

# Hi-Gear Engineering Ltd

Registered Office

82 Chestnut Ave.  
Mickleover  
Derby  
DE3 9FS, UK  
Tel/Fax 0044(0)1332 514503  
[www.hi-gearengineering.co.uk](http://www.hi-gearengineering.co.uk)

Registered in England

No. 3503082

Director

P.D.Gamble  
VAT No.705936327

OILS FOR TYPE 9 GEARBOXES

Specification 75w90 Gear Oil to API GL4

Examples

Comma SX 75w90 API GL4  
Redline MT 75w90 API GL4

Produced in the U.K. for

Hi-Gear Engineering

Received 7/11/14 815mm

Please ensure this unit is fully greased with a Lithium based grease before use (NLGI class 1 or 2)

825 between joints

min 10 mm gap required

should be 815

send passport back

See 28/10/14

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.

March 2010

# AA2432B5LB

## MGA Ford Sierra Gearbox Conversion

### Fitting Instructions

This gearbox conversion kit is designed for adapting the Ford Type 9 gearbox, 5 speed as fitted to the Ford Sierra 1983-1987 to the MGA. This gearbox is referred to as 'N' type in Haynes Owner's Workshop Manual for Ford Sierra.

### Safety

There is considerable work required underneath the MGA when fitting this conversion. Consequently the use of a vehicle inspection pit or vehicle lift is recommended. If these are not available the car will need raising front and back to give sufficient space to work safely and comfortably under the engine/gearbox/propshaft areas. To accomplish this support the car front and rear with properly sized and located 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 Aluminium Alloy Bell Housing. Four fixing bolts/washers. *to gearbox*
2. Machined aluminium alloy clutch release lever pivot. 2 fixing bolts/washers.
3. Clutch release lever pivot bolt, nut and washer.
4. Gasket. Bell housing to gearbox.
5. Spigot bush (extended).
6. Rear mounting bracket/ 2 distance pieces/ 2 bolts/ spring washers.
7. Rear mounting / 2 fixing bolts/washers/nuts. 1 central fixing bolt/ spring washer.
8. Rear mounting support cross member.
9. Cross member spacer (2)
10. Cross member tapped securing plate (2). 4 securing bolts/washers.
11. Modified gear lever assembly. 3 securing screws/plate.
12. Clutch plate. *DP 9711 AP*
13. Propshaft c/w Sierra gearbox nose piece.
14. Speedo cable / circlip / grommet.
15. LOCTITE.
16. Set of bolts & nuts to fasten bell housing to engine.

### General Philosophy

The cast aluminium alloy bell housing replaces the Ford cast iron bell housing from the Sierra application. The MGA Clutch release lever and clutch slave cylinders are re-used on the new bell housing.

An extended spigot bush is a force fit into the rear of the crankshaft and this bush supports the shorter Sierra gearbox primary shaft in the correct position.

The MGA Clutch cover assembly is re-used with the new driven plate supplied unless an MGB clutch is to be fitted.

A new gearbox mounting / attachment bracket and cross member is used to support the gearbox. The supporting crossmember is fixed to the 'C section gearbox tunnel and floorboard support rails which run longitudinally at the side of the gearbox. Fixing is by a tapped plate, spacer each side and four bolts.

A new, balanced propeller shaft complete with Sierra gearbox splined nose piece is supplied which replaces original shaft.

A new speedometer cable is supplied which adapts the Sierra gearbox speed drive to the MGA instrument, which must be re-calibrated to suit the new gearbox speed drive ratios.

A modified, extended gear lever is supplied, which puts a new MG replica chrome gear lever into the exact position as originally, using the same gear lever gaiter

### **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. At the rear of the gearbox is the extension housing, in aluminium alloy. Just forwards of the speedometer drive housing is a vertical downwards projection in the form of a narrow 'V' which engages into the rear gearbox mounting (Sierra).
6. This projection needs to be removed to clear the MGA chassis. Using a hacksaw, cut off this projection horizontally, just above the lower threaded area of the projection - see diagram. De burr and file edges smooth, round off.

### **Vehicle Preparation.**

1. Remove MGA Engine, gearbox and propeller shaft from the car as per the MGA workshop manual, observing relevant safety precautions.
2. Remove gearbox tunnel turret. This will need modifying later.
3. Separate engine and gearbox (if removed as a unit)
4. Remove the clutch slave cylinder from MGA gearbox.
5. Remove the clutch release lever and carbon thrust bearing from the MGA gearbox.
6. Remove the MGA speedometer drive cable from car.
7. Remove the MGA clutch cover and driven plate. If cover plate is to be re-used mark flywheel and cover plate before removal and re-use in the same position to preserve engine balance.

8. Examine the 'C' section gearbox tunnel and floorboard support rails which run alongside gearbox and bell housing. If not in excellent condition with welding in good state- replace and re-weld, as these take the load of gearbox mounting.

### **Assembling the new bell housing**

1. Clean the four 12 mm bell housing attachment bolts in solvent to remove oil/grease. Similarly clean the four 12 mm threaded attachment holes on the Sierra gearbox. Assemble the bell housing and gearbox together, with supplied gasket between. Apply LOCTITE (supplied) to the threads of the attachment bolts and gearbox attachment hole threads. Using the spring washers with the 12 mm bolts torque them to 55 lb ft each (75 Nm).
2. Bolt the aluminium alloy clutch release lever pivot into position using the M8 bolts and spring washers supplied, clean all threads and apply LOCTITE as in (1) above, torque the bolts to 15 lb ft.(20 Nm)
3. Assemble the original MGA clutch release lever and carbon thrust bearing into position, secure the release lever with the pivot bolt supplied, fit washer, locknut and tighten. Apply a little engine oil to the pivot bolt/ bearing.
4. Remove the original spigot bush from the rear of crankshaft, ensure that the vacated hole is smooth and without damage.
5. Apply bearing LOCTITE to the new spigot bush and drive it into the rear of the crankshaft as far as it will go. This is an interference fit into the crankshaft. Use an aluminium or copper drift to drive it in without damage.
6. Apply a little grease to the centre hole of the spigot bush to lubricate.
7. Assemble the clutch cover plate/ new driven plate in the normal way. (use a Sierra clutch alignment tool if available.)
8. At this point it is a good idea to assemble the gearbox/ bell housing to the engine to see if all is well. Bolt gearbox/ bell housing to the engine using bolts supplied.
9. Fit gear lever assembly with attachment bolts.
10. Remove engine sparking plugs, rotate engine and verify that all gears can be obtained and everything rotates freely and easily.
11. Remove bell housing / gearbox assembly from engine, remove gear lever assembly.

### **Fitting Gearbox to Car**

1. Remove the two lower 10 mm gearbox extension housing retaining bolts and loosely assemble the new gearbox mounting bracket to the gearbox using the 10 mm bolts and distance collars supplied. The distance collars are positioned between the mounting bracket and the casing, one on each side, the longer 10 mm bolts hold the bracket to the casing.
2. Place a support under the car below the position of the gearbox and place the gearbox / bell housing in position as far back as possible with the rear extension resting between the cheeks of the original MGA rear mounting bracket.
3. Insert the two top bell housing to engine bolts into the bell housing. It is not possible to fit them with engine in position.
4. Replace the engine in position, and carefully guide the gearbox input shaft into the clutch assembly on the engine. When engaged, bring engine / bell

- housing together and bolt together with bolts provided. Bolt up engine mountings.
5. Bolt new gearbox mounting onto new bracket on gearbox extension casing with 3/8" UNF bolt/ spring washer supplied. Note, the highest side of mounting should be towards the front of car. Apply LOCTITE to this bolt.
  6. Bolt new crossmember onto the bottom of gearbox mounting with 5/16"UNF bolts, spring washers and nuts. Do not tighten at this stage.
  7. Raise gearbox until new crossmember contacts 'C section rails alongside gearbox. Centralise crossmember and mark bottom face of rails where crossmember is slotted, two positions each side. Mark centre of rail width and drill 11/32" holes in these positions.
  8. Lower gearbox about 3/4". Place 5/8" spacer between bottom of rail and crossmember each side and place tapped plate above rail bottom face.
  9. Fit the four attachment bolts/ washers/ spring washers and fully tighten.
  10. Fully tighten the 10 mm lower gearbox extension bolts which now retain the new gearbox mounting bracket. Tighten to 30 lb ft.( 40 Nm ) and use LOCTITE after cleaning threads in solvent.
  11. Final bolts to tighten are the two securing the gearbox mounting to the new crossmember which run in slots in the crossmember. Push the gearbox to the right of car until the gearbox is clearing the tunnel side by 4-5 mm. this is in the area of the rear extension bolt heads and new mounting bracket. When clearance is determined by inspection, tighten up bolts/nuts.
  12. Check that the new gearbox crossmember is level to the car chassis. Sometimes the C-sections are welded to the chassis not level to each other. If the crossmember does need levelling make a suitable thickness packing piece and place between spacer and C-section to level the crossmember.
  13. Fit new propshaft. Lubricate spline and outer surface of nosepiece with gearbox oil before pushing into place through oil seal. Bolt up rear flange as before - use new locknuts
  14. Fitting Speedo Cable - see diagram
  15. Drill a hole and enlarge to 1 1/8" in RH side of gearbox tunnel. The speedo cable passes through this hole, sealed by large grommet supplied. The cable runs above floorboard in the angle formed by the tunnel and floorboard, and under the carpet. It runs forward to the RH toe board. Drill a 5/8" hole in the corner of the wooden toeboard, seal with mastic. The cable then runs up into the engine compartment and back through the bulkhead to the speedometer as before.
  19. Fill gearbox with Ford synthetic oil (Part No 5 015 547 ) Fill to level hole on LH side of gearbox. See attached list for alternative oils.
  20. Ensure all engine services/ parts are correctly installed.
  21. Fit clutch slave cylinder, push rod clevis pin /split pin. Renew push rod clevis pin if worn.
  22. Attach flexible hydraulic pipe.
  23. Bleed clutch system - test.
  24. Check car for roadworthiness.
  25. Fit Gear Lever - **See separate notes on fitting gear lever.**
  25. Road Test

26. The speedometer will need re-calibrating to the new gearbox. A data sheet is enclosed of companies who can do this work. Any competent instrument company can do this.
27. After 100 miles (160) km, recheck tightness of all newly installed accessible bolts /nuts.
28. At normal services intervals, lubricate propshaft as per vehicle service manual, and always check and replenish gearbox oil levels as necessary.

### **SPECIAL NOTE**

The propeller shaft supplied with this kit is manufactured to the original manufacturer's specification:

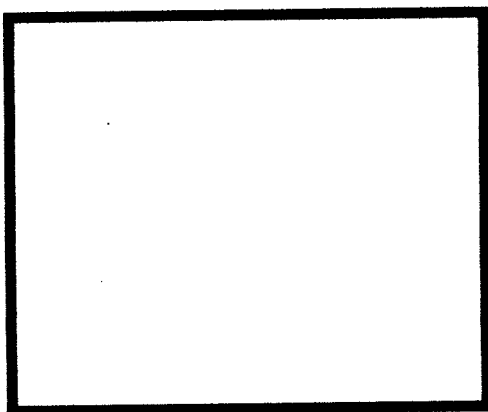
Torque rating (short duration) 570 Nm MAXIMUM (422 lb. f.ft)

Rpm rating of propeller shaft: 7000 rpm. MAXIMUM

This corresponds to an engine speed of 5740 rpm in 5th gear (ratio 0.82:1), or an engine speed of 7000 rpm in 4th gear (ratio 1:1).

For higher torque or speed applications, Hi-Gear Engineering Ltd. can refer customer to manufacturer.

**In case of any problems  
contact your supplier:**



**Or the manufacturer:**

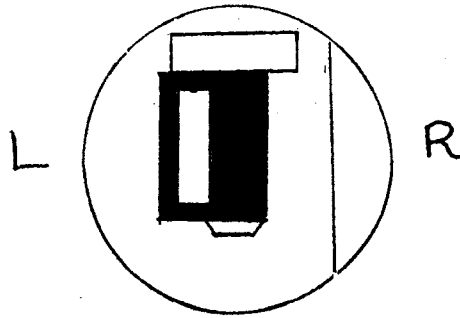
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ENGLAND**

**Tel/Fax: 00 44 (0)1332 514503**

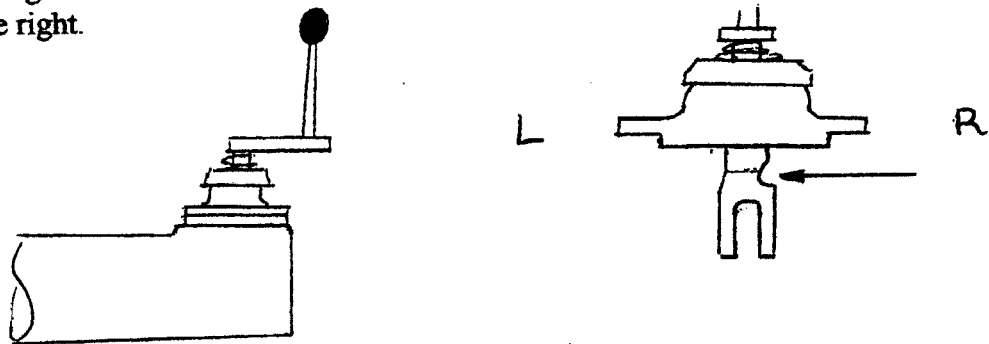
## Notes on fitting gear lever - MGA

### Fitting gear lever to gear box

1. Remove turret on top of transmission tunnel
2. Ensure there is a plastic saddle fitted to swinging arm inside gear lever housing
3. Check the plastic saddle is fitted correctly with the rectangular loop on the left.



4. Fit the gear lever with horizontal extension to the rear, and reverse detent cut out to the right.



5. Push down so that the gear lever fork end engages the plastic saddle on the swinging arm.
6. Ensure the gear lever boss fits correctly into the hole at the top of the gear lever housing.
7. Fit clamp plate and set screws/spring washers to secure the gear lever boss flange to the gearbox and tighten. Check that all gears can be engaged. For reverse, push lever down hard, push to the left and forward (parallel to first gear).
8. Note that this gearbox follows modern practice - with no side force on gear lever, pushing forward engages third gear, pulling backwards engages fourth gear consequently for first and second gear the lever must be moved to the left of the neutral position and to the right for fifth gear. This is different to the original gearbox.
9. Remove gear lever and lubricate fork end and plastic saddle with grease.

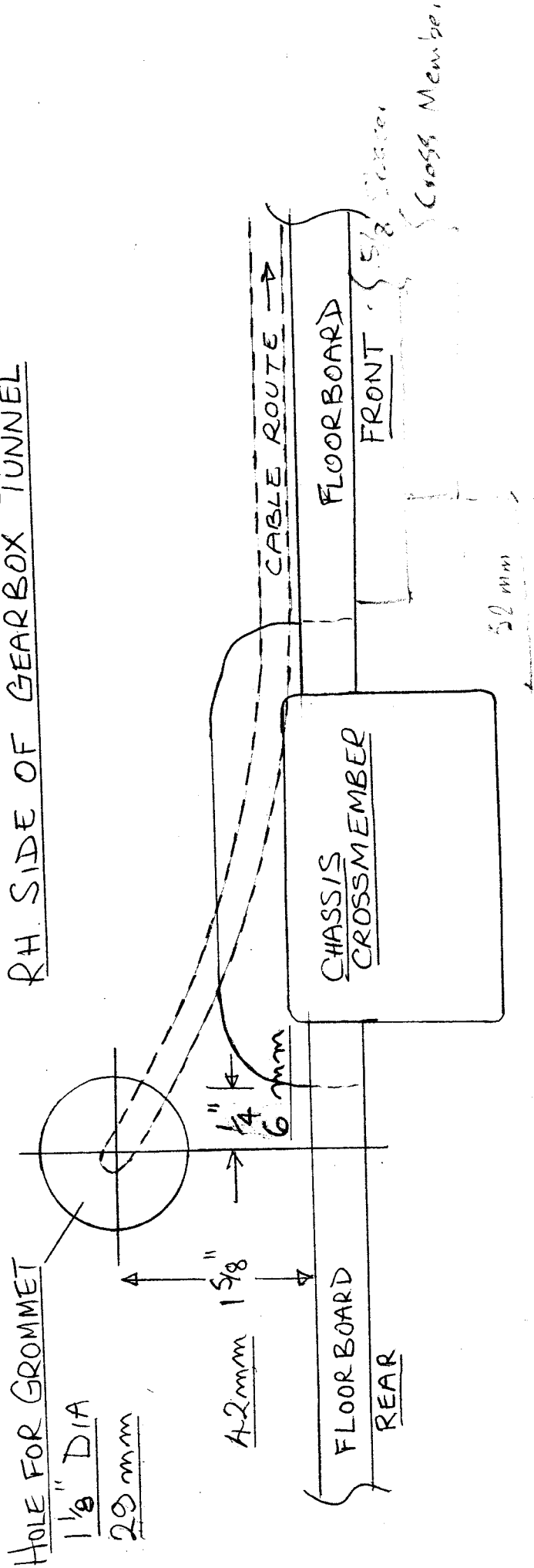
10. Refit gear lever. At this point it is worth while taking the car on the road (with transmission turret off) to ensure all gears can be engaged and the gearbox is working correctly under all load conditions and does not jump out of gear.

**ENSURE THAT THERE IS ADEQUATE VENTILATION IN THE VEHICLE TO PREVENT THE BUILD UP OF ANY POSSIBLE EXHAUST FUMES.**

11. Offer up the turret to the transmission cover. It will be necessary to substantially reform the top surface close to the hole forward of the gear lever to prevent contact between the turret and the gear lever horizontal plate. It may be necessary to remove a small amount of metal from around the hole to obtain adequate clearance.
12. When satisfactory clearance has been achieved, for all gear positions, check on the road again, that good clearance exists under all road conditions of acceleration and deceleration and that the gearbox stays in gear.
13. Fit gear lever gaiter. Check all gears can be engaged and stay in gear under all road conditions. It may be necessary to use a clip or TYRAP to prevent the gaiter riding up the gear lever and pulling it out of gear. The Ford gearbox needs less force to pull out of gear than the MG gearbox.
14. If satisfactory gear operation cannot be achieved with the standard gaiter. (Currently available gaiters are stiffer than original) then a satisfactory solution is to use an MGB 4 Synchro gear lever gaiter screwed on the top of the turret hole. This gaiter is designed to be mounted onto the top of the hole and not through the hole. This arrangement gives greater clearance and is not so restrictive as the original gaiter.

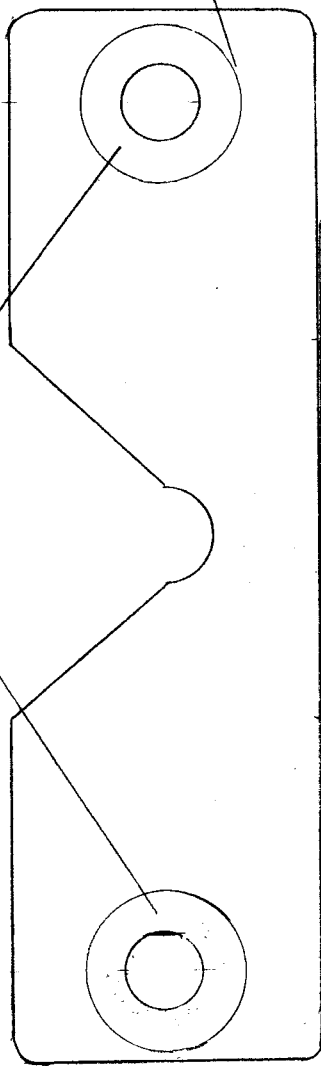


RH SIDE OF GEARBOX TUNNEL



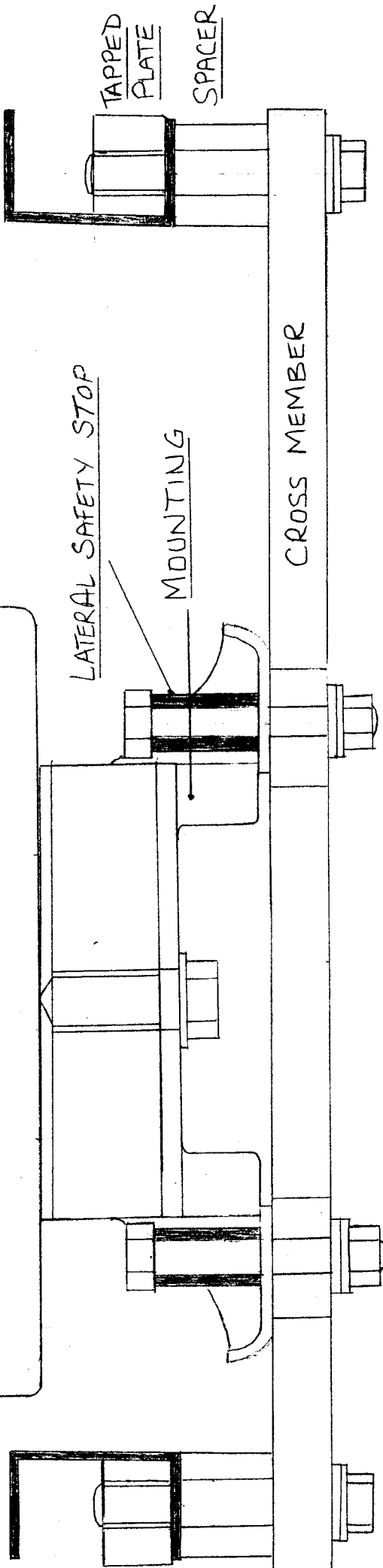
DETAILS OF SPEEDO CABLE INSTALLATION

DISTANCE PIECE  
(COLLAR)



REAR MOUNTING  
BRACKET

C SECTION RAILS



LATERAL SAFETY STOP

MOUNTING

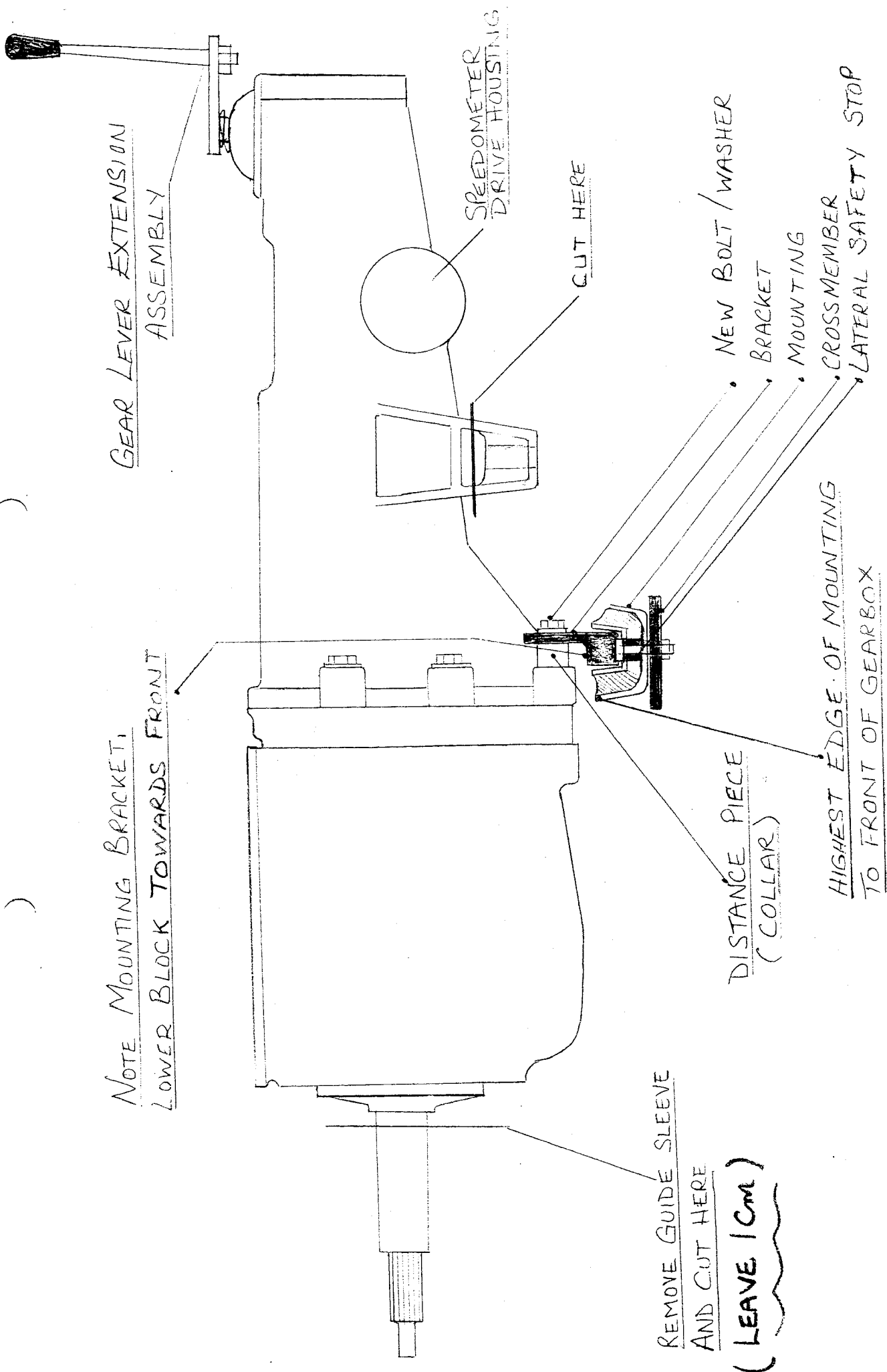
CROSS MEMBER

TAPPED  
PLATE

SPACER

ARRANGEMENT OF REAR MOUNTING ASSEMBLY  
PART SECTION

VIEW TOWARDS REAR OF VEHICLE



NOTE MOUNTING BRACKET,  
LOWER BLOCK TOWARDS FRONT

GEAR LEVER EXTENSION  
ASSEMBLY

SPEEDOMETER  
DRIVE HOUSING

CUT HERE

REMOVE GUIDE SLEEVE  
AND CUT HERE  
(LEAVE 1 CM)

NEW BOLT / WASHER  
BRACKET  
MOUNTING

DISTANCE PIECE  
(COLLAR)

CROSSMEMBER  
LATERAL SAFETY STOP  
HIGHEST EDGE OF MOUNTING  
TO FRONT OF GEARBOX

GEARBOX PREPARATION DETAILS

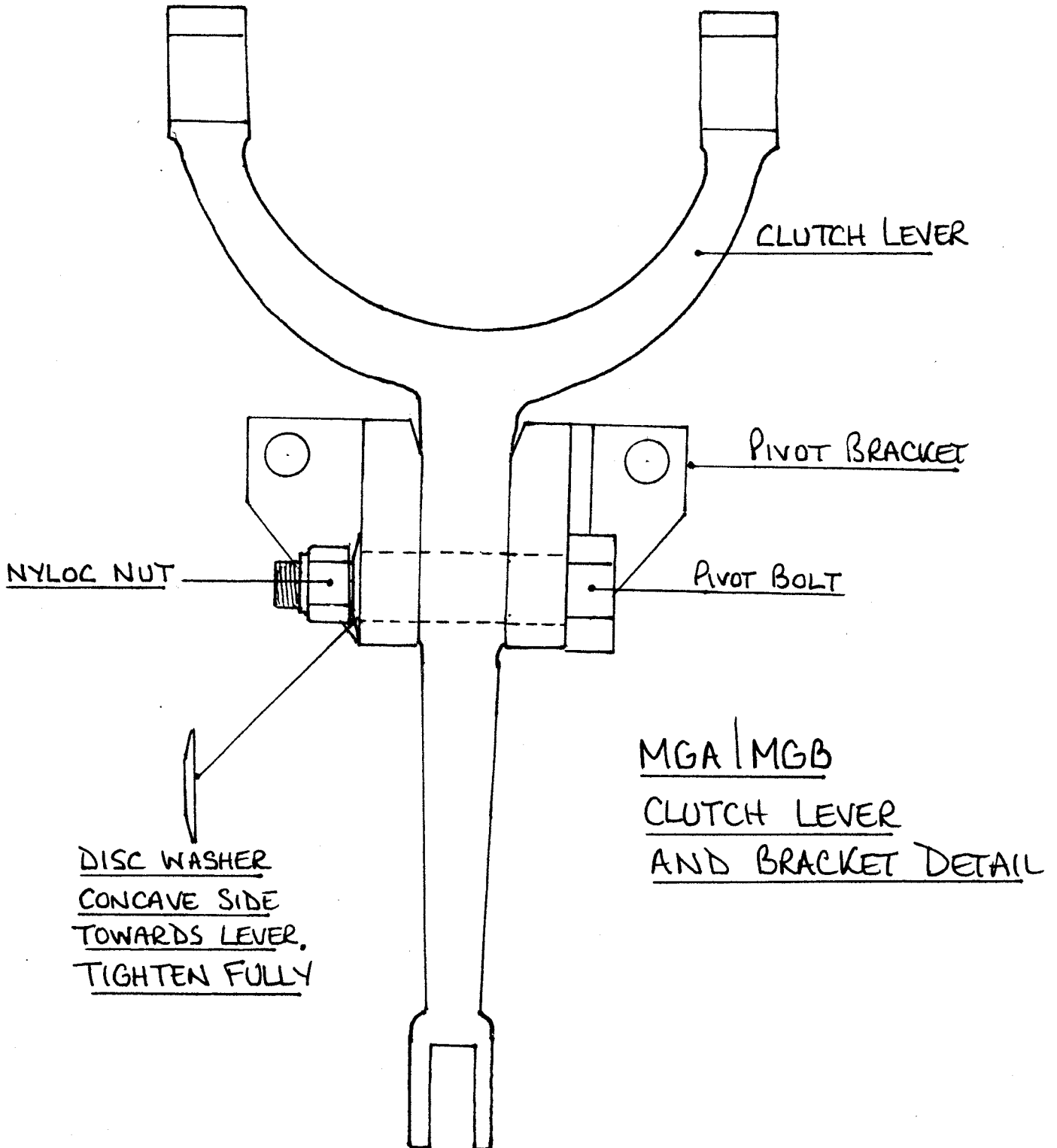
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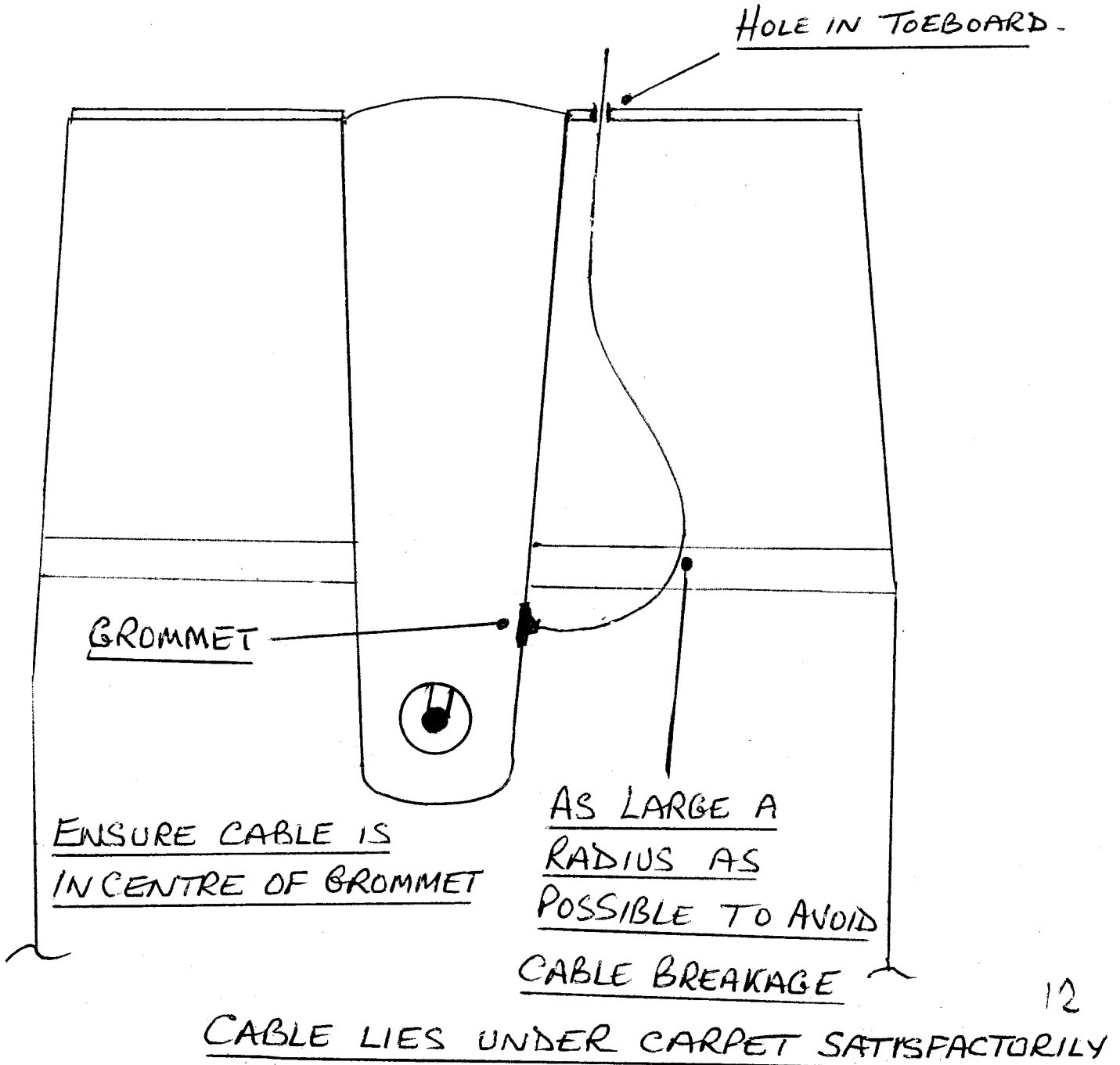
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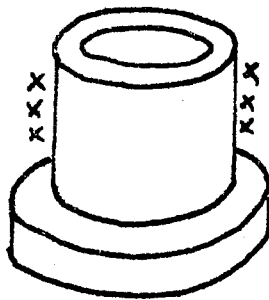
VAT No 705 9363 27  
Date

## MGA SPEEDO CABLE ROUTING



## Spigot Bush

Apply bearing Loctite to hole in rear of crankshaft and also to spigot bush around outside of smaller diameter. (\*\*\*)



Fit bush into hole in crankshaft. Drive in firmly and squarely until the flange is hard against crankshaft and will go no further.

Do not use a hammer directly on the face.

The best way is to interpose an aluminium round bar between bush and hammer or suitable softer material which keeps bush in line whilst being driven in.

For MGB 5 Bearing engines ensure that the flywheel bolt locktabs do not obstruct spigot bush flange.