SERVICE BULLETINS

The following Bulletins contain supplementary and updated information about various components and service procedures which are important to the proper functioning of your engine and its support systems.

You should familiarize yourself with the subjects and make sure that you consult the appropriate Bulletin(s) whenever your engine requires service or overhaul.

V.2

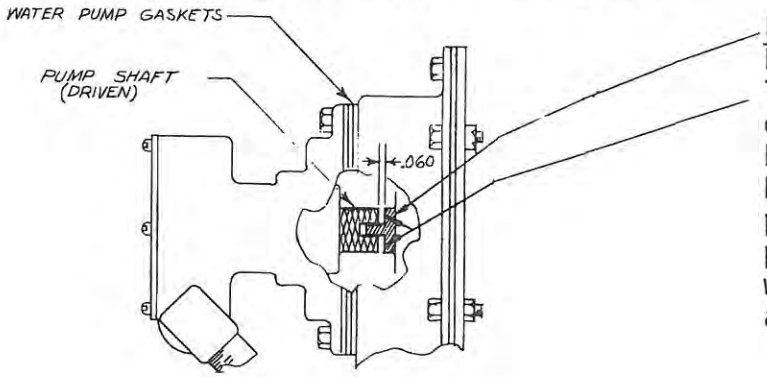
SERVICE BULLETIN

DATE: September 17, 1976 *BULLETIN NUMBER:* 10

MODEL: Westerbeke 40 and WPDS 10-15

SUBJECT: Sea Water Pump Clearance and Alignment

Clearance:
Adequate longitudinal clearance between the sea water pump shaft and the driving shaft is established by the use of multiple pump gaskets. The number of gaskets required can vary from 1 to 4. Enough gaskets must be used so that the shaft ends do not mate. See figure 1.



NOTE:
The application of liquid or paste type Prussian blue (at points indicated by arrows) will give positive indications of pump drive contact which will require the use of additional gaskets.

If the proper clearance is not maintained, the sea water pump shaft will force the fuel pump drive hub against its bushing. The bushing will seize to the drive hub and rotate in its housing. Bushing wear and loss of oil pressure will result.

When replacing the sea water pump be sure that the same number of gaskets is replaced and there is the required clearance.

Alignment:
Alignment is just as critical as clearance. The latest 1/2" pump intentionally has no pilot because the location of the timing cover itself is not precise. To assure that the pump shaft is axial with the driving shaft, install the pump with the four nuts just snugged. WITH THE FUEL STOPLEVER OFF, crank the engine for a few seconds. If the nuts have not been overtightened, the drive tang will cause the pump to align itself. It is best to deliberately offset the pump against its studs so you can visually verify movement of the pump as it centers itself during cranking. The nuts should then be tightened. This procedure must be repeated anytime the pump is loosened.

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P/N: 16742

SERVICE BULLETIN

DATE: April 23, 1968 *BULLETIN NUMBER:* 11

MODEL: Westerbeke 40 and WPDS 10-15

SUBJECT: Instructions for Replacing Injection Pump Drive Hub Bushing (#0050323)

1. Remove c/s Pulleys
2. Remove water pump
3. Remove timing cover
4. Mark idler gear and fuel pump gears before removing fuel pump gear (This is very important in order to retain proper relation of gears and eliminate re-timing of engine).
5. If fuel pump hub bushing is worn as suspected, gear and bushing will pull right out of block.
6. Remove quill shaft from injection pump (splined pump drive shaft).
7. Remove gear from drive hub
8. Remove hub bushing retaining circlip
9. If bushing is frozen on hub, tighten forward end of bushing in vise and drive hub of bushing with brass drive taking care not to damage female splines in hub
10. Place hub flange on top of vise and with small brass punch knock out drive key from hub
11. Clean hub shaft with crocus cloth or similar material. Pre-oil and fit new bushing. Check that bushing rotates freely. Replace circlip.
12. Clean bushing hole in block
13. With plastic or similar soft headed mallet drive newly assembled bushing in place hitting squarely on center until it has definitely bottomed out against block.

Continued

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WESTERBEKE SERVICE BULLETIN #11 (Continued)

14. After bushing is in place recheck for free rotation of hub making sure no binding is evident

15. Line up master spline of drive hub with master spline of fuel pump drive

16. Replace fuel pump drive shaft by passing it through drive hub until it enters into pump drive. When shaft comes up against fuel pump drive it may be necessary to hold a slight finger pressure against drive shaft and rotate slightly left and right until shaft enters pump drive. (NOTE: On drive shaft longer portion mates in drive hub)

17. After shaft is in place (using a brass or similar hammer) drive the water pump drive key into hub

18. Reinstall pump drive gear making sure gear teeth are matched (same as on removal)

19. Line up corresponding scribe marks on drive hub and drive gear then install and tighten 3 drive gear bolts.
NOTE: <u>If scribe marks are not properly aligned timing will be off.</u>

20. Reinstall timing cover

21. Reinstall pulleys

22. When installing Sherwood pump refer to attached bulletin. (Service bulletin #10)

4/23/68

SERVICE BULLETIN

V.5

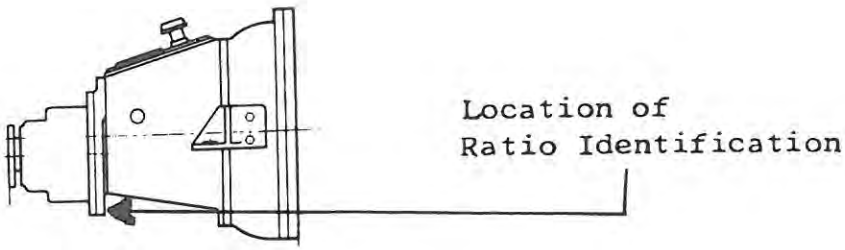
DATE: September 3, 1968 *BULLETIN NUMBER:* 16

MODEL: Westerbeke-Paragon Model SA Transmissions

SUBJECT: Reduction Gear Ratio Identification

To identify the reduction gear ratio on SA transmissions, look for digits marked on the back side of the adapter plate.

See Drawing Below



These digits represent the following ratios:

DIGITS	RATIO
R015	1.5:1
R020	2:1
R025	2.5:1

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P/N:

V.6

SERVICE BULLETIN

DATE: 6/15/69 *BULLETIN NUMBER:* 20

MODEL: All Engines

SUBJECT: Connecting Pressure Sensing Devices to Oil Galleries

Oil pressure sensing devices, such as senders and switches, must never be connected directly to any oil gallery of an engine. The reason is simply that continued engine vibration causes fatigue of the fittings used to make such a connection. If these fittings fail, the engine loses its oil pressure and very quickly seizes.

Such pressure sensing devices must be bulkhead mounted and connected to the oil gallery using an appropriate grade of lubricating oil hose. Any fittings used to connect the hose to the gallery must be of steel or malleable iron. Brass must not be used for this purpose.

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P/N: 11967

SERVICE BULLETIN

DATE: June 15, 1969 *BULLETIN NUMBER:* 21

MODEL: Westerbeke 40

SUBJECT: Replacing Injection Pump Drive Hub Part Number 12632

NOTE: When replacing the drive hub the new hub will have no timing mark scribed on it. For this reason the following procedure must be adhered to step by step. When the procedure is completed and before replacing the timing cover, a new mark is to be punched on the drive hub to coincide with the existing scribe mark on the fuel pump drive gear.

1. Remove the small cover on side of injection pump.
2. Turn engine in direction of rotation (clockwise looking aft). Use a socket and long bar on crankshaft nut and turn by hand.
3. While turning shaft, look into opening in injection pump. It will be noted that pump rotor has a series of letters on it with a scribe mark beneath each letter. It will also be noted that there is a large snap ring visible through the opening.
4. Rotate the shaft until the scribe mark for the letter "C" lines up with the edge of the lower end of the snap ring. (There is also a letter "G" on the rotor -- do not confuse it with "C".)
5. At this point #1 piston is at 22° before top dead center.
6. Remove crank shaft pulleys (when removing the crankshaft nut, if the shaft is moved before removing the pulley, reset the letter "C" with the snap ring in the pump).
7. Remove water pump.
8. Remove timing cover
9. Mark the idler gear and fuel pump gear.(This is very important in order to retain proper relation of gears and eliminate complete engine retiming.)
10. Remove fuel pump gear from drive hub.
11. Obtain three (3) 5/16" fine threaded bolts about 3" long threaded all the way. These are to be threaded into the holes on the drive hub and turned in against the front plate to pull the hub and bronze bushing out of the block as an assembly. (Note: Tighten bolt equally in sequence to prevent galling the bronze bushing in the block.)

Continued

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SERVICE BULLETIN #21 - Continued

REPLACING INJECTION PUMP DRIVE HUB

12. When the hub and bushing are removed pull out the pump splined drive shaft which will now be visible.

13. Remove circlip from old hub and transfer bushing to new hub using new circlip.

14. With plastic or similar soft headed mallet drive assembly back into block hitting squarely on center until it has definitely bottomed out against block.

15. After bushing is in place, recheck for free rotation of hub making sure no binding is evident.

16. Line up master spline of hub with master spline of fuel pump drive.

17. Replace fuel pump drive shaft by passing it through drive hub until it enters into pump drive. When the shaft comes up against fuel pump drive it may be necessary to hold a slight finger pressure against the drive shaft and rotate slightly left or right until shaft enters pump drive.

    NOTE: ON DRIVE SHAFT, LONGER SPLINED END MATES INTO DRIVE HUB.

18. Rotate hub until letter "C" is back on scribe mark.

19. Re-install drive gear making sure letter "C" is lined up before securing bolts.

20. Remark hub to correspond with mark on gear.

21. Using soft headed hammer insert water pump drive key into hub until it bottoms out.

22. Install timing gear cover, pulley, and water pump.

23. Put cover back on injection pump and bleed pump using procedure in manual.

6/15/69

Form A967

SERVICE BULLETIN

V.9

DATE: June 1969 *BULLETIN NUMBER:* 29

MODEL: Westerbeke 40

SUBJECT: Injection Pump History

1. First Pumps:

Marine:	DPA 3243880	Spring 7123-898-J
Code:	P.H.30/500/8/3190	
Generator:	DPA 3248700	Spring 7123-898T
Code:	P.H.30/500/2/1880	

NOTE: ABOVE PUMPS CAN BE USED ON EITHER APPLICATIONS BY CHANGING GOVERNOR SPRING AND CHANGING NAMEPLATE.

2. Second Pumps: Fitted from Engine No. 107U6037. These pumps cannot be changed for previous pumps owing to a timing mark change (3^{o}pump 6^{o}engine)

Marine:	DPA 3248830	
Code:	P.H. 30/500/8/3190	Spring 7123-898J
Generator:	DPA 3249050	
Code:	P.H.30/500/2/1880	Spring 7123-898T

NOTE: THESE PUMPS CAN BE USED ON EITHER APPLICATIONS BY CHANGING GOVERNOR SPRING AND CHANGING NAMEPLATE.

3. Third Pumps; (Note-two marine numbers)

Marine:	DPA 3249030	
Code:	P.H.30/500/5/3190	Spring 7123-94J
Marine:	DPA 3249020	
Code:	P.H.30/500/6/3190	Spring 7123-898H
Generator:	DPA 3248990	
Code:	P.H. 30/500/9/1880	Spring 7123-898Q

NOTE: THESE PUMPS CAN BE USED ON EITHER APPLICATIONS BY CHANGING GOVERNOR SPRING AND CHANGING NAMEPLATE. Pumps listed in #3 can be changed completely for pumps listed in #2 as the timing remains the same.

SUMMARY: #1 pumps for engines earlier than 107U6037

#2 and #3 pumps for engines later than 107U6037

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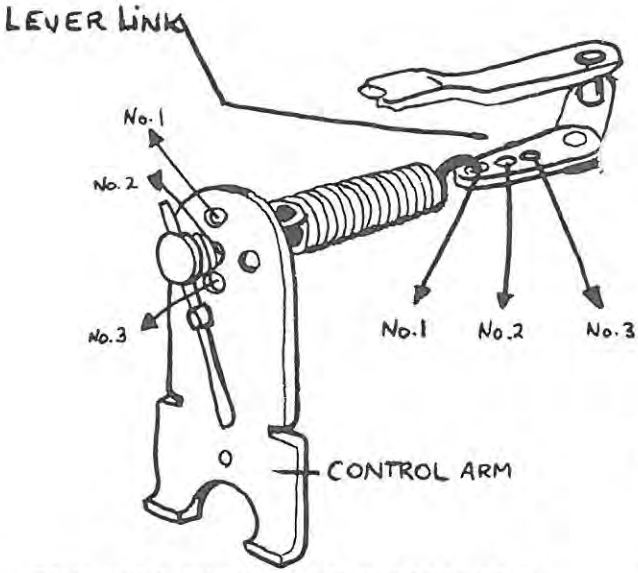
P/N:

Code #	Gov.Arm Hole	Throttle Lever
1	1	1
2	1	2
3	1	3
4	2	1
5	2	2
6	2	3
7	3	1
8	3	2
9	3	3
0	Indicates hydraulically governed	

PH 30/500/8/3190
code for spring position



GOVERNOR MAIN SPRING POSITIONS

GOVERNOR LINK SETTING: This is measured between the inside of the metering valve lever pin and the inside of the governor control cover stud. The measurements should be made with the vernier caliper held with the rule parallel to the axis of the pump. A few applications require the link setting to be set using the Visual Cut-off Tool (7144-601), such information being specified on relevant test data sheets.

The link length is specified to satisfy two main factors for governor performance:

1. Fuel cut-off at maximum speed.
2. Non-interference with fuel delivery at maximum fuel.

Whilst most governors will operate satisfactorily with the nominal link length, some units fail for the above reasons and can be corrected by an alteration to the link length. The following procedure should therefore be adopted:

1. Set to nominal link length before commencing test.
2. If unit fails for "no cut-off at maximum governed speed", reduce link length.
3. If unit fails for maximum fuel interference, increase link length.

Note, however, that incorrectly machined, worn, or wrongly assembled parts can produce the same faults, and alteration to link length, which may be correct, will not necessarily effect a solution. Should adjustment to the link setting fail to correct the fault, then this should be reset to the nominal length and the trouble looked for elsewhere.

Where adjustment to the governor link length has been made, the sequence of the governor setting tests must be repeated and the test requirements satisfied.

Adjustment must NOT be made beyond the specified tolerance.

GOVERNOR CONTROL SPRING: The sketch above indicates clearly the hole numbers in the governor control arm and the throttle shaft link, in which the main governor spring is assembled.

ADVANCE-RETARD DEVICES: A number of variations of this device are now in product and great care must be taken when testing and adjusting. Details of permissible adjustments are given on the test plans concerned and it is important that:

1. The maximum amount of shimming allowed is not exceeded.
2. Where an unhardened spring cap is used, a 0.5mm shim is fitted over the "pip" inside the cap. The unhardened cap can be identified by the thickness of the hexagon-approximately 5mm against 3mm for the hardened cap formerly used.
3. Tests are carried out strictly in the order specified on the relevant test plan.

VACUUM TEST

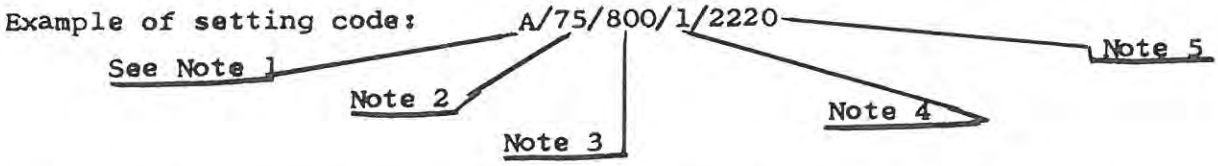
It will sometimes be found that, due to the flexible pipe connecting the vacuum gauge to the pump being partially filled with air, an incorrect reading will result. To correct this, slacken the pipe connection at the gauge end with the fuel supply turned on. Wait until fuel flows from this pipe then re-tighten union.

FOR DPA TEST PLANS:

The governor setting speed quoted in the test plan is for test purposes only. The maximum governed speed must be finally set on the engine according to the manufacturer's instruction.

The following test data is not given in the test plan for coded pumps and must be obtained from the setting code on the pump nameplate:

a) Maximum fuel setting
   Maximum fuel setting speed
c) Governor checking speeds
d) Governor spring positinn(mechanically governed pumps)



NOTE 1:(Prefix indicates pump tested with BDN12SD12 nozzles) Not required for test purposes. The letter "A" will normally be used to indicate that the pump is tested with BDN12SD12 nozzles, but in the case of Perkins engines different prefix letters will be used. These will indicate BDN12SD12 nozzles as before but in addition will also indicate the engine type to which the pump is fitted.

NOTE 2:(max fuel setting). The maximum fuel setting code is given in mm^3/stroke and must be divided by 5 to obtain the setting value in c.c/200 strokes.

NOTE 3:(max fuel setting speed). The figure given in the code indicates pump r.p.m which must be used for setting the maximum fuel above.

NOTE 4:(governor spring position) The numbers 1 to 9 will be used to indicate the various spring positions as shown in the guide on page 2. Hydraulically governed pumps will have the figure "0" in this part of the code.

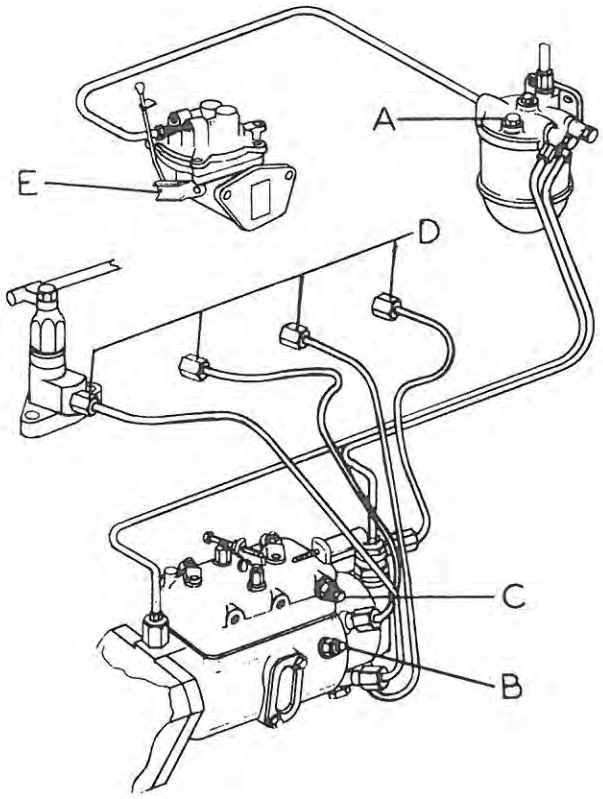
NOTE 5: Maximum no-load speed-engine R.P.M.

SERVICE BULLETIN

DATE: November 27, 1972 *BULLETIN NUMBER:* 49

MODEL: Westerbeke 40

SUBJECT: Bleeding and Priming Fuel System



1. Ensure fuel shut off valve is open.
2. Position shift lever to neutral.
3. Position fuel stop-run and throttel control levers to maximum open positions.
4. Loosen bleed plug (A). Operate priming lever (E). When fuel, free of air bubbles, issues from bleed plug, tighten plug.

   NOTE: If the engine camshaft cam driving the fuel lift pump is on maximum lift, it will not be possible to obtain a full pumping stroke with the priming lever (E), and the engine should be turned with starter motor one complete revolution.
5. Loosen bleed screw (B). Operate priming lever (E) as in step (4) above, then tighten screw.
6. Loosen bleed screw (C). Operate priming lever (E) as in step (4) above, then tighten screw.
7. Loosen the four union nuts (D). Operate the starter motor, when fuel, free of air bubbles, issues from union nuts, tighten nuts.
8. Start engine in full throttle for maximum fuel. Immediately return throttle to idle speed when engine starts.

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SERVICE BULLETIN

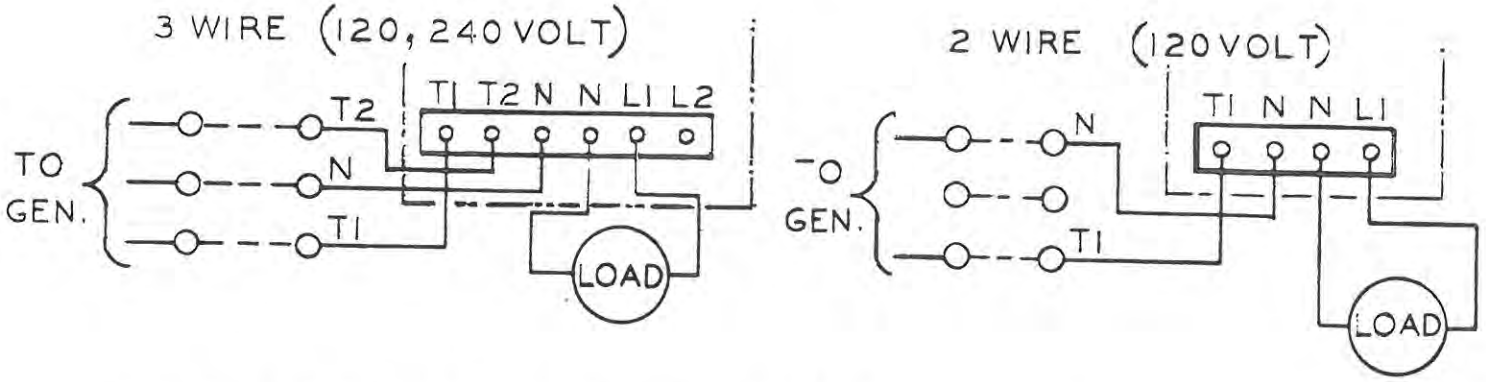
V.13

DATE: April 2, 1973

BULLETIN NUMBER: 52

MODEL: WPDS 10-15

SUBJECT: Test Procedure for DMS-2 and DMS-3 Dyna-Monitor



1. Connect DM (Dyna-Monitor) T1, T2, and N to generator junction box as shown above, if not already done.

2. Connect DM to generator as follows, if not already done:

Dyna-Monitor	Generator
1	10
2	11
3	6 (ground)

3. Connect a 60 watt load between L1 and neutral.

4. Turn generator control and DM to remote.

5. Adjust 200 ohm potentiometer slowly until generator just starts.

6. Turn off DM. Generator should shut down.

7. Disconnect the 60 watt load and connect a 25 watt load between L1 and neutral.

8. Switch DM to remote. Generator should not start. If it does, repeat steps 3 through 8.

9. With the 200 ohm potentiometer adjusted correctly, switch DM to "ON". Generator should start. If not, a malfunction is indicated.

10. Remove any extraneous connections which may have been used for this test. Return both DM and generator control to their normal mode of operation. Secure generator.

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P/N: 15269

V.14

SERVICE BULLETIN

DATE: February 1974 *BULLETIN NUMBER:* 68

MODEL: Four-107

SUBJECT: Service Replacement of Piston Ring Sets

Replacement piston ring sets have been made available for service use on Four-107 engines, should it become apparent after an appropriate period of service, that piston ring and/or cylinder bore wear may have taken place. These ring sets may only be used where the existing liners are not renewed.

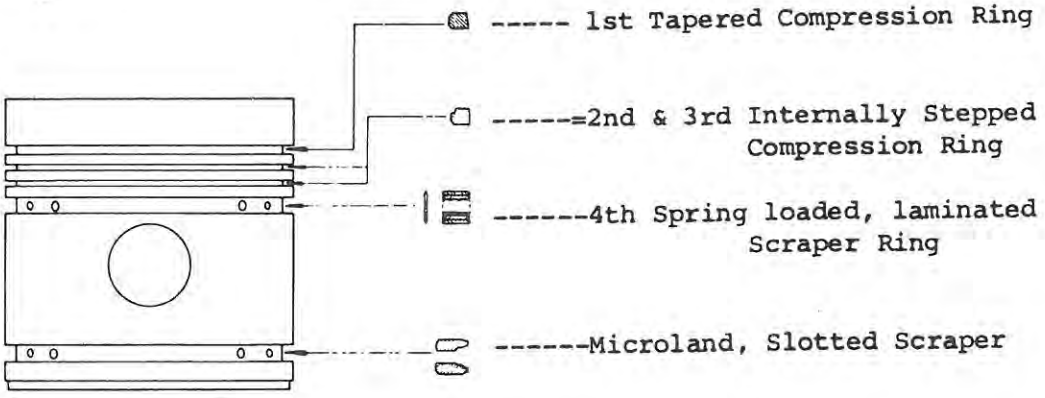
The following instructions are advised for guidance and should be strictly adhered to when undertaking to fit new piston rings to a Four-107 engine:

(a) After removal of the piston, discard the rings.
(b) Thoroughly clean the piston (not forgetting the ring grooves)
(c) Examine the piston for signs of scoring, wear or damage of any kind, paying special attention to the ring grooves.

THE MAXIMUM PERMISSIBLE WORN DIMENSIONS OF THE PISTON RING GROOVE (WIDTH) ARE AS FOLLOWS, THE GROOVES BEING NUMBERED FROM THE CROWN, DOWNWARDS:

PISTON GROOVE	MAXIMUM WORN DIMENSION (WIDTH)
1st	.084 inch
2nd & 3rd	.0695 inch
4th & 5th	.195 inch

(d) If necessary, replace with a new piston.
(e) Fit new piston ring set, part number 12906 to engines rated up to 3000 RPM and #12337 to engines rated in excess of 3,000 RPM. The difference being only in the ring fitted to the 4th piston groove (see below)



Piston Ring Arrangement Shown Four-107 Engines Rated up to 3000 RPM
RING SET, PART NUMBER 12906

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P/N: 19055

NOTE: Ring set, part number 12337, is identical to 12906 with the exception of the ring supplied for the 4th groove. For this groove, the microland slotted scraper ring is supplied as in the 5th groove of both ring sets. Each ring set provides sufficient rings for one piston only. For a complete engine, therefore, four will be required.

FITTING OF PISTON RINGS

With the exception of the laminated ring fitted in the 4th groove of applications rated up to 3,000 RPM, the correct method of fitting will be apparent from the diagram overleaf. Detailed instructions in respect to this type ring are contained below:

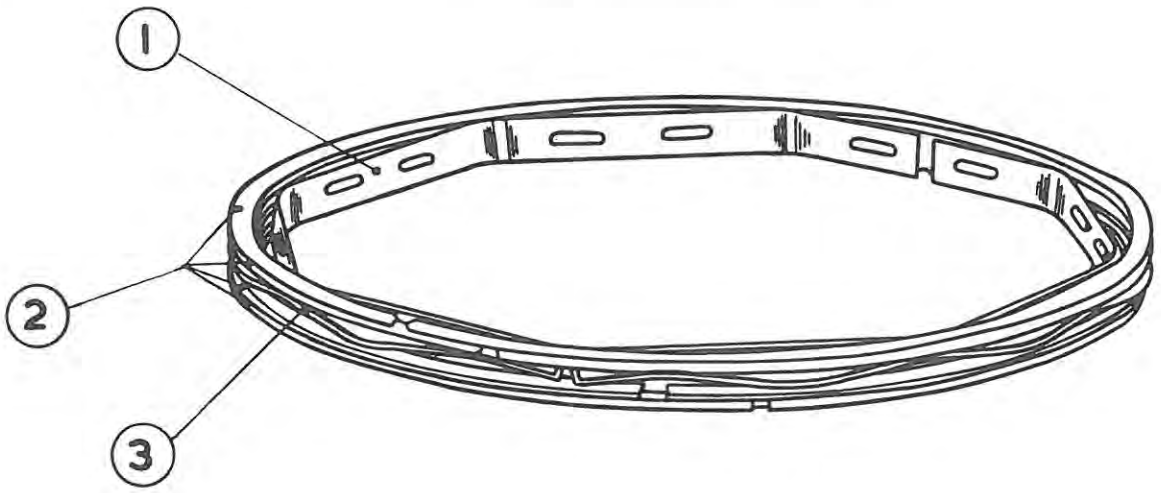
IMPORTANT:

(a) Before re-fitting the pistons, the "glaze" should be removed from the working surface of the liners by means of a medium grade emery cloth, applied in a semi-rotary movement.

(b) Care must be taken, however, to ensure that no abrasive matter is allowed to fall onto the crankshaft journals and bearings. Also, all traces of abrasive matter must be removed from the engine before re-assembly.

Below are part numbers and pertinent information to ensure ordering proper ring sets. As you will note, the rings used vary with engine rated RPM and whether new or original liners are used.

PART NO.	RING SET	REMARKS
12738	Ring Set (1)	New Liner, 3000 RPM -4.99 To Ser. 7034969
12819	Ring Set (1)	New Liner, 3000 RPM-4-107 From Ser.7034969
12958	Ring Set (1)	WORN Liner,3000 RPM- 4.99 From Ser.7007685
12840	Ring Set (1)	New Liner, 3000 RPM- 4.99 From Ser.7007685
12898	Ring Set (1)	WORN Liner,4000 RPM- 4.99 From Ser.7007685
12905	Ring Set (1)	New Liner, 3000 RPM-4-107
12906	Ring Set (1)	WORN Liner,3000 RPM-4-107
12907	Ring Set (1)	New Liner, 4000 RPM-4-107
12337	Ring Set (1)	WORN Liner,4000 RPM-4-107



SERVICE BULLETIN

DATE: 5/6/74 *BULLETIN NUMBER:* 69

MODEL: All marine generators and marine engines

SUBJECT: Exhaust system failures

When engine sea water is fed into an exhaust system so that the full stream strikes a surface, erosion may cause premature failures.

Proper design of either a water jacketed or a water injected ("wet)" exhaust system to prevent this problem requires that the sea water inlet be positioned so that the entering stream of sea water does not strike a surface directly. Also, the velocity of the entering sea water stream should be as low as possible which is achieved by having inlet fittings as big in diameter as possible.

In addition to the above design considerations, it is usually advantageous to divide the sea water flow at the point of entry to the exhaust system so that only a portion of it enters the exhaust system. The remainder is normally piped directly over the side. The proper proportion of the sea water flow to pass through the exhaust system can only be determined by trial and error. The goal is to prevent excessive exhaust temperatures with the least amount of sea water.

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SERVICE BULLETIN

V.17

DATE: May 29, 1974 *BULLETIN NUMBER:* 72

MODEL: All

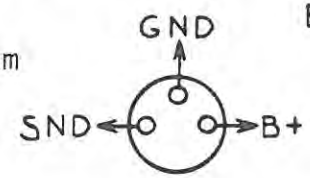
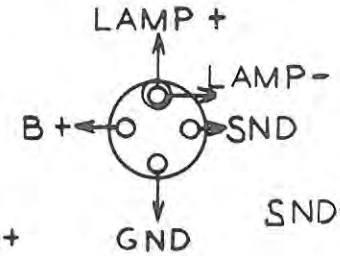
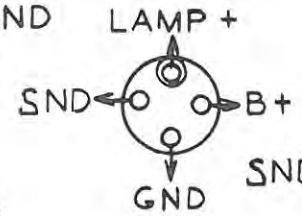
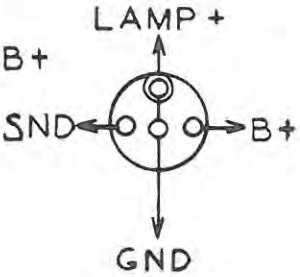
SUBJECT: Non-Interchangeability between Manufacturers of Gauges and Senders

In recent years we have purchased gauges and senders from four different manufacturers.

In no case may the gauge of one manufacturer be used with the sender of another manufacturer. In some cases the wiring of either or both the gauge and the sender varies by manufacturer.

Thus it becomes important, when ordering a replacement gauge or ordering a replacement sender, to order a matched set or to know conclusively who the manufacturer is.

Ammeters are electrically interchangeable.

	STEWART-WARNER 2" DIA CASE	VDO 2 3/8" DIA CASE	FARIA 2" DIA CASE	NOVOX 2" DIA CASE
Ammeter	11581	11931	16550	19165
Oil pressure gauge	11544	11914	16548	19166
Oil pressure sender	11542	11916	16551	19167
Water temp. gauge	11545	11913	16549	19168
Water temp. sender	11543	11915	16552	19169
Adapter ring to install 2" dia gauge in 2 3/8" dia panel cut-out	16023 and SB #44		16023 and SB #44	16023 and SB #44
Wiring diagram		 Also see SB #36		

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P/N: 19190

V.18

SERVICE BULLETIN

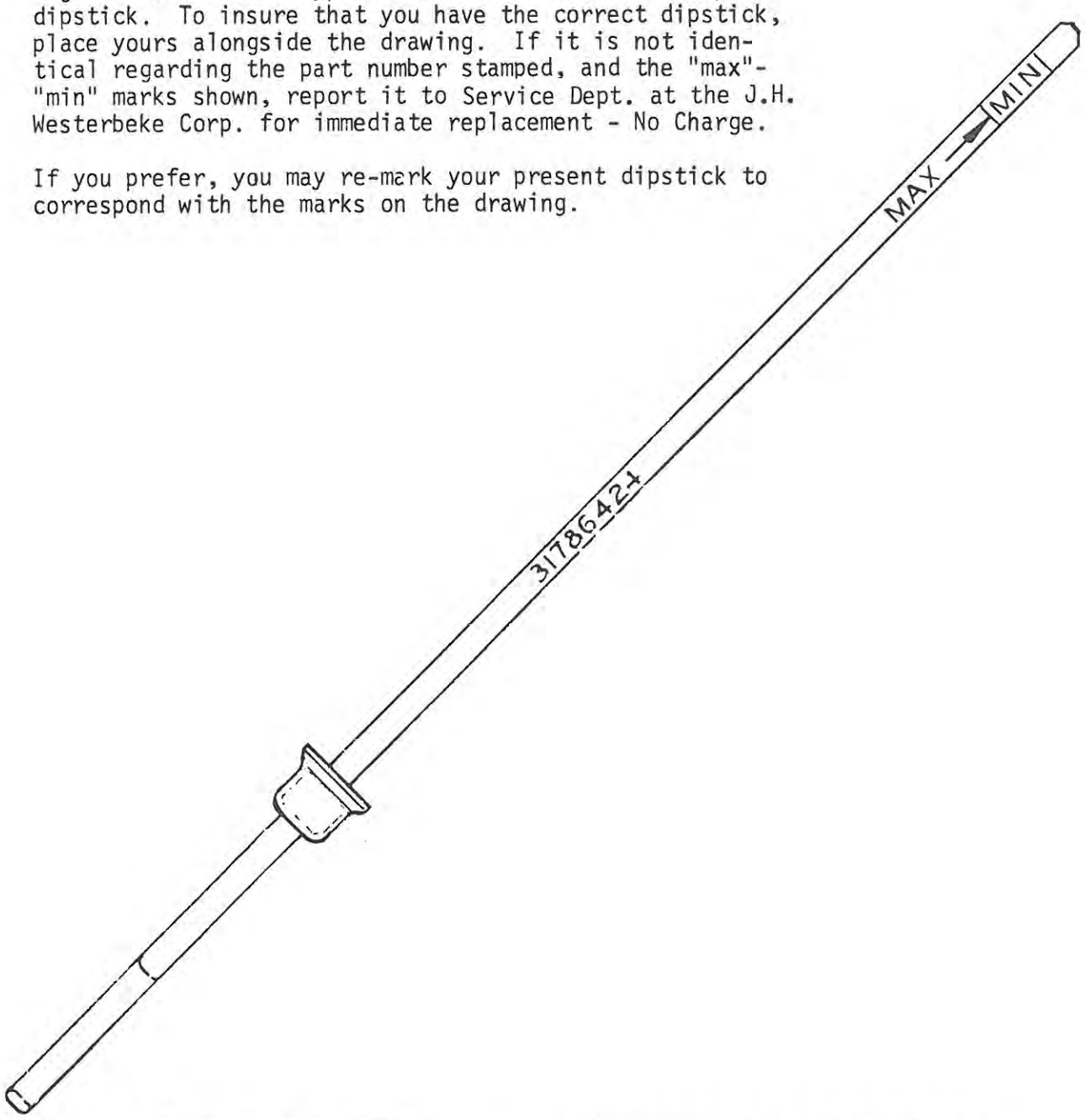
DATE: June 19, 1974 *BULLETIN NUMBER:* 73

MODEL: Four-107

SUBJECT: Lube Oil Sump Dipstick

There have been some reports that a very few Four-107 engines have been shipped with an incorrect oil sump dipstick. To insure that you have the correct dipstick, place yours alongside the drawing. If it is not identical regarding the part number stamped, and the "max"-"min" marks shown, report it to Service Dept. at the J.H. Westerbeke Corp. for immediate replacement - No Charge.

If you prefer, you may re-mark your present dipstick to correspond with the marks on the drawing.



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P/N: 19200

SERVICE BULLETIN

V.19

DATE: March 15, 1975 *BULLETIN NUMBER:* 80

MODEL: Westerbeke 40LB, 40LS, LB-49

SUBJECT: Westerbeke Lue-Cel

DESCRIPTION

The Westerbeke Lub-cel improves diesel engine cold starting and performance, typically allowing starts at 20° F. within 5 seconds in conjunction with hydraulic starting systems. It delivers a pre-determined quantity of lubricating oil, at a pre-determined rate, directly above the engine's intake valves during cranking and, when the engine has started, reloads itself from the engine oil gallery.

Pressure to deliver this oil is taken from the hydraulic starter return line. (Lub-cel is designed for use with American Bosch hydraulic starters.)

OPERATING PRESSURES

Delivery Pressure

Due to the high flow rate in the Bosch hydraulic system the return line builds up between 50 and 100 PSI. Close to the starter, this pressure is used to energise the Lub-cel.

Engine Oil Pressure

The Lub-cel requires 20-30 seconds to reload at 30 PSI lube oil pressure. The engine should never be run for less than a minute or two if the Lub-cel is to be kept fully charged with oil.

SERVICE

1. Engine Oil

The Lub-cel unit is not sensitive to types of oil used. With Westerbeke Four-107, Pilot 20 and LB-49, cold starting in below freezing temperatures it is imperative to use a good brand of S.A.E. 5W20 oil.

2. Hydraulic Fluid

We use 'Esso EP9' hydraulic fluid in our tests but any good grade equivalent hydraulic or telemotor oil may be used. In no case should oils be mixed.

3. Repair and Overhaul

All Lub-cel units should be overhauled every two years. A Factory exchange program is

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Service Bulletin 80 Con't.

available to facilitate this. Spare parts are available thru our parts department.

4. Bleeding air from Lub-cel

With engine running and oil pressure more than 30 PSI. Back off the two top screws in the diaphram housing to expel air. When oil is seen secure the two screws. Bring engine to idle. If the engine shows a short burst of power when idled there is more air in the diaphram housing. Repeat step 9. To flood delivery lines, start and stop engine about 4 or 5 times. Engine should be run at least 30 seconds each time.

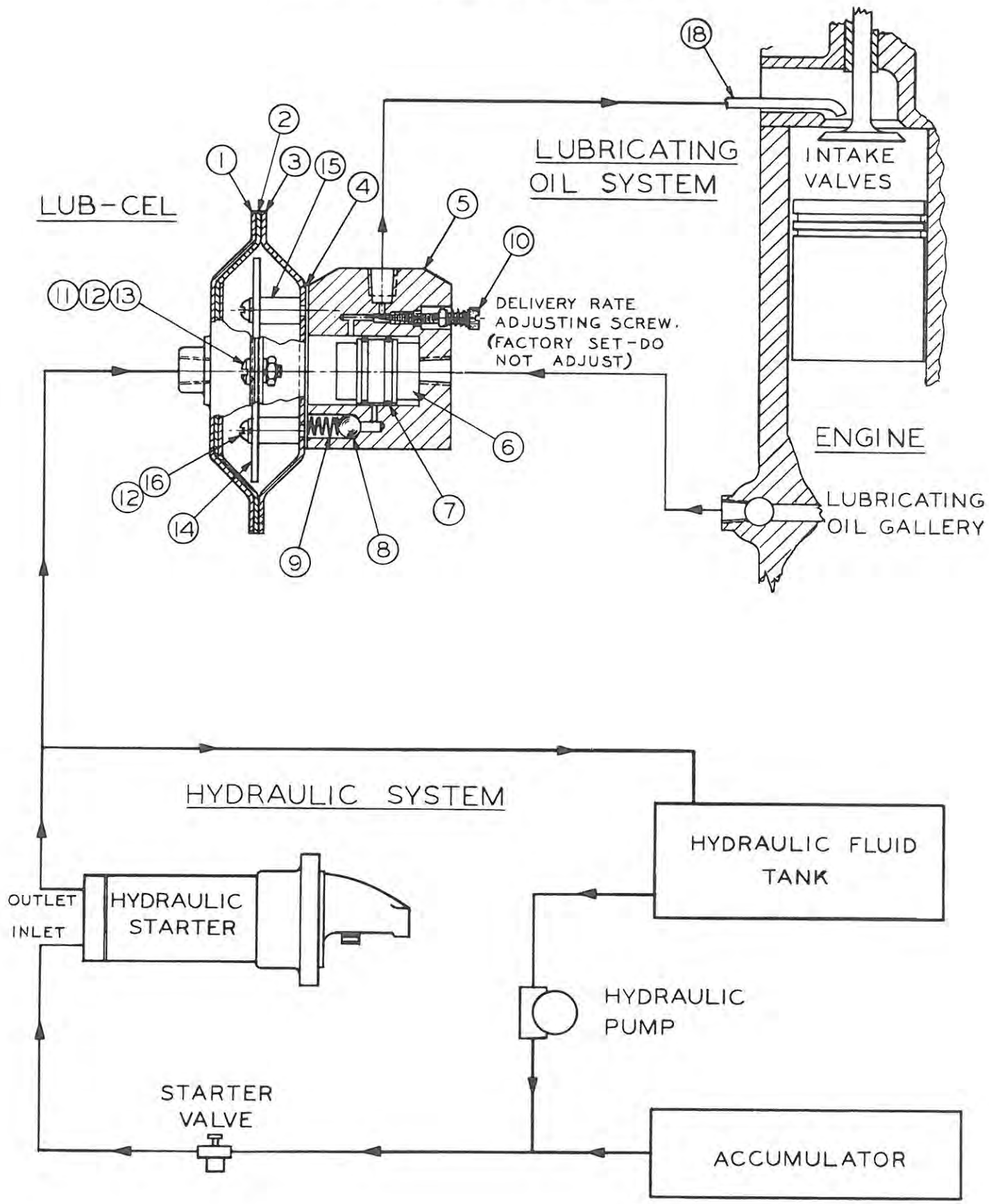
TROUBLE SHOOTING CHART

Fault	Cause	Remedy
No oil delivery	Failure to re-load	Check engine oil pressure, must be over 30 PSI. Check piston action. Should require less than 25 PSI to house.
	Needle valve closed	Open valve (see table below)

Model	Turns counterclockwise from closed position
Pilot 20	2 1/2
4-107LB	2 1/2
4-107LS	2 1/2
LB-49	4

Engine will not shut down	Piston O rings damaged	Close needle valve to stop oil flow. Check for rough or worn bore and replace O rings.
Engine speeds up briefly (1 second) when idled	Air in diaphram	Bleed air from Lub-cel (see SERVICE)
Hydraulic fluid discolored or contaminated by motor oil	Diaphram ruptured	Replace diaphram and change hydraulic and lubricating oil.
Persistant oil leaks	Hydraulic or engine oil pressure too high	Pressures should not be above 100 PSI. Refer to workshop manual for lube oil system and hydraulic starting system details.

WESTERBEKE LUB-CEL



DRWG 19457

WESTERBEKE LUB-CEL

ITEM	PN	NAME	REMARKS	QUAN
1	19371	HOUSING	Diaphragm (Hyd. Side)	1
2	19268	DIAPHRAGM		1
3	19274	HOUSING	Diaphragm (Piston Side)	1
4	19279	GASKET		1
5	19278	MANIFOLD		1
6	19280	PISTON		1
7	19342	O-RING		2
8	15618	BALL		1
9	19352	SPRING		1
10	19313	SCREW	Ass'y.	1
14	19428	PLATE		1
15	19429	PLATE		4
17	19305	NAMEPLATE		1
18-1	19331	LINE	Delivery Ass'y. Pilot-20LB.	1
18-2	19453	LINE	Delivery Ass'y. Four-107LB.	1
18-3	19290	LINE	Delivery Ass'y. LB-49	1
19-1	19470	KIT	Field Installation Four-107LB.	1
19-2	19471	KIT	Field Installation Four-107LS.	1

SERVICE BULLETIN

V.23

DATE: October 3, 1975 *BULLETIN NUMBER:* 81

MODEL: All

SUBJECT: Hydro-Hush Muffler Installation

The diagram on the reverse side shows a proper installation of the Hydro-Hush stainless steel muffler.

Make sure installation is such that water cannot enter engine at any angle of heel or pitch.

Muffler remains approximately twenty-five percent full of water after engine is shut down with maximum thirty-three inch lift used.

Muffler must be installed as close to fore-aft centerline of boat as possible.

There must be an unblocked vent to atmosphere at the high point of the sea water circuit (where it passes above the waterline) to break the vacuum which would encourage siphoning through the sea water circuit upon engine shutdown. Such siphoning would fill the engine with sea water through its exhaust. Pipe the air vent with approximately 3/16 copper tubing to discourage water flow through it when the engine is running. If water flows through the air vent when the engine is running, pipe it over the side or into the transom exhaust outlet. But be sure it will drain upon engine shutdown and function properly as a siphon break by venting the sea water circuit to atmosphere.

Use as few right angle fittings as possible. If there is any question as to back pressure, check your engine manual.

Exhaust line diameters indicated are minimums. Refer to engine manual for specifics regarding run lengths and sizes greater than indicated.

The installation tips given are to be used as a guide only. We cannot be responsible in any way for muffler installation. We presume basic understanding of good marine practice on the part of the installer.

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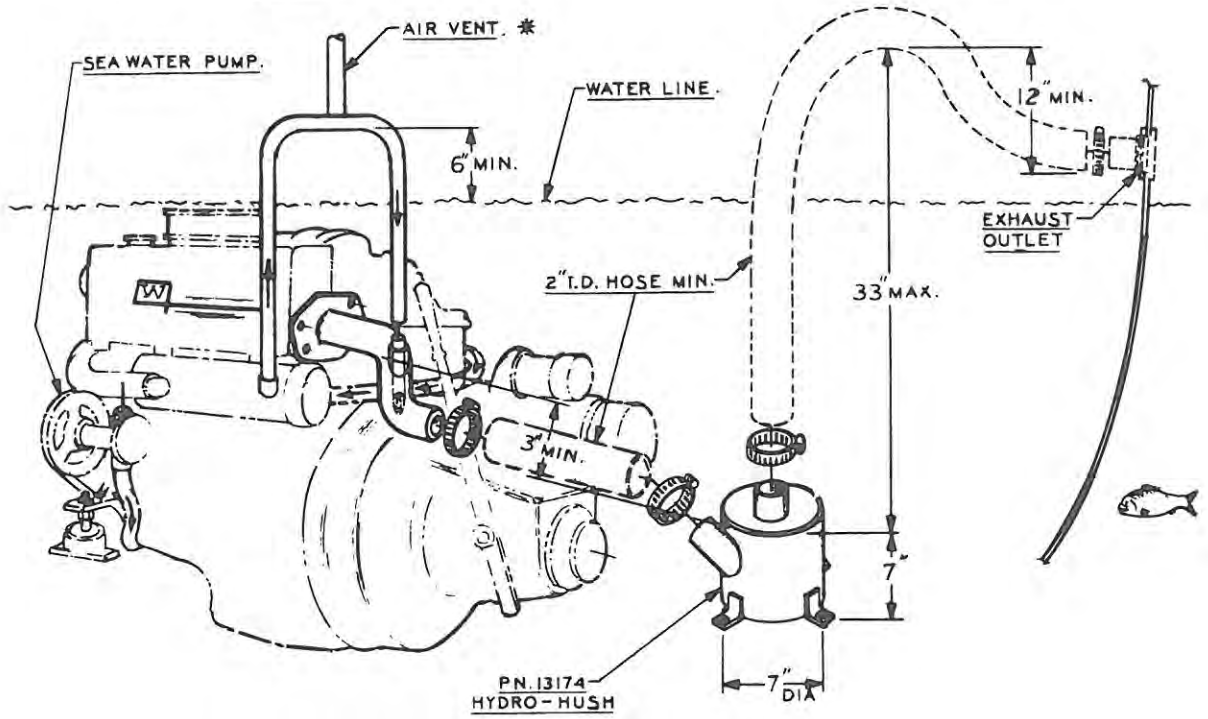
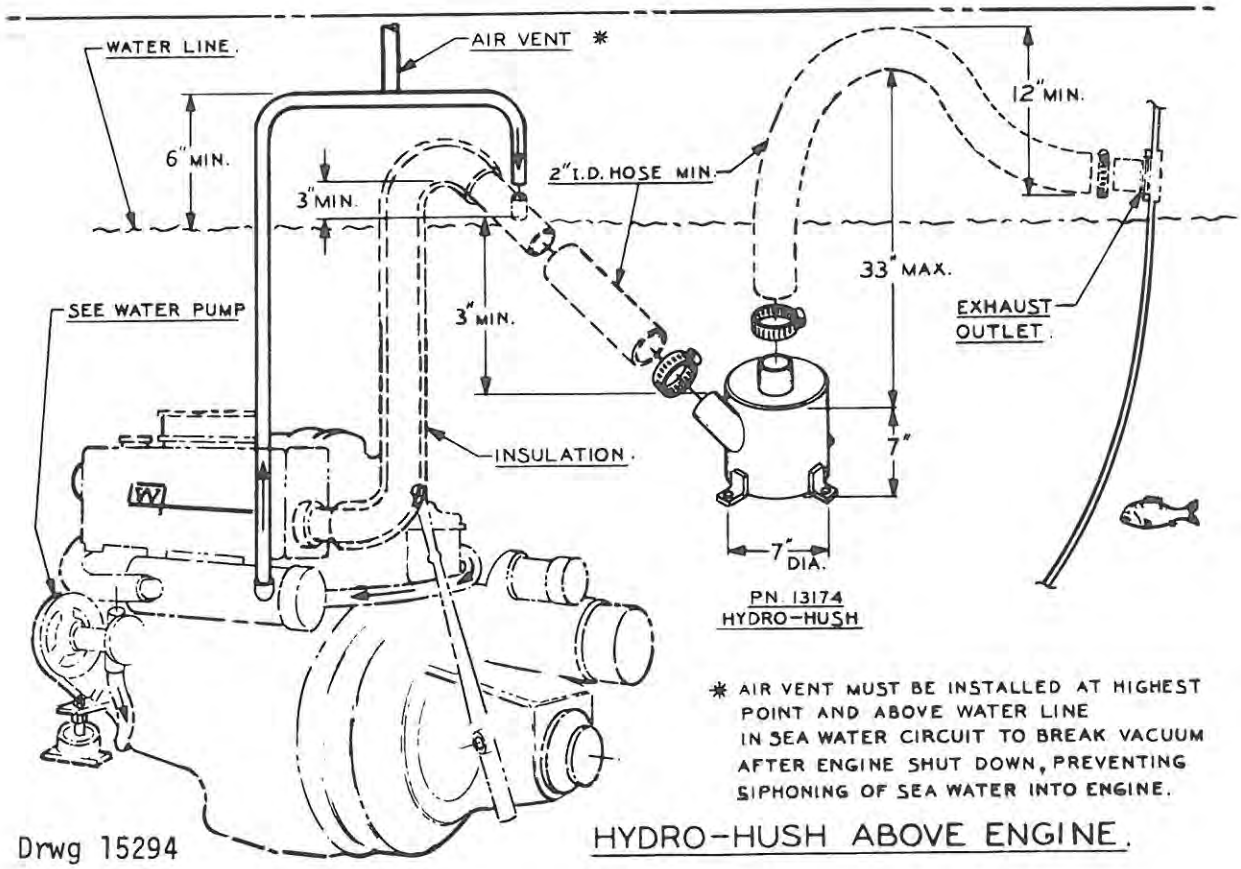
HYDRO-HUSH BELOW ENGINE.





* AIR VENT MUST BE INSTALLED AT HIGHEST POINT AND ABOVE WATER LINE IN SEA WATER CIRCUIT TO BREAK VACUUM AFTER ENGINE SHUT DOWN, PREVENTING SIPHONING OF SEA WATER INTO ENGINE.

Drwg 15294

HYDRO-HUSH ABOVE ENGINE.

SERVICE BULLETIN

V.25

DATE: May 19, 1980 *BULLETIN NUMBER:* 82

MODEL: All

SUBJECT: Battery Recommendations

BATTERY RECOMMENDATIONS

MODEL	BATTERY AMPERE HOURS	VOLTAGE
W-7, & WPD4	60-90	12 V.D.C.
W-13 & 4.4 KW	90-125	12 V.D.C.
W-21 & 7.7 KW	90-125	12 V.D.C.
W-27 & 11 KW	90-125	12 V.D.C.
W-33	90-125	12 V.D.C.
W-30	125-150	12 V.D.C.
W-40, & WPD-10-15 KW	125-150	12 V.D.C.
W-50	125-150	12 V.D.C.
W-58 & WTO-20 KW	125-150	12 V.D.C.
W-60 & WBO-20 KW	150-170	12 V.D.C.
W-80 & 30KW	170-200	12 V.D.C.
W-120 & 45 KW	200 minimum	12 V.D.C.

The ampere hour range shown is minimum. There is no real maximum.

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P/N: 20442

V.26

SERVICE BULLETIN

DATE: September 4, 1975 *BULLETIN NUMBER:* 84

MODEL: All

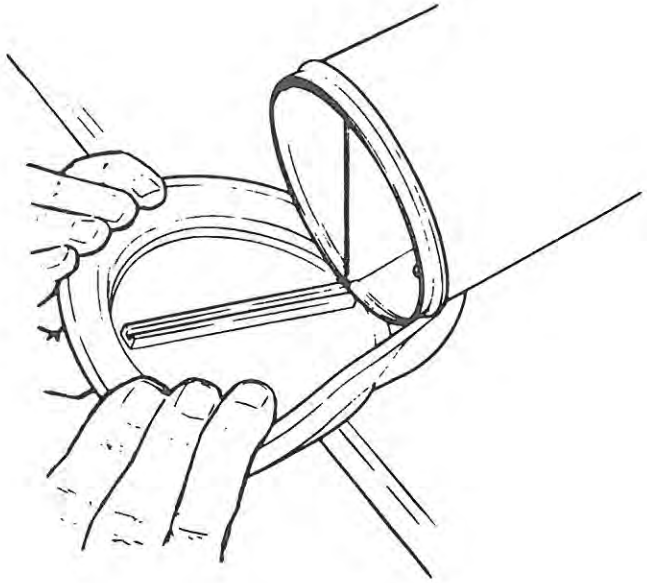
SUBJECT: Heat Exchanger Rubber End Cap

Many heat exchangers supplied on our various products incorporate a molded rubber end cap to facilitate inspection of the tubes.

There have been occasions on which engine overheating has been caused by the improper positioning of this rubber end cap.

It is absolutely essential that the molded channel running across the inside of the cap be positioned over the baffle of the heat exchanger, according to the drawing below.

In any cases of engine overheating where such a rubber end cap is used, it should be checked for proper positioning along with other routine troubleshooting.



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P/N: 20684

SERVICE BULLETIN

V.27

DATE: September 18, 1975 *BULLETIN NUMBER:* 87

MODEL: All Marine Engines

SUBJECT: Alternator Output Splitter

GENERAL DESCRIPTION: The splitter is a solid state device which allows two batteries to be recharged and brought to the same ultimate voltage from a single alternator as large as 120 amp and, at the same time, isolates each battery so that discharging one will have no effect on the other. Charging rates are in proportion to the batteries' voltage (state of discharge). This method precludes the necessity, and even the desirability of a rotary switch for selecting which battery is to be charged. It also assures that ships services cannot drain the engine starting battery.

INSTALLATION:

1. Mount splitter on a metal surface other than the engine, preferably in an air stream if available. Do not install near engine exhaust system. Install with cooling fins aligned vertically.
2. Be sure to use a wire size appropriate to the output of the associated alternator. In full power systems number 4 wire is recommended from the alternator to the splitter and from the splitter to the batteries.
3. Connect the alternator output terminal to the center splitter terminal.
4. Connect one splitter side terminal to one battery (s).
5. Connect the other splitter side terminal to the other battery(s).
6. When the splitter is installed, both batteries will see a charging voltage 8/10 volts less than usual. This voltage drop can be regained, if desired, by connecting the regulator wire directly to the alternator output terminal instead of the regulator terminal.

TEST INFORMATION: When the engine is not running, the side splitter terminals should read the voltage of the respective battery. The center splitter should read zero voltage.

With the engine running and alternator charging, the side splitter terminals should read the same voltage which should be the voltage of the regulator or somewhat less. The center splitter terminal should read .82 volts higher than the readings of the side terminals.

Continued...

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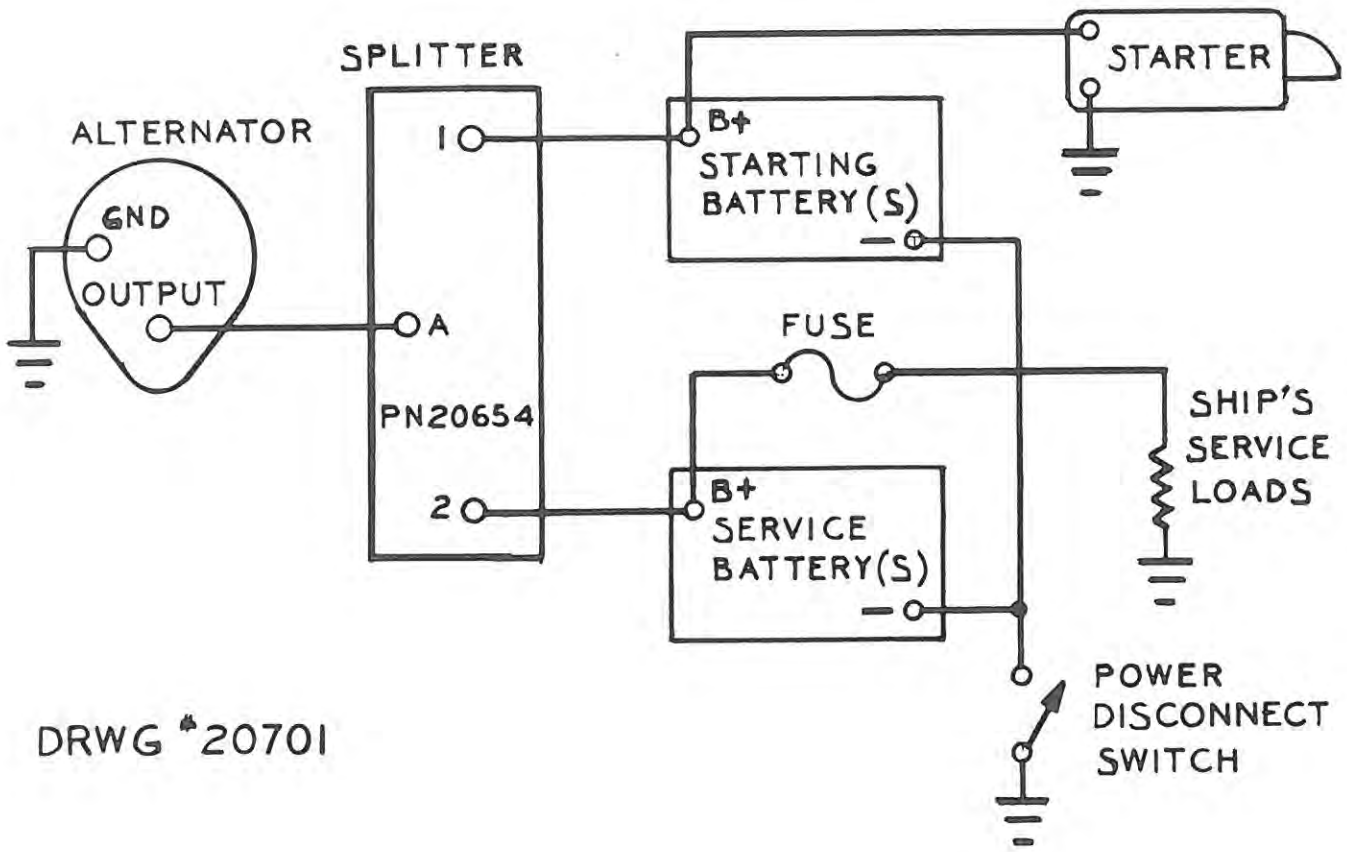
SERVICE BULLETIN #87 (Continued)
(Alternator Output Splitter)

BY-PASSING SPLITTER: In the event of failure, batteries may be charged directly from alternator by connecting either splitter terminal #1 or #2 to terminal A, bypassing the splitter itself. This should not be done simultaneously for both batteries unless they are, and will remain at, the same voltage (state of charge).



SERVICE BULLETIN

DATE: April 28, 1976 *BULLETIN NUMBER:* 92

MODEL: All

SUBJECT: Troubleshooting Water Temperature and Oil Pressure Gauges

Given a presumably faulty gauge indication with the instrument panel energized, the first step is to check for 12 VDC between the ign. (B+) and neg. (B-) terminals of the gauge.

Assuming there is 12 volts as required, leave the instrument panel energized and perform the following steps:

1. Disconnect the sender wire at the gauge and see if the gauge reads zero, the normal reading for this situation.

2. Connect the sender terminal at the gauge to ground and see if the gauge reads full scale, the normal reading for this situation.

If both of the above gauge tests are positive, the gauge is undoubtedly O.K. and the problem lies either with the conductor from the sender to the gauge, or with the sender.

If either of the above gauge tests is negative, the gauge is probably defective and should be replaced.

Assuming the gauge is O.K., preoceed as follows. Check the conductor from the sender to the sender terminal at the gauge for continuity.

Check that the engine block is connected to ground. Some starters have isolated ground terminals and if the battery is connected to the starter (both plus and minus) the ground side will not necessarily be connected to the block.

If the sender to gauge conductor is O.K. and the engine block is grounded, the sender is probably defective and should be replaced.

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P/N: 21616

V.30

SERVICE BULLETIN

DATE: June 22, 1976 *BULLETIN NUMBER:* 93

MODEL: All

SUBJECT: Adjusting Paragon P200 Series Reverse Band

If the boat moves forward when the gear is in neutral at proper idle speed, the reverse band may be out of adjustment. When adjusting, be very careful not to get reverse band too tight or it will burn out. If the boat goes backwards when in neutral, it may be too tight.

The following adjustment procedure should only be carried out when it is not possible to obtain the service of an authorized Paragon transmission service dealer.

To Adjust:

On the outside left side of the gear there is a bolt in the mounting pad. Under its head are 1 to 3 washers. Remove one washer. This should stop forward boat movement. But under NO circumstances use fewer than one washer nor more than three.

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P/N: 21683

SERVICE BULLETIN

V.33

DATE: 7 July 80 Reissued *BULLETIN NUMBER:* 95

MODEL: All

SUBJECT: Domestic Hot Water Heaters

PRINCIPLE

The heater is connected in series with the engine's freshwater circuit. This allows full water flow for maximum heat transfer to the heater. The series installation also avoids several potential pitfalls of installations in which the heater is in parallel with either the engine's by-pass or its internal freshwater circuit.

The only potential disadvantage of a series installation is flow restriction due either to a restrictive heater design, a large engine water flow (such as models W58, W80, W120), or a combination of both.

Installation

The shorter the length of piping to and from the heater, the better. The elevation of the heater should assure that the top of its internal coil is no higher than the engine pressure cap. If the heater must be higher than this at any heel angle, then the optional remote fill tank must be installed to be the highest point of the circuit.

Piping between the engine and heater should rise continuously from the heater to the engine so that trapped air will rise automatically from the heater to the engine. If trapped air can rise to the heater, then a petcock or other convenient method of bleeding that air is a necessity.

Study the attached sketches. A convenient place to interrupt the engine cooling circuit is between the thermostat housing outlet and the exhaust manifold inlet. This is also the hottest water available. CAUTION: While most owners want the hottest water available, it is possible for scalding water or even steam to come from the faucets.

Since the heater is in series with the engine cooling water, any other convenient point of the circuit can also be interrupted for heater installation.

Some engine/heater combinations require that a "by-pass" nipple be installed in parallel with the heater. This is required to maintain an adequate fresh water flow for cooling capability. The table below shows the minimum diameter of "by-pass" nipples in these situations:

	HEATER		
MODEL	SENDURE	ALLCRAFT	RARITAN
W 30			3/8" NPT
W 40			3/8" NPT
W 50			1/2" NPT
W58	1/2" NPT	1/2" NPT	3/4" NPT
W80	1/2" NPT	1/2" NPT	3/4" NPT
W120	1/2" NPT	1/2" NPT	3/4" NPT

Please see sketches on overleaf.

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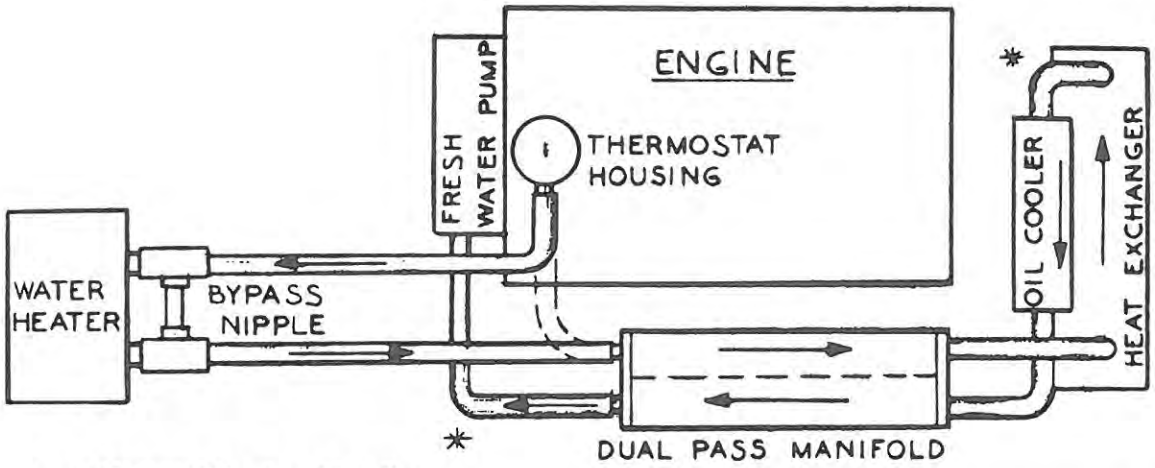
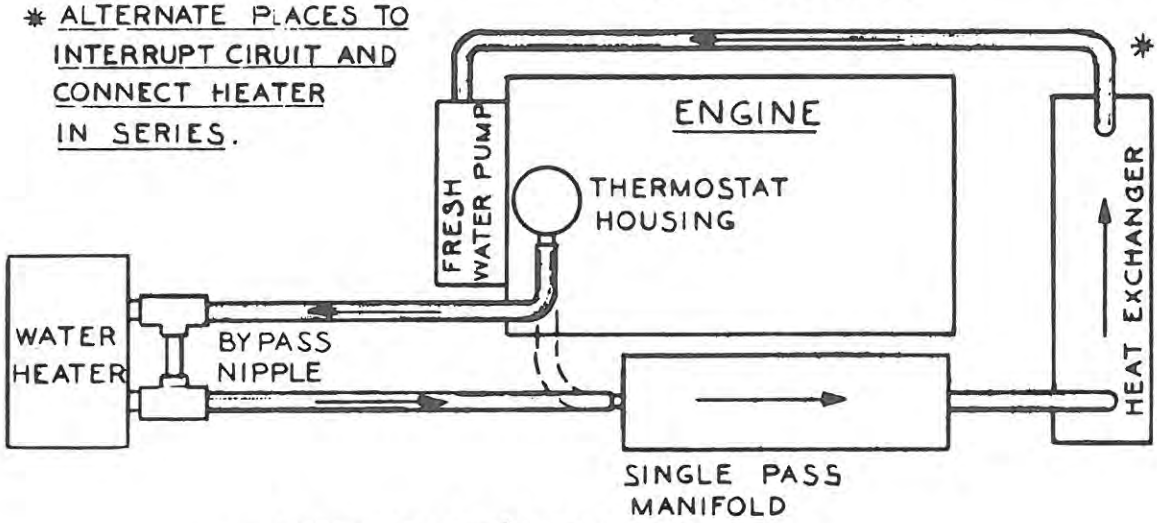
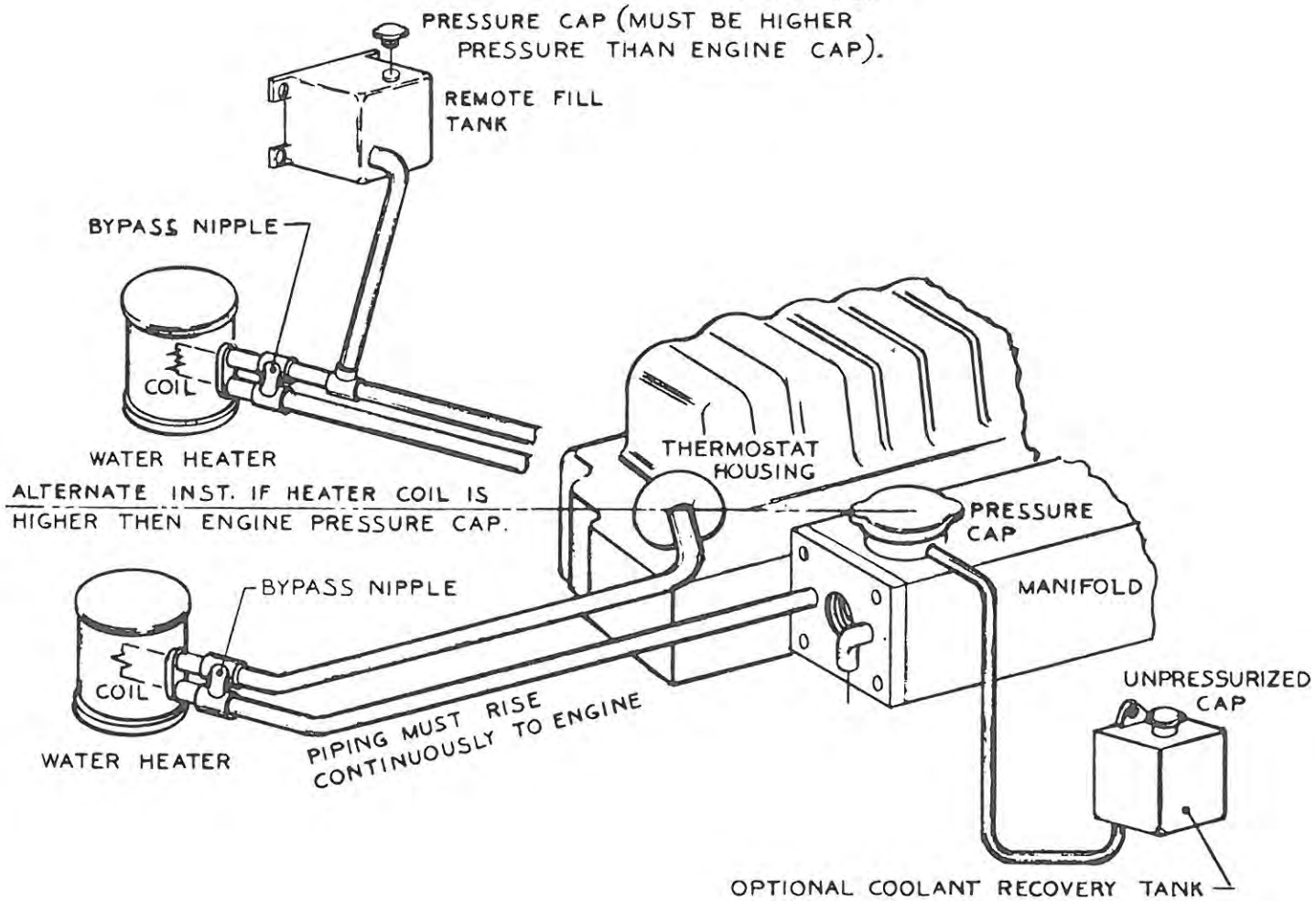


* ALTERNATE PLACES TO INTERRUPT CIRUIT AND CONNECT HEATER IN SERIES.





SERVICE BULLETIN

V.31

DATE: September 9, 1976 *BULLETIN NUMBER:* 94

MODEL: All

SUBJECT: Fuel Pressure Switch Installation

Overleaf is a parts list and an illustration showing the proper installation of the fuel pressure switch used on most of our engine products.

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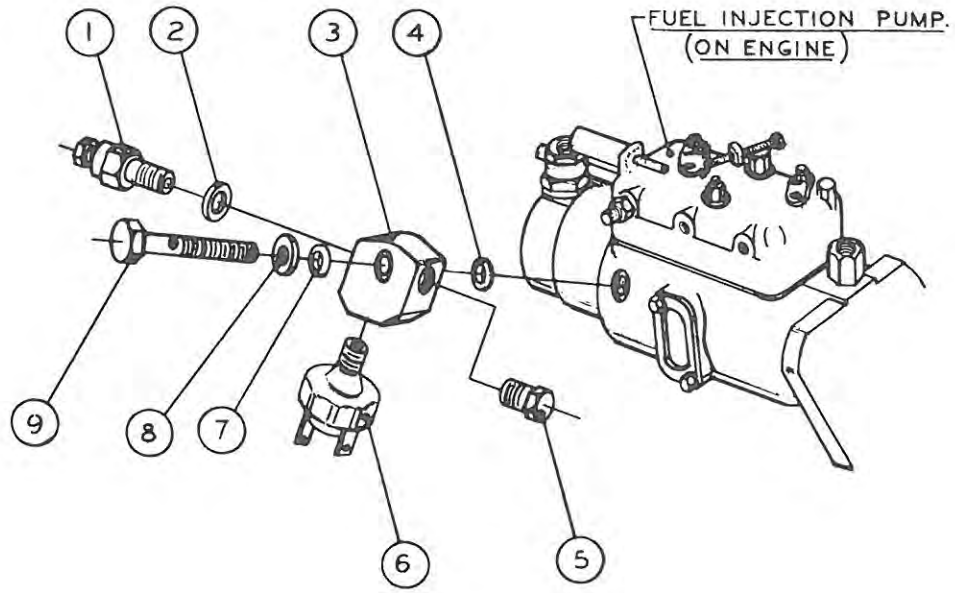
DATE	SYM	REVISION RECORD	AUTH	DR	CK



ITEM	PART NO.	DESCRIPTION	QTY
9	19187	HEX HD. SCREW	1
8	19442	FLAT WASHER	1
7	19320	"O" RING 7/16 O.D.	1
6	11383	FUEL PRESSURE SWITCH	1
5	11615	PLUG	1
4	19321	"O" RING 9/16 O.D.	1
3	19185	ADAPTER	1
2	19261	COPPER WASHER	1
1	19204	SCREW ASS'Y (BLEED)	1

TOLERANCES (EXCEPT AS NOTED)	J. H. WESTERBEKE CORP. AVON, MA. 02322		
DECIMAL ± ~	ALL ENGINES	SCALE NONE	DRAWN BY B.J.S. / APPROVED BY
FRACTIONAL ± ~	TITLE INSTALLATION DWG, FUEL PRESS. SWITCH TO A FUEL INJECTION PUMP.		
ANGULAR ± ~	DATE 9-9-76	DRAWING NUMBER 21743	

K·E ALBANENE ® 10 5465 ENGINEERS' STANDARD FORM

MADE IN U.S.A.

SERVICE BULLETIN

V.35

DATE: May 1, 1980

BULLETIN NUMBER: 107

MODEL: All Models

SUBJECT: Thermostats

Beginning approximately May, 1980, thermostats supplied by the factory have a by-pass hole sufficient to allow adequate water flow through the exhaust manifold, head, and block, during engine warm-up.

This flow is mandatory, especially in the case of marine engines and generator sets which have significant load applied soon after start-up.

We strongly recommend that only genuine WESTERBEKE thermostats be used in WESTERBEKE products to assure proper design in this regard.

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P/N: 24707

V.36

SERVICE BULLETIN

DATE: May 5, 1980 *BULLETIN NUMBER:* 108

MODEL: ALL

SUBJECT: Circuitry Change for Marine Propulsion Engines

With the W58 we introduce a new electrical circuit which will eventually be used on most models.

Some features of the new circuit are as follows:

1. A voltmeter is substituted for an ammeter. Naturally an ammeter can still be installed separately.

2. All wires between the engine and the instrument panel need not be heavier than 14 AWG.

3. The panel contains controls for preheating and starting the engine, eliminating the necessity for a separate control panel. Of course the controls can be installed remotely from the panel by the builder if desired.

4. The circuit allows commonization of the instrument panel across the broadest possible range of engine models, simplifying the distribution of spare parts.

5. The circuit allows commonization of engine wiring harnesses across the broadest range of engine models, simplifying the distribution of spare parts.

The same connectors and color coding of the connector poles are used on both new and old harnesses and cables. Functional color codes are not necessarily the same in new and old circuits. The new panel will not operate with an older engine, and new engines will not operate with an older panel. Because the connectors are the same, a physical mating of old and new components is possible, but neither the panel nor the engine will operate and no harm can be done by accidental mismatching.

Please see diagram on overleaf.

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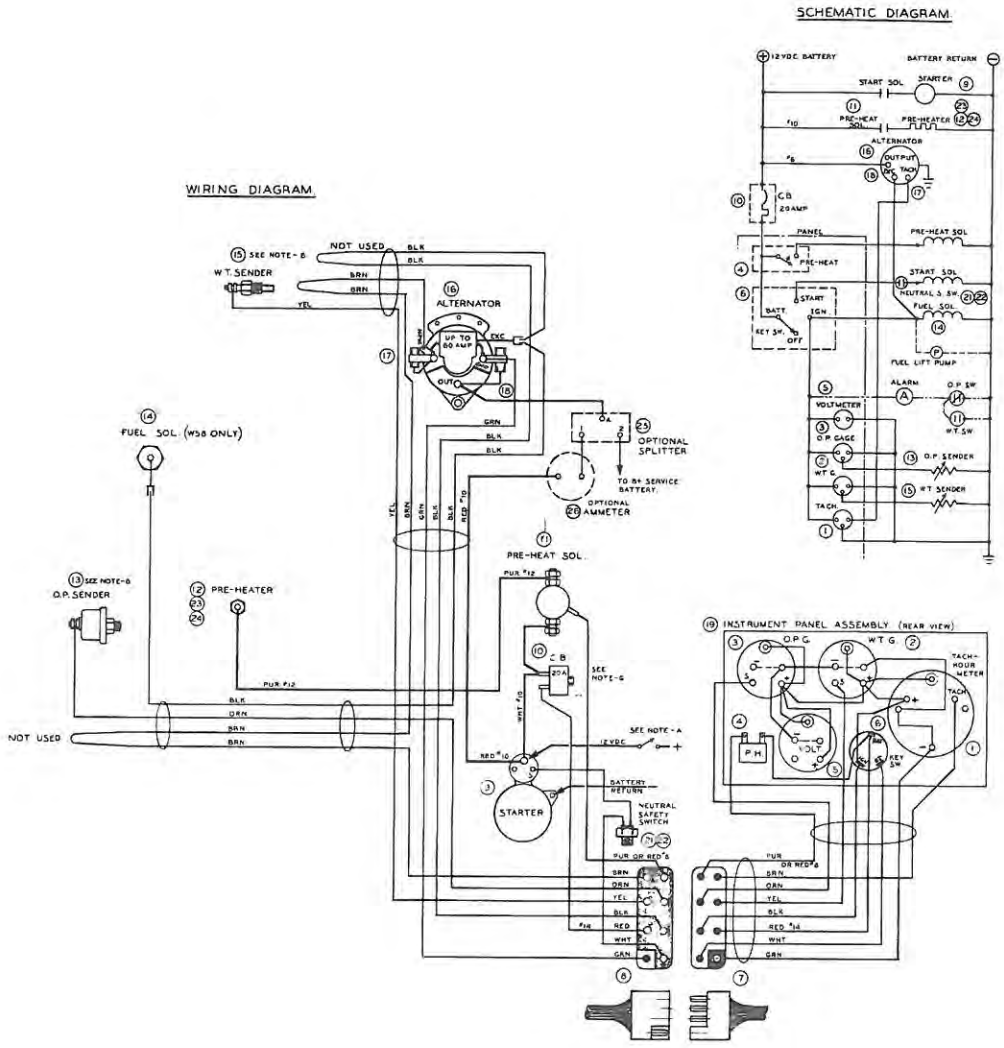
SCHEMATIC DIAGRAM
WIRING DIAGRAM
12VDC BATTERY
BATTERY RETURN
START SOL.
STARTER
PRE-HEAT SOL.
PRE-HEATER
ALTERNATOR
OUTPUT
TACH
C.B. 20 AMP
PANEL
PRE-HEAT
START
BATT
IGN.
KEY SW.
OFF
FUEL SOL.
NEUTRAL S. SW.
FUEL LIFT PUMP
ALARM
O.P. SW
W.T. SW
VOLTMETER
O.P. GAGE
W.T.G.
TACH.
O.P. SENDER
W.T. SENDER
NOT USED
W.T. SENDER
SEE NOTE-B
UP TO 60 AMP
EXC
OUT
FUEL SOL. (W38 ONLY)
OPTIONAL SPLITTER
TO 8+ SERVICE BATTERY
OPTIONAL AMMETER
PRE-HEAT SOL.
C.B. 20A
SEE NOTE-G
SEE NOTE-A
12VDC
BATTERY RETURN
STARTER
NEUTRAL SAFETY SWITCH
INSTRUMENT PANEL ASSEMBLY (REAR VIEW)
O.P.G.
W.T.G.
TACH-HOUR METER
TACH
P.H.
VOLT
KEY SW.
BLK
GRN
BRN
YEL
RED
WHT
PUR
ORG

V.38

SERVICE BULLETIN

DATE: May 5, 1980 *BULLETIN NUMBER:* 109

MODEL: W58

SUBJECT: Two Pass Manifold

The W58 employs a two pass manifold. It is a key feature of a new cooling system first appearing on the W58. The system is vented by the pressure cap at the return side of the fresh water circulating pump, the point of the lowest pressure within the system. This has the advantage of increasing cooling capacity by preventing cavitation at the fresh water pump under higher temperature conditions.

This system will ultimately be incorporated on most models.

The schematic on the overleaf shows the water flow. Operation of the circuit is as follows:

1. The thermostat has a permanent by-pass port of .06 square inches to assure water flow through the manifold while the engine is warming up. Replacement thermostats must have this permanent by-pass port.

2. Hot water leaving the engine thermostat housing passes through the inside half of the water jacketed exhaust manifold to the heat exchanger inlet.

3. Water leaving the heat exchanger enters a fresh water cooled oil cooler, if used.

4. Water leaving the oil cooler or heat exchanger enters the outside half of the water jacketed manifold.

5. The outside half of the manifold is comprised of two sections: a cooling path adjacent to the exhaust passage and an air removal path which allows entrained air to rise to the top of the manifold.

6. The pressure cap is located at the top of the air removal path.

7. From the manifold, coolant returns to the suction side of the fresh water pump.

The system is designed to accept an optional coolant recovery tank. This useful accessory offers several advantages, including:

1. A remote fill point for the circuit, in which case it should be located slightly higher than the engine's pressure cap.

Continued.....

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