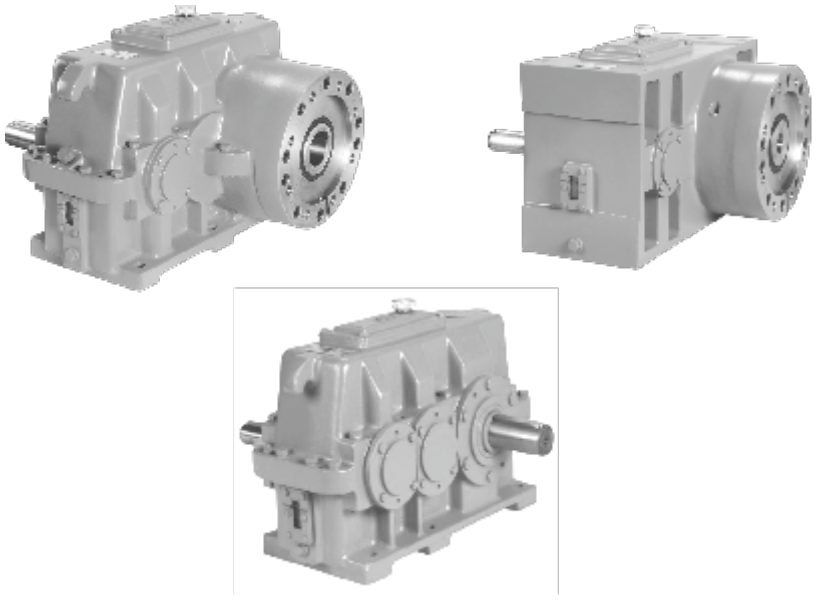
Installation Operation and Maintenance Manual

ZEAL®

Zeal Gears Pvt. Ltd.

(Formerly known as Super Glatt Machinery Pvt. Ltd.)

AN ISO 9001 CERTIFIED COMPANY



Helical Gear Box Unit
SG, SGH, SZ and SZH Series

INTRODUCTION

Most of Industries move on gears, gearing is the important part for progress of any industry. Gearing technology are upgrade every day with new invention & continue improvement, methodology. "Zeal Gears" produce his product as per ISO 9001 : 2015 Management System, our trained engineers and technicians take care of every component design & product accuracy as per required parameter We are committed for our standard quality and uniformity.

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Installation Operation & Maintenance Manual

This is the very important part of any industrial equipment, How to install a machine part for proper use. In the same way, before installing a gearbox unit, it is important to know. What is a correct method for installation of a gear unit? The proper work of a gear unit not only depends on the use of good material, good design and good workmanship but also a careful installation, appropriate lubricants and proper working condition is must. Install gearbox unit according to the instructions given in our manual to ensure proper working of gearbox unit and long and trouble free service.

1. Delivery of Gear Unit

1.1 Transportation Condition

"Zeal Gears" Gear unit supplied without oil filled, suggested oil has to be filled in before use of the gear unit.

Gear units are packed in wooden box to give protection during transportation. Casings are marked with the symbol showing the position of gear unit, inside the casing.

Before the shipment each & every gear unit inspected according the purchase order specifications and cleared by our Quality Assurance Department after test run in no load condition, its normal operation during test.

1.2 Painting and Preservation

The outside surface of the gear case is painted at our end by special paint to resistance against rusting weak acid, alkalies, oil, solvents etc. and temperature up to + 140° (Approx).

The inside of the gear casing is painted with a special oil resistant and leak proof paint.

All Bright parts such as shaft ends are protect by a coat of anti-rust compound. Anti-rust compound easily removable by apply thinner or suitable solvent. Please do not use emery paper or engineers file for remove anti rust compound it will be damage finish and ground surface accuracy.

2. Storage

Always keep store gearbox units in their original supplied, conditions.

2.1 Short term Storage

At the time of dispatch from the our works, inside the gearbox are sprayed with a rust preventive oil. This rust preventive oil will be effective for transport & storage in a sheltered area up to about two months depends on atmosphere conditions. Gear-boxes must be stored in dry place. Gearboxes must not be exposed to direct sun or UV radiation. Gearboxes must not be subject to vibration.

2.2 Long Term Storage

If you want to store gear unit for a long time, fill unit up to the centre line with suitable rust preventive oil. Rotating the shaft by hand to bring all inner parts in to contact with oil, this operation should be repeated in every two month to renew the oil film on inner parts.

To prevent corrosion during storage of gear unit, Silica Gel bags should be kept in the vicinity of gear unit (Not inside of Gear unit). Silica Gel should be periodically checked for moisture absorption and be changed from time to time.

3. Handling

In the all gear unit are provided integral lifting lugs & threaded hooks. These lugs are designed for the weight of the gear unit and no accessories should be lifted along with the gear unit (See Fig a & b).

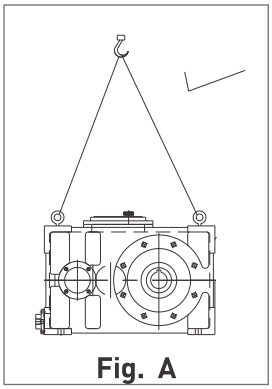


Fig. A

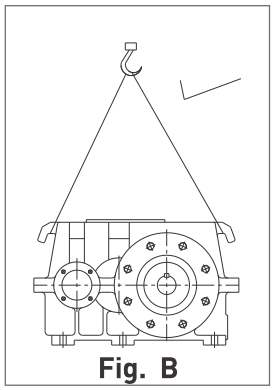


Fig. B

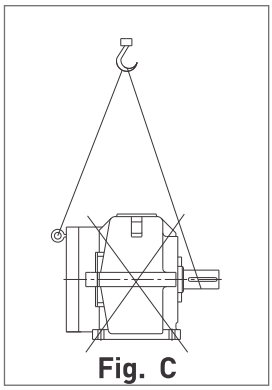


Fig. C

Don't lift units with slings wrapped around shaft (See Fig. c). Gear units with forced lubricants system should be handling with care to prevent damage to the pumps & pipe lines.

4. Installation

Installation and commissioning of a gearbox can be carried out by qualified engineer authorized to carry out such work. Quiet running and long life of the Gear unit mostly depend on a correct installation.

4.1 Erection

Gear unit should be mounted on a flat, rigid, leveled and stable bed plates or foundations in order to avoid vibrations. If the gear unit is mounted on structural foundation, ensure that the gear unit mounted on a combined base frame with the prime mover and sufficient access must be there to properly align the input and output couplings.

Note that excess vibration dangerous for the gear unit and may cause premature failure of a gear unit.

Use the fixation points as indicated in the certified drawing. Always mount the unit same position for which it was ordered.

Gear box units can be mounted in an inclined position (See Fig. d & e). Only if this requirement is clearly specified at the time of order

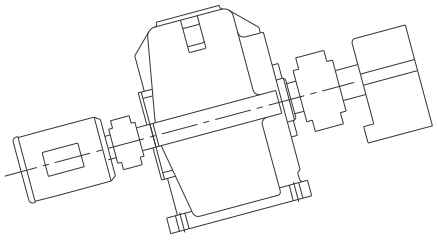


Fig. D

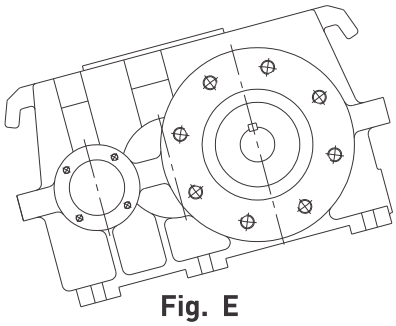


Fig. E

The gear units fix on its foundation with proper bolts size. Tightening of bolts must be done properly with torque wrenches to avoid over stressing of the bolts.

4.2 External Loads

At the time of driving a Gear unit with pulley/Gear/sprockets etc., we must know, the complete details of check the suitability of the gearbox unit to take the overhung load acting on input /output shaft due to the mounting of pulley/Gear/ sprockets etc.

In case a pulley is mounted in a input / output shaft, the pulley dimensions are maintained with his required specified dimension, and a dynamic balanced pulley is always connect in the driving /driven output shaft.

While we give drive with an overhung pulley, Gear and sprockets, care should be taken that as far as possible the reaction due to the circumferential forces is direct downwards i.e., towards foundation.

4.3 Fitting of Couplings and other items on shaft

Our recommended a bore tolerance of H7 for the couplings, and shaft are provided with key way as per IS 2048.

Always use threaded holes in shafts to assist in mounting elements on the shafts.

4.4 Alignment

Align units accurately with driving and driven parts. Regularly check alignment for proper working of a gear unit.

Misalignment of the connected parts (Screw, Barrel, pulley, Gear & Sprocket) is harmful for a gear unit. Errors in alignment, categories of angular (Fig. f) and eccentricity (Fig. g), or combination of both (Fig. h).

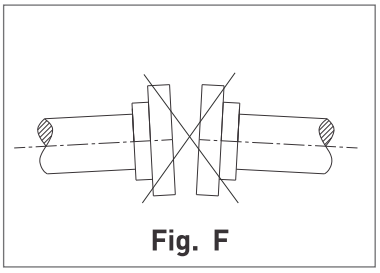


Fig. F

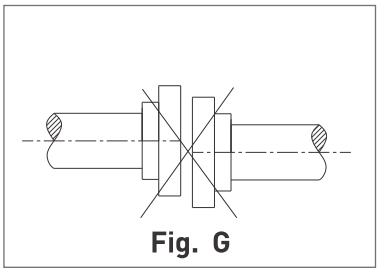


Fig. G

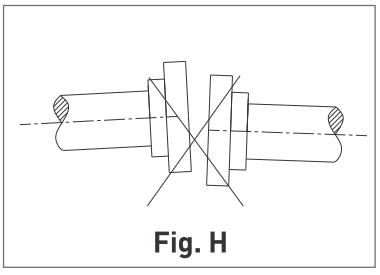


Fig. H

4.5 Precautions

If units are installed outdoors, protection from direct sun, wind and rain. Care should be taken to see that free air flow along the surface of gear unit is ensured.

5. Lubrication

Lubrication is most important part for a gear unit, due to gearbox inner parts (Wear & Tear) life is depends on a proper lubricant.

Durability, efficiency, wears free & minimum noise level operation depends on correct lube oil.

"Zeal gears" units a built in lubrication system ensuring positive and automatic supply of oil in the bearings and gears at all running speed in both direction of rotation.

5.1 Grade of Oil

The lubricants must be use mineral oil containing EP additive, with increase oil film load capacity, And lubricants also contain with anti foam additives, resist oxidization at high temperature and non corrosive elements.

The average temperature ambient is between 30°C to 40°C, We recommended oil having ISO Viscosity grade VG 320. For exceed temperature and heavy duty application, the next higher viscosity grade of oil i.e., ISO viscosity grade VG 460 is recommended.

5.2 Quantity of Lubrication Oil

The exact quantity of is to be decided by filling the oil to be middle of oil glass window or in the marking given in glass window. Quantity of lubrication oil is given in the catalog it's only for reference.

5.3 Oil Filling

Before commissioning of the gear unit, fill the gear unit for correct grade of lubrication oil. It is advice to use a filter/mesh while filling the oil to protect the entry of partials to along with the oil. Oil is to be filled up to the oil level mark in the indicator.

5.4 Oil Draining

Drain the oil while unit is still warm. To easy flow of oil at the time of draining, remove breather plug.

5.5 Ventilation

Pressure develops during gearbox unit in running position. A breather plug provided on the top of gear casing. Take care and checked regularly, the breather plug do not become clogged and painting is not be done on the breather plug.

6 Lubrication System

In the gear unit internal parts and bearings are automatically lubricated through splash system in all smaller size gearboxes for all speed and for bigger size gear unit we provide force feed lubrication system for proper flow of lubricant.

6.1 Oil Pump

Oil pumps generally are of positive displacement. On bigger size gear unit we use oil pump directly mounted to the gear unit. Oil pumps generally are geared type having sufficient capacity for flow rate and delivery pressure.

The oil pump pressure during operation is normally kept at about 2Kg/cm^2.

6.2 Cooling Coils

Cooling coils are provided inside the gearbox, customer should make provision for water connection as per specification. Direction of water flow can be in either direction. Maximum water pressure allowed is 8Kg/cm^2.

Water connection provision is to be made by the customer and water should be regulated through suitable connection valves.

If possible use DM water to avoid, Chocking of cooling coils.

Where there is possibility of frost formation, when the unit is out of operation for a longer period cooling water have to be drained off, Compressed air to be used for clear any residual water in the coil.

7. Commissioning

7.1 Point To Be Check Before Starting

Please insure following inspection points before Start the gear unit.

7.1.1 Check that no external matter or moisture has entered by the reducer casing, through inspection cover.

7.1.2 Before Starting up Check the oil level make sure that appropriate grade oil filled as per given instructions.

7.1.3 Check for free rotation of the shafts.

7.1.4 Check foundation bolts tightness and proper alignment.

7.1.5 Check proper rust preventive removed from all external parts.

7.1.6 Check breather plug proper cleaned and free from obstruction.

7.1.7 Put a drop of oil on all oil seal lips to protect from dry running.

7.2 Trial Running

During the trial run a gear unit, please keep following points in mind:

7.2.1 At the time of trial run of a gear unit keep the unit in no load operation by connecting the prime mover and the gear unit. To ensure smooth operation and long life, continue no load operation for more than 3 hours.

7.2.2 During the trial run it's very important to increase the load gradually without apply full load.

7.2.3 During the test run with no load for 12 hours, ¼ load for more than 48 hours and with ½ loads for more than 48 hours. Then operate at 70% of load for 48 hours minimum, and then take full load in a gear unit.

7.2.4 During trial run Temperature will increase with increasing load, continuous operating temperature of 90°/95°C is allowed and in no way it detrimental to the gear unit.

7.3 Points to be check after Starting

7.3.1 Check unusual noise, vibration and oil leakage after starting a gear unit.

7.3.2 Check temperature of gear unit every 15 minutes at the time of commissioning.

7.3.3 Maximum oil of bearing operating temperature is 93° C when fill specific lubricants. If operating temperature observed above 93° C please consult to us.

8. Maintenance

Maintenance operations are limited to checking of oil level time to time, to regular oil change.

8.1 Oil Change

8.1.1 The first oil change is to be done after about 400 hours of operation.
8.1.2 Subsequent oil can be changed after 4000/5000 Hours of operation.
8.1.3 The oil change interval should not exceed 18 Months.
8.1.4 If possible, the oil should be drained, when it warm, and clean of gearbox inner case with suitable flushing oil.

9. Spares

9.1 Typical cross sectional arrangement drawing supplied (On Request) to identify the parts. The client should order out necessary spares (With Sr. No. & Model No.) Well in time to minimize the stoppage time.

10 Interpretation

Wherever any difficulty arises in interpreting meaning of any of the terms, kindly consult us.

11. Lubrication Chart

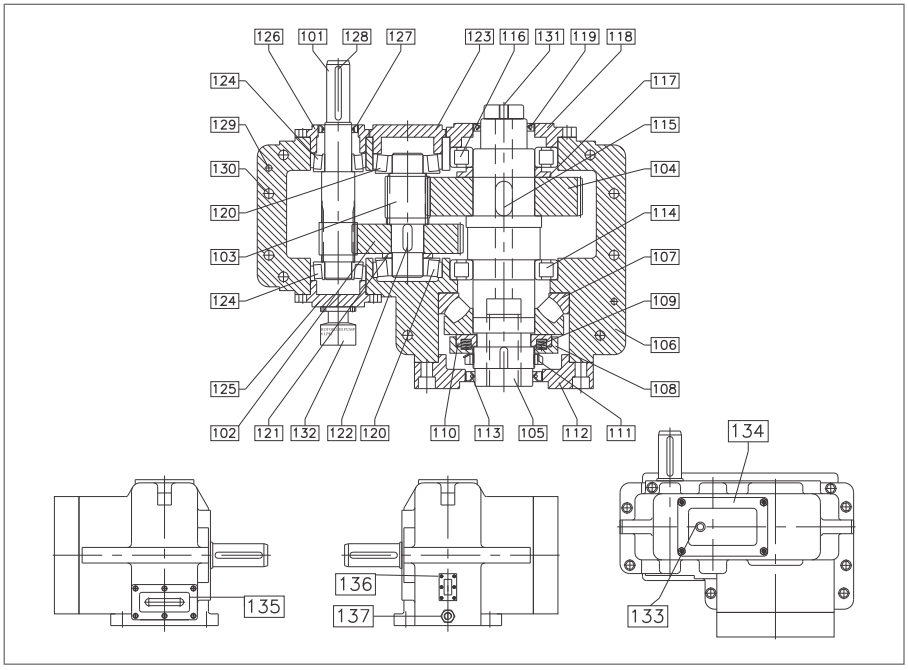
Lubricant Manufacturer	Viscosity Group (mm2/s at 40^0 C)	
	ISO VG 320	ISO VG 460
Indian Oil	Servomesh - SP 320	Servomesh - SP 460
Hindustan Petroleum	Parthan - EP 320	Parthan - EP 460
Bharat Petroleum	Bharat Amocam - 320	Bharat Amocam - 460
Castrol	Castrol Alpha SP - 320	Castrol Alpha SP - 460
Veedol	Veedol Apreslube - 320	Veedol Apreslube - 460
Balmer Lawrie	Balmerol Gearflux - BM 320	Balmerol Gearflux - BM 460

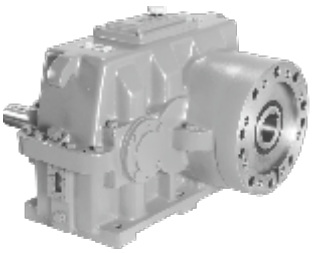
12. Trouble Shooting

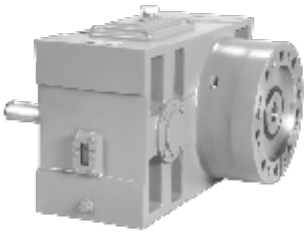
No.	Problem Description	Cause	Solution	Action
1	**Noise**	a. Insufficiently lubricated. b. Broken bearings. c. Gear tooth damage d. Too high power.	a. Check the lubrication oil for lubrication efficiency. b. Inspect with inspection window, if bearing or gear tooth damage refer model part list for new one. c. please check the safety coefficient of gearbox for insufficiency. if yes, adjust the horsepower or rotation speed	Should be immediately stop the machine for complete inspection and inform the machine manufacturers / agent for problem with details.
2	**Overheating**	a. Poor exhaust b. Too high power, Not proper cooling c. Not proper lubrication oil selection d. Cooling system not ok. e. Insufficient lubricated.	a. Check Breather plug blockage. b. please check the safety coefficient of gearbox for insufficiency. if yes, adjust the horse power or rotation speed c. Filled up recommended oil. d. check cooling coil blockage and flow for water. e. Check the lubrication oil for lubrication efficiency.	a. Clean breather plug b. Please contact to machine manufacturers. c. Refer lubrication chart. d. Apply pipe cleaning agent. e. Fill recommended volume of oil.
3	**Vibration**	a. Not proper pulley installed. b. Machine design fault. c. Too high power. d. Broken Gears. e. Broken Bearings.	a. Check pulley installation as per instruction given in manual. b. Contact machine manufacturer for machine inspection. c. please check the safety coefficient of gearbox for insufficiency. If yes, adjust the horsepower or rotation speed d. Replace new one as per part list.	Should be immediately stop the machine for complete inspection and inform the machine manufacturers /agent for problem with details
4	**Oil Leakage**	a. Excess oil filling b. Oil Seal Damaged c. Poor exhaust	a. The oil should be not above marking point of oil window. b. Replace if damage, ASAP. c. Check breather plug, replace it if blocked.	a. Refer main catalog for proper oil volume. b. Refer Part list to replace. c. Please contact to machine manufacturers / agent.

Zeal Gears Pvt. Ltd.

Two Stage Helical Gear Box, SG and SZ Series







Part List

Part No.	Part Name	Qty
101	Input Pinion	01
102	Intermediate Gear	01
103	Intermediate Pinion	01
104	Output Gear	01
105	Output Shaft	01
106	Gear Box Body	01
107	Spherical Roller Thurst BRG	01
108	Locating Ring	01
109	Spring	06
110	Split Ring	01
111	Locknut with Washer	01
112	Adaptor plate	01
113	Oil Seal	01
114	Cylindrical Roller BRG.	01
115	Key for Output Gear	01
116	Cylindrical Roller BRG.	01
117	Bearing Spacer	01
118	End Cover	01
119	Oil Seal	01

Part No.	Part Name	Qty
120	Taper Roller Bearing	02
121	Spacer	01
122	Key for Intermediate Gear	01
123	Intermediate Cover	01
124	Taper Roller Bearing	02
125	Pinion End Cover	01
126	Pinion Open Cover	01
127	Oil Seal	01
128	Key for Input Pinion	01
129	Dowel Pin	
130	Hex. Head Bolt For 106	
131	Puller	01
132	Lubrication Pump	01
133	Breather Plug	01
134	Inspection Cover	01
135	Cooling Coil Cover	01
136	Oil Level Window	01
137	Drain Plug	01

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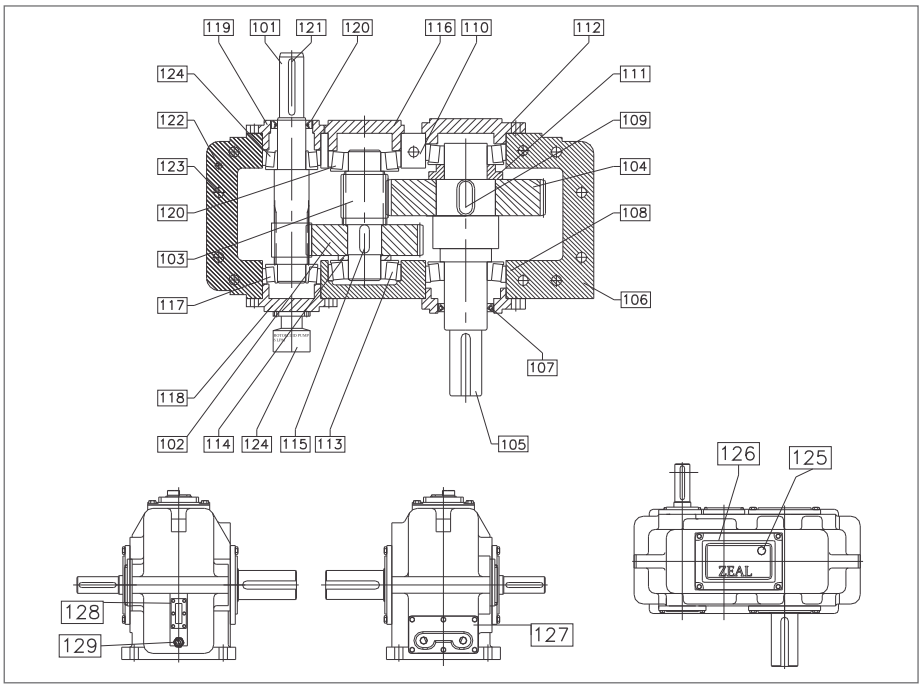
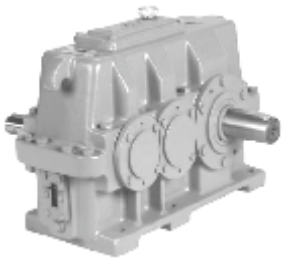
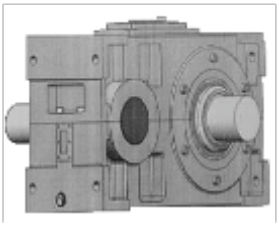
Parallel Shaft Helical Gear Box SGH and SZH Series







Part List

Part No.	Part Name	Qty
101	Input Pinion	01
102	Intermediate Gear	01
103	Intermediate Pinion	01
104	Output Gear	01
105	Output Shaft	01
106	Gear Box Body	01
107	Oil Seal	01
108	Cylinder Roller BRG.	01
109	Key for Output Gear	06
110	Cylinder Roller BRG.	01
111	Bearing Stacer	01
112	End Cover	01
113	Taper Roller BRG.	02
114	Spacer	01
115	Key for Intermediate Gear	01

Part No.	Part Name	Qty
116	Intermediate Cover	01
117	Taper Roller Bearing	02
118	Pinion End Cover	01
119	Pinion Open Cover	01
120	Oil Seal	02
121	Key for Input Pinion	01
122	Dowel Pin	
123	Hex. Head Bolt for 106	
124	Lubrication Pump	01
125	Breathing Plug	01
126	Inspection Cover	01
127	Cooling Coil Cover	01
128	Oil Lever Window	01
129	Drain Plug	

IMPORTANT NOTICE

It is advisable that the client should not open the gearbox during the warranty period. In case it is immense important to open the gearbox, the client should contact "Zeal Gears" to seek the service from "Zeal Gears".

In emergency case, if the gearbox unit opened by the customer they should ensure that all the bearings are adjusted properly by experienced technician. It's important that 85% to 90% of contact pattern must be ensured if any adjustments are done on the gears and or pinions.

It's also necessity while fitting refitting the gearbox unit, a genuine case joining compound should be use and its thickness should not be higher than 0.002 mm. Proper clearance must be sought from "Zeal Gears" in such cases of emergency.

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