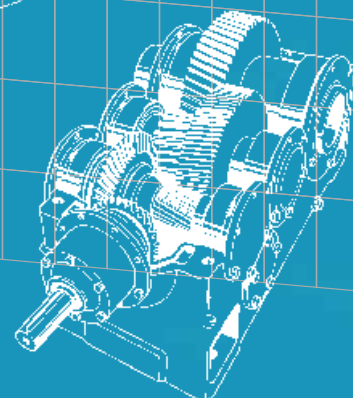
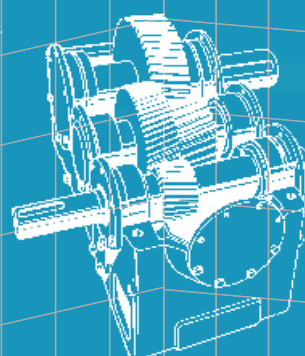
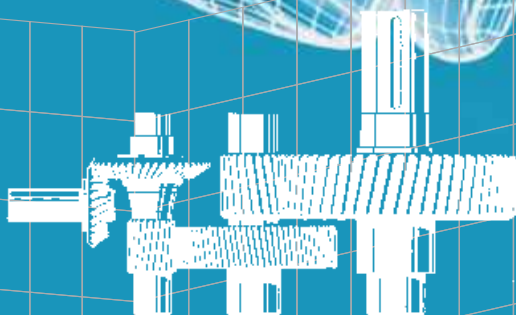




**INSTALLATION AND
ROUTINE MAINTENANCE**

PREMIUM HELICAL GEAR UNIT



PREMIUM





INSTALLATION AND ROUTINE MAINTENANCE

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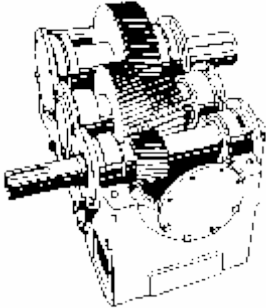
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1.0 GENERAL INFORMATION

INTRODUCTION: HELICAL UNITS



The Premium Helical Gear units incorporate the best in modern gear design. Each gear unit is produced using the most up-to-date machinery and production techniques, ensuring the highest standards of accuracy and precision.

The entire range is of a modular construction with a high degree of interchangeability of parts and assemblies. This enables a large range of sizes and ratios to be built from a relatively small number of parts so allowing comprehensive stocks of parts to be kept.

Maintenance of the Premium Helical units was one of the criteria considered at the design stage, and has led to the development of a unit that requires little maintenance but when needed may be worked on without moving it from its place of installation.

This publication outlines all necessary steps for the correct installation and maintenance of the units, following this sequence should ensure the long trouble-free life of your unit.

PURPOSE OF THE MANUAL:

The purpose of this manual is to provide the information about the gear unit, its safe transport, handling, installation, maintenance, repair and dismantling.

For rating of the gearboxes, selection of the gearboxes and other details, Sales Catalogues and Individual product catalogue must be referred.

Apart from adhering to established engineering practices, the information given in this manual must be read carefully and strictly followed.

Failure to adhere to the information provided herein may result in risk to personal health and safety, and may incur economical damages.

All the documents related to product must be stored by a person with the correct authority and should be made available for consultation.

In case of loss or damage, replacement document must be requested directly from PREMIUM.

The manual reflects the state of the art at the time of commercialization of the gear unit.

The manufacturer reserves the right to modify, supplement and improve the manual, without the present publication being for that reason considered inadequate.

Particularly in significant sections of the manual, important specifications are highlighted by symbols.



2.0 SAFETY INSTRUCTIONS:

SAFETY SYMBOLS :	
	DANGER – WARNING This symbol indicates a situation of serious danger that, if ignored, may cause serious damage to health and safety of personnel.
	CAUTION – ATTENTION This symbol indicates the need to adopt specific precautions to avoid risks to the health and safety of personnel and possible economical damage.
	IMPORTANT This symbol indicates important technical information.
WARNING :	
	Warning : Both foot and shaft mounted units are designed to operate in the horizontal position. Reference must be made to Premium Transmission Limited with full details, where units are required to operate in an inclined position. Note : Torque arms must be secured to the chassis structure in a flexible mounting as indicated within a maximum angle of 30° between the vertical plane and a plane towards the gear unit output shaft as illustrated. See Installation details.
	Warning : ALL UNITS ARE DESPATCHED WITHOUT OIL OR GREASE & ANTI CORROSION OIL. ON INSTALLING THE UNIT FILL IT WITH RECOMMENDED LUBRICANT TO CORRECT LEVEL. SEE TECHNICAL INFORMATION. (TO PREVENT BURNING AND FAST WEARING OUT OF THE LIPS OF OIL-SEALS DUE TO DRY RUNNING, TILL OIL CIRCULATION DUE TO SPLASH LUBRICATION IS ESTABLISHED. A FEW DROPS OF OIL MUST BE SQUIRTED ON THE LIPS OF OIL-SEALS TO WET THEM PRIOR TO STARTING UP OF THE GEARBOX INITIALLY AS WELL AS AT EVERY RESTART AFTER REST PERIODS IN EXCESS OF 24 HOURS).
	Warning : The customer shall be responsible for the proper use articles supplied by the company, particularly the rotating shafts between their driving and driven members, and their guarding for safety and the company shall not be responsible for any injury or damage sustained as a result of the improper use of the articles supplied. Attention is hereby drawn to the danger of using naked lights in proximity to openings in gearboxes and gear units supplied by the company, and the company shall not be liable for any claim for injury or damage arising from any action in contravention of this warning.



3.0 GEAR UNIT IDENTIFICATION

NAME PLATE DETAILS :

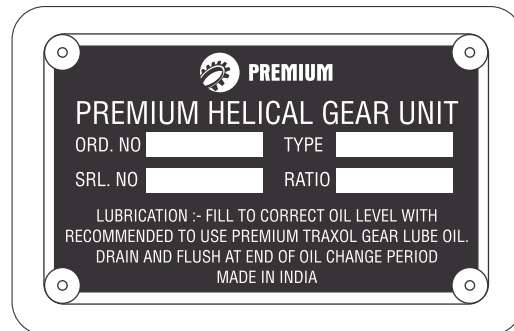
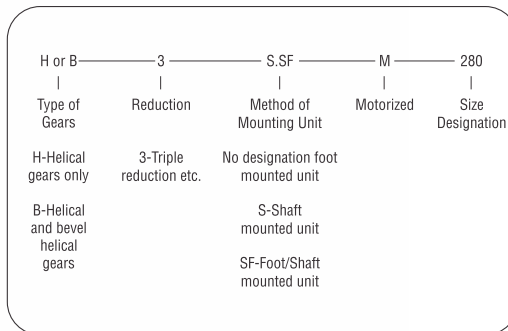
How to identify your Unit :

1. Each unit carries a nameplate with an individual six figure order number for identification purposes.

This is in the form 321020. An enquiry to Premium Transmission Limited quoting this order number will enable us to identify positively the gear unit.

2. All gear units also have a code number on the nameplate for identification purposes.

This is in the form :



By using this reference in conjunction with the sales brochure the gear unit can be identified.

Note : When ordering replacement parts quote from the nameplate the following:

1. **Order Number**
2. **Serial Number**
3. **Ratio**
4. **Type**

These are essential. Replacement parts cannot be identified without this information.

EQUIPMENT IDENTIFICATION

The gear unit bears the following nameplate. The nameplate bears all references and important safety instructions. The gear unit's identifying code is explained in the Sales Catalogue.

If the gear unit is supplied with other systems as Forced Lubrication System etc. all information regarding this is supplied in the FLS manual.



SPECIAL INSTRUCTIONS

- Ambient operating temperature from + 5°C to 50°C.
- Type of bearings used in Helical gearboxes are Taper Roller and Double Row Spherical Roller bearings of reputed make.
- Type of bearings used in worm Gearboxes are Taper Roller and Angular Contact bearings of reputed make.
- Sealant used Loctite Make Medium Blue 243 Thread locker and 574 Flange sealant.
- Lubricant used ISO VG 320 Grade oil for makes refer IOM PREMIUM/WM/CA/107 and PREMIUM/HG/CA/203.
- Grease to be used is multipurpose grease or wheel bearing grease of any reputed make.
- Type of Paint used is Air drying Blue Hammertone paint manufactured by Asian Paints India.
- External earthing to be provided by the end user.
- Whenever the gearboxes are to be installed in Angular position the same shall be referred back to PREMIUM for suitable advice.
- Instruction given for operation, installation and routine maintenance for CE products should also be followed.

SERVICE

Trained and qualified person shall carry out service job.

Readability of the nameplate

The nameplate and the information given must be readable at all times and regularly cleaned.

In case of nameplate wear and / or damaged so as to affect its readability or that of even one of the items information thereon, the end user must request a new nameplate from the Manufacturer, quoting the information given in this manual, and replace the old one.

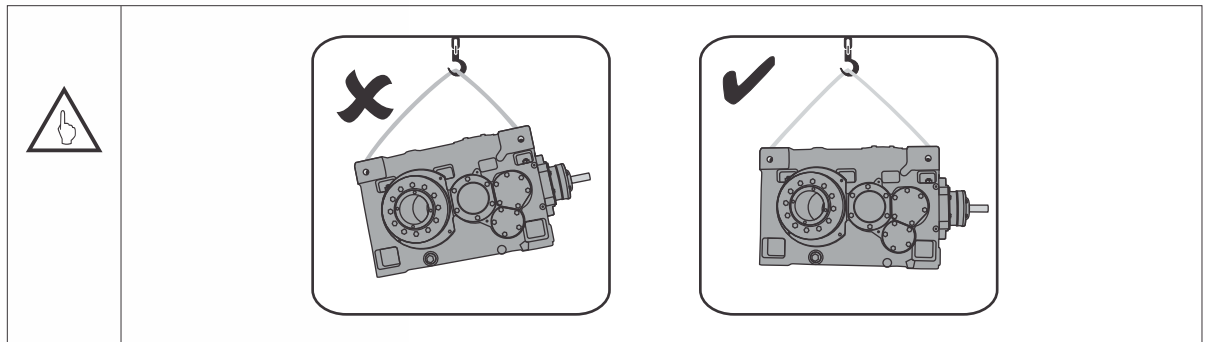


4.0 HANDLING AND STORAGE

UNPACKAGING :

Procedure to unpack the gearbox from Packing :

- Remove nails, using nail pullers and then lift the top plank using a suitable material handling tool. The workman is advised to wear hand gloves.
- Loosen the foundation bolts.
- Use suitable size wire rope / sling and lifting lugs on the gear unit to lift the gear unit. Please see that the ends of the rope or sling are placed at equal distance from the hook to avoid imbalance or tilting of the gear unit during lifting. Not adhering to this instruction may lead to falling of the gear unit and may cause injury to the work men apart from damages to the gear unit.



STORAGE & PROTECTION OF UNIT :

The machine manufacturer or end user to provide 1 to 2.5 meter space around the gearbox depending upon size of the gearbox for maintenance. For long time storage gearbox must be filled with oil so that it touches the bearing roller height at maximum height of bearing in the gearbox. The input shaft of the gearboxes to be rotated few times once in 15 days.

	Instructions on handling hot gear units : Feel the temperature of the gear unit at regular interval. In case of abnormal raise in temperature please measure it using industrial thermometer. In case the temperatures exceeds 95 Deg C, switch of the prime mover and allow the gear unit to cool down to a safe temperature for handling and the open the breather.
	Protection of Unit : All units prior to despatch are test run with a rust preventive oil giving adequate protection to internal parts for a period of six months covering normal transport inland and overseas and covered storage. When the unit is installed the rust preventive dissolves in the first fill of lubricant without harmful effect. Shaft extensions and hollow output shafts are protected with a rust inhibitor which is proof against sea water and suitable for under-cover storage upto 12 months. Notes: 1. Where gear units are to operate in abnormal conditions, or where they are to stand for long periods without running, e.g. in plant installation, Premium Transmission Limited must be notified so that suitable protective arrangements can be made. 2. Gear units which are commissioned and then left standing for an extended period should be operated, loaded or unloaded for a short time every two weeks to circulate the lubricant to protect surfaces. If this is not possible the unit should be protected from corrosion.



5.0 TECHNICAL INFORMATION

OIL LEVELS :

New Units : All units are dispatched without oil. Before operating a new unit it should be filled with a recommended lubricant (see table) to the level indicated by dipstick markings, wherever possible. run the unit for a short time without load to circulate the lubricant thoroughly. Then stop the unit and recheck the oil level and top up to the correct mark on the dipstick.

“In Vertical (V type gearboxes) a dry well arrangement is given. In case of overfilling, oil overflows & enters in output shaft bearing housing. This may result in oil seepage through output shaft. In case of overfilling, excess oil should be drained out by opening grease nipple. Grease nipple should be fitted back & grease should be filled for lubricating bottom bearing. Dipstick marking is done as per required correct oil level.”



Warning : Do not overfill unit as this can cause leakage and overheating.

Oil Changes : As the oil is used, degradation takes place, and since this process is more rapid at higher temperatures, the oil must be changed to ensure satisfactory lubrication. The type of oil and time spent at highest temperatures determines the interval between oil changes.

Oil Change Period :

Operating Temperature	Oil Change Period
Up to 95°C	6 Calendar Months

Unless special procedures have been taken when ordering the unit to specify other information, the oil level should be checked occasionally with the unit stationary and topped up if necessary. The procedure for changing the oil should be to drain the oil preferably when hot and after circulation. If the gear unit is to be flushed, the unit should be filled to the appropriate level with an oil of the same viscosity grade and type, as the lubricating oil and run before the flushing oil is drained. This procedure should be followed especially if the type of oil is being changed. The unit should be filled with the approved oil to the level marked on the dipstick. Re-check the oil level after a short period of running and top up if necessary. On certain units the output shaft bearings are grease lubricated, these should be regreased at 2000 to 3000 hour intervals unless otherwise specified.

Gear Lube Oil. Values in liters (Approximately).

Type of unit	Size of unit															
	140	160	180	200	225	250	280	315	355	400	450	500	560	630	710	800
H1	6	9	13	18	25	35	45	70	95	130	180	245	-	-	-	
H2	7	11	15	20	27	35	50	70	100	140	205	320	425	650	895	-
H2S	-	-	-	19	25	32	45	55	90	125	175	230	290	435	655	-
H2SF	7	11	15	20	27	35	50	70	100	140	205	320	425	650	895	-
H3	9	13	17	20	27	35	50	70	100	140	205	415	550	825	1150	1580
H3S	-	-	-	19	25	32	45	55	90	125	175	315	405	585	870	1230
H3SF	9	13	17	20	27	35	50	70	100	140	205	415	550	825	1150	1580
H4	9	13	17													
H4SF	9	13	17													
B2	6	9	13	18	25	35	45	70	95	130	180	275	-	-	-	-
B2S	-	-	-	17	22	30	40	50	80	115	165	190	-	-	-	-
B2SF	6	9	13	18	25	35	45	70	95	130	180	275	-	-	-	-
B3	7	11	15	20	27	35	50	70	100	140	205	410	530	800	1095	-
B3S	-	-	-	19	25	32	45	55	90	125	175	315	405	575	835	-
B3SF	7	11	15	20	27	35	50	70	100	140	205	410	535	800	1095	-
B4	9	13	17													
B4SF	9	13	17													

For those capacities not given refer to Premium Transmission Limited



OIL GRADS : EP Mineral (type E)

LUBRICANT	AMBIENT TEMPERATURE RANGE		
	-5°C to 25°C	0°C to 40°C	10°C to 50°C
Oil Grade	5E (VG 220)	5E (VG 320)	6E (VG 460)

OIL GRADS : Polyalphaolefin based Synthetic (type H)

LUBRICANT	AMBIENT TEMPERATURE RANGE		
	-10°C to 30°C	0°C to 45°C	10°C to 50°C
Oil Grade	5H (VG 220)	5H (VG 220)	6H (VG 220)

Approved Lubricants:

Premium gear units are supplied without oil. Before operating it is essential to ensure that they are filled to correct oil levels as indicated by markings on dipsticks, with lubricants recommended by Premium. Overfilling can cause overheating and leakage.

Correct lubricant is most important and it should be noted that EP oils are recommended in all instances.

Lubricants listed are suitable for normal ambient temperatures and operating duties. All gear units in this range are designed to operate under full load at a maximum temperature of 110°C. Higher temperature up to a maximum of 120°C are acceptable on the basis of peak periods of short duration only. In certain applications these maximum temperatures may be exceeded by the use of special lubricants. Such cases, or others where extreme conditions, are to be met, e.g. low temperature operation or unusual loading conditions, should be referred, with full details, to Premium for recommendations.

Recommended lubricants are based on information provided by oil suppliers and responsibility cannot be accepted for the quality or suitability of oil supplied, nor to any mechanical defect resulting from unsatisfactory lubrication due to the use of sub-standard oil.

Lubricant specification (CLP DIN 51517)

If the gear drive is started when the ambient temperature is below -7°C (20°F) use a lube oil heater.

Viscosity mm/s (cSt) at 40°C														TRIBOL
	Premium Traxol	Bharat Petroleum	Indian Oil	Hindustan Petroleum	BP Energol	Castrol	SPARAN	Mobilgear	Shell Omala Oil	Cepsa Engranjes	Klüberoil GEM 1	Aral	Chevron Gear Compound	Tribo
VG 460	-	Amocam Oil 460	Servomesh SP 460	Parthan EP-460	GR-XP 460	Alpha MW 460	Spartan EP 460	Mobilgear 634	Omala 460	HP 460	460	Degol BG 460	EP 460	Trebol 1100/460
VG 320	G-32	Amocam Oil 320	Servomesh SP 320	Parthan EP-320	GR-XP 320	Alpha MW 320	Spartan EP 320	Mobilgear 632	Omala 320	HP 320	320	Degol BG 320	EP 320	Trebol 1100/320
VG 220	-	Amocam Oil 220	Servomesh SP 220	Parthan EP-460	GR-XP 220	Alpha MW 220	Spartan EP 220	Mobilgear 930	Omala 220	HP 220	220	Degol BG 220	EP 220	Trebol 1100/220
VG 150	-	Amocam Oil 150	Servomesh SP 150	Parthan EP-460	GR-XP 150	Alpha MW 150	Spartan EP 150	Mobilgear 629	Omala 150	HP 150	150	Degol BG 150	EP 150	Trebol 1100/150
VG 100	-	Amocam Oil 100	Servomesh SP 100	Parthan EP-460	GR-XP 100	Alpha MW 100	Spartan EP 100	Mobilgear 627	Omala 100	HP 100	100	Degol BG 100	EP 100	Trebol 1100/100



GREASE : Multipurpose grease or wheel bearing grease of any reputed Make.

THREAD LOCKS : Sealant used Loctite Make Medium Blue 243 Thread locker or equivalents can be used.

GASKETING COMPOUND : 574 Flange sealant or equivalent can be used.

BREATHERS : Breathers are provided on the gearbox. Please see that these are not clogged or choked up. Regular cleaning of the breathers must be carried out.

BEARINGS : Type of bearings used Taper Roller and Double Row Spherical Roller bearings for helical gearboxes of reputed make.

Bearings : The bearings for the 'H' Series range have all been selected very carefully to best suit the requirements of each unit and to more than adequately deal with the designed maximum loads acting on them. Because of their load carrying ability, roller bearings have been used throughout, depending on the unit type and the shaft as to whether taper roller, parallel roller or spherical roller bearings are fitted (see table below for details of type of bearings).

Bearing End Floats : If unit is dismantled or partly dismantled, on reassembly, the bearing end floats should be checked and adjusted as required. The spherical and parallel roller bearings fitted to some shafts require no setting of bearing end float as component tolerances make allowances for it. If they are to be subject to frequent reversals, refer to Premium Transmission Limited. The shafts fitted with taper roller bearings however have tighter tolerances of bearing end float and require careful setting. Two methods of achieving the correct bearing end float on these shafts with taper roller bearings are shown as below. Method one is for all shafts except the Bevel Input shaft. Method two is for Bevel Input shaft only.

Method One : (For shafts other than bevel input shafts)

1. Assemble shaft, fit covers and partially tighten the bolts then rotate the shaft to ensure bearing rollers are correctly seated in their races.
2. When unit is completely assembled with top half of case in place, measure gaps between case and covers, at each side of case.
3. Add the two measurements together. Then add to it atleast the minimum recommended end float but not more than the maximum (see table). The total should then be divided by two so giving the value of shims for each cover.
4. Add shims and tighten bolts to torque values in table shown on page 12.

Method Two : (For bevel input shaft only)

1. Assemble shaft, nipping locknut up against bearing but do not fit grubscREW or oil catcher.
2. Check tooth contact markings (as shown in page 6).
3. Set a dial indicator on shaft end so as to register any axial movement.
4. Slacken locknut gradually, pushing and pulling shaft each time it moves to check movement registered on dial indicator.
5. On reaching a point where movement registered is within the bearing end float tolerance (see table) fit grubscREW so as to fix locknut in place.



OIL SEALS (REPLACING PROCEDURE) : Use only TCK make or equivalent oil seals.

Replacement of Oilseals : Oilseals should be replaced whenever unit is dismantled or if in service it shows signs of leakage or damage.

Recommended procedure for replacing an oilseal :

1. Clean and drain unit.
2. Remove any parts that may obstruct access to seal (eg. fan and cowl).
3. Remove bolts and withdraw oil catcher. Take care not to damage the shims and do not alter the shaft position. Check for burrs and scratches on the shaft as these could damage the new seal.
4. Tap the old seal out of the housing.
5. Clean joint faces and shims.
6. Position shims on oil catcher.
7. Coat joint faces of oil catcher and gear case with a good jointing compound.
8. Replace oil catcher and tighten bolts to the values shown in table.
9. Fit replacement seal. Protect seal lips by wrapping shaft with thin strong paper coated with oil or grease. Coat seal lips with grease, then using appropriate sized drift press into housing. For best performance, ensure that the seal is seated square with the shaft.
10. Fill unit with a recommended lubricant to correct levels as indicated on the dipstick.

PAINTS :

Type of Paint used Air drying Blue Hammertone paint Asian Paints India. Apcolite Hammertone finish (air drying) However customer can use equivalent paint

NOISE LEVELS :

Feel the noise of the gear unit at regular intervals. In case of noise level is abnormal (beyond 85 db) use ear mask, stop the prime mover and check the alignments and conditions of bearing after gear unit cools down to safe level.

VIBRATIONS :

Please check the vibration of the gear unit periodically. The maximum vibration limit allowed for helical gear unit is 75-micron displacement.

ELECTRICAL CONNECTIONS :

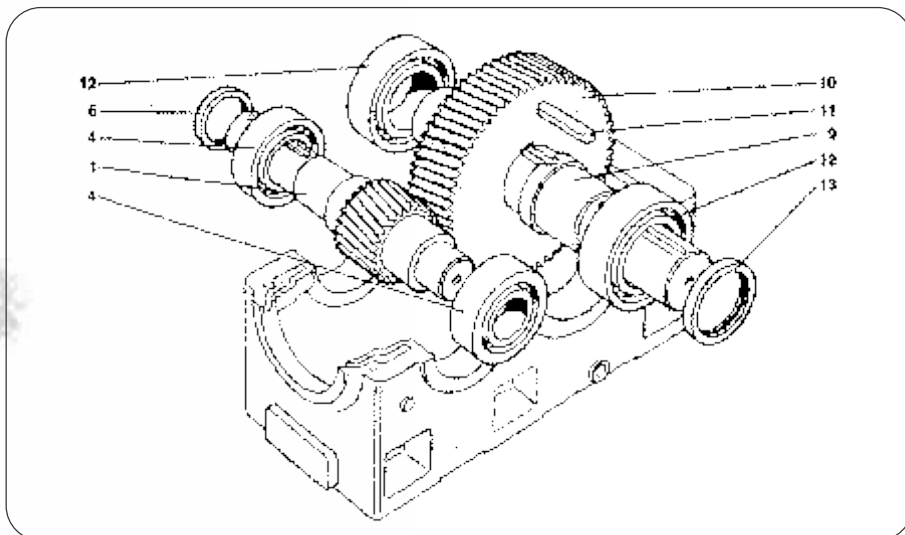
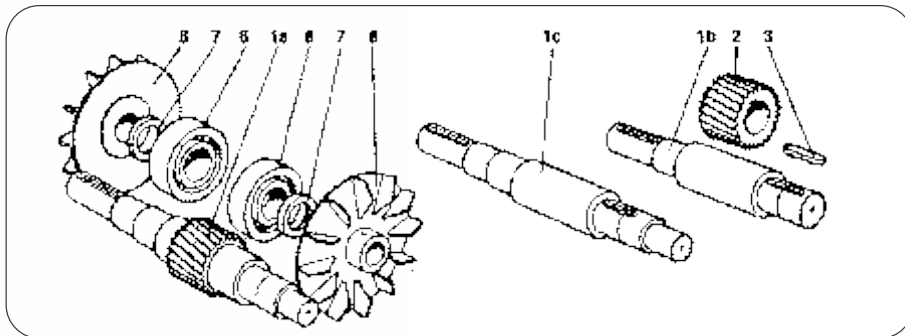
The gear units are not supplied with electrical connection. The prime mover like electrical motor needs experienced and trained personnel to connect it to the power line.



ASSEMBLY AND DISMANTLING OF GEAR UNIT.

Single Reduction - Parallel Shafts Type H1

Input shaft bored and solid pinion assembly and with fans



1	Input pinion shaft	4	Bearing for input shaft	9	Output shaft
1a	Input pinion shaft (with fan extension)	5	Oilseal for input shaft	10	Wheel
1b	Input shaft	6	Bearing for input shaft (when fan is fitted)	11	Key for wheel
1c	Input shaft (with fan extension)	7	Oilseal for input shaft (when fan is fitted)	12	Bearing for output shaft
2	Input pinion	8	Fan	13	Oilseal for output shaft
3	Pinion Key				

Input shaft depending on ratio will have either a pinion or a separate pinion.

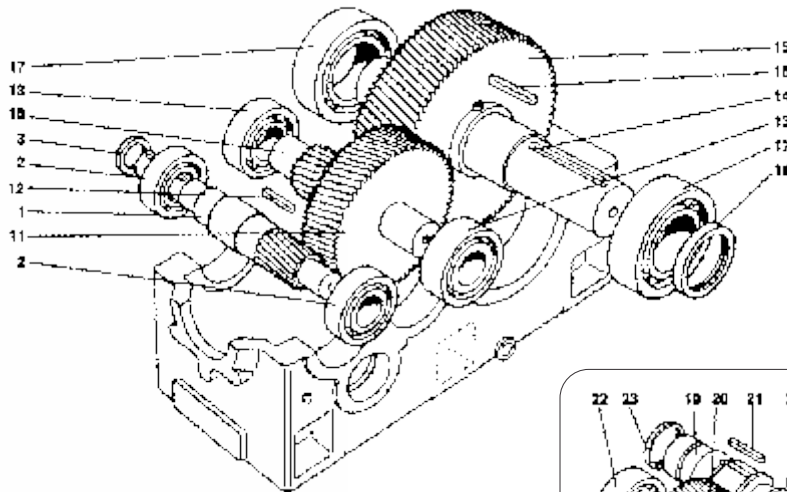
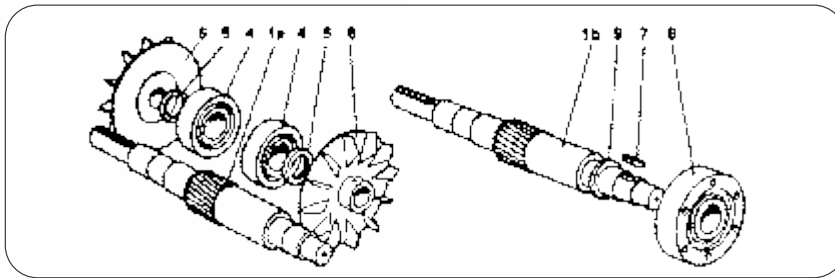
IMPORTANT : When ordering spare or replacement parts the following details from the nameplate must be quoted :

1. Serial No.
2. Unit type/size
3. Ratio



Double Reduction - Parallel Shafts Types H2, H2S, H2SF

Input shaft with fans with holdback



Shaft mounted unit (Output shaft arrangement)

- 1 Input pinion shaft
- 1a Input pinion shaft (with fan extension)
- 1b Input shaft with fan/holdback extension
- 2 Bearing for input shaft
- 3 Oil seal for input shaft
- 4 Bearing for input shaft (when fan is fitted)
- 5 Oil seal for input shaft (when fan is fitted)

- 6 Fan
- 7 Key for Holdback
- 8 Holdback
- 9 Oil seal for holdlock
- 10 Final pinion shaft
- 11 1st reduction wheel
- 12 Key for 1st reduction wheel
- 13 Bearing for final pinion shaft
- 14 Output shaft

- 15 Final reduction wheel
- 16 Key for final reduction wheel
- 17 Bearing for output shaft
- 18 Oil seal for output shaft
- 19 Hollow output shaft
- 20 Final Reduction wheel
- 21 Key for 1st reduction wheel
- 22 Bearing for hollow output shaft
- 23 Oil seal for hollow output shaft
- 24 Shrink disc

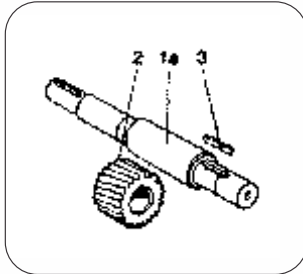
IMPORTANT : When ordering spare or replacement parts, the following details from the nameplate must be quoted :

1. Serial No.
2. Unit type/size
3. Ratio

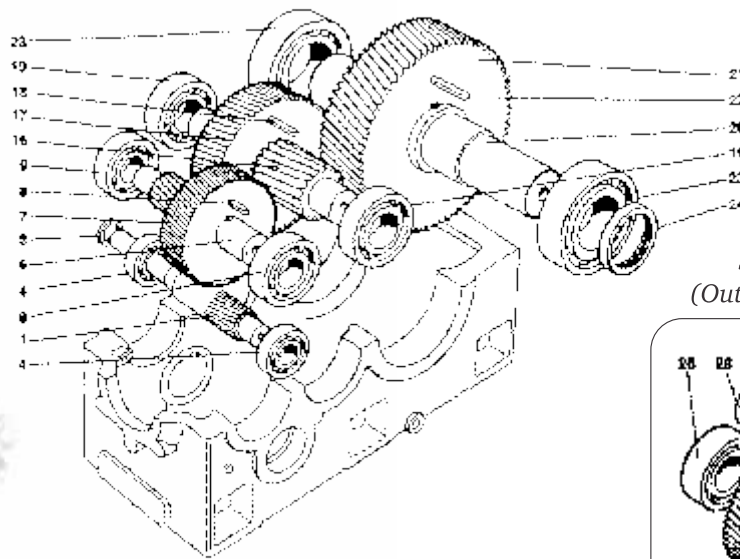
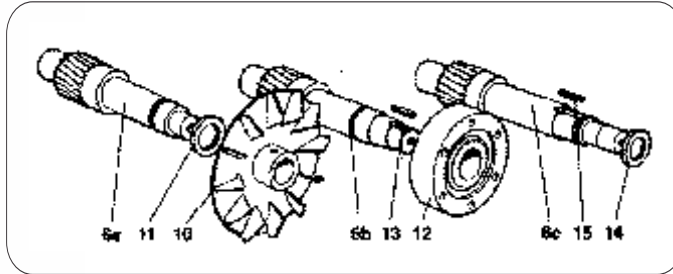


Triple Reduction - Parallel Shafts Types H3, H3S, H3SF

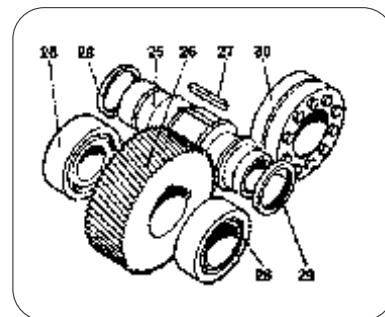
*Input shaft with
bored pinion*



*Secondary reduction pinion shaft
with fan, holdback or both*



*Shaft mounted unit
(Output shaft arrangement)*



- 1 Input pinion shaft
- 1a Input shaft
- 2 Input Pinion
- 3 Key for Input Pinion
- 4 Bearing for input shaft
- 5 Oil seal for input shaft
- 6 2nd Reduction pinion shaft
- 6a 2nd Reduction pinion shaft (with fan extension)
- 6b 2nd Reduction pinion shaft (with holdback extension)
- 6c 2nd Reduction pinion shaft (with fan & holdback extension)

- 7 First Reduction wheel
- 8 Key for First Reduction wheel
- 9 Bearing for 2nd Reduction pinion shaft
- 10 Fan
- 11 Oil seal for 2nd reduction pinion shaft
- 12 Holdback
- 13 Key for holdback
- 14 Oil seal for 2nd reduction pinion shaft
- 15 Key for holdback
- 16 Final Pinion Shaft
- 17 2nd Reduction wheel
- 18 Key for 2nd Reduction wheel

- 19 Bearing for final pinion shaft
- 20 Output shaft
- 21 Final Reduction wheel
- 22 Key for Final Reduction wheel
- 23 Bearing for output shaft
- 24 Oil seal for output shaft
- 25 Hollow output shaft
- 26 Final Reduction wheel
- 27 Key for Final Reduction wheel
- 28 Bearing for output shaft
- 29 Oil seal for output shaft
- 30 Shrink disc

Input shaft depending on ratio will have either an integral pinion or a separate pinion.

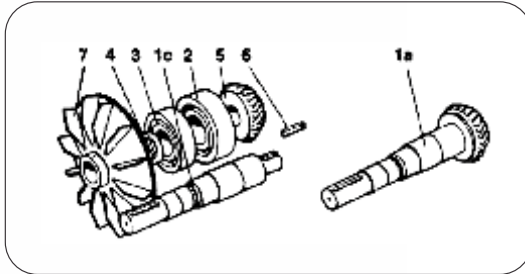
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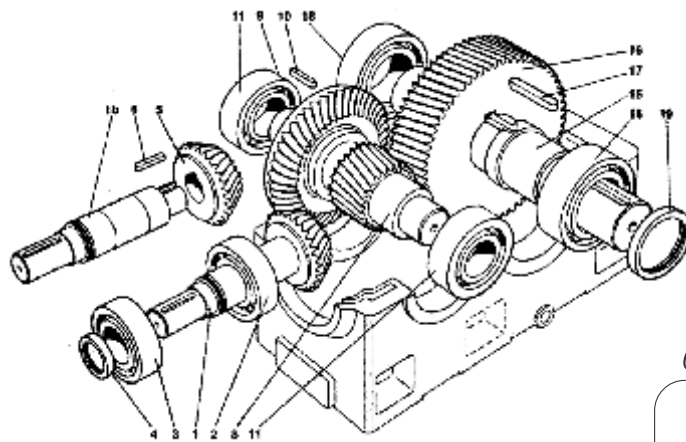
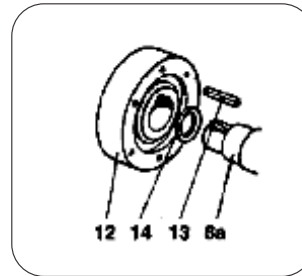


Double Reduction - Right Angle Shafts Types B2, B2S, B2SF

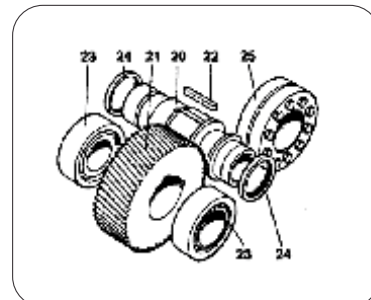
*Input shaft with bored
and solid pinion assembly fan*



*Secondary reduction shaft
with holdback*



*Shaft mounted unit
(Output shaft arrangement)*



- 1 Input pinion shaft
- 1a Input pinion shaft
(with fan extension)
- 1b Input Shaft
- 1c Input Shaft (with fan extension)
- 2 Inner Bearing for input shaft
- 3 Outer bearing for input shaft
- 4 Oil seal for input shaft
- 5 Bevel Pinion
- 6 Key for bevel pinion
- 7 Fan

- 8 Final pinion shaft
- 8a Final pinion shaft
(with holdback extension)
- 9 Bevel wheel
- 10 Key for Bevel wheel
- 11 Bearing for final pinion shaft
- 12 Holdback
- 13 Key for Holdback
- 14 Oil seal for final pinion shaft
(holdback only)
- 15 Output shaft

- 16 Final Reduction wheel
- 17 Key for final reduction wheel
- 18 Bearing for output shaft
- 19 Oil seal for output shaft
- 20 Hollow output shaft
- 21 Final reduction wheel
- 22 Key for final reduction wheel
- 23 Bearing for output shaft
- 24 Oil seal for output shaft
- 25 Shrink disc

Input shaft depending on ratio will either have an integral pinion or a separate pinion.

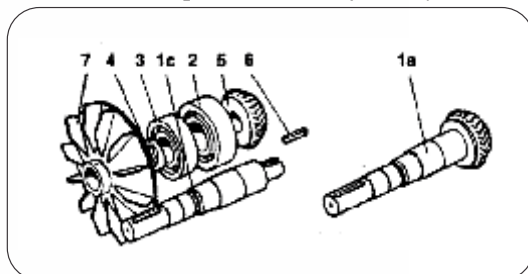
IMPORTANT : When ordering spare or replacement parts, the following details from the nameplate must be quoted :

1. Serial No.
2. Unit type/size
3. Ratio

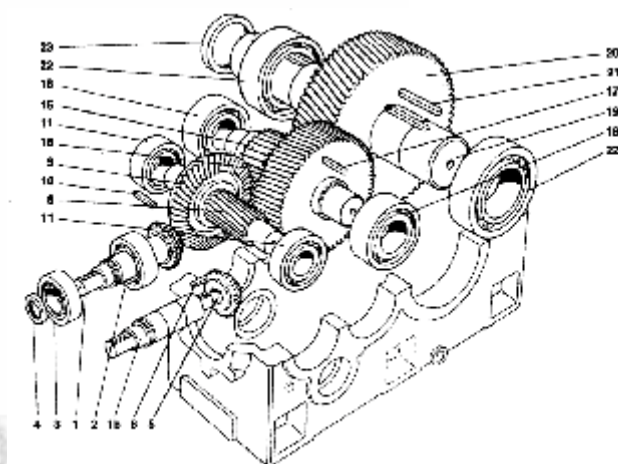
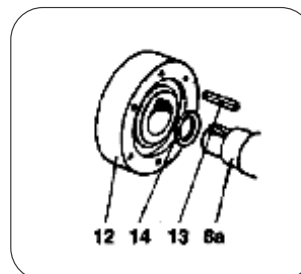


Triple Reduction - Right Angle Shafts Types B3, B3S, B3SF

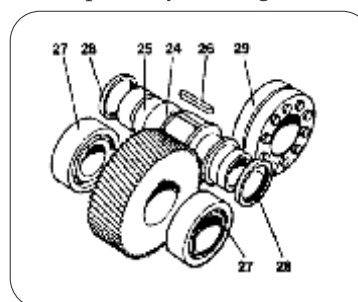
*Input shaft with bored
and solid pinion assembly with fan*



*Secondary reduction shaft
with holdback*



*Shaft mounted unit
(Output shaft arrangement)*



- 1 Input pinion shaft
- 1a Input pinion shaft
(with fan extension)
- 1b Input Shaft
- 1c Input Shaft
(with fan extension)
- 2 Inner Bearing for input shaft
- 3 Outer bearing for input shaft
- 4 Oil seal for input shaft
- 5 Bevel Pinion
- 6 Key for bevel pinion
- 7 Fan
- 8 2nd Reduction pinion shaft

- 8a 2nd Reduction pinion shaft
(with holdback extension)
- 9 Bevel wheel
- 10 Key for Bevel wheel
- 11 Bearing for 2nd Reduction final
pinion shaft
- 12 Holdback
- 13 Key for Holdback
- 14 Oil seal for 2nd Reduction pinion
shaft (holdback only)
- 15 Final Reduction pinion shaft
- 16 2nd Reduction wheel
- 17 Key for 2nd Reduction wheel

- 18 Bearing for final reduction
pinion shaft
- 19 Output shaft
- 20 Final reduction wheel
- 21 Key for final reduction wheel
- 22 Bearing for output shaft
- 23 Oil seal for output shaft
- 24 Hollow output shaft
- 25 Final reduction wheel
- 26 Key for Final reduction wheel
- 27 Bearing for output shaft
- 28 Oil seal for output shaft
- 29 Shrink disc

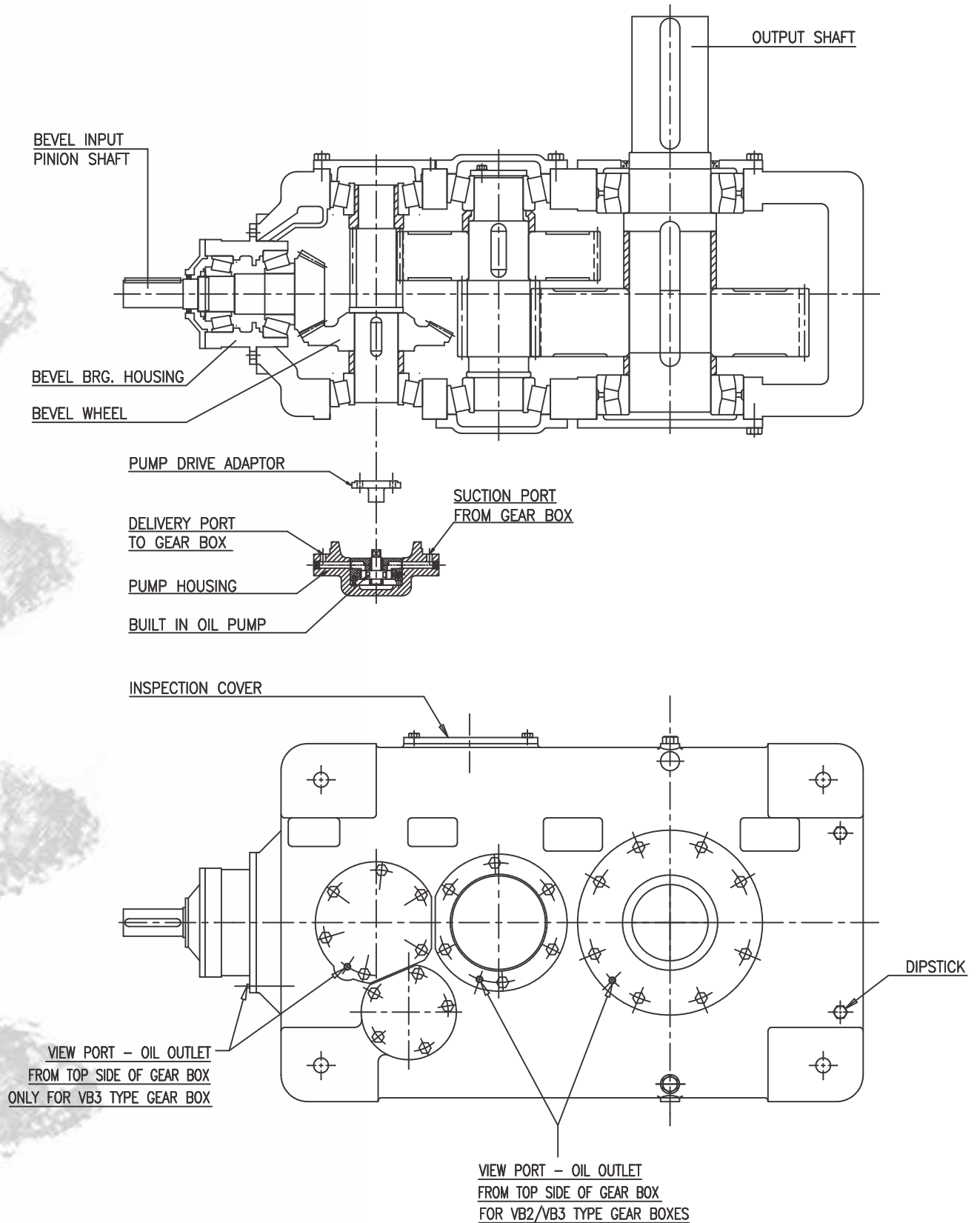
Input shaft depending on ratio will either have an integral pinion or a separate pinion fitted.

IMPORTANT : When ordering spare or replacement parts, the following details from the nameplate must be quoted :

1. Serial No.
2. Unit type/size
3. Ratio

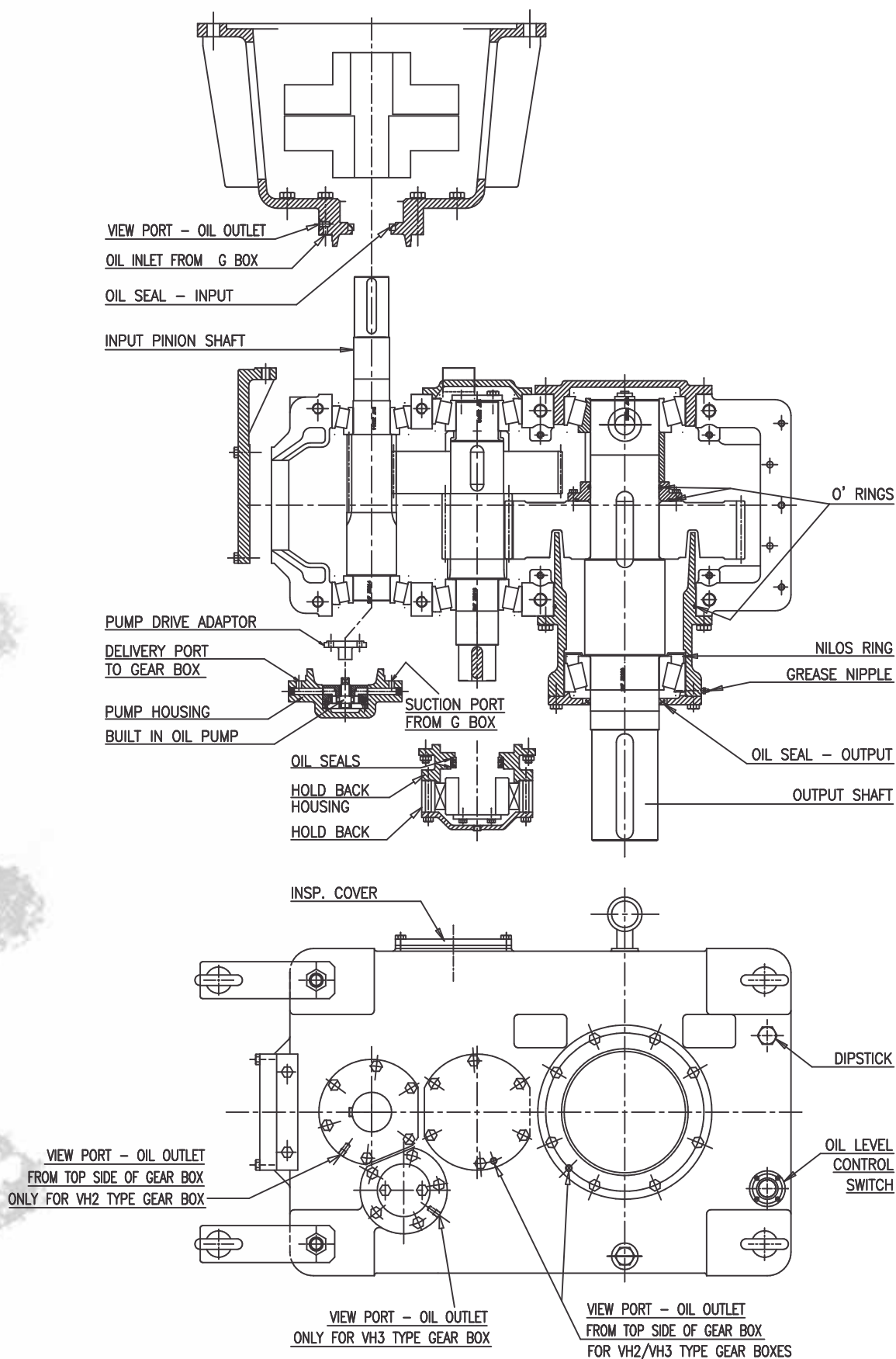


**TYPICAL SECTIONAL ARRANGEMENT OF
VERTICAL BEVEL HELICAL - STD. / CT / SA UNITS**





**TYPICAL SECTIONAL ARRANGEMENT OF
VERTICAL - STD. / CT / SA UNITS**

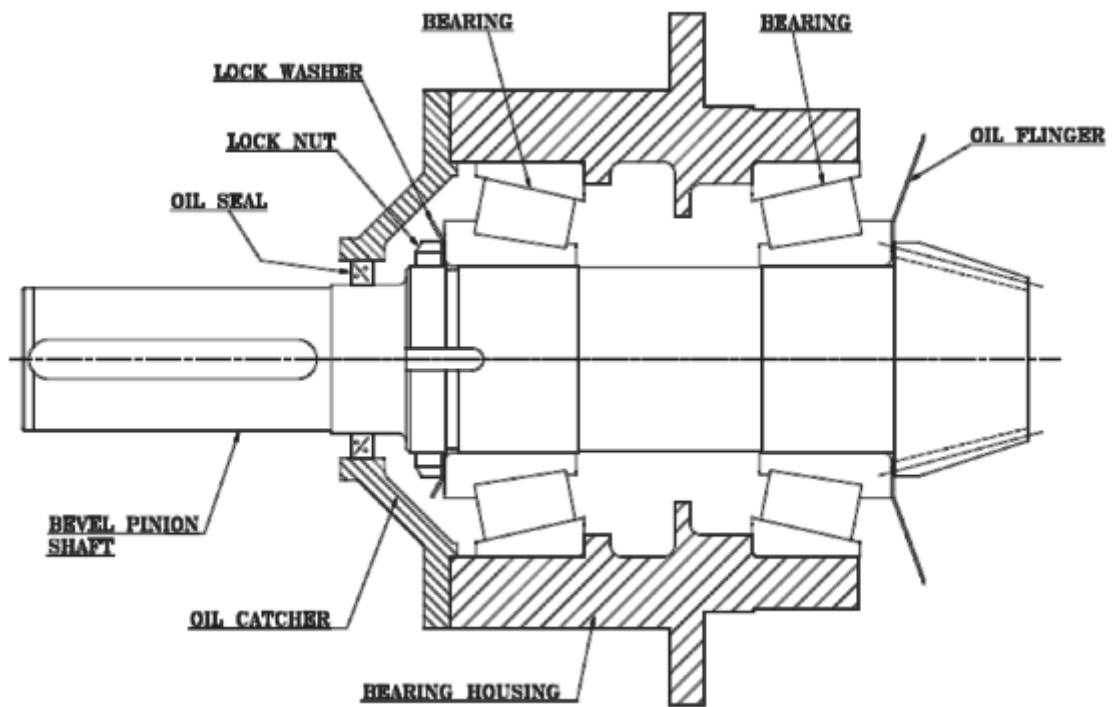




BEVEL PINION ASSEMBLY :

PREMIUM Bevel Helical Gear Boxes are fitted with Bevel Pinion Assembly wherein Bevel Pinion is an integral part of input shaft or Bevel Pinion as a separate part assembled with input shaft. Sectional arrangement drawings of Bevel Pinion Assembly are given below.

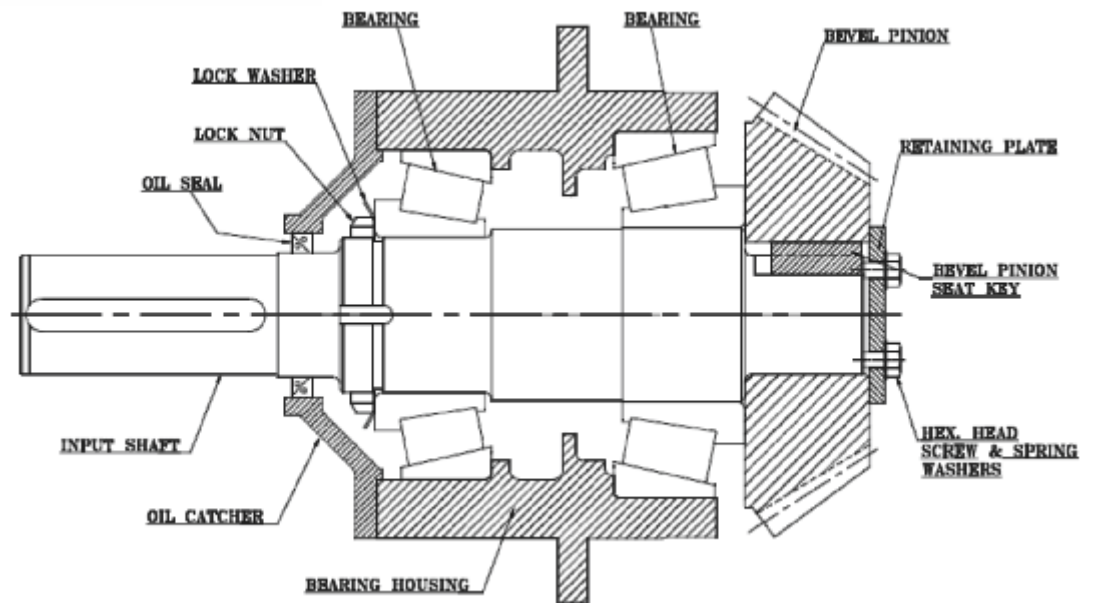
A. Bevel Pinion Assembly- Pinion integral with input shaft



Note:

1. Oil Flinger will be fitted in some of the cases as per design requirement.
2. Bevel Pinion & Wheel are to be replaced in a paired set supplied by PREMIUM as these items are lapped together.
3. In assembled condition, input shaft is free to rotate by hand.

B. Bevel Input Pinion Assembly- Pinion & input shaft separate



Note:

1. Oil Flinger will be fitted in some of the cases as per Design requirement
2. Bevel Pinion & Wheel are to be replaced in a paired set supplied by PREMIUM as these items are lapped together.
3. Tighten lock nut & washer properly.
4. In assembled condition, input shaft is free to rotate by hand.



6.0 INSTALLATION

IMPORTANT INSTRUCTIONS

- Ensure no metallic shocks, impacts are made to the gearboxes.
- All the operating and safety instructions should be thoroughly followed.
- Installation must be carried out at ambient temperature.
- All other electrical equipment shall meet the appropriate ATEX category and type of atmosphere.
- The precautions during welding operations etc. shall be taken as per the requirements.

FOOT MOUNTED GEAR UNITS

Foot Mounted Units :

The following procedure is recommended for all foot mounted units.

1. Clean shaft extensions and ventilator.
2. Secure unit to a rigid foundation using HD bolts to GR8.8 Spec. minimum.
Note : Units should, if possible be mounted on same bedplate as prime mover.
3. Align unit (see notes on shaft alignment). Note: It is important to ensure when aligning unit that all machined mounting points are supported over their full area.
4. Fit guards in accordance with factory acts.
5. Check motor wiring for correct direction of rotation, this is important when holdback device is fitted.

ALIGNMENT

While no general rule can be laid down for permissible errors in lining up it is recommended that, for flexible couplings, faces are true to within $0.05 \text{ mm} + 0.0002D$ (where D = shaft diameter) and the peripheries within 0.1 mm . With rigid type couplings these figures should be halved.

Errors of alignment are either of angularity (Fig. 1) or eccentricity (Fig. 2) or a combination of both.

'H' Series units are fitted with taper roller bearings on all input shafts which are assembled with a predetermined amount of axial float.

When the shaft moves axially it does so with a rocking motion, therefore, to facilitate accurate alignment of the coupling halves, it is necessary that this end float is temporarily eliminated by the adjustment of the end cover furthest away from the coupling. The end cover should be removed and shims inserted between its spigot and the bearing outer track, care being taken not to tip the outer track or over-tighten the bolts.

Errors of Angularity :

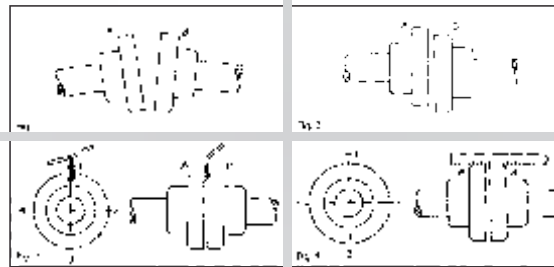
Correct before any attempt is made to eliminate errors of eccentricity. The procedure is shown in Fig. 3 using a thickness gauge in conjunction with feeler gauges. Readings should be taken in positions 1,2,3 and 4 with any axial float taken up. Adjust unit by shimming under feet.

Errors of Eccentricity :

These occur when the centre lines of shafts do not intersect (Fig. 2). When the misalignment is in the vertical plane, it can be corrected by altering the height of the either unit by means of packing shims placed under feet.

When the error is in the horizontal plane, correction may be made by moving unit transversely until set in the required position.

If both coupling halves are of the same diameter, their concentricity can be checked with the use of a straight edge as shown in Fig 4. If the coupling diameters are not equal, a straight edge should be used in conjunction with a feeler gauge equal to half the difference in diameter.



Effect of Temperature :

If there is a substantial difference between the running temperature of the gear casing and adjacent machinery, differences in heights may be appreciable. The co-efficient of linear expansion of cast iron is 0.000011 per unit length per°C (0.000006 per unit length per°F).

For a 508 mm (20 in) centre height and a difference in temperature of 50°F (27.7°C) between gear case and machine, the error of alignment, if correct when cold, will be 0.15 mm (0.006 in).

Such operating conditions can produce, particularly in large and close-coupled units, very heavy additional bearing loads and it is recommended that allowance be made such that the alignment will be correct under normal working conditions.

Premium Helical Gear units are fitted with either single helical gear throughout or a combination of single helical and spiral bevel gears. The helical gears are case hardened and profile ground, the spiral bevel gears are lapped in pairs, all to give the highest standards of accuracy and finish while giving it its quiet running characteristics.

Key Drive (Sizes 140 and 160) :

All types of shaft mounted units sizes 140 and 160 are supplied suitable for mounting on shafts fitted with keys. Recommended Shaft Dimensions for Driven Machines

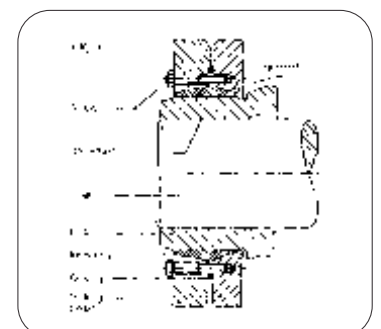
Shafts Details mm

Unit Size	Dia*	Length (mm)
140	75	250
160	85	290

*Tolerance on shaft diameters should be m6

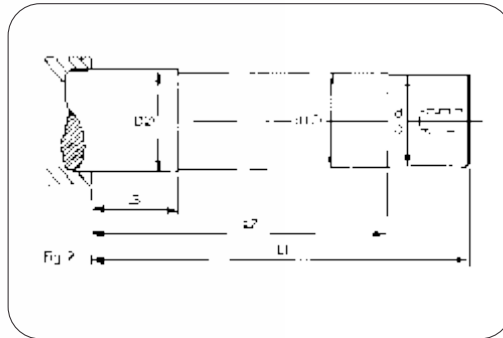
Shrink Disc Drive (Sizes 180 and above) : Each shaft mounted gear unit is fitted with a 'shrink disc' device located on the hollow output shaft to provide a positive outer locking connection between gear unit and driven shaft. The 'shrink disc' is a friction device, without keys, thus establishing a mechanical shrink fit between the gear unit hollow shaft and the driven shaft. 'Shrink disc' capacities have ample margins in dealing with transmitted torques and external loading imposed on gear units.

Working Principle : The 'shrink disc' consists of two locking collars, a double tapered inner ring, locking screws and a sealing ring. By tightening the locking screws, the locking collars are pulled together, exerting radial forces on the inner ring, thus creating a positive friction connection between hollow shaft and driven shaft. See Fig. 1. As the tapered surfaces of locking collars and inner ring are lubricated with Molykote 321 R or similar and the taper angle is not self locking, locking collars will not seize on the inner ring and can be released easily when removal is necessary. When the shrink disc is clamped in position, the high contact pressures between tapered surfaces, screw heads and their seatings, ensure hermetic sealing and eliminates the possibility of fretting corrosion.





Recommended Shaft Dimensions for Driven Machine:



Unit Size	d*	d1	D*	L1	L2	L3
180	85	87	90	412	332	80
200	95	97	100	437	347	90
225	115	117	120	487	377	110
250	125	127	130	527	407	120
280	140	142	145	580	445	135
315	160	162	165	625	475	150
355	170	172	175	705	540	165
400	190	195	200	795	615	180
450	220	225	230	885	695	190
500	Refer to Premium Transmission Limited					
560						
630						
710						
800						

*Tolerances on shaft diameters D and d should be h6 for all diameters up to 165 and g6 for those above.

Installation : When 'shrink discs' are supplied with shaft mounted units, the following procedures should be followed when fitting or removing units from driven shafts.

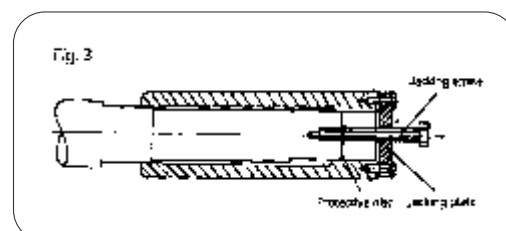
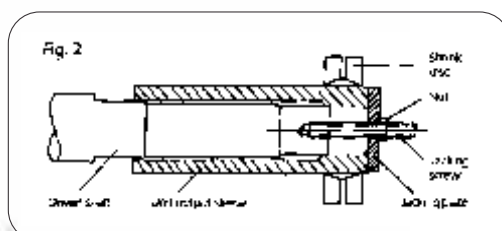
1. Release locking screws gradually and in succession. Initially a quarter of a turn on each screw will avoid tilting and jamming of collars.
2. Remove collars and clean 'shrink disc' thoroughly.
3. Clean and degrease locating diameters of gear unit hollow shaft, driven shaft and 'shrink disc' locating diameter on hollow shaft extension.
4. Draw the gear unit onto the driven shaft (See Fig.2).
5. Grease tapered surfaces of locking collars and inner ring with Molykote 321 R or similar.
6. Fit 'shrink disc' on gear unit hollow shaft to position shown in figure 2.
7. Tighten all locking screws gradually and in a succession. Do not tighten in a diametrically opposite sequence. Several passes are required until all screws are tightened to the torque figures shown in the table below. This is stamped on the inner face of the 'shrink disc'.
8. Fit protective cover. Locking collars must remain equidistant over 360°. It is recommended that customers' shafts at the non-clamped end of the sleeve should be coated with Molykote 321 R or equivalent.

Removal :

1. Reverse installation procedure. Note: Do not remove 'shrink disc' locking screws completely.
2. Remove any rust and dirt from gear unit hollow shaft.
3. Withdraw gear unit from driven shaft (See Fig. 3).

Note : 'Shrink disc' should be removed and cleaned thoroughly and Molykote 321 R or similar applied to the tapered surfaces of inner ring and locking collars before reuse. The 'O' ring should be replaced if worn or damaged.

Note : Protective covers are supplied with all 'shrink discs'. Assembly or removal kits and thrust plates are not provided by Premium Transmission Limited.





Recommended Tightening Torques for Shrink Disk Bolts

Size of unit	180	200	225	250	280	315	355	400	450	500	560	630	710	800
Tightening Torque (Nm)	58	58	100	240	240	240	240	470	470	Refer to Premium Transmission Limited				

SHAFT MOUNTED GEAR UNIT :

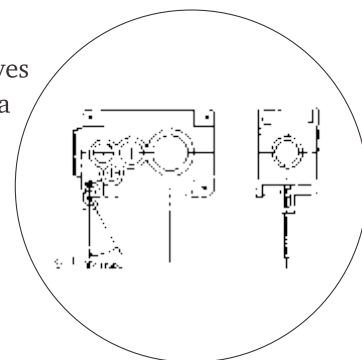
Torque arms are available for double and triple reduction shaft mounted units with parallel or right angle shafts, type H2S, H3S, B2S and B3S. They are supplied as optional extras and are secured to gear cases as shown below.

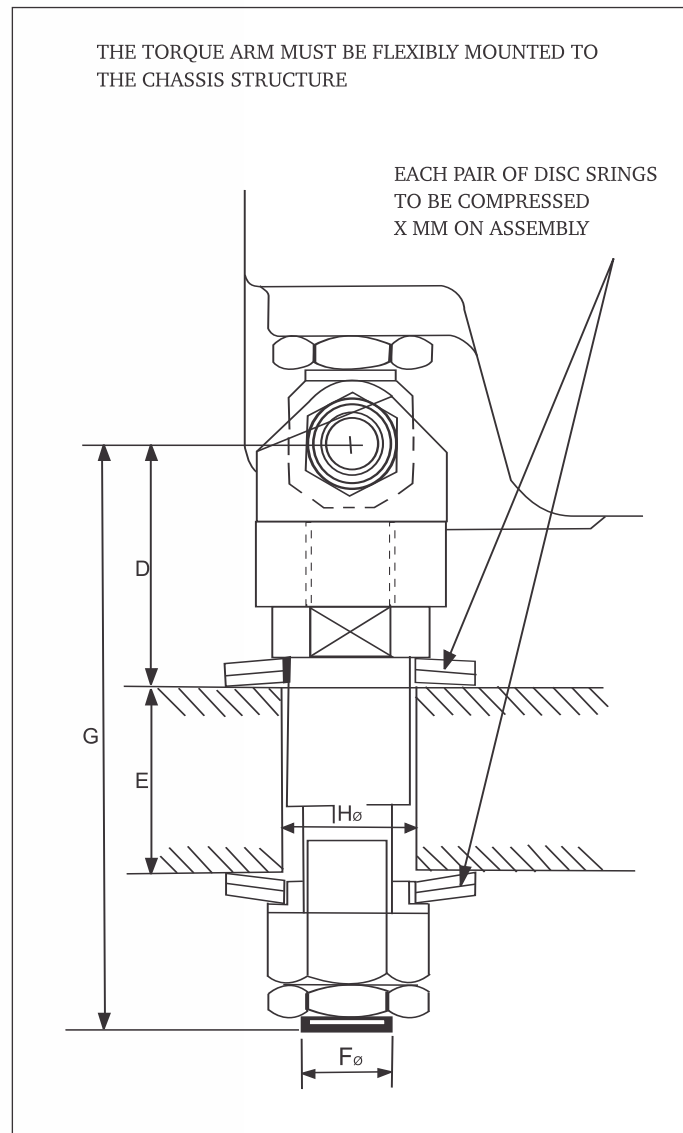
Torque arms must be secured to the chassis structure in a flexible mounting, as indicated, within a maximum angle of 30° between the vertical plane and a plane towards the gear unit output shaft as illustrated.

Shaft mounted units are designed to operate in the horizontal position. Reference must be made to Premium with full details, where units are required to operate in an inclined position or where torque arm mounting positions exceed the 30° maximum angle of inclination to the vertical plane.

Shaft mounted units for High Inertia Drive

When used on Traverse drives with high inertia driven loads, e.g. crane drives (slewing, long travel and cross travel) boggie drives and selected high inertia load roller table drives, it is recommended that shaft mounted units should be fitted with shock absorbing Torque Arms. Consult Premium with specific application details.





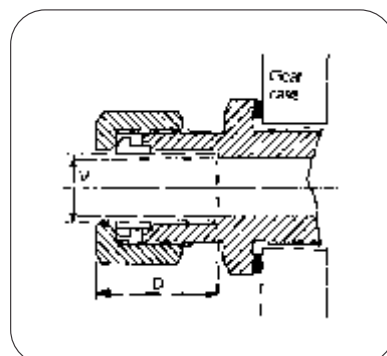
UNITS WITH COOLING COIL

Cooling Coil : If required, units will be supplied with a cooling coil fitted along with bulkhead fittings which are suitable for fitting to copper pipes. The coils fitted, are suitable for fresh, brackish or sea water with flow in either direction.

Fitting Pipe to Bulkheads : To fit pipe to bulkhead, unscrew outer ring until pipe can be pushed into bulkhead. Then screw ring back until pipe is held firmly.

Note: Cooling coil connections are not provided on shaft mounted unit types H2S, H3S, B2S and B3S.

Unit Size	V Copper tube dia	D
140,160,180	10 mm	16.5 mm
200 to 800	12 mm	18 mm





7.0 MAINTENANCE

Contacts markings, bearing end floats, tightening torque

Standard Units are now fitted with joint studs, secured with plain nuts and Loctite. Nuts should be tightened to the correct torque during routine maintenance.

Tooth Contact (Spiral Bevels) :

In the event of the gears being disturbed it will be necessary to check the tooth contact of the bevel gears if fitted, as per recommended procedure layed out below.

1. Assemble unit including fitting the top half of case but without input shaft.
2. Assemble bearing housing assembly nipping locknut up against bearing but do not fit grubscrew.
3. Fit bearing housing assembly to case without shims, ensuring that the back faces of the mating gears are flush with each other.
4. There should at this point, be a gap between bearing housing and case. This gap should be measured and shims added equal to it.

Note : Operations 3 and 4 may be ignored if same gears are being refitted. In this case the old shims or new ones equivalent to them may be fitted.

5. Bolt bearing housing to case, tightening bolts to torque values in table, shown on page 12.
6. Using inspection hole, apply engineers blue to both flanks of pinion teeth.
7. Rotate gears slowly until a well defined contact marking has been produced on the wheel.
8. Compare tooth markings with diagrams shown on page 6.
9. If tooth markings are not as in first diagram, remove bearing housing and:
 - a) add more shims if markings are as in second diagram.
 - b) reduce shimming if markings are as in third diagram.
10. Repeat operations as from number 5.

Note : After attaining the correct tooth marking, the backlash should be checked (see table on page 6).

If backlash is excessive, both bevel gears should be adjusted towards their apexes by adjusting the shims accordingly. Adjustment in the opposite direction will increase backlash in the bevel gears.

Note : Gears may be observed through inspection hole.

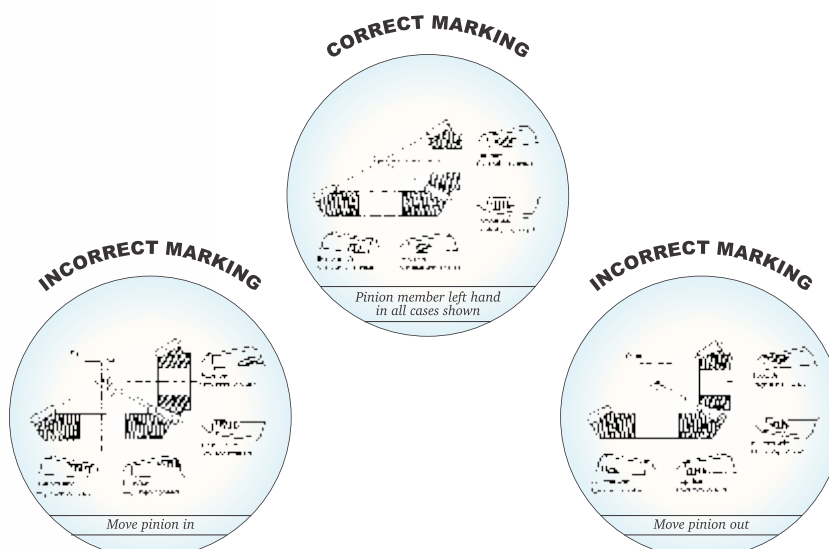


Table of Normal Backlash (Spiral Bevels)



Bearing Floats

FM Foot Mounted; SM Shaft Mounted; \$ - Spherical Roller Brg. Dimensions in mm.

Unit Type	Shaft Location	Type Of Bearing	140 Min / Max	160 Min / Max	180 Min / Max	200 Min / Max	225 Min / Max	250 Min / Max
H1	Input	Taper Roller	0.050 / 0.0100	0.050 / 0.100	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125
	Output	Spherical Roller	1	1	1	1	1	1
H2	Input	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM).	Parallel Roller	0.14	0.155	0.17	0.19	0.21	0.23
H3	Input	Taper Roller	0.025 / 0.075	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Final Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.14	0.155	0.17	0.19	0.21	0.23
H4	Input	Taper Roller	0.025 / 0.075	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	2nd Redun pinion	Taper Roller	0.025 / 0.075	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	3rd Redun Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Final Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.14	0.155	0.17	0.19	0.21	0.23
B2	2nd Redun pinion	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	1	1	1	1	1	1	1
	Output (SM).	0.14	0.155	0.17	0.19	0.21	0.23	0.23
B3	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Final Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.14	0.155	0.17	0.19	0.21	0.23
B4	2nd Redun pinion	Taper Roller	0.025 / 0.075	0.025 / 0.075	0.025 / 0.075	0.025 / 0.075	0.025 / 0.075	0.025 / 0.075
	3rd Redun Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Final Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.14	0.155	0.17	0.19	0.21	0.230.

Bearing Floats

FM Foot Mounted; SM Shaft Mounted; \$ - Spherical Roller Brg. Dimensions in mm

Unit Type	Shaft Location	Type Of Bearing	280 Min / Max	315 Min / Max	355 Min / Max	400 Min / Max	450 Min / Max	500 Min / Max
H1	Input	Taper Roller	0.075 / 0.150	0.075 / 0.150	0.100 / 0.175	1.000\$	1.000\$	1.000\$
	Output	Spherical Roller	1	1	1	1	1	1
H2	Input	Taper Roller	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150	0.100 / 0.175	0.125 / 0.200	0.125 / 0.200
	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100	0.050 / 0.100
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM).	Parallel Roller	0.25	0.28	0.31	0.34	0.39	0.5
H3	Input	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.075 / 0.150	0.100 / 0.175	0.100 / 0.175	0.100 / 0.175
	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.075 / 0.150	0.075 / 0.150	0.100 / 0.175	0.100 / 0.175	0.100 / 0.175
	Final Pinion	Taper Roller	0.050 / 0.100	0.075 / 0.150	0.075 / 0.150	0.100 / 0.175	0.100 / 0.175	0.100 / 0.175
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.25	0.28	0.31	0.34	0.39	0.5
H4	Input	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.050 / 0.125	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150
	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150
	3rd Redun Pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150
	Final Pinion	Taper Roller	0.075 / 0.150	0.075 / 0.150	0.075 / 0.150	0.100 / 0.175	0.100 / 0.175	0.100 / 0.175
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.25	0.28	0.31	0.34	0.39	0.5
B2	2nd Redun pinion	Taper Roller	0.075 / 0.125	0.075 / 0.150	0.100 / 0.175	0.125 / 0.200	0.125 / 0.200	0.125 / 0.200
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM).	Parallel Roller	0.25	0.28	0.31	0.34	0.39	0.5
B3	2nd Redun pinion	Taper Roller	0.075 / 0.125	0.075 / 0.150	0.075 / 0.175	0.075 / 0.175	0.075 / 0.175	0.075 / 0.175
	Final Pinion	Taper Roller	0.075 / 0.125	0.075 / 0.150	0.075 / 0.175	0.075 / 0.175	0.075 / 0.175	0.075 / 0.175
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.25	0.28	0.31	0.34	0.39	0.5
B4	2nd Redun pinion	Taper Roller	0.050 / 0.100	0.050 / 0.100	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125
	3rd Redun Pinion	Taper Roller	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125	0.075 / 0.175	0.075 / 0.175
	Final Pinion	Taper Roller	0.075 / 0.125	0.075 / 0.125	0.075 / 0.125	0.075 / 0.175	0.075 / 0.175	0.075 / 0.175
	Output (FM)	Spherical Roller	1	1	1	1	1	1
	Output (SM)	Parallel Roller	0.25	0.28	0.31	0.34	0.39	0.5



Bearing Floats

FM Foot Mounted; SM Shaft Mounted; \$ - Spherical Roller Brg. Dimensions in mm.

Unit Type	Shaft Location	Type Of Bearing	560 Min / Max	630 Min / Max
H1	Input	Taper Roller	1.000 \$	1.000 \$
	Output	Spherical Roller	1	1
H2	Input	Taper Roller	0.125 / 0.200	0.125 / 0.200
	2nd Redun pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Output (FM)	Spherical Roller	1.25	1.25
	Output (SM).	Parallel Roller	0.5	0.75
H3	Input	Taper Roller	0.125 / 0.200	0.125 / 0.200
	2nd Redun pinion	Taper Roller	0.125 / 0.200	0.125 / 0.200
	Final Pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Output (FM)	Spherical Roller	1.25	1.25
	Output (SM)	Parallel Roller	0.5	0.75
H4	Input	Taper Roller	0.125 / 0.200	0.125 / 0.200
	2nd Redun pinion	Taper Roller	0.125 / 0.200	0.125 / 0.200
	3rd Redun Pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Final Pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Output (FM)	Spherical Roller	1.25	1.25
	Output (SM)	Parallel Roller	0.5	0.75
B2	2nd Redun pinion	Taper Roller	0.125 / 0.200	0.125 / 0.200
	Output (FM)	Spherical Roller	1.25	1.125
	Output (SM).	Parallel Roller	0.5	0.75028
B3	2nd Redun pinion	Taper Roller	0.125 / 0.200	0.125 / 0.200
	Final Pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Output (FM)	Spherical Roller	1.25	1.25
	Output (SM)	Parallel Roller	0.5	0.75
B4	2nd Redun pinion	Taper Roller	0.125 / 0.200	0.125 / 0.200
	3rd Redun Pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Final Pinion	Taper Roller	0.175 / 0.250	0.175 / 0.250
	Output (FM)	Spherical Roller	1.25	1.25
	Output (SM)	Parallel Roller	0.5	0.75



TIGHTENING TORQUES

Case Joints Studs					Cover and Housing Bolts		
Unit Size	Unit Type	Thread Size	Torque Nm	lbf In	Thread Size	Torque Nm	lbf In
140	H1 and B2	M10	35	310	M1/8	20	177
	H2 and B3	M10	35	310	M10	40	354
	H3, H4 and B4	M10	35	310	M8	20	177
				-	M10	40	354
160	H1 and B2	M12	60	531	M8	20	177
	H2 and B3	M10	35	310	M10	40	534
	H3, H4 and B4	M12	60	531	M8	20	177
		M10	35	310	M10	40	534
		M12	60	531	M8	20	177
		M12	60	531	M10	40	534
180	H1 and B2	M10	35	310	M8	20	177
		M12	60	531	M10	40	354
		M16	160	1416			
	H2 and B3	M10	35	310	M8	20	177
		M12	60	531	M10	40	354
		M16	160	1416			
	H3, H4 and B4	M10	35	310	M8	20	177
		M12	60	531	M10	40	354
		M16	160	1416			
		M12	50	442	M8	20	177
200	H1 and B2	M16	160	1416	M10	40	354
	H2, H3 and B3	M12	50	442	M8	20	177
		M16	160	1416	M10	40	354
		M16	160	1416	M10	40	354
225	H1 and B2	M12	60	531	M10	40	354
		M16	160	1416	M12	70	619
		M20	310	2743			
	H2, H3 and B3	M12	60	531	M8	20	177
		M16	160	1416	M10	40	354
		M20	310	2743	M12	70	169
	H1 and Taper Roller	M16	160	1416	M10	40	354
		M20	310	2743	M12	70	619
250	H2, H3 and B3	M16	160	1416	M8	20	177
		M20	310	2743	M10	40	354
		M20	310	2743	M12	70	169
		M20	310	2743	M12	70	169
280	H1 and B2	M16	160	1416	M10	40	354
		M20	310	2743	M12	70	619
		M24	530	4689			
	H2, H3 and B3	M16	160	1416	M8	20	177
		M20	310	2743	M10	40	354
		M24	530	4689	M12	70	619
315	H1 and B2	M20	310	2743	M12	70	619
		M24	530	4689	M16	180	1593
		M-27-M24	530	4689			
	H2, H3 and B3	M20	310	1416	M10	40	354
		M24	530	4689	M12	70	619
		M-27-M24	530	4689	M16	180	1593
355	H1 and B2	M20	310	2743	M12	70	619
		M24	530	4689	M16	180	1593
		M30	1070	9467			
	H2, H3 and B3	M20	310	2743	M10	40	354
		M24	530	4689	M12	70	619
		M30	1070	9467	M16	180	1593
400	H1 and B2	M24	530	4689	M12	70	619
		M30	1070	9467	M16	180	1593
					M20	350	3097
	H2, H3 and B3	M24	530	4689	M16	70	619
450		M30	1070	9467	M20	350	3097
	H1 and B2	M24	530	4689	M12	180	1593
		M30	1070	9467	M16	180	1593
		M36	1880	16634	M20	350	3097
	H2, H3 and B3	M24	530	4689	M12	70	619
		M30	1070	9467	M16	180	1593

Note : For unit sizes 500-560-630-710-800, refer to Premium Transmission Limited



Roller Hold Backs (RHB):

Premium supplies Gearbox fitted with Roller Hold Backs (RHB) fitted as per customer requirement, where gearboxes are required to operate in one direction. In case the application demands the gearbox with RHB at a later stage, the matter should be referred to Premium for necessary action.

The following minimum additional parts required to incorporate above modifications:

1. Roller Hold Backs (RHB)
2. Key for RHB
3. Oil Seal
4. Shaft on which Hold back to be fitted.

Direction of rotation in RHB fitted gearbox can be altered at site by removing RHB as a total assembly from existing gearbox shaft, reversing RHB in 180° & refitting RHB on the same shaft. However this activity is to be performed by a skilled technician only as otherwise the sprags may fall down from the springs leading to failure of the device.

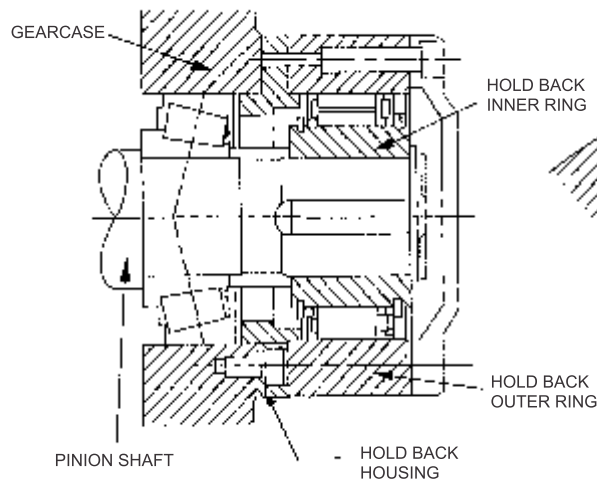


Fig. 1

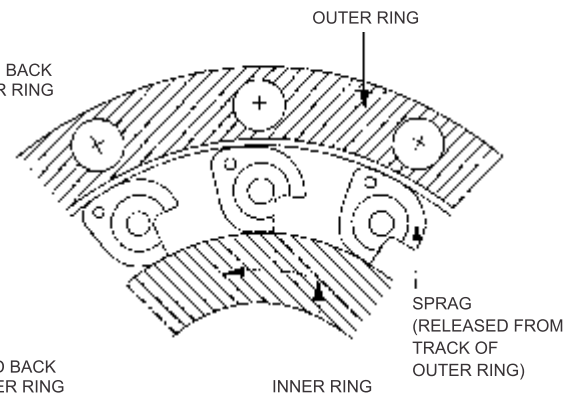


Fig. 2

“Forced Lubrication System (FLS): Due to low Thermal Rating of some Premium Gearboxes :

When the selected gear unit falls short of thermal required thermal rating, a separate Forced Lubrication System (FLS) is supplied to increase the thermal rating of the selected gear unit. It reduces oil temperature and circulates pressurized oil to the **Bearings and Gear mesh**. Generally FLS consists of a gear pump driven by an electric motor to circulate the gearbox sump oil through water cooled oil cooler. Metal strainer 100 micro mesh is fitted before the pump and a filter 50 micro mesh is fitted between the pump and the cooler. To avoid breakdown Premium supplies FLS with two filters, one in operation and another as standby. The filters can be selected without stopping the system using the shifting liver. To monitor filter condition, a Differential Pressure Switch is fitted across the filter. The cooler is generally of shell and copper tube and against customer's request plate type heat exchanger also supplied. Output oil pump pressure is generally maintained at 1.5 - 2.5 kg/cm². Pressure Gauges, Temperature Gauges; Pressure Switches etc are mounted on the delivery line to monitor proper functioning of FLS. Pressure Switches locations are indicated in the FLS drawing submitted against each order. Premium also supplies FLS with duplex pump and cooler against specific customer orders for uninterrupted functioning of FLS and also to facilitate easy maintenance coupled with higher productivity. All instruments and pipes are mounted on a square or rectangular Skid. Control panel with switches and hooter to alarm at low oil pressure is placed on the FLS Skid. Customers should ensure electrical wirings & other instructions are followed strictly as per the manual.

Premium can also provide condition monitoring systems fitted on their gear units on specific request from the customers.



Recommended Maintenance Schedule for Gearboxes.



Sr. No.	Area of Maintenance	Frequency	Work to be done
1.	Breathers	Weekly	Clean the Breathers to avoid clogging. Keep one set of breathers duly cleaned as stand by for easy replacement.
2.	Greasing	Weekly	On the Grease points wherever provided.
3.	Surfaces of the Gear unit	As Needed	Do not allow dust layers to accumulate more than 2 mm
4.	Oil level	Weekly	Check oil level as per dipstick or oil level indicator glass, top up if required.
5.	Foundation bolts	Fortnightly	Ensure foundation bolts are properly tightened.

Other points of maintenance to be followed as per the instructions given in IOM

Table of Normal Backlash (Spiral Bevels)

Unit Type / Sizes				
	B3 / 140, 160, 180 B4 / 140, 160, 180	B2 / 140, 160 B3 / 200, 225	B2 / 180, 200 B3 / 250, 280	B2 / 225, 250 B3 / 315, 355
mm	0.05-0.10	0.08-0.13	0.10-0.15	0.13-0.18
inches	0.002-0.004	0.003-0.005	0.004-0.006	0.005-0.007

Unit Type / Sizes			
	B2 / 280, 315 B3 / 400, 450	B2 / 355, 400 B3 / 500, 560	B2 / 450, 500 B3 / 630, 710
mm	0.15-0.20	0.20-0.28	0.28-0.39
inches	0.006-0.007	0.008-0.011	0.011-0.015



MAINTENANCE

- Periodic cleaning of dust deposits on gearbox surface as well as in the gap of moving parts shall be ensured.
- Persons carrying out maintenance shall be qualified to work in potentially hazardous area appropriate to the category of equipment in use.
- Equipment manufacturer/end user shall use all the tooling required for the maintenance appropriate to the working area.
- All original spare parts must be used during maintenance.



Do's	Don'ts
Use recommended grade of oil	Do not use any other oil
Fill oil up to Dipstick marking only	Do not fill excess or less oil
Breather should be clean. Check it's condition periodically	Do not keep breather in choked condition
Align gearbox correctly with Motor as per manual instructions	Do not run gearbox without ensuring alignment
Check oil level periodically, top up the level If necessary	Do not run gearbox without checking oil level
Change oil in gearbox periodically	Do not run gearbox without changing oil for long time- Refer manual
Change oil seals during overhauling	Do not use same oil seals again & again
While fitting oil seals, clean shaft diameter & catcher face and then fit oil seal with proper oil seal adapter	Do not fit oil seal on unclean & damaged oil seal diameter, also don't hammer the oil seal
Use oil seals as per specifications provided by Premium only	Do not use any locally made oil seals
Keep end float as recommended	Do not keep excess or less end float
Ensure correct contact & backlash while assembling after dismantling or overhauling the gearbox	Do not run gearbox without ensuring correct contact & backlash
While assembling gearbox after dismantling / overhauling, ensure the oil channels / holes provided for lubrication are cleaned properly	After dismantling / overhauling, do not assemble gearbox leaving oil channels, holes, in clogged condition
Apply few drops of oil on oil seal lip while starting to wet it prior to starting, if gearbox is idle for long time	Failure to adhere to this instruction may lead to oil seal failure due to dry running of the oil seal lip
While assembly, use bevel gears & pinions in pairs only	Do not interchange bevel gears & pinions
In case the gear unit is stored beyond three months, please rotate the gear box input shaft few times by hand.	Failure to perform this operation may result in reduced bearing life



8.0 TROUBLESHOOTING



TRUBLE SHOOTING CHART

SYMPTOM	TYPICAL CAUSES																				
	Lubricant			Oil seal Lip		Clogging of		Play		Improper		Backlash		Environmental			Alignment		Operational		
	Unsuitable	Insufficient	Overfilling	Hardened	Damaged	Breather	Excess	Less	Contact	More	Less	Dust	Heat	Chemical				Overload	Vibration	High Speed	Low Speed
Oil seal Leakage	★		★	★		★							★	★			★			★	
Noise	★	★					★		★	★							★			★	
Over Heating	★	★	★			★			★			★						★		★	★
Bearing Failure	★	★					★	★									★	★			★
Wormwheel Worn Out	★	★							★		★							★			
Joint Leakage	★		★			★															
Oil Oozing out through Ventilator	★		★			★							★						★		★
Oil Leakage through Output Oil seal (V Type)			★																		

Special points to be observed : • Use of correct grade of oil • Fill oil to the correct level • Change oil periodically • Check alignment of Input and Output shaft

• Ventilator to be kept clean



9.0 DISPOSAL OF GEAR UNITS/ PARTS

Disposal of used Parts :

- The fans & cowls made off polypropylene or Engineering plastics is to be dis posed off as per IS or International standards.



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PREMIUM

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