

SAN JUAN FRESH WATER COOLING SYSTEMS

5.0/5.7 GSI VOLVO

"Block Only" Cooling

Kit #V-112 Installation Instructions

San Juan Engineering Heat Exchangers provide thermostatically controlled fresh water cooling for marine engines. This installation adds 3" length to the front of the engine. Still 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 Engineering Heat Exchangers prolong engine life by preventing corrosion in the cylinder block. A anti-freeze solution can be added to the coolant if boat is used in extreme cold weather. Draining the sea water side of 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 the battery cables.

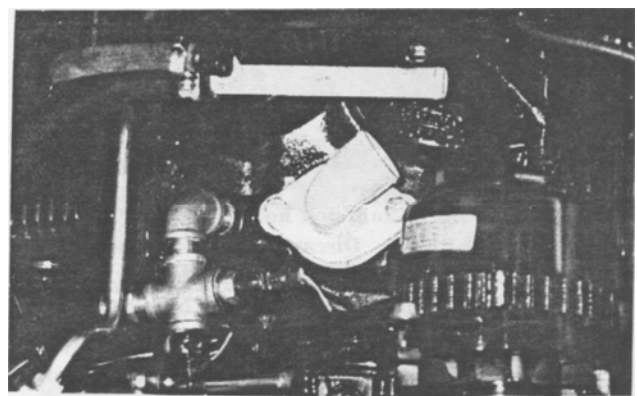
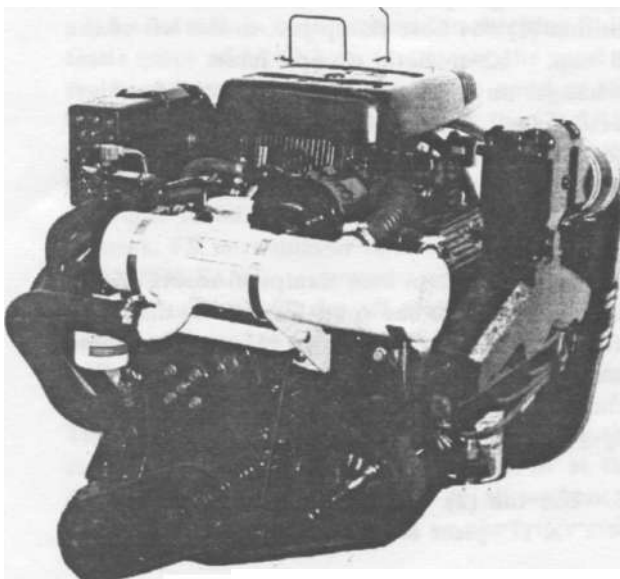
3. Locate the original thermostat housing assembly at the top, front, center of the engine. Remove all the hose clamps and the hoses connected to this

assembly. Use care not to destroy hoses or hose clamps, they will be used later. Leave all hoses connected at their other ends. Remove the 1/4" NPT X 1/4" hose 90 degree fitting from top of housing and save for later. Disconnect temperature sending units and save for later.

4. Remove thermostat housing from engine by taking out the (2) 9/16" head bolts. Discard original thermostat housing, thermostat, lifting strap and bolts. You will replace the new parts from your SJE kit. Clean thoroughly the thermostat gasket surface on intake manifold.

5. Remove temperature sender threaded into the intake manifold and save. This is located just to the left of the thermostat recess. **INSTALL FIRST. THE CROSS ASSEMBLY:** 1/2" nipple, 1/2" elbow, 1/2" nipple, 1/2" cross. 1/2" to 5/8" hose fitting for by-pass hose then install sending units as per photo below. Remove the 1/2" pipe plug located on the left side of the fresh water pump, just above the 1-3/4" hose spud. Thread the provided 1/2" NPT X 5/8" hose straight fitting into this hole. Using the 14" piece of 5/8" hose and (2) #10 hose clamps, plumb this fitting to the adapter in the cross. This is your fresh water by-pass and can be used for a heater.

6. If an auxiliary hot water heater is to be used, remove by-pass hose and run hose from the 1/2" X 5/8" hose fitting on cross to the lower fitting on your heater, and connect the top hose fitting from your heater to the other by-pass hose fitting on your fresh water pump.



San Juan Engineering and Manufacturing Co.

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

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.

Q, Check complete system for leaks after heater is connected into cooling system. **TK** 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.



SJE Thermostat housing, Thermostat, & Gasket

Figure 1

7. Retrieve from your SJE kit the new thermostat housing (Figure 1). Insert new thermostat spring end down into recess in manifold. Position new thermostat gasket between thermostat and thermostat housing. Secure thermostat housing, 1-1/2" spud facing to the right, with (2) 3/8" X 7/8" bolts and lock washers. Tighten bolts firmly and evenly. Connect wires to both temperature senders.

WARNING: Be sure thermostat fits into* recess before tightening bolts, so as not to bend thermostat housing flange.

8. Remove the bottom bolt holding the alternator bracket to the block. Discard this bolt. Using the 3/8" X 2-3/4" bolt, flat washer and lock washer, mount right hand heat exchanger bracket, RH \ 101-4 so heat exchanger will sit level in the bracket saddle. Leave bolt loose for now.

MI sonic engines, use 1/4" NIT pipe plu» to plug the hole in m>\ water "T"

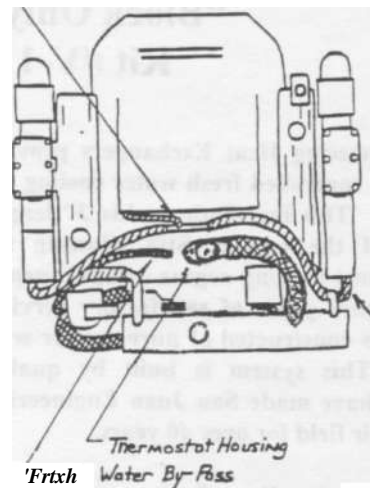


Figure 2

9. Remove the right hand bolt holding the fuel filter housing to the left head. Discard this bolt. Use the 3/8" X 6" bolt, (could be 3/8" X 5-1/2" & 3-3/4" spacer on some new engine) flat washer, lock washer and 3/8" X 4-3/16" pipe spacer to mount the left hand heat exchanger bracket, LH VI01-5. Leave bolt loose for now.

10. Install the heat exchanger bracket brace using the (2) 3/8" X 1-1/4" bolts, flat and lock washers for the left side and (1) 3/8" X 1" bolt, flat and lock washer for the right side. Tighten bracket bolts and brace bolts firmly and evenly.

11. Position (1) #64 hose clamp over left end of heat exchanger, just inside the 1" raw water inlet. Position (1) #64 hose clamp just to the left of the fill cap. Keep both clamps loose. Set heat exchanger on brackets with left end tight against electric fuel pump bracket. Heat exchanger should sit level (Figure 3). Tighten both hose clamps firmly around heat exchanger and bracket saddles.

12. Use the original hose clamps to secure the 1" raw water hose to the spud located on the back, left end of the heat exchanger. Use original hose clamps to secure 1-1/2" fresh water hose to the spud on the front, left end of heat exchanger (figure 3).

13. Use the (2) #24 hose clamps to secure the 1-1/2" X 17" piece of flex hose between the 1-1/2"

spud on the back, right end of heat exchanger and the 1-1/2" spud on the thermostat housing. Tighten both clamps firmly (Figure 3).

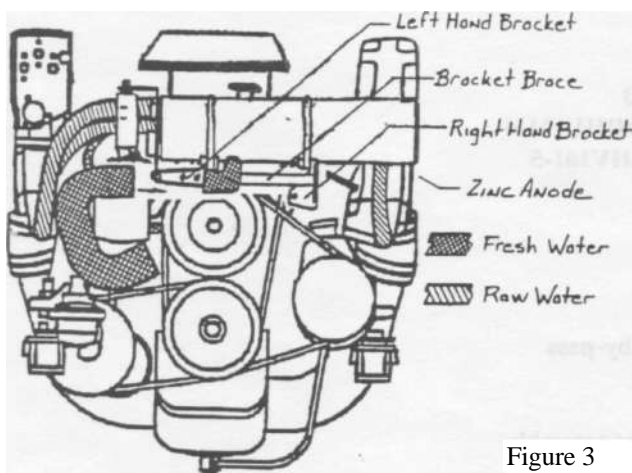


Figure 3

14. Install 1/4" NPT X 1/4" hose 90 degree fitting into 3/4" X 3/4" X 1/4" NPT Tee. Hose bib should be pointing to the short end. Cut 3/4" hose on front of right exhaust manifold according to hose cutting guide. Connect right hose to lower 3/4" fitting on heat exchanger tee. Connect piece of remaining hose to the 3/4" 90 degree elbow on tee, route hose behind thermostat housing, connect to long end of 3/4" X 3/4" X 1/4" NPT Tee. Route left exhaust manifold hose up and behind brass cross. Then connect to short leg of tee, install 1/4" hose to 1/4" 90 degree fitting on tee.

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 expansion tank. Use the (2) 5/16" spring clamps to secure the hose. Fill through the fill cap neck on the heat exchanger until full. Continue to fill until water is overflowing at the fill neck. Fill accumulator tank to cold line. 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 RP.V1 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!** Coolant capacity is approximately 14 quarts. **NOTE OPTION:** Expansion tank may be mounted in the transom area or wherever

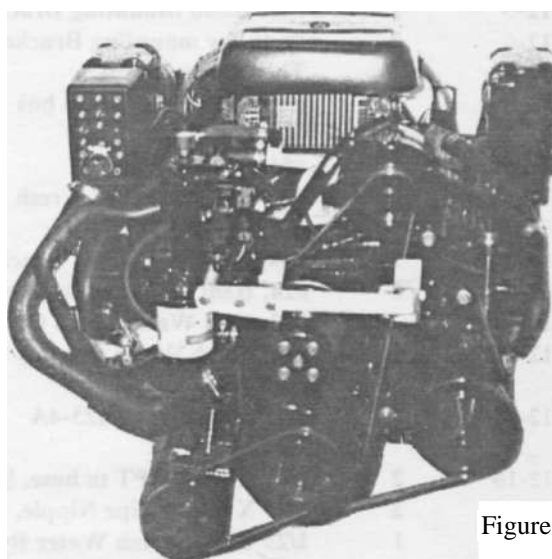
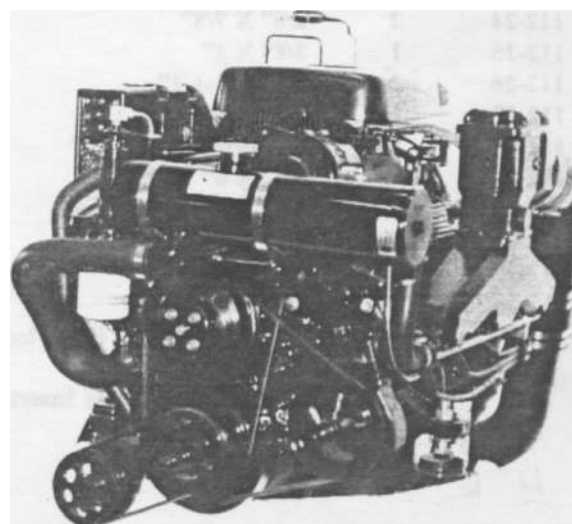


Figure 4

desirable.

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



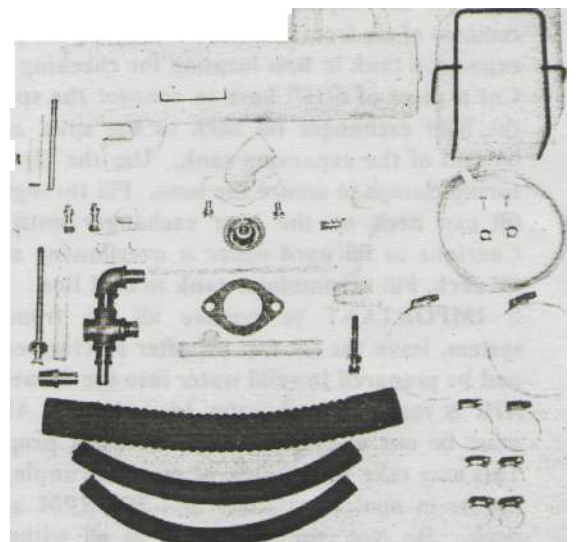
Use caution when tightening threaded fittings. Never over tighten and always use back-up wrench on threaded NPT female fittings i.e., temperature senders and zinc anode.

<u>Parts List</u>		<u>Description</u>	
V 112-0	1	Installation Manual	
V 112-1	1	Heat Exchanger	
V 112-2	1	Thermostat Housing	
V 112-3	1	Mounting bracket Brace #V101-3	
V 112-4	1	Right Hand Mounting Bracket #RHVI01-4	
V 112-5	1	Left Hand Mounting Bracket #LHVI01-5	
V 112-6	2	Pads, for mounting Bracket	
V 112-7	1	Thermostat	
V112-8	1	Expansion tank kit in box	
		<u>Hoses</u>	
V 112-9	1	#81171 Flex Hose	
V 112-10	1	5/8" X 14", Fresh water by-pass	
		<u>Hose Clamps</u>	
V 112-11	2	#64, Heat exchanger Brackets	
V 112-12	2	#24, Heat exchanger to thermostat assembly	
V 112-13	2	#12, Raw Water Cross Over "T"	
V 112-14	2	#10, Fresh Water By-pass	
		<u>Gaskets</u>	
V 112-15		Thermostat, SJE 023-4A	
		<u>Fittings</u>	
V 112-16	2	1/2" X 5/8", NPT to hose, Straight, Fresh Water By-pass	
V 112-17	2	1/2" X Close, Pipe Nipple, Fresh Water By-pass & Temp Sender	
V 112-18	1	1/2" Cross, Fresh Water By-pass & Temp Sender	
V 112-19	1	1/2" Elbow	
V 112-20	1	3/8" to 1/2" Reducer	
V 112-21	1	3/8" X 4-3/16", Pipe Spacer, Left Hand Bracket	
V 112-22	1	(Extra) 3/8" X 3-3/4" Pipe Spacer, Left Hand Bracket	
V 112-23	1	3/4" X 1/4" NPT X 7", Copper T, Raw Water Cross Over T	
		<u>Bolts, Nuts and Washers</u>	
V 112-24	2	3/8" X 7/8"	
V 112-25	1	3/8" X 1"	
V 112-26	2	3/8" X 1-1/4"	
V 112-27	1	3/8" X 2-3/4"	
V 112-28	1	(Extra) 3/8" X 5-1/2"	^
V112-29	1	3/8" X 6"	Vgt
V 112-30	5	3/8" Flat Washer	
V 112-31	7	3/8" Lock Washer	
V 112-32	3	3/8" Nuts	
V 112-33	1	3/8" Zinc Anode	
V 112-34	1	(Extra) 1/4" NPT Pipe Plug	

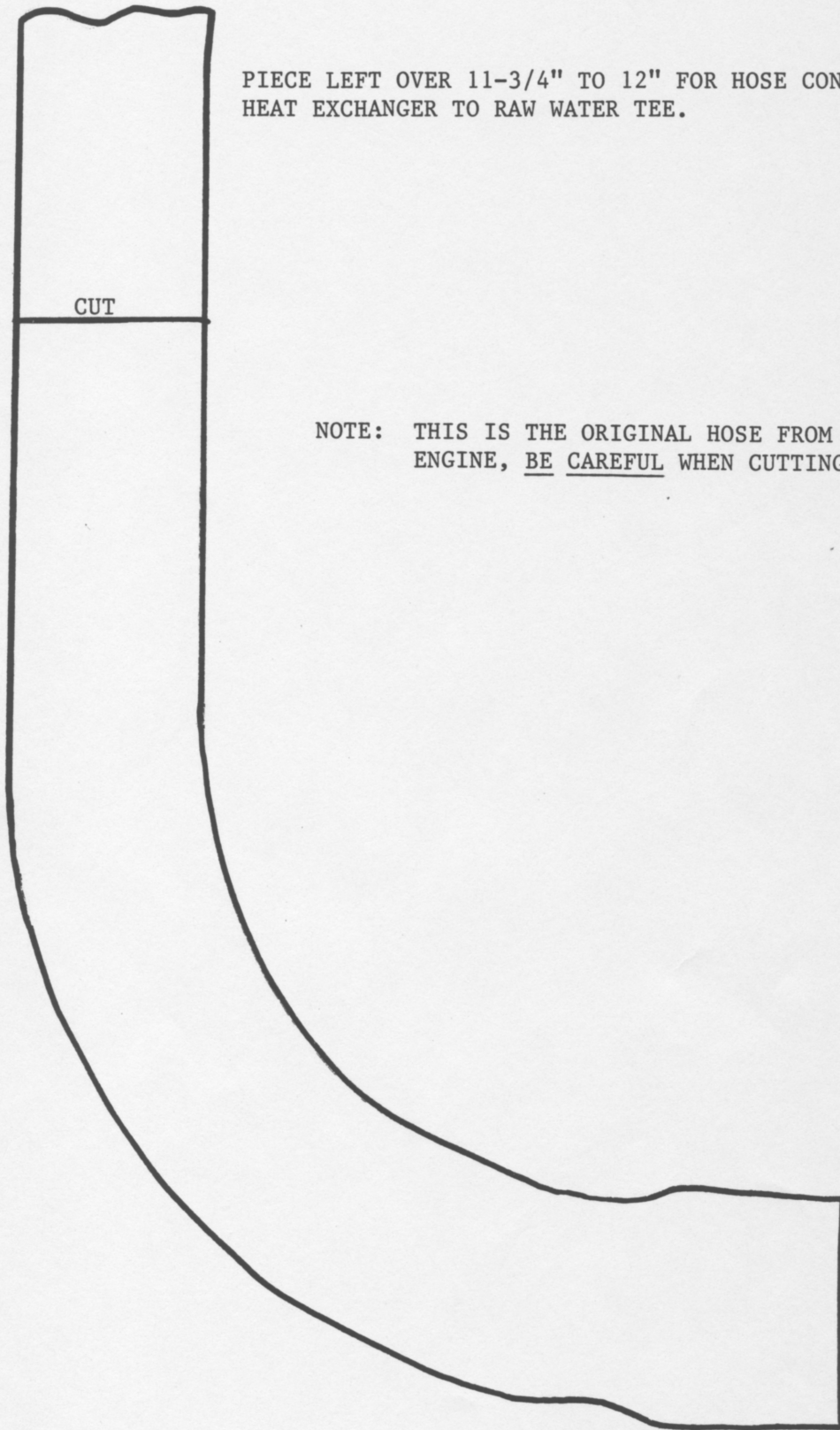
Hose Cutting Guide Insert Sheet

Packed by

Date



KIT #V112 HOSE CUTTING GUIDE (TO SCALE)



PIECE LEFT OVER 11-3/4" TO 12" FOR HOSE CONNECTING
HEAT EXCHANGER TO RAW WATER TEE.

NOTE: THIS IS THE ORIGINAL HOSE FROM THE
ENGINE, BE CAREFUL WHEN CUTTING