

**2026**  
**ZZ5, ZZ6 and**  
**ZZ8R / ZZ8S**  
**OWNERS Product**  
**Technical Specifications**

**PERFORMANCE TO MOVE YOU**

## 2026 PCM 5 YEAR TRANSFERABLE LIMITED WARRANTY

Pleasurecraft Marine Engine Co., through its PCM Engines Division ("PCM"), warrants its new products to be free from defects in material and workmanship under normal use and service conditions. This warranty is extended only to the first registered owner or registered user, as well as all subsequent users who comply with PCM's warranty transfer policy and receive PCM's approval of warranty transfer. The obligation of PCM under this warranty shall be limited to the repair or replacement with new or reconditioned components, at PCM's option, of any product, or parts thereof, which have failed during the warranty coverage period specified below and are demonstrated upon examination to have failed due to defective material and/or workmanship.

### WARRANTY COVERAGE; TRANSFER; WARRANTY PERIOD

This warranty is extended to the first registered owner or registered user purchasing the engine at retail, as well as all subsequent users who, in accordance with PCM's warranty transfer policy and warranty transfer approval, must notify PCM within 30 days of any subsequent sale of the product at which time PCM will review for an approval of the transfer of any remaining portion of warranty coverage. To obtain a PCM Warranty Transfer Application, contact your local Pleasurecraft dealer or PCM's Warranty Services Department at (803) 345-1337. Certification of an inspection of the product by an authorized technician and payment of a warranty transfer fee are required to be submitted with the Application.

All components, other than those itemized below and those components that are warranted by PCM's suppliers, are warranted, solely for non-commercial use, for a period of 5 years or 1,000 hours of use, whichever first occurs, from the earlier of (1) the date of sale to the first registered owner or registered user, or (2) from the date the engine is first placed into service for demonstration or any other purpose prior to the sale of the engine to the first owner purchasing the engine at retail. Commercial use is defined as, but not limited to, use of the product by ski schools, for promotional use, for athletes' boats, for rentals, etc. In the case of commercial use of the product, the term of this warranty shall be for a period of 5 years or 1,000 hours of use, whichever occurs first, from the earlier of (1) the date in which the engine is first registered, or (2) within 30 days from the date the boat was manufactured.

Components not covered under this warranty:

- (1) Water pump impellers are not covered by this warranty.
- (2) Seals, gaskets, O-rings, and other materials affected by time are not covered by this warranty if their effectiveness is reduced by an extended storage period prior to sale or use of the product.
- (3) Items such as, but not limited to, lubricants, spark plugs and other items which are frequently replaced as part of routine maintenance.
- (4) Emission Control parts. See Emission Control Warranty Statement.

### NO OTHER WARRANTY GIVEN

The obligations set forth in the preceding paragraphs are PCM's sole obligation and the owner's exclusive remedy. PCM makes no other express warranty. Any implied warranty of merchantability or fitness for a particular purpose that may be applicable to this product is limited in duration to the duration of this warranty. Some States do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

No distributor, dealer, agent or employee of PCM is authorized to grant any other or further warranty or incur any additional warranty obligation on PCM's behalf in connection with the sale of its products. Any qualification or restriction contained herein which is prohibited by any law of mandatory application shall be deemed to be deleted from this warranty; however, such deletion shall have no effect on the remaining provisions hereof, all of which shall remain in full force and effect.

### REMEDIES

The obligation of PCM set forth in the first paragraph of this warranty shall be the exclusive remedy for any breach of warranty hereunder, and any owner or user's sole remedy in the event of breach of the warranty is repair or replacement of the product or any warranted part thereof as set forth in this warranty. With this sole exception, PCM shall not be liable for any direct or indirect, incidental or consequential damages, including without limitation, any damages for property damage, loss of use or loss of profits, loss of income, inconvenience, trailering, towing, haul out, launch and/or any other in and out of water expenses, storage charges, dockage charges, expenses to deliver or pick up the product being warranted to and from the dealer, telephone expenses, lodging expenses, travel expenses, mechanic travel time and mileage, damage caused by any occurrence of an insurable nature, rental of substitute equipment of any type, removal and replacement and/or modification of any boat parts to facilitate repairs, moving of furniture, carpets, cleaning, painting, carpenter work, or re-delivery charges. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Any owner or user hereby waives for himself/herself/itself and his/her/its successor and assigns (a) any and all claims for punitive damages, and (b) all claims of negligence or strict liability or both. In no event will PCM's liability exceed the purchase price of the product(s) which is actually paid to PCM.

### OBTAINING PERFORMANCE UNDER WARRANTY

PCM's warranty registration form should be prepared by your selling dealer, executed by you and the dealer, and mailed by you to PCM within 30 days after the date of your purchase of the product. Upon receipt of the warranty registration form, PCM will issue to you a personalized owner's registration card which will be mailed directly to you. If the owner's registration card is not received within 8 weeks after the date of purchase, please write to PCM at the address set forth below.

At the time that a claim for warranty service is made, the owner's registration card should be presented to the person or entity providing warranty service. Authorized PCM dealers or distributors are entitled to be reimbursed by PCM for some or all of the expense of warranty repairs; thus, service under the terms of this warranty will be performed by an authorized PCM dealer or distributor without charge for established flat rate labor or replacement parts, other than items not covered by the warranty, such as, but not limited to, water pump impellers, seals, gaskets, O-rings and other materials affected by time if their effectiveness is reduced by an extended storage period prior to sale or use of the product, and lubricants, spark plugs and other items which are frequently replaced as part of routine maintenance. Charges for additional non-warranty work and/or additional dealer charges for labor relative to warranty work in excess of flat rate must be paid for by the owner.

Prior authorization in writing must be obtained from PCM for any warranty repairs over \$250.00.

Any questions concerning service, parts or this warranty should be directed to your selling dealer. If your dealer is unable to assist or if you relocate, if you are traveling or if you need a referral to your nearest dealer, contact: Pleasurecraft Marine Engine Co., 1737 Highway 76, Little Mountain, SC 29075 (803) 345-1337.

### FAILURES EXCLUDED FROM WARRANTY

This warranty will not apply to any failure which results from accidents, sinking, fire, neglect, abuse or abnormal service or use, such as racing, towing or operation in water of insufficient depth, or to any failure resulting from improper installation, improper adjustments, repairs or improper delivery service, or to any failure resulting from the use of parts, fuels, oils or lubricants not suitable for use with the product and/or materials or parts not approved by PCM. This warranty does not apply to any engine or drive which has been modified, or altered, or repaired in such a manner as, in the opinion of PCM, to affect its stability, reliability or performance. Further, this warranty will not apply to product failure resulting from (1) use of non-recommended lubricants or fuels, (2) failure to follow maintenance or lubrication schedules, (3) failure caused or contributed to by improper or contaminated fuel, (4) failure caused by water intrusion, salt corrosion to external components, or improper installation or misapplication of the engine or drive, (5) the owner's or operator's failure to exercise due or normal care and precaution, (6) failure of components and/or assemblies that are warranted by PCM suppliers, and (7) damage resulting from the owner's or operator's failure to timely replace failed water pump impellers, seals, gaskets and O-rings.

### OWNER'S RESPONSIBILITY

Performance under this warranty shall be conditioned upon the first registered owner's or registered user's compliance with the following requirements:

- (1) Owner or user shall verify that the pre-delivery service has been performed, all requested information recorded and that the selling dealer has signed the warranty registration.
- (2) Owner or user shall promptly mail the warranty registration to PCM after accepting delivery.
- (3) Owner or user shall follow the instructions in the owner's manual regarding operation, break-in, lubrication and fuel.
- (4) Owner or user shall follow or comply with the maintenance schedule, operation limits, and lay up instruction, as outlined in the owner's manual. Pleasurecraft original equipment genuine marine engine parts should be used whenever service or repairs are performed.

### CHOICE OF LAW

This limited warranty shall be governed by, and construed and interpreted in accordance with, the local laws of the State of Ohio (without application of its conflicts of laws principles), except only to the extent replaced or precluded by other law of mandatory application.

### GENERAL

This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

The PCM Federal/California Emissions Warranty and Federal/California Emissions Control Warranty Statement are separate documents included in the owner's manual. Any questions concerning the Emissions Warranty can be obtained by calling PCM at (803) 345-1337.

PCM's policy is one of continued improvement of its products, and PCM hereby reserves the right to improve and change the design and production of any of its products without assuming any obligation to modify products previously manufactured and/or sold.

## PEG WARRANTY TRANSFER APPLICATION

The remainder of the warranty coverage period of the original Pleasurecraft ("PCM") limited warranty is transferable within thirty (30) days of date of sale by the original owner/user to a subsequent purchaser for the remainder of the unused portion of the original warranty coverage period, or the remainder of 1,000 hours of use, whichever first occurs. The original date of sale or original in-service date (whichever comes first) begins the warranty coverage period. For commercial use such as, but not limited to, use of the product by ski schools, for promotional use, for athletes' boats, for rentals, etc., the warranty coverage period starts from the earlier of (1) the date in which the engine is first registered, or (2) within 30 days from the date the boat was manufactured.

### Direct Sale by Authorized Pleasurecraft Marine Dealer:

If the sale is conducted through an authorized Pleasurecraft Marine dealer, the dealer must complete and submit the PCM Warranty Transfer Application, the required engine photographs, Diacom recording and warranty transfer fee. The warranty transfer application will be processed based on the approval of PCM. This inspection will be at the seller or purchaser's expense.

### Sale by Private Individual / Non-Authorized Dealer:

If the sale is conducted between private individuals, or between a private individual and an unauthorized Pleasurecraft Marine dealer, the engine/drivetrain must be inspected by an authorized Pleasurecraft Marine dealer. This inspection will be at the seller or purchaser's expense. The dealer must complete and submit the Warranty Transfer Application, the required engine photographs, Diacom recording and warranty transfer fee. The warranty transfer will be processed based on the approval of PCM.

**The fee for warranty transfer is \$400.** The transfer fee (via certified check) and Warranty Transfer Application must be submitted to PCM within 30 days of date of sale to:

Pleasurecraft Engine Group  
1737 Highway76  
Little Mountain, S.C., 29075

- The new owner will be notified within 10 days of PCM's receipt of the Warranty Transfer Application form regarding whether the transfer has been approved by PCM. If the transfer is approved, the warranty expiration date will be provided.
- A Warranty Registration Card will be issued to the second owner, reflecting the change has been made in PCM's computer.

**OUTSIDE THE U.S. AND CANADA, CONTACT YOUR LOCAL PLEASURECRAFT DEALER OR PCM WARRANTY SERVICES AT (803) 345-1337 FOR MORE INFORMATION ON HOW TO APPLY FOR A WARRANTY TRANSFER.**

**IMPORTANT! PURCHASER NOTICE:** The inspection below is designed to insure safety and satisfaction. Therefore, we require the following inspection to be performed at your expense, by an authorized Pleasurecraft technician, prior to purchase. By signing below, the technician certifies that he/she has checked the installation and operation of the engine and finds it to be performing properly. All terms in the Limited Warranty located in the Engine Owner's Manual still apply.

ENGINE MODEL: \_\_\_\_\_  
TRANS. SERIAL: \_\_\_\_\_  
HULL SERIAL #: \_\_\_\_\_  
INSPECTION DATE: \_\_\_\_\_

ENGINE SERIAL: \_\_\_\_\_  
ENGINE HOURS: \_\_\_\_\_  
BOAT MANUFACTURED DATE: \_\_\_\_\_

### Warranty Transfer Inspection

- |   |   |   |
|---|---|---|
| <input type="checkbox"/> Check for Bulletins<br><br><input type="checkbox"/> Engine Oil: Check<br><input type="checkbox"/> VDrive Lube: Check<br><br><input type="checkbox"/> Transmission Fluid: Check<br><input type="checkbox"/> Propshaft Alignment<br><input type="checkbox"/> Battery Rating, Charge, and Level: Check<br><input type="checkbox"/> <b>Diacom Recording:</b><br>Ignition ON, Engine OFF Recording<br>(submit with application) | <input type="checkbox"/> Trouble Codes Checked<br>Trouble Codes Cleared<br><br><input type="checkbox"/> All Fuel Lines: Confirm No Leaks<br><input type="checkbox"/> All Oil Lines: Confirm No Leaks<br><br><input type="checkbox"/> All Water Lines: Confirm No Leaks<br><input type="checkbox"/> All Drain Plugs: Confirm<br>Proper Installation<br><br><input type="checkbox"/> <b>(3) Engine Photos:</b><br>Include engine top, port and starboard (photos must be clear and in good light) | <input type="checkbox"/> Belt and Pulley: Inspect for Damage<br><br><input type="checkbox"/> Exhaust Hoses/Clamps: Inspect<br><input type="checkbox"/> Record Propeller Size and Rotation<br>Diameter _____ Pitch _____ Rotation _____<br><br><input type="checkbox"/> Engine Compression<br>Cylinder 1 _____ Cylinder 2 _____<br>Cylinder 3 _____ Cylinder 4 _____<br>Cylinder 5 _____ Cylinder 6 _____<br>Cylinder 7 _____ Cylinder 8 _____ |
|---|---|---|

I hereby certify the warranty transfer inspection on engine S/N \_\_\_\_\_ and have corrected any abnormality revealed by this inspection.

\_\_\_\_\_  
(Technician signature, Dealer & Date)

\_\_\_\_\_  
(Seller's Signature and Date)

\_\_\_\_\_  
(Purchaser's Signature and Date)

DATE OF SALE (2ND Owner) \_\_\_\_/\_\_\_\_/\_\_\_\_

DATE OF SALE (1st Owner/1st Operator) \_\_\_\_/\_\_\_\_/\_\_\_\_

(New Owner)

(Previous Owner)

NAME: \_\_\_\_\_

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

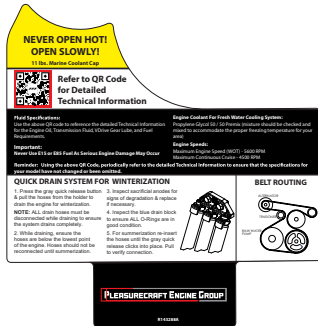
CITY, STATE, ZIP: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

EMAIL ADDRESS: \_\_\_\_\_

☐ By checking this box, you are authorizing PCM to send the email address to receive emails whenever a product bulletin or safety recall affects this product.

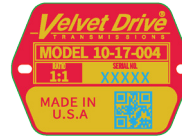
## Engine Serial Number and Specification Decal Locations



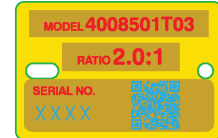
## 1. ENGINE SPECIFICATION DECAL (On Degas Bottle)



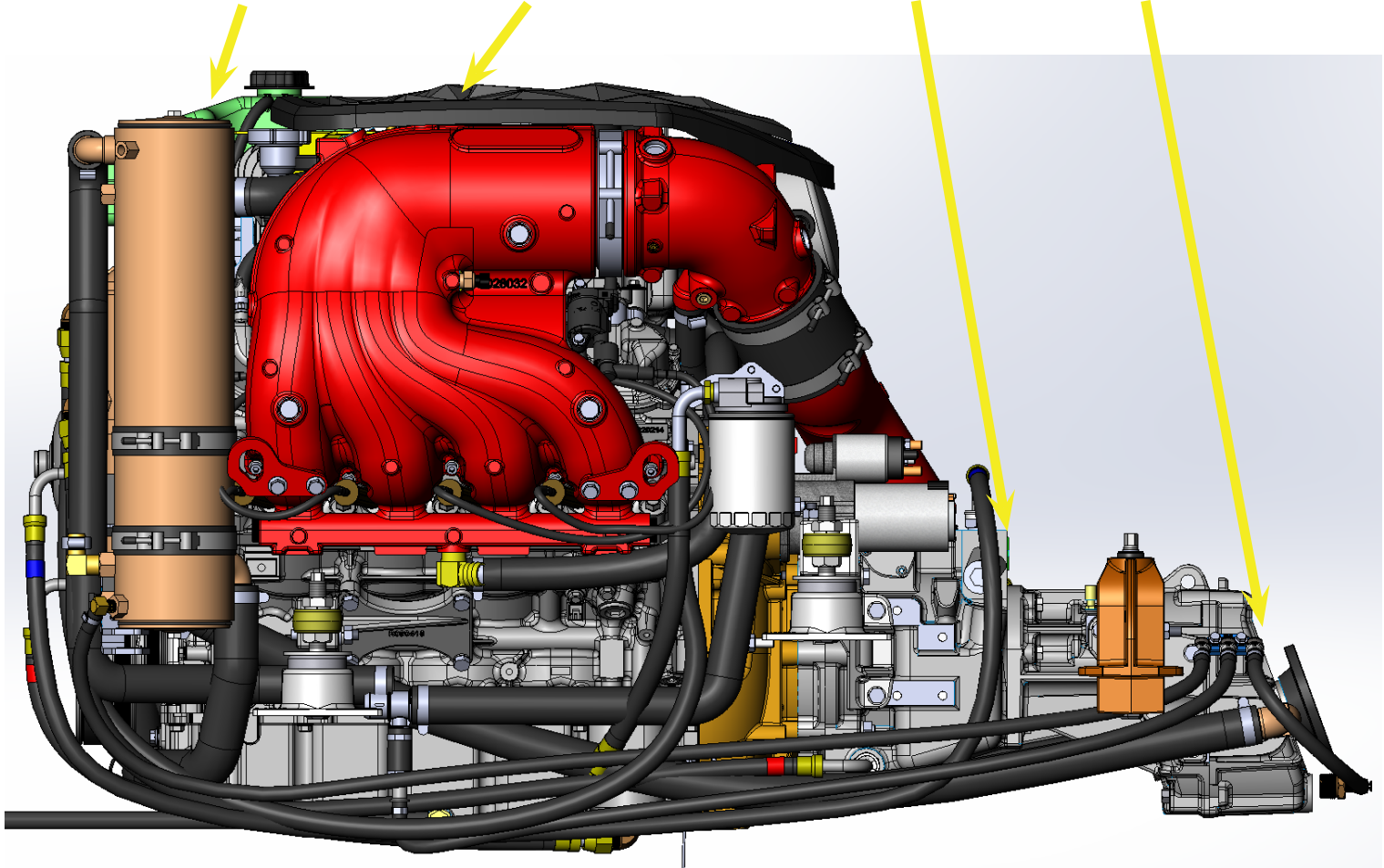
## 2. ENGINE IDENTIFICATION DECAL (On Bracket under Hood)



### 3. TRANSMISSION IDENTIFICATION PLATE



#### 4. VDRIVE IDENTIFICATION PLATE



## ENGINE RPM CHART

Model	Maximum RPM
5.3L DI (ZZ5)	5600
6.2L DI (ZZ6)	5600
6.2L DI SC (ZZ8S /ZZ8R)	5600


## IMPORTANT

Your new Pleasurecraft Marine engine incorporates an RPM "MAX GOVERNOR" in order to prevent the engine from over-revving. Operation above the Maximum RPM is not recommended. If your engine is operating above the maximum RPM listed, a higher pitched propeller would be required to lower the engine maximum RPM to the Preferred RPM.

 **CAUTION**

Prolonged WOT operation will shorten the life of your engine and could cause premature engine failure. Problems caused by prolonged WOT operation are considered abuse and are not covered under the Pleasurecraft Marine Warranty.


## ENGINE COOLING FLUID REQUIREMENTS

Prevailing Ambient Temperature	Recommended Classification	1 Gallon (R193004)
All Temperatures (Dilute according to your area temperatures)	Pleasurecraft Premium Marine Engine Coolant (See Dealer)	

**NOTE:** Fresh Water Cooling systems vary depending on half-systems, full-fresh systems, heaters, hose lengths, etc. System should be completely purged of air and the coolant level should be within the MIN/MAX level of the degas bottle after the engine has been ran at operating temperature and the system is allowed to cool down overnight. Top off as necessary.

Make sure the mixture is suitable for your temperatures and environment. Use Pleasurecraft Premium Marine Engine Coolant (P/N R193004).

## ENGINE OIL REQUIREMENTS

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity	1 Quart (R193001)
All Temperatures	Pleasurecraft 10W-40 Premium Marine Engine Oil (See Dealer)	

## ENGINE FLUID CAPACITIES

Model	ALL MODELS
Crankcase Oil Capacity <b>W / NEW FILTER</b>	Start with 6 Quarts (5.7 Liters) <sup>1</sup>
Fresh Water Cooling System Capacity	Fill Until Completely Purged <sup>3</sup>

1 - Capacities are dependent on installation angle. Oil capacities are approximate. **Always use the dipstick to determine the exact quantity of oil required.**

- Crankcase oil and oil filter change - Recommended intervals:
  - Initial oil change - This engine starts out with break-in oil and should be run in the engine for at least the first 5 hours of operation. Any time after 5 hours, but NO MORE than 25 hours, the engine oil and filter must be changed.
  - Regular oil changes - Every 50 hours of operation or once a year.
  - Heavy Duty High RPM / High Load Use (Defined as the boat filled with ballast and surfing or wakeboarding. This is sustained high RPM and high engine load) - Every 30 hours of operation or once a year.

Pleasurecraft engine customers could experience engine oil consumption of approximately 1 quart every 7 hours of operation. This can vary based on the operation and driving style of the boat. Due to bigger boats, more ballast weight and various uses, it is very important that engine oil is checked prior to using the boat each time. In this case, the engine oil should be changed every 30 hours of operation as stated in the Pleasurecraft Technical Information. Engine oil may need to be added in between oil change intervals.

**IMPORTANT:** Never over-fill the engine with oil. Over-filling engine oil can cause engine damage. The use of oils which contain "solid" additives, non-detergent oils, or low quality oils specifically are not recommended.

**WARRANTY NOTICE:** Pleasurecraft reserves the right to refuse warranty on part(s) and/or engine(s) damaged by using improper fuels and/or lubricants.


## TRANSMISSION AND VDRIVE FLUID CAPACITIES

Model	All Models
1:1 Ratio Transmission <sup>1,2</sup>	2.0 Quarts (1.9L)
1.23:1 Ratio Transmission <sup>1,2</sup>	2.0 Quarts (1.9L)
Pleasurecraft V-Drive, All Ratios <sup>1,2,3</sup>	1.5 Quarts (1.42L)

## TRANSMISSION FLUID REQUIREMENTS

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity	1 Quart (R193002)
All Temperatures	Pleasurecraft Premium Marine Transmission Fluid (See Dealer)	

## VDRIVE FLUID REQUIREMENTS

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity	1 Quart (R193003)
All Temperatures	Pleasurecraft Premium Marine VDRIVE Fluid (See Dealer)	

- 1 - Engine Fluid Capacities are dependent on installation angle. DO NOT** overfill the engine crankcase or transmission. Remove excess fluid above the “FULL” mark on the dipstick. Check oil with the boat at its normal, level, at rest position on the water. Ensure that ballast systems (if equipped) and excess water in the bilge have been purged. If the boat is on a trailer, the trailer must be level and adjusted to represent the boat’s normal resting state on the water. Oil capacities are approximate, and may not include capacity needed for transmission cooler and oil lines. Refer to the **Checking Fluid Levels** instructions and **Changing Oils** instructions of this manual, for complete instructions, important notes and Cautions for checking engine oil levels. Always use the dipstick to determine the exact amount of oil required. Add the correct amount of oil to fill to the “FULL” mark on the oil level dipstick. Check engine oil before each use. When adding engine oil, use Pleasurecraft 10W-40 Premium Marine Engine Oil (P/N R193001).
  - 2 - All Pleasurecraft Marine transmissions -** Inspect fluid level after the first 25 hours of use and monthly thereafter. Fluid must be changed every 250 hours of use, or if evidence of contamination is present. Use Pleasurecraft Premium Marine Transmission Fluid (P/N R193002).
- IMPORTANT:** 80 Series PCM 1:1, 1.23:1 and all other transmission fluid levels are checked cold, or with the engine OFF for several minutes or more to allow drain back of the fluid.
- 3 - All Pleasurecraft Marine V-Drive Gears -** Change gear fluid at the first 25 hours of use. Inspect fluid every 100 hours of use, or annually, thereafter. Fluid must be changed every 600 hours or 3 years, or if evidence of contamination is present. Use Pleasurecraft Premium Marine VDrive Fluid (P/N R193003).

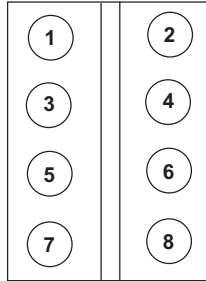


## MASTER ENGINE SPECIFICATIONS

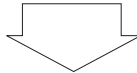
MODEL	<b>ZZ5</b> 5.3L DI CES	<b>ZZ6</b> 6.2L DI CES	<b>ZZ8S / ZZ8R</b> 6.2L DI SC CES
<b>Displacement</b>	5.3L (327 CID)	6.2L (378 CID)	6.2L (378 CID)
<b>Bore</b>	3.78 in. (96.01 mm)	4.06 in. (103.25 mm)	4.06 in. (103.25 mm)
<b>Stroke</b>	3.62 in. (92.0 mm)	3.62 in. (92.0 mm)	3.62 in. (92.0 mm)
<b>Compression Ratio</b>	11:1	11.5:1	10:1
<b>Compression</b>	130 - 240 psi	130 - 240 psi	130 - 215 psi
<b>WOT Operating RPM</b> <b>Preferred WOT RPM</b>	5600	5600	5600
<b>Cruising RPM (Max)</b>	4480	4480	4480
<b>Idle RPM (In Gear)</b>	650 RPM (Not Adjustable)	650 RPM (Not Adjustable)	650 RPM (Not Adjustable)
<b>Oil Pressure @</b> <b>2000 RPM</b>	25 - 60 psi (172 - 414 kPa)	25 - 60 psi (172 - 414 kPa)	25 - 90 psi (172 - 414 kPa)
<b>Minimum</b> <b>Oil Pressure</b>	5 psi (35 kPa) - Idle 35 psi (165 kPa) - 4000 RPM	5 psi (35 kPa) - Idle 35 psi (165 kPa) - 4000 RPM	5 psi (35 kPa) - Idle 35 psi (165 kPa) - 4000 RPM
<b>Spark Plug P/N</b> <b>Spark Plug Gap</b>	R030013 0.040 in.	R030013 0.040 in.	R030014 0.040 in.
<b>Firing Order</b>	1-8-7-2-6-5-4-3	1-8-7-2-6-5-4-3	1-8-7-2-6-5-4-3
<b>Thermostat</b>	170° F (76.6° C)	170° F (76.6° C)	180° F (82.2° C)
<b>Over- Temperature</b>	210° F (93.3° C)	210° F (93.3° C)	210° F (93.3° C)
<b>Exhaust Cooling</b> <b>System Over-</b> <b>Temperature</b>	240°F (115° C) - Stage 1 250°F (121° C) - Stage 2 Engine Derates	240°F (115° C) - Stage 1 250°F (121° C) - Stage 2 Engine Derates	240°F (115° C) - Stage 1 250°F (121° C) - Stage 2 Engine Derates
<b>Electrical System</b>	12 Volt Negative (-) Ground	12 Volt Negative (-) Ground	12 Volt Negative (-) Ground
<b>Alternator Rating</b>	150 Amps	150 Amps	150 Amps
<b>Battery Rating</b>	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah

# Specifications

## LH ROTATION FRONT



## NO DISTRIBUTOR FLYWHEEL END OF ENGINE ALL V-8 MODELS



**FIRING ORDER:**  
1-8-7-2-6-5-4-3

### PCM FUEL PRESSURE and ALARM WARNING SPECIFICATIONS

MODEL	ALL	NOTES
FCC Fuel Pressure	57-62 psi @ WOT	Monitored with sensor and displayed on Diacom Diagnostic Tool.
Fuel Rail Operating Pressure	580 psi - 2100 psi	Monitored with sensor and displayed on Diacom Diagnostic Tool.
Fuel Pressure - LPFP ALL ENGINES	7 - 9 psi (WOT)	
Coolant Over Temperature	210°F / 215°F DTC 116 / 117 MIL and Buzzer Engine Derates	Causes engine to go into Power Derate.
Exhaust Manifold Water Temperature Sensors (Fresh Water Applications)	240°F / 250°F DTC 1415 / 1416 / 1417 / 1418 MIL and Buzzer Engine Derates	Causes engine to go into Power Derate.
Low Engine Oil Pressure	< 5 psi @ idle / < 35 psi @ 4000 (Stage 1) < 30 psi @ 4000 (Stage 2) DTC 524 / 520 MIL and Buzzer Engine Derates	Causes engine to go into Power Derate.
Closed Loop Control Out of Range	DTC 1155 / 1156 DTC 1157 / 1158	Causes engine to go into Power Derate.
Adaptive Fuel Control Out of Range	DTC 171 / 172 DTC 174 / 175	Causes engine to go into Power Derate.

**IMPORTANT: FUEL PRESSURE VALIDATION MUST BE MADE WITH THE ENGINE UNDER LOAD.**



## ACCESSORY DRIVE BELT

PCM engines use a single serpentine belt to drive the engine water circulation pump, sea-water pump and the alternator.



### WARNING

Engine must be shut OFF and the ignition key removed before inspecting the drive belt(s). The drive belt(s) should be checked periodically for condition and tension. If the belt(s) shows signs of cracking, glazing or deterioration, replace with new belt(s).

## DRIVE BELT INSPECTION

Inspect the drive belt for excessive wear, shredding or missing sections.

Inspect the drive belt for contamination from excessive dirt, oil, coolant or other substances that may effect the drive belt operation.

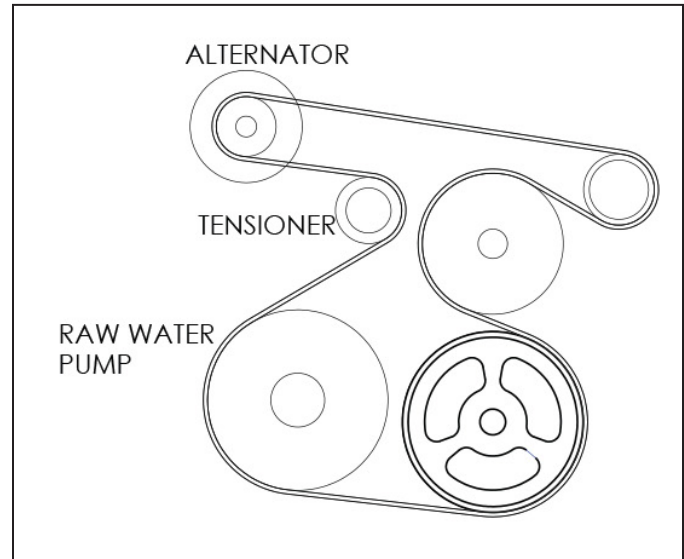
If a problem is found, replace the belt after inspecting the following items:

- All pulleys and tensioners for signs of misalignment
- All pulleys and tensioners for signs of rust or other damage
- Bent pulleys or tight bearings in the engine water circulation pump, sea-water pump and alternator

## DRIVE BELT REPLACEMENT (ZZ5 / ZZ6)

**Part Number: R066042**

1. Note the routing of the belt before removing.
2. Using a 1/2" drive ratchet, turn the belt tensioner to relieve the tension on the belt. Slide the belt off of the pulleys. **Release the tensioner slowly to prevent the tensioner from snapping against its stop, and possibly causing damage to the tensioner.**
3. Slide the new belt onto the pulleys using the same routing as noted prior to removal.
4. Compress the belt tensioner, and slide the belt over the tensioner pulley. Release the tension slowly to tension the belt.



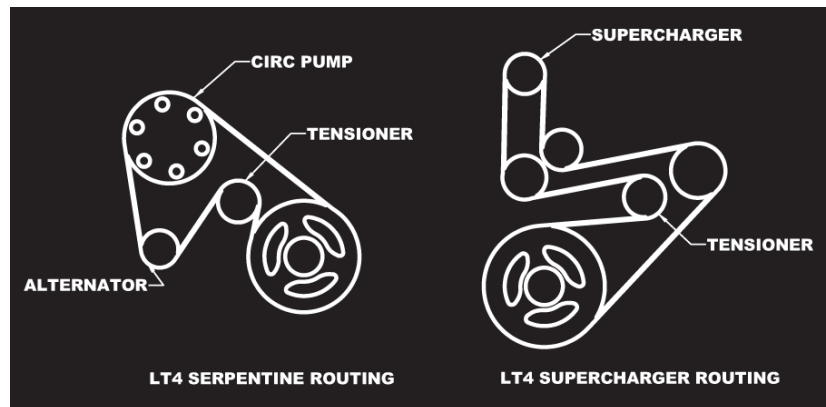
Accessory Drive Belt Configuration

## DRIVE BELT REPLACEMENTS (ZZ8S / ZZ8R)

**Accessory Drive Belt Part Number: R066044**

**Supercharge Drive Belt Part Number: R066043**

1. Note the routing of the belt before removing.
2. Using a 15mm socket, turn the belt tensioner to relieve the tension on the belt. Slide the belt off of the pulleys. **Release the tensioner slowly to prevent the tensioner from snapping against its stop, and possibly causing damage to the tensioner.**
3. Slide the new belt onto the pulleys using the same routing as noted prior to removal.
4. Compress the belt tensioner, and slide the belt over the tensioner pulley. Release the tension slowly to tension the belt.



## SERVICING RAW WATER PUMP IMPELLER

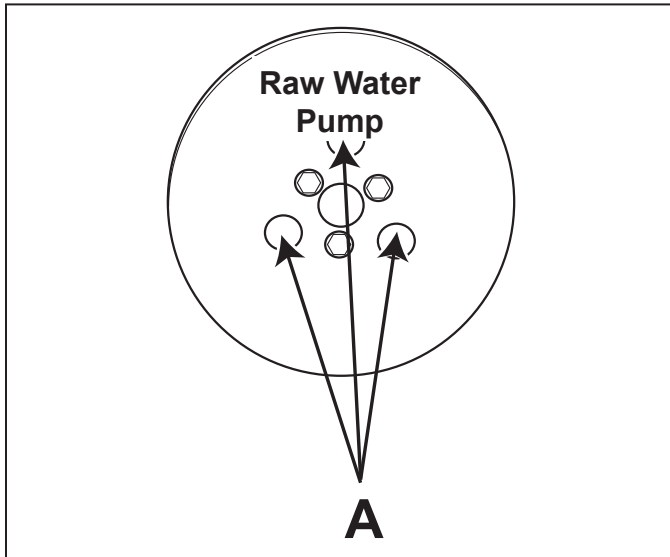
(ZZ5 / ZZ6 Raw Water Pump)

**IMPELLER KIT #: RP061022**

The raw water pump impeller should be serviced every 50 hours, or once a year, whichever occurs first. See Maintenance Schedule.

Locations "A" are access holes in order to loosen the raw water pump attaching bolts. The bolts are secured in the pump by O-rings, and will not fall out during removal.

Torque the raw water pump housing attaching bolts to 8.5-9 ft.lbs. (11.5-12 N-M), when re-installing the impeller.



Raw Water Pump Impeller Bolt Locations "A"

## SERVICING RAW WATER PUMP IMPELLER

(ZZ8S / ZZ8R Raw Water Pump)

**IMPELLER KIT #: RP061023**

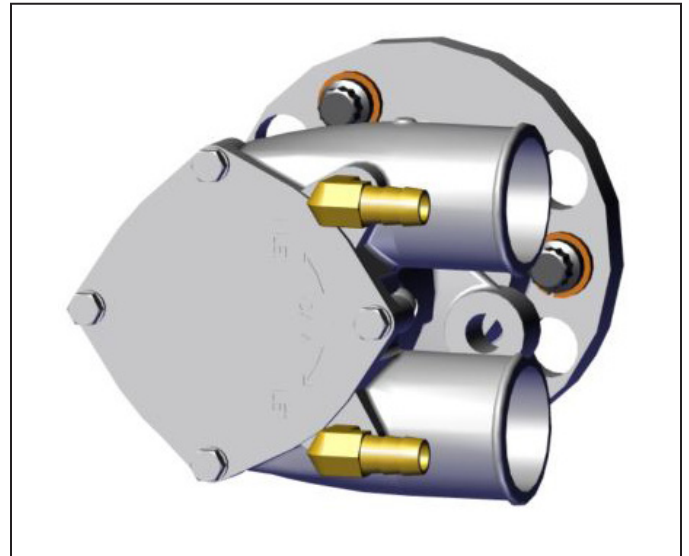
The raw water pump impeller should be serviced every 50 hours, or once a year, whichever occurs first. See Maintenance Schedule.

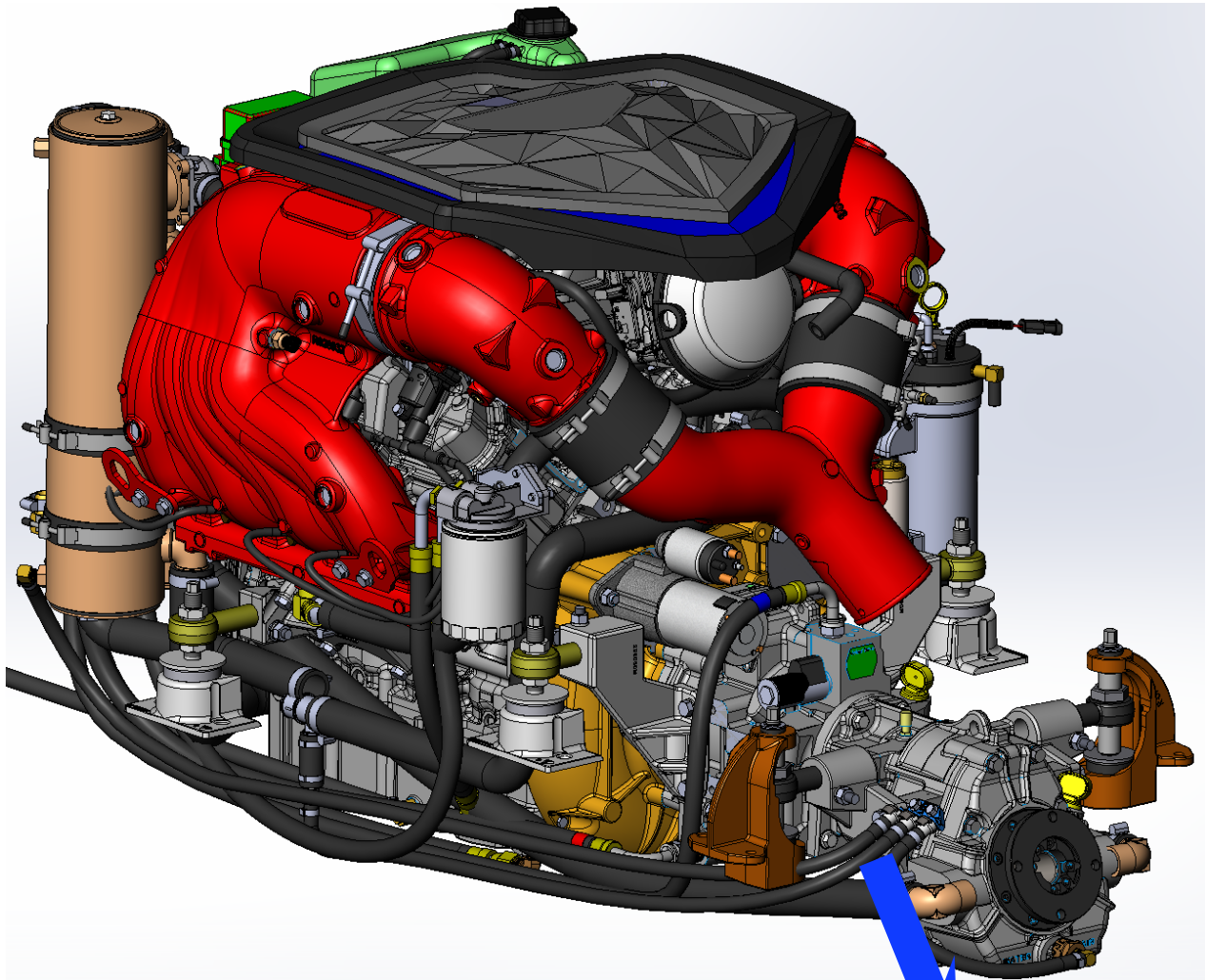
**IMPORTANT:** The raw water pump does not have to be removed from the engine to service the impeller.

1. Remove the (4) retaining bolts from the pump front cover. Remove the pump cover.
2. Discard old O-Ring.
3. Using two flat head screwdrivers, work the impeller out of the pump body.

**NOTE:** This pump uses a key way. Make sure the key is secure in place.

4. Install the new impeller into the pump body ensuring the key fits in properly.
5. Install the new O-ring and pump cover.
6. Tighten the retaining bolts securely.





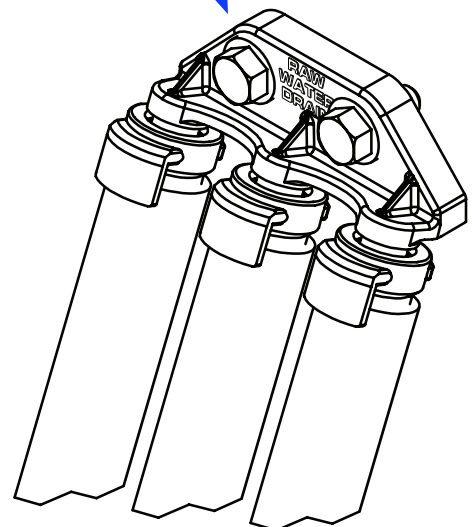
## ZZ5 / ZZ6

### QUICK DRAIN SYSTEM FOR WINTERIZATION

1. Press the gray quick release button & pull the hoses to drain the engine for winterization.

**NOTE:** ALL six drain hoses must be disconnected while draining to ensure the system drains completely.

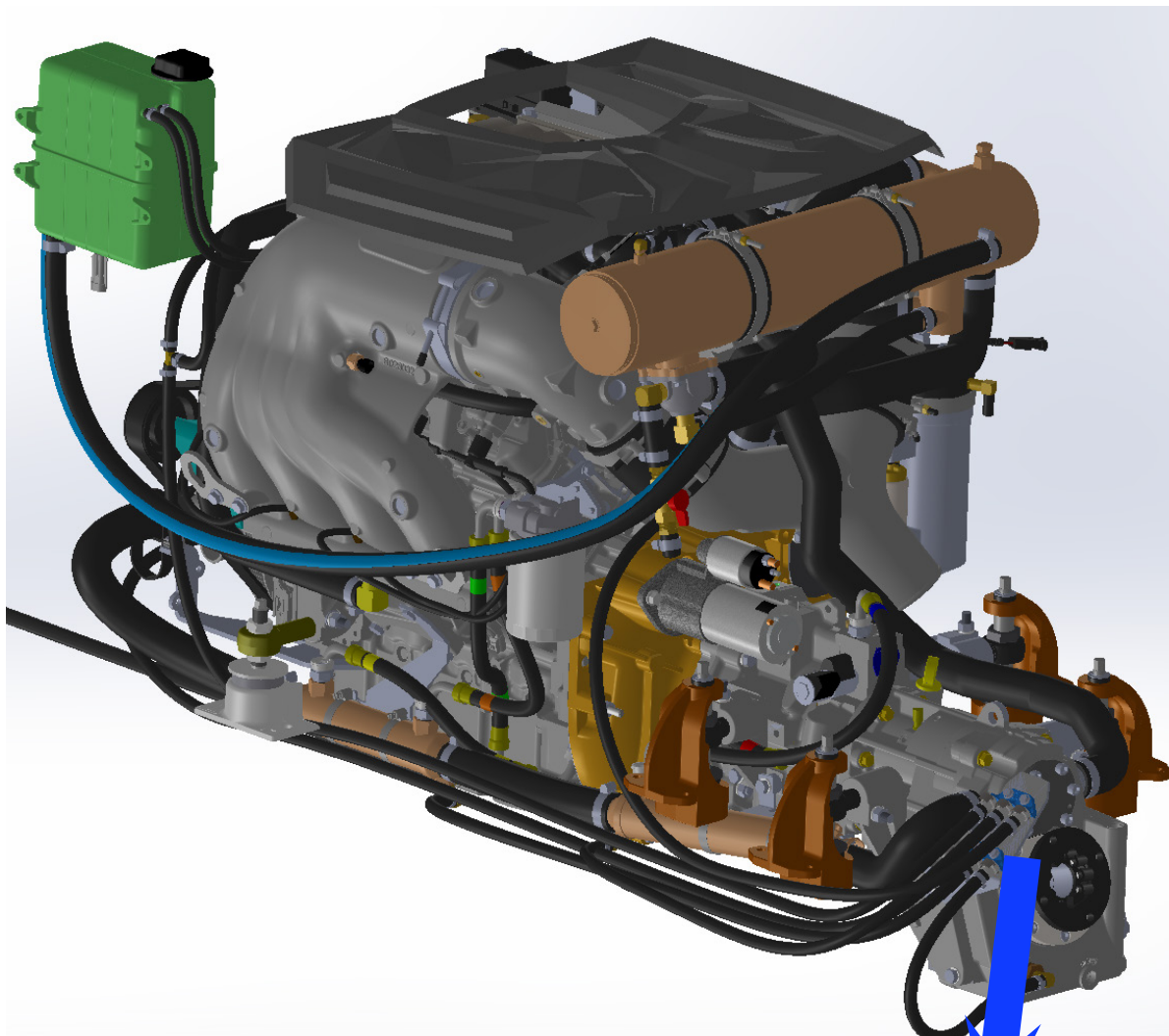
2. While draining, ensure the hoses are below the lowest point of the engine. Hoses should not be reconnected until summerization.
3. Inspect sacrificial anodes for signs of degradation & replace if necessary.
4. Inspect the blue drain block to ensure ALL O-Rings are in good condition.
5. For summerization re-insert the hoses until the gray quick release clicks into place. Pull to verify connection.



- 1 - Heat Exchanger Drain Hose
- 2 - Raw Water Hose Drain Hose
- 3 - VDrive Drain Hose

DDrive Drain Hose (located in hose between raw water pump and the dual cooler).

**IMPORTANT:** Ensure that ALL drain hoses are routed as low in the bilge as possible for draining. Ensure each drain hose is not routed in a loop or kinked anywhere to allow the system to be completely drained.



## ZZ8S / ZZ8R

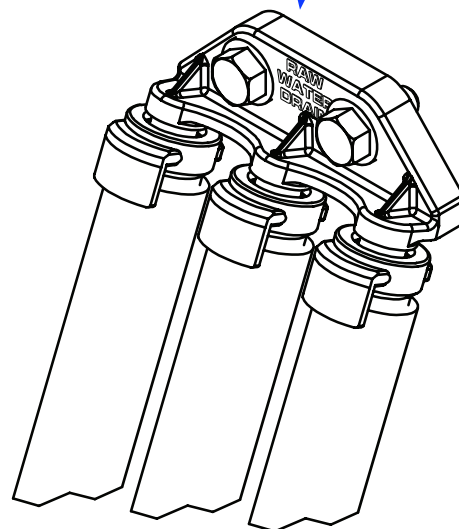
### QUICK DRAIN SYSTEM FOR WINTERIZATION

1. Press the gray quick release button & pull the hoses to drain the engine for winterization.

**NOTE:** ALL three drain hoses must be disconnected while draining to ensure the system drains completely.

2. While draining, ensure the hoses are below the lowest point of the engine. Hoses should not be reconnected until summerization.
3. Inspect sacrificial anodes for signs of degradation & replace if necessary.
4. Inspect the blue drain block to ensure ALL O-Rings are in good condition.
5. For summerization re-insert the hoses until the gray quick release clicks into place. Pull to verify connection.

**IMPORTANT:** Ensure that ALL drain hoses are routed as low in the bilge as possible for draining. Ensure each drain hose is not routed in a loop or kinked anywhere to allow the system to be completely drained.



- 1 - Heat Exchanger Drain Hose
- 2 - Raw Water Hose Drain Hose
- 3 - VDrive Location (not located on Direct Drive applications).
- 4 - Heat Exchanger Drain Hose
- 5 - Raw Water Hose Drain Hose
- 6 - VDrive Location



## ENGINE COOLING SYSTEM FILL PROCEDURE (ZZ5 / ZZ6)

This engine is a full fresh water cooling system. The complete engine and exhaust manifolds are filled with propylene glycol antifreeze. The antifreeze mixture to water depends on the temperatures of your region. Follow the manufacturers recommendation for the proper mixture for your area.

**NOTE:** Make sure when testing, you use the proper tester for propylene glycol.

1. Make sure the engine is cold.
2. Remove the Fill Cap on the degas reservoir.
3. With the engine OFF, fill through location (A) until the degas bottle is about 3/4 full.
4. Start the engine and let warm up until the thermostat opens. Air will purge out of the system and may need more added. Top of to the full line on the degas bottle decal.

## ENGINE COOLING SYSTEM FILL PROCEDURE (ZZ8R / ZZ8S)

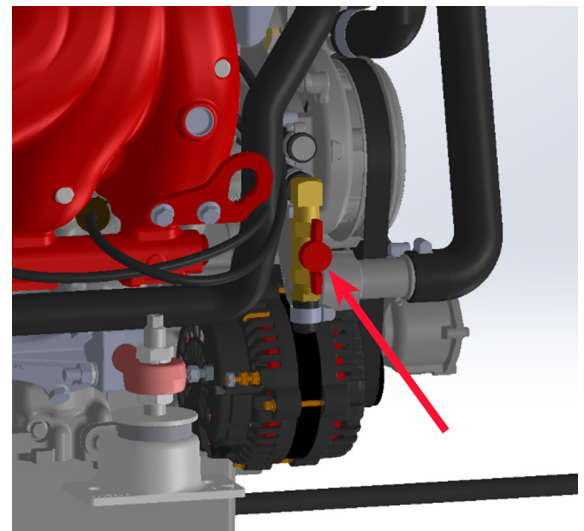
This engine is a full fresh water cooling system. The complete engine and exhaust manifolds are filled with propylene glycol antifreeze. The antifreeze mixture to water depends on the temperatures of your region. Follow the manufacturers recommendation for the proper mixture for your area.

**NOTE:** Make sure when testing, you use the proper tester for propylene glycol.

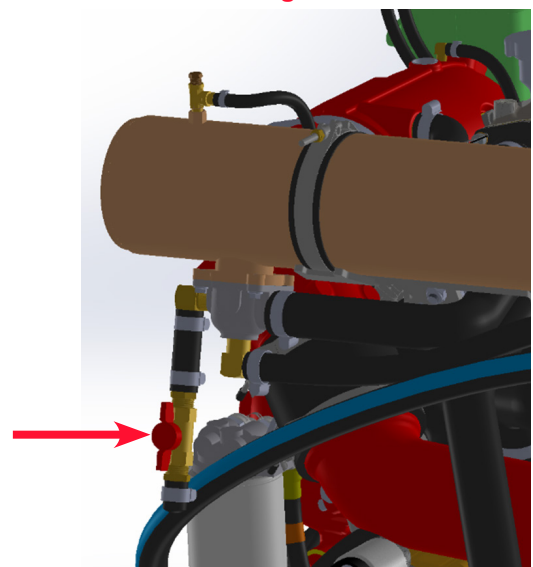
### Filling the Engine Cooling System

1. Engine OFF.
2. Make sure BOTH heater circuit ball valves are in the closed position.

Circ Pump Heater Valve



Heat Exchanger Heater Valve

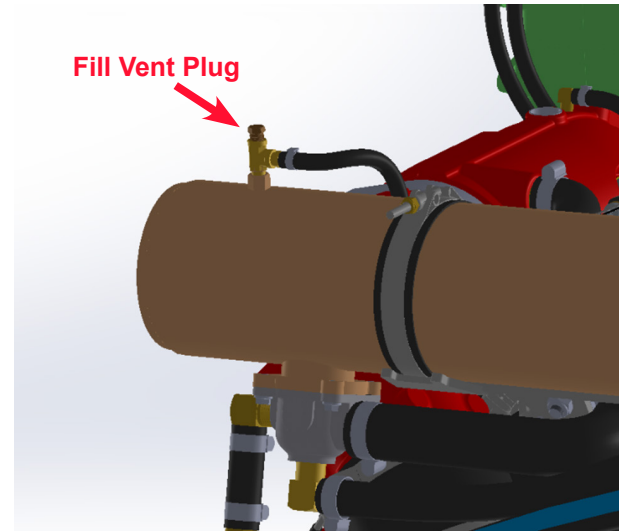


## Cooling System Filling Procedures

- 3 Remove the cap from the Degas Bottle. If equipped, remove the plug from the fill vent on the heat exchanger.

**NOTE:** If not equipped with a plug, remove the hose from the brass fitting.

4. Add coolant to the Degas Bottle until coolant starts to come out of the vent on the heat exchanger.
5. Reinstall the plug into the fill vent, or reinstall the hose.
6. Tighten plug, or clamp securely.
7. Top off the Degas Bottle to the Fill Mark on the bottle and reinstall the Degas Bottle Cap.



8. Start the engine.
9. Raise the engine RPM to 1700-2000 RPM in neutral.
10. Run the engine at the elevated RPM until the engine ECT reads 180-185°F.
11. The cooling system should be properly degassing through the vent lines and the engine temperature should remain stable.

**Not Degassing**  
(no coolant flow through vent lines)



**Properly Degassing**  
(coolant flowing through vent lines)



12. If the coolant is properly degassing through the vent lines, and the engine temperature is stable, shut the engine off.
13. Let the engine cool off. Top off the coolant to the FULL level on the Degas Bottle if necessary.

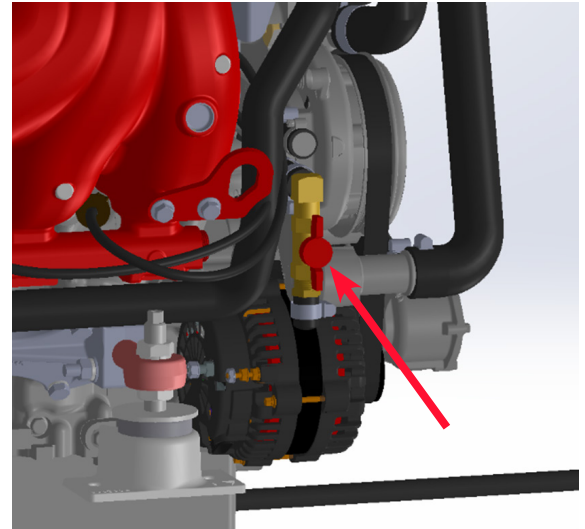
**IMPORTANT:** If the temperature is rising, or the coolant is not degassing through the vents, repeat steps 1-13.

## Connecting Heater Hoses

**IMPORTANT:** Heater hose circuits **MUST** be completely filled prior to connecting the hoses to the heater ball valves. Failure to do so will introduce more air into the system.

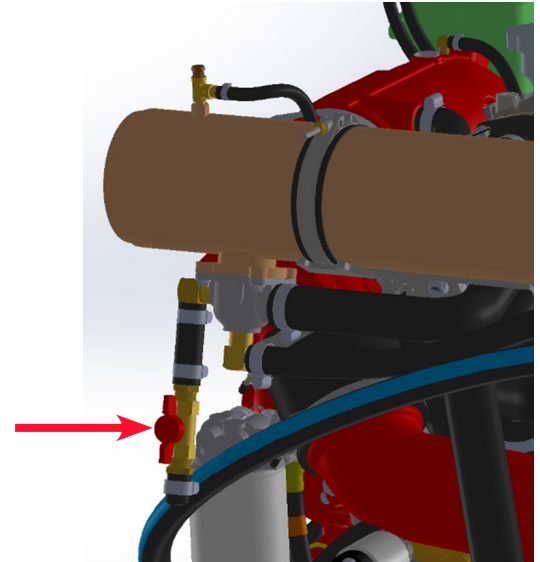
1. Engine OFF.
2. With the heater circuit completely prefilled with coolant, make sure the heater hoses are connected to the heater ball valves.
3. Open the Circ Pump Heater Valve first.

Circ Pump Heater Valve



4. Wait at least 10 seconds and open the Heat Exchanger Heater Valve.
5. If needed, add coolant to the Degas Bottle to bring the level back to the FULL MARK.

Heat Exchanger Heater Valve



## Engine Continues to Run Hot or Overheat

1. Engine OFF.
2. Close both of the heater valves.
3. Remove the degas bottle cap.



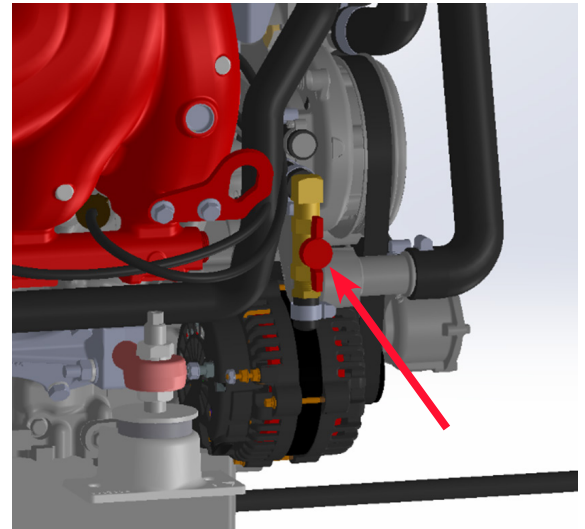
## Cooling System Filling Procedures

1. Disconnect the heater hose at the circ pump.
2. Make sure you do not lose any fluid out of the heater circuit.
3. Open the heater valve on the circ pump.
4. Let the coolant flow a "solid" stream for 5 seconds.

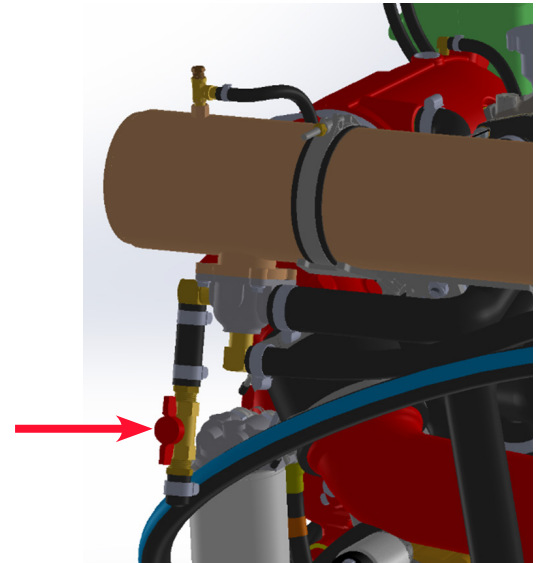
**NOTE:** Using an approved container, catch any fluid and add the coolant back to the Degas Bottle. Add any additional coolant required to bring the level of the Degas Bottle back to the Full Mark.

5. Install the Degas Bottle cap.
6. Connect the heater hose back up and open Circ Pump Heater Valve.
7. Wait at least 10 seconds, then open the heater valve on the heat exchanger.

**Circ Pump Heater Valve**

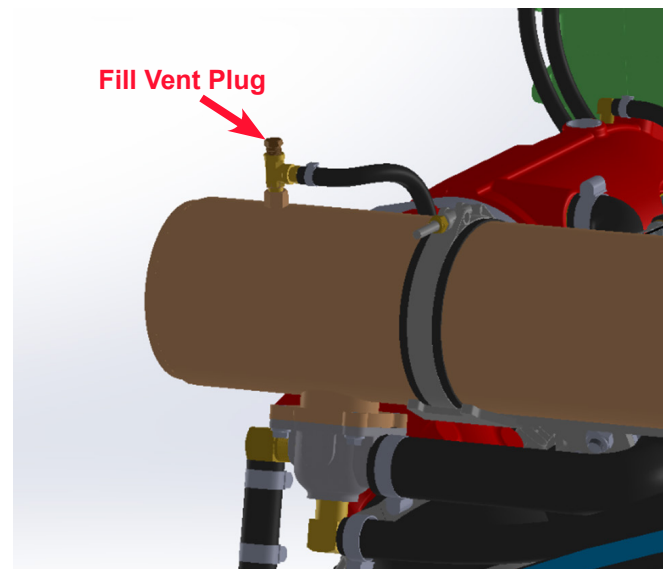


**Heat Exchanger Heater Valve**



8. Remove the Fill Vent Plug, or Vent Hose, on the Heat Exchanger to make sure all air is purged from the system.
9. Reinstall the Vent Plug or Vent Hose.

**Fill Vent Plug**



## Cooling System Filling Procedures

10. Start the engine.
11. Raise the engine RPM to 1700-2000 RPM in neutral.
12. Run the engine at the elevated RPM until the engine ECT reads 180-185°F.
13. The cooling system should be properly degassing through the vent lines and the engine temperature should remain stable.

**Not Degassing**  
(no coolant flow through vent lines)



**Properly Degassing**  
(coolant flowing through vent lines)



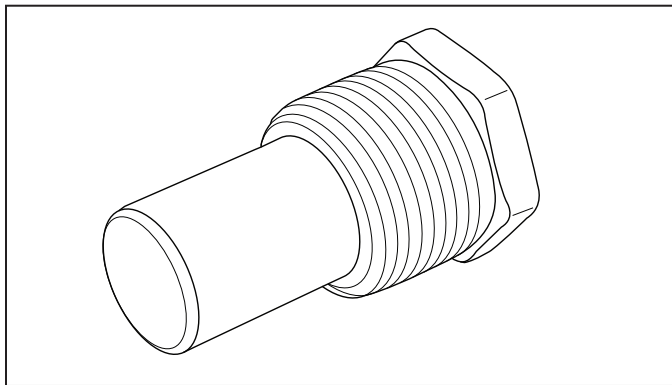
14. If the coolant is properly degassing through the vent lines, and the engine temperature is stable, shut the engine off.
15. Let the engine cool off. Top off the coolant to the FULL level on the Degas Bottle if necessary.

**IMPORTANT: If the temperature is rising, or the coolant is not degassing through the vents, repeat steps 1-15.**

**COOLING SYSTEM SACRIFICIAL ANODES**

Located in the raw water side of the cooling system are sacrificial anodes which are marked by a decal. To check, remove the anode and visually check the condition of the rod. The length of the anode rod when new is approximately 1.5 inches. If more than one half of the anode is gone, replace with a new sacrificial anode.

Different geographic locations and water make-up can result in either high or low sacrificial requirements. A high rate of sacrificial anode consumption should also alert the owner to a possibility of an improperly wired boat accessory, which would require complete checking by qualified service personnel.



**Figure 11-8** Sacrificial Anode

**SACRIFICIAL ANODE LOCATIONS****PCM Closed Cooling Applications**

- One anode is in the top of the heat exchanger.
- One anode is in each of the charge air cooler housing end caps.
- One anode is in the rear of the Vdrive Housing for a drain. (Coastal applications)