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**THINGS TO CONSIDER AND TO SOLVE WHEN
INSTALLING A MERC CRUISER 4 CYLINDER 181 CUBIC INCH ENGINE**

1. **Basic Preparation**
 - a. Get engine hoist, jacks, jack stands, tools, micrometers, dial indicators, gasket cement, Spray can of Gunk or similar degreaser to clean up old engine before you start; Blue Locktite 242-40 Thread locker (large bottle costs about \$30) and Red Stud Locktite.
 - b. Plasticote Antique White # T-27 paint is almost the same as limestone color and can be used for wheels and firewall if your vehicle is limestone.
 - c. Buy gaskets especially for fuel pump, distributor, water outlet (standard 1962 and up Chevy 6 Cylinder water housing), gasket for water pump to block (FelPro 13243 - standard Chevy 6 cylinder), intake and exhaust, valve cover and thermostat somewhere between 160 to 195 depending on service. optional if changing camshaft, timing chain cover, maybe pan gasket if welding returns in place or removing the pan for other reasons
 - d. Engine Paint - get the following Plasticote Paint Products or equivalent: Degreaser #26, Engine Primer #228, Alpine Green Engine Paint # to match Land Rover standard engine color.

2. **Engine Preparation and Layout of Engine**
 - a. Oil Pressure tap on right rearward side part way between head and pan; Engine comes with 1/8 inch NPT in the block; If you want to use a standard Rover transmitter then note its thread is British Standard Fine B.S.F. 3/8-20 straight thread - refer to paragraph 16 Instruments for more information.
 - b. Install pet cock for water drain tap on left rear side of engine.
 - c. Oil dipstick hole is just rearward of the distributor
 - d. Fuel pump - two configurations: upper and lower bowl; Chevy 153 fuel pump did not fit; marine unit will fit/
 - e. Weld oil returns in pan if needed
 - f. Clean, prime and paint engine and accessories and brackets
 - g. Consider Amsoil Bypass Filter kits if you want fine oil filtration and Marine fuel and water separator, again depending on service.

3. **Engine - Head**
 - a. Valve spring pressure should be set to about 110 to 120 pounds at installed height. It is suspected that the standard Merc Cruiser springs are only 70 pounds at installed height. A set of springs can be purchased from Clifford Performance for about \$45 (Clifford Performance, 2330 Pomona-Rincon Road, Corona, CA 91730, TEL 909-734-3310, FAX 909-734-8407).
 - b. Standard Compression ratio is low at about 9:1; brand new engine with new rings will produce 125-130 psi compression at cranking speed.
 - c. Valve springs can be easily chaged with a K-D Valve Spring Compressor, long handle, P/N 912 and spark plug adapter for compressed air.
 - d. For additional performance and reliability, consider Perfect Circle all Teflon valve

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seals, a 3 angle valve job, screw in 7/16 stubs, roller rockers with 1.72 ratio (note not the same as Chevy big block), some porting to eliminate casting protrusions left behind the valves (common in many cast iron heads).

4. Engine - Block

- a. Consider ~~balancing engine, magnafluxing rods, installing ARE bolts and shot pin rods, resize rods, cross drill and chamfer crank shaft oiling holes, balance engine, magnaflux crank assembly.~~
- b. Recommend changing marine cam which has lots of duration and short lift to RV with short duration and large lift.
- c. Front of crank shaft on late year 3.0 liter engines ~~may not have a bolt to retain the harmonic balancer. Recommend machining, tapping and installing retaining bolt; makes it easier to rotate engine.~~ Rover crank Nut can be welded to a plate and bolted to front of harmonic if desired. Front snout of crankshaft is 1.246 dia.
- d. Standard Chevy 6 Cylinder pulley on water pump will fit and line up with the v groove in the harmonic balancer that comes with engine and will also line up with a standard Chevy alternator and Chevy 6 cylinder or Mer Marine Alternator bracket. However the Marine water pump flange needs to be pressed down about an 1/16 inch to use the automotive pulley or simply place four similar flat washers between the pulley and the water pump flange. There is a 3 groove marine pulley available which will line up well with both the harmonic balancer and the alternator and provides for an additional pulley other belts.
- e. Pulleys from small block Chevy V-8's will fit the three front holes in the front harmonic balancer pulley after machining off a small sheet metal lip; probably other GM's will fit also.
- f. Engine mounting adapter plates are available from Robert for about \$50 to 75 a pair. Will use the land rover gas or diesel rubber mounts. I think the diesel rubber mounts may be stronger and are the same size as petrol rubber mounts.

5. Engine Camshaft

- a. Recommend changing marine cam which has lots of duration and short lift ($.253 \times 1.72 = .435$) to RV with short duration and large lift (about 0.295 at cam times 1.72 is about .507). {remeasured Marine at $1.607 - 1.333 = .274$ times 1.72 equals 0.471 vs Clifford's cam $1.322 - 1.055 = .277$ times 1.72 equals 0.476 lift} Recheck - something is amiss} This yields a 17 percent increase in lift. Cam shaft may have to be replaced with automotive grind; use marine timing gear cover seal which has double lip seal.
- b. Cam shaft gears. The gears on the cam shaft are matched since the cam shaft is gear driven. If changing check end play and gear tooth clearance. Replace only in sets. New set of gears cost approximately \$35.00. One source is Cloyes p/n 8-1016 or 923871 available from local speed shops and also from Clifford Performance which has three different timing woodruff key slots milled into the gears and associated liming marks. Suggest buying a new set rather than to remove the old gears from the crank and old cam shaft for reuse; If using a Clifford cam, dial indicate at standard woodruff key hole and it should come out at 4 degrees advanced. (Advanced cam should move the torque curve to a higher rpm.) When

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changing cam drive gear, always check for adequate clearance between the top of the bolt head and the aft surface of the gear. Watch out for interference can occur with high bolt heads and / or thick gears. Grind as required.

- c. Torque the two bolts to 80 Lb.-in (not 1t-ft) or 9 N-m; seems low torque value.
- d. Lubricate the cam and lifters with break in grease such as Sealed Power #55-400 and pour a small can of EOS (GM's Engine Oil Supplement) into the oil sump.
- e. If you made the mistake of trying to install a 151 camshaft in the engine, the eccentric for the fuel pump may interfere with the 2d cylinder's connecting rod.
- f. When changing the camshaft, you will need to remove the side sheet metal cover; if it is sealed well with silicone gasket maker, you may bend it badly. If so just replace it with a new one which can be purchased at the Mercury Marine dealer as part number 814702 for about \$20.

6. Bellhousing Adapter, Clutch, Pressure Plate and Flywheel

- a. An adapter will be needed to adapt the Chevy engine to the land rover gearbox. One source is Scotty's at James Howat, 45 Ridge Park Lane, Concord, CA 94518, tel 510-686-2255 but his supplies are very limited. Other sources are England and Australia.
- b. The thickness of the Bellhousing adapter should be about 2.260. At 2.260 you can use a .600 to .650 thick crank bushing and you will lose a little spline engagement on the clutch disc.
- c. The standard land rover dimension from the aft face of the flywheel adapter housing to the aft face of the clutch surface on the flywheel is about .480 to .500 and the dimension from the aft face of the flywheel adapter to the aft end of the crankshaft bushing is .940 inches. If your chevy adapter is 2.260 thick and you use a 153 tooth flywheel marine flywheel, part number GM 93422872, the distance from the aft surface of the chevy adapter to the clutch surface on the marine flywheel will measure in at 0.580 inches and the distance form the aft surface of the Chevy adapter to the aft end of a 0.600 thick bushing is ???.
- d. You need to measure you own combination and make sure that the clutch hub and inner springs clear the bushing and the flywheel to crank bolts, also that you have at least 0.400 of engagement in the crank bushing after deducting for any chamfer on the end of the transmission input gear, and that the engagement of splines on the transmission input gear is at least 0.900.
- e. When checking run outs, look for .002 max on surface of flywheel and .004 TIR on the diameter of the id of the bellhousing adapter pilot mounting hole for the Rover transmission. If the flywheel surface has a run out of .008, for example, start with a .004 shim between the flywheel and crank at the low point and perform the dial indication again until 0.002 is attained. If the pilot diameter on the bellhousing is out, you can buy engine dowels for Chevy engines with built in offsets.

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- f. If your engine (probably all early 2.5 liter engines and maybe old 3.0 liter engines) has the old style 2 piece main seal with the large diameter flywheel pilot flange used on Chevy V8 from 1955 through several years ago, consider using small Vega flywheel, GM P/N 3967058N.
- g. The Vega flywheel bolt pattern is the same a Rover pressure plate. However, the clearance in the pressure plate for a 5/16 inch bolt is too sloppy a fit for automotive use and dowels are necessary on the Vega flywheels to obtain proper centering with the Rover pressure plate.
- h. If you have a new style crankshaft with a one piece seal (all recently manufactured 3.0 liter engines), the Vega flywheel will not fit properly. Buy after market small diameter 153 tooth flywheel or a marine flywheel, part number GM 93422872.
- i. The distance from the crankshaft mounting surface to the clutch plate surface of the marine flywheel, part number GM 93422872, is .960 to .970 and the same distance on the Vega (after accounting for the flywheel lip) is .950 - nearly the same.
- j. Marine flywheel comes with Chevy 10 1/2 inch pressure place bolt pattern; check available pressure plates that will still clear the insides of the LR Transmission aluminum adapter casting - Standard Chevy pressure plate is too large; a special Hays unit might fit. Series III with "new" style throw out bearing can probably use a variety of pressure plates of the diaphragm design made for Chevies.
- k. The Rover 9 1/2 inch pressure plate works fine and should be used if you have a late IIA or earlier vehicle with the lubricated throw out bearing. The way to install it is to machine the Chevy flywheel with the Rover bolt pattern for the three dowels and for the six clutch bolts.
- l. The Rover dowels are on a circle of 10.625 dia; three holes equally spaced. Drill pressure plate with a .350 hole down _____ depth for a .002 press fit; measure the diameter of the dowel pins to be sure the press fit is right. Most dowels are .352 diameter where they press into the flywheel. It's always a good idea to drill a smaller hole clear through the flywheel to allow removal of the dowels with a punch when the flywheel needs re-surfacing at a future date.
- m. The Clutch cover bolts are also on the same 10 5/8 inch (10.625 inches) bolt circle; six holes equally spaced. Rover uses 5/16 - 24 NF threads. Use grade 8 or better bolts. Not enough room on the clutch cover itself for 3/8 bolts as used in Chevy V-8's on the Rover pressure plate.
- n. Crankshaft Bushing for Transmission - Need new bushing for transmission input shaft. Can not use the small hole in the Chevy crankshaft. Use the larger Chevy shouldered hole at the end of the crankshaft which is approximately 1.704 diameter. No standard off the shelf bearing has that OD. Suggest making a oilite bronze bushing 1.708 OD with a 7/8 or .875 id and about .600 to .650 thick. Anything over .650 is apt to interfere with the spline hub of the clutch. You can check for clearance by laying a used clutch disk on the flywheel with the bush installed and try to fit the largest "1" shaped Allen wrench you can get between the

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end of the spline hub and the bush. I suggest a clearance of .075 with a well worn clutch disk would be adequate. Land Rover shop manual says to ream out the primary input gear shaft hole to .875. Best to measure your crankshaft for the proper press fit of about .004 on the OD. Bronze oilite bushing material is readily available from any industrial bearing supply store. Suggest buying a piece of stock 2 inches od and .500 id and machine to size.

- o. Land Rover pressure plate is 75698/28 & A2920T & LR P/N 571228 used in late II a with lubricated throw out bearing; clutch for late IIA is 53131 & 5005 & LPR P/N 2297 - both 9.5 inch styles with 10 5/8 - 6 bolt circle
- p. The Chevy 181 cu inch 4 cylinder crankshaft is shipped without a dowel pin in the rear face to locate the flywheel. Although many use the crankshaft and flywheel without a locating dowel pin, the better practice is to install a dowel. The crankshaft dowel hole is usually about .437 to .438 inches and takes a standard 7/16 dowel but the flywheel hole is a little larger. If you plan to use a locating dowel, first measure your parts and consider rebalancing the crank and the flywheel after installing the dowel. Many engines run ok without the dowel.
- q. Flywheel run out should not exceed .002 inches. Torque bolts to 65 lb.-ft or 88 N-m.

7. **Oil System**

- a. Oil filter may have to be relocated with a remote oil filter kit depending if the left frame horn is in the way.
- b. Consider a cooler from MGB, Land Rover or other source if needed.
- c. Oil dipstick hole is located just rearward of the distributor.
- d. The marine oil dipstick part number is 45490 at \$16.85 and marine oil tube with threaded sleeve for "draining" oil is 87717A2 at \$29.65. Be sure to tap all the way down and seat it.
- e. Install oil return fittings in pan for oil cooler, air compressor, Amsoil bypass filter kit, oil temperature gauge, etc., if any, while pan is off.
- f. Oil pan has the sump towards the front consistent with the location of the distributor. Not much we can do here except install a larger oil pan. I do not know of any sources of off the shelf large oil pans at this time.
- g. Oil temperature should be measured at pan; also can measure it in the remote oil filter line inlet line.
- h. To fit the Land Rover oil pressure transmitter - refer to paragraph 16 Instruments.
- i. Suggest using a Amsoil dual filter kit mounted remotely. One kit which works well is identified by Amsoil Part Number BMK 3R which has inlet and outlet lines on the right side of the unit as you are looking at the unit. One filter is the normal 40 micron and the other is 2 to 5 micron. All oil flows through the first unit and about 10% of the flow passes through the second filter to eliminate small particles. The Amsoil kit costs about \$140 depending where you buy it. Also buy the swivel

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- fittings from Amsoil, BK 01 are 90 degrees and BK 02 are 45 degrees. Extra long filters are available. Kit number BMK 3R comes with hoses and bracket with hose connections on the right side of the manifold as you are looking at it.
- j. If you are in tight quarters and find the Amsoil adapter (which is probably made by Trans-Dapt or Perma Cool anyway) for the oil filter is too cumbersome and too big, try using a compact horizontal inlet and outlet unit made by Trans-Dapt, Part Number 1420 which takes a 13/16 - 16 thread on screw on stud used on the 181 engine.
 - k. You should install a magnetic oil drain plug which will attract the ferrous metal filings always present in engines; one source is Oil - Tite Part Number 65203 or any other one that fits a 1/2 - 20 thread. (Oil-Tite, Motormite Mfg Div, R&B Inc., PO Box 1800, Colmar, PA 18915; bar code 37495 65203)
 - l. Ref: Oil Pan Gasket, rubber style with steel sleeves, is QuickSilver 27-81086 or GM

8. Intake System

- a. Merc Cruiser changed intake and exhaust port design in about 1992. Therefore, if it is a late model engine, it may have a different intake and exhaust gasket than earlier models which may affect intake and exhaust combinations.
- b. Nothing is available from Marine sources without water cooled integral exhaust.
- c. Clifford Performance is making a special aluminum intake manifold to fit the newer 181 engines. It is available with water heating of the carb if you have arctic conditions or are using a carb which atomizes poorly (like most). It also comes with a wide variety of carb adapters.
- d. Other alternate sources include Thermo Electron which builds a similar engine to run on LPG and Solar air compressor and Hyster Fork lift.
- e. A 1962 Chevy Nova and up use a 153 cubic inch engine which is similar. Postal vehicles in the 1960's used a 153 cubic engine which is also similar.
- f. Another option is to use a 1978 Monza cast iron intake should be close to fitting if used with a 151 head which probably can be installed on a 181 engine as a head and intake set.
- g. There are other combinations of heads which will bolt to the Chevy block including cross flow designs.
- h. The Pierce intake and Land Rover intake come close to fitting but the bolt pattern in the marine head interferes with the ports in the Rover intakes.
- i. Weber 32/36 is used on 90 and 110 and may be a good choice of carb; call Mark Garrington 804-399-8089 (Robert's Friend) or Clifford or other performance shops.
- j. Carburetor linkage - can use the stock linkage with a few adjustments on the Weber.
- k. Air filter - get one for the carb. Many can be fitted to use the LR oil bath filter.

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- l. **PCV unknown** looks like marine engine does not have a PCV but only a vent out the valve cover. Boat installations vent it to the fire arrester (aka air cleaner).
 - m. Call Holley Custom Shop 502-781-9741 for specialty 2 barrel carbs and fuel injection or Clifford Performance. More FI units coming.
9. **Exhaust system.**
- a. Land Rover exhaust is fairly close to the marine exhaust port location. However bolt location is still a problem interfering with the ports.
 - b. Recommend an exhaust no smaller than stock land rover up to a maximum of 2 ½ inches.
 - c. If outlets are rerouted to the front of the rear tires, you can install a rear mounted gas tank in a 88 where the 88's exhaust muffler usually goes. Short exhaust systems can be noisy. Borla makes a RV stainless muffler available at any specialty shop. Several different gas tank models are for sale in Land Rover Owner's Magazine.
 - d. Clifford Performance is building headers for this installation.
10. **Cooling system**
- a. The housing assembly on front of head for thermostat comes in two pieces.
 - b. The lower housing that goes on head comes from 1962 and up Chevy 6 cylinder 250 (and maybe 153). Standard Chevy 6 cylinder lower water outlet housing has tapped holes for heater outlet filling and also temperature transmitter and fits the 181 head with a standard Chevy 6 cylinder gasket. The two tapped holes are ½ NPT and you can adapt most anything to these for heater hoses and water temperature switches and transducers. One clever approach is to screw in a three way tee with one male and two females. Then you can screw in a Ford Truck valve which has ½ NPT on the lower part of the valve and 5/8 inch hose fitting coming out of the valve at 90 degrees. This valve can be ordered from Murray part number 277983 at any auto parts store for about \$25 and is a very heavy duty manual heater control valve. You can also install one of these on the side going to a water heated intake manifold and control the water flow with the valve. The Rover temperature transducer can be adapted to fit one of the available extra holes. The other available extra hole could be used for a rear water heater, an over temperature switch, a switch for an electric fan and so on.
 - c. The upper housing is a goose neck which mounts above the thermostat and should point straight up like stock Rover. One source is Stant # 31508 - WO 5008 which is 1.560 dia and bolts directly on the Chevy lower housing and appears to accept the standard Land Rover upper radiator hose.
 - d. The marine water pump can be drilled easily with a 3/8 inch hole for inlet for heater water; Chevy 4, 6 cyl water pumps for cars were drilled but do not have a stainless steel sleeve system that is supposed to be in the marine unit. The marine

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- and the Chevy 6 Cylinder pumps take 3/4 inch hoses.
- e. If you have a car heater and another heat device such as another heater or a heated intake, then you can install a "Y" connector in the water lines so that two 5/8 hoses feed into one common 3/4 inch hose which then leads to the water pump. One "Y" connector part number is Murray 278969 which is made of nylon and costs about \$6.
 - f. Block heaters are desirable for vehicles used in cold climates. You need to remove one or both brass freeze plugs. Can tap them on one side to rotate and remove. One model of inexpensive block heater that fits is the Zero Start #880-1258 made by Phillips Temco which cost about \$18 each. I have had excellent luck with them as a block heater in a stock Rover engine.
 - g. Marine 2 piece brass pet cock (Merc Marine 552 / 22-16951 A1 \$4.00) can replace 1/4 inch pipe plug on left side rear of block to drain the water.
 - h. Water pump pulley can come from a variety of sources including many GM cars, 1980 Pontiac Sunbird is 2 groove style. Other sources include the marine version pulley and a standard chevy 6 cylinder pulley. Just do a normal alignment check. The flange on the water pump is pressed and can be pressed further on or pulled further away from the engine as needed.
 - i. If you are using a fixed fan and want a spacer, Murray p/n 209686 is a 1 inch spacer and can be used with either of the two water pump flange bolt patterns.
 - j. Upper radiator hose is part number Dayco 71132 available from an auto parts store.
 - k. You can make a lower radiator hose by using a Land Rover upper hose to attach to the radiator and a Dayco P/N filled with an appropriate exhaust system steel sleeve adapter to connect the two hose. Trim to fit. Another solution on some vehicles is to use as the lower hose a Goodyear 61269 also Dayco 71188.
 - l. Engine takes a standard Chevy 6 cylinder thermostat, part number Stant 13359 is 195 degree model suitable for us north of the mason dixie line.
 - m. Fans. Some people prefer solid fans, others like the viscous drive models and yet other prefer electric. Suggest using a viscous drive type fan or some other low resistance fan. Try a viscous fan from a 1980 or so Sunbird
 - n. The water pump on the Marine engine has both two sets of hole patterns for fans and pulleys; make sure you use the same set for both fan a pulley.
 - o. If you decide to install a new heater, Rover's North makes a 20,000 btu retrofit model. Suggest using a full flow heater valve such as Four Seasons 74662 or the Murray part number 277983. If running a heater and a heated intake manifold, try installing a y connector with two inlets of 5/8 and an outlet to the water pump intake of 3/4 inch. This heater has a much high capacity fan and a 20,000 btu heater core. The unit fits nicely and requires about 4 to 6 hours to install. If you have an early series Rover, the internal duct work will also have to be installed.

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11. Fuel System

- a. Fuel Pump can be electric or mechanical or both.
- b. If you made the mistake of trying to install a 151 camshaft in the engine, the eccentric for the fuel pump may interfere with number 2 connecting rod.
- c. I would suggest buying a Marine fuel pump rather than an automotive one. I tried a few automotive ones and they don't fit the new blocks.
- d. Marine fuel pumps come with a filter bowl on bottom; Merc Cruiser Quicksilver fuel pump part number 42725A-3 and casting number 603376F07A is made by carter and fits well; use Quicksilver marine gasket 27-43186-1 which is a sandwich cork design and appears to be about 1/8 inch thick and very rugged.
- e. A moderately priced electric fuel pump is the Carter Bellows Electric Fuel Pump Part Number P 60378; it has been around for a long time and requires a fuel filter installed upstream of it.
- f. Recommended installing a pressure regulator available from Clifford or Holley. Old LR Webers like about a 2 psi pressure at the inlet to the carb. The Holley one (part number 12-500) has two outlets; the extra one can be used for oil pressure activated shut off switch to shut off electric pump in case of a car accident or it can be used as an extra outlet for those who like to fill Jerry cans or cans for lawnmowers, chain saws, boats, or pump fuel into another vehicle that has run out of fuel. It is chromed and comes with a mounting bracket.
- g. If you use all these items, I would recommend you install them in the following order: fuel tank, fuel-water separator filter, electric fuel pump, mechanical fuel pump, pressure regulator, and finally the carb or fuel injection.
- h. Mercury Marine recommends using Loctite #592 as a sealer for fuel line threads. Mercury Marine also warns **not** to use Teflon thread on fuel connections.
- i. One water and fuel filter available is the marine type (Quicksilver part number 35-807172A4. It costs about \$42 and has a screw on filter element similar to an oil filter and would be installed between the tank and the first fuel pump.
- j. For added security off road, use an electric and a mechanical fuel pump.
- k. If you decide to use an electrical pump only, you can use a Chevy V8 block of plate trimmed around the edges, Manly Part Number 42115 works but is thin walled and should be used with a robust gasket (such as the marine one referred to above) and a high quality sealer.

12. Electric System - Ignition

- a. Firing Order is 1-3-4-2 (1-4-3-2?); distributor rotates clockwise looking down at the top of it.
- b. The distributor that came with the engine is an electronic distributor for a Merc Cruiser 4 cylinder, Delco part number 1711J-1103782-6B18 and coil 115491-5M04, photocopy enclosed. It has no vacuum advance system. Maximum total advance is about 26 degrees, may not be suitable for automotive application.

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Currently trying to find another GM module that will be a better advance curve. Otherwise the distributor is very modern and compact and has an excellent reputation with the marine folks.

- c. Also can use a spare 153 cu in HEI distributor or other type; a 1978 Chevy Monza distributor will work;
- d. Rebuilt stock point style distributors with vacuum advance such as Cardone Remanufacturers Part Number 30-1410 ones cost about \$60 plus rotor (Blue Streak DR-314x) and cap (Borg Warner C167).
- e. Distributor ignition advance recommended full advance at 2500 RPM with a curve of 24 to 26 degrees in the distributor plus initial. Try setting timing for full advance (no vacuum) at about 34 to 36 degrees BTDC - make a cardboard disk if necessary to mark the harmonic balancer at 36 degrees if you don't have fancy tools.
- f. Can buy a Jacob's Omni Pack and Point ignition system from Clifford for approximately \$220. MSD also has some devices to improve spark.
- g. Have a professional set the distributor advance curve on a Sun distributor machine if possible prior to installing the distributor if you're unfamiliar with distributor curves.
- h. Miscellaneous Ignition information: Jacobs makes units for engines, Jacobs #372416; include in order a request for 4 cylinder universal set of wires; mileage master ultimate team \$479 connects to distributor and can adjust the distributor; has multispark capability; Summitt Racing 1-800-630-3030; Milford Speed 508-473-5216, Somerset 508-676-3076; Precision Performance 508-872-3708;

13. Air Systems

- a. If you need an engine driven air compressor try Ready Air - Therold Industries, 500 East 7th Street, Holtville, CA 92250, 619-356-4516. It mounts directly on the engine and will pump at 125 psi.

14. Electrical System - Starter

- a. Starter motor takes a basic Chevy 153 tooth flywheel V-8 starter motor with bolt holes directly across from each other; block is not drilled for staggered holes.
- b. If you have trouble getting it to clear and fit engine and adapter, then use the Marine permanent magnet type which is probably better anyway, Quicksilver Part Number ~; proper bolts are available from marine dealer or auto store. Marine part numbers are 10-805343 for the short? Long? Bolt and ~ for the other one.
- c. A small diameter high performance starter motor will clear drive shaft and oil pan better than a stock automotive starter motor.
- d. Marine new style starter motor is permanent magnet style with very small outside diameter; these are available rebuilt for about \$125 and new for about \$250 and they work great. Try to get a support bracket for the forward end to take the anticipated g loads.

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15. Electrical System - Alternator

- a. Preferred alternator is lower left which is same as a Land Rover generator or alternator location if using standard head with intake and exhaust on left side of engine like standard Rover location.
- b. Merc Cruiser has a heavy duty bracket, part number 16738A1, which bolts to block to existing holes in block. Stock Chevy 6 cylinder mount is not as strong but will work nicely. However, if you are using the Davis engine mounting kit, then the alternator mount will interfere with the upper portion of the standard rover engine plate. This is easily solved by welding an extension to the Davis plate and then drill a new set of holes 1 to 1 ½ inches above the block holes and thereby the alternator will clear the mounts.

16. Electrical System - Instruments

- a. Tachometer probably connects to one of the two connectors on the Marine coil. Check with Merc Cruiser for wiring diagram; match tach to ignition system.
- b. In order to use the standard Rover oil pressure transducer, you need to adapt a male 3/8 -20 BNF thread to a female NPT; one way is to buy a pipe thread adapter fitting 1/4" female to 1/8" male pipe (typical Dorman #489-081) and screw in a 1/4" pipe plug drilled and tapped for 3/8-20 BNF. Another way is to use an American Oil Pressure Gauge like Stewart Warner or VDO which come with 1/8" NPT threads on the fittings as standard hardware.
- c. Good idea to install low oil pressure warning switch in addition to oil pressure. Can get one from any auto or marine store, Stewart Warner, VDO, etc..
- d. If a Tach is desired one solution is to replace the combination Rover fuel, water temp and alternator idiot light with a tachometer. Rover 110 has round fuel level gage, s-w makes many round water temperature gages and the idiot light can be replaced with a volt and ammeter which frees up space for the tach.
- e. Stewart Warner makes a mini panel set of oil, water and volt gauges which can sit on top of dash without disturbing the dash panel.

17. Axles

- a. Standard early Rover axle ratios are only 4.7; later ratios are available in 3.54 and 4.7; several modified units are on the market.
- b. Consider Salisbury axles in either ratio for rear; similar if not same internally as Dana 60 axles as used in many American vehicles.
- c. Specialty gear sets are available from Jack McNamera in Victoria and imported by Bill Davis in Salt Lake (801) 486-5049.