

Declaration of Conformity—Mercury Diesel Inboard (VW)

This inboard engine when installed in accordance to Mercury Marine's instructions complies with the requirements of the following directives by meeting the associated standards, as amended:

Recreational Craft Propulsion Engines with the Requirements of Directive 94/25/EC as amended by 2003/44/EC

Name of engine manufacturer: Volkswagen Antriebssysteme		
Address: HMA-E/1, PO 7962, Industriestraße Nord		
Town: Salzgitter	Post Code: 38231	Country: Germany

Name of Authorized Representative: Brunswick Marine in EMEA Inc.		
Address: Parc Industriel de Petit-Rechain		
Town: Verviers	Post Code: 4800	Country: Belgium

Name of Notified Body for exhaust emission assessment: International Marine Certification Institute (IMCI)			
Address: Rue Abbé Cuypers 3			
Town: Bruxelles	Post Code: B-1040	Country: Belgium	ID Number: 0609

Conformity assessment module used for exhaust emissions:	<input checked="" type="checkbox"/> B+C	<input type="checkbox"/> B+D	<input type="checkbox"/> B+E	<input type="checkbox"/> B+F	<input type="checkbox"/> G	<input type="checkbox"/> H
Other Community Directives applied: <u>Electromagnetic Compatibility Directive 2004/108/EC</u>						

Description of Engines and Essential Requirements

Engine Type:	Fuel Type:	Combustion Cycle:
<input checked="" type="checkbox"/> Inboard engine	<input checked="" type="checkbox"/> Diesel	<input checked="" type="checkbox"/> 4 stroke

Identification of Engines Covered by this Declaration of Conformity

Name of engine model or engine family:	Unique engine identification number(s) or engine family code(s)	EC Type-examination certificate or type-approval certificate number
SDI 1.9L 40/50/60	SDI 40-4/SDI 50-4/SDI 60-4	EXVWM001
SDI 2.5L 75	SDI 75-5	EXVWM002
TDI 2.5L 100/120	TDI 100-5/TDI 100-5 SE	EXVWM003
TDI 2.5L 140/150/165	TDI 150-5/TDI 150-5 D/TDI 165-5	EXVWM004
R4 TD; TDI 1.9L 75	TDI 75-4	EXVWM006
TDI 3.0L 230/260	TDI 230-6/TDI 260-6	EXVWM007
TDI 4.2L 285/350	TDI 285-8/TDI 350-8	EXVWM008

Essential requirements	Standards	Other normative document/method	Technical file	Please specify in more detail (* = mandatory standard)
Annex I.B – Exhaust Emissions				
B.1 engine identification	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B.2 exhaust emission requirements	<input checked="" type="checkbox"/> *	<input type="checkbox"/>	<input type="checkbox"/>	*EN ISO 8178-1:1996
B.3 durability	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B.4 owner's manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ISO 8665:2006
Annex I.C – Noise Emissions	see Declaration of Conformity of the craft in which the engine(s) has (have) been installed			

This declaration of conformity is issued under the sole responsibility of the manufacturer. I declare on behalf of the engine manufacturer that the engine(s) will meet the exhaust emission requirements of Directive 94/25/EC as amended by Directive 2003/44/EC when installed in a recreational craft, in accordance with the engine manufacturer's supplied instructions and that this (these) engine(s) must not be put into service until the recreational craft into which it is (they are) to be installed has been declared in conformity with the relevant provisions of the above mentioned Directives.

Name / function:
Mark Schwabero, President, Mercury
Marine

Signature and title:



Date and place of issue: May 16, 2012
Fond du Lac, Wisconsin, USA

Regulatory contact:
Regulations and Product Safety Department
Mercury Marine
W6250 W. Pioneer Road
Fond du Lac, WI 54936
USA

Identification Record

Please record the following information:

Engine Model and Horsepower		Engine Serial Number
Transmission Model (Inboard)	Gear Ratio	Transmission Serial Number
Propeller Number	Pitch	Diameter
Hull Identification Number (HIN)		Purchase Date
Boat Manufacturer	Boat Model	Length
Exhaust Gas Emissions Certification Number		

The serial numbers are the manufacturer's keys to numerous engineering details that apply to your Mercury Diesel power package. When contacting Mercury Marine 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, USA. Printed in USA.

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Alpha, Axius, Bravo One, Bravo Two, Bravo Three, Circle M with Waves Logo, K-planes, Mariner, MerCathode, MerCruiser, Mercury, Mercury with Waves Logo, Mercury Marine, Mercury Precision Parts, Mercury Propellers, Mercury Racing, MotorGuide, OptiMax, Quicksilver, SeaCore, Skyhook, SmartCraft, Sport-Jet, Verado, VesselView, Zero Effort, Zeus, and #1 On the Water are registered trademarks of Brunswick Corporation. Mercury Product Protection 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 Diesel products. We sincerely hope your boating will be pleasant!
Mercury Marine

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 do not understand any portion of this manual, 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 and 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 Information

Warranty Registration United States and Canada

1. 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.
2. Warranty coverage is not effective until your product is registered with Mercury Marine.
3. 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 W. Pioneer Road
P.O. Box 1939
Fond du Lac, WI 54936-1939
920-929-5054
Fax +1 920 907 6663

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.

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 and 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 and dealer's code number, name and address. The distributor or 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 or 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 or dealer. If you receive a plastic warranty registration card, you may discard the purchaser's copy that you received from the distributor or dealer when you purchased the product. Ask your distributor or dealer if this plastic card program applies to you.
5. For further information concerning the warranty registration card and its relationship to Warranty Claim processing, refer to the International Warranty. See Table of Contents.

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 Mercury Marine distributor or Mercury Marine authorized dealer fills out the warranty registration card immediately and sends the factory copy to the Marine Power International Service Center for your area.

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.

Emission Control Warranty Information

Important Information

To identify the applicable emission control warranty coverage for a particular product, refer to the **Emission Control Information** label affixed to the engine.

Engines designated as exempt from either Federal EPA or California emission control regulations are not covered by a separate emission control component warranty. The product's Mercury MerCruiser manufacturer's warranty is not affected by the engine's designation under Federal EPA or California emission control regulations.

For a list of typical emission control related engine components, refer to **Emission Control System Components** in the warranty section of your owner's manual.

U.S. EPA Emissions Limited Warranty

Consistent with the obligations created by 40 CFR Part 1042, Subpart B, Mercury Marine provides an emission warranty of five years or 500 hours of engine use whichever occurs first to the retail purchaser, that the engine is designed, built, and equipped so as to conform at the time of sale with applicable regulations under section 213 of the Clean Air Act, and that the engine is free from defects in materials and workmanship which cause the engine to fail to conform with applicable regulations. This emission-related warranty covers all the components listed in the Emission Control System Components. Warranty claims may be denied for failures that have been caused by the owner's or operator's improper maintenance or use, by accidents for which Mercury Marine has no responsibility.

Emission Control System Components

The emission-related warranty covers all components whose failure would increase an engine's emission of any regulated component including the following list of components:

1. Fuel metering system
 - a. Pressure regulator or fuel injection system
 - b. Cold start enrichment system
 - c. Intake valves
2. Air induction system
 - a. Intake manifold
 - b. Turbocharger or supercharger systems
 - c. Charge air cooler
3. Exhaust system
 - a. Exhaust manifold
 - b. Exhaust valves
4. Miscellaneous items used in above systems
 - a. Hoses, clamps, fittings, tubing, sealing gaskets or devices, and mounting hardware
 - b. Pulleys, belts, and idlers
 - c. Vacuum, temperature, check and time sensitive valves and switches
 - d. Sensors
 - e. Electronic controls

NOTE: *The EPA emission-related warranty does not cover components whose failure would not increase an engine's emissions on any regulated pollutant.*

Warranty Policy—Diesel Models

TDI High-Output Recreational Use Limited Warranty

What is Covered

Mercury Marine warrants each new engine/drive package (Product) to be free of defects in material and workmanship during the period described following.

Duration of Coverage

The warranty period begins on 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. This Limited Warranty provides coverage for two (2) years or 1000 hours of use, whichever occurs first. Commercial use of the product voids the warranty. Commercial use includes any work or employment related use of the product, or any use of the product which generates income during 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 term 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.

High-Output Rating

A **High-Output Rating** applies to variable load applications where full power is limited to one (1) hour out of every eight (8) hours of operation. Reduced power operation (the 7 hours out of 8 hours in which the engine is not operated at full power) must be at or below cruise speed. Cruise speed is dependant on the engine's maximum engine rated speed (RPM):

Full Power Engine Rated Speed (RPM)		Cruise Speed Reduction from Engine Rated Speed (RPM)
4000 RPM	3.0 L (V6)	400 RPM
4200 RPM	4.2 L (V8)	400 RPM
This rating is for pleasure (non-commercial) applications that operate 500 hours or fewer per year.		

Conditions That Must Be Met 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, Maintenance, & Warranty 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 Marine Will Do

Mercury Marine'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 Marine product. Mercury Marine 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

Warranty claims must be made through a Mercury Marine authorized repair facility. The customer must provide Mercury Marine with a reasonable opportunity to repair and reasonable access to the product for warranty service. The purchaser shall not, unless requested by Mercury Marine, ship the product or parts of the product directly to Mercury Marine.

Termination of Coverage

Warranty coverage may be terminated for used product obtained in any of the following ways:

- Repossession from a retail customer
- Purchase at auction
- Purchase from a salvage yard
- Purchase from an insurance company that obtained the product as a result of an insurance claim
- Inaccurate warranty registration information

What Is Not Covered

This limited warranty does not cover the following:

- Routine maintenance items
- 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, Maintenance & Warranty manual)
- Operation of the product in a manner inconsistent with the recommended operation and duty cycle section of the Operation, Maintenance & Warranty 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 that was not manufactured or sold by Mercury Marine and that damages the Mercury product
- Jet pump impellers and liners
- Operation with fuels, oils, or lubricants that are not suitable for use with the product (see the Operation, Maintenance & Warranty 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
- Operating the boat with the engine over trimmed

Use of the product for racing or other competitive activity, or operating with a racing-type lower unit at any point, even by a previous 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 or replacement of boat partitions or other material in order to gain 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. If such affirmation, representation, or warranty is made, it 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.

Light-Duty Commercial Use Limited Warranty

Products Included in this Coverage

Mercury Marine warrants each new engine/drive package (Product) to be free of defects in material and workmanship during the period as described in the following.

Duration of Coverage

The warranty period begins on the date the product is first sold to a light-duty commercial-use retail purchaser or the date on which the product is first put into service, whichever occurs first. This Limited Warranty provides coverage for one (1) year or 500 hours of use, whichever occurs first. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of the warranty beyond its original expiration date. Unexpired warranty coverage cannot be transferred.

Light-Duty Commercial Rating

Light-duty commercial applies to variable load applications where full power is limited to one (1) hour out of every eight (8) hours of operation. Reduced power operation (the 7 hours out of 8 hours in which the engine is not operated at full power) must be at or below cruise speed. Cruise speed is dependant on the engine's maximum engine rated speed (RPM):

Section 1 - Warranty

Full Power Engine Rated Speed (RPM)		Cruise Speed Reduction from Engine Rated Speed (RPM)
4000 RPM	3.0 L (V6)	400 RPM
4200 RPM	4.2 L (V8)	400 RPM
This rating is for pleasure (non-commercial) applications that operate 500 hours or fewer per year.		

Commercial use is defined as any work or employment related use of this 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.

Operation of the product in excess of the light-duty commercial specifications will void the warranty.

Conditions That Must Be Met 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. Routine maintenance outlined in the Operation, Maintenance, & Warranty 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 Marine Will Do

Mercury Marine'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 Marine product. Mercury Marine 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

Warranty claims must be made through a Mercury Marine authorized repair facility. The customer must provide Mercury Marine with a reasonable opportunity to repair and reasonable access to the product for warranty service. The purchaser shall not, unless requested by Mercury Marine, ship the product or parts of the product directly to Mercury Marine.

Termination of Coverage

Warranty coverage may be terminated for used product obtained in any of the following ways:

- Repossession from a retail customer
- Purchase at auction
- Purchase from a salvage yard
- Purchase from an insurance company that obtained the product as a result of an insurance claim
- Inaccurate warranty registration information

What Is Not Covered

This limited warranty does not cover the following:

- Routine maintenance items
- 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, Maintenance & Warranty manual)
- Operation of the product in a manner inconsistent with the recommended operation and duty cycle section of the Operation, Maintenance & Warranty 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 that was not manufactured or sold by Mercury Marine and that damages the Mercury product

- Jet pump impellers and liners
- Operation with fuels, oils, or lubricants that are not suitable for use with the product (see the Operation, Maintenance & Warranty 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
- Operating the boat with the engine over trimmed

Use of the product for racing or other competitive activity, or operating with a racing-type lower unit at any point, even by a previous 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 or replacement of boat partitions or other material in order to gain 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. If such affirmation, representation, or warranty is made, it 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—Diesel Models (Recreational Use Only)

What Is Covered

Mercury Marine warrants that each new recreational use engine/drive package (Product) will not be rendered inoperative as a direct result of corrosion for the period of time described in the following:

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 reregistration of the product. Warranty coverage may be terminated for used product repossessed from a retail customer, purchased at an 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 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 predelivery 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, Maintenance & Warranty manual must be in use on the boat, and routine maintenance outlined in the Operation, Maintenance & Warranty 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 remanufactured 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; 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.

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.

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.

Warranty Policy—Australia and New Zealand

MerCruiser Limited Warranty—Australia and New Zealand Policy

This Limited Warranty is given by Marine Power International Pty Ltd ACN 003 100 007 of 41–71 Bessemer Drive, Dandenong South, Victoria 3175 Australia (telephone (61) (3) 9791 5822), e-mail: merc_info@mercmarine.com.

What is Covered

Mercury Marine warrants its new products to be free of defects in material and workmanship during the period described below. The benefits to the consumer given by the warranty are in addition to other rights and remedies of the consumer under a law in relation to the goods or services to which the warranty relates.

Guarantees Under Australian Consumer Law

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

Duration of Coverage for This Limited Warranty

You are only entitled to claim this Limited Warranty for defects which appear during the relevant warranty period (see the following). Your claim must also be received by us before the warranty period expires.

MerCruiser Petrol Sterndrive and Inboard Engines

- 2-year product warranty
- 3-year corrosion warranty
- 1-year/500 hours product warranty light commercial

MerCruiser SeaCore

- 3-year product warranty
- 4-year corrosion warranty
- 1-year/500 hours product warranty light commercial

MerCruiser Tow Sport Engines

- 3-year product warranty
- 3-year corrosion warranty
- 1-year/500 hours product warranty light commercial

MerCruiser Diesel

- 2-year product warranty
- 3-year corrosion warranty
- 1-year/500 hours product warranty light commercial

Warranty Period for Recreational Use

The warranty period begins on 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. The repair or replacement of parts or the performance of service under this warranty does not extend the life of this limited warranty beyond its original expiration date. The warranty period is specific to the model covered. Refer to your model for the base coverage period.

Warranty Period for Commercial Use

The warranty period begins on the date the product is first sold to a commercial use retail purchaser or the date on which the product is first put into service, whichever occurs first. Commercial users of these products receive warranty coverage for 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 related or employment related use of the product, or any use of the product that 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.

Transfer of Coverage

Unexpired warranty coverage can be transferred to a subsequent recreational use customer upon proper registration of the product. Unexpired warranty coverage cannot be transferred either to or from a commercial use customer.

Termination of Coverage

Warranty coverage under this Limited Warranty is terminated for used product obtained in any of the following ways:

- Purchased from an insurance company that obtained the product as a result of an insurance claim
- Purchased from a salvage yard
- Repossession from a retail customer
- Purchased at an auction

Conditions That Must Be Met to Obtain Warranty Coverage

Warranty coverage under this Limited Warranty 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 predelivery inspection process specified by Mercury Marine 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 registered) may void the warranty at the sole discretion of Mercury Marine. Routine maintenance must be performed according to the maintenance schedule in the Operation, Maintenance, and Warranty manual 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 Marine's sole and exclusive obligation under this Limited Warranty is limited to, at our option, repairing a defective part, replacing such part or parts with new or Mercury Marine certified remanufactured parts, or refunding the purchase price of the Mercury Marine product. Mercury Marine 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 Under This Limited Warranty

The customer must provide Mercury Marine 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 Marine dealer authorized to service the product. A list of dealers and their contact details is available at <http://www.mercurymarine.com.au/home.aspx>. If the purchaser cannot deliver the product to such a dealer, written notice must be given to Mercury Marine at the address shown above. Mercury Marine will then arrange for the inspection and any covered repair. This Limited Warranty will not cover the purchaser for all related transportation charges and travel time. If the service provided is not covered by this limited warranty, the purchaser shall pay for all related labor and material and any other expenses associated with that service, provided that a consumer will not be obligated to pay where the service has been carried out to remedy a failure of an acceptable quality guarantee which is binding on Mercury Marine under the Australian Consumer Law. The purchaser shall not, unless requested by Mercury Marine, ship the product or parts of the product directly to Mercury Marine. Proof of registered ownership must be presented to the dealer at the time warranty service is requested in order to obtain coverage under this Limited Warranty.

What is Not Covered

This limited warranty does not cover the following:

- Operating the boat with the engine over trimmed
- Routine maintenance items
- 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. Refer to the Operation, Maintenance, and Warranty manual.
- Operation of the product in a manner inconsistent with the recommended operation and duty cycle section of the Operation, Maintenance, and Warranty 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 that was not manufactured or sold by Mercury Marine that causes damage to the Mercury product
- Jet pump impellers and liners
- Operation with fuels, oils, or lubricants that are not suitable for use with the product. Refer to the Operation, Maintenance, and Warranty 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

Use of the product for racing or other competitive activity, or operating with a racing-type lower unit at any point, even by a previous owner of the product, voids this limited 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 limited warranty. Also, expenses associated with the removal or replacement of boat partitions or other material in order to gain access to the product are not covered by this limited 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. If such affirmation, representation, or warranty is made, it shall not be enforceable against Mercury Marine.

Expense of Claiming This Limited Warranty

This Limited Warranty does not cover any expenses you may incur claiming the warranty.

DISCLAIMERS AND LIMITATIONS

EXCEPT FOR APPLICABLE GUARANTEES AND OTHER RIGHTS AND REMEDIES THAT A CONSUMER MAY HAVE UNDER THE AUSTRALIAN CONSUMER LAW OR OTHER LAW IN RELATION TO WHICH THE PRODUCTS RELATE, 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 LIMITED WARRANTY.

Transfer of Warranty—Australia and New Zealand Policy

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 hull identification number (HIN) to Mercury Marine's Warranty Registration Department. In Australia and New Zealand, mail to:

Mercury Marine
 Attn: Warranty Registration Department
 Brunswick Asia Pacific Group
 Private Bag 1420
 Dandenong South, Victoria 3164
 Australia

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.

You may change your address at any time, including at the time of the warranty claim, by calling Mercury Marine or sending a letter or fax with your name, old address, new address, and hull identification number (HIN) to Mercury Marine's Warranty Registration Department.

Global Warranty Charts

United States Warranty Chart—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Installation Quality Certification Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	1 years	2 years	3 years	Contact the Marine Power Service Center closest to you
MerCruiser TowSport	2 years	3 years	3 years	
MerCruiser SeaCore	3 years	4 years	4 years	
MerCruiser Inboard 5.7 - 6.2 MPI, 8.2 H.O.	1 year	3 years	3 years	
MerCruiser Inboard 5.7 - 6.2 - 8.2 horizon	3 years	4 years	3 years	
Mercury Diesel Sterndrive and Inboard	2 year	Not available at time of printing	3 years	

Outside United States

For product purchased outside of United States, contact the distributor in your country, or the authorized Marine Power Service Center closest to you.

Canada Warranty Chart—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Installation Quality Certification Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	1 years	2 years	3 years	Contact the Marine Power Service Center closest to you
MerCruiser TowSport	2 years	3 years	3 years	
MerCruiser SeaCore	3 years	4 years	4 years	
MerCruiser Inboard 5.7 - 6.2 MPI, 8.2 H.O.	1 year	3 years	3 years	
MerCruiser Inboard 5.7 - 6.2 - 8.2 horizon	3 years	4 years	3 years	
Mercury Diesel Sterndrive and Inboard	2 year	Not available at time of printing	3 years	

Outside Canada

For product purchased outside of Canada, contact the distributor in your country, or the authorized Marine Power Service Center closest to you.

Australia and New Zealand Warranty Chart—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	2 years	3 years	Contact the Marine Power Service Center closest to you
MerCruiser SeaCore	3 years	4 years	
MerCruiser TowSport	3 years	3 years	
Mercury Diesel Sterndrive and Inboard	2 year	3 years	

Outside Australia and New Zealand

For product purchased outside of Australia and New Zealand, contact the distributor in your country, or the authorized Marine Power Service Center closest to you.

South Pacific Warranty Chart—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	2 years	3 years	Contact the Marine Power Service Center closest to you
Mercury Diesel Sterndrive and Inboard	2 years	3 years	

Outside of the South Pacific

For product purchased outside of the South Pacific, contact the distributor in your country, or the authorized Marine Power Service Center closest to you.

Asia Warranty Chart—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Gasoline Sterndrive and Inboard	1 year	3 years	Contact the Marine Power Service Center closest to you
Mercury Diesel Sterndrive and Inboard	1 year	3 years	

Outside of Asia

For product purchased outside of the Asian region, contact the distributor in your country, or the Marine Power Service Center closest to you.

Europe and the Confederation of Independent States (CIS) Warranty Charts—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Installation Quality Certification Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	2 years	3 years	3 years	Contact the Marine Power Service Center closest to you
Horizon, Scorpion, SeaCore	3 years	4 years	3 years	
Mercury Diesel Sterndrive and Inboard	2 years	Not available at time of printing	3 years	

Outside Europe and CIS

For products purchased outside of Europe and CIS regions, contact the distributor in your country, or the Marine Power Service Center closest to you.

Middle-East and Africa (excluding South Africa) Warranty Charts—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Installation Quality Certification Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	1 years	2 years	3 years	Contact the Marine Power Service Center closest to you
Horizon, Scorpion, SeaCore	2 years	3 years	4 years	
Mercury Diesel Sterndrive and Inboard	1 years	Not available at time of printing	3 years	

Outside Middle-East and Africa

For products purchased outside of Middle-East and Africa regions, contact the distributor in your country, or the Marine Power Service Center closest to you.

South Africa Warranty Charts—MerCruiser Gas and Diesel

Product	Standard Limited Warranty	Installation Quality Certification Warranty	Standard Limited Corrosion Warranty	Commercial Application
MerCruiser Sterndrive and Inboard	1 years	2 years	3 years	Contact the Marine Power Service Center closest to you
Horizon, Scorpion, SeaCore	2 years	3 years	4 years	
Mercury Diesel Sterndrive and Inboard	1 year	Not available at time of printing	3 years	

Outside Middle-East and Africa

For products purchased outside of Middle-East and Africa regions, contact the distributor in your country, or the Marine Power Service Center closest to you.

Section 2 - Getting to Know Your Power Package

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TDI 4.2L Engine Description

The Mercury Diesel TDI 4.2L engine has the following features:

- Four-stroke diesel engine
- Common-rail direct injection
- V8 cylinder arrangement
- 4.2 liter displacement (252 cid)
- Crankshaft mounted on four bearings
- Valves control by chain connected to overhead cam
- Hydraulically adjusted bucket tappets
- Engine lubrication as forced-feed circulatory lubrication with geared oil pump and replaceable oil filter in main flow
- Dry air filter
- Turbocharged with variable vane technology
- Twin cooling circuits, utilizing seawater cooling and closed-circuit cooling.

Refer to **Engine Specifications** for additional details.

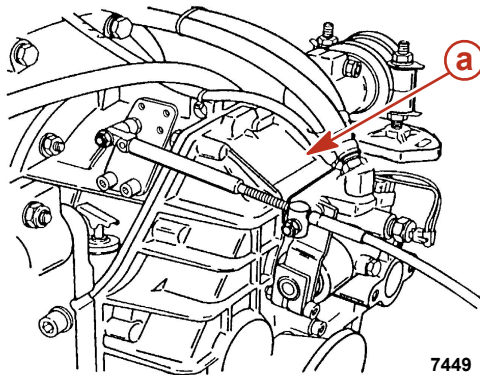
Refer to **Engine Components** for the locations of engine components referenced in this manual.

Identification

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

ZF Marine Transmissions

On the ZF Marine 63A 8° down-angle and 63IV V-drive transmissions, the transmission identification plate indicates gear ratio, serial number, and model.



Typical ZF Marine down-angle transmission show (V-drive similar)
a - Transmission identification plate

Audio Warning System

Your Mercury Diesel 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:

- The engine oil pressure is too low
- The coolant temperature is too hot
- Water in fuel
- Low coolant level

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 if you are not in a hazardous situation. Investigate the cause and correct it, if possible. If you cannot determine the cause, consult your Mercury Diesel authorized repair facility.

Testing the Audio Warning System

1. Turn the ignition switch to the "RUN" or 1 position; do not start the engine.
2. Push the audio test switch toggle lever down and hold it.
3. Listen for the alarm. The alarm will sound if the system is functioning correctly.

Instrumentation

VesselView

Your power package may be connected to a SmartCraft VesselView display. VesselView 7 is a comprehensive boat information center that can display information for up to four gasoline or diesel engines. It continuously monitors and reports basic operating data including detailed information such as seawater temperature and depth, trim status, boat speed and steering angle, and the status of fuel, oil, water, and waste tanks.

VesselView can be fully integrated with a vessel's global positioning system (GPS) or other NMEA-compatible device to provide up-to-the-minute navigation, speed, and fuel-to-destination information.

VesselView 4 and 7 are equipped with a micro SD card port that allows an authorized OEM or dealership to import the personality configuration. It can also be use by the owner to import pictures or graphics. When more than one VesselView is used, either as a triple or quad-engine application for multiple helms, the same mico SD card can be used to download those configurations.



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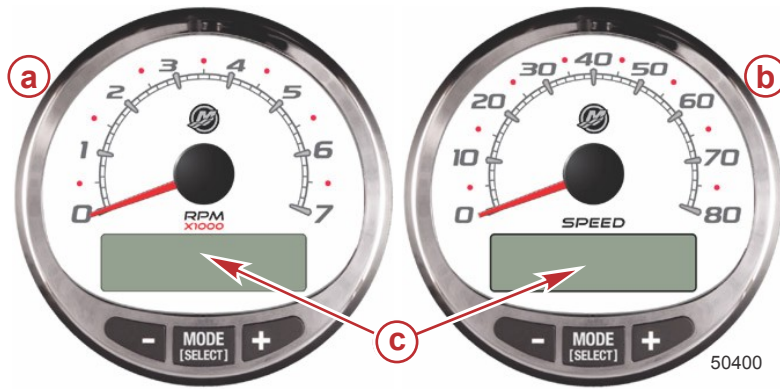
VesselView

Refer to your VesselView operations manual for detailed instructions on how to operate this display.

SmartCraft Speedometer, Tachometer, and Digital Gauges

The SmartCraft instrument package augments the information provided by VesselView. The instrument package may display:

- Engine RPM
- Boat speed
- Coolant temperature
- Oil pressure
- Battery voltage
- Fuel consumption
- Engine operating hours



SmartCraft tachometer and speedometer

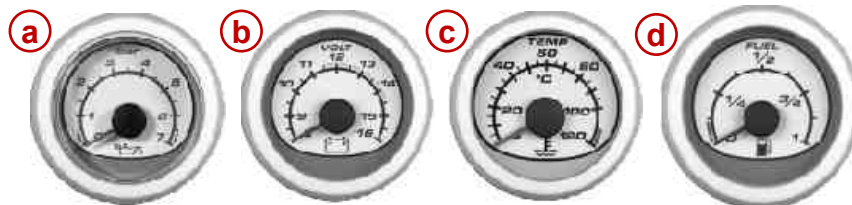
- a - Tachometer
- b - Speedometer
- c - LCD display

The SmartCraft instrument package also aids in identifying the fault codes associated with the engine audio warning system. The SmartCraft instrument package displays critical engine alarm data and other potential problems on its LCD display. For basic operation information on the SmartCraft instrument package and for details on the warning functions monitored by the system, refer to the manual provided with your gauge package.

System Link Digital Gauges

Some instrumentation packages include gauges that augment the information provided by VesselView and the SmartCraft tachometer and speedometer. The owner and operator should be familiar with all the instruments and their functions on the boat. Have your boat dealer explain the gauges and normal readings that appear on your boat.

The following types of digital gauges may be included with your power package.



37925

System Link digital gauges

Item	Gauge	Indicates
a	Oil pressure gauge	Engine oil pressure
b	Voltmeter	Battery voltage
c	Water temperature gauge	Engine operating temperature
d	Fuel gauge	Quantity of fuel in tank

Controls

Switches

Four-Position Key Switch



38160

- **"OFF"** - In the "OFF" position, all electrical circuits are off. The engine will not operate with the key switch in the "OFF" position.
- **"ACC"** - In the "ACC" position, any accessories connected to the electrical circuits can be operated. The engine will not operate with the key switch in the "ACC" position.
- **"ON"** - In the "ON" position, all electrical circuits and instrumentation receive power. The engine can be started with an optional start-stop switch.
- **"START"** - Turn the key to the start position and release to start the engine.

NOTE: The key can only be removed with the key switch in the "OFF" position.

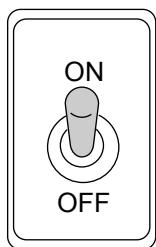
Dual-Engine Start-Stop Switch



28082

A start-stop switch is optional equipment. The start-stop switch works in conjunction with the key switch. There is one start-stop switch for each engine. Each button on a multi-engine start-stop switch functions independently. The key switch must be in the "ON" position to start a stopped engine with the start-stop switch. Pressing a start-stop switch button when an engine is running will shut down the corresponding engine.

Bilge Blower Toggle Switch



38277

Operates the bilge blower, if equipped.

Emergency Stop Switch

An emergency stop (E-stop) switch is used to turn off the engines in an emergency situation, such as a person overboard or a tangled propeller. When activated, an E-stop switch interrupts the power supply to the engine and transmission. If the boat is equipped with an E-stop switch, the E-stop switch turns off all of the engines.



Typical E-stop switch

Activation of an E-stop switch stops the engine, or engines, immediately, but the boat can continue to coast for some distance depending upon the velocity and degree of any turn at shutdown. 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 recommend instructing other occupants on proper starting and operating procedures should they need to operate the engine in an emergency.

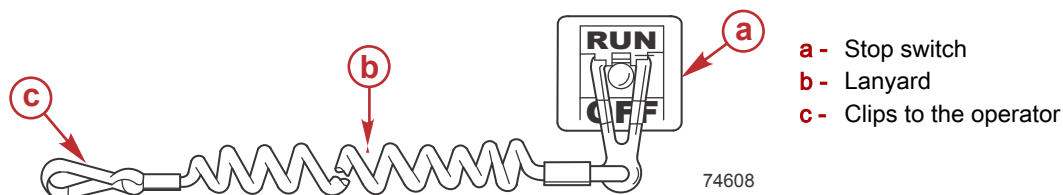
Accidental or unintended activation of the switch during normal operation is also possible, which can cause any or all of the following potentially hazardous situations:

- Occupants can be thrown forward due to unexpected loss of forward motion, and passengers in the front of the boat could be ejected over the bow and possibly struck by the propulsion or steering components.
- The operator can lose power and directional control in heavy seas, strong current, or high winds.
- The operator can lose control of the vessel when docking.

Restarting an engine using the key switch or start button after an E-stop shutdown without first turning the key switch to the off position for at least 30 seconds will restart the engine but cause fault codes to be set. Unless you are in a potentially hazardous situation, turn the key switch off and wait at least 30 seconds before restarting the engine or engines. If after restarting, some fault codes are still being displayed, contact your authorized Mercury Diesel repair facility.

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. 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 (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.

Digital Throttle and Shift

Digital Throttle and Shift (DTS) operating instructions are provided in a separate manual. Refer to Mercury Diesel's **SmartCraft and DTS Operator's Manual**.

Engine Electrical System Overload Protection

Fuses

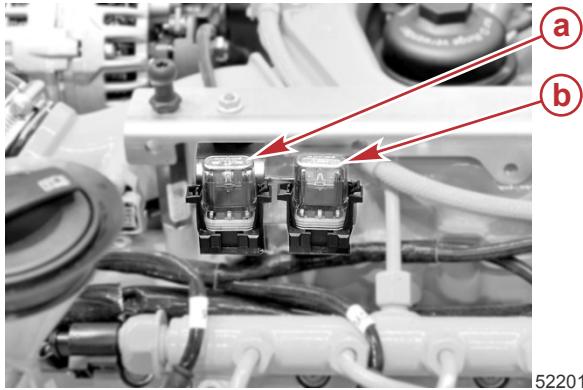
CAUTION

Failure to protect wiring with an appropriate fuse can damage the wiring and start a fire. When installing any accessories, we recommend using a Mercury accessory kit. Always use the appropriate fuse to protect wiring.

Individual circuits are protected by fuses. If an electrical overload occurs, a fuse will burn out. Find and correct the cause for the electrical overload before replacing the fuse.

Section 2 - Getting to Know Your Power Package

Two fuses are located on the top of the engine. Remove the engine cover to access these fuses. Be certain to replace an open fuse only with one of the same rating.



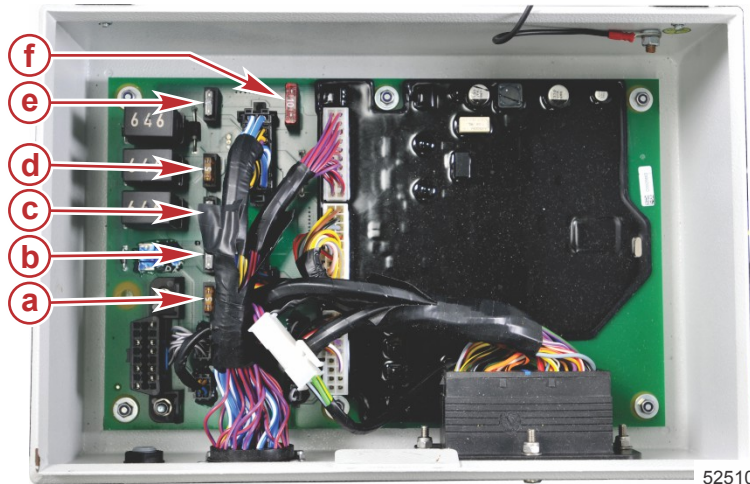
- a - 15-amp fuse
- b - 25-amp fuse

The remaining fuses are located in the vessel adapter assembly (refer to your boat owner's manual for location) and on the rear side of the control unit of the individual instrumentation.

Vessel Adapter Assembly Fuse Replacement

NOTE: Refer to your boat owner's manual for the location of the vessel adapter assembly (VAA). The key for the VAA was provided along with the ignition keys.

1. Turn the ignition switch to the "OFF" position.
2. Unlock and open the cover of the vessel adapter assembly.
3. Determine which fuse belongs to the failed circuit using the illustration below.



- a - Helm power 5-amp fuse
- b - EFP 1-amp fuse
- c - Feature A 1-amp fuse
- d - T.15 5-amp fuse
- e - Feature B 1-amp fuse
- f - Main power 10-amp fuse

4. Replace the blown fuse with a new fuse of the same rating.
5. Close and lock the cover of the VAA.

Notes:

Section 3 - On The Water

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3

Safe Boating Suggestions

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

Mercury Marine strongly recommends that all powerboat operators complete a boating safety course. Courses are offered in the U.S.A. by the U.S. Coast Guard Auxiliary, the Power Squadron, the Red Cross, and your state or provincial boating law enforcement agency. Inquiries may be made to the Boating Hotline or the Boat U.S. Foundation.

- **Know and obey all nautical rules and laws of the waterways.**
- **Perform safety checks and required maintenance.** Follow a regular schedule and verify all repairs are properly completed.
- **Check safety equipment on board.** Here are some suggestions of the types of safety equipment to carry when boating:
 - Approved fire extinguishers
 - Paddle or oar
 - Signal devices: flashlight, rockets or flares, flag, and whistle or horn
 - Radio equipment
 - Tools necessary for minor repairs
 - First aid kit and instructions
 - Anchor and extra anchor line
 - Waterproof storage containers
 - Manual bilge pump and extra drain plugs
 - Spare operating equipment, batteries, bulbs, and fuses
 - Drinking water
 - Compass and map or chart of the area
- **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, wearable-type life jacket (personal flotation device), correctly sized and readily accessible for every person aboard, 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 one person aboard in the basics of starting and operating the engine and handling the boat 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 it is full of water. When in doubt, contact your authorized Mercury Marine dealer/distributor or the boat manufacturer.
- **Verify boat occupants are 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. Verify 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.** Alcohol or drugs impairs your judgment and greatly reduces 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 operator's view when operating the boat above idle or planing transition speed. Watch out for others, keep your eyes on the water, and be aware of your wake.
- **Never drive your boat directly behind a water-skier in case the skier falls.** 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 five seconds.
- **Watch fallen skiers.** When using your boat for waterskiing 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 US \$500.00 or 4) there is complete loss of the boat. Seek further assistance from local law enforcement.

Carbon Monoxide Exposure

Be Alert To Carbon Monoxide Poisoning

Carbon monoxide (CO) is a deadly gas that is present in the exhaust fumes of all internal combustion engines, including the engines that propel boats, and the generators that power boat accessories. By itself, CO is odorless, colorless, and tasteless, but if you can smell or taste engine exhaust, you are inhaling CO.

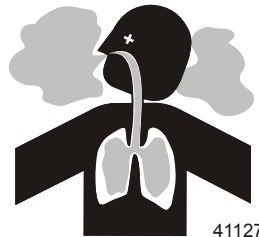
Early symptoms of carbon monoxide poisoning, which are similar to the symptoms of seasickness and intoxication, include headache, dizziness, drowsiness, and nausea.

WARNING

Inhaling engine exhaust gases can result in carbon monoxide poisoning, which can lead to unconsciousness, brain damage, or death. Avoid exposure to carbon monoxide.

Stay clear from exhaust areas when engine is running. Keep the boat well-ventilated while at rest or underway.

Stay Clear of Exhaust Areas

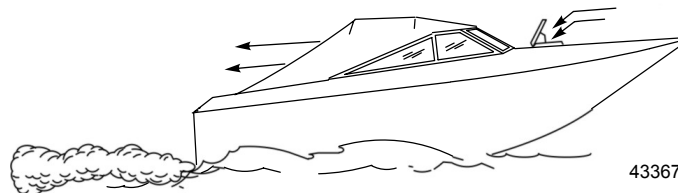


Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately behind the boat (platform dragging, teak/body surfing). This dangerous practice not only places a person in an area of high engine exhaust concentration, but also subjects them to the possibility of injury from the boat propeller.

Good Ventilation

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

Example of desired air flow through the boat:



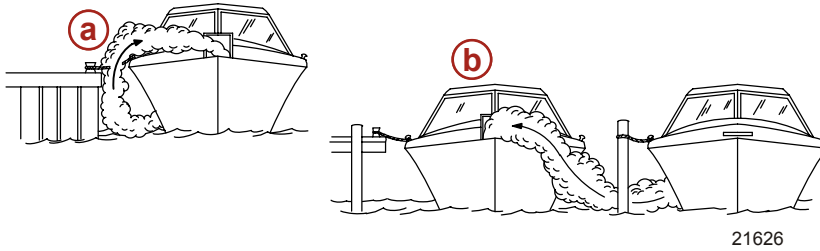
Poor Ventilation

Under certain running or wind 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 a running engine may be exposed to a hazardous level of carbon monoxide.

Section 3 - On The Water

1. Examples of poor ventilation while the boat is stationary:



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

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



- 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)

Duty Cycle

Basic Boat Operation

IMPORTANT: Damage caused by improper application or failure to operate the power package within the specified operating parameters will not be covered by the Mercury Diesel Limited Warranty.

Duty Cycle Rating

It is the responsibility of the boat manufacturer or the installing dealer to ensure that the power package is properly applied. In all cases, the power package must be equipped with the gear ratio that allows the engine to operate at wide-open throttle (WOT) at the rated engine RPM. The power package must also be applied in accordance with recommendations indicated in the appropriate applications manual. Use of Mercury Diesel engines in other than the applications indicated by the following information and in the appropriate applications manual requires written approval from an authorized Mercury Diesel application engineer.

Pleasure Duty Rating

The pleasure duty rating applies to recreational planing craft used exclusively for pleasure and recreation. Typical pleasure craft include sailboats, ski boats, runabouts, speedboats, and other planing hulls. Application must conform to the Pleasure Craft/Recreational duty cycle shown in the following table.

EPA Mode Number Cycle 5 Duty Cycle	Modes				
	1	2	3	4	5
Engine speed (percent of WOT)	100	91	80	63	Idle
Engine power (percent of total)	100	75	50	25	0
Time at given mode (percent of total operating time)	8	13	17	32	30

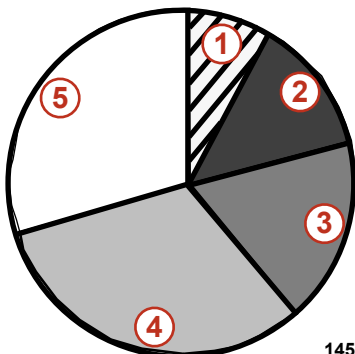


Chart showing full power operation is limited to a maximum of 1 of 12 hours

- 1 - Mode 1: 1.0 hour (8%)
- 2 - Mode 2: 1.5 hours (13%)
- 3 - Mode 3: 2.0 hours (17%)
- 4 - Mode 4: 4.0 hours (32%)
- 5 - Mode 5: 3.5 hours (30%)

Basic Boat Operation

Operation Chart

Starting Procedure	After Starting	While Underway	Stopping and Shut Down
Open the engine hatch. Air out the bilge completely.	Observe all instrumentation to monitor the condition of the engine. If not normal, stop the engine.	Frequently review all instrumentation to monitor engine condition.	Shift the remote control lever to the neutral position.
Turn the battery switch on, if equipped.	Check for fuel, oil, water, fluid, and exhaust leaks, etc.	Listen for the audio alarm.	Run the engine at idle-RPM for several minutes to allow the turbocharger and engine to cool.
Turn on and run the engine compartment bilge blower, if equipped, for five minutes.	Check shift and throttle control operation.		Turn the key switch to "OFF" position.
Check for leaks: fuel, oil, water, fluid, etc.	Check steering operation.		Turn the battery switch off, if equipped.
Open the fuel shut-off valve, if equipped.			Close the fuel shut-off valve, if equipped.
Open the seacock, if equipped.			Close the seacock, if equipped.
Prime the fuel injection system, if necessary.			Flush the seawater cooling circuit, if operating in saltwater, brackish water, or polluted water.
Turn the key switch to "START" position. Release the key when the engine starts.			
Warm-up the engine at a fast idle-RPM for several minutes.			

Freezing Temperature and Cold Weather Operation

IMPORTANT: If the boat is operated during periods of freezing temperature, take precautions to prevent freezing damage to the power package. Damage caused by freezing is not covered by 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.

In order to operate the engine in temperatures of 0 °C (32 °F) or lower, observe the following instructions:

- At the end of each daily operation, completely drain the seawater section of the cooling system to protect against damage by freezing.
- At the end of each daily operation, drain the water from the water separator, if equipped.
- Fill the fuel tank at the end of daily operation to prevent condensation.
- Use the required permanent-type antifreeze solution to protect components against damage by freezing.
- Be sure to use proper cold weather lubrication oil, filled to the specified level in the crankcase.
- Make certain that the battery is of sufficient size and is fully charged. Check that all other electrical equipment is in optimum condition.
- At temperatures of -20 °C (-4 °F) and below, use a coolant heater to improve cold starting.

Section 3 - On The Water

- If operating in arctic temperatures of -29°C (-20°F) or lower, consult your Mercury Diesel authorized repair facility for information about special cold weather equipment and precautions.

Refer to **Section 6** for cold weather or extended storage related information.

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 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 warranty.

Starting, Shifting, and Stopping

⚠ WARNING

Vapors can ignite and cause an explosion, resulting in engine damage or severe personal injury. Do not use volatile starting aids such as ether, propane, or gasoline in the engine air intake system.

⚠ 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.

Before Starting 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.

IMPORTANT: Observe the following before starting:

- Verify seawater pickup is open.
- Never operate the starter motor longer than 15 seconds at a time to avoid overheating the starter motor. If the engine does not start, wait one minute to allow the starter motor to cool; then, repeat the starting procedure.
- Ensure that the engine crankcase is filled to the correct level with the proper grade of oil for the prevailing temperature. Refer to **Specifications—Engine Oil**.
- Ensure that all electrical connections are secure.
- Check all items listed in the maintenance schedules and Operation Chart.
- Perform any other necessary checks as indicated by your Mercury Diesel authorized repair facility or specified in your boat owner's manual.

Starting a Cold Engine_DUPLICATE_PHUNKINS

IMPORTANT: Check the fluid levels before starting the engine. Refer to the Maintenance Schedule.

Never operate the starter motor longer than 15 seconds at a time to avoid overheating the starter motor. If the engine does not start, wait one minute to allow the starter motor to cool; then, repeat the starting procedure.

1. Run the engine compartment bilge blower for five minutes, or open the engine hatch to air out the bilge before attempting to start the engine.
2. Place the control handle in neutral.
3. If the engine has not been run for a long period of time and will not readily start with the standard starting procedure, proceed as follows.
4. Turn the ignition switch to the "ON" position and the fuel pump will run for five seconds. Turn the ignition switch to the "OFF" position and wait for five seconds. repeat this step six times.
5. Start the engine.

IMPORTANT: Within seconds after starting the engine, the oil pressure should exceed a minimum of 10 psi (69 kPa). If the oil pressure is below the minimum specification, stop the engine then locate and correct the problem. If you are unable to determine the problem, see your Mercury Diesel-authorized repair facility.

NOTICE

Engaging the starter motor while the engine is operating can damage the starter motor or flywheel. Do not engage the starter motor continually for longer than 15 seconds. Do not engage the starter motor when the engine is operating.

6. Verify that the charge indicator and oil pressure warning lamps are off.
7. Verify that all instrumentation is functioning properly and indicating normal readings.
8. Allow the engine to reach a normal operating temperature before demanding power from the engine.

Engine Warm-Up

1. After starting the engine, verify that all instrumentation is functioning properly.
2. Operate the engine at 1000–1200 RPM until the engine temperature is within the normal operating range. It is important that any engine be warmed up before applying full load. The warm-up period provides time for the lubricating oil to establish a film between moving parts.

NOTICE

Engine wear caused by increased friction and limited oil flow is greatest when an engine is cold. Decrease engine wear by allowing the engine coolant temperature to reach normal operating range before hard acceleration or applying full throttle.

3. After the engine has reached operating temperature:
 - a. The oil pressure should be within the range specified. Refer to **Specifications—Engine Specifications**. Stop the engine if the oil pressure is not within the range specified.
 - b. Check the fuel system for leakage from the injection pump, fuel pipes, fuel filter, or fuel lines.
 - c. Check the engine and drive system for oil leakage. Specifically inspect the oil filter, oil lines, oil line connectors, and oil pan.
 - d. Check for coolant leaks. Check the coolant hoses and connection pipes of the heat exchanger, fluid coolers, aftercooler, water pump, and drain fittings for leaks.
4. Correct any problems found, or see your Mercury Diesel-authorized repair facility if you are unable to determine the problem.

Starting a Warm Engine

1. Run the engine compartment bilge blower for five minutes, or open the engine hatch to air out the bilge before attempting to start the engine.
2. Move the remote control handle to the "NEUTRAL" position.
3. Turn the key switch to the "ON" position.
4. Turn the key switch to the "START" position and release the key when the engine starts. Verify that the charge indicator and oil pressure warning lamps turn off.
5. Verify that the instrumentation functions properly and normal readings are indicated.

Shifting

NOTICE

Shifting into gear at engine speeds above idle will damage the transmission. Shift into gear only when the engine is operating at idle.

NOTICE

Failure to rotate the propeller shaft when shifting gears or forcing the shift mechanism while the engine is not operating can result in product damage. If you must shift gears with the engine off, manually rotate the propeller shaft in the appropriate direction.

To shift the unit, verify the remote control throttle lever is in neutral. Move the remote control shift lever forward to shift into forward gear or backward to shift into reverse. After shifting the transmission, advance the throttle to the desired setting.

Engine Shutdown (Stopping)

1. Place the remote control lever in neutral.

NOTICE

Immediately stopping the engine after high load operation can damage the turbocharger bearings. Idle the engine for several minutes before shutdown.

2. Operate the engine at idle speed for several minutes to allow the turbocharger and engine to cool.
3. Turn key switch to the "OFF," or 0, position.

Protecting People in the Water

While Boat is in Operation

People in the water cannot take quick action to avoid a boat heading in their direction.



21604

Approach slowly and exercise extreme caution when boating in areas where people may be in the water.

When a boat is moving 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 the 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 down the engine before allowing people in the water near the boat.

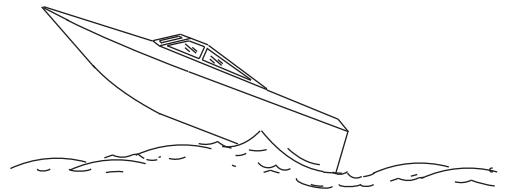
High Speed and High Performance

If your boat is 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 the **High Performance Boat Operation** booklet (90-849250-R2) from your authorized Mercury Diesel repair facility.

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.



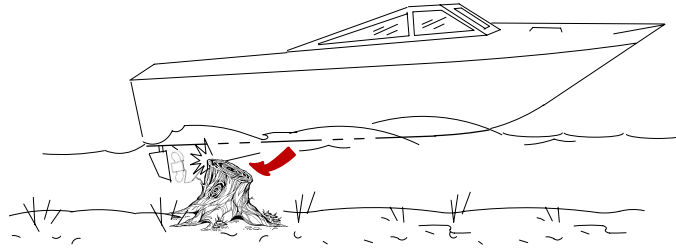
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Operating recreational boats over waves and wakes is a natural part of boating. However, when this activity is done with enough speed to force the boat hull partially or completely out of the water, certain hazards arise, particularly when the boat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



17269

Reduce speed and proceed with caution whenever you're driving a boat in shallow water areas 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. 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 minimum planing speed of 24 to 40 km/h (15 to 25 MPH).

Striking a floating or 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 throw occupants out of their seats or out of the boat.
- A rapid reduction in speed. This will throw occupants forward, even out of the boat.
- Impact damage to the underwater drive components, rudder, 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, take the power package to an authorized dealer for a thorough inspection and necessary repair.

The boat should also be checked for any 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 running 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)

Bottom of Boat

To maintain maximum speed, ensure that the boat bottom is:

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

Section 3 - On The Water

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

Elevation and Climate

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

- High elevations
- High 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, the recommended RPM can be achieved by changing to a lower pitch propeller.

Propeller Selection

NOTICE

Operating the engine with the wrong propeller installed can limit power, increase fuel consumption, overheat the engine, or cause internal powerhead damage. Choose a propeller that allows the engine to operate at the specified wide open throttle RPM.

It is the responsibility of the boat manufacturer and the selling dealer to equip the power package with the correct propellers.

IMPORTANT: Be sure that the propeller being used does not allow the engine to run against the limiter, as a significant loss in performance will result.

NOTE: Use an accurate service tachometer to verify RPM.

Select a propeller that will allow the engine power package to operate at the rated engine RPM with a full load.

If full throttle operation is below the engine rated RPM, the propeller must be changed to prevent loss of performance and possible engine damage. On the other hand, operating an engine above the rated engine RPM will cause higher than normal wear or damage.

After initial propeller selection, the following common problems may require that the propeller be changed to a lower pitch:

- Warmer weather and greater humidity cause an RPM loss (not as significant on these models).
- Operating in a higher elevation causes an RPM loss (not as significant on these models).
- Operating with a damaged propeller or dirty boat bottom causes an RPM loss.
- Operating with increased load (additional passengers, pulling skiers).

For better acceleration, such as is needed for water skiing, use the next lower pitch propeller. Do not operate at full throttle when using the lower pitch propeller but not pulling skiers.

Break-In

Initial Break-In Procedure

It is important to follow this procedure to properly break in the engine.

IMPORTANT: Mercury Marine recommends that the boat not be accelerated hard until this procedure has been completed.

IMPORTANT: Never operate the starter motor longer than 15 seconds at a time to avoid overheating the starter motor. If the engine does not start, wait one minute to allow the starter motor to cool; then, repeat the starting procedure.

1. Refer to the appropriate **Starting, Shifting, and Stopping** section and start the engine.
2. Operate the engine at a fast idle until it has reached normal operating temperature.
3. Operate the engine in gear for three minutes at each of the following: 1200 RPM, 2400 RPM, and 3000 RPM.
4. Operate the engine in gear for three minutes at each of the following: 1500 RPM, 2800 RPM, and 3400 RPM.
5. Operate the engine in gear for three minutes at each of the following: 1800 RPM, 3000 RPM, and maximum rated full throttle RPM.

Engine Break-In

20-Hour Break-In Period

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

- 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 constant speed 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 (five 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.
- Check the engine oil level frequently. Add oil as needed. High oil consumption is normal during the break-in period.

After the 20-Hour Break-In Period

To help extend the life of your power package, Mercury Marine recommends the following:

- Change the engine oil and filter and the transmission fluid at the interval indicated in the **Maintenance Schedule**. Refer to **Specifications** and **Maintenance**.
- Use a propeller that allows the engine to operate at the rated engine RPM when at full throttle with a fully loaded boat. Refer to **Specifications** and **Maintenance**.
- Operation at 3/4 throttle setting or lower is recommended. Refrain from prolonged operation at wide-open throttle RPM.

End of First Season Checkup

At the end of the first season of operation, contact an authorized repair facility to discuss 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.

Notes:

Section 4 - Specifications

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Fuel Requirements

⚠ WARNING

Failure to comply with regulations can result in injury from fire or explosion. Electrical system components on this engine are not rated as external ignition-protected (EIP). Do not store or use gasoline on boats equipped with these engines, unless provisions have been made to exclude gasoline vapors from the engine compartment (REF: 33 CFR).

⚠ 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.

⚠ WARNING

This engine requires diesel fuel. Mixing gasoline, gasohol, or alcohol and diesel fuel can cause serious injury or death due to fire or explosion. Never mix gasoline, gasohol, or alcohol with diesel fuel.

IMPORTANT: Use of improper or water-contaminated diesel fuel can seriously damage your engine. Use of improper fuel is considered misuse of the engine, and damage caused thereby will not be covered by the warranty.

Grade 2-D diesel fuel is required, must meet ASTM Standards D975 (or fuel rated Diesel DIN EN 590), and have a minimum cetane rating of 51.

The cetane number is a measure of the ignition quality of diesel fuel. Increasing the cetane number will not improve overall engine performance, but it may be necessary to raise the cetane rating for low-temperature or high-altitude use. A lower cetane number could cause hard starting and slower warm-up, and could increase engine noise and exhaust emissions.

NOTE: *If your engine suddenly becomes noisy after a fill-up, you possibly received substandard fuel with a low cetane rating.*

On intermittent-use engines, high sulphur content diesel fuel will greatly increase:

- Corrosion on metal parts
- Deterioration of elastomer and plastic parts
- Excessive wear of internal engine parts, particularly bearings, and corrosion and extensive damage to other engine parts
- Difficulty starting and operating the engine

Nonferrous Metals and the Fuel System

Nonferrous metals **must not** be used in the fuel system components. The use of items such as copper lines, brass nipples, or galvanized tanks may result in an engine power loss or a failure of the injection nozzles.

Winter Operation and Biodiesel

Biodiesel fuel up to 7% may be used.

Diesel Fuel in Cold Weather

Unaltered diesel fuels thicken and gel in cold temperatures unless treated. Virtually all diesel fuels are climatized to allow their use in the particular region for that time of the year. If it becomes necessary to further treat diesel fuel, it is the owner/operator's responsibility to add a commercial standard brand of anti-gel diesel fuel additive, following that product's directions.

Antifreeze/Coolant

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.

Diesel engines are high-compression engines that operate at higher temperatures than typical internal combustion engines. Therefore, the closed-cooling system and engine, including related cooling passages, must remain as clean as possible to provide adequate engine cooling. To ensure proper cooling, we recommend filling the closed-cooling section of the cooling system with a low silicate formula of ethylene glycol antifreeze in a solution with deionized water. Common tap water or softened water contains unwanted minerals that can leave large deposits in the system that restrict the cooling system efficiency. A low silicate formula prevents the antifreeze from separating and forming a silicate gelatin. This gelatin can block passages in the engine and heat exchanger, causing the engine to overheat.

Only premixed, coolant should be added to the closed-cooling system. Additives and inhibitors introduced into acceptable coolant solutions will form a protective film on the internal passages and provide protection against internal cooling system erosion.

Do not drain the closed-cooling section for storage. The closed-cooling section should be kept filled year-round with an acceptable antifreeze/coolant solution to avoid rust forming on the internal surfaces. If the engine will be exposed to freezing temperatures, ensure that the closed-cooling section is filled with a properly mixed antifreeze/coolant solution to protect the engine and closed-cooling system to the lowest temperature to which they will be exposed.

NOTE: It is recommended that a 50/50 solution of coolant (antifreeze) and deionized, purified water be used. A 50/50 solution will provide freeze protection to -35°C (-31°F). Decreasing the solution to 40/60 will provide freeze protection to -25°C (-13°F). Even in the warmest climates, never decrease the solution below 40/60. Increasing the solution to 60/40 will provide freeze protection to -50°C (-58°F).

IMPORTANT: The antifreeze/coolant used in these marine engines must be a low silicate ethylene glycol, containing special additives, and deionized, purified water. Using other types of engine coolant may cause fouling of the heat exchangers and overheating of the engine. Do not combine different types of coolants without knowing that they are compatible. Refer to the coolant manufacturer's instructions.

The acceptable antifreeze/coolants is listed in the following table. Refer to **Section 5 - Maintenance** for respective change intervals.

Description	Availability	Part Number
Marine Engine Coolant	Worldwide	8M0078028

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.

Engine oil must be 5W-30 viscosity, and meet VW Standard 504 00/507 00.

We strongly recommend the use of:

Description	Where Used	Part Number
5W-30 (1 L)	Engine crankcase	8M0069603
5W-30 (4 L)	Engine crankcase	8M0069602

Engine Specifications

Description	Specification
Engine type	V8 diesel
Displacement	4.2 L (252 cid)
Firing order	1-5-4-8-6-3-7-2
Bore	83.0 mm (3.27 in.)
Stroke	95.5 mm (3.75 in.)
Rated engine RPM (refer to Conditions Affecting Operation —Propeller Selection for additional information)	Refer to Performance Curve and Data Sheet TDI 350 (available at www.mercurymarine.com/engines/diesel/)
Idle RPM in neutral (engine at normal operating temperature)	650 RPM
Oil pressure at any engine temperature	750 RPM
	3800 RPM
Thermostat	Water
Coolant temperature	70° C (158° F)
Electrical system	12-volt negative (–) ground
Battery*	750 CCA, 950 MCA, or 180 mAh

Section 4 - Specifications

Description	Specification
Alternator	120 A

*Battery manufacturers may rate and test their batteries to different standards. MCA, CCA, Ah, and Reserve Capacity (RC) are the ratings recognized by Mercury Marine. Manufacturers that use standards different than these, such as equivalent MCA, do not meet Mercury Marine battery requirements.

Fluid Specifications

IMPORTANT: All capacities are approximate fluid measures.

Engine

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	Part Number
Engine oil (with filter)	9.5 L (10.0 US qt)	5W-30 4-cycle Diesel Engine Oil (1 L)	8M0069603
		5W-30 4-cycle Diesel Engine Oil (4 L)	8M0069602
Closed-cooling system	15.0 L (15.8 US qt)	Marine Engine Coolant	8M0078028
Hydraulic oil		Hydraulic oil	858075K01

Transmission

NOTE: Capacities are for the transmission only and do not include the fluid cooler or fluid cooler hose capacities.

Model	Capacity	Fluid type	Part Number
ZF Marine 63A	4.0 L (4.2 US qt)	Dexron® III Automatic Transmission Fluid or equivalent	Obtain Locally
ZF Marine 63IV	4.4 L (4.6 US qt)		

Approved Paints

Description	Part Number
Mercury Light Gray Primer	92-802878 52
Mercury Phantom Black	92-802878Q 1
Diesel White	8M0071082

Section 5 - Maintenance

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Owner and 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 a Mercury Diesel authorized repair facility for a periodic checkup.

Normal maintenance service and replacement parts are the responsibility of the owner or 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 Mercury Diesel authorized repair facility for service aids.

Dealer Responsibilities

Below is a list of Mercury Diesel dealer predelivery inspection and preparation responsibilities:

- Verify that the power package is in proper operating condition.
- Make any necessary adjustments for maximum efficiency.
- Explain and demonstrate the operation of the power package and the boat.
- Provide a copy of the Predelivery Inspection Checklist.
- Fill out the warranty registration card completely and mail it to the factory immediately upon sale of the new product. All power packages must be registered for warranty purposes.

Maintenance

WARNING

Neglect or improper maintenance, repairs, or inspections of the power package can result in product damage or serious injury or death. Perform all procedures as described in this manual. If you are not familiar with proper maintenance or service procedures, consign the work to an authorized Mercury Marine dealer.

WARNING

Accidental engine starting can cause serious injury or death. Remove the key from the ignition switch and engage the lanyard stop or E-stop switch to prevent the engine from starting when performing service or maintenance on the power package.

WARNING

Engine components and fluids are hot and can cause serious injury or death. Allow the engine to cool before removing any components or opening any fluid hoses.

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 Maintenance Schedule for a complete listing of all scheduled maintenance to be performed. Some tasks can be done by the owner or operator, while others should be performed by an authorized Mercury Diesel repair facility. Before attempting maintenance or repair procedures not covered in this manual, we recommended that you purchase the appropriate Mercury Diesel service manual and read it thoroughly.

Before performing any maintenance on your Mercury Diesel engine:

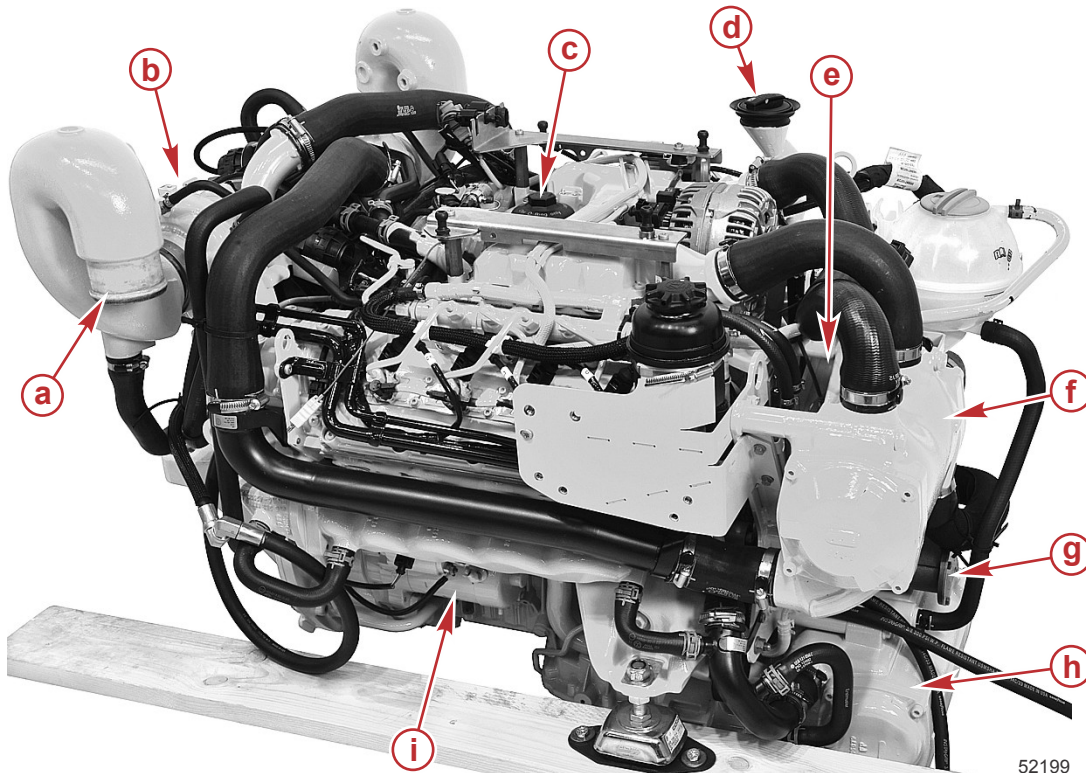
- Protect yourself with suitable work clothing and personal protection equipment.
- Stop the engine, remove the ignition key, and press the emergency stop switch.
- Move the throttle to the neutral position.
- Allow the engine to cool.
- Ventilate the engine compartment for at least five minutes before beginning work.
- Disconnect the battery, if servicing any electrical components. Always disconnect the negative (-) lead first and reconnect it last.

Replacement Parts Warning

⚠ 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.

Engine Components



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a - Exhaust outlet

NOTE: The exhaust outlet design may vary by boat model.

b - Turbocharger

c - Oil filter

d - Engine oil filler cap

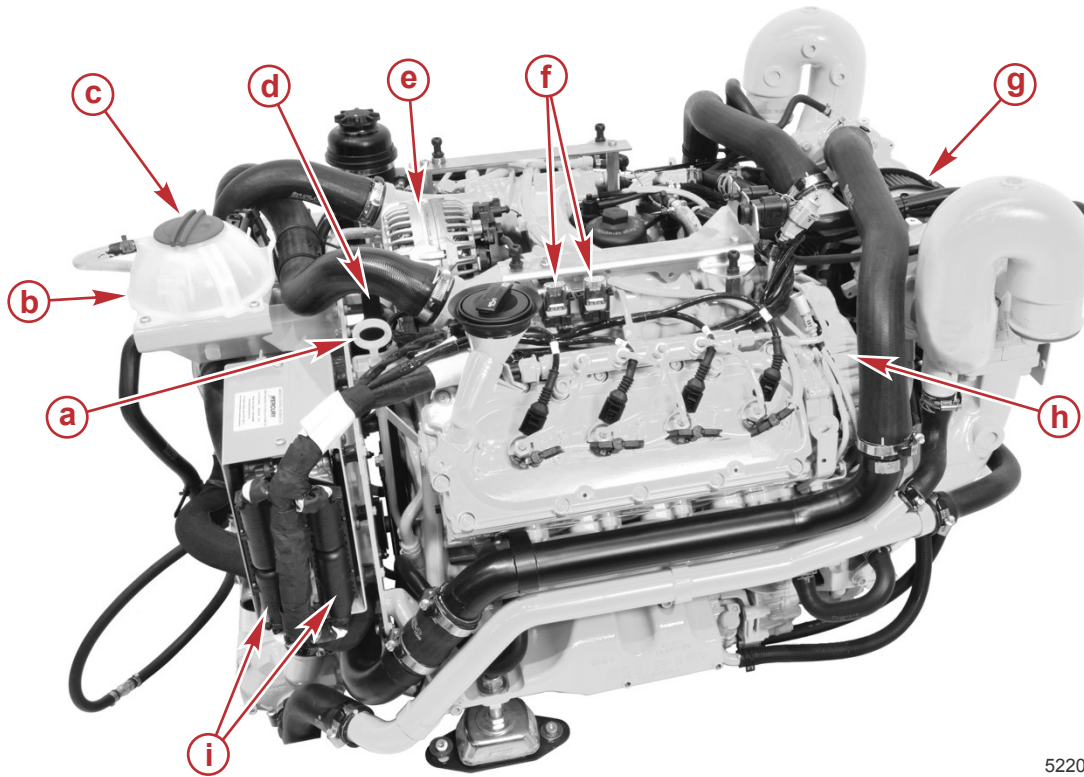
e - Sacrificial anode (hidden)

f - Intercooler

g - Seawater pump

h - Heat exchanger

i - Starter



52200

- a- Engine oil dipstick
- b- Coolant reservoir
- c- Coolant reservoir cap
- d- Ribbed V-belt
- e- Alternator
- f- Fuses
- g- Air filter
- h- Fuel injection pump drive belt (hidden)

NOTE: The fuel injection pump drive belt is located at the rear of the engine and is protected by a cover. Refer to your Mercury Diesel authorized repair facility for servicing.

- i- Electronic control units

Inspection

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

1. Check for loose, damaged, or missing parts, hoses, and clamps; tighten or replace as necessary.
2. Check electrical connections and leads for damage.
3. Remove and inspect the propeller. If badly nicked, bent, or cracked, contact your Mercury Diesel authorized repair facility.
4. Repair nicks and corrosion damage on power package exterior finish. Contact your Mercury Diesel authorized repair facility.

Routine Maintenance

Start of Season

- Inspect the power package for leaks and damage.
- Inspect the accessory drive belts, hoses, and power steering pump (if applicable).
- Inspect the fuel injection pump drive belt condition.
- Verify that the seacock operates properly.
- Check the charge, connections, and condition of the battery. Charge or replace the battery as necessary.
- Check all fluid and lubricant levels, and adjust them as necessary.

- Inspect the anodes and replace them if they are 50% eroded.

Each Day Start

- Inspect the power package for leaks and damage.
- Check the engine oil level and adjust it as necessary.
- Check the engine coolant level and adjust it as necessary.
- Check the condition of the fuel filter. Drain water from the filter as necessary.
- Check the seawater strainer and clean it as necessary.
- Check the drive lubricant level (if applicable), and adjust it as necessary.
- Check the reverse-gearbox lubricant level and adjust it as necessary, where applicable.
- Clean the gauges.
- Inspect the air filter for discoloration and contaminants.

Each Day End

- If operating in saltwater, brackish water, or polluted water, flush the seawater section of the cooling system.
- Drain any water from the fuel filter, if operating in freezing temperatures.

Weekly

- Inspect the power package for leaks and damage.
- Drain any water from the fuel filter.
- Check the trim pump fluid level, if applicable.
- Check the seawater inlets for debris or marine growth.
- Check and clean the seawater strainer.
- Inspect the anodes, and replace them if they are 50% eroded.
- Inspect the air filter for discoloration and contaminants.

End of Season

- Inspect the power package for leaks or damage.
- Change the engine oil and filter.
- Check the coolant level and adjust it as necessary.
- Check the seawater pump impeller and replace it as necessary.
- Check the air filter element and clean it as necessary.
- Check and clean the seawater strainer.
- Inspect the anodes and replace them if they are 50% eroded.
- Clean the engine and replace worn or damaged components.
- Flush, drain, and winterize the seawater cooling system, if the climate requires it.
- Fill the fuel tank with fresh fuel.

Scheduled Maintenance

Once a Year or Every 200 Operating Hours (Whichever Occurs First)

- Inspect the power package for leaks and damage.
- Check the charge, connections, and condition of the battery. Charge or replace the battery as necessary.
- Change the engine oil and filter element.
- Drain any water and change the fuel filter.
- Check the power steering hydraulic oil level (if applicable), and adjust it as necessary.
- Inspect the coolant level and adjust it as necessary.
- Inspect the air filter element and clean it as necessary.
- Inspect the accessory drive belts, hoses, and power steering pump, where applicable.
- Inspect the fuel injection pump drive belt condition.
- Inspect and clean the seawater strainer.
- Inspect the seawater pump and change the impeller as necessary.

Section 5 - Maintenance

- Inspect the anodes and replace them if they are 50% eroded.
- Verify that the gauges and the wiring connections are secure.

Maintenance Notice

IMPORTANT: Due to the risk of damaging equipment if they are performed incorrectly, we highly recommended that the following scheduled maintenance items be performed only by a Mercury Diesel authorized repair facility.

Every 5 Years or 500 Hours (Whichever Occurs First)

In addition to the Once-a-Year or Every 200 Operating Hours interval:

- Clean the intercooler core.

Every 5 Years or 1,000 Operating Hours (Whichever Occurs First)

In addition to the Once-a-Year or Every 200 Operating Hours interval:

- Clean the fuel tank.
- Check the heat exchanger pipe bundles. Remove and clean them as necessary:

Every 5 Years or 2,000 Operating Hours (Whichever Occurs First)

In addition to the Once-a-Year or Every 200 Operating Hours and Every 5 Years or 1,000 Operating Hours intervals:

- Replace the fuel injection pump drive belt.

Engine Oil

NOTICE

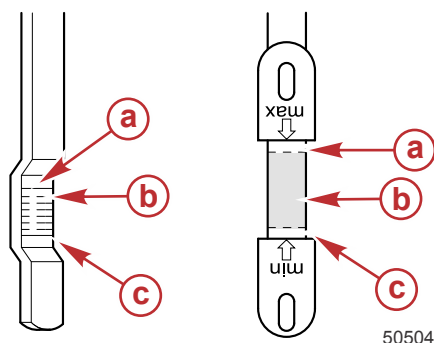
Discharge of oil, coolant, or other engine/drive fluids into the environment is restricted by law. Use caution not to spill oil, coolant, or other fluids into the environment when using or servicing your boat. Be aware of the local restrictions governing the disposal or recycling of waste, and contain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

Checking

NOTICE

With the engine running, the crankshaft journals or rod journals may strike and break the dipstick, resulting in damage to internal engine components. Stop the engine completely before removing or inserting the dipstick.

1. If it becomes necessary to check the engine oil level during operation, stop the engine and allow five minutes for the oil to drain into the pan.
2. Remove the dipstick, wipe it clean, and insert the dipstick back into the dipstick tube.
3. Remove the dipstick and check the oil level. The oil level must be between the indicator marks on the dipstick. If necessary, add oil as follows.



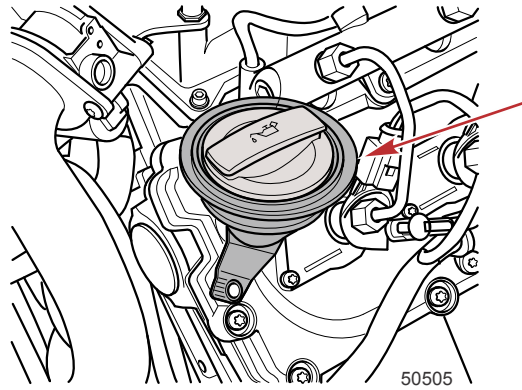
Dipstick indicator marks

- a** - Do not add oil
- b** - Safe operating range
- c** - Add oil

Filling

IMPORTANT: Do not overfill the engine with oil. When filling the engine with oil always use the dipstick to determine how much oil is required.

1. Remove the oil fill cap.



Oil fill cap

2. Add oil to bring the level up to, but not over, the maximum mark on the dipstick.

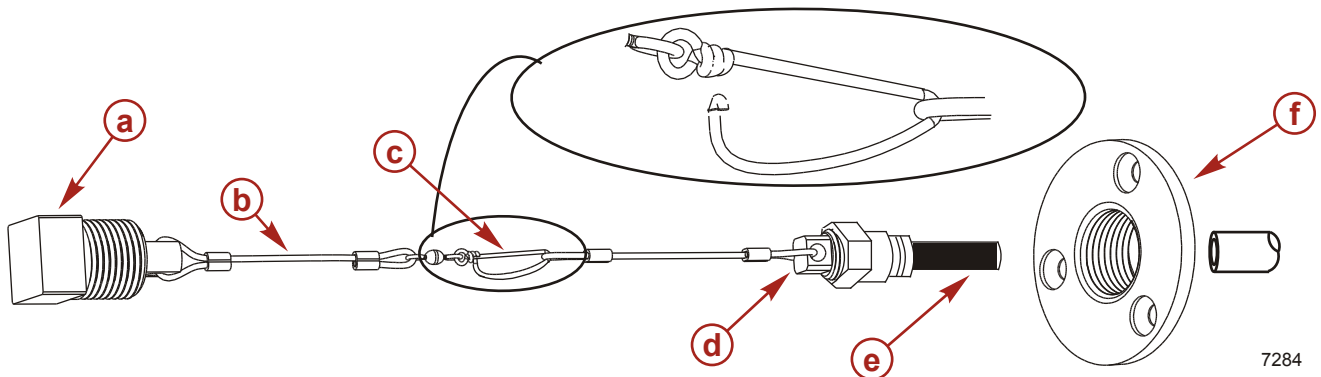
Description	Capacity	Fluid Type
Engine oil (with filter)	9.5 L (10.0 US qt)	SAE 5W-30 meeting VW Spec 50700

3. Install the oil fill cap.

Draining Using the Easy Drain System, if Equipped

NOTE: The boat must be out of the water to perform this procedure.

1. Remove the boat from the water.
2. Loosen the oil filter to vent the oil system.



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

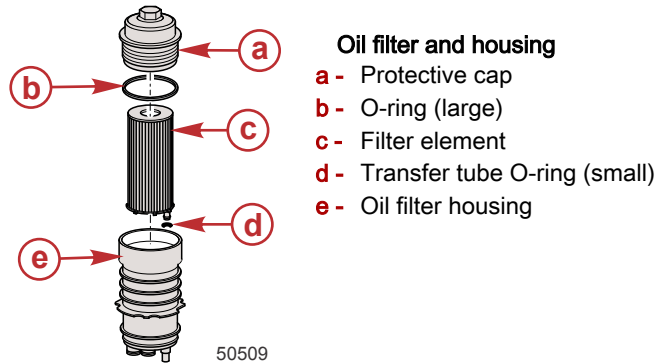
3. Remove the bilge drain plug.
4. Pull the tether through the bilge drain.
5. Place the oil drain hose in a suitable container.
6. Remove the drain plug from the oil drain hose.
7. After the oil has drained completely, install the drain plug in the oil drain hose.
8. Push the oil drain hose through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

Changing Oil and Filter

Refer to the **Maintenance Schedule** for the change interval. You should change the engine oil before placing the boat in storage.

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

1. Start and run the engine until normal operating temperature is achieved.
2. Stop the engine and wait approximately five minutes for the oil to drain into the oil pan.
3. Drain the oil from the engine into a suitable container. Dispose of all waste oil as directed by local authorities.
4. Place a suitable container under the oil filter housing to contain any oil leakage that may occur. Use an appropriate socket to loosen the oil filter protective cap.
5. Remove the protective cap and filter element.



6. Disconnect and discard the old filter element.
7. Discard the old O-ring from the protective cap.
8. Apply a small amount of engine oil to the large O-ring and install the O-ring in the protective cap.
9. Apply a small amount of engine oil to the small O-ring and install it onto the filter element transfer tube.
10. Push the filter element onto the protective cap until it is locked. Listen for a click.
11. Install the protective cap with the new filter element into the oil filter housing.
IMPORTANT: When installing the filter element into the oil filter housing, be sure to align the transfer tube on the filter element with the orifice in the bottom of the filter housing to avoid damaging the filter element.
IMPORTANT: Overtightening the protective cap will cause deformation resulting in oil leakage.
12. Thread the protective cap into the filter housing until the sealing surface contacts the housing. Tighten the protective cap to the specified torque.

Description	Nm	lb-in.	lb-ft
Protective cap	35	–	25.8

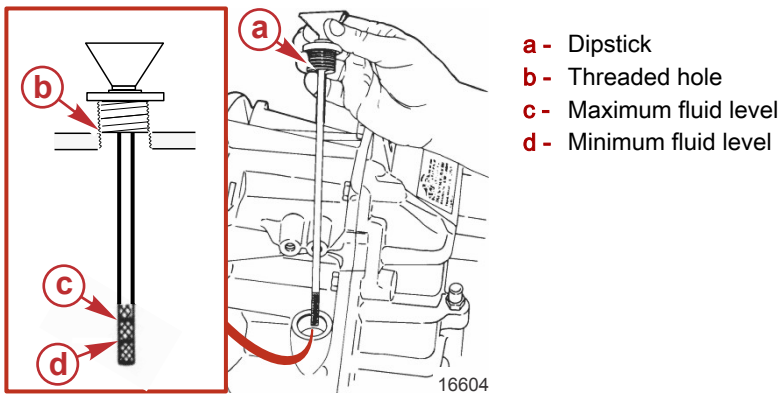
13. Remove the oil fill cap and fill the engine with new oil. Refer to **Filling**.
IMPORTANT: When filling the engine with oil, always use the dipstick to determine how much oil is required.
14. Start the engine and check for leaks.

ZF Marine Transmission Fluid

Check Fluid Level

1. Remove the dipstick.
IMPORTANT: When checking the fluid level, rest the dipstick on top of the threaded housing hole. Do not screw the dipstick into the threaded housing hole.
2. Check the fluid level as indicated on the dipstick with the dipstick resting on the top of the threaded hole.
NOTE: The fluid level may be somewhat over the maximum mark, as some of the fluid from the transmission fluid cooler and hoses may have drained back into the transmission.

- If the fluid level is below the minimum mark on the dipstick, add transmission fluid. Refer to **Add Fluid**.



IMPORTANT: To accurately check the fluid level, operate the engine at 1500 RPM for two minutes immediately before checking the level.

- Start the engine and operate at 1500 RPM for two minutes to fill all the hydraulic circuits.
- Stop the engine and quickly check the fluid level with the dipstick resting on the top of the threaded hole.
- If the fluid level is low, add transmission fluid to bring the level up to the maximum mark on the dipstick. Refer to **Add Fluid**.

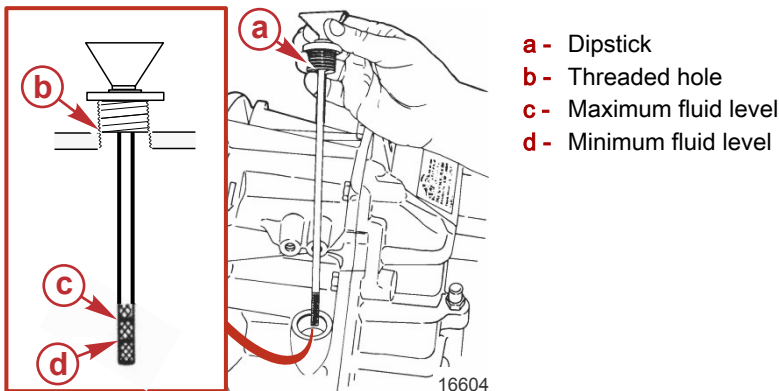
NOTE: If the transmission fluid level was extremely low, see your local Mercury Diesel authorized repair facility.

- Install the dipstick.

Add Fluid

- If necessary, add the specified automatic transmission fluid through the dipstick threaded hole to bring the level up to the maximum mark on the dipstick.

IMPORTANT: Use only the specified automatic transmission fluid (ATF).



NOTE: Always use the dipstick to determine the quantity of oil or fluid required.

NOTE: Capacities are for the transmission only and do not include the fluid cooler or fluid cooler hose capacities.

Model	Capacity	Fluid type	Part Number
ZF Marine 63A	4.0 L (4.2 US qt)	Dexron III® Automatic Transmission Fluid or Equivalent	Obtain locally
ZF Marine 63IV	4.4 L (4.6 US qt)		

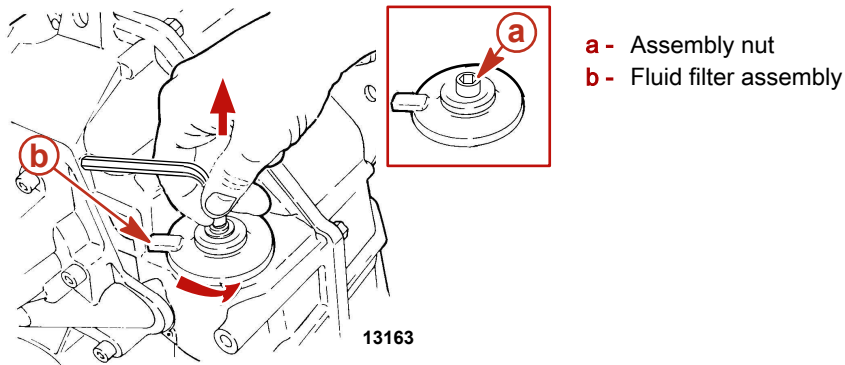
- Install the dipstick.
- Check the fluid level. Refer to **Check Fluid Level**.

Change Fluid

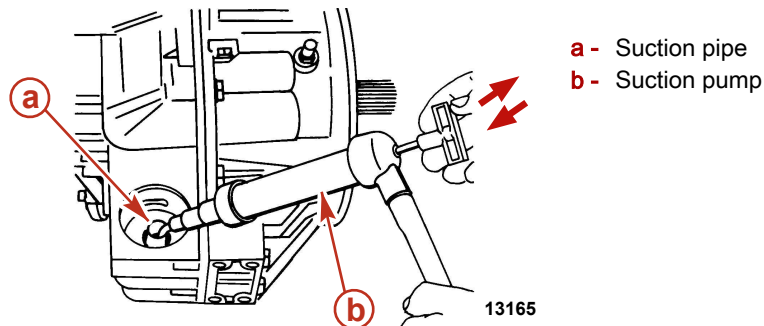
- Clean the exterior of the transmission around the fluid filter assembly.

Section 5 - Maintenance

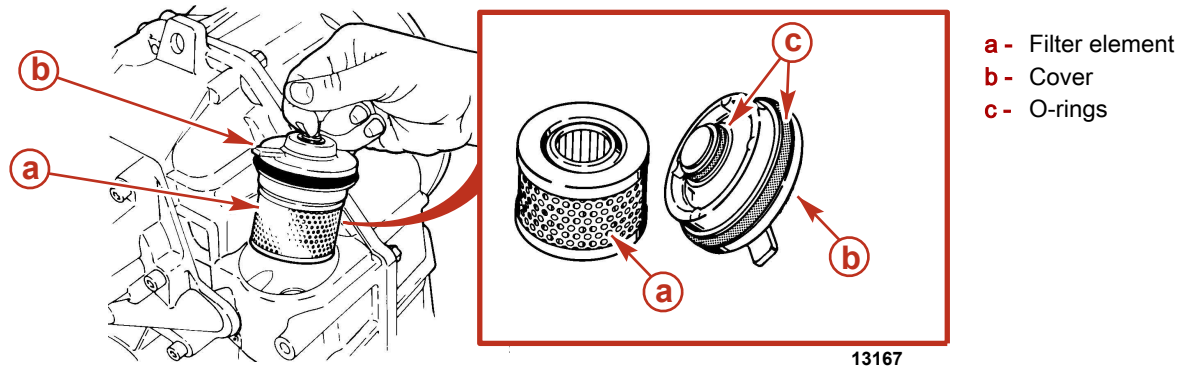
- Use a 6 mm Allen wrench and remove the fluid filter assembly by turning the assembly nut counterclockwise and pulling at the same time.



- Push the hose of a suction pump through the suction pipe and down to the bottom of the housing.
- Pump the fluid from the housing into a suitable container. Dispose of the fluid properly.



- Remove and discard the filter element and the O-rings.
- Coat the new O-rings with transmission fluid.
- Install the new O-rings and filter element.

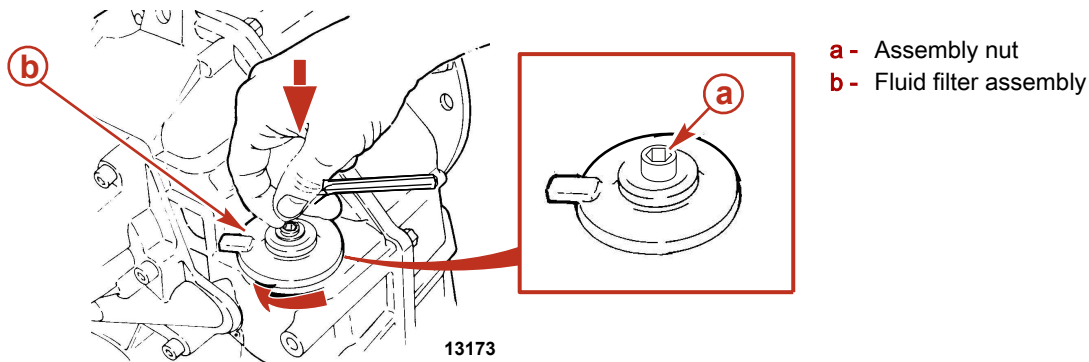


NOTICE

Improper installation of the transmission fluid filter assembly may cause the fluid to foam or leak out, resulting in decreased efficiency and damage to the transmission. Properly seat the transmission fluid filter during installation.

- Install the fluid filter assembly in the transmission cavity by turning clockwise and pushing at the same time.

9. Using a 6 mm Allen wrench, turn the filter assembly nut clockwise to tighten. Tighten the nut to the specified torque.



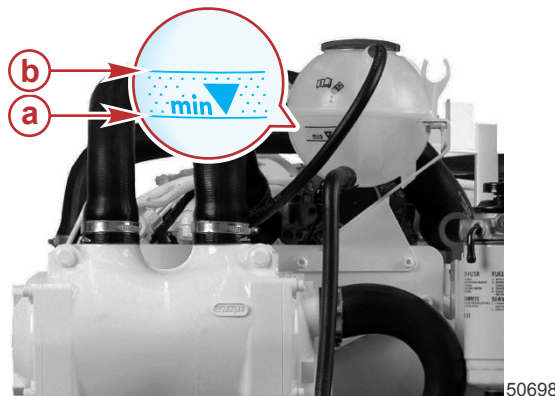
Description	Nm	lb-in.	lb-ft
Filter assembly nut	7	62	-

10. Fill the transmission to the proper level with the specified fluid. See **Add Fluid**.

Engine Coolant

⚠ 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.



- a - Coolant minimum level ("min" mark)
b - Coolant maximum level

For proper engine operation, the coolant must always be maintained at the correct level within the closed-cooling system. With the engine cold, the level should always be between the minimum and maximum level marks on the coolant expansion tank.

The coolant level is monitored by a sensor. The display window on the tachometer will warn the user of a low coolant level condition. An audible warning will also sound. A visual inspection of the coolant level within the coolant expansion tank should be performed regularly.

Checking the Coolant Level

IMPORTANT: Check the engine coolant before starting the engine.

1. Allow the engine to cool.
2. Verify that the coolant level is above the "min" mark on the coolant expansion tank.
3. If the coolant level is below the "min" mark:
 - a. Inspect the closed-cooling system for leaks. If any leaks are found, contact your Mercury Diesel authorized repair facility for further diagnosis and repair.
 - b. Refer to **Adding Coolant** and add the specified coolant as necessary.

Adding Coolant

1. Allow the engine to cool.
2. Cover the cap on the coolant expansion tank with a cloth and carefully remove the cap (counterclockwise).
IMPORTANT: If the specified coolant is not immediately available, add only water and restore the proper coolant/water ratio with the specified coolant as soon as possible. Do not add any coolant other than the specified coolant.

Section 5 - Maintenance

3. Add the specified coolant as necessary to bring the level to the minimum level ("min" mark) but no higher than the coolant maximum level.

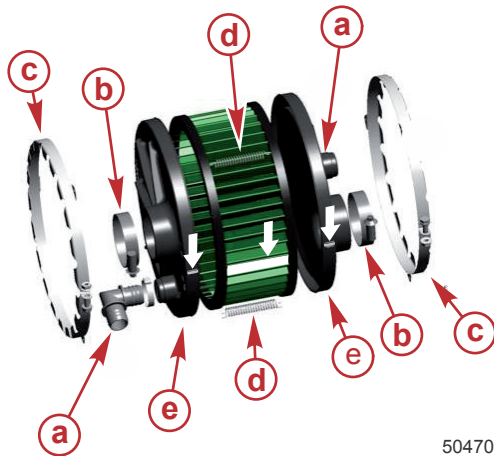
Description	Where Used	Part Number
Marine Engine Coolant	Closed-cooling system	8M0078028

4. Install the cap and tighten securely to prevent coolant loss.

Air Filter

Removal

1. Remove the crankcase ventilation hoses.
2. Remove the small clamps from the turbocharger inlets.
3. Remove the large clamps from the air filter.
4. Remove the tension springs from the air filter assembly.
5. Remove the rubber side covers from the air filter element.



Air filter mounting

- a - Crankcase ventilation hoses
- b - Small clamps
- c - Large clamps
- d - Tension springs
- e - Rubber side covers

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Inspection and Cleaning

NOTICE

Do not use fuel, thinner, or other cleaning agents for cleaning the air filter element. Use only the recommended products in the cleaning kit. Failure to use the correct products can damage the air filter element.

1. Inspect the air filter for damage.
2. Using compressed air, not exceeding 2.0 bar (29 psi), blow debris from the air filter from the inside, toward the outside of the filter.
3. For cleaning the air filter, purchase K&N® filter recharging kit 99-5050. Follow the procedures contained in recharging kit.
4. Replace the air filter as needed.

Installation

1. Install the rubber side covers onto the air filter element.
2. Align the marks as shown by the arrows in the air filter mounting illustration.
3. Install the tension springs.
4. Install the large clamps onto the rubber side covers. Tighten the fasteners to retain the boots.
5. Place the small clamps onto the small openings on the rubber side covers.
6. Gently compress the rubber side covers toward the center of the air filter element and install the filter assembly onto the turbocharger inlets.
7. Tighten the small clamps to retain the filter assembly.
8. Install the crankcase ventilation hoses.

Fuel Filter

NOTICE

Water entering the fuel injection system will cause corrosion and rusting of the injectors and other components, disabling the fuel injection system. Check daily for water in the water-separating fuel filter and have the engine inspected immediately if there is evidence of water in the fuel system.

IMPORTANT: Use a suitable container to collect fuel. Clean up any spills immediately and dispose of fuel and old filters in a safe manner in accordance with all local, federal, and international regulations.

This remote-mounted fuel filter and lift pump assembly is equipped with a water-in-fuel sensor to alert the operator when water is present in the filter. This filter needs to be replaced at specified intervals, **refer to Routine Maintenance**, or whenever water is detected in the fuel, whichever occurs first.



Draining Water from the Filter

1. Place a suitable container under the fuel filter assembly.
2. Remove the drain plug from the bottom of the assembly.
3. Drain the filter until the fuel is clean in appearance.
4. Install the drain plug and tighten securely.

Replacing the Filter

⚠ 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.

IMPORTANT: The fuel filter cannot be cleaned and reused. It must be replaced. Be sure to replace the filter with a filter of the same specifications to eliminate possible damage to the fuel system components.

1. Disconnect both battery cables from the battery.
 2. Disconnect the water-in-fuel sensor from the wiring harness.
 3. Place a suitable container under the fuel filter assembly.
 4. Remove the cannister from the assembly.
 5. Pull up on the fuel filter to remove it from the cannister.
 6. Replace the O-ring.
 7. Insert the new fuel filter into the cannister. The filter will snap into place.
 8. Lubricate the new O-ring around the cannister with clean diesel fuel.
- NOTE:** Do not fill the canister with fuel.
9. Install the cannister onto the upper portion of the fuel filter assembly and hand-tighten it.
 10. Connect the water-in-fuel sensor to the wiring harness.
 11. Connect the battery cables to the battery, connecting the negative (-) cable last.
 12. Ensure the fuel tank is filled with fuel.
 13. Turn the ignition switch to the "ON" position. The fuel pump will run for five seconds. Turn the ignition switch to the "OFF" position and wait five seconds. Repeat this step six times.

14. Start the engine and let it idle for approximately 20-30 seconds then shut the engine off.
15. Wait a few seconds and repeat step 13 two more times.
16. Check fuel filter and connections for leaks.
IMPORTANT: If leaks exist, check the connections and verify that all connections and the cannister are properly seated. If leaks continue, stop the engine immediately and contact your Mercury Diesel-authorized repair facility.

Purging the Fuel System

⚠ WARNING

The fuel injection pump generates pressure in excess of 13790 kPa (2000 psi), which is high enough to penetrate or cut the skin. Do not use your fingers to feel for fuel leaks and wear personal protective equipment when servicing the fuel system.

NOTE: It is possible that the engine will not start if the fuel system has not been completely purged of air.

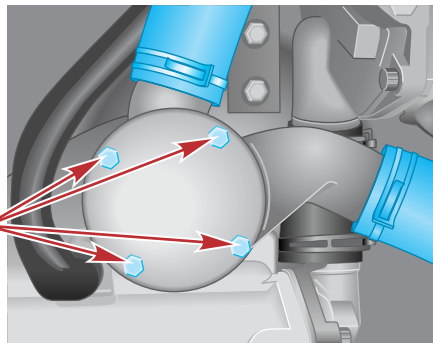
1. Ensure that the fuel tank is filled with fuel.
2. Turn the ignition switch to the "ON" position. The fuel pump will run for five seconds. Turn the ignition switch to the "OFF" position and wait five seconds. Repeat this step six times.
3. Start the engine and let it idle for approximately 20-30 seconds, then shut the engine off.
4. Wait a few seconds and repeat step 3 two more times.

Seawater System

Seawater Pump Impeller Inspection

The seawater pump impeller must be inspected (and replaced, if necessary) at the interval specified by the maintenance schedule. It is recommended this task be performed at a Mercury Diesel authorized repair facility.

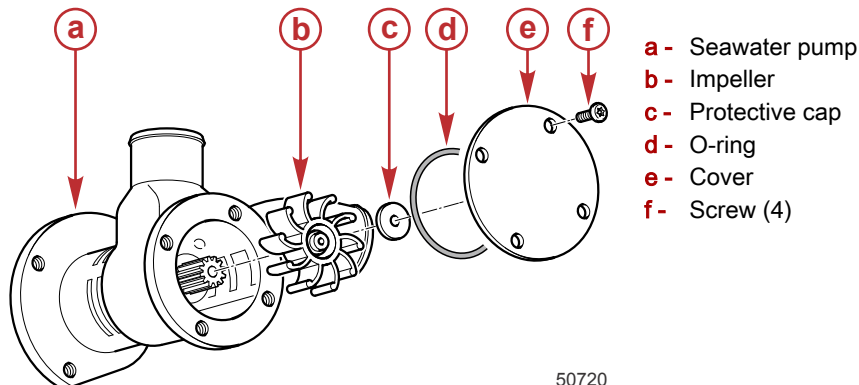
1. Close the seacock.
2. Remove the four screws on the front side of the seawater pump and remove the cover. Discard the O-ring.



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Seawater pump cover screws

3. Mark the direction of rotation of the impeller and remove the protective cap from the middle of the impeller.



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4. Use a suitable puller to remove the impeller from the impeller shaft.
5. Inspect the impeller for damage. The impeller must be replaced if there are any signs of damage.

NOTE: Keep an extra impeller onboard the boat at all times.

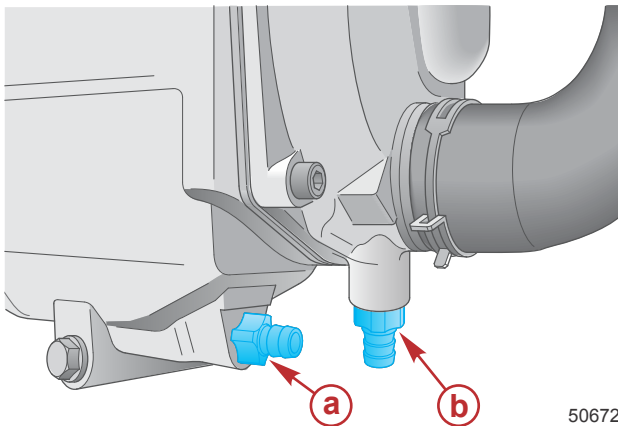
6. Lubricate the impeller with silicone spray or glycerine.
7. Push the impeller onto the shaft and press the protective cap into the impeller.
8. Insert a new O-ring into its groove.
9. Install the cover onto the housing and secure the cover with the four screws. Tighten the screws to the specified torque.

Description	Nm	lb-in.	lb-ft
Seawater pump cover screws	4.0	35.4	–

10. Open the seacock.
11. Start the engine and check the cooling system for leaks.

Flushing and Draining the Seawater System

1. Close the seacock.
2. Open and clean the seawater filter.
3. Fill the seawater filter with fresh water and operate the engine at idle.
IMPORTANT: Keep the seawater filter filled with fresh water while the engine is running.
4. Operate the engine until the water draining from the engine runs clear to ensure that all sludge and salt residues are flushed away.
5. Switch off the engine.
6. Replace the cover on the seawater filter.
7. Attach a suitable hose to the seawater-cooling system drain screw.



Heat exchanger drain screws

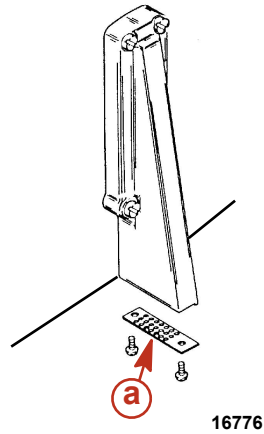
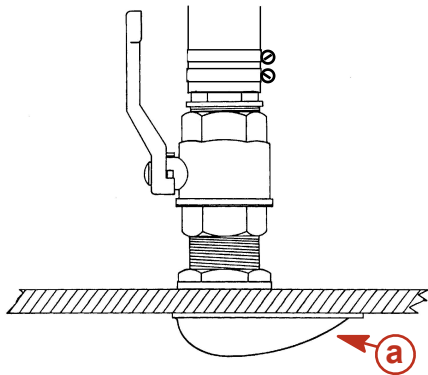
- a** - Closed-cooling system drain screw
- b** - Seawater-cooling system drain screw

50672

8. Open the drain screw and allow the water to drain into a suitable container.
9. When the draining is complete, remove the hose and close the drain screw.
10. Be certain to open the seacock prior to boat operation.

Checking the Seawater Pickups

Ensure that the water inlet holes for the seawater pickup are clean and not obstructed.



Typical through-the-hull seawater pickup

Typical through-the-transom seawater pickup

a - Water inlet holes

Cleaning the Seawater Strainer, if Equipped

NOTICE

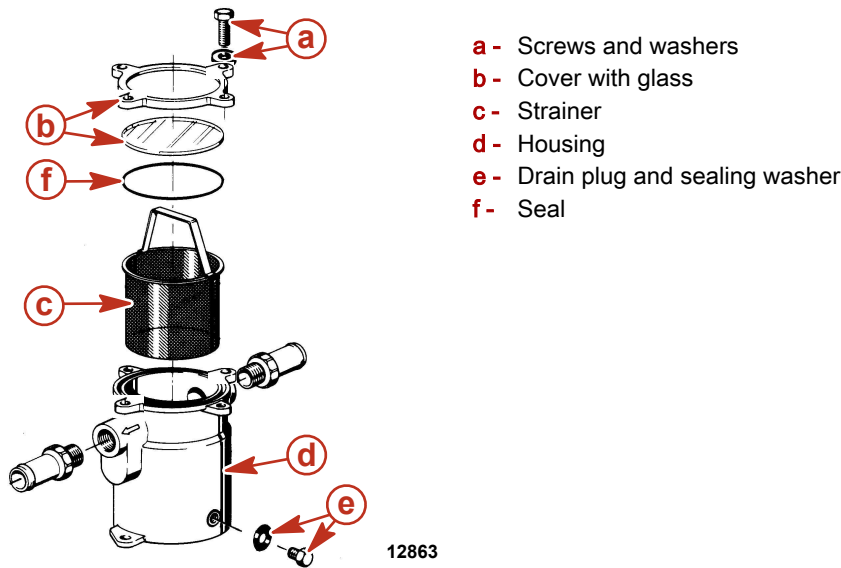
An open seawater strainer or seacock during some service or maintenance procedures can introduce water into the boat, causing damage or sinking the boat. Always close the water supply from the seawater pump, water inlet, or seacock when performing service or maintenance on the cooling system.

1. With the engine off, close the seacock, if equipped, or remove and plug the seawater inlet hose.
2. Remove the screws, washers, and cover.
3. Remove the strainer, drain plug, and sealing washer.
4. Clean all the debris from the strainer housing. Flush both the strainer and housing with clean water.
5. Check the cover gasket and replace when damaged or if it leaks.
6. Reinstall the strainer, drain plug, and sealing washer.

CAUTION

Seawater leaking from the seawater strainer could cause excess water in the bilge, damaging the engine or causing the boat to sink. Do not overtighten the cover screws, or the cover may warp and introduce seawater into the bilge.

7. Install the seal and cover using the screws and washers. Do not overtighten the cover screws.



8. Open the seacock, if equipped, or remove the plug and reconnect the seawater inlet hose.
9. Upon first starting the engine, check for leaks or air in the system that would indicate an external leak.

Corrosion Protection

General Information

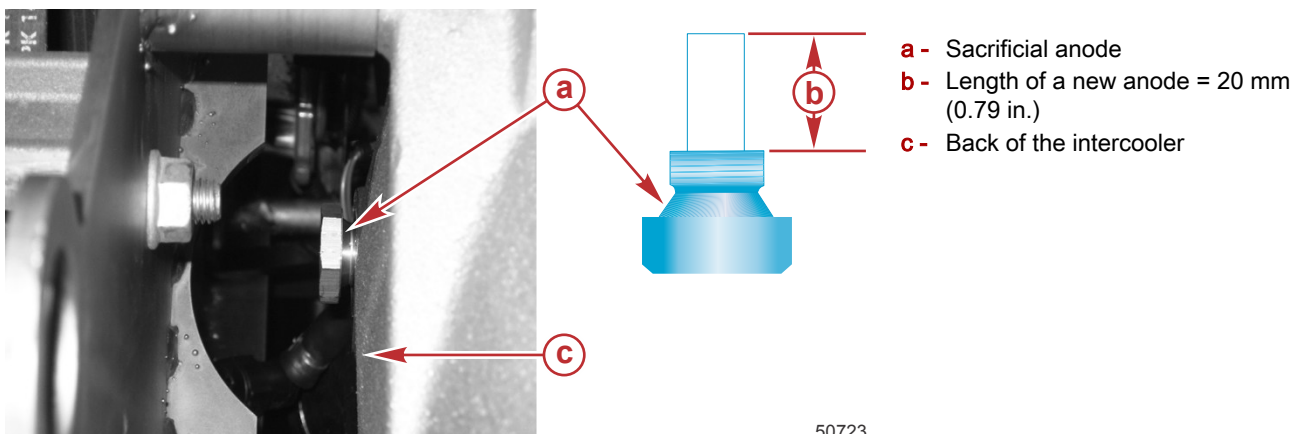
Whenever two or more dissimilar metals (such as those found on this power package) are submerged in a conductive solution such as saltwater, polluted water, or water with a high mineral content, a chemical reaction takes place causing electrical current to flow between metals. The electrical current flow causes the metal that is most chemically active, or anodic, to erode. This erosion is known as *galvanic corrosion* and, if it is not controlled, it will eventually cause the need for replacement of power package components exposed to water.

To help control the effects of galvanic corrosion, Mercury power packages come with several sacrificial anodes and other corrosion protection devices. For a more comprehensive explanation of corrosion and corrosion protection refer to the **Marine Corrosion Protection Guide**.

IMPORTANT: Replace sacrificial anodes if eroded 50% or more. Mercury strongly recommends avoiding the use of anodes from other manufacturers. Refer to your Mercury Diesel authorized repair facility for additional information.

Sacrificial Anode

The sacrificial anode in the cooling system must be checked as specified by the maintenance schedule. The anode is located at the back of the intercooler.



1. Close the seacock.
2. Place a suitable container capable of holding approximately 2–2.5 L (2.1–2.6 US qt) of liquid in a position to capture the escaping seawater.

Section 5 - Maintenance

3. Remove the sacrificial anode.
4. Inspect the anode. If the anode is less than 10 mm (0.39 in.), it has eroded more than 50% and must be replaced.
5. Install the anode into the back of the intercooler.
6. Open the seacock.
7. Start the engine and check for leaks.

Antifouling Paint

IMPORTANT: Corrosion damage that results from the improper application of anti-fouling paint is not covered by the limited warranty.

In some areas it may be advisable to paint the bottom of the boat to help prevent marine growth. Contact a Mercury Diesel authorized repair facility for recommendations for your boat.

Drive Belts

Drive Belt

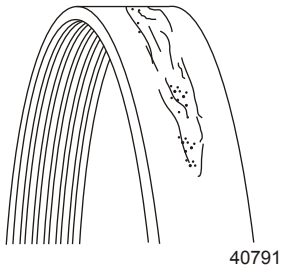
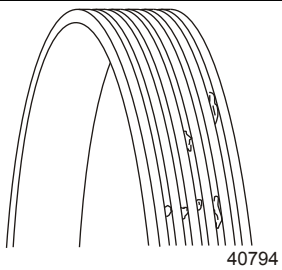
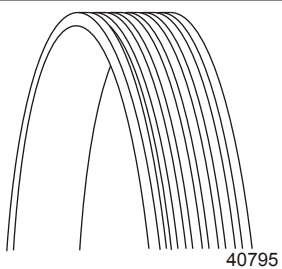
All drive belts must be periodically inspected for tension and condition. Turn the engine off and remove the ignition key before inspecting for excessive wear, cracks, fraying, and glazed surfaces.

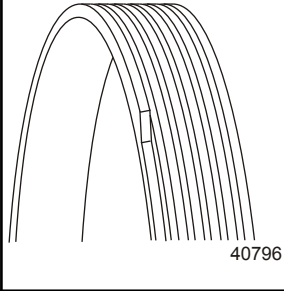
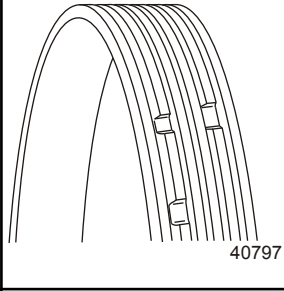
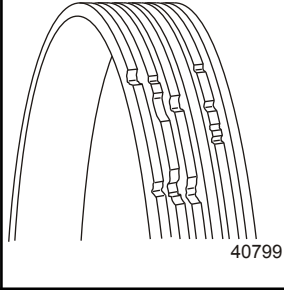
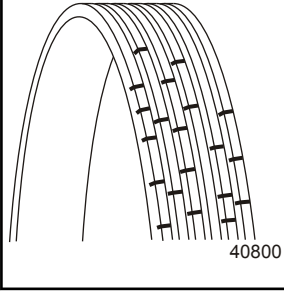
⚠ WARNING

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

In the event that the drive belt requires replacement, it is recommended the drive belt replacement be performed by a Mercury Diesel authorized repair facility.

Drive Belt Failure Identification

Appearance	Description	Cause	Solution
 <p style="text-align: right;">40791</p>	<p>Abrasion Each side of the belt appears shiny or glazed. Severe condition: Fabric is exposed.</p>	<p>The belt is in contact with an object. This can be caused by improper belt tension or tensioner failure.</p>	<p>Replace the belt and inspect its route for contact with another object. Verify that the belt tensioner is functioning.</p>
 <p style="text-align: right;">40794</p>	<p>Pilling Belt material is sheared off from the ribs and builds up in the belt grooves.</p>	<p>There are a number of causes including lack of tension, misalignment, worn pulleys, or a combination of these factors.</p>	<p>When pilling leads to belt noise or excess vibration, the belt should be replaced.</p>
 <p style="text-align: right;">40795</p>	<p>Improper installation The belt ribs begin separating from the joined strands. If left unattended, the cover will often separate, causing the belt to unravel.</p>	<p>Improper belt installation is a common cause of premature failure. One of the outermost belt ribs is placed outside the pulley groove, causing a belt rib to run without a supporting or aligning pulley groove.</p>	<p>The belt should be replaced immediately. Ensure all ribs of the replacement belt fit into the pulley grooves. Operate the engine. Then, with the engine off and the battery disconnected, inspect the belt for proper installation.</p>

Appearance	Description	Cause	Solution
 40796	Misalignment Sidewalls of the belt may appear glazed or the edge-cord may become frayed and the ribs are removed. A noticeable noise may result. In severe cases, the belt can jump off the pulley.	Pulley misalignment. Misalignment forces the belt to kink or twist while running, causing premature wear.	Replace the belt and verify the alignment of the pulley.
 40797	Chunk-out Pieces or chunks of rubber material have broken off the belt. When chunk-out has occurred, a belt can fail at any moment.	Chunk-out can happen when several cracks in one area move parallel to the cord line. Heat, age, and stress are the primary contributors.	Replace the belt immediately.
 40799	Uneven rib wear The belt shows damage to the side with the possibility of breaks in the tensile cord or jagged edged ribs.	A foreign object in the pulley can cause uneven wear and cut into the belt.	Replace the belt and inspect all pulleys for foreign objects or damage.
 40800	Cracking Small visible cracks along the length of a rib or ribs.	Continuous exposure to high temperatures, the stress of bending around the pulley leads to cracking. Cracks begin on the ribs and grow into the cord line. If three or more cracks appear in a three-inch section of a belt, 80% of the life is gone.	Replace the belt immediately.

Battery

Refer to the 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.

Battery Precautions for Multiple Engines

Alternators

Alternators are designed to charge a single battery that supplies electrical power to the individual engine on which the alternator is mounted. Connect only one battery to one alternator. Do not connect two batteries to the same alternator unless a battery isolator is used.

Engine Control Unit (ECU)

The engine control unit requires a stable voltage source. During multiple engine operation, an onboard electrical device may cause a sudden drain of voltage at the engine's battery. The voltage may go below the ECU's minimum required voltage. Also, the alternator on the other engine may now start charging. This could cause a voltage spike in the engine's electrical system.

In either case, the ECU could shut off. When the voltage returns to the range that the ECU requires, the ECU will reset itself. The engine will now run normally. This ECU shutdown usually happens so fast that the engine just appears to have an ignition miss.

Batteries

Boats with multiple engine electronic control power packages require that each engine be connected to its own battery, ensuring that the engine control unit has a stable voltage source.

Battery Switches

Battery switches should always be positioned so that each engine is operating off of its own battery. Do not operate engines with switches in the both or all position. In an emergency, another engine's battery can be used to start an engine with a dead battery.

Battery Isolators

Isolators can be used to charge an auxiliary battery used for powering accessories in the boat. They should not be used to charge the battery of another engine in the boat unless the type of isolator is specifically designed for this purpose.

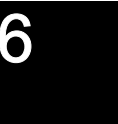
Generators

The generator's battery should be considered another engine's battery.

Section 6 - Storage

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Cold Weather or Extended Storage

IMPORTANT: Mercury Diesel strongly recommends that this service should be performed by an authorized Mercury Diesel dealer. Damage caused by freezing temperatures is not covered by the Mercury Diesel 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 Diesel requires that propylene glycol antifreeze, mixed to the manufacturer's instructions, be used in the seawater section of the cooling system for freezing temperatures or extended storage. Ensure that the propylene glycol antifreeze contains a rust inhibitor and is recommended for use in marine engines. Be certain to follow the antifreeze manufacturer's recommendations.

Preparing Your Power Package for Seasonal or Extended Storage

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.

IMPORTANT: If the boat has already been removed from the water, supply water to the water inlet holes before starting the engine.

1. Supply cooling water to the water inlet holes or the seawater pump inlet.
2. Start the engine and operate it until it reaches normal operating temperature.
3. Stop the engine.
4. Change the engine oil and filter.
5. Start the engine and operate it for about 15 minutes. Check for oil leaks.
6. Flush and then drain the seawater cooling system. Refer to **Flushing and Draining the Seawater System**.

Seasonal Storage Instructions

1. Read all precautions and perform all procedures found in **Preparing Your Power Package for Seasonal or Extended Storage**.
2. Read all precautions and perform all procedures found in **Flushing and Draining the Seawater System** and drain the seawater section of the cooling system.

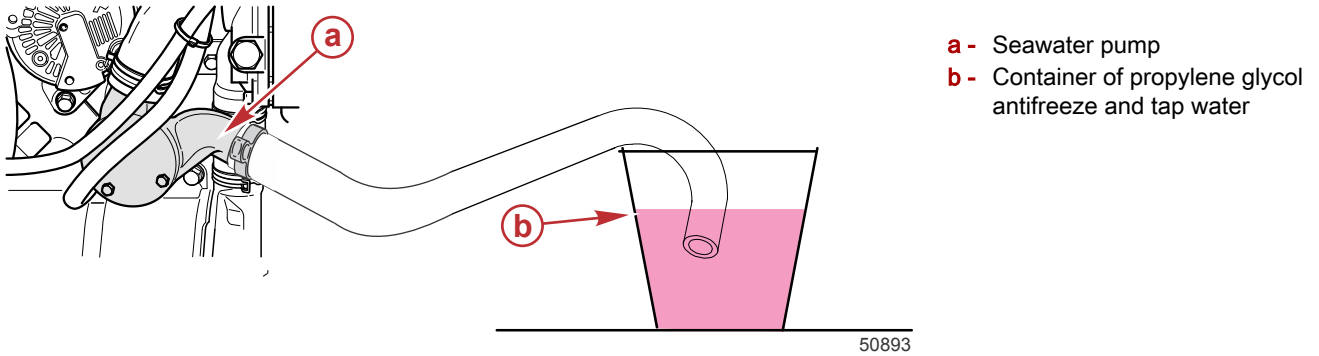
NOTICE

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.

IMPORTANT: Mercury Diesel recommends that propylene glycol antifreeze be used in the seawater section of the cooling system for cold weather (freezing temperature), seasonal storage, 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 manufacturer's recommendations.

3. Fill a container with approximately 5.6 Liter (6.0 US qt) of propylene glycol antifreeze and tap water mixed to manufacturer's recommendation to protect the engine to the lowest temperature to which it will be exposed during cold weather or extended storage.

- Disconnect the seawater inlet hose from the seawater pump. Temporarily connect an appropriate length piece of hose to seawater pump and place the other end of the hose into the container of propylene glycol antifreeze and tap water.



NOTE: Discharge of propylene glycol antifreeze into the environment may be restricted by law. Dispose of propylene glycol antifreeze in accordance with federal, state, and local laws and guidelines.

- Start the engine and operate at idle speed until the antifreeze mixture has been pumped into the engine seawater cooling system.
- Stop the engine.
- Remove the temporary hose from the seawater pump.
- Clean the outside of the engine and repaint any areas required with primer and spray paint. After the paint has dried, coat the engine with the specified corrosion inhibiting oil or equivalent.

Description	Part Number
Mercury Light Gray Primer	92-802878 52
Mercury Phantom Black	92-802878Q 1
Corrosion Guard	92-802878-55
Mercury Diesel Cloud White	8M0071082

- Your Mercury Diesel authorized repair facility should perform all checks, inspections, lubrications, and fluid changes outlined in **Maintenance Schedules**.
- Follow the battery manufacturer's instructions for storage and store the battery.

Extended Storage Instructions

IMPORTANT: Mercury Diesel strongly recommends that this service be performed by an Mercury Diesel authorized repair facility.

- Read all precautions and perform all procedures found in **Preparing Your Power Package for Seasonal or Extended Storage**.
- Read all precautions and perform all procedures found in **Flushing and Draining the Seawater System**.
- Read all precautions and perform all procedures found in **Seasonal Storage Instructions**.
- Remove the seawater pump impeller and store away from direct sunlight. See a Mercury Diesel authorized repair facility for additional information and service.

IMPORTANT: The seawater pump impeller material can be damaged by prolonged exposure to direct sunlight.

- Place a caution tag at the instrument panel and in the engine compartment stating that the seawater pump is out and not to operate the engine.

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

- 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 the cables. Tighten each cable clamp securely when connecting.
3. Coat the terminal connections with a battery terminal anticorrosion 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.

Section 7 - Troubleshooting

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Troubleshooting

The broad network of Mercury Diesel service partners with trained professionals, modern equipment, and all of the required special tools is available to you for the care and service of your Mercury Diesel engine. If repairs must be made, the engine should be brought to an authorized Mercury Diesel repair facility. However, if you experience starting or running problems while on the water, the following troubleshooting charts can help you remedy some simple problems.

Troubleshooting Charts

Starter Motor Will Not Crank Engine, or Cranks Slow

Possible Cause	Remedy
Battery switch turned off.	Turn switch on.
Remote control not in neutral position.	Position control lever in neutral.
Open circuit breaker or blown fuse.	Check and reset 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 faulty connection.
Bad battery.	Test and replace if bad.

Engine Will Not Start, or Is Hard to Start

Possible Cause	Remedy
Lanyard stop switch activated.	Check lanyard stop switch.
Improper starting procedure.	Read starting procedure.
Empty fuel tank or fuel shut off valve closed.	Fill tank or open valve.
Faulty mechanical fuel delivery pump.	Have pump replaced by a Mercury Diesel-authorized repair facility if fuel is present.
Throttle not operating properly.	Check the throttle for freedom of movement.
Faulty electrical stop-circuit.	Have a Mercury Diesel-authorized repair facility service the electrical stop circuit.
Clogged fuel filters.	Replace the filters.
Stale or contaminated fuel.	Drain tank. Fill with fresh fuel.
Fuel line or tank vent line kinked or clogged.	Replace kinked lines or blow out the lines with compressed air to remove obstruction.
Air in fuel injection system.	Purge fuel injection system.
Faulty wire connections.	Check wire connections.
Glow plugs or glow plug system inoperative, if equipped.	Have a Mercury Diesel-authorized repair facility service the glow plug system.
Electronic fuel system fault.	Have the electronic fuel system checked by a Mercury Diesel-authorized repair facility.

Engine Runs Rough, Misses, or Backfires

Possible Cause	Remedy
Throttle not operating properly.	Check the throttle for binding or an obstruction.
Idle speed too low.	Check idle speed and adjust, if necessary.
Clogged fuel or air filters.	Replace the filters.
Stale or contaminated fuel.	Drain tank and 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.
Air in fuel system.	Purge fuel injection system.

Possible Cause	Remedy
Electronic fuel system faulty.	Have electronic system checked by a Mercury Diesel–authorized repair facility.

Poor Performance

Possible Cause	Remedy
Throttle not fully open.	Inspect throttle cable and linkages for proper operation.
Damaged or improper propeller.	Replace propeller. See a Mercury Diesel–authorized repair facility.
Excessive bilge water.	Drain and check for cause of entry.
Boat overloaded or improperly distributed.	Reduce load or redistribute more evenly.
Boat bottom fouled or damaged.	Clean or repair as necessary.
Electronic fuel system fault.	Have electronic fuel system checked by a Mercury Diesel–authorized repair facility.

No Fuel or Faulty Fuel Supply

Possible Cause	Remedy
The fuel cock is closed.	Open the fuel cock.
There is no fuel in the tank.	Fill the tank. Refer to Purging the Fuel System .
The fuel tank is dirty.	Clean the fuel tank.
The fuel lines are clogged.	Check the lines and clean them if necessary.
The water level in the circulation filter (if equipped) is too high.	Drain the water from the circulation filter.
The circulation filter (if equipped) is clogged.	Clean the circulation filter or replace it if necessary.
The water level is too high in the fuel filter.	Drain the water from the fuel filter.
The fuel filter is clogged.	Replace the fuel filter.

Engine Will Not Start, Starter Does Not Turn

Possible Cause	Remedy
The throttle lever is not in the neutral position.	Move the throttle lever into neutral.
The neutral switch in the gearbox does not output a signal.	Check the operation of the neutral switch.
The lanyard stop switch is activated.	Reset the lanyard stop switch.
The ignition is switched off.	Switch on the ignition.
The battery is discharged or defective.	Check the battery and charge it. Replace the battery if necessary.
The starter connections are loose or corroded.	Check the connections and clean or replace if necessary.
The connections to the ignition or starter switch are loose or corroded.	Check the connections and clean or replace if necessary.
There is air inside the fuel system.	Refer to Purging the Fuel System . Contact an authorized Mercury Diesel repair facility for assistance.

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. See a Mercury Diesel–authorized repair facility.

Section 7 - Troubleshooting

Possible Cause	Remedy
Coolant level low in closed-cooling section.	Check for cause of low coolant level and repair. Fill system with proper coolant solution.
Heat exchanger cores plugged with foreign material.	Clean heat exchanger. See a Mercury Diesel-authorized repair facility.
Loss of pressure in closed-cooling section.	Check for leaks. Clean, inspect, and test pressure cap. See a Mercury Diesel-authorized repair facility.
Faulty seawater pickup pump.	Repair. See a Mercury Diesel-authorized repair facility.
Seawater discharge restricted or plugged.	Clean exhaust elbows. See a Mercury Diesel-authorized repair facility.
Seawater inlet hose kinked (restricted).	Position hose to prevent kinking (restriction).
Use of improperly designed hose on inlet side of seawater pump allowing it to collapse.	Replace hose with wire reinforced design.

Insufficient Engine Temperature

Possible Cause	Remedy
Faulty thermostats.	Replace. See a Mercury Diesel-authorized repair facility.

Low Engine Oil Pressure

Possible Cause	Remedy
Faulty senders.	Have the system checked by a Mercury Diesel-authorized repair facility.
Insufficient amount of oil in the crankcase.	Check and add oil as required.
Excessive oil in crankcase (causing it to become aerated).	Check and remove the required amount of oil. Check for cause of excessive oil (improper filling).
Diluted or improper viscosity oil.	Change oil and oil filter. Use the correct grade and viscosity oil. Determine the cause for dilution (excessive idling).

Battery Will Not Charge

Possible Cause	Remedy
Excessive current draw from battery.	Turn off nonessential accessories.
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.
Alternator drive belt loose or in poor condition.	Replace or adjust.
Unacceptable battery condition.	Test battery.

Remote Control Operates Hard, Binds, Has Excessive Free-play, or Makes Unusual Sounds

Possible Cause	Remedy
Insufficient lubrication on shift and throttle linkage fasteners.	Lubricate.
Obstruction in the shift or throttle linkages.	Remove the obstruction.
Loose or missing shift and throttle linkages.	Check all throttle and shift linkages. If any are loose or missing, see a Mercury Diesel-authorized repair facility immediately.
Shift or throttle cable kinked.	Straighten cable or have a Mercury Diesel-authorized repair facility replace cable if damaged beyond repair.
Improper shift cable adjustment.	Have adjustment checked by a Mercury Diesel-authorized repair facility.

Steering Wheel Turns Hard or Jerky

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

Notes:

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. 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 inform 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. 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 about 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 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 a 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 Customer Service:

- Your name and address
- Daytime telephone number

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

Contact Information for Mercury Marine Customer Service

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

United States, Canada		
Telephone	English +1 920 929 5040 Français +1 905 636 4751	Mercury Marine W6250 W. Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
Fax	English +1 920 929 5893 Français +1 905 636 1704	
Website	www.mercurymarine.com	

Australia, Pacific		
Telephone	+61 3 9791 5822	Brunswick Asia Pacific Group 41-71 Bessemer Drive Dandenong South, Victoria 3175 Australia
Fax	+61 3 9706 7228	

Europe, Middle East, Africa		
Telephone	+32 87 32 32 11	Brunswick Marine Europe Parc Industriel de Petit-Rechain B-4800 Verviers, Belgium
Fax	+32 87 31 19 65	

Mexico, Central America, South America, Caribbean		
Telephone	+1 954 744 3500	Mercury Marine 11650 Interchange Circle North Miramar, FL 33025 U.S.A.
Fax	+1 954 744 3535	

Japan		
Telephone	+072 233 8888	Kisaka Co., Ltd. 4-130 Kannabecho Sakai-shi Sakai-ku 5900984 Osaka, Japan
Fax	+072 233 8833	

Asia, Singapore		
Telephone	+65 65466160	Brunswick Asia Pacific Group T/A Mercury Marine Singapore Pte Ltd 29 Loyang Drive Singapore, 508944
Fax	+65 65467789	

Customer Service Literature

English Language

English language publications are available from:
Mercury Marine
Attn: Publications Department
W6250 West Pioneer Road
P.O. Box 1939
Fond du Lac, WI 54935-1939

Outside the United States and Canada, contact the nearest Mercury Marine or Marine Power International Service Center for further information.

When ordering be sure to:

Section 8 - Customer Assistance Information

- List your product, model, year, and serial numbers.
- Check the literature and quantities you want.
- Enclose full remittance in check or money order (NO COD).

Other Languages

To obtain an Operation, Maintenance and Warranty Manual in another language, contact the nearest Mercury Marine or Marine Power International Service Center for information. A list of part numbers for other languages is provided with your power package.

Ordering Literature

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

Model		Serial Number	
Horsepower		Year	

United States and Canada

For additional literature for your Mercury Marine power package, contact your nearest Mercury Marine dealer or contact:

Mercury Marine		
Telephone	Fax	Mail
(920) 929-5110 (USA only)	(920) 929-4894 (USA only)	Mercury Marine Attn: Publications Department P.O. Box 1939 Fond du Lac, WI 54935-1939

Outside the United States and Canada

Contact your nearest Mercury Marine authorized service center to order additional literature that is available for your particular power package.

Submit the following order form with payment to:	Mercury Marine Attn: Publications Department W6250 West Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
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Ship To: (Copy this form and print or type—This is your shipping label)

Name	
Address	
City, State, Province	
ZIP or postal code	
Country	

Quantity	Item	Stock Number	Price	Total
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Section 9 - Maintenance Log

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