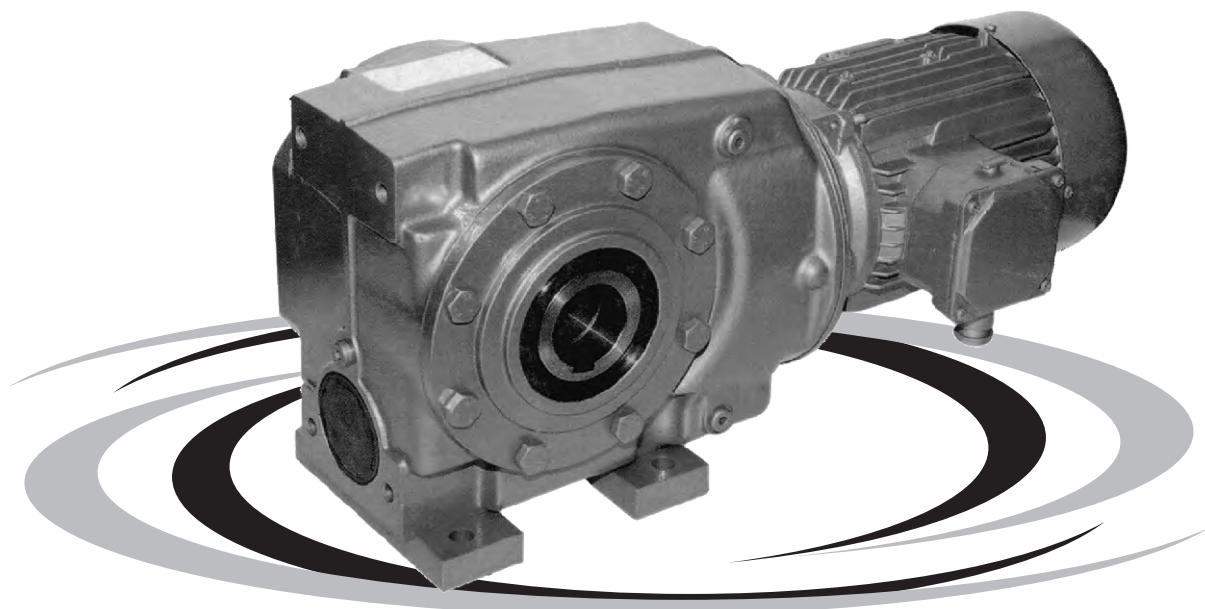


Series C

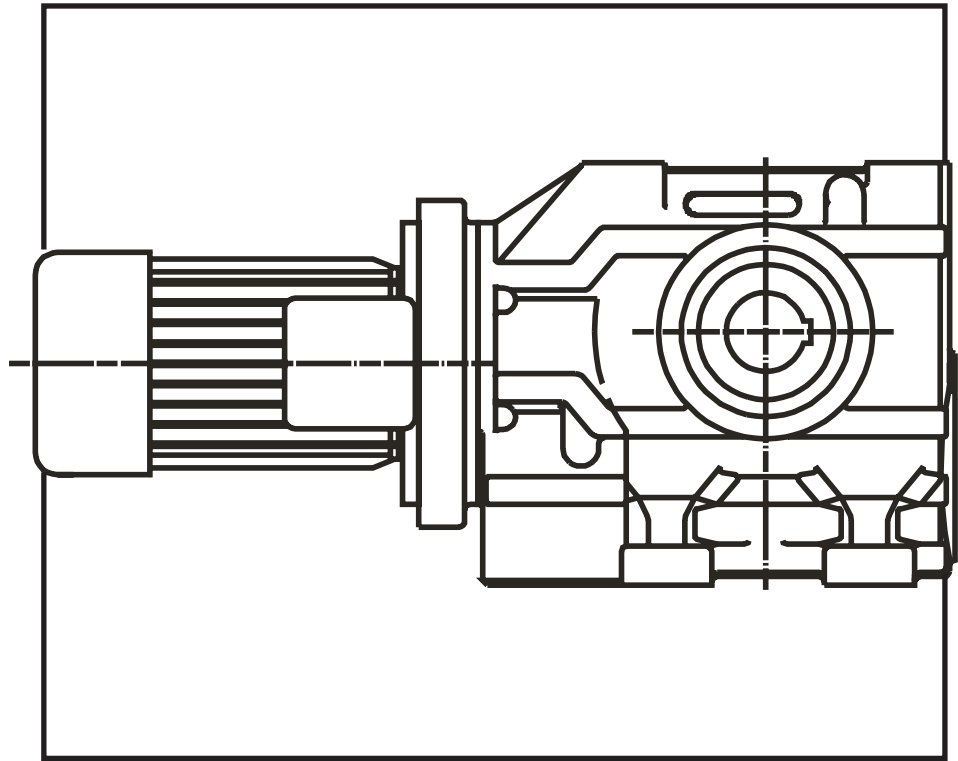


Installation & Maintenance Manual



POWER BUILD LIMITED
Leaders in Power Transmission Solutions

Cat. No.: IM/C/04/02-13/1500



**INSTALLATION
&
MAINTENANCE
SERIES C**



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.



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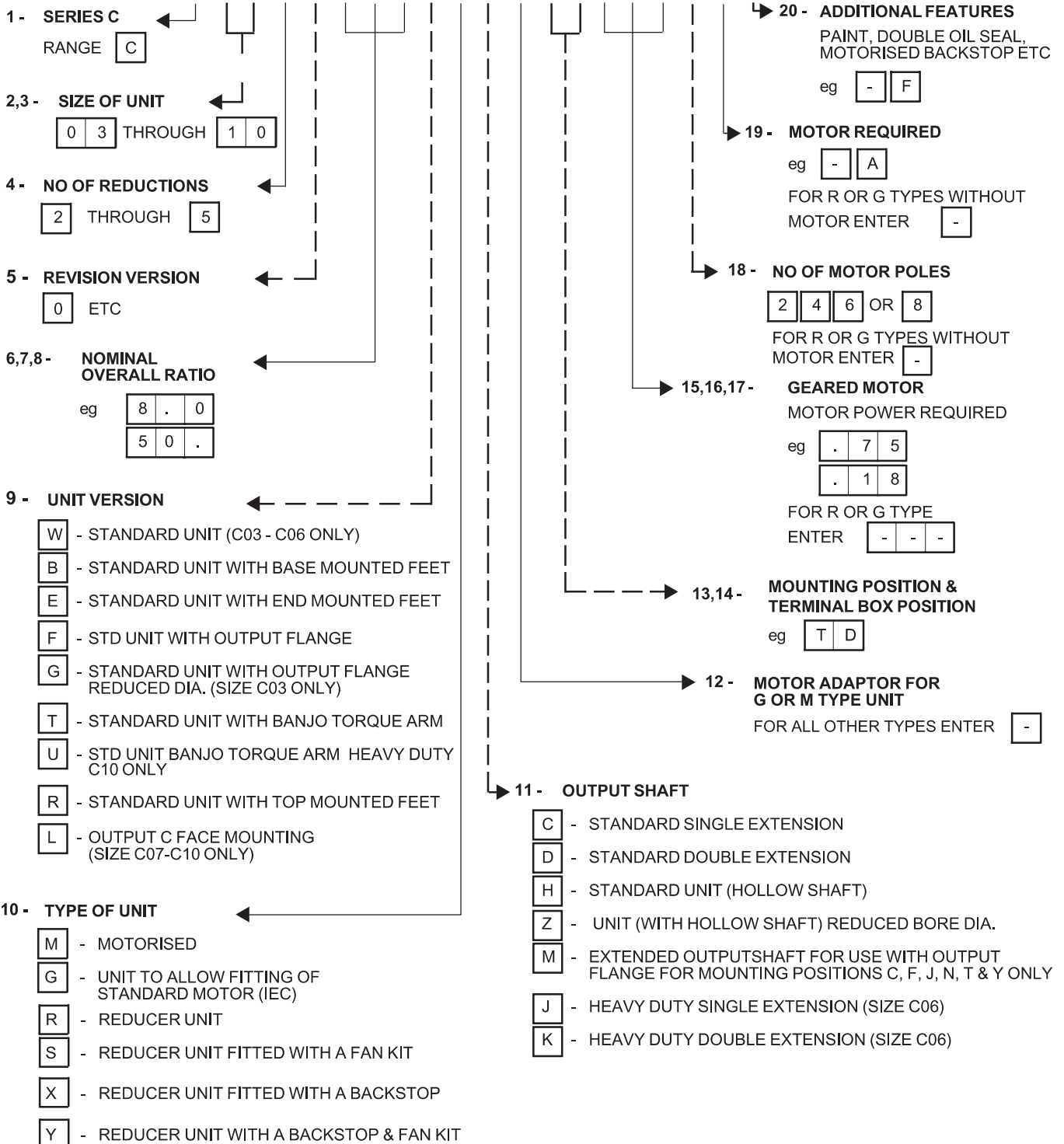
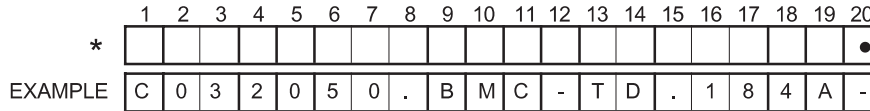
SERIES C INSTALLATION AND MAINTENANCE

1 UNIT IDENTIFICATION

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

- Unit Type
- Sr. Number

		POWER BUILD LIMITED	
		VALLABH VIDYANAGAR-388120 GUJARAT-INDIA	
UNIT TYPE			
Sr. No.		OIL GRADE	
INPUT KW		ASSEMBLY POSITION	
RATIO		OUTPUT RPM	





2 GENERAL INFORMATION

The following instructions will help you achieve a satisfactory installation of your Power Build Limited Series C 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.

Series C gear units will perform satisfactorily if subjected to full load immediately after installation. However, optimum performance is best achieved by a process of gradual load increments, up to the full value, over the first 50 hours or so of their working life. During these early stages of running, sensible precautions should be taken to avoid overloads.

The gear unit operating temperature may be higher during this period of run-in. A progressive reduction in temperature may occur over many hours until the unit has reached its highest efficiency.

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
C0320 / C0330	M5 x 12.5 mm deep	M6 x 16 mm deep
C0420 / C0430	M5 x 12.5 mm deep	M10 x 22 mm deep
C0520 / C0530	M5 x 12.5 mm deep	M10 x 22 mm deep
C0620	M6 x 16 mm deep	M12 x 28 (35mm ø Shaft)
C0630	M5 x 12.5 mm deep	M16 x 36 (45mm ø Shaft)
C0720	M8 x 19 mm deep	M16 x 36 mm deep
C0730	M6 x 16 mm deep	M16 x 36 mm deep
C0820	M10 x 22 mm deep	M20 x 42 mm deep
C0920	M12 x 28 mm deep	M20 x 42 mm deep
C1020	M16 x 36 mm deep	M24 x 50 mm deep

4 WEATHER PROTECTION OF UNIT

All Series C 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 C03, 04, 05 and 06 are supplied factory filled with correct amount of lubricant for mounting position quoted.
- Sizes C07, 08, 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 factory filled 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 C03, 04, 05 & 06 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, 'C' facing or feet to the customer equipment use set screws to ISO grade 8.8 minimum.

Torque tighten to:-

Set Screw Size	Tightening Torque
M6	10 Nm
M8	25 Nm
M10	50 Nm
M12	85 Nm
M16	200 Nm
M20	350 Nm
M24	610 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.

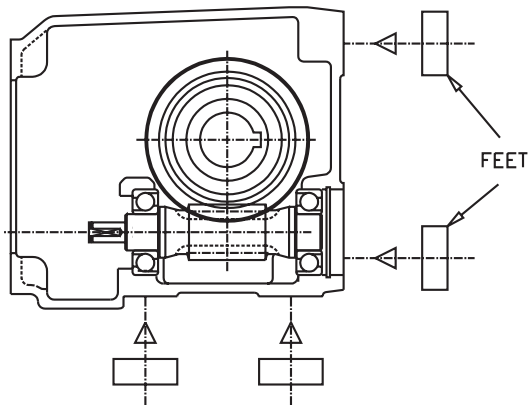
Foot mounted units are supplied either as free standing units, or if required, mounted on a standard baseplate with a foot mounted motor correctly aligned and connected by a flexible coupling.

- 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 finale 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 holdback device is fitted.
- h) Fill gear unit with oil (if not factory filled) as detailed in Section 6.

5.6 FITTING FEET ON UNITS

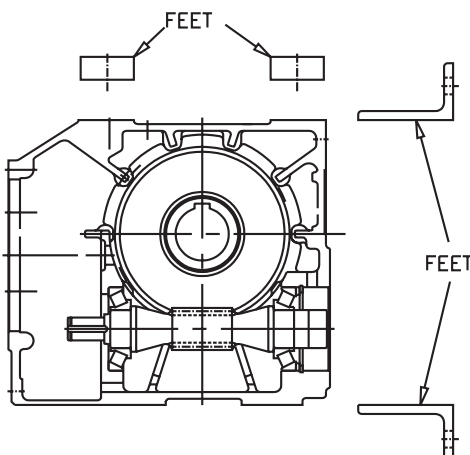
Series C units are fitted with detachable feet. These are normally factory fitted to clients specification, but if for any reason the feet are supplied separately, or dismantling is necessary after supply, they should be re-fitted and torque tightened to the following settings.

FOR SIZES C03, C04, C05 & C06



- 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
C03	M8	25 Nm
C04/C05	M10	50 Nm
C06	M12	85 Nm



FOR SIZES C07, C08, C09 & C10

- 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:

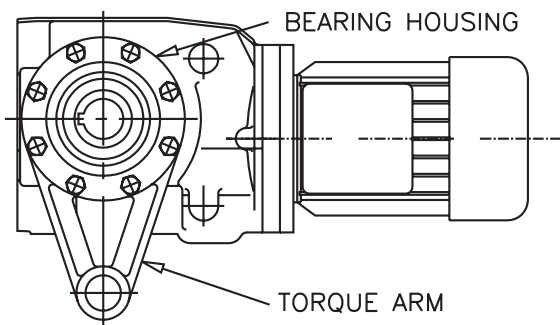
Unit Size	Bolt Size	Torque
C07/C08	M20	176 Nm
C09/C10	M24	240 Nm

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 arm to the side of the unit adjacent to the driven machine where possible, as detailed below.

Note: Unless specified otherwise, the torque arm will be supplied loose.

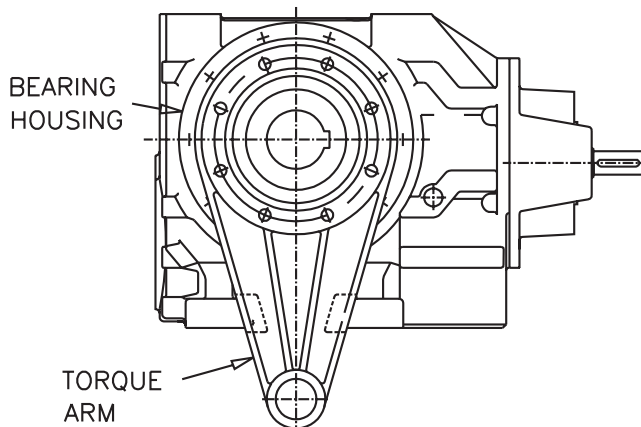


FOR SIZES C03, C04, C05 & C06

- Remove bearing housing bolts (note: take care not to split gasket joint).
- Clean torque arm & bearing housing facings with Lowtox or Loctite 7061.
- Fit torque arm as shown (unless order states otherwise) with longer bolts provided

Torque to:

Unit Size	Bolt Size	Torque
C03/C04/C05	M8	25 Nm
C06	M10	50 Nm



FOR SIZES C07, C08, C09 & C10

- Clean torque arm & bearing housing facings with Lowtox or Loctite 7061.
- Fit torque arm as shown (unless order states otherwise) with bolts provided

Torque to:

Unit Size	Bolt Size	Torque
C07/C08	M12	85 Nm
C09/C10	M16	200 Nm

- e) Anchor case to a secure point by means of the torque arm.
- f) Fit guards in accordance with the factory acts.
- g) Check motor wiring for correct direction of rotation, this is important when a holdback device is fitted.
- h) Fill gear unit with oil (if not factory filled) as detailed in Section 6.

5.8 REPLACEMENT OF OIL SEALS

1. Clean and drain the unit.
2. Remove the holding screws and withdraw cover.
NOTE: Take care not to damage the shims and do not alter the shaft position. Check for burrs or scratches on the shaft which could damage the new seal.
3. Tap the old seal out of the housing or cover using an appropriate sized drift.
4. Ensure that joint faces and shims are clean and position the shims in the cover.
5. Coat joint faces of cover and case with a good jointing compound, replace oil catcher and tighten screws.
6. Smear oil seals with grease (See Appendix 4).
7. Fit replacement seal on a seal guide, slide it along the shaft and press the seal into the housing or cover.
8. Fill with the correct amount of an approved lubricant, see Appendix 2.

5.9 REPLACEMENT OF HOLDBACKS

If and when it becomes necessary to replace the holdback contact Power Build Limited.



6 LUBRICATION AND MAINTENANCE

6.1 LUBRICATION

- Unit sizes C03, 04, 05 and 06 are factory filled with a grade 6G lubricant.
- Unit sizes C07, 08, 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 on sizes C05 & C06
 every 1000 hours or 2 months whichever is sooner on sizes C07, C08, C09 & C10
 and if necessary top up with the recommended grade of lubricant.

6.3 OIL CHANGES

Size 03 and 04 units are lubricated for life. On all other 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. c. Environment - humidity, dust, etc.
 b. Type of oil. 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		
	SYNTHETIC OIL		
70 or less	26000 HOURS	OR	3 YEARS
75	22000 HOURS	OR	3 YEARS
80	15000 HOURS	OR	3 YEARS
85	10500 HOURS	OR	3 YEARS
90	7500 HOURS	OR	2 1/2 YEARS
95	6000 HOURS	OR	2 YEARS
100	4500 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 Tables 2 and 3, Appendix 2. A diagram showing mounting position designations is also included in Appendix 2.

6.5 APPROVED LUBRICANTS

Table 4 Appendix 2 gives the lubricants approved for use in the gear unit.

6.6 APPROVED GREASES

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

6.7 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.

7 NOISE

The range of Series C 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).



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.

MOTOR FLANGE	MOTOR FRAME	C0320/C0420/C0520 C0330/C0430/C0530/C0630		C0720		C0620/C0730	
		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				M	G	G	G
160					G		

- 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

C08/09/10
ON ALL MOTOR FRAME SIZES
G

- Note:
- 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, and that the threads of the set screws are coated with Loctite Nut Lock 243.

SET SCREW TORQUES:-

SET SCREW SIZES	RECOMMENDED TORQUE
M6	10 Nm
M8	18 Nm
M10	37 Nm
M12	64 Nm
M16	150 Nm
M20	260 Nm



LUBRICANT AND QUANTITY

Unit sizes C03, 04, 05 and 06 are factory filled with a grade 6G lubricant.

Unit sizes C07, 08, 09 and 10 will be despatched without oil.

The oil grade is stamped on the name plate and the oil level should be taken using the level plug, see page 11. These are determined from the operating speed of the gear unit and the ambient temperature range, which if not given when ordering will be assumed to be 1450 rev / min input and ambient temperature range 0 to 35°C. Oil grades and oil level should therefore always be checked before installation, instructions are provided with all units despatched.

To determine the oil grade refer to table 1, and then subsequently to table 4 which gives approved lubricants.

To determine the oil capacity refer to appropriate table 2 or 3. Oil capacities are only approximate and units should be filled until oil escapes from the level plug holes. Do not overfill as excess will cause overheating and leakage.

Note: Catalogue ratings are based on the polyglycol range of synthetic oils recommended on this page. The use of mineral or special oils will require a derate, please contact Power Build Limited Application Engineers.

TABLE 1 SERIES C OIL GRADES

If not stated with the order these are the operating conditions that will be assumed

GEAR UNIT DETAILS			AMBIENT TEMPERATURE RANGE *		
UNIT TYPE	RATIO RANGE	INPUT SPEED (REV / MIN)	-30°C to 20°C	0°C to 35°C	20°C to 50°C
DOUBLES	8 - 18	0 - 750	6G	6G	8G
		>750 - 2000	5G	6G	7G
	20 - 36	>2000 - 3000	4G	6G	6G
		0 - 2000	6G	6G	8G
TRIPLES	40 - 250	>2000 - 3000	5G	6G	7G
		0 - 3000	6G	6G	8G
QUADRUPLES	ALL RATIOS	0 - 3000	6G	6G	8G
QUADRUPLES	630 - 2800	0 - 750	6G	7G	9G
		>750 - 3000	6G	6G	8G
QUINTUPLES	3200 - 16000	0 - 3000	6G	7G	9G
		ALL RATIOS	0 - 3000	6G	7G

* For other ambient temperatures please refer to Power Build Limited Application Engineers

TABLE 2 LUBRICANT QUANTITY (Litres) (double and triple reduction and final stage quadruple and quintuple reduction)

DOUBLE AND TRIPLE REDUCTION AND FINAL STAGE QUADRUPLE AND QUINTUPLE REDUCTION															
Unit Size			C0320	C0330	C0420	C0430	C0520	C0530	C0620	C0630	C0720	C0730	C0820	C0920	C1020
MOUNTING POSITION	ABC	Level 1 •	0.3	0.4	0.4	0.5	0.7	0.9	1.5	2.1	4.5	4.8	7.4	14.4	21.6
		Level 2 •									3.4	3.8	6.5	8.5	12.2
	DEF	Level 1 •	0.7	1.2	1.0	1.5	1.4	2.1	3.1	4.0	5.5	5.9	10.25	17.1	31.3
		Level 2 •									3.2	3.6	5.75	7.5	17.3
	GHJ		0.5	0.8	0.7	0.9	1.0	1.2	2.3	2.5	3.7	3.7	6.0	11.1	19.0
	KMN		0.5	0.8	0.6	0.8	1.0	1.4	2.2	2.5	3.7	3.7	6.0	11.1	19.0
	PST		0.6	1.0	0.9	1.3	1.4	2.0	3.0	4.6	6.1	6.6	9.6	16.6	31.5
	WXY *	Motorised	0.65 (0.65)	1.15 (1.1)	1.0 (0.88)	1.5 (1.4)	1.4 (1.3)	1.9 (1.8)	3.2 (3.0)	4.0 (3.7)	5.2	5.6	9.4	17.0	28.8
		Reducer	0.85 (0.75)	1.35 (1.2)	1.2 (1.0)	1.7 (1.6)	1.6 (1.5)	2.1 (2.0)	3.4 (3.1)	4.2 (3.9)	5.6	6.0	9.8	17.4	29.2

• See page 11 for oil level positions

* For PG kits 0.8 to 2.8 use the quantities in brackets

TABLE 3 LUBRICANT QUANTITY (Litres) (primary stage quadruple and quintuple reduction)

PRIMARY STAGE QUADRUPLE AND QUINTUPLE REDUCTION											
Unit Size		C0640	C0650	C0740	C0750	C0840	C0850	C0940	C0950	C1040	C1050
SECONDARY UNIT (Lubricant quantity see table 2)		C0620	C0620	C0720	C0720	C0820	C0820	C0920	C0920	C1020	C1020
PRIMARY UNIT		M0420	M0430	M0420	M0430	M0620	M0630	M0620	M0630	M0720	M0630
PRIMARY QUANTITY • (Unit lubricant)	Vertical	1.6	2.1	1.6	2.1	3.2	4.8	3.2	4.8	6.8	9.0
	Horizontal	1.1	1.3	1.1	1.3	2.4	1.3	2.4	2.6	4.6	2.6

• Unit filled with Grade 6G lubricant suitable for all ambient temperatures between 0°C to 35°C and are 'lubricated for life'

TABLE 4 APPROVED LUBRICANTS

* Only one grade available hence no grade designation

TYPE G - POLYGLYCOL BASE SYNTHETIC		OIL GRADE No					
LUBRICANT SUPPLIER	LUBRICANT RANGE NAME	4G	5G	6G	7G	8G	9G
Batoyle Freedom Group	Helicol W	* (-15)					
Boxer Services / Millers Oils Limited	Boxergear W	150 (-15)	220 (-31)	320 (-31)	460 (-28)		
BP Oil International Limited	Energyn SG-XP		220 (-31)		460 (-34)	680 (-28)	
Caltex	Synlube CLP	150 (-37)	220 (-34)	320 (-31)	460 (-28)	680 (-31)	
Carl Bechem GmbH	Berusynth EP	150 (-26)	220 (-25)	320 (-25)	460 (-25)	680 (-28)	1000 (-28)
Castrol International	Alphasyn PG	150 (-34)	220 (-34)	320 (-31)	460 (-28)		
Esso/Exxon	Glycolube	150 (-25)	220 (-25)	320 (-25)	460 (-23)		
Fuchs Lubricants	Renogear PGW	120 (-23)					
	Renolin PG	150 (-34)	220 (-34)	320 (-34)	460 (-34)	680 (-28)	1000 (-28)
Klüber Lubrication	Klübersynth GH6	150 (-30)	220 (-25)	320 (-25)	460 (-20)	680 (-20)	1000 (-20)
Kuwait Petroleum International	Q8 Gade		220 (-22)	320 (-22)	460 (-22)		
Laporte Performance Chemicals Ltd	Breox Worm Gear Lube	65 (-25)					
	Breox Industrial Lubricant Sw	150 (-25)	220 (-25)	320 (-25)	460 (-23)		
	Breox Oil Soluble Industrial Lub	220 (-23)					
Mobil Oil Company Limited	Glygoyle	22 (-25)	30 (-22)	HE320 (-37)	HE460 (-35)		
Optimol Ölwerke GmbH	Optiflex A	150 (-31)	220 (-28)	320 (-28)	460 (-28)	680 (-28)	1000 (-25)
Shell Oils	Omala S4WE	SA (-25)	SB (-25)	SC (-25)	SD (-23)		
	Omala S4WE	150 (-40)	220 (-34)	320 (-34)	460 (-34)	680 (-34)	1000 (-31)
Texaco Limited	Synlube CLP	150 (-37)	220 (-34)	320 (-31)	460 (-28)	680 (-31)	
Total	Carter SY		220 (-25)	320 (-28)	460 (-22)		
Tribol, GmbH	Tribol 800	150 (-37)	220 (-27)	320 (-25)	460 (-25)	680 (-25)	1000 (-23)

HANDING & MOUNTING POSITIONS

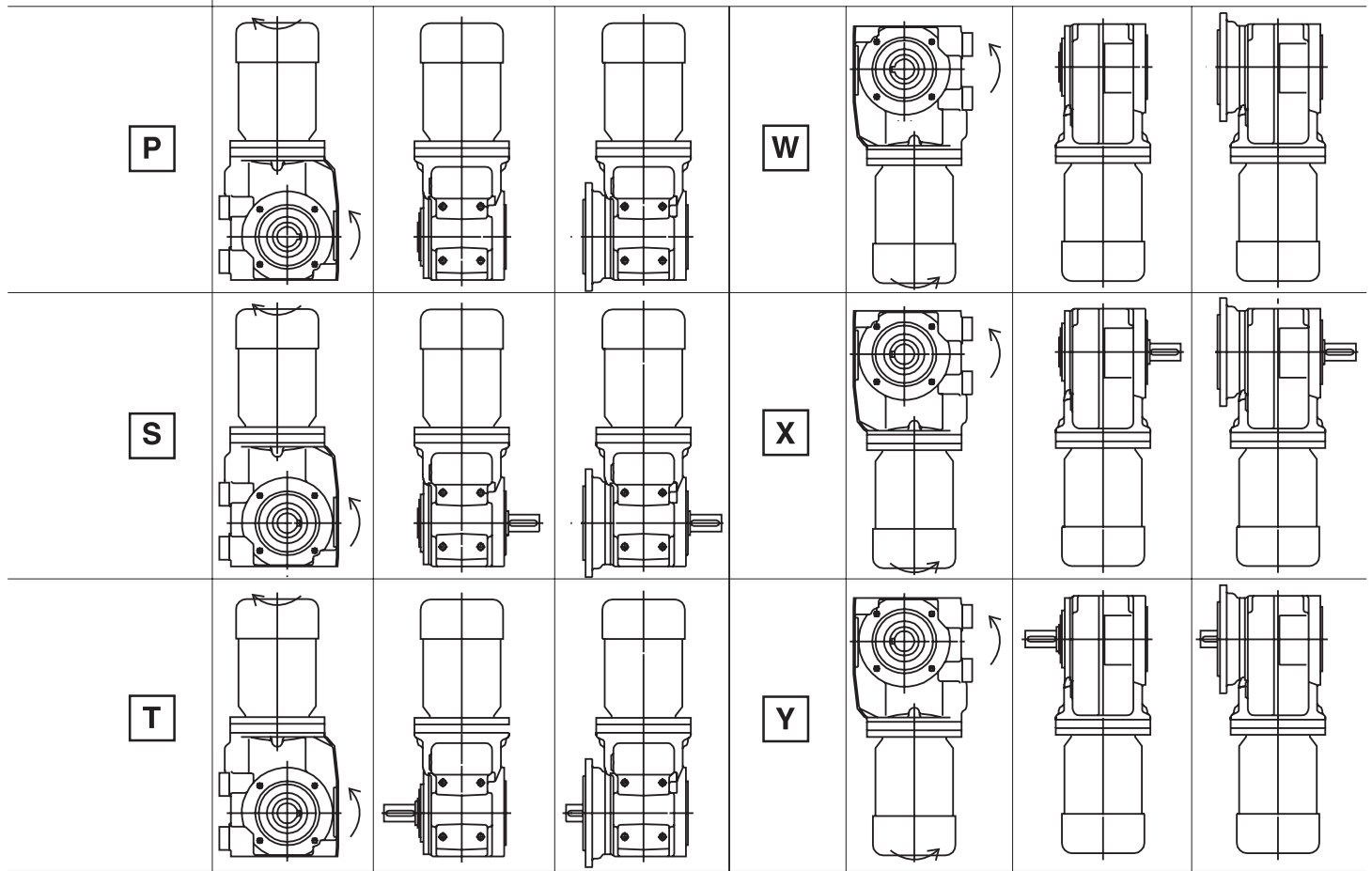
**COLUMN 13
ENTRY**

**DOUBLE OUTPUT SHAFTS ARE AVAILABLE FOR ALL MOUNTING POSITIONS
MOUNTING POSITIONS SHOWN AS MOTORISED - APPLIES ALSO FOR REDUCERS**

A			
B			
C			
D			
E			
F			
G			
H			
J			
K			
M			
N			

HANDING & MOUNTING POSITIONS / RATIO SPLITS

DOUBLE OUTPUT SHAFTS ARE AVAILABLE FOR ALL MOUNTING POSITIONS
MOUNTING POSITIONS SHOWN AS MOTORISED - APPLIES ALSO FOR REDUCERS



RATIO SPLITS

Mounting positions A, B and C require a different oil level depending on worm speed.
Work out wormspped and refer to page 11 for oil level position.

DOUBLE REDUCTION	NOMINAL RATIO	Final Reduction Worm Ratio
	8 . 0	10 : 1
	1 1 .	10 : 1
	1 2 .	10 : 1
	1 4 .	10 : 1
	1 6 .	20 : 1
	1 8 .	10 : 1
	2 0 .	10 : 1
	2 2 .	20 : 1
	2 5 .	20 : 1
	2 8 .	20 : 1
	3 2 .	10 : 1
	3 6 .	20 : 1
	4 0 .	20 : 1
	4 5 .	10 : 1
	5 0 .	10 : 1
	5 6 .	20 : 1
	6 3 .	20 : 1
	7 1 .	10 : 1
	8 0 .	10 : 1
	9 0 .	20 : 1
	1 0 0	20 : 1
	1 1 2	10 : 1
	1 2 5	10 : 1
	1 4 0	20 : 1
	1 6 0	20 : 1
	2 1 2	20 : 1
	2 5 0	20 : 1

TRIPLE REDUCTION	NOMINAL RATIO	Final Reduction Worm Ratio
	1 0 0	10 : 1
	1 1 8	10 : 1
	1 3 2	20 : 1
	1 5 0	20 : 1
	1 6 0	10 : 1
	1 8 0	10 : 1
	2 0 0	20 : 1
	2 2 5	20 : 1
	2 6 5	10 : 1
	2 8 0	10 : 1
	3 1 5	20 : 1
	3 6 0	20 : 1
	4 0 0	10 : 1
	4 5 0	10 : 1
	5 0 0	20 : 1
	5 6 0	20 : 1
	8 0 0	20 : 1
	9 0 0	20 : 1

$$\text{Wormspeed} = \frac{\text{Input Speed}}{\text{Nominal Ratio}} \times \text{Worm Ratio}$$

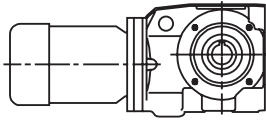
Example			
A 45/1 unit @ 1450 rev/min input			
Wormspeed	=	$\frac{1450}{45}$	x 10
= 322 rev/min (therefore unit will require the higher oil level)			

SERIES C

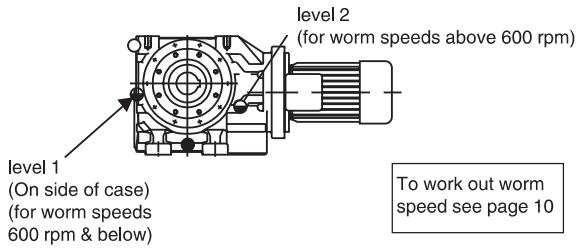
APPENDIX 2

LUBRICATION FILL LEVELS

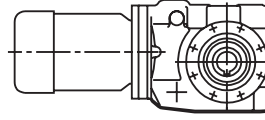
MOUNTING A B C C03, 04, 05, 06 ●



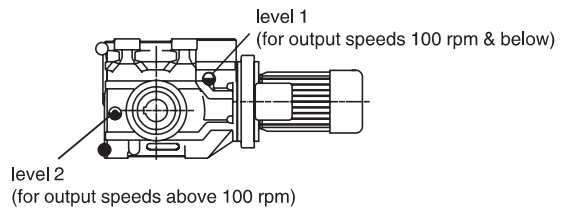
C07, 08, 09, 10



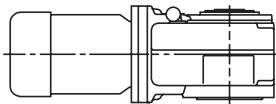
MOUNTING D E F C03, 04, 05, 06 ●



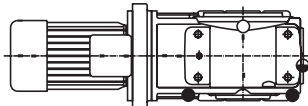
C07, 08, 09, 10



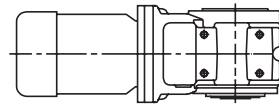
MOUNTING G H J C03, 04, 05, 06 ●



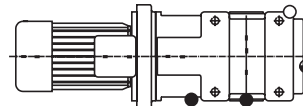
C07, 08, 09, 10



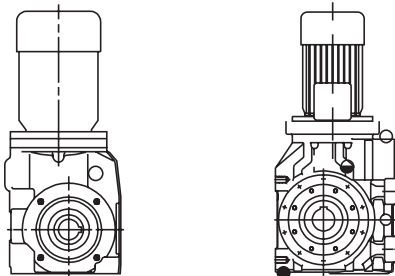
MOUNTING K M N C03, 04, 05, 06 ●



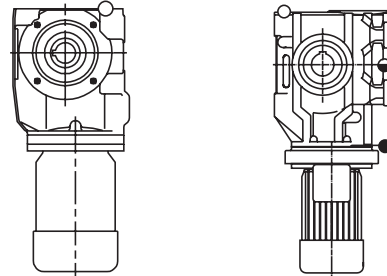
C07, 08, 09, 10



MOUNTING P S T C03, 04, 05, 06 ● C07, 08, 09, 10



MOUNTING W X Y C03, 04, 05, 06 C07, 08, 09, 10



MOTOR MUST BE FITTED WITH SEAL FOR THIS POSITION

- DRAIN POSITION } C07/08/09/10
- LEVEL POSITION } ONLY
- VENTILATOR / FILLING POSITION

● THESE UNITS ARE NOT FITTED WITH A VENTILATOR
 SIZES C03 AND C04 HAVE TWO TAPPED HOLES FOR FILLING PURPOSES,
 SIZES C05 AND C06 HAVE THREE TAPPED HOLES FOR FILLING PURPOSES

MOUNTING POSITIONS - SHOWN AS MOTORISED - APPLIES ALSO FOR REDUCERS

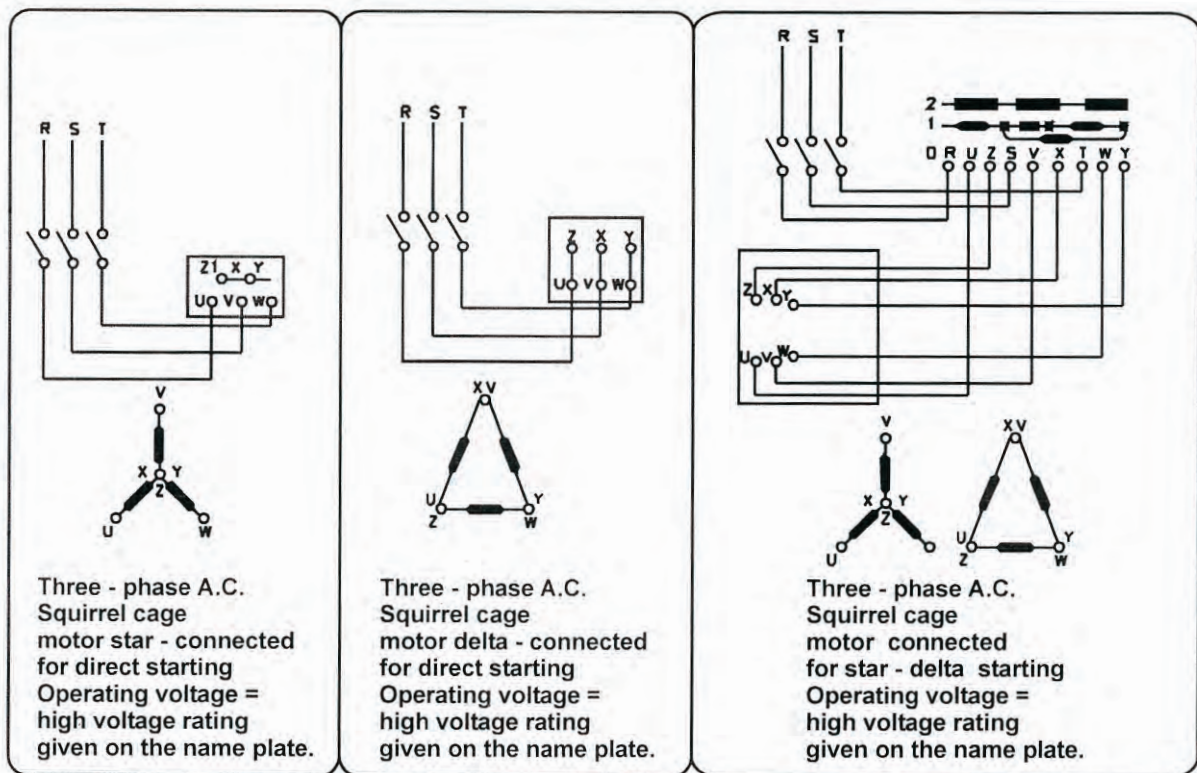
Connetion to Power System

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.



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 Limited Application Engineers if the unit is operating in an ambient temperature outside the range of -30°C to 50°C.

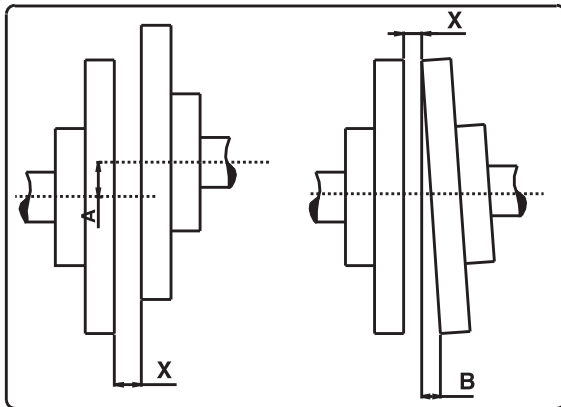
CONNECTION WITH THE DRIVEN MACHINE

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.)

CONNECTION WITH THE DRIVEN MACHINE

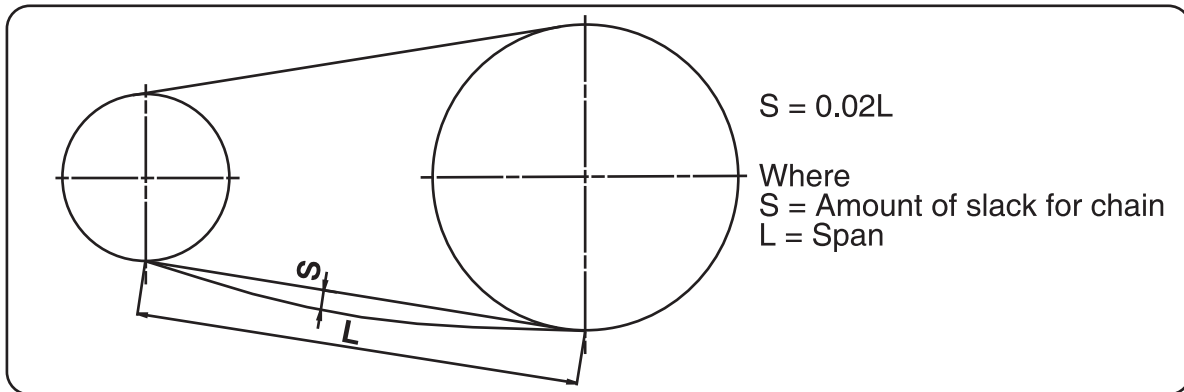


Fig. 2

(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.

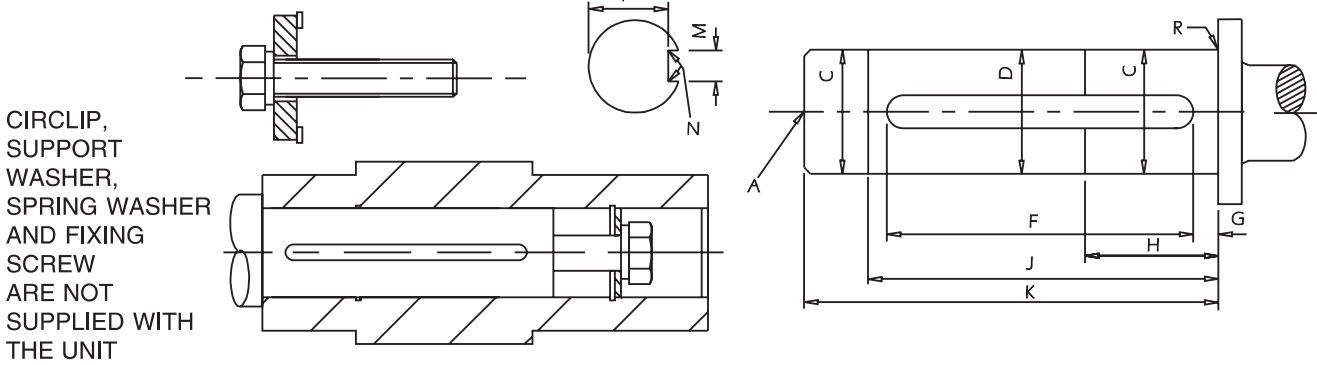
(d) When load (overhung load) is applied on the output shaft, please make sure that it is within the limit of allowable value. Allowable value of overhung load is shown in graph of catalogue.

3. Dimension of keyway

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

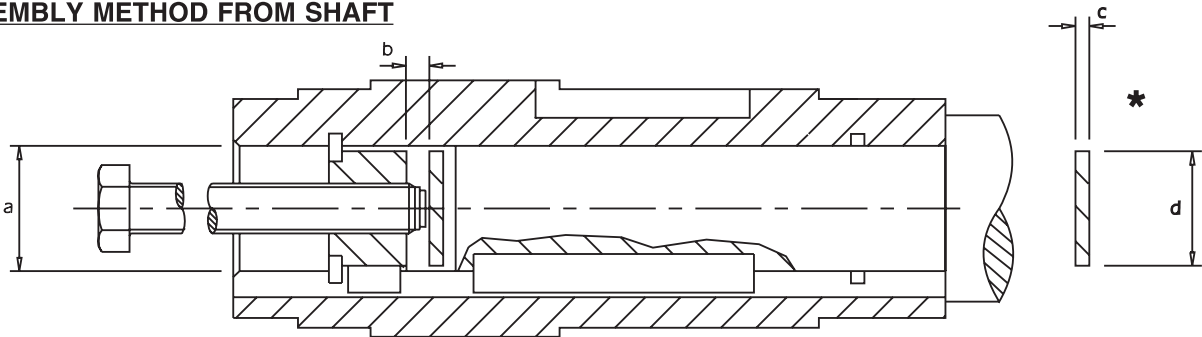
DIMENSIONS ASSEMBLY/DISASSEMBLY

ASSEMBLY ONTO SHAFT - CUSTOMERS SHAFT DETAIL

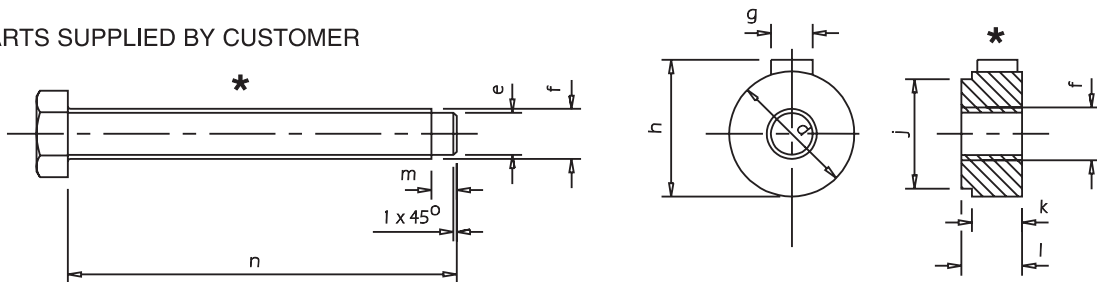


SIZE	A	C	D	F	G	H	J	K	M	N	P	R
C03	M8 x 1.0 18 deep	19.992 / 19.980	-	61.3 61.0	10	-	-	82	5.994 / 5.969	0.25R 0.16R	16.51 16.41	0.8R
C04	M10 x 1.5 22 deep	29.992 / 29.980	-	79.3 79.0	10	-	-	99	7.986 / 7.950	0.4R 0.25R	26.00 25.80	0.8R
C05	M12 x 1.75P 30 deep	34.991 / 34.976	-	77.3 77.0	13	-	-	104	9.985 / 9.949	0.4 0.25R	30.00 29.80	0.8R
C06	M16 x 2.0 38 deep	44.991/ 44.976	-	101.5 101.0	13	-	-	126	13.983/ 13.940	0.4 0.25R	39.50 39.29	0.8R
C07	M20 x 2.5 42 deep	59.990 / 59.971	59.6	148.5 148.0	3	79	128	153	18.000 / 17.957	0.9R 0.7R	53.0 52.8	1.2R
C08	M20 x 2.5 42 deep	69.990 / 69.971	69.6	177.5 177.0	3	90	160	183	20.000 / 19.948	0.9R 0.7R	62.5 62.3	1.2R
C09	M24 x 3.0 56 deep	89.988 / 89.966	89.6	221.5 221.0	3	108	192	227	25.000 / 24.948	1.5R 1.25R	81.0 80.8	1.2R
C10	M24 x 3.0 50 deep	99.988 / 99.966	99.6	257.5 257.0	3	132	217	263	28.000 / 27.948	1.5R 1.25R	90.0 89.8	1.2R

DISASSEMBLY METHOD FROM SHAFT



* PARTS SUPPLIED BY CUSTOMER



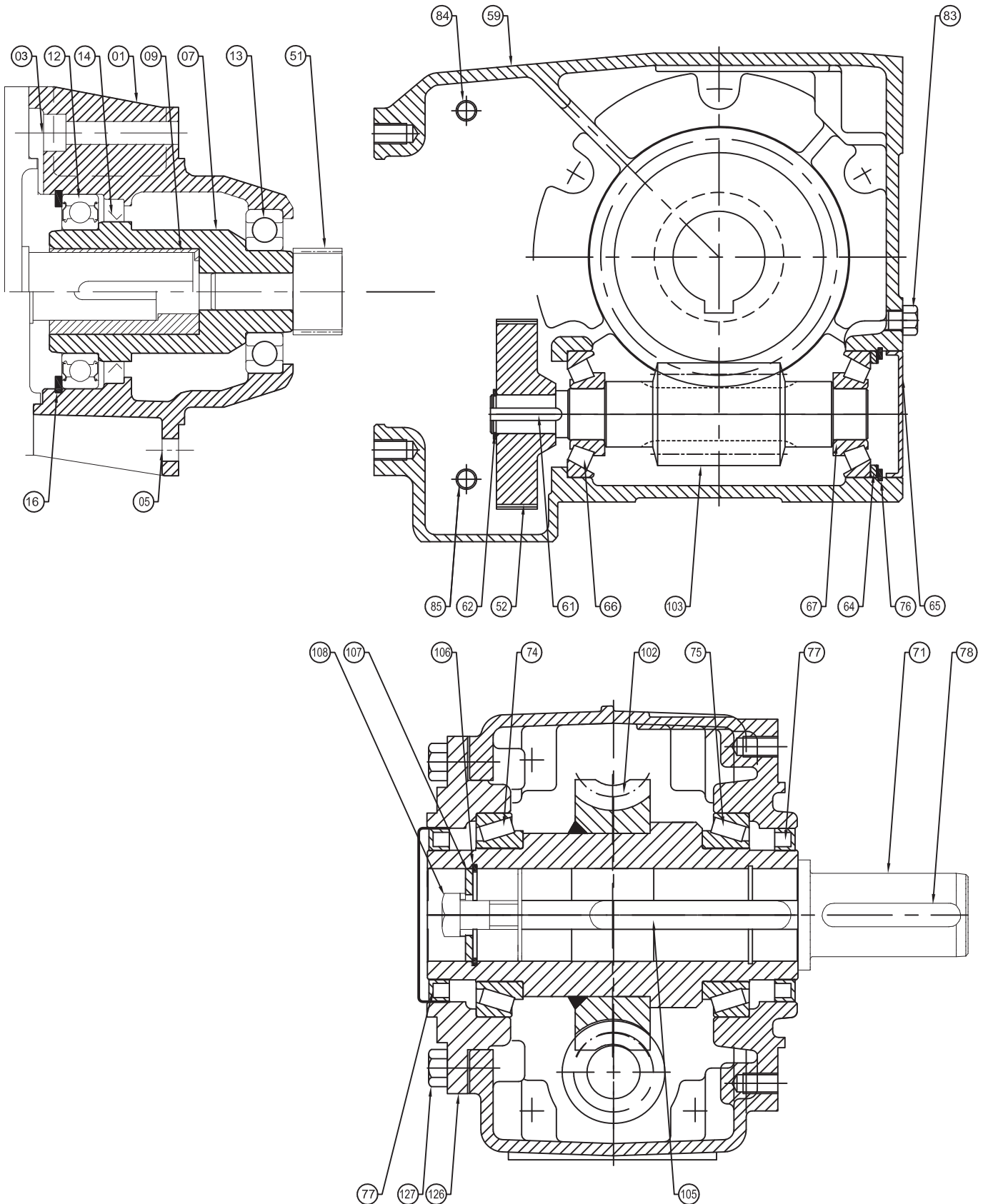
SIZE	a	b	c	d	e	f	g	h	j	k	l	m	n
C03	20.021 20.000	3	5	19.9	7	M10 x 1.5	6	22	11.2	10	12	5	120
C04	30.021 30.000	3	5	29.9	13	M16 x 1.5	8	33	20.8	15	17	5	160
C05	35.025 35.000	3	5	34.9	13	M16 x 1.5	10	38	25.2	15	17	5	160
C06	45.025 45.000	5	5	44.9	20	M24 x 1.5	14	49	34.1	20	23	5	250
C07	60.030 60.000	3	8	59.9	26	M30 x 1.5	18	64	47.4	24	27	5	250
C08	70.030 70.000	5	8	69.9	26	M30 x 1.5	20	74.5	56.4	24	27	5	310
C09	90.035 90.000	6	8	89.9	26	M30 x 1.5	25	95	75.3	24	27	5	360
C10	100.035 100.000	8	8	99.9	32	M36 x 1.5	28	106	84.1	30	34	5	420



SERIES C

TWO STAGE GEARED MOTOR UNIT

ALL 'C' SERIES

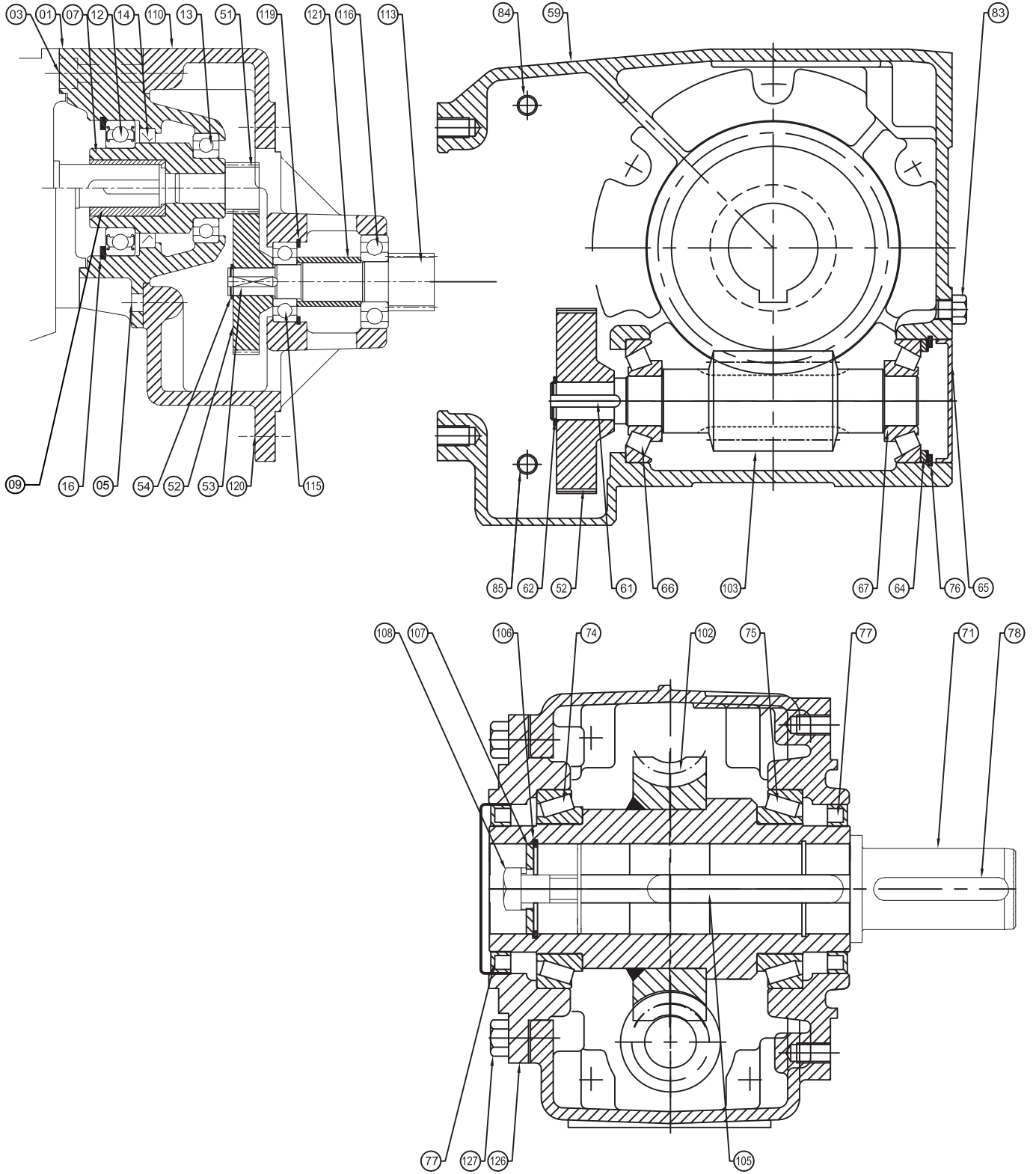




SERIES C

THREE STAGE GEARED MOTOR UNIT

ALL 'C' SERIES

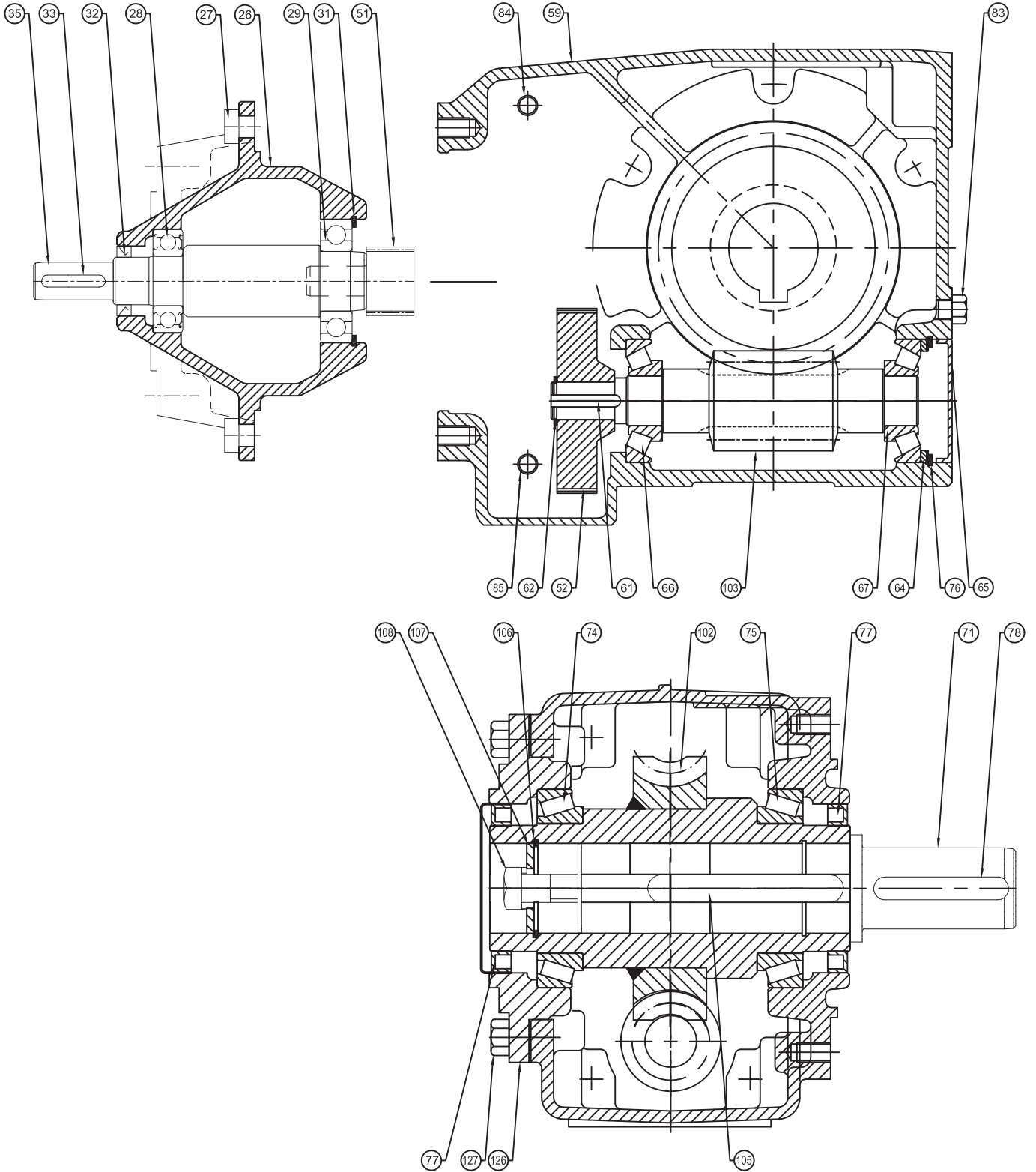




SERIES C

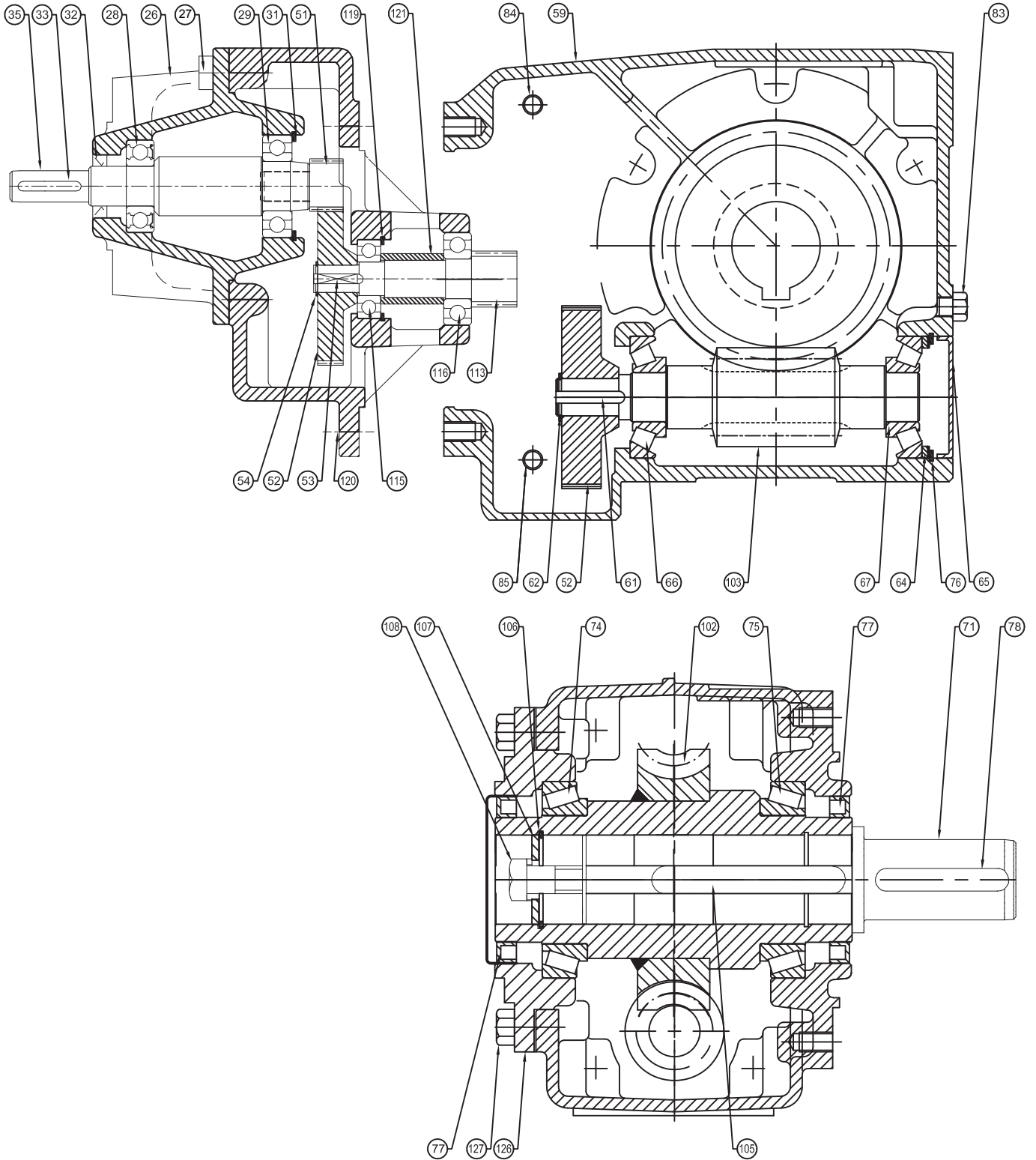
TWO STAGE REDUCER UNIT

ALL 'C' SERIES





SERIES C THREE STAGE REDUCER UNIT ALL 'C' SERIES





PART LIST FOR M,C,F & K 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	96	Key For Backstop
8	Coupling	52	97	External Circlip for Backstop
9	Nylon Sleeve	53	98	Nilos Ring 1 On Output (K)
10	Nylon Key	54	99	Nilos Ring 2 On Output (K)
11	Key	55	100	Output Flange (M)
12	Bearing (Motor Side)	56	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	104	Grease Nipple (C07-C10)
16	Circlip (Motor Side)	60	105	Key (OP Sleeve+OP Shaft)
17	Nilos Ring	61	106	Circlip (OP Sleeve+OP Shaft)
18	Grease Nipple	62	107	Washer (OP Sleeve)
19	Support Washer	63	108	Bolt (OP Sleeve+OP Shaft)
20	Shims	64	109	
21		65	110	Triple Housing
22		66	111	Triple Ring
23		67	112	Copper Washer
24		68	113	Triple Pinion
25		69	114	Triple Wheel
26	Housing Input	70	115	Bearing Input Side
27	Fastener Housing + Gear Case	71	116	Bearing Pinion Side
28	Bearing (Input Side)	72	117	Key (Final Pinion+Triple Wheel)
29	Bearing (Pinion Side)	73	118	Circlip For Triple Wheel on Primary Pinion
30	Nilos Ring	74	119	Circlip For Triple Bore
31	Circlip	75	120	Hexagon Socket Head Cap Screw
32	Oil Seal	76	121	Distance Piece
33	Key	77	122	
34	Support Washer	78	123	
35	Input Shaft	79	124	
36	Shim	80	125	
37	Grease Nipple	81	126	Bearing Housing
38		82	127	Fastener For Bearing Housing
39		83		
40		84		
41		85		
42		86		
43		87		
44		88		



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