

# SAN JUAN FRESH WATER COOLING SYSTEMS

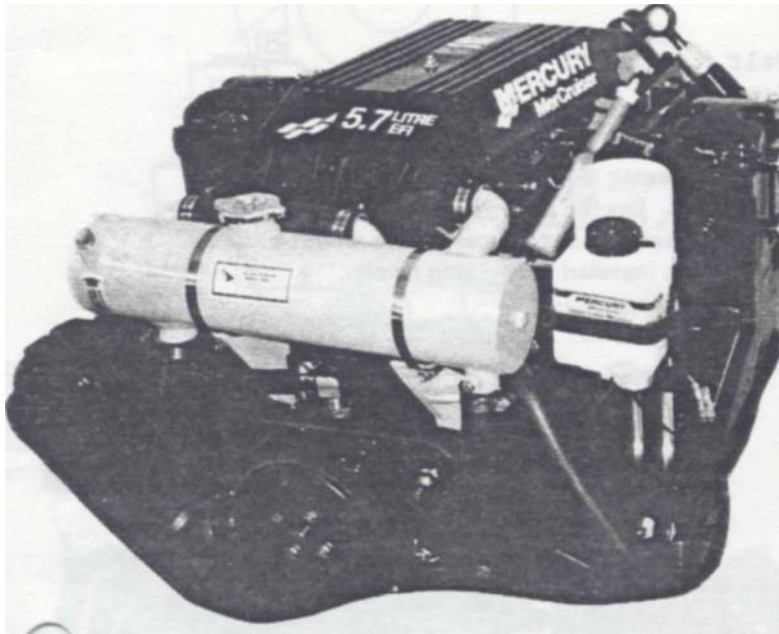
## 4.3/5.0/5.7 MERCUISER EFI "Block Only Cooling" With Flat Serpentine Belt Kit #MC-331 Installation Instructions "2000"

San Juan Engineering Heat exchangers provide thermostatically controlled fresh water cooling for marine engines. When installed on the engine, it does not increase the height, width, or length to the 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 40 years. San Juan Heat Exchangers prolong engine life by preventing corrosion in the cylinder block. A hot water heater or cabin heater is now possible with fresh water cooling.

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 power steering is on the right hand side.

2. Disconnect battery cables.



3. Locate original thermostat housing assembly at top, front, center of engine (Figure 1). Disconnect the wire connected to the high water temperature alarm sending unit and the wire connected to the water temperature sending 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) 9/16" head bolts at back end of housing. Carefully remove plastic retainer and thermostat, high water temperature alarm sender and water temperature sender from housing. These will be used later. Discard original thermostat housing, lifting strap and bolts. You will replace these with new parts from your SJE kit.

6. Remove the 1/2" pipe plug from the intake manifold and save for later. This is located slightly in front and to the left of the thermostat, next to left valve cover. Cross Assembly: Thread 1 2" X 3/8" bushing and 3/8" close nipple, 3/8" cross and 3/8" NPT to 5/8" hose 90 degree fitting together for by-pass hose. Thread temperature sending units into the threaded holes in cross. Tighten both senders firmly, using caution not to over tighten. We recommend using pipe thread sealant when installing threaded fittings. Always use a back-up wrench on threaded NPT female fitting ie. temperature sending units and zinc anode. The two wire connectors may not reach the sending unit you installed in the by pass brass tee. It may need to be pulled out of the loom and taped. **USE CAUTION:** Cut the loom, extend wires, make connection, and re-tape wires.

**SAN JUAN ENGINEERING & MANUFACTURING CO.**

766 Marine Drive Bellingham. Washington 98225 USA PH: (360) 734-1910 FAX: (360) 734-9683

7. Remove the 1/2" pipe plug located on the left hand side of the fresh water pump, just above the large 1-3/4" suction hose. Thread (1) 1/2" pipe to 5/8" hose straight fitting into this hole. Tighten. Using the 14" piece of 5/8" hose and (2) #8 hose clamps, plumb these two fittings together. For the cleanest installation, this hose length should be trimmed to suit. This is your fresh water by-pass and can also be used for a heater. For a heater plumb the bottom of the heater to the by-pass outlet next to the thermostat assembly, the top of the heater to the outlet at the water pump.

**IMPORTANT:** When connecting cabin 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 may cause the engine to overheat.

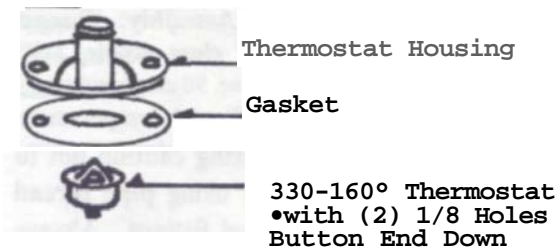


Figure 1

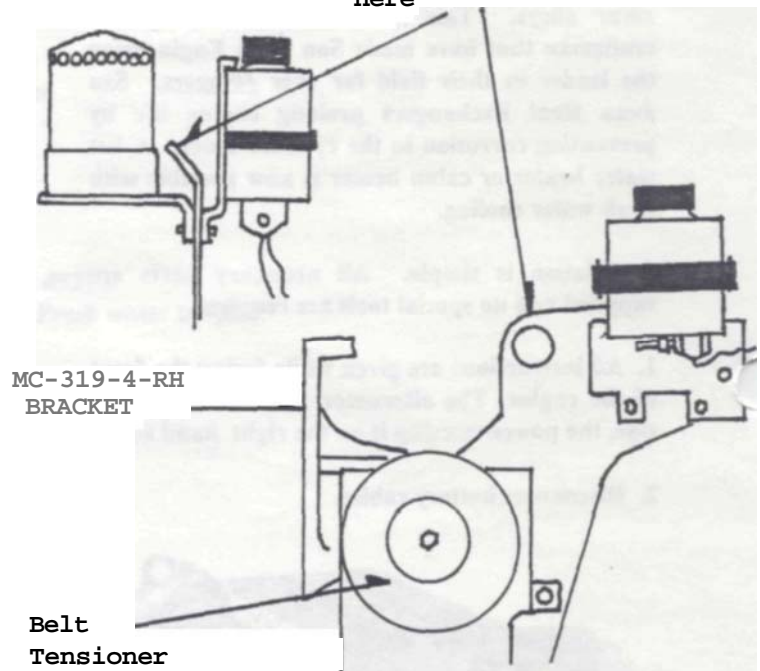
8. Clean thermostat housing gasket surface on the intake manifold. Insert original thermostat, spring end down (Figure 2). Position new gasket, supplied in your SJE kit between thermostat and thermostat housing. Secure thermostat housing with the (2) 3/8" X 1-1/4" bolts and lock washers. Tighten the two bolts firmly and evenly. Use the 1/2" pipe plug you saved from the intake manifold to plug the thermostat housing.

9. Remove the upper 3/8 bolt behind the belt tensioner (Figure #2). Install RH Heat exchanger bracket #MC-319-4RH using (2) 3/8 NC X 1-1/2"

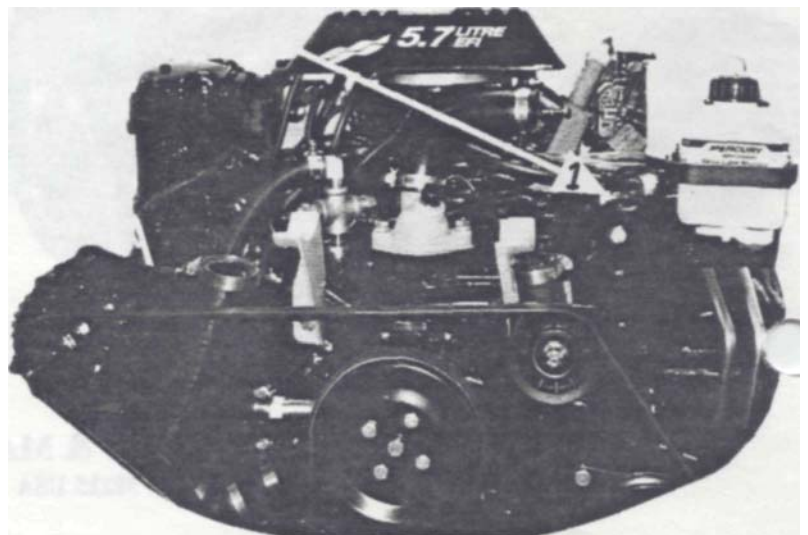
long bolt, washer, lock washer and (3) spacer washers behind mounting bracket.

10. Remove the 3/8 bolt located just above the engines circulating pumps left side mounting point. Install bracket MC-319-4-LH using (1) 3/8 NC X 1-1/4 Bolt, washer and lockwasher.

11. Using Figure #2 as reference, bend the lifting strap towards the rear of the engine just enough so when the heat exchanger is installed there is clearance between the heat exchanger and the lifting strap. Bend lifting strap here



12. Place the (2) rubber strip onto the cradle of the mounts then install heat exchanger on brackets. Use the large #64 hose clamps to secure. Leave heat exchanger loose on the mount until all hoses are installed then clamp firmly.



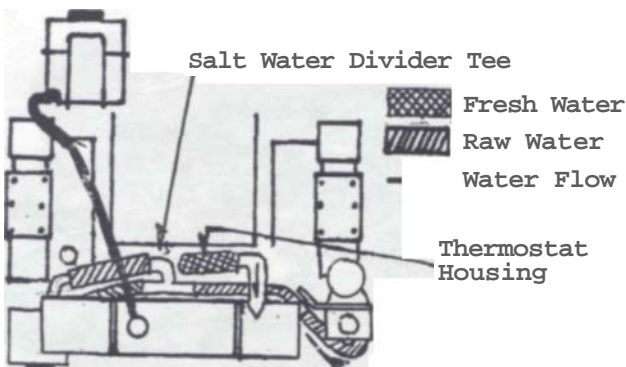
13. Using the 90 degree 1-1/2" hose and (2) #24 hose clamps provided in your kit, connect the thermostat assembly to the heat exchanger. Cut hose to fit. Slip the hose clamps loosely over the hose first, then slide the hose onto the thermostat assembly. The other end of the hose is connected to the 1-1/2" hose barb on the back, right hand side of the heat exchanger.

14. Carefully cut the 1-1/4" raw water hose on the right hand side of engine. Use the hose cutting guide to acquire the correct length. This hose is referred to as "Hose A". With the hose cut to length, slide original hose clamp loosely over hose and slip hose over the 1-1/4" hose nipple located on the lower right hand end of heat exchanger. Tighten hose clamp firmly.

15. Using the hose cutting guide, carefully cut the 1-3/4" fresh water suction hose located on the left hand side of the fresh water pump. Referred to as "Hose B" in the cutting guide. Loosely slide the original hose clamps over the hose and slip hose on to the 1-3/4" hose nipple located on the left hand bottom of the heat exchanger. Tighten hose clamp firmly.

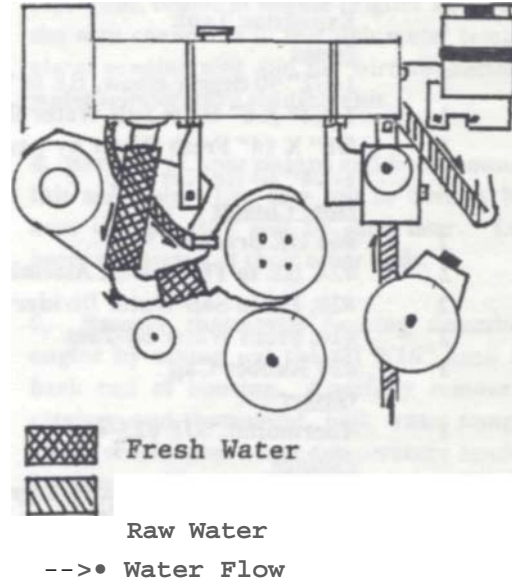
16. Now install the 1-1/4" W X 8" long hose with (2) #20 hose clamps between the salt water divider tee and the 1-1/4" OD elbow on the back left side of the heat exchanger. Now be sure all hose clamps are tight.

'Remote Mounted Expansion Tank



17. Carefully re-route the 3/4" raw water hose that leads from the bottom of the right hand exhaust manifold, it will now run above the Belt Tensioner bracket and behind bracket #MC-319-4-RH. Connect this hose to the salt water tee, clamp. Now connect the corresponding hose on the left side to the other end of the salt water tee.

18. 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 the 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.



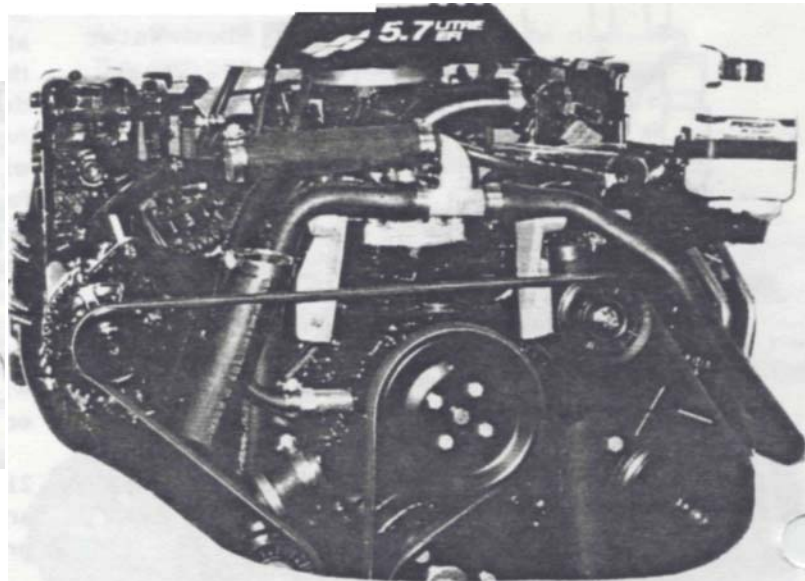
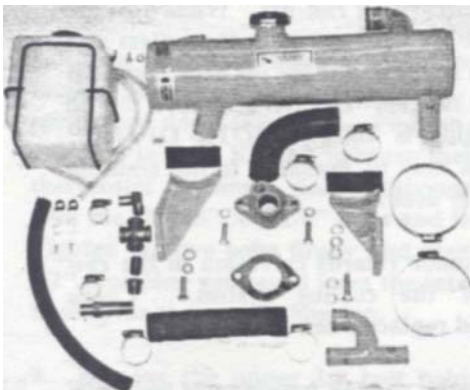
19. Fill accumulator tank to cold line. Fill through the fill cap neck on the heat exchanger until full. Continue to fill until water is overflowing at the fill neck. As it is IMPORTANT to remove all air from the system, leave the fill cap off after starting engine and be prepared to refill water into 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 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! NOTE OPTION: Expansion tank may be mounted in the transom area or wherever desirable.

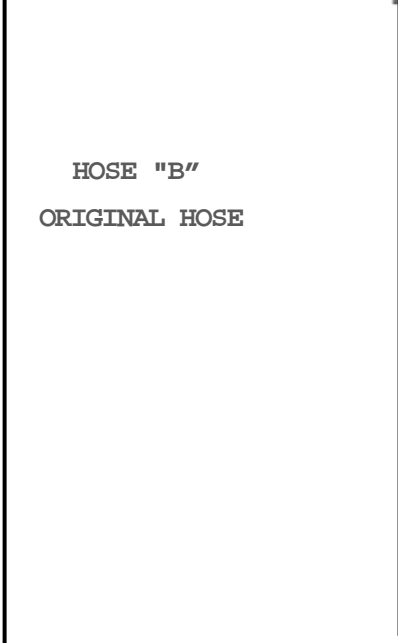
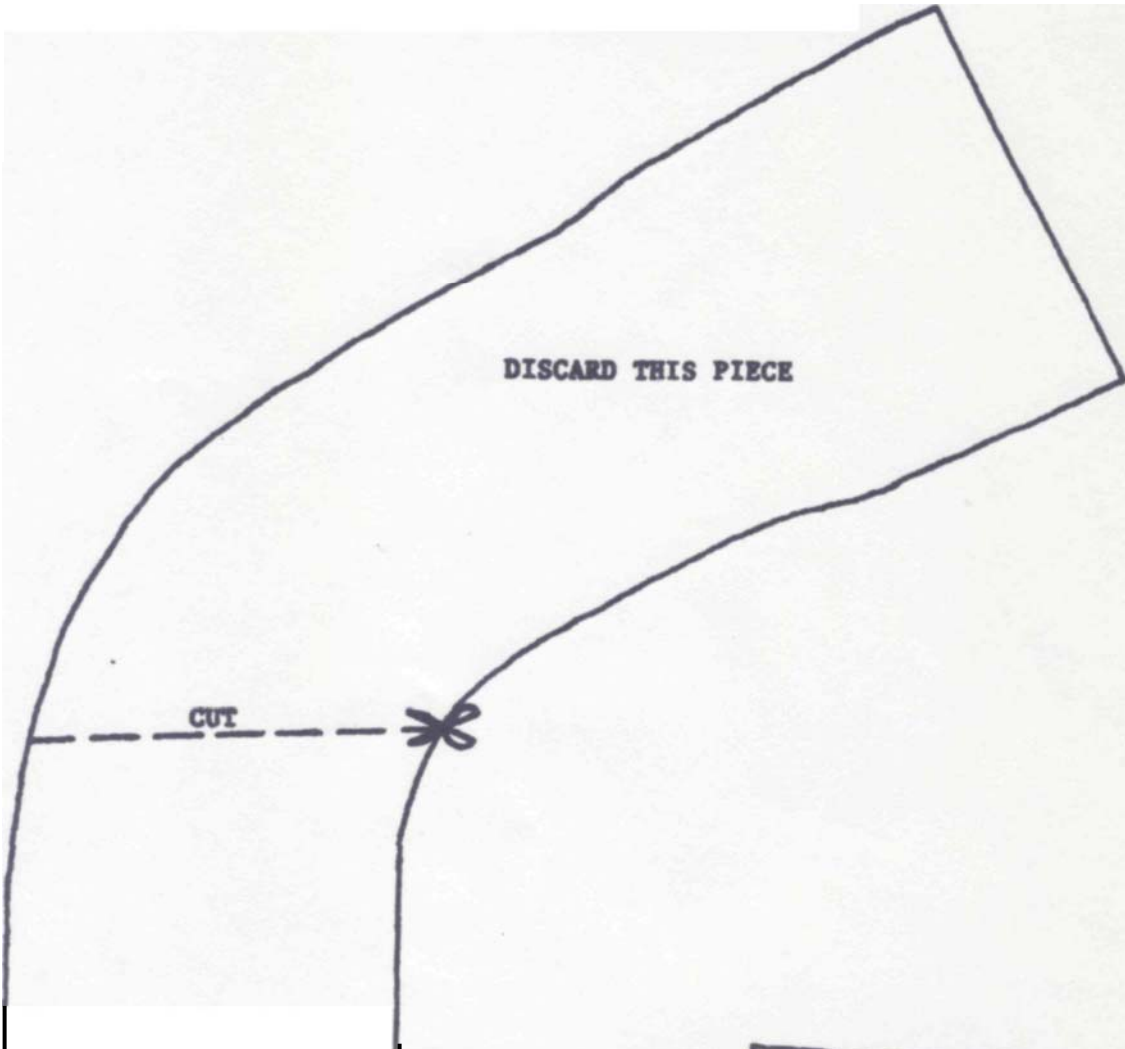
20. The zinc anode retards corrosion in the raw water side of the cooling system. Check occasionally and replace when 3/4 eroded.

21. Check to make sure all hose clamps and bolts are firmly tightened before moving on to start-up procedures.

4.3/5.0/5.7 MerCruiser EFL  
 "BLOCK ONLY COOLING" W/SERPENTINE BELT

<b>Parts List</b>		<b>Description</b>
MC-331-0	1	Installation Manual
MC-331-1	1	Heat Exchanger
MC-331-2	1	Salt Water Divider Tee
MC-331-3	1	Thermostat Assembly #2025
MC-331-4	1	RH Bracket 0MC319-4RH
MC-331-5	1	LH Bracket #MC319-5LH
MC-331-6	1	Expansion Tank
		<i>Hoses</i>
MC 331-7	1	1-1/2" 90 degree elbow, HE to Thermostat assembly
MC 331-8	1	1-14" X 8" He to Salt Water Divider Tee
MC 331-9	1	5/8" X 14" Fresh Water by-pass
MC 331-10	1	1-1/4" ID Rubber Cap
		<i>Hose Clamps</i>
MC 331-11	2	#64 HE Bracket
MC 331-12	2	#24, HE to Thermostat Assembly
MC 331-13	2	#20, HE to Salt Water Divider Tee
MC 331-14	2	#10, Fresh Water By-Pass
MC 331-15	1	#20 Rubber Cap
		<i>Gasket</i>
MC 331-16	1	Thermostat, SJE 023-4A
		<i>Fittings</i>
MC 331-17	1	3/8" NPT X 5/8" Hose, 90 degree #53EB
MC 331-18	1	1/2" NPT X 5/8" Hose, Straight, Fresh water by-pass
MC 331-19	1	3/8" X 1/2" Brass Bushings
MC 331-20	1	3/8" X Close Brass Nipple
MC 331-21	1	3/8" Cross
		<i>Bolts, Nuts and Washers</i>
MC 331-22	3	3/8" X 1-1/4"
MC 331-23	1	3/8" X 1-1/2"
MC 331-24	5	3/8" Flat Washers
MC 331-25	4	3/8" Lock Washers
MC 331-26	1	3/8" NPT Zinc anode
MC 331-27	2	Rubber Strips





**HOSE  
CUTTING  
GUIDE**

