

SJE SAN JUAN FRESH WATER COOLING SYSTEMS

7.4 LX MPI MerCruiser Total EFI "1997" w/V-Belts "FULL SYSTEM" Cooling Kit #MC-324 Installation Instructions

San Juan Engineering Heat Exchangers provide thermostatically controlled fresh water cooling for marine engines. Its compact installation does not increase the height, width or length and fits within overall engine dimensions, allowing for installation in most existing engine compartments. Designed to ensure years of satisfactory service, the entire unit is constructed of pure copper with silver alloys. This system is built by quality craftsmen that have made San Juan Engineering the leader in their field for over 38 years.

San Juan Engineering Heat Exchangers prolong engine life by preventing corrosion in the cylinder block. Anti-freeze solution can be added to the coolant if the boat is used in extreme cold weather. Only draining the sea water side of the cooling system from the zinc anode in the heat exchanger is required when the boat is not in operation.

Installation is simple. All necessary parts are supplied and no special tools are required.

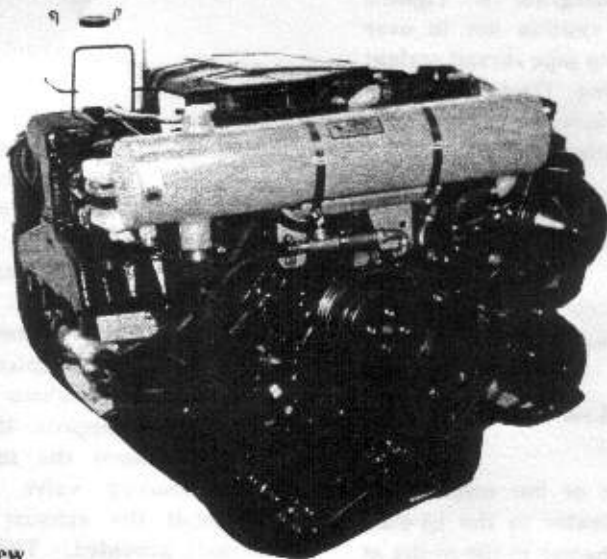
1. All instructions are given while facing the front of the engine. The alternator is on the right hand side, the fuel filter on the left hand side.
2. Disconnect battery cables. Drain the engine block (both sides) and both exhaust manifolds.

3. Locate original thermostat housing assembly at top, front, center of engine. Disconnect wire connected to the water temperature alarm sending unit on the left side and the wire connected to the water temperature sending unit on the right side. Remove and Save the (2) temperature sending units from the original thermostat housing. Carefully note which wire connects to each unit.

4. Remove all hose clamps and hoses connected to this assembly. Use care not to destroy hoses or hose clamps, they will be used later. Leave all hoses connected at their other ends.

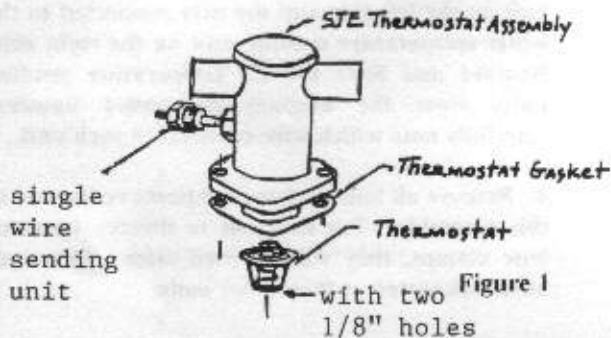
5. Remove thermostat housing assembly from engine by taking out the (2) 3/8" bolts at the back end of the housing. Discard original thermostat housing, lifting strap, bolts and plastic retainer. Note: Save thermostat to be used later.

6. Clean thermostat housing gasket surface on the intake manifold. Insert new SJE thermostat, spring end down (Figure 1). Position new thermostat gasket, between thermostat and thermostat housing. Secure thermostat housing with the (2) 3/8" by 7/8" bolts and lock washers. Tighten the two bolts firmly and evenly.



Front View

7. Remove small rubber curved hose from water pump to intake manifold and fittings (save clamps). Screw together tees and fittings as shown (diagram 1). Fittings and tees first and screw elbow into pump last. Then connect 5/8" X 2-1/4" hose and clamp. NOTE: On some engines loosen bolts on front of pump pulley and pull out just enough to screw in elbow & re-tighten.

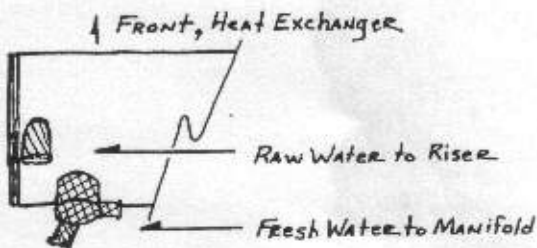


Mounting Bracket



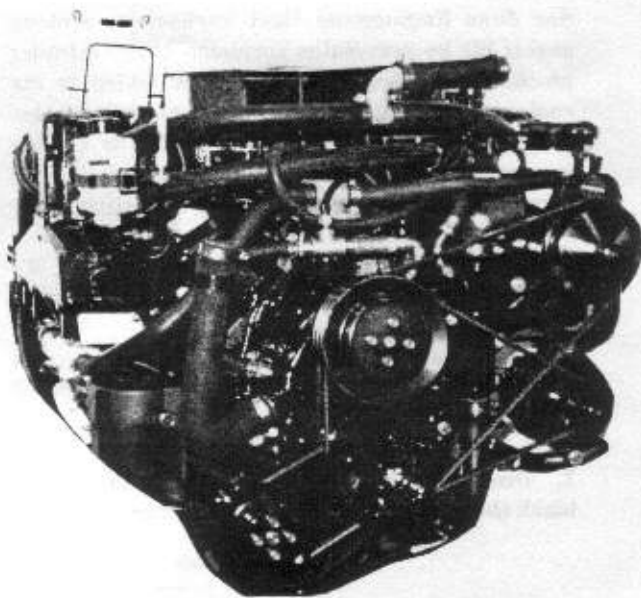
Figure 1A

8. Remove the new thermostat housing assembly from your SJE kit (Figure 1). Thread the original water temperature sender single wire into the threaded hole on the left. The EFI engine sending unit has two prongs for two wires locate in tee in 3/8" pipe threaded hole (see diagram 1). Tighten both senders firmly, using caution not to over tighten. We recommend using pipe thread sealant when installing threaded fitting. On some engines you may have to extend the wires on the two wire sending unit (see wire splice diagram 2).



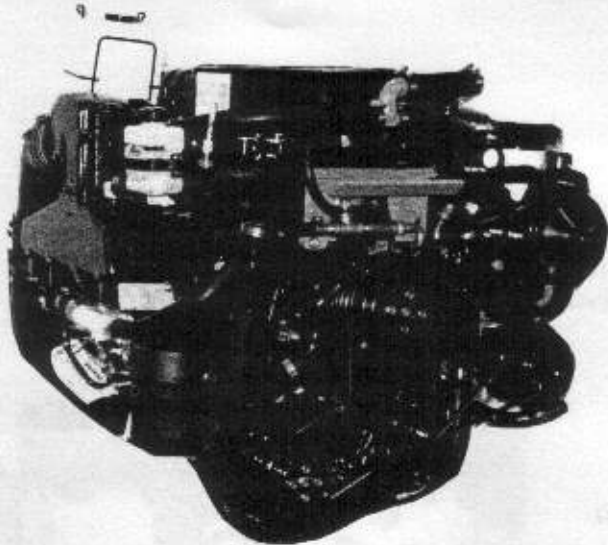
9. For a hot water heater or hot water tank, plumb the bottom of the heater to the by-pass outlet on tee, the top of the heater to the outlet at the bottom of water pump.

10. Installing the heat exchanger mount from your kit. The top hose fitting on the oil cooler may need to be moved slightly forward to make room for the heat exchanger mounting bracket. There are two 7/16" threaded horizontal holes in the top front of the engine. Each hole is about 4" from each side of the 1" diameter 90 degree curved by-pass hose that connects down into the engines water pump. Using the 7/16" X 1-1/2" bolt supplied, and the mount from kit, hold mount up to engine front with cradle part up and forward. Start bolt through right mount hole and into power steering mount hole. Using the 7/16" X 2" bolt and the 1" spacer supplied, install bolt into the left cylinder heads corresponding hole. Tighten both bolts firmly.



11. Remove both exhaust risers. Carefully clean both the riser and the exhaust manifold gasket surfaces. They must be absolutely free from all gasket particles. At this time remove the two hollow headed 3/4" pipe plugs from each manifold. They are just forward of the manifolds exhaust gasket surface. (Use a 1/2" drive flex bar for this). In the kit find two brass, 90 degree 3/4" pipe to 1" hose, adapter elbows. Screw these into manifolds and tighten so the hose spuds point forward and approx. 45 degree in, toward center and/or toward the top front corner of each corresponding valve cover. Now carefully re-install the exhaust risers using the blank gaskets provided. Tighten bolts alternately and evenly until they are very firm.

12. Install the two original hoses removed in Step four, that connect from under the exhaust manifold, up to the front of engine. Connect each hose onto a corresponding spud on the NEW thermostat housing. Clamp. Bend dipstick back to clear heat exchanger.



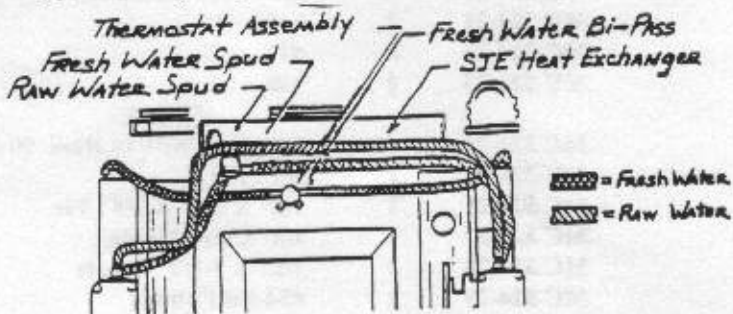
13. When installing the heat exchanger, place the rubber pad supplied onto the mount. Do not cover slots in mount. Place the heat exchanger onto the mount with its fill cap up and back. Secure in place with (2) #550 clamps provided. NOTE: Place long end of clamp down around the rear of the heat exchanger and into the mounts slots then under the mount. Screw end should be pointing forward and positioned against the forward slope at "V" in the mounts. Tighten just snugly.

14. Carefully cut the original large hose that connects onto the engines water pump inlet, so that it can connect onto the large spud under the right end of the heat exchanger, (see hose cutting guide), clamp. Cut 1-1/4" elbow hose from original thermostat housing. The hose is to fit under heat exchanger to oil cooler (see hose cutting guide). Connect hoses as follows: Fresh water hoses, Left manifold to heat exchanger 1" X 25", Right manifold to heat exchanger 1" X 10" with 1" copper coupling and elbow hose. Raw water hoses, Left manifold to salt water tee 1" X 23", Right manifold to salt water tee 1" X 13", Salt water tee to heat exchanger 1-1/4" X 7". Tie wrap hose down to clear throttle.

15. This system uses a recovery type accumulator tank for the expansion of the coolant and also

removal of air from the system. Secure the plastic expansion tank in best location for checking fluid. Cut a piece of 5/16" hose to connect the spud at the heat exchanger fill neck to the spud at the bottom of the expansion tank. Use the (2) 5/16" spring clamps to secure the hose.

16. Fill accumulator tank to cold line. Fill through the fill cap neck on heat exchanger until full. Continue to fill until water is overflowing at the fill neck. As it is IMPORTANT to remove all air from the system, leave the fill cap off after starting engine and be prepared to refill water into the fill neck as AIR is removed and water level drops. All air must be out of system if it is to work properly. This may take 10 minutes, or more, of running the engine in neutral at 1,000 to 1,500 RPM at the dock. Do Not run the engine at all without a water supply to the water inlet on the lower unit. The sea water pump will be damaged or destroyed if run dry. When you are sure all air has been purged from the system and the water level has stabilized at the fill neck and it is full, install the fill cap. Do not remove the fill cap when engine is hot! Coolant capacity is approximately 14 quarts.



17. Check to be sure that all hose clamps are snug and bolts are firmly tightened before moving on to the start up procedures. Do Not over tighten. Check all hoses to be sure they do not chaff on engine parts, belts, etc.

18. The zinc anode retards corrosion in the raw water side of the cooling system. Check occasionally and replace when 3/4 eroded.

NOTE: The insert sheet contains your complete parts list on one side and your hose cutting guide on the other.

Use caution when tightening threaded fittings. Always use back-up wrench on threaded NPT female fittings i.e., temp. senders and zinc anode.

Parts List

MC 324-0	1	Installation Manual
MC 324-1	1	Heat exchanger (Rubber under clamp area)
MC 324-2	1	Thermostat Assembly
MC 324-3	1	Hanging Bracket For Heat Exchanger
MC 324-4	1	1" Pipe Spacer
MC 324-5	1	Expansion Tank Kit
MC 324-6	1	1/8" X 4" X 9" Rubber Pad
MC 324-7	1	Thermostat, 160 Degree
MC 324-8	1	Salt water tee

Hoses

MC 324-9	1	1" X 25" (fresh water spud to LH manifold)
MC 324-10	1	1" X 23" (raw water spud to LH riser)
MC 324-11	1	1" X 10-1/4" (fresh water spud to RH manifold)
MC 324-12	1	1" X 13" (RH manifold to salt water tee)
MC 324-13	1	1" X 2" copper coupling
MC 324-14	1	#70241 Curved Hose
MC 324-15	1	1-1/4" X 7"
MC 324-16	1	5/8" X 12"
MC 324-17	1	5/8" X 2-1/2"

Gaskets

MC 324-18	1	Thermostat, SJE 023-4A GMT-1
MC 324-19	2	Exhaust/Riser, MC 330-TR

Hose Clamps

MC 324-20	2	#550 (heat exchanger)
MC 324-21	2	#10
MC 324-22	8	#16
MC 324-23	2	#20

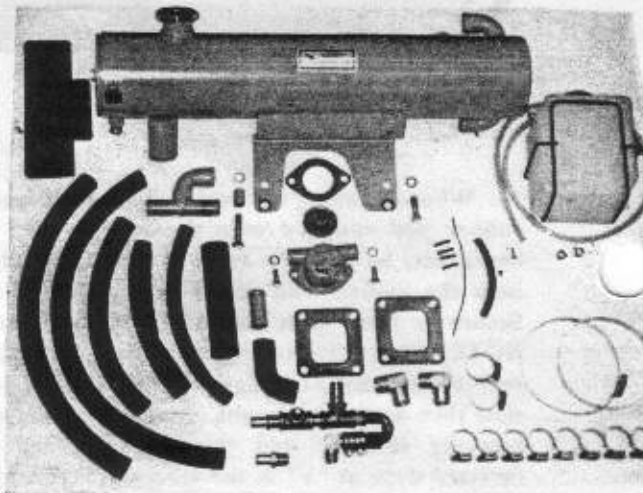
Fittings

MC 324-24	2	3/4" X 1" NPT to Hose, 90 degree
MC 324-25	1	1/2" Tee
MC 324-26	1	1/2" X 1/2" X 3/8" Tee
MC 324-27	1	1/2" Close Nipple
MC 324-28	1	1/2" X 1-1/2" Nipple
MC 324-29	2	#54-SB Fittings
MC 324-30	1	#54-EB Fitting
MC 324-31	1	5/8" U Assembly

Bolts, Nuts, Washer

MC 324-32	2	3/8" X 7/8"
MC 324-33	1	7/16" X 1-1/2"
MC 324-34	1	7/16" X 2"
MC 324-35	2	7/16" Lock Washers
MC 324-36	2	3/8" Lock Washers
MC 324-37	1	3/8" NPT Zinc Anode in Heat exchanger

MC 324-38	4	Wire Connectors #18-22
MC 324-39	2	Piece of Wire #18-8" long
MC 324-40	1	Cover piece for Wire 1/2" X 6"
MC 324-41	1	Tie Wrap



KIT #MC 323 / #MC 324
HOSE CUTTING GUIDE

Cut from original
1-3/4" I.D. Curved hose
from fresh water pump

HOSE B

CUT

Cut from original
hose from fuel cooler
to thermostat housing

HOSE A

CUT

ORIGINAL
LENGTH

ORIGINAL
LENGTH

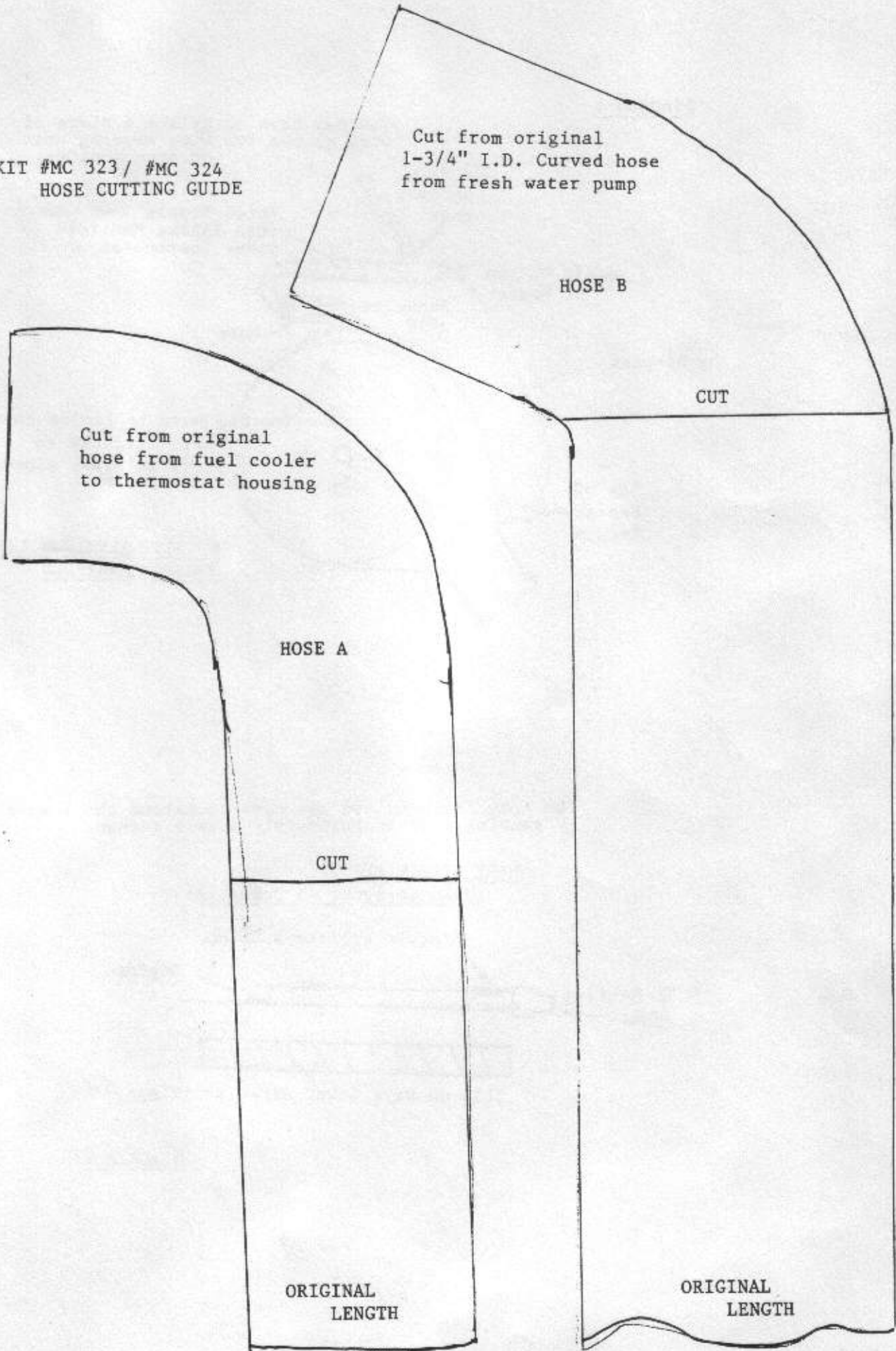
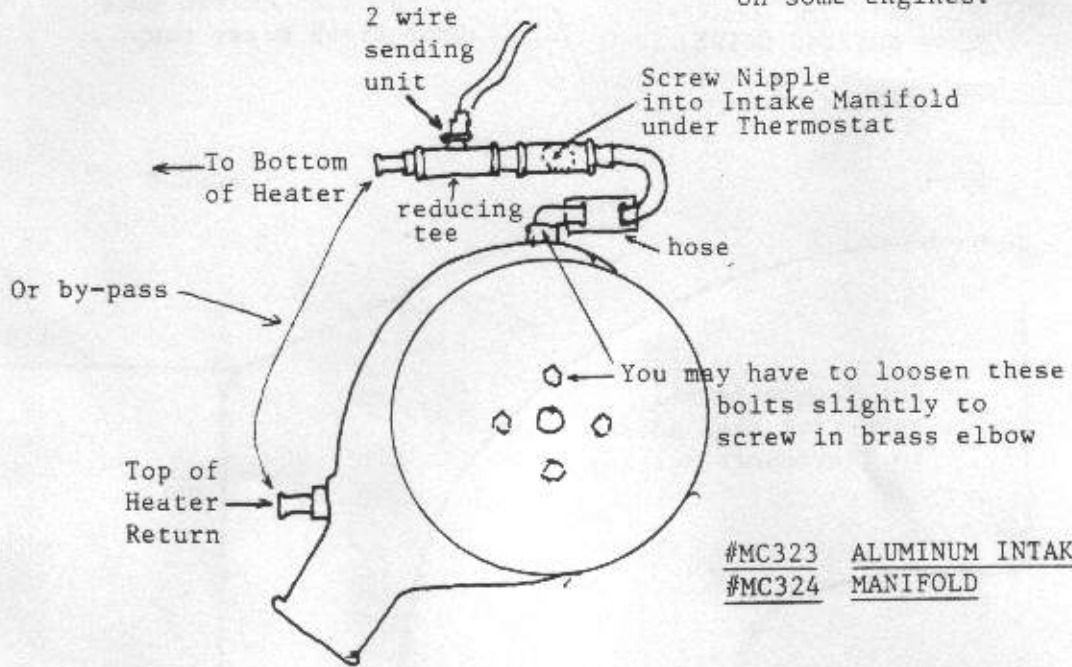


DIAGRAM 1

You may have to splice a piece of wire to the two wire sending unit on some engines.



On Some Engines, you may have to extend the 2 wire sending unit approximately 4 to 6 inches.

WIRE SPLICE SET UP
(Make up Short As Possible)

