ORCA
MARINE COOLING SYSTEMS
BELLINGHAM, WA 98226

Installation Instructions

Mercruiser 4.3 - 5.7 & 383 **#401371**
02 - 2011 Dry Joint **Full System**

NOTE:
MAY NEED NEW ECM 30 GPM RAW WATER NEEDED.
WE PROVIDE THE BLOCK-OFF GASKETS ONLY.
IF YOU HAVE A RISER/SPACER UNDER THE EXHAUST ELBOW ADDITIONAL FULL FLOW GASKETS ARE REQUIRED. THAY CAN BE ORDERED.

1. We recommend you disconnect the batteries while doing any work on your engine. Flush and drain the engine block according to your owner's manual. Remove the plastic engine shroud from the top of the spark arrestor. Disconnect all hoses from the existing thermostat housing. Remove the Water Distribution Housing and the hoses attached to it. Remove the plastic manifold attached to the Water Distribution Housing and the hoses connected to it. Disconnect the wires from the alarm and temperature sending units. Remove the sending units. Remove the thermostat housing, clean the gasket surface and plug the hole with a rag to prevent small parts falling in.

2. Disconnect the 3/8" drain hoses from their "push-lock" fittings on each side of the engine block just above the oil pan. Measure 3-1/4" from each end of the plastic "push-lock" female fitting and cut each hose. Slide a #06 size clamp over the stub hose and then insert the 3/8" plastic plug tighten the clamp. Fit the stub hoses back on the existing "push-lock" male fittings to act as caps.

3. Exhaust manifold preparation with cold riser or no riser:

The 3" and 6" cold riser is identified by the threaded 3/4" water port being on the bottom front of the casting. Remove the exhaust elbows or exhaust elbows/risers from the exhaust manifold and carefully clean the gasket surfaces. If you have a riser make sure you clean the surfaces between the riser and the exhaust elbow. Replace the 3/4" plug in the lower front of the elbow or riser with the 3/4M x 1H brass hose barb. <u>This is your raw water out fitting.</u> Place a full flow gasket between the top of the riser and the exhaust elbow. Set the block-off gaskets on top of the exhaust manifold, below the riser and replace the exhaust elbow. Install the 3/4M x 1H brass hose barb in the top front of the exhaust manifold. <u>This is your antifreeze return to the heat exchanger.</u> Install the 3/4M x 1H 90 degree brass hose elbow in the bottom of the exhaust manifold and face them forward. You will reinstall the 1" hoses connecting the bottom of the exhaust manifold to the water outlet.

1/26/2022

TKS: If your engine has additional drain hoses at the bottom fitting on the exhaust manifold they must be plugged by using the 3/4" plastic plugs and #12 ss clamps. Use small sections of the hose to hold the plugs.

4. Exhaust manifold preparation with warm riser or no riser:

The 3" warm riser has the threaded 3/4" water port in the center front of the casting. The 6" warm riser has the threaded 3/4" water port at the top front of the casting. If no riser, install as step 3 above with the block off gasket directly between the elbow and the exhaust manifold. The warm riser gasket setup is reversed from the cold riser setup. The full flow gasket will go between the exhaust manifold and the bottom of the riser. The block off gasket will go on top of the riser, directly below the elbow. Thread one 3/4M x 1H brass hose barb into the port at the bottom front of the exhaust elbow. This is your raw water out fitting. The other brass hose barb will go into the center front of the 3" riser or the top front of the 6" riser. This is your antifreeze return to the heat exchanger.

GEAR OIL RESERVOIR: If your engine has the gear oil reservoir bottle mounted directly below, and in front of the lifting eye, you will have to move it. See the information and drawings at the end of these instructions.

5. The new thermostat housing has 3 – 3/8" NPTF holes machined into it and a recess on top for the new thermostat. The housing will have the holes facing forward when installed on the engine. The 3 holes are tapered pipe threads and caution must be used to not over-tighten the fittings. Use pipe thread compound for the threads. NOTE: YOU CANNOT USE TEFLON OR ANY OTHER NON-CONDUCTIVE THREAD SEALER ON THREADS THAT CONDUCT ELECTRICITY. Insert the temperature sending unit into the hole on the starboard side. The 3/8" x 5/8" brass hose barb will go into the center hole and the ECM alarm sensor will go into the port hole.

6. Remove the 3/4" plug from the top of the circulating pump and replace it with the 3/4" x 5/8" brass hose barb. (If you are installing a heater see below) Thread the 8mm studs in the thermostat boss and snug with fingers. Slip on the 3/8OD x 4-1/4 copper sleeve and then set the #5-A gasket in place. NOTE: This gasket has 4 small brass rivets for electrical continuity; it MUST go on first. Set the thermostat housing on next, brass fittings facing forward with the thermostat recess on top. If not installing a heater you will connect the two 5/8" hose barbs with the 5/8" wire hose and two #08 hose clamps. Reconnect the sending unit wires. Set the new 160° thermostat (1-small hole) in place with the center cone up. Drop a #5 fiber gasket on next, then the steel, double saddle mounting bracket, another #5 fiber gasket, the KA-118 water outlet and secure loosely with the 8mm nuts and lock washers. NOTE: You may have to use the 1/2" thermostat spacer to clear the intake plenum.

HEATER: Connect the inlet (pressure) side to the heater to the thermostat housing 5/8 brass hose barb and the outlet (suction) side from the heater to the circulating pump 5/8 brass hose barb.

7. Disconnect the 1-1/4" raw water supply hose at the fitting joining it to the bottom of the 1-3/4" circulating pump hose. Loosen the clamp holding the 1-3/4" hose to the circulating pump and temporarily remove the hose. If your hose is an equal diameter thru the whole length you will use the copper elbow with the 3" extension and trim the existing 1-3/4" circulating pump hose. Use a small section of the trimmed hose to connect the lower end back to the pump. If it is belled at each end and a smaller diameter in the mid-section you will use the 1-1/2 copper connector to section the hose. Place cushion tape on the saddle brackets and set the heat exchanger temporarily in place. Connect the 1-1/4" x 36" wire hose between the fitting on the heat exchanger and the end of the fuel cooler on the port side of the engine. If the 1-1/4 raw water in comes over the engine alongside the port valve cover you will use the 1-1/4 copper connector to fit the hose to the heat exchanger.

8. Insert the 1-3/4" angled fitting on the bottom of the heat exchanger into the trimmed 1-3/4" hose. Once in place, secure with the #32 ss clamps in the kit. Adjust the heat exchanger so the fill neck is straight up and the unit is parallel to the front of the engine. Use 2 of the 1" hoses in the kit to connect the antifreeze return fittings on the manifold or riser to the heat exchanger.

9. Position the 1" x 1" x 1-1/4" 90° tee behind the thermostat housing. Measure and cut the 1" hoses in the kit to fit between the raw water out fittings and the copper tee. Connect the tee to the heat exchanger with the 1-1/4 x 7 hose. Secure all clamps.

10. Check all hoses and fittings under the heat exchanger to make sure the clamps are tight and that no hoses are potentially touching moving parts. If needed use the HD black cable ties to hold them in position.

11. If you are installing the recovery bottle on the heat exchanger follow these directions. If not, see the CAUTION on the last page. Remove the plastic recovery bottle from its cage bracket. Clamp the bracket upside down in a vise so the mounting bracket eyes are hidden about 1/2" below

the top of the jaw. Bend so the eyes are 90° away from the center of the bracket so they will not interfere with the replacement of the plastic recovery bottle. Loop the 5.25" T-bolt clamps around the heat exchanger and the saddle brackets making sure the male end of the thread is pointing upward. Place a 5/16" ss flat washer on each side of the eyelet, set over the clamp threads and then the nut.

Tighten the clamp so the cap on the bottle is level with the top of the heat exchanger. Attach and trim the 5/16" clear hose between the bottom of the recovery bottle and the vent tube on the pressure cap. The 5/16" clear vinyl tube in the kit is the overflow tube in case the recovery bottle becomes full.

12. Fill the heat exchanger with a maximum 50/50 mix of antifreeze and distilled water. Follow the directions on the antifreeze for your area. Idle the engine with the pressure cap off until you see the liquid begin to move in the heat exchanger. You may need to add solution as the engine draws down the mixture. It should stabilize just below the base of the fill neck before you place the pressure cap back on. Once you place the pressure cap on, DO NOT REMOVE IT AGAIN WHILE HOT. SERIOUS BURNS OR INJURY CAN OCCUR FROM ESCAPING STEAM. If your temperature gauge indicates an overheating situation you should shut down the engine and allow it to cool. Once cool, adjust the level in the recovery bottle as indicated.

CAUTION:

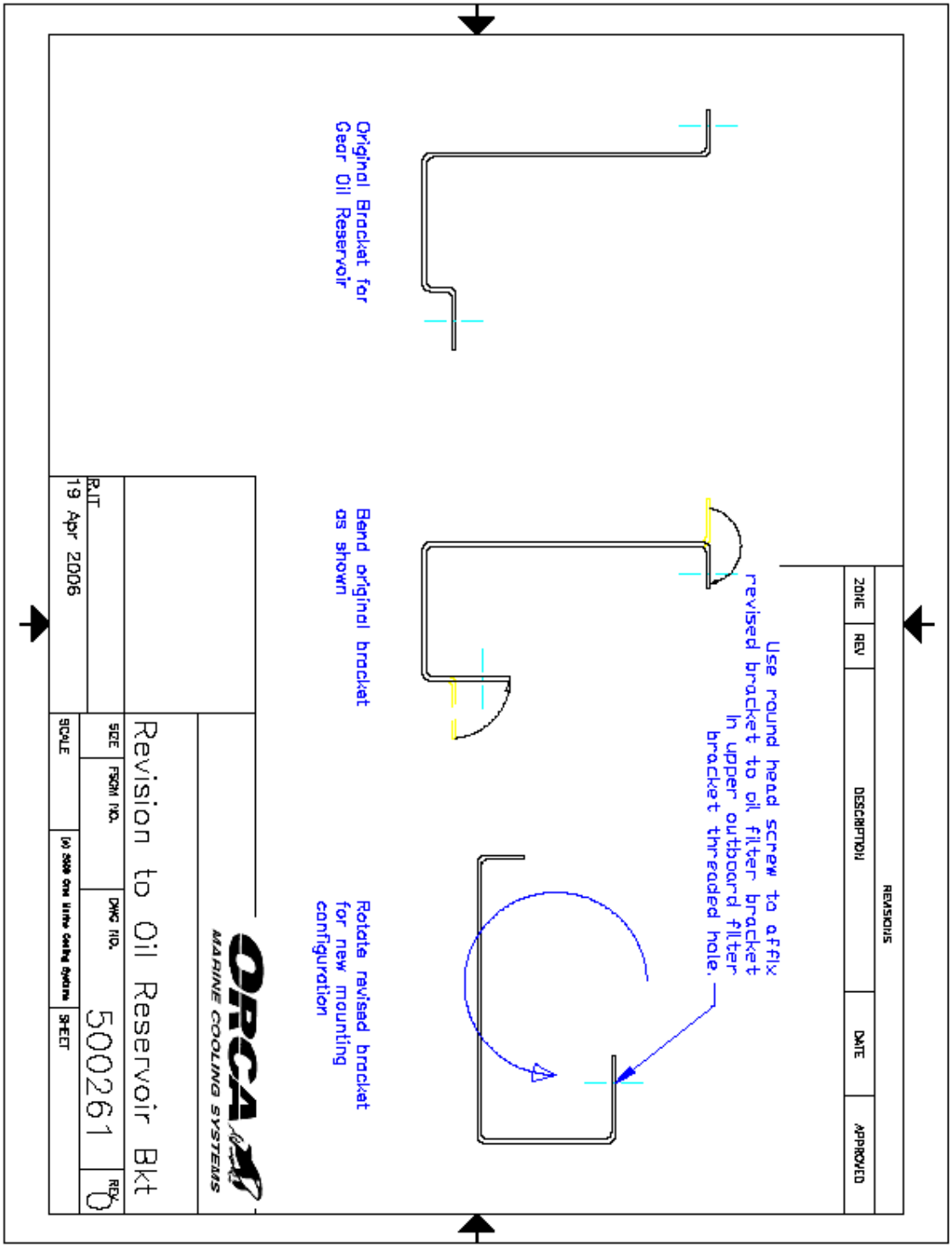
INSTALLATION OF THE PLASTIC COOLANT RECOVERY BOTTLE IS CRITICAL TO THE OPERATION OF THIS SYSTEM.

IT MAY BE INSTALLED ANYWHERE IN THE ENGINE COMPARTMENT BUT MUST MAINTAIN THE LIQUID LEVEL BETWEEN THE WARM AND COLD LINES.

THE RECOVERY BOTTLE ALLOWS FOR THE EXPANSION AND CONTRACTION OF THE ANTI-FREEZE SOLUTION IN NORMAL OPERATION.

Gear Oil Reservoir Bottle located as shown in photo:
You can modify your existing bracket per the drawing or purchase a Mercruiser 860065A 1 kit that re-locates the reservoir to the front of the bracket.

Remove the upper, outer 3/8” bolt from the inside of the oil filter bracket. Insert the 3/8 x 1-1/4 RHMS through the hole in the modified bracket. Then into the oil filter bracket fitting and the oil filter will be secured with a 3/8 lock washer and nut. The 1/4" hose, 1/4" tube and 2-#06 clamps may be needed to extend the gear oil hose when the bottle is moved.



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4.3 - 5.7L MERCRUISER — Parts List — 401371
2002 - 08 Dry joint — Full system

Bag #1:

1. 2 - Stud, ss, 8 x 135mm 500870
2. 2 - Nuts, hex, ss, 8mm 400312
3. 2 - Washers, lock, ss, 8mm 400313
4. 1 - Hose barb, brass, 3/8M x 5/8H 001055
5. 1 - Hose barb, brass, 3/4M x 5/8H 400259
6. 2 - Elbow, brass, 90, 3/4M x 1H 000955
7. 4 - Hose barb, 3/4M x 1H 001062
8. 4 - Washer, flat, ss, 5/16 003780
9. 2 - Clamp, ss, #24 006845
10. 2 - Stud, plated 3/8 x 4-1/2 400070
11. 3 - Nut, plated 3/8 021588
12. 4 - Plug, plastic 3/4" 502436
13. 4 - Clamp, ss, #06 400273
14. 2 - Clamp, ss, #08 006101
15. 10 - Clamp, ss, #16 006105
16. 7 - Clamp, ss, #20 006844
17. 2 - Clamp, ss, #32 006846
18. 2 - Clamp, T-bolt, ss, 5.25 400291
19. 2 - Elbow, brass, 45, 3/4M x 1H 300750
20. 2 - Plug, brass, sq head, 3/4M 001064
21. 2 - Plug, brass, countersunk, 3/4M 300960
22. 3 - Lock washer, plated 3/8 070206
23. 1 - RHMS, plated 3/8 x 1-1/4 500262
24. 4 - Clamp, ss #12 006843

Bag #2:

25. 2 - Gasket, fiber, #5 300479
26. 1 - Gasket, continuity, #5-A 300233
27. 2 - Cap, rubber, 1-1/4 300682
28. 2 - Gasket, block-off 27-864549A 1 400674
29. 2 - Cable tie, HD, black, 14" 300955
31. 2 - Tape, cushion 300496
31. 2 - Plug, plastic, 3/8" 400458
32. 1 - Tube, cpr 1/4OD x 3 001043

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Bag #3:

33 1 - Outlet, water, KA-118
400110

34 1 - Housing, t-stat, 3-hole
400040

35 1 - T-stat spacer, alum, 1/2"
400187

36 1 - Bkt, stl, 5" universal, 1-7/8 hole
400469

Bag #4:

37 1 - Connector, copper, 1-1/2"
300892

38 1 - El, cpr, 1-3/4 OD with 3" ext
300356

39 1 - Thermostat, 160, 1-hole
400422

40 1 - Connector, copper, 1-1/4"
300891

41 2 - 3/8OD X 4-1/4 cpr tube
043467

42 1 - Tee, copper, 1 x 1 x 1-1/4 90 el
300373

Hose:

43 1 - Oil, 1/4ID x 8
500273

44 1 - Hose, wire, 5/8 x 16
051453

45 4 - Hose, formed 1"
300772

46 1 - Hose, wire, 1-1/4 x 36
039172

47 1 - Hose, heater, 1-1/4 x 7
006775

Loose packed:

48 1 - Recovery bottle
300671

49 1 - Installation instructions and warranty card

PROUDLY PACKED AND SHIPPED BY _____

EXTRA MERCRUISER GASKETS NEEDED, BUT NOT SUPPLIED, IF YOU HAVE A 1-3/4", 3" OR 6" SPACER UNDER THE EXHAUST ELBOW

FULL-FLOW GASKET 27-864547A02 2 EACH