2002 - 2003 Fresh Water Cooling Installation Instructions - Direct Drive Kit RK147046

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TABLE OF CONTENTS

FWC KIT INSTALLATION INSTRUCTIONS - RK147046

INSTALLATION NOTES AND RECOMMENDATIONS

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REFERENCES:

The following manuals are required to effectively perform this installation procedure. If you do not have a copy of each of these manuals, obtain copies prior to beginning this installation procedure.

L510013	Marine Illustrated Parts Manual Model MP5.0/5.7L MY 2002 - 2004
L510010-03	Owner's Operation and Maintenance Manual

NOTE: Use pipe sealant with Teflon on all fittings being installed during these procedures. Loctite™ 565, PST Pipe Sealant, Part No. 56541 or equivalent is recommended.

WARNING

Do not remove cooling system filler cap when the engine is hot. Allow the engine to cool and then remove the pressure cap slowly, allowing the pressure to vent. Hot coolant, under pressure, may discharge violently and cause severe burns.

DIRECT DRIVE INSTALLATION

IMPORTANT: **Thoroughly read these instructions before beginning this installation procedure. Due to model variations between '02 and '03 model years, continuing product improvements, and O.E.M. considerations, variations exist. If the motor you are installing the kit on is already equipped with a crank mounted raw water pump, you will skip steps 11 and 12 and step 33 of this procedure. Kit items 17-22, 45-46 will not be used. Other variations are addressed within the text of this procedure.**

Installation of the fresh water cooling system, on some direct drive applications, will require the relocation of the transmission oil cooler and transmission oil cooler lines. Provisions should be made to recover oil spilled from the lines.

Installation of the fresh water cooling system, on direct drive applications, will require the relocation of the remote oil filter and oil lines. Provisions should be made to recover oil spilled from the lines.

An oil and filter change is not required, but it is recommended at this time. Draining the oil and changing the filter at the beginning of the procedure will help minimize oil spillage, and insure proper oil level. Add oil and check for proper operating level at the completion of the procedure. This will insure proper oil level in the engine after installation is complete.

NOTE: Some Excaliburs may have the remote oil filter relocated to the front of the exhaust elbow. If your engine has the remote oil filter located to the front of the engine; skip steps 13-22 of this procedure. In addition, items 24-30 of the kit will not be used.

PARTS DELETED - 5.7L, V-BELT, DIRECT DRIVE - R/W

FIGURE 1-1

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R045135A	**Hose**, r/w pump to tstat housing	1
2	RS3858	**Clamp**, 1 1/4”	2
3	R090082	**Clamp**, strap	1
4	RS1527	**Nut**, strap clamp attaching	1
5	R025031	**Housing**, tstat, lower	1
6	RM0121	**Gasket**, tstat housing, lower	1
7	R026002	**Thermostat**, 160º F	1
8	RM0258	**Gasket**, tstat housing, upper	1
9	R025033	**Housing**, tstat, upper	1
10	98333080	**Bolt**, tstat housing	2
11	RS2179	**Lock Washer**, tstat housing	2
12	98223035	**Bolt**, tstat housing	1
13	93920000	**Lock Washer**, tstat housing	1
14	R020002	**Sender**, water temperature	1
15	TBD	**Plug**, intake, (water temp sender)	1
16	R045048	**Hose**, r/w supply to engine	1
17	RS3852	**Clamp**, 1 3/4”	2
18	R045107	**Hose**, r/w dump	2
19	RS3851	**Clamp**, 1”	4
*20	R045021F	**Hose**, trans. oil cooler to r/w pump	1
*21	RS5858	**Clamp**, 1 1/4”	2
*22	R090082	**Clamp**, strap	1
23	R060060	**Hood**	1
24	R143141	**Decal**, hood, “PCM Excalibur”	1
25	R143142	**Decal**, hood, “Excalibur”	2
26	R143143	**Decal**, hood, spec	1
*27	R143158	**Decal**, hood, “3 Star” emission ‘03 MY, ONLY, SN 430913 and higher	1
28	R090143	**Bracket**, shift cable	1

PARTS DELETED - 5.7L, V-BELT, DIRECT DRIVE - R/W

FIGURE 1-1

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
29	R090190A	**Bracket**, oil header	1
30	RS0302	**Bolt**, brkt, oil header	3
31	RS2180	**Lock Washer**, brkt, oil header	3
32	RS0282	**Bolt**, oil header	3
33	RS2179	**Lock Washer**, oil header	3
34	RS1027	**Nut**, oil header	3
35	RA045120C	**Oil Lines**	2
36	R024184	**Fitting**, oil line adapter	2
37	R096144	**Bracket**, plug wire clip	2
38	RS0285	**Bolt**, riser, short	2
39	RS2179	**Lock Washer**, riser	2
*40	RS0279	**Bolt**, 10-Pin Bracket attaching	1
*41	RS2179	**Lock Washer**, 10-Pin Bracket attaching	1
*42	RA045007B	**Hose**, transmission oil	1
*43	RA045007K	**Hose**, transmission oil	1
*44	RS0306	**Bolt**, trans. cooler attaching	1
*45	RS2180	**Lock Washer**, trans. cooler attaching	1
*46	RS1028	**Nut**, trans. cooler attaching	1

IMPORTANT: ITEM NUMBERS MARKED WITH AN "*" MAY OR MAY NOT BE DELETED DEPENDING ON YOUR ENGINE CONFIGURATION. BE SURE TO READ ALL INSTRUCTIONS THOROUGHLY BEFORE PERFORMING THE FWC KIT INSTALLATION INSTRUCTIONS. REFER TO MANUAL L510013 FOR PARTS BREAKOUT.

PARTS ADDED - 5.7L, V-BELT, DIRECT DRIVE -F/W

FIGURE 1-2

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
1	R020003	**Sender**, water temperature	1
2	R090260	**Bracket**, coolant fill riser	1
3	98223016	**Bolt**, fill riser brkt attaching	2
4	RS2672	**Lock Washer**, fill riser brkt, attaching	2
5	RS7068	**Flat Washer**, fill riser brkt, attaching	2
6	R034047	**Coolant Fill Riser**	1
7	R034006A	**Cap**, coolant fill riser	1
8	RS0252	**Bolt**, fill riser mounting	2
9	RS2179	**Lock Washer**, fill riser mounting	2
10	RS1026	**Nut**, fill riser mounting	2
11	R025015A	**Housing**, FWC thermostat	1
12	R026002F	**Thermostat**, 160° F	1
13	R047189	**O-Ring**, thermostat housing	1
14	RS6531	**Bolt**, thermostat housing attaching	2
15	RS2179	**Lock Washer**, thermostat housing attaching	2
16	R024055	**Elbow**, 1/8 NPT X 1/4 vent hose	1
*17	R090013A	**Bracket**, trans. oil cooler mounting	1
*18	RS0302	**Bolt**, cooler clamp to brkt attaching	1
*19	RS2180	**Lock Washer**, cooler clamp to brkt attaching	1
*20	RS1028	**Nut**, cooler clamp to brkt attaching	1
*21	RA045007S	**Hose**, transmission oil to cooler, 17”	1
*22	RA045007T	**Hose**, transmission oil to cooler, 31”	1
23	R090143A	**Bracket**, shift cable	1
*24	R090257	**Bracket**, oil header	1
*25	RS0286	**Bolt**, brkt, oil header	2
*26	RS2179	**Lock Washer**, brkt, oil header	2
*27	98333020	**Bolt**, oil header	3
*28	RS2179	**Lock Washer**, oil header	3
*29	RA045120D	**Hose**, oil line	2
*30	R024184	**Fitting**, oil adapter, 90°, 1/2 NPT X 5/8	2

PARTS ADDED - 5.7L, V-BELT, DIRECT DRIVE -F/W

FIGURE 1-2

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
*31	R090265	**Bracket**, heat exchanger	1
*32	RS0281	**Bolt**, (-265) brkt, heat exchanger attaching	2
*33	RS2179	**Lock Washer**, (-265) brkt, heat exchanger	2
*34	R090266	**Bracket**, heat exchanger	1
*35	RS0304	**Bolt**, (-266) brkt, heat exchanger attaching	2
*36	RS2180	**Lock Washer**, (-266) brkt, heat exchanger	2
37	R101013	**Wire**, H.E. ground	1
38	R094040	**Isolator**, rubber, adhesive	1
39	RA147046	**Heat Exchanger**	1
40	R094041	**Isolator**, rubber	2
41	RS3857	**Clamp**, 4”	2
42	RS1078	**Nut**, w/lock washer, H.E. grd. stud	1
43	R045025	**Hose**, r/w dump, 1”	2
44	RS3851	**Clamp**, 1”	4
*45	R045113	**Hose**, trans. oil cooler to r/w pump	1
*46	RS3858	**Clamp**, 1 1/4”	2
47	R045146	**Hose**, circ. pump to H.E.	1
48	RS3852	**Clamp**, 1 3/4”, circ. pump	1
49	RS3868	**Clamp**, 1 1/2”, H.E.	1
50	R045102A	**Hose**, r/w pump to H.E.	1
51	RS3858	**Clamp**, 1 1/4”	2
52	R045124	**Hose**, coolant fill riser to H.E.	1
53	RS3851	**Clamp**, 1”	2
54	R045144	**Hose**, t-stat housing to H.E.	1
55	RS3858	**Clamp**, 1 1/4”	2
56	R045132	**Hose**, coolant fill riser to t-stat housing	1
57	RS3870	**Clamp**, 1/4”	2

PARTS ADDED - 5.7L, V-BELT, DIRECT DRIVE -F/W

FIGURE 1-2

ITEM	PART NUMBER	DESCRIPTION	QUANTITY
58	R045139	**Hose**, overflow bottle to coolant fill riser	1
59	R127084	**Clamp**, 1/4”	2
60	R146002	**Coolant Overflow Bottle w/cap**	1
61	RS0282	**Bolt**, overflow bottle mounting	2
62	RS2673	**Flat Washer**, overflow bottle mounting	2
63	RS2179	**Lock Washer**, overflow bottle mounting	2
64	RS1027	**Nut**, overflow bottle mounting	2
65	R060061A	**Hood**	1
66	R143141	**Decal**, hood, “PCM Excalibur”	1
67	R143142	**Decal**, hood, “Excalibur”	2
68	R143143	**Decal**, hood, spec	1
*69	R143158	**Decal**, hood, “3 Star” emission ‘03 MY, ONLY, SN 430913 and higher	1

IMPORTANT: ITEM NUMBERS MARKED WITH AN “*” MAY OR MAY NOT BE USED DEPENDING ON YOUR ENGINE CONFIGURATION. BE SURE TO READ ALL INSTRUCTIONS THOROUGHLY BEFORE PERFORMING THE FWC KIT INSTALLATION INSTRUCTIONS. REFER TO MANUAL L510013 FOR PARTS BREAKOUT.

FWC KIT INSTALLATION - DIRECT DRIVE

1. Disconnect the negative battery terminal cable.

IMPORTANT: If an oil change is going to be performed in conjunction with this procedure; drain oil and change filter at this time. Do not refill the oil until you are instructed to do so later in this procedure.

2. Remove the hood (Figure 1-1, item 23) from the engine. The hood is not required to complete the installation. Save the hood retention nuts for installation of the new hood later in this procedure.

3. Remove the thermostat housing, water temperature sender, and associated hoses.

NOTE: The complete thermostat housing with hoses, temp sender, and thermostat can be remove as an assembly. (Figure1-1, items 1-22)

   a. Disconnect the wire connected to the water temperature sender (Figure 1-1, item 14), located in the lower thermostat housing.

   b. Loosen the hose clamps of the raw water dump hoses at each exhaust manifold connection, the raw water pump hose at the raw water pump, the raw water pump hose retaining clamp and retaining nut on the lower port stud of the circulating pump, and the raw water supply to engine hose at the circulating pump.

   c. Remove the two bolts and lock washers (Figure 1-3) attaching the thermostat housing assembly to the intake manifold.

   d. Remove, from the engine, the thermostat assembly, all hoses and clamps. Clean thermostat gasket from the intake manifold. None of these parts are required to complete the installation.

4. Remove and discard the plug located right, front of the intake manifold. Figure 1-3.

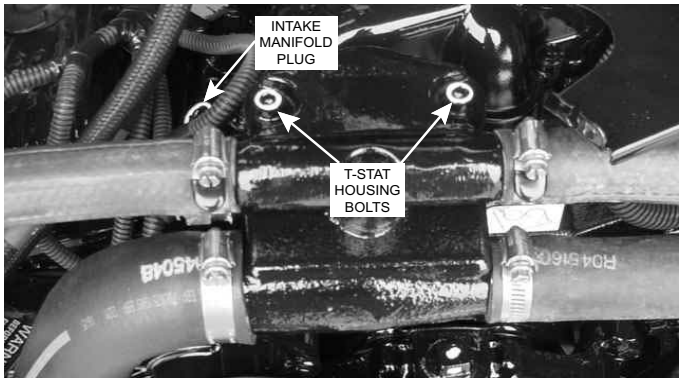

Figure 1-3 Disconnect Points - Steps 3 - 4.

NOTE: Use pipe sealant with Teflon on all fittings being installed during these procedures. Loctite™ 565, PST Pipe Sealant, Part No. 56541 or equivalent is recommended.

5. From the kit, install the Water Temperature Sender (Figure 1-2, item 1) into the intake manifold, where the plug was removed, and reconnect the temperature sending wire to the sensor. This is the wire disconnected in step 3a.

6. Remove 90° hose fittings from the (engine) front of each exhaust manifold and the plug fitting from the rear of each exhaust manifold.

   Install the hose fittings in the rear of each exhaust manifold, with the hose barb facing inboard. Install the plugs in the front of each exhaust manifold. Be sure to clean the threads of each fitting, then apply PST prior to installation.

NOTE: Use pipe sealant with Teflon on all fittings being installed during these procedures. Loctite™ 565, PST Pipe Sealant, Part No. 56541 or equivalent is recommended.

7. From the kit, install the Coolant Fill Riser Bracket using (2) Bolts (*metric), (2) Lock washers, and (2) Flat washers (Figure 1-2, items 2 - 5). The bracket is installed to the existing bracket on the (engine) starboard side of the intake manifold.

8. From the kit, install the Coolant Fill Riser onto the Coolant Fill Riser Bracket using (2) bolts, (2) lock washers, and (2) nuts (Figure 1-2, items 6-10). The fill riser is mounted on the exhaust elbow side of the bracket. Install pressure cap onto fill riser.

9. From the kit, install the Thermostat, O-ring, and Thermostat Housing using (2) Bolts, (2) Lock washers, (Figure 1-2, items 11 - 15).

10. From the kit, install the Vent Hose Fitting (Figure 1-2, item 16) into the Thermostat Housing. The hose barb should be positioned to starboard, approximately parallel with the Thermostat Housing outlet.

**** IMPORTANT: STEPS 11 - 12 ARE ONLY PERFORMED IF YOUR ENGINE IS EQUIPPED WITH A V-BELT DRIVEN RAW WATER PUMP.***

11. Disconnect water hose connected to the input of the pump. Remove the (2) bolts and (2) lock washers securing the r/w pump to the r/w pump adjustment bracket. Rotate the pump 180° (cam retaining screw is up) and reinstall the pump onto the adjustment bracket.

NOTE: The following procedure involves the relocation of the Transmission Oil Cooler and oil hoses. Have materials in place to absorb any transmission fluid spilled.

NOTE: It is recommended that the transmission fluid be removed from the transmission at this time. This will help minimize the amount of fluid spilled during the cooler relocation process.

IMPORTANT: **In most cases, engines equipped with the v-belt driven r/w pump will have the oil cooler located on the starboard rear of the engine. If your engine has the oil cooler located on the starboard rear of the engine, you must perform step 12.**

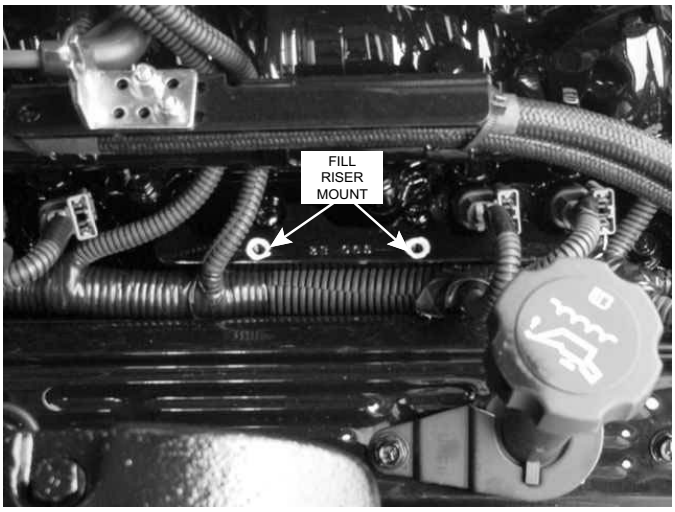

Figure 1-4 Coolant Fill Riser Bracket Location

12. Relocate the Transmission Oil Cooler from its rear, starboard location to engine port front motor mount.

    a. Disconnect water hoses connected to the input and output of the cooler. The water hose connected to the output of the cooler should be removed completely from the engine. You will have to release the hose clamp securing the hose to the starboard side of the engine by removing the bolt and lock washer securing it at the starboard front engine mount; after the clamp is removed reinstall the bolt and lock washer into the motor mount.

    b. Disconnect and remove the transmission oil hoses from the oil cooler and the transmission and discard hoses. Have materials available to absorb transmission fluid that will spill from the lines, cooler, and transmission.

    c. Remove the oil cooler, with mounting clamp attached, from the engine. The cooler clamp will be secured to the engine either by a ground stud bolt on the bell housing or a bolt, lock washer, and nut through a mounting hole on the bell housing. If it was secured by the ground stud, replace the ground stud and all grounds after removal of the cooler; if it was secured by a bolt, lock washer, and nut, those items may be discarded.

NOTE: To minimize transmission fluid spillage in the boat, once the cooler has been removed from its mounting point, perform step e on a work bench.

d. The transmission oil line fittings need to be re-indexed. Remove the top fitting on the transmission, clean the threads, coat threads with PST, and reinstall the fitting so it is facing the front of the engine at an approximate 45° angle to port. Remove the lower port oil line fitting on the transmission, clean the threads, coat the threads with PST, and reinstall the fitting so it is facing down with a slight angle toward the engine.

e. The transmission oil line fittings will need to be re-indexed. Remove the oil line fittings from the oil cooler. Clean the threads thoroughly, apply PST to the fitting threads, and reinstall the fittings into the oil cooler so the rear fitting is parallel with the cooler facing the rear of the engine, and the forward fitting is facing the rear at a slight up angle to allow for oil hose attachment. See Figure 1-5.

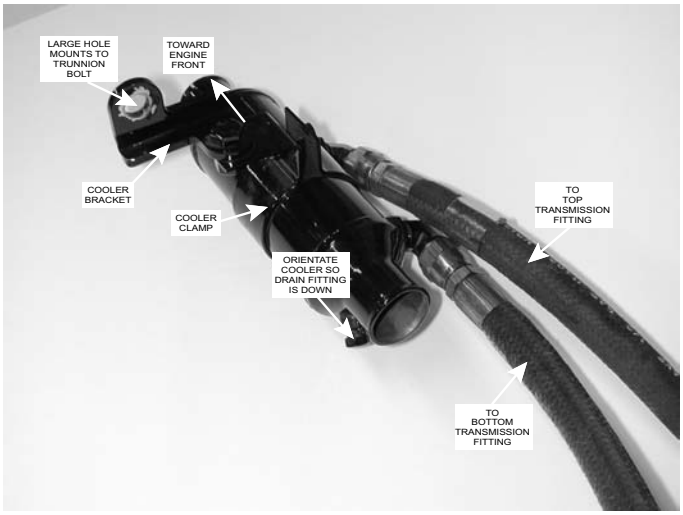

Figure 1-5 Transmission Oil Cooler, Reconfigured

f. From the kit, locate the Oil Cooler Bracket, (1) bolt, (1) lock washer, (1) nut, and (2) Transmission Oil Hoses (Figure 1-2, items 28 - 33). If necessary, loosen the cooler clamp and orientate the cooler to the position shown in Figure 1-5. Tighten the clamp. Attach the cooler bracket to the cooler clamp as shown in Figure 1-5. Attach the shorter of the two transmission oil line hose to the rear oil fitting of the cooler. Attach the longer transmission oil line hose to the forward fitting on the oil cooler.

g. Mount the assembled cooler to the engine port front motor mount trunnion bolt. Remove the nut and lock washer from the trunnion bolt, slide the oil cooler bracket onto the trunnion bolt and secure with the nut and lock washer.

Once installed the cooler may need to be rotated up or down slightly for best fit. Make sure all mounting hardware is secure if loosened for fit adjustment.

h. Route the transmission oil line hoses under the remote oil filter lines. Attach the shorter transmission oil line hose to the bottom fitting on the transmission, and the longer hose to the upper fitting on the transmission. Make sure all oil line hose connections are secure.

IMPORTANT: CHECK TRANSMISSION FLUID LEVEL. IF IT IS NOT TO THE "FULL" MARK OF THE DIPSTICK, ADD FLUID AT THIS TIME UNTIL FLUID LEVEL INDICATES FULL.

13. On the port exhaust riser, remove the (2) forward retaining bolts and lock washers. From the kit, install the Remote Oil Filter Bracket using (2) Bolts and (2) Lock washers (Figure 1-2, items 24-26).

NOTE: The following procedure involves the removal of the remote oil header, oil lines, and remote oil adapter housing. Have materials in place to absorb any oil spilled.

14. Disconnect oil lines from the oil header. Keep the ends of the lines elevated to reduce oil spillage.

15. Remove the (3) oil header mounting bolts, lock washers, and nuts. Relocate the oil header to the new Oil Header Bracket (step 13). The notch in the bracket locates the rib of the oil header to allow for easier mounting. From the kit, Use (3) Bolts (*metric) and (3) lock washers (Figure 1-2, items 27-28), mount the oil header to the new bracket.

16. Remove the oil lines from the Oil Bypass Adapter and discard.

17. Remove the outboard oil adapter fitting.

18. Remove the oil bypass adapter attaching fitting and oil line fitting as an assembly. The oil adapter housing will come free at this time. Set the housing aside keeping the O-rings in the housing clean and free of dirt. Retrieve the oil adapter housing O-ring from the engine if it did not come with the housing. Place it in the groove of the housing. Remove the oil fitting from the oil adapter housing attaching fitting. Discard both old oil fittings. Figure 1-7.

19. Reattach the oil bypass adapter. Hand tighten the oil bypass adapter fitting, then tighten 1/4 turn more. Install the new oil fitting (Figure 1-2, item 30) into the oil bypass attaching fitting. The oil connection needs to face forward. Do not allow the oil bypass attaching fitting to tighten further while installing the new oil fitting.

⚠ **CAUTION**
Do not over tighten the oil bypass adapter fitting. Damage to the engine can occur.

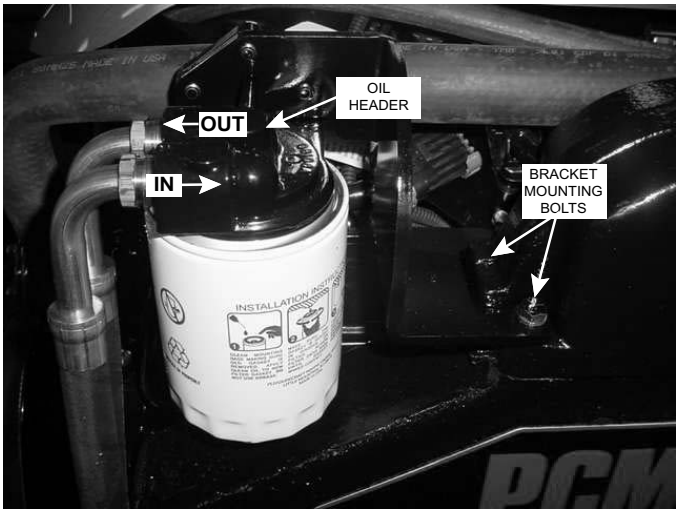

Figure 1-6 Oil Header and Bracket - New Location


Figure 1-7 Oil Adapter and Fittings

20. Install the second new oil fitting (Figure 1-2, item 30) into the outboard port of the oil bypass adapter, orientating the oil connection forward.

21. Route the new oil lines (Figure 1-2, item 29) inboard of the front port engine mount. The oil line connected to the center fitting of the oil adapter housing will connect to the output of the oil header; the oil line connected to the outboard fitting of the oil adapter housing will connect to the input of the oil header. Secure these connections. Refer to Figure 1-8 for proper routing; Figure 1-6 and 1-9 for proper connections at the oil header and oil adapter.

CAUTION

Severe engine damage can occur if the oil lines are not connected properly.

22. Remove the old remote oil header bracket. Discard the bracket, (3) bracket mounting bolts, (3) lock washers, and (1) plug wire retaining clip bracket.

24. Remove the existing shift cable bracket and install the new shift cable bracket, from the kit. (Figure 1-2, item 23) Be sure to reconnect the shift cable onto the new bracket.

25. Remove the starboard plug wire retaining bracket, located on the rear of the starboard head. Retain bolt and lock washer for use in step 26.

Figure 1-8 Oil Line Routing

Figure 1-9 Oil Line Connections at Adapter Housing

NOTE: For steps 26 -28 of this procedure parts added and relocated will vary according to the Bell Housing installed on your engine. Refer to Figure 1-10 for Bell Housing differences. Figure 1-10A is distinguished by having 'PCM' cast into the upper center surface and is a bottom mount starter only housing. Figure 1-10B is the current style Bell Housing and is distinguished by being able to accept either top mount or bottom mount starters dependent upon application.

26. Relocate the 10-Pin Bracket to the lower top mount starter block-off plate bolt, or to the upper starboard transmission mounting bolt. Refer to Figure 1-10. If a ground wire was secured at the 10-Pin Bracket mounting point, relocate this ground wire to the lower mounting hole on the rear of the starboard head using (1) bolt and (1) lock washer, from step 25. If the 10-Pin bracket was originally secured with a ground stud bolt (typical of Figure 1-10B) return the bolt to its original location and tighten. If the 10-Pin was secured by a bolt and lock washer (typical of Figure 1-10A) you may discard the bolt and lock washer.

27. From the kit, install the Heat Exchanger Ground Wire (Figure 1-2, item 37) at the upper port bell housing mounting bolt. Refer to Figure 1-10 for exact location.

28. From the kit, install the Heat Exchanger Bracket (Figure 1-2, items 31 - 36) to the bell housing. For the bell housing pictured in Figure 1-10A use items 31-33 from the kit, for the bell housing pictured in Figure 1-10B use items 34-36 from the kit.

29. From the kit, cut the rubber isolator with adhesive into thirds (Figure 1-2, item 38). Affix the isolator onto the Heat Exchanger Bracket in the center and inboard of each of the mounting clamp holes.

30. From the kit, obtain the Heat Exchanger (Figure 1-2, item 39). Mount the Heat Exchanger assembly to the H.E. Bracket using (2) 4" Hose Clamps (Figure 1-2, item 41). Do not fully tighten the clamps, at this time.

31. From the kit, use the Nut w/lock washer (Figure 1-2, item 42) to secure the ground wire to the H.E. ground stud.

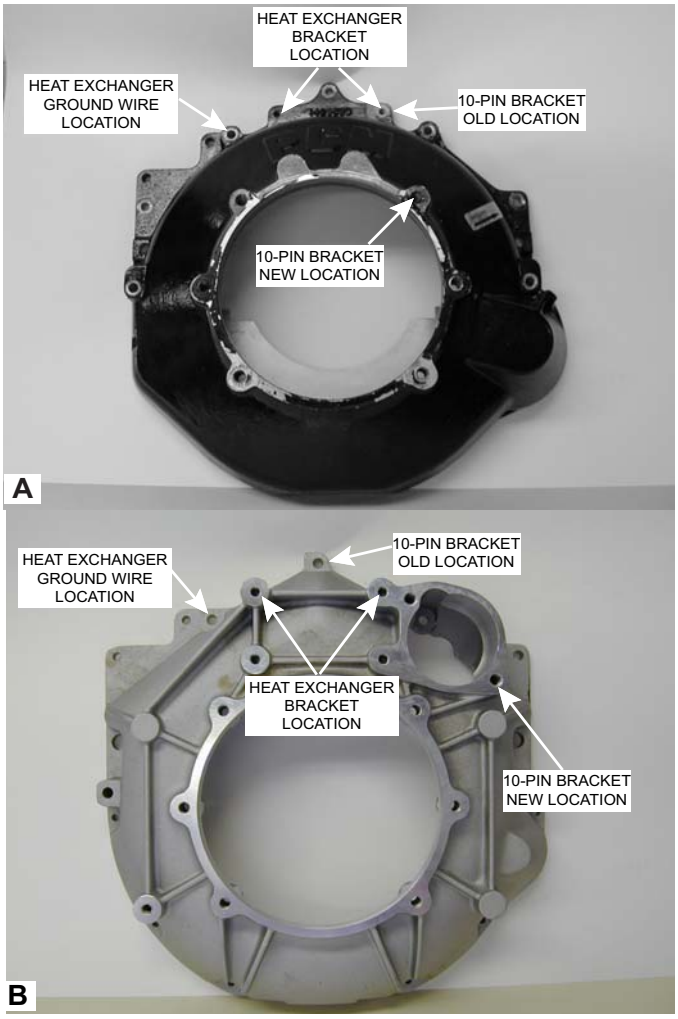

Figure 1-10 Bell Housing Configurations and Accessory Mounting Locations

32. From the kit, install the (2) Raw Water Dump Hoses, using (4) 1" Hose Clamps, (Figure 1-2, items 43 - 44) to the H.E. 1" outboard fittings and to the 90° fittings installed in rear ports of the exhaust manifolds.

NOTE: The r/w dump hoses may need to be trimmed slightly, at the H.E. side, to prevent them from rubbing on the corner of the engine heads.

33. If you performed steps 11-12 of this procedure, from the kit, install the Cooler to R/W Pump Hose (Figure 1-2, item 45) using hose clamps provided (Figure 1-2, item 46). The hose may need to be trimmed at the cooler side to provide a smooth fit.

34. From the kit, install the Circulating Pump to Heat Exchanger Hose (Figure 1-2, item 47). Use 1-3/4" hose clamp (Figure 1-2, item 48) at the circulating pump and use 1-1/2" hose clamp (Figure 1-2, item 49) at the H.E. The hose may need to be trimmed at the heat exchanger end to provide a smooth fit.

35. From the kit, install the R/W Pump to Heat Exchanger Hose (Figure 1-2, item 50) using 1-1/4" hose clamps (Figure 1-2, item 51).

NOTE: The R045102A hose (Figure 1-2, item 50) is moulded to fit the crank driven r/w pump. When installing this hose on a system using the belt driven r/w pump you will have to cut the 'U' end of the hose off and then trim it to fit.

36. From the kit, install the Coolant Fill Riser to Heat Exchanger Hose (Figure 1-2, item 52), using 1" hose clamps (Figure 1-2, item 53). The moulded end of the hose will connect to the fill riser and the end of the hose connecting to the H.E. may need to be trimmed to provide a smooth fit.

37. From the kit, install the Thermostat Housing to Heat Exchanger Hose (Figure 1-2, item 54), using 1-1/4" hose clamps (Figure 1-2, item 55).

38. From the kit, install the Coolant Fill Riser to thermostat Housing Hose (Figure 1-2, item 56), using 1/4" hose clamps (Figure 1-2, item 57). This hose connects to the nipple fitting located on the engine front of the fill riser and routes inside the oil fill tube to the thermostat housing fitting.

39. From the kit, locate the Coolant Overflow Bottle w/Cap, Coolant Overflow Hose, 1/4" Hose Clamps, and Overflow Bottle mounting hardware, (2) bolts, (2) flat washers, (2) lock washers, and (2) nuts (Figure 1-2, items 58-64). Attach the coolant overflow hose to the overflow bottle using 1/4" hose clamp. Mount the Overflow Bottle to the Heat Exchanger Bracket using the (2) bolts, flat washers, lock washers and nuts. Bolt with flat washer on the bottle side and lock washer and nut on bracket side. Route the overflow hose under the H.E. then up and forward to the engine rear fitting on the coolant fill riser and secure with 1/4" hose clamp.

40. Ensure that the H.E. r/w and f/w drains are facing straight down. From the kit, install a rubber isolator (Figure 1-2, item 40) under each of the H.E. mounting clamps, then tighten clamps securing the H.E. to the H.E. Mounting Bracket.

IMPORTANT: If you performed step 12 of this procedure, relocation of the transmission oil cooler will require a new water intake hose between the cooler and the sea cock (or sea strainer, depending upon application). Hoses disconnected during this procedure may be of sufficient length to accomplish this or you may need to order 1-1/4" i.d. water hose of sufficient length from the O.E.M. or other source. Ensure that this connection is made before you operate the engine.

41. Remove the engine block drain plugs and drain any remaining water from the engine block. Reinstall block drain plugs.

42. Make sure that ALL drain plugs are properly installed and all hose connections (fuel, oil, and water) are secure.

IMPORTANT: If the engine oil was drained at the beginning of this procedure, you will need to replace the oil in the engine at this time. Add 4 quarts of oil to the engine. Do not add any more oil until after you have run the engine.

FILLING FRESH-WATER COOLING SYSTEM

A new extended life engine coolant known as DEX-COOL™ is recommended for use in your engine. It is imperative to note the following about DEX-COOL™ engine coolant:

- IT IS PINK IN COLOR TO DISTINGUISH IT FROM CONVENTIONAL COOLANT.
- THE SERVICE CHANGE INTERVAL ON ENGINES BUILT WITH DEX-COOL™ IS 5 YEARS.
- TO MAINTAIN FULL CORROSION PROTECTION DURABILITY, DEX-COOL™ MUST NOT BE MIXED WITH CONVENTIONAL (CONTAINING SILICATE) ENGINE COOLANTS.
- DEX-COOL™ IS AN ETHYLENE GLYCOL BASED PRODUCT, THEREFORE, BOIL AND FREEZE PROTECTION ARE MEASURED IN THE SAME FASHION AS CONVENTIONAL COOLANTS.

TO FULLY REALIZE ITS MANY ADVANTAGES, DEX-COOL™ MUST NEVER BE MIXED WITH CONVENTIONAL COOLANTS.

DEX-COOL™ can become contaminated by inadvertently topping-off with conventional coolant, adding conventional coolant to the system or even if fill/drain containers are shared between coolants. If contamination occurs, the cooling system must be immediately drained and flushed, and refilled with DEX-COOL™. No short-term damage will occur, however, the service interval will be reduced from 5 years to 2 years.

The fresh-water cooling side of the cooling system must be filled with a 50/50 mixture of DEX-COOL™ (or equivalent, which meets GM6277M) extended life antifreeze and water solution.

IMPORTANT: More than 50% antifreeze solution can contribute to an overheating condition.

43. Reconnect negative terminal of the battery.

44. Remove the pressure cap from the Coolant Fill Riser.

45. Prepare 5 gallons of DEX-COOL™ 50/50 solution. Slowly fill the system with antifreeze solution until the system is full. Coolant Fill Riser will be full to the top.

46. Prime the fuel system. Turn the ignition key to the ON position for 5 seconds, turn the key OFF for 10 seconds, and repeat 1-3 times.

WARNING

Visually inspect unit for fuel leaks before operating the engine. If fuel leaks are present, DO NOT operate the engine, repair immediately.

47. Start the engine and operate at idle speed (650-1000 RPM) to purge air from the system. Continue to add coolant until the coolant level remains constant, then add coolant to the Overflow Bottle to the “Full” mark on the bottle. Install the pressure cap on the Coolant Fill Riser.

48. Continue to run the engine until it reaches normal operating temperature. Check for fuel leaks, oil leaks, fresh water coolant leaks, and raw water leaks at all fittings and connections. Correct all leaks, as required.

NOTICE: It is not necessary to remove pressure cap to check coolant levels. Check Overflow Bottle daily and keep filled to between the ‘ADD” and “FULL” level indicated on the bottle.

WARNING

Do not remove cooling system filler cap when the engine is hot. Allow the engine to cool and then remove the pressure cap slowly, allowing the pressure to vent. Hot coolant, under pressure, may discharge violently and cause severe burns.

49. Continue to run the engine at normal operating temperature. Verify engine operating temperature and thermostat operation. Check the Overflow Bottle for the proper level and add coolant if necessary.

50. Tun engine off. Check transmission fluid level. If the level is not to the ‘FULL’ mark on the dipstick add fluid until level reads ‘FULL’ . DO NOT overfill.

    Check engine oil level. Add oil until level reads “Full” on the dipstick. DO NOT overfill.

51. From the kit, affix decals to the new hood (Figure 1-2, items 65-69) and attach the hood to the engine with the retention nuts removed in step 2.

Installation of the Fresh Water Cooling Kit on a Direct Drive application is complete.

FIGURE 2-1, FWC WATER FLOW DIAGRAM

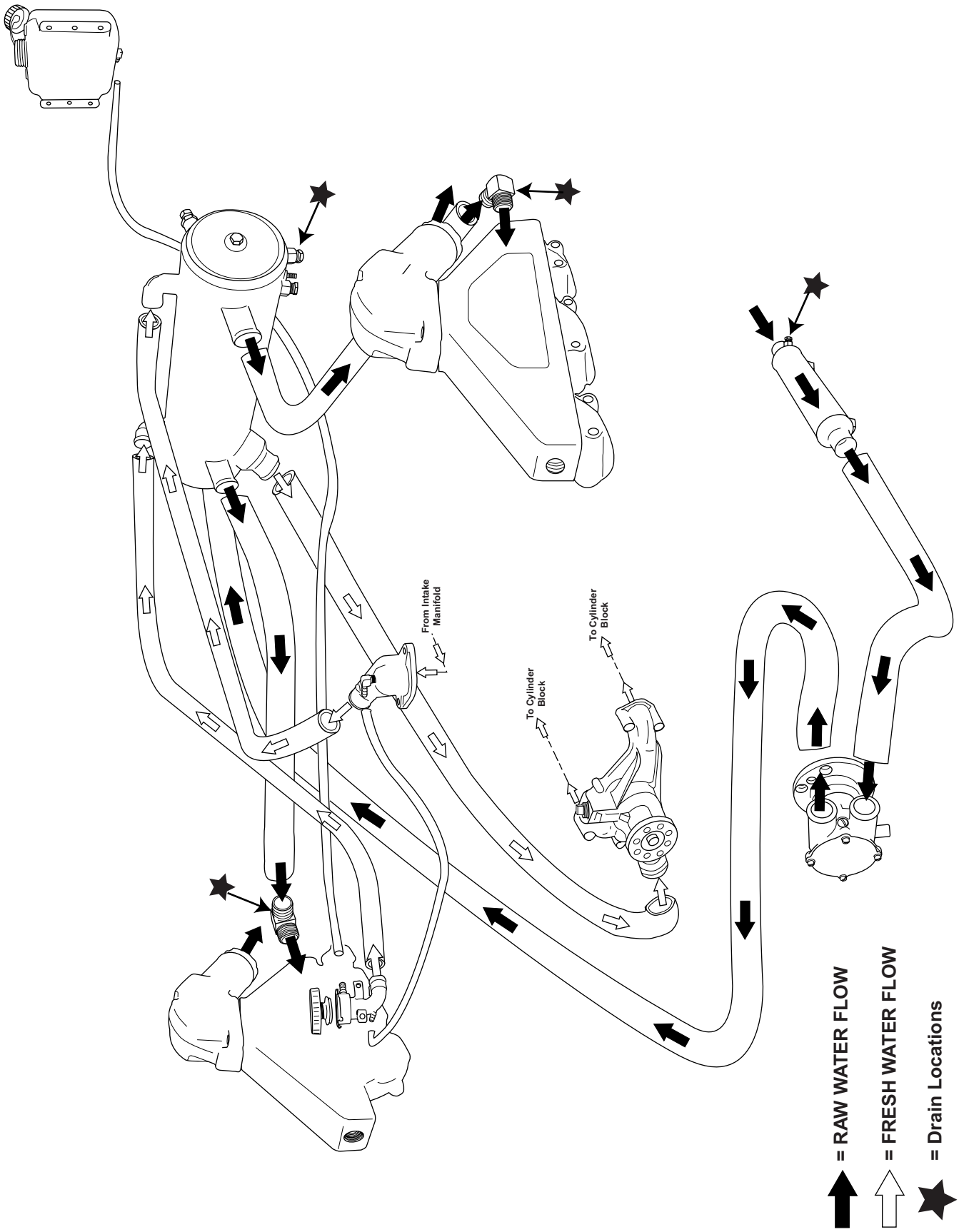

Figure 2-1 Fresh-Water Cooling System (5.7L Crank Driven R/W Pump)

FIGURE 2-2, FWC WATER FLOW DIAGRAM

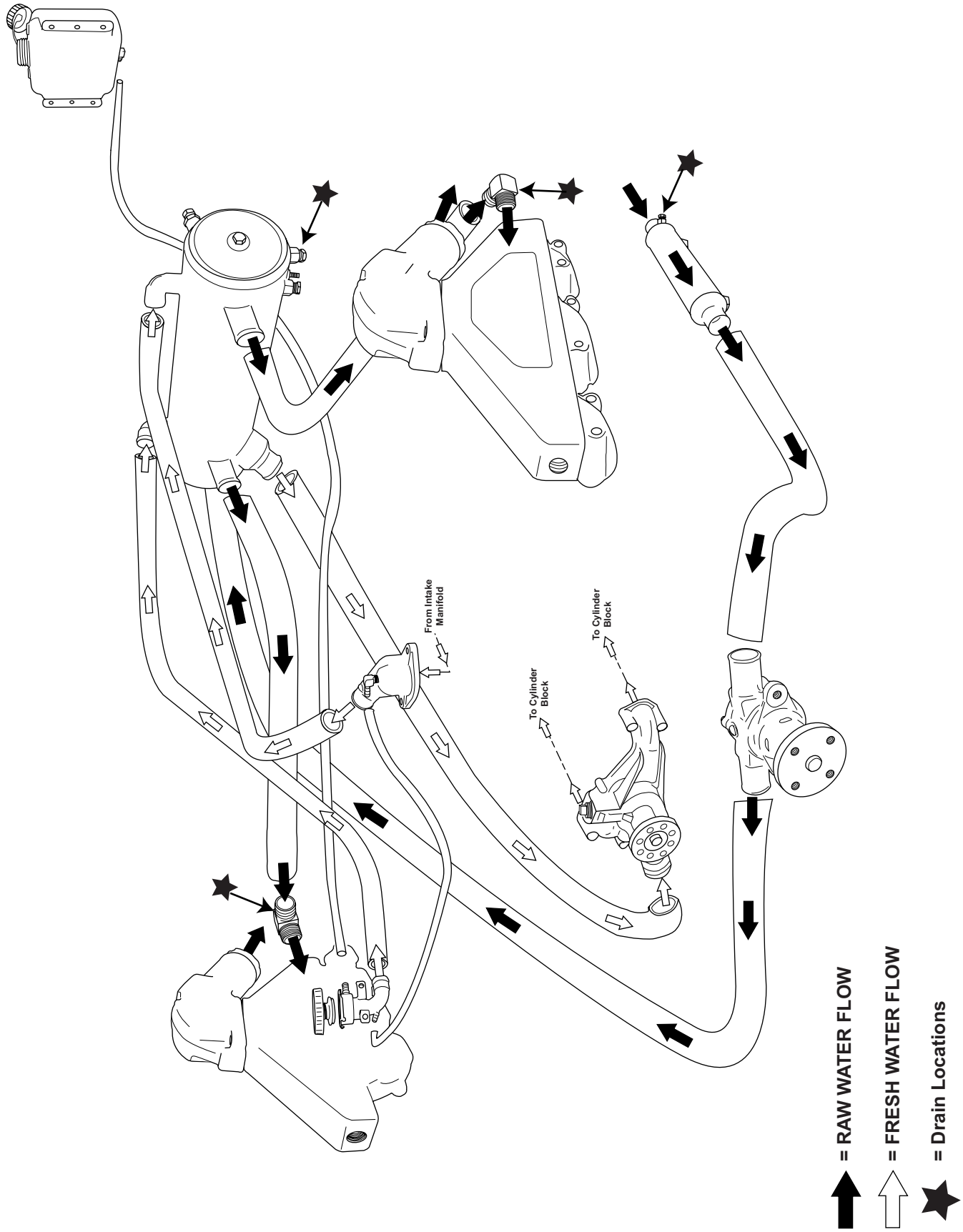

Figure 2-1 Fresh-Water Cooling System (5.7L Belt Driven R/W Pump)