From the Frame Up, LLc

Tech Tips:

GE100 - 5 Speed TD/TF Gearbox Assembly

The 5 speed gearbox conversion is a popular item to improve the drivability of your TC. This kit is aimed at TB/TC owners who really want to use their cars on modern roads. The primary benefit is that is that the 5th gear provides the equivalent of an overdrive, reducing engine RPM for normal cruise on the motorways. The end result is economy, comfort and increased engine life.

General information is as follows:

- This conversion adapts a Ford Sierra 5 speed gearbox to the XPAG engine.
- The assembly is complete, essentially replacing most items from the bell housing back to the differential.
- A list of those items included in the kit is attached along with installation instructions.
- The engine stays in the same position so there is not cutting or drilling of the chassis.
- The new shift lever sits in the exact position as the old one, consequently the conversion is not easily detectable.
- The front end of the pro tunnel must be modified to accommodate the longer gearbox.
- Please note the specific lubricant required for the gearbox. Initial supply to fil is included for installation.

There can be a variance in required length of the propeller shaft for the TD/F. Therefore, when ordering this assembly provide the following measurement:

- Distance between the shaft face of the old gearbox flange and the Forward face of the differential prop shaft flange.
- If the old gearbox has been removed, then provide the measurement at the front engine mount center hole back to the face of the differential flange.

Thank you for your purchase.

SAFETY FAST!

FROM THE FRAME UP

EXPERTISE | RESTORATION | MANUFACTURING | PARTS

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MG TD/TF Ford Type 9 Gearbox Conversation - Type 2 (Retaining original engine position)

Fitting Instructions

This gearbox conversion is designed for adapting the ford Type 9 gearbox, 5 speed as fitted to the Ford Sierra 1983-91 to the MG TD/TF. This gearbox is referred to as 'N' type in Haynes Owner's Workshop Manual for Ford Sierra.

Safety

The conversion work can be accomplished from inside the car. Disconnect the battery before work commences. If for any reason, it is preferred to raise the car, support the car with suitably sized axle stands. Do not use vehicle or trolley jacks for permanent support, only for raising and lowering the car.

The conversion kit comprises the following parts:

1. Cast aluminum bell housing 5/8" or¾" cross shaft
2. Gasket bell housing to gearbox
3. Spigot bush
4. Rear rubber gearbox mounting
5. New gearbox support crossmember assembly
6. Heatshield (RHD only)
7. Exhaust support bracket
8. Two floor rail support brackets (LH/RH}
9. Gear lever assembly- chrome
10. Clutch plate, driven, for 7 ¼" or 8" pressure plate.
11. Speedometer cable/ circlip
12. Brake pipe (RHD only)
13. Propshaft assembly
14. Gearbox rubber cover
15. All bolts /fasteners
16. Loctite
17. Detailed fitting instructions
18. Roll pin - replaces taper pin on clutch operating shaft
19. Duct tape.

General Philosophy

The cast aluminum alloy bell housing replaces the Ford cast iron bell housing from the Sierra application. The TD/TF clutch operating mechanism is re-used in the new bell housing and operates exactly the same as before. The only changed component is the driven plate, supplied with the kit. A new spigot bush to accept the 15mm first motion shaft of the Ford gearbox replaces the existing bush.

The TD/TF clutch cover is re-used with the driven plate supplied, as is the original type carbon release bearing.

The center part of the existing gearbox cross tube is removed. A new cast aluminum cross member replaces the part removed and supports the gearbox using the original Ford gearbox mounting point and a rubber mounting.

This arrangement allows the engine to remain in its normal position. The new aluminum cross member is clamped to the remaining two side parts of the original cross tube with 8 3/8" UNC set screws with lock tabs.

RHO cars are supplied with a new brake pipe and heat shield. The heat shield is to protect the brake pipe from exhaust heat as the exhaust passes under the cross member. THESE MUST BE FITTED. The heat shield also supports the brake pipe.

The new cross member ensures that the original chassis strength is maintained.

The original transmission cover is re-used with modification (see chassis preparation).

A new rubber cover replaces the original rubber cover on the transmission cover. This is of similar appearance but is made to fit the Ford gearbox. This is secured to the original transmission cover with six self-tapping screws.

Note: the original MG gearbox can be mounted on this new cross member using the original mounting rubbers.

A new, balanced propeller shaft complete with Sierra gearbox splined nosepiece is supplied which replaces original shaft.
A modified, extended gear lever is supplied, which puts a new MG replica chrome gear lever into the exact position as original.

A new speedometer cable is supplied which adapts the Sierra gearbox speedo drive to the MG instrument, which must be re-calibrated to suit the new gearbox speedo drive ratios. Data sheet included with instructions.

Sierra gearbox preparation

1. Remove the Sierra bell housing and clutch release mechanism from gearbox and discard.
2. At the front of the gearbox remove the four bolts and withdraw the clutch release bearing guide sleeve, note the orientation of the guide sleeve base. The small protuberance on the base points towards the bottom of the gearbox.
3. Carefully, using a hacksaw, saw off the parallel sleeve from the base leaving approximately 1 cm of sleeve on the base. De- burr and remove filings, clean oil seal thoroughly. The sleeve is not required.

4. Lubricate oil seal and shaft and replace base in correct position on gearbox. Replace cork gasket if damaged, again noting orientation, with the gasket cut out at the bottom. Replace and tighten bolts. 7-8 lb ft. 9-11 Nm.
5. *The rear gearbox extension* casing is attached to *the* main case *with* 6 x 10mm bolts.

Remove the lowest bolt on RHS of gearbox and replace with 90mm long bolt and washer. Tighten to 30 lb ft {40Nm). This new bolt goes through the extension flange, sandwich plate and main case flange and protrudes through under the main case. The exhaust bracket is secured by the end of this 10mm bolt with a washer and self-lock nut. It is prevented from moving by a dowel which locates into the Sierra dowel hole adjacent to it.

The original exhaust pipe clip is then bolted to the bracket using a 8mm bolt and nut - see diagram.

Vehicle Preparation

Remove
- Steering wheel
- Seats, carpets
- Gearbox (transmission) cover
- Floor boards
- Floor support rails
- Gearbox/clutch operating rod. Brake pipe RHO only
- Propshaft tunnel (handbrake tunnel)
- Speedo Cable

Support rear of engine and remove gearbox.

Chassis preparation

Remove central piece of gearbox support tube.
See chassis preparation diagrams.

Assembling the new bell housing/clutch.

1. Remove the clutch operating shaft and fork from the original bell housing.
2. Replace them in the new conversion bell housing, noting the correct orientation of all parts. If any parts are worn it is a good policy to replace them at this time.
3. Clean the four 12mm bell housing attachment bolts in solvent to remove oil/grease. Similarly den the four 12mm threaded attachment holes on the Sierra gearbox. Assemble the bell housing and gearbox together with the supplied gasket between. Apply LOCTITE (Supplied) to the threads of the attachment bolts and gearbox hole threads.
4. Using the spring washers with the 12mm bolts torque them to 55 lb ft (75Nm). Replace carbon thrust bearing.
5. Mark the clutch cover and flywheel so that they can be reassembled in the same position to preserve engine balance.
6. Remove clutch cover and driven plate.
7. Remove spigot bush from end of crankshaft using a hacksaw blade to make one clean cut along the bearing. Clean up the hole.
8. Insert new spigot bush into the vacated hole and drive squarely and evenly into the same depth as original.

9. Apply a little oil to the center hole of spigot bush for initial lubrication.
10. Assemble the clutch cover and new driven plate in the normal way (use a Sierra clutch alignment tool if available). (FLAT SIDE OF DRIVEN PLATE TO FLYWHEEL FACE}.

Fit the gearbox to the engine, bolt up the 10 x 8mm bolts attaching gearbox to engine.

Now support the gearbox, the engine support can be removed.

At this point it is a good idea to see if all is well with the engine, gearbox, clutch before proceeding further. Fit gear lever. Remove sparking plugs, rotate engine with starting handle and verify that all gears can be obtained, and everything rotates freely and easily.

The clutch operation can be checked at this time (ensure the gearbox is securely supported) by attaching the clutch rod.
Do not try to start the engine because at this point there is no oil in the gearbox and the gearbox support crossmember is not fitted.

Fitting the new crossmember.
Remove the eight set screws and tab washers holding the caps onto the new crossmember. Note the position and orientation of these caps. These are marked LH and RH (Left hand and right hand) as you sit in the car.

When fitted, the markings that are visible on the underside of the caps should be to the front of the cross member.

The RH cap is shaped to allow the exhaust pipe to clear the underside.

Raise the gearbox to enable the new crossmember to be fitted in the gap made in the gearbox support tube.

Fit from the rear and rotate until level. Fit the caps, tab washers, and set screws. Ensure that the underside of the cross member is parallel to the chassis. If there is side clearance, set in the center.

Tighten the eight bolts evenly and gradually so the caps are seated evenly in the recesses. Torque to 25 lb ft (34Nm) MAX. Do not over tighten. Bend up each tab.

The gearbox mounting rubber sits on the rear platform.

Place the mounting rubber in position, on RHD cars only fit the stainless-steel heat shield under the mounting rubber.

2 x 5/16 "set screws/ distance pieces/ spring washers, large washer and nut secure the mounting rubber and heat shield to the platform.
When these are in position, but not tight, lower the gearbox until the gearbox mounting point is in position on the rubber mounting.

Secure the gearbox mounting to the gearbox mounting point with the single 12mm set screw and spring washer, (use Loctite here). This is accessed through the hole in the mounting platform. Torque to 37 lb ft (50Nm).

Centralize gearbox as far as possible. Tighten mounting rubber set screws to 20 lb ft (27Nm).

On RHD cars fit new brake pipe. See diagram. Ensure that the routing keeps the pipe as far away as possible from heat shield and exhaust pipe.

Fit new propshaft. Lubricate spline and outer surface of nose piece. Bolt up flange as before, use new locknuts.

NOTE: before bolting up propshaft flange: The threaded part of the pinion which passes through locknut, and which is visible inside axle drive flange, sometimes is long enough to prevent the new type propshaft flanges from locating correctly on axle flange. It may be necessary to grind off one or two threads to allow the flanges to register correctly. (See chassis preparation)

Fit the new floor rail supports onto the top of the new crossmember with 5/16" UNC set screws, note RH and LH sides.

Fit the floor support rails having modified them as per diagram (Chassis preparation).

Refit floorboards. They will need trimming in order to fit around the new gearbox. Allow 10mm clearance all round.

On the LHS of gearbox an extra piece must be taken from the floorboards corresponding to the cuts in the original gearbox metal cover. This is to allow for the bulge in the gearbox and to allow for hexagon key or square key to remove/ tighten filler level plug.

Fit original metal gearbox cover having modified it as in chassis preparation. Bend out the piece on LHS within the cuts made, by 10mm. Bend the flange to be parallel to the floor. Seal the gaps with duct tape.

Fit gear lever and securing plate using 3 x 8mm screws and washers supplied. Grease mechanism liberally inside gear lever aperture.

Refit clutch operating rod. Check clutch operation/ clearance. On RHO models bleed brakes.

Fill gearbox with gear oil until it reappears out of filler hole. To save time this could be done before fitting gearbox metal cover. Gear oil spec. semi-synthetic 75W90 GL4. 1.3 or 1.9 liter.

Fit new gearbox rubber cover (similar to original) secure with 6 self-tapping screws. Make sure gear lever is in center of hole when in neutral.

Refit carpets, seats, steering wheel.

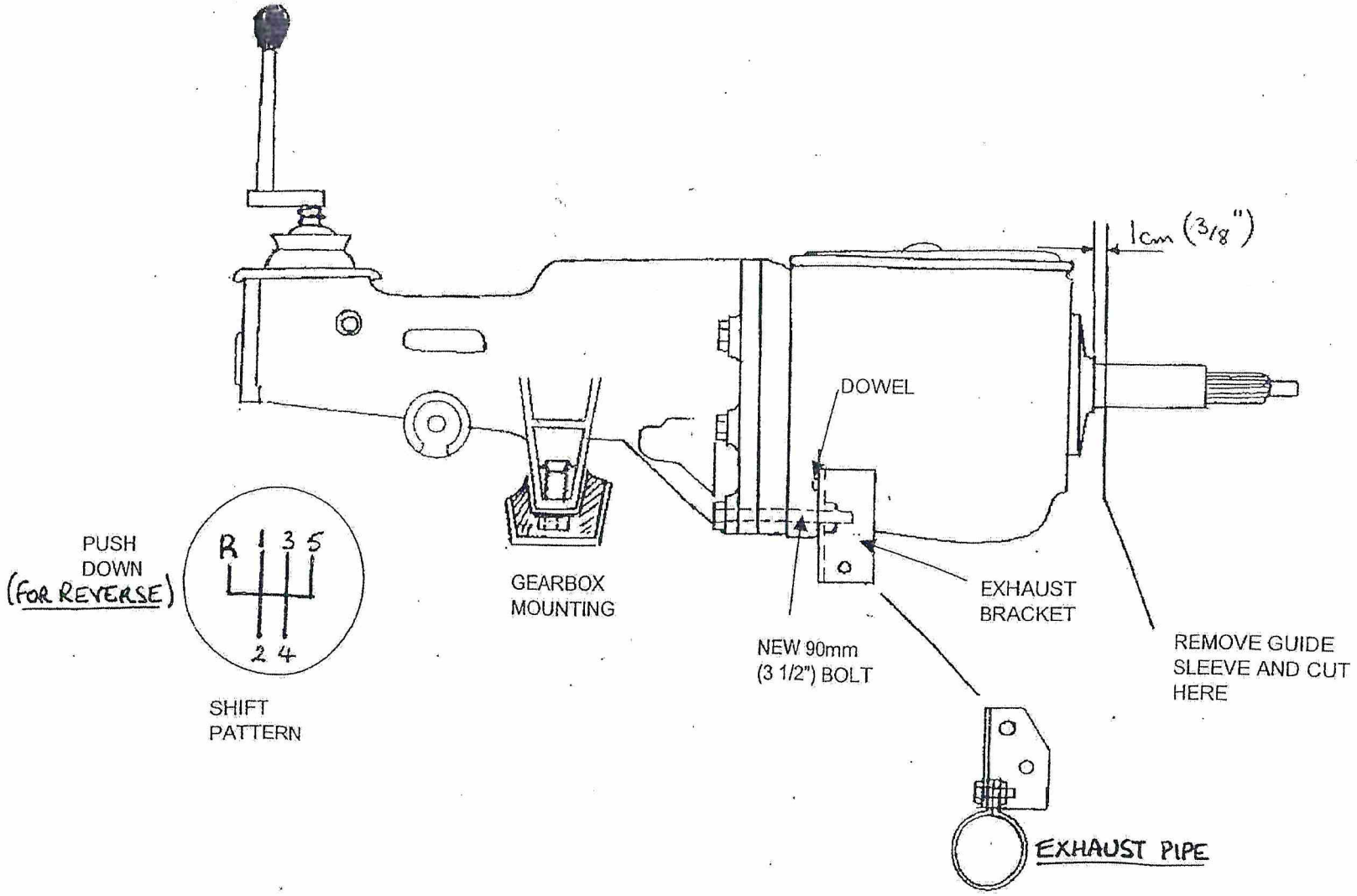
Check all vehicle services. Reconnect battery.

Check car for road worthiness.

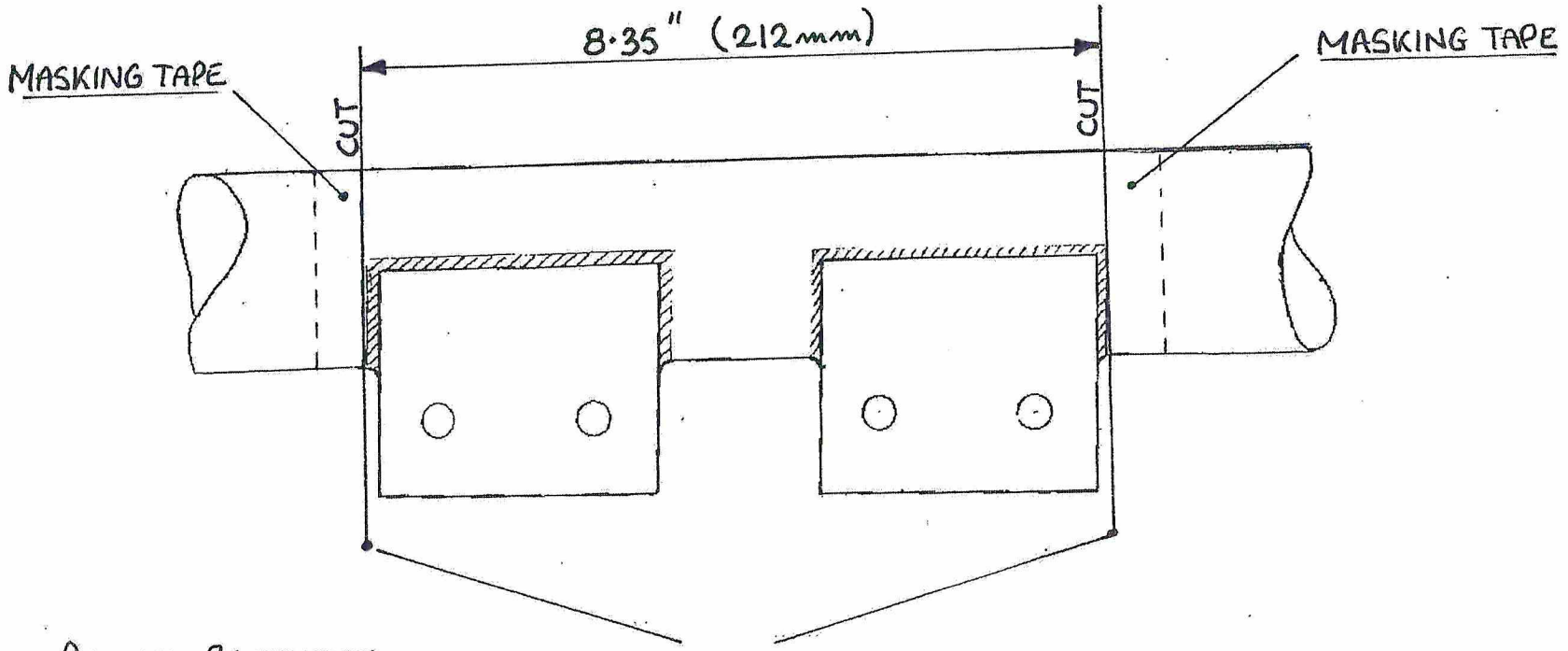
Road test.

After 100 miles check gearbox oil level when cold and on RHO models check new brake pipe for leaks.

TD/TF GEARBOX PREPARATION

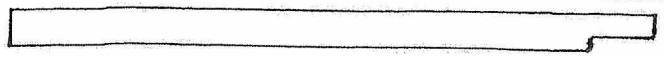


TD/TF CHASSIS PREPARATION 1

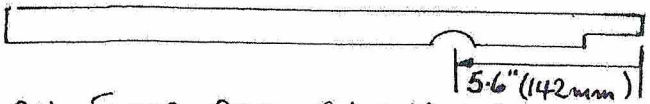


1. REMOVE BRAKEPIPE
2. CUT THROUGH CHASSIS TUBE TO DIMENSIONS SHOWN (CUT MUST BE SQUARE TO TUBE) (USING WRAPPED MASKING TAPE AS MARKER)
3. REMOVE CENTRAL PIECE AND KEEP.
4. THOROUGHLY DE-BURR OUTER STUBS. DE RUST AND PAINT INSIDE TUBE

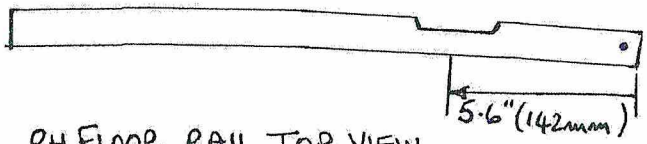
FRONT



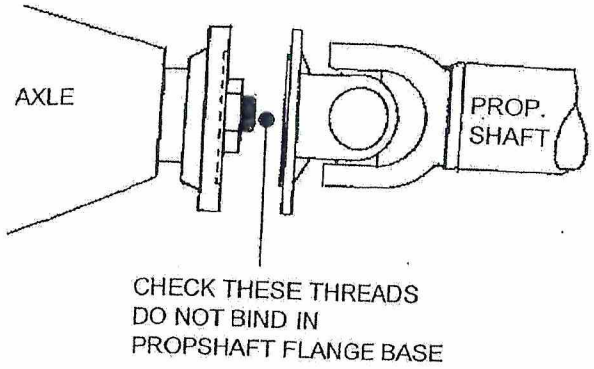
LH / RH FLOOR RAIL SIDE VIEW
REMOVE PIECE 2" x 3/8" (50x10mm)

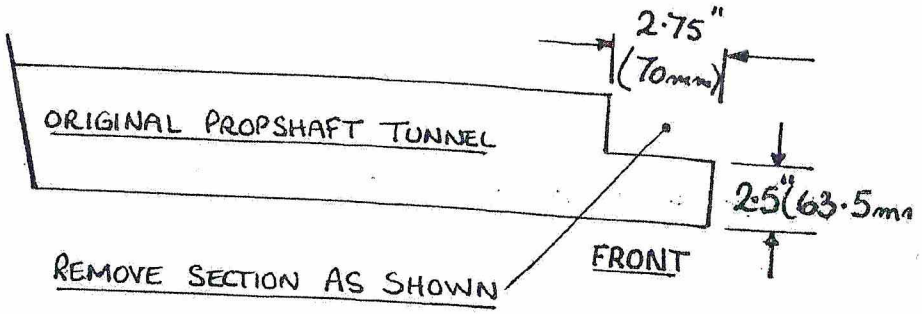


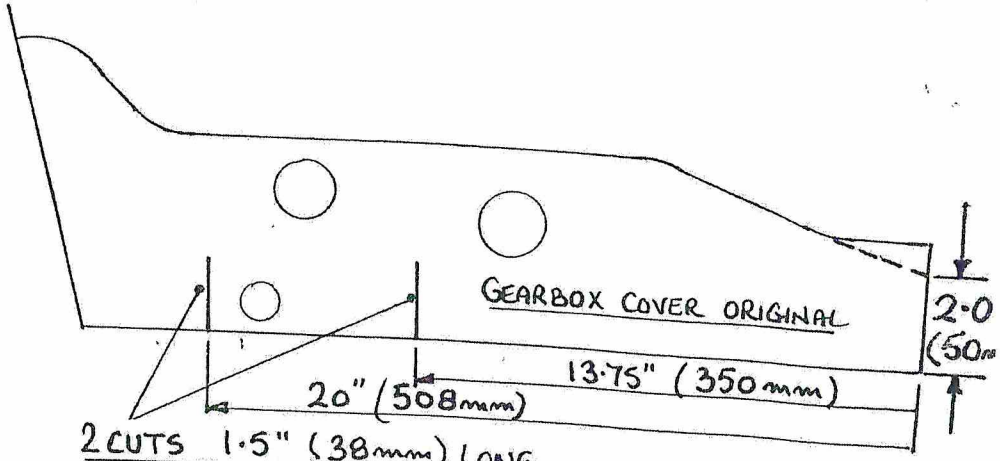
RH FLOOR RAIL SIDE VIEW
CIRCULAR CUT OUT FOR SPEEDO CABLE
5/16" x 3/4" (8mm x 19mm)

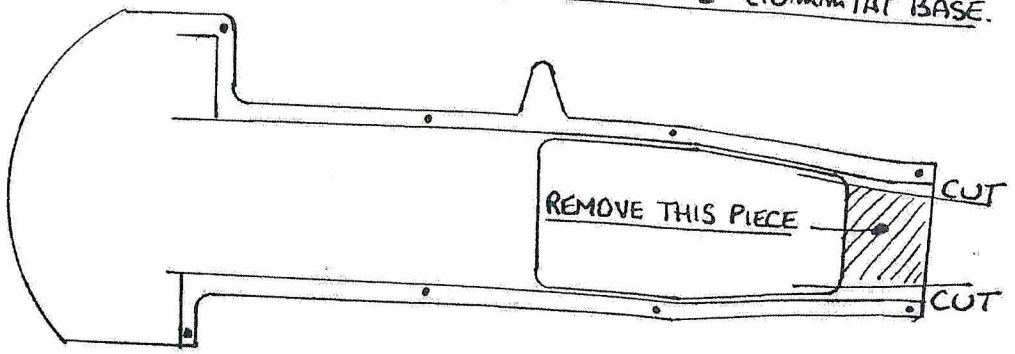


RH FLOOR RAIL TOP VIEW
CUT OUT 1½" x 5/16 (38mm x 8mm)
ONLY IF SPEEDO DRIVE STEP UP GEARBOX
IS USED. (CHRONOMETRIC SPEEDO)

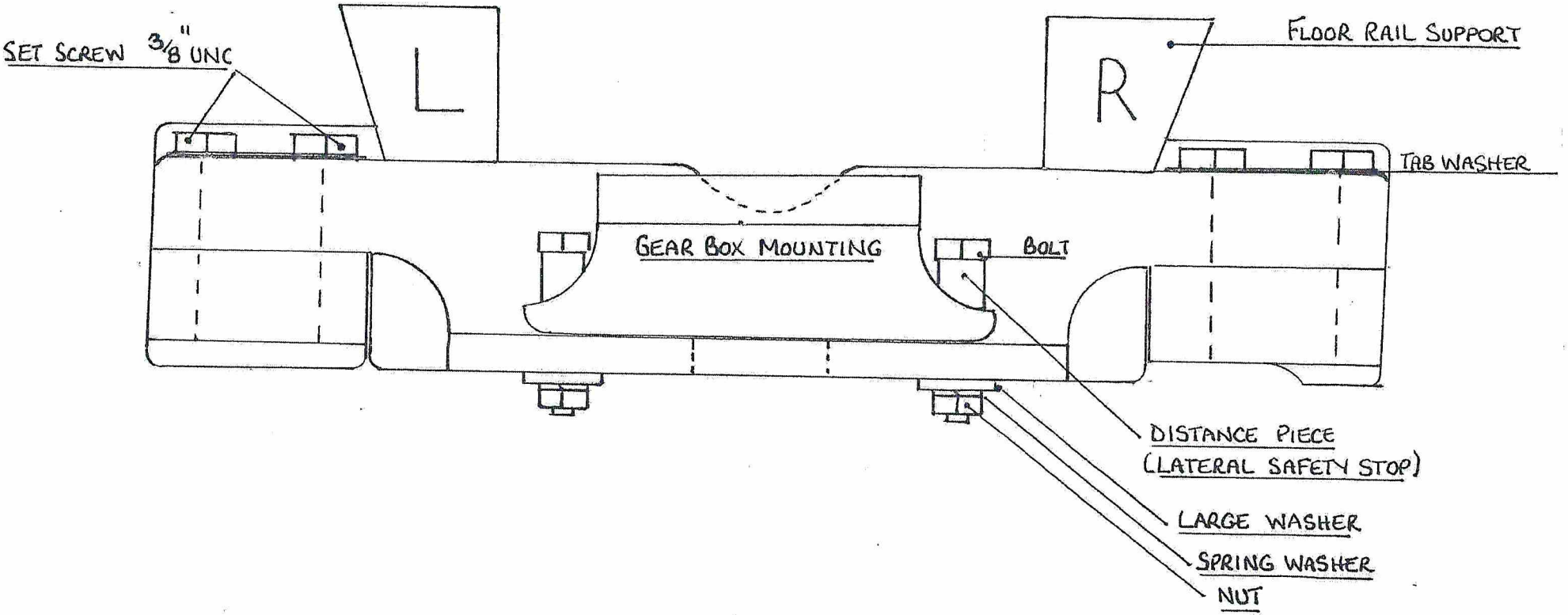




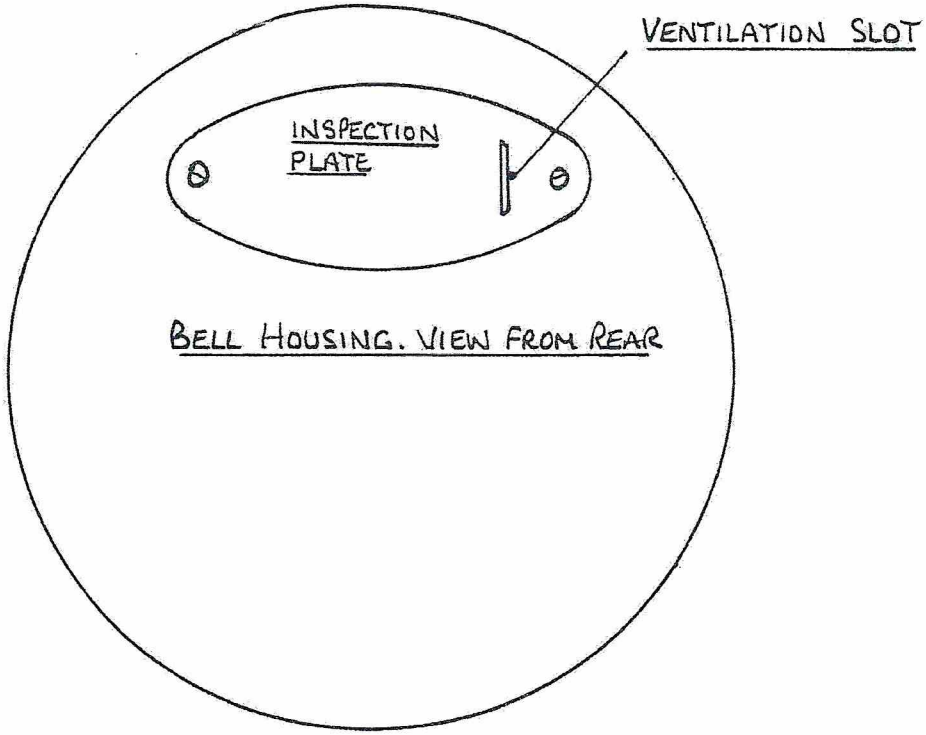




CHASSIS PREPARATION 2



CROSS MEMBER ASSEMBLY
VIEW FROM REAR



POSITION INSPECTION PLATE WITH VENTILATION SLOT ON RIGHT HAND SIDE

THIS IS TO PREVENT OIL LEAKAGE FROM REAR MAIN BEARING CAUSED BY LOW AIR PRESSURE (PARTIAL VACUUM) IN BELL HOUSING, DUE TO CENTRIFUGAL ACTION OF CLUTCH PRESSURE PLATE.

OILS FOR TYPE 9 GEARBOXES

Specification 75w90 Gear Oil to API GL4

Examples

Comma SX 75w90 API GL4
Redline MT 75w90 APIGL4

DO NOT RUN ON AXLE STANDS. (STARVES REAR BEARING OF OIL)

DO NOT USE GL5 The extra antifriction additives* will cause irreversible damage to the gearbox bearings. This will invalidate guarantee.

DO NOT USE ATF FLUID (Automatic transmission fluid).

DO NOT crank, start or run the engine without the correct grade of oil IN THE GEARBOX, otherwise damage to gearbox will occur.

*current API GL5 formulations contain more antifriction additives than earlier API GL5 formulations.

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