TOYOTA MARINE Sports

Technical Service Bulletin #50

V-Drive Fresh Water Cooling System

May 30, 2000

NOTE: The Shower option cannot be installed on any model with the Closed Water Cooling system.

Parts Needed

Fresh Water Cooling Kit, V-Drive – MEH0011108

Kit Includes

Heat Exchanger, VD – MEH001110907	Fill Neck Assembly w/cap, VD – MEH001110902
Tubular Thermostat Housing – MEH001110803	Bracket, Heat Exchanger, VD – MEH001110901
Expansion Tank – MEH001110805	Gasket, Throttle body – 9043020017
Gasket, Thermostat housing – MEH001110807	Hose, VD, water pump to heat exchange – MHO001110903
Hose, Tube assembly top inlet to thermostat housing – MHO00111809	Hose, Tube assembly middle inlet to thermostat housing – MHO001110810
Hose, VD, tube assembly bottom to heat exchange – MHO001110904	Hose, Fill neck assembly, top inlet to thermostat - MHO001130301
Hose, VD, Fill neck, bottom, 90deg to heat exchange – MHO001130905	Sleeve, Thermostat housing – MEH001110806
Hose, VD, Port exhaust manifold to heat exchange – MHO001110907	Qty 2 – Hose, expansion tank inlet & outlet – MHO001110816
Qty 2 – Bolt, 5/16-18X2-1/2”,22 – MFSY200548	Qty 4 – Hose clamp, VT300i #25 – 9008046259
Qty 8 - Hose clamp, VT300i #23 – 9008046260	Qty 4 – Hose clamp, VT300i #8 – 9008046261
Qty 4 - Hose clamp, #24, SS – MHC0010024	Qty 4 – Hose clamp, #72, SS – MHC0010072
Pads, DD, set of 15, nonskid – MGR0011502	Bolt, M10-1.25, 18mm – 91512-B1016
Bolt, M8-1.25, 12mm – 9034108005	Adhesive, silicone, 3M, 3oz – MCT0011302
Pads, VD, set of 15, nonskid – MGR0011502	Qty 2 – Bolt, 5/16-18X2-1/2”,SS – MFSY200548

Tools Needed

Philips screwdriver	Flathead screwdriver	Ratchet
18mm socket	12mm Socket	Hose puller
Liquid dish soap	Hose cutter	10mm Allen wrench

⚠ **WARNING**

Always be sure to wear OSHA approved eye protection when using a drill or other rotary tools as these have the potential to throw debris into the air.

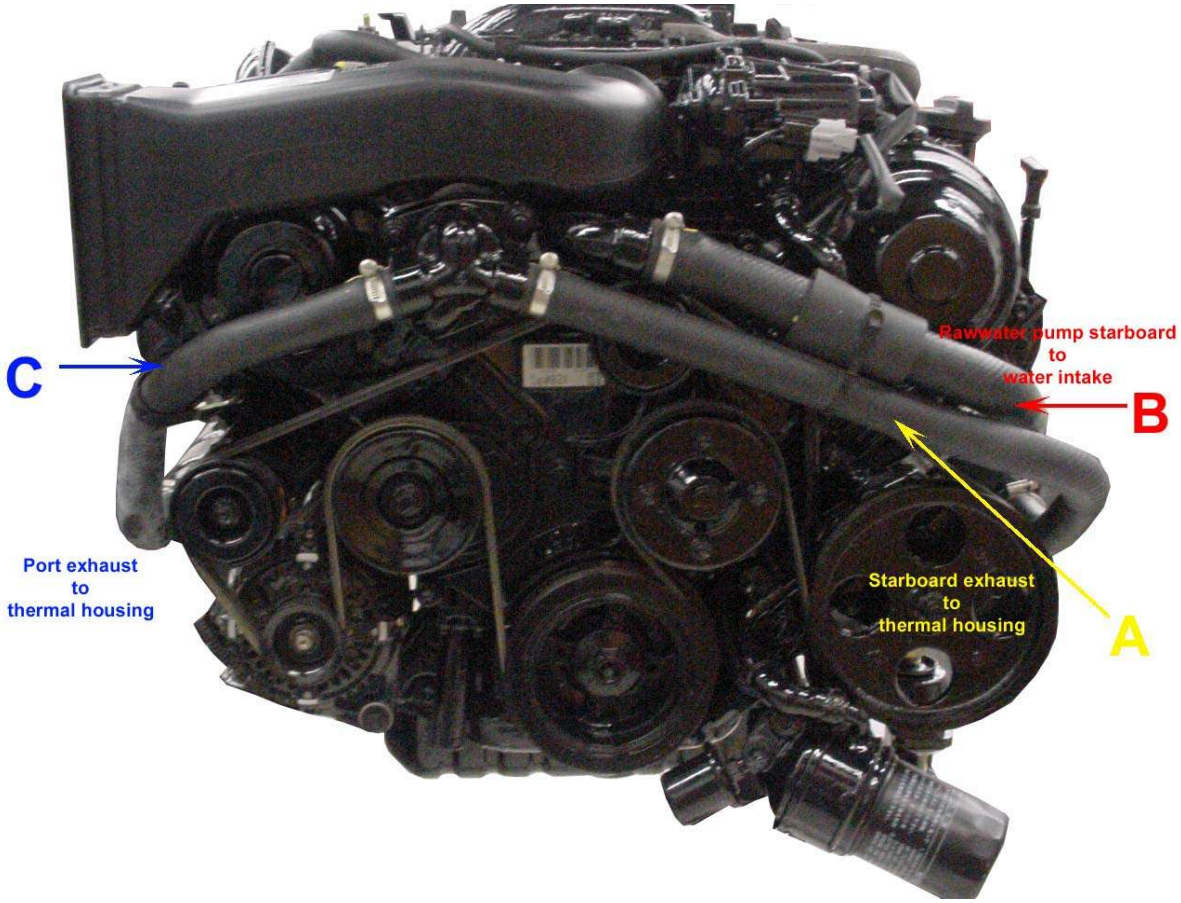
Procedure

Step 1 – Engine Preparation

Remove the five bulkheads and the floor panel.

Step 2 – Hose Removal

Remove hoses **A**, **B** and **C** but save the hose clamp fastening it to the engine. This clamp will need to be reused later. Once the hoses are removed, loosen the bolt holding the hose bracket to the engine and rotate the bracket clockwise until it is in a horizontal position.



Step 3 – Heat Exchanger Bracket

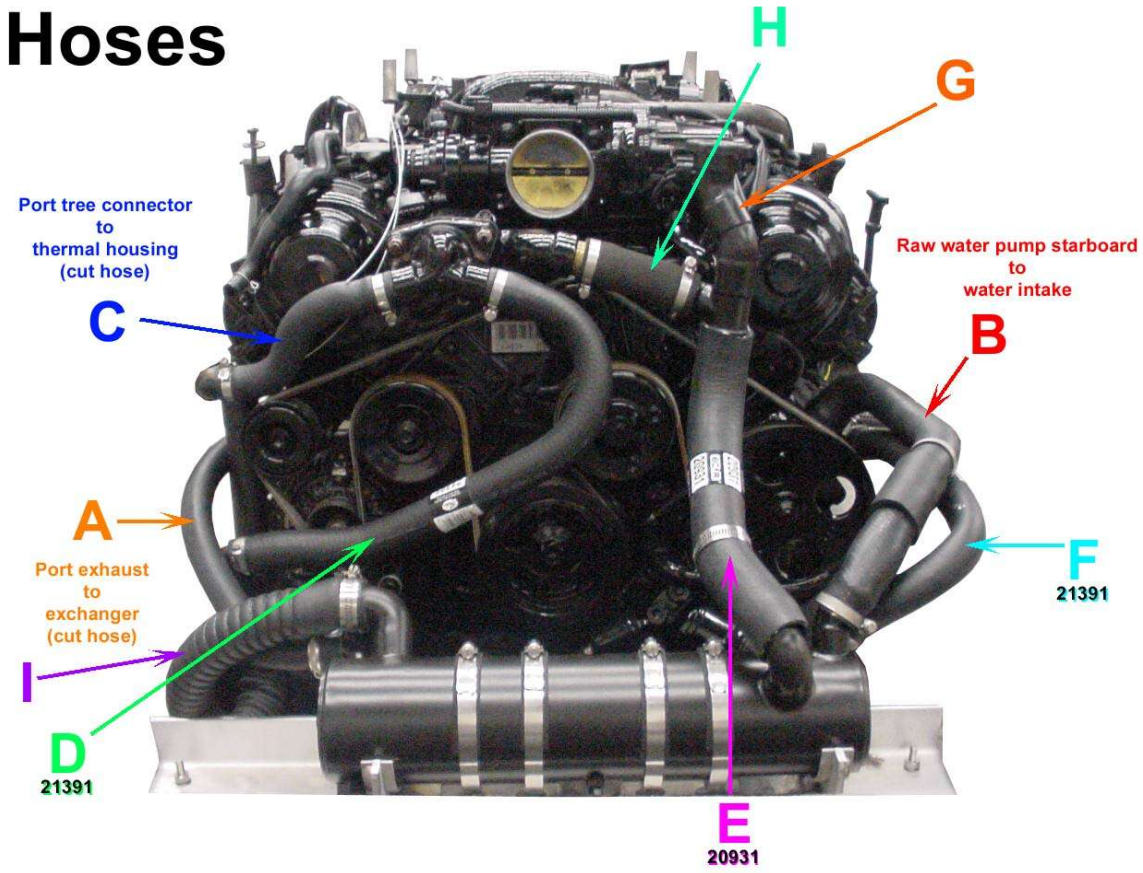
First, prepare the Heat Exchanger bracket by bolting the angle to the bottom. Leave loose for adjustments. Place the bracket across the bilge area over the top of the steering arm on the rudder. Next, place the Heat Exchanger in the bracket so that the zinc drain is to the port side. Do not fasten the Heat Exchanger to the bracket until all the hoses have been installed. This is for the purpose of adjusting the hose in case of kinking.

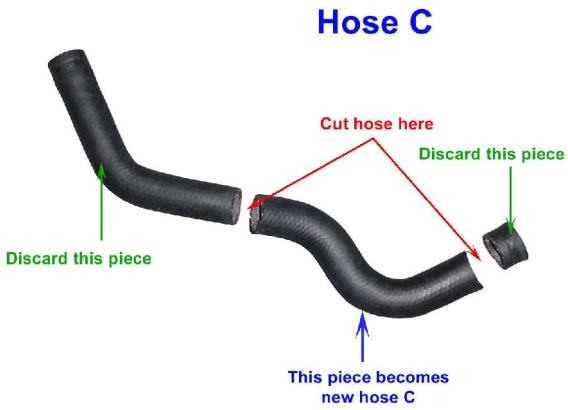
Step 5 – Thermostat Housing

First, remove the three 12mm thermostat housing mounting bolts and remove the housing cover and the thermostat. Next, insert the sleeve into the engine tapper end first and until flush. Reinstall the thermostat. Install the Thermostat Housing Gasket and check the o-ring for proper fit. Finally, reinstall the thermostat housing and tighten the bolts to 14ft-lbf +/- 20%.

Step 6 – Starboard Side Hose Installation

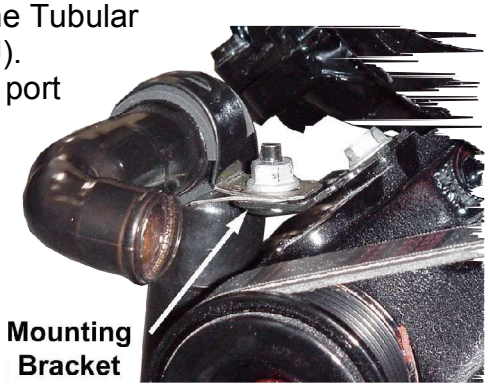
Note: All hoses in Steps 6 & 7 are cut to a standard length. Some hoses may need slight trimming to fit properly depending on exact height and position of the engine mounting. All hose clamps should be tightened to 2ft-lbf +/- 30%.
First, connect the starboard exhaust manifold hose to the starboard side 45-degree pipe on heat exchanger (hose F). Next, connect the water pump hose to the inlet pipe on the starboard side of the heat exchanger (hose B). This hose may kink during installation if it is too long, some slight resizing may be necessary after all hoses are connected. Connect the Fill Neck Assembly (part G) to the inside starboard thermostat-housing inlet using the 4" hose provided (hose H). The bottom of the fill tube connects to the remaining inlet on the heat exchanger (hose E). Finally, connect the top of the Fill Neck Assembly to the Expansion tank with the clear tubing by running the tubing to the bottom hose position on the Expansion tank. **Note: The hose clamp securing the clear tube to the top of the Fill Neck Assembly must have the tightening screw facing downward to prevent the clamp from interfering with the Fill Neck cap.**





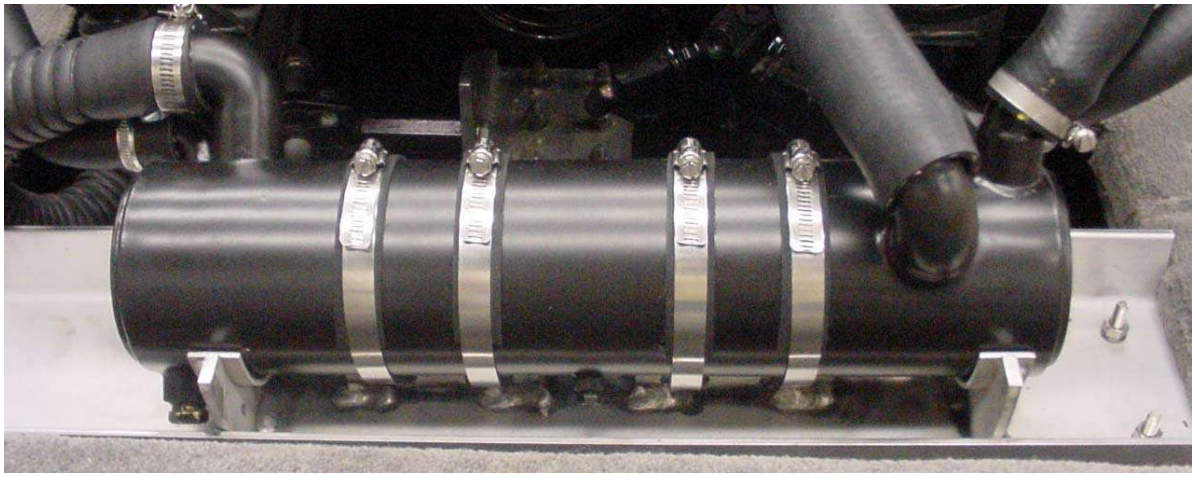
Step 7 – Port Side Hose Installation

First, connect the top inlet on the Tubular Assembly to the port thermostat-housing outlet (hose C). This hose must be positioned a minimum of 3 /4" away from the belt pulley to prevent rubbing. Next, connect the port thermostat-housing outlet to the middle inlet on the Tubular Assembly (hose D). Attach the Tubular Assembly to the port side of the Heat Exchanger (hose J). Connect the aft port outlet on the Heat Exchanger to the port exhaust manifold (hose A).
The Tubular Assembly must be fastened to the bracket adjusted in Step 2. Tighten the bracket nut to 13 ft-lbf +/- 20%. The Tubular Assembly is fastened to the engine bracket on the top 90-degree elbow. The bracket must have a piece of sanopad attached between the tube and the clamp to prevent vibration noise.



Step 8 – Securing The Heat Exchanger

Once all hoses are attached to the exchanger the final position can be established. Mark, drill and bolt the position of the 4 holes on the angle brackets to the hull stringers. Next, apply strips of sanopad to the Heat Exchanger where the four hose clamps will fasten it to the bracket. Finally, fasten the Heat Exchanger to the Heat Exchanger Bracket using 4 hose clamps tightened to 2 ft-lb +/- 20%.



Step 9 – Bleeding The System

Before filling the Closed Water Cooling system with coolant remove the throttle cap using a 10mm Allen wrench located aft and port of the air filter. Remove the Fill Neck Assembly fill cap. Once the throttle cap has been removed add premixed coolant and water to the engine though the Throttle opening until over flowing. Next, loosen the Coolant Drain on the Heat Exchanger until a steady flow of coolant drains. Retighten the Coolant drain and refill the engine through the Throttle opening. Next, fill the Overflow Tank, and the Fill Neck Assembly. Finally, reinstall the Throttle cap and the Fill Neck Assembly Cap and water test the system.

Note: During water testing be sure to test the boat under load. A water test with the boat on the trailer or using a 'fake-a-lake' is not sufficient stress to bring the engine to a point where an air bubble or kinked hose will cause an over heat situation.

Step 10 – Draining The System

To drain the fresh water half of the Closed Water Cooling system remove the drain plug located on the bottom port side of the Heat Exchanger unit and allow the water to drain into the bilge after removing the aft and garboard drain plugs. To drain the coolant from the Closed Water Cooling system you must first remove the three hose clamps securing the Heat Exchanger to the Heat Exchanger Bracket. Next, remove the garboard drain plug and place a bucket under the boat to catch the coolant as it drains from the bilge. Finally, lift up the Heat Exchanger and remove the drain plug located at the center, bottom of the unit.