

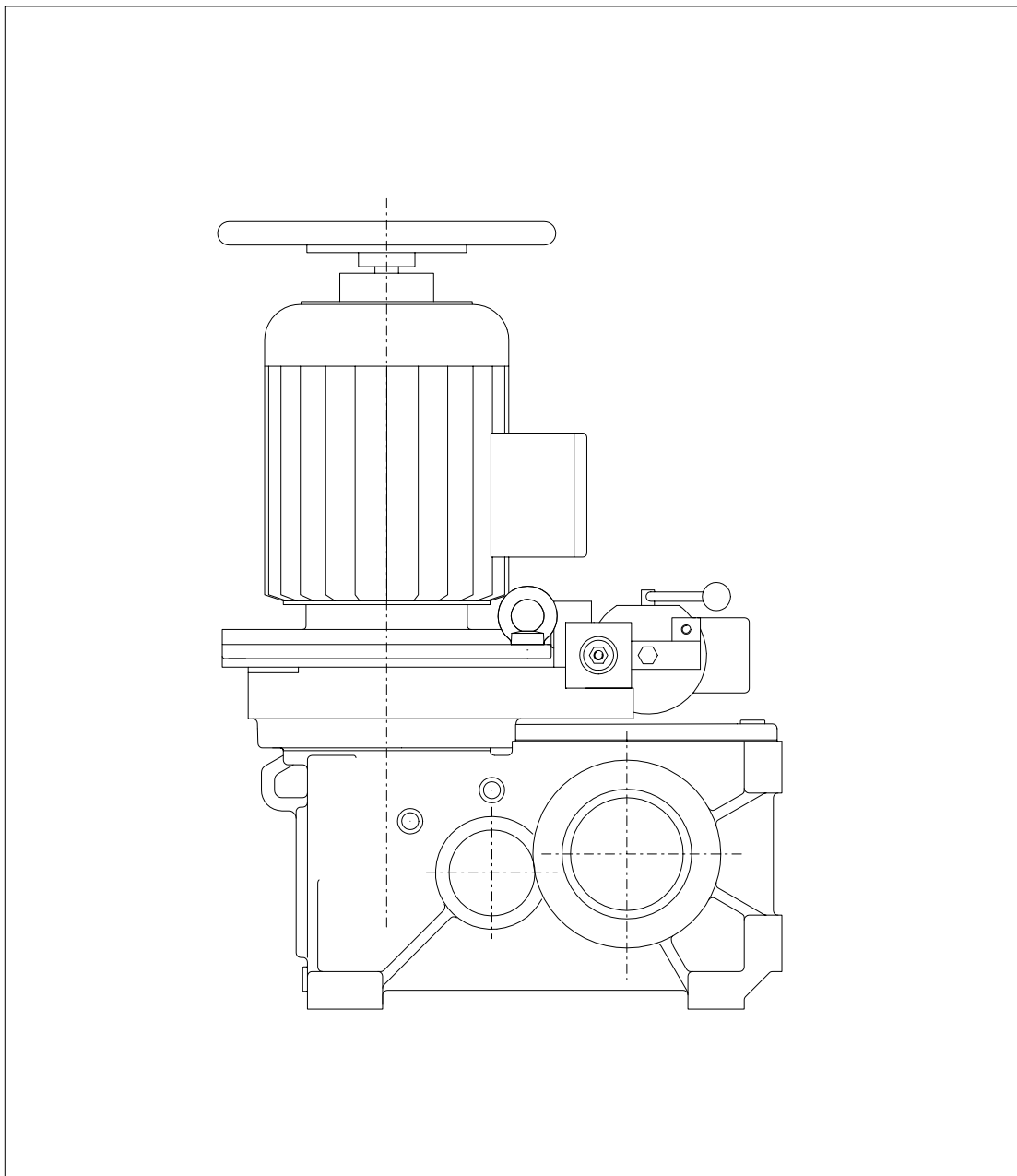
# Operating Instructions

## BA 6800 EN 03.03

Lift Drives Type

**CG 26**

Size 100, 112, 135, 170



# FLENDER

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## 1. Technical data

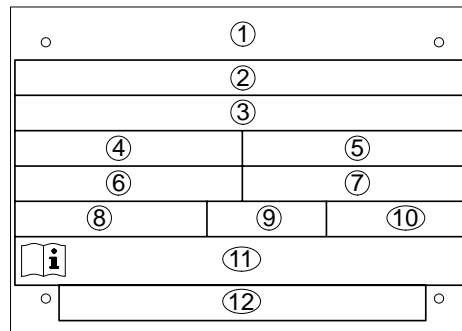
### 1.1 General technical data

The nameplates to the individual component assemblies show the following technical data.

They show the most important technical data. These data together with the contractual agreements determine the limits of its proper use.

A differently designed name plate may be fitted by special arrangement.

#### 1.1.1 Gear unit nameplate



- |  |   |
|--|---|
| ① Company logo and production location | ⑦ Speed $n_2$                                     |
| ② Special information                  | ⑧ Type of oil                                     |
| ③ Order no. - item - serial no.        | ⑨ Viscosity of oil in VG class                    |
| ④ Type / Size                          | ⑩ Quantity of oil in litres for main gear housing |
| ⑤ Torque $T_2$ in Nm                   | ⑪ Operating instructions number                   |
| ⑥ Speed $n_1$                          | ⑫ Special information                             |

For further technical data, refer to the drawings in the gear-unit documentation.

#### 1.1.2 Motor nameplate

The motor nameplate shows the following data:

Type, serial number, speed, output or torque, voltage, frequency and current.

#### 1.1.3 Brake nameplate

The brake nameplate shows the following data:

Type, serial number and braking torque range.

#### 1.1.4 Brake lifting device nameplate

The brake lifting device nameplate shows the following data:

Type, serial number, voltage, frequency, current and duty cycle.

## 1.2 Weights

Gear-unit size	100	112		135		170			
Motor size	132	132	160	132	160	160	180	200	225
Approx. weight (kg) of drive	290	320	380	430	490	700	750	780	840

Table 1.1: Weights (approx. values only)

**Note:** The indicated weights apply to the complete drive, incl. motor, brake, coupling and oil filling, but not to the traction sheave.

## 1.3 Measuring-surface sound-pressure level

The measuring-surface sound-pressure level for the drive at a distance of 1 m is shown in table 1.2.

Measurement is carried out to DIN 45635 Parts 1 and 23 by the sound-intensity method and at at least 30 % rated output.

The workplace of the operating personnel is defined as the area on the measuring surface at a distance of 1 metre from the drive in the vicinity of which persons may be present.

The sound-pressure level applies to drives that have run warm and at the speeds indicated in Table 1.2.

If repeat measurements on site do not produce conclusive results with regard to measuring technology, the measurement obtained on the FLENDER test bench will apply.

The sound-pressure levels stated in the table were obtained by statistical calculation by our Quality Control Dept. The drives can be statistically expected to comply with these noise levels.

Measuring-surface sound-pressure level $L_{pA}$ in dB(A)				
$n_1$ 1/min	Gear-unit size			
	100	112	135	170
2000	69	69	70	73
1500	63	63	65	68
1000	61	62	63	66

Table 1.2: Measuring-surface sound-pressure levels at maximum load and with the largest permissible LUGA motor fitted (permissible deviation +3 dB(A)). Other types of motor and operation of frequency converters can negatively affect the noise.

## 2. General instructions

### 2.1 Introduction

These operating instructions (BA) are an integral part of the drive supplied and must be kept in its vicinity for reference at all times.

**Caution!**

**All persons involved in the installation, operation, maintenance and repair of the drive must have read and understood these operating instructions and must comply with them. We accept no responsibility for damage or disruption caused by disregard of these Instructions.**

The drive described here has been manufactured in compliance with the recognised safety regulations and the state of technical development applying at the time these operating instructions were printed.

In the interest of technical progress we reserve the right to make changes to the individual assemblies and accessories which we regard as necessary to preserve their essential characteristics and improve their efficiency and safety.

### 2.2 Copyright

The copyright to these Operating Instructions is held by **FLENDER GMBH**.

These Operating Instructions must not be wholly or partly reproduced for competitive purposes, used in any unauthorised way or made available to third parties without our agreement.

Technical enquiries should be addressed to the following works

A. FRIEDR. FLENDER GMBH

D-46393 Bocholt

Tel.: 02871/92-0

Fax: 02871/92-2596

or to one of our customer-service addresses. A list of our customer-service addresses is given in section 11. "Spare parts, customer-service addresses".

## 3. Safety instructions

### 3.1 Proper use

- The drive has been manufactured in accordance with the state of the art and is delivered in a condition for safe and reliable use. Changes made by the user which affect the safe and reliable operation of the gear unit are not permitted. This applies equally to safety features designed to prevent accidental contact.
- The drive must be used and operated strictly in accordance with the conditions laid down in the contract governing performance and supply.

### 3.2 Obligations of the user

- The user must ensure that all persons involved in the installation, operation, maintenance and repair of the gear unit have read and understood these Operating Instructions and comply with them at all times in order to:

- avoid injury or damage to the user and third parties,
- ensure the safety and reliability of the drive,

and

- avoid disruptions and environmental damage through incorrect use.
- During transport, assembly, installation, disassembly, operation and maintenance of the unit the relevant safety and environmental regulations must be complied with.
- The drive must be operated, maintained and repaired only by authorised, properly trained and qualified personnel.
- The gear unit must not be cleaned with high-pressure cleaning equipment.
- All work on the coupling must be carried out with great care and with due regard to safety.
- All work on the drive must be carried out only when it is not in operation.  
The drive unit must be secured against being switched on accidentally (e.g. by locking the key switch or removing the fuses from the power supply). A notice should be attached to the start switch stating clearly that work is in progress on the drive.
- No welding work must be done on the drive.  
The drives must not be used as an earthing point for welding operations. Toothed parts and bearings may be irreparably damaged by welding.
- If any changes (e.g. overheating or unusual noises) are noticed on the drive during operation, the drive unit must be switched off immediately.
- Rotating drive components such as traction sheaves and hand wheels must be fitted with suitable safeguards to prevent contact.
- If the drive is intended for installation in plant or machinery, the manufacturer of such plant or machinery must ensure that the contents of these operating instructions are incorporated in his own instructions.
- Notices such as nameplates etc. attached to the drive must be observed. They must be kept free from dirt and paint at all times. Missing plates must be replaced.
- All spare parts must be obtained from FLENDER.

## 3.3 Environmental protection

- When changing oil, the used oil must be collected in suitable containers. Any oil spillage must be removed immediately.
- Used oil, preservative agent, oil-binding agents and oil-soaked cloths must be disposed of in accordance with environmental legislation.

## 3.4 Special dangers

- Depending on operating conditions, the surface of the drive may heat up considerably.  
**Danger of burns!**
- When changing oil, take care to prevent scalding by hot oil.

## 3.5 Warnings and symbols used in these Operating Instructions (BA)



This symbol indicates safety measures which must be observed to avoid **personal injury**.

**Caution!**

This symbol refers to safety measures which must be observed to avoid **damage to drive components**.

**Note:**

This symbol indicates general **operating instructions** which are of particular importance.

## 4. Transport, handling and storage

**Note:** Observe the "Safety instructions" in section 3.

### 4.1 Scope of supply

The products supplied are listed in the despatch papers. Check immediately on receipt to ensure that all the products listed have actually been delivered. Parts damaged during transport or missing parts must be reported in writing immediately.

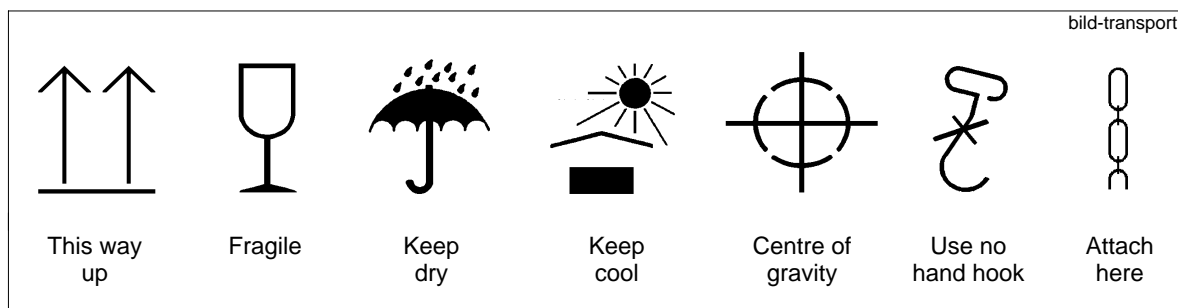
### 4.2 Transport and handling



**When handling FLENDER products, use only lifting and handling equipment of sufficient load-bearing capacity!**

Different forms of packaging may be used, depending on the size of the drive and method of transport. Unless otherwise agreed, the packaging complies with the **HPE Packaging Guidelines**.

The symbols marked on the packaging must be observed at all times. These have the following meanings:



**Caution!**

**The drive must always be transported and handled with due care to avoid damage to persons and the drive. If, for example, the free shaft ends are knocked, this may damage the drive.**

**Note:** The drive must be transported and handled with suitable equipment only.

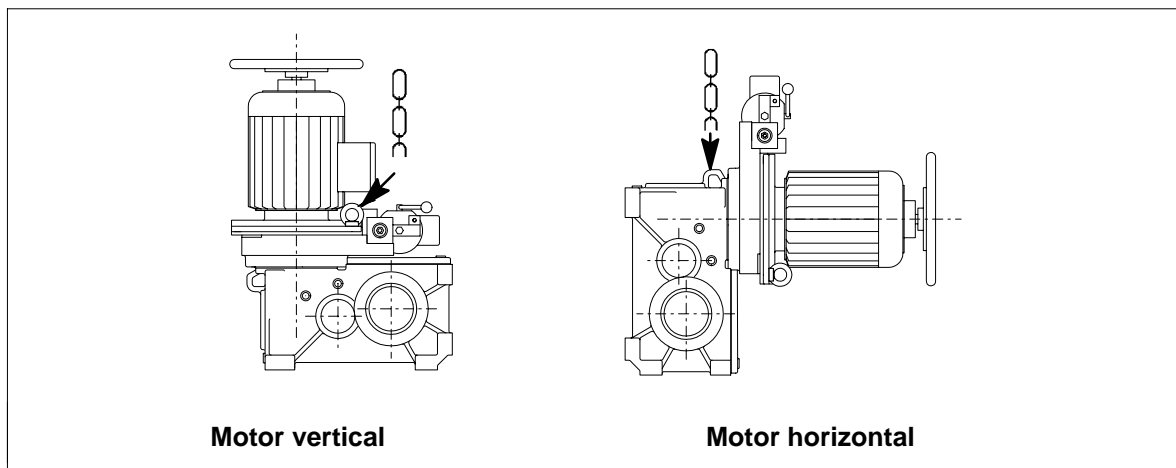
**Note:** If the gear unit is filled with oil, the rating plate will show the following information:  
**Filled with oil.**

**Caution!**

**Use only the eyes provided to transport and handle the drive.  
Do not use the front threads at the shaft ends to attach eye bolts for transport.**

**Caution!**

**During transport and handling care must be taken not to damage the hand wheel. Ropes or chains must not come in contact with the hand wheel during transport and handling.**



#### 4.3 Storing the drives

The drive must be stored in the position of use on a vibration-free wooden base in a sheltered place and covered over.

**Caution!**

**If the gear unit is being stored out of doors, it must be covered with particular care. It must be ensured that neither moisture nor foreign material can collect on the gear unit.**

**Note:** Provision for special environmental conditions during transport (e.g. transport by ship) and storage (climate, termites, etc.) must be contractually agreed.

#### 4.4 Standard preservation

The gear unit has been initially filled with synthetic oil (long-term lubrication) by us.

**Note:** If initial filling has not been expressly agreed, the internal parts of the gear unit are treated with preservative. This preservative is sufficient for normal transport conditions (including overseas transport) and for a period of 6 months until initial start-up.

The outer paint coating is resistant to dilute acids, alkalis, oils and solvents. It is also resistant to sea water, tropical conditions and temperatures up to 140 °C.

The shaft ends have been provided with a rust-preventive paint coating. It is resistant to seawater and tropical conditions for a period of 12 months.

**Note:** Ensure that the paint is not damaged!  
Mechanical damage (scratches), chemical damage (acids, alkalis) and thermal damage (sparks, welding beads, heat) cause corrosion which may cause failure of the external protective coating.

For longer periods of storage (> 24 months) we advise regular checking and, if necessary, renewal of the internal and external preservative (see section 7. "Start-up").

## 5. Technical description

**Note:** Observe the "Safety instructions" in section 3.

### 5.1 General description

The worm- and helical-gear unit and the traction sheave located on the output shaft are driven by a three-phase motor via a flexible coupling.

A double-shoe brake is fitted to the gear unit to brake and stop the load.

### 5.2 Three-phase motor

Drive is provided by a three-phase motor fitted with an additional hand wheel. An incremental transmitter for monitoring the speed is located under the hand wheel.

The motor is normally provided with PTC resistors to signal thermal overload. The PTC resistors are wired to the terminal box of the motor.

### 5.3 Coupling

The flexible coupling located between the motor and the gear unit requires no maintenance. The coupling section on the gear unit side is designed as a brake disk.

### 5.4 Brake

The gear unit is fitted with a double-shoe brake constructed as a twin-circuit safety brake.

The brake is fitted with an electrically operated brake lifting device and a hand lifting lever.

The change-over control system required to operate the brake is installed in the terminal box to the brake lifting device. In the case of the size 16 brake only, the change-over control system is delivered separately and must be separately installed.

The brake can be provided with two switches to monitor brake wear or monitor operation (brake on/off). In this case the lead ends of the switches are run to a terminal box on the gear unit.

### 5.5 Gear unit




The gear unit is a CAVEX worm- and helical-gear unit. It is outstanding for its quiet running and high efficiency.

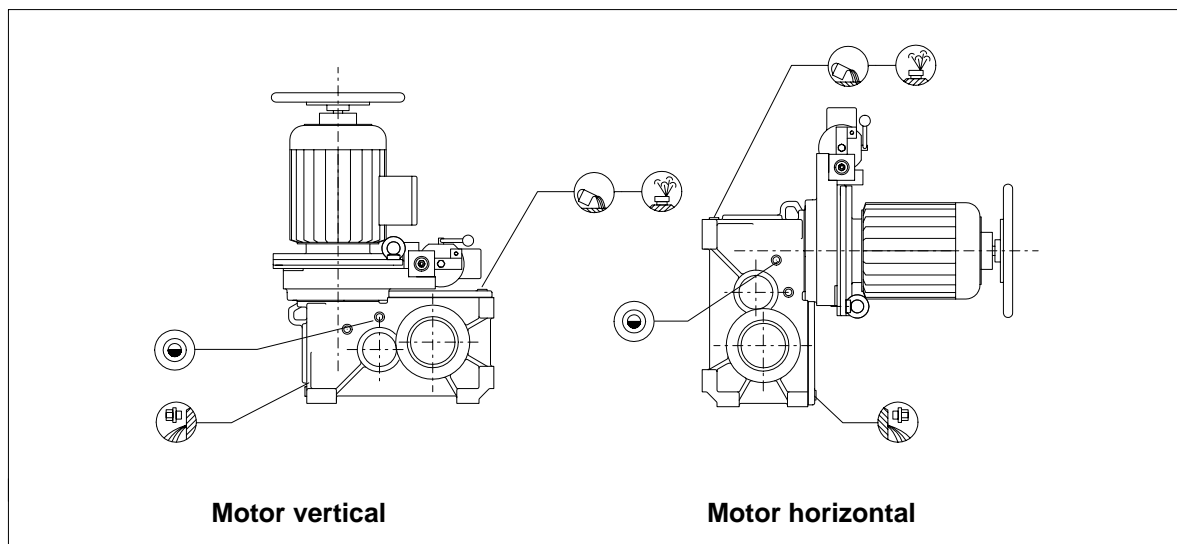
**Caution!** The gear unit is not self-locking.

All toothed gear-unit parts and rolling bearings are adequately supplied with oil by dip lubrication.

The gear unit is provided with the necessary inspection and fitting holes.

Colour codes for venting, oil inlet, oil level and oil drainage:

Breather:	yellow	
Oil inlet:	yellow	
Oil level:		
Oil drain:	white	



## 5.6 Traction sheave

The traction sheave is delivered separately. The associated cable clamp is enclosed with the traction sheave.

## 6. Assembly

**Note:** Observe the "Safety instructions" in section 3.

### 6.1 General information on assembly and installation

Assembly and installation work must be done with great care by trained and qualified personnel. The manufacturer cannot be held liable for damage caused by incorrect assembly and installation.

During the planning phase sufficient space must be left around the drive for later care and maintenance work.

Adequate lifting equipment must be available before beginning the installation and assembly work.

#### **Caution!**

**No welding work must be done on the drive.  
The drives must not be used as an earthing point for welding operations.  
Toothed parts and bearings may be irreparably damaged by welding.**

#### **Caution!**

**All the fastening points provided by the design of the unit must be used.**

The air feed for cooling the drive must not be impaired.

A means of monitoring the oil level must be provided.

## 6.2 Mounting surface

The mounting surface must be horizontal or vertical and level.

The permissible unevenness is 0.2 mm for gear unit sizes 100 and 112 and 0.3 mm for gear unit sizes 135 and 170.

The mounting surface is rigid and robust enough to withstand the forces set up.

## 6.3 Description of installation work

- Remove anti-corrosive paint on the shafts and connecting surfaces with cleaning medium

### Caution!

**The cleaning medium must not be allowed to come in contact with the shaft sealing rings.**



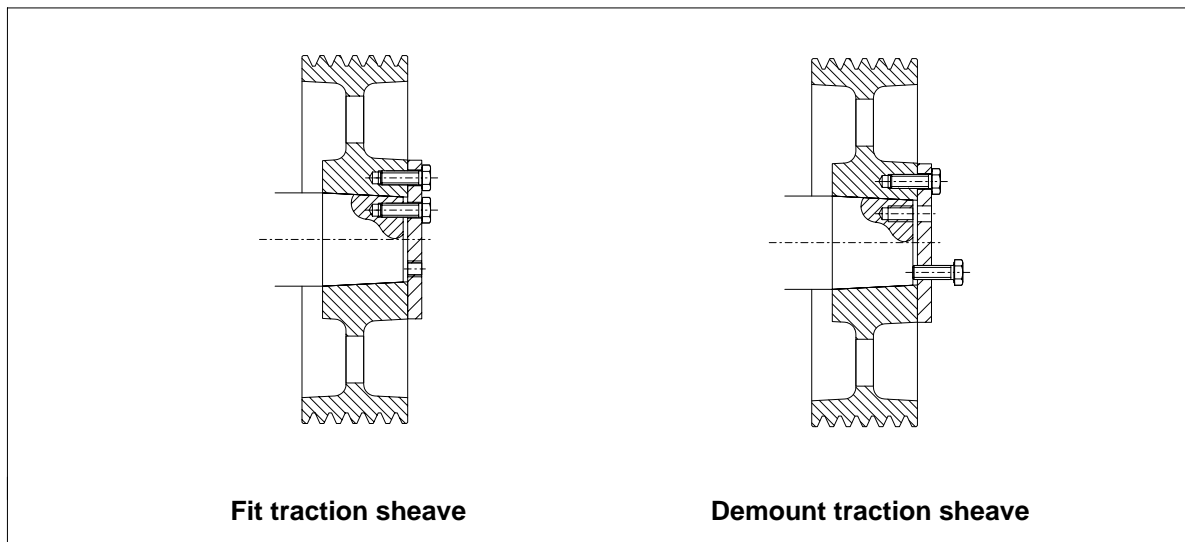
**Ensure adequate ventilation. Do not smoke!  
Danger of explosion!**

- Stand gear unit on the mounting surface and fasten down.

Fastening bolts or nuts must be tightened to the prescribed torque. For the correct torque, refer to item 10.2.4. Bolts of the minimum strength class 8.8 must be used.

- Screw the mountings for the cable safety device on in the correct position for the cable safety requirement.
- Mount the traction sheave on the output shaft and secure with the end plate.

Hexagon bolts and nuts should be tightened to the specified torque. For the correct torque, refer to item 10.2.4. The screws delivered with the unit are of strength class 8.8.



### Caution!

**Never use force or knock the couplings into position, as this may damage the rolling bearings, locking rings, etc.**

- Fit safety equipment such as cable safety device and cable guard.

## 7. Start-up

**Note:** Observe the "Safety instructions" in section 3.

**Caution!**

**On drives for non-controlled operation the brakes must be fitted with switches to monitor wear (residual travel monitoring).**

### 7.1 Oil filling

**Caution!**

**Check the oil level before starting up. The oil must be up to the middle of the sight glass at least or up to the upper edge of the sight glass at most.**

**Caution!**

**Before starting up, the upper screw plug (marked yellow) must be replaced with the breather screw supplied separately.**

#### 7.1.1 Gear unit with oil filling

In this case the gear units are filled with synthetic lubricant (polyglycol) by us before despatch.

**Note:** The rating plate shows the information: **Filled with oil.**

#### 7.1.2 Gear unit without oil filling

If the drive has been delivered without an oil filling, the gear unit must be filled with oil up to the middle of the oil sight glass at least or up to the upper edge of the sight glass at most, before starting up.

The oil quantity indicated on the rating plate is a reference value.

Various lubricants are indicated in the lubricant table (see section 10) according to the oil manufacturers' recommendations. Equivalent brands of non-foaming oil by other manufacturers may also be used. It is important to use the type of oil (synthetic or mineral oil) specified on the nameplate.

However, we cannot guarantee that a selected lubricant is completely suitable.

The oil selected for use in the gear unit must be of the viscosity (VG class) indicated on the rating plate.

### 7.2 Breather

On starting up care must be taken that the breather screw with its seal is fitted.

## 7.3 Connecting the motor, PTC resistors and the incremental transmitter

Circuit diagrams showing how the motor and, if provided, the PTC resistors and incremental transmitter must be connected up are located in the motor terminal box.

### Caution!

**Connection must be carried out by a specialist in accordance with the safety regulations applying. The relevant installation and operating regulations and the usual national and international regulations must be observed.**

- Observe information on rating plates!
- Note wiring!
- Observe rating current for safety switch setting!

**Note:** The motor must be protected against overheating e.g. with a motor safety switch.

- The cross-sectional areas of the feed lines must be adapted to fit the rating current.
- Provide pull-relief for the connecting leads.
- Ensure that the non-fused earth conductors to DIN VDE 0100 are connected to the marked earth conductor terminal.
- When closing the terminal box, use the seal originally provided.
- Seal unused inlet holes to prevent entry of dust and water.

### Caution!

**Voltages higher than 2.5 V must not be applied to the PTC-resistors.**

- Before starting up, the insulation resistance of the winding must be measured phase to phase and phase to earth.
- Damp windings can result in creep currents, flashovers and blowouts. The insulation resistance of the stator winding must be at least 1.5 megohm on motors for 220 – 1000 V at a winding temperature of 20 °C. If values are lower, the winding must be dried.



### Check before start-up:

Observe information on rating plates!

Check whether voltage and frequency of the motor correspond to the mains supply values!

Check that the motor is properly protected!

Check that the electrical connections are properly tightened and the monitoring equipment is properly connected and set!

Check that air inlet holes and cooling surfaces are clean!

Check that protective measures have been taken! **EARTH!**

Check that the terminal box cover is closed and the line inlets are properly sealed!

## 7.4 Connecting the brake lifting device.

**Caution!**

Connection must be carried out by a specialist in accordance with the safety regulations applying. The relevant installation and operating regulations and the usual national and international regulations must be observed.

**Note:** The data indicated on the nameplate must be observed!

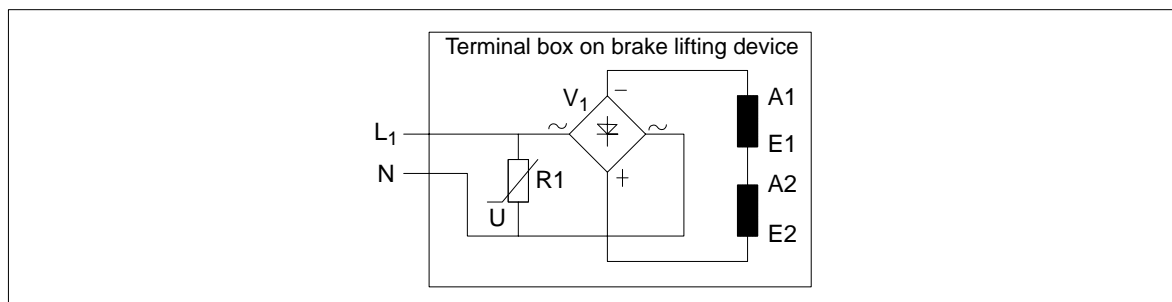
Technical data to the brake lifting device:

Brake size	10 A	10	11	13	16
Rated voltage of coil	205 V DC				
Coil resistance (± 10%)	2 x 400 Ω	2 x 143 Ω	2 x 148 Ω	2 x 130 Ω	2 x 165 Ω
Input voltage	230 V AC (+6 %, -10 %), 50/60 Hz				
Power requirement – stopping	69 W	184 W	180 W	207 W	161 W
Holding current	0.30 A	0.80 A	0.78 A	0.90 A	0.70 A
Power requirement – lifting	69 W	736 W	720 W	828 W	637 W
Lifting current	0.30 A	3.20 A	3.10 A	3.60 A	2.77 A
perm. duty cycle Ed / 10 minutes	100 %	15 / 60 %	15 / 60 %	15 / 60 %	25 / 100 %

The following diagrams show how to connect up the brake lifting device.

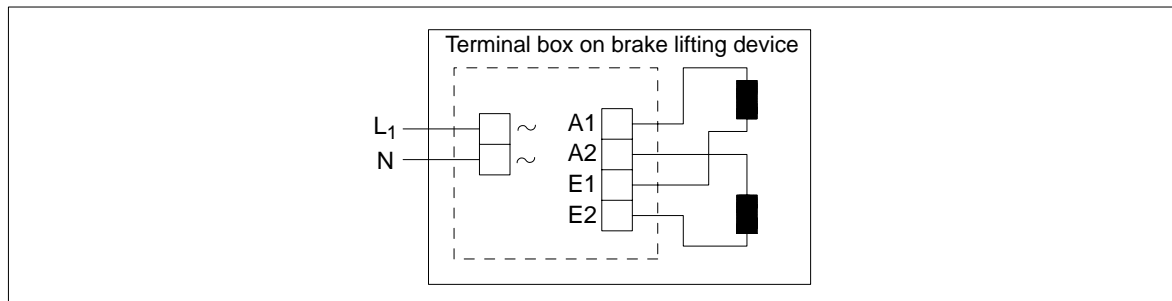
### 7.4.1 Connection diagram of the brake lifting device for brake size 10 A

Brake lifting device without overexcitation



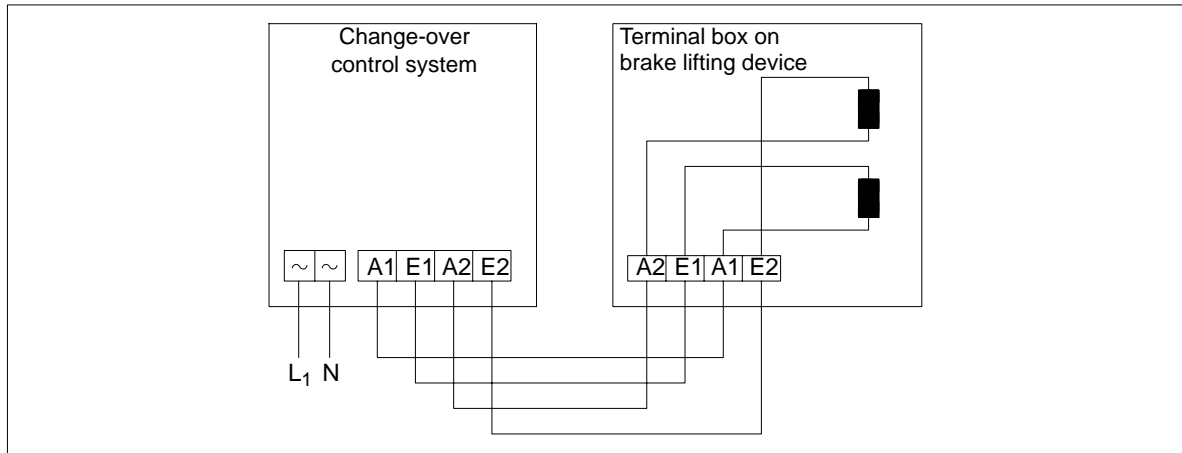
### 7.4.2 Connection diagram of the brake lifting device for brake size 10, 11 and 13

Brake lifting device with overexcitation

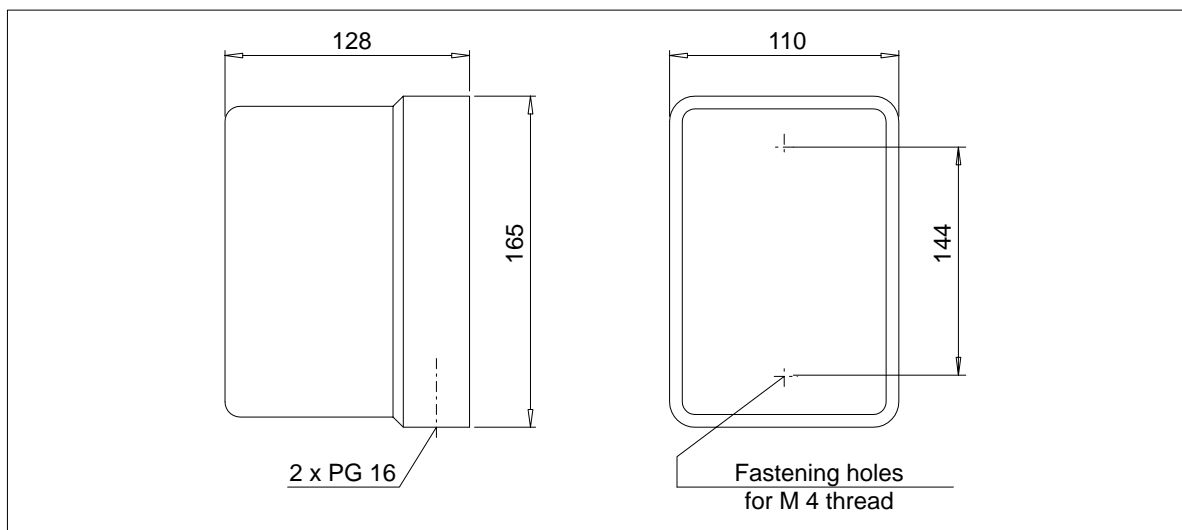


## 7.4.3 Connection diagram of the brake lifting device for brake size 16

Brake lifting device with separate change-over control system



Dimensions of plastic housing with integrated change-over control system (delivered separately)



## 7.5 Connecting the switches

**Caution!**

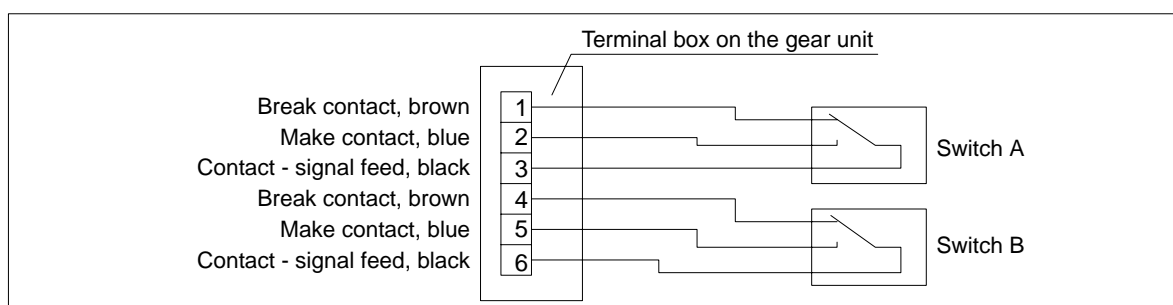
Connection must be carried out by a specialist in accordance with the safety regulations applying. The relevant installation and operating regulations and the usual national and international regulations must be observed.

The switches are designed for:

- Permanent current 4 A
- Rating current 1 A
- Rating voltage 230 V AC

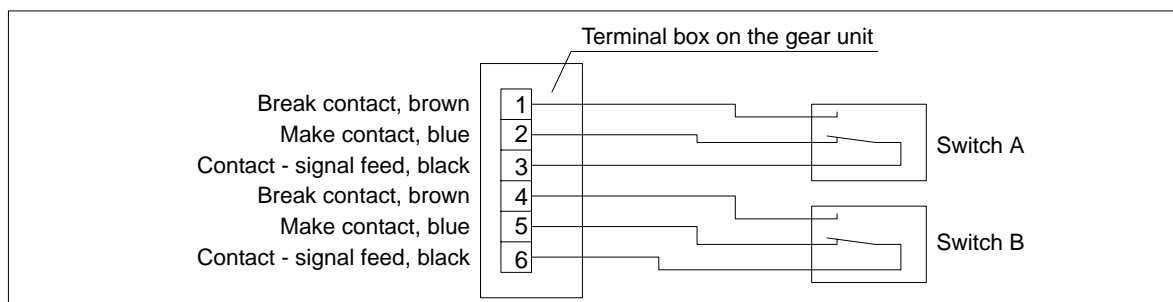
The following diagrams show how to connect up the switches.

### 7.5.1 Connection diagram of the switches for wear monitoring



Switch shown in rest position – it operates when minimum residual stroke = 0.4 mm is reached.

Connection diagram of switches for function check (brake on/off)



Switch position for braked condition – when the brake is lifted, the switch changes to the rest condition.

## 8. Operation

**Note:** Observe the "Safety instructions" in section 3.

### 8.1 General operating data

During operation of the drive watch for:

- excessive operating temperature
- unusual noises
- possible oil spillage

**Caution!**

If any irregularities are noticed during operation, switch the drive assembly off at once. Determine the cause of the fault, using the table in section 9. This table contains a list of possible faults, their causes and suggested remedies.

If the cause cannot be identified or the unit repaired with the facilities available, you are advised to contact one of our customer-service offices for specialist assistance (see section 11.).

## 9. Faults, causes and remedy

**Note:** Observe the "Safety instructions" in section 3.

**Note:** Faults and malfunctions occurring during the guarantee period and requiring repair work on the drive must be carried out only by FLENDER Customer Service. In the case of faults and malfunctions occurring after the guarantee period and whose cause cannot be precisely identified we advise our customers to contact our customer service.

**Caution!**

**FLENDER cannot guarantee or otherwise be responsible for further operation of the drive, if the drive is put to improper use, modifications are carried out without FLENDER's agreement or spare parts not supplied by FLENDER are used.**



**When remedying faults and malfunctions, the drive must be taken out of service.**

**Secure the drive unit to prevent it from being started up unintentionally. Attach a warning notice to the start switch.**

**Caution!**

**The gear unit is not self-locking.**

### 9.1 Possible faults on the gear unit

Malfunctions	Causes	Remedy
Changes in gear noise	Damage to gear teeth	Contact Customer Service.
	Excessive bearing play	Contact Customer Service.
	Bearing defective	Contact Customer Service.
	Fastening has worked loose	Tighten bolts / nuts to prescribed torque. See item 10.2.4. Replace damaged bolts / nuts.
Operating temperature too high	Oil level in gear-unit housing too high or too low	Check the oil level at room temperature and, if necessary, adjust oil level
	Oil too old	Check date of last oil change and, if necessary, change oil. See section 10.
	Oil badly contaminated	Change oil. See section 10.
	Bearing defective	Contact Customer Service.
Circumferential backlash on the traction sheave too high	Wear on worm gear	Contact Customer Service.
	Excessive bearing play	Contact Customer Service.
Oil leakage from gear unit	Radial shaft sealing rings defective	Check radial shaft sealing rings and, if necessary, replace

## 9.2 Possible faults on motor

Malfunctions	Causes	Remedy
Excessive running noise	Bearing defective	Contact Customer Service.
	Hand wheel defective	Replace hand wheel.
	Incremental transmitter defective	Replace incremental transmitter.
Excessive bearing temperature	Bearing defective	Contact Customer Service.
Motor will not start	Mains voltage too low	Check mains conditions.
	Phase break	Check connections.
Motor getting too hot	Fan suction hole fouled up	Clean fan cover.
Protective device trips	Phase break	Check connections.
	Winding or terminal short-circuit	Check insulation resistance.

## 9.3 Possible faults on brake

Malfunctions	Causes	Remedy
Brake travel too short or too long	Brake not properly adjusted	Alter braking torque. See item 10.2.5.
Switches for wear monitoring emit signal	Wear on brake linings	Re-adjust brake. See item 10.2.7 and 10.2.8.
Brake will not lift, motor will not start	Brake lifting device defective	Contact Customer Service.
Brake lifts on one side only	Brake lifting device not properly connected up	Check connections.
	Brake lifting device defective	Contact Customer Service.

## 10. Maintenance and repair

**Note:** Observe the "Safety instructions" in section 3.

### 10.1 General notes on maintenance

**Note:** Maintenance and repair work must be done with care by trained and qualified personnel only.  
Adherence to the inspection intervals is part of the guarantee conditions.

Measures	Periods	Remarks
Check gear-unit temperature	monthly	perm. 80 °C on housing, for higher temperatures, see item 9.1.
Check for unusual gear-unit noise	monthly	if changed, see item 9.1.
Check oil level	monthly	Oil level at least up to middle of oil sight glass or at most up to upper edge of oil sight glass
Check gear unit for leaks	monthly	
First oil change after start-up	after approx. 1 000 (300) operating hours, but at latest after 5 years (18 months)	see item 10.2.1
subsequent oil changes	after approx. 6000 (2000) operating hours, but at latest after 5 years (18 months)	see item 10.2.1
Cleaning the breather screw	simultaneously with oil change	see item 10.2.2
Clean the drive	simultaneously with oil change	see item 10.2.3
Checking tightness of fastening bolts	simultaneously with oil change	see item 10.2.4
Check circumferential backlash on traction sheave	yearly	Permissible are 2 mm on a 350 mm traction sheave radius (for higher circumferential backlash, see item 9.1).
Check brake linings	with controlled operation yearly; with non-controlled operation every 3 months	see item 10.2.8 and 10.2.9
Check residual stroke on brake lifting device	with controlled operation every 3 months; with non-controlled operation monthly	Set residual stroke (see items 10.2.6 and 10.2.7)

Table 10.1: Inspection intervals

**Note:** The times shown in brackets apply to mineral oils.

## 10.2 Description of maintenance and repair work

### 10.2.1 Changing the oil

**Caution!**

**When changing the oil, always re-fill the gear unit with the same type of oil. Never mix different types of oil or oils made by different manufacturers. Never mix synthetic oils with mineral-based oils or with other synthetic oils.**

**Note:**

The oil must be drained off immediately after shutting down the drive and while the oil is still warm. The oil must be given sufficient time to drain off in order to remove oil sludge, abraded metal and oil residues. If iridescent abraded bronze particles appear in the oil, this is not in any way harmful.



**There is a danger of scalding from the hot oil emerging from the housing. Wear protective gloves. Remove any oil spillage immediately with an oil-binding agent.**

### 10.2.2 Cleaning the breather screw

The breather screw must be cleaned, if a layer of dust has built up. To do this, the breather screw must be unscrewed, cleaned with benzine or similar agent and dried. It can also be cleaned by blowing out with compressed air.

### 10.2.3 Clean the drive

- Stop the drive by switching off the drive assembly



**Secure the drive unit to prevent it from being started up unintentionally. Attach a warning notice to the start switch.**

- Remove any dirt adhering to the drive with a hard brush.
- Remove any corrosion.

**Caution!**

**The drive must not be cleaned with high-pressure cleaning equipment.**

### 10.2.4 Checking tightness of fastening bolts

- Stop the drive by switching off the drive assembly



**Secure the drive unit to prevent it from being started up unintentionally. Attach a warning notice to the start switch.**

- Check tightness of all fastening bolts with a torque wrench
- Fastening bolts or nuts must be tightened to the prescribed torque. For the tightening torque, see following table.

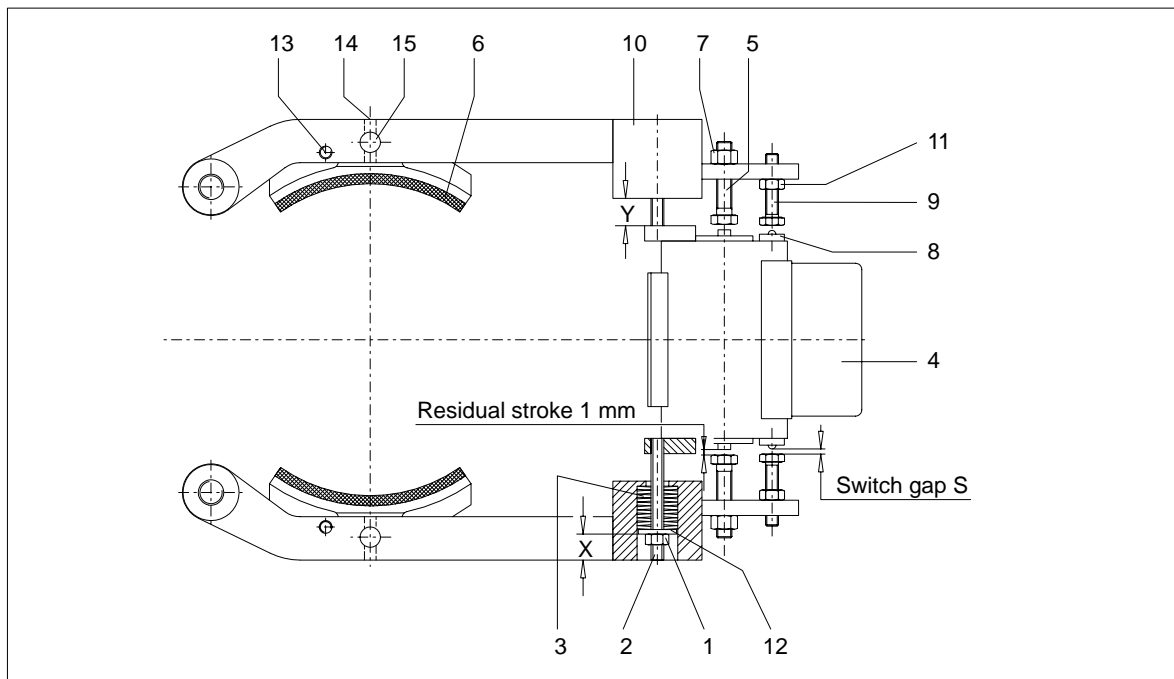
<b>Tightening torques for bolts and nuts of strength class 8.8</b>						
<b>Thread</b>	<b>M 8</b>	<b>M10</b>	<b>M 12</b>	<b>M 16</b>	<b>M 20</b>	<b>M 24</b>
<b>Tightening torque (Nm)</b>	25	49	86	210	410	710

**Note:**

Damaged bolts must be replaced with new bolts of the same type and strength class.

## 10.2.5 Alter braking torque

The brake construction is as shown below.



- Switch gap  $S = 0.6$  mm, if using the switches to monitor wear.
- Switch gap  $S = 0$  (switch biased), if using the switches to indicate position.

Brake size									
10 A		10		11		13		16	
$T_{\text{Brake}}$	Setting dimension X	$T_{\text{Brake}}$	Setting dimension X	$T_{\text{Brake}}$	Setting dimension X	$T_{\text{Brake}}$	Setting dimension X	$T_{\text{Brake}}$	Setting dimension X
Nm	mm	Nm	mm	Nm	mm	Nm	mm	Nm	mm
10	6.6	40	10.9	60	8.0	100	9.5	100	-0.6
15	7.3	45	11.7	70	9.1	120	10.2	150	0.3
20	8.0	50	12.6	80	10.3	140	10.9	200	1.5
25	8.7	55	13.6	90	11.6	160	11.8	250	2.7
30	9.4	60	14.7	100	13.0	180	12.8	300	4.1
35	10.1	65	16.0	110	14.8	200	14.0	350	5.7
40	10.9	70	17.4	120	17.0	220	15.7	400	7.7
45	11.7	75	19.0	130	19.5	240	17.5	450	10.1
50	12.6	80	20.7	140	23.6	260	20.0	500	14.3
27 cup springs individually stacked per brake lever				23 cup springs individually stacked and 1 compression spring per brake lever		30 cup springs double-stacked per brake lever			
$X_{\text{max.}} = 12.6$		$X_{\text{max.}} = 20.7$		$X_{\text{max.}} = 23.6$		$X_{\text{max.}} = 20.0$		$X_{\text{max.}} = 14.3$	
$Y_{\text{min.}} = 10.0$		$Y_{\text{min.}} = 10.0$		$Y_{\text{min.}} = 10.0$		$Y_{\text{min.}} = 5.0$		$Y_{\text{min.}} = 5.0$	

The braking torque is raised or lowered by tightening or loosening the adjusting nuts (1) on the drawbars (2).

The max. torque has been reached when the springs (3) are initially tensioned to " $X_{\text{max.}}$ " in accordance with the table.

## 10.2.6 Check residual stroke on brake lifting device

The residual stroke between brake lifting device (4) and adjusting screws (5) must be 1 mm. The residual stroke is reduced through wear on the brake linings (6). If the residual stroke is reduced (minimum residual stroke = 0.4 mm) the adjusting screw (5) must be reset to a gap of 1 mm and locked with the hexagon nut (7). The setting dimension "X" for initially tensioning the springs (3) by tightening the adjusting nut (1) must be re-adjusted by the same amount as the re-adjustment of the residual stroke.



**If no residual stroke is set, brake failure may result!**

## 10.2.7 Set switch points on the monitoring switches

On drives fitted with switches (8) to monitor wear on the brake linings (6), the switch gap must be set as follows after every re-adjustment of the residual stroke:

### a) Adjustment with gauge plate

- Screw adjusting screw (9) in until there is an approx. gap of 1 mm between it and the switch (8) in the brake lever (10).
- Locate 0.6 mm thick gauge plate between switch (8) and adjusting screw (9).
- Screw adjusting screw (9) out as far as the switch point on switch (8).
- Lock adjusting screw (9) with hexagon nut (11).

### b) Adjustment without gauge plate

- Screw adjusting screw (9) out as far as the switch point on switch (8).
- Screw adjusting screw (9) back 0.4 of a turn.
- Lock adjusting screw (9) with hexagon nut (11).

If the fitted switches (8) are used to indicate the position of the brake (brake on/off), these must be set as follows:

- Screw adjusting screw (9) in until there is an approx. gap of 1 mm between it and the switch (8) in the brake lever (10).
- Unscrew adjusting screw (9) without gauge plate as far as the switch point on switch (8).
- Turn adjusting screw (9) a further 0.5 mm (1/3 of a turn) towards switch (8).
- Lock adjusting screw (9) with hexagon nut (11).

## 10.2.8 Check wear on brake linings

To check the brake linings, dimension "Y" must be checked against the diagram in item 10.2.5.

**Note:** Dimension "Y<sub>min.</sub>" must not be lower than that indicated in the table, item 10.2.5.

## 10.2.9 Change brake shoes

The brake shoes must be changed as follows:

- Unscrew adjusting nut (1) from the drawbar (2).
- Remove thrust piece (12) and springs (3) from brake lever (10).
- Swing out brake lever.
- Undo set screw (13).
- Remove clamping sleeve (14) and bolt (15)
- Remove brake shoe (6).
- Assemble brake with new brake shoe (6) in reverse order.

**Caution!**

**Ensure that springs (1) are stacked in the correct order as indicated in the table, item 10.2.5.**

- Re-adjust braking torque (guide values for adjustment dimension “X” in table, item 10.2.5.)
- Adjust residual stroke and switch gaps (see items 10.2.6 and 10.2.7).

## 10.3 Lubricants

The oil selected for use in the gear unit must be of the viscosity (VG class) indicated on the rating plate. The viscosity class applies for the contractually agreed operating conditions.

FLENDER must be consulted for any change in operating conditions.

For its gear units, FLENDER approves only CLP oils which contain ingredients to DIN 51517-3 for improvement of corrosion protection, resistance to ageing, and which reduce wear in mixed-friction areas.

**Note:** For the various makes of oil to be used, refer to the following table.

We therefore advise our customers to select one of the lubricants listed in the table, taking into account the VG class specified on the nameplate.

**Note:** The use of gear oils which do not comply with the above quality requirements, may invalidate our product guarantee. Every oil manufacturer or supplier of oil is responsible for the quality of his product.

Always select the gear oil in accordance with the viscosity class indicated on the rating plate on the gear unit. If a different viscosity is selected, or oil of a type other than those recommended in these instructions, the operator assumes the responsibility for its technical suitability. In order to minimise the technical risk in such a case, we advise the use of a CLP oil of the above quality which should be accompanied by a statement of suitability by the oil manufacturer.

**Caution!**

**Always comply with the information given on the rating plates and the written instructions for the gear units.**

## 10.3.1 Oil types

- Mineral oils
- Synthetic oils (polyglycol)

The synthetic oils have a wider temperature range and a higher viscosity index (i.e. a flatter viscosity-temperature gradient) than the mineral oils. Guideline values for temperature range:

mineral oils approx. -10 °C to +90 °C (short term +100 °C);  
polyglycols approx. -20 °C to +100 °C (short term +110 °C).

**Note:** The upper and lower temperatures (flash point, pour point) for using certain gear oils may deviate widely from the figures indicated. For these and other data and properties of the gear oils, refer to the technical-data sheets published by the oil manufacturers.






## 10.3.2 Oil change





The degree of purity of the oil affects the operating reliability and life span of the oil and the gear unit. It should therefore be ensured that the oil in the gear unit is clean. Follow the gear-unit instructions regarding the first oil change after start-up as well as for subsequent oil changes. In the case of larger oil quantities, an analysis should be carried out before cleaning or changing the oil.

When changing oil, the quantity of oil remaining in the gear unit should be kept as low as possible. Generally speaking, a small residual quantity will cause no particular problems. Gear oils of different types and manufacturers must not be mixed. If necessary, the manufacturer should confirm that the new oil is compatible with residues of the old oil. Residues of old oil must be completely removed from the gear unit.

### Caution!

**Gear oils must never be mixed with other substances. Flushing with paraffin or other solvents is not permitted, as traces of these substances always remain inside the unit.**

Lubricant	Viscosity ISO-VG DIN 51519 at 40 °C (mm <sup>2</sup> /s)					
Mineral oils	VG 460	Degol BG 460 Plus	Energol GR-XF 460	Falcon CLP 460	SPARTAN EP 460	
	VG 220	Degol BG 220 Plus	Energol GR-XF 220	Falcon CLP 220	SPARTAN EP 220	
Synthetic oils polyglycol	VG 460	Degol GS 460		Polydea PGLP 460	GLYCOLUBE 460	SYNTHESO D 460 EP
	VG 220	Degol GS 220		Polydea PGLP 220	GLYCOLUBE 220	SYNTHESO D 220 EP

Lubricant	Viscosity ISO-VG DIN 51519 at 40 °C (mm <sup>2</sup> /s)				 <small>A BURMAH CASTROL COMPANY</small>	
Mineral oils	VG 460	Mobilgear 634		Ersolan 460	Tribol 1100 / 460	
	VG 220	Mobilgear 630		Ersolan 220	Tribol 1100 / 220	
Synthetic oils polyglycol	VG 460	Mobil Glygole HE 460	Tivela Oil SD		Tribol 800 / 460	
	VG 220	Mobil Glygole 30	Tivela Oil WB		Tribol 800 / 220	

## 11. Spare parts, customer-service addresses

### 11.1 Stocking spare parts

By stocking the most important spare and wearing parts on site you can ensure that the drive is ready for use at any time.

To order spare parts, refer to the spare-parts list.

For further information refer to the spare-parts drawing stated in the list.

We guarantee only the original spare parts supplied by us.

#### Caution!

**Please note that spare parts and accessories not supplied by us have not been tested or approved by us. The installation and/or use of such products may therefore impair essential characteristics of the drive, thereby posing an active or passive risk to safety. FLENDER will assume no liability or guarantee for damage caused by spare parts and accessories not supplied by FLENDER.**

Please note that certain components often have special production and supply specifications and that we supply you with spare parts which comply fully with the current state of technical development as well as current legislation.

When ordering spare parts, always state the following:

Order no. / Item	Type / Size	Part no.	Quantity
------------------	-------------	----------	----------

### 11.2 Spare-part and customer-service addresses

When ordering spare parts or the services of our specialist engineers, apply first to FLENDER GMBH.

#### FLENDER Germany

##### A. FRIEDR. FLENDER GMBH

DE- 46393 Bocholt - Tel.: (0 28 71) 92-0 - Fax: (0 28 71) 92 25 96  
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Shipping address: Alfred - Flender - Strasse 77, DE- 46395 Bocholt

##### A. FRIEDR. FLENDER GMBH - Kupplungswerk Mussum

Industriepark Bocholt - Schlavenhorst 100 - DE- 46395 Bocholt - Tel.: (0 28 71) 92 28 68 - Fax: (0 28 71) 92 25 79  
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## 12. Declaration by the manufacturer

### Declaration by the manufacturer

in accordance with EC Engineering Guideline 98/37/EC, Appendix II B

We hereby declare that the

Lift Drives Type  
**CG 26**  
Size 100, 112, 135, 170

described in these Operating Instructions are intended for incorporation in a machine, and that it is prohibited to put them into service before verifying that the machine into which they are incorporated complies with the EC Guidelines (original edition 98/37/EC including any subsequent amendments thereto).

This Manufacturer's Declaration takes into account all the unified standards (inasmuch as they apply to our products) published by the European Commission in the Official Journal of the European Community.



Bocholt, 2003-03-27

\_\_\_\_\_  
Signature (person responsible for products)