

# SAN JUAN FRESH WATER COOLING SYSTEMS

## 4.3/ 5.7 LX/V8 THUNDERBOLT V IGNITION

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### Full System Cooling

### Kit #MC-321 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 of 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 craftsman that have made San Juan Engineering the leader in their field for over 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 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 pump on the left hand side.
2. Disconnect battery cables.
3. Locate original thermostat housing assembly at top, front, center of engine (Figure 1). Disconnect wire connected to the high water temperature alarm sending unit and the wire connected to the water temperature sending unit. Be sure wires are re-connected to the same sending units.
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 high water temperature alarm sender and water temperature sender from housing. These will be used later. Discard original thermostat housing, thermostat, and lifting strap and bolts. You will replace these with new parts from your SJE kit.

6. Remove 1/2" pipe plug from the intake manifold, located slightly forward and to the left of the thermostat (figure 2). Use the 3/8" X 1/2" NPT adapter provided. Thread the 3/8" X 1-1/2" nipple, 3/8" Cross and 3/8" NPT X 5/8" hose, 90 degree fitting together. Remove 1/2" pipe plug located on left hand side of the fresh water pump, just above the 1-3/4" suction hose. Thread the brass 1/2" NPT to 5/8" hose fitting into this hole. Tighten firmly. Plumb the 5/8" X 15" hose and (2) #8 hose clamps between fittings. Thread the two sending units into 3/8" Cross. Connect wires.

7. Clean thermostat housing gasket surface on the intake manifold. Insert new SJE thermostat, with (2) 1/8" holes, pointed end up (figure 2). Position new thermostat gasket, between thermostat and thermostat housing. Secure thermostat housing with the (2) 3/8" X 7/8" bolts and lock washers. Tighten the two bolts firmly and evenly.

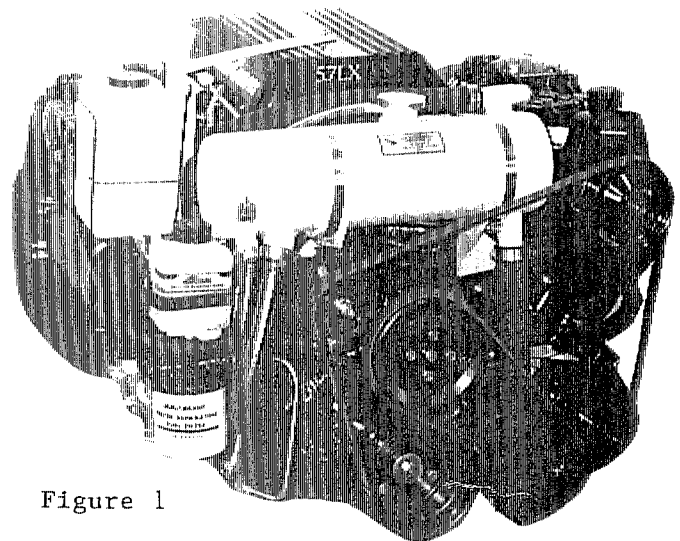


Figure 1

**SAN JUAN ENGINEERING & MANUFACTURING CO.**

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

8. If an auxiliary hot water heater is to be installed use 1/2" NPT hole in the lower housing on the left side to the LOWER FITTING on heater. Use the 3/8" NPT hole on the heater return fitting for return from the top of the heater.

**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.*

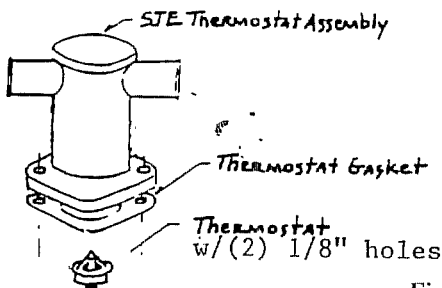


Figure 2

9. Remove the top front, right hand nut from the power steering pump bracket. Discard this nut. From your kit install the RH heat exchanger bracket, marked #MC314-11 RH using the 3/8" NYLOCK NUT. (NOTE: It is absolutely essential that you use the NYLOCK NUT).

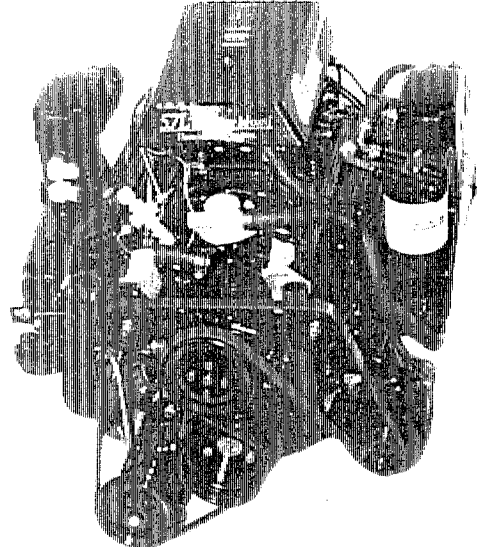
10. Remove upper 3/8" X 3/4" bolt from idler bracket, inboard side of left head. Install #320-12-LH bracket using 3/8" X 2" bolt, lock washer, flat washer and 3/8" X 3/4" spacer.

11. Remove the (2) 3/4" pipe plugs from the right hand exhaust manifold assembly. The top plug comes out of the riser, the bottom plug out of the top of the exhaust manifold. Use the brass 3/4"

pipe to 1" 90 degree 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 degree fitting provided in your kit into the hole in top of 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.



14. Repeat these procedures to the left hand side.

15. Replace the plastic drain fittings on bottom of the manifold with 3/4" NPT X 1" hose brass fitting provided. Re-connect original hoses.

16. 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 3).

17. Place heat exchanger on brackets keeping the right end approx. 1/4" from the steering pump. Use the large #80 or #550 hose clamps to secure. Tighten clamps firmly.

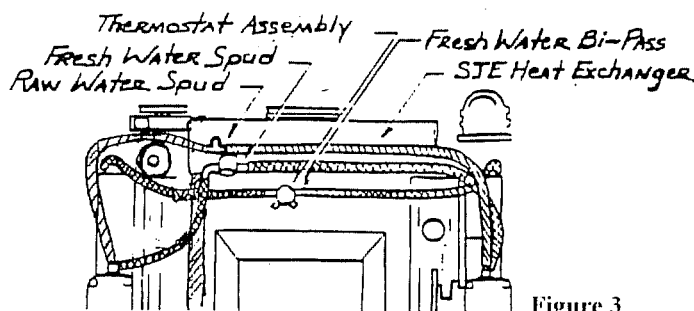
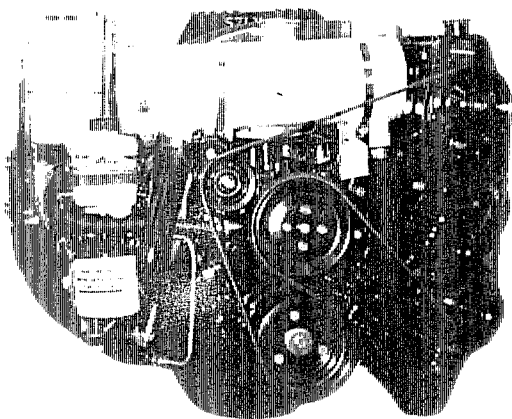


Figure 3

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



19. Using the hose cutting guide, carefully cut the 1-1/2" 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 1-1/2" spud located on the left hand bottom of the heat exchanger. Tighten hose clamp firmly.

20. Use the 9-3/4" 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 16" piece of 1" hose to connect left side.

21. Use the curved hose and (2) #16 hose clamps to connect the brass 1" 90 degree 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 19-1/2" piece of 1" hose to connect the left side (Figure 3).

22. With the exp. tank bracket facing you (Figure 4) thread the #88 hose clamp through the two slotted holes at the bottom of the bracket. Slide tail of the hose clamp and bottom of the bracket down between the left exhaust manifold and valve cover. Tighten hose clamp so bracket is loosely held in place. Attach exp. tank brace between the exp. tank bracket and the center stud of the flame arrester, using 1/4" washer in kit & existing nylock nut (do not overtighten). Use the top center hole and the 3/8" bolt, nut and lock washer provided in your kit to secure brace to bracket. After brace is secured tighten the #88 hose clamp firmly. Mount the exp. tank to the bracket using the 1/4" bolts, nuts and washers in your kit. Cut to fit the piece of 5/16" hose to connect the spud at the fill neck of the heat exchanger to the spud at the bottom back of the exp. tank. Use the (2) 5/16" spring clamps to secure the hose. Use the remainder of the hose as an overflow, attaching one end to the spud at the top of the tank and running the other towards the bilge. NOTE OPTION: Expansion tank may be mounted wherever desirable.

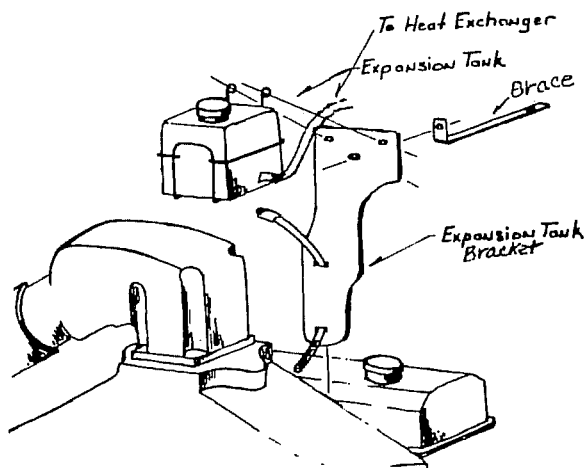


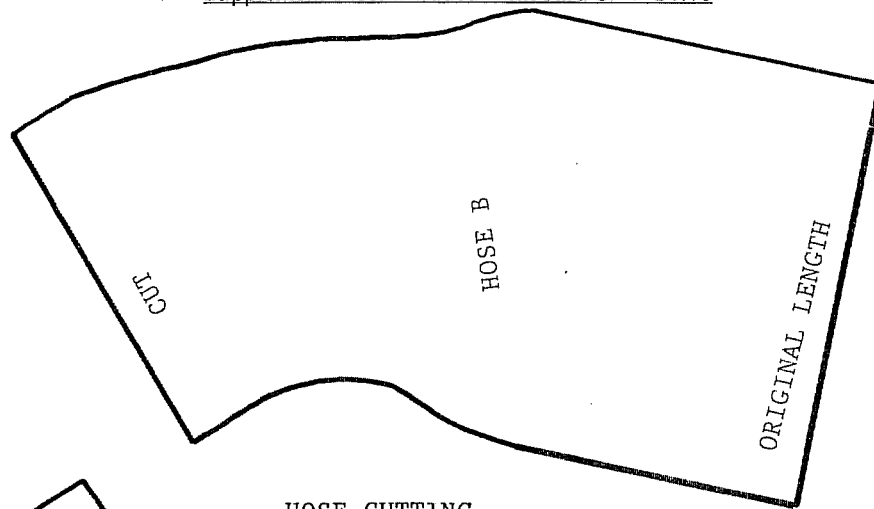
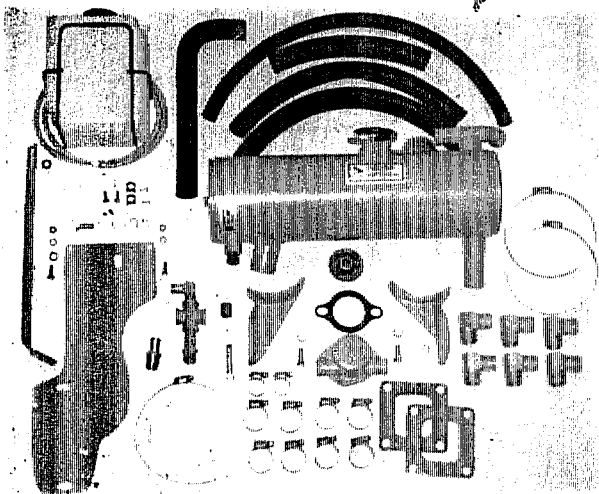
Figure 4

23. Check & Replace zinc anode when 3/4 eroded. Be sure hose clamps & bolts are firmly tightened before moving to the start up procedures.

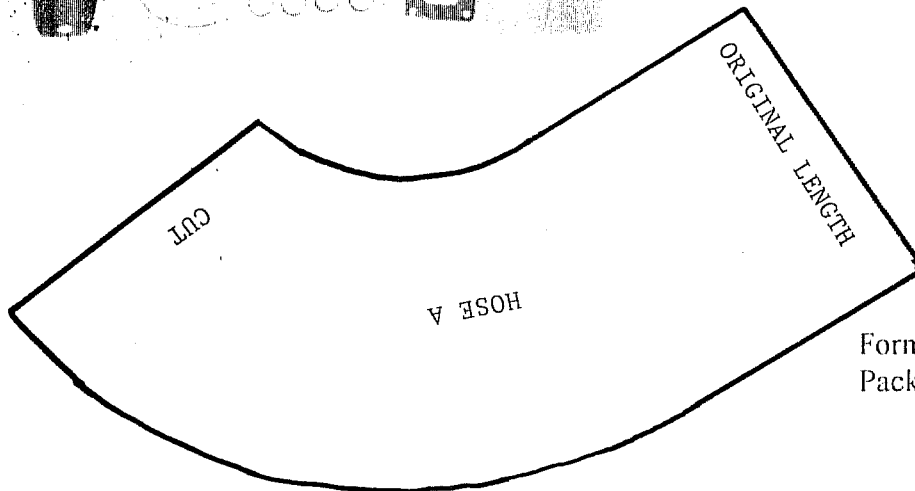
# 4.3/ 5.7 LX/V8 THUNDERBOLT V IGNITION "FULL SYSTEM" SERPENTINE BELT

## Parts List

MC 321-0	1	Installation Manual			
MC 321-1	1	Heat Exchanger	MC 321-19	2	<u>Hose Clamps</u>
MC 321-2	1	Thermostat Assembly	MC 321-20	1	#80 or #550 HE Bracket
MC 321-3	1	#MC 314-11 RH bracket	MC 321-21	8	#88, Exp. tank Bracket
MC 321-4	1	#MC 320-12 LH bracket	MC 321-22	2	#16, Riser, Manifold
MC 321-5	1	Expansion Tank	MC 321-23	2	#8, Fresh water by-pass
MC 321-6	1	Expansion Tank Bracket			5/16" Spring Clamps exp tank hose.
MC 321-7	1	Exp Tank bracket Brace			<u>Fittings</u>
MC 321-8	1	Pressure Cap	MC 321-24	1	1/2" X 5/8", NPT to hose,
MC 321-9	1	Thermostat 160 degree with (2) 1/8" holes	MC 321-25	6	fresh water by-pass.
MC 321-10	1	3/8" X 3/4" Spacer			3/4" X 1", NPT to hose.
		<u>Hoses</u>			90 degree
MC 321-11	1	1" X 16" Fresh water spud to LH Manifold.	MC 321-26	1	3/8" NPT Cross
MC 321-12	1	1" X 19-1/2" Raw water spud to LH Manifold.	MC 321-27	1	3/8" X 2" Nipple
MC 321-13	1	1" X 9-3/4" Fresh water spud to RH Manifold	MC 321-28	1	3/8" to 1/2" Bushing
MC 321-14	1	Curved hose #71218 raw water spud to RH Riser	MC 321-29	1	3/8" X 5/8" 90 degree
MC 321-15	1	5/8" X 15" Fresh water by-pass			<u>Bolts, Nuts &amp; Washers</u>
MC 321-16	1	5/16" X 47", exp. tank overflow, cut to fit.	MC 321-30	3	3/8" X 7/8"
		<u>Gaskets</u>	MC 321-31	1	3/8" X 2"
MC 321-17	1	Thermostat, SJE 023-4A	MC 321-32	2	3/8" Flat Washer
MC 321-18	2	Exhaust/Riser, MC330TR block-off, solid gasket	MC 321-33	4	3/8" Lock Washer
			MC 321-34	1	3/8" NPT Zinc Anode
			MC 321-35	2	1/4" X 3/4" Bolts
			MC 321-36	2	1/4" Nuts
			MC 321-37	1	1/4" Flat Washers
			MC 321-38	2	1/4" Lock Washers
			MC 321-39	1	3/8" Nut
			MC 321-40	1	3/8" Nylock Nut
					1 Supplement sheet included if Inboard or V-Drive



HOSE CUTTING GUIDE



Form #MC 321-97/98

Packed By \_\_\_\_\_ Date \_\_\_\_\_