PCM® marine engines

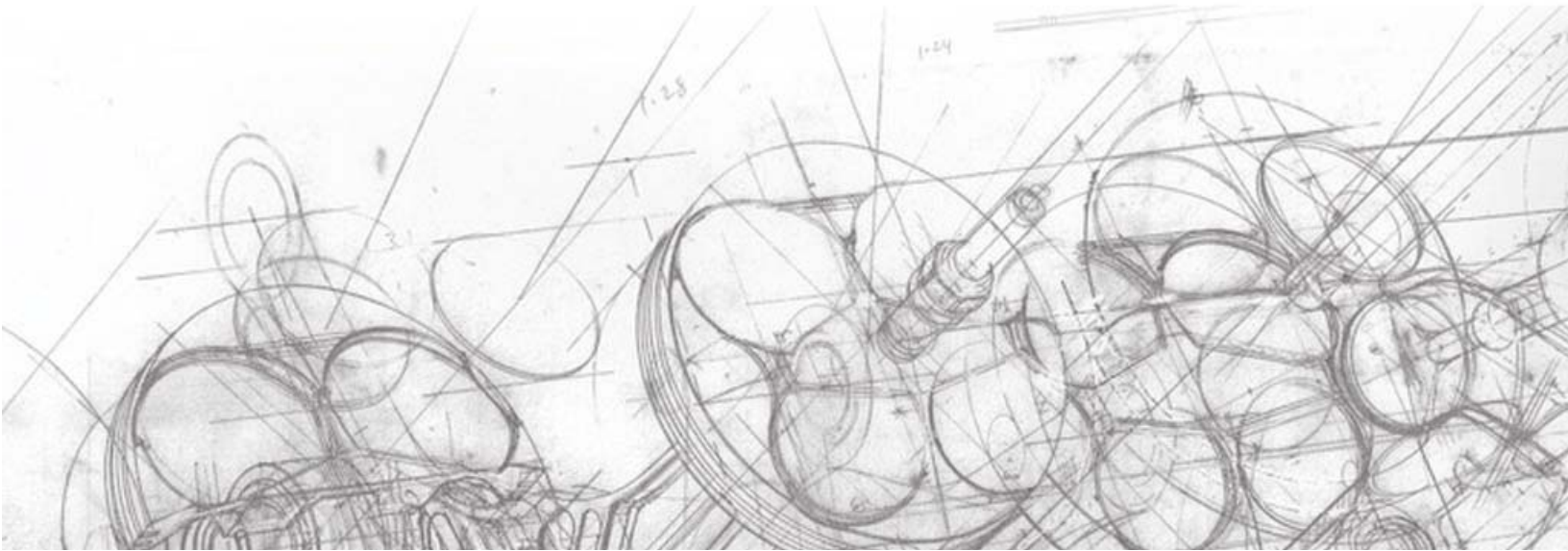
PREMIER DEALER

WORLDWIDE

PCM E-TRAIN PROGRAM

Course 1

Reference Material



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NOTE: All other publications can be quickly referenced, downloaded or printed conveniently from your PCM Premier Dealer Website. Use your assigned Dealer ID and Password to access this information.

WELCOME

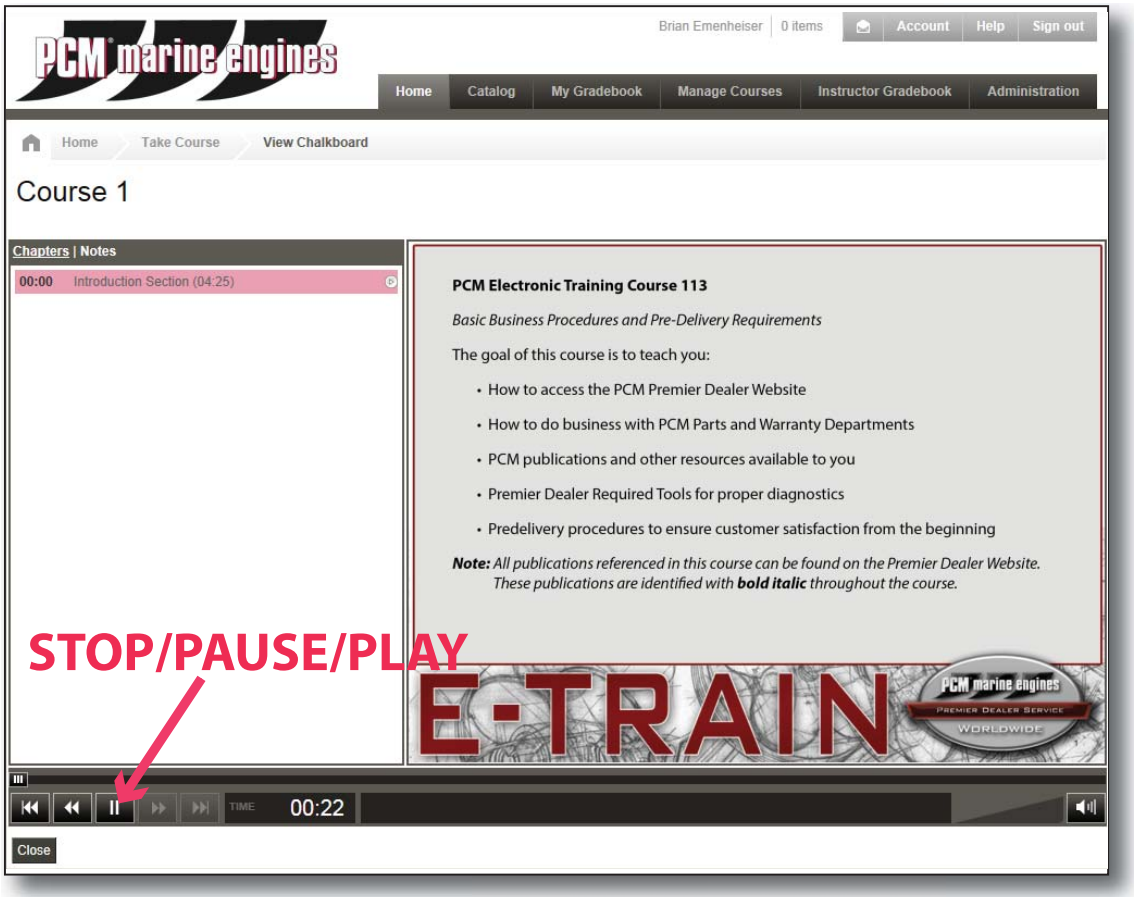
Congratulations on your new PCM Electronic Training (E-Train) Program purchase! We hope you'll enjoy the new look and convenience of PCM's E-Train program, training online, from the comfort and convenience of your dealership, or personal computer. The PCM E-Train Program is a series of electronic courses designed to prepare PCM dealers and Service Technicians to do business with PCM, pre-deliver, maintain, diagnose and repair PCM marine engines.

At Pleasurecraft, we believe that well trained dealers who supply genuine PCM engines, parts and service are absolutely essential to our company's success in fully satisfying our customers. PCM's primary focus is, first and always, the safety and dependability of our products. As a result, PCM inboards command the highest degree of customer satisfaction in the industry. PCM's goal is to create a network of knowledgeable dealers who can provide parts, service and warranty on the PCM product line. The PCM E-Train is one tool used to elevate the standards of PCM service technicians, who were already providing a superior, uncompromising commitment to customer satisfaction, to a level not seen before. Thank you for choosing to be part of the PCM Premier Dealer Worldwide Team.

STOP / PAUSE / PLAY TRAINING SESSION

There are video controls at the lower left hand corner of the screen. These controls work the same as any other video controls. You can stop, pause and play the training session at your pace.

The training session will run continuously through each section or chapter, pausing for several seconds in between screens. You can use the controls to stop, or pause the screen if you need more time to make some notes. Once the Stop/Pause button is clicked on, the control changes to a Play button so you can resume the training session when you are done taking your notes. The only time the training session stops, or pauses automatically is at the end of each section, or chapter. See the following "Section Checkpoints" for further information so your training session does not timeout on you.



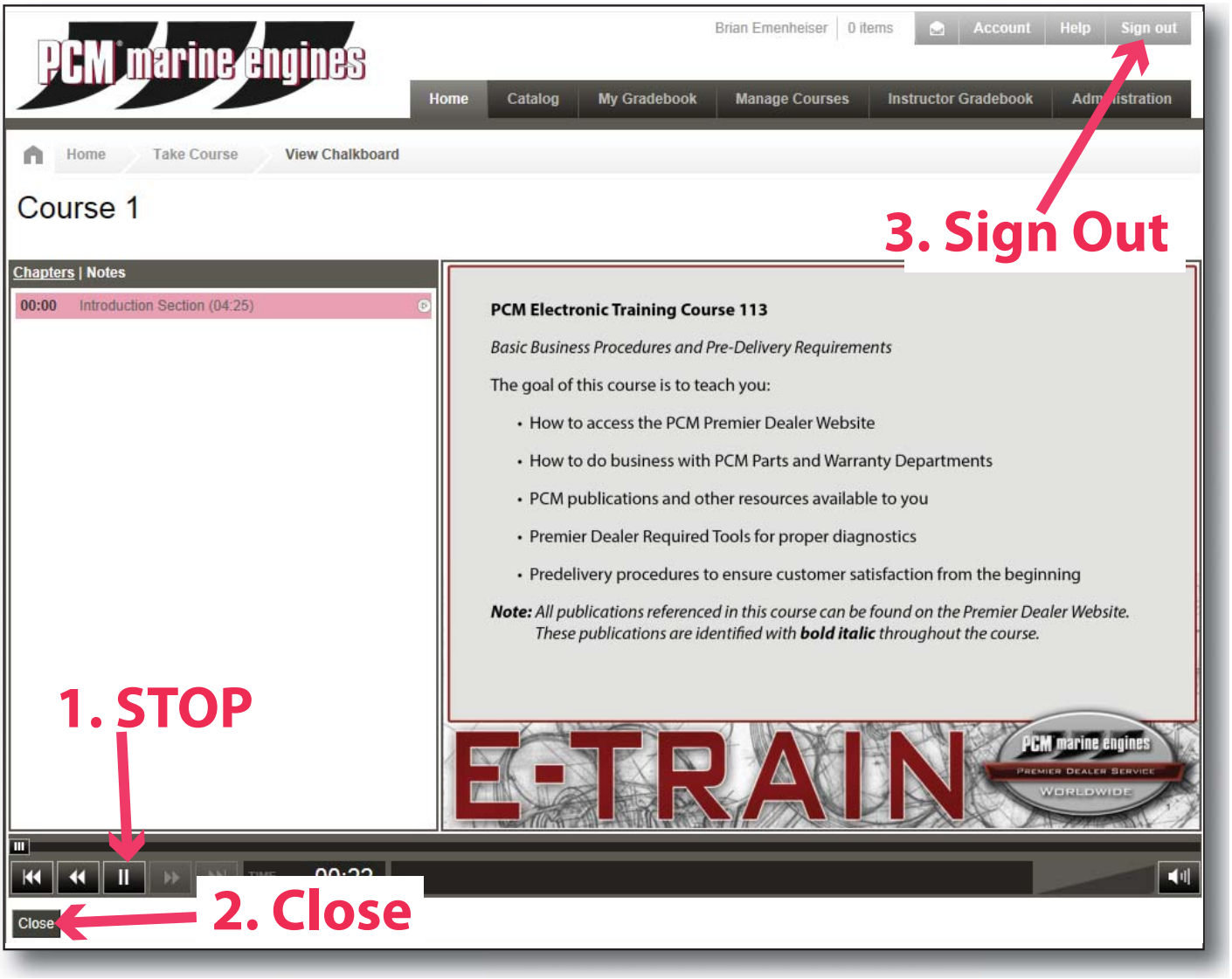
BOOKMARKING YOUR TRAINING SESSION

If for any reason you need to end your session before completing the training course, you will be able to finish the course at a later time, even from a different computer if needed.

To properly end your session and “bookmark” your location, you must

1. First click the STOP button on the lower left corner of the screen.
2. Second click on CLOSE in order to properly close the session.
3. Third SIGN OUT.

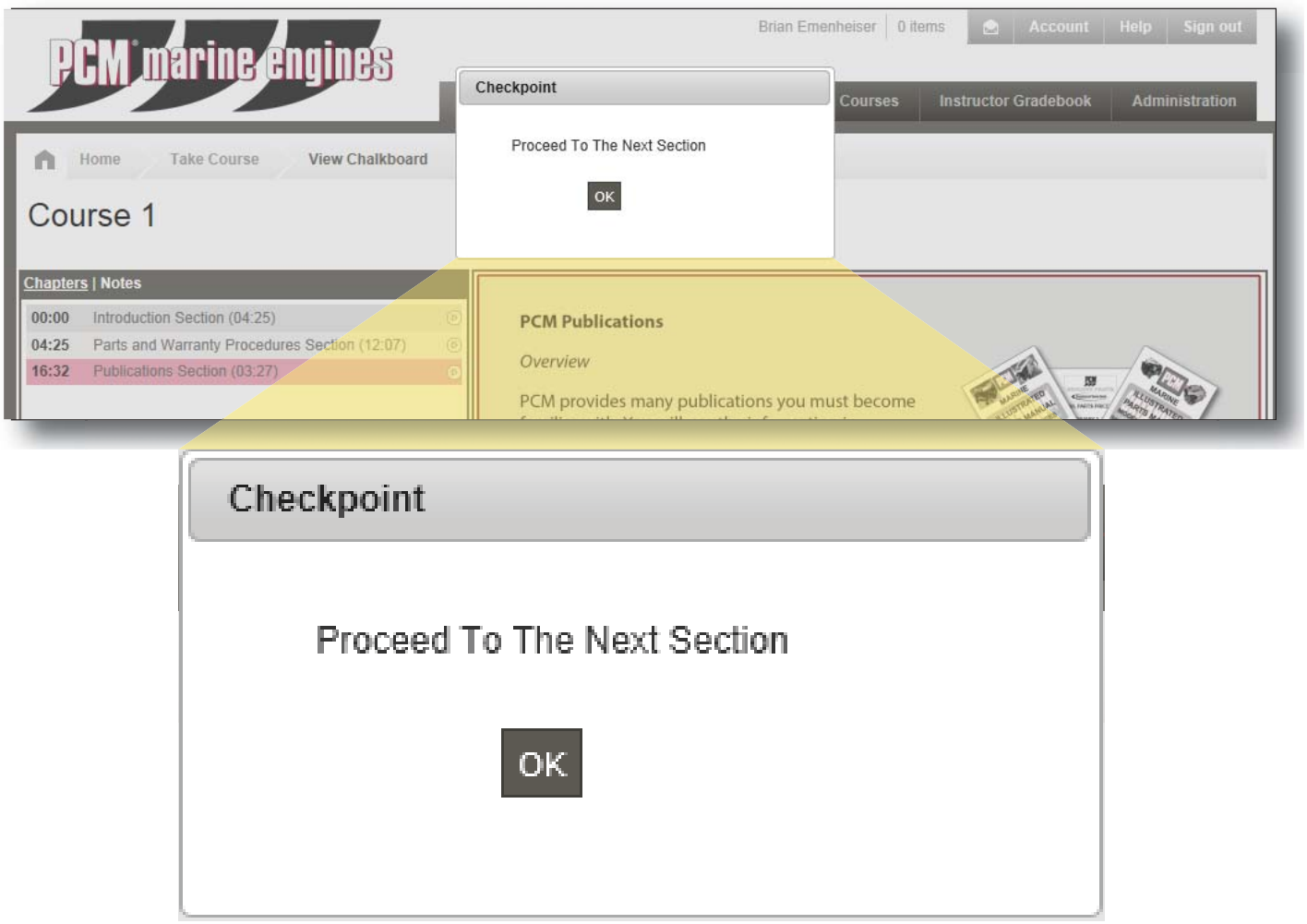
Your training session has been bookmarked and can be resumed at a later time.



SECTION CHECKPOINTS

At the end of each section, or chapter, a Checkpoint dialogue box will appear. The Checkpoint requires you to click “OK” to proceed to the next section. You must click OK within one minute or the session will time out.

If you allow the session to time out this way, when you log back in you must start the course over from the beginning. BE SURE to stop the session and properly close out so a “bookmark” is established, and you can resume where you left off.



SAFETY PRECAUTIONS

PCM's primary focus is, first and always, the safety and dependability of our products. As a result, PCM inboards command the highest degree of customer satisfaction in the industry. The following is only a partial listing of the safety warnings that apply when working on the boat or the PCM product. It is required of all technicians performing service on the boat or the PCM product that all manuals be reviewed for the proper procedures and safety precautions, these include, but are not limited to, the boat manufacturer's Owner's Manual and the PCM Owner's Operation and Maintenance Manual.

NOTE: This is only a partial listing of the safety warnings that apply when working on a boat or PCM product. All applicable boat and engine manuals should be consulted before beginning work. Before attempting to perform any procedure, operation, or action on the boat or PCM product please read and observe all safety precautions:

1) Always refer to and follow the engine manufacturer's safety and service procedures to prevent personal injury and damage to the equipment.

2) Always refer to and follow the boat manufacturer's safety and service procedures to prevent personal injury and damage to the equipment.

3) Always refer to and follow all test equipment manufacturer's safety and service procedures to prevent personal injury and damage to the equipment.

4) The technician should review all owner's manuals, boat manufacturer and PCM, to become fully aware of all safety and operational warnings, before performing any procedure on the boat or engine.

5) The boat operator must be qualified and aware of his or her surroundings in order to safely perform the following operations. He/she must be fully familiar with all the safety and operational warnings provided by the boat manufacturer for the craft being tested.

6) Prior to starting the engine, carefully follow the boat manufacturer's starting procedures, including operation of the blower, etc., to insure safe operation.

7) Fuel and oil are the most dangerous items onboard any boat. A small oil or fuel line leak may cause a fire or explosion. It is imperative that all fuel and oil lines be checked for leaks and corrected prior to delivery to our customer.

8) Over- or under-filling, or using oils not recommended by PCM, may cause engine or transmission damage which will not be covered under the PCM warranty.

9) When working near batteries never use any device that is capable of producing a spark, high temperature or open flame. Batteries contain sulfuric acid and produce highly explosive gasses that may ignite. To prevent serious injury always observe this precaution along with the safety precautions provided by the engine, boat, and battery manufacturers.

10) Always test and service a running engine in a well ventilated area.

11) Always wear approved eye protection.

It is important that you recognize the potential danger to yourself, others around you and/or property that may be damaged if an accident should occur. It is impossible for PCM to foresee all the potential for accidents that are present at the numerous locations and under varying circumstances existing at those locations. Therefore, **IT IS YOUR RESPONSIBILITY** to determine if you are able to proceed safely in performing repairs at your location.

NOTES

NOTES

WARRANTY POLICIES AND PROCEDURES

Revised January, 2013

Prepared for PCM Dealer and Service Network by PCM Warranty Services

L190181

WARRANTY APPROVAL GUIDELINES

The warranty statement supplied with each engine owner's manual is the official statement of warranty. The following guidelines do not modify our, then current, warranty statement in anyway. The purpose of these guidelines is to inform dealers and distributors of PCM warranty approval procedures, and how to initiate the warranty repair process.

The dealer determines warranty eligibility by referring to the original date of sale and to the Limited Warranty Statement that applies to the unit in need of repair. The warranty on a current PCM engine to the original owner is 3-Years, unlimited hours. You then submit a Warranty Claim Form to PCM electronically through the Premier Dealer Website or via fax. By approving a warranty claim, PCM states they are approving a specified warranty repair at an agreed upon rate. Each warranty claim is approved or denied on a case by case basis. By signing this form, the dealer representative states that the dealer has the skills and knowledge necessary to perform the repairs in a safe and satisfactory manner, that the dealer has the owner's consent to repair, and that the dealer agrees to perform the repairs per PCM's, then current, Warranty Policies and Procedures Manual. PCM does not recognize a dealer as a certain status as a result of a warranty repair being approved.

When the dealer performs the required repair based on the approved warranty claim, he accepts the allowable labor amount defined on the approved warranty claim. Additional labor reimbursement must have prior approval.

1. WARRANTY ACCOUNTS:

All warranty accounts must be kept current to continue to receive warranty reimbursement. Parts required to be returned for warranty MUST be received within 30 days of warranty approval. If the parts are not received within the 30 day period, the dealer will be billed for the part(s) and will not be eligible for labor reimbursement.

2. APPROVAL REQUIREMENTS:

Our warranty statement specifies that all repairs requiring more than $50.00 in parts and/or labor must receive prior approval. This requirement offers dealer advantage by:

> Repairs less than $50.00 parts and/or labor are relatively simple and can be accomplished in a short time

> Repairs requiring in excess of $50.00 parts and/or labor are usually more complicated and may require extensive diagnostic work. With information obtained through the dealer network, technicians may be provided with data that may eliminate unnecessary steps in troubleshooting. Therefore, we are able to minimize customer downtime and enhance dealer image.

> Prior approval also allows for a determination of part repair or replacement. In many cases, replacing a failed part, rather than repairing, may be more effective for all parties involved.

3. ACQUIRING APPROVAL:

> To obtain approval, go to the PCM Premier Dealer Website and submit an Electronic Warranty Claim Form. By submitting the Electronic Warranty Claim Form, the dealer representative is stating that the dealer has the skills and knowledge necessary to perform the repairs in a safe and satisfactory manner, that the dealer has the owner's consent to repair, and that the dealer agrees to perform the repairs per PCM's, then current, Warranty Policies and Procedures Manual. This means the owner understands the repairs being made, and that the repairs are covered under PCM warranty. In the event you are unable to submit an Electronic Warranty Claim Form, or fax a warranty claim form, you may contact the Warranty Services Department at (803) 345-0050. The same information will be required as appears on the Warranty Claim Form.

4. PCM CLAIM PROCESS AND PAYMENT:

A. Dealer determines warranty eligibility and submits an Electronic Warranty Claim Form to PCM Warranty Services Department via the PCM Premier Dealer website, or fax a warranty claim form to 1-800-321-3797 (International 1-803-345-0336).

B. The PCM Warranty Manager will review the claim, confirm eligibility, and assign a claim number.

C. A copy of the claim is returned whether the claim is approved or denied. If the claim is approved, the allowable labor amounts are filled in, and whether the defective parts are required to be returned. (For servicing dealers who do not meet the requirement for 100% reimbursement, the maximum labor rate paid is 50% of your posted retail labor rate, not to exceed $40.00 per hour).

When the dealer performs the required repair based on the approved warranty claim, he accepts the allowable labor amount defined on the approved warranty claim. Additional labor reimbursement must have prior approval.

Note: *By approving a warranty claim, PCM states they are approving a specified warranty repair at an agreed upon rate. Each warranty claim is approved or denied on a case by case basis.*

D. Warranty replacement parts are shipped to the servicing dealer from PCM Manufacturing Facility. If the dealer has the previously approved, required part(s) in stock, they may be utilized in the repair. A stocking fee of 10% may be added to the warranty claim for “in stock” warranty replacement part(s), not to exceed $500.00 dealer cost (some limitations may apply). PCM will Memo Bill the servicing dealer for the replacement parts. (Memo Billing is a term used at PCM. It serves as a record of warranty parts shipment and the amount that will be billed to the servicing dealer if the defective parts are NOT returned within 30 days).

E. After the repair is made, each defective part is tagged with engine serial number, placed in a box along with a copy of the approved Warranty Claim Form and shipped to:

PCM/Attn: Warranty Returns
1737 US Hwy 76
Little Mountain, SC 29075

F: When tagged, defective parts are received by PCM Warranty Department, along with a copy of the approved Warranty Claim Form, within the required 30 days, the Memo Bill invoice will be cleared and payment or credit will be issued.

Important Notes:

> Warranty replacement parts are shipped ground only. If any other means of shipping are required, it will be at dealer or customer expense.

> Return claim with defective part(s) via UPS ground prepaid. PCM includes a Return Shipping Label and instuctions whenever a part is Memo Billed. Other methods of return require prior approval BEFORE shipment.

> Defective parts not tagged with engine serial number and accompanied by the approved warranty claim will not be considered for payment.

> If part(s) are not required to be returned for a warranty repair, PCM will begin processing the approved claim for immediate payment.

> PCM Warranty Services must be contacted for required shipping instructions BEFORE an engine may be returned.

> Only the Electronic Warranty Claim Form on the PCM Premier Dealer Website, or the Warranty Claim Form enclosed in this manual, may be submitted for warranty review. (Omission of information, i.e. engine hours, date of sale, may cause claim to be delayed or denied).

> PCM will contact the servicing dealer if any additional documentation is needed for warranty claims processing, (i.e. a copy of the servicing dealer’s in-house repair order may be required for major failures).

> It is the servicing dealers responsibility to maintain the approved Warranty Claim Form, **A COPY MUST BE RETURNED WITH DEFECTIVE PART(S) WITHIN (30) DAYS OR CLAIM WILL BE DENIED.**

PCM marine engines

WARRANTY CLAIM APPLICATION

FAX: 1-800-321-3797

INTERNATIONAL FAX: 1-803-345-0336

ENGINE SERIAL #:_____

PCM CLAIM #:_____

ENG. SERIAL #:_____ ENG. HRS.:_____

ENG. MODEL #:_____

TRANS. SERIAL #:_____

TRANS. MODEL #:_____

DATE OF SALE:____/____/____ DATE OF FAILURE:____/____/____

BOAT HULL TYPE:_____

BOAT HULL SERIAL #:_____

PCM DEALER #_____ DATE:____/____/____

DEALER NAME:_____ TECH OR CONTACT:_____

ADDRESS:_____

_____

PHONE #:_____ FAX #:_____

EMAIL ADDRESS:_____

OWNER NAME:_____ PHONE #:_____

ADDRESS:_____

_____

SYMPTOM AND DESCRIPTION OF PROBLEM:

_____

_____

_____

_____

_____

IMPORTANT: THE ENGINE, DEALER, OWNER, AND SYMPTOM INFORMATION REQUESTED ABOVE, MUST BE COMPLETELY FILLED IN AND THIS FORM SIGNED OR WARRANTY CLAIM MAY BE DENIED.

QTY.	PART #	DESCRIPTION	COST	QTY.	PART#	DESCRIPTION	COST

LABOR OP. #	TIME ALLOW.	LABOR EXT.	FAIL CODE	LABOR OPERATION DESCRIPTION

PARTS:	
STOCK PARTS ADD 10%:	
LABOR:	
MISC.:	
RETURN FREIGHT:	
CLAIM TOTAL:	

NOTE TO DEALER: **A COPY OF THIS CLAIM MUST BE RETURNED WITH DEFECTIVE PART(S) IN 30 DAYS OR CLAIM WILL BE DENIED. RETURN PARTS TO: 1737 US HWY 76, LITTLE MOUNTAIN, SC 29075. CLAIM MUST BE SIGNED BY DEALER REPRESENTATIVE STATING THAT THE DEALER HAS THE SKILLS AND KNOWLEDGE NECESSARY TO PERFORM THE REPAIRS IN A SAFE AND SATISFACTORY MANNER, THAT THE DEALER HAS THE OWNERS CONSENT TO REPAIR, AND THAT THE DEALER AGREES TO PERFORM THE REPAIRS PER PCM'S, THEN CURRENT, WARRANTY POLICIES AND PROCEDURES MANUAL. MAXIMUM RATE PAID TO DEALERS WHO DO NOT MEET REQUIREMENTS FOR 100% REIMBURSEMENT WILL BE PAID 50% OF POSTED RETAIL LABOR RATE, NOT TO EXCEED $40.00 PER HOUR.**

APPROVED AT THE ABOVE LABOR TIME. ADDITIONAL LABOR AND/OR EXPENSES ARE THE DEALER/OWNER'S RESPONSIBILITY!

X_____

DEALER'S SIGNATURE (REQUIRED)

APPROVED ☐ DENIED ☐ PARTS RETURN REQUIRED: YES ☐ NO ☐

PARTS SUPPLIED BY: DEALER [ ] DISTRIBUTOR [ ] MANUFACTURER [ ] AUTH. LABOR RATE:_____ PREMIER DEALER: YES ☐ NO ☐

SOLD TO: CUST. #_____ SHIP TO: CUST. #_____ SHIPPING INSTRUCTIONS: GRD [ ] NDA [ ] 2 DAY SELECT [ ] 3 DAY [ ] COD [ ] OTHER [ ]

TERMS:_____ DISCOUNT:_____ PCM ORDER #_____

PCM WARRANTY TRANSFER APPLICATION

The remainder of the original 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 term, **provided the engine does not have in excess of 300 hours.** The original date of sale or original in-service date (whichever comes first) begins the warranty coverage period.

Direct Sale by Owner/Dealer Promo/Ski Show User/ or First Operator:

- The second purchaser can be registered as the owner and retain the unused portion of the warranty term by sending the following:
  - Original owner's Warranty Registration Card
  - Copy of Bill of Sale/Sales Contract/Operator Contract
  - Completed Warranty Transfer Application
  - Warranty transfer fee

Transfer Fee:

- **The fee for transfer is $100.00.** The applicable transfer fee must be submitted via certified check **within 30 days of date of sale** along with the transfer application information to:

  Pleasurecraft Engine Group
  P.O. Drawer 369
  Little Mountain, S.C., 29075

- A Warranty Registration Card will be issued to the second owner, reflecting the change has been made in the factory computer.

OUTSIDE THE U.S. AND CANADA, CONTACT YOUR LOCAL PLEASURECRAFT DEALER OR WARRANTY SERVICES AT (803) 345-0050 FOR MORE INFORMATION ON HOW TO APPLY TO THIS PROGRAM.

IMPORTANT! PURCHASER NOTICE: The checks listed below are designed to insure safety and satisfaction. A step-by-step procedure for pre-delivery can be found in Course 1 of the PCM E-Train Program. Therefore, we require the following inspection be performed at your expense by a qualified technician prior to delivery. By signature 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 Owners Manual still apply.

ENGINE MODEL:_____ **ENGINE SERIAL:**_____

TRANS. SERIAL:_____ **ENGINE HOURS:**_____

HULL SERIAL #:_____

Predelivery Check-

- ☐ Check for Bulletins
- ☐ Engine Oil: Check
- ☐ Drive Lube: Check
- ☐ Battery Rating, Charge, and Level: Check
- ☐ Control Adjustments: Confirm Proper Operation
- ☐ Gauges: Check for Proper Operation
- ☐ Record Propeller Size, Rotation and WOT
  WOT RPM_____Diameter_____ Pitch_____Rotation_____
- ☐ Record Fuel Pressure, Idle _____
  Record Fuel Pressure, WOT _____
- ☐ Dealer Reviewed Warranty with Owner
- ☐ Belt and Pulley: Inspect for Damage
- ☐ All Drain Plugs: Confirm Proper Installation
- ☐ All Fuel Lines: Confirm No Leaks
- ☐ All Oil Lines: Confirm No Leaks
- ☐ All Water Lines: Confirm No Leaks
- ☐ Electrical Wiring: Check for Proper Installation
- ☐ Trouble Codes Checked
  Trouble Codes Cleared

DATE OF SALE (2ND Owner) _____/_____/_____

(New Owner)
NAME:_____

ADDRESS:_____

CITY,STATE, ZIP_____

DATE OF SALE (1st Owner/1st Operator) _____/_____/_____

(Previous Owner)
NAME:_____

ADDRESS:_____

CITY,STATE, ZIP_____

I hereby certify the pre-delivery checklist on engine #_____ and have corrected any abnormality revealed by this inspection.

_____ **(Technician Signature, Dealer & Date)**

_____ **(Seller's Signature & Date)**

_____ **(Purchaser's Signature & Date)**

SUMMARY OF WARRANTY TERM LIMITS

This list does not, in any way, modify the official Limited Warranty Statement of PCM. This list has been compiled only as a general outline of year and hour limits imposed on different models of PCM engines. Please review the official Limited Warranty Statement, in the PCM Owner / Operation Manual, as they apply to the particular engine / component involved. If the Limited Warranty Statement is unavailable, contact PCM Warranty Services Department at (803) 345-0050, to obtain a copy of the official Limited Warranty Statement.

NOTICE: 3-Year Limited Warranty ONLY applies to engines and transmissions installed by OEM boat builders.

ENGINE MODEL YEAR:	**WARRANTY COVERAGE TERM:**
2007 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2008 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2009 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2010 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2011 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2012 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2013 ***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
Base Engine	1 year, 200 hours with exclusions.

Note:

*** 2007-2013 Model Year Engines: The remainder of the original PCM limited warranty is transferable to a subsequent purchaser, provided the engine ***does not have in excess of 300 hours and is submitted to PCM within 30 days of the date of sale.***

PCM OWNERSHIP CHANGE NOTICE

If you are the new owner of a Pleasurecraft Marine Engine on which the warranty has expired and would like to inform Pleasurecraft of your ownership for notification purposes in case of Service Updates, Recalls, etc., complete the section below and return by mail to PCM. PO Drawer 369, Little Mountain, SC 29075.

ENGINE MODEL:_____ **ENGINE SERIAL NUMBER:**_____

TRANS. MODEL:_____ **TRANS. SERIAL NUMBER:**_____

HULL SERIAL #:_____

(New Owner) NAME: _____

EMAIL ADDRESS: _____

ADDRESS: _____

CITY,STATE,ZIP: _____

DATE OF PURCHASE: _____

(Previous Owner)NAME: _____

ADDRESS: _____

CITY,STATE,ZIP: _____

PCM BASE (UN-MARINIZED)
LIMITED ENGINE WARRANTY

PCM (hereinafter PCM) extends to the purchaser of each new marine base engine supplied by PCM to a PCM dealer a LIMITED WARRANTY for a period of 200 hours of operation or twelve (12) calender months, six (6) calender months in commercial use, FROM THE DAY OF DELIVERY REQUIRED TO BE ENTERED BELOW AT THE TIME OF DELIVERY TO THE PURCHASER. This warranty is applied in the same manner and under the same conditions as the LIMITED WARRANTY which covers all new marinized PCM engines, COPY AVAILABLE UPON REQUEST, with the following exceptions.

1. PCM will reimburse or credit the customer for the repair or replacement under this warranty for any part which in the opinion of PCM is found to be defective, in the following manner.
    A. Parts: Reimbursement or credit for parts used in the repair of covered items on any base engine covered by this warranty, will be paid at PCM's current published dealer net price of such a part.
    B. Labor: Reimbursement or credit for labor performed in the repair of covered items on any base engine covered by this warranty will be paid in accordance with the published Chevrolet or Ford bench flat rate labor repair time figured at PCM's normal labor rate as agreed upon with the dealer prior to repair.
2. The person making repairs under this warranty must receive prior approval from PCM before repairs are made to any failed base engine. Major failures may require inspection at PCM facility or by their designate, prior to replacement.

THIS WARRANTY DOES NOT COVER THE FOLLOWING:

1. Failure resulting from any outside source not a part of the base engine, including but not limited to, parts transferred to or added to the base engine or add-on items or parts, accessories, controls, etc. or any other item which in the opinion of PCM adversely affects the performance or reliability of the base engine whether such item is assembled to, or in any other way involved in the operation of the final configuration as installed in the purchaser's application of the base engine.
2. Engines used in applications other than marine use, not approved in writing by PCM prior to the delivery are not covered by this warranty.
3. Labor for removal or reinstallation of the engine in the boat and/or labor for removal or reinstallation of add-on parts in or out of the boat are not covered by this warranty.
4. Any and all items not covered by PCM complete engine warranty are not covered by this warranty. (Copy available on request)
5. Engines not registered upon sale as required below are not covered by this warranty. The purchaser is required to sign this warranty registration at the time of purchase and return to PCM, PO Drawer 369, Little Mountain, SC 29075 within ten (10) days of purchase to validate this warranty.

BASE ENGINE DELIVERY RECORD / WARRANTY REGISTRATION

ENGINE CID:_____ HOT STAMP #:_____ SERIAL NUMBER:_____

SELLING DEALER:_____

ADDRESS:_____

CITY STATE ZIP:_____

DEALER SIGN:_____

CUSTOMER NAME:_____ EMAIL:_____

ADDRESS:_____

CITY STATE ZIP:_____

PHONE:_____

After reading the above warranty statement and entries, the provisions of which I understand and accept, I now affix my signature below, as purchaser, in proof of receipt of this base engine and acceptance of the above warranty provisions:

_____

(Purchaser Signature) (Date)

PLEASURECRAFT MARINE ENGINE CO.

FAX PARTS ORDER FORM FREE FAX LINE! 1-800-321-3797

DEALER NUMBER:_____

DATE**:**_____ PO# _____ PG____ OF _____

SHIP TO:_____

COMPANY NAME:_____

PHONE:_____ FAX:_____ CANCEL BACK ORDERS? _____ Y _____ N

SHIP VIA: (circle) UPS GRD UPS BLUE UPS NDA FEDEX STD FEDEX PRTY COMM. CARRIER OTHER:

COMMENTS:_____

QUANTITY	PART NO.	DESCRIPTION AND DATA	

FAX GUARANTEE: IF YOU DON'T HEAR FROM US BY PHONE OR FAX WITHIN 24 HOURS, YOUR ORDER IS ON ITS WAY!

WARRANTY FLAT RATE MANUAL

PCM Flat Rate Manual

This manual lists the operations normally performed in the course of repairing a marine engine and/or transmission. The inclusion of an operation in the manual does not imply that the operation will be considered for warranty reimbursement. To determine the specific repair eligibility, refer to the Limited Warranty Statement that applies to the unit being repaired. To obtain necessary approval to perform warrantable repairs, please read and follow the "Warranty Approval Guidelines" located on page 3 of this publication. If any questions arise regarding the policies of PCM or the warranty limits, please contact the Warranty Services Department at 1-803-345-0050.

ALL TIMES LISTED IN THIS MANUAL HAVE SEPARATE CODES, WHICH ALLOW FOR DIAGNOSIS AND ALL STEPS NECESSARY TO COMPLETE REPAIRS. Occasionally it is necessary to spend additional time in determining the cause of any particular problem. Prior approval from PCM is necessary and required BEFORE work is performed, in order to be eligible for reimbursement.

Careful diagnosis is very important in order to institute the correct repair. If there are any questions on a technical course of action, contact PCM Warranty Services Department at 1-803-345-0050. Due to PCM's nationwide exposure, we may help eliminate steps that may not be necessary.

The operations listed do not cover all repairs. To do so would be impossible. If a repair is made that is not covered by a listed operation, the repair should be listed with the job code closest to the repair that was made. The time paid will use this code as the basis for payment by adding or subtracting for the actual work performed.

Notes:

- Engine and/or transmission R&R is not included in any of the operations listed. Dealer must add appropriate time(s) as shown in this manual.
- All warranty labor times are based on reasonable access to the engine and components. PCM warranty does not cover the cost of removing or disassembling any portion of the boat.
- This manual provides time allowances for PCM products. The listed rates may also be used for services performed outside the warranty period.
- Times listed include removal and replacement of all necessary engine components to complete the repair. Warranty claim forms and/or additional copies of this manual may be obtained by contacting PCM at 1-803-345-0050.

JOB DESCRIPTION: ENGINE MECHANICAL	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Camshaft (including R.H. rotation)	EN01	5.5	6.0
Camshaft Gear and/or Timing Chain	EN02	3.0	3.5
Connecting Rod (incl. R&R all necessary parts)	EN03	5.5	6.5
Connecting Rod (each additional)	EN04	0.3	0.3
Connecting Rod Bearing	EN05	2.5	3.5
Connecting Rod Bearing (each additional)	EN06	0.3	0.3
Crankshaft	EN07	5.0	5.5
Crankshaft Pulley	EN08	0.5	0.5
Cylinder Head (one)	EN09	4.0	4.5
Cylinder Head (both)	EN10	6.0	6.5
Harmonic Balancer	EN11	0.6	0.6
Hydraulic Lifters (replace)	EN12	3.0	3.5
Intake Manifold / Gasket	EN13	2.2	2.5
Main Bearing (one)	EN14	4.0	4.0
Main Bearing (each additional)	EN15	0.4	0.4
Oil Pan and/or Gasket	EN16	2.2	2.5
Piston or Piston Rings (one)	EN17	5.5	6.5
Piston or Piston Rings (each additional, same bank)	EN18	0.5	0.5
Piston or Piston Rings (one, opposite bank)	EN19	1.5	1.5
Pushrod and/or Rocker Arm (one)	EN20	0.7	0.7
Pushrod and/or Rocker Arm (each additional)	EN21	0.1	0.1
Rocker Arm Cover and/or Gasket	EN22	0.8	0.8
Timing Cover Seal and/or Gasket	EN23	2.5	2.5
Valves - Grind (one head)	EN24	5.5	6.0
Valves - Grind (complete)	EN25	8.0	8.5
Valve Seal / Spring (one head)	EN26	2.5	2.5
Valve Seal / Spring (both heads)	EN27	3.5	3.5
Rocker Arm Stud (one)	EN28	1.5	1.0
Rocker Arm Stud (each additional)	EN29	0.5	0.5
Oil Pump	EN30	2.0	2.0
Rear Main Seal (one piece)	EN31	1.5	1.5
Rear Main Seal (two piece) *add oil pan R&R	EN32	0.5	0.5
Remote Oil Filter Adapter	EN33	0.5	0.5
Remote Oil Filter Lines (all)	EN34	0.8	1.0
Bellhousing or Drive Dampener Replacement *add Trans. R&R	EN35	0.7	0.7

JOB DESCRIPTION: R&R COMPLETE ENGINE	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Inboard	RR01	4.0	4.0
Stern-Drive	RR02	4.0	4.0
Inboard Cruiser	RR03	5.0	5.0
V-Drive Cruiser	RR04	5.0	5.0
V-Drive Watersports	RR05	10.0	10.0

JOB DESCRIPTION: BASE ENGINE	JOB CODE	TIME ALLOWED ALL
Transfer Components	TC01	6.0

JOB DESCRIPTION: TRANSMISSION	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Transmission R&R (inboard)	TR01	3.5	3.5
Transmission R&R (cruiser)	TR02	4.0	4.0
Transmission R&R (Vee drive)	TR03	6.5	6.5
Transmission Overhaul (1:1) *add Trans. R&R	TR04	2.0	2.0
Transmission Overhaul (reduction gear) *add Trans. R&R	TR05	2.5	2.5
Transmission Reseal *add Trans. R&R	TR06	1.0	1.0
Front Pump Seal - replace *add Trans. R&R	TR07	0.5	0.5
Output Seal - replace	TR08	0.8	0.8
Flush Cooler and Lines	TR09	0.5	0.5
PCM V-Drive R&R	TR10	4.0	4.0

JOB DESCRIPTION: COOLING SYSTEM	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Sea-water or Raw-water Pump	C001	0.7	0.7
Circulation Pump	C002	1.5	1.5
Thermostat and/or Housing	C003	0.5	0.5
Heat Exchanger	C004	1.0	1.3
Fresh-water Cooling Hoses (each)	C005	0.3	0.3
Transmission Cooler - replace	C006	1.0	1.0
Test and Diagnose Cooling System	C007	0.5	0.5

JOB DESCRIPTION: EXHAUST SYSTEM	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Manifold (replace one)	EX01	1.2	1.3
Riser and/or Riser Gasket (replace one)	EX02	0.8	0.8
Manifold Gasket (replace one)	EX03	0.6	0.6
Catalyst Manifold R&R	EX04	3.0	4.0
Catalyst Crossover R&R	EX05	1.0	1.5

JOB DESCRIPTION: ELECTRICAL SYSTEM	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Alternator R&R	EL01	0.5	0.5
Engine Wiring Harness (repair)	EL02	0.5	0.5
Engine Wiring Harness (replace)	EL03	1.0	1.5
Starter Motor	EL04	0.7	0.7
Starter Relay	EL05	0.3	0.3
Oil Pressure Sender or Switch	EL06	0.2	0.2
Coolant Switch or Sender	EL07	0.2	0.2
Electrical System Test and Diagnosis - Includes test alternator and battery.	EL08	0.5	0.5

JOB DESCRIPTION: FUEL SYSTEM	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Carburetor (replace)	FL01	0.5	0.5
Carburetor (rebuild)	FL02	2.0	2.0
Mechanical Fuel Pump	FL03	0.5	0.5
Electric Fuel Pump	FL04	0.5	0.5
Fuel Lines (replace all)	FL05	0.2	0.2
Fuel System Test and Diagnosis - Includes check fuel pressure and operation with external tank	FL06	0.5	0.5

JOB DESCRIPTION: IGNITION SYSTEM	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	364 (6.0L) 496 (8.1L)
Distributor (replace)	IG01	0.5	0.5
Ignition Coil	IG02	0.3	0.3
Ignition Pickup	IG03	0.8	0.8
Spark Plug Wires	IG04	0.5	0.5
Spark Plugs	IG05	0.5	0.5
Ignition System Diagnosis	IG06	0.5	0.5

JOB DESCRIPTION: ELECTRONIC FUEL INJECTION	JOB CODE	TIME ALLOWED 350 (5.7L) 351 (5.8L) 305 (5.0L)	 364 (6.0L) 496 (8.1L)
Fuel Pressure Regulator	FI01	0.5	0.5
Fuel Control Cell (FCC) - repair or replace	FI02	0.5	0.5
Throttle Body Replace	FI03	0.5	0.5
Plenum, upper - GT-40	FI04	0.5	N/A
Intake Manifold	FI06	2.0	2.0
Intake Manifold, lower - GT-40	FI07	2.0	N/A
Fuel Rail	FI08	0.8	0.8
Fuel Injector (all)	FI09	1.0	1.0
Electronic Control Module (ECM)	FI10	0.3	0.3
Engine Coolant Temperature (ECT) Sensor	FI11	0.2	0.2
Manifold Absolute Pressure (MAP) Sensor	FI12	0.2	0.2
Throttle Position (TP) Sensor	FI13	0.4	0.4
Knock Sensor	FI14	0.2	0.2
Electronic Spark Control Module	FI15	0.3	0.3
System, Fuel Pump or Starter Relay	FI16	0.2	0.2
EFI Wiring Harness (repair)	FI17	0.5	0.5
EFI System Diagnosis - Includes check fuel pressure, check Cam Retard (5.0/5.7L), check trouble codes	FI18	0.5	0.5
Crankshaft Position Sensor	FI19	0.5	0.5
Camshaft Position Sensor	FI20	0.5	0.5
Intake Air Temperature Sensor	FI21	0.3	0.3
Oxygen Sensor	FI22	0.2	0.2

NOTES

NOTES

PCM QUICK REFERENCE PARTS

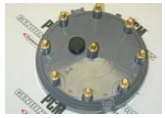
Engine Model	Eng Oil	Oil Filter	Spark Plugs	Ignition Wires	Distributor Cap	Distirbutor Rotor	Cap & Rotor Kit	Flame Arrestor	RWP Impellor Kit	Belts	Fuel Filters	TCP Sensor	PVC Valve	Thermostat Kit
5.0/5.8 FORD			RP030001(18MM) 1971-1974	RA121008/9	RA108002(CLIP DOWN)** RA108003(SCREW DOWN)**	R1030003 (86' AND PRIOR)	RP173074(CLIP DOWN) RP173073(SCREW DOWN)				RP080008** RP080012**		R035004(FWC) R035007(RWC) R035023(90*)	RP026001(170) RP026003(143)
5.8 PRO TEC HO FORD		R077001	RP030007(14MM)	RA121040(LH)	N/A	N/A	N/A	R147017	RP061015	RP06601/8	RP080020**	N/A		
5.0/5.8 HO FORD	20W(32F-) 30W(32-90F) 40W(90F+)			RA121008/9	RA108003(SCREW DOWN)**	R103004	RP173073(SCREW DOWN)							
5.8 GT40 FORD				RK120015	RA108007**	R103009	RP173082	R145016			RP080026** FCC FILTER	R020026	R035023(90*)	RP026002(160)
5.0/5.7GM CARB.			RP030003	RK120017(ALL MALLORY) RK120011(DELCO)	R108001(MALLORY)** RA108006(DELCO)**	R103001(MALLORY) R103008(DELCO)	RP173081A(MALLORY) RP173081(DELCO)	R147017			RP077014** PREFILTER	N/A		RP026002(160) RP026003(143)
5.0/5.7 TBI GM		R077002							RP061017	RP066010/21				
5.7 APEX GM MPI			RP030008	RK120011(DELCO)	RA108006(DELCO)**	R103008(DELCO)	RP173081(DELCO)	R145019(FWC) R145020(RWC)			RP080024A** PREFILTER		R035034	
5.0/5.7 EXCALIBUR (BOSCH) MPI GM	15W40 or HD40 if oil consumption	R077001	RP030010	RK120018 RK120023(CAT)	RA108009**	R103011	RP173098	R145025 R145025A(2006) R145027(08-CUR.)	RP061017(CRANK AND VBELT) RP061022(SERP.)	R066008(ALT.) R066026(RWP) R066028(SERP.)	R077019** F/W SEP.	R020041(02-05) RA119004(06) RA119005(07-CUR.) (If Aplicable)	R035015	R026002(160) (USE RM0258A GASKET)
7.4GM CARB.	20W(32F-) 30W(32-90F) 40W(90F+)	R077002 R077001(REMOTE)	RP030003	RK120011(DELCO) RK120017(ALL MALLORY)	RA108006(DELCO)** R108001(MALLORY)**	R103008(DELCO) R103001(MALLORY)	RP173081(DELCO) RP173081A(MALLORY)	R145006	RP066017	RP06611/21	RP080008** RP080012**	N/A	R035015 R035034(90*)	R026002(160)
7.4GM TBI								R145018			RP080020**		R035015	
7.4GM PROTEC				RA121040	N/A	N/A	N/A							
7.4GM MPI				RK120011(DELCO)	RA108006(DELCO) **	R103008(DELCO)	RP173081(DELCO)				RP080026** FCC FILTER	R020041		
502 PYTHON MPI				RK120011A(DELCO, PYTHON 502)				R145022						
8.1GM MPI			RP030009	RK120019A	N/A	N/A	N/A	R145021					N/A	
6.0GM MPI	15W40	R077001	RP030011	RK120021(03-07 NON CAT) RK120022(08-CUR. NON CAT) RK120021B(08-CUR. CAT)	N/A	N/A	N/A	R145026(03-05) R145026A(06) R145026B(07)	RP061022	R066027(03-07) R066033(08-CUR.)	R080024A** PREFILTER R077019**	RA119004(06) RA119005(07-CUR.) (If Aplicable)	10-current TBD	RP026007(06-07) RP026002(08-CUR.NONCAT AND CAT H/S) RP026007A(08-CUR. CAT F/S)
6.2LSA 550 S/C	Mobile one Synthetic 5W30		RP030012	RK120021B	N/A	N/A	N/A	R145019	RP061022	R066036 R066037(S/C)	F/W SEP.	RA119005 (If Aplicable)	NSS	RP026002


R108001
CLIP DOWN


R108002
CLIP DOWN


R108003
SCREW DOWN


R108006
DELCO


R108007
GT40


R108009
EXCALIBUR


RP08008
SHORT


RP080012
TALL


RP080020
F/W SEP.


RP080026
FCC FILTER


R077019
F/W SEP.


R080024A
PREFILTER
(REFER TO OWNERS MANUAL)

NOTE: ** INDICATES TO REFER TO PICTURE
F/S= FULL SYSTEM FRESH WATER COOLING
H/S= HALF SYSTEM FRESH WATER COOLING


RP077014
PREFILTER ON FEED PUMP

PCM QUICK REFEREANCE SPECS

Engine Model	Displacement	Eng Oil	Oil Pressure	Fuel Pressure	WOT Operating RPM	Cruising RPM	Firing order	Plug Gap	Points Gap	Cam Retard	Ignition Timing
5.0/5.8 FORD			20-60PSI	5-6PSI	4400RPM	3600RPM		0.035	MALLORY=.020 PREST.=.018	N/A	CLIP DOWN=10° @ BTDC SCREW DOWN=6° @ BTDC
5.8 PRO TEC HO FORD	5.0=302CID		20-60PSI	14-17PSI	4800RPM	3600RPM	LH:1-3-7-2-6-5-4-8	0.045	N/A	N/A	18° @BTDC
5.8 HO FORD	5.8=351CID		20-60PSI	5-6PSI	5000RPM	3600RPM	RH:1-8-4-5-6-2-7-3	0.035	MALLORY=.020 PREST.=.018	N/A	10° @BTDC
5.8 GT40 FORD		20W(32F-) 30W(32-90F)	20-60PSI	39-42PSI	4800RPM	4000-4200RPM		0.045	N/A	N/A	5° @BTDC
5.0/5.7GM CARB.		40W(90F+)	20-60PSI	5-6PSI	5000RPM	4000RPM		0.035	MALLORY=.020 PREST.=.018	N/A	5° @BTDC
5.0/5.7 TBI GM	5.0=305CID		20-60PSI	27-33PSI	5000RPM	3600RPM		0.045	N/A	N/A	10° @BTDC
5.7 APEX GM MPI	5.7=350CID	5W30(49F-) 15W40(50F+)	20-60PSI	44-48PSI	5000RPM	4000RPM		0.045			10° @BTDC
5.0/5.7 EXCALIBUR (BOSCH) MPI GM		15W40 OR HD 40W SEE NOTES	25-60PSI	57-62PSI	5000RPM(5.0,5.7 TO 07) 5000RPM(5.0,5.7 TO 07) 5200RPM(5.7 07 TO PRESENT) 4900RPM(5.0 07 TO PRESENT)	5.7=4000RPM 5.0=3800RPM	LH:1-8-4-3-6-5-7-2 RH:1-2-7-5-6-3-4-8	0.06	N/A	7° OR 15° REFER TO OWNERS MANUAL AND DECAL	NON ADJUSTABLE
7.4GM CARB.		20W(32F-) 30W(32-90F) 40W(90F+)	20-60PSI	5-6PSI	4400RPM	3600RPM		0.035	MALLORY=.020 PREST.=.018	N/A	5° @BTDC
7.4GM TBI	7.4=454CID		20-60PSI	27-33PSI	4400RPM	3600RPM		0.045		N/A	5° @BTDC
7.4GM PROTEC			20-60PSI	14-17PSI	4400RPM	3600RPM		0.045			18° @BTDC
7.4GM MPI					5200RPM	4100RPM		0.045			
502 PYTHON MPI	8.2=502CID		20-60PSI		5000RPM	4000RPM		0.045	N/A		NON ADJUSTABLE
8.1GM MPI	8.1=496CID	5W30(49F-) 15W40(50F+)	25-60PSI	44-48PSI(-04) 57-62PSI(05-)	5200RPM	4000RPM		0.06		NON ADJUSTABLE	
6.0GM MPI	6.0=364CID	15W40	25-80PSI	57-62PSI(ALL)	5500RPM	4000RPM	LH:1-8-7-2-6-5-4-3 RH:N/A	0.06			
6.2LSA 550 S/C	6.2=376CID	5W30 SYN SEE NOTES	25-80PSI		5300RPM	4000RPM		0.04			

FOR 5.0/5.7 ENGINES ONLY! IF OIL CONSUMPTION USE CASTROL HD40 OPTIMUM VISCOSITY.

FOR 6.2 S/C ENGINE PCM RECOMENDS MOBILE ONE 5W30 FULL SYNTHETIC.

Troubleshooting tools:
Fuel Pressure Gauge--RTK0078
Diacom--RT0086
Remote key switch--RT0091

OWNER'S OPERATION

and

MAINTENANCE MANUAL

INFORMATION

A Division of PLEASURECRAFT ENGINE GROUP

INTRODUCTION - 1

SAFETY INFORMATION

"Safety Warnings" and additional information or instructions are used to alert the installer/operator of possible safety hazards in performing certain service or maintenance procedures incorrectly or carelessly. DANGERS and WARNINGS are accompanied by the international HAZARD symbol: 

These "Safety Warnings" alone cannot eliminate the hazards that they signal. Strict compliance with these warning instructions while performing service and maintenance procedures, plus "common sense" operation, are major accident prevention measures.

REPLACEMENT PARTS

DANGER

Electrical, ignition and fuel system components are designed and manufactured to comply with U.S. Coast Guard rules and regulations to minimize the possibility of fire or explosion hazard.

Use of replacement parts (i.e. automotive, after-market, etc.) in the electrical, ignition and fuel systems, which are not U.S. Coast Guard approved, could cause a fire or explosion hazard and should be avoided.

Always request that genuine PCM Engines replacement parts be used in any repairs or maintenance being performed on your engine(s).

SAFETY WARNINGS

DANGER

Signals serious damage, failure or breakdown of equipment; severe injury or high probability of death to the user if proper precautions are not taken. This signal word is applied in extreme situations

WARNING

Indicates a potential hazard which could result in personal injury.

CAUTION

Indicates a hazard which could result in damage to equipment.

IMPORTANT: or ***IMPORTANT:*** Used to provide information to perform a procedure more easily.

WARRANTY NOTICE: Indicates a possible warranty exclusion.

ENGINE IDENTIFICATION

When ordering service parts or obtaining information, always give the engine model and the serial number. This information can be found on the following decal.

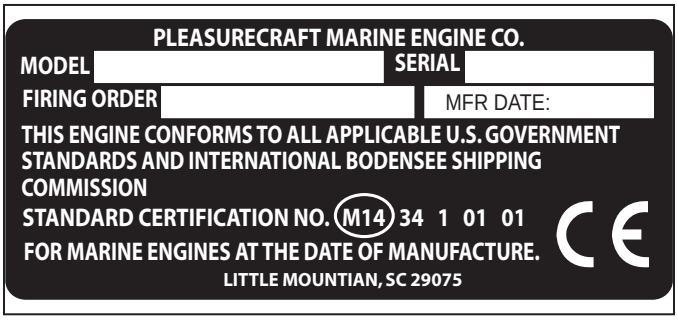


Figure 3-1 Engine Identification Decal

Model EX343 CES - Tag is located on the inboard side of the left hand rocker cover.

Model ZR409 CES / ZR450 CES - Tag is located on the outboard side of left hand rocker cover and on the heat exchanger.

Model XS550 / XR550 - Tag is located on the right hand side of the supercharger cover and on the intercooler cooler.

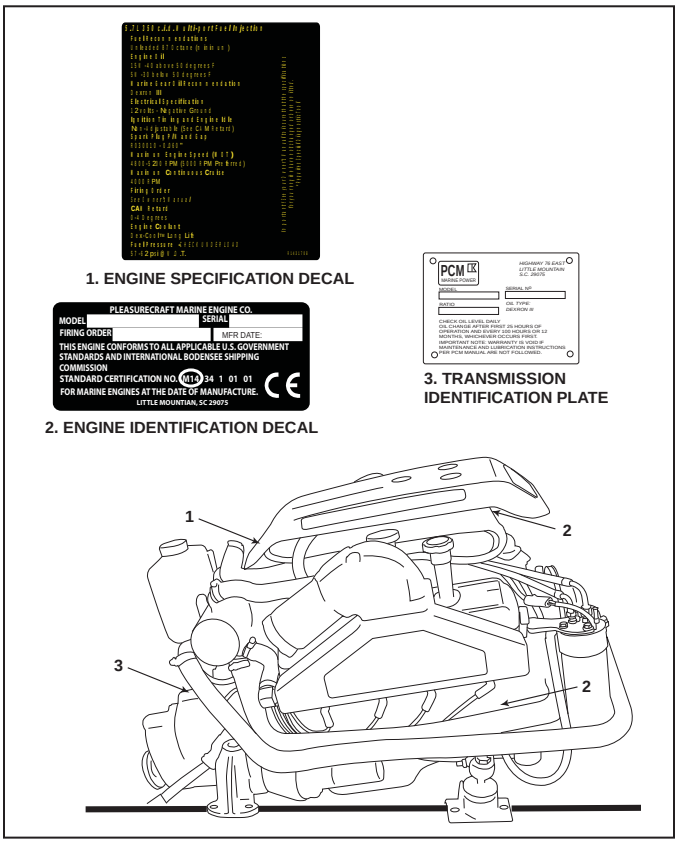


Figure 3-2 Engine Identification Tag Locations (5.0/5.7L)

OWNER IDENTIFICATION AND REGISTRATION INFORMATION

We suggest that you record the following information for quick reference when ordering parts or requesting service or warranty.

	PORT	STARBOARD
Engine Model Number:		
Serial Number(s):		
Gear Model Number:		
Serial Number(s):		
Boat Make:		
Boat Model:		
Hull Serial Number:		
Propeller Size:		
Ignition Key Number:		

OPERATING INSTRUCTIONS - 5

ENGINE ALARM SYSTEM

The PCM engine electronic system is programmed to control the engine alarm system. This system utilizes an indicator lamp (“MIL” or “Check Engine”) and/or an optional audible alarm to warn the operator of possible engine problems.

The alarm circuit has a “self” checking feature programmed into the system. This feature will momentarily light the “MIL”, and if equipped, sound the alarm for two short pulses upon initial start-up of the engine.

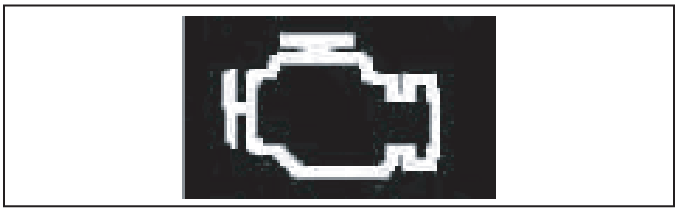
If the “MIL” lights and/or the alarm sounds during operation, observe the instrument panel readings for the possible source of the malfunction, such as low oil pressure or excessive engine temperature readings.

Other conditions that may sound the warning buzzer are a transmission over-temperature warning (if equipped), exhaust gas over-temperature warning (if equipped), and for an electronic throttle malfunction.

ENGINE ALARM SYSTEM (CES ENGINES)

The PCM engine electronic system is programmed to control the engine alarm system. Your CES Engine Alarm System may utilize up to three (3) alarm circuits to warn you of a potential problem with your engine.

The Malfunction Indicator Lamp (MIL) is used for notification of any emissions-related fault. This is an amber indicator lamp, that may be labeled ‘Service Soon’ or with the ISO icon, to warn the operator of possible engine problems.



ISO Icon

The Check Gauges Lamp (CGL) is used for notification of any non-emissions-related fault. This is a red indicator lamp to warn the operator of possible engine problems such as low oil pressure or an over temperature condition.

The Buzzer is an audible notification to the operator, that may be used in conjuction with the MIL and/or CGL.

For events such as an engine over-temperature condition, low oil pressure, etc., the Buzzer will sound for 1/2 second ON, 1/4 second OFF, continuously as an audible warning. For emissions related faults (MIL), the buzzer will initially sound for 5 seconds, then will sound for 1/2 second ON once per minute thereafter. In the event of a MIL circuit failure, MIL circuit functions will be transferred to the Buzzer circuit.

The alarm circuit has a “self” checking feature programmed into the system. This feature will light the “MIL” and “CGL” lamps, and also sound the buzzer for two short pulses upon initial start-up of the engine.

NOTE: If, during Key ON, engine OFF, either the MIL or CGL lamps are flashing, this indicates that a stored trouble code or engine fault is recorded in the ECM. Refer to your dealer for proper diagnosis.

If the “MIL” or “CGL” lights and the alarm sounds during operation, observe the instrument panel readings for the possible source of the malfunction, such as low oil pressure or excessive engine temperature readings.

Other conditions that may sound the warning buzzer are a transmission over-temperature warning (if equipped), exhaust manifold water over-temperature warning , and for an electronic throttle malfunction.

IMPORTANT: A failure involving the Electronic Throttle may result in ***Idle only*** operation of the engine. The operator must obtain service by an authorized PCM Premier dealer to determine the exact cause of this malfunction as soon as possible.

In most cases, when the “MIL” or “CGL” lights are on, the engine may lose some performance and/or efficiency, but remain running adequately. Also, the lights may go out or become intermittent, but a trouble code will be logged for future diagnosis.

NOTE: If the MIL is blinking during Key ON, Engine OFF situation, that means there is a stored diagnostic trouble code.

In any case, the operator must obtain service by an authorized PCM Premier dealer to determine the exact cause of the malfunction.

NOTICE: Some boat builders may install their own alarm system. It is recommended that the boat owner check with his or her boat dealer for an explanation of the particular alarm system upon initial delivery.

PROPELLER SELECTION

Best all-around performance and maximum engine life is achieved when the engine is propped to run near the top of (but within) the recommended full throttle RPM range with a normal load. See ENGINE SPECIFICATIONS for rated full throttle RPM for your model engine.

Generally, gross weight (total weight of the entire boat, including full fuel and water, optional equipment, passengers and other miscellaneous gear) is one of the major factors and should be one of the primary considerations when selecting a propeller. Other factors to take into consideration are as follows:

- Warmer weather and higher humidity will cause an RPM loss.
- Operating the boat in a higher elevation will cause an RPM loss.
- Operating the boat with an increased load will cause an RPM loss (additional equipment, passengers, etc.).

If full throttle RPM is above or below the recommended range as stated in ENGINE SPECIFICATIONS, the propeller must be changed to prevent loss of performance. A one-inch change in the pitch of a given propeller will generally change engine RPM by 150 to 250 RPM.

ENGINE RPM CHART

Model	Minimum Full Load	Preferred	Maximum
HO303	4800	4900	5000
EX343	5000	5200	5300
ZR409/ZR450	5400	5500	5600
XS550	5200	5300	5400

CAUTION

Prolonged WOT operation will shorten the life of your engine and could cause premature engine failure. See NORMAL CRUISING SPEEDS in SPECIFICATIONS. Problems caused by prolonged WOT operation are considered abuse and are not covered under the PCM Warranty.

IMPORTANT NOTICE: ***Your new PCM engine incorporates an RPM "MAX GOVERNOR" in order to prevent the engine from over-revving. Operation above the Maximum RPM listed, in the chart above, 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 listed in the chart above.***

ENGINE BREAK-IN PERIOD - 7

WARNING

Use this procedure ONLY when conditions are such that it can be done in complete safety.

The break-in period of your engine is the first 25 hours of operation. Proper engine break-in is essential to achieve maximum performance, longevity and minimum oil consumption. During the break-in period, the following operation guidelines must be adhered to:

- After the engine is thoroughly warmed up, and the boat is underway, open the throttle to wide open throttle until maximum RPM is reached. DO NOT EXCEED MAXIMUM RPM. (RPM should cease climbing after 10 to 20 seconds).

CAUTION

DO NOT operate at full throttle in neutral at any time, or at sustained full throttle during the first 5 hours of operation. Thereafter, use sustained wide open throttle in the event of an emergency.

- Reduce the throttle to 2800 - 3000 RPM, and cruise at or below this speed for 1/2 hour. Reduce the speed to idle. Go to wide open throttle until maximum RPM is reached and operate for approximately 1 minute. Reduce throttle to 2800-3000 RPM and operate for a few minutes. (Bringing the engine speed from idle to wide open throttle will load the engine and assist in seating the piston rings). This cycle should be repeated from time to time during the first 5 hours of operation, but wide open throttle should not be sustained for more than 1 minute.

- During the remaining 20 hours of break in period, the engines can be run at cruise speeds that are approximately 75-80% of the wide open throttle RPM, occasionally varying the cruise speed by 100 RPM.

- During the early part of the break in period, the correct propeller selection can be confirmed. (With a normal load aboard, the engine's RPM should reach, but not exceed, the maximum RPM as listed in the specifications section).

- During the break in, all gauges should be watched carefully, and the speed should be reduced if abnormal readings become evident.

CAUTION

DO NOT attempt to break in any engine by prolong idling, or running at the dock.

The engine oil level should be checked often and oil added when necessary. It must be understood that every internal combustion engine will use a certain amount of oil during operation to act as a lubricating and cooling agent, especially during the break-in period. Oil consumption should decrease and become stabilized after approximately 100 hours of operation.

At the end of your 25-hour break-in period, contact your dealer and have the recommended 25-hour inspection done.

NOTICE: PCM Engines assumes no responsibility for the costs related to the 25-hour inspection. This is the owner's responsibility.

25-HOUR ENGINE INSPECTION - 8

After the first 25 hours of operation, it is recommended that the engine be given an inspection. Your boat dealer or a PCM Premier servicing dealer should be contacted to perform the necessary checks and adjustments to ensure the proper engine performance. The following maintenance should be performed:

- Change the engine oil and filter.
- Replace the primary fuel pre-filter
- Check the engine alignment.
- Inspect the accessory drive belt(s) and check the tension.
- Check all the fluid levels.
- Check the throttle and the shift cable adjustments and check for freedom of movement.
- Cooling System - Inspect all the hoses for leaks, damage and deterioration. Check all the hose clamps for adequate tightness.
- ZR409 CES and ZR450 CES with Thermostatically-Controlled Exhaust Cooling System - Inspect exhaust cooling system thermostat housing inlet filter. Clean as necessary.
- Exhaust System - Inspect the entire exhaust system for leaks, damage and deterioration. Check all the hose clamps for adequate tightness.
- Battery - Check the electrolyte level and specific gravity. Inspect the case for damage. Check the battery cables and connections.
- Engine Assembly - Check for loose, missing or damaged parts. Pay close attention to engine mounts, starter and alternator mounting fasteners.

NOTICE: PCM Engines assumes no responsibility for the costs related to the 25-hour inspection. This is the owner's responsibility.

OIL REQUIREMENTS - 10

ENGINE OIL RECOMMENDATIONS

Use of Supplemental Additives

Engine oils meeting PCM Engines' recommendations already contain a balanced additive treatment. The use of supplemental additives which are added to the engine oil by the customer are unnecessary and may be harmful. PCM Engines does not review, approve or recommend such products.

Synthetic Oils

Synthetic engine oils may be used in PCM Marine Engines. Synthetic oils must meet the Engine Oil Requirements for Classification and Viscosity listed below. The use of synthetic oil **does not** permit the extension of oil change intervals.

Engine Oil Requirements

The following chart shows the recommended oil viscosity for various ambient temperature ranges:

Engine Oil Requirements (ALL Engines EXCEPT XS550)

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity
Above 50˚F	SAE 15W-40 "GF-4/SM"
Below 50˚F	SAE 5W-30 "GF-4/SM"

Engine Oil Requirements (XS550 ONLY)

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity
All Temperatures	Mobil 1 Synthetic 5W-30

IMPORTANT: The use of oils which contain "solid" additives, non-detergent oils or low quality oils specifically are not recommended.

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

Oil Change Intervals (Common)

Crankcase oil and oil filter change - Recommended intervals:

- Initial oil change - 1st 60 days or 25 hours of operation, whichever occurs first
- Regular oil changes - Every 50 hours of operation or 120 days, whichever occurs first

TRANSMISSION AND "V"-DRIVE OIL REQUIREMENTS

Transmission and "V" Drive	Recommended A.P.I. Classification and Viscosity
PCM Transmissions	Dexron III Automatic Transmission Fluid (ATF) or equivalent
PCM V-Drive Transmissions	Mobiltrans SHC 50 Synthetic Transmission Lubricant (R190250)
Walters "V"-Drive	SAE 30
All Hurth Gear Transmissions	Dexron III Automatic Transmission Fluid (ATF) or equivalent

IMPORTANT: Dexron III should be used in all applications requiring Dexron III. Dexron VI should not be mixed with Dexron III when servicing.

Transmission Fluid

CAUTION

PCM Engines uses marine transmissions supplied by several manufacturers. The maintenance requirements can be different between these manufacturers. It is important that you refer to the operation and maintenance manual supplied by the transmission manufacturer before you attempt to perform maintenance on your own. If no maintenance manual is available, PCM Engines recommends that you contact your dealer service department for any required maintenance or service instructions.

PCM 40 Series Transmissions

1. Engine must be running at operating temperature.
2. Shift at least once into forward, once in reverse, then back to neutral.
3. With the engine running, and the prop shaft not turning, install the dipstick in all the way.
4. Remove the dipstick and check the fluid level. The dipstick should read FULL.
5. If the fluid level is low, add in small increments until the FULL mark is reached.
6. It is normal, after the engine is turned OFF, for the level to read above the FULL mark.

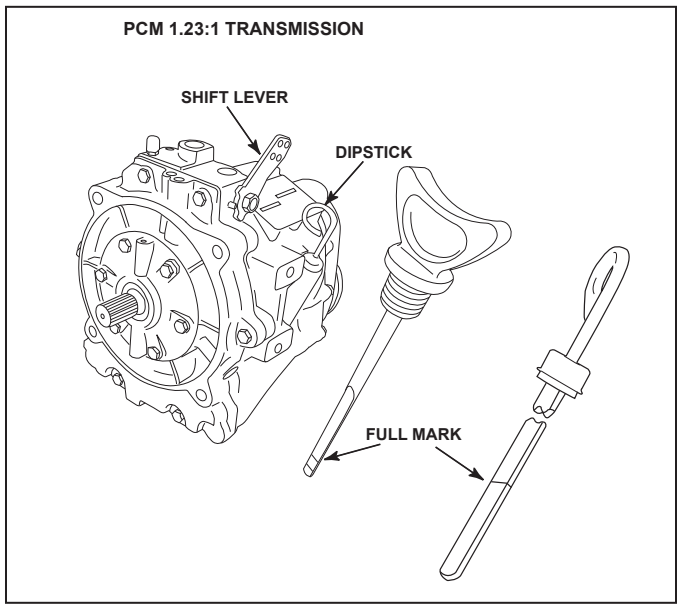


Figure 11-2 40 Series Transmission Dipstick and Location

WARNING

Do not attempt to remove the transmission dipstick while the engine is running. Hot transmission fluid could be sprayed from the dipstick hole.

PCM 80 Series Transmissions

(Dipstick Handle has a "hole" as a Dipstick Identifier)

NOTE: *If the Dipstick Handle does not contain the "hole" identifier, consult PCM Customer Service for the proper Checking Procedure.*

1. The fluid level must be checked in one of the following conditions:
   A. Engine/Transmission is cold;
   B. Engine/Transmission has been shut off for at least 2 minutes to allow fluid to drain back.
2. Remove the dipstick by turning the T-handle counterclockwise. Wipe the dipstick off using a clean cloth.
3. Re-insert the dipstick to the threads (***DO NOT screw the dipstick in***) and remove. Observe the fluid level.
4. The fluid level should be at the "FULL" mark. If low, add the specified fluid in small increments through the dipstick hole in the transmission. Repeat the checking procedures untill the fluid level is at the "FULL" mark.
5. Replace the dipstick and tighten securely.

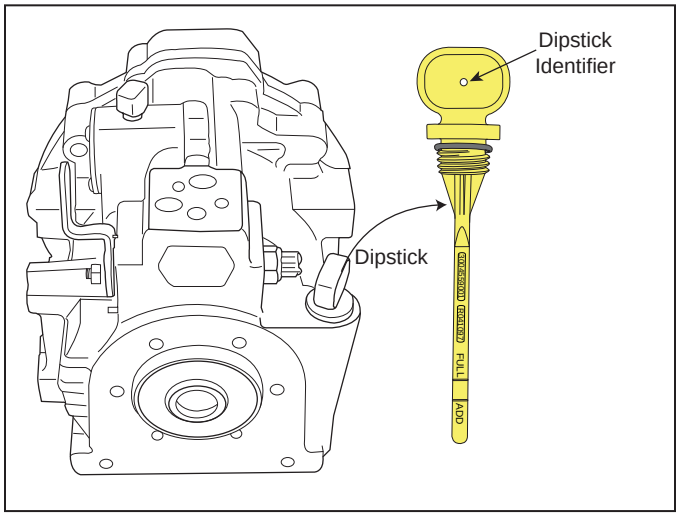


Figure 11-3 80 Series Transmission Dipstick and Location

PCM Power-Plus V-Drive Transmission

WARNING

Do not attempt to remove the transmission drain/fill plug while the engine is running or while the transmission is hot. Hot transmission fluid could be sprayed from the hole.

All PCM Power-Plus "V" Drive transmissions are designed to be 'Maintenance Free'. Inspect fluid level after the first 25 hours of use and annually thereafter. Fluid should only be changed if evidence of contamination is present. Use Mobiltrans SHC 50 synthetic transmission lubricant. PCM P/N: R190250.

1. Remove the drain/fill/dipstick plug from the transmission. Wipe the dipstick clean and insert into transmission - Do Not Screw the dipstick into the hole. Remove and observe the fluid level.
2. The fluid level should be between the FULL mark and the end of the dipstick. ***If a plug is used, fluid level should be to the bottom of the threaded hole***. If low, add the specified fluid through the threaded hole to the proper level.

NOTE: The transmission fluid is a very high viscosity, to make adding fluid easier, remove both fill plugs.

3. Replace the drain/fill/dipstick plug(s) and tighten securely.

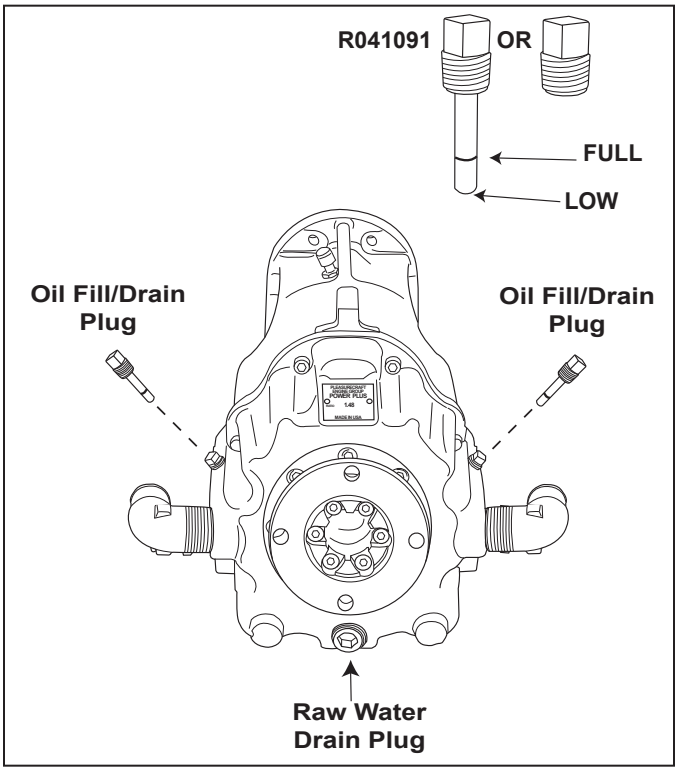


Figure 11-4 Transmission Service Location

LUBRICATION

Throttle Cable

Lubricate pivot points and exposed cable (Figure 11-5) with SAE 30W-30 engine oil.

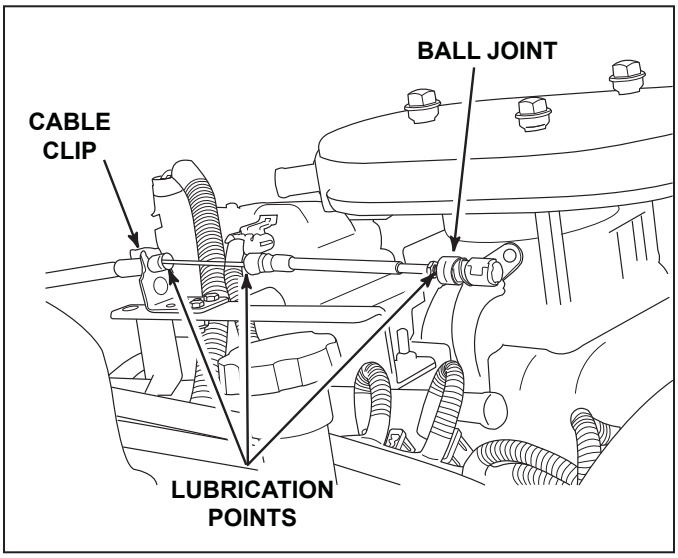


Figure 11-5 Typical Throttle Cable

Shift Cable

Lubricate pivot points and exposed cable (Figure 11-6) with SAE 30W-30 engine oil.

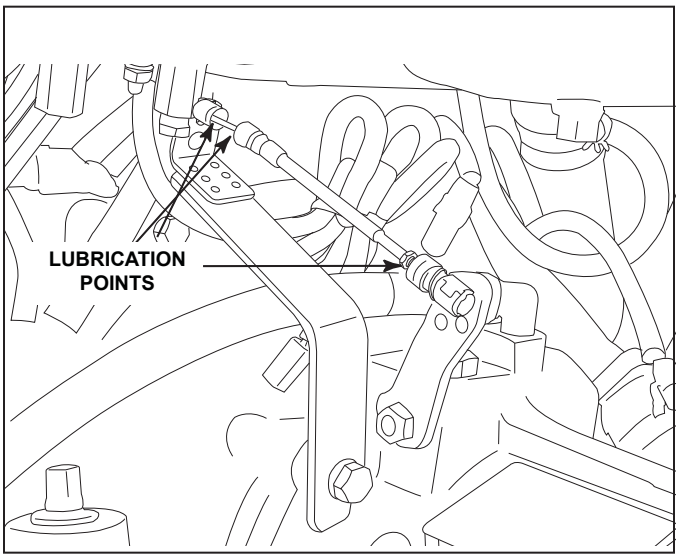


Figure 11-6 Typical Shift Cable

INSPECT and CLEAN INLET SCREEN ON RAW WATER THERMOSTAT - ZR409 CES / ZR450 CES / XR550 Partial Fresh Systems

Remove raw water thermostat housing and inspect screen on inlet side of thermostat housing. Clean as required. This filter must be inspected and cleaned the first 25 hour inspection. The filter must be inspected every 50 hours or once a year thereafter.

IMPORTANT

Thermostat housing MUST be assembled and tightened as shown, in the vertical position. Failure to do so may cause the thermostat to improperly seat and result in a leak.

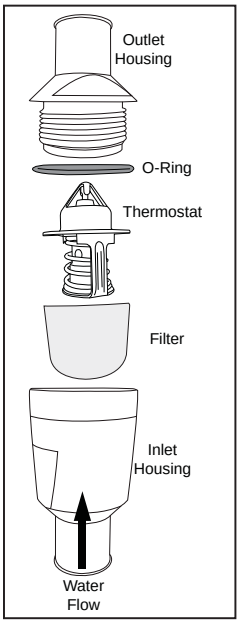


Figure 11-12 Exhaust Cooling System Thermostat Housing - 6.0L CES

CLEANING SEA-WATER SECTION OF HEAT EXCHANGER - FRESH-WATER COOLED MODELS ONLY

The sea-water section of the heat exchanger should be cleaned whenever there is a noticeable decrease in cooling efficiency. You may use the following procedure for cleaning, or, if the build-up of scale and mineral deposits is heavy, it is recommended that the heat exchanger be removed and taken to a repair facility to be boiled out (such as a radiator repair facility).

1. Remove the bolts securing the heat exchanger end plates. Remove the end plates and gaskets.

2. Clean the water passages in the heat exchanger by inserting a suitable-size wire brush into each passage. Use compressed air to blow out loose particles.

3. Clean the gasket surfaces on the end plates and the heat exchanger. Apply PerfectSeal to both sides of the new gaskets. Install the end plates and the new gaskets onto the heat exchanger. Install the bolts and tighten securely.

4. Start the engine and inspect for leaks.

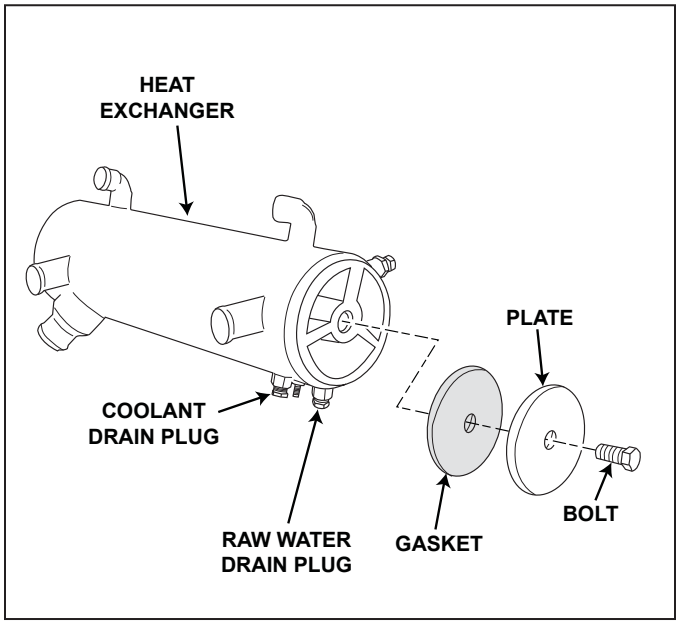


Figure 11-13 Heat Exchanger and End Plate Removal (Typical)

FUEL SYSTEM DESCRIPTION

WARNING

Extreme caution must be exercised when servicing the fuel system and/or replacing fuel filter. Gasoline is extremely flammable and highly explosive under certain conditions. Be sure the ignition key is off and do not smoke or allow open flame in the area while servicing. Wipe up any spilled fuel immediately.

WARNING

Accumulation of water and other fuel contaminants may form corrosive compounds that can damage the fuel filter, and result in fuel leakage. Ethanol blended fuel may increase this risk. For this reason, annual replacement of the fuel filter, at a minimum, is required to avoid risk of explosion or fire.

WARNING

Extreme caution must be exercised when servicing the fuel system. The fuel system operates under high pressure. Use caution when removing or replacing components, as residual pressure may be present.

WARNING

Make sure that there are no fuel leaks before closing the engine hatch.

WARNING

Visually inspect unit for fuel leaks before operating the engine. If fuel leaks are present, DO NOT operate the engine, contact your service center immediately.

Fuel Control Cell (FCC) Fuel System

The Fuel Control Cell (FCC) eliminates vapor lock and air ingestion caused by fuel tank slosh, and provides the necessary filtration and water separation.

The FCC system incorporates two (2) fuel pumps to provide an uninterrupted flow of fuel to your PCM marine engine. Fuel is fed into the FCC bowl by a low-pressure, high-volume electric fuel pump. This pump flows fuel at a volume much greater than the fuel flow rate required of the high-pressure pump and engine demands. The high-pressure pump, mounted inside the FCC bowl, provides the necessary fuel pressure and volume to maintain proper engine performance. The FCC constantly has an ample supply of fuel to meet the idle, cruise and acceleration fuel requirements of the engine.

The fuel pressure regulator may be located on the fuel rail or inside the FCC bowl, controls the fuel pressure and maintains a constant pressure across the fuel delivery system. Excess fuel, not used by the engine, returns to the FCC bowl.

The fuel delivered to the engine by the FCC is filtered by a filter and water separator element, which surrounds the high pressure pump inside the FCC bowl.

As indicated above, fuel enters the FCC bowl from two (2) locations, the low-pressure pump (initial input) and the fuel pressure regulator (unused, recirculating fuel). Fuel exits the FCC bowl at two (2) locations, the high-pressure output to the fuel injection system and all excess fuel in the FCC bowl is routed back to the tank via the return line.

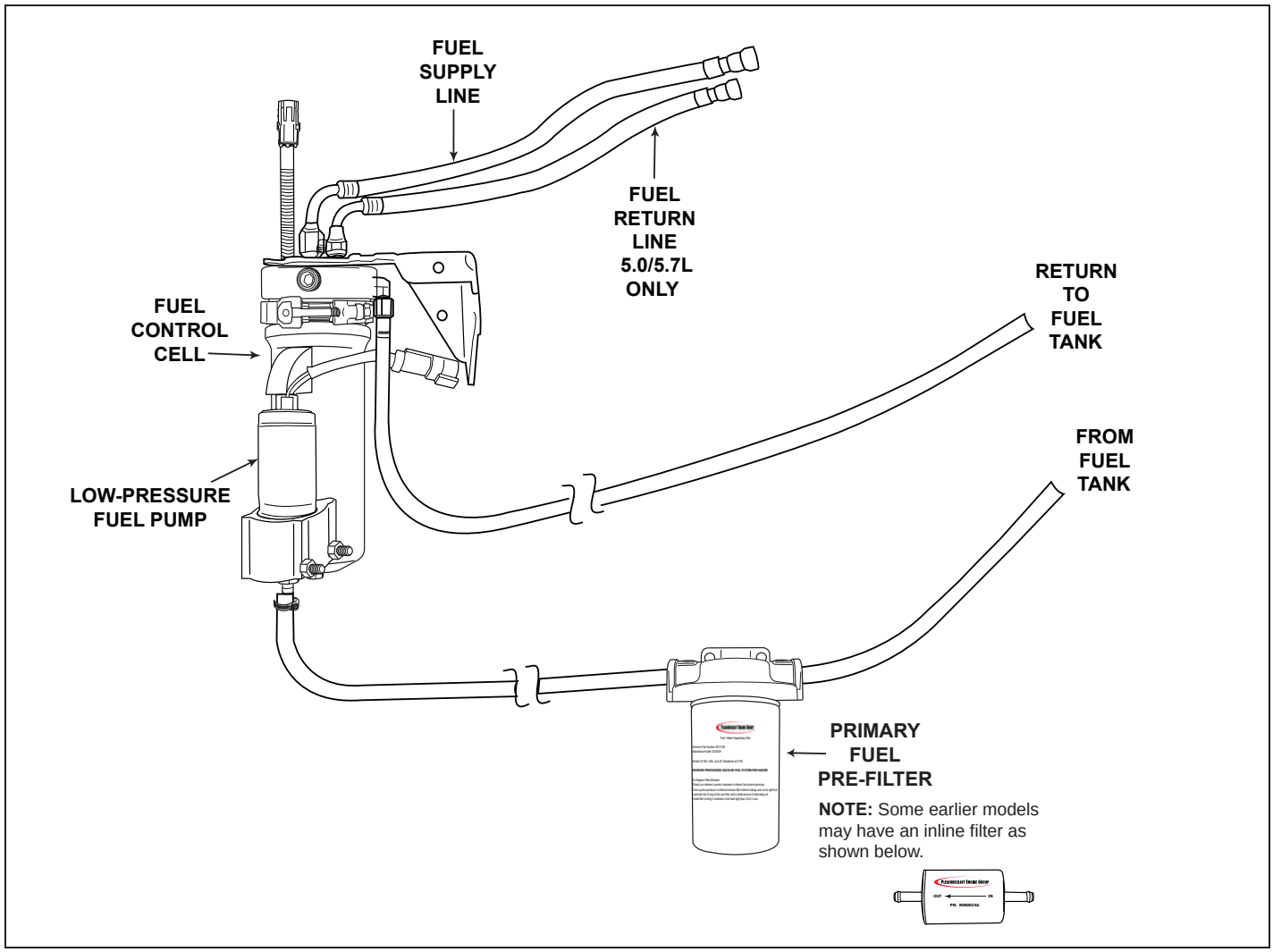


Figure 11-14 Fuel Control Cell (FCC) Fuel System (Typical)

Servicing the FCC

The frequency of draining the water or replacing the filter element is determined by the contamination level of the fuel. Replace the filter element at least once a year, or when a loss of power is noticed (whichever occurs first).

WARNING

Improper use, installation or servicing may cause an explosion or fire resulting in bodily injury, or death. This unit should only be serviced by a qualified technician. Read and follow all instructions before proceeding. Run the engine and check for fuel leaks after installation, element replacement or draining the bowl. DO NOT remove the FCC bowl unless servicing the filter element, otherwise contamination or bowl O-ring swelling may result.

FCC Fuel Filter (FCC Clamp-on Canister)

WARNING

Extreme caution must be exercised when servicing the fuel system. The fuel system operates under high pressure. Use caution when removing or replacing components, as residual pressure may be present.

Draining the FCC Bowl, ENGINE OFF

1. Disconnect the two-wire electrical connectors from the FCC and the Low Pressure Fuel Pump (LPFP).
2. Remove the 7/16” plug, and drain the bowl contents into an approved container.

CAUTION: Both fuel and water will drain from the FCC bowl.

3. Apply pipe sealant, suitable for use with gasoline, to the threads of the 7/16” plug.

Draining the FCC Bowl, ENGINE OFF

1. Disconnect the two-wire electrical connectors from the FCC and the Low Pressure Fuel Pump (LPFP).
2. Remove the 7/16” plug, and drain the bowl contents into an approved container.

CAUTION: Both fuel and water will drain from the FCC bowl.

3. Apply pipe sealant, suitable for use with gasoline, to the threads of the 7/16” plug.
4. Tighten the 7/16” plug.
5. Reconnect the two-wire electrical connectors to the FCC and LPFP.
6. Cycle the ignition key several times to run the electric fuel pumps and fill the FCC bowl with fuel. Inspect the drain plug area for leaks.

WARNING

Residual fuel will leak from the pump and the supply line. Elevate and plug the supply line to minimize fuel leakage. Capture/clean-up spilled fuel as required. Dispose of shop towels in an approved container.

Correct any leaks prior to operating the engine.

7. Start the engine and inspect for fuel leaks. Correct any leaks prior to operating the engine any further.

Filter Element Replacement, ENGINE OFF

FCC SERVICE KIT#: RP080026

1. Disconnect the two-wire electrical connectors from the FCC and the Low Pressure Fuel Pump (LPFP).
2. Disconnect the fuel supply line from the LPFP.
3. Remove the 7/16” plug, and drain the bowl contents into an approved container.

CAUTION: Both fuel and water will drain from the FCC bowl.

4 Remove the canister retaining clamp.

5 Slide the canister downward over the suspended filter element. It may be necessary to pull the unit to one side in order to remove.

6. Remove the fuel filter element from the suspended pump by gripping the fuel pump with one hand, and pulling the filter element downward with the other hand.
7. Visually inspect all internal components, i.e. hoses, wires, etc.

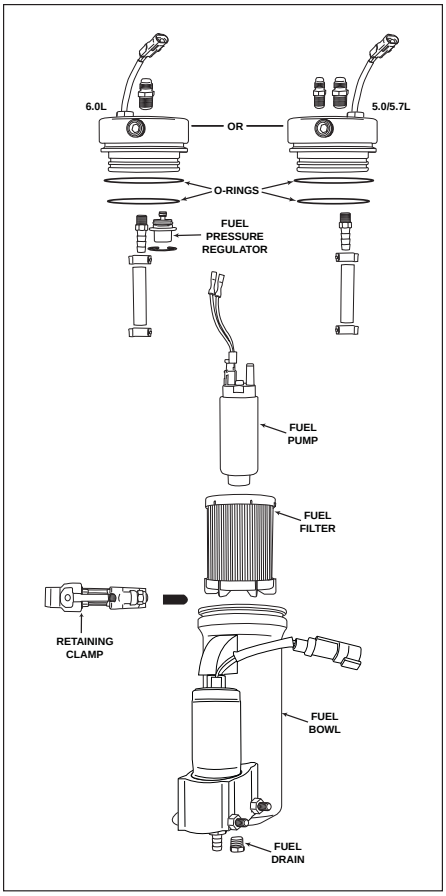


Figure 11-15 Fuel Control Cell (FCC) - Clamp-on Canister (Typical)

8. Push on new filter element (part number RP080026) over the electric fuel pump.
9. Using a pick made of soft material, such as a toothpick, remove the old O-rings from the FCC head.

CAUTION: The mounting head O-ring grooves may be damaged by using sharp steel tools to remove the O-rings.

CAUTION: Use only fuel approved O-rings (R047241) provided in RP080026 Kit. Use of non-approved O-rings may cause fuel to leak from the FCC.

10. Install the new O-rings in the same location. Lubricate the new O-rings with a fuel resistant O-ring lubricant.
11. Apply pipe sealant, suitable for use with gasoline, to the threads of the 7/16” plug.
12. Install and tighten the 7/16” plug into the canister.
13. Install the canister firmly back onto the FCC head.
14. Reinstall the retaining clamp and tighten securely.

15. Reconnect the fuel supply line to the LPFP.
16. Reconnect the two-wire electrical connectors to the FCC and the LPFP.
17. Cycle the ignition key several times to run the electric fuel pumps and fill the FCC bowl with fuel. Inspect the drain plug area for leaks. Correct any leaks prior to operating the engine.
18. Start the engine and inspect for fuel leaks. Correct any leaks prior to operating the engine any further.

DO NOT ATTEMPT TO SERVICE ANY OTHER PARTS ON THIS UNIT.

Servicing the Primary Fuel Pre-Filter

The frequency of replacing the filter element is determined by the contamination level of the fuel. Replace the filter element after the first 25 hours, then every 50 hours or once a year (whichever occurs first).

WARNING

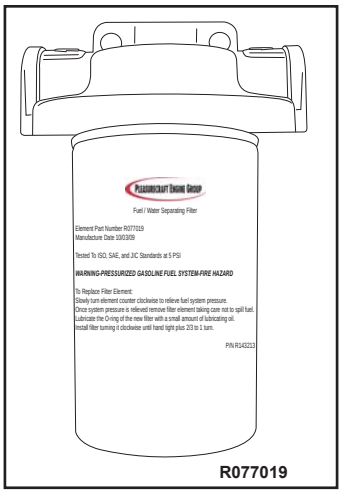
Improper use, installation or servicing may cause an explosion or fire resulting in bodily injury, or death. This unit should only be serviced by a qualified technician. Read and follow all instructions before proceeding. Run the engine and check for fuel leaks after installation or element replacement.

Filter Element Replacement, ENGINE OFF

PRIMARY FUEL PRE-FILTER #: R077019 (SPIN-ON)

NOTE: This filter may be located in various locations. Consult your boat manufacturer's operation manual for correct location.

1. Loosen the fuel filter by spinning it counterclockwise. A filter wrench may be required.
2. Remove the filter. Ensure that the old O-ring is removed with the filter.
3. Install the new filter by spinning it on clockwise.. Ensure the new filter is installed correctly. Tighten the filter securely.
4. Start the engine and inspect for fuel leaks. Correct any leaks prior to operating the engine any further.



Priming Fuel System

To prime the fuel system, cycle the ignition key 3 times using the following procedures:

1. Turn ignition key to ON position for 5 seconds.
2. Turn ignition key OFF.
3. Pause for 10 seconds.
4. Repeat steps 1-3 three times.

Crank the engine until it starts or 30 seconds elapse. If the engine does not start, repeat the priming procedures.

WARNING

Make sure there are no fuel leaks before closing the engine hatch.

FLAME ARRESTOR

At specified intervals, the flame arrestor should be checked for blockage caused by dirt or other foreign material.

Loosen the fastener securing the flame arrestor to the air intake throttle body. Remove the flame arrestor. Clean the flame arrestor with solvent and dry with compressed air. Reinstall the flame arrestor and tighten the fastener securely.

ENGINE MAINTENANCE - 11

MAINTENANCE SCHEDULE

Location and Service	Check Daily	After 1st 25 Hrs of Operation	Every 50 Hours of Operation	Every 100 Hours of Operation	Once Each Year
Check coolant level - Fresh-water cooled models only	X				
Check oil level - Engine crankcase	X				
Check oil level - Transmission	X				
Engine Assembly (complete - Check for obvious leaks (water, oil, fuel and exhaust)	X				
Remote Control and Steering System - Check for proper operation	X				
Sea Strainer - Check (if equipped)	X				
Partial Cooling System - Check and clean screen on inlet side of raw water thermostat housing as required.		X	X		X
Cooling System - Check condition and tightness of all hose clamps		X		X[1]	X
Cooling System - Inspect/Replace raw water pump impeller			X		X
Drive Belt - Inspect condition and check tension		X		X	X
Exhaust System - Check condition and tightness of all hose clamps		X		X[1]	X
Exhaust System - Check for water leaks at the manifold, riser and elbow gaskets	X				
Ignition System and Spark Plugs - Clean and inspect condition		O		O	O
Engine Assembly (complete) - Check for loose, missing or damaged parts (especially engine mounts, starter and alternator mounting fasteners)		X		X	X
Change engine oil and filter		X	X		X
Engine Alignment - Check and adjust if necessary		O			O
Ignition Timing - Not Adjustable					
Battery - Check electrolyte level and specific gravity. Inspect case for damage. Check cables and connections.		X	X		X
Electrical System (complete) - Check for loose or dirty connections and damaged wiring			X[2]		X
Flame Arrestor and Crankcase Ventilation System - Clean and inspect				X	X

MAINTENANCE SCHEDULE (cont'd)

Location and Service	Check Daily	After 1st 25 Hrs of Operation	Every 50 Hours of Operation	Every 100 Hours of Operation	Once Each Year
Hoses (all) - Inspect for cracks, swelling, weather checking or other signs of deterioration				X	X
Shift and Throttle Cable Linkage - Inspect and lubricate (**A**)				X[1]	X
Fuel Filters - Service or replace		O	O		O
Transmission - Change fluid (**B**) and clean strainer, if equipped		O			O
'V'-Drive Transmissions - Change fluid (**C**) and clean strainer, if equipped		O			O

MAINTENANCE SCHEDULE (cont'd)

Fresh-water cooled models - Clean sea-water section	As required [3] (X)
Fresh-water cooled models - Check coolant for alkalinity	At least once each year (X)
Fresh-water cooled models - Change coolant	Every five years
Zinc Anodes - Heat exchanger and cooler - check condition	Every 30 days [3] (X)
Engine Assembly Exterior Surfaces - spray with rust-preventative oil (**D**)	Fresh water areas - Every 60 days (X) Salt water areas - Every 30 days (X)
Cooling System (SALT WATER AREAS ONLY) - Flush sea-water section	After use each day (X)

Notes:

(X) Denotes service to be performed by the owner/ operator

(O) Denotes service to be performed by an authorized PCM Engines Premier dealer

(A) Use SAE 30 engine oil

(B) All PCM, Velvet Drive and Hurth transmissions - Use Dexron III automatic transmission fluid

(C) All PCM Power-Plus "V" Drive transmissions are designed to be 'Maintenance Free'. Inspect fluid level after the first 25 hours of use and annually thereafter. Fluid should only be changed if evidence of contamination is present. Use Mobiltrans SHC 50 synthetic transmission lubricant. PCM P/N: R190250

All Walters "V" Drive transmissions - Use Exxon Spartan EP-68 or SAE 30 engine oil

All Velvet "V" Drive transmissions - Use Dexron III automatic transmission fluid

(D) Use WD-40 penetration oil or equivalent

[1] In fresh-water areas, every 100 hours of operation or 120 days (whichever occurs first). In salt-water areas, every 50 hours of operation or 60 days (whichever occurs first).

[2] In fresh-water areas, every 50 hours of operation or 60 days (whichever occurs first). In salt-water areas, every 25 hours of operation or 30 days (whichever occurs first).

[3] Requires more frequent inspection if used in extremely salty, polluted or mineral-laden waters.

[4] See COOLANT SPECIFICATIONS.

PCM Engines recommends that all periodical and annual service be performed by your local, authorized PCM Engines Premier dealer.

ENGINE MAINTENANCE - 11

VISUAL INSPECTION

It is important for the owner/operator to visually inspect the complete engine assembly at regular intervals. Most often, costly repairs can be avoided if potential problems are corrected before there is a failure.

Inspect the complete engine assembly for obvious fuel, oil, water or exhaust leaks. Check for loose, damaged or missing parts. Check all hose clamps for adequate tightness. Check the electrical system for loose or dirty connections or damaged wiring.

Touch up scratches, nicks and corrosion damage to the exterior finish of the engine. Spray paint may be obtained from your local PCM Engines dealer.

Protect engine finish from corrosion by periodically spraying the engine exterior finish with a rust preventative oil (such as WD-40).

ENGINE FLUID CAPACITIES

Model	ALL MODELS
Crankcase Oil Capacity **W / NEW FILTER**	Start with 4 Quarts (3.7L)[1]
Fresh Water Cooling System Capacity	Fill Until Completely Purged[3]

TRANSMISSION FLUID CAPACITIES

Model	All Models	Type
PCM, 1:1 Ratio [1,2]	2.0 Quarts (1.9L)	DEXRON III
PCM, 1.23:1 Ratio [1,2]	2.0 Quarts (1.9L)	DEXRON III
Hurth (Exc. V-Drive), All Ratios [1,2]	4.0 Quarts (3.7L)	DEXRON III
Hurth V-Drive, All Ratios [1,2]	4.5 - 5.0 Quarts (4.25L - 4.73L)	DEXRON III
PCM Power-Plus V-Drive, All Ratios [1,2]	1.5 Quarts (1.42L)	Mobiltrans SHC 50 synthetic - R190250
Walters RV-36D V-Drive	1.5 Quarts (1.42L)	SAE 30

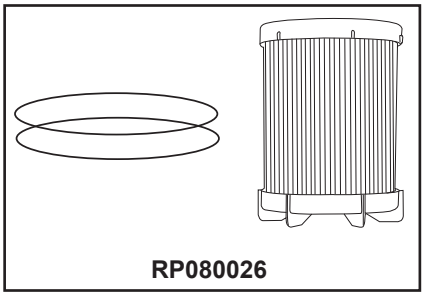
1 - ***Engine Fluid Capacities are dependent on installation angle.*** **DO NOT** overfill the crankcase or transmission. Remove excess fluid above the "FULL" mark on the dipstick. Check oil with the boat at its normal, level, at rest position on the water. Ensure that ballast systems (if equipped) and 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 page 29 and **Changing Oils** instructions page 46, of this manual, for complete instructions, important notes and Cautions for checking engine oil levels. Always use the dipstick to determine the exact quantity of oil required. Add the correct amount of oil to fill to the "FULL" mark on the oil level dipstick.

2 - Refer to the **Checking Fluid Levels** instructions pages 30-31 of this manual for complete instructions for checking transmission fluid levels. **IMPORTANT:** Fluid levels on the 40 Series PCM 1:1 and 1.23:1 transmissions are checked while the engine is running. 80 Series PCM 1:1, 1.23:1 and all other transmission fluid levels are checked at operating temperature and immediately after shutdown of the engine.

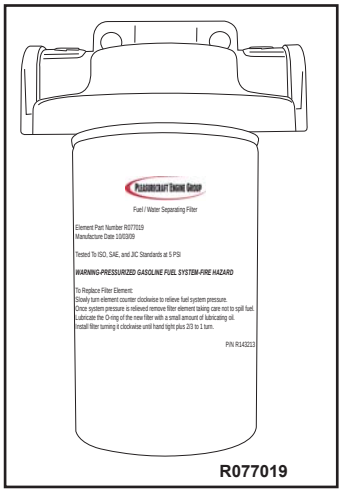
3 - Fresh Water Cooling systems vary depending on half-systems, full-fresh systems, heaters, hose lengths, etc. System should be completely purged of air and the coolant level should be within the MIN/MAX level of the degas bottle after the engine has been ran at operating temperature and the system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

FILTER REQUIREMENTS

Description	Part No.
Oil Filter (remote-mounted)	R077001
Kit, Transmission Oil Filter (ZF)	RP077011
Primary Fuel Pre-Filter	R077019
Fuel Control Cell (FCC) Fuel Filter Element	RP080026



RP080026



R077019

PCM POWER-PLUS V-DRIVE LUBRICANT

Description	Part No.
PCM Power-Plus V-Drive Lubricant (1 qt. bottle)	R190250

PCM BASIC CRUISE SPEED CONTROL SYSTEM

Description	Part No.
PCM Basic Cruise Control Panel	RA152008
Speed Control Interface Harness - 14 Ft	RA121091B

ENGINE SPECIFICATIONS - 12

PCM MASTER ENGINE SPECIFICATIONS - 2013

MODEL	CES/MPI HO303	CES/MPI EX343	CES/MPI ZR409/ ZR450	XS550
Displacement	5.0L (305 CID)	5.7L (350 CID)	6.0L (366 CID)	6.2L (376 CID)
Bore	3.75 in. (95.0 mm)	4.0 in. (101.6 mm)	4.0007 in. (101.618 mm)	4.0649 in. (103.25 mm)
Stroke	3.48 in. (88.3 mm)	3.48 in. (88.3 mm)	3.622 in. (92.0 mm)	3.622 in. (92.0 mm)
Compression Ratio	9.4:1	9.4:1	9.67:1	9.1:1
Compression	130 - 215 psi	130 - 215 psi	130 - 215 psi	130 - 215 psi
WOT Operating RPM **Preferred WOT RPM**	4800-5000 **4900**	5000 - 5300 **5200**	5400 - 5600 **5500**	5200 - 5400 **5300**
Cruising RPM (Max)	3800	4000	4000	4000
Idle RPM (In Gear)	650 (Not Adjustable)	650 (Not Adjustable)	650 (Not Adjustable)	650 (Not Adjustable)
Oil Pressure @ 2000 RPM	25 - 60 psi (172 - 414 kPa)	25 - 60 psi (172 - 414 kPa)	25 - 80 psi (172 - 552 kPa)	25 - 80 psi (172 - 552 kPa)
Minimum Oil Pressure	5 psi (35 kPa) at Idle	5 psi (35 kPa) at Idle	5 psi (35 kPa) at Idle	5 psi (35 kPa) at Idle
Spark Plug P/N **Spark Plug Gap**	R030010 0.060 in.	R030010 0.060 in.	R030011 0.040 in.	R030012 0.040 in.
Firing Order	1-8-4-3-6-5-7-2 (LH) 1-2-7-5-6-3-4-8 (RH)	1-8-4-3-6-5-7-2 (LH) 1-2-7-5-6-3-4-8 (RH)	1-8-7-2-6-5-4-3 (LH) NA	1-8-7-2-6-5-4-3 (LH) NA
Thermostat	RWC 160˚F (61.7˚C) FWC 170˚F (76.7˚C)	RWC 160˚F (61.7˚C) FWC 170˚F (76.7˚C)	NA FWC 160˚F (61.7˚C)	NA FWC 160˚F (61.7˚C)
Over- Temperature	200° F (93.3° C)	200° F (93.3° C)	200° F (93.3° C)	200° F (93.3° C)
Electrical System	12 Volt Negative (-) Ground	12 Volt Negative (-) Ground	200° F (93.3° C) Ground	200° F (93.3° C) Ground
Alternator Rating	100 Amps	100 Amps	100 Amps	100 Amps
Ignition Timing	Not Adjustable	Not Adjustable	Not Adjustable	Not Adjustable
CAM Retard	15 + / - 1 degrees	15 + / - 1 degrees	Not Adjustable	Not Adjustable
Battery Rating	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah	650 CCA (Minimum) 120 Ah

PCM MASTER FUEL PRESSURE SPECIFICATIONS - 2013

MODEL	ALL HO303	ALL EX343	ALL ZR409/ZR450
Fuel Pressure STD. FCC	57-62 psi @ WOT	57-62 psi @ WOT	
Fuel Pressure - FCC Returnless to Rail			57-62 psi (WOT)
Fuel Pressure - LPFP ALL ENGINES	7 - 9 psi (WOT)	7 - 9 psi (WOT)	7 - 9 psi (WOT)

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

PCM MASTER WARNING/ALARM SPECIFICATIONS - 2013

MODEL	HO303 CES	EX343 CES	ZR409/ZR450 CES	XS550
Coolant Over-Temperature Sensor	200°F DTC 116/217 Check Gauges Lamp and Buzzer Engine Derates	200°F DTC 116/217 MIL and Buzzer Engine Derates	200°F DTC 116/217 MIL and Buzzer Engine Derates	200°F DTC 116/217 Check Gauges Lamp and Buzzer Engine Derates
Exhaust Manifold Water Temperature Sensors	240°F/ 250°F DTC 1415/1416/ 1417/1418 Check Gauges Lamp and Buzzer Engine Derates	240°F/ 250°F DTC 1415/1416/ 1417/1418 Check Gauges Lamp and Buzzer Engine Derates	220°F/ 225°F DTC 1415/1416/ 1417/1418 Check Gauges Lamp and Buzzer Engine Derates	240°F/ 250°F DTC 1415/1416/ 1417/1418 Check Gauges Lamp and Buzzer Engine Derates
Low Oil Pressure Sensor	< 5 psi @ idle / < 24 psi @ 4000 DTC 524 Check Gauges Lamp and Buzzer Engine Derates	< 5 psi @ idle / < 24 psi @ 4000 DTC 524 MIL and Buzzer	< 5 psi @ idle / < 24 psi @ 4000 DTC 524 MIL and Buzzer	< 5 psi @ idle / < 24 psi @ 4000 DTC 524 Check Gauges Lamp and Buzzer

NOTE: FOR NEW BOAT PROPPING, IT IS RECOMMENDED THAT OEMS PROP TO THE MAXIMUM RPM LISTED.

ENGINE SPECIFICATIONS - 12

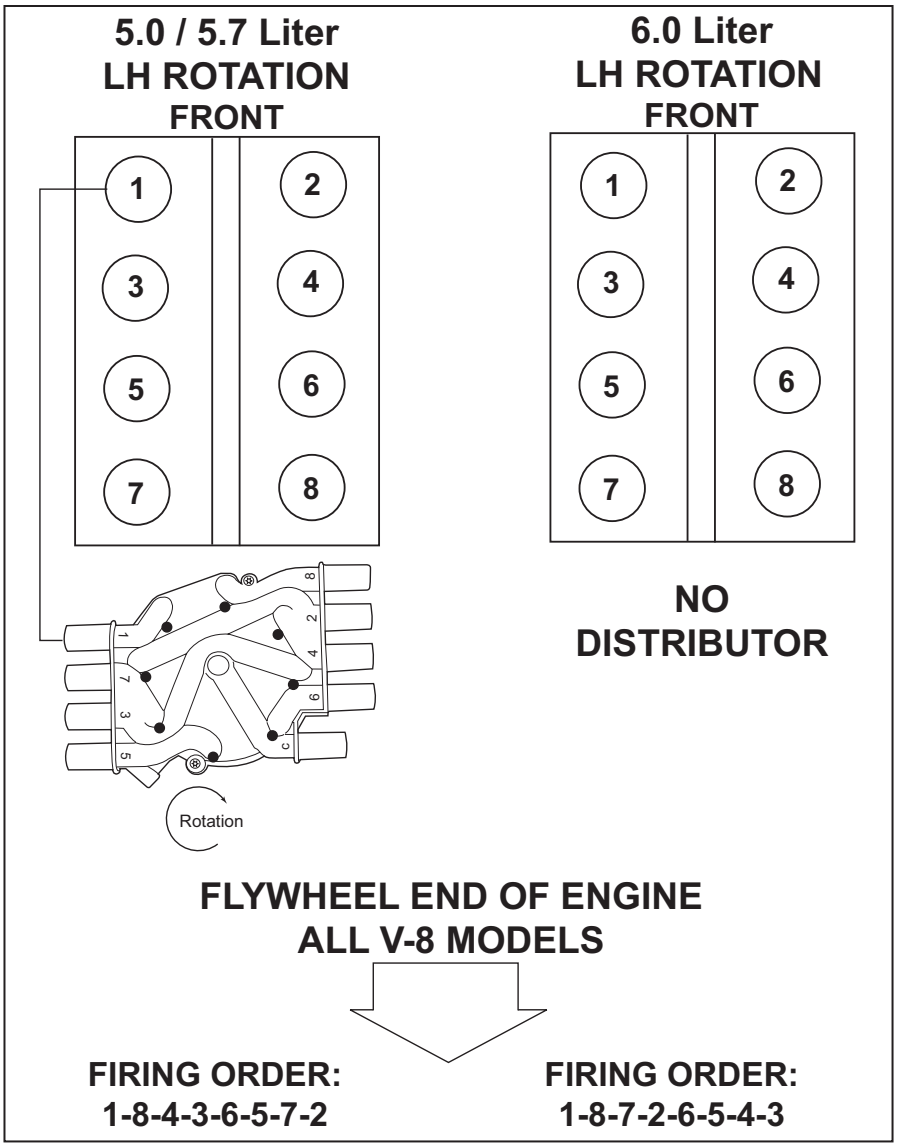


Figure 12-1 V-8 Firing Orders

TUNE-UP SPECIFICATIONS

Model	**ALL HO303 ALL EX343**	**ALL ZR409 ALL ZR450**	**XS550**
Spark Plug Type	R030010	R030011	R030012
Spark Plug Gap	0.060 in. (1.52 mm)	0.040 in (1.02 mm)	0.040 in. (1.02 mm)
Ignition Timing	Fixed, Not Adjustable	Fixed, Not Adjustable	Fixed, Not Adjustable
Firing Order	1-8-4-3-6-5-7-2 (LH Rotation)	1-8-7-2-6-5-4-3 (LH Rotation)	1-8-7-2-6-5-4-3 (LH Rotation)
CAM Retard	15 $\pm$ 1 degrees	Not Adjustable	Not Adjustable

ENGINE STORAGE

IMPORTANT: This service should be performed by an Authorized PCM Premier dealer.

CAUTION

Refer to FLUSHING COOLING SYSTEM before proceeding.

1. Fill the fuel tanks with gasoline and add a sufficient amount of gasoline stabilizer, such as STA-BIL™ fuel stabilizer, to prevent the formation of fuel gum and varnish. Follow the instructions on the container.

WARNING

On fuel injected engines, you MUST bleed off fuel pressure before proceeding. Failure to do so may cause personal injury.

2. Remove, empty and clean the fuel filter assembly. Reinstall with a new fuel filter and gasket / seals. Refer to Engine Maintenance for filter replacement procedures.

NOTE: DO NOT re-use old fuel filter components. Always replace with new fuel filter element and gasket / seals.

WARNING

Accumulation of water and other fuel contaminants may form corrosive compounds that can damage the fuel filter, and result in fuel leakage. Ethanol blended fuel may increase this risk. For this reason, annual replacement of the fuel filter, at a minimum, is required to avoid risk of explosion or fire.

WARNING

Operate the bilge blower and be sure no fuel vapors are present when treating the engine. Be sure the engine compartment is well-ventilated to prevent a potential fire hazard.

3. Run the engine and allow it to reach normal operating temperature (a minimum of 10 minutes). Shut down the engine and change the oil and oil filter (See ENGINE MAINTENANCE).
4. Flush the cooling system if operating in salt water or brackish water areas. (See ENGINE MAINTENANCE).

WARNING

Operate the bilge blower and be sure no fuel vapors are present when treating the engine. Be sure the engine compartment is well-ventilated to prevent a potential fire hazard.

5. Restart the engine and allow it to idle for 5 minutes.
6. Turn off the ignition. If fogging the engine is required for extended storage, remove the spark plugs. Use an aerosol-type fogging solution and spray a sufficient amount of oil into each cylinder spark plug hole. (Follow the instructions for the storage oil used.) Turn the crankshaft several revolutions by hand to spread the oil evenly throughout the cylinders.
   Install the spark plugs and connect the spark plug wires.

CAUTION

Excess storage oil in the engine's cylinders can cause hydrostatic locking to occur, and severe damage to the engine.

7. Remove and clean the flame arrestor and the vent hoses, and reinstall on the engine. Cover the throttle body assembly ,to prevent the possibility of the water entering the engine through the throttle body assembly, during storage.
8. Close the fuel shut-off valve (if equipped).

OUT-OF-SEASON STORAGE - 13

DRAINING INSTRUCTIONS

IMPORTANT: These services should be performed by an Authorized PCM Premier dealer.

CAUTION

If the boat is to remain in the water during or after draining, close the seacock to prevent a siphoning action that may occur, allowing sea water to flow from drain holes or removed hoses.

IMPORTANT: When removing the drain plugs, insert a wire into the hole to remove any obstruction which would prevent water from draining completely.

MPORTANT: The fresh-water section of the cooling system must be kept filled year around with recommended coolant. Make certain that the cooling system is protected with an ethylene glycol antifreeze mixture properly mixed to protect the engine to the lowest temperature that it will be exposed to.

See the ENGINE MAINTENANCE section for testing alkalinity, draining and refilling procedures of the Fresh Water Cooling System, as required.

IMPORTANT: Drain the sea-water section of the cooling system only.

1. Remove all the drain plugs and/or hoses according to the correct application found in the WATER FLOW DIAGRAM section of this manual.

NOTICE: It may be necessary to bend or lift the hoses to allow water to drain completely.

2. Remove the raw water pump impeller. (See ENGINE MAINTENANCE) If inspection proves the impeller to be in good condition, store it in an accessible spot for re-installation at the end of the storage period. A damaged or badly worn impeller should be discarded and a new one installed at the end of the storage period.

NOTE: Removal of the impeller during storage will prevent the impeller vanes from drying and taking a permanent “set”.

3. After the water has completely drained, coat the threads of drain plugs with PerfectSeal (or equivalent), and reinstall in the proper locations. Reinstall the hoses and tighten all the clamps securely.

After draining is completed, perform the additional required maintenance as outlined in the MAINTENANCE SCHEDULE under ONCE EACH YEAR.

BATTERY STORAGE

Follow the battery manufacturer’s instructions for storage. If not available, use the following instructions:

- Remove the battery from the boat and clean, removing dirt and grease from the top of the battery.
- Fill the battery with distilled water to the manufacturer’s specifications.
- Store the battery in a cool, dry place. Do not store on a concrete surface.
- Periodically (every 30 to 45 days), check the water level and recharge the battery to the manufacturer’s specifications. Do not fast charge.

CAUTION

A discharged battery can be damaged by freezing.

RECOMMISSIONING AFTER STORAGE

IMPORTANT: These services should be performed by an Authorized PCM Premier dealer.

When recommissioning the engine after storage, the following items should be checked:

1. Assemble the raw water pump and reinstall on the engine.

2. Check all the cooling system hoses. Be sure they are properly connected and all the hose clamps are tight.

CAUTION

When installing the battery, make certain that you connect the POSITIVE (+) BATTERY CABLE to the POSITIVE (+) BATTERY TERMINAL first, and the NEGATIVE (-) BATTERY CABLE to the NEGATIVE (-) BATTERY TERMINAL last. If the battery cables are reversed, the electrical system will be damaged.

WARNING

Do not use jumper cables and/or a booster battery to start the engine. Do not recharge a weak battery in the boat. Remove the battery and recharge in a ventilated area away from fuel vapors, sparks or open flame.

3. Install the fully charged battery. Be sure that all the connections are clean and free from corrosion. Coat the battery terminal connections with an anti-corrosion battery terminal spray.

4. Readjust alternator and water pump drive belt tension.

5. Check engine alignment.

6. Check engine and transmission oil levels.

7. Check engine mount fasteners.

8. Open the fuel shut-off valve (if equipped).

9. Refer to the OPERATING INSTRUCTIONS section and perform all the safety checks before starting the engine.

10. Refer to the Engine Maintenance section and perform the Priming the Fuel System instructions.

CAUTION

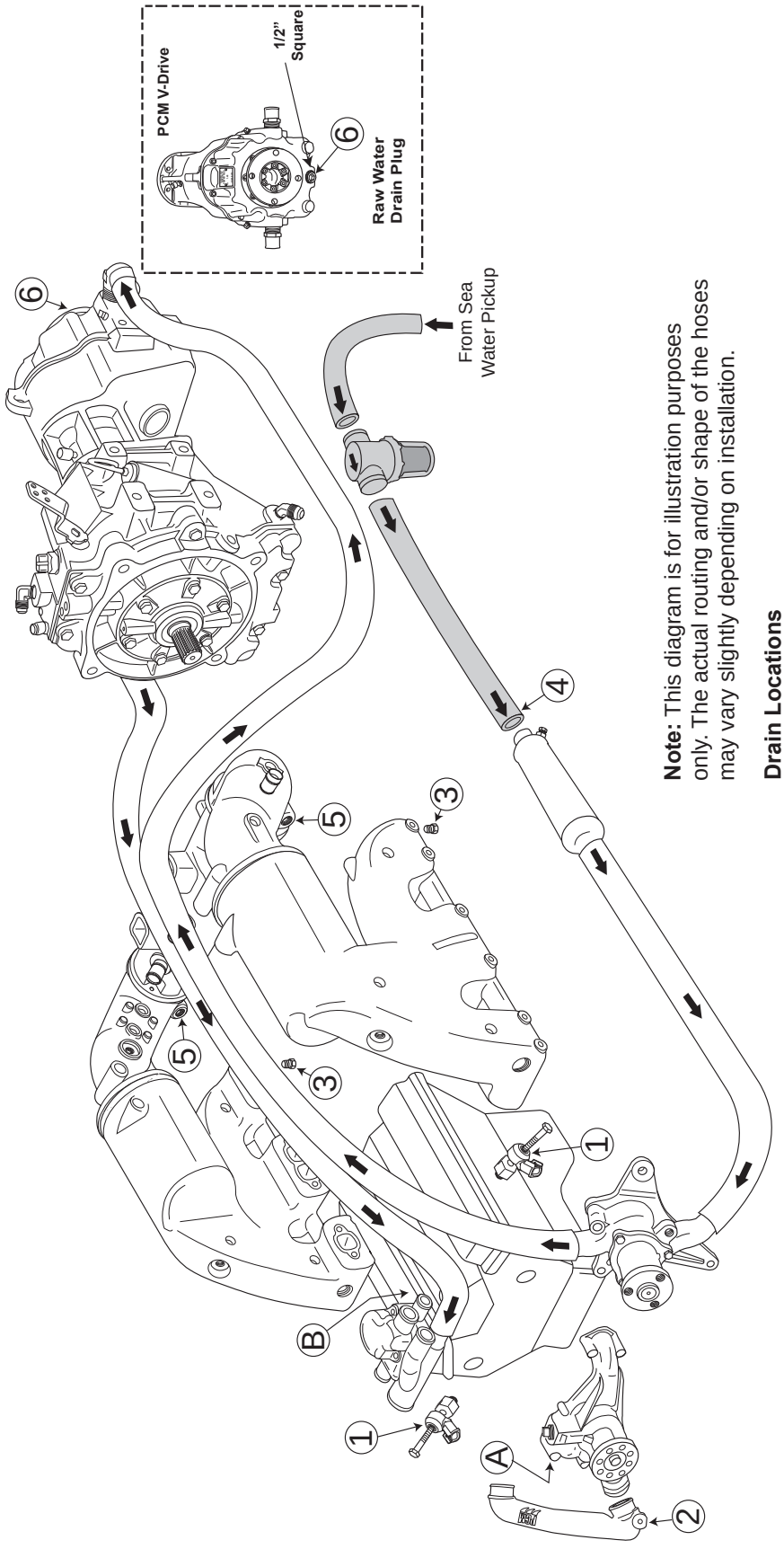
If the engine(s) is (are) to be started prior to launching, use the procedure FLUSHING COOLING SYSTEM before proceeding to start the engine(s).

11. Open the seacock before starting the engine.

12. Start the engine and closely observe the instrument panel. Allow the engine to reach normal operating temperature. Inspect the engine carefully for fuel, exhaust, oil and water leaks.

13. Check the steering, shift and throttle controls for proper operation.

WATER FLOW DIAGRAMS - 15



Note: This diagram is for illustration purposes only. The actual routing and/or shape of the hoses may vary slightly depending on installation.

Drain Locations

1. Engine Block Drains - Remove Knock Sensors
2. Engine Circulating Water Pump Pipe - Remove Drain Plug
3. Exhaust Manifolds - Remove Drain Plugs
4. Transmission Cooler - Remove Inlet Hose
5. Exhaust System Corners - Remove Drain Plugs
6. VDrive - Remove Drain Plug

NOTE: (If Equipped) Remove heater hoses from locations A and B.

CAUTION: If compressed air is used to purge Heater, use no more than 10psi. The heater core can be damaged from excessive air pressure.

Figure 15-4 Vee Drive CES HO303 / EX343

WATER FLOW DIAGRAMS - 15

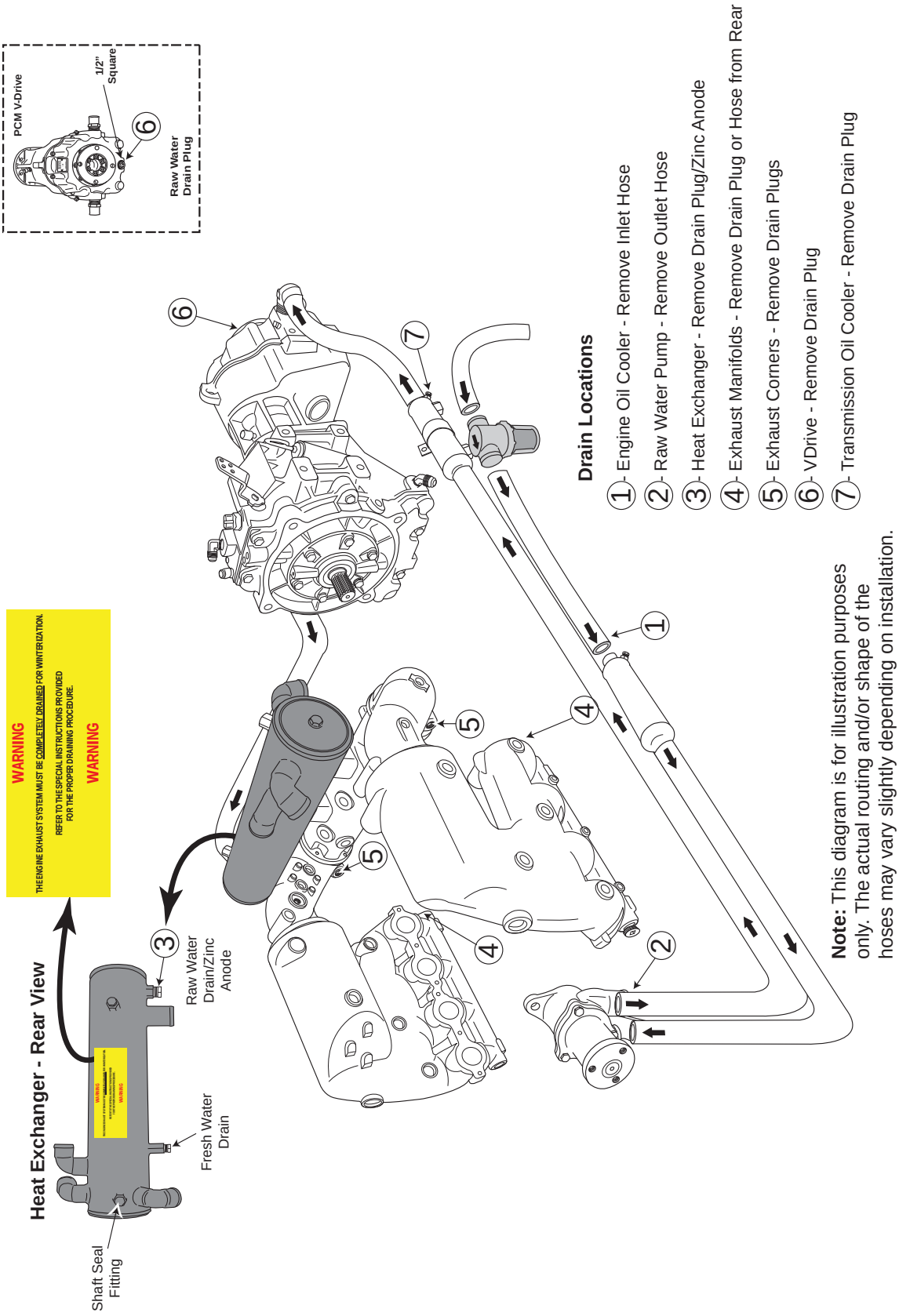


Figure 15-6 Vee Drive Partial Full-System ZR409 CES / ZR450 CES

WATER FLOW DIAGRAMS - 15

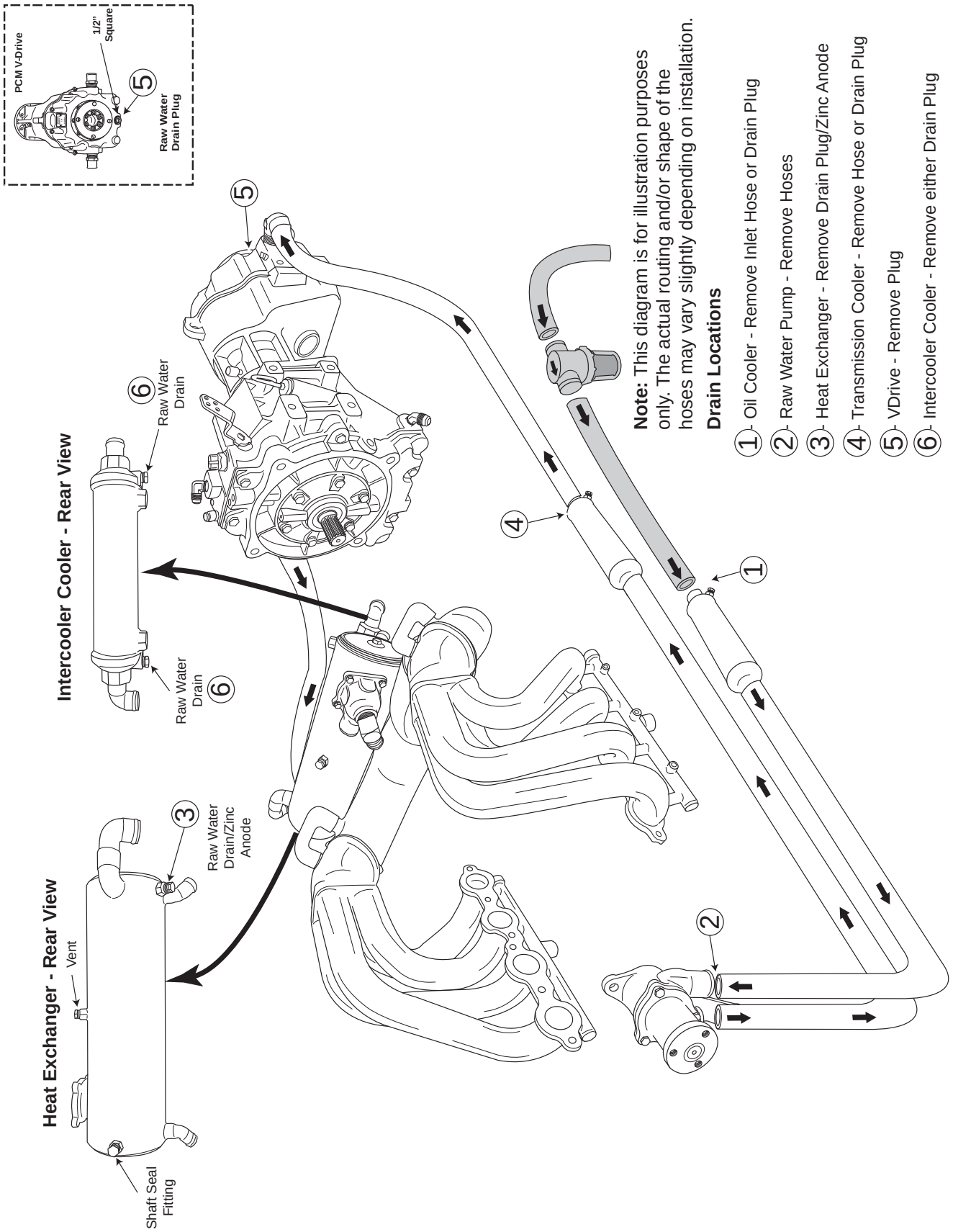


Figure 15-7 Full System Vee Drive XS550

WATER OUT

Remove plug from intake manifold and install proper barbed fitting. The plug is located toward the front of the intake (belt end) on the even cylinder side.

WATER RETURN

Remove plug from circulation pump and install proper barbed fitting. The plug is located on the side of the circulation pump.

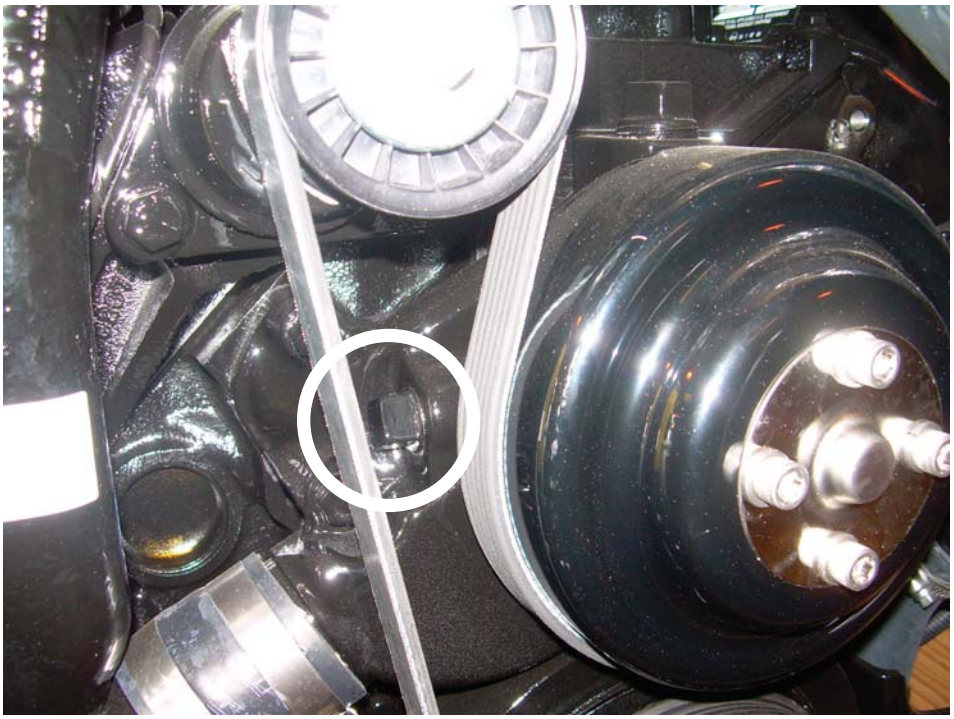


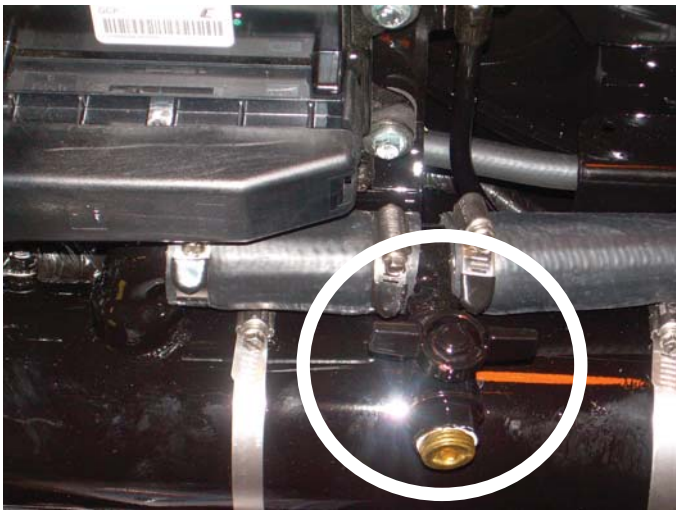
Figure 16-1 5.0/5.7L All Applications

HEATER CONNECTIONS - 16

WATER OUT

Remove plug from supplied ball valve fitting and install proper barbed fitting. The fitting is located in the hose above the heat exchanger on both CES and non-catalyst engines.

6.0L Catanium Exhaust System (CES**)**



6.0L Non-Catalyst

WATER RETURN

Remove plug from supplied ball valve fitting and install proper barbed fitting. The fitting is located in the U-tube at the front lower right hand portion of the engine, both CES and non-catalyst engines.

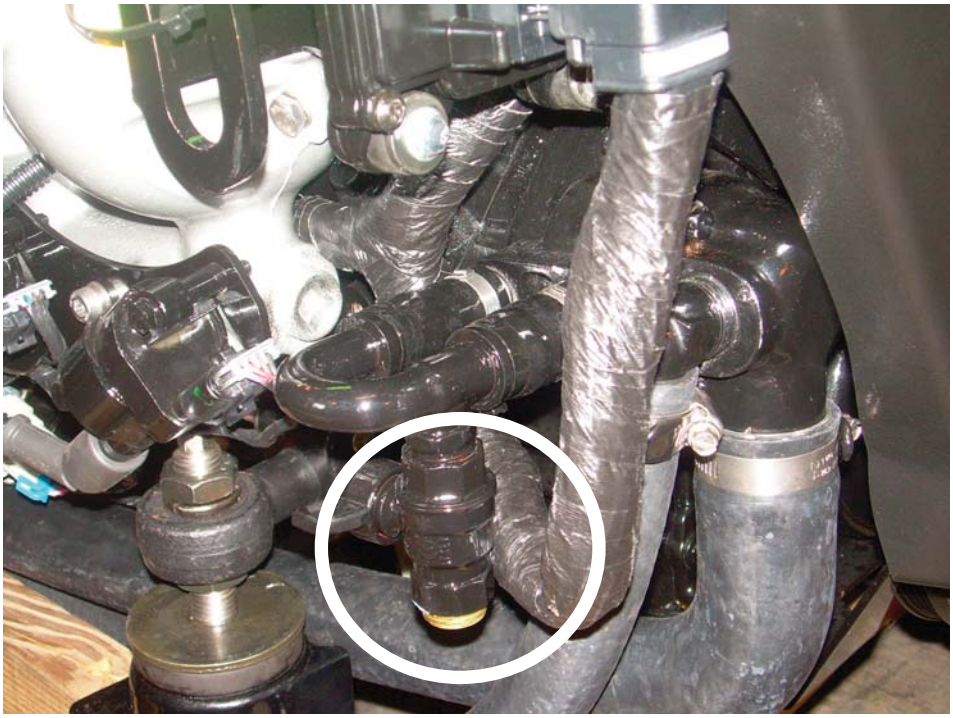


Figure 16-2 6.0L Applications

PCM WARRANTY TRANSFER APPLICATION

The remainder of the original 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 term, **provided the engine does not have in excess of 300 hours.** The original date of sale or original in-service date (whichever comes first) begins the warranty coverage period.

Direct Sale by Owner/Dealer Promo/Ski Show User/ or First Operator:

- The second purchaser can be registered as the owner and retain the unused portion of the warranty term by sending the following:
  - Original owner's Warranty Registration Card
  - Copy of Bill of Sale/Sales Contract/Operator Contract
  - Completed Warranty Transfer Application
  - Warranty transfer fee

Transfer Fee:

- **The fee for transfer is $100.00.** The applicable transfer fee must be submitted via certified check **within 30 days of date of sale** along with the transfer application information to:

  Pleasurecraft Engine Group
  P.O. Drawer 369
  Little Mountain, S.C., 29075

- A Warranty Registration Card will be issued to the second owner, reflecting the change has been made in the factory computer.

OUTSIDE THE U.S. AND CANADA, CONTACT YOUR LOCAL PLEASURECRAFT DEALER OR WARRANTY SERVICES AT (803) 345-0050 FOR MORE INFORMATION ON HOW TO APPLY TO THIS PROGRAM.

IMPORTANT! PURCHASER NOTICE: The checks listed below are designed to insure safety and satisfaction. A step-by-step procedure for pre-delivery can be found in Course 1 of the PCM E-Train Program. Therefore, we require the following inspection be performed at your expense by a qualified technician prior to delivery. By signature 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 Owners Manual still apply.

ENGINE MODEL:_____ **ENGINE SERIAL:**_____

TRANS. SERIAL:_____ **ENGINE HOURS:**_____

HULL SERIAL #:_____

Pre-Delivery Checklist

- ☐ Check for Bulletins
- ☐ Engine Oil: Check
- ☐ Drive Lube: Check
- ☐ Battery Rating, Charge, and Level: Check
- ☐ Control Adjustments: Confirm Proper Operation
- ☐ Gauges: Check for Proper Operation
- ☐ Record Propeller Size, Rotation and WOT
  WOT RPM_____Diameter_____ Pitch_____Rotation_____
- ☐ Record Fuel Pressure, Idle _____
  Record Fuel Pressure, WOT _____
- ☐ Dealer Reviewed Warranty with Owner
- ☐ Belt and Pulley: Inspect for Damage
- ☐ All Drain Plugs: Confirm Proper Installation
- ☐ All Fuel Lines: Confirm No Leaks
- ☐ All Oil Lines: Confirm No Leaks
- ☐ All Water Lines: Confirm No Leaks
- ☐ Electrical Wiring: Check for Proper Installation
- ☐ Trouble Codes Checked
  Trouble Codes Cleared

DATE OF SALE (2ND Owner) _____/_____/_____

(New Owner)
NAME:_____

ADDRESS:_____

CITY,STATE, ZIP_____

DATE OF SALE (1st Owner/1st Operator) _____/_____/_____

(Previous Owner)
NAME:_____

ADDRESS:_____

CITY,STATE, ZIP_____

I hereby certify the pre-delivery checklist on engine #_____ and have corrected any abnormality revealed by this inspection.

_____ **(Technician Signature, Dealer & Date)**

_____ **(Seller's Signature & Date)**

_____ **(Purchaser's Signature & Date)**

PCM

SUMMARY OF WARRANTY TERM LIMITS

This list does not, in any way, modify the official Limited Warranty Statement of PCM. This list has been compiled only as a general outline of year and hour limits imposed on different models of PCM engines. Please review the official Limited Warranty Statements on the following pages for specific terms and limitations as they apply to the particular engine / component involved.

ENGINE MODEL YEAR:	WARRANTY COVERAGE TERM:
2007***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2008***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2009***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2010***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2011***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2012***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
2013***	3 years, unlimited hours, GM. 3 years, unlimited hours Transmission
Base Engine	1 year, 200 hours with exclusions.

Note:

*** 2005-2012 Model Year Engines: The remainder of the original PCM limited warranty is transferable to a subsequent purchaser, provided the engine ***does not have in excess of 300 hours and is submitted to PCM within 30 days of the date of sale.***

PCM OWNERSHIP CHANGE NOTICE

If you are the new owner of a Pleasurecraft Marine Engine on which the warranty has expired and would like to inform Pleasurecraft of your ownership for notification purposes in case of Service Updates, Recalls, etc., complete the section below and return by mail to PCM. PO Drawer 369, Little Mountain, SC 29075.

ENGINE MODEL: _____

ENGINE SERIAL NUMBER: _____

TRANS. MODEL: _____

TRANS. SERIAL NUMBER: _____

(New Owner) NAME: _____

ADDRSS: _____

_____

CITY,STATE,ZIP: _____

DATE OF PURCHASE: _____

(Previous Owner)NAME: _____

ADDRESS: _____

CITY,STATE,ZIP: _____

3 Year Transferable Limited Warranty

Pleasurecraft Marine Engine Co. (PCM) warrants its new products to be free from defects in material and workmanship under normal use and service conditions, to the first registered user, and all subsequent user who, in accordance with PCM's warranty transfer policy, transfers any remaining portion of this warranty coverage within 30 days of any subsequent sale/purchases. All components of PCM products are covered under the PCM Warranty, except for those components that are warranted by PCM's suppliers. The obligation of PCM hereunder shall be limited to the repair or replacement with new or remanufactured components, at its option, of any product or parts thereof which has failed during the period of warranty and which is demonstrated upon examination to have failed due to defective material and/or workmanship.

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.

NO OTHER WARRANTY GIVEN

The obligations set forth in the preceding paragraph are PCM's sole obligation and owner's exclusive remedy. PCM makes no other express warranty to the extent that any additional warranty may be implied by law, the term of such implied warranty shall be limited to the warranty term stated herein, from the date of delivery of the PCM product to the parties outlined herein.

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 herefrom, however, such deletion shall have no effect on the remaining provisions hereof, all of which shall remaining full force and effect.

REMEDIES

The obligations 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 warranties which are made by PCM is repair or replacement of the product or any warranted part thereof as set forth herein: **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 limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

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 goods which is actually paid to PCM.

WARRANTY COVERAGE, TERM

This Warranty is extended only to the first registered owner or registered user, and all subsequent user who, in accordance with PCM's warranty transfer policy, transfers any remaining portion of this warranty coverage within 30 days of any subsequent sale/purchases, for the period specified below:

All components, other than and those itemized below, are warranted for a period of three (3) years from the date of delivery to the first registered owner or registered user, and all subsequent user who, in accordance with PCM's warranty transfer policy, transfers any remaining portion of this warranty coverage within 30 days of any subsequent sale/purchases in non-commercial use. In case of commercial use, the term of this Warranty shall be the shorter of (a) a period of six (6) months from the date of delivery to the first registered owner or registered user or (b) the expiration of 200 hours of use.

Items not covered under this warranty;

(A) Water pump impellers are not covered by this Warranty.

(B) Seals, gaskets, O-rings, and other material affected by time are not covered by this Warranty if their effectiveness is reduced by an extended storage period prior to sale or use.

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 purchase. 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 eight (8) weeks after the date of purchase, please write PCM at the address 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, lubricants, spark plugs, points, and other items which are normally 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 $50.00 and in all cases where the owner fails to establish the purchase and warranty expiration dates with the owner's registration card sent upon receipt of the warranty registration form by PCM. While failure to present the owner's registration card will not prevent you from obtaining coverage hereunder, this Warranty shall not be effective and, therefore, cannot be honored until the product purchase date can be confirmed by PCM. If the card is lost, communicate with PCM at the address listed below, and, for a processing fee of $10.00, a new owner's registration card will be issued to you.

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 or are travelling or need a referral to your nearest dealer contact: Pleasurecraft, P.O. Drawer 369, Little Mountain, SC 29075

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 failure resulting from use of non-recommended lubricants or fuels, failure to follow maintenance or lubrication schedules, failure caused or contributed to by contaminated fuel, failure caused by improper installation or misapplication of the engine or drive, failure resulting from the owner's or operator's failure to exercise due or normal care and precaution, or failure of components and/or assemblies that are warranted by PCM suppliers.

OWNER'S RESPONSIBILITY

Performance under this Warranty shall be conditioned upon the first registered owner's or registered users'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 instruction 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.

CHOICE OF LAW

This Limited Warranty shall be governed by, and construed and interpreted in accordance with, the laws of the State of Ohio, except only to the extent replaced or precluded by other law of mandatory application.

SPECIAL STATE LEGAL REQUIREMENTS

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

The PCM California Emissions Warranty and California Emissions Control Warranty Statement is a separate document included in this Manual. Any questions concerning the Emissions Warranty can be obtained by calling 1-803-345-0050.

L599001-13

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L585002

IMPORTANT

The checks as listed below are designed to insure the safety and satisfaction of you, the owner. By signing this form, the dealer certifies that he has checked the installation and operation of the engine and finds it to be performing properly. The owner or his agent should perform similar inspections periodically to identify potential problems before they occur and have any suspected defects checked and/or corrected immediately.

Make Owner and Dealer copies of the Registration Card, as required. Mail <u>original</u> to Pleasurecraft Engine Group.

Use Owner's Copy for Warranty ID until Warranty Identification Card is received by Owner.

Engine Model No. – – Engine Serial No.

Trans/Gear Serial No. VDrive Serial No. Date of Sale –

Owners Name

Owner's Primary Mailing Address

City State Zip Code

Owner's Primary Email Address

Owner's Signature Date

Boat Make Hull Serial # Length

Selling Dealer Premier Dealer No.

Selling Dealer Mailing Address

City State Zip Code

Predelivery Checklist

- ☐ Check for Bulletins
- ☐ Engine Oil: Check
- ☐ Drive Lube: Check
- ☐ Battery Rating, Charge, and Level: Check
- ☐ Control Adjustments: Confirm Proper Operation
- ☐ Gauges: Check for Proper Operation
- ☐ Record Propeller Size, Rotation and WOT
  WOT RPM_____Diameter_____ Pitch_____Rotation_____
- ☐ Record Fuel Pressure, Idle _____
  Record Fuel Pressure, WOT _____
- ☐ Dealer Reviewed Warranty with Owner
- ☐ Belt and Pulley: Inspect for Damage
- ☐ All Drain Plugs: Confirm Proper Installation
- ☐ All Fuel Lines: Confirm No Leaks
- ☐ All Oil Lines: Confirm No Leaks
- ☐ All Water Lines: Confirm No Leaks
- ☐ Electrical Wiring: Check for Proper Installation
- ☐ Trouble Codes Checked
  Trouble Codes Cleared

Dealer's Signature Date

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PCM DRIVABILITY CHECKLIST

ENGINE SERIAL NUMBER: _____

Date: _____ **Dealership Name:** _____

Technician's Name:_____ **Technician's Contact Phone #:** _____

Owner/Operator Name: _____

Person Reporting the problem (if different from owner/operator): _____

Service Writer or Person that took the problem report: _____

1) PROBLEM OR SYMPTOM: _____

Who first observed the symptom?_____When did the symptom first occur? _____
Any recent change or service work prior to symptom occurring - replaced belts or impeller, major engine or boat repairs, recently refueled, etc.? _____ Has someone, other than yourself, tried to correct the current symptom? _____ If yes, what work was done?_____

Accessories Added Recently? _____Is the symptom currently present? _____

Special conditions (if any) required to duplicate the symptom: _____

Use an additional sheet of paper if more space is required for symptoms or descriptions.

2) CHECK FOR SERVICE UPDATES:

ENGINE SERIAL NUMBER: _____ **ENGINE MODEL NUMBER:** _____ **ENGINE HOURS:** ____

HULL NUMBER: _____

ENGINE: None Apply: __ Performed: _____

BOAT: None Apply: __ Performed: _____

3) VISUAL INSPECTION:

Inspection	YES	NO
Evidence of an over-heat:		
Engine Harness connectors connected properly:		
Physical Damage - wiring, connectors, assemblies, and **Remove Spark Plugs and inspect for fluids.**		
Corrosion:		
Hull-clean and free of excessive growth:		

Inspection	YES	NO
Evidence of or Excessive Water in the Bilge:		
Fluid levels checked:		
Leaking Fluids:		
Firing order correct:		
Correct size propellers installed:		
Underwater gear is undamaged:		
Accessories added? If yes, check items		

4) VERIFY THE PROBLEM - 'TAKING THE ENGINE'S PULSE'

	YES	NO	
Does the engine start and continue to run?	**go to 3 below**	**go to 1 below**	
1) Key-ON-Engine-OFF (KOEO)	**YES**	**NO**	**Fuel Press.**
Both Fuel Pumps run 2-4 seconds:			
Fuel Pressure near wot specification - when pumps run:			
2) Key-ON-Engine-Running (KOER)	**YES**	**NO**	**Fuel Press.**
Engine cranks:			
Fuel Pressure near wot specification - engine cranking:			
Engine Starts and continues to run:		go to (3) Water Test	
3) WATER TEST	**YES**	**NO**	**Fuel Press.**
Verify reported symptom:			
Fuel Pressure - idle:			
Fuel Pressure - under load, @ WOT:			

Check Accessories Added:

- ☐ Heater
- ☐ Shower
- ☐ Hot Water Tank
- ☐ Flush Kit
- ☐ Multi-Function Display
- ☐ Synchronizer
- ☐ After-Market Stereo Equipment
- ☐ After-Market Depth/Fish Finder
- ☐ After-Market Navigational Equipment, such as GPS, Radar, Sonar, Auto-pilot systems
- ☐ After-Market Radio Equipment
- ☐ Lights
- ☐ Other - (please list)

4A) Revised or additional symptom found?: _____

PCM DRIVABILITY CHECKLIST

5) PERFORM THE OBD SYSTEM CHECK

CODE(S) PRESENT: _____ DIAGNOSTIC PROCEDURE USED: _____ **Continue to Step 6**

6) ISOLATE AND REPAIR THE PROBLEM.

Were you able to isolate and repair the problem? If ***YES***, continue to **Step 7.**
If ***NO***, complete the Drivability Checklist for No Codes, step 6A below. If the problem is still not resolved, then call for factory technical assistance.

6A) NO CODES - ENGINE RUNS - DRIVABILITY SYMPTOM STILL PRESENT

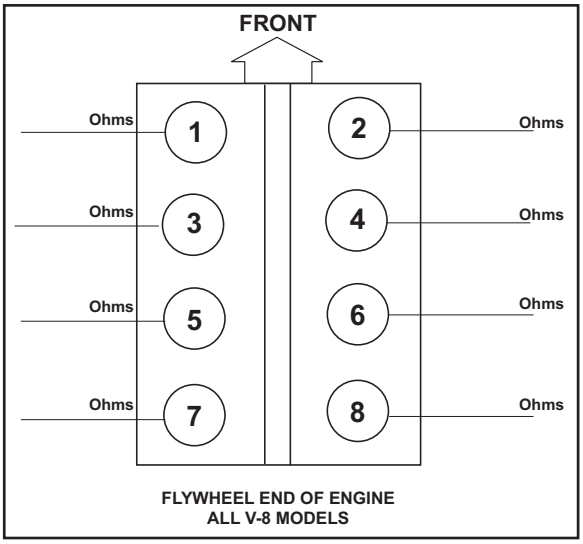
Inspection or Check	YES	NO
1) Review Steps **1** thru **5**:		
2) Inspect fuel for contamination:		
3) Electrically isolate engine from boat:		
4) Powertrain is aligned:		
5) Remove and Inspect Distributor Cap and Rotor (5.0/5.7L only):		
6) Check&**record** Ignition wire resistance:		
7) Remove and Inspect each spark plug:		
8) Perform a Compression Check on all 8 cylinders: **Record below.**		

Inspection or Check	YES	NO
WATER TEST		
9) Verify CAM Retard** (5.0/5.7L only):		
10) Performance verified against a similar boat w/same engine. package, if available		
11) Perform the Diacom Power Balance Check; under load, @ 1600-1800rpm:		
12) Perform the harness 'Wiggle Test':		
13) Diacom recording-Pre-Delivery test:		

7) VERIFY REPAIR HAS CORRECTED THE PROBLEM.

Check for and clear all codes from the ECM memory.
Water test the boat. Run the engine for a minimum of two (2) minutes, then verify that no codes have returned. Continue with your water test long enough to verify that the problem has been corrected.

**** CAM Retard - '02 thru '06 = 43-47 degrees**
'07 - SN 485993 = 0 - 4 degrees/CES and SN 485994↑ = 15 ± 2 degrees



IGNITION WIRE RESISTANCE CHECK
Less than 10,000 ohms/ft

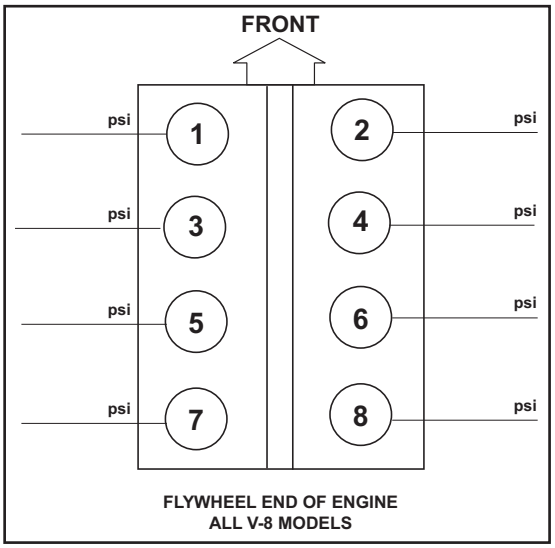
COMPRESSION PRESSURE:

5.0/5.7L - 130-215 psi

6.0L - 130-215 psi

6.2L - 130-215 psi

Lowest pressure should be within 70% of highest pressure. Minimum cylinder pressure - 100 psi.



COMPRESSION CHECK

REFERENCES:

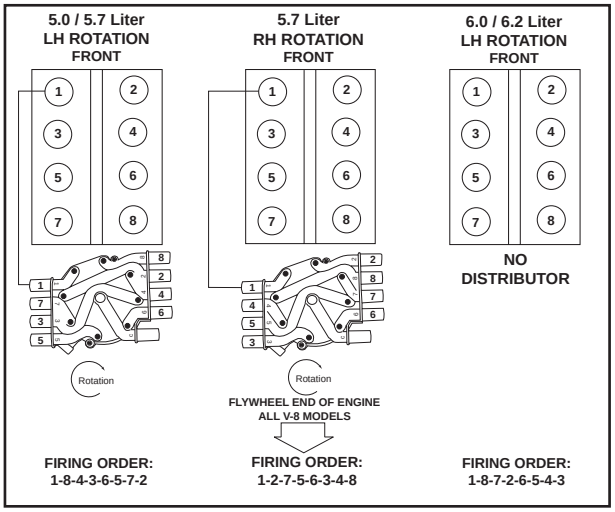
Master Engine Specification Sheets

L510030 - GCP / 4G Diagnostic Service Manual

L510015 - 5.0/5.7L Engine Mechanical Service Manual

L510016 - 6.0L Engine Mechanical Service Manual

PCM Premier Dealer Website - All the Latest Publications



Diagnostic Trouble Code (DTC)	Suspect Parameter Number (SPN)	Failure Mode Identifier (FMI)	Fault Description
DTC 107	106	4	MAP voltage low
DTC 108	106	16	MAP pressure high
DTC 11	520800	7	Distributor Position Error
DTC 111	105	15	IAT higher than expected stage 1
DTC 1111	515	16	RPM above fuel rev limit level
DTC 1112	515	0	RPM above spark rev limit level
DTC 112	105	4	IAT voltage low
DTC 1121	91	31	FPP1/2 simultaneous voltages out-of-range (redundancy lost)
DTC 1122	520199	11	FPP1/2 do not match each other or IVS (redundancy lost)
DTC 113	105	3	IAT voltage high
DTC 1155	4236	0	Closed-loop gasoline bank1 high
DTC 1156	4236	1	Closed-loop gasoline bank1 low
DTC 1157	4238	0	Closed-loop gasoline bank2 high
DTC 1158	4238	1	Closed-loop gasoline bank2 low
DTC 116	110	15	ECT higher than expected stage 1
DTC 117	110	4	ECT voltage low
DTC 118	110	3	ECT voltage high
DTC 121	51	1	TPS1-2 lower than expected
DTC 122	51	4	TPS1 voltage low
DTC 123	51	3	TPS1 voltage high
DTC 127	105	0	IAT higher than expected stage 2
DTC 129	108	1	BP pressure low
DTC 1311	1323	11	Cylinder 1 misfire detected
DTC 1312	1324	11	Cylinder 2 misfire detected
DTC 1313	1325	11	Cylinder 3 misfire detected
DTC 1314	1326	11	Cylinder 4 misfire detected
DTC 1315	1327	11	Cylinder 5 misfire detected
DTC 1316	1328	11	Cylinder 6 misfire detected
DTC 1317	1329	11	Cylinder 7 misfire detected
DTC 1318	1330	11	Cylinder 8 misfire detected
DTC 134	3217	5	EGO1 open / lazy
DTC 140	3256	5	EGO3 open / lazy
DTC 1411	441	3	EMWT1 voltage high
DTC 1412	442	3	EMWT2 voltage high

DTC 1413	441	4	EMWT1 voltage low
DTC 1414	442	4	EMWT2 voltage low
DTC 1415	441	15	EMWT1 higher than expected stage 1
DTC 1416	442	15	EMWT2 higher than expected stage 1
DTC 1417	441	0	EMWT1 higher than expected stage 2
DTC 1418	442	0	EMWT2 higher than expected stage 2
DTC 154	3227	5	EGO2 open / lazy
DTC 1542	704	4	AUX analog Pull-Up/Down 1 low voltage (Transmission Temp.)
DTC 16	636	8	Crank and/or cam could not synchronize during start
DTC 160	3266	5	EGO4 open / lazy
DTC 1611	1079	31	Sensor supply voltage 1 and 2 out-of-range
DTC 1612	629	31	Microprocessor failure - RTI 1
DTC 1613	629	31	Microprocessor failure - RTI 2
DTC 1614	629	31	Microprocessor failure - RTI 3
DTC 1615	629	31	Microprocessor failure - A/D
DTC 1616	629	31	Microprocessor failure - Interrupt
DTC 171	4237	0	Adaptive-learn gasoline bank1 high
DTC 172	4237	1	Adaptive-learn gasoline bank1 low
DTC 174	4239	0	Adaptive-learn gasoline bank2 high
DTC 175	4239	1	Adaptive-learn gasoline bank2 low
DTC 2111	51	7	Unable to reach lower TPS
DTC 2112	51	7	Unable to reach higher TPS
DTC 2115	91	0	FPP1 higher than IVS
DTC 2116	29	0	FPP2 higher than IVS
DTC 2120	520199	11	FPP1 invalid voltage and FPP2 disagrees with IVS (redundancy lost)
DTC 2121	91	18	FPP1-2 lower than expected
DTC 2122	91	3	FPP1 voltage high
DTC 2123	91	4	FPP1 voltage low
DTC 2125	520199	11	FPP2 invalid voltage and FPP1 disagrees with IVS (redundancy lost)
DTC 2126	91	16	FPP1-2 higher than expected
DTC 2127	29	4	FPP2 voltage low
DTC 2128	29	3	FPP2 voltage high
DTC 2130	558	5	IVS stuck at-idle, FPP1/2 match
DTC 2131	558	6	IVS stuck off-idle, FPP1/2 match
DTC 2135	51	31	TPS1/2 simultaneous voltages out-of-range
DTC 2139	91	1	FPP1 lower than IVS

DTC 2140	29	1	FPP2 lower than IVS
DTC 217	110	0	ECT higher than expected stage 2
DTC 219	515	15	RPM higher than max allowed govern speed
DTC 221	51	0	TPS1-2 higher than expected
DTC 222	3673	4	TPS2 voltage low
DTC 2229	108	0	BP pressure high
DTC 223	3673	3	TPS2 voltage high
DTC 2428	173	0	EGT temperature high
DTC 261	651	5	Injector 1 open or short to ground
DTC 2618	645	4	Tach output ground short
DTC 2619	645	3	Tach output short to power
DTC 262	651	6	Injector 1 coil shorted
DTC 264	652	5	Injector 2 open or short to ground
DTC 265	652	6	Injector 2 coil shorted
DTC 267	653	5	Injector 3 open or short to ground
DTC 268	653	6	Injector 3 coil shorted
DTC 270	654	5	Injector 4 open or short to ground
DTC 271	654	6	Injector 4 coil shorted
DTC 273	655	5	Injector 5 open or short to ground
DTC 274	655	6	Injector 5 coil shorted
DTC 276	656	5	Injector 6 open or short to ground
DTC 277	656	6	Injector 6 coil shorted
DTC 279	657	5	Injector 7 open or short to ground
DTC 280	657	6	Injector 7 coil shorted
DTC 282	658	5	Injector 8 open or short to ground
DTC 283	658	6	Injector 8 coil shorted
DTC 301	1323	31	Cylinder 1 emissions/catalyst damaging misfire
DTC 302	1324	31	Cylinder 2 emissions/catalyst damaging misfire
DTC 303	1325	31	Cylinder 3 emissions/catalyst damaging misfire
DTC 304	1326	31	Cylinder 4 emissions/catalyst damaging misfire
DTC 305	1327	31	Cylinder 5 emissions/catalyst damaging misfire
DTC 306	1328	31	Cylinder 6 emissions/catalyst damaging misfire
DTC 307	1329	31	Cylinder 7 emissions/catalyst damaging misfire
DTC 308	1330	31	Cylinder 8 emissions/catalyst damaging misfire
DTC 326	731	2	Knock1 excessive or erratic signal
DTC 327	731	4	Knock1 sensor open or not present

DTC 331	520197	2	Knock2 excessive or erratic signal
DTC 332	520197	4	Knock2 sensor open or not present
DTC 336	636	2	CRANK input signal noise
DTC 337	636	4	Crank signal loss
DTC 341	723	2	CAM input signal noise
DTC 342	723	4	Loss of CAM input signal
DTC 420	3050	11	Catalyst inactive on gasoline (Bank 1)
DTC 430	3051	11	Catalyst inactive on gasoline (Bank 2)
DTC 502	84	8	Roadspeed input loss of signal
DTC 521	100	0	Oil pressure sender high pressure
DTC 522	100	4	Oil pressure sender low voltage
DTC 523	100	3	Oil pressure sender high voltage
DTC 524	100	1	Oil pressure low
DTC 524	100	1	Oil pressure sender low pressure
DTC 562	168	17	Vbat voltage low
DTC 563	168	15	Vbat voltage high
DTC 601	628	13	Microprocessor failure - FLASH
DTC 604	630	12	Microprocessor failure - RAM
DTC 606	629	31	Microprocessor failure - COP
DTC 627	1348	5	Fuel pump relay coil open
DTC 628	1347	5	Fuel-pump high-side open or short to ground
DTC 629	1347	6	Fuel-pump high-side short to power
DTC 642	1079	4	Sensor supply voltage 1 low
DTC 643	1079	3	Sensor supply voltage 1 high
DTC 650	1213	5	MIL open
DTC 652	1080	4	Sensor supply voltage 2 low
DTC 653	1080	3	Sensor supply voltage 2 high
DTC 685	1485	5	Power relay coil open
DTC 686	1485	4	Power relay ground short
DTC 687	1485	3	Power relay coil short to power
DTC 8901	3221	31	UEGO1 internal processor fault
DTC 8902	3222	3	UEGO1 heater supply high voltage
DTC 8903	3222	4	UEGO1 heater supply low voltage
DTC 8904	3221	3	UEGO1 cal resistor voltage high
DTC 8905	3221	4	UEGO1 cal resistor voltage low
DTC 8906	3056	3	UEGO1 return voltage shorted high

DTC 8907	3056	4	UEGO1 return voltage shorted low
DTC 8908	3218	3	UEGO1 pump voltage shorted high
DTC 8909	3218	4	UEGO1 pump voltage shorted low
DTC 8910	3217	3	UEGO1 sense cell voltage high
DTC 8911	3217	4	UEGO1 sense cell voltage low
DTC 8912	3225	3	UEGO1 pump voltage at high drive limit
DTC 8913	3225	4	UEGO1 pump voltage at low drive limit
DTC 8914	3222	10	UEGO1 sense cell slow to warm up
DTC 8915	3225	10	UEGO1 pump cell slow to warm up
DTC 8916	3222	0	UEGO1 sense cell impedence high
DTC 8917	3225	0	UEGO1 pump cell impedence high
DTC 8918	3225	1	UEGO1 pump cell impedence low
DTC 8919	67049	31	UEGO2 internal processor fault
DTC 8920	67050	3	UEGO2 heater supply high voltage
DTC 8921	67051	4	UEGO2 heater supply low voltage
DTC 8922	67052	3	UEGO2 cal resistor voltage high
DTC 8923	67053	4	UEGO2 cal resistor voltage low
DTC 8924	67054	3	UEGO2 return voltage shorted high
DTC 8925	67055	4	UEGO2 return voltage shorted low
DTC 8926	67056	3	UEGO2 pump voltage shorted high
DTC 8927	67057	4	UEGO2 pump voltage shorted low
DTC 8928	67058	3	UEGO2 sense cell voltage high
DTC 8929	67059	4	UEGO2 sense cell voltage low
DTC 8930	67060	3	UEGO2 pump voltage at high drive limit
DTC 8931	67061	4	UEGO2 pump voltage at low drive limit
DTC 8932	67062	10	UEGO2 sense cell slow to warm up
DTC 8933	67063	10	UEGO2 pump cell slow to warm up
DTC 8934	67064	0	UEGO2 sense cell impedence high
DTC 8935	67065	0	UEGO2 pump cell impedence high
DTC 8936	67066	1	UEGO2 pump cell impedence low
DTC 8937	3222	4	UEGO1 heater open / ground short
DTC 8938	3222	3	UEGO1 heater short to power
DTC 8940	3232	4	UEGO2 heater open / ground short
DTC 8941	3232	3	UEGO2 heater short to power

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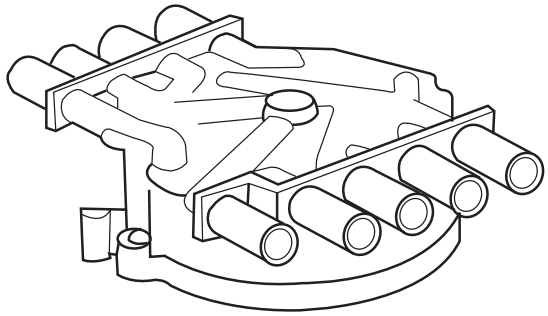
SERVICE UPDATE

Distributor Cap Replacement

September, 2011
SUP2011-01

Attention PCM Premier Dealers:

PCM emailed you a memo on June 14, 2011 in regards to Distributor Cap part number RA108009 and Distributor Tune Up Kit part number RP173098. PCM asked that if you had either of these two part numbers in your inventory to please quarantine them. This was due to a batch of distributor caps that was received from our vendor that was defective.



RA108009 Distributor Cap

PCM has now replenished inventory with corrected distributor caps. Please fill out the attached FASTFAX form and fax it to PCM in order to receive a RGA authorization number to return your quarantined parts for replacement. One form can be submitted with part number(s) and quantities. This form can also be submitted electronically through the PCM Premier Dealer Website. FASTFAX is for parts inventory replacement ONLY.

ALL FASTFAX forms must be submitted by October 14, 2011 in order to receive complete replacement. Thank you for your cooperation and support.

SERVICE UPDATE

6.0L CES Enhanced Exhaust Cooling System

April, 2012
SUP2012-01

PCM has engineered an enhanced exhaust cooling system kit for ZR409 CES applications between serial numbers 516315-525466 and ZR450 CES applications between serial numbers 515397-525466.

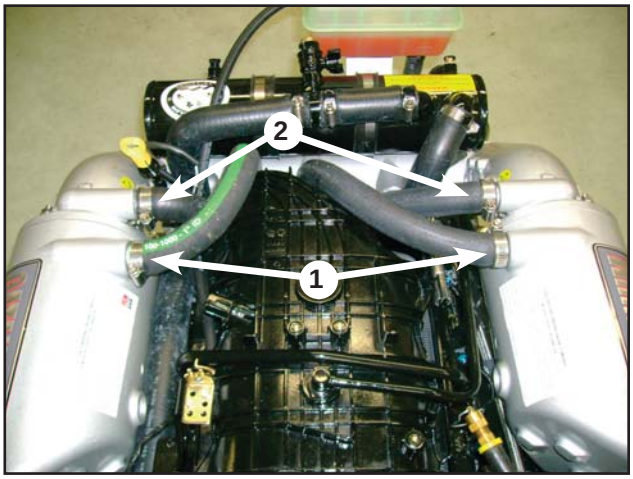
The enhanced exhaust cooling system has been developed has been designed to optimize exhaust cooling temperatures on your Catanium Clean Emissions System (CES). This enhancement precisely controls exhaust cooling temperatures and eliminates the conditions that, in some cases, may set diagnostic trouble codes and turn on the Malfunction Indicator Lamp.

Contact the PCM Service/Warranty Department for assistance in ordering the enhancement kit, P/N RF201013. If you have any boats in inventory, update them prior to sale.

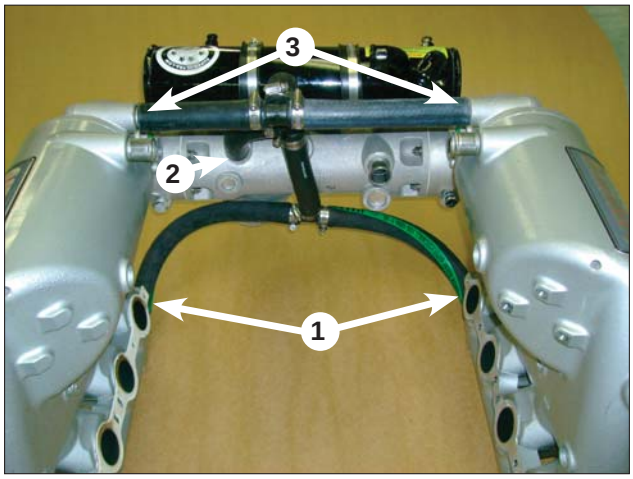
The following instructions will guide you through the enhancement kit installation. At the completion of installing the kit, it is required to connect Diacom to the engine and update the ECM calibration. This is to improve the ability to diagnose and protect the cooling system.

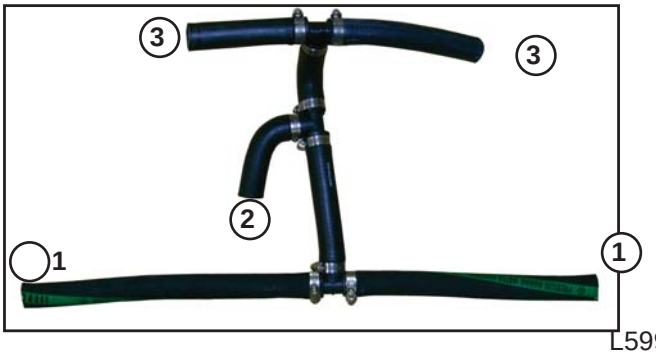
Enhancement Kit Installation Procedure

1. Ensure the battery switch is in the OFF position.
2. Remove the engine cover by removing the three attaching thumb screws.
3. Remove the two hoses (1) that go from the top of each exhaust manifold down to the exhaust crossover. Discard hoses.
4. Remove the two hoses (2) that go from each exhaust corner down to the rear of each exhaust manifold. Discard hoses.

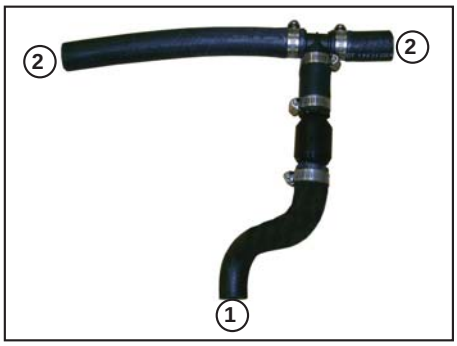


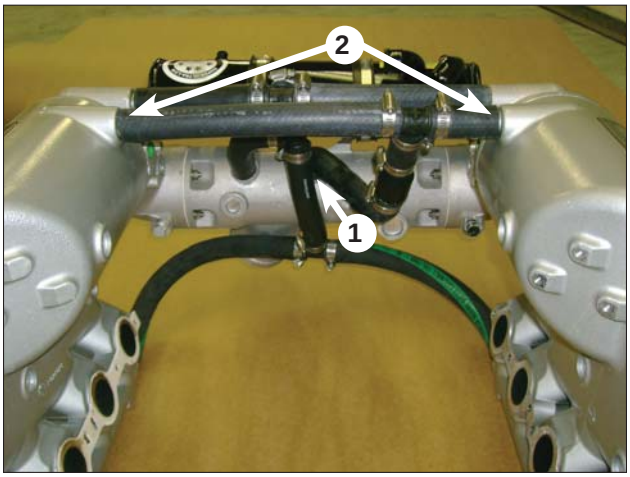
5. Install the hose assembly as shown.
6. Feed the two lower hoses (1) down between the rear of the intake manifold and the exhaust crossover. Attach these hoses to the bottom rear of each exhaust manifold.
7. Attach the hose (2) to the exhaust crossover fitting as shown in illustration.
8. Attach the two upper hoses (3) to each exhaust corner.





9. Install the hose assembly with thermostat housing as shown.
10. Attach the hose (1) to exhaust crossover fitting as shown in illustration.
11. Attach the two upper hoses (2) to each exhaust manifold.



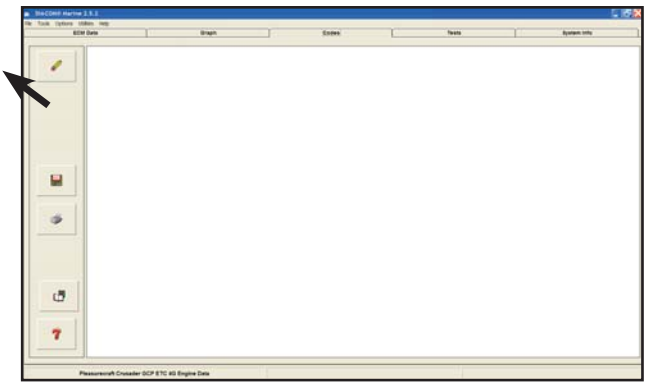


12. Ensure all hose clamps are tigntened securely.
13. Reinstall engine cover.

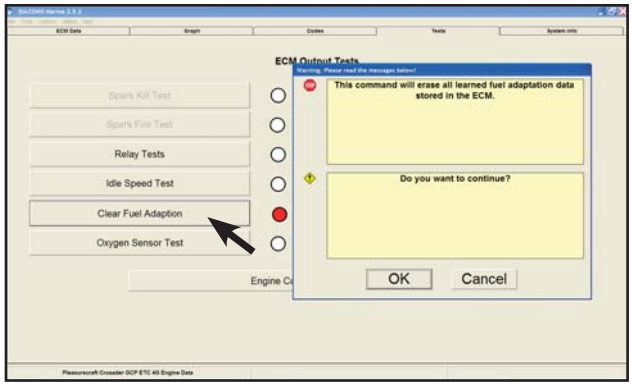
14. Using Diacom, perform the following steps to ensure the system is cleared of any false data.

15. Within the “Codes” tab, make sure that all Diagnostic Trouble Codes are cleared.

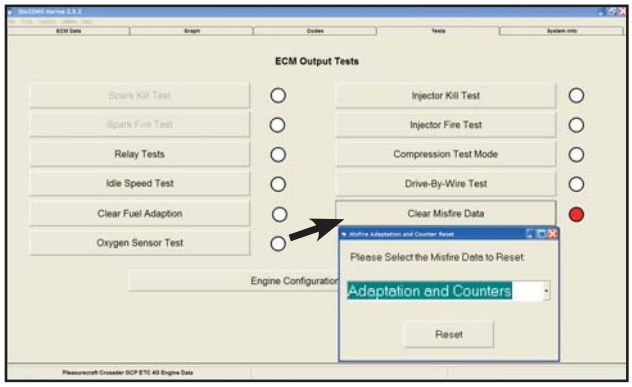
    Use the “Eraser” button to clear DTC’s if needed.



16. Within the “Tests” tab, select “Clear Fuel Adaption” and follow the steps.



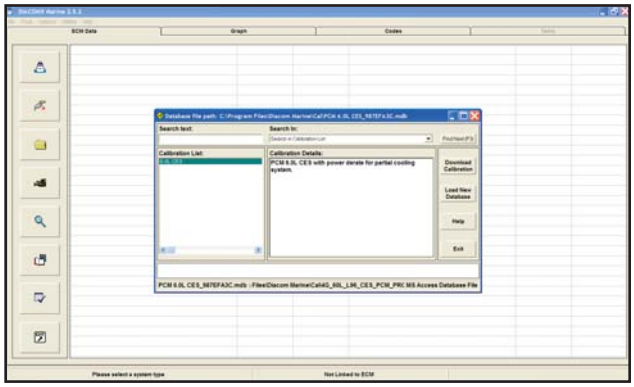
17. Within the “Tests” tab, select “Clear Misfire Data” then “Adaption and Counters“and follow the steps.



18. Download the calibration update. Contact PCM Warranty with the engine serial number in order to receive the Diacom files needed for this operation.

NOTE: The calibration update allows the engine to power derate in the event that a manifold temperature exceeds a threshold. There are two stages of power derate. Stage 1 limits the engine to maximum of 35% throttle position. Stage 2 limits the engine to 12% throttle position (just above idle speed).

Caution: In the event a problem occurs and the engine goes into Power Derate due to an over-temperature on the manifolds, the engine should be shutdown and the problem evaluated. Continuing to run the engine, even at idle speeds, could result in the manifolds getting too hot and damage occurring.

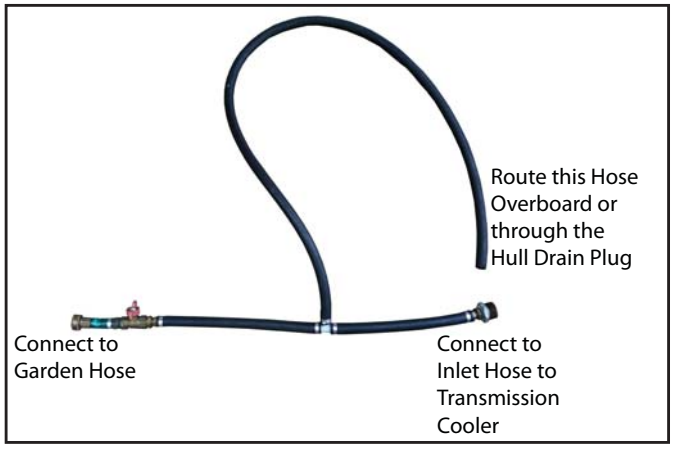


System Validation

NOTE: The engine must be run on the trailer in order to validate the system.

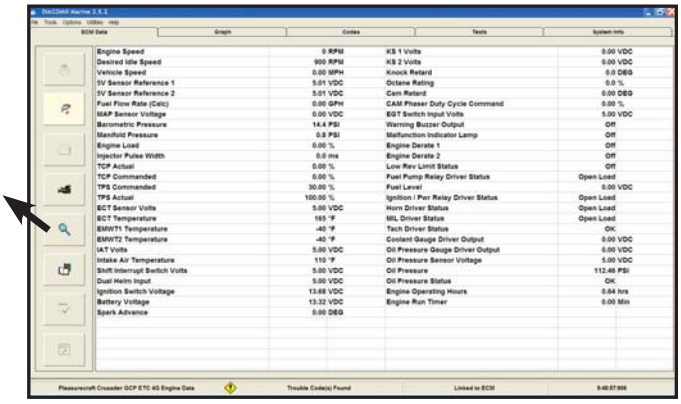
IMPORTANT: A proper setup MUST be used in order to supply the engine with sufficient amount of water WITHOUT the hose sucking closed.

1. Connect a garden hose using a setup similar to the one shown in the diagram. This allows for water to “bleed” off when the engine is not running and keeps the garden hose from sucking closed when the engine RPM’s are raised.



NOTE: This setup can be easily created with a few garden hose fittings and hose from the local hardware store. This makes a great tool for running boats on the trailer for any reason.

2. Laptop should be connected with Diacom running.
3. Ignition ON, engine OFF.
4. Start a Diacom Recording.
5. Start the engine and idle 5 minutes.
6. Bring the engine RPM up to 2000 RPM and hold for 5 minutes.



7. **IMPORTANT: Save the Diacom Recording and email it to mschneider@pleasurecraft.com with the engine serial number.**
   This is because PCM has encountered a small batch of Right Hand exhaust manifolds that may be suspect for a casting flaw. By performing the above System Validation and emailing PCM the recorded file, we can quickly determine if the manifold casting is suspect and may need to be replaced.
   Once the emailed recording is received, PCM will contact you shortly to let you know if everything is working properly, or PCM may ship an exhaust manifold for replacement.

#SUP2012-04

PCM Product Safety Update
Coast Guard Safety Recall

September 2012

#120049T

6.0L Non-Catalyst Vee Drive Wiring Harness Inspection

Engines Affected: 6.0L Vee Drive ONLY **Model Numbers: xx-601V-xx**

Serial Numbers Affected: 485198 - 507498

Coast Guard Safety Recall #120049T addresses a possible safety issue with the 6.0L non-catalyst vee drive applications indicated above. PCM has recognized that the wiring harness may come in contact with the fuel line or bracket. This issue was addressed with Service Update SUP2010-02 (November 2010). This may be a result from improper routing, engine installation and/or previous work in the area of concern. In the event that this happens, there is a possiblity that the wiring harness can become chaffed and cause wiring to be shorted to ground. If certain wires are shorted, there is a risk of a fire and/or personal injury. This section of the harness contains all the wiring coming out of the ECM and Fuse Block. The range of symptoms can vary greatly, depending on which wire(s) may short to ground. This condition MUST be inspected and repaired if necessary immediately on the affected models.

Immediately inspect this area of the harness to ensure that the harness is not contacting the fuel line or bracket. Regardless whether this is causing a problem or not, follow the instructions below to properly inspect and secure the harness, ensuring that it will never contact the fuel line or bracket and cause a problem.

If you are experiencing any type of driveability complaint on the above mentioned application, inspect this area thoroughly prior to any further diagnostics. If a problem is found with the harness being damaged, contact PCM Service Department via FASTFAX for repairing or replacing authorization. Properly secure the harness as outlined below.

Wiring Harness Inspection

1. Remove the two nuts (Figure 1) securing the Fuse Block to the bracket.
2. Remove the ECM connector. This allows for the Fuse Block to be moved in order to properly inspect the wiring harness.

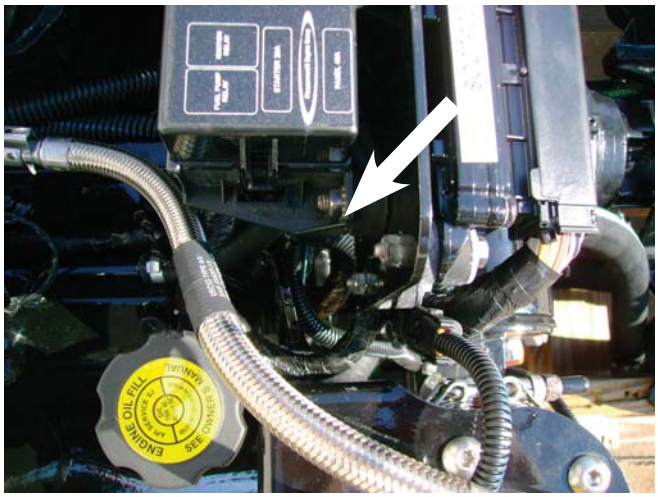


Figure 1 - Remove Fuse Block

3. Inspect the wiring harness in the area shown. Completey inspect the harness from where it exits the Fuse Block down to the main harness trunk as indicated in Figure 2. If there is no damage present to the wiring harness, proceed to **Securing and Protecting the Wiring Harness**.
4. If the wiring harness is damaged, repair or replace per PCM's direction. Once the repair is complete, proceed to **Securing and Protecting the Wiring Harness** to ensure future damage does not occur.

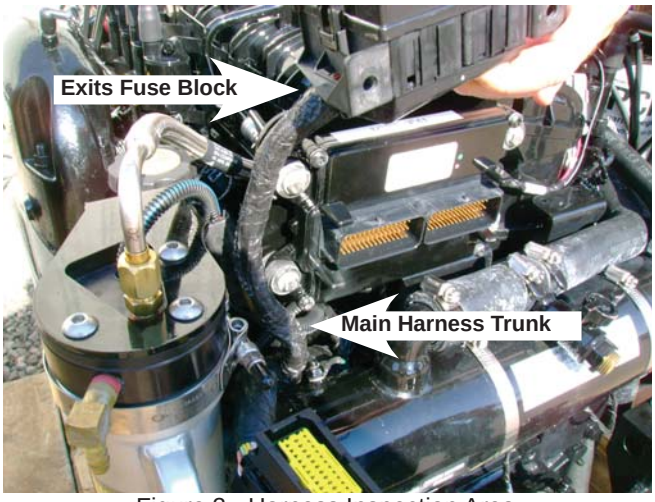


Figure 2 - Harness Inspection Area

Securing and Protecting the Wiring Harness

(Harmess Protection Kit, P/N RF201014)

1. Install the provided flex tubing over the harness between the Fuse Block and the main harness trunk as shown.

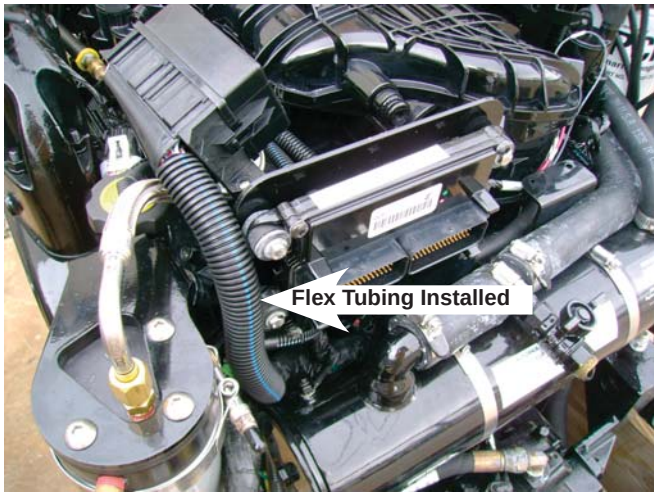


Figure 3 - Harness Protection Kit

2. Install Fuse Block back to the bracket. Tighten nuts securely.

3. Make sure the harnessing coming out of the Fuse Block is routed appropriately; not contacting brackets or fuel lines.

4. Make sure the fuel line is orientated in a way that keeps it away from the wire harness, but does not allow kinking of the fuel line.

5. Install the supplied velcro wrap around the fuel line in the location shown. Secure with tie straps at each end.

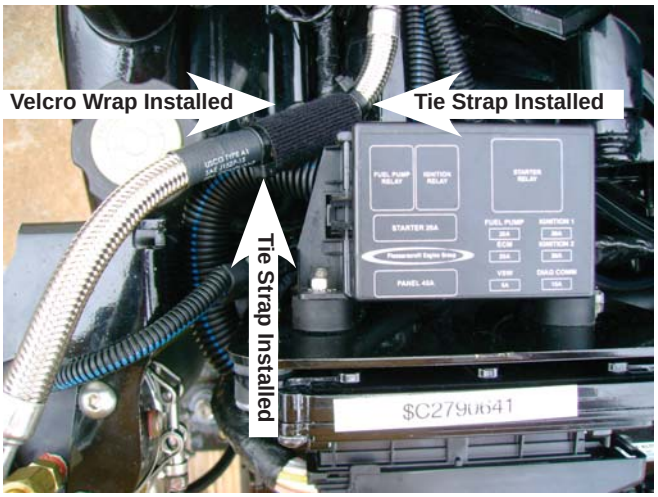


Figure 4 - Velcro Wrap Installed

6. Install the supplied rubber cap over the ground stud and nut on the Heat Exchanger. Push the cap down to fit securely over the nut.

Figure 5 - Rubber Cap Installed

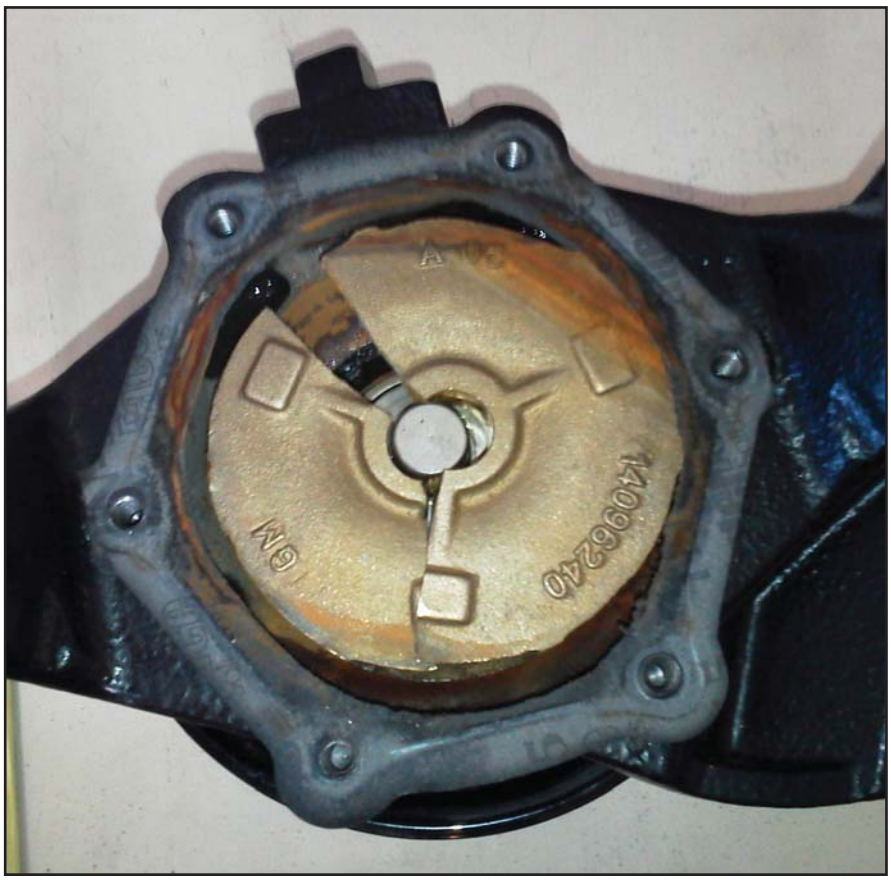
SERVICE UPDATE

5.7L Engine Circulation Pump

May, 2012
SUP2012-03

In the event you are diagnosing an overheat or running hot condition, the engine circulation pump should be tested and inspected prior to extensive diagnostics.

PCM is issueing Service Update SUP2012-03 to address a problem with 5.7L engines. General Motor's vendor for the circulation pump has supplied some pumps with impellers that do not meet the "Hardness" spec on the metals. The impeller metals in some cases are too hard. This condition results in the impeller cracking and is no longer able to circulate water through the engine and exhaust system. The crack can be anything from a hair-line crack to completely broken as shown below.



Back Cover Removed - Faulty Circulation Pump

#SUP2013-01 **PCM Product Information Update** Jan. 2013

Excessive Engine Oil Consumption
Supercedes SUP2012-05

Engines Affected: 5.7L / 5.7L CES ONLY	**Model Numbers: xx-570x-xx**
Serial Numbers Affected: ALL	**xx-570C-xx**

This update addresses excessive engine oil consumption concerns with 5.7L marine engines. The engine loads experienced in marine engines are much greater than those experienced in automotive applications. PCM has been testing and monitoring oil consumption with engines used in the watersports industry. Watersports activities may require the engine to run at very high load and/or high RPM conditions. PCM would like to share their findings with you in an attempt to minimize oil consumption between oil change intervals.

Marine engines have typically had Maintenance schedules such that the engine receives its first oil change after the 25-hour break-in period. The oil change is then performed once a year or every 50 hours. This schedule has worked accurately for boats operated with less load and less RPM requirements.

If the boat is going to be used primarily in high load and/or high RPM conditions above 60˚F, PCM recommends to use HD40 Optimum Viscosity engine oil after the 25-hour break-in period for 5.7L engines only. HD40 oil is formulated for use in high load situations. It is a premium monograde oil that was engineered for greater protection against thermal breakdown. PCM also recommends that the oil change interval should be every 30 hours. This will minimize the oil breakdown caused by these high load conditions. The more thermal breakdown, the more the engine is susceptible to burning oil in between oil changes.

NOTE: Never over-fill the engine with oil. Engines over-filled with oil can cause engine damage.

Engine Oil Requirements - Heavy Duty High RPM / High Load Use
(5.7L / 5.7L CES ONLY)

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity
Above 60˚F	HD40 Optimum Viscosity (API Service - SN, SM, SL, SJ)

Engine Oil Requirements - Typical Use
(5.7L / 5.7L CES / 6.0L / 6.0L CES / 6.0L HO CES)

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity
Above 50˚F	SAE 15W-40 “GF-4/SM”
Below 50˚F	SAE 5W-30 “GF-4/SM

Engine Oil Requirements - ALL Usage
(6.2L Supercharged ONLY)

Prevailing Ambient Temperature	Recommended A.P.I. Classification & Viscosity
All Temperatures	Synthetic 5W-30

NOTE: Refer to your PCM Owner’s Operation and Maintenance Manual for proper engine oil requirements for each application.

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PCM PRE-DELIVERY INSPECTION PROCEDURE

ENGINE SERIAL #:_____

TRANS. SERIAL#:_____

OWNER NAME:_____

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Pre-Delivery Inspection

REFERENCES: **PCM Owner's Operation and Maintenance Manual**
PCM Master Engine Specifications Sheet
Boat Owner's Manual

The Pre-Delivery Inspection ensures that the engine is performing properly and there are no deficiencies.. It is necessary that the inspection procedures be performed in the order given. PCM recommends that the inspection be accomplished in a timely manner, prior to the boat's delivery to our customer. This will allow for repairs (if necessary) to made without inconvenience to our customer.

The inspection is laid out in three stages. Stage number one is performed prior to launching the boat. Stage number two is performed in the water, at the dock, after launching the boat. Stage number three is a performance test of the engine, on the water. After completion of the Pre-Delivery Inspection you will have the information necessary to accurately and completely fill out the Pre-Delivery Checklist portion of the Warranty Registration Form.

Stage 1 - Prelaunch Inspection

1. Engine and Transmission Identification.
(Refer to the PCM Owner's Operation and Maintenance Manual for Engine and Transmission Identification locations.)

Locate the engine identification tag and record the model and serial number in the space provided. The PCM model identification provides you with valuable information concerning the engine you are working on. Information includes raw/fresh water cooling, engine rotation, engine type, drive type and function, propeller shaft rotation, gear ratio, and ignition and fuel type. This information will be needed for the next step in this procedure so you can narrow your search for Service Updates to only those associated with the engine you are preparing to put into service.

ENGINE MODEL NO. _____ ***ENGINE SERIAL NO.*** _____

Locate the transmission identification tag and record the model and serial number in the space provided**.**

TRANS. MODEL NO. _____ ***TRANS. SERIAL NO.*** _____

2. Service Update Bulletin Check

Once you have located the Engine and Transmission Model and Serial numbers, you need to review the Service Updates for any which may apply to the engine you are preparing for delivery.

Go to the PCM Premier Dealer Website and search for PCM Service Updates for the engine's serial number. Correct any condition that may be discovered. Note Service Update number in the space provided and check the compliance box**.**

SERVICE UPDATE # _____
_____
_____

SERVICE UPDATE - CHECK ☐

3. Propeller Identification and Inspection

(Refer to the PCM Owner's Operation and Maintenance Manual and the Master Engine Specification Sheet for operational parameters based on propeller selection.)

Proper boat performance is dependent upon boat design, engine power and a properly sized propeller. The size markings will be needed if a performance issue is raised.

With the boat out of the water, rotate the propeller until the size and rotation markings can be read.

Record the markings, Diameter, Pitch, and Rotation in the space provided and compare to known standards. If you are unsure of the proper propeller size, contact the boat manufacturer for the information necessary to determine the proper size for the boat. Correct any deficiency.

DIAMETER _____ PITCH _____ ROTATION _____

The boat manufacturer and/or the dealer selects and installs the propeller. Problems that are associated with the propeller or its installation should be corrected at the direction of the boat manufacturer and/or installer and are not a PCM warranty item.

4. Static Leak Check of Fuel and Oil Lines ☐

With the engine off, check all fuel and oil lines for leaks. Inspect each and every fuel and oil line to and on the engine for leaks. Note the location of any leaks found. Correct any deficiency.

_____

_____

The boat manufacturer and/or the dealer selects and installs the fuel lines from the fuel tank to the engine. Problems associated with this fuel line or its installation should be corrected at the direction of the boat manufacturer and/or installer and are not a PCM warranty item.

5. Engine Wiring Inspection ☐

Do a visual inspection to ensure that all plug-in connectors of the engine wiring harness are plugged into their proper devices. Check to ensure that the boat harness is plugged completely and correctly into the engine harness. Correct any deficiencies found and check the compliance box.

6. Static, Prelaunch Fluids Check ☐

Engine and transmission oil levels must be verified prior to engine operation. These levels will again be checked after launch. Oil levels must be at least to the low oil level mark at this time.

With the boat resting close to its in-the-water position, remove the dipstick and note the oil level.

Wipe the dipstick clean of oil and insert the dipstick into the dipstick tube. Be sure that the dipstick bottoms out in the tube.

Remove the dipstick and note the oil level. Correct any deficiency

Remove the dipstick from the transmission and note the oil level.

Wipe the dipstick clean of oil and insert the dipstick into the dipstick opening. Be sure that the dipstick bottoms out on case.

Remove the dipstick from the transmission and note the oil level. Correct any deficiency.

Check the compliance box.

7. Check Water & Exhaust Hoses for Proper Connection ☐

Attach hoses removed for winterization.

Inspect each hose for leaks, routing, rubbing, cuts or abrasions. Correct any deficiency.

If equipped, check to ensure that the strainer is not damaged or leaking. Correct any deficiency.

If equipped, check to ensure that the hull inlet valve is turned to its OPEN position.

If equipped, with fresh water cooling check to ensure that the coolant level is proper.

Check the compliance box on the procedure.

The boat manufacturer selects and installs the water and exhaust hoses to the engine. Problems associated with these hoses or their installation should be corrected at the direction of the boat manufacturer and/or installer and are not a PCM warranty item.

8. Install and Tighten all Drain Plugs ☐

The drain plugs have been removed for shipping or winterization. Before the engine may be safely started the drain plugs must be installed. Refer to PCM Owner's Operation and Maintenance Manual for proper locations.

Insert a plug of the proper size coated with PST (Pipe Sealant with Teflon by Loctite or equivalent) into each drain location.

Tighten each drain plug securely. ***Caution: Do Not Over Tighten Or Damage Could Occur.***

Check the compliance box on the procedure.

9. Visual Check of Belt And Pulley Alignment ☐

All PCM engines currently use a serpentine belt at the front of the engine. This belt has a self-tensioning system which is not adjustable.

Check belt for cuts or other damage. Correct any deficiency.

Check the pulleys for damage. Correct any deficiency.

Visually inspect for pulley and belt alignment. Correct any deficiency.

Check the compliance box on the procedure.

10. Check Battery Installation And Charge Level ☐

Check battery cold cranking amps against the minimum recommended Cold Cranking Amps listed on the *Master Engine Specification Sheet*. Correct any deficiency.

Check for a properly connected power cable (Red) and ground cable (Black) **at the engine.** Correct any deficiency.

Check the electrolyte level (as required) and battery charge. Correct any deficiency.

Always connect the positive (+) cable to the battery first and tighten securely.

Connect the negative (-) cable to the battery and tighten securely.

After following boat manufacturer's pre-start procedures, turn the Ignition Switch to the ON position and check for normal operation of the gauges. Turn the Ignition Switch to the OFF position. Do not start the engine at this time.

Check the compliance box.

Problems that are associated with the battery or its installation should be corrected at the direction of the supplier and/or installer and are not a PCM warranty item.

11. Check Control Adjustment, Direction and Travel ☐

The boat manufacturer and / or the dealer selects and installs the control cables and control head. Check both the throttle (if equipped) and shift cable in accordance with the boat manufacturers and/or installers instructions. Many manufacturer's are using an electronic throttle handle which only has the shift cable adjustment.

Generally, when the control is in the neutral position, inspect that the throttle linkage is at its zero or detent position and the transmission shift arm is in its neutral position. With the control moved to its in gear and zero throttle position, the transmission shift arm should be to its **full** in gear position (both forward and reverse positions need to be checked) and the throttle linkage should still be at its zero throttle position or detent position. Adjustments should be made as necessary and in accordance with the boat manufacturer's / installer's instructions.

Control cables are not a PCM warranty item.

Check the compliance box on the procedure.

Stage 2 - In-The-Water Inspection

1. Test Equipment Connection ☐

Prior to launch, with the boat on the trailer and the trailer backed down in the water, locate the OBDM CAN Connector on the engine. Connect the Diacom cable from your computer to the engine using the CAN BUS Network Adapter.

Install the fuel pressure gauge onto the fuel rail pressure fitting. Readings should be made with the gauge positioned at the same height as the fitting to which it is attached. Consult the *Master Engine Specification Sheet* for the proper pressures for the engine being tested.

Check the compliance box.

2. Check for Fuel Leaks ☐

Turn the Ignition Switch to the ON position to allow the fuel pumps to run until they shut off, then turn the Ignition Switch to the OFF position. This procedure may have to be repeated 1-3 times to prime the fuel system. Check for fuel leaks at the fuel pressure gauge connection. Repeat as necessary to build fuel pressure to the specification of this engine. Correct any leaks before proceeding.

When the fuel pressure is at the specified level, stop cycling the pumps and allow the engine to sit for one minute while observing the fuel pressure reading on fuel gauge. Pressure must remain constant when the fuel pumps are not operating.

NOTE: While the pumps are operating fuel pressure should be within the *Master Engine Specification* range for WOT pressure. After the pumps shut off, pressure will drop slightly but remain constant. If proper pressure is not displayed, or does not remain constant, correct this condition before proceeding.

Check for signs of fuel in the engine compartment and all fuel lines for leaks before starting the engine. Correct any deficiency prior to proceeding.

Check the compliance box.

3. Engine at Idle Check ☐

Follow boat manufacturer's starting procedures regarding the blower, etc. Start the engine. ***WARNING! If fuel leaks are present shut off the engine immediately.***

- Check to ensure that the water pump is pumping water. Allow the engine to idle for approximately one minute. Shut the engine off. Inspect each fuel line and fitting for leaks. Correct any deficiency prior to proceeding.
- Inspect each oil line and fitting for leaks. Correct any deficiency prior to proceeding.
- Inspect each water hose and fitting for leaks. Correct any deficiency prior to proceeding.
- Start the engine and inspect the exhaust hose and fitting for leaks. Correct any deficiency prior to proceeding.
- Check pulleys for wobble. Correct any deficiency.
- Remove the boat from the trailer and secure it to the dock. Shut the engine off and leave the test equipment attached to the engine.

Check the compliance box.

4. Engine and Transmission Fluid Check ☐

Engine:

Wipe the dipstick clean of oil and insert the dipstick into the dipstick tube. Be sure that the dipstick bottoms out in the tube.

Remove the dipstick and note the oil level. Correct any deficiency.

Correct a low oil level condition by adding the proper amount of oil, that meets the specification stated on the engine specification decal, to bring the oil to the full mark. Correct an over-filled condition by removing oil until the level reading on the dipstick is at the full mark.

PCM Transmission:

There is multiple methods of checking transmission oil level, depending on the application. Consult the PCM Owner's Operation and Maintenance manual to ensure the proper method is being used.

Remove the dipstick from the transmission and note the oil level. Correct any deficiency.

Correct any low oil deficiency by adding the proper amount of oil that meets the specification stated on the engine specification decal. Correct an over-filled condition by removing oil until the level reading on the dipstick is proper.

Check the compliance box.

5. Engine Management System (EMS) Check ☐

The DTC's also have both a Failure Mode Indicator (FMI) and Suspect Parameter Number (SPN). Each DTC has both a FMI and SPN in order to identify the exact circuit failure.

Note: *Diacom only displays the FMI and SPN numbers. Be sure to have both these numbers for each fault displayed.*

A check of the engine management system is done to ensure that the system has not been damaged or modified since shipment from PCM.

- With the Diacom connected to the engine and the Data Set configured to "Engine Data", turn the ignition switch to the 'ON' position (Do Not start the engine) and check the engine for codes. If codes are present, make a note of them, in the space provided on the Pre-Delivery Inspection Procedure, and then erase the codes using the 'Pencil with Eraser' icon button on the Diacom screen.
- If any code returns after the erase procedure is performed, the problem is still in the circuit indicated by the code and must be corrected by the technician before proceeding.

Trouble Codes

SPN	FMI	Fault Description
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

- When the system tests code-free, you may proceed to start the engine.

After starting the engine, for 5.0L and 5.7L engines only, CAM Retard must be checked using Diacom. Consult both Master Specifications and all Service Updates as there are different specifications for various models.

Check the compliance box.

6. Instrumentation Check ☐

The boat's instrumentation is the operator's insight into the engine's vital signs. Constant monitoring of the instrumentation is necessary. This will ensure that abnormal conditions are recognized as soon as possible to prevent engine damage and/or dangerous conditions from occurring.

Check and verify proper operation of all instrumentation. Correct any deficiency.

The boat manufacturer and/or the dealer selects and installs the instrumentation and/or gauges. Problems associated with the instrumentation and/or gauges, or their installation, should be corrected at the direction of the boat manufacturer and/or installer. These repairs are not a PCM warranty item.

Check the compliance box.

Stage 3 - Performance Check and Inspection

1. Test Engine Performance And WOT RPM ☐

All instrumentation and test equipment should be observed as frequently as possible to allow the operator to react quickly to any discrepancy displayed. The operator must also listen for unusual sounds, feel for unusual vibrations, smell for signs of fuel, smoke, etc. and look for any sign of abnormal operational characteristics.

- Check all instrumentation to verify normal operation and readings.

- Once temperature is stabilized, check and record the fuel pressure while at idle.

When conditions permit, accelerate to bring the boat on plane and to a cruising speed of 3600 RPM. While frequently observing the gauges, operate the boat at this speed until oil pressure and engine temperature stabilize.

- Move the throttle to wide-open-throttle (WOT) and run at this speed (not to exceed 30 seconds) until the RPMs have stopped increasing. Reduce the throttle to 3600 RPM. Note and record the WOT RPM, Throttle Position % and fuel pressure at WOT.

- While frequently observing the gauges, return the engine to 3600 RPM until oil pressure and engine temperature stabilize.

Return to idle.

FUEL PRESSURE - IDLE _____ WOT_____

WOT RPM _____ WOT THROTTLE POSITION % _____

Note: *Engines equipped with electronic throttle control utilize an electronic governing feature in order to not exceed the maximum RPM. In some cases, you may find that the maximum RPM is being achieved, but throttle position has backed off to something less than 100%. In many cases this is by design for more lower end performance.*

2. Diacom Record of Engine Performance ☐

Record the following water test for your records, using the DIACOM recording feature. This recording is to be made after all defects, if any are found, are corrected.

1. Idling for 10 seconds.
2. Running at 1,000, 2,000, 3,000, 4,000 RPM for 10 seconds each.
3. Return to idle for 10 seconds.
4. Accelerate to 3600 RPM and run @ 3600 RPM for 30 seconds.
5. Accelerate to WOT and run at WOT until the RPM's stop increasing (not to exceed 30 seconds).
6. Return the throttle quickly to idle and allow the engine idle for 10 seconds, then stop the recording.
7. Save the recording, using the engine serial number as the *file name.*

Note: *This information provides a valuable baseline for each model engine. This can be used to compare against a recording on an engine, that has a drivability complaint, to help identify a problem.*

Return to the dock, turn off the engine. Compare your recorded oil pressure, WOT fuel pressure and WOT RPM value to the Master Engine Specification Sheet. Correct any defects that were noted and retest the boat.

Check the engine for leaks (water, oil and fuel) and correct any leaks noted. Recheck the fluid levels in the engine and transmission and correct as necessary.

Recover the boat from the water. If defects that could not be corrected in the water were noticed, correct those defects. After correction of defects return the boat to the water to retest the boat.

Disconnect test equipment and prepare boat for final delivery.

Check the compliance box.

3. Lay-Up Engine (if required) ☐

Performance of Pre-Delivery Inspection Procedure has dewinterized the boat. Winterize the engine as necessary. Refer to the PCM Owner's Operation and Maintenance Manual for Lay-Up instructions.

Check the compliance box.

4. Complete the Electronic PreDelivery Checklist

Using the data noted in the Pre-Delivery Inspection Procedure, complete all the required information on the Online Engine Registration.

Engine Model No.

Engine Serial No.

Drive Serial No.

Search for Service Updates

Engine Oil: Check

Drive Lube: Check

Battery Rating, Charge, and Level: Check

Control Adjustments: Confirm Proper Operation

Gauges: Check for Proper Operation

Record Propeller Size, Rotation, and WOT

WOT RPM _____ Diameter _____Pitch _____ Rotation _____

Record Fuel Pressure, Idle _____ WOT _____

Belt and Pulley: Inspect for Damage

All Drain Plugs: Confirm Proper Installation

All Fuel Lines: Confirm No Leaks

All Oil Lines: Confirm No Leaks

All Water Lines: Confirm No Leaks

Electrical Wiring: Check for Proper Installation

Trouble Codes Checked / Trouble Codes Cleared

A copy of Pre-Delivery Inspection Procedure and your Diacom recording should be filed in your records by engine serial number, owner's name, or both for future reference by the technician.

5. Completing Warranty Registration Form

When the boat is sold, you will complete the remaining blocks of the Warranty Registration Form. **Completely fill in the required information.**

Owner's Name
Address
City, State, Zip
Owner's Email Address
Boat Make, Length, Type
Date of Sale
Selling Dealer
Dealer Address

Review the PCM 3-Year Transferable Limited Warranty with the new owner. Then complete the remaining dealer portion of the form by filling in the following blocks.

Dealer Reviewed Warranty with Owner (the last block of the Pre-Delivery Checklist)
Dealer Signature (By signing this form, the dealer certifies that he has checked the installation and operation of the engine(s) and finds them to be performing properly.)
Owner's Signature and Date

Give the customer their copy of the completed form along with the copy of the Warranty Statement. Register the engine through the Premier Dealer Website Online Engine Registration.

This completes the registration of a new PCM engine. By signing this form, the dealer certifies that he has checked the installation and operation of the engine(s) and finds them to be performing properly.