

SAN JUAN FRESH WATER COOLING SYSTEMS

4.3, 5.0 - 5.7 Alpha and Bravo MerCruisers Full System Cooling Kit # MC-314 Installation Instructions

San Juan Engineering Heat Exchangers provide thermostatically controlled fresh water cooling for marine engines. Its compact installation fits within overall engine dimensions, allowing (or 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 craftsman that have made San Juan Engineering the leader in their field for over 30 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 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.

3. Locate original thermostat housing assembly at top, front, center of engine (Figure 1). Disconnect beige wire connected to the water temperature alarm sending unit on the left side and the beige/blue wire connected to the water temperature sending unit on the right side.

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, water temperature alarm sender and water temperature sender from housing. Discard original thermostat, thermostat housing, lifting strap, bolts and plastic retainer.

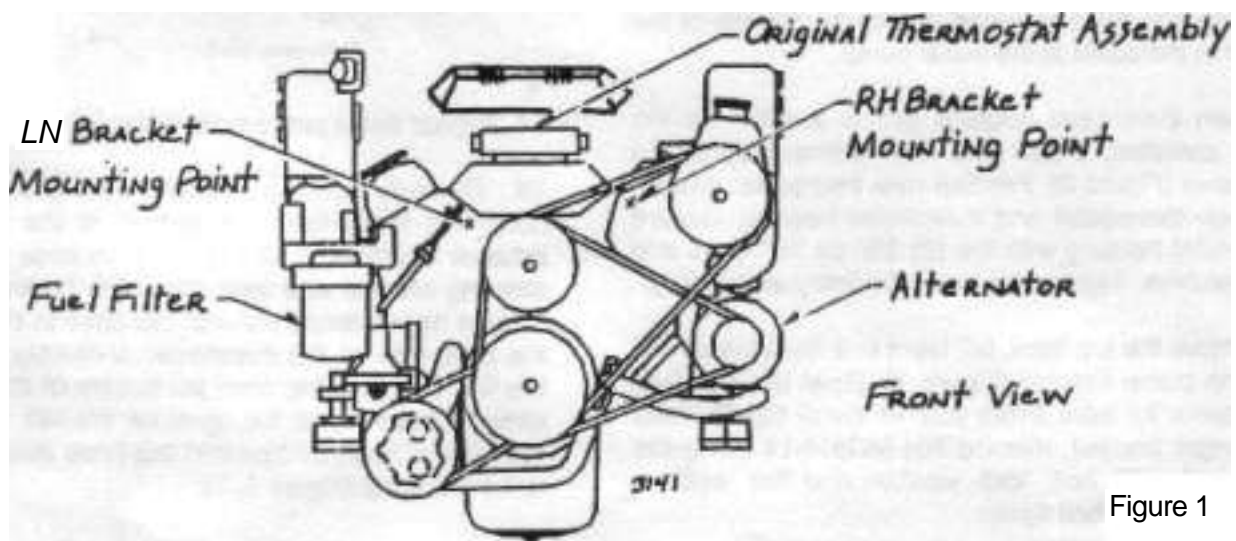


Figure 1

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6. Remove the new thermostat housing assembly from your SJE kit (Figure 2). With the NPT threaded holes facing away from you, thread the original water temperature sender, sender with the larger probe, into the threaded hole on the left. Thread the original water temperature alarm sender into the remaining threaded hole on the right. Tighten both senders firmly, using caution not to over tighten. We recommend using pipe thread sealant when installing threaded fittings.

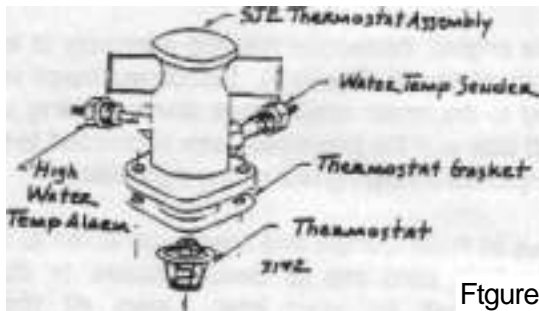


Figure 2

7. Remove the 3/8" pipe plug from the intake manifold. This is located slightly in front and to the left of the thermostat. (Figure 5). If your manifold has a 1/2" pipe plug, use the 3/8" to 1/2" NPT adaptor provided. Thread the brass 3/8" pipe to 5/8" hose 90° fitting into the hole or adaptor. This spud must face towards the back edge of the fuel filter. 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 the brass 1/2" pipe to 5/8" hose straight fitting into this hole. Tighten both fittings snugly. Using the 15" piece of 5/8" hose and (2) #8 hose clamps, plumb these two fittings together. This is your fresh water bi-pass and can also be used for a heater. For a heater plumb the bottom of the heater to the bi-pass outlet next to the thermostat assembly, the top of the heater to the outlet at the water pump.

8. Clean thermostat housing gasket surface on the intake manifold. Insert new SJE thermostat, spring end down (Figure 2). 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.

9. Remove the top front, left hand bolt from the power steering pump bracket (Figure 1). Save this bolt and flat washer for later. From your kit install the RH heat exchanger bracket, marked RH MC314-11 using the 3/8" by 1 1/2" bolt, lock washer and flat washer. Tighten bracket bolt firmly.

10. Add a lock washer and flat washer to the 3/8" by 1 1/4" bolt removed from the steering pump bracket. Install LH heat exchanger bracket, marked LH MC314-12 using the empty hole located on the top, inboard side of left head (Figure 1). Tighten bracket bolt firmly.

11. Remove the (2) 3/4" pipe plugs from the right hand exhaust manifold assembly (Figure 7). The top plug comes out of the riser, the bottom plug out of the exhaust manifold. Use the straight brass 3/4" pipe to 1" hose fitting from your SJE kit to thread into the hole in the riser.

12. Repeat these procedures to the left hand side.

13. Separate the right hand riser from the exhaust manifold by loosening the hose clamps at the exhaust outlet and then removing the (4) 9/16" head bolts on the top. With the assembly separated, thread the brass 3/4" pipe to 1" hose 90° fitting provided in your kit into the hole in the exhaust manifold. Be sure that this fitting is facing towards the front of the engine. Clean the gasket surface thoroughly and replace with the new block-off gasket provided. This gasket allows the exhaust manifold to be cooled with engine water rather than raw water. Re-install riser to the manifold, tighten the bolts and hose clamps evenly and firmly.

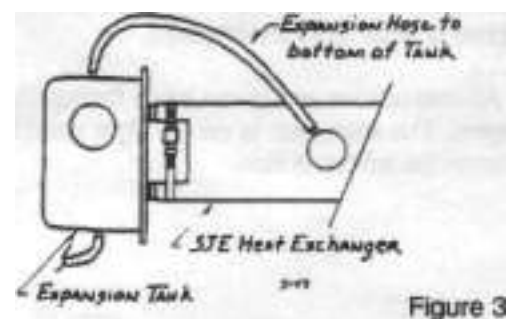


Figure 3

14. Repeat these procedures to the left hand side.

15. Carefully re-route the right hand 3/4" raw water hose that leads from the bottom of the right hand exhaust manifold. It will now run outside the power steering bracket and over the valve cover. With the original hose clamps connect this hose to the spud on the right side of the thermostat assembly. Connect the 3/4" hose leading from the bottom of the left hand exhaust manifold to the spud on the left. Again use the original hose clamps and this hose does not need to be re-routed (Figure 5, 7).

For installation and technical assistance, or additional information on other San Juan Engineering products, please call, (360) 734-1910 or by fax (360) 734-9633

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

16. Carefully cut the 1 1/4" raw water hose on the right hand side of engine (Figure 6). Use the hose cutting guide on the last page to acquire the correct length. This hose is referred to as "Hose A". With nose cut to length, slide original hose clamp loosely over hose and slip hose over the 1 1/4" spud located on the tower right hand end of heat exchanger. Tighten hose clamp firmly.

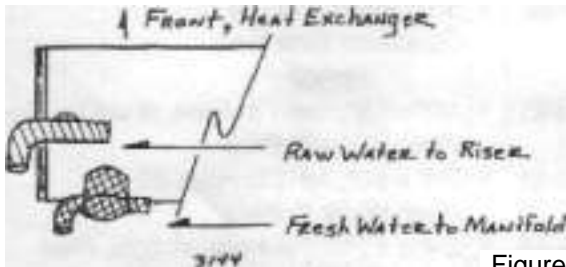


Figure 4

17. 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 clamp over the hose and slip hose on to the 1 3/4" spud located on the left hand bottom of the heat exchanger. Tighten hose clamp firmly. (Figure 6)

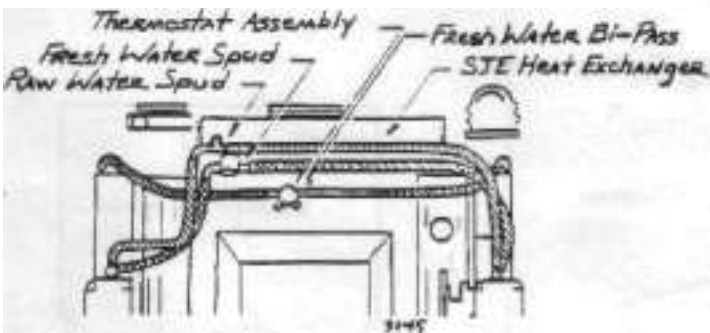


Figure 5

19. Use the 11" piece of 1" hose and (2) # 16 hose clamps to connect the brass fitting, threaded into the right hand exhaust manifold to the fresh water spud on the right end of the heat exchanger. Use the 24 1/4" piece of T" hose to connect the left side (Figure 4, 5).

20. Use the "S" hose and (2) # 16 hose clamps to connect the brass 1" straight fitting, threaded into the right hand riser, to the raw water spud on the right end of the heat exchanger. This hose length may need to be trimmed. Use the 21" piece of 1" hose to connect the left side (Figure 4, 5).

21. Secure the plastic expansion tank to aluminum bracket using the 1/4" bolts, washers and nuts. Position the plastic expansion tank assembly on the left end of heat exchanger. Use the #00 hose clamp to secure tank to heat exchanger (Figure 3). In some applications this assembly can be rotated back to clear engine hatch. 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 (Figure 3). The remaining hose is used as an overflow, attach one end to the spud at the top of the tank the other is routed towards the bilge.

22. The zinc-anode retards corrosion in the raw water side of the cooling system. Check occasionally and replace when 3/4 eroded (Figure 7). Check to make sure all hose clamps and bolts are firmly tightened before moving on to the start-up procedures.

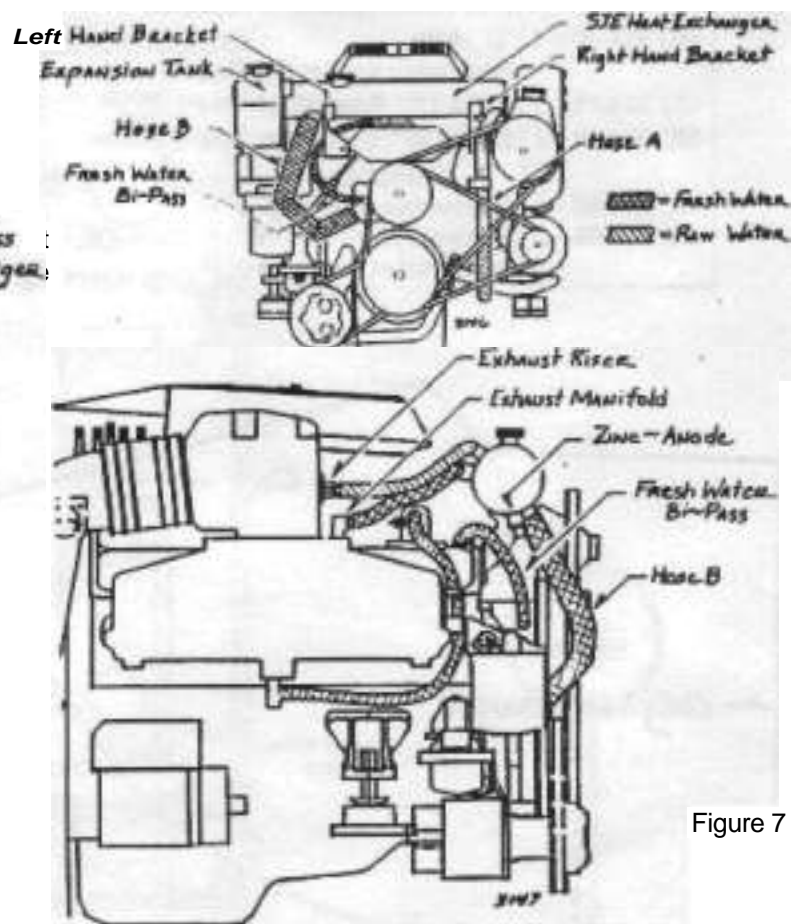


Figure 7

Figure 6



San Juan Engineering providing the highest quality of craftsmanship for the past 30 years.

Parts List 4.3, 5.0 - 5.7 Alpha and Bravo MerCruiser, Full Cooling System

MC 314-0	1	Installation Manual								
MC314-1	1	Heat Exchanger SJE ID# located on top RH end.	MC 314-17	3	<u>Hose Clamps</u> #80, Heat Exchanger Bracket & Expansion Tank					
MC 314-2	1	Thermostat Assembly	MC 314-18	8	#16, Riser, Manifold					
MC 314-11	1	RH Hanging Bracket	MC 314-19	2	#8, Fresh Water Bi-Pass					
MC 314-12	1	LH Hanging Bracket	MC 314-20	2	5/16" Spring Clamps Expansion Tank Hose					
MC 314-3	1	Expansion Tank			<u>Fittings</u>					
MC 314-4	1	Expansion Tank Bracket	MC 314-21	1	1/2"x5/8", NPT to Hose, straight, Fresh Water Bi-Pass					
MC314-E	1	Pressure Cap	MC 314-22	1	3/8"x5/8", NPT to Hose, 90 deg., Fresh Water Bi-Pass					
MC 314-6	1	Thermostat, 160 deg, with (2) 1/8 holes <u>Hoses</u>	MC 314-23	2	3/4" x 1", NPT to Hose, straight, Riser					
MC314-7	1	1" x 24 1/4" Fresh water spud to LH Manifold	MC 314-24	2	3/4" x 1", NPT to Hose, 90 deg					
MC 314-8	1	1"x21" Raw water spud to LH Riser	MC 314-25	1	3/8" NPT Female x 1/2" NPT Male <u>Bolts, Nuts and Washers</u>					
MC 314-9	1	1" x 11" Fresh water spud to RH Manifold	MC 314-26	2	3/8" X7/BT					
MC 314-10	1	"S" Hose Raw water spud to RH Riser	MC 314-27	1	3/8" X 1 1/2"					
MC 314-13	1	5/8" x 15", Fresh Water Bi-Pass	MC 314-28	1	3/8" Flat Washer					
MC 314-14	1	5/16" x 47". Expansion Tank Overflow <u>Gaskets</u>	MC 314-29	4	3/8" Lock Washer					
MC 314-15	1	Thermostat, SJE 023-4A	MC 314-30	1	3/8" NPT Zinc Anode					
MC 314-16	2	Exhaust/Riser, MC 330-TR, Block-Off, Solid Gasket No Slots Cut	MC 314-31	2	1/4" x 3/4"					
			MC 314-32	2	1/4" Nuts					
			MC 314-33	2	1/4" Flat Washers					
			MC 314-34	2	1/4" Lock Washers					

Hose Gutting Guide

