

SAN JUAN FRESH WATER COOLING SYSTEMS

7.4 MPI MerCruiser W/Serpentine Belt

"Block Only Cooling"

Kit #MC-329 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 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. Remove and Save the temperature sending unit from the original thermostat housing.
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. The thermostat you will be

using in this unit is located in the original thermostat housing. After removing housing, look at the bottom side, there is a small round plastic retainer, Remove and lift out thermostat and SAVE. Discard original thermostat housing, lifting strap, bolts and plastic retainer.

6. Clean thermostat housing gasket surface on the intake manifold. Insert 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.

We recommend using pipe thread sealant when installing threaded fittings.

7. 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.

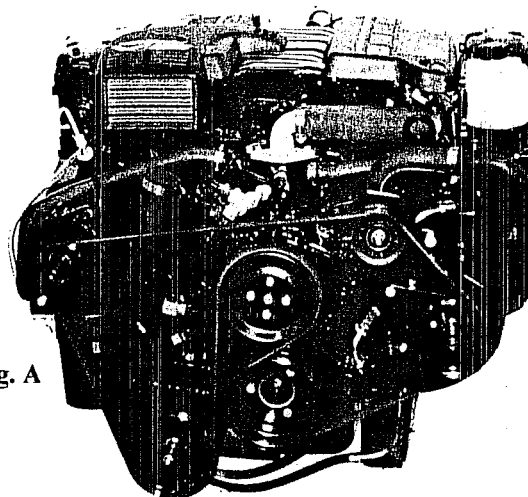


Fig. A

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8. If an auxiliary hot water heater is to be used, plumb the bottom of the heater to the by-pass outlet on the tee, the top of the heater to the outlet at the bottom 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. (16mm) 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.

Temperature sending unit

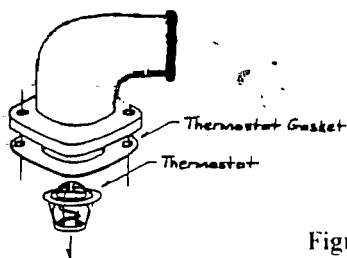


Figure 1

Mounting Bracket

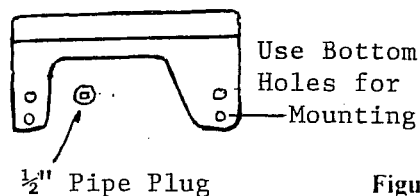
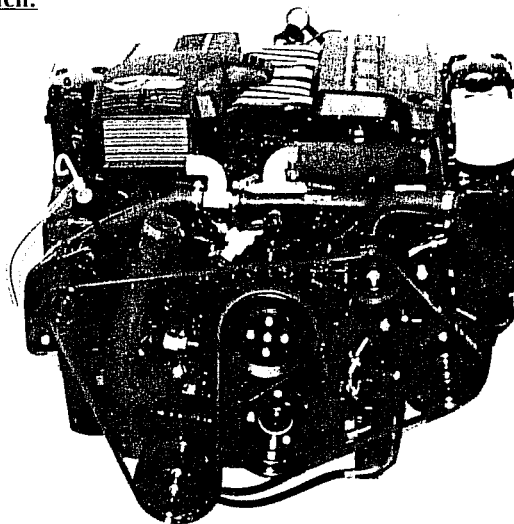


Figure 1A

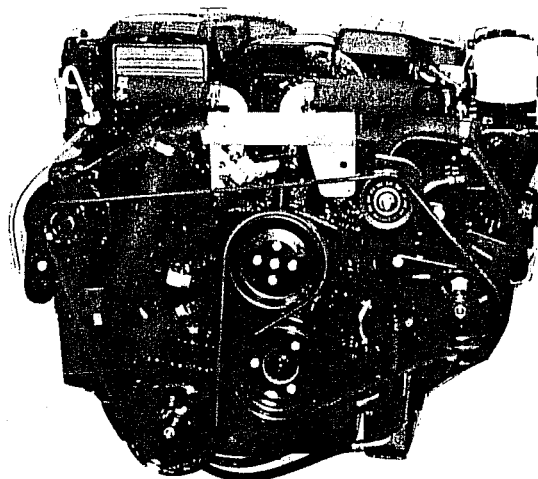
9. Installing the heat exchanger mount. Remove 7/16" bolt from idler bracket mount, discard. Using the 7/16" X 1-1/4" bolt supplied and the mount from the kit, hold mount up to engine front with cradle part up and forward. Start bolt through right mount hole and into idler bracket mount hole. Using the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

heads corresponding hole. Tighten both bolts firmly.

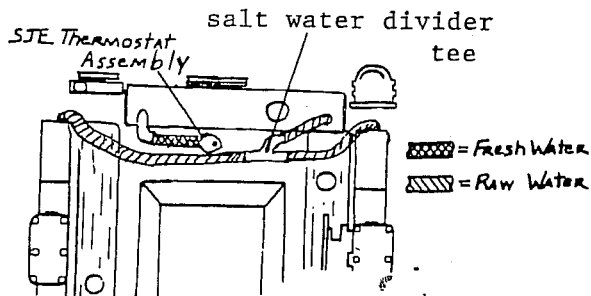
10. On most engines the dipstick may need to be bent left towards the alternator 3/4 of an inch. Also on most engines the lifting bracket (located in front of the right valve cover at the front of the motor), may need to be bent forward 3/4 of an inch.



11. 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) #64 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.



12. Connect 1-1/4" X 6-1/2" hose to the 1-1/4" elbow on heat exchanger. Clamp. Slip the other end over the 1-1/4" 90 degree copper tee, opening to left, clamp. Now connect the two 1" hoses to the tee that were previously attached to the thermostat housing. Clamp firmly. 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 the 1-1/2" X 9-1/4" hose and clamps from the SJE thermostat housing to the 1-1/2" OD elbow on right side of heat exchanger. Clamp firmly.



13. The zinc anode retards corrosion in the raw water side of the cooling system. Check occasionally and replace when 3/4 eroded. Check to make sure that all hose clamps are snug. Do Not over tighten. Also, check all hoses to be sure they do not chaff on engine parts, belts, etc., before moving on to the start up procedures.

14. Some engine parts are not protected by antifreeze in the system. Such as the sea water side of the heat exchanger. Drain by removing the zinc anode under the left end. Also remove the lower hose on the sea water pump (be sure to replace) and the oil cooler on the right side of engine down by the oil pan. Consult your engine manual for specifics.

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 accumulator tank. Use the (3) 5/16"

spring clamps to secure the hose. 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. Fill accumulator tank to cold line. Do not remove the fill cap when engine is Hot! Coolant capacity is approximately 14 quarts.

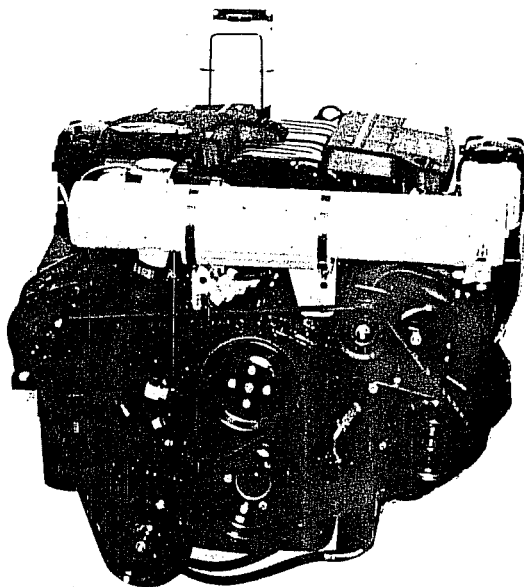


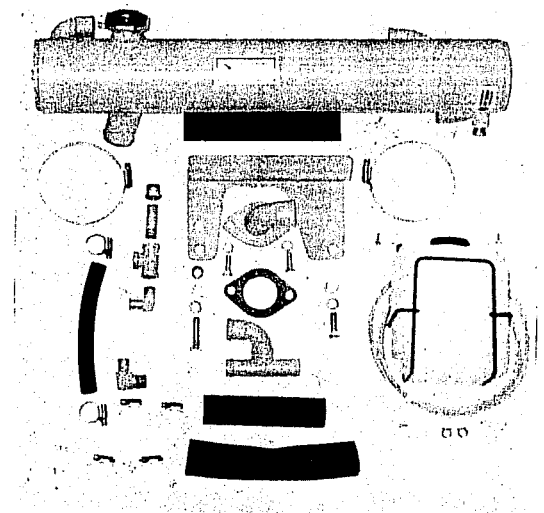
Photo of finished installation. Heat exchanger and all parts in kit, painted black.

For Installation/technical assistance, or information on other San Juan Engineering products. Phone (360) 734-1910 or Fax (360) 734-9683.

7.4 MPI MerCruiser w/Serpentine Belt "Block Only" Cooling "1998"

Parts List

		<u>Description</u>
MC 329-0	1	Installation Manual
MC 329-1	1	Heat Exchanger
MC 329-2	1	Thermostat Assembly
MC 329-3	1	Hanging Bracket for Heat Exchanger
MC 329-4	1	3/8" Pipe X 1/2" Spacer
MC 329-5	1	Expansion Tank Kit in Box
MC 329-6	1	1/8" X 3"X9" Rubber Pad
MC 329-7	1	Salt Water Tee
		<u>Hoses</u>
MC 329-8	1	1-1/2" X 9-1/4" Thermostat Housing to Heat Exchanger
MC 329-9	1	1-1/4" X 6-1/2" Salt Water Tee to Heat Exchanger
MC 329-10	1	5/8" X 7-1/2" By Pass Hose
		<u>Gasket</u>
MC 329-11	1	Thermostat, SJE 023-4A or GMT-1
		<u>Hose Clamps</u>
MC 329-12	2	#64 or #450
MC 329-13	2	#24
MC 329-14	2	#20
MC 329-15	2	#10
		<u>Fittings</u>
MC 329-16	1	3/8" Tee Brass
MC 329-17	1	1/2" X 3/8" Bushing Brass
MC 329-18	1	1/2" X 2" Nipple Brass
MC 329-19	1	54-EB 1/2" NPT X 5/8" Hose 90 Degree
MC 329-20	1	53-EB 3/8" NPT X 5/8" Hose 90 Degree
		<u>Bolts, Nuts & Washers</u>
MC 329-21	1	7/16" X 1-3/4"
MC 329-22	1	7/16" X 1-1/4"
MC 329-23	2	3/8" X 1"
MC 329-24	2	7/16" Lock Washers
MC 329-25	2	3/8" Lock Washers
MC 329-26	1	3/8" NPT Zinc Anode in Heat Exchanger
MC 329-27	2	7/16" Flat Washers



Packed by _____ Date _____

Form#MC329-98