

31/03/11



## MFK560G3

### CHEVY GEN3 V8 PETROL TO LAND CRUISER 3, 4 & 5 SPEED PETROL TRANSMISSIONS

#### Fitting Instructions

Thank you for purchasing a product manufactured by Marks 4WD Adaptors. The following instructions are intended as a guide. We recommend that you purchase a service manual pertaining to your vehicle for specific torque values, wiring diagrams and other related information.

This kit has been designed to directly replace the original Land Cruiser F155, 2F and 3F engine. If replacing H or 2H diesel engine, you must obtain a complete petrol bellhousing assembly to suit your vehicles transmission.

**NOTE:** The Holden Gen3 and Gen4 engines are fitted with front drop sumps. Engines fitted with this type of sump will need them to be swapped over to a rear drop type. This is required in all 4WD applications as the front drop type will not clear the front differential.

#### Engine Sump Modifications Part No. G3CKS

1. To fit the Chevy truck rear drop sump to the Commodore Gen3 engine you will need to make some modifications to the windage tray. **NOTE:** The Gen4 windage tray should already suit the truck style sump and oil pickup.





1. The windage tray will need to be modified to allow for the new pickup bracket position. See photo above.
2. The windage tray will also need to be modified in the position pointed out in the above photo. This section will need to be cut out or bent up to clear the cast section in the sump just above the oil filter. See next photo.



3. Before fitting the modified engine sump and pickup you must take the following step.
4. To re-install the dipstick tube, you will need to remove the small plug fitted in the engine block just in front of the starter motor.
5. Fit the modified oil pickup.
6. Fit the modified engine sump. Use a small amount of silicone on the engine side of the gasket where the timing cover joins the block. Do the same at the other end where the rear main seal housing meets the block. Secure the sump using the original Commodore/Chevy bolts. **NOTE:** Use a straight edge to get the back face of the sump flush with the engine block.
7. The dip stick needs to be modified to allow for the deeper sump. Fill the engine with 7ltrs of engine oil. And then adjust the length of the stick to indicate the engine is full. **NOTE:** The stick should require an extra 50mm of length, the easiest way to modify it is by cutting down the dipstick tube by this amount. Marks 4WD Adaptors also stock the factory truck dip stick and tube.



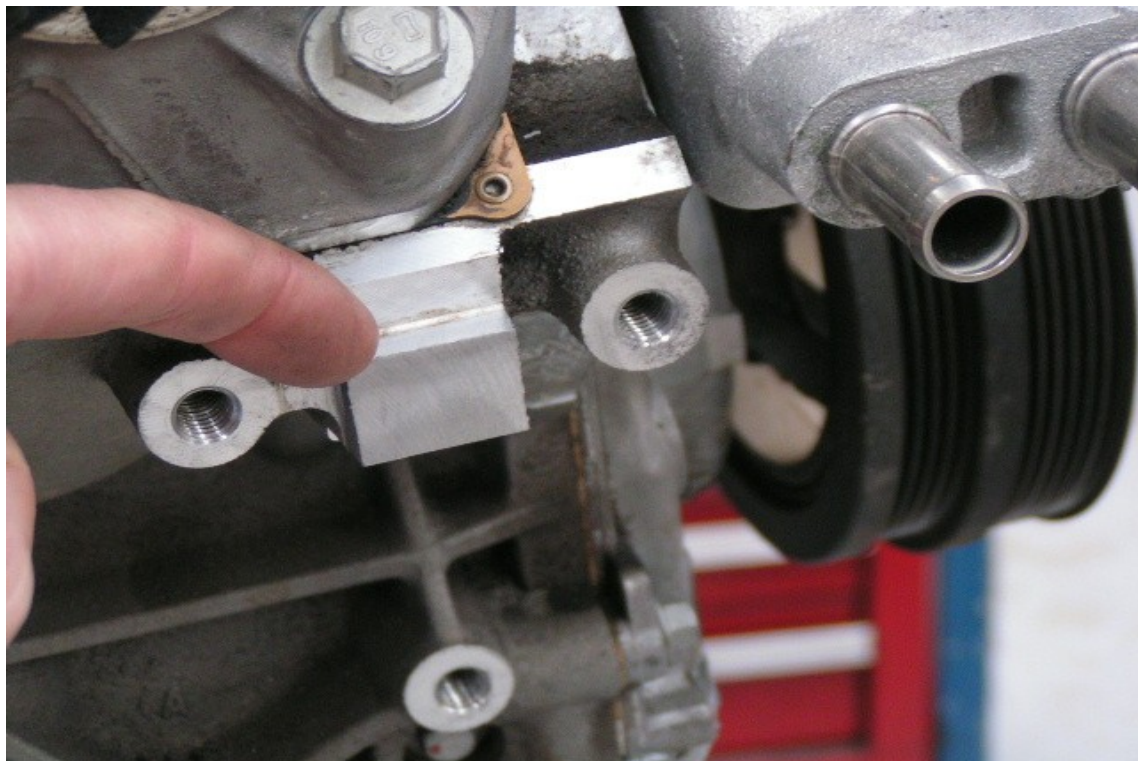
8. The truck style oil filter part number is GM 89017524 (AC Delco PF48), it uses a larger thread to hold it in place. If you don't want to use the truck type filter you can replace the threaded boss in the truck sump with the one from the Holden sump.
9. The heat shield on the starter motor will need to be modified to allow the dipstick tube to be fitted in its new location. The rear corner needs to be cut off. See the photo below.



#### **Engine completion.**

1. To fit the re-machined air conditioning bracket the bolts will need to be cut down by 5mm. See next photo.
2. The engine block has a small machined section which slots into the back of the air conditioning bracket. This section will need to be cut down by 5mm to allow the re-machined bracket to fit properly. See the photo below. **NOTE:** Some late model Gen3 and Gen4 engines require a section under the square pad to also be ground away.



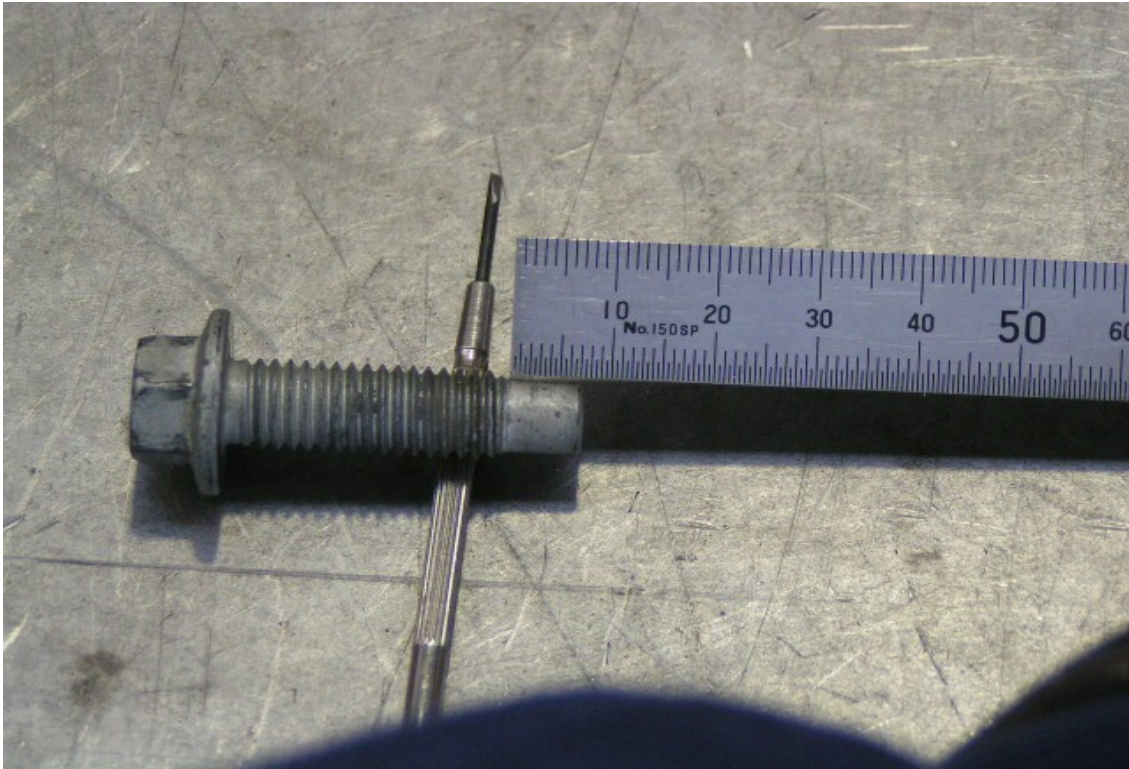






3. The A/C compressor mounting bolts will also need to be shortened by 5mm. See the following photo.





4. The A/C belt tensioner will also need to be modified. Grind away the small section of casting around the end of the tensioner spring. See photo below.

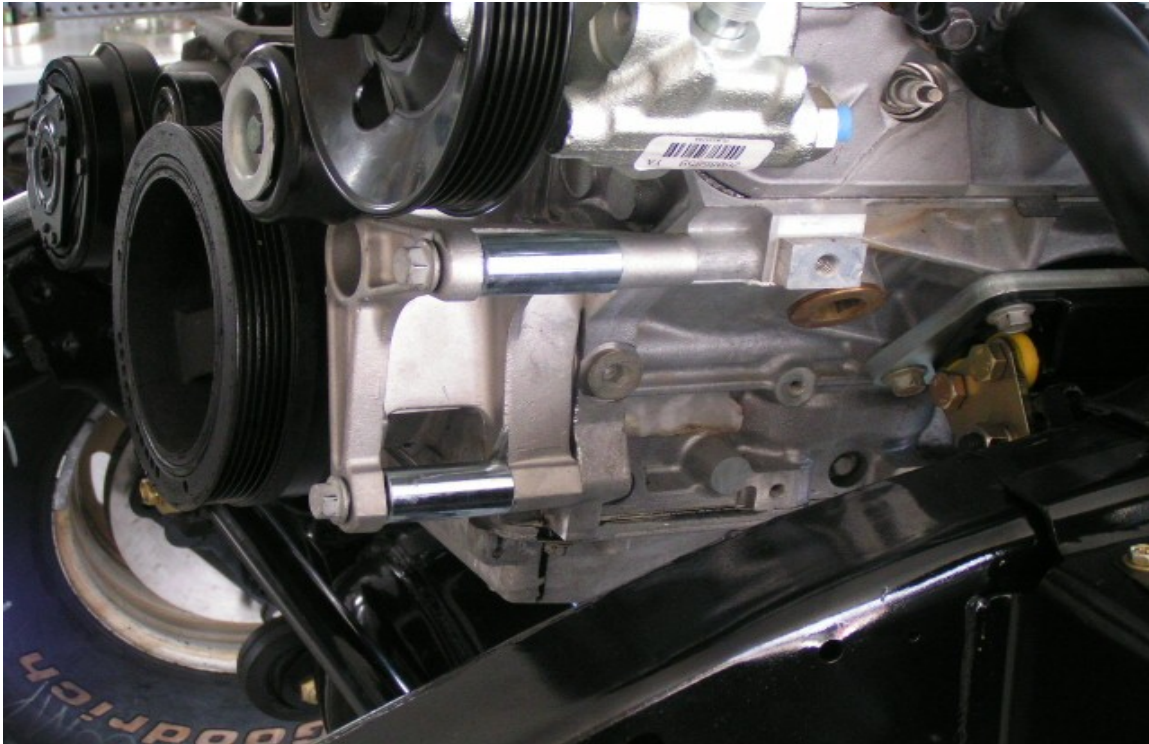


### Alternator Relocation



The alternator is relocated to the top of the engine to help obtain chassis clearance for the A/C compressor fittings on the other side of the engine.

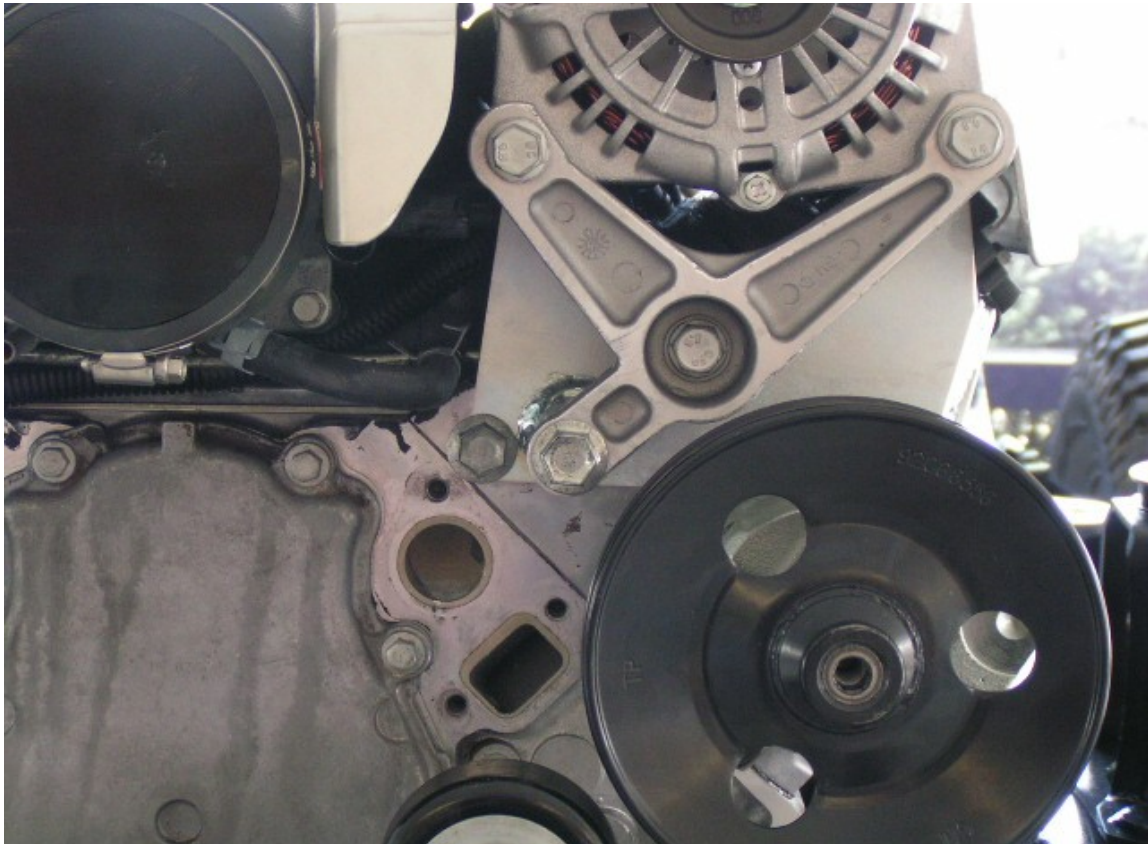
1. Remove the alternator and the stay bracket fitted between the block and the alternator. NOTE: One of the bolts will be required to hold the new alternator bracket to the front of the engine.
2. Fit the two 51mm long spacers supplied in place of the alternator and secure then using the original alternator bolts. See the following photo.



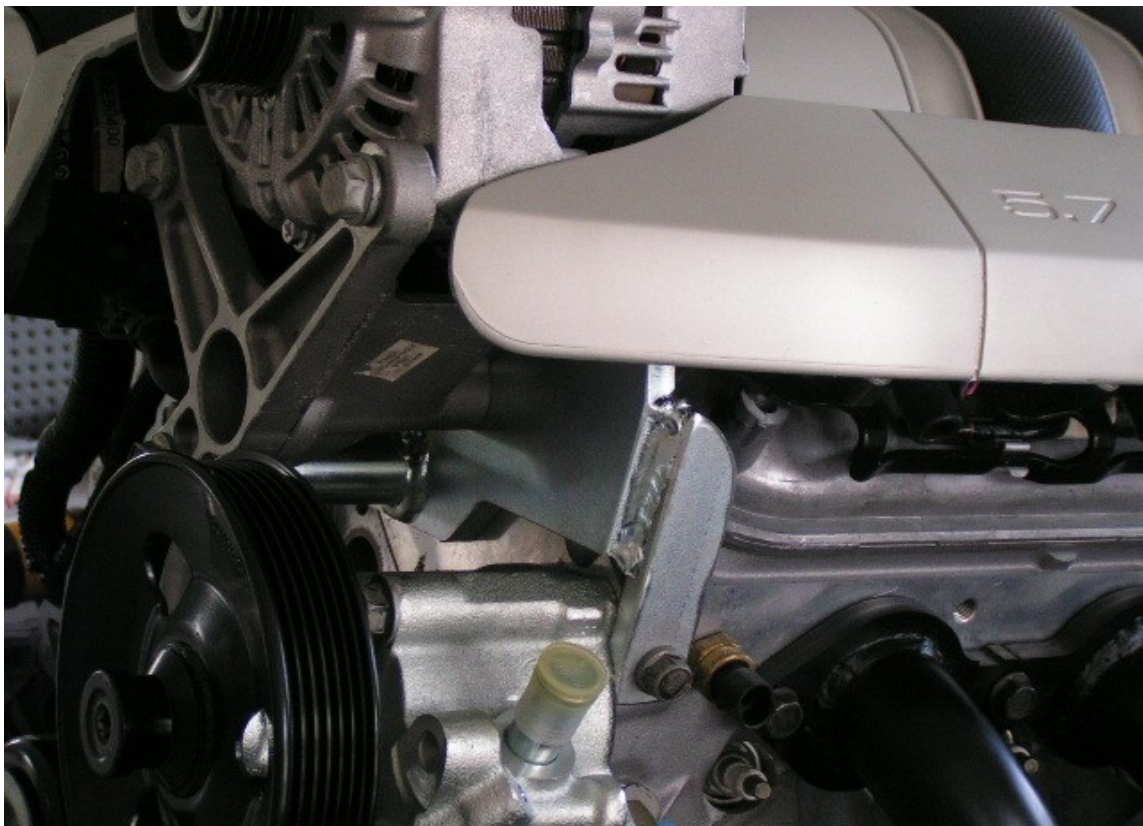
3. Remove the power steering reservoir and hoses.
4. Remove the power steering/lifting bracket from the front of the left hand cylinder head. NOTE: The bolts will be required to hold the new alternator bracket to the front of the engine.
5. Fit the new steel alternator bracket along with the re machined aluminium alternator bracket to the front of the left hand cylinder head. Secure them using the M10x1.5x90 and the M10x1.5x25 long bolts, flat washers and spring washers supplied in the kit. Also use the two bolts previously used to secure the lifting bracket. See the next two photos.
6. The 6ltr engine in the photo below has had the purge vacuum hose reversed, (swapped end for end) to clear the alternator bracket.



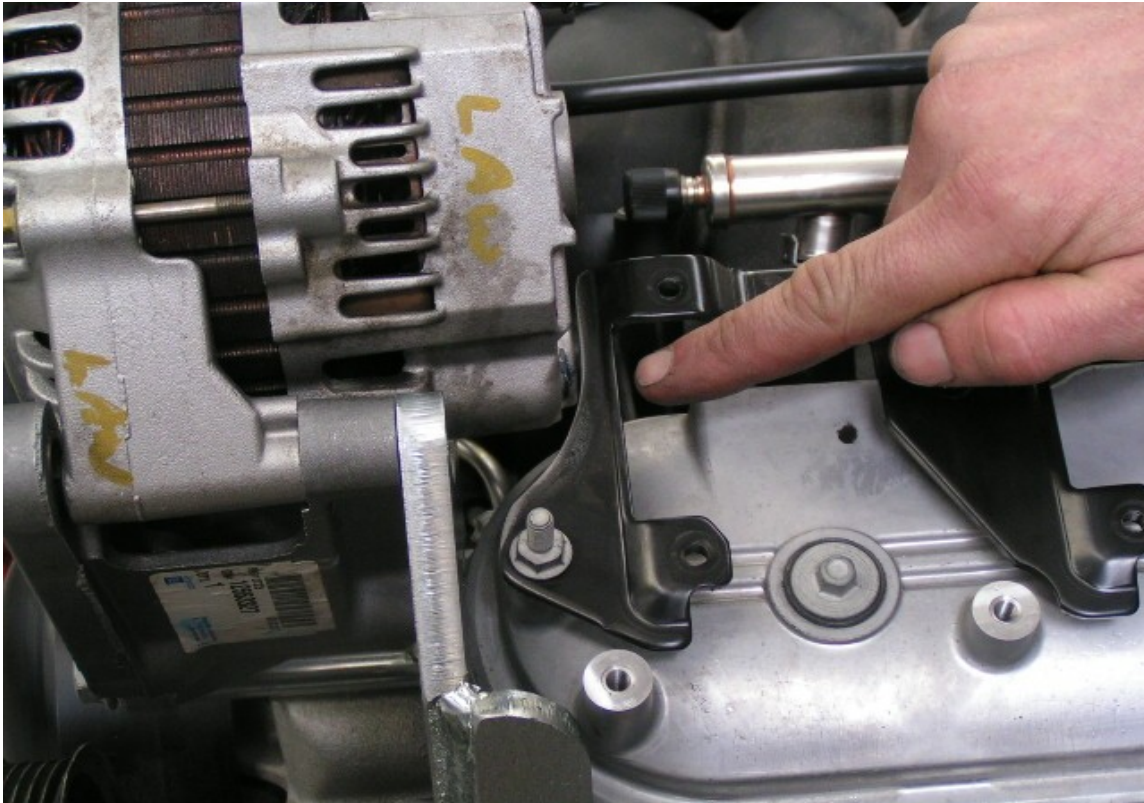
7. The coil pack bracket will need to be modified to allow for clearance behind the alternator. See the following photo's.
8. Fit the alternator using the two M10 bolts, nuts, spring and flat washers supplied in the kit.











### **Water Pump Pulley**

The new water pump pulley is designed to accept a reverse rotation fan and viscous coupling as supplied in the kit.

1. Remove the water pump from the engine.
2. Using a hydraulic puller, remove the pulley. **Note:** You will most likely need to heat the pulley over the shaft. Have a wet rag on hand to cool the shaft when the pulley is off.
3. Remove the cover on the back of the water pump exposing the impeller. Using a press while supporting the impeller shaft press the new pulley all the way onto the shaft. **Note: 1** Make sure you don't press on the impeller as this can bend it out of shape causing it to rub on the housing. **Note: 2** Do not press directly on the small spigot end of the pulley as this can easily distort the shape of the end making it impossible to fit the viscous coupling.
4. Reinstall the rear cover on the pump. Depending on the condition of the o'ring you may need to apply some silicone sealer to the faces.
5. Reinstall the water pump onto the engine. Depending on the condition of the gaskets you may need to apply some silicone sealer to the faces.



### **Main Drive Belt**

6. Fit the drive belt as per the photo below.



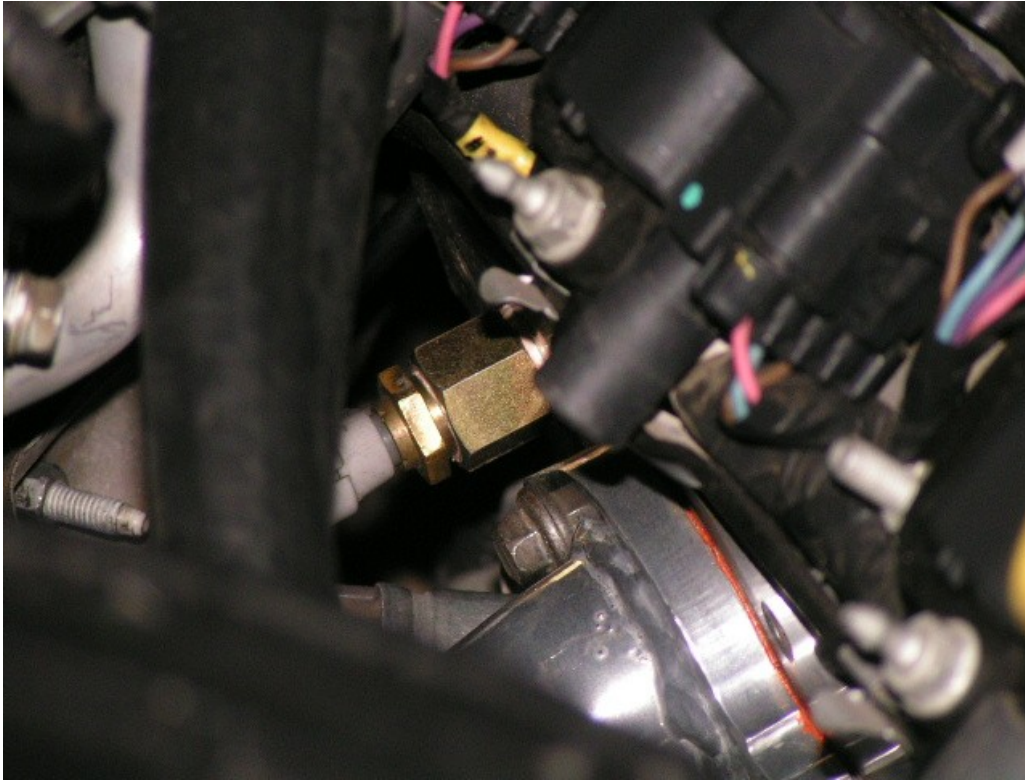


### **Water Temp & Oil**

11. Remove the socket head cap screw located in the driver side cylinder head at the rear. Fit the water temperature adaptor and the original vehicle sender. **Note:** If your sender is too big for the adaptor you will need to purchase the correct one from Toyota, part number 83420-16040. **See photos below.**







12. Remove the original GM oil pressure switch. Fit the oil pressure adaptor in its place. NOTE: Use the copper washer supplied in the kit to help with correct orientation of the Toyota oil pressure sender. The original GM oil pressure switch is not used. **NOTE:** Use Teflon tape or liquid Teflon as required. **See photo below.**





13. Remove the exhaust manifolds.
14. Tape over the exhaust ports to prevent any contaminants from entering the cylinders.

### **Toyota Engine Removal**

1. Remove the bonnet from the vehicle and tie back the hinges.
2. Disconnect and label all the hoses and wiring attached to the old engine.
4. Remove complete exhaust system from vehicle.
5. Drain the radiator and engine of all fluids.
6. Remove the radiator from the vehicle.

### **B.** **1F, 2F, and early 3F fitted with the one-piece cast iron bellhousing.**

1. Remove the bellhousing cover plate.
2. Remove the slave cylinder.
3. Undo the front engine mounts.
4. Support the transmission with a jack and remove the gearbox to bellhousing bolts.
5. Undo the side bellhousing mounts. **NOTE:** This applies to pre 08/80 vehicles only.
6. Remove the slave cylinder from the side of the bellhousing.
7. Remove the engine and bellhousing assembly from the vehicle using suitable engine lifting equipment.
8. Remove the Land Cruiser clutch.
9. Remove the flywheel.
10. Remove the bellhousing from the engine.
11. Remove the oil pressure and water temperature senders from the Toyota engine.

### **C.** **3F fitted with the Two-piece aluminium bellhousing and cast iron sandwich plate.**

1. Undo the front engine mounts.



2. Support the transmission with a jack and remove the bellhousing bolts.
3. Remove the engine and bellhousing assembly from the vehicle using suitable engine lifting equipment.
4. Remove the Land Cruiser clutch.
5. Remove the flywheel.
6. Remove the sandwich plate from the engine.
7. Remove the oil pressure and water temperature senders from the Toyota engine.

**D.**

**Transmission and Adaptor Kit Preparation**

1. Remove the thrust bearing and carrier from the front of the gearbox.

**Refer to diagram A for the next step.**

2. Assemble the thrust-bearing carrier by first fitting the lock nut (4) onto the carrier (2) then screw the carrier into the sleeve (5).

1. If your vehicle is fitted with the **pressed metal thrust-bearing carrier and fork** remove the spring clip from the carrier.
2. The new carrier (2) has a groove machined in the back, sit the clip in the groove.
3. The bearing blocks (1) are then used to secure the spring clip. Fit the bearing blocks (1) to the carrier (2) using the 4 x M4 counter sunk screws supplied in the kit. **NOTE:** Use loctite on the screws.





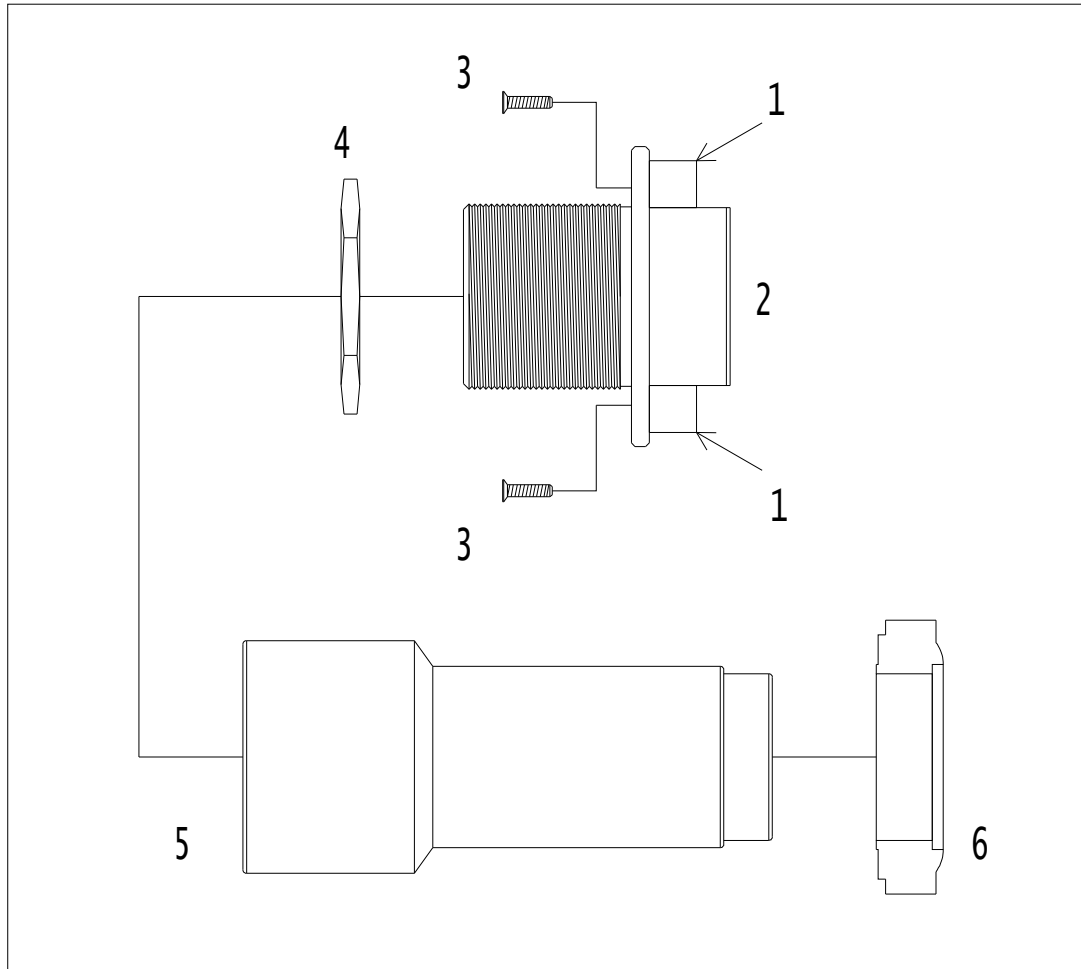


Slide the thrust bearing extension carrier through the inside of the adaptor housing. Ensure that the tube slides in and out of the adaptor housing with ease. If the thrust bearing extension tube is tight, you may need to clean any burs inside the housing with light emery paper.

3. Fill with grease the groove inside the middle of the adaptor housing and refit the thrust bearing extension tube.
4. Press the thrust bearing onto the front of the extension tube.
5. Fit the two 10-mm dowels (MFC197) into the gearbox end of the new adaptor housing.
6. Now is a good time to check the condition of the gearbox-input bearing and front seal. If faulty, replace them.

**Diagram A.**





**E.**

**1F, 2F, and early 3F fitted with the one-piece cast iron bellhousing.**

1. Fit the adaptor housing assembly to the Toyota petrol bellhousing using the original bolts.
2. Fit the bellhousing and adaptor assembly to the gearbox.

**Pre 08/80 vehicles.**

1. Fit the bellhousing rubbers and bolts but do not tighten them. This will make the engine mount set up procedure easier.

**Cast iron clutch fork**

3. Refit the clutch fork and retaining clips to the thrust-bearing carrier using the 2 clips supplied in the kit.
4. Refit the slave cylinder.
5. Using silastic or a suitable gap sealer, seal the slot between the adaptor housing and bellhousing. The slot is located on the driver side top of the housing. This hole was once used as the timing inspection hole.

**Refer to diagram B and C.**

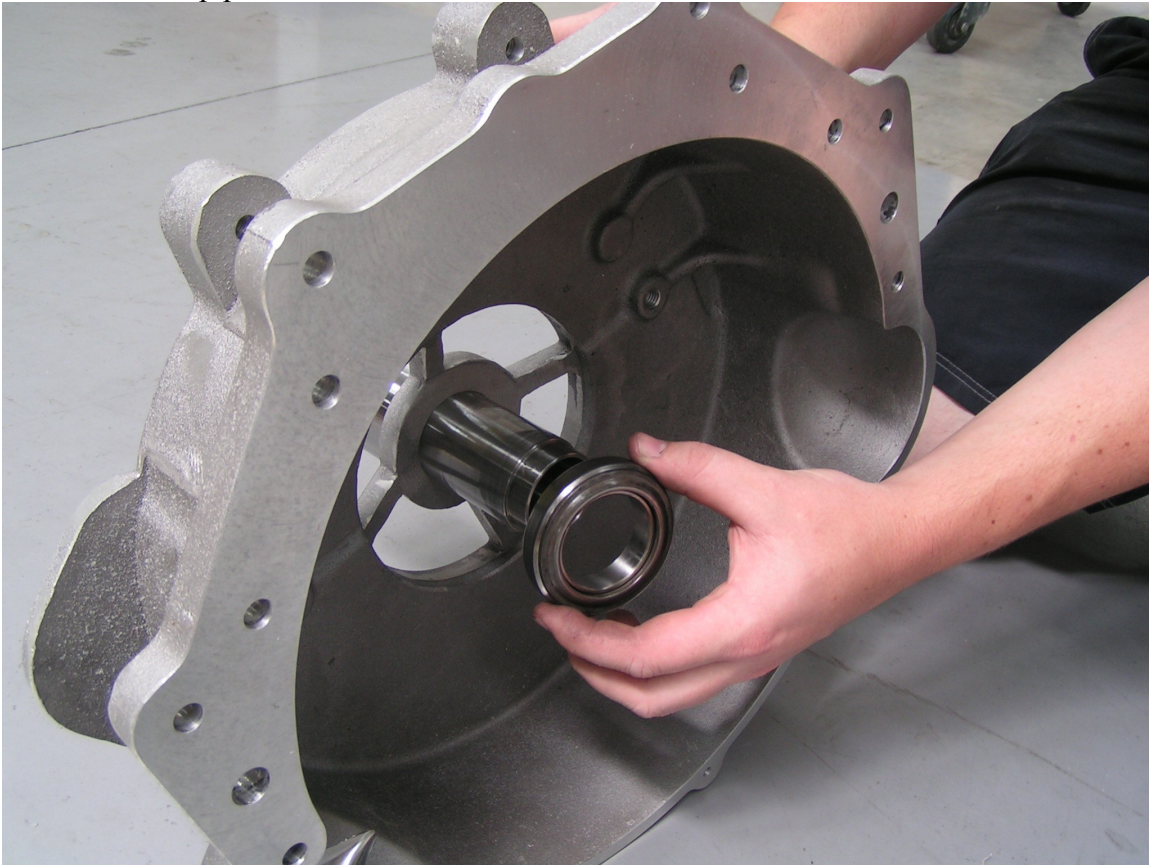


This operation requires the slave cylinder push rod and clutch fork to be fitted.

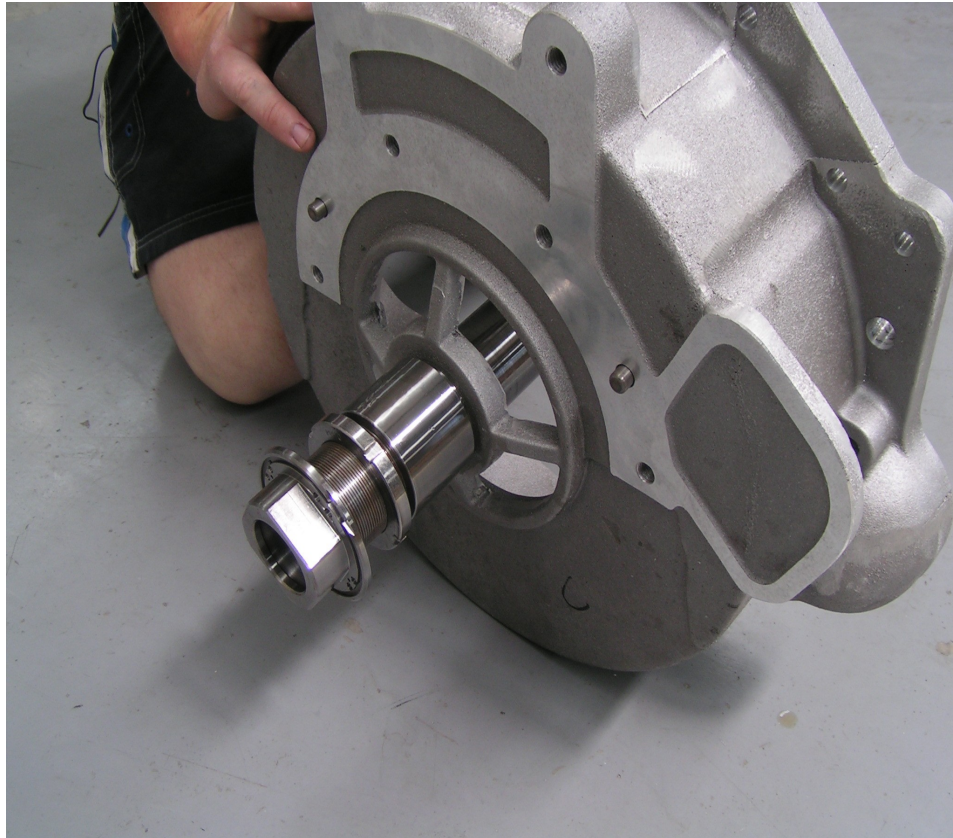
6. Push the thrust bearing and carrier as far back as it will go. Measure the distance from adaptor housing engine face (Dimension A) to the front of the thrust bearing.

This measurement should be 7mm,  $\pm 3$ mm greater than the distance measured between the engine rear face and the pressure plate fingers.

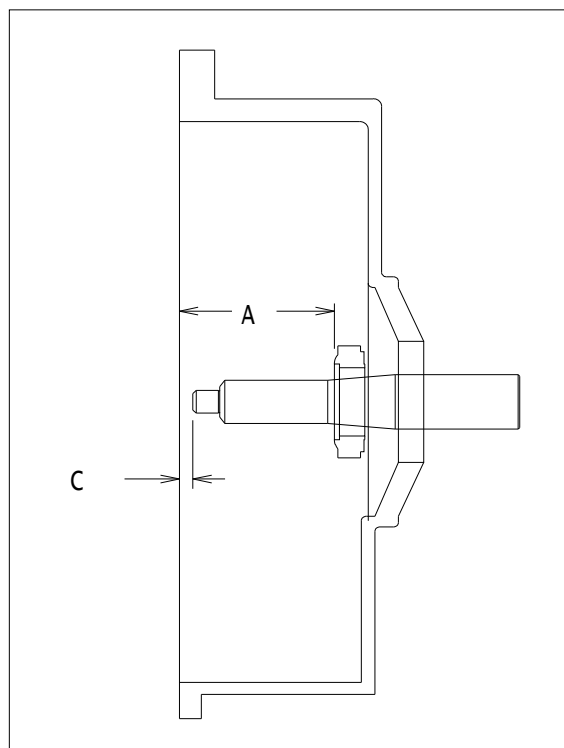
7. Do not fit the input shaft extension to the transmission. This will make the engine mount set up procedure easier.







***Diagram B.***





**F.**

**3F fitted with the Two-piece, aluminium bellhousing and cast iron sandwich plate.**

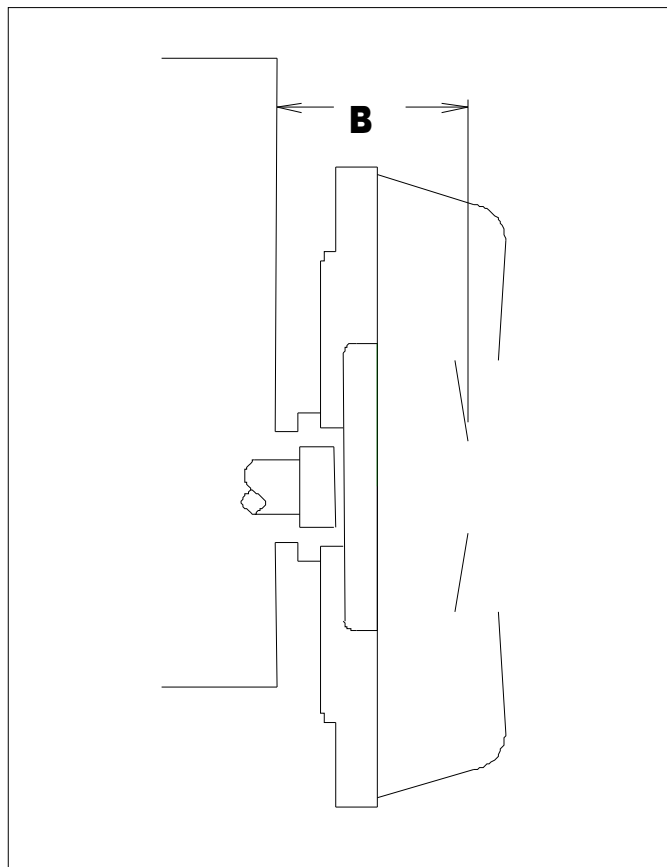
1. Fit the adaptor housing assembly to the sandwich plate using the original bolts.
2. Fit the sandwich plate and adaptor assembly to the gearbox.
3. Refit the thrust-bearing carrier retaining clips to the clutch fork.
4. Using silastic or a suitable gap sealer, seal the slot between the adaptor housing and bellhousing. The slot is located on the driver side top of the housing. This hole was once used as the timing inspection hole.

**Refer to diagram B and C.**

This operation requires the slave cylinder push rod and clutch fork to be fitted.

5. Push the thrust bearing and carrier as far back as it will go. Measure the distance from adaptor housing engine face to the front of the thrust bearing. This measurement should be 7mm,  $\pm 3$ mm greater than the distance measured between the engine rear face and the pressure plate fingers.
6. Adjust the length of the carrier to obtain the 7mm gap and then tighten the lock nut using the spanner supplied in the kit.

**Diagram C.**

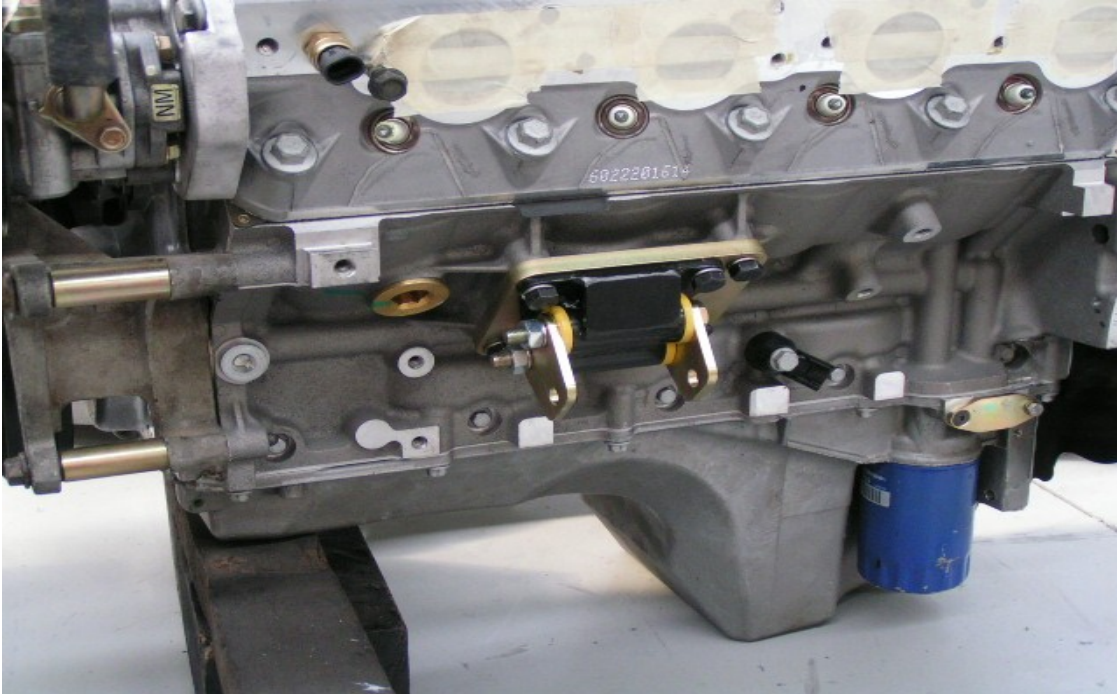


7. Do not fit the input shaft extension to the transmission. This will make the engine mount set up procedure easier.



### **Engine Mount Set Up**

1. Fit the engine mounting adaptor plates to the engine, secure them using the bolts and washers supplied in the kit. See the following photo.
2. Fit the engine mounting rubbers to the adaptor plates, secure them using the bolts supplied in the kit. See the following photo.







3. Lift the engine into the vehicle and secure it to the adaptor housing using 4 of the bolts supplied in the kit.
4. Fit the chassis mount towers to the rubbers, use the bolts supplied in the kit to hold them in place.
5. Sit the chassis bracket base plate over the chassis.
6. Adjust the height of the engine to enable the top edge of the tower to sit flush with the top of the base plate. See the following photos.
7. Tack weld the mounts into position.
8. Remove the engine and complete the welding.
9. Paint all bare metal sections.
10. Fit a 25mm bump stop extension to the front diff housing on the driver side. See the photo below.





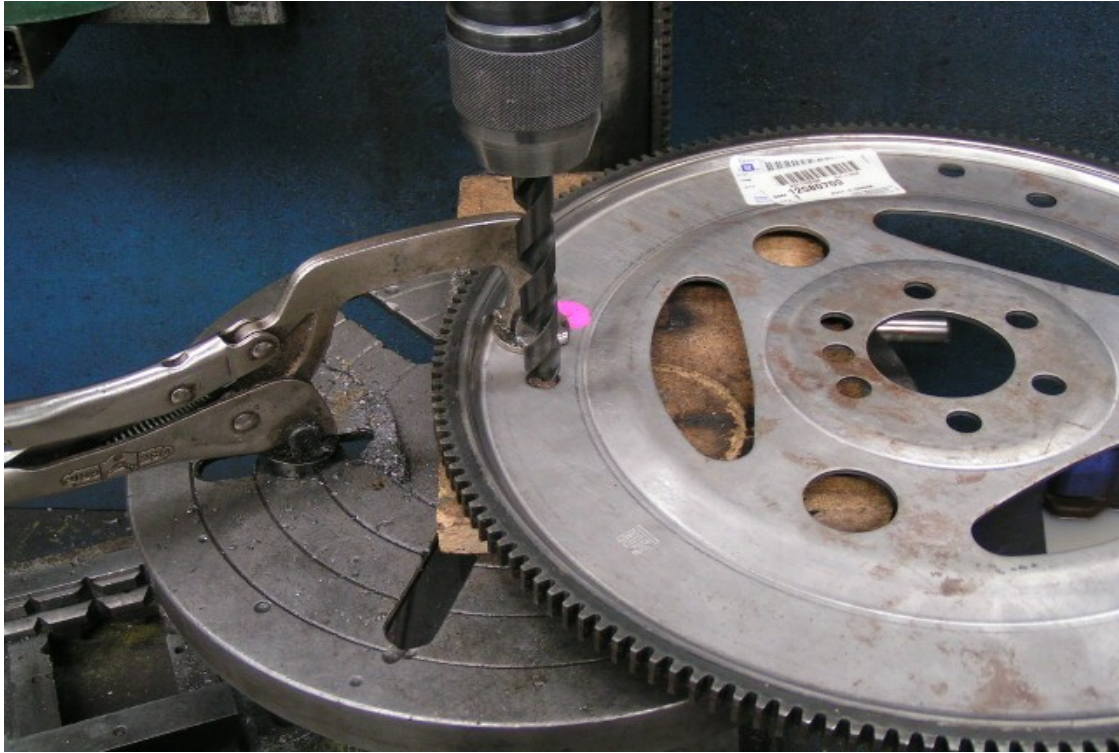




### **Final Engine Preparation**

1. Fit the spigot bearing adaptor and bearing supplied. **NOTE: 1** Use a large socket or a piece of pipe as a drift to fit the bush into the rear of the GM crankshaft this should prevent any burring of the adaptor ring. **NOTE: 2** The bearing and adaptor ring must be fitted as far forward as they can go.
2. Fit the flywheel cover plate to the back of the engine, make sure the hole for the starter is on the correct side.
3. Drill the slotted flexplate hole out to 13mm. See below:





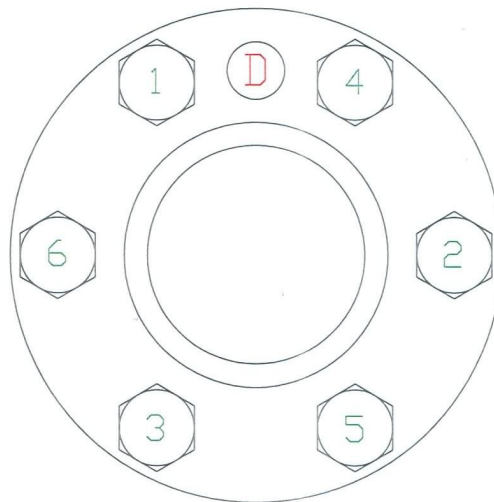
2. Fit the new flywheel to the GM flex plate. **NOTE:** Use the locating bung to align the two parts. Torque the bolts to 65-70ft lb



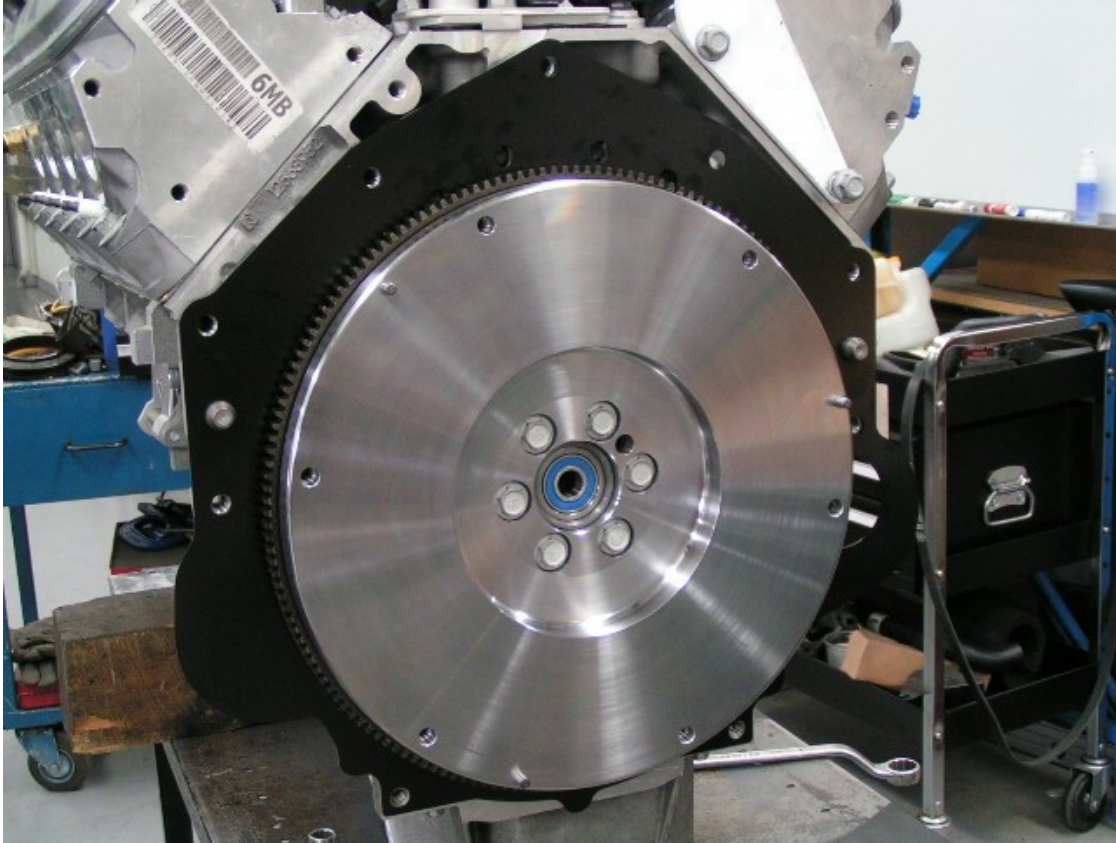




3. Fit the flywheel assembly to the engine and secure it using loctite on the bolts, and then torque to specification. The sequence is shown in the diagram below. This is done in two stages, the first stage is 50nm followed by 100nm.

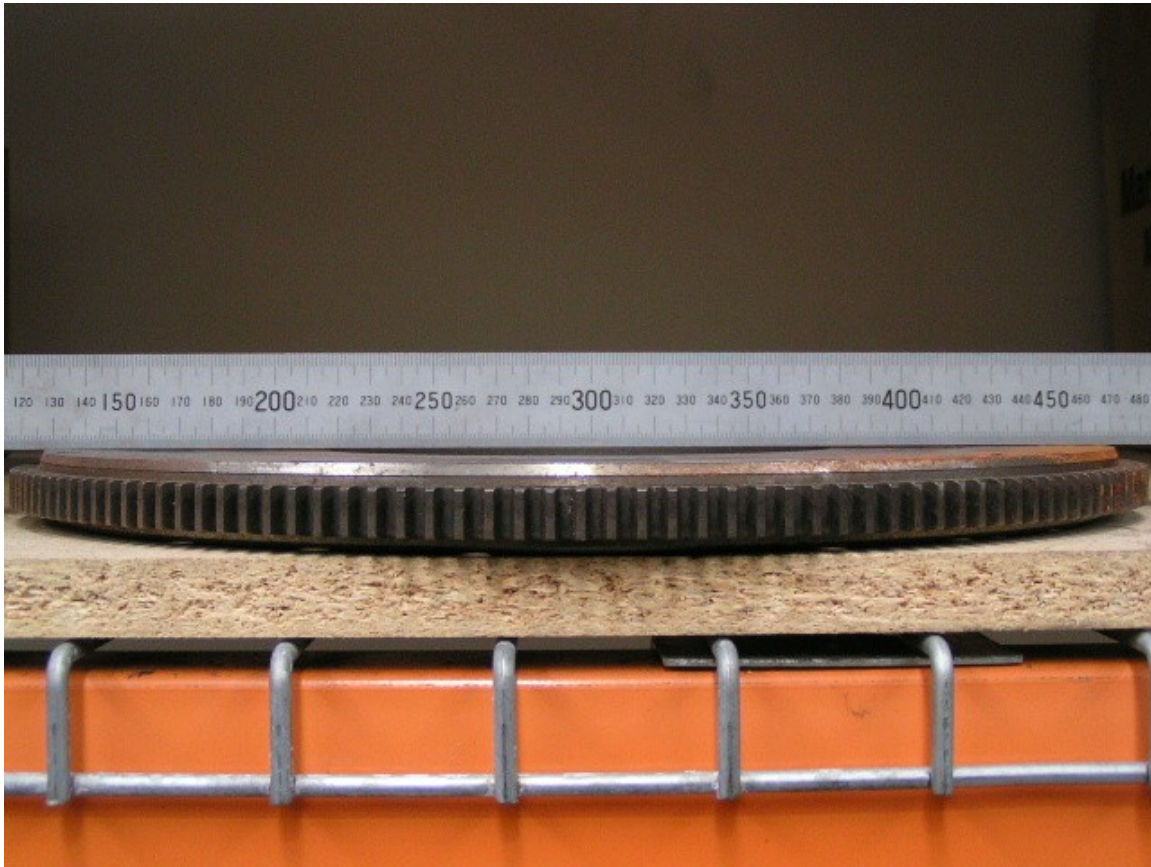






4. Fit the clutch assembly to the flywheel using the input shaft extension as a clutch aligning tool. **NOTE:** We only recommend the 11" heavy duty clutch Part No. MCK560HDG3 or the 11" extra heavy duty clutch kit with a cushion button clutch plate Part No. MCK560XHD for this conversion.
5. When using one of the above clutch kits the slave cylinder must be changed to a smaller bore as longer stroke is required for correct operation. The non genuine part number for the recommended slave cylinder is JB4065, this slave cylinder has a 19mm bore.
6. The following photo clearly shows a 2mm to 3mm bow in a genuine LS1 flywheel. This is the reason for not recommending its use in a 4WD.





### **Engine Installation**

**NOTE:** The bottom right hand engine bolt/SHCS in the adaptor housing is 70mm long some castings may need a small amount ground off them in order to fit this bolt/SHCS.

1. Put the gearbox into 4th gear and the transfer case into high range. Raise one of the rear wheels off the ground.
2. Guide the engine into place and rock the back wheel backward and forward to help with the gearbox spline alignment into the clutch plate. Once aligned secure the engine using the bolts, spring washers, and flat washers supplied.
3. Lower the engine over the engine mounting rubbers and tighten all of the bolts once aligned.
4. The engine is now sitting higher than the Toyota engine. This is to give the required legal sump clearance over the front diff. **NOTE:** A rear drop sump must be used for this conversion.



**For cast iron bell housings only.**

1. Fit the original Toyota cover plate to the underside of the Toyota petrol bellhousing using the original bolts.
  5. Check the Hi-Low lever for correct operation, a small bend in the lever may be required to clear the hole in the floor.
  6. Modify the radiator spouts to correspond with the new engine outlets.
  7. Fit the heater and radiator hoses.
  8. Connect the power steering pump and air-conditioning compressor if required.  
**NOTE:** Hoses will need to be modified or manufactured.
  9. If you plan on using a different grade fuel, drain the fuel tank and fuel lines.
  10. Put 20 liters of the correct fuel into the tank.
  11. A surge tank and an external fuel pump are required to lift the fuel from the tank. Our part number for the surge tank is MFK1410.
  12. An external high pressure EFI fuel pump is then used to transfer the fuel to the engine via a EFI fuel filter and a fuel pressure regulator. The part number for the high pressure fuel pump is MFK255EFIPE. The mounting bracket kit for the pump and filter is MFK683NP, the fuel pressure regulator part number is MFKG3FPR.
  13. Complete the wiring. Various interface harnesses are available, call for details.
  14. Fit the headers, our part number MFH1790.
  15. Complete the exhaust system. **NOTE:** Heat shields must be fitted to the exhaust system to prevent excessive heating of the engine mounting rubbers and clutch slave cylinder and brake pipes. Failure to do so will cause premature engine mounting failure and possible clutch or brake failure.
  16. Check all fluid levels.
  17. Double check all mounting bolts are tight.
  18. Start engine and check for-
    - Fuel leaks.
    - Oil leaks.
    - Water leaks.
    - Exhaust leaks.
- Allow the engine to warm up and recheck above.



19. Refit the bonnet.

The components supplied in the kit are designed for specific type conversions. Modifications to any components without the written consent from Marks 4WD Adaptors will void any possible warranty or return privileges. Should you have any further questions that are not covered in the instruction sheet, please contact our sales department for assistance.

***Proudly Manufactured by:***

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