

SAN JUAN FRESH WATER COOLING SYSTEMS

7.4 MPI MerCruiser W/Serpentine Belt

"RLL SYSTEM" Cooling

Kit #MC-330 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 40 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 for 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 left hand side, the fuel filter on the right hand side.
2. Disconnect battery cables. Drain the engine block (both sides) and both exhaust manifolds.
3. Locate original thermostat housing assembly. Remove temperature alarm sending unit on left

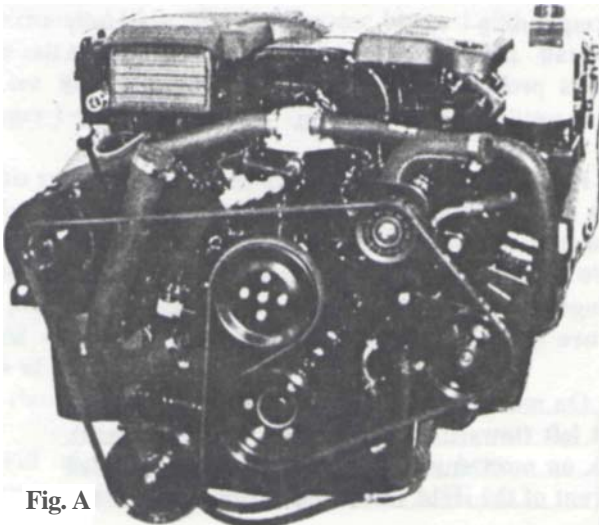


Fig. A

side of housing, Save. Carefully remove all hoses and clamps from housing, use care not to destroy, they will be used later. Remove housing from engine. Discard original housing, lifting strap, bolt and plastic retainer.

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

Use caution when tightening threaded fittings. Always use back-up wrench on threaded NPT female fitting ie., temperature senders, zinc anodes. We recommend using pipe thread sealant when installing threaded fittings.

5. Install first, the tee and by-pass assembly. See Figure A. Remove the 1/2" plug down and to the left of the other sending unit located in the intake manifold. Thread the 1/2" X 3/8" bushing and 3/8" X 2" nipple, 3/8" tee and 3/8" NPT X 5/8" 90 degree adapter as shown. Retrieve single wire sending unit and thread into 3/8" tee. Connect wire. Remove 1/2" plug on the left side of the water pump, just above the large 1-3/4" suction hose. Install the 1/2" NPT X 5/8" 90 degree adapter. Connect the 3/8" X 5/8" 90 degree adapter to the 1/2" X 5/8" 90 degree adapter with 7-1/2" hose, use (2) #10 clamps.

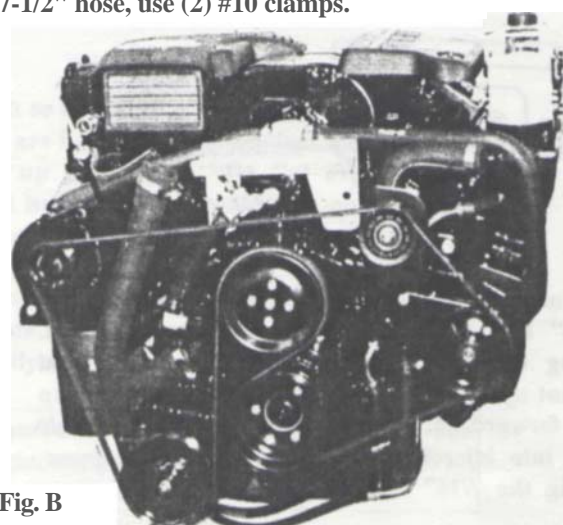


Fig. B

SAN JUAN ENGINEERING & MANUFACTURING CO.

766 Marine Drive Bellingham, Washington 98225 USA PHONE (360) 734-1910 FAX (360) 734-9683

6. If an auxiliary hot water heater is to be used, plumb the bottom of the heater to the by-pass outlet on tee, the top of the heater to the outlet at the side of the water pump.

IMPORTANT: When connecting cabin heater or hot water heater, certain requirements must be met.

A. Supply hose (from engine to heater) and return hose (from heater to engine) **MUST NOT EXCEED 5/8 in. (16 mm) inside diameter.**

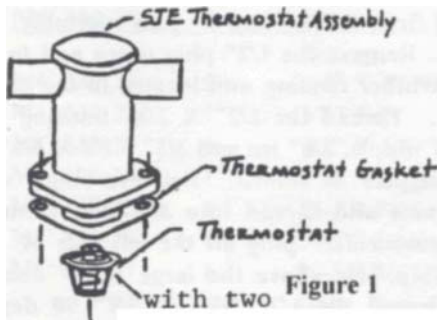
B. Make heater connections **ONLY** at locations described in the following instructions.

C. Check complete system for leaks after heater is connected into cooling system.

D. Check for overheating condition (of engine) after heater is connected.

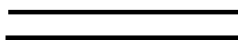
CAUTION!

Heater must be mounted lower than the fill cap on the heat exchanger. If the heater is higher than the fill cap on the heat exchanger and some coolant is lost from the system, an air pocket may form in the closed cooling system. This can cause the engine to overheat.



1/8" holes

Mounting Bracket



Use Bottom Holes for Mounting

pipe plug

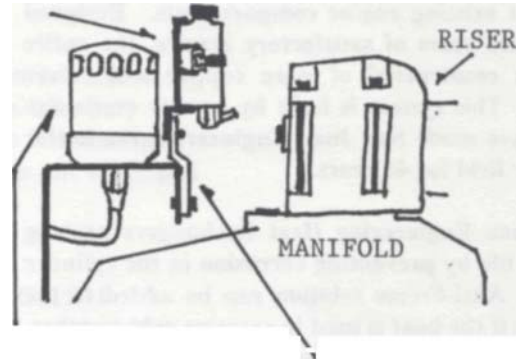
Figure IA

7. Installing the heat exchanger mount. Remove 7/16" bolt from idler bracket mount, discard. Using the 7/16" X 1-1/4" bolt supplied, hold mount up to the engine front with cradle part up and forward. Start bolt through right mount hole and into idler bracket mount hole, leave loose. Using the 7/16" X 1-3/4" bolt and 1/2" spacer

provided, install bolt into the left cylinder head's corresponding hole. Tighten bolts firmly.

8. On most engines you will need to raise the drive oil reservoir using the bracket supplied in your kit. Remove drive oil bracket from engine. Attach original bracket onto new SJE bracket so that when mounted, the original bracket will be closer to oil filler. See figure I If.

DRIVE OIL RESERVOIR BRACKET



OIL FILTER

SJE BRACKET

RESERVOIR BRACKET EXTENSION FIGURE IB

9. 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**. Torque to 27 lbs.

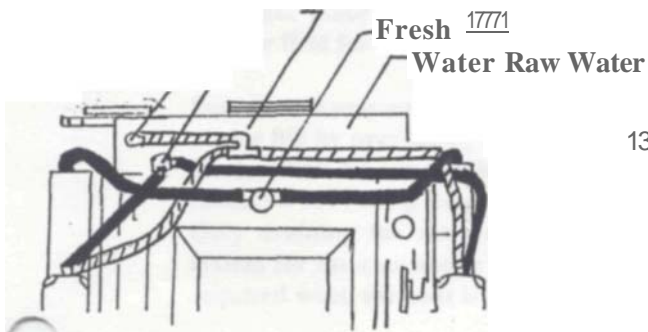
10. Remove the plastic fitting on the underside of each manifold that hold the hoses you removed from thermostat housing. Now install the 3/4" X 1" 90 degree adapters from kit in place of plastic fittings. Replace hoses. Connect the other ends to the new thermostat housing.

11. On most engines the dipstick may need to be bent left (towards the alternator 3/4 of an inch). Also, on most engines the lifting bracket (located in front of the right valve cover at the front of the

motor) may need to be bent forward 3/4 of an inch.

12. When installing the heat exchanger, place the rubber pad supplied onto the mounts. Do not cover slots in mount. Place heat exchanger onto the mount with its fill cap up. 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 mount. Screw end should be pointing forward and positioned against the forward slope at "V" in the mounts. Tighten just snugly.

Salt Water Tee Fresh Water Spud/
Raw Water Spud/
Thermostat Assembly
SJE Heat Exchanger



Carefully cut the original large hose that connects onto the engine water pump inlet, so that it can connect onto the large spud under the left end of the heat exchanger, (see hose cutting guide hose B), clamp. Cut approximately 1" from 1-1/4" hose coming up the right side from the oil cooler, (see cutting guide hose A). This connects to the 1-1/4" 90 degree elbow pointing inward on the bottom right side of heat exchanger. Connect hoses as follows: Fresh water hoses. Left manifold to heat exchanger 1" X 27", Right manifold to heat exchanger 1" X 9". Raw water hoses, Left riser to salt water tee 1" X 19". Right riser to salt water tee 1" X 16-1/2", Salt water tee to heat exchanger 1-1/4" X II.

14. 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.

15. Fill through the fill cap neck on heat exchanger until full. 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 without a salt 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. Fill accumulator tank to cold line. Continue to fill until water is overflowing at the fill neck. Do Not remove the fill cap when engine is hot! Coolant capacity is approximately 14 quarts.

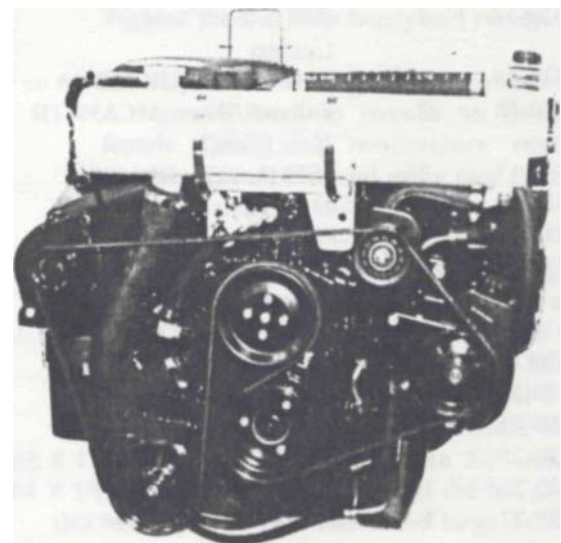


Photo of finished installation. Heat exchanger and all parts in kit, painted black.

16. 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.

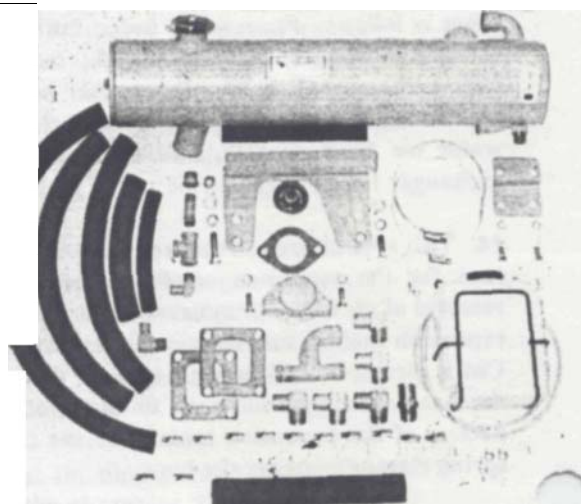
17. The zinc anode retards corrosion in the raw water side of the cooling system. Check occasionally and replace when 3/4 eroded.

Installation/Technical assistance, or other San Juan Engineering Products, Ph: (360) 734-1910, FAX (360) 734-9683.

7.4 MPI MerCruiser w/Serpentine Belt "FULL SYSTEM" 1998

Parts List

	<i>Description</i>
MC 330-0	1 Installation Manual
MC 330-1	1 Heat Exchanger
MC 330-2	1 Thermostat Assembly
MC 330-3	1 Hanging Bracket for Heat Exchanger
MC 330-4	1 1/2" Pipe Spacer
MC 330-5	1 Expansion Tank Kit
MC 330-6	1 1/8"X3"X9" Rubber Pad
MC 330-7	1 Thermostat. 160 degree w/Two 1/8" Holes
MC 330-8	1 Salt Water Tee
<i>Hoses</i>	
MC 330-9	1 1" X 27" (fresh water spud to LH manifold)
MC 330-10	1 1" X 19" (raw water spud to LH riser)
MC 330-11	1 1" X 9" (fresh water spud to RH manifold)
MC 330-12	1 1" X 16-1/2" (FH manifold to salt water tee)
MC 330-13	1 1-1/4" X 11"
MC 330-14	1 5/8" X 7-1/2"
<i>Gaskets</i>	
MC 330-15	1 Thermostat, SJE 023-4A or GMT -1
MC 330-16	2 Exhaust//Riser, MC'330-TR
<i>Hose Clamps</i>	
MC 330-17	2 #550 (heat exchanger)
MC 330-18	2 #10
MC 330-19	8 #16
MC 330-20	2 #20
<i>Fittings</i>	
MC 330-21	5 3/4" x 1" NPT to Hose, 90 degree
MC 330-22	1 3/8" Tee
MC 330-23	1 1/2" X 3/8" Bushing
MC 330-24	1 1/2" X 2" Nipple
MC 330-25	1 53-SB Fitting 3/8" NPT X 5/8" OD X 90 degree
MC 330-26	1 54-EB fitting 1/2" NPT X 5/8" OD X 90 degree
MC 330-27	1 86-SB 3/4"NPT X 1"OD
<i>Bolt, Nuts & Washers</i>	
MC 330-28	2 3/8" X 3/4" Bolts
MC 330-29	2 3/8" X 1" Bolts
MC 330-30	2 3/8" Nuts
MC 330-31	1 7/16" X 1-1/4"
MC 330-32	1 7/16" X 1-3/4"
MC 330-33	2 7/16" Lock Washers
MC 330-34	4 3/8" Lock Washers
MC 330-35	1 3/8" NPT Zinc Anode in Heat Exchanger
MC 330-36	2 7/16" Flat Washers
MC 330-37	1 Drive Oil Reservoir Bracket



Form //MC330-98

SAN JUAN FRESH WATER COOLING SYSTEMS

"WARNING NOTICE»

SJE Part Number MC330

1999 7.4 Fresh Water System Manifold & Block Cooling

MerCruiser has installed on all big block engines, plastic plugs in the exhaust manifolds. They are located on the side of the manifold facing the engine block. They cannot be seen when inspecting the engine.

If a (full) block and manifold cooling system is installed, both manifolds must be removed and the plastic plugs replaced with metal. You must also remove and replace the 90 degree plastic drains on the bottom of the manifolds.

If this warning notice is not followed the plugs will melt and serious damage will result

San Juan Engineering and Manufacturing Co.

766 Marine Drive Bellingham, Washington 98225 PH: 360-734-1910 FAX: 360-734-9683



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766 Marine Drive

Bellingham, Washington 96225

Phone (360) 734-1910

Fax (360) 734-9683

MC-330
MC-329

7.4 MAGNUM
WITH ALUMINUM
INTAKE MANIFOLD

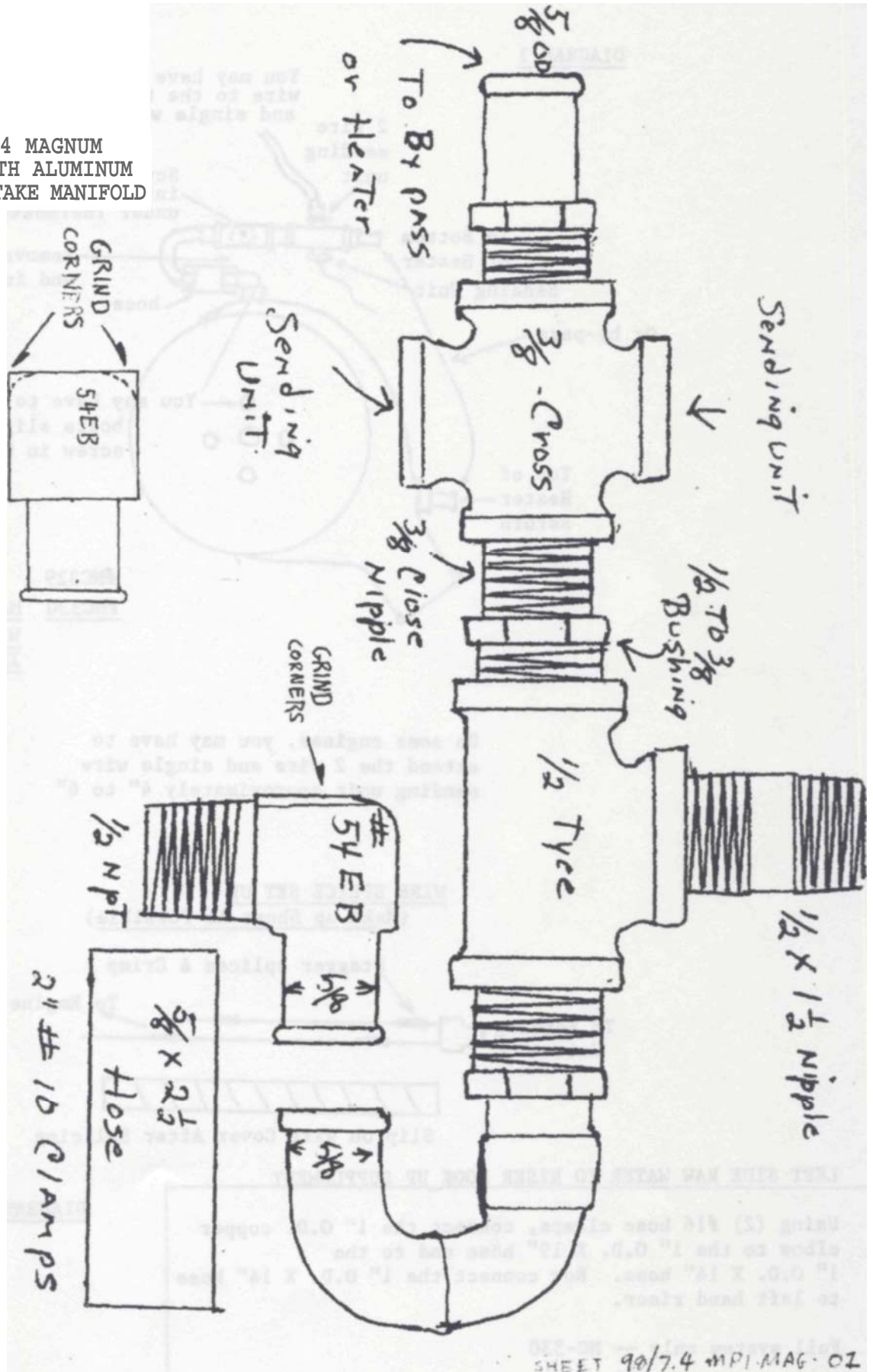
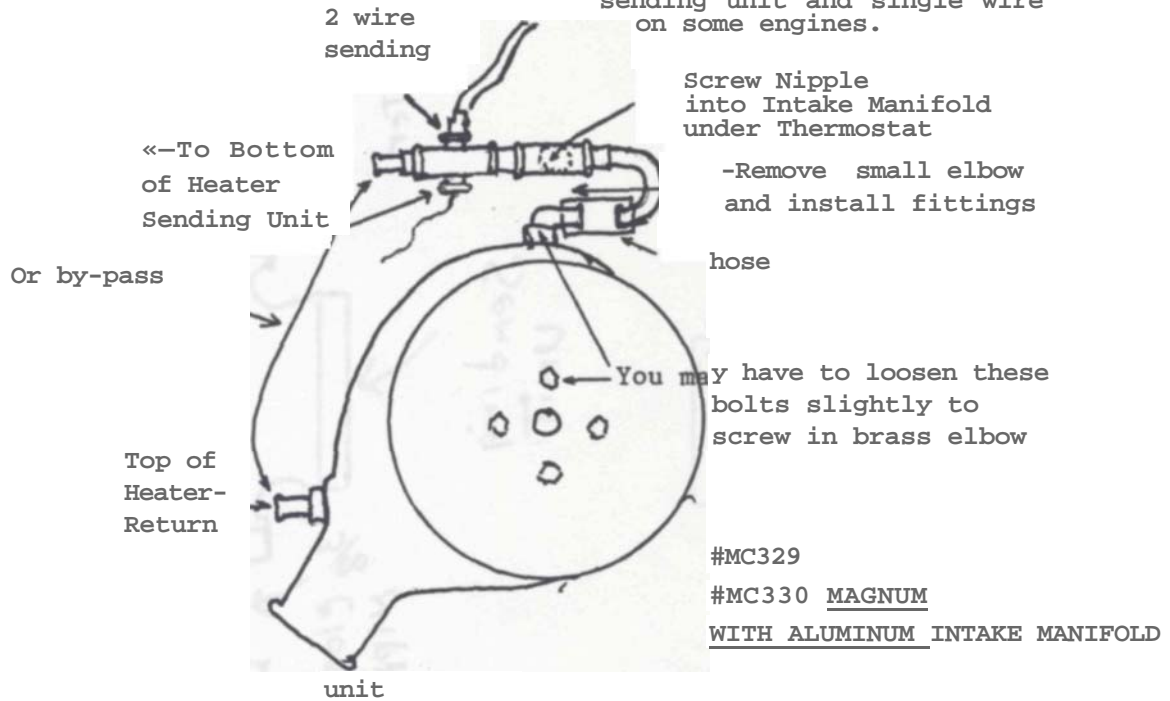


DIAGRAM 1

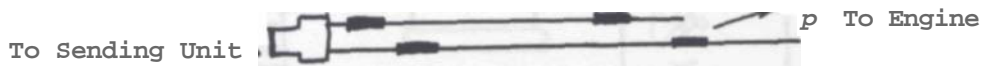
You may have to splice a piece of wire to the two wire sending unit and single wire on some engines.



On some engines, you may have to extend the 2 wire and single wire sending unit approximately 4" to 6"

WIRE SPLICE SET UP
(Make up Short As Possible)

Stagger splices & Crimp



KIT# MC-329 MAGNUM
KIT# MC-330 MAGNUM



Slip on Wire Cover After Splicing

LEFT SIDE RAW WATER TO RISER HOOK UP SUPPLEMENT

Using (2) #16 hose clamps, connect the 1" O.D. copper elbow to the 1" O.D. X 19" hose and to the 1" O.D. X 14" hose. Now connect the 1" O.D. X 14" hose to left hand riser.

Full system only - MC-330

HOSE CUTTING GUIDE

KIT # MC 329

KIT # MC 330

