Declaration of Conformity—Mercury Diesel Sterndrive (VW)

This sterndrive 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:**B-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

Name of notified body for noise 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: ☒ **B+C** ☐ **B+D** ☐ **B+E** ☐ **B+F** ☐ **G** ☐ **H**
Conformity assessment module used for noise emissions: **A** ☐ **Aa** ☒ **G** ☐ **H** ☐
Other Community Directives applied: Electromagnetic Compatibility Directive 2004/108/EC

Description of Engines and Essential Requirements

Engine Type	Fuel Type	Combustion Cycle
☒ z or sterndrive with integral exhaust	☒ Diesel	☒ 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
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
TDI 3.0L 225/230/265	TDI 225-6/TDI 230-6/TDI 265-6	EXVWM007
V6 TDI 100/230/260	TDI 3.0L 100/TDI 3.0L 230/TDI 3.0L 260	EXVWM007
TDI 4.2L 285/350	TDI 285-8/TDI 350-8	EXVWM008
V8 TDI 335/370	TDI 4.2L 335/TDI 4.2L 370	EXVWM008

Essential requirements	Standards	Other normative document/ method	Technical file	Please specify in more detail (* = mandatory standard)
Annex 1.B—Exhaust Emissions				
B.1 engine identification	☐	☐	☒	
B.2 exhaust emission requirements	☒*	☐	☐	*EN ISO 8178-1:1996
B.3 durability	☐	☐	☒	
B.4 owner's manual	☒	☐	☐	ISO 8665:2006
Annex 1.C—Noise Emissions				
C.1 Noise emission levels	☒*	☐	☐	*EN ISO 14509
C.2 Owner's manual	☐	☒	☐	Owner's manual

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) mentioned above complies (comply) with all applicable essential requirements in the way specified.

Name / function:
Mark Schwabero, President
Mercury Marine

Signature and title:

Date and place of issue: June 6, 2013
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**
Transom Assembly Serial Number (Sterndrive)	**Gear Ratio**	**Sterndrive Unit Serial Number**
Propeller Number	**Pitch**	**Diameter**
Hull Identification Number (HIN)		**Purchase Date**
Boat Manufacturer	**Boat Model**	**Length**

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.

Welcome

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

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

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

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

Mercury MerCruiser

Warranty Message

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

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

Read This Manual Thoroughly

IMPORTANT: If you 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.

Copyright and Trademark Information

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Warranty Information

Warranty Registration United States and Canada

To be eligible for warranty coverage, the product must be registered with Mercury Marine.

At the time of sale, the selling 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.

A copy of the warranty registration should be provided to you by your selling dealer.

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

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

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

Outside United States and Canada

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 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 United States and Canada

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 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 record the new owner's information.

There is no charge for this service.

Outside the United States and Canada

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

Diesel Duty-Cycle Application Definitions

Continuous duty: This engine rating will allow for load factors above 65% and will allow the continuous use of full power.

Medium duty: This engine rating will allow for load factors up to 50% and is for applications that use full power for 33% of engine run time (4 hours of full power for every 12 hours of engine run time) with the remainder at cruise speeds.

Recreational or light duty commercial: This engine rating will allow for load factors up to 40 percent and will allow for the engine to use full power for 13% of engine run time (1 hour of full power for every 8 hours of engine run time) with the remainder at cruise speeds.

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 of use. 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 that 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 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 (RPM)
3500 RPM	3.0L (V6)	3100 RPM
4000 RPM	3.0L (V6)	3600 RPM
4200 RPM	4.2L (V8)	3800 RPM
This rating is for pleasure (noncommercial) 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 predelivery 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 registered) may void the warranty at the sole discretion of Mercury Marine. Routine maintenance outlined in the Operation, Maintenance and 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 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: 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 if:

- The product was repossessed from a retail customer
- Purchased at an auction
- Purchased from a salvage yard
- Purchased from an insurance company that obtained the product as a result of an insurance claim
- Registered with incorrect 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
- Damage caused by abnormal use
- Damage caused by the use of a propeller or gear ratio that does not allow the engine to run in its recommended RPM range (see the Operation, Maintenance and Warranty manual)
- Damage caused by operating the product in a manner inconsistent with the recommended operation and duty cycle section of the Operation, Maintenance and Warranty manual

- Damage caused by neglect
- Damage caused by an accident
- Damage caused by submersion
- Damage caused by improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product)
- Damage caused by improper service
- Damage caused by the 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
- Damage caused by the use of fuels, oils, or lubricants that are not suitable for use with the product
- Alteration or removal of parts
- Damage caused by 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
- Damage caused by running the engine out of water
- Mounting the engine too high on the transom
- Damage caused by operating the boat with the engine overtrimmed

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.

TDI Light-Duty Commercial 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 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 the number of hours of use, whichever occurs first, specific for the product stated horsepower. 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: 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):

Engine Full Power Rated Speed (RPM)	Maximum Cruise Speed RPM	Maximum Hours Used
3.0L V6 100 hp (3000)	2600	1500
3.0L V6 230 hp (3500)	3100	1500
3.0L V6 230 hp (4000)	3600	1000
3.0L V6 260 hp (4000)	3600	1000
4.2L V8 335 hp (4200)	3800	1500
4.2L V8 370 hp (4200)	3800	1000

COMMERCIAL USE: 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. Light-duty commercial use is not available in the United States.

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 predelivery 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 and 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 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: 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 if:

- The product was repossessed from a retail customer
- Purchased at an auction
- Purchased from a salvage yard
- Purchased from an insurance company that obtained the product as a result of an insurance claim
- Registered with incorrect 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
- Damage caused by abnormal use
- Damage caused by the use of a propeller or gear ratio that does not allow the engine to run in its recommended RPM range (see the Operation, Maintenance and Warranty manual)
- Damage caused by operating the product in a manner inconsistent with the recommended operation and duty cycle section of the Operation, Maintenance and Warranty manual
- Damage caused by neglect
- Damage caused by an accident
- Damage caused by submersion
- Damage caused by improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product)
- Damage caused by improper service
- Damage caused by the 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
- Damage caused by the use of fuels, oils, or lubricants that are not suitable for use with the product
- Alteration or removal of parts
- Damage caused by 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
- Damage caused by running the engine out of water
- Mounting the engine too high on the transom
- Damage caused by operating the boat with the engine overtrimmed

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 TowSport 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 year	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 years	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 year	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 years	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 years	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 year	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.

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 year	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 South Africa

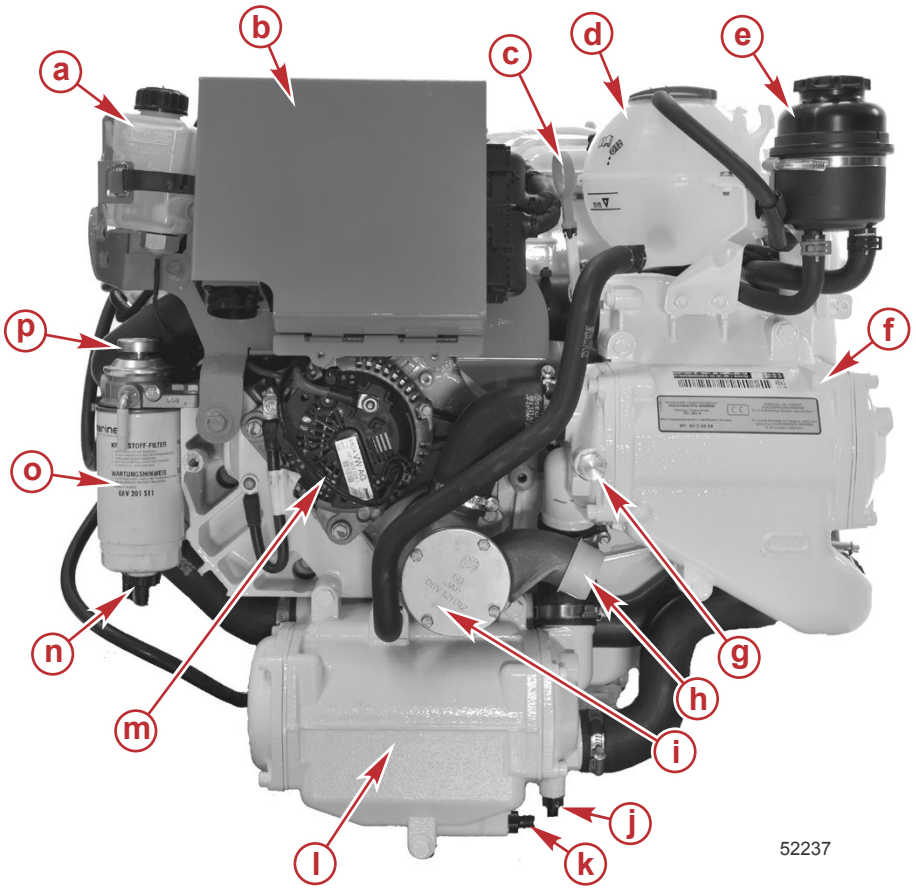
For products purchased outside of South Africa, contact the distributor in your country, or the Marine Power Service Center closest to you.

Section 2 - Getting to Know Your Power Package

Table of Contents

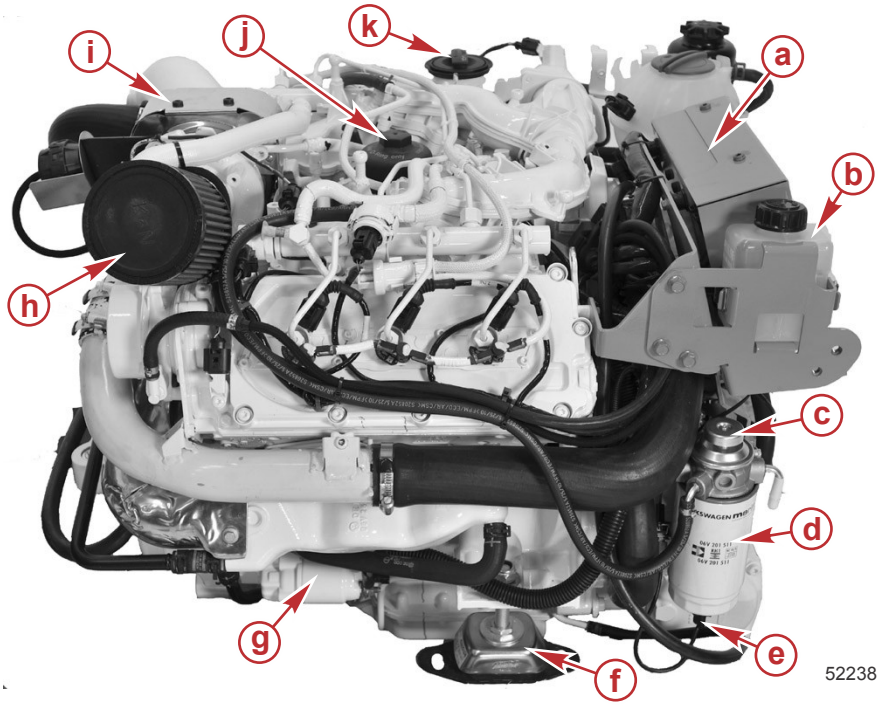
Engine Component List

3.0 Liter TDI Front View Components



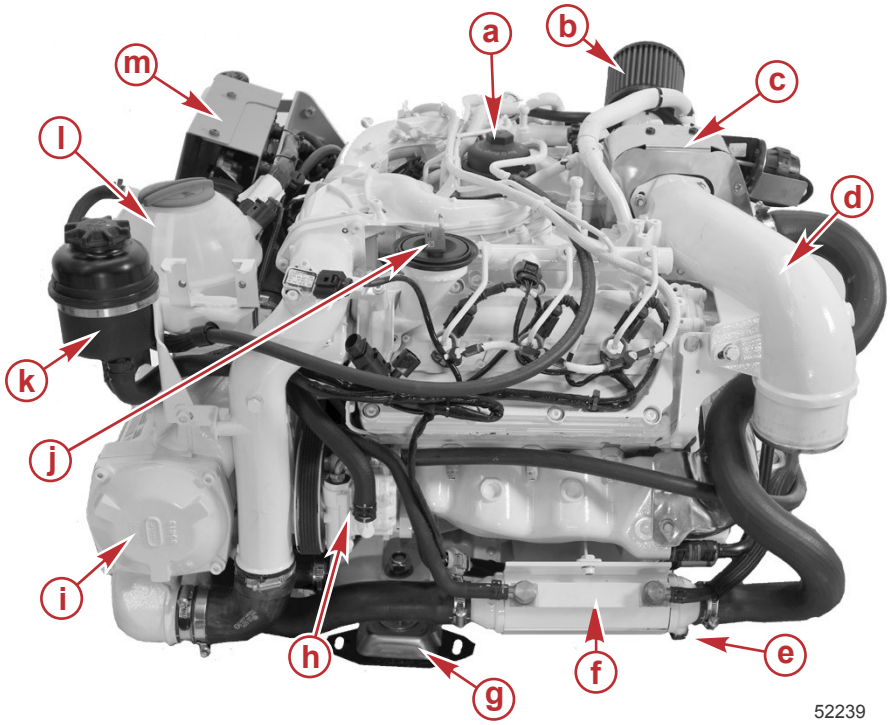
- **a -** Gear lubrication monitor
- **b -** Engine control module cover
- **c -** Engine oil dipstick
- **d -** Engine coolant expansion tank
- **e -** Power steering oil reservoir
- **f -** Charge air cooler (intercooler)
- **g -** Sacrificial anode
- **h -** Seawater inlet connection
- **i -** Seawater pump
- **j -** Seawater-cooling system drain screw
- **k -** Closed-cooling system drain screw
- **l -** Heat exchanger
- **m -** Alternator
- **n -** Water-in-fuel sensor
- **o -** Fuel filter with water sensor
- **p -** Manual fuel primer

3.0 Liter TDI Starboard View Components



- **a -** Engine control module cover
- **b -** Gear lubrication monitor
- **c -** Manual fuel primer
- **d -** Fuel filter with water sensor
- **e -** Water-in-fuel sensor
- **f -** Motor mount
- **g -** Starter
- **h -** Air filter
- **i -** Turbocharger
- **j -** Oil filter
- **k -** Oil fill cap

3.0 Liter TDI Port View Components



- **a -** Oil filter
- **b -** Air filter
- **c -** Turbocharger
- **d -** Exhaust pipe
- **e -** Seawater-cooling drain screw
- **f -** Power steering/gearbox oil cooler
- **g -** Motor mount
- **h -** Power steering pump
- **i -** Charge air cooler (intercooler)
- **j -** Oil fill cap
- **k -** Power steering oil reservoir
- **l -** Engine coolant expansion tank
- **m -** Engine control module cover

Features and Controls

TDI 3.0 Liter Engine Features

The Mercury Diesel 3.0 Liter 6-cylinder engine has the following features:

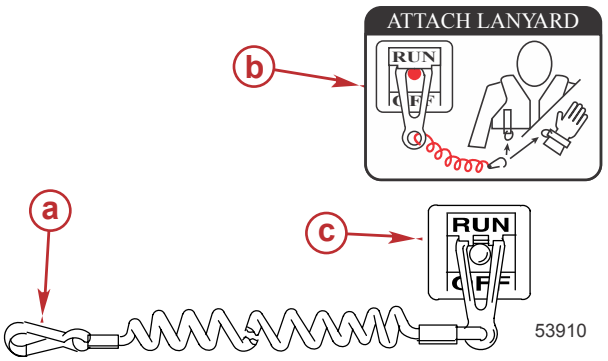
- Four-stroke diesel engine
- Common-rail direct injection
- 6 cylinders (90° V angle)
- 3.0 liter displacement (183.1 cid)
- Crankshaft mounted on four bearings
- 4 valves per cylinder
- Hydraulically adjusted bucket tappets
- Forced-feed circulatory engine lubrication with geared oil pump and replaceable oil filter in main flow
- Dry air filter
- Turbocharged with variable turbine geometry
- Two separate cooling circuits
  - Seawater-cooled circuit runs through the oil cooler, the main heat exchanger, and the exhaust manifold.
  - Closed-cooling circuit runs coolant as a closed pressurized system through the engine block, oil cooler, exhaust collector, and after reaching the operating temperature, through the main heat exchanger.

Refer to **Specifications** for additional details.

Lanyard Stop Switch

A lanyard switch is designed to shut down the engine in the event the operator unexpectedly moves away from the helm, as may happen in an accidental ejection. The lanyard is connected to the operator's personal flotation device or wrist.

A decal near the lanyard stop switch reminds the operator to attach the lanyard to his or her personal flotation device or wrist.



a - Lanyard cord clip
b - Lanyard decal
c - Lanyard stop switch

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
- Carelessness caused by consuming alcohol or drugs
- High-speed boating maneuvers

The lanyard is a cord usually between 122 and 152 cm (4 and 5 ft) long 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 operator's normal position. The operator can shorten the lanyard by wrapping the lanyard around his wrist, or by tying 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 its velocity. While the boat is coasting, it can cause injury to anyone in the boat's path as it would under power.

Instruct all passengers on the proper starting and operating procedures should they be required to operate the boat in an emergency.

⚠ 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.

Keep the Lanyard Stop Switch and Lanyard Cord in Good Operating Condition

Before each use, ensure that the lanyard stop switch works properly. Start the engine, and then stop it by pulling the lanyard cord. If the engine does not stop, have the switch repaired before operating the boat.

Before each use, inspect the lanyard cord to ensure that it is in good working condition and that there are no breaks, cuts, or wear to the cord. Check that the clips on the ends of the cord are in good condition. Replace any damaged or worn lanyard cords.

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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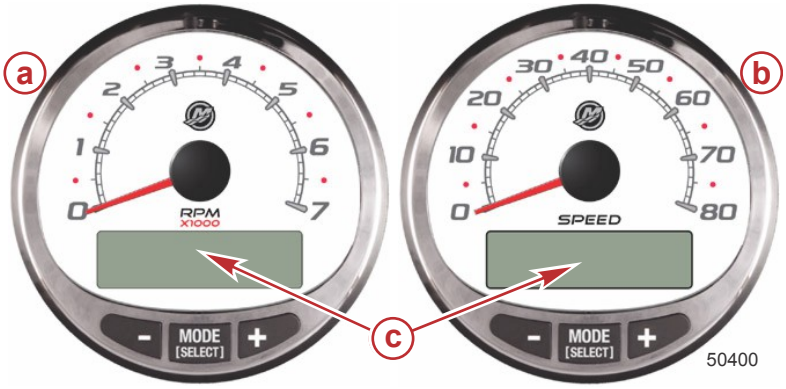
VesselView

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

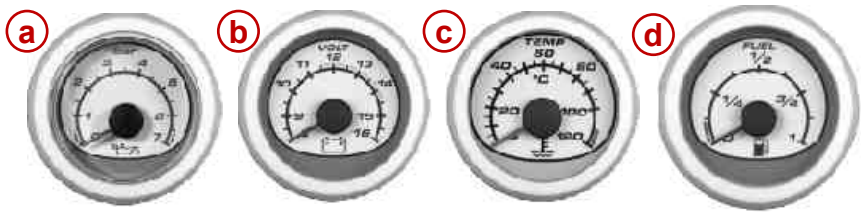
The SmartCraft instrument package also aids in identifying the fault codes associated with the engine audio warning system. The SmartCraft instrument package displays critical engine alarm data and other potential problems on its LCD display.

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.



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

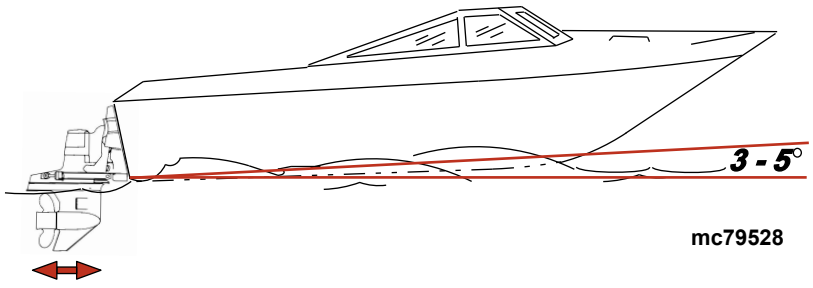
Power Trim

Power trim allows the operator to adjust the sterndrive angle while underway to provide the ideal boat angle for varying load and water conditions. Also, the trailering feature allows the operator to raise and lower the sterndrive for trailering, beaching, launching, low-speed (below 1200 RPM engine speed), and shallow water operation.

⚠ WARNING

Excessive trim can cause serious injury or death at high speeds, and single-ram trim systems do not provide a trim-out limiting device or trim indicator. Use caution when trimming with a single-ram trim system and never trim out beyond the unit's side support flanges while the boat is underway or at engine speeds above 1200 RPM.

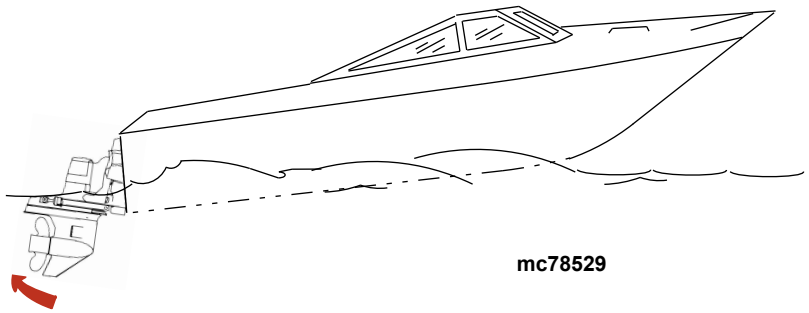
For best performance trim the sterndrive so that the boat bottom is at a 3–5° angle to the water.



Trimming the sterndrive up (out) can:

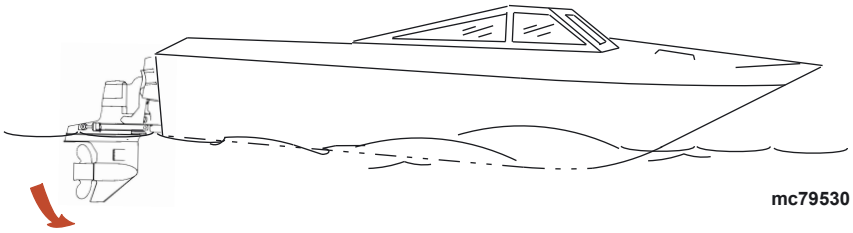
- Generally increase top speed
- Increase clearance over submerged objects or a shallow bottom
- Cause the boat to accelerate and plane off slower
- In excess, cause boat porpoising (bouncing) or propeller ventilation

- Cause engine overheating if trimmed up (out) to a point where any cooling water intake holes are above the water line



Trimming the sterndrive down (in) can:

- Help the boat accelerate and plane off quicker
- Generally improve the ride in choppy water
- In most cases, reduce boat speed
- If in excess, lower the bow of some boats to a point at which they begin to plow with their bow in the water while on plane. This can result in an unexpected turn in either direction called bow steering or over steering if any turn is attempted or if a significant wave is encountered.



Single Engine Trim and Trailer

Single engine applications have a button that can be pressed to trim the sterndrive unit up (out) or down (in).

To raise the sterndrive for trailering, beaching, launching, low-speed (below 1200 RPM), and shallow water operation push the trim button to raise the sterndrive to the full up (out) position.

Some controls also have a trailer button that trims the sterndrive to a position suitable for trailer purposes only.

Dual Engine Trim and Trailer

NOTICE
If using external tie bars, raising or lowering the drives independently of each other can damage the drive and steering systems. If using an external tie bar, raise and lower all drives together as a unit.

Dual engine applications may have a single integral button to operate both sterndrives simultaneously or may have separate buttons for each sterndrive.

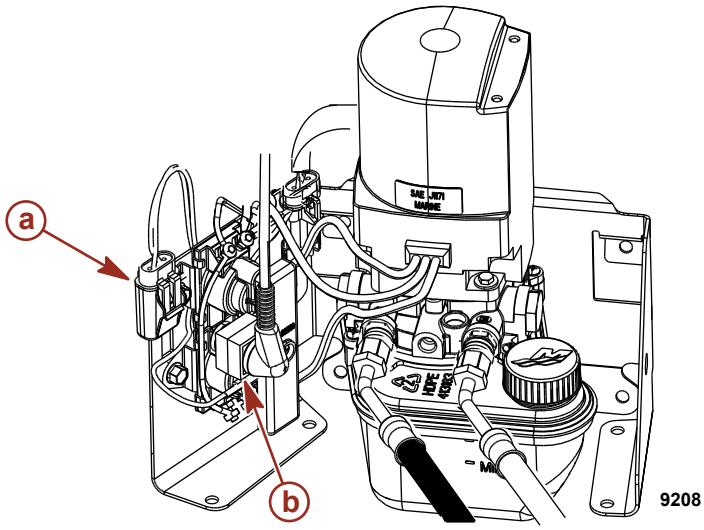
Some controls also have a trailer button that trims the sterndrives to a position suitable for trailer purposes only.

Power Trim and MerCathode Overload Protection

If an electrical overload on the electrical system occurs, a fuse will open (blow). Find and correct the cause before replacing the fuse.

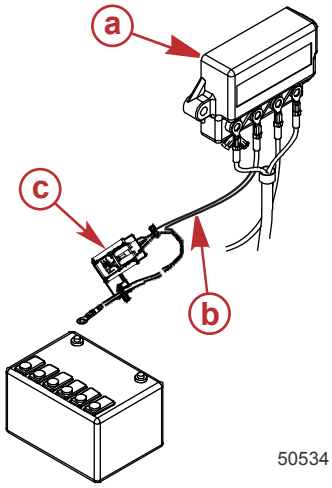
NOTE: *If you must operate the engine in an emergency, turn off and disconnect all accessories from the engine and instrumentation wiring if you cannot find and correct the cause for the electrical overload or excessive current draw. Replace the fuse. If the fuse burns out, the electrical overload has not been eliminated. Further checks must be made on the electrical system. Contact your Mercury Diesel authorized repair facility.*

1. The power trim system is protected from overload by a 110-amp fuse and a 20-amp in-line fuse on the power trim pump.



a - 20-amp in-line fuse holder
b - 110-amp fuse

2. There are several different Quicksilver MerCathode systems available. Each has a fuse connected to the positive (+) terminal on the controller. If the fuse is open (blown), the system will not operate, resulting in a loss of corrosion protection. Replace the fuse with one of the same amp rating.



a - MerCathode
b - Red/purple wire
c - Fuse

Warning Horn Signals

When the key switch is turned to the on position, the horn will turn on for a moment as a test to indicate the horn is working.

There are two types of warning horns to alert the operator of an active problem within the engine's operating system.

1. **Continuous six second beep:** Indicates a critical engine condition. Depending on the condition, the Engine Guardian system may engage and protect the engine by limiting power. You should return to port immediately and contact your servicing dealer.
2. **Intermittent short beeps for six seconds:** Indicates a noncritical engine condition. This condition does not require immediate attention. You may continue using your boat, however, depending on the nature of the problem, the engine's power may be limited by the Engine Guardian system to protect the engine. You should contact your servicing dealer at your earliest convenience.

It is important to note that in either of the above scenarios, the horn will only sound one time. If you key the engine off and restart it, the horn will sound again, one time, if the fault is still present.

A few of the noncritical conditions indicated by the intermittent short beeps for six seconds can be corrected by the operator. These operator correctable conditions are as follows:

- Water in the fuel filter. Refer to **Maintenance – Water Separating Fuel Filter**.
- Cooling system (water pressure or engine temperature) problem. Stop the engine and check the water intake holes in the lower unit for obstruction.
- Low engine oil level. Refer to **Fuel and Oil – Checking and Adding Engine Oil**.

Engine Guardian System

The Engine Guardian system monitors the critical sensors on the engine for any early indications of problems. Engine Guardian is functional whenever your engine is operating, so you never have to be concerned about whether or not you are protected. The system will respond to a problem by sounding the warning horn for six seconds and/or reducing engine power in order to provide engine protection.

If Engine Guardian has been activated, reduce the engine speed. The problem will need to be identified and corrected. The system must be reset before the engine will operate at higher speeds. Moving the throttle lever back to the idle position will reset the Engine Guardian system. If the Engine Guardian system has determined the reset has not corrected the problem, Engine Guardian will remain activated, limiting the throttle. The problem must be identified and corrected before Engine Guardian will allow the engine to reach a normal operating RPM.

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.

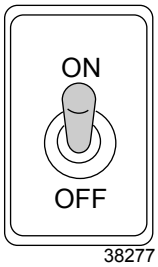
NOTE: *The key can only be removed with the key switch in the "OFF" position.*

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 run 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.

35308

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.

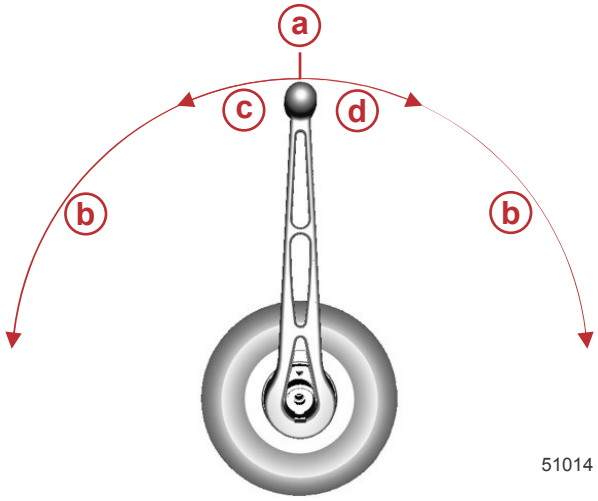
Restarting an engine using the key switch or start button after an E-stop shutdown without first turning the key switch to the off position for at least 30 seconds will restart the engine but cause fault codes to be set. Unless you are in a potentially hazardous situation, turn the key switch off and 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.

Remote Control

Remote Control Function

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

The remote control handle must be in the neutral position to start the engine.



51014

a - Neutral
b - Increase engine RPM
c - Forward gear
d - Reverse gear

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**.

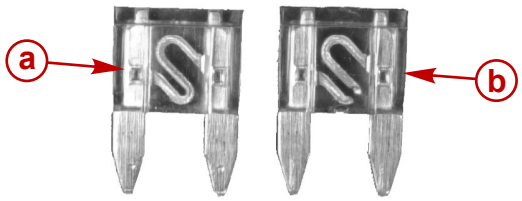
Electrical System Overload Protection

⚠ 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.

Fuses

Fuses protect individual circuits from an overload. If an electrical overload occurs, a fuse will burn out. Find and correct the cause for the electrical overload before replacing the fuse. Always replace a burned out fuse with a fuse that is the same current rating. Never install a higher current rated fuse.

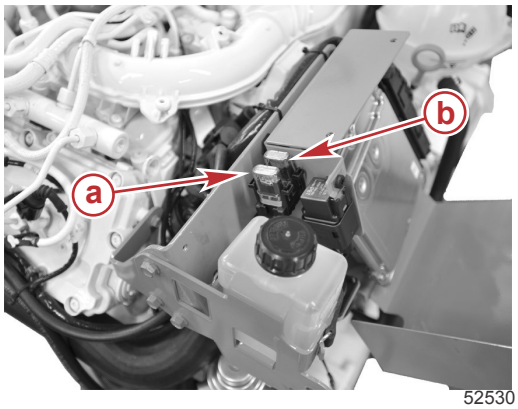


28619

Identifying a burned out fuse
a - Good fuse
b - Burned out fuse

Two fuses are located on the engine. To access these fuses, remove the two screws securing the engine control module cover. Be certain to replace an open fuse only with one of the same current rating.

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.



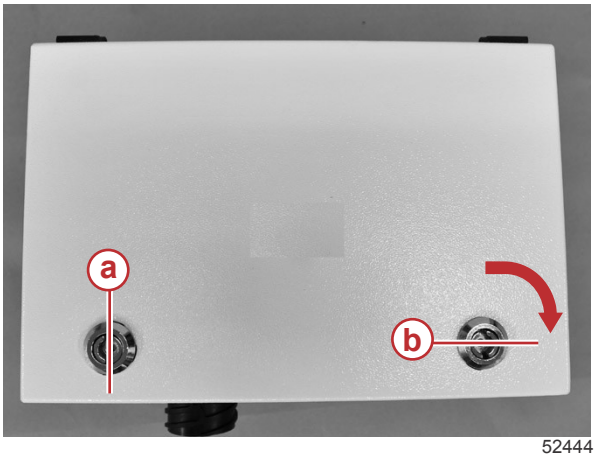
52530

Engine Control Module
a - 25-amp fuse
b - 15-amp fuse

Vessel Adapter Assembly (VAA) 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. Verify the ignition key is off and the lanyard switch is off.
2. Insert the key into the lock and turn it 1/4 turn to the right to unlock it.

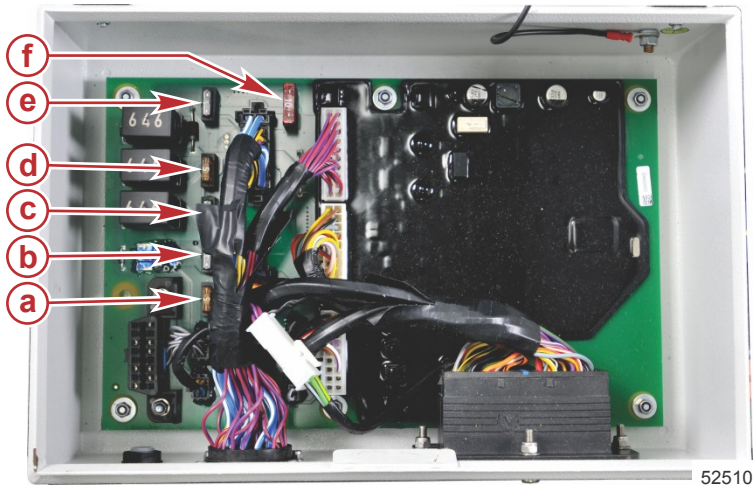


52444

Vessel adapter assembly

a - Locked
b - Unlocked

3. Lift the cover. A decal on the cover identifies components and fuses inside the VAA.



52510

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 open fuse with a new fuse of the same current rating.
5. Close and lock the cover to prevent water intrusion and an accidental short circuit.

Identification

Serial Number Decal Placement

Three sets of engine, transom assembly, and sterndrive serial number decal strips are provided with each power package. One set should be used for each of the following:

- Engine specification decal
- Warranty registration card

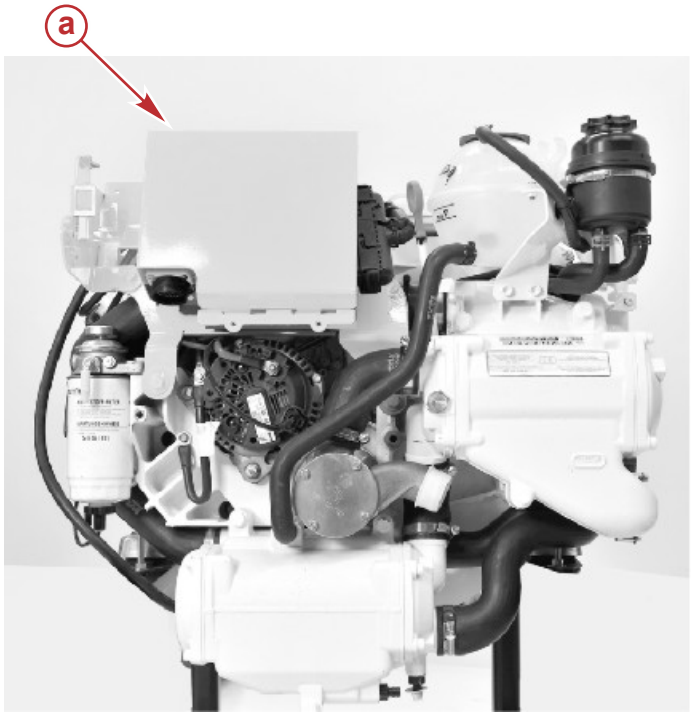
- Operation, Maintenance, and Warranty Manual identification page.

25986

Engine specification and serial number decal

Engine Data Label Location

The engine data label is located on top of the electrical box.

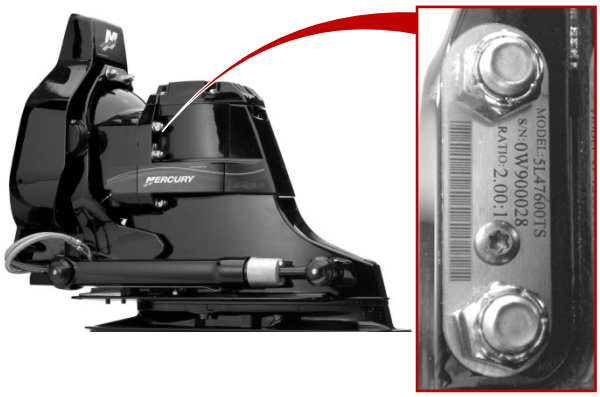


52079

a - Engine data label (not seen—on top of the electrical box)

Bravo Sterndrive Serial Number and Identification

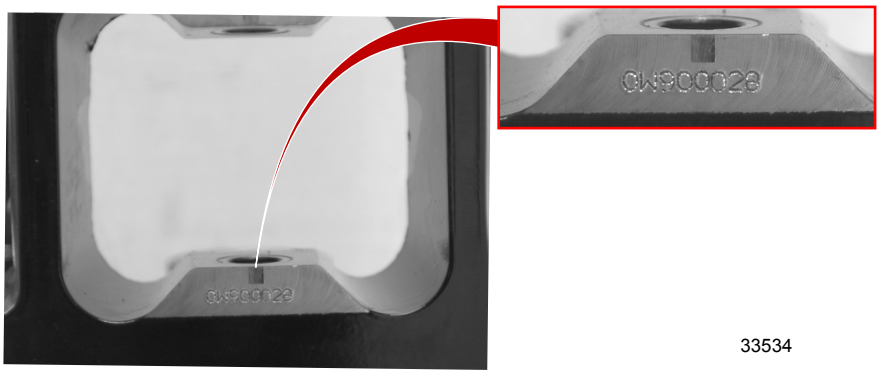
The Bravo sterndrive serial number, gear ratio, model number, and bar code are embedded in the ground plate on the port side of the sterndrive.



33533

Bravo sterndrive information on ground plate

The serial number is also stamped as a permanent reference on the sterndrive casting inside the back cover.



33534

Bravo sterndrive serial number stamping

Bravo Transom Serial Number

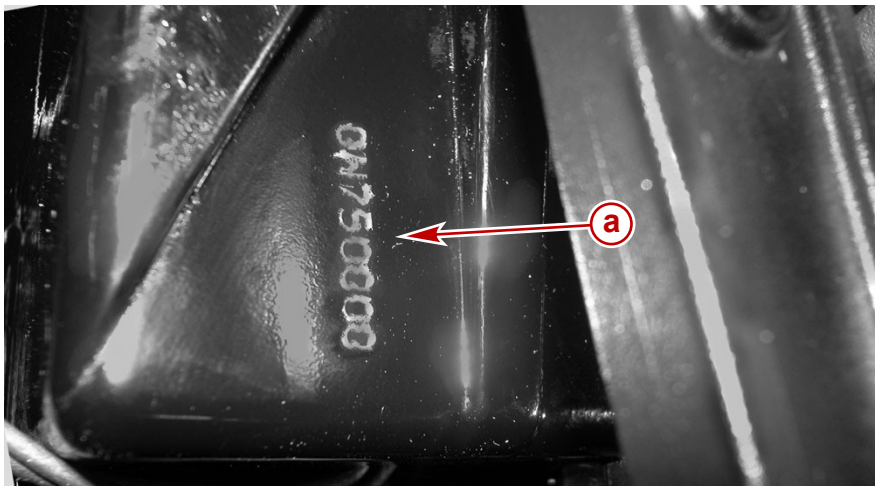
The Bravo transom serial number is stamped in the U-bolt plate of the Bravo transom assembly.

51170

Bravo transom assembly U-bolt plate

a - Transom assembly serial number

The serial number is also stamped on the gimbal housing. This is used as a permanent reference for Mercury Diesel authorized repair facilities.



25905

Gimbal housing with serial number stamping

a - Transom assembly serial number

SeaCore Equipped Drives

SeaCore Components and Castings

Mercury MerCruiser SeaCore power packages are equipped with additional stainless steel components and particular aluminum castings with special coatings. Do not replace SeaCore components with non-SeaCore. Use only the specified Mercury MerCruiser SeaCore components and castings on these power packages.

Stainless Steel Fasteners

SeaCore models are equipped with additional stainless steel fasteners to maximize corrosion resistance in saltwater environments.

Stainless steel fasteners are subject to galling when installed without lubrication. Galling can result in fastener destruction, improper clamp loads, or both. Galled fasteners may appear to torque properly, but still have incorrect clamp loads.

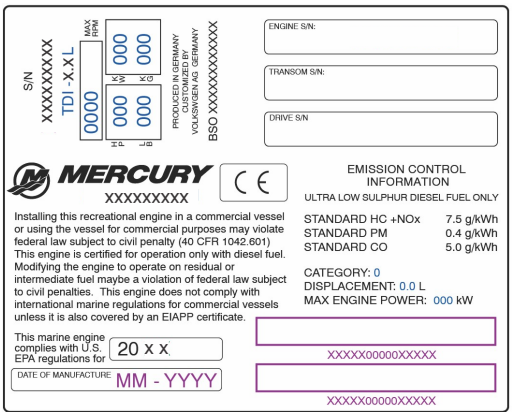
Apply lubricant 2-4-C with PTFE or an equivalent, on the threads of stainless steel fasteners during installation to avoid galling. Lubricate at least the first 8 mm (1/4 in.) of the threads before installation.

Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with PTFE	Threads of stainless steel fasteners	92-802859A 1

Emissions Information

Exhaust Gas Emissions Certificate (Europe Only)

A tamper-resistant label is affixed to the engine at time of manufacture. In addition to the required exhaust gas emissions certificate number, the label lists the engine serial number, engine family, maximum RPM, engine power, and weight. Note that the exhaust gas emissions certification will not affect the fit, function, or performance of the engines. Boatbuilders and dealers may not remove the label or the part it is affixed to before sale. If modifications are necessary, contact Mercury Diesel about the availability of replacement decals before proceeding.



52250

Owner Responsibility

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

Section 3 - On The Water

Table of Contents

Safe Boating Recommendations

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

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

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

Perform safety checks and required maintenance.

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

Check safety equipment onboard.

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

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

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

Passenger boarding.

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

Use personal flotation devices.

- Federal law requires that there be a U.S. Coast Guard-approved life jacket (personal flotation device), correctly sized and readily accessible for every person onboard, 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 onboard in the basics of starting and operating the engine and boat handling in case the driver becomes disabled or falls overboard.

Do not overload your boat.

- Most boats are rated and certified for maximum load (weight) capacities (refer to your boat's 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 or the boat manufacturer.

Ensure that everyone in the boat is properly seated.

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

Never operate a boat while under the influence of alcohol or drugs. It is the law.

- Alcohol or drugs can impair your judgment and greatly reduce your ability to react quickly.

Know your boating area and avoid hazardous locations.

Be alert.

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

Never drive your boat directly behind a water skier.

- Your boat traveling at 40 km/h (25 mph) will overtake a fallen skier who is 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 $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.

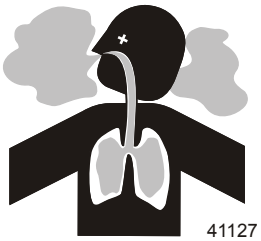
Early symptoms of carbon monoxide poisoning, which are similar to the symptoms of seasickness and intoxication, include headache, dizziness, drowsiness, and nausea.

⚠ 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

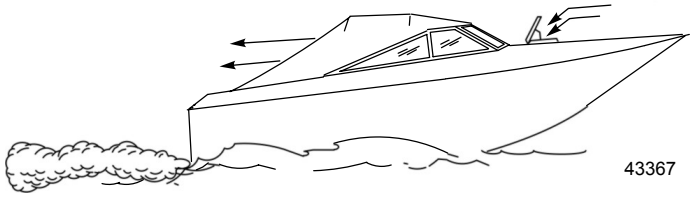


Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately 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:

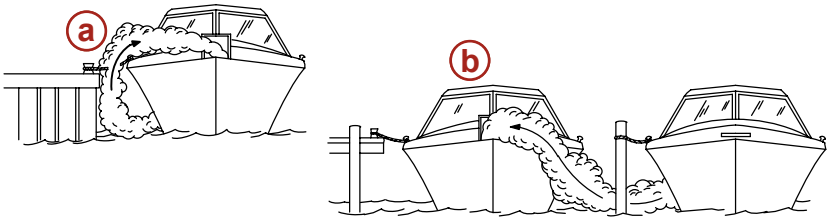


Poor Ventilation

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.

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

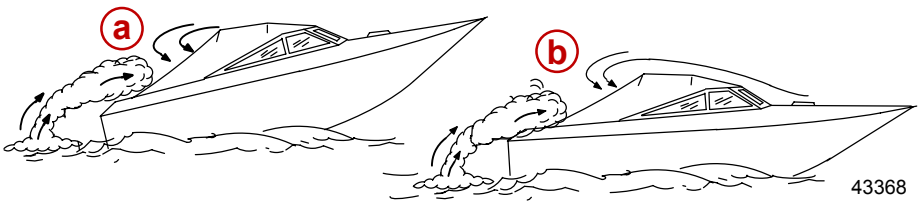


21626

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:



43368

a - Operating the boat with the trim angle of the bow too high

b - Operating the boat with no forward hatches open (station wagon effect)

Basic Boat Operation

IMPORTANT: Always check to ensure the bilge drain plug is installed before launching the boat.

Duty Cycle Rating

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.

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 applications include pleasure craft such as sailboats, ski boats, runabouts, speedboats, and other planing hulls. Application must conform to the Pleasure Craft/Recreational duty cycle shown (EPA Mode Number Cycle 5 Duty Cycle).

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

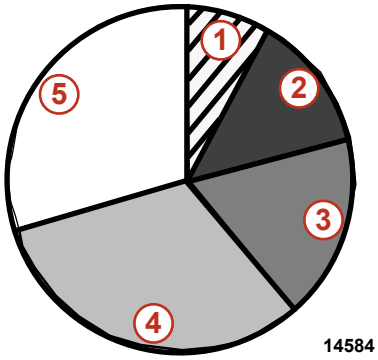


Chart showing full power operation is limited to a maximum of 1 of 12 hours

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%)

TDI Operation Chart

Starting Procedure	After Starting	While Underway	Stopping and Shutdown
Open the engine hatch. Air out the bilge completely.	Observe all gauges and indicator lamps to check the condition of the engine. If not normal, stop the engine.	Frequently observe all gauges and indicator lamps 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 the shift and throttle control operation.		Turn the key switch to the off position.
Check for leaks: fuel, oil, water, fluid, etc.	Check the 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 the run position and check that the lights and indicator lamps come on.			
Turn the key switch to the start position. Release the key when the engine starts.			
Check that the charge indicator and oil pressure indicator lamps are off after engine starts.	Verify there are no faults.		
Warm-up the engine at a fast idle-RPM for several minutes.			

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:

- **Provide water to the seawater pickup pump.**
- **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 Schedule 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

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

1. Turn on and run the engine compartment bilge blower (if equipped) for five minutes. Or, open the engine hatch to air out the bilge before attempting to start the engine.
2. Place the sterndrive in the full down (in) position.
3. Place the control handle in neutral.

   NOTE: *The fuel delivery pump is equipped with a priming lever to assist in filling the fuel filter or fuel system. The fuel delivery pump priming lever can be moved up and down repeatedly in the event that the hand pump and primer plunger on the fuel filter header is not used to fill the system.*
4. If the engine has not been run for a period of time and will not readily start with the standard starting procedure, use the hand pump and primer plunger located on the fuel filter header. Move the primer plunger (or the priming lever on the fuel delivery pump) up and down four or five strokes. Attempt to start the engine following the normal procedure.
5. Turn the key switch to the "RUN" position. Observe the indicator lamp for the glow plugs, if equipped. When the cylinder temperature is great enough to sustain combustion, the indicator lamp will go off and the engine can be started.

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. Turn the key switch to the "START" position. Release the key and allow the switch to return to the "RUN" position when the engine starts.
   IMPORTANT: Within seconds after starting the engine, the oil pressure should exceed 10 psi (69 kPa) minimum. If the oil pressure does not meet these minimum limits, stop the engine then locate and correct the problem. If you are unable to determine the problem, see your Mercury Diesel authorized repair facility.
7. Ensure that the charge indicator and oil pressure warning lamps are off.
8. Ensure that all instrumentation is functioning properly and indicating normal readings.

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. Otherwise, open the engine hatch to air out the bilge before attempting to start the engine.
2. Place the remote control handle in neutral.
3. Turn the key switch to the "RUN" position.
4. Turn the key switch to the "START" position and release the key when the engine starts. Ensure that the charge indicator and oil pressure warning lamps turn off.
5. Ensure that all the instrumentation functions properly and indicates normal readings.

Shifting

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

1. Ensure that the remote control shift lever is in Neutral.
2. To shift the sterndrive, move the remote control shift lever with a firm, quick motion forward to shift to forward gear, or backward to shift to reverse.
3. After shifting the sterndrive, advance the throttle to the desired setting.
   IMPORTANT: Avoid stopping the engine if the sterndrive is in gear. If the engine does stop with the sterndrive in gear, see the following procedure:
4. Push and pull repeatedly on the remote control handle until the handle returns to the neutral detent position. This may take several tries if the power package was operating above idle RPM when the engine stopped.
5. After the handle returns to the neutral detent position, resume normal starting procedures.

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" position.

Starting the Engine After Stopped While in Gear

IMPORTANT: Avoid stopping the engine if the sterndrive is in gear. If the engine does stop with the sterndrive in gear, see the following procedure:

1. Push and pull repeatedly on the remote control handle until the handle returns to the neutral detent position. This may take several tries if the power package was operating above idle RPM when the engine stopped.
2. After the handle returns to the neutral detent position, resume normal starting procedures.

Trailering the Boat

Your boat can be trailered with the sterndrive in the up (out) or down (in) position. Adequate clearance is required between the road and sterndrive when transporting.

If adequate road clearance is a problem, place the sterndrive in full trailer position and support it with an optional trailer kit, which is available from your Mercury Marine authorized repair facility.

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 the Mercury Marine 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 connect 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.
- Use proper cold weather lubrication oil; ensure that the crankcase contains a sufficient amount.
- 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 and a marine application bilge air heater to improve cold starting.
- 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.

Protecting People In The Water

While You Are Cruising

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

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

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

While Boat Is Stationary

⚠ WARNING

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

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

High Speed and High Performance

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.

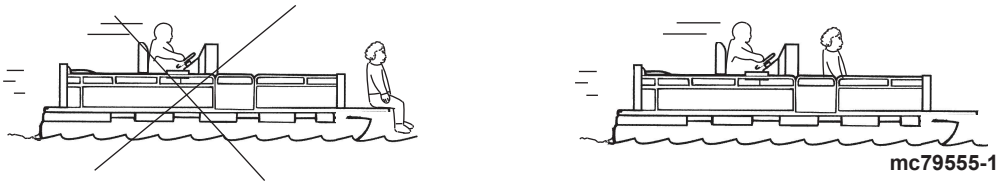
Passenger Safety in Pontoon Boats and Deck Boats

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

Boats Having an Open Front Deck

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

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



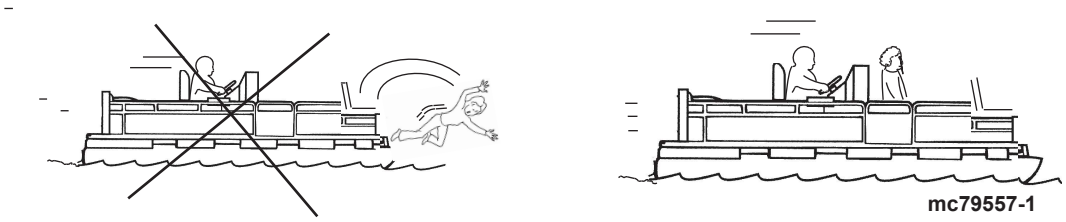
⚠ WARNING

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

Boats with Front-Mounted, Raised-Pedestal Fishing Seats

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

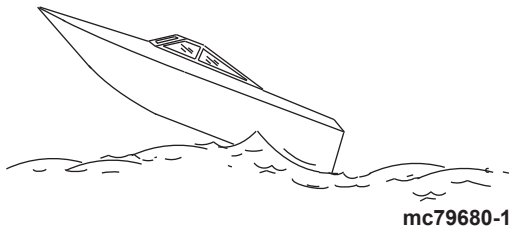
Any unexpected, sudden reduction in boat speed could result in the elevated passenger falling over the front of the boat.



Wave and Wake Jumping

⚠ WARNING

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



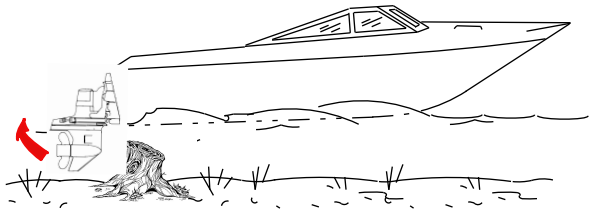
Operating recreational boats over waves and wakes is a natural part of boating. However, when this activity is done with enough speed to force the boat hull partially or completely out of the water, certain hazards arise, particularly when the boat reenters the water.

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

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



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IMPORTANT: To help reduce injury or impact damage from striking a floating or underwater object, control the boat speed. Under these conditions, boat speed should be kept to a maximum of 24 to 40 km/h (15 to 25 mph).

The following demonstrate some, but not all, examples of what can happen if the boat strikes an object:

- The boat could move suddenly in a new direction. 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 cause occupants to be thrown forward, even out of the boat.
- Impact damage to the underwater drive components, rudder, or boat.

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

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

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

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

⚠ WARNING

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

Conditions Affecting Operation

Weight Distribution (Passengers and Gear) Inside the Boat

Shifting weight to the 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 the 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

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.

Cavitation

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

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

Ventilation

Ventilation is caused by surface air or exhaust gases that are introduced around the propeller resulting in propeller speed-up and a reduction in boat speed. Air bubbles strike the propeller blade and cause erosion of the blade surface. If allowed to continue, eventual blade failure (breakage) will occur. Excessive ventilation is usually caused by:

- The drive unit being trimmed out too far
- A missing propeller diffuser ring
- A damaged propeller or gear housing, that allows exhaust gases to escape between the propeller and gear housing
- The drive unit installed too high on transom

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 rated engine 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 especially important that the following procedure be used on new diesel engines. This break-in procedure allows the proper seating of the pistons and rings, which greatly reduces the likelihood of problems.

IMPORTANT: It is recommended 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 approximately 60-seconds to allow the starter motor to cool; then, repeat the starting procedure.

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

Sterndrive 10-Hour Break-In Period (New or With Replacement Gears)

It is important that the following procedure be used on new sterndrives and rebuilt sterndrives with new replacement gears. This break-in procedure allows the proper seating of the sterndrive gears and related components, which greatly reduces the likelihood of problems.

- Avoid full-throttle starts.
- Do not operate at any constant speed for an extended period of time.
- Do not exceed 75% throttle during the first five-hours. During the next five-hours, operate at intermittent full throttle.
- The sterndrive should be shifted into forward gear a minimum of 10 times during break-in, with run-in time at moderate RPM after each shift.

Engine Break-In

20-Hour Break-In Period

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

- Do not operate below 1500 RPM for extended periods of time for the first 10 hours. Shift into gear as soon as possible after starting, and advance the throttle above 1500 RPM if conditions permit safe operation.
- Do not operate at any constant speed for an extended period of time.
- Do not exceed 3/4 throttle during the first 10 hours. During the next 10 hours, occasional operation at full throttle is permissible (in five-minute intervals).
- Avoid full-throttle acceleration from an idle.
- Do not operate at full-throttle until the engine reaches normal operating temperature.
- Check engine oil level frequently. Add oil as needed. High oil consumption is normal during the break-in period.
- At the end of the 20-hour break-in period, change the engine oil and filter as specified. Refer to **Specifications** and **Maintenance**.

After the 20-Hour Break-In Period

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

- Select a propeller that functions efficiently throughout the recommended engine powerband for a fully-loaded boat. Refer to **Specifications** and **Maintenance**.
- Never operate at wide-open throttle for prolonged periods. Operation at 3/4 throttle and below is recommeneded.

End of First Season Checkup

At the end of the first season of operation, contact an authorized Mercury Diesel repair facility regarding scheduled maintenance items. If the product is operated on a continuous, or year-round basis, contact the 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.

Mercury diesels are required to use Grade No. 2-D ULSD (ultra-low sulphur diesel) fuel meeting ASTM Standards D975 (or fuel rated Diesel DIN EN 590), and having a minimum cetane rating of 40.

BIODIESEL: The blend of diesel fuel used may not contain more than 7% biodiesel fuel. Use of LSD or blends of ULSD fuel containing more than 7% biodiesel fuel may result in fuel system degradation, injection nozzle clogging, hard starting, increased oil change intervals, or excessive exhaust smoke.

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.

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 insternal 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		Specifications
Engine type		90° V6 cylinder diesel
Displacement		3.0 L (183.1 cid)
Engine weight		330 kg (727.5 lb)
Firing order		1-4-2-5-3-6
Bore		83 mm (3.267 in.)
Stroke		91.4 mm (3.598 in.)
Rated engine RPM		4000
Idle RPM in neutral (engine at normal operating temperature)		640 ± 25
Rated engine horsepower	230	171.5 kw (230.0 hp)
	260	193.8 kw (260.0 hp)
Charge air pressure at 4000 RPM	230	1 bar (14.5 psi)
	260	1.5 bar (21.7 psi)
Oil pressure (minimum)	640 RPM (idle)	1.8 bar (26.0 psi)
	2000 RPM	4.0 bar (58.0 psi)
Thermostat temperature	Water	70 °C (158 °F)

Description	Specifications
Cooling system type	Twin circuit cooling system: Closed-cooling system with separate expansion tank, thermostat controlled Heat exchange system cooled with a seawater/freshwater impeller pump
Overpressure valve opening	1.4–1.6 bar (20.3–23.2 psi)
Coolant temperature (maximum)	105 °C (221 °F)
Coolant specification	50% water and 50% antifreeze (lilac colored)
Oil temperature (maximum)	135 °C (275 °F)
Oil volume difference between minimum and maximum markings on the dipstick	1.3 L (1.4 US qt)
Electrical system	12-volt negative (–) ground
Alternator rating	2160 W, 12 V
Recommended battery rating*	750 CCA, 950 MCA, or 180 mAh

*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

Engine Fluid Capacity

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

All models	Capacity	Fluid type	Part Number
Engine oil with filter	8.0 L (8.45 US qt)	5W-30	8M0069602
Closed cooling system	9.0 L (9.5 US qt)	Marine Engine Coolant (lilac colored)	8M0070979

Bravo Sterndrive Fluid Specifications—Diesel

Sterndrive Model	Fluid Capacity includes the Sterndrive and the Gear Lube Monitor	Fluid Type	Fluid Part Number
Bravo One X Diesel	2736 ml (92.5 oz)	High Performance Gear Lubricant	92-858064K01
Bravo Two X Diesel	3209 ml (108.5 oz)		
Bravo Three X Diesel	2972 ml (100.5 oz)		

Power Steering and Power Trim Fluids

Approved Power Steering Fluids

Description	Part Number
Power Trim and Steering Fluid	92-802880A1
Dextron III Automatic Transmission Fluid	Obtain Locally

Approved Power Trim Fluids

Description	Part Number
Power Trim and Steering Fluid	92-802880A1
SAE Engine Oil 30W	Obtain locally
SAE Engine Oil 40W	Obtain locally

Approved Paints

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

Notes:

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 are not covered by 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

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

- Before delivery, making certain that the Mercury Diesel power package is in proper operating condition.
- Making all necessary adjustments for maximum efficiency.
- Explaining and demonstrating the operation of the power package and the boat.
- Providing a copy of the Predelivery Inspection Checklist.
- Filling out the Warranty Registration Card completely and mailing 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.

Do-It-Yourself Maintenance Suggestions

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

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

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

Your local Mercury Diesel authorized repair facility is there to service your power package. They have qualified factory-trained mechanics.

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

Inspection

Inspect your power package often and at regular intervals to help maintain 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 it is 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.

Maintenance Schedule (Sterndrive Models)

Routine Maintenance

Each Day Start

- Check the engine oil level.
- Check the engine coolant level.
- Check the power-assisted steering fluid level.
- Check the sterndrive gear lubricant level in the gear lube monitor.

Each Day End

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

Weekly

- Drain any water from the fuel filter.

- Check the trim pump fluid level.
- Check the seawater inlets for debris or marine growth.
- Check and clean the seawater strainer.
- Inspect the anodes and replace if they are 50% eroded.
- Inspect the air filter.

Every Two Months

- Check the battery connections and fluid level.
- Lubricate the propeller shaft and torque the propeller nut (if operating in only freshwater, this maintenance may be extended to every four months).
- Spray the engine surfaces with Corrosion Guard if operating in saltwater, brackish water, or polluted waters.

Tube Ref No.	Description	Where Used	Part No.
	Corrosion Guard	Engine surfaces	92-802878 55

- Inspect the air filter every two months or every 20 hours, whichever occurs first.
- Ensure that the gauges and the wiring connections are secure. Clean the gauges every two months or every 50 hours, whichever occurs first. If operating in saltwater, the interval is reduced to every 25 hours or 30 days whichever occurs first.

Scheduled Maintenance

Annually

Touch up the power package with paint and spray with Corrosion Guard.

Tube Ref No.	Description	Where Used	Part No.
	Corrosion Guard	Engine surfaces	92-802878 55

Every 100 Hours or Annually (Whichever Occurs First)

- Change the sterndrive gear lube.
- Torque the gimbal ring U-bolt locknuts.
- Check the steering system and the remote control for loose, missing, or damaged parts. Lubricate the cables and linkages.
- Inspect the sterndrive U-joints and lubricate the splines. Inspect the bellows, the exhaust tube, and check the clamps for tightness.
- Inspect the gimbal bearing and lubricate the engine coupler every 50 hours if operated at idle for prolonged periods of time.
- Check the continuity circuit for loose or damaged connections. If equipped with MerCathode, test the unit output. See your authorized dealer.
- Check the electrical system for loose, damaged, or corroded fasteners.
- Driveshaft extension models: Inspect the driveshaft U-joints, transom end (tailstock) bearings, and engine end (output) bearings for wear. See your authorized dealer.
- Lubricate the throttle and shift linkage if applicable.

Every 200 Hours or Annually (Whichever Occurs First)

- Visual inspection for leaks.
- Change the engine oil and filter.
- Replace the fuel water separator filter.
- Check the power steering fluid level.
- Check the closed cooling fluid condition and level.
- Inspect the air filter element and clean if necessary.
- Check the condition of the alternator and power steering pump ribbed V-belt.
- Check the condition of the fuel injection pump belt. See your authorized dealer.
- Clean the seawater filter.
- Inspect the seawater pump and replace the impeller if necessary. See your authorized dealer.
- Inspect the sacrificial anode and replace if necessary.

Every 500 Hours or 5 Years (Whichever Occurs First)

- Replace the turbocharger outlet air temperature sensor.
- Inspect and clean the turbocharger intercooler core as required.

Every 1000 Hours or 5 Years (Whichever Occurs First)

- Clean the fuel tank.
- Inspect and clean, as required, the pipe bundles of the heat exchanger.

Every 2000 Hours or 5 Years (Whichever Occurs First)

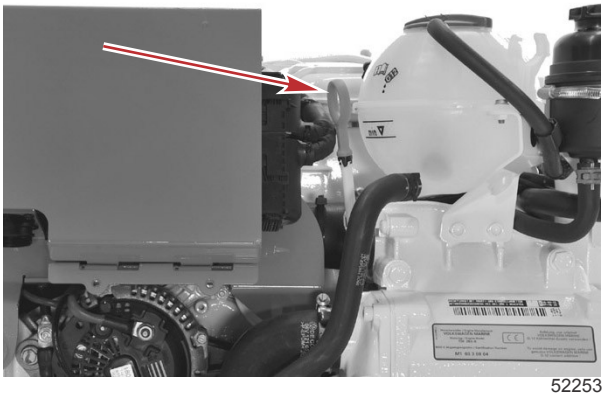
Replace the fuel injection pump belt. See your authorized dealer.

Engine Oil

Checking the Engine Oil Level

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. Stop the engine and allow five minutes for the oil to drain into the pan.
2. Remove the dipstick, wipe it clean, and install it into the dipstick tube. Verify that the dipstick is completely inserted into the tube.



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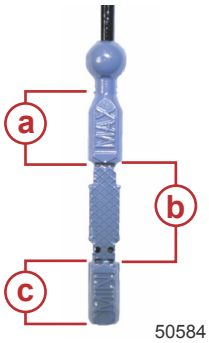
3. Remove the dipstick and observe the oil level. The oil level must be between the marks on the dipstick. If necessary, add oil.



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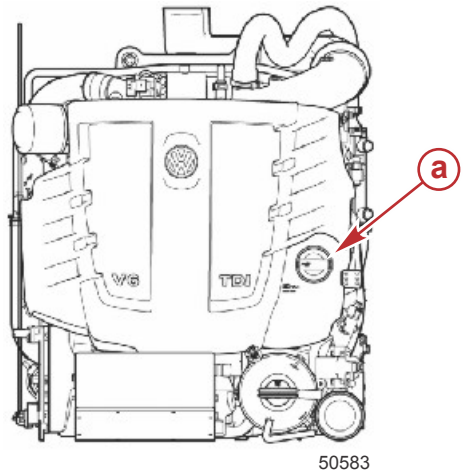
a - No oil required
b - Oil may be added but not to exceed range "a"
c - Oil must be added but not to exceed range "a"

Adding Engine Oil

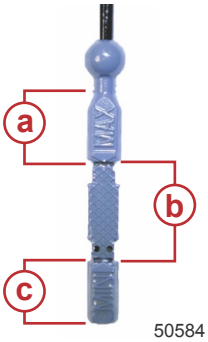
IMPORTANT: When filling or adding oil to the engine, always use the dipstick to determine how much oil is required. Do not overfill the engine with oil.

1. Remove the oil fill cap.



a - Oil fill cap

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



a - No oil required
b - Oil may be added but not to exceed range "a"
c - Oil must be added but not to exceed range "a"

NOTE: *If the engine will be running for an extended period of time (10–12 hours), the oil level must be in the middle of the MIN and MAX markings indicated on the dipstick.*

3.0 L TDI	Fluid Type	Capacity
Engine oil (with filter)	5W-30 that meets VW 504 00/507 00 specifications	8.0 Liter (8.45 US qt)
Volume difference between the minimum and maximum markings on the dipstick		1.3 Liter (1.4 US qt)

3. Install the oil fill cap.

Changing the Oil Filter

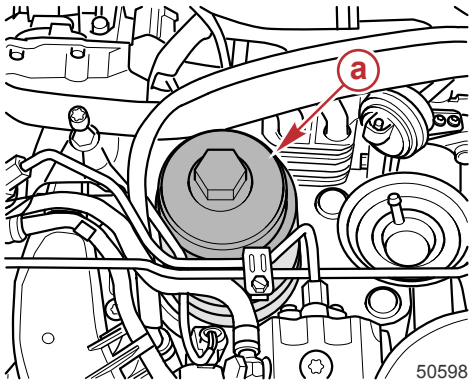
NOTICE
Discharge of oil, coolant, or other engine/drive fluids into the environment is restricted by law. Use caution not to spill oil, coolant, or other fluids into the environment when using or servicing your boat. Be aware of the local restrictions governing the disposal or recycling of waste, and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

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 recommended engine oil. Refer to Specifications.

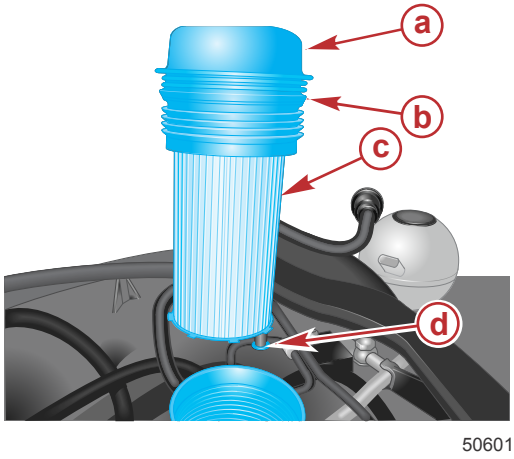
1. Remove the top engine cover.

2. Remove the cover of the oil filter so that the return valve opens, allowing the oil to return to the oil sump.



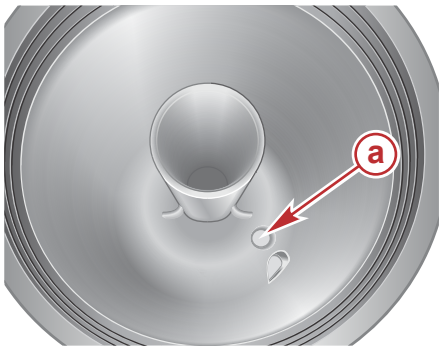
a - Oil filter cover

3. Separate the oil filter element from the oil filter cover.
4. Clean the cover with a clean cloth.
5. Replace the sealing O-rings.
6. Apply clean oil to the new sealing O-rings.



a - Filter cover
b - O-ring
c - Oil filter element
d - Pin with O-ring

7. Install the new oil filter element into the filter housing.
IMPORTANT: When installing the oil filter element, ensure that the pin on the lower end of the filter element is aligned with the hole in the housing.



a - Hole

8. Install the cover onto the filter element. Tighten the cover to the specified torque.

Description	Nm	lb-in.	lb-ft
Oil filter element cover	35	–	25.8

9. Clean up any spilled oil and dispose of as directed by local authorities.
10. Remove the oil fill cap and add the required amount of oil to the engine.
IMPORTANT: When adding oil to the engine, always use the dipstick to determine how much oil is required.

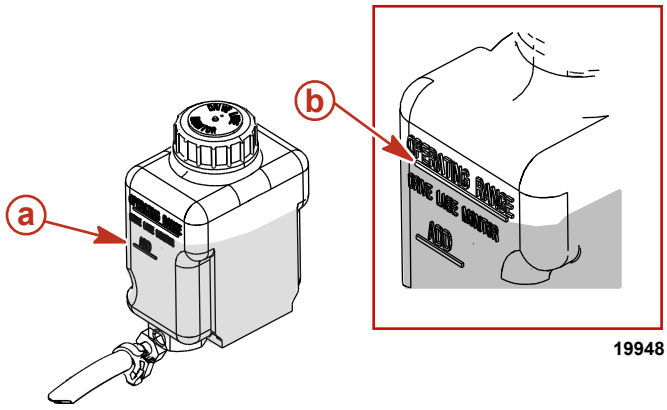
Sterndrive Gear Lube

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

NOTE: *The gear lube level will fluctuate during operation. The gear lube level should be checked with the engine cold, before starting.*

Check the gear lube monitor to determine the gear lube level. Keep the gear lube level within the recommended operating range. Refer to **Filling**.



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Gear lube level shown is at the correct operating range

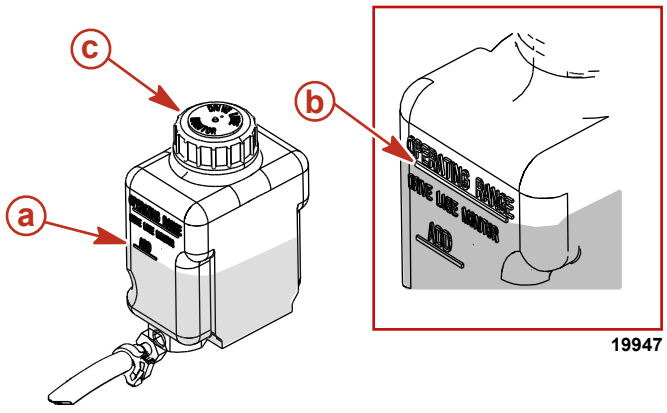
a - "ADD" mark

b - "OPERATING RANGE" mark

Filling

IMPORTANT: If more than 59 ml (2 fl oz) of High Performance Gear Lube is required to fill the gear lube monitor, a seal may be leaking. Damage to the sterndrive may occur due to lack of lubrication. Contact your Mercury Diesel–authorized repair facility.

1. If the gear lube level is below or near the "ADD" mark, the specified gear lube must be added.
2. Remove the gear lube monitor cap.
3. Fill the gear lube monitor with the specified gear lube so that the gear lube level is in the operating range. Do not overfill.



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Gear lube monitor

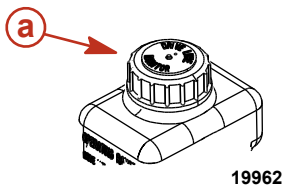
a - Gear lube level at the "ADD" mark

b - Gear lube level at the "OPERATING RANGE" mark

c - Gear lube monitor cap

Tube Ref No.	Description	Where Used	Part No.
87	High Performance Gear Lube	Gear lube monitor	92-858064K01

4. Ensure that the rubber gasket is inside the gear lube monitor cap and install the cap. Do not overtighten.



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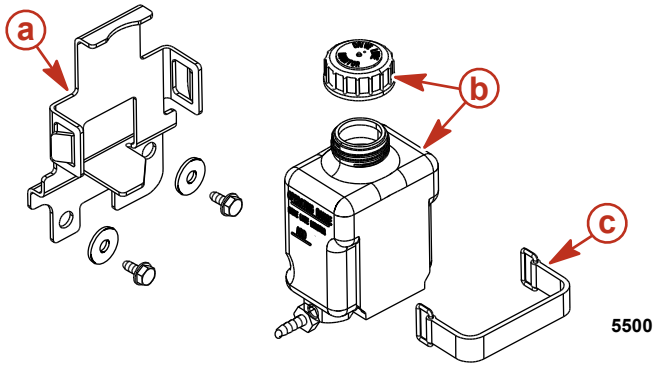
a - Gear lube monitor cap

NOTE: *When filling the entire sterndrive, refer to* ***Changing****.*

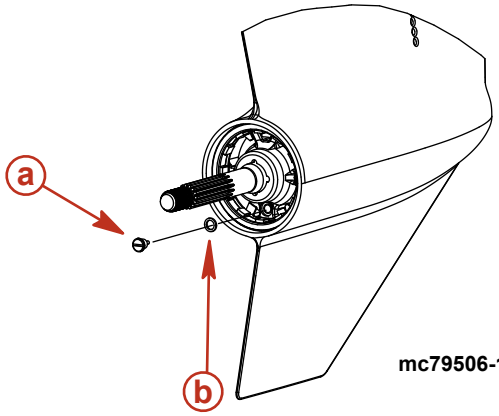
Changing

1. Remove the gear lube monitor from the bracket.



a - Gear lube monitor bracket
b - Gear lube monitor and cap
c - Retaining strap

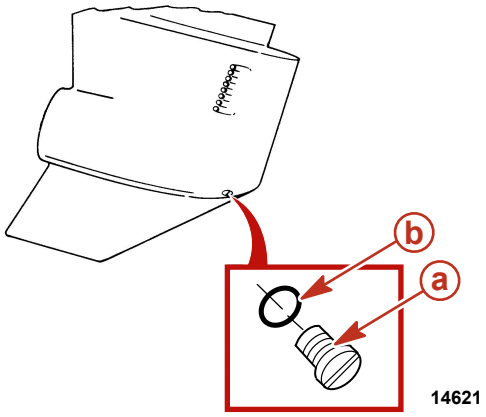
2. Empty the contents of the gear lube monitor into a suitable container.
3. Install the gear lube monitor in the bracket.
4. **Bravo One X Models:**
   a. Remove the propeller.
   b. Lower the sterndrive to the full down (in) position.
   c. Remove the gear lube fill and drain plug and the sealing washers.
   d. Drain the gear lube into a suitable container.



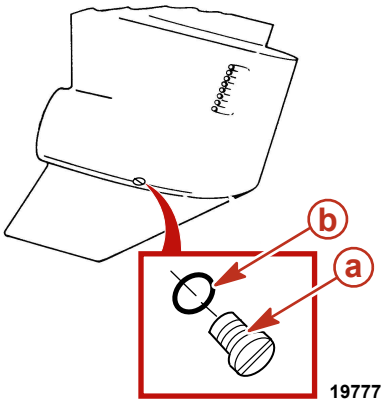
a - Fill and drain plug
b - Sealing washer

5. **Bravo Three X Models:**
   a. Place the sterndrive in the full trim limit out position.
   b. Remove the fill and drain plug and the sealing washers.

c. Drain the gear lube into a suitable container.



Bravo Two X

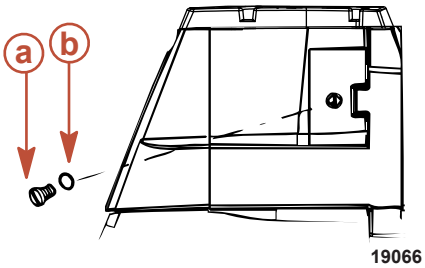


Bravo Three X

a - Fill and drain plug
b - Sealing washer

6. Remove the vent plug and sealing washer. Allow the gear lube to drain completely.

a - Vent plug
b - Sealing washer



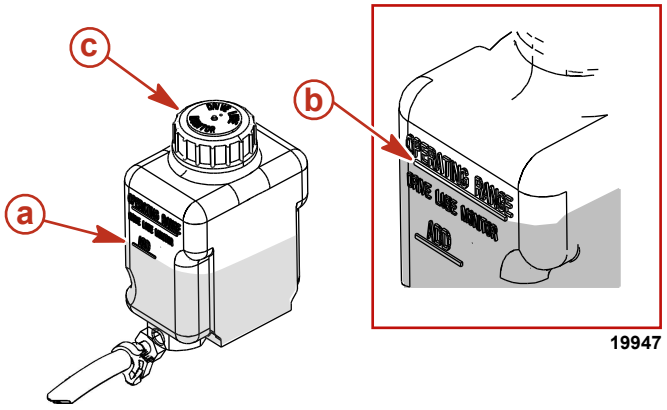
IMPORTANT: If any water drains from the fill and drain plug hole, or if the gear lube appears milky, the sterndrive is leaking and should be checked immediately by your Mercury Diesel–authorized repair facility.

7. Lower the sterndrive so that the propeller shaft is level.
8. Fill the sterndrive through the fill and drain plug hole with the specified gear lube until an air-free stream of lube flows from the vent plug hole.
IMPORTANT: Use only Mercury/Quicksilver High Performance Gear Lube in the sterndrive.

Tube Ref No.	Description	Where Used	Part No.
87	High Performance Gear Lube	Sterndrive unit	92-858064K01

9. Install the vent plug and sealing washer.
10. Continue to pump gear lube into the drive through the fill and drain plug hole until the gear lube appears in the gear lube monitor.

11. Fill the gear lube monitor so that the gear lube level is in the operating range. Do not overfill.

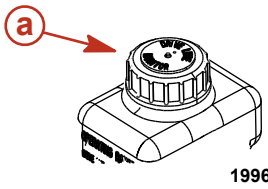


Gear lube monitor

- **a -** Gear lube level at the "ADD" mark
- **b -** Gear lube level at the "OPERATING RANGE" mark
- **c -** Gear lube monitor cap

Sterndrive Model	Fluid Capacity includes the Sterndrive and the Gear Lube Monitor	Fluid Type	Fluid Part Number
Bravo One X Diesel Bravo One XR	2736 ml (92.5 oz)	High Performance Gear Lube	92-802854A1
Bravo Two X Diesel	3209 ml (108.5 oz)		
Bravo Three X Diesel Bravo Three XR	2972 ml (100.5 oz)		

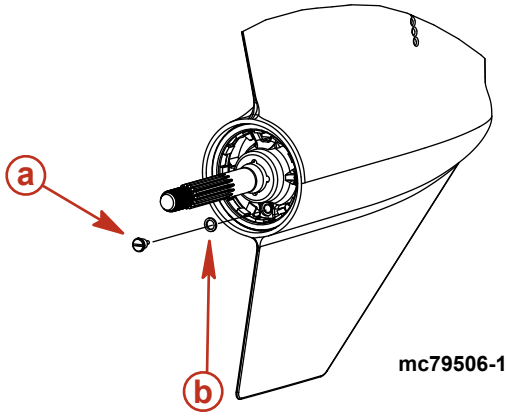
12. Ensure that the rubber gasket is inside the gear lube monitor cap and install. Do not overtighten.



- **a -** Gear lube monitor cap

13. Remove the pump from the sterndrive fill and drain plug hole.

14. Quickly install the sealing washer and the fill and drain plug. Tighten the plug to the specified torque.



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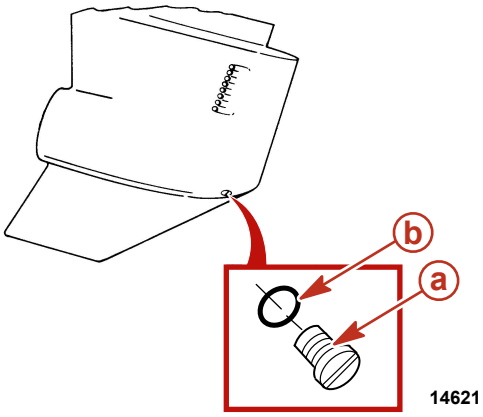

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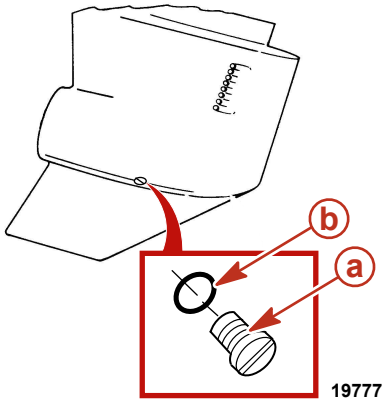

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All Bravo models shown

a - Fill and drain plug

b - Sealing washer

Description	Nm	lb-in	lb-ft
Fill and drain plug	6.8	60	—

15. Install the sterndrive propeller. Refer to **Propellers**.
16. Check the level of the gear lube monitor after the first use.

IMPORTANT: The gear lube monitor level will change while the product is in use. Always check the gear lube level when the sterndrive is cool and the engine is not running.

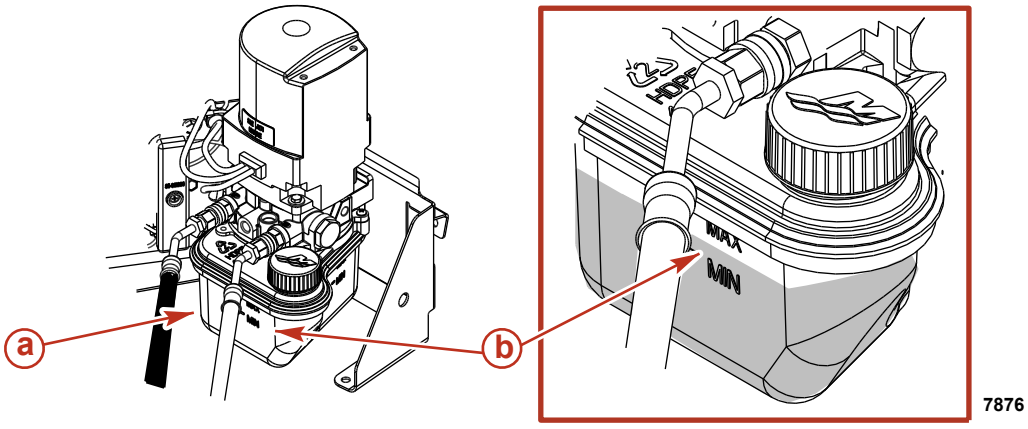
Power Trim Fluid

Checking

IMPORTANT: Check the fluid level with the sterndrive in the full down (in) position only.

1. Place the sterndrive in full down (in) position.

2. Observe the fluid level. The fluid level must be between the "MIN" and "MAX" lines on the reservoir.



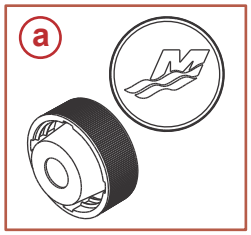
a - Reservoir
b - "MIN" and "MAX" lines

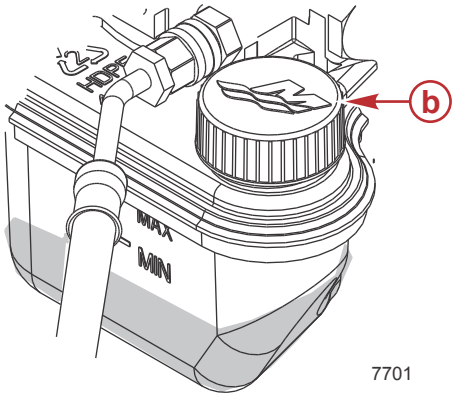
3. Fill as necessary with the specified fluid. Refer to **Filling**.

Tube Ref No.	Description	Where Used	Part No.
114	Power Trim and Steering Fluid	Power trim pump	92-858074K01

Filling

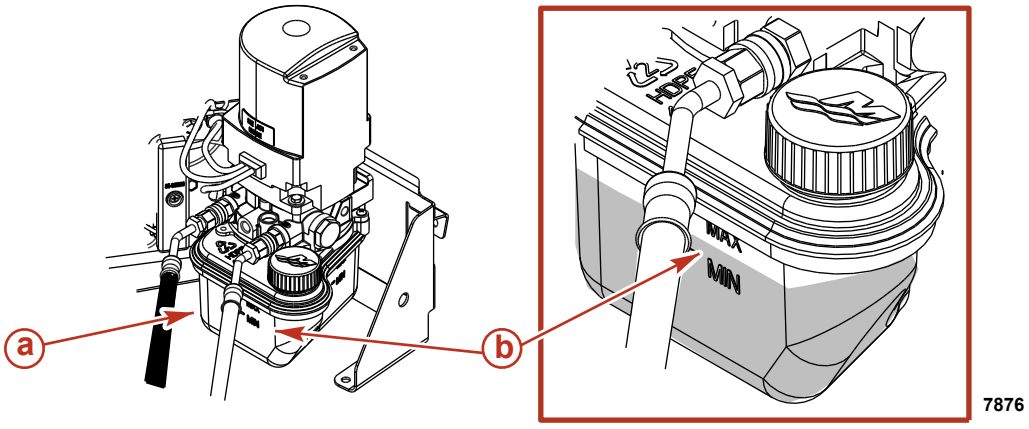
1. If the fluid level is below the "MIN" line, the specified fluid must be added.
2. Remove the fill cap from the reservoir.
   NOTE: *Fill cap is vented.*





Power trim pump reservoir shows the fluid level is below "MIN" line
a - Fill cap assembly
b - Fill cap installed

3. Add the specified fluid to bring the fluid level to within the "MIN" and "MAX" lines on the reservoir.



a - Reservoir
b - "MIN" and "MAX" lines

Tube Ref No.	Description	Where Used	Part No.
114	Power Trim and Steering Fluid	Power trim pump	92-858074K01

4. Install the fill cap.

Changing

Power trim fluid does not require changing unless it becomes contaminated with water or debris.

Power-Assisted Steering Fluid

The power steering fluid level should be checked at regular intervals.

IMPORTANT: Do not leave the steering wheel at full lock for longer than 15 seconds with the engine running. The power steering fluid will heat up considerably when the steering wheel is at full lock and could cause damage to the power steering system.
When the steering wheel is at full lock, power steering pump noise will increase as the pump is under full load and the engine idle RPM will be reduced momentarily.

Checking

1. Center the sterndrive and stop the engine.
2. Remove the fill cap and dipstick from the fluid reservoir and observe the level.

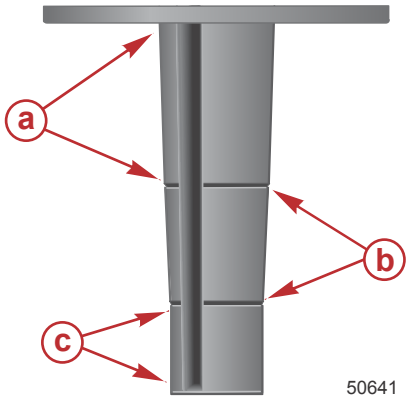
IMPORTANT: If fluid is not visible in the fluid reservoir, see your Mercury Diesel authorized repair facility.

Filling

1. Remove the fill cap/dipstick and wipe it with a clean cloth.
2. Install the fill cap/dipstick completely into the power steering fluid reservoir.
3. Remove the fill cap/dipstick from the reservoir and observe the fluid level.

- If the fluid level is within range , no fluid should be added.
- If the fluid level is within range "b", fluid may be added but should not exceed the maximum level in range "a".
- If the oil level is within range "c", fluid must be added. There is sufficient fluid when the fluid level is within range "b".

NOTE: *If high steering loads are expected for a prolonged period of operation (10–12 hours), the fluid level should be in the middle of the min/max markings of the dipstick.*



a - No fluid required
b - Oil may be added, but do not exceed range "a"
c - Oil **must** be added, but do not exceed above "a"

4. Add the specified fluid to bring the fluid level up to the proper level.

Tube Ref No.	Description	Where Used	Part No.
28	Dexron III Automatic Transmission Fluid	Power-assisted steering system	Obtain Locally

5. Install the fill cap/dipstick.

Changing

Power-assisted steering fluid does not require changing unless it becomes contaminated. See your Mercury Diesel authorized repair facility.

Engine Coolant

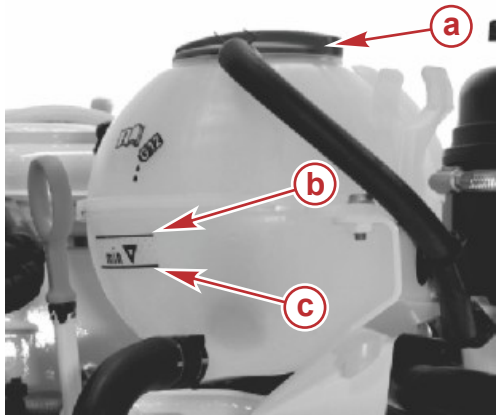
⚠ CAUTION

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.

Checking

IMPORTANT: Check the engine coolant before starting the engine.

1. Stop the engine and allow the engine to cool.
2. Remove the pressure cap from the coolant expansion tank.
3. The coolant level must be above the minimum mark and below the maximum mark on the coolant expansion tank.

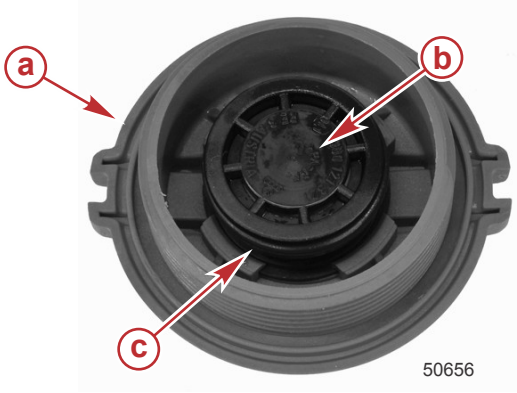


a - Pressure cap
b - Maximum mark
c - Minimum mark

IMPORTANT: The coolant level is monitored by a sensor. If the coolant level is low, a fault will be recorded, indicated on a SmartCraft gage, and a warning tone will be activated.

4. If the coolant level is low:

a. Inspect the coolant recovery system for leaks.
b. Inspect the O-ring in the pressure cap for damage and replace if necessary.



a - Pressure cap
b - Over pressure valve
c - O-ring

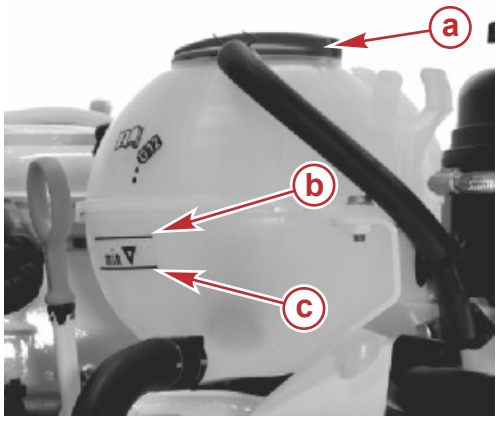
c. The pressure cap maintains pressure on the cooling system and may not be holding pressure properly. To have the cap tested, contact your Mercury Diesel authorized repair facility.
d. Refer to **Filling** and add the specified coolant as necessary.

IMPORTANT: When installing the pressure cap, be sure to tighten it securely until it clicks to prevent coolant loss.

5. If the coolant level is correct, install the pressure cap and tighten securely until it clicks.

Filling

1. Allow the engine to cool.
2. Remove the pressure cap from the coolant expansion tank.
3. If the coolant is low in the coolant expansion tank, add the specified coolant as necessary to bring the level between the minimum mark and the maximum mark.



a - Pressure cap
b - Maximum mark
c - Minimum mark

Description	Capacity	Part Number
Marine Engine Coolant	9.0 Liter (9.5 US qt)	8M0070979

IMPORTANT: When installing the pressure cap, be sure to tighten it securely until the cap clicks to prevent coolant loss.

4. Install the pressure cap. Tighten it securely until the cap clicks.

Changing

Change (replace) the engine coolant at the prescribed interval. Refer to **Replacing the Engine Coolant in the Closed Cooling System**.

Replacing the Engine Coolant in the Closed-Cooling System

Draining the Closed-Cooling System

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.

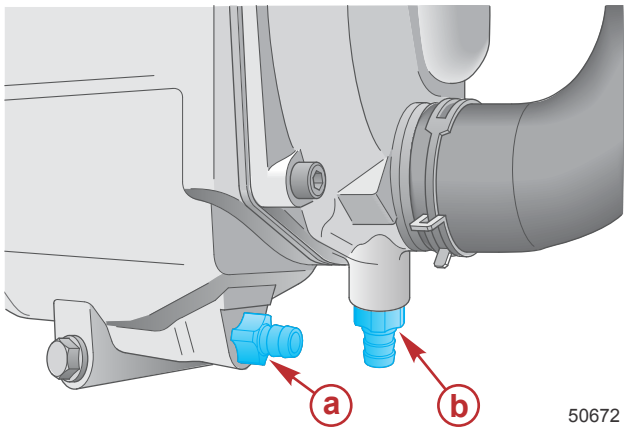
NOTE: *For instructions on draining the seawater section, refer to* ***Flushing and Draining the Seawater System*** *in this section.*

IMPORTANT: Observe the following points:

- **Ensure that the engine is as level as possible to promote complete draining of the cooling system.**
- **The closed-cooling section must be filled year-round with the required coolant. If the engine will be exposed to freezing temperatures, ensure that the closed-cooling section is filled with a solution of ethylene glycol antifreeze and water properly mixed to protect the engine to the lowest temperature to which it will be exposed.**
- **Do not use propylene glycol antifreeze in the closed-cooling section of the engine.**

⚠ 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.

1. Allow the engine to cool.
2. Remove the pressure cap from the expansion tank coolant reservoir.
3. Loosen the closed cooling heat exchanger drain screw approximately two turns, and allow the contents to drain into an appropriate container.



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

4. If required, clean the closed-cooling system. See your Mercury Diesel authorized repair facility.
5. Fill the system with the specified coolant. Refer to **Filling the Closed-Cooling System**.

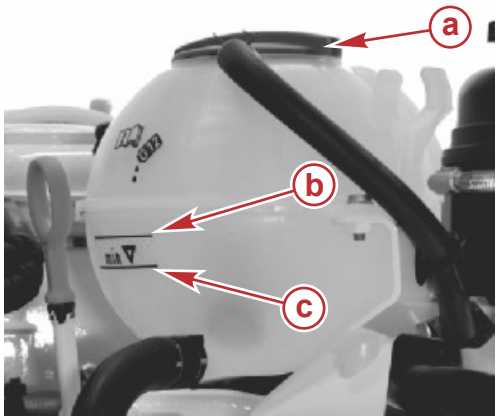
Filling the Closed-Cooling System

IMPORTANT: Use only the specified coolant.

Description	Capacity	Part Number
Marine Engine Coolant	9.0 Liter (9.5 US qt)	8M0070979

1. Verify that the closed-cooling heat exchanger drain screw is tight.

2. Remove the pressure cap from the expansion tank coolant reservoir.

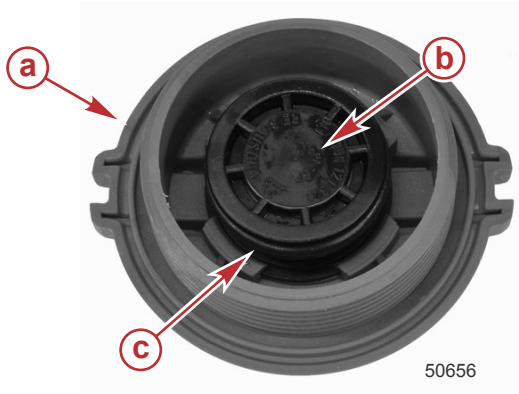


a - Pressure cap
b - Maximum mark
c - Minimum mark

3. Slowly add the coolant to the expansion tank. Allow the entrapped air to escape.
4. When coolant cannot be added, supply the seawater pump with water.

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. Do not install the pressure cap. Start and operate the engine at idle for approximately two minutes.
6. Add coolant if necessary to maintain the coolant at the specified level on the expansion tank.
7. Allow the engine to warm up,
8. Add coolant if necessary to maintain the coolant at the specified level on the expansion tank.
9. Inspect the O-ring in the pressure cap for damage and replace if necessary.



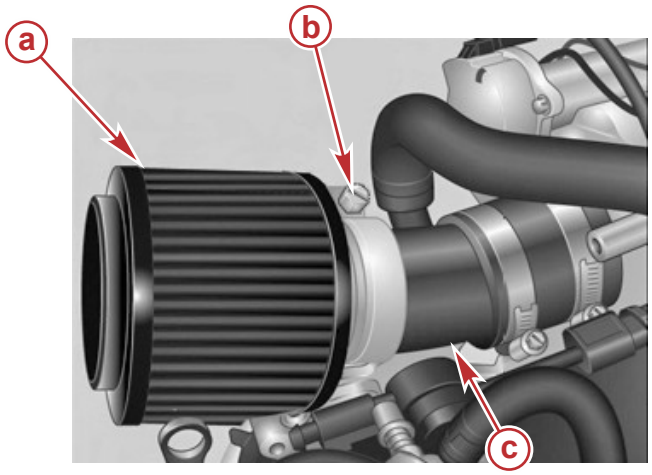
a - Pressure cap
b - Over pressure valve
c - O-ring

10. Install the pressure cap after the engine has reached normal operating temperature (with the thermostat fully open) and the coolant level remains constant.
11. Observe the temperature gauge and check the engine for coolant leaks. If the temperature gauge indicates the presence of excessive temperature or coolant is leaking, stop the engine immediately and inspect for the cause.
12. After the first operation, allow the engine to cool.
13. Remove the pressure cap and add the specified coolant to the level indicated on the expansion tank.
14. Install and securely tighten the pressure cap.

Air Filter Cleaning

Removal

1. Loosen the screw securing the air filter to the intake manifold and remove the air filter.



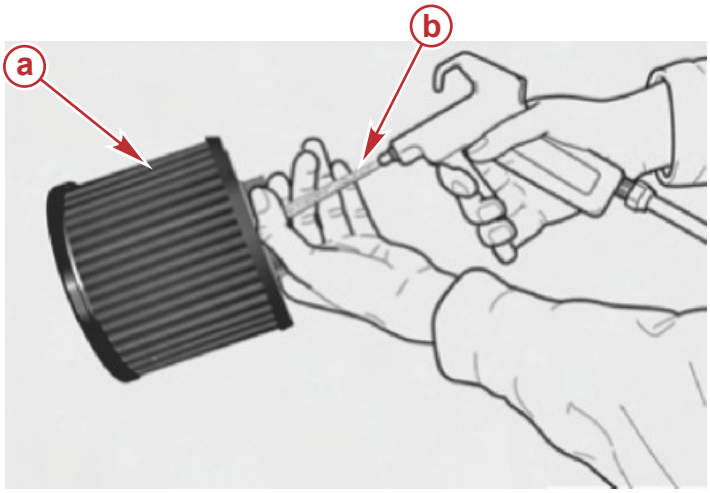
50680

a - Air filter
b - Screw
c - Intake manifold

⚠ CAUTION

Using compressed air can cause serious injury. Always wear eye protection when working with compressed air to prevent injury from ruptured hoses or flying debris.

2. Use compressed air to blow out the filter from the inside towards the outside. Do not exceed the air pressure specification.



50675

a - Air filter
b - Compressed air nozzle

Air Filter Cleaning	
Maximum air pressure	2.0 bar (29 psi)

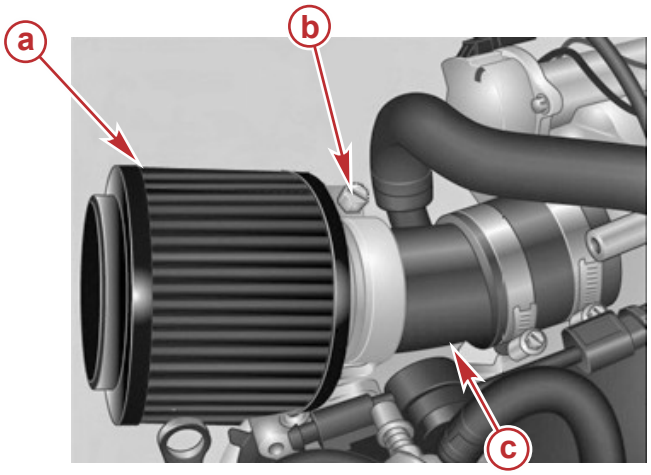
IMPORTANT: Do not use petroleum products for cleaning the air filter as the filter element may be damaged.

3. For cleaning the air filter, purchase K&N® filter recharging kit 99-5050. Follow the procedures contained in the recharging kit.

Installation

1. Install the air filter onto the intake manifold.

2. Tighten the air filter attaching screw securely.



50680

a - Air filter
b - Screw
c - Intake manifold

Water Separating Fuel Filter

⚠ WARNING

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

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 in a safe manner in accordance with all local, federal, and international regulations.

The engine-mounted water separating fine element fuel filter is equipped with a water-in-fuel sensor that should alert the operator when water is present in the filter. This fuel filter needs to be replaced at specified intervals or whenever water is detected in the fuel, whichever comes first.

The operator may be alerted that the water-in-fuel sensor has detected water in the fuel, if the boat is equipped with the proper instrumentation:

- Instrument notification (if equipped)
- Indicator lamp (if equipped)

When the engine is equipped with a remote mounted primary filter, it should be drained or replaced at specified intervals, or whenever water is detected in the engine mounted fuel filter.

Draining

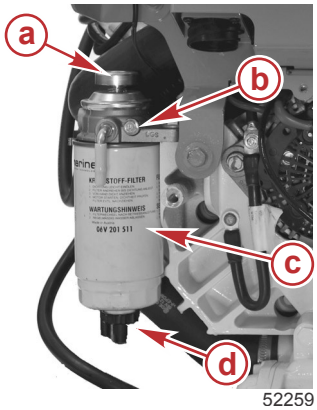
The engine-mounted water separating fuel filter can be drained of water and sediment by removing the water-in-fuel sending unit located on the bottom of the filter.

NOTE: *To ensure complete draining in warm weather, drain the filter before starting daily operations. In cold weather, where there is a possibility that the condensed water will freeze, drain the filter shortly after the end of daily operations.*

NOTE: *Place a suitable container under the fuel filter to catch contaminated fuel or water. Dispose of fuel and old filters in a safe manner in accordance with all local, federal, and international regulations.*

1. Place a suitable container under the water separating fine element fuel filter.
2. Disconnect the water-in-fuel sensor harness connector.
3. Remove the water-in-fuel sensor from the bottom of the filter.
4. Unscrew the bleed screw.
5. Drain the filter until the fuel is free of debris and water.
6. Install the water-in-fuel sensor and tighten securely.
7. Connect the water-in-fuel harness connector.

8. Install the bleed screw and tighten securely.
9. Push on the primer pump on top of the fuel filter until increased resistance is felt. Increased resistance will indicate the fuel system has been filled with fuel.



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a - Primer pump
b - Bleed screw
c - Fine element fuel filter
d - Water-in-fuel sensor

Replacing

⚠ 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 fine element fuel filter cannot be cleaned and reused. It must be replaced.

1. Disconnect both battery cables from the battery.
2. Disconnect the water-in-fuel sensor harness connector.
3. Place a suitable container under the water separating fine element fuel filter.
4. Unscrew the fine element fuel filter and empty the fuel contents into the container.
5. Remove the water-in-fuel sensor and O-ring from the fuel filter.
6. Install the water-in-fuel sensor with O-ring into the new fuel filter. Tighten securely.
7. Fill the new fuel filter with clean diesel fuel.

   NOTE: *After replacing the fine element fuel filter and filling it with fuel, it is not necessary to bleed the fuel system.*
8. Apply clean diesel fuel to the new fuel filter sealing O-ring.
9. Install the new fine element fuel filter onto the filter bracket and tighten by hand.
10. Connect the water-in-fuel sensor harness connector.
11. After changing the fine element fuel filter, push on the primer pump on the filter housing until increased resistance is felt. The fuel system has then been filled.
12. Visually check the fuel system for leaks.
13. Connect the battery cables.
14. Start and operate the engine. Check the filter connection for fuel leaks. If leaks exist, recheck filter installation. If leaks continue, stop the engine immediately and contact your Mercury Diesel authorized repair facility.

Filling

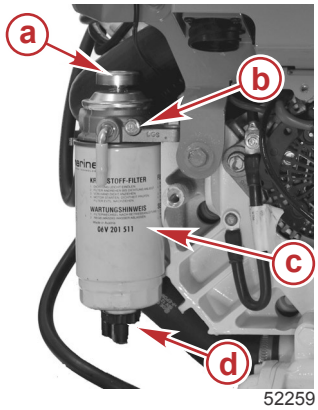
A plunger-type of primer pump is located on the fuel filter bracket and is used to:

- Fill the fuel filter when draining or changing the fine element fuel filter.
- Fill the fuel system on the engine if the system was run dry.
- Prime the fuel system if the engine has not been run for an extended period.

NOTE: *Follow this procedure after installing a new filter if it has not been prefilled or if the fuel has been drained from the filter when checking for water.*

1. Loosen the bleed screw on the fuel filter bracket.
2. Move the primer pump up and down repeatedly until the filter is full and the stream of fuel flowing from the bleed screw contains no air bubbles.

3. Securely tighten the bleed screw.

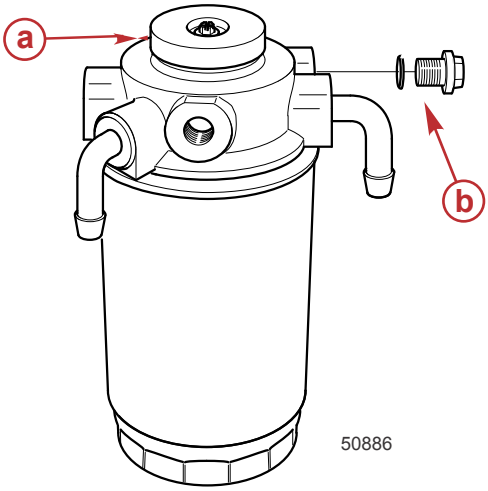


a - Primer pump
b - Bleed screw
c - Fine element fuel filter
d - Water-in-fuel sensor

Purging the Fuel System

IMPORTANT: The fuel line must be purged before the engine is put into operation.

1. Loosen the bleed screw on top of the fuel filter bracket.
2. Use a suitable container to collect fuel while purging the system. Clean up any spills immediately and dispose of the fuel in a safe manner according with all local, federal, and international regulations.
3. Move the hand pump on top of the fuel filter bracket up and down repeatedly. The filter is full when an air-free stream of fuel flows from the bleed screw port.



a - Hand pump
b - Bleed screw and seal

4. Install the bleed screw with the seal and securely tighten.

Fuel System

Priming

Prime the engine if it has not been run for an extended period or if the engine will not start.

1. Move the hand pump/primer plunger on the fine element fuel filter bracket up and down several times.
2. Start the engine.

Filling the Fuel System

NOTE: *Follow this procedure if the fuel system was run dry or if part of the fuel system was drained for a service function.*

1. Move the hand pump/primer plunger on the fine element fuel filter bracket up and down several times to fill the fuel filter.
2. Check the filter for fuel leaks. Ensure that the bleed screw on the fuel filter bracket is closed.

Winterization of Fuel System

1. Fill the fuel tank to prevent condensation from forming.
2. Inspect the fuel system for leaks.
3. Drain the water from the circulation filter.

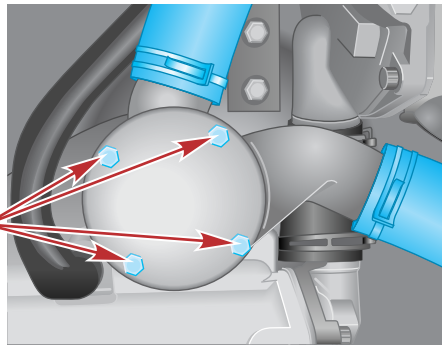
4. Replace the fine element fuel filter.

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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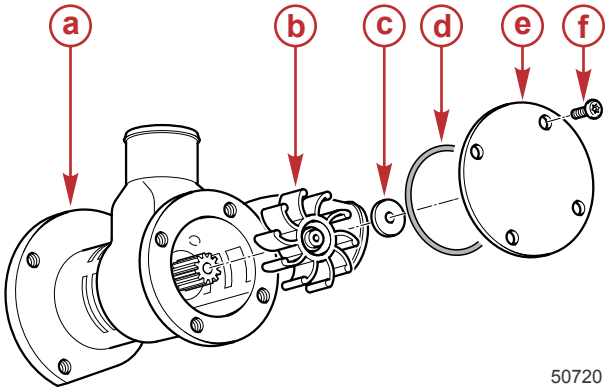
Seawater pump cover screws

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



a - Seawater pump
b - Impeller
c - Protective cap
d - O-ring
e - Cover
f - Screw (4)

50720

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.

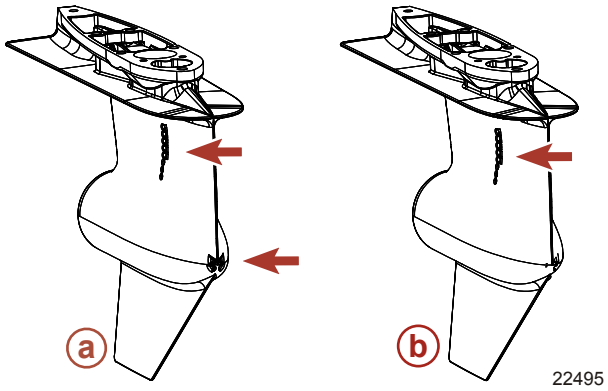
Description	Nm	lb-in.	lb-ft
Seawater pump cover screws	4.0	35.4	–

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

Sterndrive Water Inlets Check

1. Obtain a piece of wire the appropriate size to insert into the water inlets holes.
2. Insert the wire in and out of the sterndrive water inlets to ensure that they are open and to remove debris or marine growth. Do not scrape the sterndrive paint.

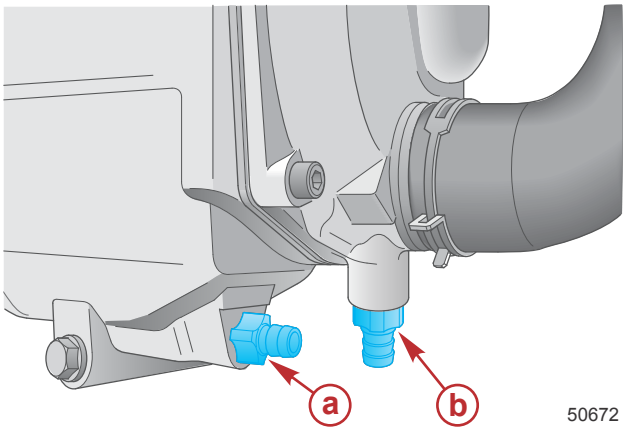
3. Remove the wire from the sterndrive and retain for periodic water inlet checks.



a - Dual water pickup water inlets
b - Side pickup water inlets

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.

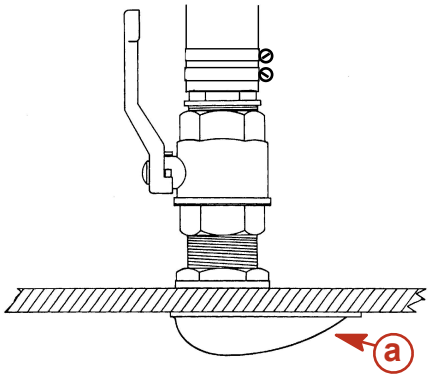


Heat exchanger drain screws
a - Closed-cooling system drain screw
b - Seawater-cooling system drain screw

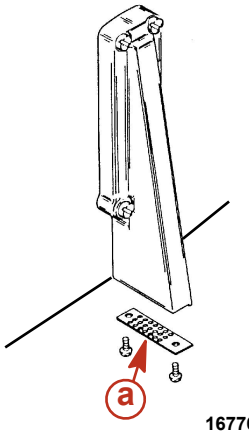
8. Open the drain screw and allow the water to drain into a suitable container.
9. When the draining is complete, remove the hose and close the drain screw.
10. Be certain to open the seacock prior to boat operation.

Checking the Seawater Pickups

Verify the water inlet holes for the seawater pickup are clean and unobstructed.



Typical through-the-hull seawater pickup



Typical through-the-transom seawater pickup

a - Water inlet holes

Cleaning the Seawater Strainer, if Equipped

NOTICE

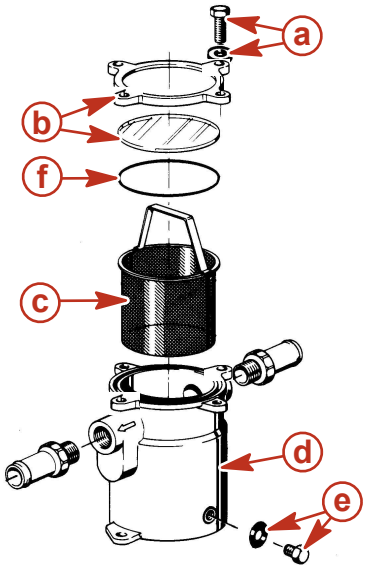
An open seawater strainer or seacock during some service or maintenance procedures can introduce water into the boat, causing damage or sinking the boat. Always close the water supply from the seawater pump, water inlet, or seacock when performing service or maintenance on the cooling system.

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.



a - Screws and washers
b - Cover with glass
c - Strainer
d - Housing
e - Drain plug and sealing washer
f - Seal

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

When two or more dissimilar metals are submerged in a conductive solution of 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 Diesel 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 they are eroded 50% or more. Mercury Diesel strongly recommends avoiding the use of anodes from other manufacturers. Refer to your Mercury Diesel–authorized repair facility for additional information.

Engine Corrosion Protection Components

The engine is equipped with a sacrificial anode located on the intercooler end cover to assist in protecting the engine and the seawater cooling system from corrosion.

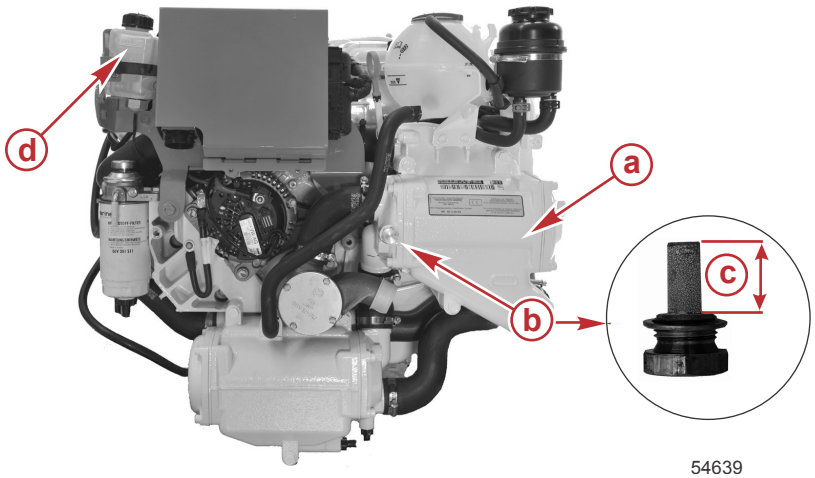
Removal

1. Allow the engine to cool.

NOTICE
Failure to close the seawater inlet or seacock when removing or replacing the anode plugs can lead to water damage. Close the seacock or remove and plug the seawater inlet hose to prevent water from entering the anode plug holes.

2. With the engine off, close the seacock, if equipped, or remove and plug the seawater inlet hose.
3. Drain the seawater system. Refer to **Flushing and Draining the Seawater System**.

4. Remove the anode assembly.



a - Intercooler
b - Anode plug
c - Anode length 20 mm (0.79 in.)
d - Gear lubrication monitor (sterndrive only)

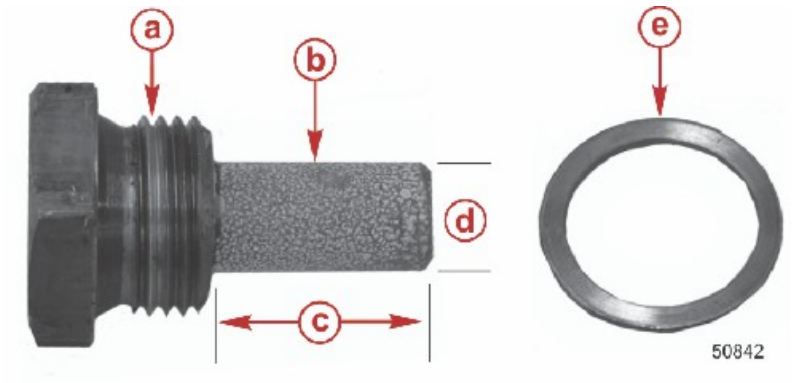
Cleaning and Inspection

Inspection and replacement interval will vary according to the condition of the seawater and the mode of engine operation.

NOTE: *Use sandpaper, fiber brush, or cleaning pad, remove the deposits from the surface of the anode before trying to determine the amount of erosion. Do not use a mild steel brush which might leave deposits that could accelerate corrosion.*

1. Remove the deposits.
2. Inspect and measure the anode. Compare the measurements to the specifications for a new sacrificial anode and replace the anode assembly when deteriorated 50%.

   NOTE: *Sacrificial anodes are available only as an assembly. Replace both the plug and anode as a unit.*



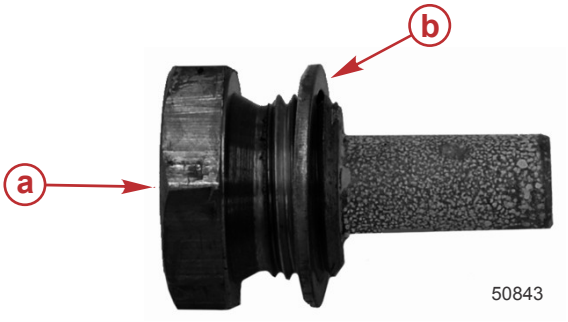
a - Anode plug
b - Sacrificial anode
c - Length
d - Diameter
e - Sealing washer

Sacrificial anode measurements (new)	
Length	20.0 mm (0.79 in.)
Diameter	9.9 mm (0.390 in.)

3. Discard the sealing washer.

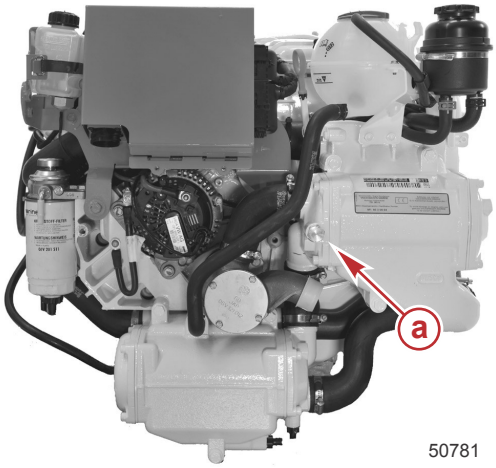
Installation

1. Install a new sealing washer on the anode assembly.



a - Anode assembly
b - Sealing washer

2. Install the anode assembly with the washer into the intercooler end cover and tighten securely.



a - Anode

3. Unplug and connect the seawater inlet hose, or open the seacock if equipped.

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.

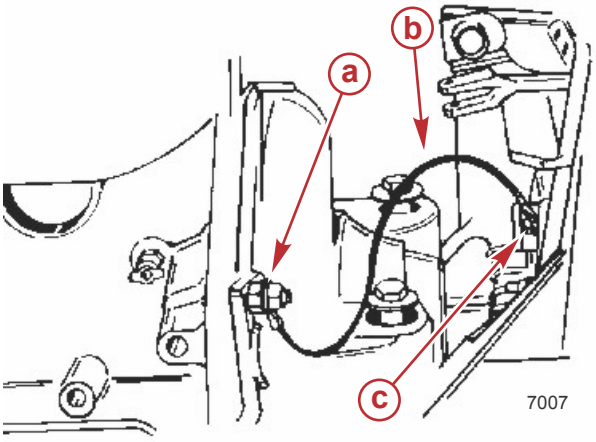
4. Ensure that the seawater pickup pump is supplied cooling water.
5. Start the engine and check for leaks.

Maintaining Ground Circuit Continuity

The transom assembly and sterndrive are equipped with a ground wire circuit to ensure good electrical continuity between the engine, transom assembly, and sterndrive components. Good continuity is essential for the anode and the MerCathode system to function effectively.

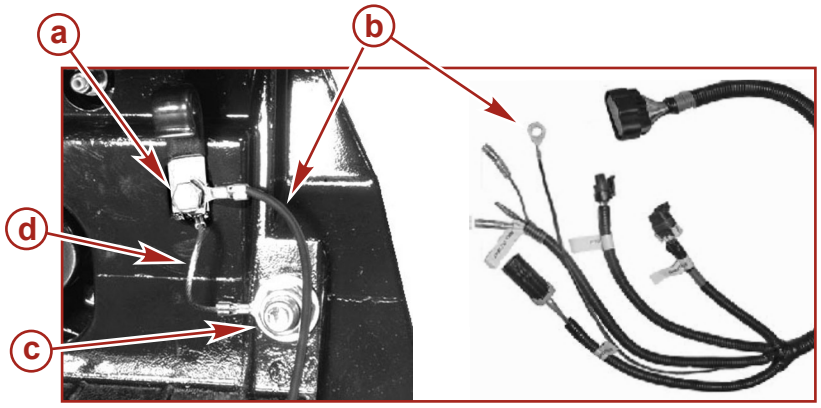
Inspect all ground circuit components for loose connections and broken or fraying wires.

Models equipped with a separate ground wire must have the wire connected between the engine flywheel housing and the transom plate.



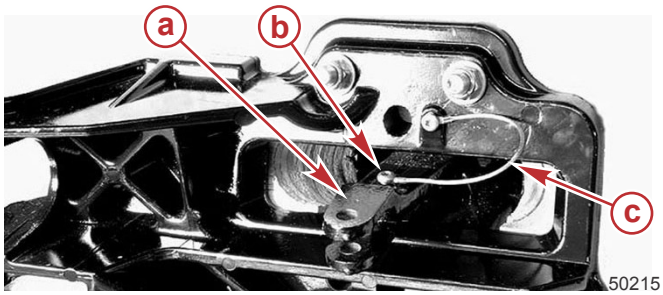
a - Engine flywheel housing bolt
b - Ground wire
c - Inner transom plate grounding screw

Models equipped with a transom harness must connect its ground wire to the grounding screw on the gimbal housing.



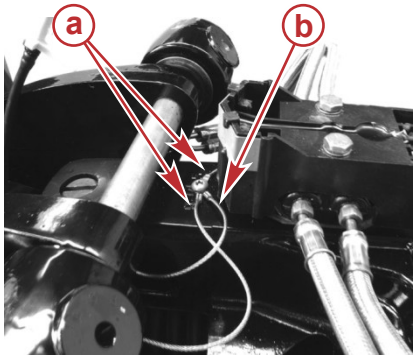
37462

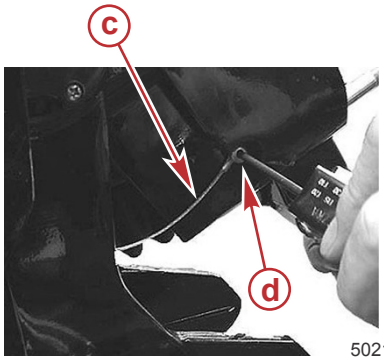
a - Gimbal housing grounding screw
b - Transom harness ground wire to engine harness
c - Transom plate grounding stud and nut
d - Grounding wire gimbal housing to transom plate



50215

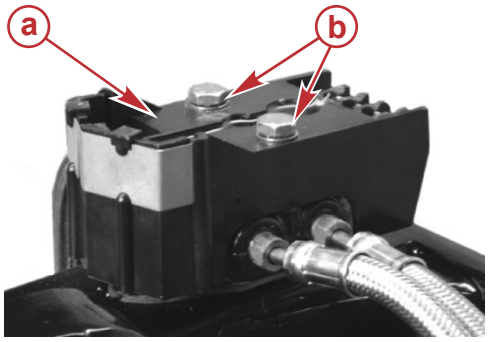
a - Steering lever
b - Torx® screw
c - Continuity wire

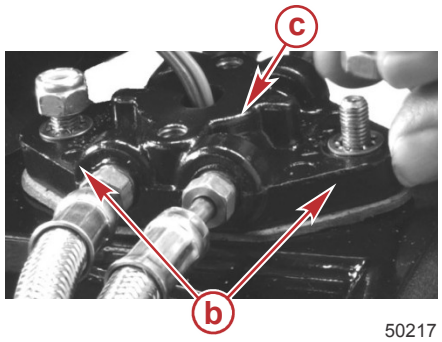




50216

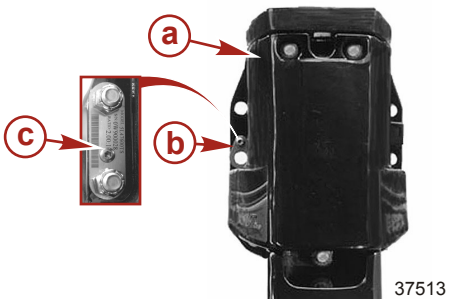
Bravo model shown, Alpha similar
a - Trim-cylinder-to-gimbal-ring ground wire (2)
b - Gimbal-housing-to-gimbal-ring ground wire
c - Gimbal-ring-to-bell-housing ground wire
d - Screw





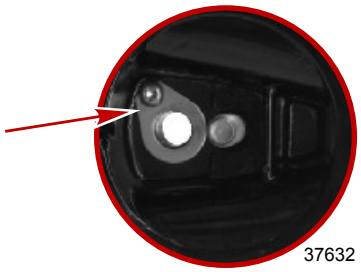
50217

a - MerCathode
b - Continuity washers
c - Hydraulic manifold

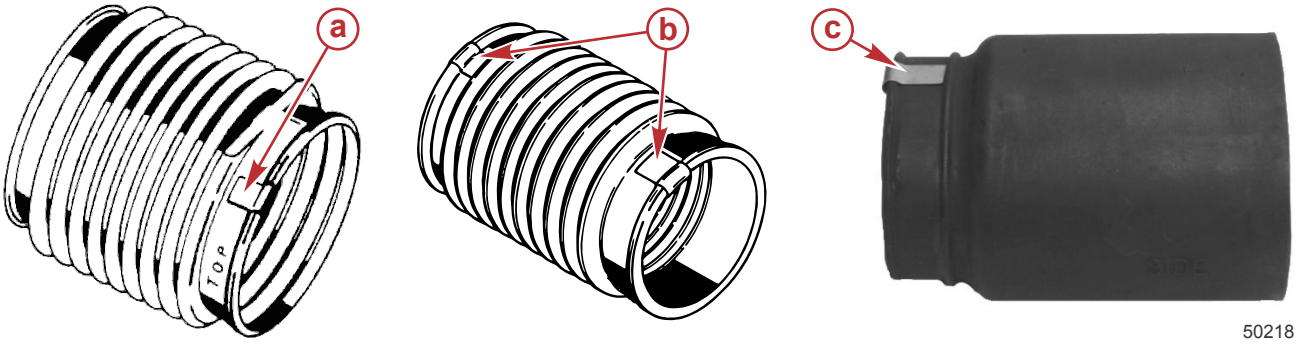


Bravo sterndrive shown, Alpha sterndrive similar

- **a -** Sterndrive
- **b -** Ground washer
- **c -** Ground plate (later model)



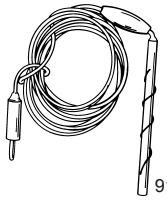
Ground washer shown inside anode cavity of Bravo Three gear housing, other models similar



- **a -** U-joint bellows ground clip
- **b -** Exhaust bellows ground clip
- **c -** Exhaust tube ground clip

MerCathode

If the boat is equipped with a MerCathode system, the system should be tested to ensure that it is providing adequate output to protect the underwater metal parts on the boat. The test should be made where the boat is moored, using a Reference Electrode and Test Meter.

Reference Electrode	91-76675T 1
 9188	Senses and electrical current in the water when testing the MerCathode system. Use to check hull potential.

Refer to the appropriate Mercury MerCruiser sterndrive service manual for testing procedures.

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.

Lubrication

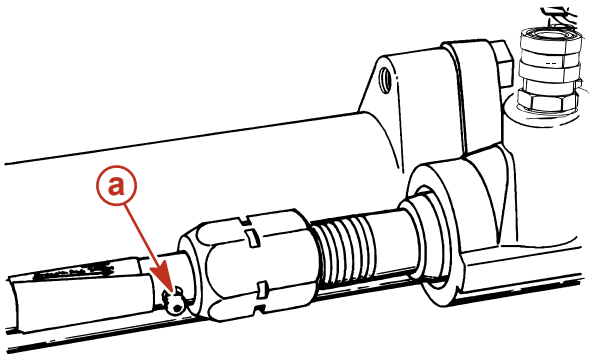
Steering System

⚠ WARNING

Incorrect cable lubrication can cause hydraulic lock, leading to serious injury or death from loss of boat control. Completely retract the end of the steering cable before applying lubricant.

NOTE: *If the steering cable does not have a grease fitting, the inner wire of the cable cannot be greased.*

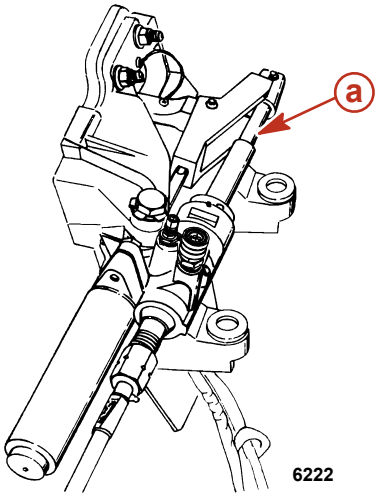
1. **If the steering cable has grease fittings**, turn the steering wheel until the steering cable is fully retracted into the cable housing. Apply approximately three pumps of grease from a typical hand-operated grease gun.



a - Steering cable grease fitting

Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with PTFE	Steering cable grease fitting	92-802859A 1

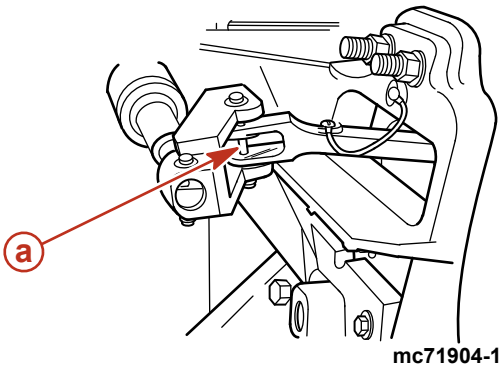
2. Turn the steering wheel until the steering cable is fully extended. Lightly lubricate the exposed part of the cable.



a - Extended steering cable

Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with PTFE	Steering cable	92-802859A 1

3. Lubricate the steering pin.



a - Steering pin

Tube Ref. No.	Description	Where Used	Part No.
	Synthetic Blend MerCruiser Engine Oil SAE25W-40	Steering pin	92-883725K01

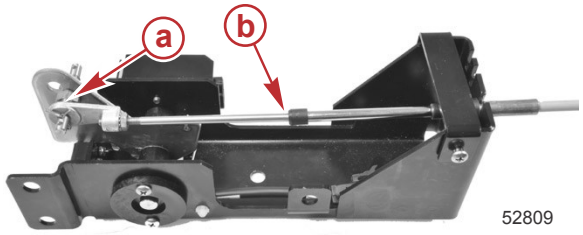
4. On dual engine boats: Lubricate the tie bar pivot points.

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

5. Upon first starting the engine, turn the steering wheel several times to starboard and then port to ensure that the steering system operates properly before getting underway.

Throttle Cable

Lubricate the pin and throttle cable surfaces with oil.



Throttle cable lubrication

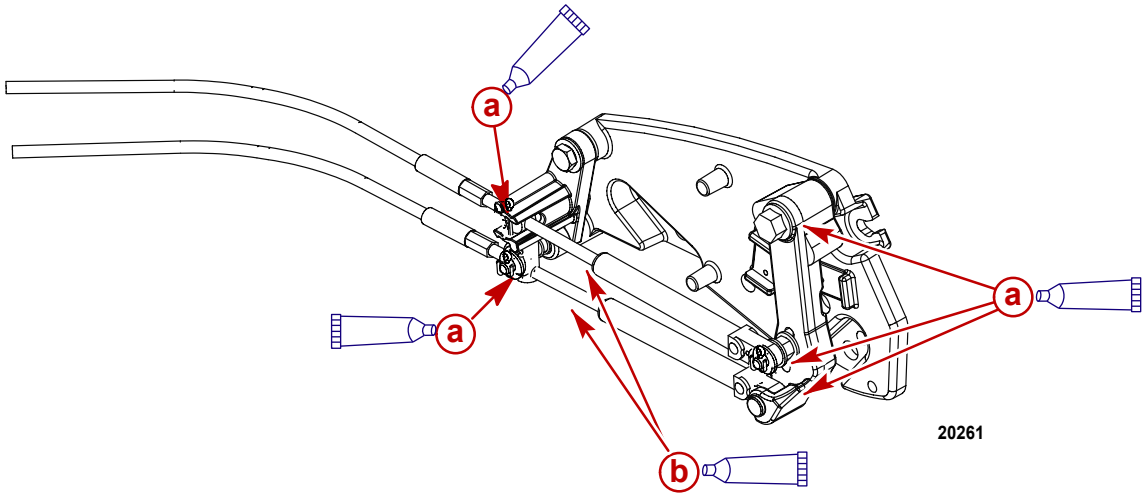
a - Pin

b - Throttle cable

Tube Ref No.	Description	Where Used	Part No.
80	SAE Engine Oil 30W	Ball pin and throttle cable end contact surfaces	Obtain Locally

Shift Cable

1. Lubricate the pivot points and guide contact surfaces.



Typical sterndrive model shift cable

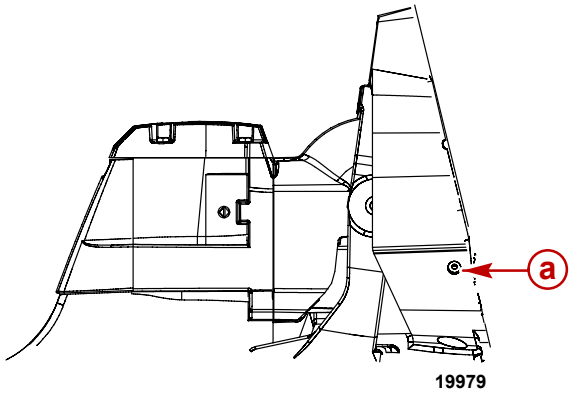
a - Pivot points

b - Guide contact surface

Tube Ref No.	Description	Where Used	Part No.
80	SAE Engine Oil 30W	Shift cable pivot points and guide contact surfaces	Obtain Locally

Transom Assembly

Lubricate the gimbal bearing by applying approximately 8–10 pumps of grease from a typical hand-operated grease gun.



a - Gimbal bearing grease insert

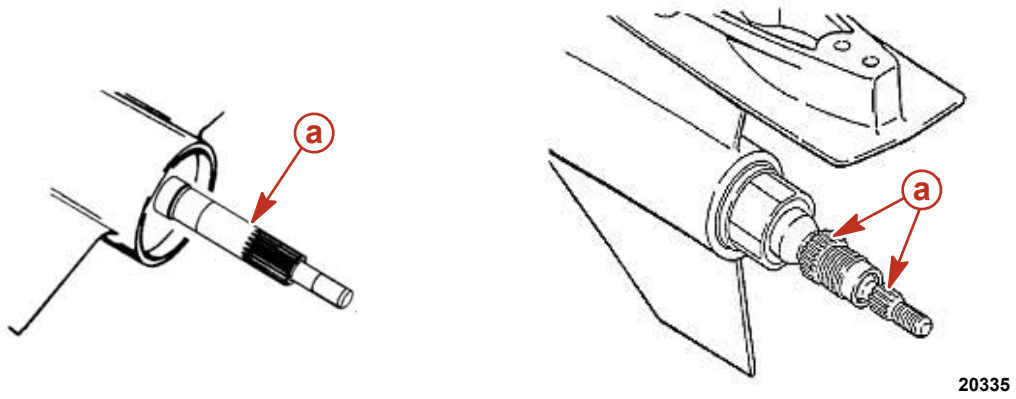
Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Gimbel bearing grease insert	8M0071842

Propeller Shaft

NOTE: *Refer to* ***Propeller Removal****.*

Lubricate the sterndrive propeller shaft by applying a coating of one of the following lubricants to the propeller shaft.

- Apply a generous coating of one of the following lubricants to the propeller shaft.



a - Propeller shaft

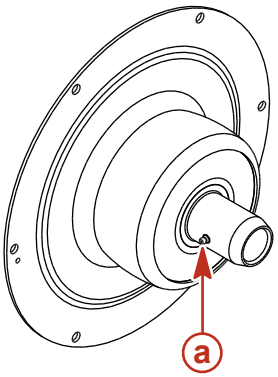
Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Propeller shaft	8M0071842
95	2-4-C with PTFE	Propeller shaft	92-802859A 1

Engine Coupler

IMPORTANT: These engines are equipped with a sealed engine coupler. The sealed coupler and the shaft splines can be lubricated without removing the sterndrive unit.

1. Lubricate the engine coupler splines through the grease fitting on the coupler by applying approximately 8-10 pumps of Extreme Grease from a typical hand-operated grease gun.

   NOTE: *If the boat is operated at idle for prolonged periods of time, the coupler should be lubricated on Bravo models every 50 hours.*



Coupler shown separated for clarity

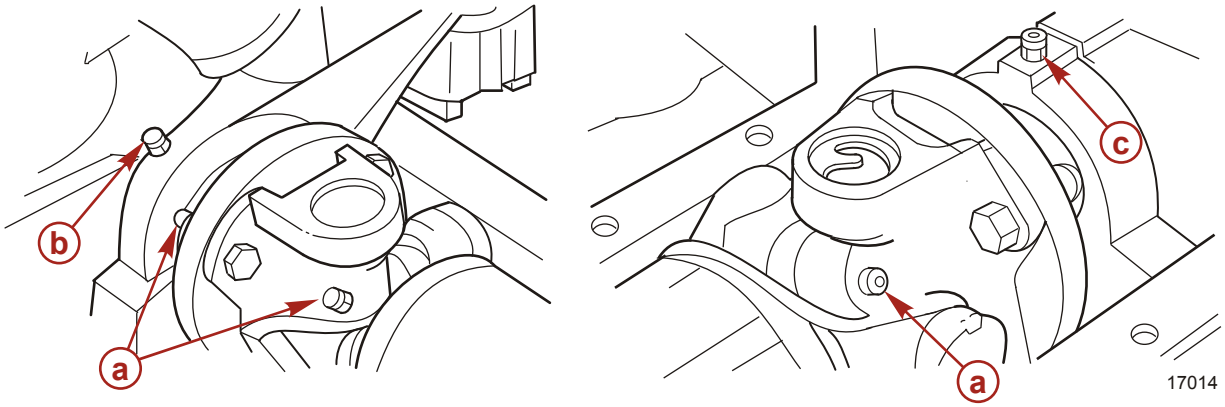
a - Grease fitting

Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Engine coupler and shaft splines	8M0071842

Driveshaft Extension Models

1. Lubricate the transom end grease fitting and engine end grease fitting by applying approximately 10–12 pumps of grease from a typical hand-operated grease gun.

2. Lubricate the driveshaft grease fittings by applying approximately 3–4 pumps of grease from a typical hand-operated grease gun.



a - Driveshaft grease fittings
b - Transom end grease fitting
c - Engine end grease fitting

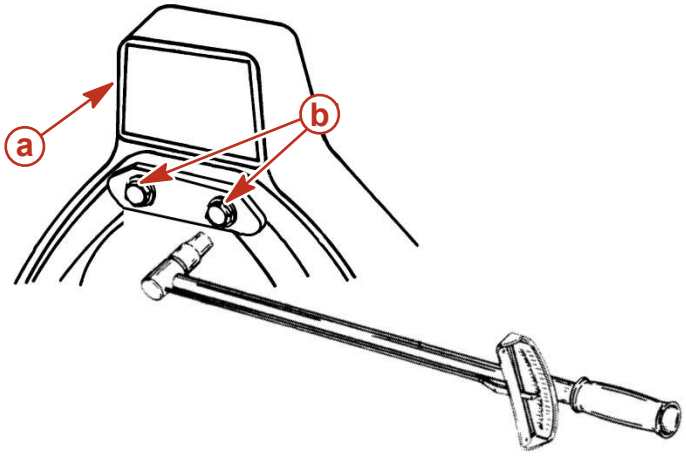
Tube Ref No.	Description	Where Used	Part No.
	Extreme Grease	Transom end grease fitting, engine end grease fitting, driveshaft grease fittings	8M0071842

Maintaining Torques

Gimbal Ring U-bolt Nuts

NOTE: *The gimbal ring is a component of the transom assembly.*

Tighten the gimbal ring U-bolts to the specified torque.



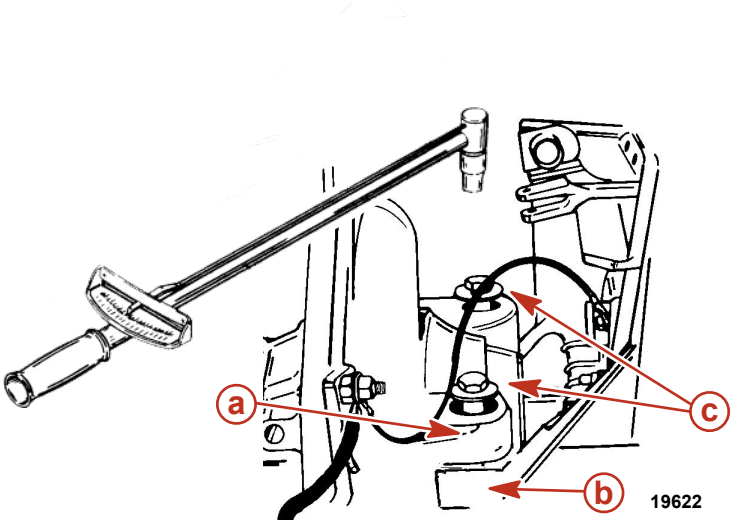
19624

a - Transom assembly
b - Gimbal ring U-bolt nuts

Description	Nm	lb-in.	lb-ft
Gimbal ring U-bolt nuts for 3/8 in. U-bolt	72	–	53
Gimbal ring U-bolt nuts for 7/16 in. U-bolt	95	–	70

Engine Mounts

Loosen the rear engine mount bolts 1 to 1-1/2 turns. Tighten the rear engine mount bolts to the specified torque.



a - Rear engine mount
b - Transom plate mount
c - Rear engine mount bolt

Description	Nm	lb-in.	lb-ft
Rear engine mount bolts	51	–	38

Propellers

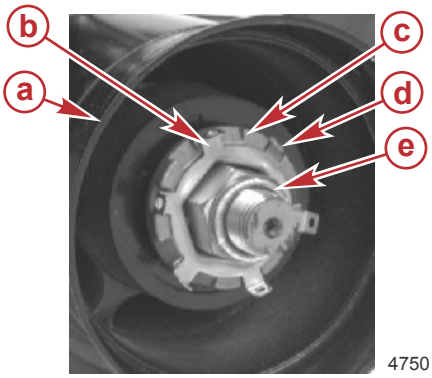
Bravo Sterndrive Propeller Removal

⚠ WARNING

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

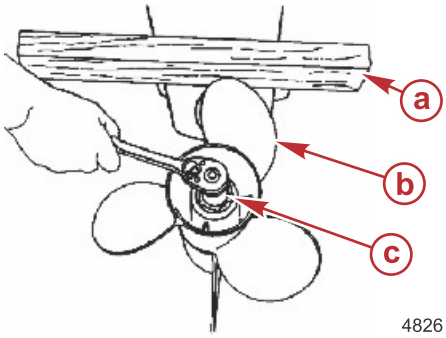
Bravo One Models

1. Straighten the bent tabs of the tab washer on the propeller shaft.



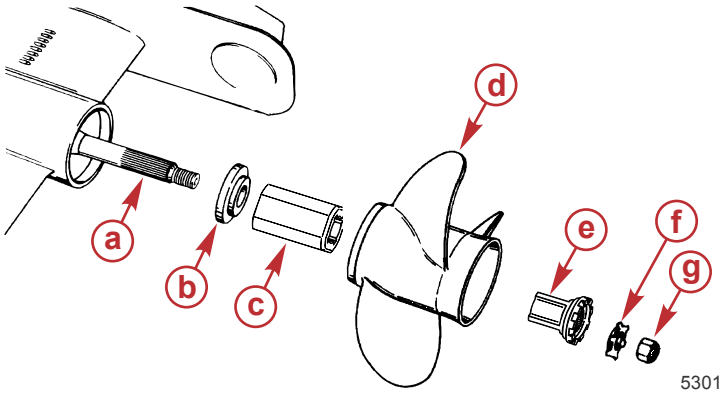
a - Propeller
b - Tab washer
c - Drive sleeve adapter
d - Tab bent down
e - Propeller nut

2. Place a block of wood between the propeller blade and the sterndrive's anti-ventilation plate.



a - Wood block
b - Propeller
c - Propeller nut under socket

3. Turn the propeller shaft nut counterclockwise and remove the nut.
4. Slide the propeller and the attaching hardware from the propeller shaft.

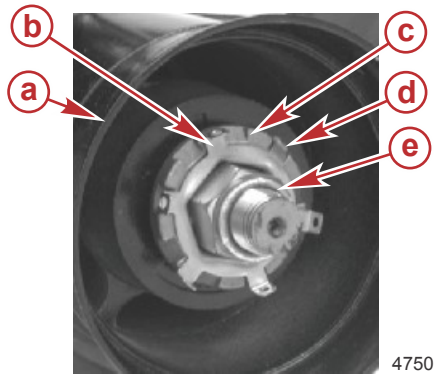


Bravo One models

a - Propeller shaft splines
b - Forward thrust hub
c - Flo-Torque II drive hub
d - Propeller
e - Drive sleeve adapter
f - Tab washer
g - Propeller nut

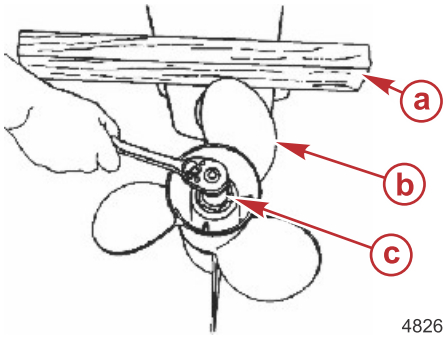
Bravo Two Models

1. Straighten the bent tabs of the tab washer on the propeller shaft.



a - Propeller
b - Tab washer
c - Drive sleeve adapter
d - Tab bent down
e - Propeller nut

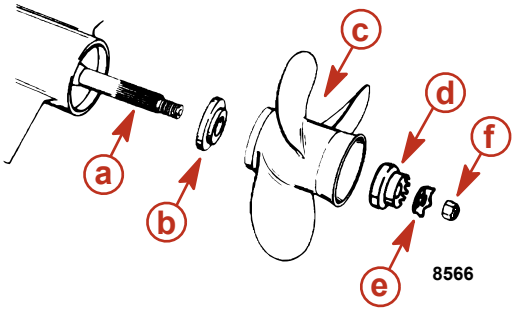
2. Place a block of wood between the propeller blade and the sterndrive's anti-ventilation plate.



a - Wood block
b - Propeller
c - Propeller nut under socket

3. Turn the propeller shaft nut counterclockwise to remove the nut.

4. Slide the propeller and attaching hardware from the propeller shaft.

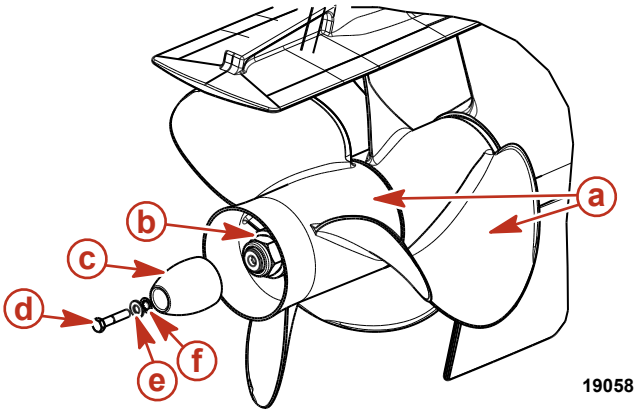


Bravo Two

- **a -** Propeller shaft splines
- **b -** Forward thrust hub
- **c -** Propeller
- **d -** Spline washer
- **e -** Tab washer
- **f -** Propeller nut

Bravo Three Models

1. Place a block of wood between the propeller blade and the sterndrive's anti-ventilation plate.
2. Remove the bolt and washers securing the propeller shaft anode.
3. Remove the propeller shaft anode.

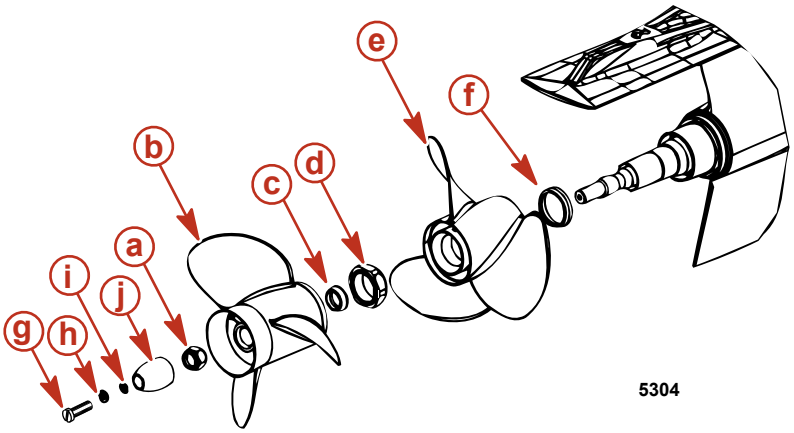


- **a -** Propeller
- **b -** Propeller shaft nut
- **c -** Propeller shaft anode
- **d -** Propeller shaft anode screw
- **e -** Flat washer
- **f -** Star washer

4. Turn the aft propeller shaft nut counterclockwise to remove the nut.
5. Slide the propeller and thrust hub off of the propeller shaft.
6. Using the propeller nut tool, turn the front propeller shaft nut counterclockwise and remove the nut.

Propeller Nut Tool	91-805457T 1
 10677	Aids in the removal and installation of the front propeller nut.

7. Slide the propeller and the thrust hub off the propeller shaft.



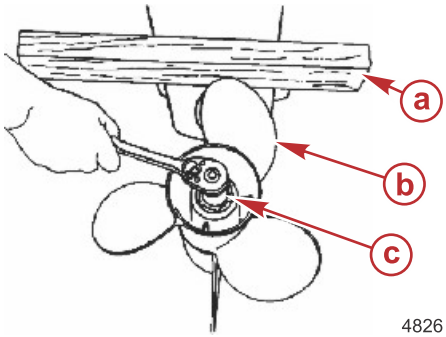
Bravo Three

- **a -** Aft propeller nut
- **b -** Aft propeller
- **c -** Aft propeller thrust hub
- **d -** Front propeller nut
- **e -** Front propeller
- **f -** Front propeller thrust hub
- **g -** Propeller shaft anode screw
- **h -** Flat washer
- **i -** Star washer
- **j -** Propeller shaft anode

Bravo Sterndrive Propeller Installation

⚠ WARNING

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



- **a -** Wood block
- **b -** Propeller
- **c -** Propeller nut under socket

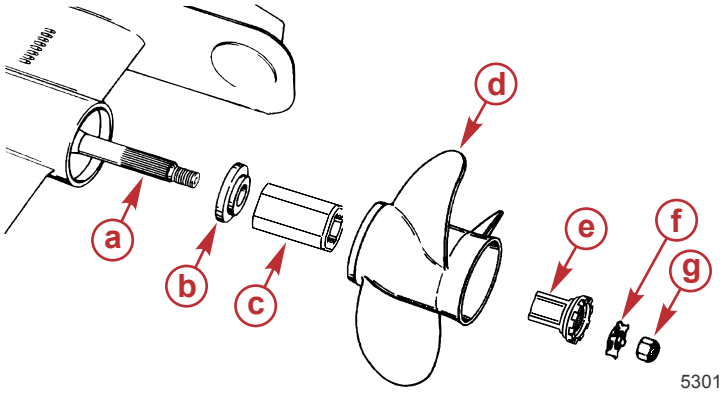
Bravo One Models

IMPORTANT: Use the correct rotation propeller. The propeller rotation must match the direction of rotation of the propeller shaft.

1. Liberally coat the propeller shaft spline with one of the following lubricants.

Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with PTFE	Propeller shaft splines	92-802859A 1
	Extreme Grease	Propeller shaft splines	8M0071842

2. Install the propeller with the attaching hardware as shown.
3. Tighten the propeller nut to the specified torque.



Typical Bravo One models

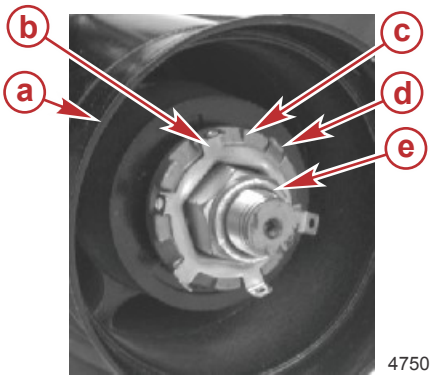
- **a -** Propeller shaft splines
- **b -** Forward thrust hub
- **c -** Flo-Torque II drive hub
- **d -** Propeller
- **e -** Drive sleeve adapter
- **f -** Tab washer
- **g -** Propeller nut

NOTE: *The propeller torque stated is a minimum torque value.*

Description	Nm	lb-in.	lb-ft
Bravo One propeller nut	75	–	55
	Then align tabs with grooves		

4. **Models equipped with the tab washer**: Continue to tighten the propeller nut until the three tabs on the tab washer align with the grooves on the spline washer.

5. Bend the three tabs down into the grooves.



4750

a - Propeller
b - Tab washer
c - Drive sleeve adapter
d - Tab bent down
e - Propeller nut

Bravo Three

1. Liberally coat the propeller shaft spline with <u>one</u> of the following lubricants.

Tube Ref No.	Description	Where Used	Part No.
95	2-4-C with PTFE	Propeller shaft splines	92-802859A 1
	Extreme Grease	Propeller shaft splines	8M0071842

2. Slide the forward thrust hub onto the propeller shaft with the tapered side toward the propeller hub.
3. Align splines and place front propeller on propeller shaft.
4. Install the front propeller locknut and tighten to the specified torque using the propeller nut tool.

Propeller Nut Tool	91-805457T 1
 10677	Aids in the removal and installation of the front propeller nut.

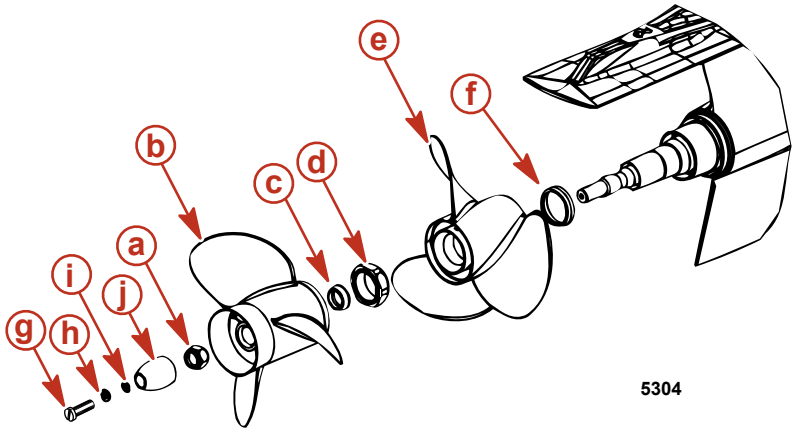
Description	Nm	lb-in.	lb-ft
Bravo Three front propeller nut	136	–	100

5. Slide the aft thrust hub onto the propeller shaft with the tapered side toward the propeller hub.
6. Align the splines and install the aft propeller.
7. Install the propeller nut and torque.

NOTE: *The propeller torque stated is a minimum torque value.*

Description	Nm	lb-in.	lb-ft
Bravo Three rear propeller nut	81	–	60

8. Install the propeller shaft anode and secure with the screw. Tighten the screw to the specified torque.



Bravo Three

- **a -** Rear propeller nut
- **b -** Rear propeller
- **c -** Rear propeller thrust hub
- **d -** Front propeller nut
- **e -** Front propeller
- **f -** Front propeller thrust hub
- **g -** Propeller shaft anode screw
- **h -** Flat washer
- **i -** Star washer
- **j -** Propeller shaft anode

Description	Nm	lb-in.	lb-ft
Propeller shaft anode screw	19	168	–

Drive Belt

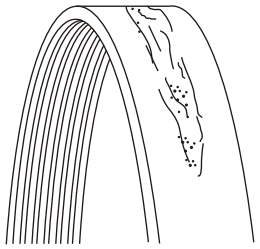
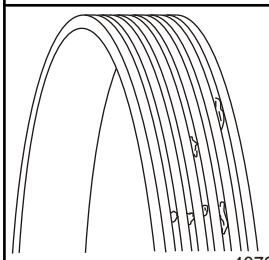
All drive belts must be periodically inspected for tension and condition. Turn the engine off and remove the ignition key before inspecting for excessive wear, cracks, fraying, and glazed surfaces.

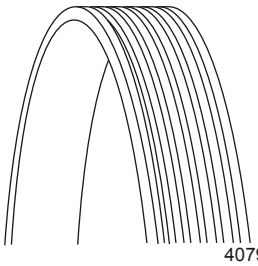
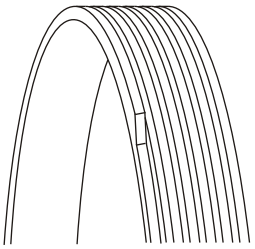
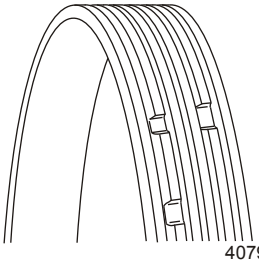
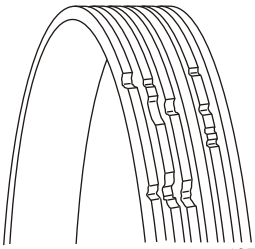
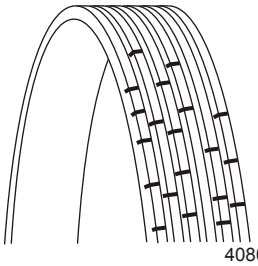
⚠ WARNING

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 that the drive belt replacement be performed by a Mercury Diesel–authorized repair facility.

Drive Belt Failure Identification

Appearance	Description	Cause	Solution
 40791	**Abrasion** Each side of the belt appears shiny or glazed. Severe condition: Fabric is exposed.	The belt is in contact with an object. This can be caused by improper belt tension or tensioner failure.	Replace the belt and inspect its route for contact with another object. Verify that the belt tensioner is functioning.
 40794	**Pilling** Belt material is sheared off from the ribs and builds up in the belt grooves.	There are a number of causes including lack of tension, misalignment, worn pulleys, or a combination of these factors.	When pilling leads to belt noise or excess vibration, the belt should be replaced.

Appearance	Description	Cause	Solution
 40795	**Improper installation** The belt ribs begin separating from the joined strands. If left unattended, the cover will often separate, causing the belt to unravel.	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.	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.
 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.

Notes:

Section 6 - Storage

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6

Cold Weather (Freezing Temperature), Seasonal Storage, and Extended Storage

IMPORTANT: Mercury Diesel strongly recommends that this service be performed by a Mercury Diesel–authorized repair facility. Damage caused by freezing 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.*

You should consider a boat is in storage whenever it is not in operation. The amount of time that the power package is not operated may be for a brief period, such as during a day, overnight, for a season, or for an extended period of time. Certain precautions and procedures must be observed to protect the power package from freeze damage, corrosion damage, or both types of damage during storage.

Freeze damage can happen when water trapped in the seawater cooling system freezes. For example, after operating the boat, exposure to freezing temperatures for even a brief period of time could result in freeze damage.

Corrosion damage is the result of saltwater, polluted water, or water with a high mineral content trapped in the seawater cooling system. Saltwater should not stay in an engine's cooling system for even a brief storage time; drain and flush the seawater cooling system after each outing.

Cold weather operation refers to operating the boat whenever the possibility of freezing temperatures exists. Likewise, cold weather (freezing temperature) storage refers to whenever the boat is not being operated and the possibility of freezing temperatures exists. The seawater section of the cooling system must be completely drained immediately after operation.

Seasonal storage refers to when the boat is not being operated for one month or more. The length of time varies depending on the geographic location of the boat in storage. Seasonal storage precautions and procedures include all of the steps for cold weather (freezing temperature) storage and some additional steps that must be taken when storage will last longer than the short time of cold weather (freezing temperature) storage.

Extended storage means storage for a period of time that may last for several seasons or longer. Extended storage precautions and procedures include all of the steps for cold weather (freezing temperature) storage and seasonal storage plus some additional steps.

Refer to the specific procedures in this section related to the conditions and the length of storage for your application.

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. Follow all warnings and flushing attachment procedures stated in Flushing the Seawater System.

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

Seasonal Storage Instructions

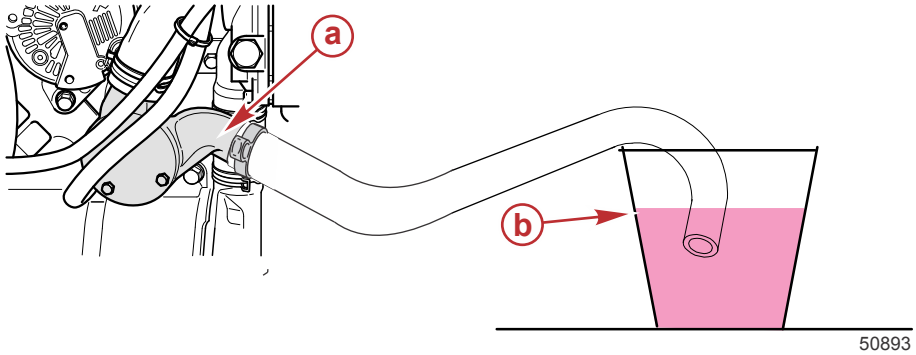
1. Read all precautions and perform all procedures found in **Preparing Your Power Package for Seasonal or Extended Storage**.
2. Read all precautions and perform all procedures found in **Flushing and Draining the Seawater System** and drain the seawater section of the cooling system.

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 propylene glycol 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 provide –73.3 °C (–100 °F) protection to the engine.
4. Disconnect the seawater inlet hose from the seawater pump. Using an adapter, if required, temporarily connect an appropriate length piece of hose to the seawater pump and place the other end of the hose into the container of propylene glycol antifreeze and tap water.



a - Seawater pump
b - 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.*

5. Start the engine and operate at idle speed until the antifreeze mixture has been pumped into the engine seawater cooling system.
6. Stop the engine.
7. Remove the temporary hose from the seawater pump.
8. 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	Where Used	Part Number
Corrosion Guard	Outside of engine, transom assembly, and sterndrive	92-802878-55
Light gray primer paint	Outside of engine, transom assembly, and sterndrive	92-802878-52
Phantom black paint	Transom assembly and sterndrive	92-802878-1
Diesel white paint	Outside of engine	92-8M0071082

9. Your Mercury Diesel–authorized repair facility should now perform all checks, inspections, lubrications, and fluid changes outlined in **Maintenance Schedules**.

NOTICE

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

10. Place the sterndrive in the full down (in) position.
11. 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.

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**.
3. Read all precautions and perform all procedures found in **Seasonal Storage Instructions**.
4. 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.
5. 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

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

1. On engines that were prepared for extended storage, refer to a Mercury Diesel authorized repair facility and have the seawater pump impeller installed, if it was removed for storage.
2. On engines that were prepared for cold weather (freezing temperature), seasonal, or extended storage, drain the propylene glycol antifreeze into a suitable container. Refer to **Flushing and Draining the Seawater System.** Dispose of the propylene glycol antifreeze in accordance with federal, state, and local laws and guidelines.
3. Ensure that all cooling system hoses are in good condition, connected properly, and clamped tightly. Verify that all drain valves and drain plugs are installed and tight.
4. Inspect all drive belts.
5. Perform all lubrication and maintenance specified for completion according to **Annually** in **Maintenance Schedules**, except items that were performed at time of engine storage.
6. Fill the fuel tanks with fresh diesel fuel. Do not use old fuel. Check the general condition of the fuel lines and inspect the connections for leaks.
7. Replace the water-separating fuel filter or filters (some engines may have more than one).

⚠ 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.

8. Install a fully charged battery. Clean the battery cable clamps and terminals. Reconnect the cables (see the CAUTION listed above). Secure each cable clamp when connecting. Coat terminals with a battery terminal anti-corrosion spray to help retard corrosion.
9. Perform all checks in the Starting Procedure column found in the **Operation Chart**. See the **On the Water** section.

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.

10. Supply cooling water to the water inlet openings.
11. Start the engine and closely observe instrumentation. Ensure that all systems are functioning correctly.
12. Carefully inspect the engine for fuel, oil, fluid, water, and exhaust leaks.
13. Check the steering system, shift, and throttle control for proper operation.

Section 7 - Troubleshooting

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7

Diagnosing Electronically Controlled Fuel System Problems

Your Mercury Diesel authorized repair facility has the proper service tools for diagnosing problems on electronically controlled fuel systems. The engine control module on these engines has the ability to detect some problems with the system when they occur, and store a trouble code in the control module's memory. This code can then be read later by a service technician using a special diagnostic tool.

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.
Faulty turbocharger outlet air temperature sensor.	Replace.

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.

Possible Cause	Remedy
Faulty thermostat.	Replace. See a Mercury Diesel–authorized repair facility.
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.

Power Trim Does Not Operate (Electric Motor Operates but Sterndrive Unit Does Not Move)

Possible Cause	Remedy
The trim pump oil level is low.	Fill the trim pump with oil.
The drive unit is binding in the gimbal ring.	Check for obstruction. See a Mercury Diesel–authorized repair facility.

Power Trim Does Not Operate (Electric Motor Does Not Operate)

Possible Cause	Remedy
Blown fuse.	Replace the fuse.
Loose or dirty electrical connections or damaged wiring.	Check all the associated electrical connections and the wires (especially the battery cables). Clean and tighten the faulty connection. Repair or replace the wiring.

Notes:

Section 8 - Customer Assistance Information

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8

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 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 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:

- 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 Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
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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			Total Due	.

Section 9 - Maintenance Log

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Maintenance Log

Record all maintenance performed on your power package here. Be sure to save all work orders and receipts.

Date	Maintenance Performed	Engine Hours