

# Identification Record

Please record the following information:

<b>Engine Model and Horsepower</b>		<b>Engine Serial Number</b>
<b>Transom Assembly Serial Number (Sterndrive)</b>	<b>Gear Ratio</b>	<b>Sterndrive Unit Serial Number</b>
<b>Transmission Model (Inboard)</b>	<b>Gear Ratio</b>	<b>Transmission Serial Number</b>
<b>Propeller Number</b>	<b>Pitch</b>	<b>Diameter</b>
<b>Hull Identification Number (HIN)</b>		<b>Purchase Date</b>
<b>Boat Manufacturer</b>	<b>Boat Model</b>	<b>Length</b>
<b>Exhaust Gas Emissions Certification Number</b>		

The serial numbers are the manufacturer's keys to numerous engineering details that apply to your Mercury MerCruiser® power package. When contacting your Authorized Mercury MerCruiser Dealer about service, always specify model and serial numbers.

The description and specifications contained herein were in effect at the time this guide was approved for printing. Mercury Marine, whose policy is one of continuous improvement, reserves the right to discontinue models at any time, or to change specifications or designs, without notice and without incurring obligation.

Mercury Marine, Fond du Lac, Wisconsin, U.S.A. Printed in U.S.A.

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Mercury, Mercury Marine, MerCruiser, Mercury MerCruiser, Mercury Racing, Mercury Precision Parts, Mercury Propellers, Mariner, Quicksilver, #1 On The Water, Alpha, Bravo, Bravo Two, Pro Max, OptiMax, Sport-Jet, K-Planes, MerCathode, RideGuide, SmartCraft, Zero Effort, M with Waves logo, Mercury with Waves logo, Vesselview, and SmartCraft logo are all registered trademarks of Brunswick Corporation. Mercury Product Protection logo is a registered service mark of Brunswick Corporation.

## Welcome

You have selected one of the finest marine power packages available. It incorporates numerous design features to assure operating ease and durability.

With proper care and maintenance, you will thoroughly enjoy using this product for many boating seasons. To ensure maximum performance and carefree use, we ask that you thoroughly read this manual.

The Operation, Maintenance and Warranty Manual contains specific instructions for using and maintaining your product. We suggest that this manual remain with the product for ready reference whenever you are on the water.

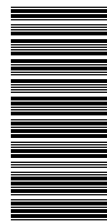
Thank you for purchasing one of our Mercury MerCruiser products. We sincerely hope your boating will be pleasant!

Mercury MerCruiser

## Warranty Message

The product you have purchased comes with a **limited warranty** from Mercury Marine; the terms of the warranty are set forth in the Warranty Sections of this manual. The warranty statement contains a description of what is covered, what is not covered, the duration of coverage, how to best obtain warranty coverage, **important disclaimers and limitations of damages** and other related information. Please review this important information.


Mercury Marine products are designed and manufactured to comply with our own high quality standards, applicable industry standards and regulations, as well as certain emissions regulations. At Mercury Marine every engine is operated and tested before it is boxed for shipment to make sure that the product is ready for use. In addition, certain Mercury Marine products are tested in a controlled and monitored environment, for up to 10 hours of engine run time, in order to verify and make a record of compliance with applicable standards and regulations. All Mercury Marine product, sold as new, receives the applicable limited warranty coverage, whether the engine participated in one of the test programs described above or not.



## Read This Manual Thoroughly

**IMPORTANT:** If You Don't Understand Any Portion, Contact Your Dealer For A demonstration Of Actual Starting And Operating Procedures.

### Notice

Throughout this publication, and on your power package, dangers, warnings, cautions, and notices, accompanied by the International Hazard Symbol , may be used to alert the installer/user to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. These Safety Alerts alone cannot eliminate the hazards that they signal. Strict compliance with these special instructions while performing the service, plus common sense operation, are major accident prevention measures.

#### DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

#### WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

#### CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

#### NOTICE

Indicates a situation which, if not avoided, could result in engine or major component failure.

**IMPORTANT:** Identifies information essential to the successful completion of the task.

**NOTE:** Indicates information that helps in the understanding of a particular step or action.

#### WARNING

The operator (driver) is responsible for the correct and safe operation of the boat, the equipment aboard and the safety of all occupants aboard. We strongly recommend that the operator read this Operation, Maintenance and Warranty Manual and thoroughly understand the operational instructions for the power package and all related accessories before the boat is used.

#### WARNING

The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

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# Section 1 - Warranty

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## Warranty Registration United States and Canada

1. You may change your address at any time, including at time of warranty claim, by calling Mercury Marine or sending a letter or fax with your name, old address, new address, and engine serial number to Mercury Marine's Warranty Registration Department. Your dealer can also process this change of information.

Mercury Marine  
Attn: Warranty Registration Department  
W6250 Pioneer Road  
P.O. Box 1939  
Fond du Lac, WI 54936-1939  
920-929-5054  
Fax 920-929-5893

**NOTE:** Registration lists must be maintained by Mercury Marine and any dealer on marine products sold in the United States, should a safety recall notification under the Federal Safety Act be required.

2. To be eligible for warranty coverage, the product must be registered with Mercury Marine. At the time of sale, the dealer should complete the warranty registration and immediately submit it to Mercury Marine via MercNET, E-mail, or mail. Upon receipt of this warranty registration, Mercury Marine will record the registration.
3. Upon processing the warranty registration, Mercury Marine will send registration verification by mail to the purchaser of the product. If this registration verification is not received within 30 days, please contact your selling dealer immediately. Warranty coverage is not effective until your product is registered with Mercury Marine.

## Warranty Registration Outside the United States and Canada

1. It is important that your selling dealer fills out the Warranty Registration Card completely and mails it to the distributor or Marine Power Service Center responsible for administering the warranty registration/claim program for your area.
2. The Warranty Registration Card identifies your name and address, product model and serial numbers, date of sale, type of use and the selling distributor's/dealer's code number, name and address. The distributor/dealer also certifies that you are the original purchaser and user of the product.
3. A copy of the Warranty Registration Card, designated as the Purchaser's Copy, MUST be given to you immediately after the card has been completely filled out by the selling distributor/dealer. This card represents your factory registration identification and should be retained by you for future use when required. Should you ever require warranty service on this product, your dealer may ask you for the Warranty Registration Card to verify date of purchase and to use the information on the card to prepare the warranty claim forms.
4. In some countries, the Marine Power Service Center will issue you a permanent (plastic) Warranty Registration Card within 30 days after receiving the Factory Copy of the Warranty Registration Card from your distributor/dealer. If you receive a plastic Warranty Registration Card, you may discard the Purchaser's Copy that you received from the distributor/dealer when you purchased the product. Ask your distributor/dealer if this plastic card program applies to you.  
**IMPORTANT: Registration lists must be maintained by the factory and dealer in some countries by law. It is our desire to have ALL products registered at the factory should it ever be necessary to contact you. Make sure your dealer/distributor fills out the warranty registration card immediately and sends the factory copy to the Marine Power International Service Center for your area.**
5. For further information concerning the Warranty Registration Card and its relationship to Warranty Claim processing, refer to the International Warranty.

## Transfer of Warranty

The limited warranty is transferable to a subsequent purchaser, but only for the remainder of the unused portion of the limited warranty. This will not apply to products used for commercial applications.

To transfer the warranty to the subsequent owner, send or fax a copy of the bill of sale or purchase agreement, new owner's name, address and engine serial number to Mercury Marine's Warranty Registration Department. In the United States and Canada, mail to:

Mercury Marine  
Attn: Warranty Registration Department  
W6250 W. Pioneer Road  
P.O. Box 1939  
Fond du Lac, WI 54936-1939  
920-929-5054  
Fax +1 920 907 6663

Upon processing the transfer of warranty, Mercury Marine will send registration verification to the new owner of the product by mail.

There is no charge for this service.



For products purchased outside the United States and Canada, contact the distributor in your country, or the Marine Power Service Center closest to you.

## **Mercury Product Protection Plan**

### **United States And Canada Only**

(Certain performance products, triple engine installations, and commercial applications are excluded.)

The Mercury Product Protection Plan provides coverage against unexpected mechanical and electrical breakdowns that may occur beyond the standard limited warranty.

The optional Mercury Product Protection Plan is the only Factory Plan available for your engine.

One, two, three, four or five - year term plans can be purchased up to 12 months after the original engine registration date.

See your participating Mercury MerCruiser dealer for complete program details.

## **Mercury MerCruiser Limited Warranty (Gasoline Fueled Products Only)**

### **What Is Covered**

Mercury Marine warrants its new products to be free of defects in material and workmanship during the period described following.

### **Standard Coverage**

This Limited Warranty provides coverage for either one (1) year from the date the product is first sold to a recreational use retail purchaser, or the date on which the product is first put into service, whichever occurs first. Products installed by an IQ Certified Installer receive one (1) year of additional coverage. Commercial users of these products receive warranty coverage of either one (1) year from the date of first retail sale, or the accumulation of 500 hours of operation, whichever occurs first. Commercial use is defined as any work or employment related use of the product, or any use of the product which generates income, for any part of the warranty period, even if the product is only occasionally used for such purposes. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred from one recreational use customer to a subsequent recreational use customer upon proper re-registration of the product. Unexpired warranty coverage cannot be transferred either to or from a commercial use customer. Warranty coverage is terminated for used product repossessed from a retail customer, purchased at auction, from a salvage yard, or from an insurance company that obtained the product as a result of an insurance claim.

### **Horizon Sterndrive and Inboard Models, and MX 6.2 Black Scorpion Tow Sport Model Coverage**

This Limited Warranty provides coverage for either three (3) years from the date the product is first sold to a recreational use retail purchaser, or the date on which the product is first put into service, whichever occurs first. An additional one (1) year is added to the recreational user if the product is installed by an IQS certified installer. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred from one recreational use customer to a subsequent recreational use customer upon proper re-registration of the product. Warranty coverage is terminated for used product repossessed from a retail customer, purchased at auction, from a salvage yard, or from an insurance company that obtained the product as a result of an insurance claim.

### **Conditions That Must Be Met In Order To Obtain Warranty Coverage**

Warranty coverage is available only to retail customers that purchase from a Dealer authorized by Mercury Marine to distribute the product in the country in which the sale occurred, and then only after the Mercury Marine specified pre-delivery inspection process is completed and documented. Warranty coverage becomes available upon proper registration of the product by the authorized dealer. Inaccurate warranty registration information regarding recreational use, or subsequent change of use from recreational to commercial (unless properly re-registered) may void the warranty at the sole discretion of Mercury Marine. Routine maintenance outlined in the Operation and Maintenance Manual must be timely performed in order to obtain warranty coverage. Mercury Marine reserves the right to make any warranty coverage contingent upon proof of proper maintenance.

### **What Mercury Will Do**

Mercury's sole and exclusive obligation under this warranty is limited to, at our option, repairing a defective part, replacing such part or parts with new or Mercury Marine certified re-manufactured parts, or refunding the purchase price of the Mercury product. Mercury reserves the right to improve or modify products from time to time without assuming an obligation to modify products previously manufactured.

## How To Obtain Warranty Coverage

The customer must provide Mercury with a reasonable opportunity to repair, and reasonable access to the product for warranty service. Warranty claims shall be made by delivering the product for inspection to a Mercury dealer authorized to service the product. If purchaser cannot deliver the product to such a dealer, written notice must be given to Mercury. We will then arrange for the inspection and any covered repair. Purchaser in that case shall pay for all related transportation charges and/or travel time. If the service provided is not covered by this warranty, purchaser shall pay for all related labor and material, and any other expenses associated with that service. Purchaser shall not, unless requested by Mercury, ship the product or parts of the product directly to Mercury. Proof of registered ownership must be presented to the dealer at the time warranty service is requested in order to obtain coverage.

## What Is Not Covered

This limited warranty does not cover routine maintenance items, tune ups, adjustments, normal wear and tear, damage caused by abuse, abnormal use, use of a propeller or gear ratio that does not allow the engine to run in its recommended RPM range (see the Operation and Maintenance Manual), operation of the product in a manner inconsistent with the recommended operation/duty cycle section of the Operation and Maintenance Manual, neglect, accident, submersion, improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product), improper service, use of an accessory or part which damages the Mercury product and was not manufactured or sold by us, jet pump impellers and liners, operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operation and Maintenance Manual), alteration or removal of parts, water entering the engine through the fuel intake, air intake or exhaust system or damage to the product from insufficient cooling water caused by blockage of the cooling system by a foreign body, running the engine out of water, mounting the engine too high on the transom, or running the boat with the engine trimmed out too far. Use of the product for racing or other competitive activity, or operating with a racing type lower unit, at any point, even by a prior owner of the product, voids the warranty. Expenses related to haul-out, launch, towing, storage, telephone, rental, inconvenience, slip fees, insurance coverage, loan payments, loss of time, loss of income, or any other type of incidental or consequential damages are not covered by this warranty. Also, expenses associated with the removal and/or replacement of boat partitions or material caused by boat design for access to the product are not covered by this warranty. No individual or entity, including Mercury Marine authorized dealers, has been given authority by Mercury Marine to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against Mercury Marine.

### **DISCLAIMERS AND LIMITATIONS**

**THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME STATES/COUNTRIES DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE. AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH VARY FROM STATE TO STATE AND COUNTRY TO COUNTRY.**

## 3 Year Limited Warranty Against Corrosion (Worldwide)

### What Is Covered

Mercury Marine warrants that each new Mercury, Mariner, Mercury Racing, Sport Jet, M<sup>2</sup> Jet Drive, Tracker by Mercury Marine Outboard, MerCruiser Inboard or Sterndrive engine (Product) will not be rendered inoperative as a direct result of corrosion for the period of time described below.

### Duration Of Coverage

This limited corrosion warranty provides coverage for three (3) years from either the date the product is first sold, or the date on which the product is first put into service, whichever occurs first. The repair and replacement of parts, or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred to subsequent (noncommercial use) purchaser upon proper re-registration of the product. Warranty coverage is terminated for used product repossessed from a retail customer, purchased at auction, from a salvage yard, or from an insurance company that obtained the product as a result of an insurance claim.

## Condition That Must Be Met In Order To Obtain Warranty Coverage

Warranty coverage is available only to retail customers that purchase from a Dealer authorized by Mercury Marine to distribute the product in the country in which the sale occurred, and then only after the Mercury Marine specified pre-delivery inspection process is completed and documented. Warranty coverage becomes available upon proper registration of the product by the authorized dealer. Corrosion prevention devices specified in the Operation and Maintenance Manual must be in use on the boat, and routine maintenance outlined in the Operation and Maintenance Manual must be timely performed (including without limitation the replacement of sacrificial anodes, use of specified lubricants, and touch-up of nicks and scratches) in order to maintain warranty coverage. Mercury Marine reserves the right to make warranty coverage contingent upon proof of proper maintenance.

## What Mercury Will Do

Mercury's sole and exclusive obligation under this warranty is limited to, at our option, repairing a corroded part, replacing such part or parts with new or Mercury Marine certified re-manufactured parts, or refunding the purchase price of the Mercury product. Mercury reserves the right to improve or modify products from time to time without assuming an obligation to modify products previously manufactured.

## How To Obtain Warranty Coverage

The customer must provide Mercury with a reasonable opportunity to repair, and reasonable access to the product for warranty service. Warranty claims shall be made by delivering the product for inspection to a Mercury dealer authorized to service the product. If purchaser cannot deliver the product to such a dealer, written notice must be given to Mercury. We will then arrange for the inspection and any covered repair. Purchaser in that case shall pay for all related transportation charges and/or travel time. If the service provided is not covered by this warranty, purchaser shall pay for all related labor and material, and any other expenses associated with that service. Purchaser shall not, unless requested by Mercury, ship the product or parts of the product directly to Mercury. Proof of registered ownership must be presented to the dealer at the time warranty service is requested in order to obtain coverage.

## What Is Not Covered

This limited warranty does not cover electrical system corrosion; corrosion resulting from damage, corrosion which causes purely cosmetic damage, abuse or improper service; corrosion to accessories, instruments, steering systems; corrosion to factory installed jet drive unit; damage due to marine growth; product sold with less than a one year limited Product warranty; replacement parts (parts purchased by the Customer); products used in a commercial application. Commercial use is defined as any work or employment related use of the product, or any use of the product which generates income, for any part of warranty period, even if the product is only occasionally used for such purposes.

## Mercury Installation Quality Certification Program



15502

Mercury MerCruiser products installed by a Mercury Installation Quality Certified Manufacturer are Installation Quality certified products and may receive an additional one (1) year of limited warranty coverage.

The Installation Quality Certification program was developed to recognize MerCruiser boatbuilder customers who have achieved higher manufacturing standards. It is the first and only comprehensive manufacturer-installation certification program in the industry.

The program has three goals:

1. To enhance overall product quality.

## Section 1 - Warranty

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2. To improve the boat ownership experience.
3. To enhance overall customer satisfaction.

The certification process is designed to review all facets of manufacturing and engine installation. The program is composed of design, manufacturing and installation review stages with which builders must comply. Certification applies leading-edge methodologies to create:

- Efficiencies and best practices specific to engine installation.
- World-class assembly and component specifications.
- Efficient installation processes.
- Industry standard end-of-line test procedures

Boat builders that successfully complete the program and meet all certification requirements earn Installation Quality System Certified Manufacturer status and receive an additional one (1) year of Mercury limited factory warranty coverage on all MerCruiser-powered boats that are registered on and after the boat builder's certification date for all worldwide registrations.

Mercury has designated a section of our Website to promote the Installation Quality Certification Program and communicate its benefits to consumers. For a current list of MerCruiser-powered boat brands that have earned Installation Quality Certification, visit [www.mercurymarine.com/mercruiser\\_warranty](http://www.mercurymarine.com/mercruiser_warranty).

## California Emissions Limited Warranty

**NOTE:** Mercury Marine does not establish model years for the Mercury MerCruiser product line. In order to comply with CARB warranty regulations, and for that limited purpose only, model year shall have the same meaning as calendar year. As an example, 2003 model year products refers to products manufactured during calendar year 2003.

The California Air Resources Board has promulgated air emissions regulations for inboard and sterndrive engines. The regulations apply to all inboard and sterndrive engines that were manufactured for the 2003 model year and later. Mercury Marine, in compliance with those regulations, provides this limited warranty for the emission control systems (see the components of the emission control system listed following), and further warrants that the inboard or sterndrive engine was designed, built, and equipped to conform with all applicable regulations adopted by the California Air Resources Board pursuant to its authority in Chapters 1 and 2, Part 5, Division 26 of the Health and Safety Code. For information regarding the limited warranty for the non-emissions related components of the inboard or sterndrive engine, please see the limited warranty statement for your engine.

## What Is Covered

**NOTE:** Your dealer will register your engine for warranty coverage for you. The warranty registration process is not related in any way to the process of obtaining a license, title or registration from state boating authorities. You should ask your dealer to update your warranty registration information to reflect a change of address or a transfer of ownership. (This change may be made at any time.) Refer to the Warranty Registration information in your owners manual or to your dealer for more information.

Mercury Marine warrants the components of the emissions control systems (see the components of the emission control system listed following) of its new, 2003 model year and later California-certified inboard and sterndrive engines, registered to a California resident, to be free from defects in material or workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in the application of Mercury Marine for certification from the California Air Resources Board, for the period of time, and under the conditions identified below. The cost to diagnose a warranty failure is covered if the warranty claim is approved. Damage to other engine components caused by the failure of a warranted part will also be repaired under warranty.

## Duration of Coverage

**NOTE:** Mercury Marine does not establish model years for the Mercury MerCruiser product line. In order to comply with CARB warranty regulations, and for that limited purpose only, model year shall have the same meaning as calendar year. As an example, 2003 model year products refers to products manufactured during calendar year 2003

This limited warranty provides coverage for the components of the emissions control systems. Specific emission control related parts on new inboard or sterndrive engines are warranted for 3 years or 480 hours, whichever first occurs, from either the date the product is first sold, or first put into service, whichever occurs first. Emission related normal maintenance items such as spark plugs and filters, that are on the warranted parts list are warranted up to their first required replacement interval only. Refer to **Emission Control System Components** and **Maintenance Schedule**. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred to a subsequent purchaser. Refer to **Transfer of Warranty**.

## How to Obtain Warranty Coverage

The customer must provide Mercury with a reasonable opportunity to repair and reasonable access to the product for warranty service. Warranty claims shall be made by delivering the product for inspection to a Mercury dealer authorized to service the product. If purchaser cannot deliver the product to such a dealer, please notify Mercury Marine and Mercury will then arrange for the inspection and any covered repair. Purchaser in that case shall pay for all related transportation charges and/or travel time. If the service provided is not covered by this warranty, purchaser shall pay for all related labor and material, and any other expenses associated with that service. Purchaser shall not, unless requested by Mercury, ship the product or parts of the product directly to Mercury.

## What Mercury Will Do

Mercury Marine's sole and exclusive obligation under this warranty is limited to, at our expense and at our option, repairing or replacing defective parts with new or Mercury Marine certified re-manufactured parts, or refunding the purchase price of the Mercury product. Mercury reserves the right to improve or modify products from time to time without assuming an obligation to modify products previously manufactured.

## What Is Not Covered

This limited warranty does not cover routine maintenance items, tune ups, adjustments, normal wear and tear, damage caused by abuse, abnormal use, use of a propeller or gear ratio that does not allow the engine to run in its recommended wide-open-throttle RPM range (see Specifications), operation of the product in a manner inconsistent with the recommended operation procedures, neglect, accident, submersion, improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product), improper service, jet pump impellers and liners, operation with fuels, oils or lubricants which are not suitable for use with the product (see Specifications), alteration or removal of parts.

Expenses related to haul-out, launch, towing, storage, telephone, rental, inconvenience, slip fees, insurance coverage, loan payments, loss of time, loss of income, or any other type of incidental or consequential damages are not covered by this warranty. Also, expenses associated with the removal and/or replacement of boat partitions or material caused by boat design for access to the product are not covered by this warranty.

Non-warranty maintenance, replacement, or repair of emission control devices and systems may be performed by any marine engine repair establishment or individual. The use of non-Mercury parts for non-warranty maintenance or repairs will not be grounds for disallowing other warranty work. The use of add-on (as defined at section 1900 (b)(1) and (b)(10) of Title 13 of the California Code of Regulations) or modified parts not exempted by the California Air Resources Board may be grounds for disallowing a warranty claim, at the discretion of Mercury Marine. Failures of warranted parts caused by the use of a non-exempted add-on or modified part will not be covered.

## Disclaimers and Limitations

### DISCLAIMERS AND LIMITATIONS

**THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED. TO THE EXTENT THAT THEY CANNOT BE DISCLAIMED, THE IMPLIED WARRANTIES ARE LIMITED IN DURATION TO THE LIFE OF THE EXPRESS WARRANTY. INCIDENTAL AND CONSEQUENTIAL DAMAGES ARE EXCLUDED FROM COVERAGE UNDER THIS WARRANTY. SOME STATES/COUNTRIES DO NOT ALLOW FOR THE DISCLAIMERS, LIMITATIONS AND EXCLUSIONS IDENTIFIED ABOVE. AS A RESULT, THEY MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER LEGAL RIGHTS WHICH VARY FROM STATE TO STATE AND COUNTRY TO COUNTRY.**

If you have any questions regarding your warranty rights and responsibilities, refer to Owner Service Assistance for contact information.

## California Emission Control Warranty Statement

### Your Warranty Rights and Obligations

**NOTE:** Mercury Marine does not establish model years for the Mercury MerCruiser product line. In order to comply with CARB warranty regulations, and for that limited purpose only, model year shall have the same meaning as calendar year. As an example, 2003 model year products refers to products manufactured during calendar year 2003.

The California Air Resources Board is pleased to explain the emission control system warranty on your 2003 model year and later inboard or sterndrive engine. In California, new inboard and sterndrive engines must be designed, built and equipped to meet the State's stringent anti-smog standards. Mercury Marine must warrant the emission control system on your inboard or sterndrive engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your inboard or sterndrive engine.

Your emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included may be hoses, belts, connectors and other emission-related assemblies.

## Section 1 - Warranty

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Where a warrantable condition exists, Mercury Marine will repair your inboard or sterndrive engine at no cost to you; including diagnosis, parts and labor.

### Manufacturer's Warranty Coverage

Select emission control parts from 2009 and later (inboard or sterndrive) engines are warranted for 3 years or 480 hours, whichever first occurs. However, warranty coverage based on the hourly period is only permitted for engines that are equipped with hour meters as defined in s 2441(a)(13) or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by Mercury Marine.

### Owner's Warranty Responsibilities

As the inboard or sterndrive engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Mercury Marine recommends that you retain all receipts covering maintenance on your inboard or sterndrive engine, but Mercury Marine cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

As the inboard or sterndrive engine owner, you should however be aware that Mercury Marine may deny you warranty coverage if your inboard or sterndrive engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

You are responsible for presenting your inboard or sterndrive engine to a Mercury Marine dealer authorized to service the product as soon as a problem exists. The warranty repairs will be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding your warranty rights and responsibilities, refer to Owner Service Assistance for contact information.





### Emission Certification Star Label

Your boat is labeled on the hull with one of the following star labels. The Symbol for Cleaner Marine Engines Means:

Cleaner Air and Water - for a healthier lifestyle and environment.

Better Fuel Economy - burns up to 30-40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.

Longer Emission Warranty - Protects consumer for worry free operation.

<b>One Star - Low emission</b>	
 <p>The logo features a single star with a stylized boat wake below it, all within an oval border. The text 'LOW' is at the top, 'CALIFORNIA EMISSIONS STANDARDS' is in a smaller font above the star, and 'EMISSION' is at the bottom. The code 'mc79569-1' is located at the bottom right of the logo area.</p>	<p>The one-star label identifies personal watercraft, outboard, sterndrive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.</p>
<b>Two Stars - Very Low emission</b>	
 <p>The logo features two stars with a stylized boat wake below them, all within an oval border. The text 'VERY · LOW' is at the top, 'CALIFORNIA EMISSIONS STANDARDS' is in a smaller font above the stars, and 'EMISSION' is at the bottom. The code 'mc79570-1' is located at the bottom right of the logo area.</p>	<p>The two-star label identifies personal watercraft, outboard, sterndrive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star - Low-Emission engines.</p>
<b>Three Stars - Ultra Low emission</b>	
 <p>The logo features three stars with a stylized boat wake below them, all within an oval border. The text 'ULTRA · LOW' is at the top, 'CALIFORNIA EMISSIONS STANDARDS' is in a smaller font above the stars, and 'EMISSION' is at the bottom. The code 'mc79571-1' is located at the bottom right of the logo area.</p>	<p>The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star - Low Emission engines.</p>
<b>Four Stars - Super Ultra Low emission</b>	
 <p>The logo features four stars with a stylized boat wake below them, all within an oval border. The text 'SUPER · ULTRA · LOW' is at the top, 'CALIFORNIA EMISSIONS STANDARDS' is in a smaller font above the stars, and 'EMISSION' is at the bottom. The code 'mc79572-1' is located at the bottom right of the logo area.</p>	<p>The Four Star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star - Low Emission engines.</p>

Notes:



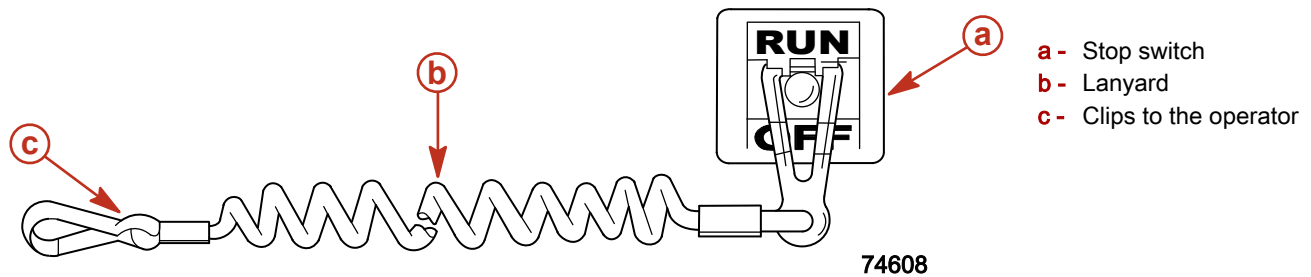
# Section 2 - Getting to Know Your Power Package

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## Lanyard Stop Switch

The purpose of a lanyard stop switch is to turn off the engine when the operator moves outside the operator's position (as in accidental ejection from the operator's position).



Accidental ejections, such as falling overboard, are more likely to occur in:

- low-sided sport boats
- bass boats
- high performance boats

Accidental ejections can also occur from:

- poor operating practices
- sitting on the seat or gunwale at planing speeds
- standing at planing speeds
- operating at planing speeds in shallow or obstacle infested waters
- releasing your grip on the steering wheel that is pulling in one direction
- consuming alcohol or drugs
- high speed boating maneuvers

The lanyard is a cord usually between 122 and 152 cm (4 and 5 ft) in length when stretched out, with an element on one end made to be inserted into the switch and a snap on the other end for attaching to the operator. The lanyard is coiled to make its at-rest condition as short as possible to minimize the likelihood of lanyard entanglement with nearby objects. Its stretched-out length is made to minimize the likelihood of accidental activation should the operator choose to move around in an area close to the normal operator's position. If it is desired to have a shorter lanyard, wrap the lanyard around the operator's wrist or leg, or tie a knot in the lanyard.

Activation of the lanyard stop switch will stop the engine immediately, but the boat will continue to coast for some distance depending upon the velocity and degree of any turn at shut down. However, the boat will not complete a full circle. While the boat is coasting, it can cause injury to anyone in the boat's path as seriously as the boat would when under power.

We strongly recommend that other occupants be instructed on proper starting and operating procedures should they be required to operate the engine in an emergency (e.g. if the operator is accidentally ejected).

### **⚠ WARNING**

**If the operator falls out of the boat, stop the engine immediately to reduce the possibility of serious injury or death from being struck by the boat. Always properly connect the operator to the stop switch using a lanyard.**

Accidental or unintended activation of the switch during normal operation is also a possibility. This could cause any, or all, of the following potentially hazardous situations:

- Occupants could be thrown forward due to unexpected loss of forward motion, a particular concern for passengers in the front of the boat who could be ejected over the bow and possibly struck by the propulsion or steering components.
- Loss of power and directional control in heavy seas, strong current or high winds.
- Loss of control when docking.

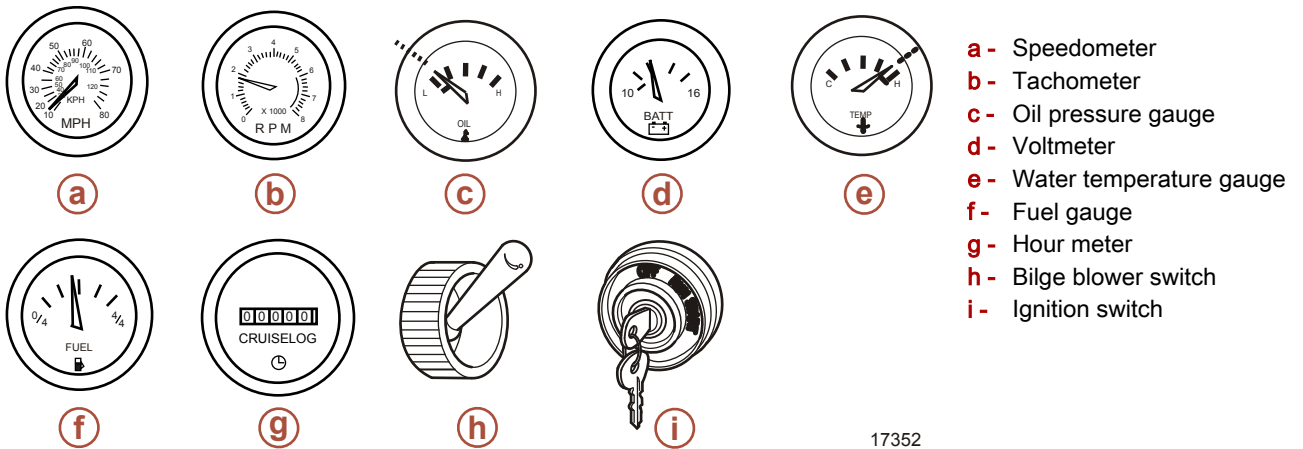
### **⚠ WARNING**

**Avoid serious injury or death from deceleration forces resulting from accidental or unintended stop switch activation. The boat operator should never leave the operator's station without first disconnecting the stop switch lanyard from the operator.**

## Instrumentation

### Analog Gauges

The following is a brief explanation of the instrumentation typically found on some boats. The owner/operator should be familiar with all instruments and their functions. Because of the large variety of instrumentation and manufacturers, you should have your boat dealer explain the particular gauges and normal readings for your boat.



17352

**Speedometer:** Indicates boat speed.

**Tachometer:** Indicates engine RPM.

**Oil Pressure Gauge:** Indicates engine oil pressure.

**Voltmeter:** Indicates battery voltage.

**Water Temperature Gauge:** Indicates engine operating temperature.

**Fuel Gauge:** Indicates quantity of fuel in tank.

**Hour meter:** Records engine operating time.

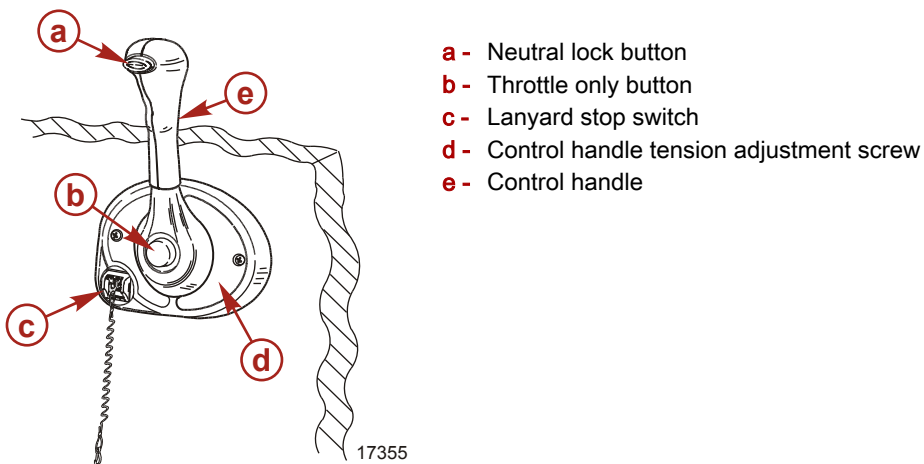
**Bilge Blower Switch:** Operates bilge blower.

**Ignition Switch:** Allows operator to start and stop engine.

### Remote Controls

Your boat may be equipped with a Mercury Precision Parts or Quicksilver remote controls. All controls may not have all features shown. Consult your dealer for a description and/or demonstration of your remote control.

### Panel Mount Features



17355

**Neutral Lock Button** - Prevents accidental shift and throttle engagement. Neutral lock button must be pushed in to move the control handle out of neutral.

**Throttle Only Button** - Allows engine throttle advancement without shifting the engine. This is done by disengaging the shift mechanism from the control handle. The throttle only button can be depressed only when the remote control handle is in the neutral position, and should only be used to assist in starting the engine.

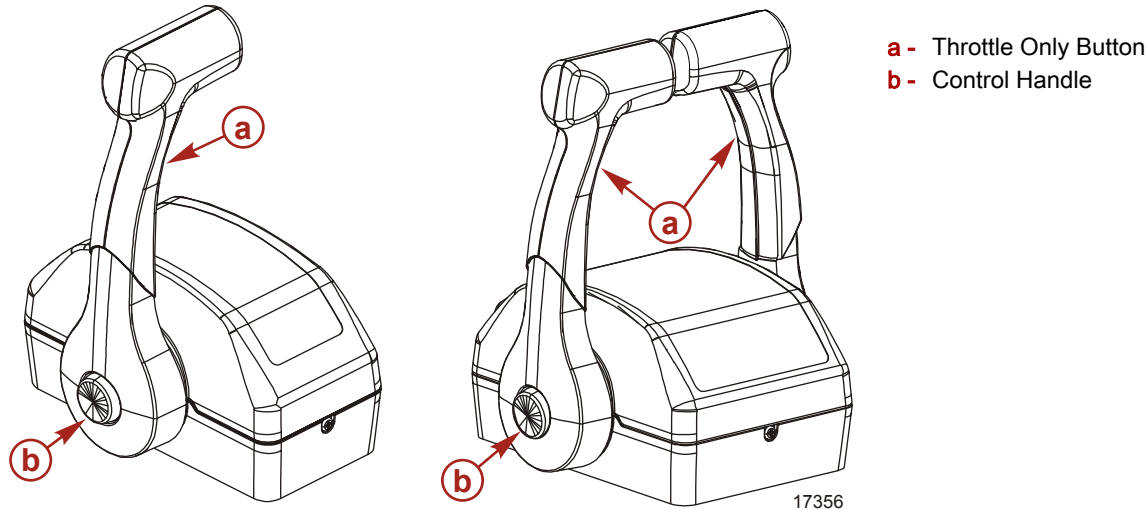
## Section 2 - Getting to Know Your Power Package

**Lanyard Stop Switch** - Turns the ignition off whenever the operator (when attached to the lanyard) moves far enough away from the operator's position to activate the switch. Refer to **Lanyard Stop Switch** for information on the use of this switch.

**Control Handle** - Operation of the shift and throttle are controlled by the movement of the control handle. Push the control handle forward from neutral with a quick firm motion to the first detent for forward gear. Continue pushing forward to increase speed. Pull the control handle back from neutral with a quick firm motion to the first detent for reverse gear and continue pushing back to increase speed.

**Control Handle Tension Adjustment Screw - (not visible)** This screw is used to adjust the effort required to move the remote control handle. Refer to instructions provided with remote control for complete adjustment instructions.

### Console Mount Features



**Throttle Only Button** - Allows engine throttle advancement without shifting the engine. This is done by disengaging the shift mechanism from the control handle. The throttle only button can be depressed only when the remote control handle is in the neutral position.

**Control Handles** - Operation of the the shift and throttle are controlled by the movement of the control handle. Push the control handle forward from neutral with a quick firm motion to the first detent for forward gear and continue pushing forward to increase speed. Pull the control handle back from neutral with a quick firm motion to the first detent for reverse gear and continue pushing back to increase speed.

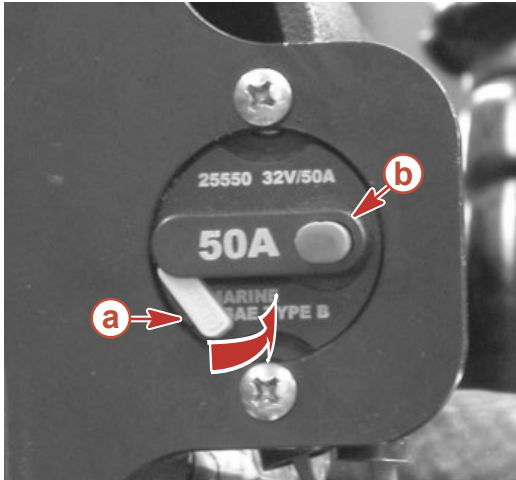
**Control Handle Tension Adjustment Screw - (not visible)** This screw is used to adjust the effort required to move the remote control handle. Refer to instructions provided with remote control for complete adjustment instructions.

### Electrical System Overload Protection-Carbureted Engines

If an electrical overload occurs, a fuse will blow or the circuit breaker will trip open. The cause must be found and corrected before replacing the fuse or resetting the circuit breaker.

**NOTE:** *In an emergency, when the engine must be operated and the cause for the high current draw cannot be located and corrected, turn off or disconnect all accessories connected to the engine and instrumentation wiring. Reset the circuit breaker. If the breaker remains open, the electrical overload has not been eliminated. Further checks must be made on the electrical system. Contact your authorized dealer.*

1. A circuit breaker provides protection for the engine wiring harness and the instrumentation power lead. The circuit breaker can be tested by pushing the red button. If the circuit breaker is functioning properly, the yellow lever will appear. Reset the yellow lever after testing, or if tripped, by pushing the yellow lever back into the housing.

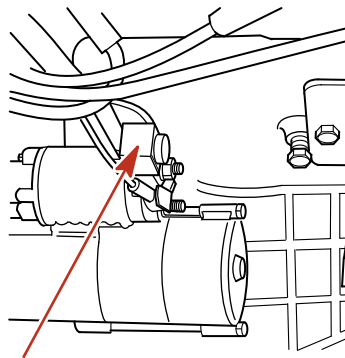


22529

**Yellow lever style circuit breaker-typical**

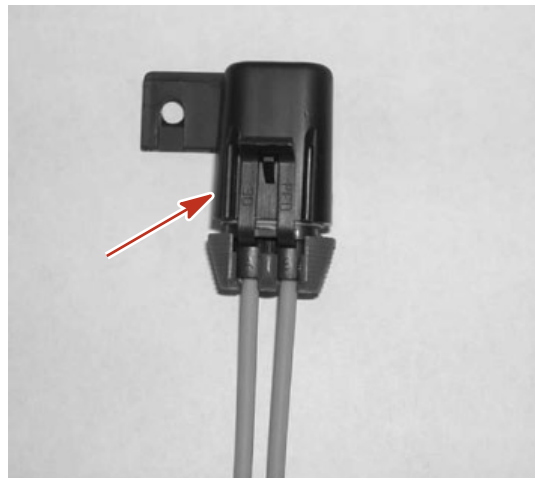
- a - Yellow lever-shown tripped
- b - Red test button

2. A 90 amp fuse is located on the large post of the starter solenoid. This fuse is designed to protect the engine wiring harness if an electrical overload occurs.



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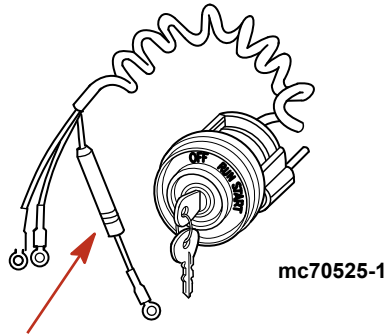
3. A 15 amp accessory fuse is located on the rear of the engine. This fuse protects the accessory circuits. A similar 20 amp fuse is located on the top of the engine to protect the TKS circuit.



7524

## Section 2 - Getting to Know Your Power Package

4. A 20 amp fuse may be located in the ignition switch "I" terminal lead to protect the electrical system. Check for blown fuse if the ignition key is turned to the "START" position and nothing happens (and circuit breaker is not tripped).



## Audio Warning System

Your Mercury MerCruiser power package may be equipped with an Audio Warning System. The Audio Warning System will not protect the engine from damage. It is designed to warn the operator that a problem has occurred.

The audio warning system will sound with a continuous horn if one of the following occurs:

- Engine oil pressure too low
- Engine temperature too hot
- Seawater pressure too low

The audio warning system will sound with an intermittent beeping if the following occurs:

- Transmission fluid temperature too hot

### *NOTICE*

**A continuous horn indicates a critical fault. Operating the engine during a critical fault can damage components. If the warning horn emits a continuous beep, do not operate the engine unless avoiding a hazardous situation.**

If the alarm sounds, stop the engine immediately. Investigate cause and correct it, if possible. If the cause cannot be determined, contact your authorized Mercury MerCruiser dealer.

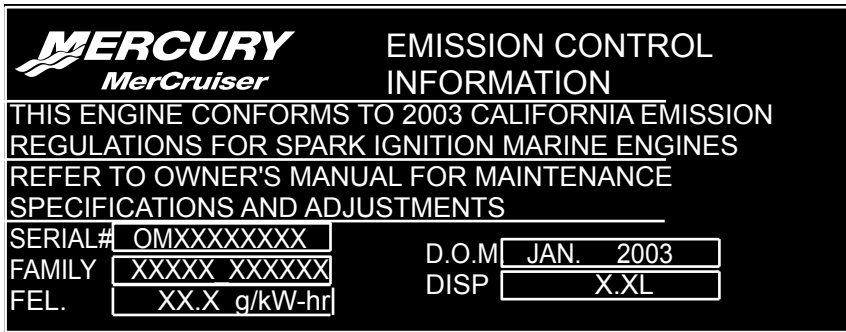
## Testing The Audio Warning System

1. Turn the ignition switch to the "ON" position without cranking the engine.
2. Listen for the audio alarm. The alarm will sound if the system is functioning correctly.

## Emissions Information

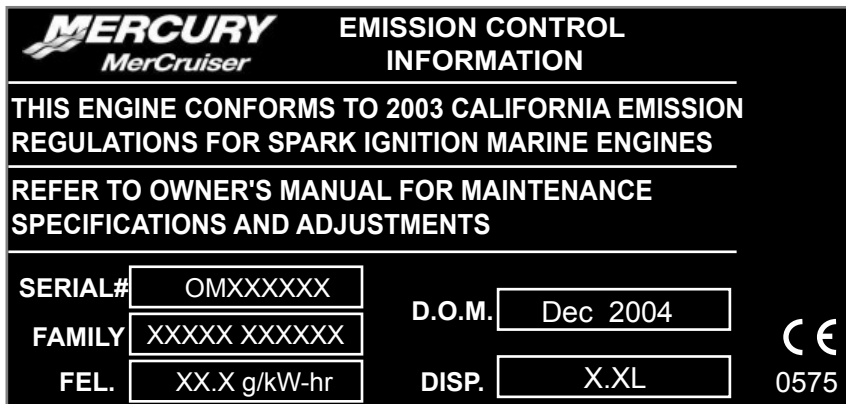
### Emission Control Information Label

A tamper-resistant Emission Control Information label is affixed in a visible location to the engine at time of manufacture by Mercury MerCruiser. In addition to the required emissions statement, the label lists the engine serial number, family, FEL (emission level), date of manufacture (month, year), and the engine displacement. Please note that the low emissions certification will not affect the fit, function, or performance of the engines. Boatbuilders and dealers may not remove the label or the part it is affixed to before sale. If modifications are necessary, contact Mercury MerCruiser about the availability of replacement decals before proceeding.



Emission Control Label - Non CE Marked

- "SERIAL#" - Engine Serial Number
- "FAMILY" - Engine Family
- "FEL." - Family Emission Limit
- "D.O.M." - Date of Manufacture
- "DISP" - Piston Displacement



Emission Control Label - CE Marked

- "SERIAL#" - Engine Serial Number
- "FAMILY" - Engine Family
- "FEL." - Family Emission Limit
- "D.O.M." - Date of Manufacture
- "DISP" - Piston Displacement

CE - When this mark is present in the lower right corner of the Emission Control Information Label, on the engine, the Declaration of Conformance applies. Refer to the front page of this Manual for further information.

### Owner Responsibility

The owner/operator is required to have routine engine maintenance performed to maintain emission levels within prescribed certification standards.

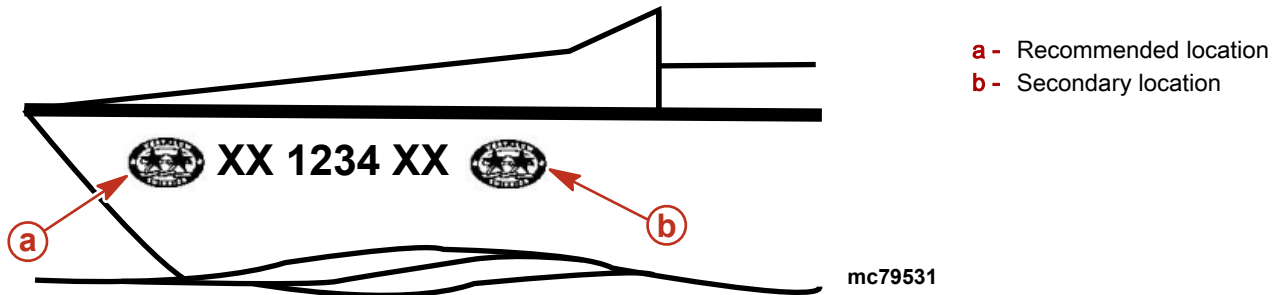
The owner/operator is not to modify the engine in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

## Star Label

Beginning January 1, 2003, one Three-Star label will be included with each factory-certified Mercury MerCruiser engine.

All Mercury MerCruiser engines (500 hp and below) will have a Three-Star Ultra Low Emission rating. The Three-Star label identifies that these engines meet the California Air Resources Board's Sterndrive and Inboard marine engine 2003 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One-Star - Low Emissions engines.

The Three-Star label will be affixed on the left side of the hull as shown.



<b>One Star - Low emission</b>	
<p>mc79569-1</p>	<p>The one-star label identifies personal watercraft, outboard, sterndrive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.</p>
<b>Two Stars - Very Low emission</b>	
<p>mc79570-1</p>	<p>The two-star label identifies personal watercraft, outboard, sterndrive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emission standards. Engines meeting these standards have 20% lower emissions than One Star - Low-Emission engines.</p>
<b>Three Stars - Ultra Low emission</b>	
<p>mc79571-1</p>	<p>The three-star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emission standards or the Sterndrive and Inboard marine engine 2003 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star - Low Emission engines.</p>
<b>Four Stars - Super Ultra Low emission</b>	
<p>mc79572-1</p>	<p>The Four Star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star - Low Emission engines.</p>



# Section 3 - On The Water

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## Safe Boating Suggestions

To safely enjoy the waterways, familiarize yourself with local and all other governmental boating regulations and restrictions and consider the following suggestions.

### **Know and obey all nautical rules and laws of the waterways.**

- We recommend that all powerboat operators complete a boating safety course. In the US, the U.S. Coast Guard Auxiliary, the Power Squadron, the Red Cross, and your state or provincial boating law enforcement agency provide courses. For more information in the US, call the Boat U.S. Foundation at 1-800-336-BOAT (2628).

### **Perform safety checks and required maintenance.**

- Follow a regular schedule and ensure that all repairs are properly made.

### **Check safety equipment on board.**

- Here are some suggestions of the types of safety equipment to carry when boating:
  - Approved fire extinguishers
  - Signal devices: flashlight, rockets or flares, flag and whistle or horn
  - Tools necessary for minor repairs
  - Anchor and extra anchor line
  - Manual bilge pump and extra drain plugs
  - Drinking water
  - Transistor radio
  - Paddle or oar
  - Spare propeller, thrust hubs, and an appropriate wrench
  - First aid kit and instructions
  - Water-proof storage containers
  - Spare operating equipment, batteries, bulbs and fuses
  - Compass and map or chart of the area
  - Personal flotation device (1 per person on board)

### **Watch for signs of weather change and avoid foul weather and rough-sea boating.**

### **Tell someone where you are going and when you expect to return.**

### **Passenger boarding.**

- Stop the engine whenever passengers are boarding, unloading or are near the back (stern) of the boat. Shifting the drive unit into neutral is not sufficient.

### **Use personal flotation devices.**

- Federal Law requires that there be a U. S. Coast Guard approved life jacket (personal flotation device), correctly sized and readily accessible for every person on board, plus a throwable cushion or ring. We strongly advise that everyone wear a life jacket at all times while in the boat.

### **Prepare other boat operators.**

- Instruct at least 1 person on board in the basics of starting and operating the engine and boat handling in case the driver becomes disabled or falls overboard.

### **Do not overload your boat.**

- Most boats are rated and certified for maximum load (weight) capacities (refer to your boat capacity plate). Know your boat's operating and loading limitations. Know if your boat will float if full of water. When in doubt, contact your authorized Mercury MerCruiser dealer or the boat manufacturer.

### **Ensure that everyone in the boat is properly seated.**

- Do not allow anyone to sit or ride on any part of the boat that was not intended for such use. This includes the backs of seats, gunwales, transom, bow, decks, raised fishing seats and any rotating fishing seat; anywhere that sudden unexpected acceleration, sudden stopping, unexpected loss of boat control or sudden boat movement could cause a person to be thrown overboard or into the boat. Ensure that all passengers have a proper seat and are in it before any boat movement.

### **Never be under the influence of alcohol or drugs while boating (it is the law).**

- They impair your judgment and greatly reduce your ability to react quickly.

### **Know your boating area and avoid hazardous locations.**

### **Be alert.**

- The operator of the boat is responsible by law to maintain a proper lookout by sight and hearing. The operator must have an unobstructed view particularly to the front. No passengers, load or fishing seats should block the operators view when the boat is above idle or planing transition speed. Watch out for others, the water and your wake.

#### Never drive your boat directly behind a water skier in case the skier falls.

- As an example, your boat traveling at 40 km/h (25 MPH) will overtake a fallen skier who was 61 m (200 ft.) in front of you in 5 seconds.

#### Watch fallen skiers.

- When using your boat for water skiing or similar activities, always keep a fallen or down skier on the operator's side of the boat while returning to attend to the skier. The operator should always have the down skier in sight and never back up to the skier or anyone in the water.

#### Report accidents.

- Boat operators are required by law to file a Boating Accident Report with their state boating law enforcement agency when their boat is involved in certain boating accidents. A boating accident must be reported if 1) there is loss of life or probable loss of life, 2) there is personal injury requiring medical treatment beyond first aid, 3) there is damage to boats or other property where the damage value exceeds \$500.00 or 4) there is complete loss of the boat. Seek further assistance from local law enforcement.

## Be Alert to Carbon Monoxide Poisoning

Carbon monoxide is present in the exhaust fumes of all internal combustion engines including the outboards, sterndrives and inboard engines that propel boats, as well as the generators that power various boat accessories. Carbon monoxide is a deadly gas that is odorless, colorless and tasteless.

Early symptoms of carbon monoxide poisoning, which should not be confused with seasickness or intoxication, include headache, dizziness, drowsiness and nausea.

### ⚠ WARNING

Carbon monoxide poisoning can lead to unconsciousness, brain damage, or death. Keep the boat well ventilated while at rest or underway and avoid prolonged exposure to carbon monoxide.

## Good Ventilation

Ventilate the passenger area, open the side curtains or forward hatches to remove fumes.

- Example of desired air flow through the boat.



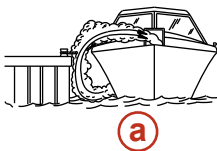
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## Poor Ventilation

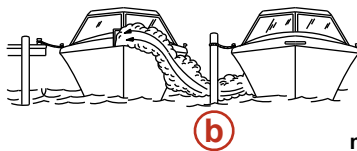
Under certain conditions, permanently enclosed or canvas enclosed cabins or cockpits with insufficient ventilation may draw in carbon monoxide. Install one or more carbon monoxide detectors in your boat.

Although the occurrence is rare, on a very calm day, swimmers and passengers in an open area of a stationary boat that contains or is near an operating engine may be exposed to a hazardous level of carbon monoxide.

- Examples of poor ventilation while a boat is stationary:



a



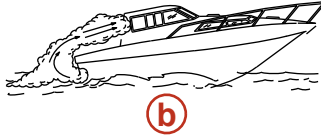
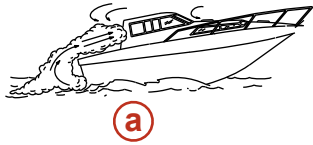
b

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- a - Operating the engine when the boat is moored in a confined space
- b - Mooring close to another boat with its engine operating

## Section 3 - On The Water

2. Examples of poor ventilation while a boat is moving:



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- a** - Operating the boat with the trim angle of the bow too high  
**b** - Operating the boat with no forward hatches open (station wagon effect)

## Basic Boat Operation

### Launching and Boat Operation

**IMPORTANT:** Install bilge drain plug prior to launching boat.

### Operation Chart

Operation Chart			
BEFORE STARTING	AFTER STARTING	WHILE UNDERWAY	AFTER STOPPING
Install bilge drain plug.	Observe all gauges to check condition of engine. If not normal, stop engine.	Observe all gauges to check condition of engine. If not normal, stop engine.	Turn ignition key to the "OFF" position.
Open engine hatch.	Check for fuel, oil, water, fluid and exhaust leaks.	Listen for the audio alarm.	Turn battery switch to the "OFF" position.
Turn battery switch on.	Check shift and throttle control operation.		Close fuel shut off valve.
Operate bilge blowers.	Check steering operation.		Close seacock, if equipped.
Open fuel shut off valve.			Flush cooling system if in saltwater.
Open seacock, if equipped.			Drain bilge.
Close the drain system.			
Check the engine oil.			
Perform all other checks specified by your dealer and/or boat builder.			
Listen for Audio Warning Alarm to sound when the ignition switch is in the "ON" position.			

### Starting and Stopping the Engine

**NOTE:** Only perform those functions applicable to your power package.

#### Starting the Engine

1. Check all items listed in the Operation Chart.
2. Place the remote control handle in neutral.

#### NOTICE

Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

#### ⚠ WARNING

Explosive fumes contained in the engine compartment can cause serious injury or death from fire or explosion. Before starting the engine, operate the bilge blower or vent the engine compartment for at least five minutes.

3. Turn ignition key to "START". Release key when engine starts and allow switch to return to "ON" position. Allow the engine to warm up (6–10 minutes on the first start of the day).

**NOTE:** If the engine has not run for a long period of time it may require a couple of attempts.

4. If engine does not start after 3 attempts:
  - a. Push the **throttle only** button and position the remote control handle/throttle lever to the 1/4 throttle position.
  - b. Turn ignition key to "START". Release key when engine starts and allow switch to return to "ON" position.
5. If engine does not start after step 4:
  - a. Move the remote control handle/throttle lever to full throttle position, then return to 1/4 throttle.
  - b. Turn ignition key to "START". Release key when engine starts and allow switch to return to "ON" position.
6. Inspect the power package for fuel, oil, water and exhaust leaks.
7. Move control handle with a firm, quick motion forward to shift to forward gear, or backward to shift to reverse. After shifting, advance throttle to desired setting.

### NOTICE

Shifting into gear at engine speeds above idle will damage the gearcase. Shifting into gear when the engine is not running can cause misalign the clutch, preventing proper shifting. Always shift the gearcase into gear when the engine is operating at idle. If you must shift while the engine is not operating, rotate the propeller shaft in the appropriate direction during shifting.

## Stopping the Engine

1. Move the remote control handle to neutral/idle and allow the engine to slow to idle speed. If engine has been operated at high speed for a long period of time, allow the engine to cool at idle speed for 3 to 5 minutes.
2. Turn ignition key to the "OFF" position.

## Throttle-Only Operation

1. Refer to **Remote Controls** section for remote control features.
2. Move the control lever to the idle/neutral position.
3. Depress and hold the throttle only button, and move the control lever to the idle/forward or idle/reverse position.
4. Advancing the control lever beyond the idle/forward or idle/reverse position will cause engine speed to increase.  
**IMPORTANT: Moving the control lever back to the idle/neutral position will disengage the throttle only button and allow the engine to shift into gear.**
5. Throttle only mode is deactivated by moving the control lever to the idle/neutral position. Moving the control lever from the idle/neutral position to the idle/forward or idle/reverse position without pressing the throttle only button will shift the unit into the chosen gear.

## Freezing Temperature Operation

**IMPORTANT:** If the boat is operated during periods of freezing temperature, precautions must be taken to prevent freeze damage to the power package. Damage caused by freezing is not covered by Mercury MerCruiser Limited Warranty.

## Drain Plug and Bilge Pump

The engine compartment in your boat is a natural place for water to collect. For this reason, boats are normally equipped with a drain plug and/or a bilge pump. It is very important to check these items on a regular basis to ensure that the water level does not come into contact with your power package. Components on your engine will be damaged if submerged. Damage caused by submersion is not covered by the Mercury MerCruiser Limited Warranty.

## Protecting People in the Water

### While You Are Cruising

It is very difficult for a person in the water to take quick action to avoid a boat heading in their direction, even at slow speeds.



Always slow down and exercise extreme caution any time you are boating in an area where there might be people in the water.

## Section 3 - On The Water

Whenever a boat is moving (even coasting) and the gear shift is in neutral, there is sufficient force by the water on the propeller to cause the propeller to rotate. This neutral propeller rotation can cause serious injury.

### While Boat Is Stationary

#### WARNING

A spinning propeller, a moving boat, or any solid device attached to the boat can cause serious injury or death to swimmers. Stop the engine immediately whenever anyone in the water is near your boat.

Shift into neutral and shut off the engine before allowing people to swim or be in the water near your boat.

### High-Speed and High-Performance Operation

If your boat is considered a high-speed or high-performance boat with which you are unfamiliar, we recommend that you never operate it at its high speed capability without first requesting an initial orientation and demonstration ride with your dealer or an operator experienced with your boat. For additional information, refer to **Hi-Performance Boat Operation** booklet (90-849250-R2) from your dealer, distributor or Mercury Marine.

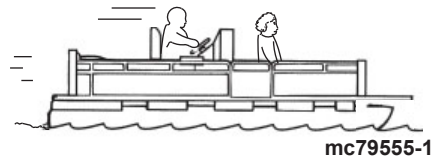
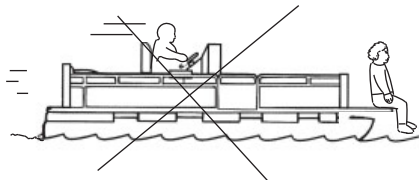
### Passenger Safety in Pontoon Boats and Deck Boats

Whenever the boat is in motion, observe the location of all passengers. Do not allow any passengers to stand or use seats other than those designated for traveling faster than idle speed. A sudden reduction in boat speed, such as plunging into a large wave or wake, a sudden throttle reduction, or a sharp change of boat direction, could throw them over the front of boat. Falling over the front of the boat between the two pontoons will position them to be run over.

### Boats Having an Open Front Deck

No one should ever be on the deck in front of the fence while the boat is in motion. Keep all passengers behind the front fence or enclosure.

Persons on the front deck could easily be thrown overboard or persons dangling their feet over the front edge could get their legs caught by a wave and pulled into the water.



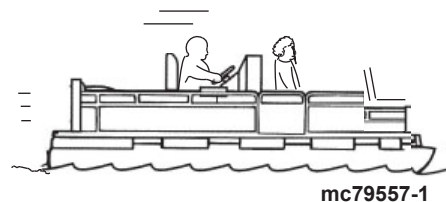
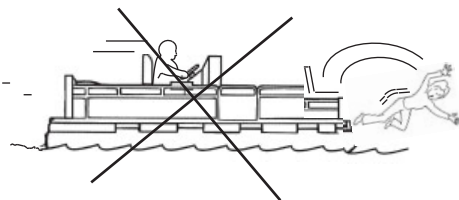
#### WARNING

Sitting or standing in an area of the boat not designed for passengers at speeds above idle can cause serious injury or death. Stay back from the front end of deck boats or raised platforms and remain seated while the boat is in motion.

### Boats With Front-Mounted, Raised Pedestal Fishing Seats

Elevated fishing seats are not intended for use when the boat is traveling faster than idle or trolling speed. Sit only in seats designated for traveling at faster speeds.

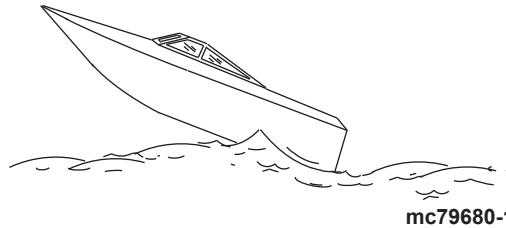
Any unexpected, sudden reduction in boat speed could result in the elevated passenger falling over the front of the boat.



## Wave and Wake Jumping

### ⚠ WARNING

Wave or wake jumping can cause serious injury or death from occupants being thrown within or out of the boat. Avoid wave or wake jumping whenever possible.



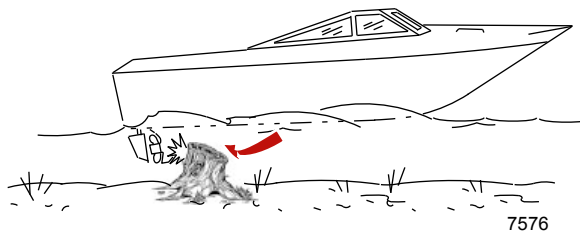
Operating recreational boats over waves and wakes is a natural part of boating. However, when this activity is done with enough speed to force the boat hull partially or completely out of the water, certain hazards arise, particularly when the boat re-enters the water.

The primary concern is the boat changing direction while in the midst of the jump. In such cases the landing may cause the boat to violently veer in a new direction. Such a sharp change in direction or turn can cause occupants to be thrown out of their seats or out of the boat.

There is another less common hazardous result from allowing your boat to launch off of a wave or wake. If the bow of your boat pitches down far enough while airborne, upon water contact it may penetrate under the water surface and submarine for an instant. This will bring the boat nearly to a stop in an instant and can send the occupants flying forward. The boat may also veer sharply to one side.

## Impact with Underwater Hazards

Reduce speed and proceed with caution whenever you're driving a boat in shallow water or in areas where the waters are suspected of having underwater obstacles that could be struck by the underwater drive components, rudder or the boat bottom.



**IMPORTANT: The most important thing you can do to help reduce injury or impact damage from striking a floating or underwater object is control the boat speed. Under these conditions, boat speed should be kept to a maximum speed of 24 to 40 km/h (15 to 25 MPH).**

Striking a floating/underwater object may result in an infinite number of situations. Some of these situations could result in the following:

- The boat could move suddenly in a new direction. Such a sharp change in direction or turn can cause occupants to be thrown out of their seats or out of the boat.
- A rapid reduction in speed. This will cause occupants to be thrown forward, even out of the boat.
- Impact damage to the underwater drive components, rudder and/or boat.

Keep in mind, one of the most important things you can do to help reduce injury or impact damage in these situations is control the boat speed. Boat speed should be kept to a minimum planing speed when driving in waters known to have underwater obstacles.

After striking a submerged object, stop the engine as soon as possible and inspect the drive system for any broken or loose parts. If damage is present or suspected, the power package should be taken to an authorized Mercury MerCruiser dealer for a thorough inspection and necessary repair.

The boat should be checked for hull fractures, transom fractures and water leaks.

Operating with damaged underwater drive components, rudder or boat bottom could cause additional damage to other parts of the power package, or could affect control of the boat. If continued operation is necessary, do so at greatly reduced speeds.

 **WARNING**

Operating a boat or engine with impact damage can result in product damage, serious injury, or death. If the vessel experiences any form of impact, have an authorized Mercury Marine dealer inspect and repair the vessel or power package.

## Conditions Affecting Operation

### Weight Distribution (Passengers and Gear) Inside the Boat

#### Shifting weight to rear (stern):

- Generally increases speed and engine RPM
- Causes bow to bounce in choppy water
- Increases danger of following wave splashing into the boat when coming off plane
- At extremes, can cause the boat to porpoise

#### Shifting weight to front (bow):

- Improves ease of planing
- Improves rough water ride
- At extremes, can cause the boat to veer back and forth (bow steer)

### The Bottom of the Boat

To maintain maximum speed, the boat bottom should be:

- Clean, free of barnacles and marine growth
- Free of distortion; nearly flat where it contacts the water
- Straight and smooth, fore and aft

Marine vegetation may accumulate when the boat is docked. This growth must be removed before operation; it may clog the water inlets and cause the engine to overheat.

### Cavitation

Cavitation occurs when water flow cannot follow the contour of a fast-moving underwater object, such as a gear housing or a propeller. Cavitation increases propeller speed while reducing boat speed. Cavitation can seriously erode the surface of the gear housing or the propeller. Common causes of cavitation are:

- Weeds or other debris snagged on the propeller
- Bent propeller blade
- Raised burrs or sharp edges on the propeller

### Elevation and Climate

Elevation and climate changes will affect the performance of your power package. Loss of performance can be caused by:

- Higher elevations
- Higher temperatures
- Low barometric pressures
- High humidity

For you to have optimum engine performance under changing weather conditions, it is essential that the engine be propped to allow the engine to operate at or near the top end of the specified maximum RPM range with a normal boat load during your normal boating weather conditions.

In most cases, recommended RPM can be achieved by changing to a lower pitch propeller.

## Getting Started

### 20-Hour Break-In Period

**IMPORTANT:** The first 20 hours of operation is the engine break-in period. Correct break-in is essential to obtain minimum oil consumption and maximum engine performance. During this break-in period, the following rules must be observed:

- Do not operate below 1500 RPM for extended periods of time for the first 10 hours. Shift into gear as soon as possible after starting and advance the throttle above 1500 rpm **if conditions permit safe operation.**
- Do not operate at one speed consistently for extended periods.



- Do not exceed 3/4 throttle during the first 10 hours. During the next 10 hours, occasional operation at full throttle is permissible (5 minutes at a time maximum).
- Avoid full throttle acceleration from idle speed.
- Do not operate at full throttle until the engine reaches normal operating temperature.
- Frequently check engine oil level. Add oil as needed. It is normal for oil consumption to be high during the break-in period.

## After Break-In Period

To help extend the life of your Mercury MerCruiser power package, follow these recommendations:

- Ensure that propeller allows the engine to operate at or near the top of the specified WOT RPM range. Refer to **Specifications** and **Maintenance**.
- Operate the engine at 3/4 throttle or lower. Refrain from prolonged operation at wide-open-throttle RPM.
- Change the engine oil and oil filter. Refer to **Maintenance**.
- Change the transmission oil and filter. Refer to **Maintenance** (ZF Transmission models).<sup>1</sup>

## End of First Season Checkup

At the end of the first season of operation, contact an authorized Mercury MerCruiser dealer to discuss and/or perform scheduled maintenance items. If you are in an area where the product is operated continuously, year-round, you should contact your dealer at the end of the first 100 hours of operation or once yearly, whichever occurs first.

1. Require fluid and filter change after the first 25 hours and then every 100 hours.

## Notes:

# Section 4 - Specifications

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## Cruising RPM

Modern inboard engines operate at higher engine speeds than those produced just a few years ago. This increased RPM along with better breathing is largely responsible for the significant increase in horsepower of these new engines. Along with the higher WOT RPM comes higher cruising RPM. This higher RPM is critical for optimum performance and efficiency. The materials and design of the new engines allow these higher speeds without durability penalty. In fact, over-propping the boat to reduce the cruising RPM to previous levels will increase the susceptibility to engine damage from detonation and pre-ignition. The recommended cruising RPM ranges are:

Cruising RPM for Peak Efficiency	
Model	RPM Range
5.7L	3200-3600

## Fuel Requirements

**IMPORTANT: Use of improper gasoline can damage your engine. Engine damage resulting from the use of improper gasoline is considered misuse of the engine, and damage caused thereby will not be covered under the limited warranty.**

## Fuel Ratings

Mercury MerCruiser engines will operate satisfactorily when using a major brand of unleaded gasoline meeting the following specifications:

**USA and Canada**—having a posted pump Octane Rating of 87 (R+M)/2 minimum. Premium gasoline [92 (R+M)/2 Octane] is also acceptable. Do not use leaded gasoline.

**Outside USA and Canada**—having a posted pump Octane Rating of 90 RON minimum. Premium gasoline (98 RON) is also acceptable. If unleaded gasoline is not available, use a major brand of leaded gasoline.

## Using Reformulated (Oxygenated) Gasolines (USA Only)

This type of gasoline is required in certain areas of the USA. The 2 types of oxygenates used in these fuels is Alcohol (Ethanol) or Ether (MTBE or ETBE). If Ethanol is the oxygenate that is used in the gasoline in your area, refer to Gasolines Containing Alcohol.

These Reformulated Gasolines are acceptable for use in your Mercury MerCruiser engine.

## Gasolines Containing Alcohol

If the gasoline in your area contains either methanol (methyl alcohol) or ethanol (ethyl alcohol), you should be aware of certain adverse effects that can occur. These adverse effects are more severe with methanol. Increasing the percentage of alcohol in the fuel can also worsen these adverse effects.

Some of these adverse effects are caused because the alcohol in the gasoline can absorb moisture from the air, resulting in a separation of the water/alcohol from the gasoline in the fuel tank.

The fuel system components on your Mercury MerCruiser engine will withstand up to 10% alcohol content in the gasoline. We do not know what percentage your boat's fuel system will withstand. Contact your boat manufacturer for specific recommendations on the boat's fuel system components (fuel tanks, fuel lines, and fittings). Be aware that gasolines containing alcohol may increase:

- Corrosion of metal parts
- Deterioration of rubber or plastic parts
- Fuel permeation through rubber fuel lines
- Difficulty starting and operating the engine

### WARNING

**Fuel leakage is a fire or explosion hazard, which can cause serious injury or death. Periodically inspect all fuel system components for leaks, softening, hardening, swelling, or corrosion, particularly after storage. Any sign of leakage or deterioration requires replacement before further engine operation.**

Because of possible adverse effects of alcohol in gasoline, we recommend only alcohol-free gasoline when possible. If the only fuel available contains alcohol or if you do not know whether the fuel contains alcohol, inspect for leaks and abnormalities more frequently.

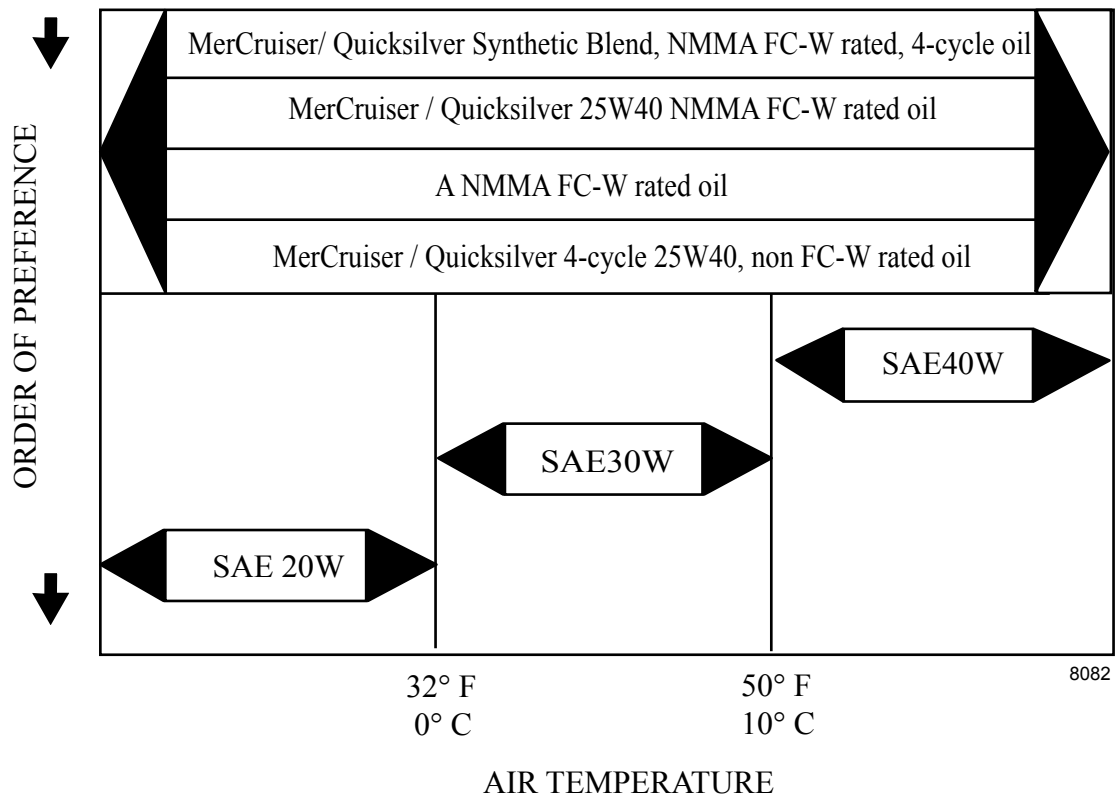
**IMPORTANT: When operating a Mercury MerCruiser engine on gasoline containing alcohol, do not store the gasoline in the fuel tank for long periods. Whereas cars normally consume alcohol-blend fuels before they can absorb enough moisture to cause trouble, boats often sit idle long enough for phase separation to take place. In addition, internal corrosion may take place during storage if alcohol has washed protective oil films from internal components.**

## Engine Oil

To help obtain optimum engine performance and to provide maximum protection, we strongly recommend the use of the following oils listed in the order of recommendation:

1. MerCruiser / Quicksilver Synthetic Blend, NMMA FC-W rated, 4 cycle oil.
2. MerCruiser / Quicksilver 25W40 NMMA FC-W rated oil.
3. A NMMA FC-W rated oil.
4. MerCruiser / Quicksilver 4-cycle 25W40, non FC-W rated oil.
5. A good grade straight weight detergent automotive oil per the operating chart below.

**NOTE:** The use of non-detergent oils, multi-viscosity oils (other than as specified), non FC-W rated synthetic oils, low quality oils or oils that contain solid additives are specifically not recommended.



## Engine Specifications

Models	5.7L Inboard	5.7L Tow Sport
Horsepower <sup>1</sup> .	260	270
Kilowatts <sup>1</sup> .	194	201
Displacement	5.7 L (350 cid)	
Specified WOT RPM Range <sup>2</sup> .	4200-4600	4400-4800
Idle RPM in Neutral <sup>2</sup> .	650 <sup>3</sup> .	
Minimum Oil Pressure @ Idle <sup>4</sup> .	41 kPa (6 psi)	
Minimum Oil Pressure @ 2000 RPM <sup>4</sup> .	124 kPa (18 psi)	
Thermostat	71° C (160° F)	

1. Performance obtained and corrected in accordance with SAE J1228/ISO 8665 Crankshaft Power.
2. Measured using an accurate service tachometer with the engine at normal operating temperatures
3. A special procedure must be followed to adjust idle rpm. Consult your Authorized Mercury MerCruiser Dealer before attempting this procedure.
4. Oil pressure must be checked with the engine at normal operating temperature.

## Section 4 - Specifications

Models	5.7L Inboard	5.7L Tow Sport
Timing @ Idle <sup>3</sup> .	10° BTDC	
Firing Order	1-8-4-3-6-5-7-2	
Electrical System	12 Volt Negative (-) Ground	
Alternator Rating - Hot Operating Amps	65 amp	
Alternator Rating - Cold Operating Amps	72 amp	
Recommended Battery Rating (Minimum)	375 CCA, 475 MCA, or 90 Ah	
Spark Plug Type	AC MR43LTS or AC 41-993 (Platinum)	
Spark Plug Gap	1.14 mm (0.045 in.)	

## Fluid Specifications

### Engine

**IMPORTANT: All capacities are approximate fluid measures.**

**IMPORTANT: It may be necessary to adjust oil levels depending on installation angle and cooling systems (heat exchanger and fluid lines).**

All Models	Capacity	Fluid Type
Engine Oil (With Filter) <sup>1</sup> .	4.25 liters (4.5 U.S. qts)	Quicksilver Synthetic Blend, NMMA FC-W rated, 4 cycle oil
Seawater Cooling System <sup>2</sup> .	20 liters (21 U.S. qts)	Propylene Glycol and Purified Water

1. Always use the dipstick to determine the exact quantity of oil or fluid required.

2. Seawater Cooling System capacity information is for winterization use only.

## Transmission

Model	Capacity	Fluid Type
5000A	2.8 Liter ( 3 U.S. Quart)	Dexron III Automatic Transmission Fluid
5000V	3.3 Liter (3.5 U.S. Quart)	Dexron III Automatic Transmission Fluid
71C In-Line <sup>3</sup> .	1.7 Liter ( 1.75 U.S. Quart)	Dexron III Automatic Transmission Fluid
71C Gear Reduction	2.8 Liter ( 3 U.S. Quart)	Dexron III Automatic Transmission Fluid
71C Remote gear drive	1.7 Liter ( 1 3/4 U.S. Quart)	Dexron III Automatic Transmission Fluid
72C In-Line	1.7 Liter ( 1 3/4 U.S. Quart)	Dexron III Automatic Transmission Fluid
72C Gear Reduction	1.7 Liter (1 3/4 U.S. Quart)	Dexron III Automatic Transmission Fluid
72C Remote V-drive	1.7 Liter (1 3/4 U.S. Quart)	Dexron III Automatic Transmission Fluid
72C V-Drive	3.8 Liter (4.0 U.S. Quart)	Dexron III Automatic Transmission Fluid
63A	4.0 Liter (4.25 U.S. Quart)	Dexron III Automatic Transmission Fluid
63 V	4.0 Liter (4.25 U.S. Quart)	Dexron III Automatic Transmission Fluid
45C Tow sports	1.8 Liter (60 oz. )	Dexron III Automatic Transmission Fluid
45C Tow Sports	1.8 Liter (60 oz.)	Dexron III Automatic Transmission Fluid
45C Remote V. Drive	1.9 Liter (64 Oz)	Dexron III Automatic Transmission Fluid
45C In-Line <sup>4</sup> .	1.9 Liter (66 oz.)	Dexron III Automatic Transmission Fluid

3. Walter V-drive applications have 2 fluid service points, the transmission and the gear box drive. Refer to the Walter owners manual for capacity and service intervals.
4. Refer to manufacturers owners manual for information concerning remote V-drive fluid capacities.

## Notes:



# Section 5 - Maintenance

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## Owner/Operator Responsibilities

It is the operator's responsibility to perform all safety checks, to ensure that all lubrication and maintenance instructions are complied with for safe operation and to return the unit to an authorized Mercury MerCruiser dealer for a periodic checkup.

Normal maintenance service and replacement parts are the responsibility of the owner/operator and as such, are not considered defects in workmanship or material within the terms of the warranty. Individual operating habits and usage contribute to the need for maintenance service.

Proper maintenance and care of your power package will ensure optimum performance and dependability and will keep your overall operating expenses at a minimum. See your authorized Mercury MerCruiser dealer for service aids.

## Dealer Responsibilities

In general, a dealer's responsibilities to the customer include predelivery inspection and preparation such as:

- Ensure that the boat is properly equipped.
- Prior to delivery, make certain that the Mercury MerCruiser power package and other equipment are in proper operating condition.
- Make all necessary adjustments for maximum efficiency.
- Familiarize the customer with the on-board equipment.
- Explain and demonstrate the operation of the power package and boat.
- Provide you with a copy of a Predelivery Inspection Checklist.
- Your selling dealer should fill out the Warranty Registration Card completely and mail it to the factory immediately upon sale of the new product.

## Maintenance

### ⚠ WARNING

Performing service or maintenance without first disconnecting the battery can cause product damage, personal injury, or death due to fire, explosion, electrical shock, or unexpected engine starting. Always disconnect the battery cables from the battery before maintaining, servicing, installing, or removing engine or drive components.

### ⚠ WARNING

Fuel vapors trapped in the engine compartment may be an irritant, cause difficulty breathing, or may ignite resulting in a fire or explosion. Always ventilate the engine compartment before servicing the power package.

**IMPORTANT:** Refer to the maintenance schedule for complete listing of all scheduled maintenance to be performed. Whereas you can perform some items, others should be performed only by an authorized Mercury MerCruiser dealer. Before attempting maintenance or repair procedures not covered in this manual, we recommend that you purchase a Mercury MerCruiser service manual and read it thoroughly.

*NOTE: Maintenance points are color coded for ease of identification. See the decal on engine for identification.*

Maintenance Point Color Codes	
Blue	Coolant
Yellow	Engine oil
Orange	Fuel
Black	Gear lube oil (sterndrive models only)
Brown	Transmission (inboard models only)

## Do-It-Yourself Maintenance Suggestions

Present day marine equipment, such as your Mercury MerCruiser power package, are highly technical pieces of machinery. Electronic ignition and special fuel delivery systems provide greater fuel economies, but also are more complex for the untrained mechanic.

If you are one of those persons who likes to do it yourself, here are some suggestions for you.

- Do not attempt any repairs unless you are aware of the Cautions, Warnings and procedures required. Your safety is our concern.

- If you attempt to service the product yourself, we suggest you order the service manual for that model. The service manual outlines the correct procedures to follow. It is written for the trained mechanic, so there may be procedures you don't understand. Do not attempt repairs if you do not understand the procedures.
- There are special tools and equipment that are required to perform some repairs. Do not attempt these repairs unless you have these special tools and/or equipment. You can cause damage to the product in excess of the cost a dealer would charge you.
- Also, if you partially disassemble an engine or drive assembly and are unable to repair it, the dealer's mechanic must reassemble the components and test to determine the problem. This will cost you more than taking it to the dealer immediately upon having a problem. It may be a very simple adjustment to correct the problem.
- Do not telephone the dealer, service office or the factory to attempt for them to diagnose a problem or to request the repair procedure. It is difficult for them to diagnose a problem over the telephone.

Your authorized dealer is there to service your power package. They have qualified factory trained mechanics.

It is recommended you have the dealer do periodic maintenance checks on your power package. Have them winterize it in the fall and service it before the boating season. This will reduce the possibility of any problems occurring during your boating season when you want trouble free boating pleasure.

## Inspection

Inspect your power package often, and at regular intervals, to help maintain its top operating performance and correct potential problems before they occur. The entire power package should be checked carefully, including all accessible engine parts.

- Check for loose, damaged or missing parts, hoses and clamps; tighten or replace as necessary.
- Check plug leads and electrical leads for damage.
- Remove and inspect the propeller. If badly nicked, bent or cracked, contact your authorized Mercury MerCruiser dealer.
- Repair nicks and corrosion damage on power package exterior finish. Contact your authorized Mercury MerCruiser dealer.

## Maintenance Schedule - Inboard Models

### Routine Maintenance

*NOTE: Only perform maintenance which applies to your particular power package.*

#### Each Day Start

- Check the crankcase oil (interval can be extended based on experience).
- Check the transmission fluid level.

#### Each Day End

- If operating in salt, brackish or polluted waters, flush the cooling system after each use.

#### Weekly

- Check the water inlets for debris or marine growth. Check the seawater strainer and clean.
- Check the coolant level.
- Check the transmission fluid.

#### Every Two Months or 50 Hours

- Operating in saltwater or brackish or polluted water only: treat the power package with Corrosion Guard.
- Check the battery connections and the fluid level.
- Ensure that the gauges and the wiring connections are secure. Clean the gauges.<sup>1</sup>

### Scheduled Maintenance

*NOTE: Only perform maintenance which applies to your particular power package.*

#### After the Initial 20 Hour Break-In Period

To help extend the life of your Mercury MerCruiser power package, we recommend the following:

- Change the engine oil and filter
- Change the transmission oil and filter on inboard models.

*NOTE: ZF Marine requires the transmission to be changed to preserve the warranty.*

1. If operating in saltwater, interval is reduced to every 25 hours or 30 days whichever occurs first.



## Engine Oil

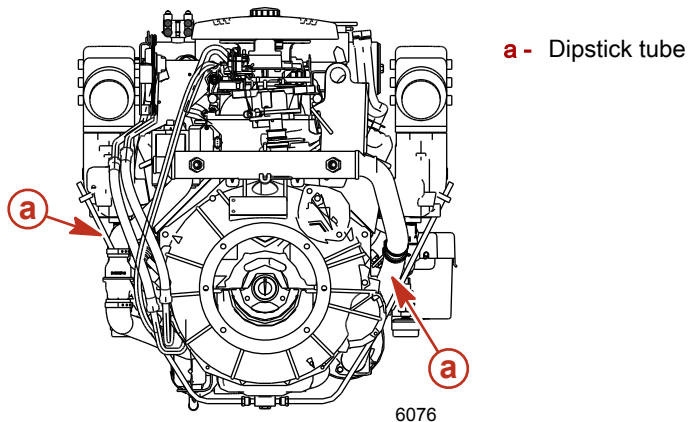
### NOTICE

Discharge of oil, coolant, or other engine/drive fluids into the environment is restricted by law. Use caution not to spill oil, coolant, or other fluids into the environment when using or servicing your boat. Be aware of the local restrictions governing the disposal or recycling of waste, and contain and dispose of fluids as required.

### Checking

1. Stop the engine. Allow approximately 5 minutes for the oil to drain into the oil pan. The boat must be at rest in the water.
2. Remove the dipstick. Wipe clean and reinstall fully into the dipstick tube. Wait 60 seconds to allow trapped air to vent.

**NOTE:** Ensure that dipstick is installed with oil level indication marks facing the rear of the engine (flywheel end).



**IMPORTANT:** Add the specified engine oil to bring the level up to, but not over, the full or OK range mark on the dipstick.

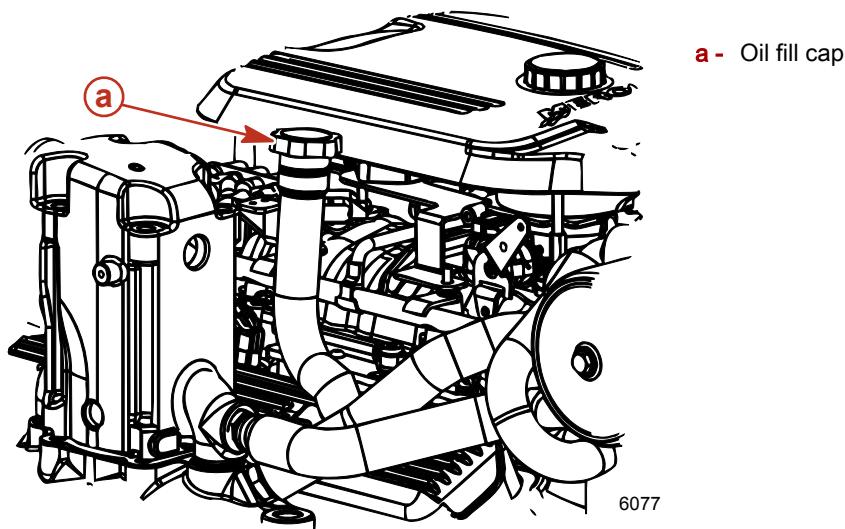
3. Remove the dipstick and observe the oil level. Oil level must be between full or OK range and add. Reinstall dipstick into dipstick tube.

### Filling

**IMPORTANT:** Do not overfill the engine with oil.

**IMPORTANT:** Always use the dipstick to determine the exact quantity of oil or fluid required.

1. Remove oil fill cap.



**IMPORTANT:** Add the specified engine oil to bring the level up to, but not over, the full or OK range mark on the dipstick.

2. Add the specified engine oil to bring the level up to, but not over, the full or OK range mark on the dipstick. Recheck oil level.
3. Replace the fill cap.

Models	Capacity	Fluid Type
Engine Oil (With Filter)	4.25 liters (4.5 U.S. Quart)	Mercury/Quicksilver Synthetic Blend MerCruiser Engine Oil 25W-40

## Changing Oil and Filter

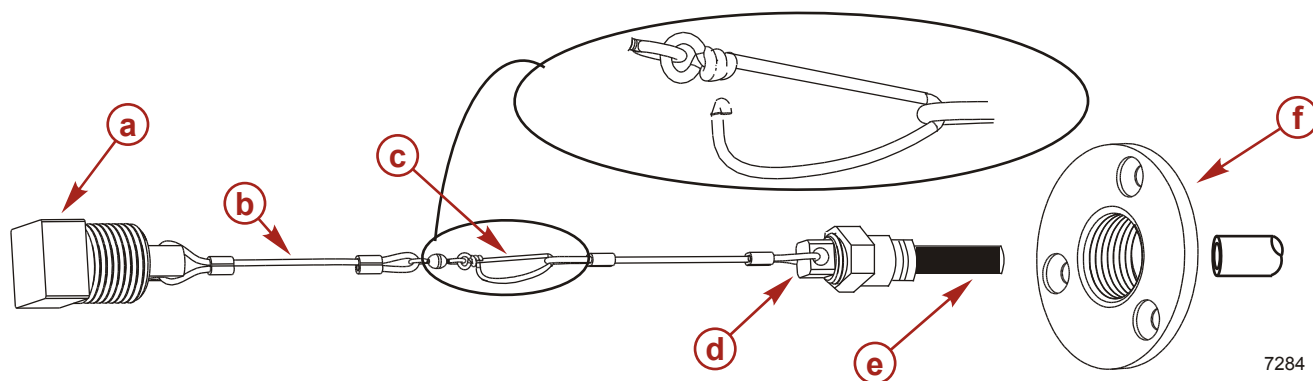
Refer to the Maintenance schedule for the change interval. Engine oil should be changed before placing the boat in storage.

**IMPORTANT: Change engine oil when the engine is warm from operation. Warm oil flows more freely, carrying away more impurities. Use only recommended engine oil (refer to Specifications).**

## Easy Engine Oil Drain System

*NOTE: Boat must be out of water to perform this procedure.*

1. Loosen the oil filter to vent the system.
2. Remove the bilge drain plug.
3. Pull tether through the bilge drain.

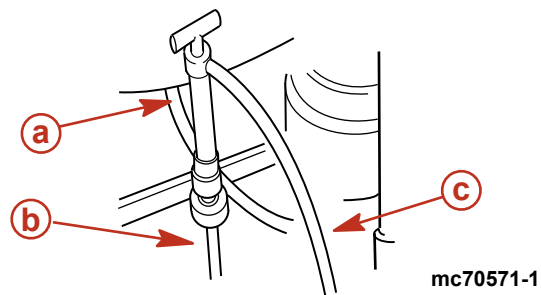


- a - Bilge drain plug
- b - Tether
- c - Clip
- d - Oil drain hose plug
- e - Oil drain hose
- f - Bilge drain flange

4. Place the oil drain hose in a suitable container.
5. Remove the drain plug from the oil drain hose.
6. After oil has drained completely, install the drain plug in the oil drain hose.
7. Push the hose through bilge drain and install the plug.

## Engine Oil Drain Pump

1. Loosen the oil filter to vent the system.
2. Remove the dipstick.
3. Install the oil pump onto the dipstick tube.



- a - Typical oil pump
- b - Dipstick tube
- c - Oil drain hose

4. Insert the hose end of the crankcase oil pump onto an appropriate container and, using the handle, pump until the crankcase is empty.
5. Remove the pump.

6. Install the dipstick.

## Changing Filter

1. Remove and discard oil filter.
2. Coat sealing ring on new filter with engine oil and install.
3. Tighten oil filter securely (following filter manufacturer's instructions). Do not overtighten.
4. Remove oil fill cap.  
**IMPORTANT: Always use dipstick to determine exactly how much oil is required.**
5. Add recommended engine oil to bring level up to the bottom of the OK range on the dipstick.
6. With the boat at rest in the water, check the oil level and add specified fluid to bring the oil level up to, but not over, the full or OK range.

**NOTE:** Adding 0.95 liters (1 quart) of engine oil will raise the level from the add mark to the top of the OK range.

Models	Capacity	Fluid Type
Engine Oil (With Filter)	4.25 liters (4.5 U.S. Quart)	Mercury/Quicksilver Synthetic Blend MerCruiser Engine Oil 25W-40

7. Start the engine, run the engine for three minutes, and check for leaks. Stop the engine. Allow approximately 5 minutes for the oil to drain into the oil pan. The boat must be at rest in the water.

## Transmission Fluid

### Checking While the Engine is Warm

1. Velvet Drive Transmissions - Stop the engine and immediately check fluid level by turning T-handle counterclockwise, to remove dipstick. Fluid level should be up to full mark. If low, add specified fluid through dipstick tube on transmissions.
2. ZF Marine Transmissions - Stop the engine and remove the dipstick to check level. If fluid is below top (full) line, add specified fluid through dipstick hole. Do not overfill. Reinstall dipstick with cap fully seated.
3. Walter V-Drive Transmissions - Stop the engine and remove the dipstick to check the level. If the fluid is below the top (full) line, add the specified fluid through the breather elbow. Do not overfill. Reinstall the dipstick with the cap fully seated.

### Checking While Engine is Cold

**NOTE:** Cold fluid level check: To ease checking the fluid level, the dipstick can be marked or scribed with a cold level mark.

1. Follow the procedure for the warm fluid level check, then allow the boat to sit overnight.  
**IMPORTANT: Be sure to push the dipstick all the way down into the dipstick tube when checking the fluid level.**
2. Remove the dipstick, wipe clean and reinsert.
3. Remove the dipstick, observe the fluid level and mark the cold fluid level.
4. Reinstall the dipstick, tighten the T-handle securely. Do not overtighten.

## Changing

Contact your authorized Mercury MerCruiser dealer.

## Engine Coolant

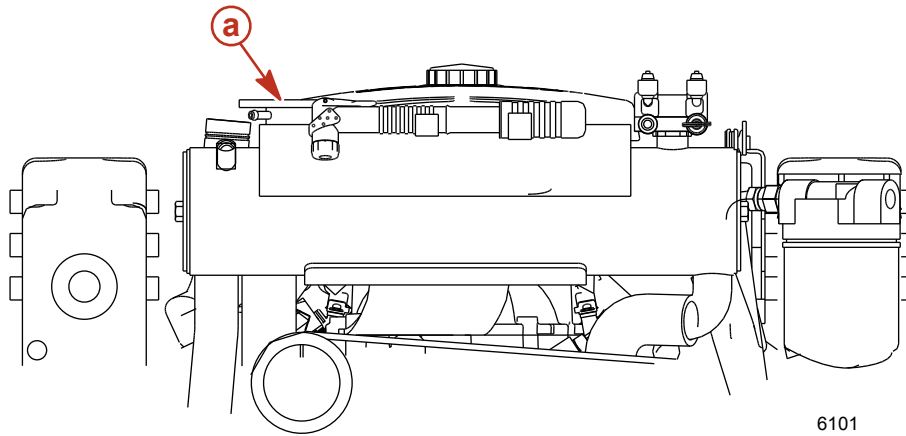
### Checking

#### CAUTION

A sudden loss of pressure can cause hot coolant to boil and discharge violently resulting in serious injury from burns. Allow the engine to cool down before removing the coolant pressure cap.

**Section 5 - Maintenance**

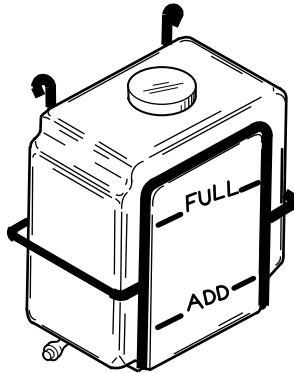
1. Remove the cap from the heat exchanger and observe the fluid level.



**a** - Heat exchanger cap


6101

2. The coolant level in the heat exchanger should be at the bottom of the filler neck. If the coolant level is low, contact your authorized Mercury MerCruiser dealer.
3. Install the cap onto the heat exchanger.  
**IMPORTANT: When reinstalling the pressure cap, be sure to tighten it until it seats on the filler neck.**
4. With the engine at normal operating temperature, check the coolant level in the coolant recovery bottle.
5. The coolant level should be between the "ADD" and "FULL" marks.



6102

6. Add the specified fluid as necessary.

Tube Ref No.	Description	Where Used	Part No.
 122	Extended Life Antifreeze/ Coolant	Closed Cooling System	92-877770K1

**Filling**

**NOTICE**

Using propylene glycol antifreeze in the closed cooling system can damage the cooling system or the engine. Fill the closed cooling system with an ethylene glycol antifreeze solution suitable to the lowest temperature to which the engine will be exposed.

**NOTICE**

Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.


**NOTICE**

Air trapped in the closed cooling system can cause the engine to overheat, resulting in engine damage. Minimize the possibility of trapping air when initially filling the closed cooling system by positioning the boat so that the front of the engine is higher than the rear of the engine.



**NOTE:** Add coolant only when engine is at normal operating temperature.

1. Remove the fill cap from the coolant recovery bottle.
2. Fill to the "FULL" line with the specified coolant.

Tube Ref No.	Description	Where Used	Part No.
 122	Extended Life Antifreeze/ Coolant	Closed Cooling System	92-877770K1

3. Install the fill cap onto the coolant recovery bottle.

## Changing

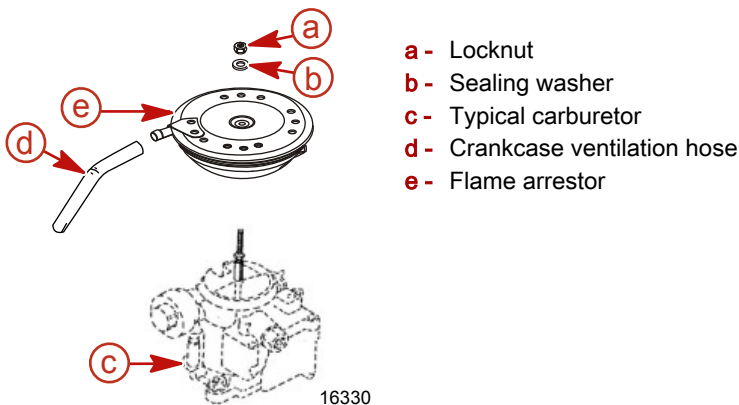
Contact your authorized Mercury MerCruiser dealer.

## Cleaning the Flame Arrestor

### ⚠ WARNING

Fuel is flammable and explosive. Ensure that the key switch is off and the lanyard is positioned so that the engine cannot start. Do not smoke or allow sources of spark or open flame in the area while servicing. Keep the work area well ventilated and avoid prolonged exposure to vapors. Always check for leaks before attempting to start the engine, and wipe up any spilled fuel immediately.

1. Disconnect and remove the crankcase ventilation hose from the fitting on the flame arrestor and valve cover.
2. Remove the flame arrestor.



3. Clean the flame arrestor with warm water and a mild detergent.
4. Inspect the flame arrestor for holes, cracks, or deterioration. Replace if necessary.
5. Allow the flame arrestor to air dry completely before use.
6. Clean the crankcase ventilation hose with warm water and a mild detergent. Dry with compressed air or allow to air dry completely.
7. Inspect the crankcase ventilation hose for cracks or deterioration. Replace if necessary.
8. Install the flame arrestor, sealing washer, and locknut. Torque the flame arrestor locknut to specification.

Description	Nm	lb-in.	lb-ft
Flame arrestor nut	12	106	

9. Connect the crankcase ventilation hose to the fitting on the flame arrestor and valve cover.

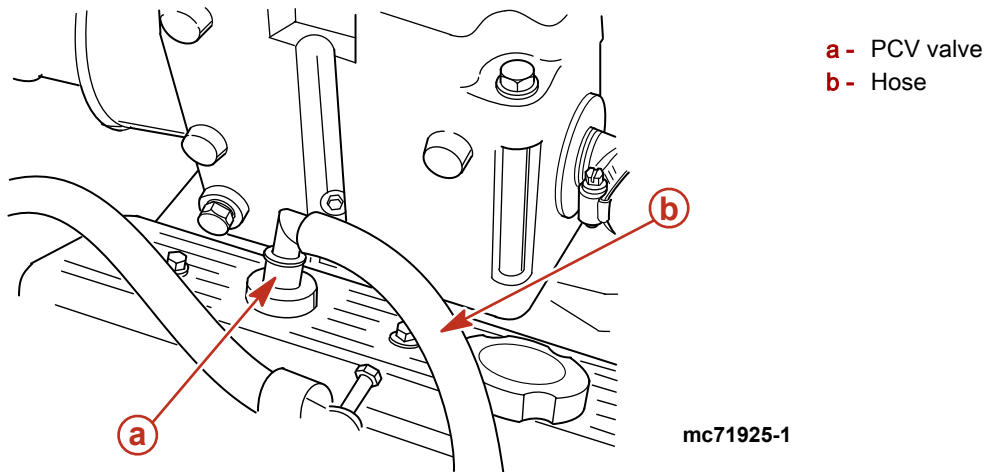
## Positive Crankcase Ventilation Valve (PCV)

### Changing

**NOTE:** We recommend the use of Mercury MerCruiser replacement parts to ensure compliance with emission regulations.

**NOTE:** On V6 models the PCV valve is non-serviceable and is an internal component of the valve cover.

1. Remove the PCV valve from the port valve cover.




2. Disconnect the PCV valve from the hose and discard the valve.
3. Install a new PCV valve in the valve cover and reconnect the hose.
4. Ensure the PCV valve is tightly seated in the valve cover.

## Changing Water Separating Fuel Filter

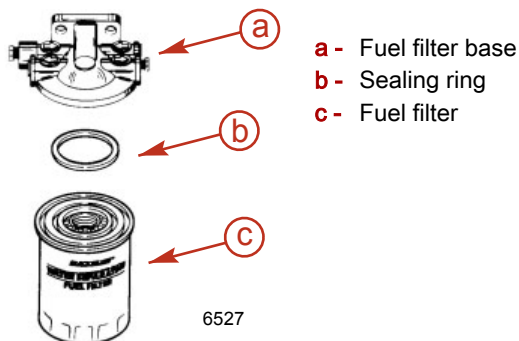
### ⚠ WARNING

Fuel is flammable and explosive. Ensure that the key switch is off and the lanyard is positioned so that the engine cannot start. Do not smoke or allow sources of spark or open flame in the area while servicing. Keep the work area well ventilated and avoid prolonged exposure to vapors. Always check for leaks before attempting to start the engine, and wipe up any spilled fuel immediately.

1. Allow the engine to cool down.  
*NOTE: Mercury MerCruiser recommends that the engine be shut off for 12 hours prior to filter removal.*
2. Close fuel supply valve, if equipped.
3. Wrap the water separating fuel filter with a cloth to help catch any fuel spills or spray.
4. Remove and discard the water separating fuel filter and sealing ring from the mounting bracket.
5. Coat the sealing ring on the new filter with engine oil.

Tube Ref. No.	Description	Where Used	Part No.
	Synthetic Blend MerCruiser Engine Oil SAE25W-40	Filter sealing ring	92-883725K01

6. Thread filter onto bracket and tighten securely by hand. Do not use a filter wrench.

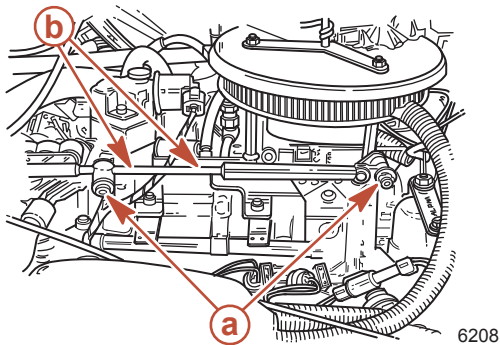


7. Open fuel supply valve, if equipped.
8. Supply cooling water to the engine.
9. Start the engine. Check for gasoline leaks around the fuel filter assembly. If leaks exist, stop the engine immediately. Recheck the filter installation, clean spilled fuel and properly ventilate the engine compartment. If leaks continue, stop engine immediately and contact your authorized Mercury MerCruiser dealer.


## Lubrication

### Throttle Cable

1. Lubricate the pivot points and the guide contact surfaces.



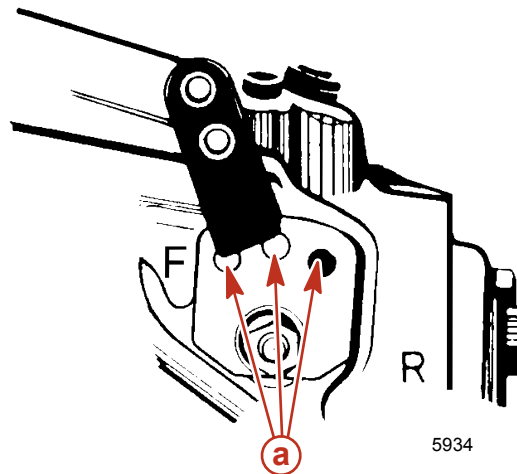
- a - Pivot points
- b - Guide contact surfaces

Tube Ref. No.	Description	Where Used	Part No.
	Synthetic Blend MerCruiser Engine Oil SAE25W-40	Throttle cable pivot points & guide contact surfaces	92-883725K01


### Transmission Linkage

**IMPORTANT:** The poppet ball must be centered in the detent hole for each F-N-R position.

1. Lubricate the detent ball and the holes in the shift lever.

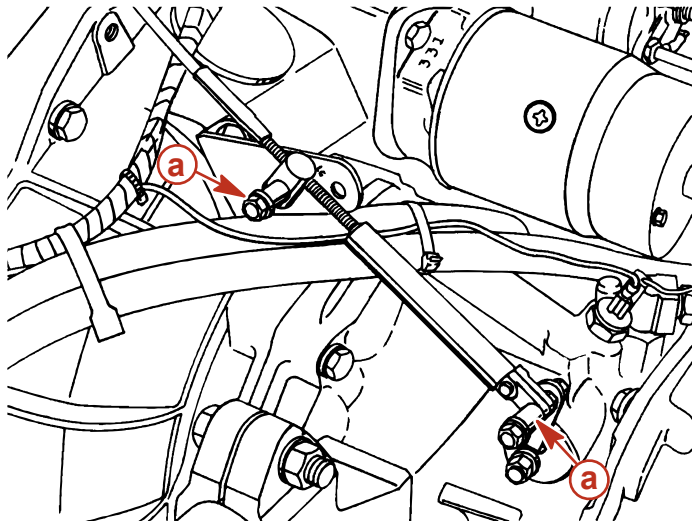


In-Line Transmission

Tube Ref. No.	Description	Where Used	Part No.
	Synthetic Blend MerCruiser Engine Oil SAE25W-40	Detent ball and shift lever holes	92-883725K01


## Section 5 - Maintenance

- Lubricate the shift cable pivot points.

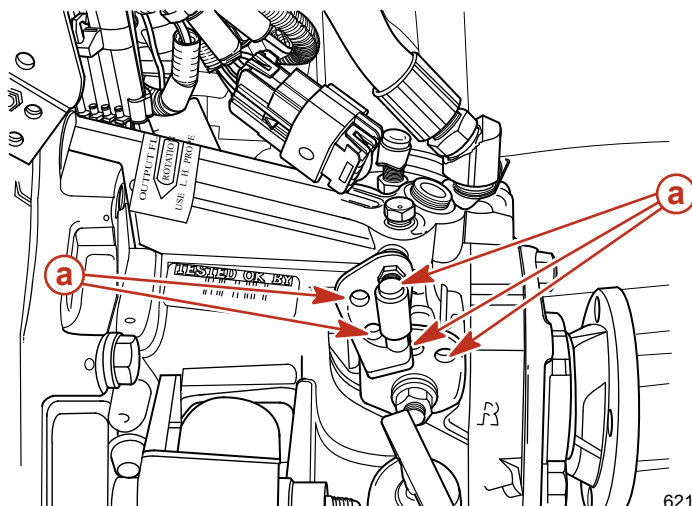


a - Pivot points

5935


Tube Ref. No.	Description	Where Used	Part No.
	Synthetic Blend MerCruiser Engine Oil SAE25W-40	Shift cable pivot points	92-883725K01

- Lubricate the poppet ball and the holes in the shift lever.



a - Poppet ball locations

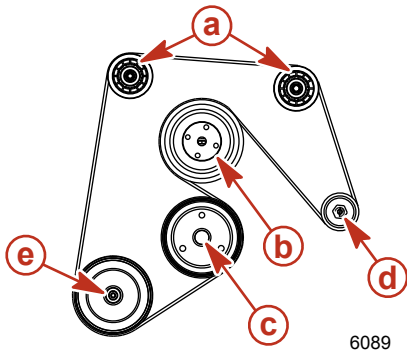
6219

Tube Ref No.	Description	Where Used	Part No.
 95	2-4-C with Teflon	Poppet ball and holes	92-802859A 1

## Serpentine Drive Belt

### ⚠ WARNING

Inspecting the belts with the engine running may cause serious injury or death. Turn off the engine and remove the ignition key before adjusting tension or inspecting belts.



- a - Idler pulley
- b - Circulating pump pulley
- c - Crankshaft pulley
- d - Alternator pulley
- e - Seawater pump pulley

6089

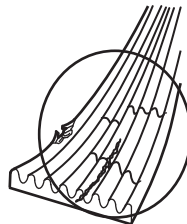
### Checking

1. Inspect the drive belt for proper tension and for the following:

- Excessive wear
- Cracks

**NOTE:** Minor, transverse cracks (across the belt width) may be acceptable. Longitudinal cracks (in the direction of belt length) that join transverse cracks are NOT acceptable.

- Fraying
- Glazed surfaces
- Proper tension - 13 mm (1/2 in.) deflection, with moderate thumb pressure, on the belt at the location that has the longest distance between two pulleys.



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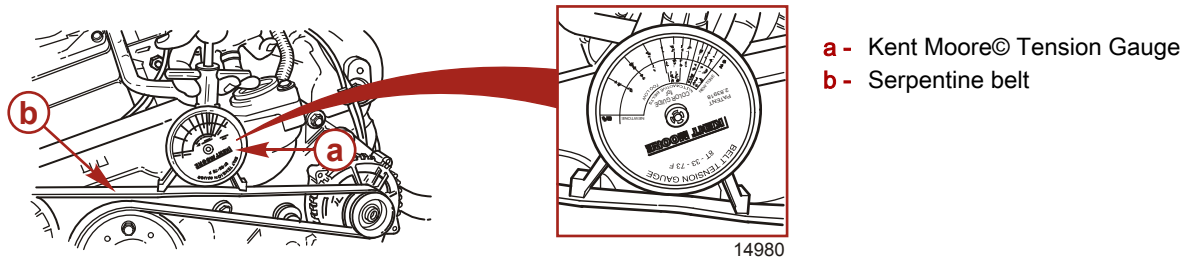
### Replacing Belt and/or Adjusting Tension

**IMPORTANT:** If a belt is to be reused, it should be installed in the same direction of rotation as before.

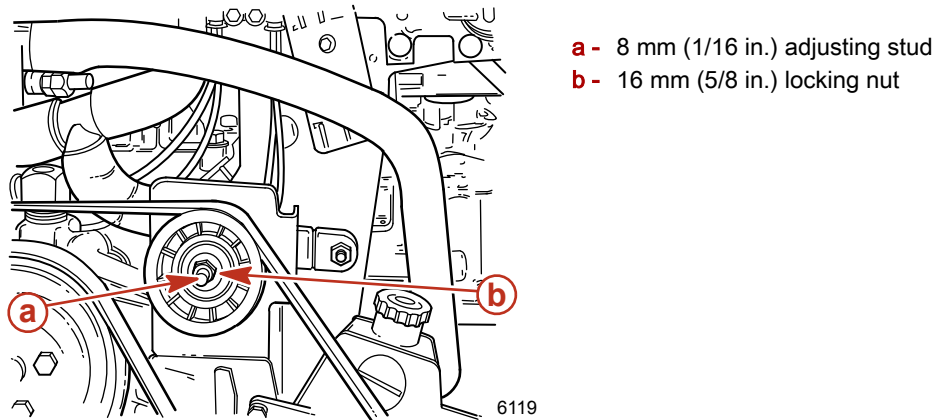
**NOTE:** Belt deflection is to be measured on the belt at the location that has the longest distance between two pulleys.

1. Loosen the 16 mm (5/8 in.) locking nut on the adjustment stud.
2. Turn the adjustment stud and loosen the belt.
3. If a new serpentine drive belt is required, remove the old belt and install a new belt onto the pulleys.
4. Put a wrench on the adjustment stud 16 mm (5/8 in.) locking nut.
5. Use a 8 mm (5/16 in.) socket and tighten adjusting the stud to adjust the belt deflection.
6. Using one of the 2 methods following, check for correct deflection.
  - a. Push down with moderate thumb pressure on the longest stretch of belt. Proper deflection is 13 mm (1/2 in.).

- b. Attach the Kent Moore® Belt Tension Gauge to the belt. The gauge has different ranges for new and used belts.



7. While holding the adjustment stud at the correct belt tension, tighten the 16 mm (5/8 in.) locking nut.



8. Operate the engine for a short period of time and recheck the belt adjustment.

## Flushing The Power Package

### Inboards

**NOTE:** Flushing is needed only for salty, brackish, mineral laden or polluted water applications. Flushing is recommended after each outing for best results.

1. Close the seacock, if equipped, or remove the water inlet hose and plug the inlet.
2. Attach the quick connect fitting to a water hose.
3. Remove the blue cap from the flush socket on the engine

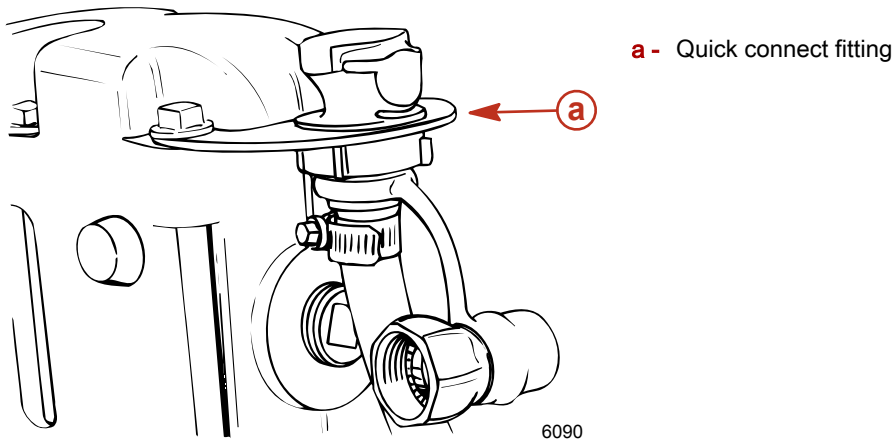
### NOTICE

Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

### NOTICE

Flushing the engine when it is not operating will result in water collecting in the exhaust system, damaging the engine. Do not supply flush water for more than 15 seconds without the engine operating.

4. Snap the quick connect fitting and the water hose into the flush socket on the engine.



5. Open the water source completely.
6. Start the engine within 15 seconds.
7. Operate the engine at 1300 RPM, +/- 100 RPM.
8. Allow engine to reach normal operating temperature. Watch the temperature gauge on the dash to ensure that the engine does not overheat.
9. Flush the engine for a minimum of 10 minutes or until the discharge water is clear.
10. Shut off the engine.

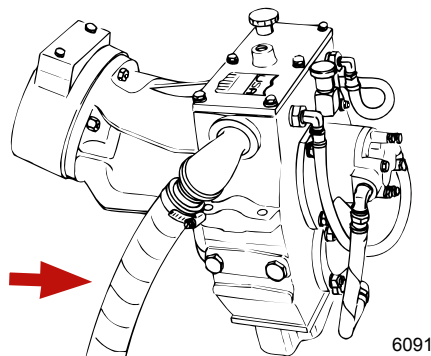
### NOTICE

**Flushing the engine when it is not operating will result in water collecting in the exhaust system, damaging the engine. Do not supply flush water for more than 15 seconds without the engine operating.**

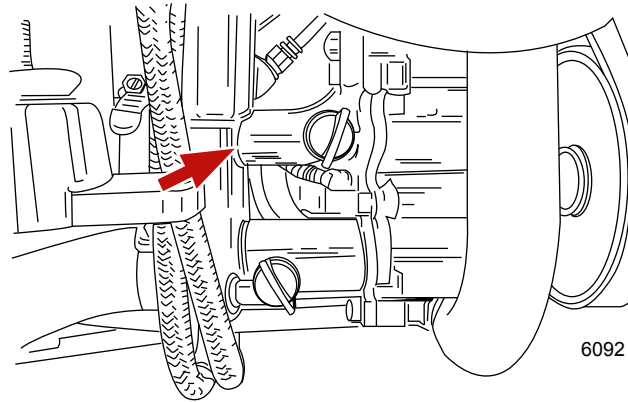
11. Turn off water source within 15 seconds of shutting off engine.
  12. Disconnect the quick connect fitting and water hose from the flush socket on the engine by pressing the release button on the flush socket
  13. Attach to the next engine, if equipped, and repeat procedure.
  14. Turn off the water source.
  15. Remove the quick connect fitting from the water hose.
  16. Replace the blue cap into the flush socket on the engine.
  17. Open the seacock, if equipped, or unplug and reconnect the water inlet hose prior to operating the engine.
- NOTE:** *If the unit is to be stored in the water, the seacock should remain closed until time of usage. If unit is to be stored out of the water, open the seacock.*

## Tow Sports

1. **If flushing the engine with the boat in the water**, close the seacock or remove and plug the water inlet hose.
  - a. **Models with Water V-Drive Transmissions:** Disconnect water inlet hose from the transmission fitting. Using appropriate connector, connect water hose to water source. Proceed to Step 3.



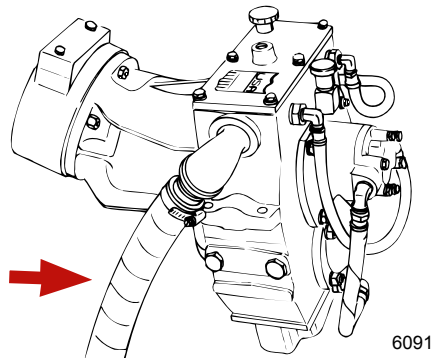
- b. **All other models:** Using appropriate connector, connect the flushing hose from the water source to the water inlet hose (upper hose) of the seawater pickup pump. Proceed to Step 3.



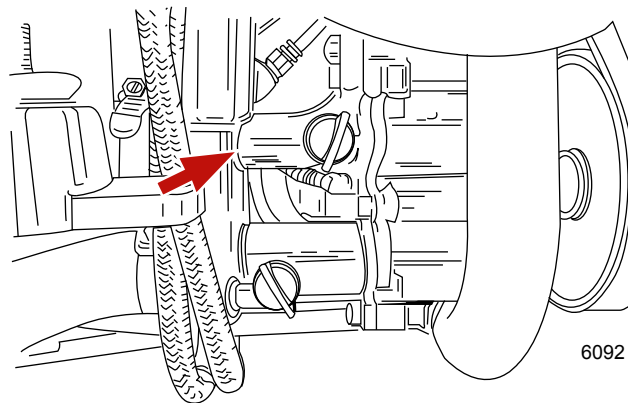
**⚠ WARNING**

Rotating propellers can cause serious injury or death. Never operate the boat out of the water with a propeller installed. Before installing or removing a propeller, place the drive unit in neutral and engage the lanyard stop switch to prevent the engine from starting. Place a block of wood between the propeller blade and the anti-ventilation plate.

- 2. **If flushing the engine with the boat out of the water,** remove the propeller. Refer to boat manufacturers' instructions.
  - a. **Models with Walter V-Drive Transmissions:** Disconnect water inlet hose from transmission fitting. Using appropriate connector, connect the flushing hose. Proceed to Step 3.



- b. **All other models:** Using appropriate connector, connect the flushing hose from the water to the water inlet hose (upper hose) of the seawater pickup pump. Proceed to Step 3.



- 3. Open the water source completely.
- 4. Place remote control in neutral, idle speed position, and start engine. Operate engine at idle speed, in neutral, for about 10 minutes or until discharge water is clear.
- 5. Stop the engine.



6. Remove the flushing connector from the water inlet.
7. Reconnect the water inlet hose.
8. Tighten hose clamp securely.
9. Attach to the next engine, if equipped, and repeat procedure.
10. Turn off the water source.
11. Open the seacock, if equipped, or unplug and reconnect the water inlet hose prior to operating the engine.  
**NOTE:** *If the unit is to be stored in the water, the seacock should remain closed until time of usage. If unit is to be stored out of the water, open the seacock.*
12. Replace the propeller if removed. Refer to the boat manufacturers' instructions.

## Battery

Refer to specific instructions and warnings accompanying your battery. If this information is not available, observe the following precautions when handling a battery.

### WARNING

Recharging a weak battery in the boat, or using jumper cables and a booster battery to start the engine, can cause serious injury or product damage from fire or explosion. Remove the battery from the boat and recharge in a ventilated area away from sparks or flames.

### WARNING

An operating or charging battery produces gas that can ignite and explode, spraying out sulfuric acid, which can cause severe burns. Ventilate the area around the battery and wear protective equipment when handling or servicing batteries.

## Notes:

# Section 6 - Storage

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## Cold Weather or Extended Storage

**IMPORTANT:** Mercury MerCruiser strongly recommends that this service should be performed by an authorized Mercury MerCruiser dealer. Damage caused by freezing temperatures IS NOT covered by the Mercury MerCruiser Limited Warranty.

### NOTICE

Water trapped in the seawater section of the cooling system can cause corrosion or freeze damage. Drain the seawater section of the cooling system immediately after operation or before any length of storage in freezing temperatures. If the boat is in the water, keep the seacock closed until restarting the engine to prevent water from flowing back into the cooling system. If the boat is not fitted with a seacock, leave the water inlet hose disconnected and plugged.

*NOTE:* As a precautionary measure, attach a tag to the key switch or steering wheel of the boat reminding the operator to open the seacock or unplug and reconnect the water inlet hose before starting the engine.

**IMPORTANT:** Mercury MerCruiser requires that propylene glycol antifreeze, mixed to the manufacturers instructions, be used in the seawater section of the cooling system for freezing temperatures or extended storage. Make sure that the propylene glycol antifreeze contains a rust inhibitor and is recommended for use in marine engines. Be certain to follow the propylene glycol manufacturer's recommendations.

## Preparing Power Package for Storage

1. Fill the fuel tanks with fresh gasoline (that does not contain alcohol) and a sufficient amount of Quicksilver Gasoline Stabilizer for Marine Engines to treat the gasoline. Follow instructions on the container.
2. If the boat is to be placed in storage with fuel containing alcohol in fuel tanks (if fuel without alcohol is not available): Fuel tanks should be drained as low as possible and Mercury/Quicksilver Gasoline Stabilizer for Marine Engines added to any fuel remaining in the tank. Refer to **Fuel Requirements** for additional information.
3. Flush the cooling system. Refer to the **Maintenance** section.  
**IMPORTANT:** In order to run the engine as required in the remainder of the storage preparation procedure, water must be supplied to the engine as described in the flushing procedure.
4. Provide cooling water to the engine as done in the previous step.
5. Operate the engine sufficiently to bring it up to normal operating temperature and allow fuel with Mercury/Quicksilver Gasoline Stabilizer to circulate through the fuel system. Shut off the engine.
6. Change the oil and oil filter.
7. Prepare the engine and fuel system for storage. Refer to **Engine and Fuel System Preparation**.
8. Drain the engine seawater cooling system. Refer to **Draining the Seawater System**.

### NOTICE

Water trapped in the seawater section of the cooling system can cause corrosion or freeze damage. Drain the seawater section of the cooling system immediately after operation or before any length of storage in freezing temperatures. If the boat is in the water, keep the seacock closed until restarting the engine to prevent water from flowing back into the cooling system. If the boat is not fitted with a seacock, leave the water inlet hose disconnected and plugged.

9. For additional assurance against freezing and rust, after draining, fill the cooling system with propylene glycol mixed to the manufacturer's recommendation to protect engine to the lowest temperature to which it will be exposed during freezing temperatures or extended storage.

### NOTICE

The universal joint bellows may develop a set when stored in a raised or up position, causing the bellows to fail when returned to service and allowing water to enter the boat. Store the sterndrive in the full down position.

10. Store the battery according to the manufacturer's instructions.

## Engine and Fuel System Preparation

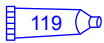
### ⚠ WARNING

Fuel is flammable and explosive. Ensure that the key switch is off and the lanyard is positioned so that the engine cannot start. Do not smoke or allow sources of spark or open flame in the area while servicing. Keep the work area well ventilated and avoid prolonged exposure to vapors. Always check for leaks before attempting to start the engine, and wipe up any spilled fuel immediately.

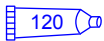
**⚠ WARNING**

Fuel vapors trapped in the engine compartment may be an irritant, cause difficulty breathing, or may ignite resulting in a fire or explosion. Always ventilate the engine compartment before servicing the power package.

1. Prepare carbureted fuel system for extended storage as follows:
  - a. Start engine.
  - b. Provide cooling water to the engine as done in the previous step.
  - c. Remove flame arrestor assembly.
  - d. Close the fuel shut off valve, if equipped. Disconnect and plug the fuel inlet fitting if not equipped with a fuel shut off valve.
  - e. While operating engine at fast idle (1300 RPM), fog internal surfaces of induction system and combustion chambers by spraying approximately 227 g (8 oz.) of Mercury/Quicksilver Storage Seal or SAE 20W engine oil into carburetor bores.
  - f. Spray the remaining 57 g (2 oz.) of Storage Seal (or oil) rapidly into carburetor, just as the engine begins to stall, due to lack of fuel. Allow engine to stop.

Tube Ref No.	Description	Where Used	Part No.
 119	Storage Seal Rust Inhibitor	Carburetor	92-858081K01

- g. Turn ignition key to "OFF" position.
2. Refer to **Flushing the Power Package** and appropriately remove the water supply the the seawater pickup pump.
3. Clean the flame arrestor and crankcase ventilation hoses and reinstall.
4. Lubricate all items listed in the **Lubrication** section.
5. On models with closed cooling systems: Test coolant to ensure that it will withstand the lowest temperature expected during storage.
6. Service batteries according to the manufacturer's instructions.
7. Clean the outside of the engine and repaint any areas required with Mercury/Quicksilver Light Gray Primer and Phantom Black Paint. After paint has dried, wipe down the outside of the engine with Corrosion Guard.

Tube Ref No.	Description	Where Used	Part No.
 120	Corrosion Guard	Outside of engine	92-802878 55

8. For sterndrive unit lay-up, refer to appropriate Mercury MerCruiser sterndrive service manual.
9. Replace the fuel filter. Refer to the **Maintenance** section for proper procedure.
10. Change the oil and oil filter.

## Draining the Seawater System

**⚠ CAUTION**

Water can enter the bilge when the drain system is open, damaging the engine or causing the boat to sink. Remove the boat from the water or close the seacock, disconnect and plug the seawater inlet hose, and ensure the bilge pump is operational before draining. Do not operate the engine with the drain system open.

**IMPORTANT:** Only drain the seawater section of the closed cooling system.

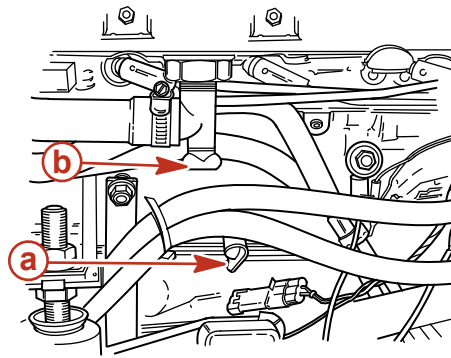
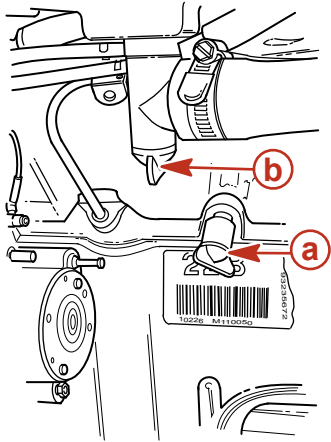
**IMPORTANT:** The boat must be as level as possible to ensure complete draining of the cooling system.

Your power package is equipped with a drain system. Refer to **Drain System Identification** to determine which instructions apply to your power package.

**IMPORTANT:** The engine must not be operating at any point during the draining procedure.

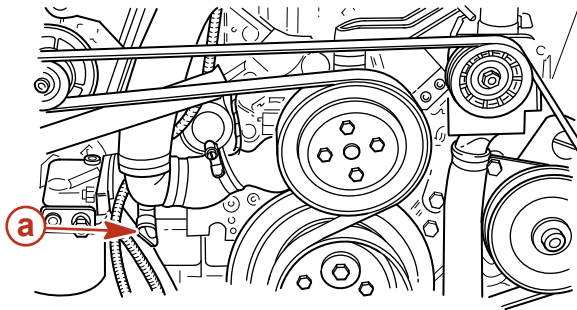
## Drain System Identification

### Multi-Point Drain (MPD) System



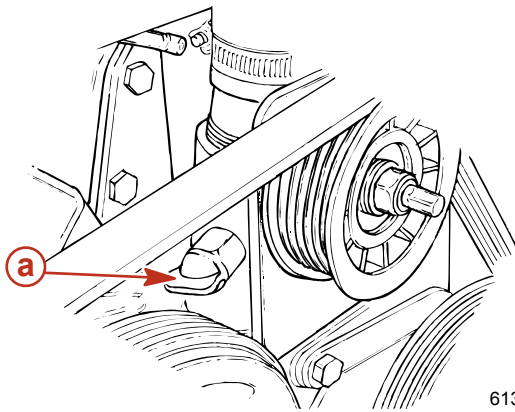
- a - Side of cylinder block
- b - Bottom of exhaust manifolds

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- a - Water circulating pump hose

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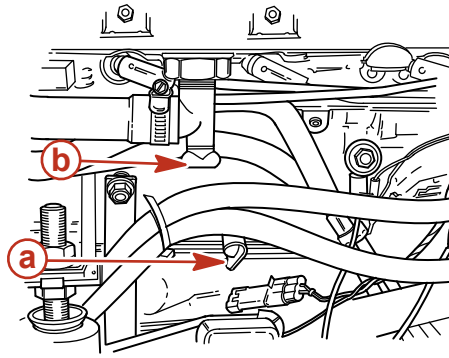
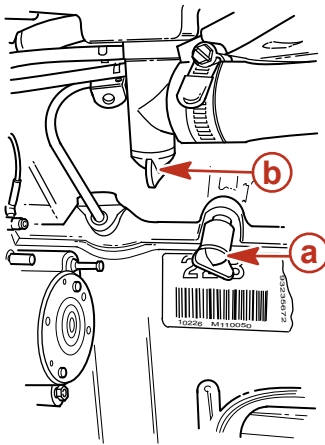
- a - Check valve (if equipped)

6131

### Multi-Point Drain (MPD) System

1. Place the boat on a level surface to ensure complete draining of the system.
2. Remove the blue drain plugs from the following locations. It may be necessary to clean out the drain holes using a stiff piece of wire. Do not until the entire system is drained.
  - a. Port and starboard side of cylinder block

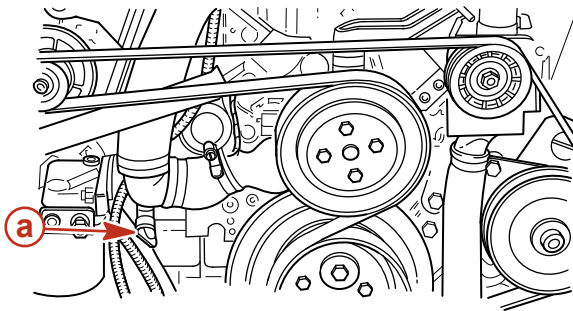
b. Bottom of exhaust manifolds



- a** - Cylinder block drain plug
- b** - Exhaust manifold drain plug

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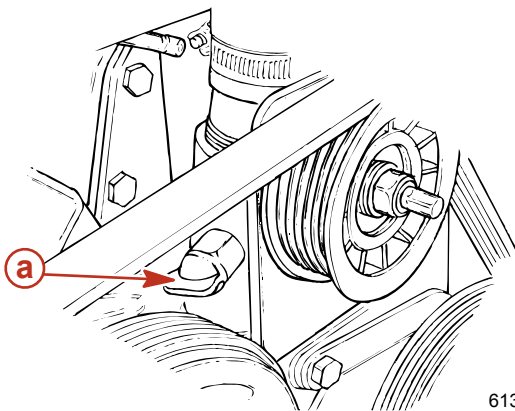
c. Water circulating pump hose



- a** - Drain plug

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d. Check valve

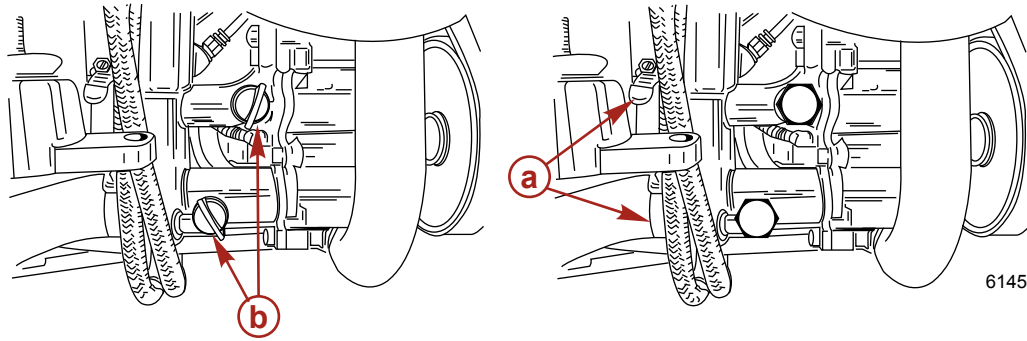


- a** - Drain plug (if equipped)

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## Section 6 - Storage

3. On models with a seawater pickup pump, remove the two blue drain plugs. If the seawater pickup pump does not have blue drain plugs, or you are unable to access them, loosen the clamps and remove both hoses.



- a - Hose clamps
- b - Blue drain plugs

4. Crank the engine over slightly with starter motor to purge any water trapped in the seawater pickup pump. Do not allow the engine to start.
5. After the cooling system has been drained completely, install the drain plugs, reconnect hoses, and tighten all hose clamps securely.

## Battery Storage

Whenever the battery will be stored for an extended period of time, be sure the cells are full of water and the battery is fully charged and in good operating condition. It should be clean and free of leaks. Follow the battery manufacturer's instructions for storage.

## Recommissioning the Power Package

1. Ensure that all cooling system hoses are connected properly and hose clamps are tight.

### ⚠ CAUTION

Disconnecting or connecting the battery cables in the incorrect order can cause injury from electrical shock or can damage the electrical system. Always disconnect the negative (-) battery cable first and connect it last.

2. Install a fully charged battery. Clean the battery cable clamps and terminals and reconnect cables. Tighten each cable clamp securely when connecting.
3. Coat the terminal connections with a battery terminal anti-corrosion agent.
4. Perform all the checks in the before starting column of the **Operation Chart**.

### NOTICE

Without sufficient cooling water, the engine, the water pump, and other components will overheat and suffer damage. Provide a sufficient supply of water to the water inlets during operation.

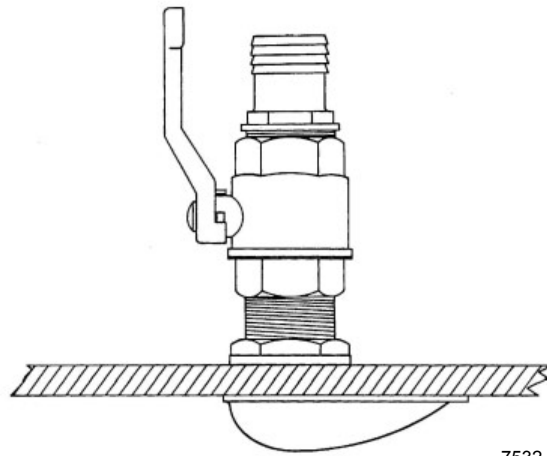
5. Start the engine and closely observe instrumentation to ensure that all systems are functioning correctly.
6. Carefully inspect the engine for fuel, oil, fluid, water and exhaust leaks.
7. Inspect the steering system, shift and throttle control for proper operation.

## Seacock

The ABYC and other industry standards/regulations require the use of a seacock on certain types of applications to stop the entry of water in the event of a leak in the cooling system. Refer to applicable standards/regulations for specific requirements. The seacock also allows the water to be shut off when servicing the engine.



Seacock must provide minimum restriction to water flow (refer to Specifications). A ball or gate valve is recommended. The ball valve is most common and is typically equipped with a lever type handle that operates in a 90 degree arc. This design gives a clear indication of whether the valve is open or shut. Industry standards/requirements typically require that the seacock be rigidly attached to the hull at the water pickup. Seacock location should be readily accessible for quick, easy operation.



## Notes:

# Section 7 - Troubleshooting

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## Starter Motor Will Not Crank Engine, Or Cranks Slow

Possible Cause	Remedy
Battery switch turned off.	Turn the switch on.
Remote control not in neutral position.	Position the control lever in neutral.
Open circuit breaker or blown fuse.	Check and reset the circuit breaker or replace fuse.
Loose or dirty electrical connections or damaged wiring.	Check all electrical connections and wires (especially battery cables). Clean and tighten all faulty connections.
Bad battery or low battery voltage.	Test the battery and charge if necessary; replace if bad.
Lanyard stop switch activated.	Check the lanyard stop switch.

## Engine Will Not Start Or Is Hard To Start

Possible Cause	Remedy
Lanyard stop switch activated.	Check the lanyard stop switch.
Improper starting procedure.	Read the starting procedure.
Insufficient fuel supply.	Fill fuel tank or open valve.
Engine flooded.	Turn the key switch off and wait 5 minutes. Push the throttle only button, push the remote control handle/throttle lever to the 1/4 throttle position, and attempt to restart.
Faulty ignition system component.	Service the ignition system.
Clogged fuel filter.	Replace fuel filter.
Stale or contaminated fuel.	Drain fuel tank. Fill with fresh fuel.
Fuel line or tank vent line kinked or clogged.	Replace kinked lines or blow out lines with compressed air to remove obstruction.
Faulty wire connections.	Check wire connections.
TKS fuse blown.	Check TKS fuse. Replace the fuse if blown.

## Engine Runs Rough, Misses or Backfires

Possible Cause	Remedy
Clogged fuel filter.	Replace filter.
Stale or contaminated fuel.	If contaminated, drain tank. Fill with fresh fuel.
Kinked or clogged fuel line or fuel tank vent line.	Replace kinked lines or blow out lines with compressed air to remove obstruction.
Flame Arrestor dirty.	Clean Flame Arrestor.
Faulty ignition system component.	Service ignition system.

## Poor Performance

Possible Cause	Remedy
Throttle not fully open.	Inspect the throttle cable and linkages for proper operation.
Damaged or improper propeller.	Replace the propeller.
Excessive bilge water.	Drain and check for cause of entry.
Boat overloaded or load improperly distributed.	Reduce load or redistribute load more evenly.
Flame arrestor dirty.	Clean the flame arrestor.
Boat bottom fouled or damaged.	Clean or repair as necessary.
Ignition problem.	See <b>Engine Runs Rough, Misses or Backfires</b> .
Engine overheating.	See <b>Excessive Engine Temperature</b> .

Possible Cause	Remedy
Running rich.	Have authorized Mercury MerCruiser dealer check and repair.

## Excessive Engine Temperature

Possible Cause	Remedy
Water inlet or seacock closed.	Open.
Drive belt loose or in poor condition.	Replace or adjust belt.
Seawater pickups or sea strainer obstructed.	Remove obstruction.
Faulty thermostat.	Replace.
Coolant level (if equipped) low in closed cooling section.	Check for cause of low coolant level and repair. Fill system with proper coolant solution.
Heat Exchanger or Fluid Cooler plugged with foreign material	Clean Heat Exchanger, Engine Oil Cooler, and Transmission Oil Cooler (if equipped).
Loss of pressure in closed cooling section.	Check for leaks. Clean, inspect and test pressure cap.
Faulty seawater pickup pump.	Repair.
Seawater discharge restricted or plugged.	Clean exhaust elbows.

## Insufficient Engine Temperature

Possible Cause	Remedy
Faulty thermostat.	Replace.

## Low Engine Oil Pressure

Possible Cause	Remedy
Insufficient oil in crankcase.	Check and add oil.
Excessive oil in crankcase (causing it to become aerated).	Check and remove required amount of oil. Check for cause of excessive oil (improper filling).
Diluted or improper viscosity oil.	Change oil and oil filter, using correct grade and viscosity oil. Determine cause for dilution (excessive idling).

## Battery Will Not Recharge

Possible Cause	Remedy
Excessive current draw from battery.	Turn off non-essential accessories.
Alternator drive belt loose or in poor condition.	Replace and/or adjust.
Unacceptable battery condition.	Test battery, replace if necessary.
Loose or dirty electrical connections or damaged wiring.	Check all associated electrical connections and wires (especially battery cables). Clean and tighten faulty connections. Repair or replace damaged wiring.
Faulty alternator	Test alternator output, replace if necessary.

## Remote Control Is Difficult to Move, Has Excessive Play, or Makes Unusual Sounds

Possible Cause	Remedy
Insufficient lubrication on shift and throttle linkage fasteners.	Lubricate.
Obstruction in shift or throttle linkages.	Remove obstruction.
Loose or missing shift and throttle linkages.	Check all throttle linkages. If any are loose or missing, see authorized Mercury MerCruiser dealer immediately.
Shift or throttle cable kinked.	Straighten cable or have authorized Mercury MerCruiser dealer replace cable if damaged beyond repair.

## Steering Wheel Jerks or Is Difficult to Turn

Possible Cause	Remedy
Low power steering pump fluid level.	Check for leak. Refill system with fluid.
Drive belt loose or in poor condition.	Replace and/or adjust.
Insufficient lubrication on steering components.	Lubricate.
Loose or missing steering fasteners or parts.	Check all parts and fasteners if any are loose or missing, see authorized Mercury MerCruiser dealer immediately.
Contaminated power steering fluid.	See authorized Mercury MerCruiser dealer.

# Section 8 - Customer Assistance Information

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## Owner Service Assistance

### Local Repair Service

If you need service for your Mercury MerCruiser–powered boat, take it to your authorized dealer. Only authorized dealers specialize in Mercury MerCruiser products and have factory-trained mechanics, special tools and equipment, and genuine Quicksilver parts and accessories to properly service your engine.

**NOTE:** *Quicksilver parts and accessories are engineered and built by Mercury Marine specifically for Mercury MerCruiser sterndrives and inboards.*

### Service Away From Home

If you are away from your local dealer and the need arises for service, contact the nearest authorized dealer. Refer to the Yellow Pages of the telephone directory. If, for any reason, you cannot obtain service, contact the nearest Regional Service Center. Outside the United States and Canada, contact the nearest Marine Power International Service Center.

### Stolen Power Package

If your power package is stolen, immediately advise the local authorities and Mercury Marine of the model and serial numbers and to whom the recovery is to be reported. This information is maintained in a database at Mercury Marine to aid authorities and dealers in recovery of stolen power packages.

### Attention Required after Submersion

1. Before recovery, contact an authorized Mercury MerCruiser dealer.
2. After recovery, immediate service by an authorized Mercury MerCruiser dealer is required to reduce the possibility of serious engine damage.

### Replacement Service Parts

#### WARNING

**Avoid fire or explosion hazard. Electrical, ignition, and fuel system components on Mercury Marine products comply with federal and international standards to minimize risk of fire or explosion. Do not use replacement electrical or fuel system components that do not comply with these standards. When servicing the electrical and fuel systems, properly install and tighten all components.**

Marine engines are expected to operate at or near full throttle for most of their life. They are also expected to operate in both fresh and saltwater environments. These conditions require numerous special parts. Exercise care when replacing marine engine parts, because specifications are different from those of the standard automotive engine. For example, one of the most important special replacement parts, is the cylinder head gasket. Marine engines cannot use steel-type automotive head gaskets because saltwater is highly corrosive. A marine engine head gasket uses special materials to resist corrosion.

Because marine engines must be capable of running at or near maximum RPM much of the time, they also have special valve springs, valve lifters, pistons, bearings, camshafts and other heavy-duty moving parts.

Mercury MerCruiser marine engines have other special modifications to provide long life and dependable performance.

### Parts and Accessories Inquiries

Direct any inquiries concerning Quicksilver replacement parts and accessories to your local authorized dealer. The dealer has the necessary information to order parts and accessories for you if they are not in stock. Only authorized dealers can purchase genuine Quicksilver parts and accessories from the factory. Mercury Marine does not sell to unauthorized dealers or retail customers. When inquiring on parts and accessories, the dealer requires the **engine model** and **serial numbers** to order the correct parts.

### Resolving a Problem

Satisfaction with your Mercury MerCruiser product is very important to your dealer and to us. If you ever have a problem, question or concern about your power package, contact your dealer or any authorized Mercury MerCruiser dealership. If you need additional assistance:

1. Talk with the dealership's sales manager or service manager. Contact the owner of the dealership if the sales manager and service manager have been unable to resolve the problem.
2. If your question, concern, or problem cannot be resolved by your dealership, please contact Mercury Marine Service Office for assistance. Mercury Marine will work with you and your dealership to resolve all problems.

The following information will be needed by the Service Office:

- Your name and address
- Daytime telephone number



- Model and serial numbers for your power package
- The name and address of your dealership
- Nature of problem

Mercury Marine Service Offices are listed on the next page.

## Mercury Marine Service Offices

For assistance, call, fax or write. Please include your daytime telephone number with mail and fax correspondence.

Telephone	Fax	Mail
(405) 743 6566	(405) 743 6570	Mercury MerCruiser 3003 N. Perkins Rd. Stillwater, OK 74075
(905) 567 MERC (6372)	(905) 567 8515	Mercury Marine Ltd. 2395 Meadowpine Blvd. Mississauga, Ontario L5N 7W6 Canada
(61) (3) 9791 5822	(61) (3) 9793 5880	Mercury Marine Australia 132-140 Frankston Road Dandenong, Victoria 3164 Australia
(32) (87) 32 32 11	(32) (87) 31 19 65	Marine Power - Europe, Inc. Parc Industriel de Petit-Rechain B-4800 Verviers, Belgium
(954) 744 3500	(954) 744 3535	Mercury Marine - Latin America & Caribbean 11650 Interchange Circle North, Miramar, FL 33025 U.S.A.
(81) 53 423 2500	(81) 53 423 2510	Mercury Marine - Japan 283-1 Anshin-cho Hamamatsu, Shizuoka 435-0005 Japan
(65) 6546 6160	(65) 6546 7789	Mercury Marine Singapore 72 Loyang Way , 508762 Singapore

## Ordering Literature

Before ordering literature, please have the following information about your power package available:

- Model
- Serial number
- Horsepower
- Year built

## United States and Canada

For information on additional literature that is available for your particular Mercury MerCruiser power package and how to order that literature contact your nearest dealer or contact us at:

Mercury Marine Publications  
P.O. Box 1939  
Fond du Lac, WI 54936-1939  
(920) 929 5110  
Fax (920) 929 4894

## **Outside the United States and Canada**

Contact your nearest dealer or Marine Power Service Center for information on additional literature that is available for your particular Mercury MerCruiser power package and how to order that literature.

Print or type your mailing address, which be used as your shipping label, and include your order and payment. Mail to:

Mercury Marine

Attn: Publications Department

W6250 West Pioneer Road

P.O. Box 1939

Fond du Lac, WI 54936-1939

USA