WALTHER FLENDER®
ANTRIEBSTECHNIK

Operating, lubrication and maintenance instructions for gearboxes and motors

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General notes

I. Assembly instructions

These instructions contain general notes applicable to all types of gearing and power transmissions. Carefully observing these notes is essential to ideal running and a long service life.

1. The drive unit shall without exception be installed in the attitude specified in the order, since the lubrication concept is set up for this arrangement.
2. All mating surfaces are to be carefully cleaned before assembly; apply a cost of rust-protection grease to the machinery and gearbox shafts.
3. When installing the gearing in close quarters it is necessary to ensure that air flow to the surface of the case is not restricted and the oil drain plug is accessible.
4. The mounting surfaces on the machine must be rigid, absolutely flat and exactly at right angles to the center of the shaft in order to avoid vibrations, tensions and bearing damage.
5. Where bottom flange connections are used with direct power transfer between the machine and the drive unit, an elastic coupling should if at all possible be used in order to compensate for any misalignment; otherwise particular care will have to be paid to alignment in all planes. The bolts for the bottom flange connectors may be tightened down only after alignment is complete.
6. Where severe loading peaks are expected, with the hazard of blocking, safety slip couplings (either frictional or one-way) or electronic overload and protective devices should be installed.

II. Motor installation

The motor is to be connected in accordance with the diagram found inside the terminal box cover or with the help of the enclosed operating instructions. The motor overload protector is set for the rated motor current (see type plate). Make sure that local voltage and frequency are identical with the specifications given on the type plate.

III. Lubrication and maintenance

The instructions for gearbox lubrication and maintenance, specific to the design employed, are to be observed. The following general notes apply as well:

1. Before putting the gearbox into service, check to make sure that there is sufficient lubricant for the intended installation position. The installation position is specified in the order. Please contact our technical office if this is ever changed. It is necessary to keep the lubrication level up to oil level screw.
2. Gearboxes which were not filled with lubricant at the factory will have to be filled with a lubricant suitable for the gearbox design, as indicated in the table below
3. The oil fill volumes given for any particular installation attitude are only guideline values; the oil level shown in the sight glass is authoritative.
4. Never mix up different sorts of lubricants or rather lubricants of different manufacturers.
5. Petroleum based lubricants as synthetic lubricants are not allowed to be mixed up; if gearboxes which had already been run with petroleum-based lubricants are to be filled with a synthetic product, then it will be necessary to flush the inside of the gearbox beforehand in order to avoid saponification.
6. The oil change intervals for the various gearbox designs and sizes are to be observed (see the table on „General oil change intervals").
7. The oil should be warm when it is drained; flush the gearbox before installing new oil.
8. The flanks of the toothing in a new gearbox will run in during the first few hours in service. This creates microscopic particles which will contaminate the lubricant. That is why we recommend changing the lubricant after the first 500 hours in service and flushing the gearbox before installing new lubricant.

Storage

If longer periods out of service or in storage (particularly outdoors, in salty air or in rooms with high humidity, wide temperature fluctuations or corrosive vapors) are to be expected, then a preservative agent will have to be applied to the gearing and the motors and renewed at regular intervals. In addition, the gearboxes will have to be filled completely with lubricant and operated every two to three months or the shafts will have to be turned through a few revolutions. It will also be necessary to start the motors and braking motors briefly several times at the same intervals.
The oil will have to be lowered to the prescribed level before returning the system back to service.

General oil change intervals

Oil temperature	Operating mode	Hours in operation
< 60° C	Continuous Intermittent	5000 h 8000 h
> 60° C	Continuous Intermittent	2500 h 5000 h

Environment temperature		**-10°C to +50°C**		**-30°C to +100°C**	**-40°C to +120°C**	**-10°C to +60°C**
Lubricant		**Petroleum based oil**	**Synthetic oil**	**Synthetic grease**		
Load		**Medium**	**Heavy**	**Medium and Heavy**		**Medium and Heavy**
Manufacturer	**IP**	Mellana Oil 320	Mellana Oil 460	Telesia Oil 150		Telesia Compound A
	ESSO	Spartan EP 320	Spartan EP 460	S 220		EGL 3818 A
	AGIP	Blasia 320	Blasia 460	Blasia 5		
	MOBIL	Mobilgear 632	Mobilgear 634	Glycoil 30		Glycoil Grease 00
	SHELL	Omala EP 320	Omala EP 460	Tivela Oil WB		Tivela Compound A
	BP	Energol GR-XP 320	Energol GR-XP 460	Energol SG-XP 220		Energrease G-SF
	TEXACO	Meropa 320	Meropa 460	Synoil CLP-220		Glissando GF 1064
	TOTAL	Carter EP 320	Carter EP 460			
	KLÜBER			Syntheso D220	Syntheso HT 220	Structovis P Liquid

Worm gears

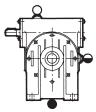
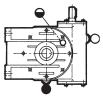
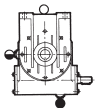
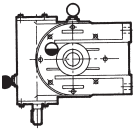
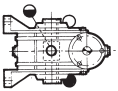
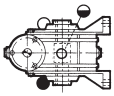
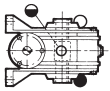
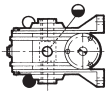
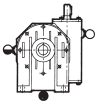
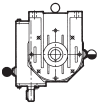
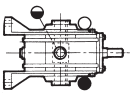
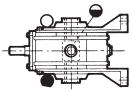
All worm gears and worm gear motors through to and including size 90 are shipped with a lifetime lubricant fill and thus are maintenance-free. Gearboxes as of size 110 will have to be filled with oil before they are put into service. Following consultation with the manufacturer, a lifetime grease fill may be installed (see table at the right).
The Tivela SC 320 synthetic lubricant made by Shell is used for gearboxes up to size 190.
Similar synthetic oils listed in the table may also be used.
Thanks to their excellent lubricant properties, these oils are extremely dependable and will extend the service life of the gearing.

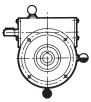
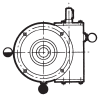
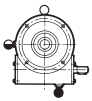
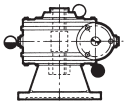
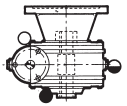
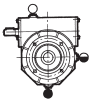
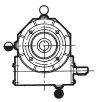
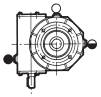
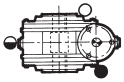
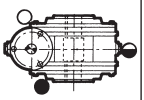
Lifetime lubrication
Recommended synthetic lubricants

	Operating temperature	**- 40°C + 130°C**
	Environment temperature	**- 30°C + 50°C**
	Lubricant	**Synthetic oil**
	Type of loading	**Medium and heavy**
Manufacturer	**IP**	Teliumöl VSF
	ESSO	Clycoil Liberange 220
	FINA	Giran S 320
	SHELL	Tivela Oil SC 320
	KLÜBER	Syntheso D 220 EP

Oil quantity for worm gears

Gearbox size	**I 30**	**I 40**	**I 50**	**I 60**	**I 70**	**I 80**	**I 90**	**I 110**	**I 130**	**I 150**	**I 175**
Oil / Liters	0.03	0.095	0.163	0.384	0.44	1.05	1.75	2	3	5	7

Version	**B3**	**V5**	**B8**	**V6**	**B6**	**B7**
A	Standard 					
B	Standard 					
V	Standard 					

Version	**B5**	**B51**	**B53**	**B52**	**V1**	**V3**
F **FR** **FBR**						
FP			Standard 			

○ Fill/vent screw ◒ Oil level indicator ● Drain screw

Helical Bevel gears, Helical gears and slip-on gears

The preliminary stages for the three-stage Helical (bevel gears) are factory-filled with Tivela SC 320 synthetic oil, made by Shell. The main gearbox (version OT, with the exception of size 56) are delivered dry; the customer will have to install oil.

Select the oil in accordance with the appropriate table of lubricants; the amount of oil will depend on the size and design of the gearing and the installation attitude..

The synthetic oils are particularly suited for long-term lubrication with extended inspection cycles.

It is recommended that gearboxes be serviced every six months to a year, depending on the type of loading and the operating temperatures. In these inspections noise and temperature measurements are to be made with the system running and the oil fill level is to be checked with the system at a standstill.

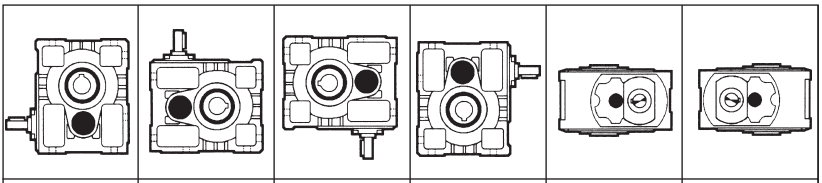
Heavy grime can hinder heat dissipation and is thus to be removed. If oil is escaping at the seals, then the gaskets will have to be replaced; the flange bolts may have to be tightened down where flange seals are used.

Shaft sealing rings made of fluoride plastics will be required at operating temperatures of more than 85°C.

Helical Bevel gears

Installation position

OT.. OT../3



B3	B6	B7	B8	V5	V6

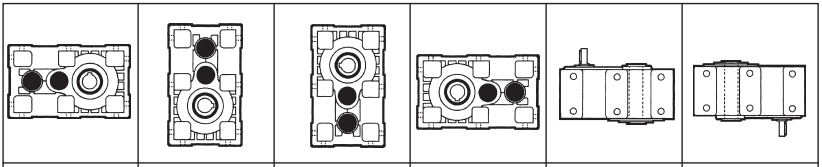
Lubricant quantity in liters

Installation position	Size					
	56	63	80	100	125	160
B 3, B 6, B 7	(factory filled) 0.8	0.9	1.4	2.6	5.6	9.5
B 8	0.9	1.1	1.6	3.2	6.5	11.0
V 5, V 6	0.9	1.0	1.5	3.0	5.8	10.5
Preliminary stage for OT../3 Factory-filled	0.2	0.3	0.5	0.7	0.9	1.5

Helical gears with parallel shaft

Installation position

PL..
PL../3



B3	B6	B7	B8	V5	V6

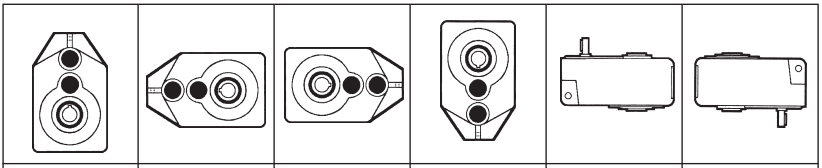
Lubricant quantity in liters

Installation position	Size 63	80	100	125	160
B 3, B 8	0.9	1.5	2.8	5.6	10.0
B 6	1.4	2.1	4.0	7.6	12.5
B 7	1.1	1.8	3.6	7.0	11.7
V 5, V 6	1.2	1.9	3.8	7.2	12.0
Preliminary stage for PL../3 Factory-filled	0.2	0.3	0.4	0.6	0.8

Slip-on gears (shaft mounted gearboxes)

Installation position

PD..
PD../3



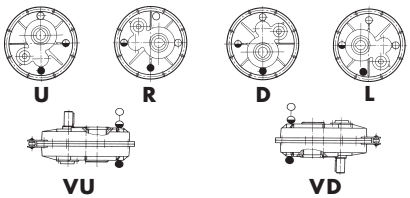
B3	B6	B7	B8	V5	V6

Lubricant quantity in litres

Installation position	Size 63	80	100	125	160
B 3	1.1	1.6	2.8	5.5	10.0
B 6, B 7	0.8	1.4	2.6	5.3	9.8
B 8	1.0	1.7	3.5	6.6	11.2
V 5, V 6	11.1	1.8	3.6	6.8	11.6
Preliminary stage for PD../3 Factory-filled	0.2	0.3	0.4	0.6	0.8

Slip-on shaft mounted gearboxes

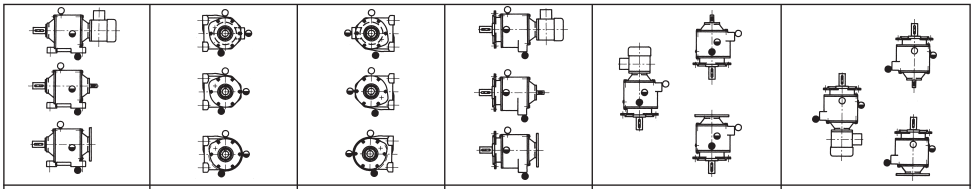
Installation position



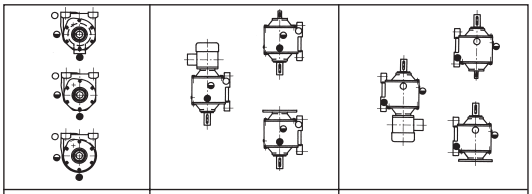
Type of gearbox	Lubricant quantity in litres
RP 71/2	1
RP 91/2	2.4
RP111/2	3.1
RP131/2	3.9
RP151/2	5.7
RP181/2	8
RP221/2	12

Coaxial Helical gears (Type HL)

Installation position



B3	B6	B7	B5	V1	V3



B8	V5	V6

Gearbox size	Oil volume in liters (depending on the installation position)								
	B3	B5	B6	B7	B8	V1	V3	V5	V6
HL 20/2 (*)	0.4	0.4	0.5	0.5	0.5	0.7	0.6	0.7	0.6
HL 25/2	0.4	0.4	0.7	0.8	0.6	1.1	1	1.1	1
HL 30/2	0.7	0.6	1.2	1.3	1.1	2.2	2.1	2.2	2.1
HL 40/2	1.3	1.2	2.2	2.3	2.1	3.8	3.6	3.7	3.5
HL 50/2	2.9	2.7	4.6	4.8	4.5	7.8	7.5	7.8	7.5
HL 60/2	5	4.7	7.5	8.4	7.2	12.8	12.1	13	12.3
HL 70/2	7	6.5	11.4	12.4	10.8	19.5	18.6	20	19
HL 25/3	0.5	0.5	0.8	0.9	0.7	1.2	1.1	1.2	1.1
HL 30/3	0.8	0.7	1.3	1.4	1.2	2.3	2.2	2.3	2.2
HL 40/3	1.5	1.4	2.4	2.5	2.3	4	3.8	3.9	3.7
HL 50/3	3.1	2.9	4.8	5	4.7	8	7.7	8	7.7
HL 60/3	5.4	5	7.8	8.7	7.5	13.2	12.5	13.3	12.5
HL 70/3	7.5	7	11.9	12.9	11.3	20	19.1	20.5	19.5

(*) Filled with lubricant at the factory

WF angular gears – light version

All WF angular gears are delivered from the factory with lubricant installed. Size DZ 1 is lifetime-lubricated with AGIP GR SLL synthetic grease; all other sizes are filled with a petroleum-based oil (AGIP BLASIA 100).

There is positive lubrication due to the rotation of the components. It is advisable to replace the lubricating oil after the first 500 hours in service and to flush the gearbox.

It is recommended that the oil be changed every 3,000 hours in service thereafter. It is absolutely necessary to flush the inside of the gearbox before installing a synthetic oil in order to avoid saponification.

Important: Never mix up different sorts of lubricants or rather lubricants of different manufacturers.

Table of lubricants

Gearbox size	DZ 1	DZ 2 bis DZ 5
Lubricant type	Synthetic grease	Petrolium-based oil
Ambient-temperature	-10° C + 60° C	-10° C + 50° C
	Lubricant selection	
AGIP	GR SLL	Blasia 100
ESSO	EGL 3818 A	Spartan EP 100
SHELL	Tivela Compound A	Omala 100
MOBIL	Glycoil Grease 00	Mobilgear 627
KLÜBER	Structovis liquid	Lamora Gear oil 100

Lubricant quantity

Gearbox sizes	DZ 1	DZ 2	DZ 3	DZ 4	DZ 5
Fill quantity	15 g	30 ml	150 ml	180 ml	200 ml

WF angular gears – heavy version

The bevel gears will be delivered with grease lubrication for input speeds of up to 1,000 rpm.

In all other cases (please indicate when ordering), oil lubrication will be provided. The bevel gears in this case will be delivered with an oil filler plug, vent screw, oil level screw and drain screw. This makes it necessary to specify the installation attitude.

Implementing positive lubrication is recommended at high input speeds.

Since the lubricant will be contaminated to a certain extent during initial service, we recommend replacing the lubricant after the first 500 hours in service and to flush the gearbox before installing new lubricant.

Lubricant quantity / Gearbox weights

Size	Grease (Liters)	Oil (Liters)	Weight (kg)
BG 12	0.15	0.10	2.5
BG 19	0.22	0.15	6.0
BG 24	0.35	0.22	12.0
BG 32	0.90	0.60	22.0
BG 38	1.70	1.10	37.0
BG 42	3.50	2.20	57.0
BG 55	5.50	3.60	87.0
BG 75	14.00	9.00	255.0

Recommended lubricants

The following table lists the recommended lubricant quantities, referenced to the gearbox size and input speed. These specifications are valid for ambient temperatures of from 0 to +35°C.

	Speed (rpm)					
	0 to 100	**100 to 400**	**400 to 700**	**700 to 1000**	**1000 to 1500**	**1500 to 3000**
BG 12	Grease	Grease	Grease	Grease	Grease	Grease
BG 19	Grease / B / 2	Grease / C / 3	Grease / C / 3	Grease / C / 3	Grease / D / 4	Grease / D / 4
BG 24	Grease / B / 2	Grease/ B / 2	Grease / C / 3	Grease / C / 3	Grease / D / 4	D / 4
BG 32	Grease / B / 2	Grease / B / 2	Grease / C / 3	Grease / C / 3	Grease / C / 3	D / 4
BG 38	Grease / B / 2	Grease / B / 2	Grease / B / 2	Grease / C / 3	C / 3	C / 3
BG 42	Grease / A / 1	Grease / B / 2	Grease/ B / 2	Grease / C / 3	C / 3	C / 3
BG 55	A / 1	A / 1	B / 1	B / 2	B / 2	*)
BG 75	A / 1	A / 1	B / 1	B / 2	*)	*)

*) Not suited for these speeds.

	Petrolium-based oil					
Quality	**ISO VG at 40°C**	**Mobil**	**Shell**	**IP**	**Esso**	**Tribol**
A	320	Mobilgear 632	Omala Oil 320	Mellana 320	Spartan EP320	1100/320
B	220	Mobilgear 630	Omala Oil 220	Mellana 220	Spartan EP220	1100/220
C	150	Mobilgear 629	Omala Oil 150	Mellana 150	Spartan EP150	
D	68	Mobilgear 626	Omala Oil 68	Mellana 68	Spartan EP 68	1100/68

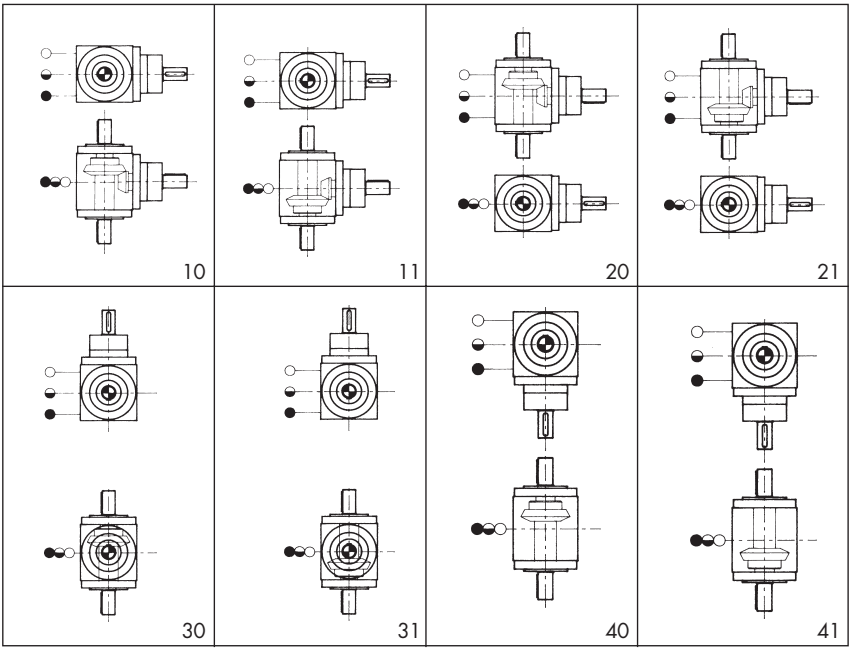
	Synthetic Oil				
Quality	**ISO VG at 40°C**	**Mobil**	**Shell**	**IP**	**Tribol**
1	320	SHC-632		Enersyn EPX 320	1510/320
2	220	SHC-630	Tivela Oil WB	Enersyn EPX 220	1510/220
3	150	SHC-629	Tivela Oil WA	Enersyn EPX 150	
4	68	SHC-626			1510/68

	Grease	
Quality	**Mobil**	**Esso**
Petroleum-based	Mobilux EP 004	Beacon EP 2
Synthetic	Gligoyle Grese 00	

Installation position, Type A

Side view

Top view

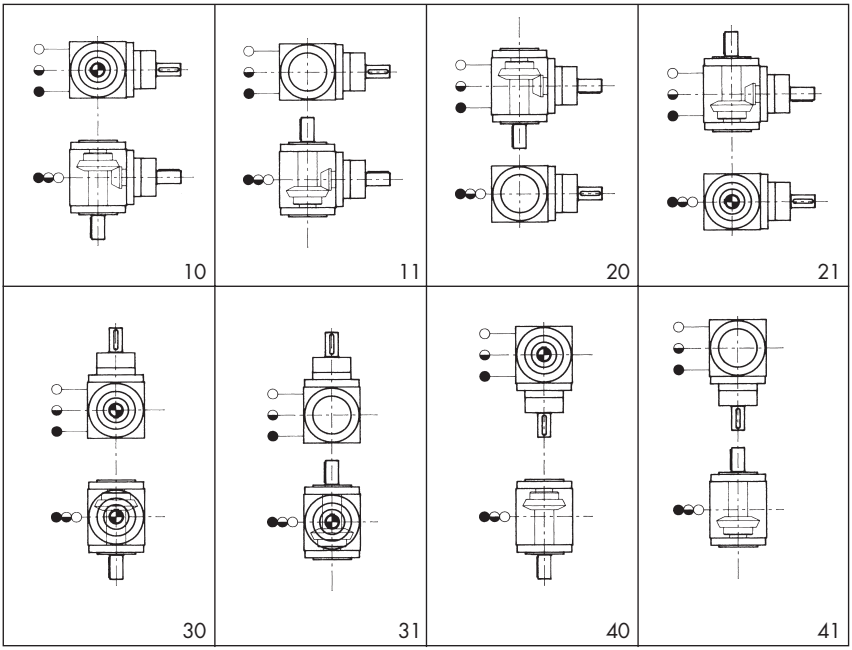


○ Fill / vent screw ◒ Oil level indicator ● Drain screw

Installation position, Type AS

Side view

Top view

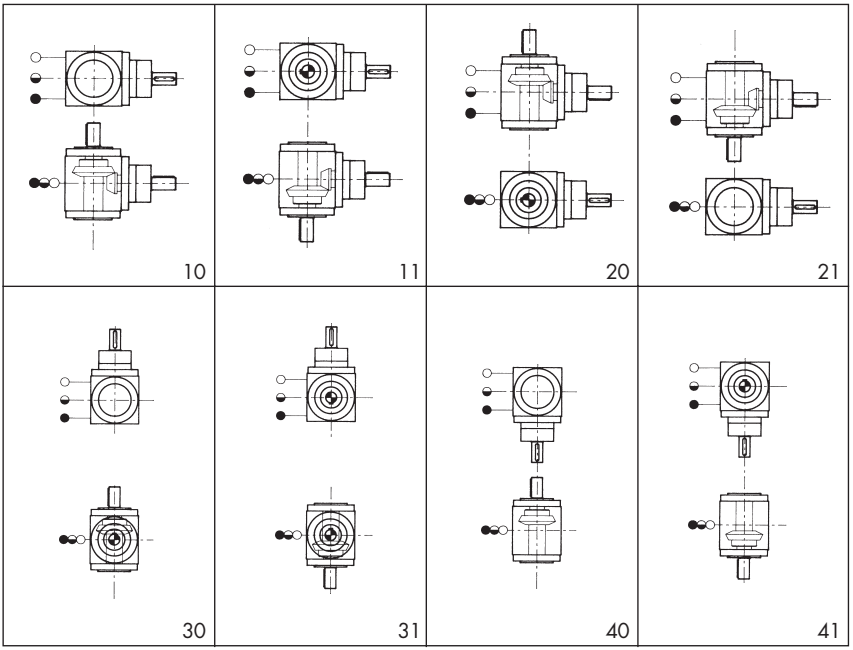


○ Fill / vent screw ◒ Oil level indicator ● Drain screw

Installation position, AD

Side view

Top view



Side view

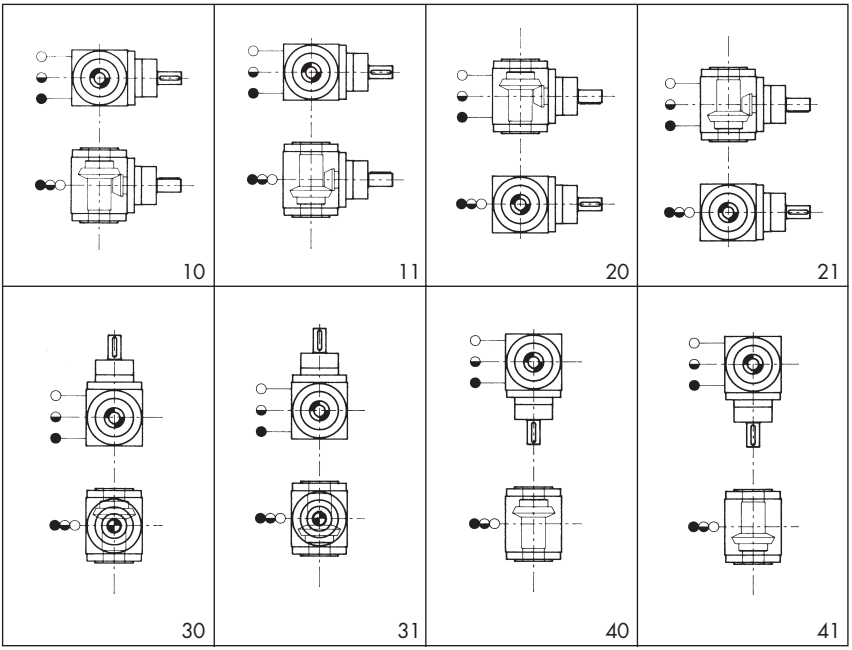
Top view

○ Fill / vent screw ◒ Oil level indicator ● Drain screw

Installation position, AH

Side view

Top view



Side view

Top view

○ Fill / vent screw ◒ Oil level indicator ● Drain screw

Speed variators

The oil in speed variators will have to be replaced after the first 100 hours in service and every 1,000 operating hours thereafter. Here it is always necessary to check ensure that the fill level comes to the middle of the sight glass.

All downline gearboxes in the R1 Series (single-stage), the R2 Series (two-stage) and the R3 Series (three-stage), in sizes 40, 50 and 63, are filled with a long-life lubricant and thus have only oil filler and drain screws and no sight glass.

The R2 and R3 Series gearboxes in sizes 80, 100 and 125 are delivered filled with oil and will require an oil change after a run-in period of between 500 and 1,000 hours in operation.

The inside of the gear case will have to be cleaned thoroughly before installing new oil. Subsequent oil changes are required every 4,000 hours in service.

The gear cases are fitted with one each oil filler, drain and vent screw. To avoid oil losses during shipping the vent opening is closed with a blind screw. This will have to be removed and replaced with the supplied vent screw (see "Installation attitude" illustration) before putting the unit into service.

Lubricant quantity, dependent on the installation guide

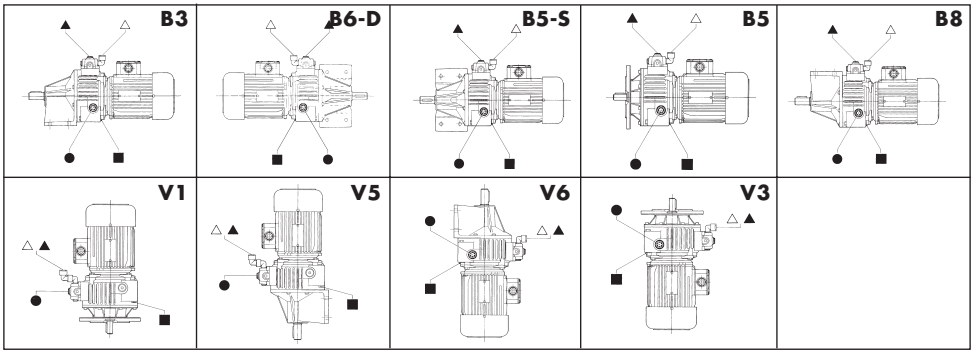
	Installation guide			Recommended lubricants	
SC-SF-ST	**B3-B5-B6-B8**	**V1-V5**	**V3-V6**		
03	0.150	0.210	0.225	DEXRON FLUID II [1]	IP [1]
05	0.210	0.330	0.330	A.T.F. DEXRON FLUID	SHELL
10	0.360	0.680	0.360	A.T.F. 220	MOBIL
20	0.600	1.070	0.600	A.T.F. DEXRON	FINA
30/50	1.200	2.150	2.150	BP AUTRAN DX	BP
100	2.000	3.580	3.840	A.T.F. DEXRON	ESSO
				A.T.F. DEXRON	CHEVRON
				A.T.F. DEXRON	AGIP

[1] Lubricant installed at the factory

Lubricant quantity for downline coaxial gears

R1 gearing				R2-R3 gearing			
SRT SRF-SRM	**Oil quantity**	**Oil type**	**Manu-facturer**	**SRT-SRF**	**Oil quantity**	**Oil type**	**Manu-facturer**
03/1 - 40	0.100	ATINA GREASE 0	IP	2-40	0.300	TELESIA COM-POUND A	IP
				3-40			
05/1 - 50	0.38			2-50	0.800		
				3-50			
10/1 - 63	0.650			2-63	1.300		
				3-63			
20/1 - 80	1.000			2-80	2.100	MELLANA OILS	
				3-80			
30/50/1-100	1.400			2-100	4.200		
				3-100			
100/1-125	1.800			2-125	6.300		
				3-125			

Installation position



△ Vent screw ▲ Oil fill screw ■ Drain screw ● Sight glass

Operating instructions for electric motors

Electrical connection – Star/delta circuit

Before connecting to the line supply, ensure that the line voltage is identical with the specifications on the motor's data plate.

The motor shall be properly wired at the terminal box and in accordance with the schematic shown for 3-phase AC motors.

If the direction of rotation is not correct then it can be reversed by interchanging two „hot" wires.

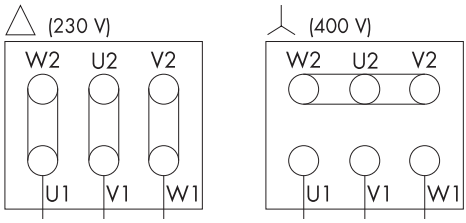
Voltage/Frequency

Unless stated otherwise with the order, three-phase current motors are wound for a voltage of 230/400 V, 50 cycles ± 10 %, as standard. Threephase current motors wound for the 50 Cycles mains frequency can also be connected to a 60 cycles mains network.

This exludes brake motors, explosion-protected motors and single-phase motors.

The tables below give the data, taking into account the voltage or frequency change.

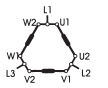
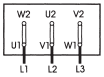
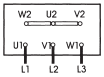
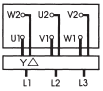
Star-Delta connection



Motor winding	Motor-power supply	Variable data depending upon mains frequency				
		kW	n_1	A	Nominal torque	Acceleration torque
230 V 50 Hz	230 V 60 Hz	100 %	120 %	100 %	83 %	83 %
	265 V 60 Hz	115 %	120 %	100 %	100 %	100 %
400 V 50 Hz	400 V 60 Hz	100 %	120 %	100 %	83 %	83 %
	460 V 60 Hz	115 %	120 %	100 %	100 %	100 %

Operating Connections for Three-Phase Motors

Windings configuration	Operating voltage at 50 Hz	With squirrel cage roto for direct switch on	For Y/Δ starting
220/380 Y	220 380	220 Δ 380 Y	220 –
230/400 V	230 400	230 Δ 400 Y	230 -
380 Y	380	380 Y	-
400 Y	400	400 Y	-
500 Y 500 Δ	500 500	500 Y 500 Δ	- 500
380 Δ /660 Y	380 660	380 Δ 660 Y	380 -
400 Δ/690 Y	400 690	400 Δ 690 Y	400 -
660 Y	660	660 Y	-
690 Y	690	690 Y	-

	Winding configuration 230 VΔ/400 VY Direct switching on at operating voltages of 230 V	400 V	Y-Starting at operating voltage of 230 V
Connection of the winding legs			The ends of the three winding legs go to a Y switch
Connection on the terminal board	 Δ-Connection	 Y-Connection	 YΔ-Connection

General Bearing Information

In the standard configuration, the motors are quipped with C3 bearing. For motors whose bearings are subjected to extremely low or extremely high temperatures, special grease and/or special bearings must be used.

Bearing Lubrication

Closed Bearings

The motors of the construction group 56 to 160 are equipped with closed bearing and therefore cannot be re-lubricated. For this reason, these bearings must be replaced after the fatigue service life or grease service life expires (see table). In the standard configuration, our motors are delivered with 2Z bearing with a lubricant with a reference temperature of 85 °C. Also with regard to other factors such as contamination and the effects of humidity, the renewal of 2Z bearings is recommended at least every four years.

Re-lubrication Intervals

The Re-lubrication intervals depend to a large degree on the speed, the bearing loading, the environmental factors and the mounting of the motor. For re-lubricating, the recommendations of the bearing and grease manufacturers are to be observed. For motors with vertical mounting, the re-lubrication interval must be halved. For bearing temperatures that are higher than the reference temperature of the grease used, the re-lubrication interval must be halved for each 15 „C of temperature increase. For lower bearing temperatures, a longer re-lubrication period is adequate, however, should not be longer than double the value given.

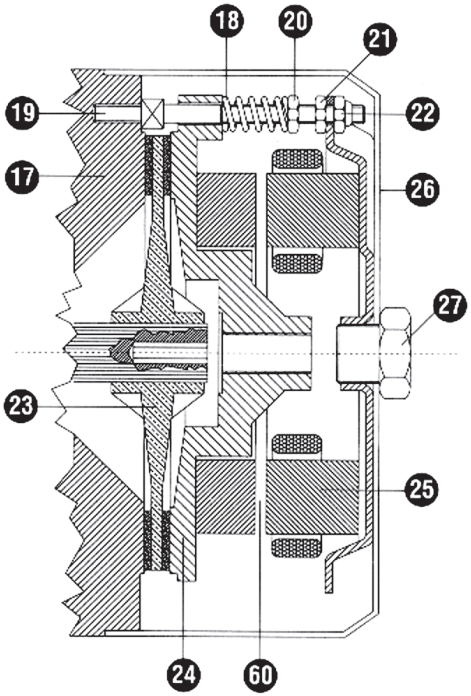
Brake Group BA-CF Series

AIR GAP ADJUSTMENT

The air gap 60, i.e. the distance between the 2 magnetics cores, brake coil 25 and brake moving element 24, must be 2-4 tenths of a millimeter. It is unadvisable to exceed this value in order to avoid vibrations of the brake moving element and, probably, the burning of the brake coil. It is advisable to check periodically the air gap, because by the wear of the brake disc linings, it tends to increase. In order to set the air gap back to the required value, operate on the nut 21 to obtain the brake coil's forward displacement towards the brake moving element. When this operation has been settled, the locknut 22 should be tightened.

BRAKING TORQUE ADJUSTMENT

The braking torque is proportional to the springs 18 compression, which can be varied operating on locknut 20. The compression of the three springs must be as even as possible. If the brake coil 25 isn't able to call the brake moving element 24 back with a quick stroke and keep it attracted without vibrations, verify the exact air gap adjustment and, if this inconvenience still persists, loosen the locknut 20 of two threads and try it again until desired functioning is obtained.



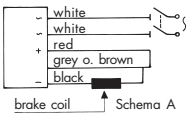
Brake

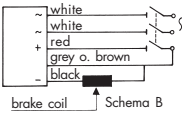
The motors of series BA are delivered with threephase AC brakes. On request the motors can be supplied with DC brakes. Those differ from the AC brakes by the electromagnet and the rectifier, through which the feeding take place.

Both types of brakes can be feeded also at motor full stop at no time limit.

The threephase brake AC will brake fast and exactly, whilst the DC brake is breaking steady and smooth. The motors are delivered with the basic connection per scheme A.

If there is desired a fast braking the connection must be done per scheme B.





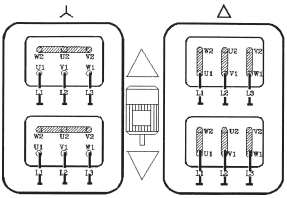
Wiring Diagram

Double Terminal Board

BA
- A.C. Brake -

Brake

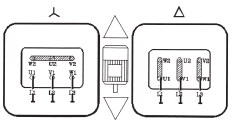
Motor



Brake +
Motor

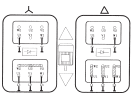
Single Terminal Board

BA
- A.C./D.C. Brake -



Brake
Rectifier
Motor

BA
- D.C. Brake -



TROUBLESHOOTING GUIDE

This chart contains malfunctions that may arise during operation. They are listed according to the individual functions of the gearbox. The trouble, causes and part that may have caused the fault are indicated in the chart.

PROBLEM	POSSIBLE CAUSES	REMEDY
The motor does not start	a) The motor's electrical wiring is faulty b) The motor is faulty c) Wrong size motor	a) Check the connections b) Replace the motor c) Replace the motor
The motor and gearbox reach temperatures which are too high	a) Mechanical overload b) Wrong size geared motor assembly	a) Check the mechanical parts driven by the geared motor assembly b) Replace the geared motor assembly
The current absorbed and/or the temperature of the motor are too high	a) Motor faulty b) Wrong size motor	a) Replace the motor b) Replace the motor
The gearbox reaches a temperature which is too high	a) Gearbox faulty b) Wrong size gearbox c) Wrong mounting position d) Not enough lubricant indicated is reached	a) Repair or replace the gearbox b) Replace the gearbox c) Check that the gearbox supplied is that ordered d) Add lubricant until the level
Oil leaks from the shafts	a) Ring seals worn down or defective b) Seal seat on the shaft worn	a) Replace the ring seals b) Replace the ring seals and install them in a very slightly different position or replace the shafts
Oil leaks from the seals	a) Flanges not tightened properly b) Seals defective	a) Tighten the flanges b) Replace the seals and check that the surfaces are properly machined
The gearbox is making a banging noise	a) Gear teeth defective	a) Contact our customer service department
The gearbox is whistling	a) Not enough lubricant b) Gears defective or worn down c) Bearings defective or not installed properly	a) Add lubricant until the level indicated is reached b) Contact our customer service department c) Contact our customer service department

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