

21/02/12



FITTING INSTRUCTIONS FOR
MFK605G3ZD30A
CHEVY GEN3, GEN4 V8
TO
NISSAN PATROL ZD30 AUTOMATIC

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 and new engine, for specific torque values, wiring diagrams and other related information.

Note: 1. Some transmission tunnel modification (panel beating) is required for clearance between the bellhousing and the firewall. The location for these modifications is over the top of the bellhousing down to the passenger side foot well.

Note: 2. When fitting a 6ltr engine you will need the accessories from a LS1 engine, the LS2 A/C compressor will not fit in between the engine and the chassis rail.

Note: 3. With this kit you are best to run the ZD30 manual crossmember & tail shafts, you can then run our bolt in engine mount kit (MFK1820ZD) & engine driven fan kit.

Engine Removal

1. Remove the bonnet from the vehicle. It is advisable that you mark the position of the hinges on the bonnet in order to aid alignment when refitting the bonnet once the conversion is completed.
2. Disconnect the battery cables and remove the battery/batteries from vehicle.
3. Drain the engine oil and coolant from the ZD30 engine and disconnect radiator and heater hoses attached to the engine.
4. Disconnect and label all wiring attached to the original engine. This will make it easier to identify wires at a latter stage.
5. Disconnect and remove the air intake hose and MAF sensor.
6. Remove the fan shroud and radiator.
7. **Air conditioning.** Call a specialist air conditioner service technician to evacuate the old gas from the system. Disconnect the air conditioning hoses from the compressor back to the condenser (pressure side) and back to the firewall (suction side).

7. **Power steering.** Disconnect the hoses attached to the power steering pump and tie them back to the body.
8. Remove the complete exhaust system from vehicle.
9. Undo the engine to transmission bellhousing bolts.
10. Undo the bottom engine mounting rubber nuts.
11. Support the transmission using a jack stand and remove the complete engine assembly using suitable engine lifting equipment. Do not discard the old engine as some parts are still required for the conversion.
12. Remove the oil pressure sender and water temperature senders from the ZD30 engine.

EFI in Tank Fuel Pump

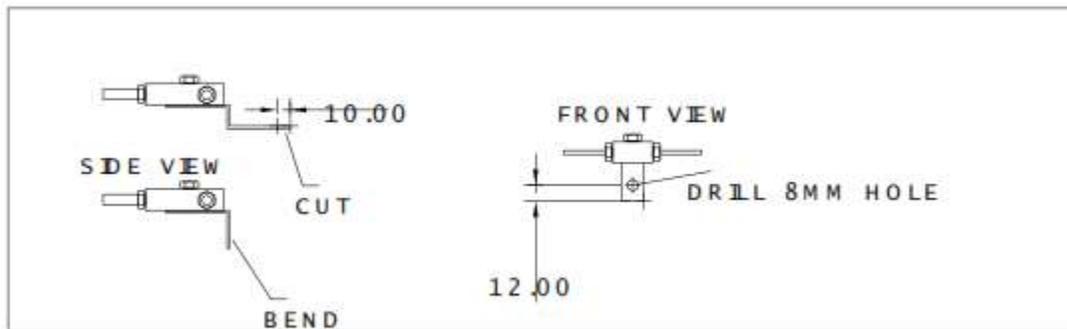
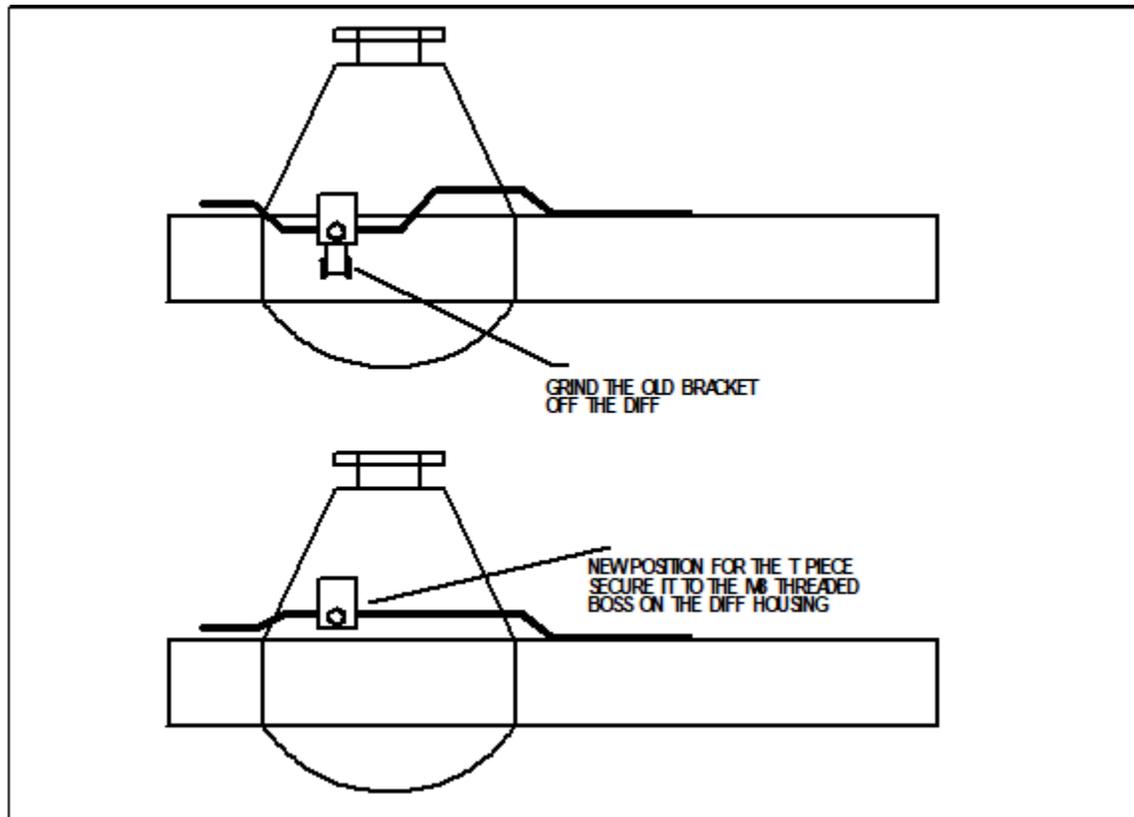
NOTE: You will need to purchase a Nissan EFI 4.5ltr or 4.8ltr GU in tank fuel pump sender complete either used or new. The Nissan pump is not required so a complete used one would be perfect.

1. Fit the 255ltr per hour High pressure pump in place of the used Nissan EFI pump. See the following photos.
2. Retain the Nissan fuel pump locating rubber fitted on the bottom of the pump. Place a large cable tie around the rubber and lower section of the pump to keep all parts retained.
3. Drain the fuel tanks and fuel lines of diesel.
4. Remove the main fuel tank.
5. Remove the fuel sender/pickup.
6. Fit the new EFI fuel sender/pump assembly into the tank. **NOTE:** Inspect the oring seal for damage and replace it if required.
- 7.

Brake Pipe to Engine Mounting Clearance

NOTE: *Not all Nissan Patrols are fitted with this type of bracket, check all engine, sump and starter clearances with the front springs removed.*

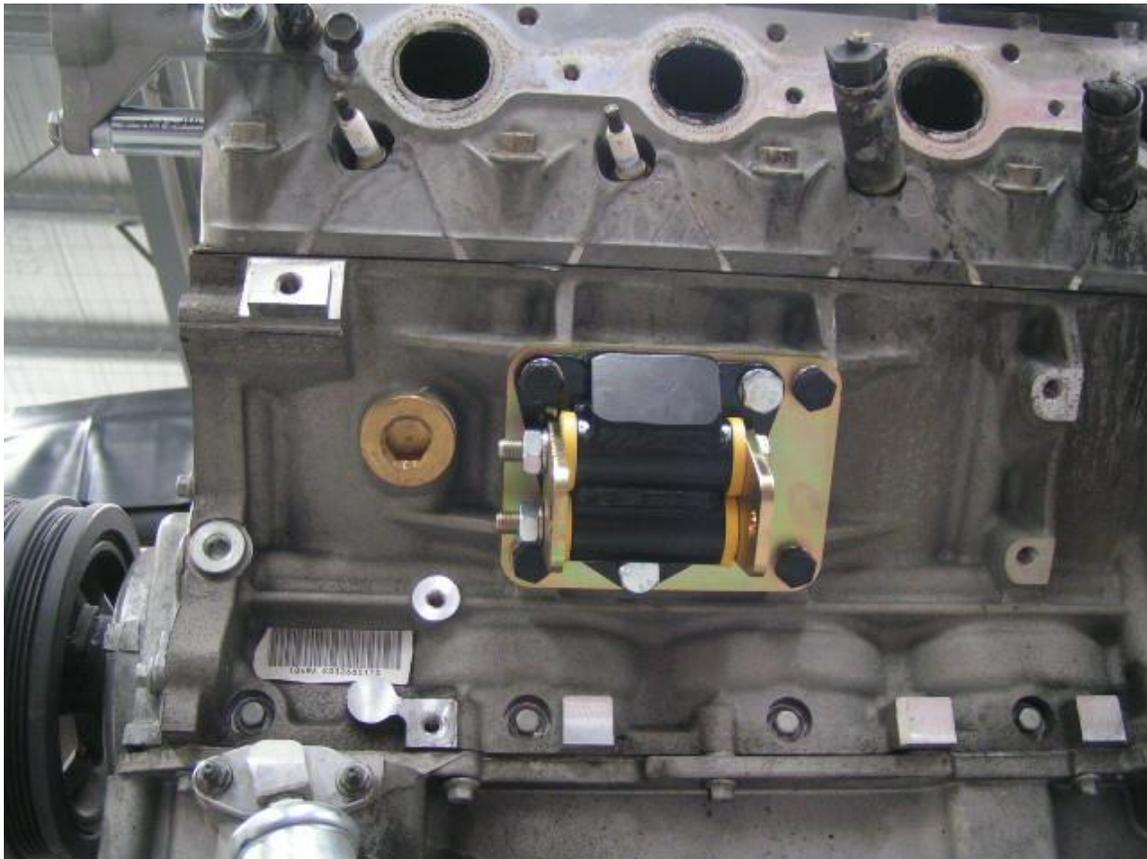
1. Remove the brake block bracket with a small grinder.



2. Cut 10mm off the original bracket. *Refer to diagram*
3. Bend the bracket down by 90 degrees. *Refer to diagram*
4. Drill an 8mm hole in the bracket. *Refer to diagram*
5. Using a M8 X 12mm bolt, fix bracket to vacant mounting block and bend the pipes to follow closely the shape of the diff housing.

ENGINE MOUNTINGS

1. Remove the exhaust manifolds.
2. Remove the alternator.
3. If your vehicle is not fitted with after market suspension you will most likely need to fit the new engine sump prior to installing the engine mount, see the following instructions if required.
4. Fit the engine mount base plates to the engine block with the rebuildable engine mount rubbers. The rubber mount should be located with the single bolt on the base at the bottom in line with the taped hole in the base plate. The front (engine front) top bolt hole in both the base plate and rubber are secured to the block using the M10x1.5x30 bolts supplied. All of the base plate to engine bolts are M10x1.5x30, the taped base plate holes accept the M10x1.5x20 SHCS (socket head cap screws). See the following photo.



5. Lower the engine into the vehicle and attach it to the transmission using two bolts only, one per side near the engine dowels.
6. Position the engine on the new chassis brackets, the driver side chassis bracket is the longer of the two, use the two 7/16"x4" bolts nuts and spring washers supplied in the kit. Position the engine as far to the passenger side as possible to allow the A/C compressor hose outlets to clear the chassis. Compressor to chassis clearance should be at least 16mm.
7. Position the new chassis brackets so that the top plate is sitting on the folded edge on top of the chassis, then tack weld the vertical faces to the chassis. See the photos below.





8. Remove the engine and complete the vertical welding.
9. Heat the top plate and bend it down flush with the top of the chassis. See the photo below.

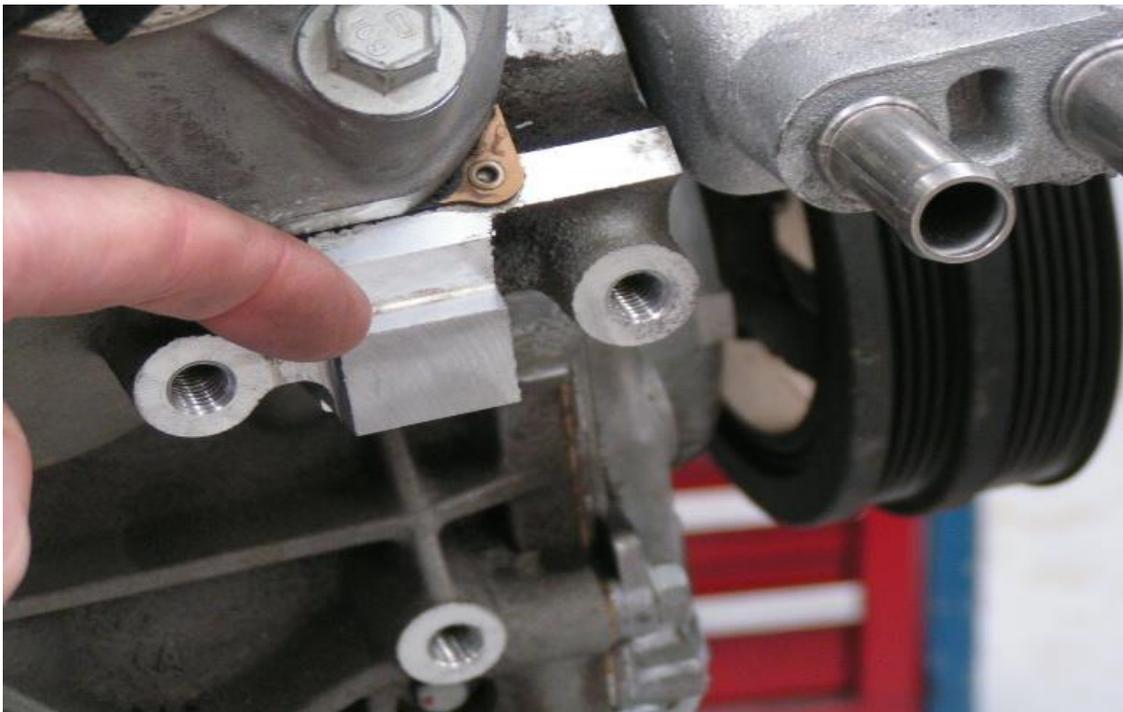


10. Complete the welding.

11. Paint the welded area.

Engine Accessory Mounting.

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.



1. 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.



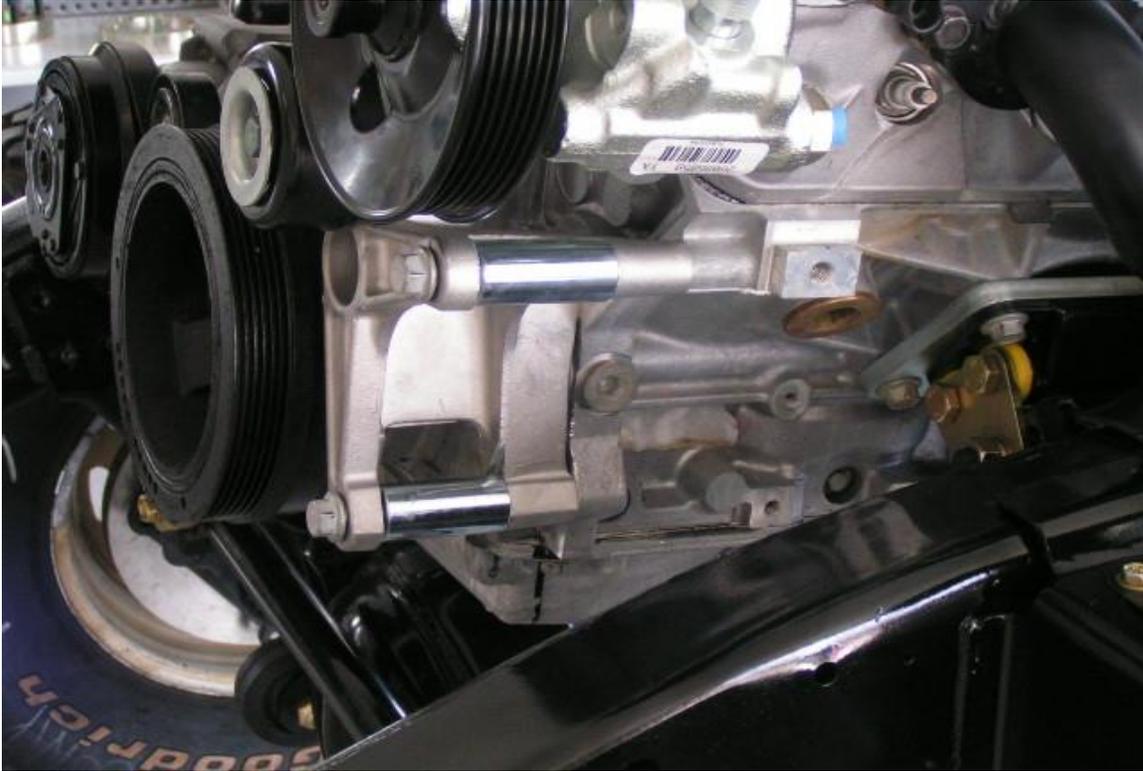
2. Remove the M10 stud fitted in the A/C compressor, a new M10 SHCS is supplied in the MFK1837 A/C hose kit. The stud is removed as the A/C hose manifold can not be removed from the compressor when the engine is fitted. See the photo below.



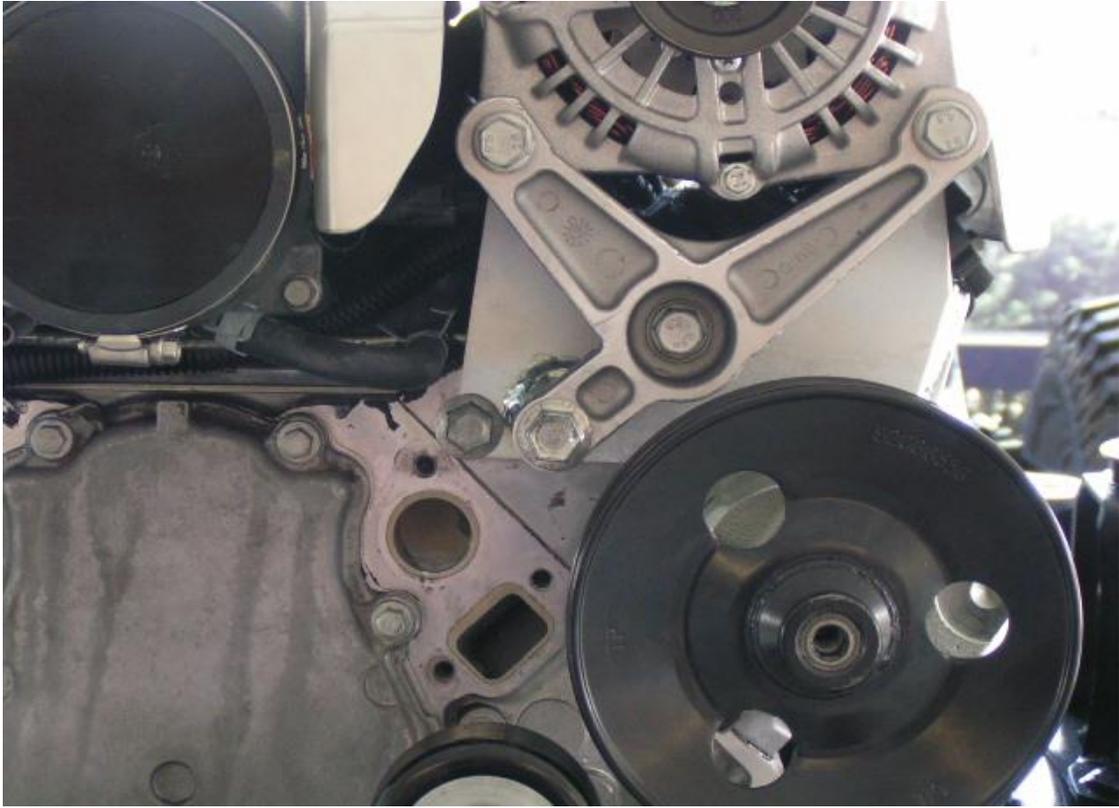
Alternator Relocation

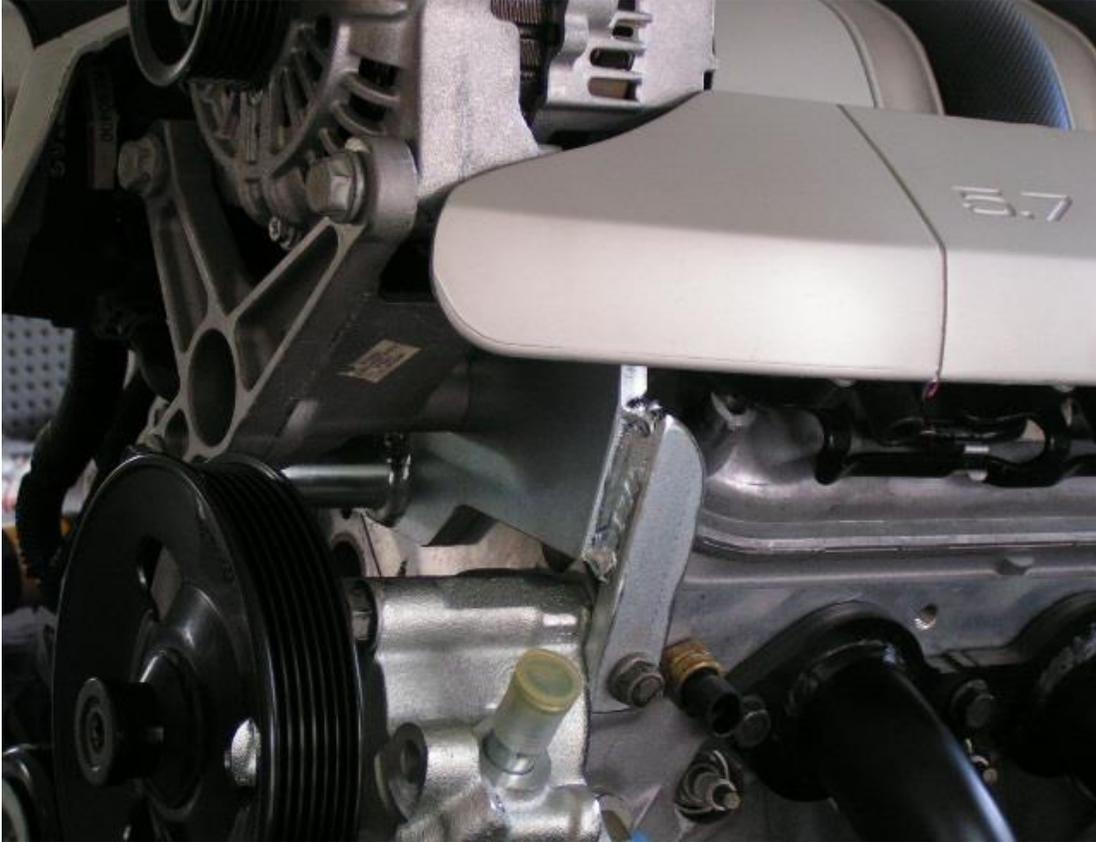
The alternator is relocated to the top of the engine to help obtain chassis clearance for the A/C compressor fittings on the other side of the engine.

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 them using the original alternator bolts. See the photo below.



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.





Water Pump Pulley

The new water pump pulley is designed to accept the reverse rotation fan and fan clutch from a Holden Rodeo V6 3.2ltr Part Number 8971303621 .

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 directly 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 hollow spigot end of the pulley as this can easily distort the shape of the end making it impossible to fit the viscous fan clutch.
4. Reinstall the rear cover on the pump. You may need to apply some 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.

Engine Sump Modifications

No standard Chevy or Commodore sump will fit without modifications, you must use a modified Chevy truck style as its design is best suited for off road vehicles.

Note: The following instruction assumes you have purchased one of our modified truck sumps.

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.



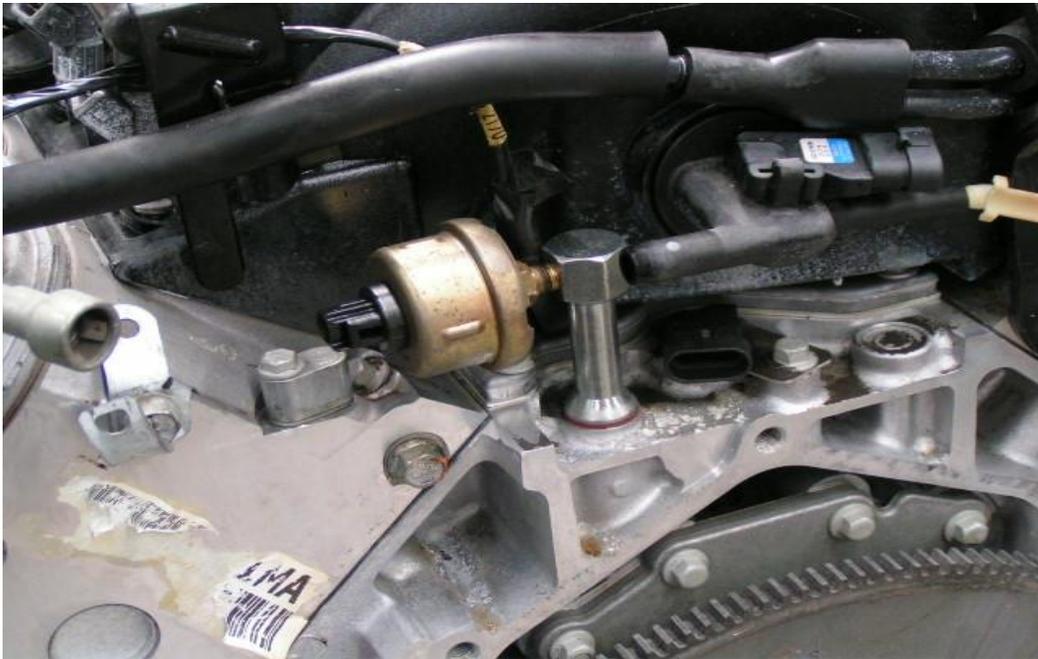
2. The windage tray will need to be modified to allow for the new pickup bracket position. See photo. **Note:** Some sumps are supplied with a new windage tray, if this is the case, fit the new tray using the original bolts and nuts.
3. The Commodore windage tray will also need to be modified in the position pointed out in the 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.



4. Before fitting the modified engine sump and pickup you must take the following step.
5. 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.
6. Fit the modified oil pickup.
7. 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 bolts. ***NOTE:*** Use a straight edge to get the back face of the sump flush with the engine block.
8. 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 of. See the photo below.
9. The Commodore dip stick needs to be modified to allow for the deeper sump. Fill the engine with 6ltrs of engine oil. And then adjust the length of the stick to indicate the engine is full. ***Note 1:*** 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. ***Note 1:*** Some of our engine sumps are supplied with the correct length truck type dip stick and tube, if so fit it and modify the mounting lug to suit.
1. 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.



11. Fit the Nissan water temperature sender in the adaptor and then fit the assembly into the driver side rear cylinder head. **NOTE 1:** The adaptor is supplied with a copper washer and should be fitted, you should also use thread sealer. **NOTE 2:** The water temp sender on the left hand front cylinder head is used by the engine PCM.
12. Fit the oil pressure adaptor in place of the original GM sender located behind the intake manifold. Note: the GM sender is no longer required. Use thread sealer with the copper washer supplied in the kit. **See photos below.**



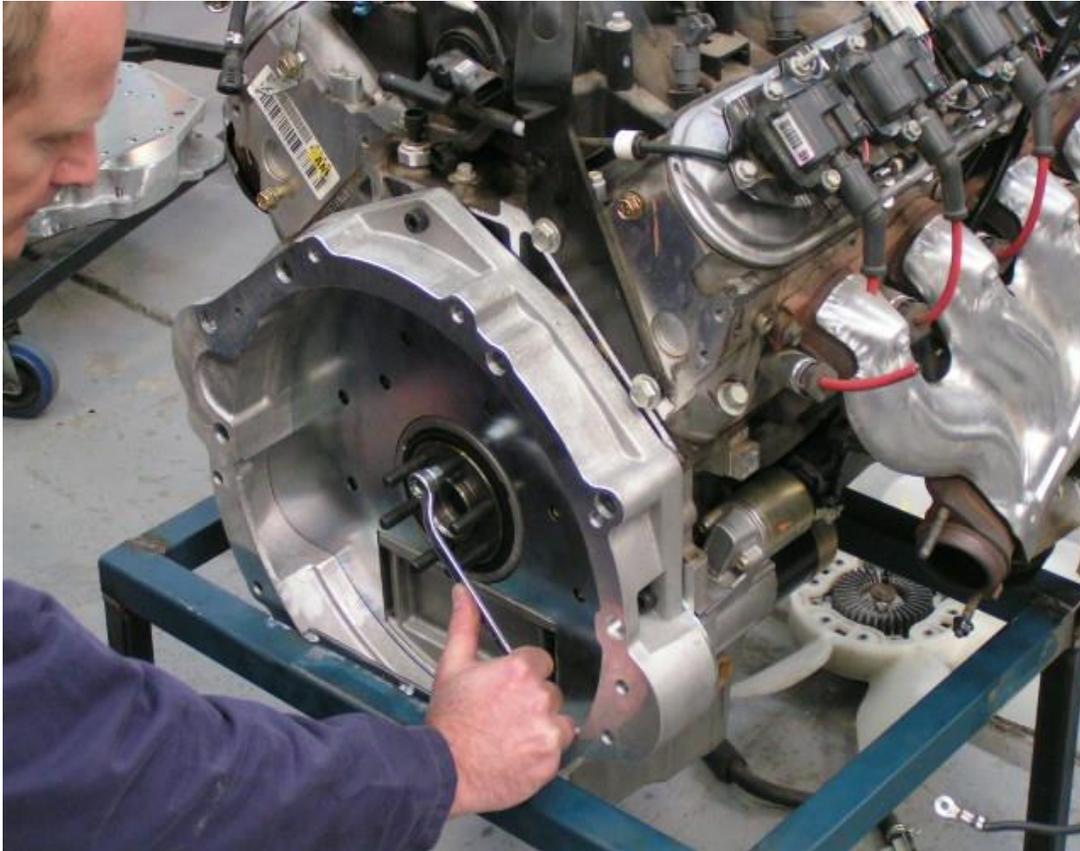
1. Fit the starter motor and seal up any gaps with silastic, this will prevent any water or mud from entering the clutch, which can cause premature failure.

Adaptor Kit Preparation

1. Remove the Chevy flex plate or flywheel if fitted.
2. Remove the Chevy spigot bearing if fitted.

3. Fit the flywheel cover plate to the back of the Chevy engine. The cover plate should fit snugly over the two Chevy dowels.
 4. Fit the adaptor housing to the back of the Chevy engine and secure it using the bolts supplied in the kit.
1. Fit the 9.5mm dowels in the rear of the adaptor housing. These dowels are supplied in the kit.
 1. Fit the M11 studs to the crankshaft, use loctite 262 on all threads. **NOTE 1:** Make sure you fit the studs the correct way around. The thread in the crankshaft is M11 x 1.5 and thread in the nuts is M11 x 1. **NOTE 2:** Do not use a stud remover on these studs as any burrs on them will make it impossible to fit the flex plate and crank adaptor. To fit the studs use 2 of the M11 x 1 nuts locked together on the stud, see the following photos.
 2. Torque the studs to 35 ft lb.





Flex Plate / Flywheel Preparation

1. Thoroughly clean the flex plate stiffener and crank adaptor as they may be shipped with rust preventing grease.
2. The GM flex plate has an elongated hole which needs to be drilled out to accept the M12 bolts that secure it to the flex plate stiffener. See photo below.



3. Remove all burrs around the flex plate holes. Also remove any burrs around the crankshaft holes.
4. Fit the flex plate to the back of the flex plate stiffener. For correct alignment use the tool supplied in the kit. See photo next page.
5. Secure them using the 3 x M12 x 20 bolts and M12 spring washes supplied in the kit. Use loctite 262 on the threads and torque to 88nm/64ftlb. See next photo.

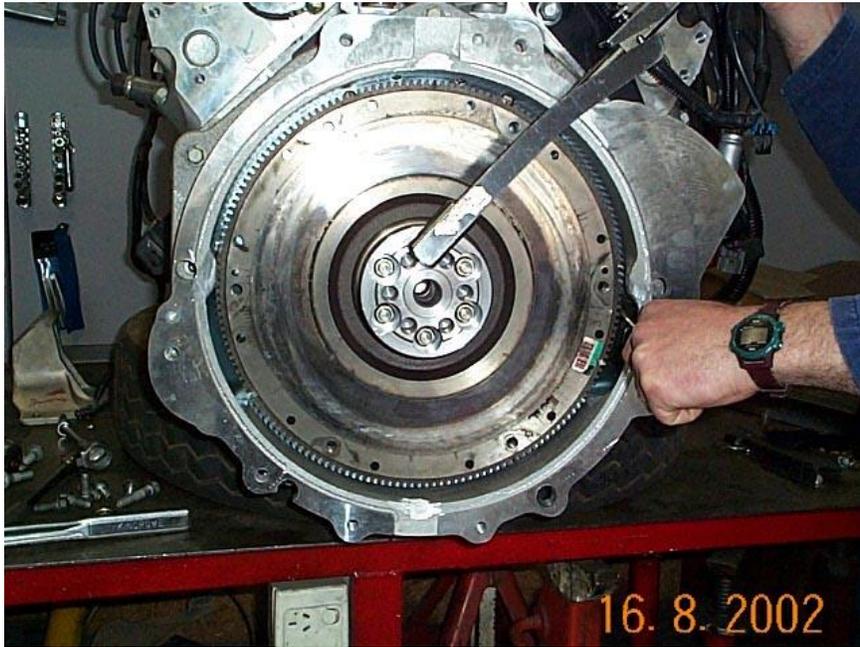


ENGINE PREPARATION

1. Fit the new studs in the crankshaft with the flywheel in place and use loctite on the threads. **Note:** To screw them in, fit two of the M11x1 nuts on the end of the stud and lock them together using two spanners, now use one spanner on the outside nut to do it up. Torque the studs to 35ft lb **See photos below.** **NOTE 2:** The following photo's show the engine as fitted with an original manual flywheel, the installation procedure is the same when fitting the flexplate and flexplate stiffener components.

1. Fit the new crankshaft adaptor over the studs and up to the rear of the flywheel/flexplate stiffener. Use loctite on the M11 nuts supplied. Torque to specification 55 to 60ftlb or 75 to 80nm.

CHECKING CRANK ADAPTOR RUN OUT



1. By using the rear block surface as an accurate reference point, check that there is no excessive run out on the rear most edge of the new crank adaptor. If you do have excessive run out (more than 0.005") you will need to remove the crank adaptor and rotate it 180 degrees and recheck the run out. **Refer to photo.**

2. If everything checks OK so far, bolt the original Nissan flexplate and torque converter spigot locator to the rear of the new crank adaptor using loctite on the original bolts. Torque the bolts to specification 70ftlb or 95nm. **NOTE 1:** The spacer is located behind the flexplate between the crank and flexplate. Nissan use this spacer to locate the torque converter spigot to the crankshaft. If in doubt, refer to your Nissan workshop manual. The photos below are of the spacer with our crankshaft adaptor. **NOTE 2:** The ZD30 flex plate to crankshaft bolts will need to be shortened by approximately 4mm. Please also note the ZD30 crank adaptor is not shown in the photos. **NOTE 3:** If somehow you have managed to sell your old engine with adaptor and require a new one, the part numbers are as follows: 12330-1W400 suits ZD30/TD42 7 bolt crank, 12333-03J10 suits TB45, TB48, 6 bolt crank.

11. Fit the main drive belt, see the following photo.



Engine Installation

1. Guide the engine into place while rocking the rear wheel backwards and forwards. This will help with the spline alignment into the clutch plate. Once aligned secure the engine using the bolts, spring washers and flat washers supplied.
1. Refit the engine mounting rubbers and brackets.
2. The Power steering box may need to be spaced 10mm away from the chassis, this is to give extra clearance for the air conditioning hoses.
6. Heavy duty front springs are also recommended for adaptor housing clearance, along with the fitting of a 25mm high spacer fitted to the driver side front differential bump stop. See photo below.

6. Modify the radiator spouts to correspond with the new GM engine's outlets. **NOTE:** The 2.8ltr diesel, 3ltr diesel, 4.2ltr and 4.5ltr petrol models can utilise our radiator hose kits without modification to the radiator. Part No. MFK605G3HK.
7. Refit the radiator.
8. Fit the top and bottom radiator hoses supplied in the kit. Part No. MFK605G3HK.
9. Fit the heater hoses.
10. Fit the power steering pump hoses. **NOTE:** The Commodore power steering pressure hose can be used with modification.
11. Cut the power steering hose, engine mounting bracket as shown in the photo below. This is to allow it to fit to the new engine sump.



12. Cut the Nissan banjo fitting off at the steering box end of the hose leaving about 30mm of pipe. Remove all burrs.

13. Cut the flare nut of the GM pipe just behind the fitting. Remove all burrs.
14. Push Nissan pipe 10mm to 15mm inside the GM pipe. Check the orientation of the banjo for best fitment in the vehicle and then silver solder or bronze the pipes together. **NOTE:** Have a water soaked rag on hand to keep the pipe cool on the hose end of the fitting. See the following photo.



15. Fit the air-conditioning compressor hoses and re-gas the system.
16. Complete the wiring. **NOTE:** Marks 4WD Adaptors manufacture a range of interface looms for Gen3 engines. Call if you require assistance.
17. Fit the accelerator cable. **NOTE:** The Commodore cable can be used with modification to the Nissan pedal assembly.
18. Fit the air cleaner. A Commodore one can be fitted or alternately a Donaldson type can be used.

19. Fit the headers supplied in the kit. Part No. MFH1790. Complete the exhaust system.



20. Check all fluid levels and fill fuel tank with required grade of fuel.
 21. Double check all-mounting bolts are tight.
 22. Start the engine and check for-
 - Fuel leaks.
 - Oil leaks.
 - Water leaks.
 - Exhaust leaks.
- Allow the engine to warm up and recheck above.

18. 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.

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