting loads. The unit is suitable for both indoor and outdoor use. Please note possible restrictions for special environments (e.g. galvanization plants).

The main components of the drive are the motor and the gear reducer. The gear reducer is used to reduce the motor speed and to increase the motor torque to the desired level. The gear ratio is constant and is selected according to the motor speed and the desired traveling speed. Several sets of different gear ratios are available, especially for two-speed motor drives.

3.2 Mounting position of the drive



The standard unit is equipped with a breather plug located at the center near the top, opposite side of the motor. With this arrangement the drive can be mounted in any angle not exceeding 90° from the vertical position (motor up, output shaft down). The unit can be turned in 90° increments.

The standard position of the terminal box (plug connector) on the motor is at the top. The position of the junction box (plug) can be changed by turning the motor in 90° steps to either side.

3.3 Assembling the drive



Ensure that the working area is safe and the machine cannot be started accidentally when doing the assembly work. Be sure to switch off and lock out power at the main switch to avoid an electrical hazard.

- Lightly grease the spline on the output shaft before assembling the unit to the wheel.
- Align the the splines of the wheel and output shaft and push the in unit until it is seated against the bearing housing surface.
- Rotate the unit or the drive wheel to align the bolt holes. Note that the motor brake prevents the free rotation of the output shaft. Manually release the brake, (see the Motor instructions) or jack the wheel off the rail to rotate it for alignment of the mounting bolt holes.
- Insert and hand-tighten the mounting bolts . Be sure to include the washers.
- If the wheel is jacked up, lower it down before tightening the mounting bolts to the recommended tightening torque. (see 'Recommended tightening torques' section)



Before tightening the mounting bolts, make sure the wheel is sitting on the rail in its normal position. This is to ensure that a misaligned load is not directed towards the output shaft.



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- Remove the pin from the breather plug.



The pin in the breather plug prevents the lubricant from leaking during shipment of the unit. If the pin is not removed from the breather plug before operating, pressure could build up in the gearbox and cause lubrication leakage.

- Connect the power supply plug to the motor.

3.4 Start-up procedure

- Make sure that the conditions at the operating site correspond to the operating conditions for which the drive is designed or selected for (including indoor/outdoor use, ambient temperature/radiance temperature, wind, dust, splashing, snow, water, handling hazardous materials, fire risk, etc).
- Check that the supply voltage and frequency are suitable for the motor and brake.
- Check that the direction of rotation is correct. Verify that the direction corresponds to the control signal. In multi-motor systems, check that all the units function correctly in series. If any of the motors do not operate properly, an electrician must check and correct the electrical connections. Refer to the electrical instructions and wiring diagram for further information.



Be prepared for the equipment to move in the wrong direction when first testing.

- Check the function of the brake. The brake is factory set. Adjust the air gap if the braking distance is too long (with nominal load) or too short or the brake is not releasing. Refer to the motor instructions section for further information. If an inverter controls the motor, check that inverter parameters are set up correctly.
- Make an audible check of the machinery while operating. A very loud growling sound indicates an incorrect electrical connection to the motor. This must be corrected immediately. A regular distinct clatter sound is an indication of a bad bearing in the geartrain.
- Check with your hand for excessive vibration while the unit is running. The cause of the excessive vibration must be identified. If the machinery causes an inverter fault, it must be checked out.
- Check the running temperature of the motor during the long-term operation. The temperature rise of the F-class motor must not exceed 100°C. If the motor is overheating, it may be due to a faulty motor, or poor cooling or an overloaded motor. The reason must be identified and corrected.
- Make sure that any safety devices (limit switches, etc) bypassed for testing purposes are restored to full operational status.

3.5 Inspection and service procedure for Drive

Carry out the following inspections and servicing procedures at regular intervals. See 'Inspection and servicing intervals' section for the inspections and servicing schedule.

- Check the tightness of the bolts.
- Check that the breather plug is not blocked by foreign obstacles or remove the pin from the plug.
- Check the gearbox for leakage.
- Check the traveling motion: acceleration and deceleration.
- Check the brake for wear. If necessary, clean the brake and replace the friction discs.
- Check the air gap and adjust if necessary. Refer to the motor instructions section for further information.
- If an inverter controls the motor, check that the inverter operates correctly.
- Gears are lubricated with semi-fluid grease and does not require adding or changing the lubricant when used in normal operating conditions.



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If machinery is operating under heavy conditions (high temperature, high humidity level, difficult atmosphere) the lubricant shall be changed regularly. When necessary, pump the old lubricant out from the breather plughole and refill the gear with a fresh lubricant. See 'Lubricants' section for the correct lubricant type and lubricant amount.

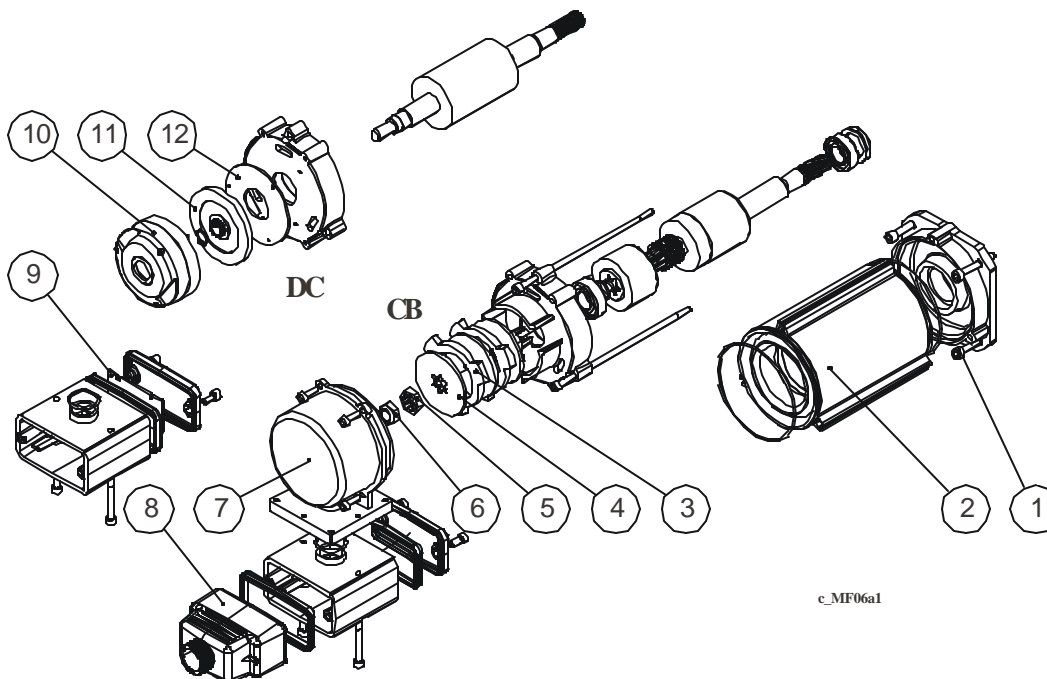
3.6 Removing the drive



Ensure that the working area is safe and the machine cannot be started accidentally when doing the assembly work. Be sure to switch off and lock out power at the main switch to avoid an electrical hazard.

- Disconnect the power supply plug from the motor.
- Remove the mounting bolts from the drive.
- Pull out the unit from the wheel.
- Assemble the new unit according to the instructions in section 'Assembling the drive'.

4 MF06 motor with Compact or DC brake



c_MF06a1

DC=DC-brake

CB=Compact brake

1. Mounting bolts for traveling gear

2. Motor

3. Friction disc

4. Brake disc

5. Aluminum ring

6. Adjustment nut for brake air gap (self-locking)

7. Brake cover

8. Power supply plug

9. Rectifier (DC brake motor)

10. Brake (DC brake motor)

11. Brake disc (DC brake motor)

12. Friction plate (DC brake motor)



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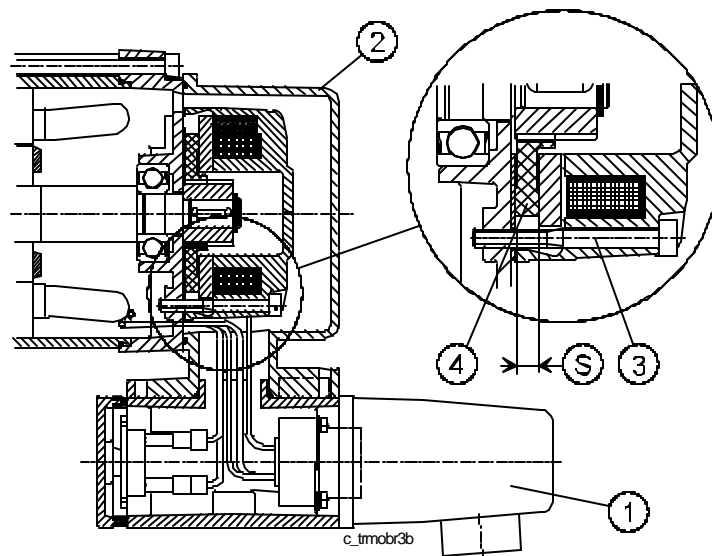
4.1 Adjustment of Compact-brake air gap

- Switch off and lock out power at the main switch.
- Check for any live power at the motor.
- Remove the power supply plug (8) from the motor.
- Open the motor cover (7).
- Push the brake disc (4) and measure the air gap between the adjustment nut (6) and aluminum ring (5). The air gap has to be 0.2 - 0.3 mm. If needed, adjust the air gap by turning the adjustment nut (6).
- Reinstall the brake cover (7) and plug in the power supply plug (8).

4.2 Removing the Compact-brake

- Switch off and lock out power at the main switch.
- Check for any live power at the motor.
- Unplug the power supply plug (8) from the motor.
- Open the motor cover (7).
- Unscrew the adjustment nut (6) for the brake air gap.
- Remove the brake parts. If the thickness of the friction material is less than 5 mm, replace all the brake parts.
- Reassemble in the reverse order.
- Adjust the brake air gap. Refer to the 'Adjustment of Compact-brake air gap' section.

4.3 Removing and inspection of DC-brake



1. Power supply plug
 2. Motor cover
 3. Brake mounting screws
 4. Brake friction disc
- S. Thickness of brake friction disc



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- Switch off and lock out power at the main switch.
- Check for any live power at the motor.
- Unplug the power supply plug (1) from the motor.
- Open the brake cover (2).
- Unscrew the brake mounting screws (3).
- Check the brake type on the rating plate attached to the brake. Measure the thickness of the brake disc (4). Replace the brake disc if it has worn below the minimum thickness as shown in the table.

Brake type and size	Min. thickness of brake disc	Tightening torque for Brake mounting screws
NM38710NR#, 2 Nm	5.8 mm	2.5 Nm / 1.8 lbf.ft
NM38711NR#, 4 Nm	5.95 mm	2.5 Nm / 1.8 lbf.ft

- Reassemble in the reverse order.

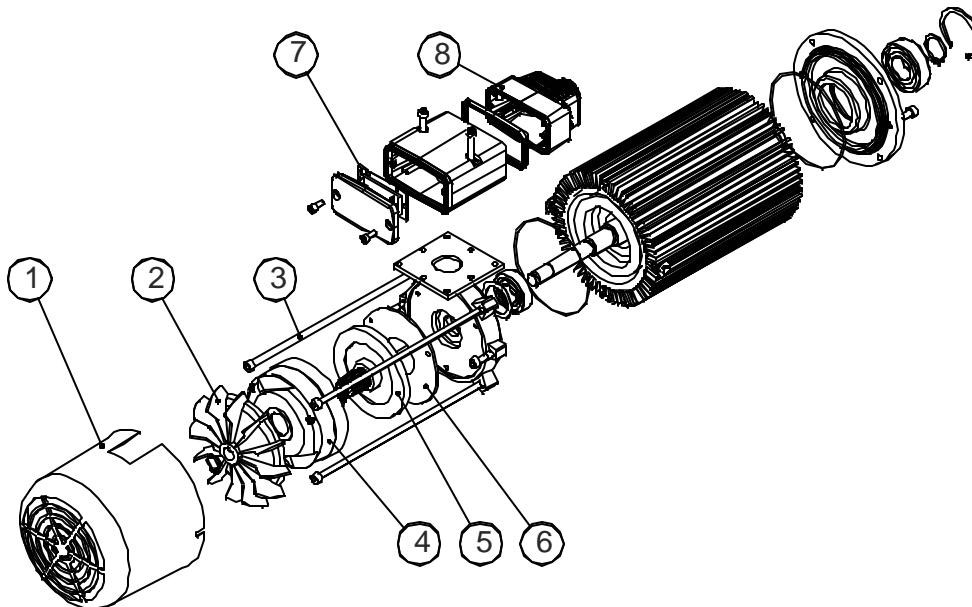


Tighten the brake mounting screws to the tightening torque for the brake screws shown in the table above.

4.4 Removing the motor

- Switch off and lock out power at the main switch.
- Check for any live power at the motor.
- Unplug the power supply plug (8) from the motor.
- Remove the motor mounting screws (1).
- Detach the motor from the gearbox.
- Reassemble in the reverse order.

5 MF07 and MF10 motor



1. Fan cover
2. Fan / Flywheel
3. Motor mounting screws
4. Brake
5. Brake disc
6. Friction plate
7. Rectifier
8. Power supply plug



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5.1 Removing and inspection of DC brake

- Switch off and lock out power at the main switch.
- Check for any live power at the motor.
- Unplug the power supply plug (8) from the motor.
- Remove the fan cover (1).
- Remove the fan (2).
- Unscrew the brake mounting screws.
- Check the brake type on the rating plate attached to the brake. Measure the thickness of the brake disc (5). Replace the brake disc if it has worn below the minimum thickness as shown in the table below.

Brake type and size	Min. thickness of brake disc	Tightening torque for Brake mounting screws
NM38770NR#, 16 Nm	6.8 mm	5 Nm / 3.7 lbf.ft
NM38771NR#, 8 Nm	6.65 mm	5 Nm / 3.7 lbf.ft
NM38720NR#, 21 Nm	7.6 mm	9 Nm / 6.6 lbf.ft

- Reassemble in the reverse order.



Tighten the brake mounting screws to the tightening torque for brake mounting screws shown in the table above.

5.2 Removing the motor

- Switch off and lock out power at the main switch.
- Check for any live power at the motor.
- Unplug the power supply plug (8) from the motor.
- Remove the motor mounting screws (3).
- Detach the motor from the gearbox.
- Reassemble in the reverse order.

6 Lubricants



Use of a low-grade or incompatible lubricant could damage the gearing or bearings. Use only the lubricants recommended by the manufacturer.

Factory-installed lubricant unless otherwise specified:

Gear type	Trade name and number	Volume	Operating temperature °C
GES3	Mobilux EP 004	250 ml / 15 cu.in.	-30...+120
GES4	Mobilux EP 004	500 ml / 30 cu.in.	-30...+120
GES5	Mobilux EP 004	1000 ml / 61 cu.in.	-30...+120



If the transmission lubricant has to be topped off, make sure that the lubricant being added is compatible. If transmission oil has to be replaced, flush out the gearbox before filling it up.



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6.1 Alternative lubricants

Alternative lubricants:

Trade name and number	Operating temperature °C
Shell Alvania GC	-15...+80
Shell Alvania EP00	-15...+80
Shell Tivela Compound A S)	-20...+130
Neste Center Grease 00 EP	-35...+100
Castrol EPL 00	-35...+100
MOBILITH SHC 007 S)	-50...+230

S) Synthetic lubricant.

If the drive is operated for long periods in extremely cold conditions (colder than -25 °C) or extremely hot conditions (hotter than + 55 °C), it is recommended that a synthetic lubricant be used.

7 Recommended tightening torques

Recommended tightening torques for screws and nuts

Size	Tightening torque			
	Strength 8.8		Strength 10.9	
	Nm	Ft lb	Nm	Ft lb
M4	2.7	2.0	4.0	2.9
M5	5.4	4.0	7.9	5.8
M6	9.3	6.8	14	10.3
M8	23	17.0	33	24
M10	45	33.0	66	48.5
M12	77	56.6	115	84.6
M14	125	92	180	132
M16	190	206	280	206
M18	275	202	390	287
M20	385	283	550	404
M22	530	390	750	552
M24	660	485	950	699
M27	980	721	1400	1030
M30	1350	993	1900	1398

8 Inspection and servicing intervals

The inspection and servicing interval for a drive is 12 calendar months for a crane in an 8-hour per day, 5-day per week work period, under normal environmental conditions (free from excessive dust, moisture, and corrosive fumes). The inspection and servicing intervals of the drive could be defined by Safe Working Periods (SWPs) if it is being monitored. If the Safe Working Periods is being monitored, then the servicing interval must be carried out at the end of the Safe Working Period (SWP%) of the crane or hoist, or by the end of the stated number of calendar months, whichever comes first. If the drive is being used intermittently, it should be inspected before being used again.



If the duty is heavier, or the environment severe, service intervals should be shortened and more frequent.

Only authorized or adequately-trained personnel may carry out service or repair work. If any defects or abnormalities are observed, they must be investigated and corrective action must be taken in accordance with the instructions.