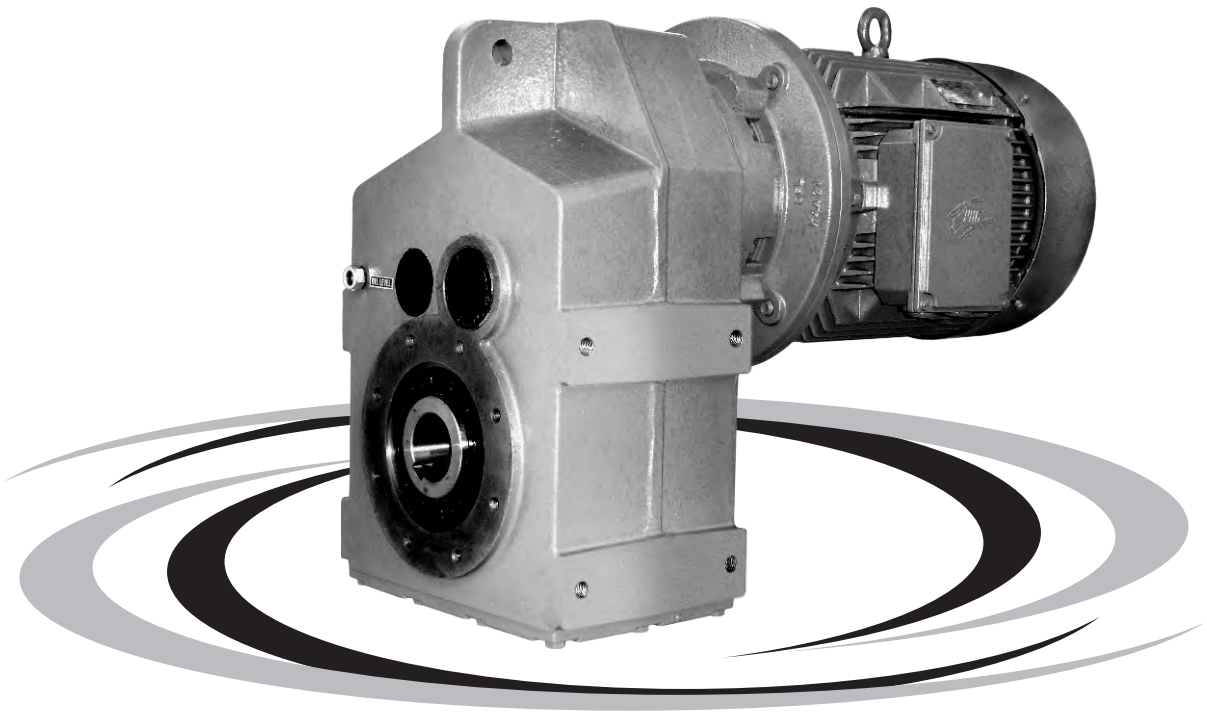
Series F

TÜVRheinland® CERT
Certified Management System according to ISO 9001:2008

Installation & Maintenance Manual

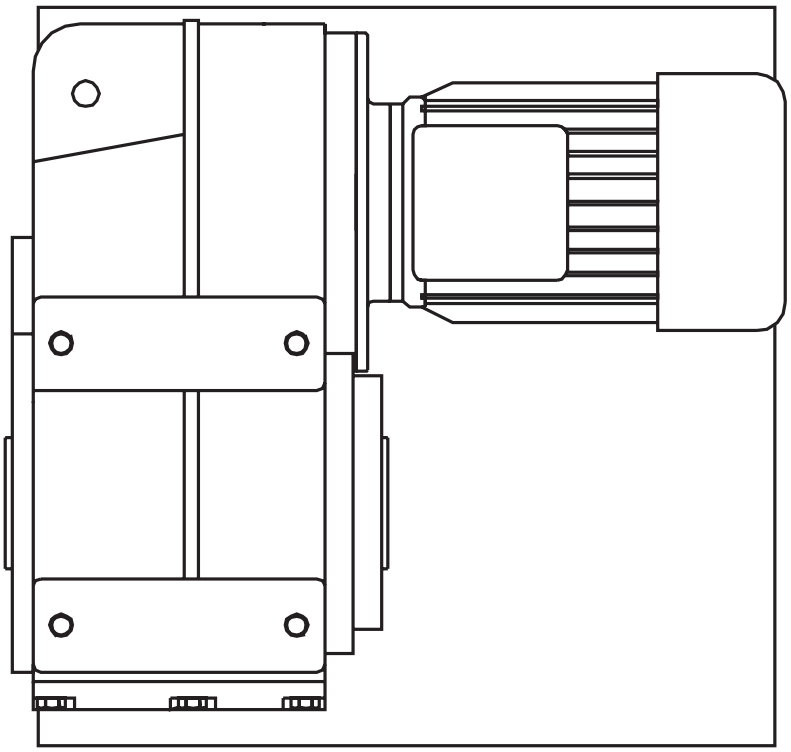


radicon POWERBUILD

POWER BUILD LIMITED

Leaders in Power Transmission Solutions

Cat.No.: IM/F/02/07-10/500



INSTALLATION & MAINTENANCE

SERIES F

POWER BUILD LIMITED

Leaders in Power Transmission Solutions

IMPORTANT

Product Safety Information

General - The following information is important in ensuring safety. It **must** be brought to the attention of personnel involved in the selection of Power Build Limited equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

Power Build Limited equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment **proper precautions must** be taken as indicated in the following paragraphs, to ensure safety.

Potential Hazards - these are **not** necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:-

1) Fire/Explosion
   (a) Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked lights in the proximity of gearbox openings, due to the risk of fire or explosion.
   (b) In the event of fire or serious overheating (over 300 °C), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.

2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.

3) Noise - High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances.

4) Lifting - Where provided (on larger units) only the lifting points or eyebolts must be used for lifting operations (see maintenance manual or general arrangement drawing for lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.

5) Lubricants and Lubrication
   (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
   (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Take notice of all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.

6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the gearbox or associated equipment, in order to prevent the machinery being started.

7) Installation, Maintenance and Storage
   (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, Power Build Limited must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration.

   The rotating components (gears and shafts) must be turned a few revolutions once a month (to prevent bearings brinelling).
   (b) External gearbox components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent.

   Preservatives applied to the internal parts of the gear units do not require removal prior to operation.
   (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
   (d) Before working on a gearbox or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
   (e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and Power Build Limited approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.

8) Hot Surfaces and Lubricants
   (a) During operation, gear units may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
   (b) After extended running the lubricant in gear units and lubrication systems may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.

9) Selection and Design
   (a) Where gear units provide a backstop facility, ensure that back-up systems are provided if failure of the backstop device would endanger personnel or result in damage.
   (b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
   (c) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
   (d) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the gear units.

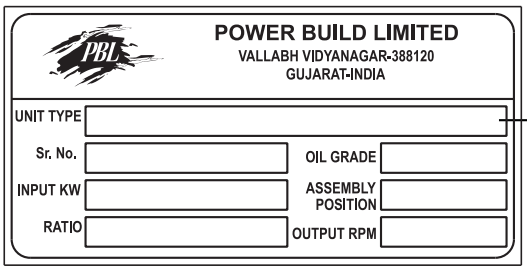
Any further information or clarification required may be obtained by contacting Power Build Limited.

CONTENTS

1 UNIT IDENTIFICATION

When requesting further information, or service support quote the following information from the nameplate:

- Unit Type
- Sr. Number



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
EXAMPLE	F	0	4	2	0	5	0	.	T	M	C	-	1	A	.	1	8	4	A	-

1 - SERIES F

RANGE [F]

2,3 - SIZE OF UNIT

[0][4] THROUGH [1][0]

4 - NO OF REDUCTIONS

[2] THROUGH [5]

5 - REVISION VERSION

[0] ETC

6,7,8 - NOMINAL OVERALL RATIO

eg [8][.][0]
[5][0][.]

9 - UNIT VERSION

- [T] - STANDARD UNIT WITH TORQUE BUSH
- [W] - STANDARD UNIT WITHOUT TORQUE BUSH
- [B] - STANDARD UNIT WITH BASE OR TOP MOUNTED FEET
- [F] - STANDARD UNIT WITH OUTPUT FLANGE

10 - TYPE OF UNIT

- [M] - MOTORISED
- [G] - UNIT TO ALLOW FITTING OF IEC STANDARD MOTOR
- [R] - REDUCER UNIT
- [S] - REDUCER UNIT FITTED WITH A FAN KIT
- [X] - REDUCER UNIT FITTED WITH A BACKSTOP
- [Y] - REDUCER UNIT WITH A BACKSTOP & FAN

11 - OUTPUT SHAFT

- [C] - STANDARD SINGLE EXTENSION
- [D] - STANDARD DOUBLE EXTENSION
- [H] - STANDARD UNIT WITHOUT SHAFT
- [Z] - SPECIAL

12 - MOTOR ADAPTOR FOR G OR M TYPE UNIT

FOR ALL OTHER TYPES ENTER [-]

13,14 - MOUNTING POSITION & TERMINAL BOX POSITION

eg [5][D]

15,16,17 - GEARED MOTOR

MOTOR POWER REQUIRED

eg [.][7][5]
[.][1][8]

FOR R OR G TYPE

ENTER [-][-][-]

18 - NO OF MOTOR POLES

[2][4][6] OR [8]

FOR R OR G TYPE ENTER [-]

19 - MOTOR REQUIRED

eg [-][A]

FOR R OR G TYPES WITHOUT MOTOR ENTER [-]

20 - ADDITIONAL FEATURES

PAINT, LUBRICANT
DOUBLE OIL SEAL ETC

eg [-][F]

2 GENERAL INFORMATION

The following instructions will help you achieve a satisfactory installation of your Power Build Limited Series F unit, ensuring the best possible conditions for a long and trouble free operation.

All units are tested and checked prior to despatch, a great deal of care is taken in packing and shipping arrangements to ensure that the unit arrives at the customer in the approved condition.

3 FITTING OF COMPONENTS TO EITHER THE UNIT INPUT OR OUTPUT SHAFT

The input or output shaft extension diameter tolerance is to ISO tolerance k6 (for shaft diameter ≤ 50mm) and m6 (for shaft diameter > 50mm) and the fitted components should be to ISO tolerance M7 (for bore diameter ≤ 50mm) and K7 (for bore diameter > 50 mm).

- Items (such as gears, sprockets, couplings etc) should not be hammered onto these shafts since this would damage the shaft support bearings.

- The item should be pushed onto the shaft using a screw jack device fitted into the threaded hole provided in the end of the shaft.

- Items being fitted may be heated to 80/100°C to aid assembly further.

THREADED HOLE DETAILS

UNIT SIZE	INPUT SHAFT	OUTPUT SHAFT
F0420 / F0430	M5 x 12.5 mm deep	M10 x 22 mm deep
F0620	M6 x 16 mm deep	M16 x 36 mm deep
F0630	M5 x 12.5 mm deep	
F0720	M8 x 19 mm deep	M16 x 36 mm deep
F0730	M6 x 16 mm deep	
F0820	M10 x 22 mm deep	M20 x 42 mm deep
F0830	M8 x 19 mm deep	
F0920	M12 x 28 mm deep	M20 x 42 mm Deep
F0930	M10 x 22 mm deep	
F1020	M16 x 27 mm deep	
F1030	M12 x 28 mm deep	

4 WEATHER PROTECTION OF UNIT

All Series F units are provided with protection against normal weather conditions. Where units are to operate in extreme conditions, or where they are to stand for long periods without running, eg during plant construction, we should be notified when ordering so that arrangements for adequate protection can be made.

5 INSTALLATION

5.1 MOTORISED AND REDUCERS

- Sizes F04, 06 and 07 are supplied factory filled with correct amount of lubricant for mounting position quoted (Factory fill - Power Build Limited).
- Sizes F08, 09 and 10 will be oil filled by client.
  If the unit is to be mounted in a different position to that originally intended then the amount of lubricant in the unit will require amending
  - See Appendix 2 of this document for the revised quantities
  - See Appendix 1 for the methodology for doing this.

NOTE: It is important that the same oil is used as is already in the unit.

If an oil other than that in the unit is to be used the unit should be drained and flushed with the oil to be used and filled with the correct quantity.

5.2 GEAR HEADS

If the unit has been supplied as a Gear Head type to allow fitting of the motor separately then refer to Appendix 1. For sizes F04, 06 & 07 only, units satisfying condition 'G' (ref Appendix 1) will be supplied filled with oil, and units satisfying condition 'A' or 'M' (ref Appendix 1) will be supplied less oil.

5.3 FIXING TO CUSTOMER EQUIPMENT

Fixing the Gear Head flange facing, or feet to the customer equipment use set screws to ISO grade 8.8 minimum.

Torque tighten to:-

Set Screw Size	Tightening Torque
M10	50 Nm
M12	85 Nm
M16	200 Nm
M20	350 Nm

5.4 MOTOR CONNECTIONS

TO MAINS

Connection of the electric motor to the mains supply should be made by a qualified person. The current rating of the motor will be identified on the motor plate, and correct sizing of the cables to electrical regulations is essential.

MOTOR TERMINAL CONNECTION

Circuit diagrams for the correct wiring of the motor terminal box are included as Appendix 3.

5.5 FOOT-MOUNTED UNITS

The following procedure is recommended for all foot mounted units.
Foot mounted units are supplied either as free standing units, or if required, mounted on a standard baseplate with a foot mounted motor correctly aligned and connected by a flexible coupling.

a) Clean shaft extensions and ventilator when fitted.

b) Secure unit, or baseplate if fitted to a rigid foundation using heavy duty bolts to ISO grade 8.8 minimum.

c) Ensure baseplate is not distorted
Note: Units not supplied on baseplates should if possible be mounted on the same bedplate as the prime mover.

d) Align unit (see Appendix 5)
Note: It is important to ensure when aligning unit on baseplate that all machined mounting points are supported over their full area.
If steel packings are used these should be placed either side of the foundation bolt as close as possible. During the final bolting ensure the unit or baseplate is not distorted this will cause strains in the gear case resulting in errors of alignment of shafts and gearing.

e) For units mounted on bedplates after alignment select any two diagonally opposite feet, drill ream and dowel in position.

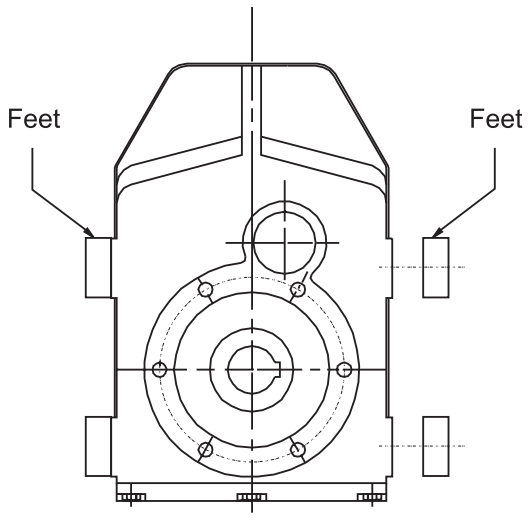
f) Fit guards in accordance with the factory acts.

g) Check motor wiring for correct direction of rotation this is important when a backstop device is fitted.

h) Fill gear unit with oil (if not factory filled) as detailed in Section 6.

5.6 FITTING FEET ON UNITS

Series F units are fitted with detachable feet. These are normally factory fitted to clients specification, but if for any reason the feet are supplied separately, or dismantling is necessary after supply, they should be re-fitted and torque tightened to the following settings.



ALL SIZES

- Scrape any paint etc off foot location faces on casing.
- Clean feet and case fixing faces with Lowtox or Loctite 7061.
- Fit feet with setscrews to torques:

Unit Size	Bolt Size	Torque
F04	M10	50 Nm
F06	M12	85 Nm
F07, F08, F09	M16	200 Nm
F10	M20	350 Nm

5.7 SHAFT MOUNTED UNITS

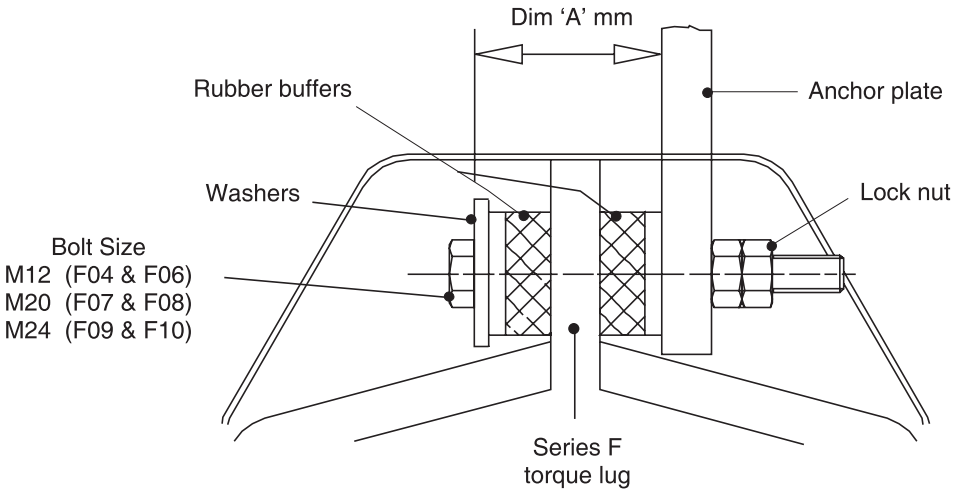
The following procedure is recommended for all shaft and foot/shaft mounted units.

a) Clean shaft extensions, bore and ventilator when fitted.

b) Locate in position, using the most convenient method available see Appendix 6, ensuring it is as close as possible to the bearing on the driven machine.

c) Secure unit onto the shaft using chosen method from Appendix 6.

d) Fit torque bush as detailed below.
Note: Unless specified otherwise, the torque bush will be supplied loose.



Unit Size	Dim 'A' mm
F04	54
F06	56
F07	84
F08	88
F09	114
F10	116

Notes 1) Tighten bolt to give Dim 'A' this will pre compress the rubber buffers
2) Power Build Ltd. Torque arm kit comprises two rubber buffers. The customer must supply other components shown.

e) Anchor case to a secure point by means of the torque bush.

f) Fit guards in accordance with the factory acts.

g) Check motor wiring for correct direction of rotation, this is important when a backstop device is fitted.

h) Fill gear unit with oil (if not factory filled) as detailed in Section 5.

5.8 REPLACEMENT OF OIL SEALS

a. Clean and drain the unit.

b. If the unit has an output shaft then remove any equipment from the outputshaft such as couplings and remove the output key. If the unit is Shaft Mounted then remove the unit from the shaft.

c. Remove the old seal.

d. Smear oil seals with grease (see Appendix 4).

e. Fit replacement seal on a seal guide, slide it along the shaft and press the seal into the housing.

f. Fill with the correct amount of approved lubricant, see Appendix 2

6 LUBRICATION AND MAINTENANCE

6.1 LUBRICATION

- Unit sizes F04, 06 and 07 are factory filled with mineral oil.
- Unit sizes F08, 09 and 10 will be oil filled by client. (See Appendix 2).

6.2 PERIODIC INSPECTION

a. Check oil level every 3000 hours or 6 months whichever is sooner and if necessary top up with the recommended grade of lubricant.
b. Add two shots of grease monthly to units having grease lubricated bearings.

6.3 OIL CHANGES

On all sizes regular oil changes are essential and the following factors should be used to determine the frequency at which these are carried out.

a. Oil temperature - unit operating under load.
b. Type of oil.
c. Environment - humidity, dust, etc.
d. Operating conditions - shock, loading, etc.

At elevated temperatures the effective life of the oil is very much reduced. This is most pronounced with oils containing fatty and E.P. additives. To prevent damage to the unit through lubricant breakdown the oil should be renewed as detailed in the following table:

UNIT OPERATING TEMPERATURE °C	RENEWAL PERIOD	
	MINERAL OIL	SYNTHETIC OIL
75 OR LESS	17000 HOURS OR 3 YEARS	26000 HOURS OR 3 YEARS
80	12000 HOURS OR 3 YEARS	26000 HOURS OR 3 YEARS
85	8500 HOURS OR 3 YEARS	21000 HOURS OR 3 YEARS
90	6000 HOURS OR 2 YEARS	15000 HOURS OR 3 YEARS
95	4200 HOURS OR 17 MONTHS	10500 HOURS OR 3 YEARS
100	3000 HOURS OR 12 MONTHS	7500 HOURS OR 2 1/2 YEARS
105	2100 HOURS OR 8 MONTHS	6200 HOURS OR 2 YEARS
110	1500 HOURS OR 6 MONTHS	5200 HOURS OR 18 MONTHS
NB: INITIAL FILL OF OIL SHOULD BE CHANGED IN A NEW GEAR UNIT AFTER 1000 HOURS OPERATION OR ONE YEAR OR HALF THE ABOVE LIFE WHICHEVER IS THE SOONEST		

Note: Figures quoted are for oil temperatures when the unit has attained normal running temperature when operating under load. These figures are based on normal running but where conditions are particularly severe it may be necessary to change the oil more frequently. When changing lubricant, if same lubricant is not used then unit must be flushed out and filled only with one type of lubricant.

6.4 LUBRICANT QUANTITY

The quantity of lubricant required by size and mounting position is given in Table 1, Appendix 2. A diagram showing mounting position designations is also included in Appendix 2.

6.5 APPROVED LUBRICANTS

Tables 2 and 3 Appendix 2 give the lubricants approved for use in the gear unit.

6.6 APPROVED GREASES

Appendix 4 gives the greases approved for use in the unit.

7 NOISE

The range of Series F product satisfies a noise (sound pressure level) of 85 dB(A) or less when measured at 1 metre from the unit surface.
Measurements taken in accordance with B.S.7676 Pt1 : 1993 (ISO 8579-1 : 1993).

8 CLEANING

With the drive stationary periodically clean any dirt or dust from the gear unit and the electric motor cooling fins and fan guard to aid cooling.

Any further information or clarification required may be obtained by contacting Power Build Ltd.
Please see contact details at the back of this booklet.

ASSEMBLY OF MOTOR AND MOTOR ADAPTOR TO THE GEAR HEAD

Depending on motor frame size and type of flange facing (C or D flange) determines whether or not the motor adaptor is attached firstly to the motor or to the Gear Head.

	F0420 F0430/F0630		F0620/0730		F0720/F0830	
MOTOR FLANGE \ MOTOR FRAME	C (B14)	D (B5)	C (B14)	D (B5)	C (B14)	D (B5)
63	N/A	A				
71	M	G	M	G		
80	M	G	M	G	M	G
90	G	G	M	G	M	G
100 / 112	G	G	M	G	M	G
132			G	G	M	G
160						G

	F0820, F09 & F10
ALL MOTOR FRAME SIZES	G

SERIES M MOTOR ADAPTORS	SERIES F GEARHEAD
M04	F04
M06	F06
M07	F07
M08	F08
M09	F09
M10	F10

A - Adaptor sandwiched between motor and Gear Head
M - Fix adaptor to motor then fix assembly to Gear Head
G - Fix adaptor to Gear Head first then fit motor
N/A - Not available

Note: (Re Sizes F04 to F07)

- For build condition 'A' and 'M' only, prior to fitting the motor adaptor, fill the gearcase with the correct amount of lubricant (Appendix 2). Apply liquid gasket material (Loctite 518) to the upturned face of the gearhead in a continuous bead. The gasket material should be outside any leak path and all screw holes should be ringed. (Health and Safety instructions with the material must be observed).

- When fitting the motor adaptor to the electric motor for build condition 'M', ensure that the copper washers supplied with the kit are fitted under the heads of the set screws fixing the adaptor to the motor.

SET SCREW TORQUES:-

SET SCREW SIZES	RECOMMENDED TORQUE
M6	10 Nm
M8	18 Nm
M10	37 Nm
M12	64 Nm
M16	150 Nm

The standard lubricant, Power Build Ltd. Grade 6E, is suitable for operation in ambient temperatures of 0° to 30°C, outside of this consult Tables 2 and 3 or Power Build Ltd. Application Engineers.

Oil quantities are only approximate and units should be filled until oil escapes from the level plug hole. Do not overfill as excess will cause overheating and leakage.

TABLE 1 LUBRICANT QUANTITY (Litres)

DOUBLE AND TRIPLE REDUCTION													
Unit Size		**F0420**	**F0430**	**F0620**	**F0630**	**F0720**	**F0730**	**F0820**	**F0830**	**F0920**	**F0930**	**F1020**	**F1030**
MOUNTING POSITION	1	1.7	2.0	4.7	4.8	8.0	8.2	10.9	10.9	19.0	18.0	34.0	34.0
	2	1.0	1.2	2.5	3.4	4.2	5.6	8.6	8.7	13.0	14.5	22.0	23.0
	3	1.4	1.8	3.9	4.7	7.0	7.7	10.0	9.4	17.0	16.0	28.0	28.0
	4	1.1	1.3	2.5	2.7	4.4	4.8	9.4	9.0	15.0	16.0	26.5	27.5
	5	1.8	2.6	3.9	6.5	7.0	11.9	14.0	14.0	24.0	24.0	43.0	43.0
	6	2.1	2.6	5.0	5.8	8.8	10.9	15.3	15.3	25.0	25.0	43.0	43.0

QUADRUPLE AND QUINTUPLE REDUCTION													
Unit Size		**F0640**		**F0650**		**F0740**		**F0750**		**F0840**		**F0850**	
		Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
		M0420	F0620	M0430	F0620	M0420	F0720	M0430	F0720	M0620	F0820	M0420	F0830
MOUNTING POSITION	1	0.6	4.7	0.9	4.7	0.6	8.0	0.9	8.0	1.7	10.9	0.6	10.9
	2	0.6	2.5	0.9	2.5	0.6	4.2	0.9	4.2	1.7	8.6	0.6	8.7
	3	0.6	3.9	0.9	3.9	0.6	7.0	0.9	7.0	1.7	10.0	0.6	9.4
	4	0.6	2.5	0.9	2.5	0.6	4.4	0.9	4.4	1.7	9.4	0.6	9.0
	5	1.4	3.9	2.1	3.9	1.4	7.0	2.1	7.0	3.1	14.0	1.4	14.0
	6	1.6	5.0	2.1	5.0	1.6	8.8	2.1	8.8	3.6	15.3	1.6	15.3

QUADRUPLE AND QUINTUPLE REDUCTION									
Unit Size		**F0940**		**F0950**		**F1040**		**F1050**	
		Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
		M0720	F0920	M0420	F0930	M0820	F1020	M0420	F1030
MOUNTING POSITION	1	2.8	19.0	0.6	18.0	4.6	34.0	0.6	34.0
	2	2.8	13.0	0.6	14.5	4.6	22.0	0.6	23.0
	3	2.8	17.0	0.6	16.0	4.6	28.0	0.6	28.0
	4	2.8	15.0	0.6	16.0	4.6	26.5	0.6	27.5
	5	6.3	24.0	1.4	24.0	9.5	43.0	1.4	43.0
	6	6.8	25.0	1.6	25.0	10.5	43.0	1.6	43.0

TABLE 2 MINERAL OILS

Type E - Mineral oils containing industrial EP additives. These have a high load carrying capacity

SUPPLIER	LUBRICANT RANGE	LUBRICATING OIL GRADE	
		6E	7E
		AMBIENT TEMPERATURE RANGE °C	
		0 to 30	20 to 50
Batoyle Freedom Group	Remus	320 (-2)	460 (-2)
Boxer Services / Millers Oils	Indus	320 (-10)	460 (-10)
BP Oil International Limited	Energol GR-XF	320 (-13)	460 (-1)
	Energol GR-XP	320 (-10)	460 (-7)
Caltex	Meropa	320 (-4)	460 (-4)
	RPM Borate EP Lubricant	320 (-4)	460 (-7)
Carl Bechem GmbH	Berugear GS BM	320 (-13)	460 (-10)
	Staroil G	320 (-13)	460 (-10)
Castrol International	Alpha Max	320 (-13)	460 (-10)
	Alpha SP	320 (-16)	460 (-1)
Chevron International	Gear Compound EP (USA version)	320 (-13)	460 (-10)
Oil Company Limited	Gear Compound EP (Eastern ver)	320 (-13)	460 (-13)
	Ultra Gear	320 (-7)	460 (-7)
Eko-Elda Abee	Eko Gearlub	320 (-10)	460 (-1)
Engen Petroleum Limited	Gengear	320 (-12)	460 (-3)
Esso	Spartan EP	320 (-13)	460 (-7)
Esso/Exxon	Spartan EP	320 (-12)	460 (-4)
Fina	Giran	320 (-10)	460 (-10)
Fuchs Lubricants	Powergear	P/Gear (-16)	M460 (-4)
	Renogear V	320EP (-4)	460EP (-4)
	Renogear WE	320 (-4)	400 (-4)
	Renolin CLPF Super	8 (-10)	10 (-10)
Klüber Lubrication	Klüberoil GEM1	320 (-5)	460 (-5)
Kuwait Petroleum International	Q8 Goya	320 (-13)	460 (-10)
Lubrication Engineers Inc	Almasol Vari-Purpose Gear	605 (-13)	608 (-10)
Mobil Oil Company Limited	Mobil gear 600 Series	632 (-13)	634 (-1)
	Mobil gear XMP	320 (-13)	460 (-7)
Omega Manufacturing Division	Omega 690	85w/140 (-15)	
Optimol Ölwerke GmbH	Optigear BM	320 (-10)	460 (-7)
	Optigear	320 (-9)	460 (-7)
Pertamina (Indonesia)	Masri	320 (-4)	460 (-4)
Petro-Canada	Ultima EP	320 (-16)	460 (-10)
Rocol	Sapphire Hi-Torque	320 (-13)	460 (-13)
Sasol Oil (Pty) Limited	Cobalt	320 (-1)	460 (-4)
	Hemat	320 (-7)	460 (-4)
Saudi Arabian Lubricating Oil	Gear Lube EP	EP320 (0)	EP460 (0)
ShellOils	Omala S2G	320(-4)	460 (-4)
	Omala F	320 (-10)	460 (-4)
Texaco Limited	Meropa	320 (-16)	460 (-10)
	Meropa WM	320 (-16)	460 (-11)
Total	Carter EP	320 (-7)	460 (-4)
	Carter VP/CS	320 (-13)	460 (-7)
Tribol GmbH	Molub-Alloy Gear Oil	690 (-16)	140 (-13)
	Tribol 1100	320 (-18)	460 (-16)

DANGER
Numbers in brackets indicate recommended minimum operating temperature in °C.
THE UNIT MUST NOT RUN BELOW THIS TEMPERATURE.

TABLE 3 SYNTHETIC OILS

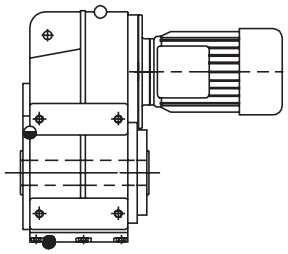
Type H - Polyalphaolefin based synthetic lubricants with Anti-Wear or EP additives. These have a medium to high load carrying capacity.

SUPPLIER	LUBRICANT RANGE	LUBRICATING OIL GRADE		
		5H	6H	7H
		AMBIENT TEMPERATURE RANGE °C		
		-30 to 10	-10 to 30	20 to 50
Batoyle Freedom Group	Titan	220 (-31)	320 (-28)	
Boxer Services / Millers Oils	Silkgear	220 (-35)	320 (-35)	460 (-35)
BP Oil International Limited	Enersyn EPX		320 (-28)	
Caltex	Pinnacle EP	220 (-43)	320 (-43)	460 (-37)
Carl Bechem GmbH	Berusynth GP	220 (-38)	320 (-35)	460 (-32)
Castrol International	Alphasyn EP	220 (-37)	320 (-31)	460 (-31)
	Alphasyn T	220 (-31)	320 (-28)	460 (-28)
Chevron International	Tegra	220 (-46)	320 (-33)	460 (-31)
Esso/Exxon	Spartan Synthetic EP	220 (-46)	320 (-43)	460 (-40)
Fuchs Lubricants	Renogear SG	220 (-32)	320 (-30)	
	Renolin Unisyn CLP	220 (-37)	320 (-34)	460 (-28)
Klüber Lubrication	Klübersynth GEM 4	220 (-30)	320 (-25)	460 (-30)
Kuwait Petroleum International	Q8 EL Greco	220 (-22)	320 (-19)	460 (-16)
Lubrication Engineers Inc	Synolec Gear Lubricant	9920 (-40)		
Mobil Oil Company Limited	Mobilgear SHC	220 (-40)	320 (-37)	460 (-32)
	Mobilgear SHC XMP	220 (-40)	320 (-33)	460 (-31)
Optimol Ölwerke GmbH	Optigear Synthetic A	220 (-31)	320 (-31)	
Petro-Canada	Super Gear Fluid	220 (-43)	320 (-37)	460 (-37)
Shell Oils	Omala HD	220 (-43)	320 (-40)	460 (-37)
Texaco Limited	Pinnacle EP	220 (-43)	320 (-43)	460 (-37)
	Pinnacle WM	220 (-43)	320 (-40)	
Total	Carter SP	220 (-34)	320 (-31)	460 (-28)
Tribol GmbH	Tribol 1510	220 (-36)	320 (-33)	460 (-28)

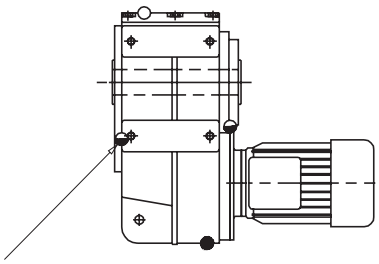
DANGER
Numbers in brackets indicate recommended minimum operating temperature in °C.
THE UNIT MUST NOT RUN BELOW THIS TEMPERATURE.

APPENDIX 2
MOUNTING POSITION

MOUNTING 1

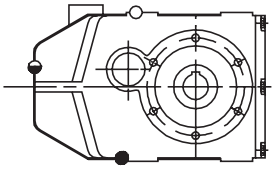


MOUNTING 2

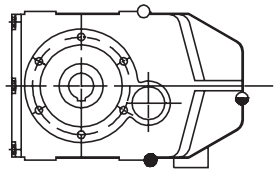


FILL TO PLUG AT THIS SIDE OF CASE FOR F08, F09 AND F10 UNITS

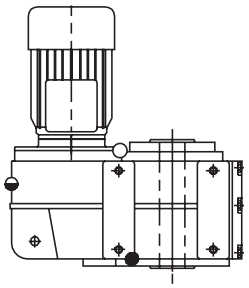
MOUNTING 3

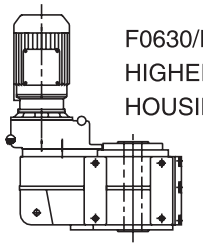


MOUNTING 4



MOUNTING 5

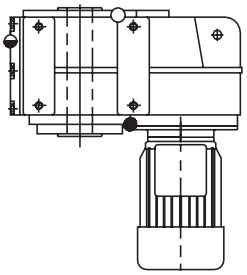




F0630/F0730 - OIL LEVELS TO HIGHER PLUG IN TRIPLE HOUSING

F0430 - NO OIL PLUGS IN TRIPLE HOUSING

MOUNTING 6



MOTOR MUST BE FITTED WITH SEAL FOR THIS POSITION

- ● DRAIN POSITION
- ◒ LEVEL POSITION
- ○ VENTILATOR/FILLING POSITION

MOUNTING POSITIONS - SHOWN AS MOTORISED - APPLIES ALSO FOR REDUCERS

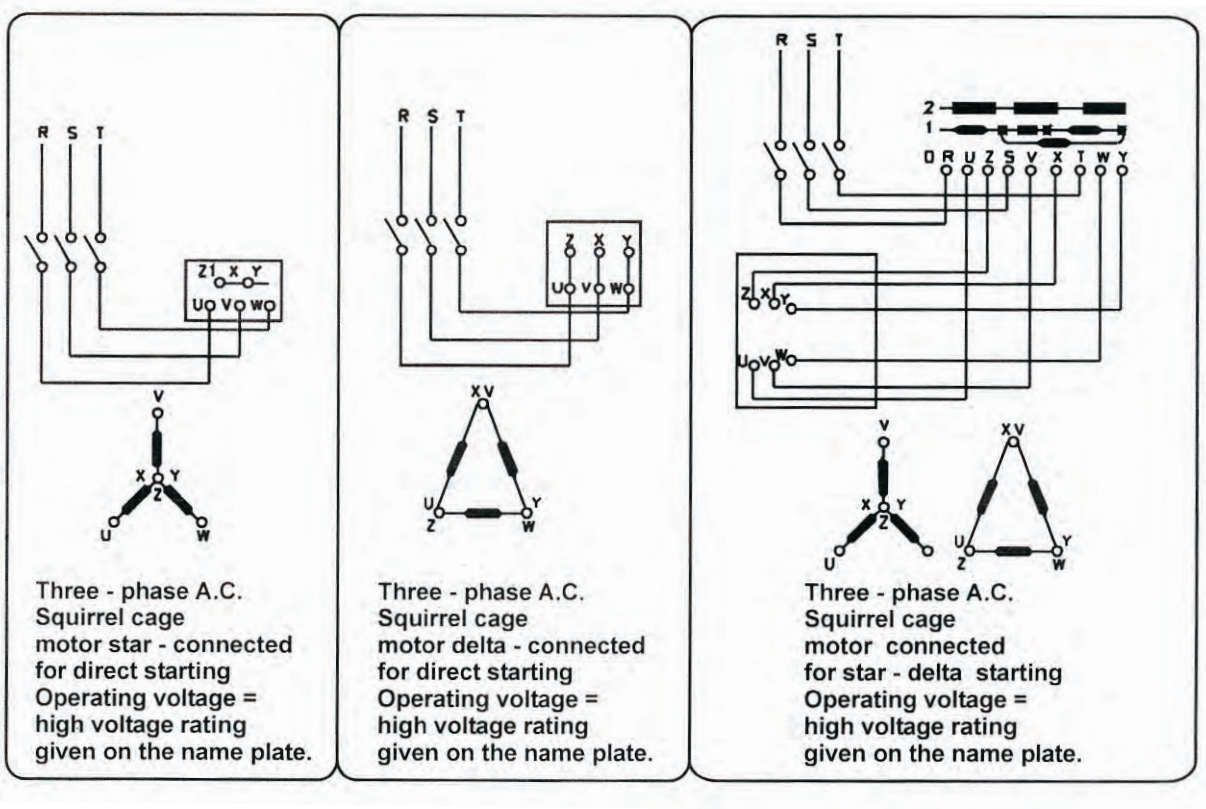
Connetion to Power System

All geared motors are factory-adjusted for maximum voltage if not stipulated otherwise. Make sure that the voltage on the installation site coincides with that indicated on the rating plate of the motor. The direction of rotation may be changed by interchanging two phases of the mains.

The geared motors are connected to the power supply system like any other three-phase A.C. Motors. There are no special instructions for Geared Motors beyond applicable for standard electric motors. The feed lines should be of sufficient diameter to avoid any notable drop of voltage upon starting the geared motors.

It is advisable to fit a protective motor switch with adjustable overload relays. This switch, which is adjusted to the motor rating, cuts out all three phases in case of overload or failure of one phase. The normal fuses can not give sufficient overload protection.

The connection diagram given below shows the usual types of connection of three phase A.C. Squirrel cage motors.



Geared Motors with pole and voltage changing system as well as motors for braking gears are provided with special connection diagrams which will be found on the inside of the terminal box of each motor.

APPENDIX 4
APPROVED BEARING GREASES

SUPPLIER	LUBRICANT RANGE	ALLOWABLE OPERATING TEMPERATURE RANGE °C	
		ABOVE	TO
BP Oil International Limited	Energrease LS-EP	-30	130
Caltex	Multifak EP	0	120
Castrol International	LMX Grease	-40	150
	Spheerol AP	-30	110
	Spheerol EPL	-10	120
Fuchs Lubricants	Renolit EP	-25	100
Klüber Lubrication	Klüberlub BE 41-542	-20	140
Mobil Oil Company Limited	Mobilgrease XHP	-15	150
	Mobilith SHC	-20	180
Omega Manufacturing Division	Omega 85	-40	230
Optimol Ölwerke GmbH	Longtime PD	-45	140
Shell Oils	Albida RL	-20	150
	Alvania EP B	-20	120
	Nerita HV	-30	130
Texaco Limited	Multifak All Purpose EP	-30	140

Notes:

1) All the above greases are NLGI grade 2.

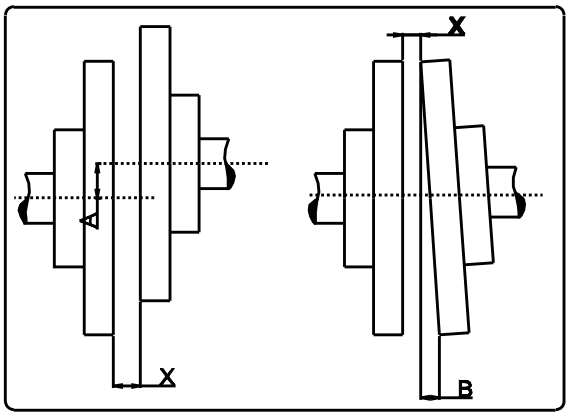
2) Refer to Power Build Ltd. Application Engineers if the unit is operating in an ambient temperature outside the range of -30°C to 50°C.

Connection with the Driven Machine

Since output shaft (low-speed shaft) and input shaft (high-speed shaft) are protected with rust preventive coating, remove it with thinner or a similar solvent.

1. Direct Connection

(a) When the input shaft of the driven machine and the output shaft (low-speed shaft) of the geared motor/reducer are coupled directly, use a "flexible coupling" and make sure that both ends are in alignment. (Refer to Fig. 1.)



Allowance of Dimension A	0.05 mm
Allowance of Dimension B	0.04 mm
Dimension X	Specified by coupling maker

Fig. 1 Accuracy of alignment of direct coupling connection

2. When the machine is driven by V-belt, chain or gearing.

Make arrangement to ensure that the shaft of driven machine and that of geared motor/reducer is positioned parallel. When the machine is driven by V-belt or chain, ensure that the center distance is not too long by setting the proper distance and belt and chain are stretched at right angle. When the machine is driven by gearing, geared motor/reducer should be installed setting up the accurate center distance and avoiding partial bearing of gears, and the output shaft is pushed downward.

(a) Point of load application on the output shaft :

When load (overhung load) is applied on the tip of the shaft, it may cause damage to the shaft. The gearing or chain sprocket wheel must be mounted such that the point of load application is as near as possible to the face of the unit to minimize overhung load.

(b) Tension of chain:

When using chain, it is necessary to give suitable slack to chain. If the tension of chain is too loose, excessive shock will be generated at starting or load fluctuations, which may damage both the geared motor/reducer and the driven machine. Generally, the recommended amount of slack is 2% of span distance. (Refer to Fig. 2.)

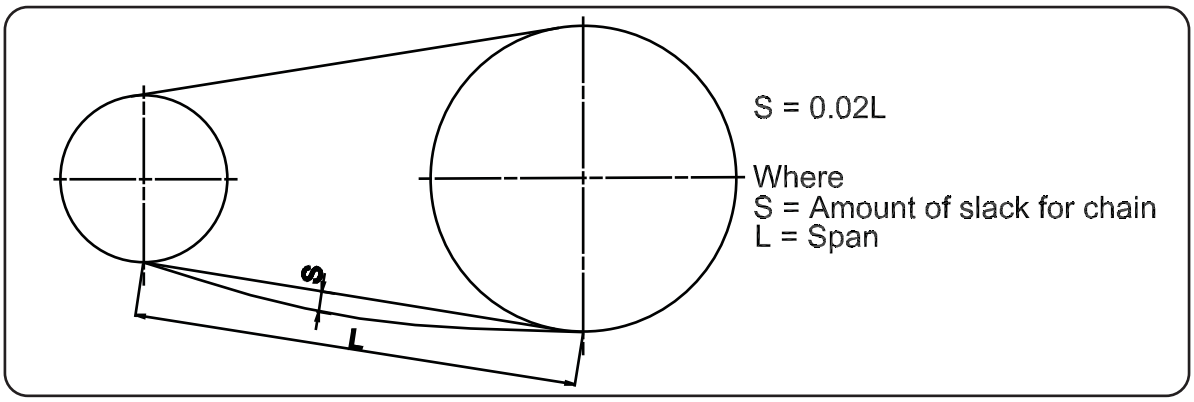


Fig. 2

(c) Layout of chain driving:

When using chain horizontally for connection with the drive and the driven machine, arrange shafts so as to give tension to the upper side of chain. Shaft arrangement of vertical transmission is not recommended, however, if necessary, the large wheel should be positioned at lower end.

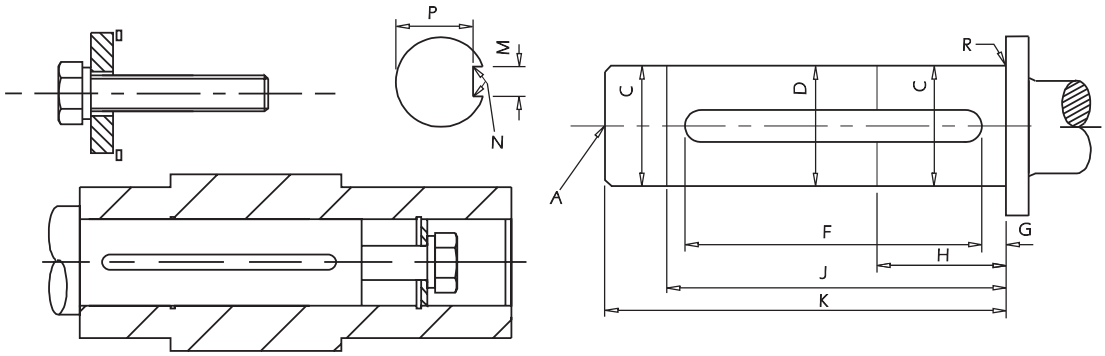
(d) When load (overhung load) is applied on the output shaft, please make sure that it is within the limit of allowable value. Allowable value of overhung load is shown in graph of catalogue.

3. Dimension of keyway

Dimension of the shaft end keyway is in accordance with DIN 6885.

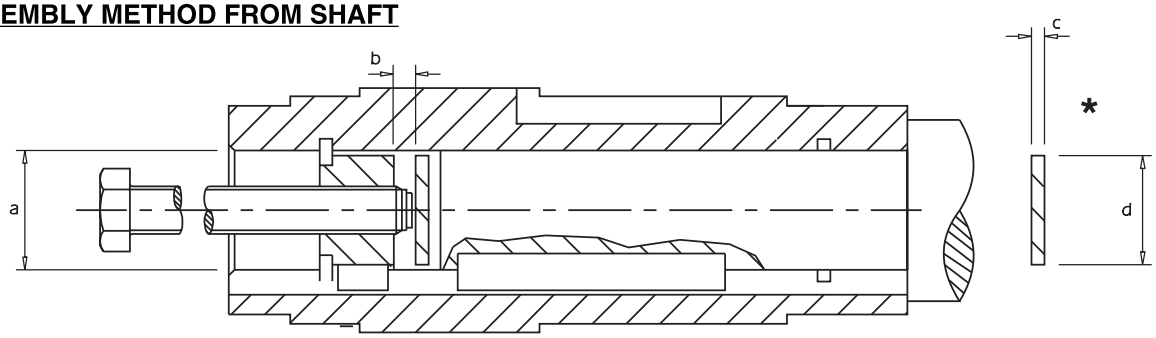
APPENDIX 6
DIMENSIONS ASSEMBLY/DISASSEMBLY

ASSEMBLY ONTO SHAFT - CUSTOMERS SHAFT DETAIL

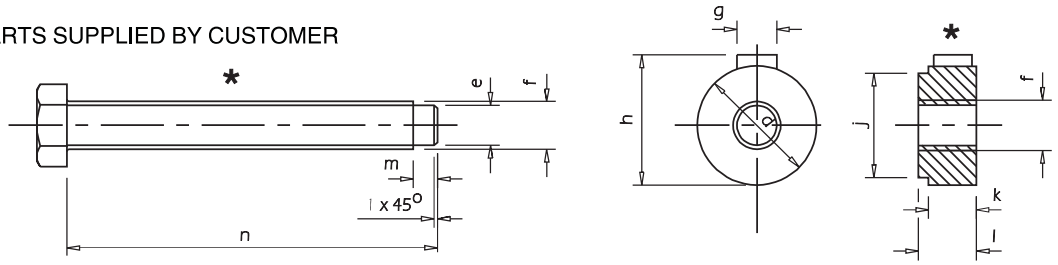


SIZE	A	C	D	F	G	H	J	K	M	N	P	R
F04	M10x 1.5 22 deep	29.993 / 29.980	29.6	79.3 79.0	2	45	84	99	8.000 / 7.964	0.25 0.16R	26.0 25.8	0.8R
F06	M16x 2.0 36 deep	39.991 / 39.975	39.6	93.3 93.0	3	60	106	126	12.000 / 11.957	0.40 0.25R	35.0 34.8	0.8R
F07	M16x 2.0 36 deep	49.991 / 49.975	49.6	101.5 101.0	3	75	128	153	14.000 / 13.957	0.40 0.25R	44.5 44.3	0.8R
F08	M20x 2.5 42 deep	59.990 / 59.971	59.6	148.5 148.0	3	90	143	173	18.000 / 17.957	0.40 0.25R	53.0 52.8	0.8R
F09	M20 x 2.5P 42 deep	69.990 / 69.971	69.6	161.5 161.0	3	105	197	232	20.000 / 19.948	0.6 0.4R	62.5 62.3	0.8R
F10	M20 x 2.5P 42 deep	79.990 / 79.971	79.6	188.5 188.0	5	120	235	275	22.000 / 21.948	0.6 0.4R	71.0 70.8	0.8R

DISASSEMBLY METHOD FROM SHAFT



* PARTS SUPPLIED BY CUSTOMER

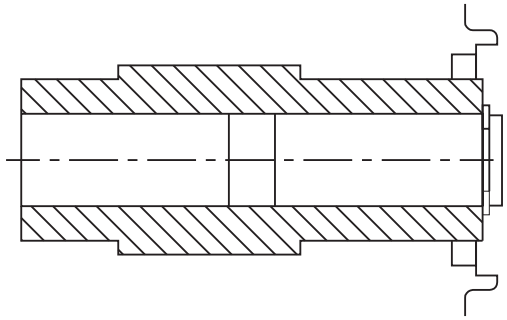


SIZE	a	b	c	d	e	f	g	h	j	k	l	m	n
F04	30	4.00	5	29.9	13	M16 x 1.5	8	33	20.8	15	17	5	120
F06	40	5.35	5	39.9	20	M24 x 1.5	12	43	29.9	20	23	5	154
F07	50	10.10	5	49.9	20	M24 x 1.5	14	53.5	39.0	20	23	5	186
F08	60	5.00	8	59.9	26	M30 x 1.5	18	64	47.4	24	27	5	205
F09	70	6.05	8	69.9	26	M30 x 1.5	20	74.5	56.4	24	27	5	273
F10	80	6.00	8	79.9	26	M30 x 1.5	25	95	75.3	24	27	5	316

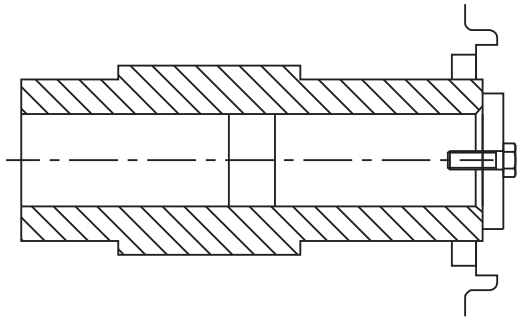
Assembly Instructions

1. Spray the hollow shaft bore and mating diameter of the output shaft with Rocol DFSM or equivalent antiscuffing spray.
2. Fit key into shaft.
3. Fit the circlip into the output sleeve.
4. Fit the spacer tube only if the output shaft has no shoulder, then fit the output shaft into the output sleeve.
5. Secure in place with the washer and bolt.

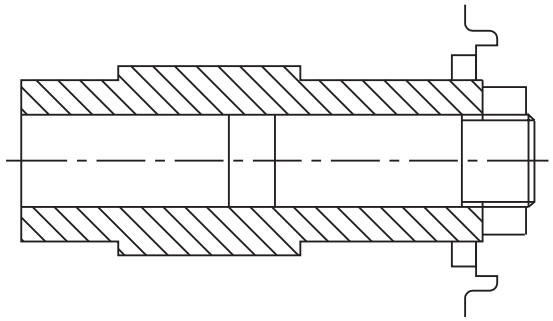
SHAFT MOUNT UNITS
ALTERNATIVE SHAFT FIXING METHODS



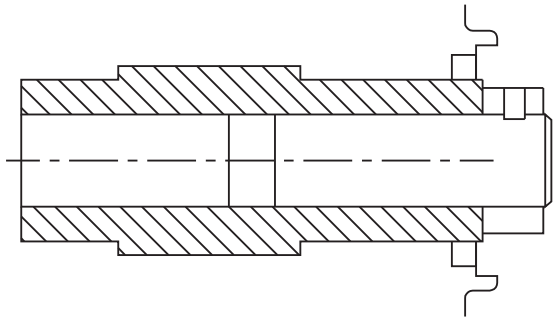
SHAFT MOUNT UNITS RETAINED WITH A CIRCLIP



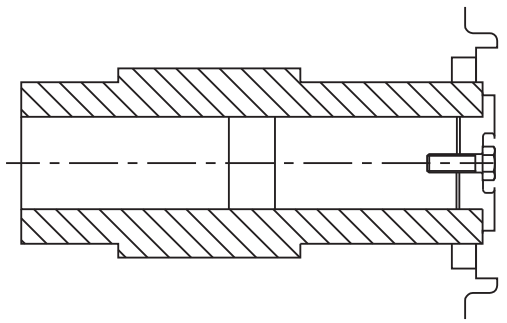
SHAFT MOUNT UNITS RETAINED WITH A BOLT AND PLATE



SHAFT MOUNT UNITS RETAINED WITH A LOCKNUT

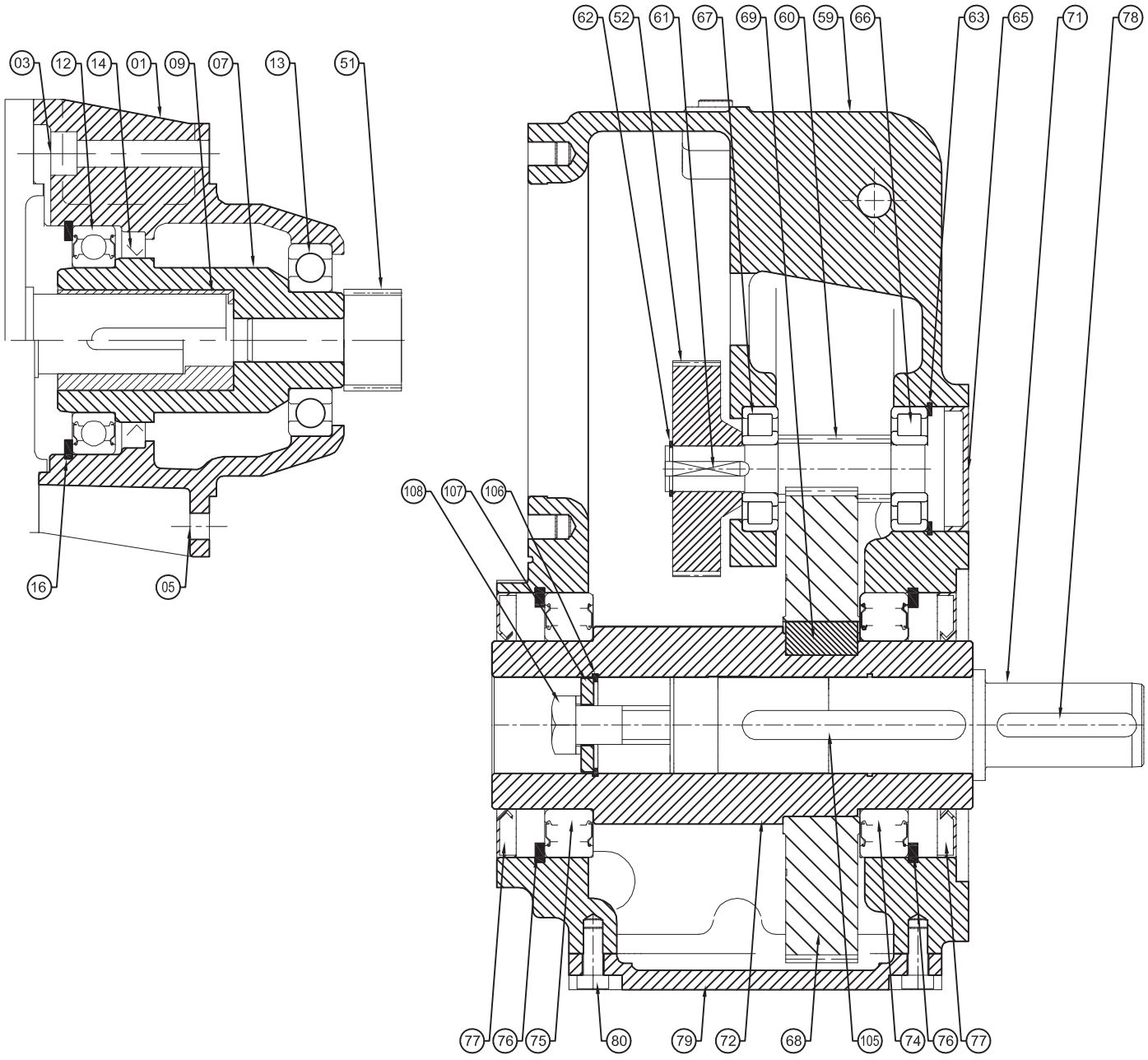


SHAFT MOUNT UNITS RETAINED WITH A COLLAR AND GRUBSCREW

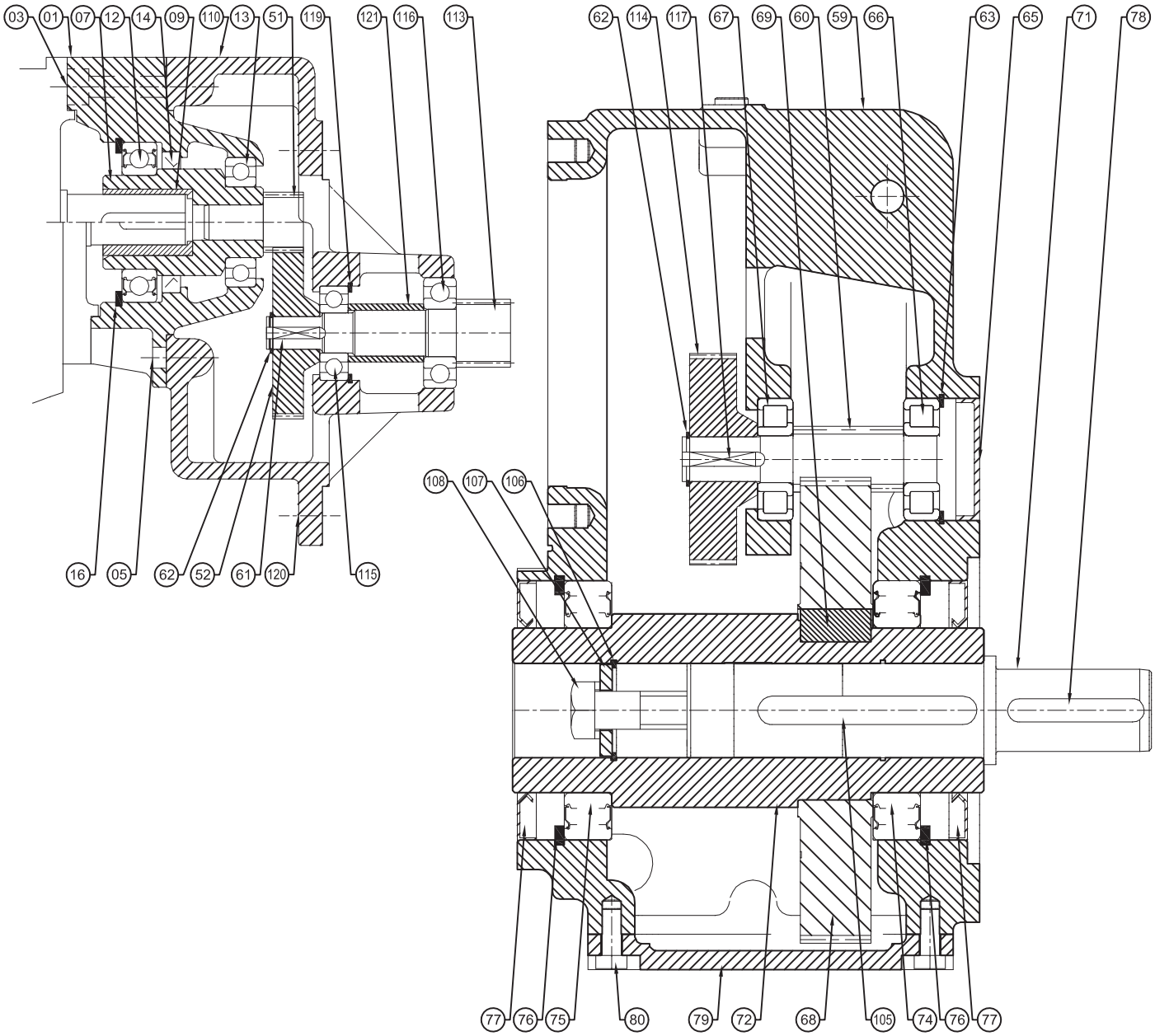


SHAFT MOUNT UNITS RETAINED WITH A RECESSED PLATE AND BOLT

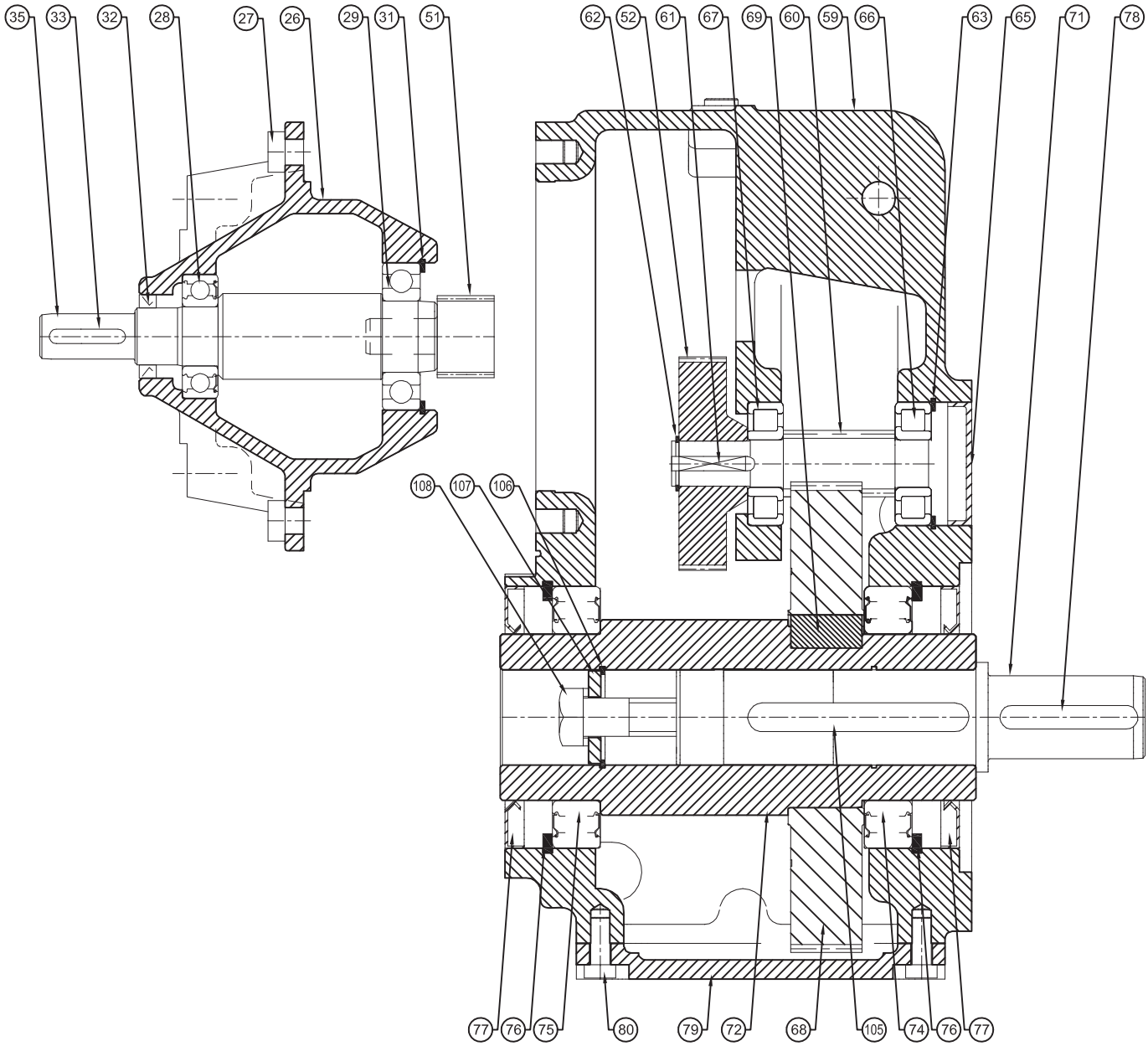
TWO STAGE GEARED MOTOR UNIT
ALL 'F' SERIES



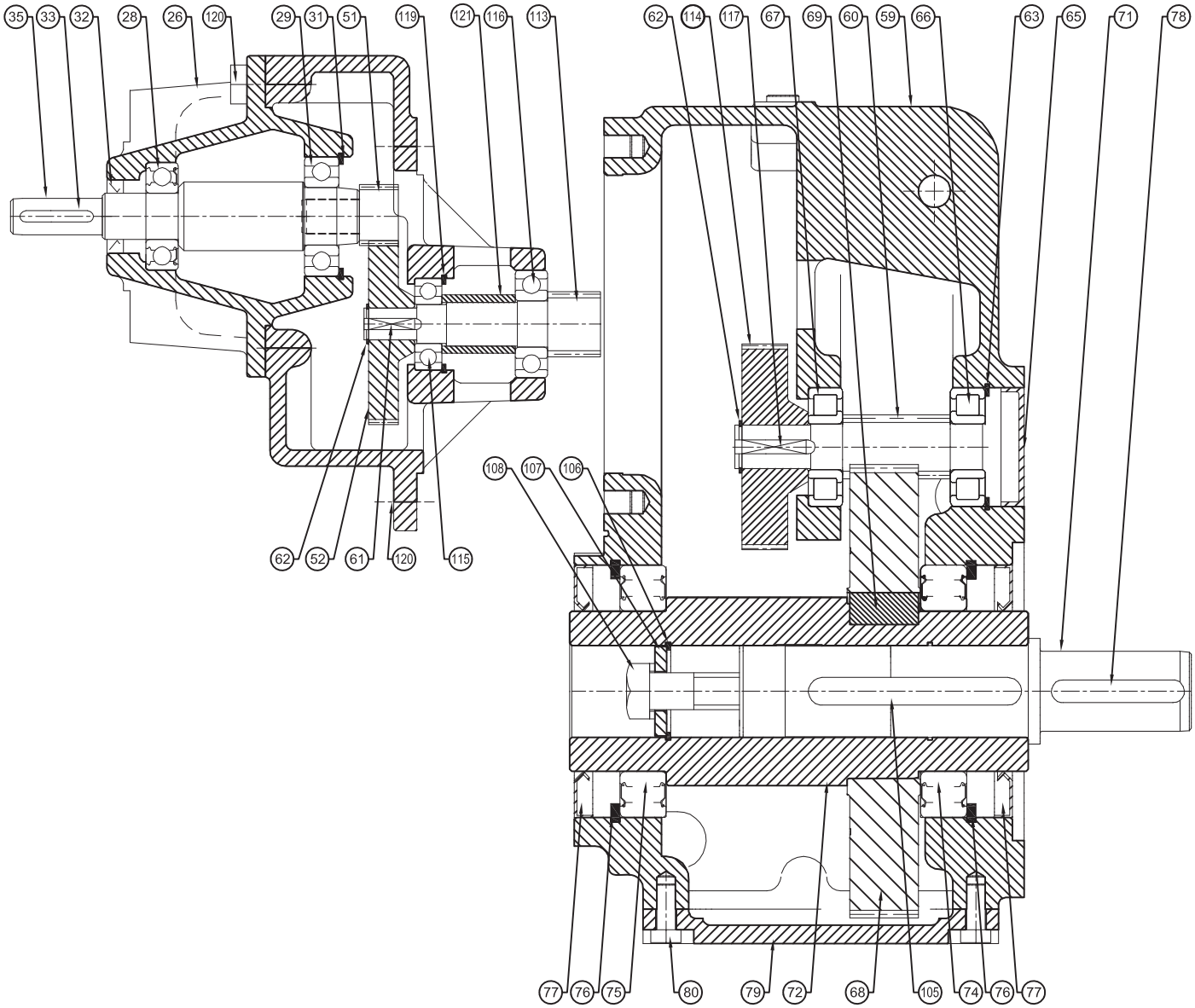
THREE STAGE GEARED MOTOR UNIT
ALL 'F' SERIES



TWO STAGE REDUCER UNIT
ALL 'F' SERIES



THREE STAGE REDUCER UNIT
ALL 'F' SERIES



1	Motor Adaptor	45		89	Bearing On Bevel Pinion 1
2	Flange (Adaptor)	46		90	Bearing On Bevel Pinion 2
3	Fastener (Adaptor + Motor)	47		92	Key (Bevel Wheel+Final Pinion)
4	Fastener (Adaptor + Flange)	48		93	End Cover For Bevel Bore
5	Fastener (Flange + Gear Case)	49		94	Internal Circlip For Final Pinion Bearing
6	Nut (In Triple Only)	50		95	Backstop
7	Plug in Shaft	51	Primary Pinion	96	Key For Backstop
8	Coupling	52	Primary Wheel	97	External Circlip for Backstop
9	Nylon Sleeve	53	Key	98	Nilos Ring 1 On Output (K)
10	Nylon Key	54	Circlip	99	Nilos Ring 2 On Output (K)
11	Key	55	Lock Nut	100	Output Flange (M)
12	Bearing (Motor Side)	56	Lock Washer	101	Flange Fastener (M)
13	Bearing (Pinion Side)	57		102	Worm Wheel
14	Oil Seal Input	58		103	Worm Shaft
15	Circlip (Pinion Side)	59	Gear Case	104	Grease Nipple (C07-C10)
16	Circlip (Motor Side)	60	Final Pinion	105	Key (OP Sleeve+OP Shaft)
17	Nilos Ring	61	Key (Primary Wheel+Final Pinion)	106	Circlip (OP Sleeve+OP Shaft)
18	Grease Nipple	62	Circlip for Primary Wheel	107	Washer (OP Sleeve)
19	Support Washer	63	Internal Circlip for Intermediate Bearing)	108	Bolt (OP Sleeve+OP Shaft)
20	Shims	64	Distance Piece Final Pinion	109	
21		65	End cover for Final Pinion	110	Triple Housing
22		66	Bearing Final Pinion 1	111	Triple Ring
23		67	Bearing Final Pinion 2	112	Copper Washer
24		68	Final Wheel	113	Triple Pinion
25		69	Key (Final Wheel+Output Shaft/Sleeve)	114	Triple Wheel
26	Housing Input	70	External Criclip OP End Bearing	115	Bearing Input Side
27	Fastener Housing + Gear Case	71	Output Shaft (C,F,K)(Double Extended)	116	Bearing Pinion Side
28	Bearing (Input Side)	72	Output Sleeve (C,F,K)	117	Key (Final Pinion+Triple Wheel)
29	Bearing (Pinion Side)	73	Distance Piece (Output Shaft/Sleeve)	118	Circlip For Triple Wheel on Primary Pinion
30	Nilos Ring	74	Bering Output Shaft (Wheel End)	119	Circlip For Triple Bore
31	Circlip	75	Bering Output Shaft (OP End)	120	Hexagon Socket Head Cap Screw
32	Oil Seal	76	Internal Circlip OP End Bearing	121	Distance Piece
33	Key	77	Output Oil Seal	122	
34	Support Washer	78	Key (OP Shaft End)	123	
35	Input Shaft	79	Inspection Cover	124	
36	Shim	80	Fastener Gear Case+Cover	125	
37	Grease Nipple	81	Eye Bolt	126	Bearing Housing
38		82	Shim	127	Fastener For Bearing Housing
39		83	Oil Level Indicator		
40		84	Vent Plug		
41		85	Drain Plug		
42		86	Bevel Pinion (K)		
43		87	Nilos Ring On Final Pinion (K)		
44		88	Circlip For Primary Wheel on Bevel Pinion		

Notes :

POWER BUILD LIMITED

Leaders in Power Transmission Solutions

Regd. Office & Works : Anand - Sojitra Road, Vallabh Vidyanagar 388 120, Gujarat, India.
Correspondence Address : Post Box # 28, Vithal Udyognagar 388 121, Vallabh Vidyanagar, Gujarat, India.
Phone : +91-2692-231070, 231120, 231170 * Fax : +91-2692-236559
E-mail : infopbl@pbl.elecon.com Website : www.pbl.co.in

MARKETING & SERVICING COMPANY

EMTICI ENGINEERING LIMITED

REGISTERED OFFICE :

Anand - Sojitra Road, Vallabh Vidyanagar - 388 120. Gujarat, INDIA. Phones : +91 269 223 0168, +91 269 223 1125 Fax : +91 269 223 6508
Website : www.emtici.co.in

NATIONAL BRANCHES :

AHMEDABAD :
Phone : +91 79 26406683, 26406684, 26406685
Fax : +91 79 26401363
E-mail:sales@ahdemtici.elecon.com

Bilaspur :
Phones : +91 7752 247723, 247625
Fax : +91 7752 247720
E-mail : salesbil@bilemtici.elecon.com

INDORE :
Phone : +91 731 2558077
Telefax : +91 731 2558077

Madurai :
Phone : +91 4549 293488
Fax : +91 4549 293468

New Delhi :
Phones : +91 11 23414340, 23414341, 23414069
Fax : +91 11 23709046
E-mail : salesdel@delemtici.elecon.com

Secunderabad :
Phones : +91 40 27844748, 27845250
Fax : +91 40 27848317
E-mail : salessec@secemtici.elecon.com

Asansol :
Phones : +91 341 2305901, 2311726
Fax : +91 341 2302038
E-mail : salesasn@asnemtici.elecon.com

Chennai :
Phones : +91 44 24349237, 24349497, 24322455
Fax : +91 44 24349643
E-mail : salesmad@mademtici.elecon.com

Jamshedpur :
Phones : +91 657 2361837, 2362376
Fax : +91 657 2464241
E-mail : salesjns@jmpemtici.elecon.com

Mumbai :
Phones : +91 22 22821315, 22820725,
Fax : +91 22 22870791
E-mail : salesbom@bomemtici.elecon.com

Pune :
Phones : +91 20 40191400
Fax : +91 20 40191420
E-mail : salespune@puneemtici.elecon.com

Vadodara :
Phone : +91 265 2312972, 23136701
Fax : +91 265 2312982
E-mail : salesbrd@brdemtici.elecon.com

Bangalore :
Phones : +91 80 22260219, 22281834
Fax : +91 80 22281834
E-mail : salesbgl@bglemtici.elecon.com

Dhanbad :
Phones : +91 326 2230404
Fax : +91 326 2230490
E-mail : salesdhn@dhnemtici.elecon.com

Kolkata :
Phones : +91 33 24761861, 24760876
Fax : +91 33 24761831
E-mail : salescal@calemtici.elecon.com

Nagpur :
Phones : +91 712 6642600, 6642601
Fax : +91 712 6642622
E-mail : salesnag@nagemtici.elecon.com

Raipur :
Phones : +91 0771 4081541
Fax : +91 712 4081541
E-mail : ssrivastava@bilemtici.elecon.com

Visakhapatnam :
Phone : +91 891 2531630, +91 891 2731630
E-mail : salessec@secemtici.elecon.com

INTERNATIONAL BRANCHES :

MIDDLE EAST :
ELECON MIDDLE EAST FZCO
Phone : +97 146 091 424, +97 146 091 425
Fax : +97 146 091 426
E-Mail : rajen@dubai.elecon.com
milap@dubai.elecon.com
nirav@dubai.elecon.com

FAR EAST :
ELECON SINGAPORE PTE. LTD.
Phone : +65 622 782 58
Fax : +65 622 789 42
E-Mail : vipul@singapore.elecon.com
tejas@singapore.elecon.com

Akaaish Printing & Stationery