

Thank You

for your purchase of one of the finest outboards available. You have made a sound investment in boating pleasure. Your outboard has been manufactured by Mercury Marine, a world leader in marine technology and outboard manufacturing since 1939. These years of experience have been committed to the goal of producing the finest quality products. This led to Mercury Marine's reputation for strict quality control, excellence, durability, lasting performance, and being the best at providing after the sale support.

Please read this manual carefully before operating your outboard. This manual has been prepared to assist you in the operation, safe use, and care of your outboard.

All of us at Mercury Marine took pride in building your outboard and wish you many years of happy and safe boating.

Again, thank you for your confidence in Mercury Marine.

EPA Emissions Regulations

Outboards sold by Mercury Marine in the United States are certified to the United States Environmental Protection Agency as conforming to the requirements of the regulations for the control of air pollution from new outboard motors. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, wherever practicable, returned to the original intent of the design. **Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine engine repair establishment or individual.**

Engines are labeled with an Emission Control Information decal as permanent evidence of EPA certification.

WARNING

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

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 Information** section 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.

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

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

Litho in U.S.A.

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

Mercury Premier Service

Mercury evaluates the service performance of its dealers and assigns its highest rating of "Mercury Premier" to those demonstrating an exceptional commitment to service.

Earning a Mercury Premier Service rating means a dealer:

- Achieves a high 12 month service CSI (Customer Satisfaction Index) score for warranty service.
- Possesses all necessary service tools, test equipment, manuals, and parts books.
- Employs at least one Certified or Master technician.

- Provides timely service for all Mercury Marine customers.
- Offers extended service hours and mobile service, when appropriate.
- Uses, displays, and stocks adequate inventory of genuine Mercury Precision Parts.
- Offers a clean, neat shop with well organized tools and service literature.

Declaration of Conformity OptiMax - For Recreational Craft Propulsion Engines with the Requirements of Directive 94/25/EC as amended by 2003/44/EC

Name of engine manufacturer: Mercury Marine			
Address: W6250 Pioneer Road P.O. Box 1939			
Town: Fond du Lac, WI	Post Code: 54936-1939	Country: USA	

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

Name of Notified Body for exhaust emission assessment: Det Norske Veritas AS			
Address: Veritasveien 1			
Town: Hovik	Post Code: 1322	Country: Norway	ID Number: 0575

Name of Notified Body for noise emission assessment: Det Norske Veritas AS			
Address: Veritasveien 1			
Town: Hovik	Post Code: 1322	Country: Norway	ID Number: 0575

Conformity assessment module used for exhaust emissions:	<input type="checkbox"/> B+C	<input type="checkbox"/> B+D	<input type="checkbox"/> B+E	<input type="checkbox"/> B+F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> H
Conformity assessment module used for noise emissions:	<input type="checkbox"/> A	<input type="checkbox"/> Aa	<input type="checkbox"/> G	<input checked="" type="checkbox"/> H		
Other Community Directives applied: Safety of Machinery Directive 98/37/EC; Electromagnetic Compatibility Directive 2004/108/EC						

Description of Engines and Essential Requirements

Engine Type	Fuel Type	Combustion Cycle
<input checked="" type="checkbox"/> Outboard engine	<input checked="" type="checkbox"/> Petrol	<input checked="" type="checkbox"/> 2 stroke

Identification of Engines Covered by This Declaration of Conformity

Name of engine family	Unique engine identification number: starting serial number	EC Module H certificate number
1.5L OptiMax 75, 80, 90, 115, 125 hp	1B227000	RCD-H-2
2.5L OptiMax 135, 150, 175 hp	1B227000	RCD-H-2
3.0L OptiMax 200, 225 hp	1B227000	RCD-H-2

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	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B.2 exhaust emission requirements	<input checked="" type="checkbox"/> *	<input type="checkbox"/>	<input type="checkbox"/>	* EN ISO 8178-1:1996
B.3 durability	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
B.4 owner's manual	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	ISO 8665: 1995
Annex 1.C—Noise Emissions				
C.1 Noise emission levels	<input checked="" type="checkbox"/> *	<input type="checkbox"/>	<input type="checkbox"/>	EN ISO 14509
C.2 Owner's manual	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 engines mentioned preceding complies with all applicable essential requirements in the way specified.

Name / function:

Mark D. Schwabero, President, Mercury
Outboard

A handwritten signature in black ink, reading "Mark D. Schwabero". The signature is written in a cursive style with a large, stylized initial 'M'.

Date and place of issue: July 24, 2008
Fond du Lac, Wisconsin, USA

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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 on marine products sold in the United States, should a safety recall notification under the Federal Safety Act be required.*

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

Your dealer can also process this change of information.

Mercury Marine

Attn: Warranty Registration Department

W6250 W. Pioneer Road

P.O. Box 1939

Fond du Lac, WI 54936-1939

920-929-5054

Fax +1 920 929 5893

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 INFORMATION

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 W. Pioneer Road
P.O. Box 1939
Fond du Lac, WI 54936-1939
920-929-5054
Fax +1 920 929 5893

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.

Transfer of Mercury Product Protection (Extended Service Coverage) Plan United States and Canada

The remaining coverage period of the Product Protection Plan is transferable to the subsequent purchaser of the engine within thirty (30) days from the date of sale. Contracts not transferred within thirty (30) days of the subsequent purchase will no longer be valid and the product will no longer be eligible for coverage under the terms of the contract.

WARRANTY INFORMATION

To transfer the plan to the subsequent owner, contact Mercury Product Protection or an authorized dealer to receive a Request for Transfer form. Submit to Mercury Product Protection a receipt/bill of sale, a completed Request of Transfer form, and a check payable to Mercury Marine in the amount of \$50.00 (per engine) to cover the transfer fee.

Plan coverage is not transferable from one product to another product or for non-eligible applications.

The Certified Pre-Owned engine plans are not transferable.

For help or assistance, contact Mercury Product Protection Department at 1-888-427-5373 from 7:30 a.m. to 4:30 p.m. CST, Monday–Friday or email mpp_support@mercmarine.com.

Outboard Limited Warranty

UNITED STATES, CANADA, EUROPE, MIDDLE EAST, AFRICA, AND THE CONFEDERATION OF INDEPENDENT STATES

WHAT IS COVERED: Mercury Marine warrants its new products to be free of defects in material and workmanship during the period described below.

WARRANTY INFORMATION

DURATION OF COVERAGE: This Limited Warranty provides coverage for three (3) years from the date the product is first sold to a recreational use retail purchaser, or the date on which the product is first put into service, whichever occurs first.

Commercial users of these products receive warranty coverage of one (1) year from the date of first retail sale, or one (1) year from the date on which the product was first put into service, whichever occurs first. Commercial use is defined as any work or employment related use of the product, or any use of the product which generates income, for any part of the warranty period, even if the product is only occasionally used for such purposes.

The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred from one recreational use customer to a subsequent recreational use customer upon proper reregistration of the product. Unexpired warranty coverage cannot be transferred either to or from a commercial use customer.

Warranty coverage may be terminated for used repossessed product; or product purchased at auction, from a salvage yard, or from an insurance company.

CONDITIONS THAT MUST BE MET IN ORDER TO OBTAIN WARRANTY COVERAGE: Warranty coverage is available only to retail customers that purchase from a Dealer authorized by Mercury Marine to distribute the product in the country in which the sale occurred, and then only after the Mercury Marine specified 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 reregistered) may void the warranty at the sole discretion of Mercury Marine. Routine maintenance outlined in the Operation and Maintenance Manual must be timely performed in order to maintain warranty coverage. Mercury Marine reserves the right to make warranty coverage contingent upon proof of proper maintenance.

WARRANTY INFORMATION

WHAT MERCURY WILL DO: Mercury's sole and exclusive obligation under this warranty is limited to, at our option, repairing a defective part, replacing such part or parts with new or Mercury Marine certified 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.

WARRANTY INFORMATION

WHAT IS NOT COVERED: This limited warranty does not cover routine maintenance items, tune-ups, adjustments, normal wear and tear, damage caused by abuse, abnormal use, use of a propeller or gear ratio that does not allow the engine to run in its recommended wide-open throttle RPM range (see the Operation and Maintenance Manual), operation of the product in a manner inconsistent with the recommended operation/duty cycle section of the Operation and Maintenance Manual, neglect, accident, submersion, improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product), improper service, use of an accessory or part not manufactured or sold by us, jet pump impellers and liners, operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operation and Maintenance Manual), alteration or removal of parts, water entering the engine through the fuel intake, air intake or exhaust system, or damage to the product from insufficient cooling water caused by blockage of the cooling system by a foreign body, running the engine out of water, mounting the engine too high on the transom, or running the boat with the engine trimmed out too far. Use of the product for racing or other competitive activity, or operating with a racing type lower unit, at any point, even by a prior owner of the product, voids the warranty.

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

No individual or entity, including Mercury Marine authorized dealers, has been given authority by Mercury Marine to make any affirmation, representation or warranty regarding the product, other than those contained in this limited warranty, and if made, shall not be enforceable against Mercury Marine.

WARRANTY INFORMATION

For additional information regarding events and circumstances covered by this warranty, and those that are not, see the Warranty Coverage section of the Operation and Maintenance Manual, incorporated by reference into this warranty.

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

WHAT IS COVERED: Mercury Marine warrants that each new Mercury, Mariner, Mercury Racing, Sport Jet, M² Jet Drive, Tracker by Mercury Marine Outboard, Mercury MerCruiser Inboard or Sterndrive Engine (Product) will not be rendered inoperative as a direct result of corrosion for the period of time described below.

DURATION OF COVERAGE: This limited corrosion warranty provides coverage for three (3) years from either the date the product is first sold, or the date on which the product is first put into service, whichever occurs first. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred to subsequent (noncommercial use) purchaser upon proper reregistration of the product.

WARRANTY INFORMATION

CONDITIONS THAT MUST BE MET IN ORDER TO OBTAIN

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

WHAT MERCURY WILL DO: Mercury's sole and exclusive obligation under this warranty is limited to, at our option, repairing a corroded part, replacing such part or parts with new or Mercury Marine certified 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.

WARRANTY INFORMATION

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

WHAT IS NOT COVERED: This limited warranty does not cover electrical system corrosion; corrosion resulting from damage, corrosion which causes purely cosmetic damage, abuse, or improper service; corrosion to accessories, instruments, steering systems; corrosion to factory installed jet drive unit; damage due to marine growth; product sold with less than a one year limited Product warranty; replacement parts (parts purchased by 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 the warranty period, even if the product is only occasionally used for such purposes.

WARRANTY INFORMATION

Corrosion damage caused by stray electrical currents (onshore power connections, nearby boats, submerged metal) is not covered by this corrosion warranty and should be protected against by the use of a corrosion protection system, such as the Mercury Precision Parts or Quicksilver MerCathode system and/or Galvanic Isolator. Corrosion damage caused by improper application of copper base antifouling paints is also not covered by this limited warranty. If antifouling protection is required, Tri-Butyl-Tin-Adipate (TBTA) base antifouling paints are recommended on Outboard and MerCruiser boating applications. In areas where TBTA base paints are prohibited by law, copper base paints can be used on the hull and transom. Do not apply paint to the outboard or MerCruiser product. In addition, care must be taken to avoid an electrical interconnection between the warranted product and the paint. For MerCruiser product, an unpainted gap of at least 38 mm (1.5 in.) should be left around the transom assembly. Refer to the Operation and Maintenance Manual for additional details.

For additional information regarding events and circumstances covered by this warranty, and those that are not, see the Warranty Coverage section of the Operation and Maintenance Manual, incorporated by reference into this warranty.

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.

WARRANTY INFORMATION

Warranty Coverage and Exclusions

The purpose of this section is to help eliminate some of the more common misunderstandings regarding warranty coverage. The following information explains some of the types of services that are not covered by warranty. The provisions set forth following have been incorporated by reference into the Three Year Limited Warranty Against Corrosion Failure, the International Limited Outboard Warranty, and the United States and Canada Limited Outboard Warranty.

Keep in mind that warranty covers repairs that are needed within the warranty period because of defects in material and workmanship. Installation errors, accidents, normal wear, and a variety of other causes that affect the product are not covered.

Warranty is limited to defects in material or workmanship, but only when the consumer sale is made in the country to which distribution is authorized by us.

Should you have any questions concerning warranty coverage, contact your authorized dealer. They will be pleased to answer any questions that you may have.

GENERAL EXCLUSIONS FROM WARRANTY

1. Minor adjustments and tune-ups, including checking, cleaning, or adjusting spark plugs, ignition components, carburetor settings, filters, belts, controls, and checking lubrication made in connection with normal services.
2. Factory installed jet drive units - Specific parts excluded from the warranty are: the jet drive impeller and jet drive liner damaged by impact or wear, and water damaged driveshaft bearings as a result of improper maintenance.
3. Damage caused by neglect, lack of maintenance, accident, abnormal operation, or improper installation or service.
4. Haul-out, launch, towing charges, removal and/or replacement of boat partitions or material because of boat design for necessary access to the product, all related transportation charges and/or travel time, etc. Reasonable access must be provided to the product for warranty service. Customer must deliver product to an authorized dealer.

WARRANTY INFORMATION

5. Additional service work requested by customer other than that necessary to satisfy the warranty obligation.
6. Labor performed by other than an authorized dealer may be covered only under the following circumstances: when performed on emergency basis (providing there are no authorized dealers in the area who can perform the work required or have no facilities to haul-out, etc., and prior factory approval has been given to have the work performed at this facility).
7. All incidental and/or consequential damages (storage charges, telephone or rental charges of any type, inconvenience or loss of time or income) are the owner's responsibility.
8. Use of other than Mercury Precision or Quicksilver parts when making warranty repairs.
9. Oils, lubricants, or fluids changed as a matter of normal maintenance is customer's responsibility unless loss or contamination of same is caused by product failure that would be eligible for warranty consideration.
10. Participating in or preparing for racing or other competitive activity or operating with a racing type lower unit.
11. Engine noise does not necessarily indicate a serious engine problem. If diagnosis indicates a serious internal engine condition which could result in a failure, condition responsible for noise should be corrected under the warranty.
12. Lower unit and/or propeller damage caused by striking a submerged object is considered a marine hazard.
13. Water entering engine through the fuel intake, air intake, or exhaust system or submersion.
14. Failure of any parts caused by lack of cooling water, which results from starting motor out of water, foreign material blocking inlet holes, motor being mounted too high, or trimmed too far out.
15. Use of fuels and lubricants which are not suitable for use with or on the product. Refer to the **Maintenance** section.

WARRANTY INFORMATION

16. Our limited warranty does not apply to any damage to our products caused by the installation or use of parts and accessories which are not manufactured or sold by us. Failures which are not related to the use of those parts or accessories are covered under warranty if they otherwise meet the terms of the limited warranty for that product.

U.S. EPA Emissions Limited Warranty

Consistent with the obligations created by 40 CFR Part 1045, Subpart B, Mercury Marine provides a five year or 175 hours of engine use, whichever occurs first, to the retail customer, 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**.

Emission Control System Components

The EPA and California emission-related warranty covers all the following list of components:

COMPONENTS OF THE EMISSIONS CONTROL SYSTEM:

1. Fuel metering system
 - a. Carburetor and internal parts (and/or 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 (where applicable)
3. Ignition system
 - a. Spark plugs
 - b. Magneto or electronic ignition system
 - c. Spark advance/retard system

WARRANTY INFORMATION

- d. Ignition coil and/or control module
- e. Ignition wires
- 4. Lubrication system (4-Stroke engines excluded)
 - a. Oil pump and internal parts
 - b. Oil injectors
 - c. Oil meter
- 5. Exhaust system
 - a. Exhaust manifold
 - b. Exhaust valves
- 6. 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. Electronic controls

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

California Emissions Limited Warranty

The California Air Resources Board has promulgated air emission regulations for outboard engines. The regulations apply to all outboard engines sold to retail consumers in California, and which were manufactured for the 2001 model year and later. Mercury Marine, in compliance with those regulations, provides this limited warranty for the emission control systems (see the components listed in the **Emission Control System Components**), and further warrants that the outboard engine was designed, built, and equipped to conform with all applicable regulations adopted by the California Air Resources Board pursuant to its authority in Chapters 1 and 2, Part 5, Division 26 of the Health and Safety Code. For information regarding the limited warranty for the nonemission-related components of the outboard, please see the limited warranty statement for your outboard.

WARRANTY INFORMATION

WHAT IS COVERED: Mercury Marine warrants the components of the emissions control systems (see the components listed in the **Emission Control System Components**) of its new, 2001 model year and later outboards, sold by a California dealer to retail customers residing in California, to be free from defects in material or workmanship, that cause the failure of a warranted part to be identical in all material respects to that part as described in the application of Mercury Marine for certification from the California Air Resources Board, for the period of time, and under the conditions, identified below. The cost to diagnose a warranty failure is covered under the warranty (if the warranty claim is approved). Damage to other engine components caused by the failure of a warranted part will also be repaired under warranty.

DURATION OF COVERAGE: This limited warranty provides coverage for the components of the emissions control systems of new, 2001 model year and later outboards, sold to retail customers in California for four (4) years from either the date the product is first sold, or first put into service, whichever occurs first, or the accumulation of 250 hours of engine operation (as determined by the engine's hour meter, if any). Emission-related normal maintenance items such as spark plugs and filters, that are on the warranted parts list, are warranted up to their first required replacement interval only. Refer to **Emission Control System Components and Maintenance Schedule**. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred to a subsequent purchaser. (See instructions on transfer of warranty.)

WARRANTY INFORMATION

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

WHAT MERCURY WILL DO: Mercury Marine's sole and exclusive obligation under this warranty is limited to, at our expense and at our option, repairing or replacing defective parts with new or Mercury Marine certified 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.

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

WARRANTY INFORMATION

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

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

DISCLAIMERS AND LIMITATIONS

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

If you have any questions regarding your warranty rights and responsibilities, you should contact Mercury Marine at 1-920-929-5040.

WARRANTY INFORMATION

California Air Resources Board Explanation of Your California Emission Control Warranty Statement

YOUR WARRANTY RIGHTS AND OBLIGATIONS: The California Air Resources Board is pleased to explain the emission control system warranty on your 2001 model year and later outboard engine. In California, new outboard engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. Mercury Marine must warrant the emission control system on your outboard engine for the periods of time listed below, provided there has been no abuse, neglect, or improper maintenance of your outboard engine.

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

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

MANUFACTURER'S WARRANTY COVERAGE: Select emission control parts from model year 2001 and later outboard engines are warranted for four (4) years, or for 250 hours of use, whichever occurs first. However, warranty coverage based on the hourly period is only permitted for outboard engines and personal watercraft equipped with appropriate hour meters or their equivalent. If any emission-related part on your engine is defective under warranty, the part will be repaired or replaced by Mercury Marine.

OWNER'S WARRANTY RESPONSIBILITIES: As the outboard engine owner, you are responsible for the performance of the required maintenance listed in the **Maintenance** section. Mercury Marine recommends that you retain all receipts covering maintenance on your outboard engine, but Mercury Marine cannot deny warranty solely for the lack of receipts or your failure to ensure the performance of all scheduled maintenance.

WARRANTY INFORMATION

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

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

If you have any questions regarding your warranty rights and responsibilities, you should contact Mercury Marine at 1-920-929-5040.

Emission Certification Star Label



Outboards are labeled on the cowl with one of the following star labels.

The symbol for a cleaner marine engine means:

Cleaner air and water - for a healthier lifestyle and environment.

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

Longer emission warranty - protects consumer for worry-free operation.

 <p>The label features a black oval with a white star in the center. The word "LOW" is written in white above the star, and "EMISSION" is written in white below the star. A banner across the star contains the text "CALIFORNIA EMISSION STANDARDS". The number "22531" is printed to the right of the label.</p>	<p>One Star - Low Emission</p> <p>The One Star label identifies engines that meet the Air Resources Board's 2001 exhaust emissions standards. Engines meeting these standards have 75% lower emissions than conventional carbureted two-stroke engines. These engines are equivalent to the U.S. EPA's 2006 standards for marine engines.</p>
 <p>The label features a circular design with a white star in the center. The words "VERY LOW" are written in white above the star, and "EMISSION" is written in white below the star. A banner across the star contains the text "PERSONAL WATERCRAFT AND OUTBOARD MARINE ENGINE". The number "42537" is printed to the right of the label.</p>	<p>Two Stars - Very Low Emission</p> <p>The Two Star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2004 exhaust emissions standards. Engines meeting these standards have 20% lower emissions than One Star - Low Emission engines.</p>

WARRANTY INFORMATION



Three Stars - Ultra Low Emission

The Three Star label identifies engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2008 exhaust emissions standards or the Sterndrive and Inboard marine engine 2003-2008 exhaust emission standards. Engines meeting these standards have 65% lower emissions than One Star - Low Emission engines.



Four Stars - Super Ultra Low Emission

The Four Star label identifies engines that meet the Air Resources Board's Sterndrive and Inboard marine engine 2009 exhaust emission standards. Personal Watercraft and Outboard marine engines may also comply with these standards. Engines meeting these standards have 90% lower emissions than One Star - Low Emission engines.

GENERAL INFORMATION

Boater's Responsibilities

The operator (driver) is responsible for the correct and safe operation of the boat and safety of its occupants and general public. It is strongly recommended that each operator (driver) read and understand this entire manual before operating the outboard.

Be sure at least one additional person onboard is instructed in the basics of starting and operating the outboard and boat handling in case the driver is unable to operate the boat.

Before Operating Your Outboard

Read this manual carefully. Learn how to operate your outboard properly. If you have any questions, contact your dealer.

Safety and operating information that is practiced, along with using good common sense, can help prevent personal injury and product damage.

This manual as well as safety labels posted on the outboard use the following safety alerts to draw your attention to special safety instructions that should be followed.

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.

GENERAL INFORMATION

Boat Horsepower Capacity

WARNING

Exceeding the boat's maximum horsepower rating can cause serious injury or death. Overpowering the boat can affect boat control and flotation characteristics or break the transom. Do not install an engine that exceeds the boat's maximum power rating.

Do not overpower or overload your boat. Most boats will carry a required capacity plate indicating the maximum acceptable power and load as determined by the manufacturer following certain federal guidelines. If in doubt, contact your dealer or the boat manufacturer.

U.S. COAST GUARD CAPACITY	
MAXIMUM HORSEPOWER	XXX
MAXIMUM PERSON CAPACITY (POUNDS)	XXX
MAXIMUM WEIGHT CAPACITY	XXX

26777

High-Speed and High-Performance Boat Operation

If your outboard is to be used on 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 familiarization demonstration ride with your dealer or an operator experienced with your boat/outboard combination. For additional information, obtain a copy of our **Hi-Performance Boat Operation** booklet from your dealer, distributor, or Mercury Marine.

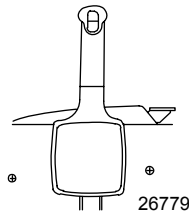
GENERAL INFORMATION

Outboard Remote Control Models

The remote control connected to your outboard must be equipped with a start in neutral only protection device. This prevents the engine from starting when the shift is actuated in any position other than neutral.

WARNING

Starting the engine with the drive in gear can cause serious injury or death. Never operate a boat that does not have a neutral-safety-protection device.



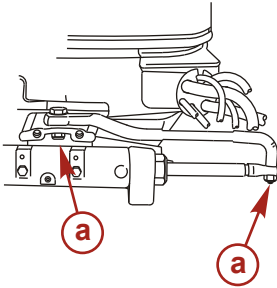
Remote Steering Notice

The steering link rod that connects the steering cable to the engine must be fastened utilizing self-locking nuts. These self-locking nuts must never be replaced with common nuts (non-locking) as they will work loose and vibrate off, freeing the link rod to disengage.

GENERAL INFORMATION

⚠ WARNING

Improper fasteners or improper installation procedures can result in loosening or disengagement of the steering link rod. This can cause a sudden, unexpected loss of boat control, resulting in serious injury or death due to occupants being thrown within or out of the boat. Always use required components and follow instructions and torque procedures.



a - Self-locking nuts

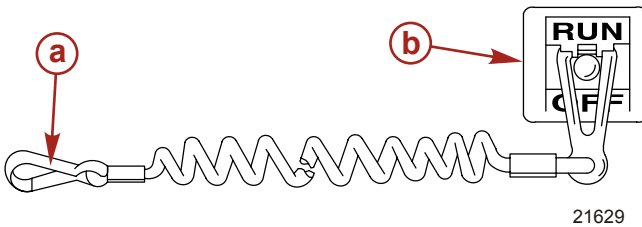
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Lanyard Stop Switch

The purpose of a lanyard stop switch is to turn off the engine when the operator moves far enough away from the operator's position (as in accidental ejection from the operator's position) to activate the switch. Tiller handle outboards and some remote control units are equipped with a lanyard stop switch. A lanyard stop switch can be installed as an accessory - generally on the dashboard or side adjacent to the operator's position.

GENERAL INFORMATION

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



- a** - Lanyard cord
- b** - Lanyard stop switch

Read the following Safety Information before proceeding.

GENERAL INFORMATION

Important Safety Information: The purpose of a lanyard stop switch is to stop the engine when the operator moves far enough away from the operator's position to activate the switch. This would occur if the operator accidentally falls overboard or moves within the boat a sufficient distance from the operator's position. Falling overboard and accidental ejections are more likely to occur in certain types of boats such as low sided inflatables, bass boats, high performance boats, and light, sensitive handling fishing boats operated by a hand tiller. Falling overboard and accidental ejections are also likely to occur as a result of poor operating practices such as sitting on the back of the seat or gunwale at planing speeds, standing at planing speeds, sitting on elevated fishing boat decks, operating at planing speeds in shallow or obstacle infested waters, releasing your grip on a steering wheel or tiller handle that is pulling in one direction, drinking alcohol or consuming drugs, or daring high speed boat maneuvers.

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

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

WARNING

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

GENERAL INFORMATION

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.

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 gearcase or propeller.
- Loss of power and directional control in heavy seas, strong current, or high winds.
- Loss of control when docking.

KEEP THE LANYARD STOP SWITCH AND LANYARD CORD IN GOOD OPERATING CONDITION

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

Before each use, visually inspect the lanyard cord to ensure 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.

Stopping the Boat in an Emergency

A jet powered boat has emergency stopping capability unique to this form of propulsion.

GENERAL INFORMATION

⚠ WARNING

Using the emergency stopping capability of a jet drive unit will slow down the boat in an emergency. However, sudden stopping may cause the occupants of the boat to be thrown forward or out of the boat resulting in serious injury or death. Use caution when performing the emergency stopping procedure, and be sure to practice in a safe area.

In an emergency, putting the jet outboard into reverse and applying reverse throttle can rapidly slow down the boat and reduce stopping distance. However, such a maneuver may cause occupants in the boat to be thrown forward or possibly out of the boat.

Protecting People In The Water

WHILE YOU ARE CRUISING

It is very difficult for a person standing or floating in the water to take quick action to avoid a boat heading in his/her direction, even at slow speed.



Always slow down and exercise extreme caution when boating in an area where there might be people in the water.

Avoid shallow water or where any loose material such as sand, shells, seaweed, grass, tree branches, etc., can be pulled in and expelled from the pump as a high speed projectile.

GENERAL INFORMATION

WHILE BOAT IS STATIONARY

WARNING

Avoid injury resulting from contacting the rotating impeller or having hair, clothing, or loose objects drawn into the water intake and wrapping around the impeller shaft. Stay away from the water intake and never insert an object into the water intake or water outlet nozzle when the engine is running.

Stop the engine immediately whenever a person is in the water near the boat. The jet drive is always drawing water through the water intake when the engine is running. Stay away from the water intake located under the jet drive and never insert an object into the water intake or outlet nozzle when the engine is running.

Passenger Safety Message - Pontoon Boats and Deck Boats

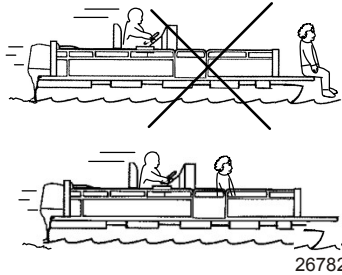
Whenever the boat is in motion, observe the location of all passengers. Do not allow any passengers to stand or use seats other than those designated for traveling faster than idle speed. A sudden reduction in boat speed, such as plunging into a large wave or wake, a sudden throttle reduction, or a sharp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

BOATS HAVING AN OPEN FRONT DECK

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

GENERAL INFORMATION

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.



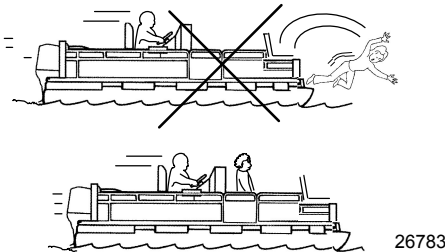
⚠ WARNING

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.

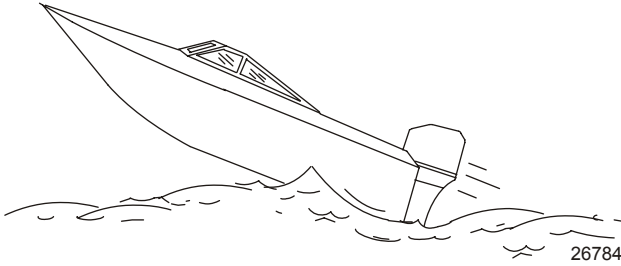
Any unexpected, sudden reduction in boat speed could result in the elevated passenger falling over the front of the boat.



GENERAL INFORMATION

Wave and Wake Jumping

Operating recreational boats over waves and wake is a natural part of boating. However, when this activity is done with sufficient 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 case, the landing may cause the boat to veer violently in a new direction. Such a sharp change in direction can cause occupants to be thrown out of their seats, or out of the boat.

WARNING

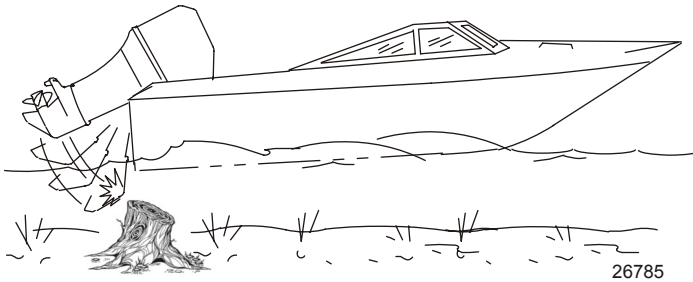
Wave or wake jumping can cause serious injury or death from occupants being thrown within or out of the boat. Avoid wave or wake jumping whenever possible.

There is another less common hazardous result from allowing your boat to launch off 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 to a nearly instantaneous stop and can send the occupants flying forward. The boat may also steer sharply to one side.

GENERAL INFORMATION

Impact with Underwater Hazards

Reduce speed and proceed with caution whenever you drive a boat in shallow water areas, or in areas where you suspect underwater obstacles may exist which could be struck by the outboard or the boat bottom. **The most important thing you can do to help reduce injury or impact damage from striking a floating or underwater object is to control the boat speed. Under these conditions, boat speed should be kept to a minimum planing speed of 24 to 40 km/h (15 to 25 MPH).**



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

- Part of the outboard or the entire outboard could break loose and fly into the boat.
- The boat could move suddenly in a new direction. Such a sharp change in direction can cause occupants to be thrown out of their seats or out of the boat.
- A rapid reduction in speed. This will cause occupants to be thrown forward, or even out of the boat.
- Impact damage to the outboard and/or boat.

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

GENERAL INFORMATION

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

The boat should also be checked for any hull fractures, transom fractures, or water leaks.

Operating a damaged outboard could cause additional damage to other parts of the outboard, or could affect control of the boat. If continued running is necessary, do so at greatly reduced speeds.

WARNING

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

Exhaust Emissions

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.

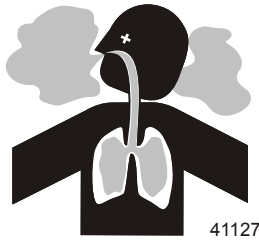
WARNING

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.

GENERAL INFORMATION

STAY CLEAR OF EXHAUST AREAS

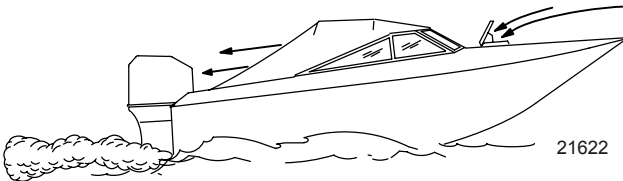


Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately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



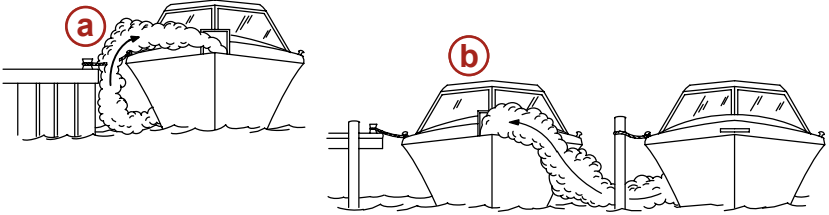
POOR VENTILATION

Under certain running and/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.

GENERAL INFORMATION

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.

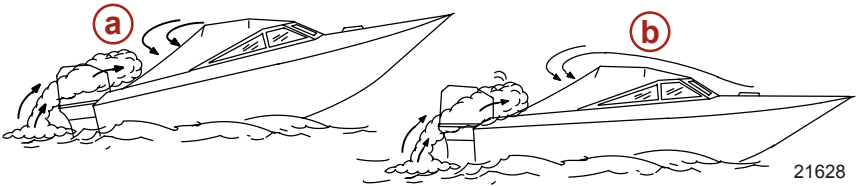
1. Examples of poor ventilation while the boat is stationary:



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:



21628

- 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)

Selecting Accessories for Your Outboard

Genuine Mercury Precision or Quicksilver Accessories have been specifically designed and tested for your outboard. These accessories are available from Mercury Marine dealers.

IMPORTANT: Check with your dealer before installing accessories. The misuse of approved accessories or the use of nonapproved accessories can damage the product.

GENERAL INFORMATION

Some accessories not manufactured or sold by Mercury Marine are not designed to be safely used with your outboard or outboard operating system. Acquire and read the installation, operation and maintenance manuals for all your selected accessories.

Safe Boating Suggestions

In order to safely enjoy the waterways, the operator should be familiar with local and other governmental boating regulations and restrictions, and consider the following suggestions.

Use flotation devices. Have an approved personal flotation device of suitable size for each person aboard (it is the law) and have it readily accessible.

Do not overload your boat. Most boats are rated and certified for maximum load (weight) capacities (refer to your boat capacity plate). If in doubt, contact your dealer or the boats manufacturer.

Perform safety checks and required maintenance. Follow a regular schedule and ensure that all repairs are properly made.

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

Boat operators should complete a boating safety course.

Courses are offered in the U.S.A. by 1) The U.S. Coast Guard Auxiliary, 2) The Power Squadron, 3) The Red Cross and 4) any state boating law enforcement agency. Inquiries may be made to the Boating Hotline, 1-800-368-5647 or the Boat U.S. Foundation information number 1-800-336-BOAT.

Make sure 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 back of seats, gunwales, transom, bow, decks, raised fishing seats, any rotating fishing seat; or anywhere that an 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.

Never be under the influence of alcohol or drugs while boating (it is the law). Alcohol or drug use impairs judgment and greatly reduces the ability to react quickly.

GENERAL INFORMATION

Prepare other boat operators. Instruct at least one other person on board in the basics of starting and operating the jet drive, and boat handling, in case the driver becomes disabled or falls overboard.

Passenger boarding. Stop the engine whenever passengers are boarding, unloading, or are near the back (stern) of the boat. Just shifting the outboard into neutral is not sufficient.

Be alert. The operator of the boat is responsible by law to maintain a proper lookout by sight and hearing. The operator must have an unobstructed view particularly to the front. No passengers, load, or fishing seats should block the operators view when operating the boat above idle speed.

Avoid shallow water conditions. Never operate the jet drive in very shallow water or where there is a noticeable amount of floating debris or weeds. Always be in at least 61 to 91 cm (2 to 3 ft.) of water. Any loose material such as sand, shells, seaweed, grass, tree branches, etc., can be pulled in by the pump. This may not only block the water flow and cause lost of steering control, but can be expelled from the rear of the pump as a high-speed projectile.

Watch for boat movement in neutral. When the jet drive is in neutral, the drive impeller continues to rotate. Although the approximate balancing of forward and reverse thrust will minimize boat movement, the boat may tend to move slowly forward or backward. This is normal for a direct-drive jet driven boat. The operator should be aware of this and use caution whenever the engine is running.

Never drive the boat directly behind a water skier in case the skier falls. As an example, a boat traveling at 40 km/hr (25 MPH) will overtake a fallen skier 61 m (200 ft.) in front of the boat in 5 seconds.

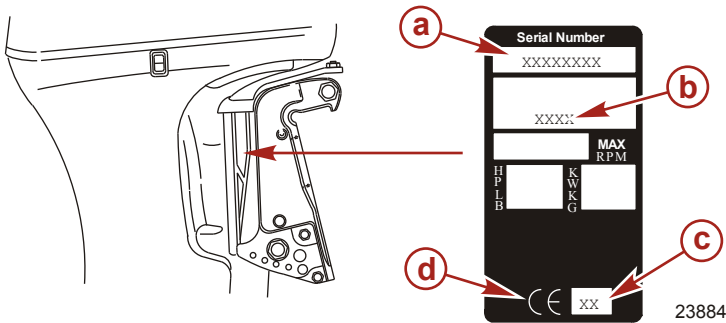
Watch fallen skiers. When using the boat for water skiing or similar activities, always keep a fallen or down skier on the operator's side of the boat while returning to assist the skier. The operator should always have the down skier in sight and never back up to the skier or anyone in the water.

GENERAL INFORMATION

Report accidents. Boat operators are required by law to file a Boating Accident Report with their state boating law enforcement agency when the 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.

Recording Serial Number

It is important to record this number for future reference. The serial number is located on the outboard as shown.



- a** - Serial number
- b** - Model designation
- c** - Year manufactured
- d** - Certified Europe Insignia (as applicable)

110 Jet OptiMax Specifications

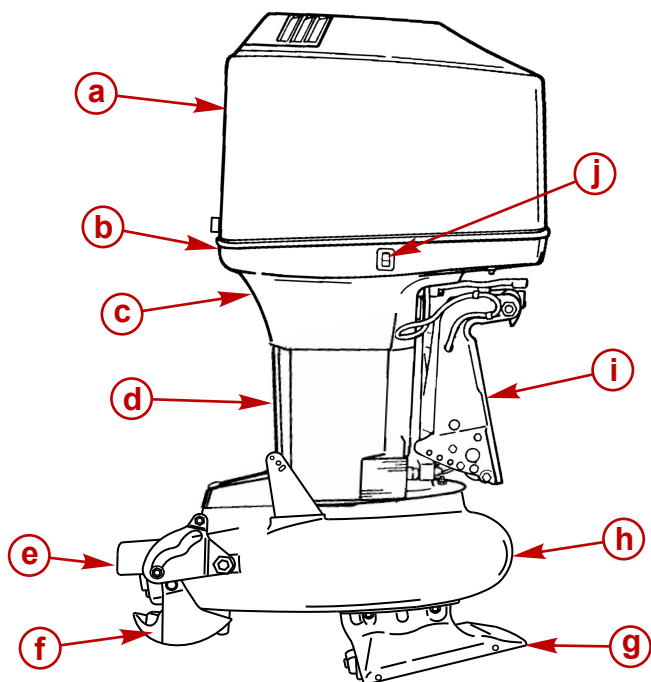
Models	110 Jet
Horsepower	110
Kilowatts	80.9
Full throttle RPM speed	5000–5500 RPM
Idle speed in forward gear	550 ± 25 RPM
Number of cylinders	6

GENERAL INFORMATION

Models	110 Jet
Piston displacement	2508 cc (153 in ³)
Cylinder bore	88.4 mm (3.500 in.)
Piston stroke	67.3 mm (2.650 in.)
Recommended spark plug	NGK IZFR5G
Spark plug gap	0.8 mm (0.030 in.)
Recommended gasoline	Refer to Fuel and Oil
Recommended oil	Refer to Fuel and Oil
Battery rating	1000 marine cranking amps (MCA) or 800 cold cranking amps (CCA)
Charging system output	60 A
Emission control system	Electronic engine control (EC)

GENERAL INFORMATION

Component Identification



33528

- a** - Top cowl
- b** - Bottom cowl
- c** - Water pump indicator hole
- d** - Driveshaft housing
- e** - Water outlet nozzle
- f** - Reverse gate
- g** - Water intake housing
- h** - Jet drive housing
- i** - Transom brackets
- j** - Auxiliary tilt switch

TRANSPORTING

Trailer Boat/Outboard

Trailer your boat with the outboard tilted down in a vertical operating position.

If additional ground clearance is required, the outboard should be tilted up using an accessory outboard support device. Refer to your local dealer for recommendations. Additional clearance may be required for railroad crossings, driveways, and trailer bouncing.

IMPORTANT: Do not rely on the power trim/tilt system or tilt support lever to maintain proper ground clearance for trailering. The outboard tilt support lever is not intended to support the outboard for trailering.

FUEL AND OIL

Fuel Recommendations

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

FUEL RATINGS

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

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

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

USING REFORMULATED (OXYGENATED) GASOLINES (USA ONLY)

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

These reformulated gasolines are acceptable for use in your Mercury Marine engine.

GASOLINES CONTAINING ALCOHOL

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

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

FUEL AND OIL

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

- Corrosion of metal parts
- Deterioration of rubber or plastic parts
- Fuel permeation through rubber fuel lines
- Starting and operating difficulties

WARNING

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

Because of possible adverse effects of alcohol in gasoline, it is recommended that only alcohol-free gasoline be used where possible. If only fuel containing alcohol is available, or if the presence of alcohol is unknown, increased inspection frequency for leaks and abnormalities is required.

IMPORTANT: When operating a Mercury Marine engine on gasoline containing alcohol, storage of gasoline in the fuel tank for long periods should be avoided. Long periods of storage, common to boats, create unique problems. In cars, alcohol-blend fuels normally are consumed before they can absorb enough moisture to cause trouble, but boats often sit idle long enough for phase separation to take place. In addition, internal corrosion may take place during storage if alcohol has washed protective oil films from internal components.

FUEL AND OIL

Oil Recommendation

Recommended Oil	Mercury OptiMax/DFI or Quicksilver DFI 2-Cycle Engine Oil
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Mercury OptiMax/DFI or Quicksilver DFI 2-Cycle Engine Oil is recommended for your engine. If Mercury OptiMax/DFI or Quicksilver DFI 2-Cycle Engine Oil is not available, we recommend using Mercury or Quicksilver TC-W3 Premium Plus 2-Cycle Oil. Severe engine damage may result from use of an inferior oil.

Fuel Additives

To minimize carbon deposit buildup in the engine, it is recommended to add Mercury or Quicksilver Quickleen Engine Treatment additive to the engine's fuel at each tank fill throughout the boating season. Use additive as directed on container.

Fuel Requirements

Do not use premixed gas and oil in this engine. The engine automatically receives extra oil during engine break-in. Use a fresh supply of the recommended gasoline during engine break-in and after engine break-in.

Avoiding Fuel Flow Restriction

IMPORTANT: Adding components to the fuel supply system (filters, valves, fittings, etc.) may restrict the fuel flow. This may cause engine stalling at low speed, and/or a lean fuel condition at high RPM that could cause engine damage.

Low Permeation Fuel Hose Requirement

Required for outboards manufactured for sale, sold, or offered for sale in the United States.

- The Environmental Protection Agency (EPA) requires that any outboard manufactured after January 1, 2009 must use low permeation fuel hose for the primary fuel hose connecting the fuel tank to the outboard.

FUEL AND OIL

- Low permeation hose is USCG Type B1-15 or Type A1-15, defined as not exceeding 15/gm²/24 h with CE 10 fuel at 23 °C as specified in SAE J 1527 - marine fuel hose.

EPA Pressurized Portable Fuel Tank Requirements

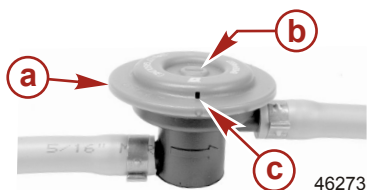
The Environmental Protection Agency (EPA) will require portable fuel systems that are produced after January 1, 2011 for use with outboard engines to remain fully sealed (pressurized) up to 34.4 kPa (5.0 psi). These tanks may contain the following:

- An air inlet that opens to allow air to enter as the fuel is drawn out of the tank.
- An air outlet that opens (vents) to the atmosphere if pressure exceeds 34.4 kPa (5.0 psi).

Fuel Demand Valve (FDV) Requirement

Whenever a pressurized fuel tank is used, a fuel demand valve is required to be installed in the fuel hose between the fuel tank and primer bulb. The fuel demand valve prevents pressurized fuel from entering the engine and causing a fuel system overflow or possible fuel spillage.

The fuel demand valve has a manual release. The manual release can be used (pushed in) to open (bypass) the valve in case of a fuel blockage in the valve.



- a** - Fuel demand valve - installed in the fuel hose between the fuel tank and primer bulb
- b** - Manual release
- c** - Vent/water drain holes

Mercury Marine's Pressurized Portable Fuel Tank

Mercury Marine has created a new portable pressurized fuel tank that meets the preceding EPA requirements. These fuel tanks are available as an accessory or are provided with certain portable outboard models.

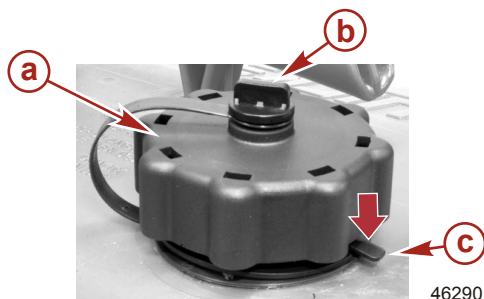
FUEL AND OIL

SPECIAL FEATURES OF THE PORTABLE FUEL TANK

- The fuel tank has a two-way valve which allows air to enter the tank as the fuel is drawn to the engine, and also opens to vent to the atmosphere if internal pressure in the tank exceeds 34.4 kPa (5.0 psi). A hissing noise may be heard as the tank vents to the atmosphere. This is normal.
- The fuel tank includes a fuel demand valve that prevents pressurized fuel from entering the engine and causing a fuel system overflow or possible fuel spillage.
- When installing the fuel tank cap, turn the cap to the right until you hear a click. This signals that the fuel cap is fully seated. A built-in device prevents overtightening.
- The fuel tank has a manual vent screw which should be closed for transportation and open for operation and cap removal.

Since sealed fuel tanks are not openly vented, they will expand and contract as the fuel expands and contracts during heating and cooling cycles of the outside air. This is normal.

REMOVING THE FUEL CAP



- a - Fuel cap
- b - Manual vent screw
- c - Tab lock

IMPORTANT: Contents may be under pressure. Rotate the fuel cap 1/4 turn to relieve pressure before opening.

1. Open the manual vent screw on top of the fuel cap.
2. Turn the fuel cap until it contacts the tab lock.
3. Press down on the tab lock. Rotate the fuel cap 1/4 turn to relieve the pressure.
4. Press down on the tab lock again and remove the cap.

FUEL AND OIL

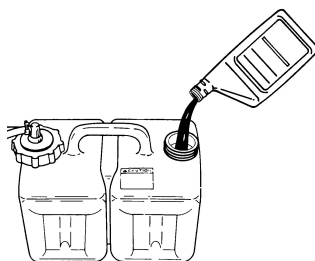
DIRECTIONS FOR USING THE PRESSURIZED PORTABLE FUEL TANK

1. When installing the fuel tank cap, turn the cap to the right until you hear a click. This signals that the fuel cap is fully seated. A built-in device prevents overtightening.
2. Open the manual vent screw on top of the cap for operation and cap removal. Close the manual vent screw for transportation.
3. For fuel hoses that have quick disconnects, disconnect the fuel line from the engine or fuel tank when not in use.
4. Follow **Filling Fuel Tank** instructions for refueling.

Filling Remote Oil Tank

Remove filler cap and fill with the specified oil. Oil tank capacity is 11.5 liters (3 gallons). Replace filler cap and tighten securely.

IMPORTANT: Always make sure the oil tank caps are threaded on tight. An air leak will prevent oil flow to the engine.



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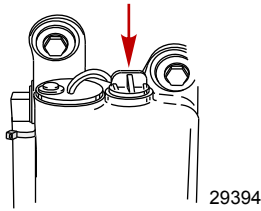
Filling Engine-Mounted Oil Reservoir Tank

NOTE: Filling this tank is only necessary if the oil level should ever drop and the low oil warning system is activated.

1. Remove the top cowl.
2. Loosen the fill cap on the engine oil reservoir tank. Run the engine until all the air has been vented out of the oil reservoir tank and the tank is filled with oil to the point of overflow.

FUEL AND OIL

3. Retighten the fill cap. Stop the engine and replace the top cowl.



Filling Fuel Tank

WARNING

Avoid serious injury or death from a gasoline fire or explosion. Use caution when filling fuel tanks. Always stop the engine and do not smoke or allow open flames or sparks in the area while filling fuel tanks.

Fill fuel tanks outdoors away from heat, sparks, and open flames.

Remove portable fuel tanks from boat to refill them.

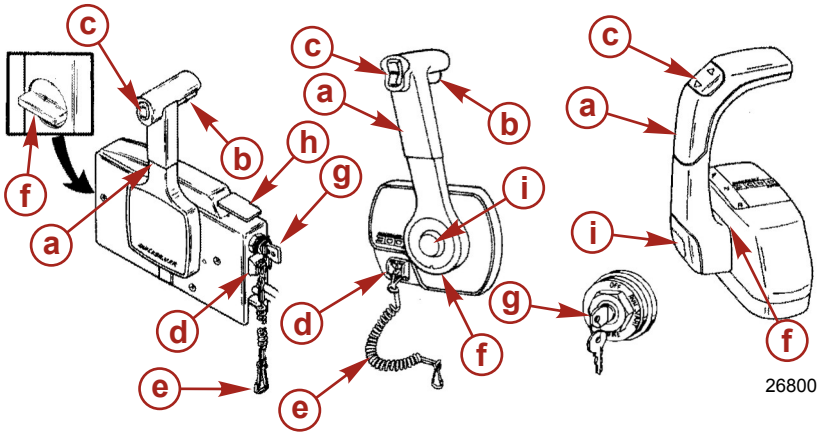
Always stop engine before refilling tanks.

Do not completely fill the fuel tanks. Leave approximately 10% of the tank volume unfilled. Fuel will expand in volume as its temperature rises and can leak under pressure if the tank is completely filled.

FEATURES AND CONTROLS

Remote Control Features

Your boat may be equipped with one of the Mercury Precision or Quicksilver remote controls shown. If not, consult your dealer for a description of the functions and operations of the remote control.

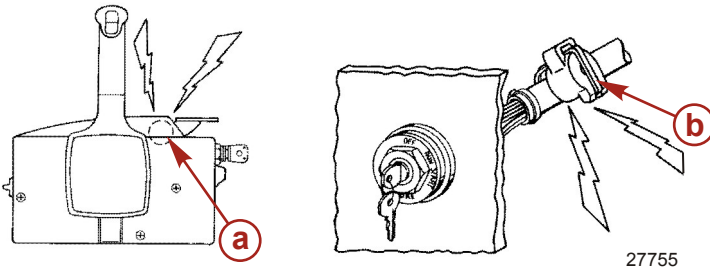


- a** - Control handle - forward, neutral, reverse
- b** - Neutral release lever
- c** - Trim/tilt switch (if equipped) - Refer to **Features and Controls - Power Trim and Tilt**
- d** - Lanyard stop switch - Refer to **General Information - Lanyard Stop Switch**
- e** - Lanyard - Refer to **General Information - Lanyard Stop Switch**
- f** - Throttle friction adjustment - Console controls require cover removal for adjustment
- g** - Ignition key switch - "OFF," "ON," "START"
- h** - Fast idle lever - Refer to **Operation - Starting the Engine**
- i** - Throttle only button - Refer to **Operation - Starting the Engine**

FEATURES AND CONTROLS

Warning System

The outboard warning system incorporates a warning horn inside the boat. The warning horn may be located inside the remote control or connected to the ignition key switch.



a - Horn inside remote control

b - Horn connected to ignition key switch

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 show the horn is working.

The warning horn will emit either a continuous beep or intermittent short beeps. This will alert the operator and help identify the following listed situations. For visual display of the specific engine functions and for additional engine data, refer to **SmartCraft Product** information, following.

Warning Horn		
Function	Sound	Description
Start-up	One beep	Normal system test.
Low oil reserve	Four beeps every 2 minutes	Oil lever is low in the engine mounted oil reservoir. Refill the engine mounted oil reservoir along with the remote oil tank. Refer to Fuel and Oil .
Water in fuel	Four beeps every 2 minutes	Water in the water separating fuel filter reaches the full level. Water can be removed from the filter. Refer to Maintenance - Fuel System for filter removal.

FEATURES AND CONTROLS

Warning Horn		
Function	Sound	Description
Cooling system problem	Continuous	Engine Guardian System is activated. Power limit will vary with level of overheat. Shift outboard into neutral and check for a steady stream of water coming out of the water pump indicator hole. If no water is coming out of the water pump indicator hole or flow is intermittent, stop engine and check water intake holes for obstruction. The Guardian System must be RESET before engine will operate at higher speeds. Moving throttle lever back to idle resets the system.
Oil level is critically low	Continuous	Engine Guardian System is activated. Power will be limited. The oil level is critically low in the engine mounted oil reservoir. Refill the engine mounted oil reservoir along with the remote oil tank.
Oil pump failure	Continuous	Engine Guardian System is activated. Power will be limited. The warning horn is activated if the oil pump should ever stop functioning electrically. No lubricating oil is being supplied to the engine.
Engine overspeed	Continuous	The warning horn is activated any time engine speed exceeds the maximum allowable RPM. The system will limit the engine speed to within the allowable range. Engine overspeed indicates a condition that should be corrected. Overspeed could be caused by incorrect engine height, trim angle, worn jet pump impeller, etc.
Sensor out of range	Continuous	Engine Guardian System is activated. Power will be limited.
	Intermittent beep	

ENGINE GUARDIAN SYSTEM

The Engine Guardian System monitors the critical sensors on the engine for any early indications of problems. The system will respond to a problem by emitting a continuous beep and/or reducing engine power in order to provide engine protection.

FEATURES AND CONTROLS

If Guardian System has been activated, reduce throttle speed. The horn will turn off when throttle speed is within the allowable limit. Consult your dealer for assistance.

SMARTCRAFT PRODUCT

A Mercury SmartCraft System instrument package can be purchased for this outboard. A few of the functions the instrument package will display are engine RPM, coolant temperature, battery voltage, fuel consumption and engine operating hours.

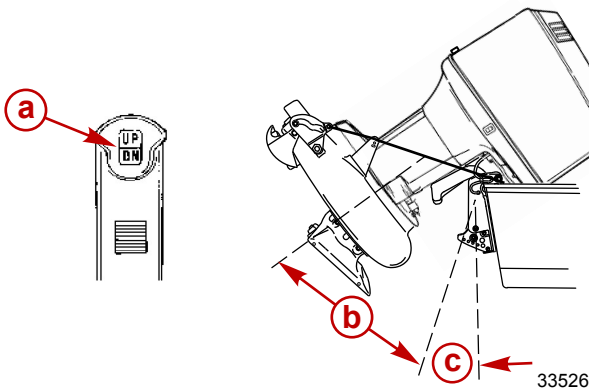
The SmartCraft instrument package will also aid in Engine Guardian diagnostics. The SmartCraft instrument package will display critical engine alarm data and potential problems.

NOTE: If equipped with SmartCraft instruments, the check engine icon will be displayed during the engine break-in period.

FEATURES AND CONTROLS

Power Trim and Tilt

Your outboard has a trim/tilt control called power trim. This enables the operator to easily adjust the position of the outboard by pressing the trim switch. Moving the outboard in closer to the boat transom is called trimming in or down. Moving the outboard further away from the boat transom is called trimming out or up. The term trim generally refers to the adjustment of the outboard within the first 20° range of travel. This is the range used while operating your boat on plane. The term tilt is generally used when referring to adjusting the outboard further up out of the water. With the engine turned off, the outboard can be tilted out of the water. At low idle speed, the outboard can also be tilted up past the trim range to permit, for example, shallow water operation.



- a** - Trim switch
- b** - Tilt range of travel
- c** - Trim range of travel

POWER TRIM OPERATION

The power trim and tilt feature of the outboard is convenient for drifting and when operating at low throttle speed in very shallow water. When under power, do not trim out the outboard in an effort to gain speed as is done with a conventional propeller driven boat.

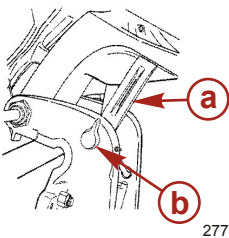
FEATURES AND CONTROLS

When planing, the outboard should be positioned vertical or tilted in toward the boat to provide a scooping angle on the water intake grate. Tilting the outboard out beyond a vertical position reduces the scoop angle and can cause impeller slippage and cavitation burns on the impeller blades.

TILTING OPERATION

To tilt outboard, shut off the engine and press the trim/tilt switch or auxiliary tilt switch to the up position. The outboard will tilt up until the switch is released or it reaches its maximum tilt position.

1. Engage the tilt support lever by rotating the knob to bring the support lever upward.
2. Lower the outboard to rest on the tilt support lever.
3. Disengage the tilt support lever by raising the outboard off the support lever and rotating the lever down. Lower the outboard.



a - Tilt support lever

b - Knob

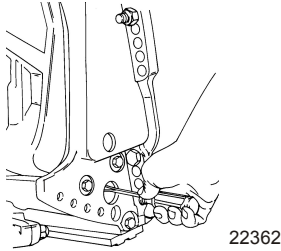
MANUAL TILTING

If the outboard cannot be tilted using the power trim/tilt switch, the outboard can be manually tilted.

NOTE: *The manual tilt release valve must be tightened before operating the outboard to prevent the outboard from tilting up during reverse operation.*

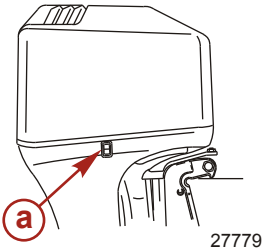
FEATURES AND CONTROLS

Turn out the manual tilt release valve three turns counterclockwise. This allows manual tilting of the outboard. Tilt the outboard to the desired position and tighten the manual tilt release valve.



AUXILIARY TILT SWITCH

The auxiliary tilt switch can be used to tilt the outboard up or down using the power trim system.



a - Auxiliary tilt switch

OPERATION

Pre-Starting Check List

- Operator knows safe navigation, boating, and operating procedures.
- An approved personal flotation device of suitable size for each person aboard and readily accessible (it is the law).
- A ring type life buoy or buoyant cushion designed to be thrown to a person in the water.
- Know your boats maximum load capacity. Look at the boat capacity plate.
- Fuel supply OK.
- Oil supply (oil injection) OK.
- Ensure the boat drain plug is installed.
- Arrange passengers and load in the boat so the weight is distributed evenly and everyone is seated in a proper seat.
- Tell someone where you are going and when you expect to return.
- It is illegal to operate a boat while under the influence of alcohol or drugs.
- Know the waters and area you will be boating; tides, currents, sand bars, rocks, and other hazards.
- Make inspection checks listed in **Maintenance - Inspection and Maintenance Schedule**.
- Check steering for free operation.
- Check for debris around the rudder and reverse gate which may jam or hinder operation.
- Before launching, examine the jet drive water intake for obstructions which may prevent pumping of water.
- Ensure the driveshaft bearing on the jet drive is lubricated.

Operating in Freezing Temperatures

When using your outboard or having your outboard moored in freezing or near freezing temperatures, keep the outboard tilted down at all times so the gearcase is submerged. This prevents the trapped water in the gearcase from freezing and causing possible damage to the water pump and other components.

OPERATION

If there is a chance of ice forming on the water, the outboard should be removed and drained completely of water. If ice should form at the water level inside the outboard driveshaft housing, it will block water flow to the engine causing possible damage.

Operating in Saltwater or Polluted Water

We recommend that you flush the internal water passages of your outboard with fresh water after each use in salt or polluted water. This will prevent a buildup of deposits from clogging the water passages. Refer to **Maintenance - Flushing the Cooling System**.

If you keep your boat moored in the water, always tilt the outboard so the gearcase is completely out of water (except in freezing temperatures) when not in use.

Wash the outboard exterior and flush out the exhaust outlet of the propeller and gearcase with fresh water after each use. Each month, spray Mercury Precision or Quicksilver Corrosion Guard on external metal surfaces. Do not spray on corrosion control anodes as this will reduce the effectiveness of the anodes.

Operating in Shallow Water

The life of the impeller and water intake can be greatly increased by avoiding the intake of sand and gravel. The intake suction will act like a dredge when the water intake comes close to the bottom. It is better to stop the engine and drift up to shore when landing, and to shove off with an oar when leaving. The engine can idle through areas of water less than 61 cm (2 ft) deep, but there should be more than 61 cm (2 ft) of water under the boat when increasing speed to reach full plane.

Once the boat is on plane, the boat speed will prevent the ingestion of gravel and other debris from the bottom. The suction is still present, but the water intake passes too quickly over the bottom to allow debris to be drawn into the water intake.

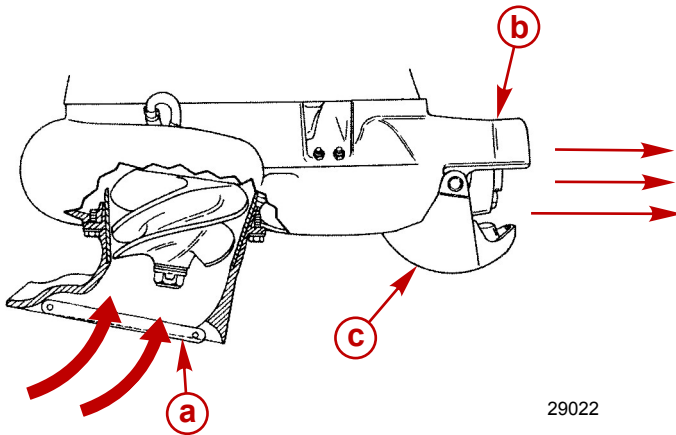
OPERATION

When boating through shallow water areas, choose a course of travel that avoids sharp rocks and other underwater obstacles that could damage the boat. Running the boat through these areas on full plane may be helpful as the boat will be riding higher in the water. If the boat gets stuck on the bottom, immediately stop the engine and move the boat to deeper water.

How the Jet Drive Operates

A jet driven boat has substantially different handling characteristics compared to a propeller driven boat. It is recommended that the operator adjusts to these characteristics by experimenting in open water at both high and low speeds.

The driveshaft driven impeller draws water up through the water intake and then redirects it at a high pressure through the water outlet nozzle to create forward thrust. To obtain reverse, the reverse gate moves over the outlet nozzle to direct the water in the opposite direction.



29022

- a** - Water intake
- b** - Water outlet nozzle
- c** - Reverse gate

OPERATION

When the jet drive is in neutral, the impeller continues to rotate. However, the reverse gate is positioned so that some of the forward thrust is diverted to create reverse thrust. This approximate balancing of forward and reverse thrust will minimize any boat movement. Because the impeller is always rotating and creating thrust when the engine is running, the boat may tend to move slowly forward or backward. This is normal for a direct-drive jet driven boat. The operator should be aware of this and use caution whenever the engine is running.

WARNING

Avoid injury resulting from contacting the rotating impeller or having hair, clothing, or loose objects drawn into the water intake and wrapping around the impeller shaft. Stay away from the water intake and never insert an object into the water intake or water outlet nozzle when the engine is running.

The jet drive is always drawing water into the housing when the engine is running. Do not operate the jet drive with the grate removed from the water intake. Keep hands, feet, hair, loose clothing, life jackets, etc., away from the water intake. Never insert an object into the water intake or water outlet nozzle when the engine is running.

Stopping the Boat in an Emergency

A jet powered boat has emergency stopping capability unique to this form of propulsion.

WARNING

Using the emergency stopping capability of a jet drive unit will slow down the boat in an emergency. However, sudden stopping may cause the occupants of the boat to be thrown forward or out of the boat resulting in serious injury or death. Use caution when performing the emergency stopping procedure, and be sure to practice in a safe area.

OPERATION

In an emergency, putting the jet outboard into reverse and applying reverse throttle can rapidly slow down the boat and reduce stopping distance. However, such a maneuver may cause occupants in the boat to be thrown forward or possibly out of the boat.

Steering the Boat

The jet drive is dependent on water jet thrust for steering the boat. If the water jet thrust should ever stop (water blockage, engine stops, etc.), the boat will slow to a stop. However, while slowing there will be a reduced ability to steer the boat.

WARNING

Steering the vessel in a tight turn can result in loss of boat control. In some cases, the boat can spin out or roll over, causing serious injury or death. Avoid steering beyond the capabilities of the vessel, especially at high speeds.

WARNING

A loss or reduction in water jet thrust will directly affect boat directional control, and may result in property damage, personal injury, or death. Boat directional control can also be substantially reduced or lost altogether by a sudden loss of power such as running out of gas, quickly backing off the throttle, turning off the ignition switch, activating the lanyard stop switch, or plugging the water intake to the jet pump. Use caution when maneuvering at high speeds in areas where debris (weeds, logs, gravel, etc.) could be picked up into the jet drive. The ability to take evasive action is dependent on sufficient water jet thrust to control the boat.

While steering the boat at engine speeds above idle, the boat will respond quickly; but, due to the relatively flat-bottom hulls and lack of a gearcase in the water, the boat will tend to skid on turns. Turns must be started early and use sufficient power to maintain steering control.

OPERATION

Mooring the Boat

Be sure to tilt the jet drive out of the water when the boat is pulled onto a beach or tied to a dock in shallow water. Failure to do this may cause the water intake housing to fill with sand or debris and could prevent the outboard from cranking over for starting.

Water Intake Blockage

WARNING

A rotating impeller could cause injury if contact is made with hands, clothing, or tools. To avoid injury, keep hands and clothing away from the inlet or outlet of the jetdrive, regardless of whether the boat is in the water. Secure tools and loose items to avoid being struck by projectiles as a result of contact with the rotating impeller, and to prevent damage to the impeller.

A large amount of debris being drawn into the water intake may result in a loss of power. Intake suction holding debris against the grate will result in restricted water flow. Shutting the engine off may allow the debris to fall off the intake grate allowing full power to be restored. If debris does not fall off the intake grate, the engine must be shut off and debris physically removed from the grate.

Engine Break-In Procedure

IMPORTANT: Failure to follow the engine break-in procedures can result in poor performance throughout the life of the engine and can cause engine damage. Always follow break-in procedures.

GASOLINE/OIL BREAK-IN MIXTURE

***NOTE:** Do not use premixed gas and oil during break-in. Use straight gasoline during engine break-in and after engine break-in.*

OPERATION

The engine break-in procedure for an OptiMax outboard is important to ensure proper performance and maximum life from the engine. The following break-in procedure allows the internal engine parts to wear-in evenly. Incorrect engine break-in can shorten the engine life.

The engine automatically receives extra oil during the first hours of operation. For most boaters this extra oil mode will be complete in about ten hours.

BREAK-IN PROCEDURE

1. For the first hour of operation, allow the engine to warm up for 30–60 seconds.
 - a. Run the engine at varied throttle settings, the majority of the time between 3000 and 4500 RPM or three-quarter throttle.
 - b. Change engine speed approximately every two minutes, and avoid continuous operation at idle speed for more than ten minutes. Short bursts of full throttle for periods up to ten seconds are acceptable.
 - c. Avoid trimming the outboard out (up) beyond a vertical trim position during operation.

NOTE: *It is the driver's responsibility to always drive in a safe manner. Improper trim angle of the outboard when driving at high speed can be difficult and dangerous. The purpose of specifying trim angle is to help guide the operator in determining how to put the proper load on the engine. They are intended to be guidelines and do not suggest or require unsafe boat operation.*

2. For the next three hours of operation, change engine speed every ten minutes.

Starting the Engine

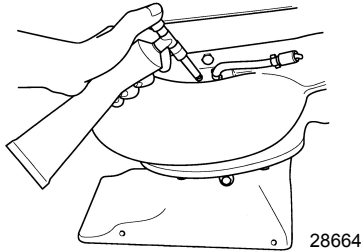
Before starting, read the pre-starting check list, special operating instructions, and engine break-in procedure in the **Operation** section.

OPERATION

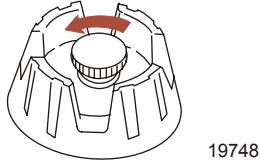
NOTICE

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.

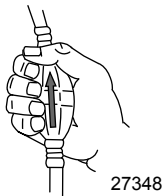
1. Ensure that the driveshaft bearing on the jet drive is lubricated. Refer to **Maintenance - Lubrication Points**.



2. Open the fuel tank vent screw, located in the filler cap, on manual venting type fuel tanks.



3. Position the fuel line primer bulb so the arrow on the side of the bulb is pointing up. Squeeze the fuel line primer bulb several times until it feels firm.



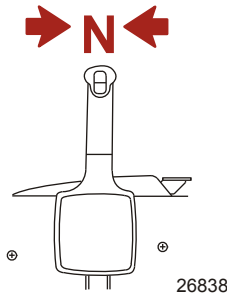
OPERATION

4. Set the lanyard stop switch to "RUN" position. Refer to **General Information - Lanyard Stop Switch**.



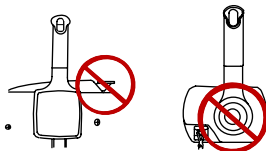
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5. Shift outboard to neutral ("N") position.



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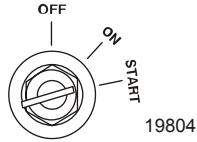
6. For the initial start of a new engine, or for an engine that ran out of fuel or was drained of fuel, the fuel system should be filled as follows:
 - a. Squeeze the fuel line primer bulb until it feels firm.
 - b. Turn the ignition key switch to the "ON" position for three seconds. This operates the electric fuel pump.
 - c. Turn the ignition key switch back to the "OFF" position, and squeeze the primer bulb again until it feels firm. Turn the ignition key switch to the "ON" position again for three seconds. Continue this procedure until the fuel line primer bulb stays firm.
7. Do not advance the neutral fast idle speed feature on the remote control for starting.



27242

OPERATION

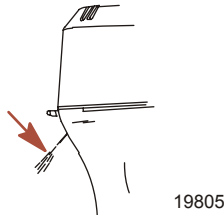
- Turn the ignition key to "START" position. Release the key when engine starts. If engine fails to start in 10 seconds, return the key to "OFF" position, wait one second and try again.



NOTE: The electronic starting system will automatically prime (choke) the engine and increase idle speed for starting.

- Check for a steady stream of water flowing out of the water pump indicator hole.

IMPORTANT: If no water is coming out of the water pump indicator hole, stop engine and check cooling water intake holes for obstruction. No obstruction may indicate a water pump failure or blockage in the cooling system. This condition will cause the engine to overheat. Have the outboard checked by your dealer. Operating the engine while overheated will cause engine damage.



Gear Shifting

IMPORTANT: Never shift the outboard into gear unless engine speed is at idle.

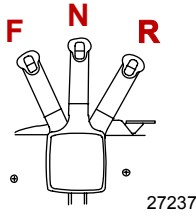
Your outboard has three gear shift positions to provide operation: forward (F), neutral (N), and reverse (R).

When shifting, always stop at neutral position and allow the engine speed to return to idle.

Always shift outboard into gear with a quick motion.

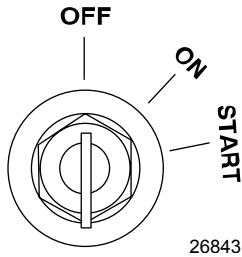
OPERATION

After shifting outboard into gear, advance the lever further to increase speed.



Stopping the Engine

Reduce engine speed and shift outboard to neutral position. Turn ignition key to "OFF" position.



MAINTENANCE

Outboard Care

To keep your outboard in the best operating condition, it is important that your outboard receive the periodic inspections and maintenance listed in the **Inspection and Maintenance Schedule**. We urge you to keep it maintained properly to ensure the safety of you and your passengers, and retain its dependability.

Record maintenance performed in the **Maintenance Log** at the back of this book. Save all maintenance work orders and receipts.

SELECTING REPLACEMENT PARTS FOR YOUR OUTBOARD

We recommend using original Mercury Precision or Quicksilver replacement parts and Genuine Lubricants.

EPA Emissions Regulations

All new outboards manufactured by Mercury Marine are certified to the United States Environmental Protection Agency, as conforming to the requirements of the regulations for the control of air pollution from new outboard motors. This certification is contingent on certain adjustments set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, wherever practicable, returned to the original intent of the design. **Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine spark ignition (SI) engine repair establishment or individual.**

MAINTENANCE

EMISSION CERTIFICATION LABEL

An emission certification label, showing emission levels and engine specifications directly related to emissions, is placed on the engine at the time of manufacture.

MERCURY		EMISSION CONTROL INFORMATION	
THIS ENGINE CONFORMS TO <input type="checkbox"/> CALIFORNIA AND U.S. EPA EMISSION REGULATIONS FOR SPARK IGNITION MARINE ENGINES			
REFER TO OWNERS MANUAL FOR REQUIRED MAINTENANCE, SPECIFICATIONS, AND ADJUSTMENTS			
IDLE SPEED (in gear): <input type="text"/>		FAMILY: <input type="text"/>	
<input type="text"/> hp	<input type="text"/> L	HC+NOx:FEL: <input type="text"/> g/kWh	
<input type="text"/> kw		CO FEL: <input type="text"/> g/kWh	
SPARK PLUG: <input type="text"/>		GAP: <input type="text"/>	
LOW PERM/HIGH PERM: <input type="text"/>			

43210

- a** - Idle speed
- b** - Engine horsepower
- c** - Piston displacement
- d** - Engine power - kilowatts
- e** - Date of manufacture
- f** - Family number
- g** - Regulated emission limit for the engine family
- h** - Regulated emission limit for the engine family
- i** - Recommended spark plug and gap
- j** - Percent of fuel line permeation

OWNER RESPONSIBILITY

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

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

Inspection and Maintenance Schedule

BEFORE EACH USE

- Check that lanyard stop switch stops the engine.
- Visually inspect the fuel system for deterioration or leaks.

MAINTENANCE

- Inspect the outboard for tightness to the boat transom. If any looseness of the outboard or mounting fasteners exist, retorque the outboard mounting fasteners to 75 Nm (55 lb-ft).
- Check steering system for binding or loose components.
- Visually check steering link rod fasteners for proper tightness. See **Steering Link Rod Fasteners**.
- Make sure the driveshaft bearing on the jet drive is lubricated. See **Lubrication Points**.

AFTER EACH USE

- Flush out the outboard cooling system if operating in salt or polluted water. See **Flushing the Cooling System**.
- If operating in saltwater, wash off all salt deposits and flush out the exhaust outlet of the jet drive with fresh water.

EVERY 100 HOURS OF USE OR ONCE YEARLY, WHICHEVER OCCURS FIRST

- Retorque the outboard mounting fasteners that fasten the outboard to the transom. Torque to 75 Nm (55 lb-ft).¹
- Lubricate all lubrication points. Lubricate more frequently when used in saltwater. See **Lubrication Points**.
- Replace spark plugs at first 100 hours or first year. After that, inspect spark plugs every 100 hours or once yearly. Replace spark plugs as needed. See **Spark Plug Inspection and Replacement**.
- Replace water separating fuel filter. See **Fuel System**.
- Replace compressor air intake filter. See **Compressor Air Intake Filter**.
- Inspect alternator belt. See **Alternator Belt Inspection**.
- Check corrosion control anodes. Check more frequently when used in saltwater. See **Corrosion Control Anode**.
- Check power trim fluid. See **Checking Power Trim Fluid**.
- Inspect battery. See **Battery Inspection**.
- Check control cable adjustments.¹

1. These items should be serviced by an authorized dealer.

MAINTENANCE

- Lubricate splines on the driveshaft.¹
- Check tightness of bolts, nuts, and other fasteners.
- Replace water pump impeller (more often if overheating occurs or reduced water pressure is noted).¹
- Check cowl seals to make sure seals are intact and not damaged.
- Check internal cowl sound reduction foam (if equipped) to make sure foam is intact and not damaged.
- Check that the intake silencer (if equipped) is in place.
- Check that the idle relief muffler (if equipped) is in place.
- Check for loose hose clamps and rubber boots (if equipped) on the air intake assembly.

BEFORE PERIODS OF STORAGE

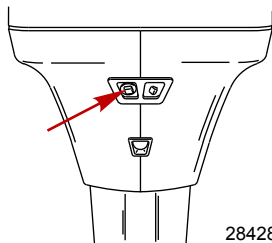
- Refer to storage procedure. See **Storage** section.

Flushing the Cooling System

Flush the internal water passages of the outboard with fresh water after each use in salt, polluted, or muddy water. This will help prevent a buildup of deposits from clogging the internal water passages.

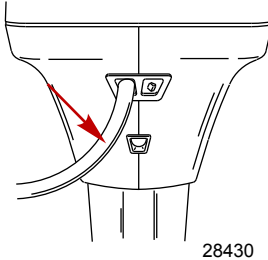
NOTE: Engine can be stopped, or running at idle speed, when flushing the cooling system. Do not flush the engine using a water system that exceeds 310.26 kPa (45 psi).

1. Remove the plug from the fitting in the bottom cowl.



MAINTENANCE

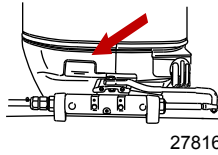
2. Attach a water hose to the fitting. Turn on the water and flush for 3–5 minutes.



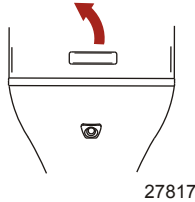
Top Cowl Removal and Installation

REMOVAL

1. Pull out the front cowl latch.



2. Lift up the rear cowl latch. Remove the top cowl.



INSTALLATION

1. Lower top cowl into position over engine.
2. Push down the rear cowl latch to lock down the rear and push in the front cowl latch to lock down the front.

MAINTENANCE

Cleaning Care for Top Cowl

IMPORTANT: Dry wiping (wiping the plastic surface when it is dry) will result in minor surface scratches. Always wet the surface before cleaning. Follow the cleaning and waxing procedure.

CLEANING AND WAXING PROCEDURE

1. Before washing, rinse the top cowl with clean water to remove the dirt and dust that may scratch the surface.
2. Wash the top cowl with clean water and a mild non-abrasive soap. Use a soft clean cloth when washing.
3. Dry thoroughly with a soft clean cloth.
4. Wax the surface using a non-abrasive automotive polish (polish designed for clear coat finishes). Remove the applied wax by hand using a clean soft cloth.

Flywheel Cover Removal and Installation

REMOVAL

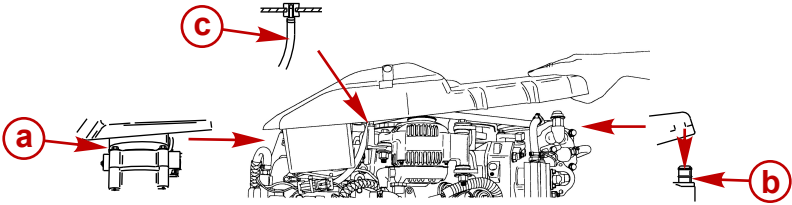
1. Remove the flywheel cover by lifting off.
2. Pull out the vent hose.

INSTALLATION

1. Install flywheel cover as follows:
 - a. Place cover onto the front flange.
 - b. Push rear of the cover down onto the rear pin and air intake tube for the air compressor.
 - c. Insert vent hose into hole.

MAINTENANCE

IMPORTANT: Make sure the flywheel cover is pushed down on the air intake tube for the air compressor.



29395

- a** - Front flange
- b** - Air intake tube
- c** - Vent hose

Fuel System

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.

Before servicing any part of the fuel system, stop the engine and disconnect the battery. Drain the fuel system completely. Use an approved container to collect and store fuel. Wipe up any spillage immediately. Material used to contain spillage must be disposed of in an approved receptacle. Any fuel system service must be performed in a well-ventilated area. Inspect any completed service work for sign of fuel leakage.

FUEL LINE INSPECTION

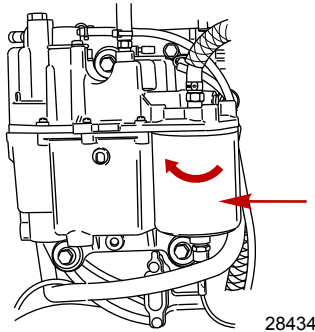
Visually inspect the fuel line and primer bulb for cracks, swelling, leaks, hardness, or other signs of deterioration or damage. If any of these conditions are found, the fuel line or primer bulb must be replaced.

MAINTENANCE

WATER SEPARATING FUEL FILTER

NOTE: The warning system will turn on when water in the fuel filter reaches the full level. See **Features & Controls - Warning System**.

The water separating fuel filter removes moisture and also debris from the fuel. If the filter becomes filled with water, the water can be removed. If the filter becomes plugged with debris, the filter must be replaced with a new filter.



1. Remove and replace filter as follows:
 - a. Turn ignition key switch to "OFF" position.
 - b. Disconnect wire at bottom of filter.
 - c. Remove filter by turning the filter clockwise. Tip the filter to drain fluid in a suitable container.
 - d. Lubricate the sealing ring on the filter with oil. Thread on the filter and tighten securely by hand. Reconnect the wire to the filter.

IMPORTANT: Visually inspect for fuel leakage from the filter by squeezing the primer bulb until firm, forcing fuel into the filter.

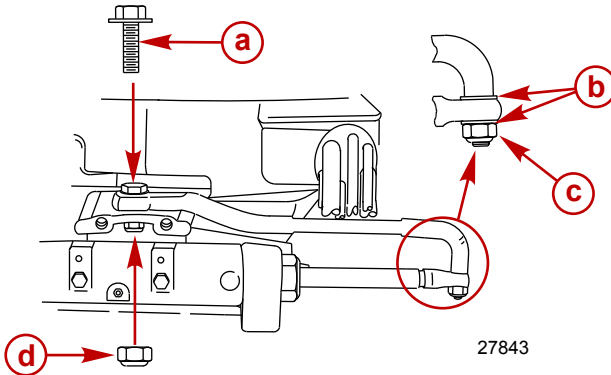
Steering Link Rod Fasteners

IMPORTANT: The steering link rod that connects the steering cable to the engine must be fastened using a special washer head bolt ("a" - Part Number 10-849838) and self-locking nylon insert locknuts ("c" and "d" - Part Number 11-826709113). These locknuts must never be replaced with common nuts (nonlocking) as they will work loose and vibrate off, freeing the link rod to disengage.

MAINTENANCE

⚠ WARNING

Improper fasteners or improper installation procedures can result in loosening or disengagement of the steering link rod. This can cause a sudden, unexpected loss of boat control, resulting in serious injury or death due to occupants being thrown within or out of the boat. Always use required components and follow instructions and torque procedures.



- a** - Special washer head bolt (10-849838)
- b** - Flat washer (2)
- c** - Nylon insert locknut (11-826709113)
- d** - Nylon insert locknut (11-826709113)

Description	Nm	lb-in.	lb-ft
Special washer head bolt	27		20
Nylon insert locknut "d"	27		20
Nylon insert locknut "c"	Tighten until it seats, then back off 1/4 turn		

Assemble steering link rod to steering cable with two flat washers and self-locking nylon insert locknut. Tighten locknut until it seats, then back nut off 1/4 turn.

Assemble steering link rod to engine with special washer head bolt and self-locking nylon insert locknut. First torque bolt, then torque locknut to specifications.

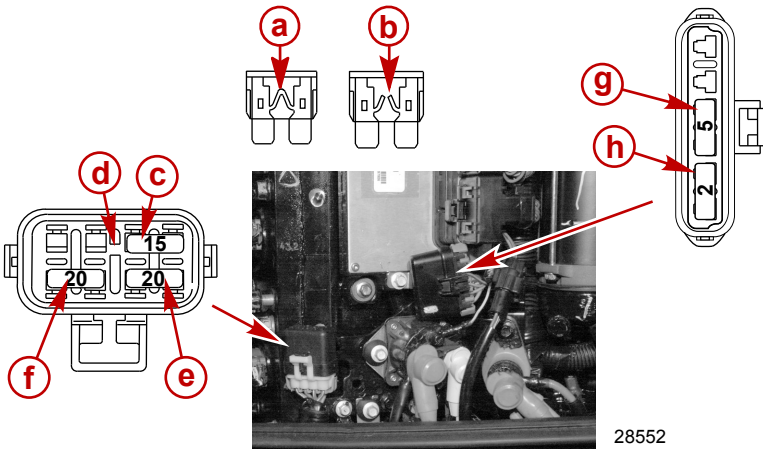
MAINTENANCE

Fuse Replacement

IMPORTANT: Always carry spare 5 and 20 AMP fuses.

The electrical wiring circuits on the outboard are protected from overload by fuses in the wiring. If a fuse is blown, try to locate and correct the cause of the overload. If the cause is not found, the fuse may blow again.

Open the fuse holder and look at the silver colored band inside the fuse. If band is broken, replace the fuse. Replace fuse with a new fuse with the same rating.



- a** - Good fuse
- b** - Blown fuse
- c** - Main power relay - 15 amp fuse
- d** - Spare fuse slot
- e** - Ignition system circuit - 20 amp fuse
- f** - Electric fuel pump/ECM driver power/injectors/oil pump circuit - 20 amp fuse
- g** - Power to 10-pin SmartCraft connector - 5 amp fuse
- h** - Diagnostic circuit 4-pin connector - 2 amp fuse

Battery Inspection

The battery should be inspected at periodic intervals to ensure proper engine starting capability.

MAINTENANCE

IMPORTANT: Read the safety and maintenance instructions which accompany your battery.

1. Turn off the engine before servicing the battery.
2. Ensure the battery is secure against movement.
3. Battery cable terminals should be clean, tight, and correctly installed. Positive to positive and negative to negative.
4. Ensure the battery is equipped with a nonconductive shield to prevent accidental shorting of battery terminals.

Battery Information

CAUTION

Hex nuts must be used to secure battery leads to the battery posts to avoid loss of electrical power.

- Do not use deep-cycle batteries. Engines must use a marine starting battery with 1000 MCA, 800 CCA, or 180 Ah.
- When connecting engine battery, hex nuts must be used to secure battery leads to battery posts. Torque nuts to specification.

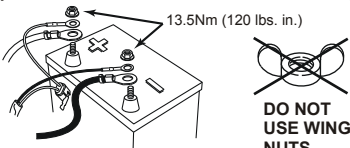
Description	Nm	lb. in.	lb. ft.
Hex nuts	13.5	120	

MAINTENANCE

Decal needs to be placed on or near battery box for future service reference. One 5/16 in. and one 3/8 in. hex nut are supplied per battery for wing nut replacement. Metric hex nuts are not supplied.

NOTICE - DTS & OptiMax Engines

DO NOT USE DEEP CYCLE BATTERIES!
DTS (Digital Throttle and Shift) applications and OptiMax engines must use a marine starting battery with 1000 MCA, 800 CCA, or 180 Ah. rating.



IMPORTANT:
Battery cable size and length is critical. Refer to engine installation manual for size requirements.

37-895387

Place decal on or near battery box for future service reference. 5/16" and 3/8" hex nuts supplied for wing nut replacement. Metric hex nuts not supplied.

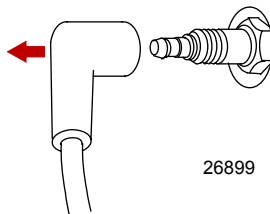
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Spark Plug Inspection and Replacement

⚠ WARNING

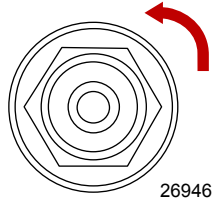
Damaged spark plug boots may emit sparks which can ignite fuel vapors under the engine cowl, resulting in serious injury or death from a fire or explosion. To avoid damaging the spark plug boots, do not use any sharp object or metal tool to remove the spark plug boots.

1. Remove the spark plug leads. Twist the rubber boots slightly and pull off.

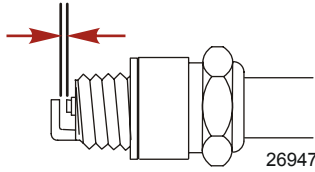


MAINTENANCE

2. Remove the spark plugs to inspect. Replace spark plug if electrode is worn or the insulator is rough, cracked, broken, blistered, or fouled.



3. Set the spark plug gap to specification.



Spark Plug	
Spark plug gap	0.80 mm (0.030 in.)

4. Before installing spark plugs, clean off any dirt on the spark plug seats. Install plugs finger-tight, and then tighten 1/4 turn or torque to specifications.

Description	Nm	lb-in.	lb-ft
Spark plug	27		20

Compressor Air Intake Filter

The filter should be changed every 100 hours of operation, or once a season.

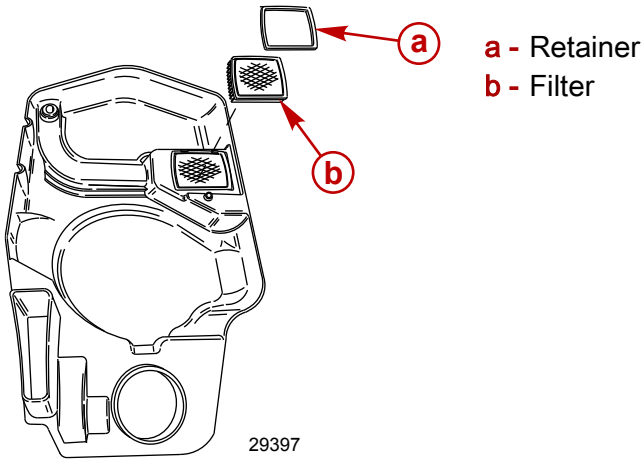
IMPORTANT: Never run the engine without the air filter.

REMOVAL

1. Remove flywheel cover from engine.

MAINTENANCE

2. Snap out the retainer and remove filter.

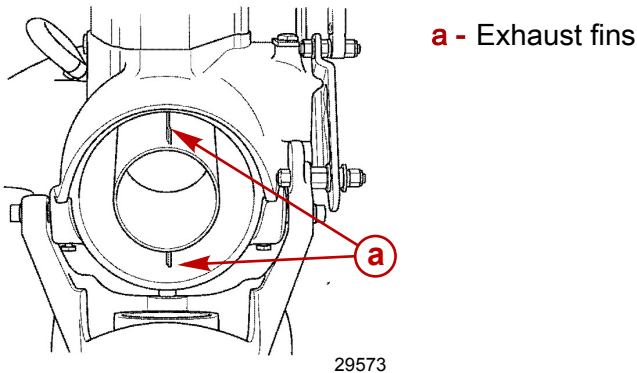


INSTALLATION

1. Install filter into cover.
2. Secure filter into cover with retainer.

Steering Pull Adjustment

The steering on some boats will have the tendency to pull towards starboard. This pulling condition can be corrected by using a pliers and bending the ends of the exhaust fins 1.5 mm (1/16 in.) toward the starboard side of the outboard.



MAINTENANCE

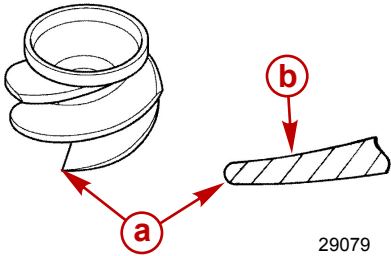
Worn/Dull Impeller

The intake of gravel through the pump can round off and wear the leading edges of the impeller. Some conditions that could be experienced from a worn/dull impeller are as follows:

- Noticeable performance loss, especially on acceleration
- Difficulty getting the boat on plane
- An increase in engine RPM at wide-open throttle

IMPORTANT: Do not sharpen or alter the top side lifting angle.

Check the impeller blades occasionally for damage. Use a flat file to resharpen the leading edges. Sharpen to a 0.8 mm (1/32 in.) radius by removing material from bottom side only.



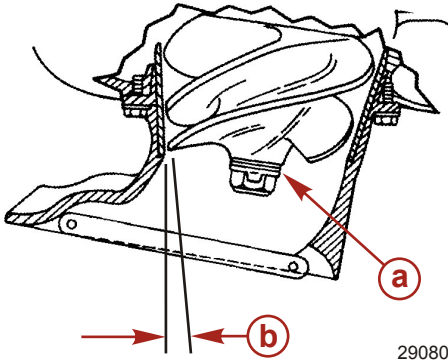
- a** - Leading edge
- b** - Top side lifting angle

Impeller Clearance Adjustment

The impeller should be adjusted so there is approximately 0.8 mm (0.03 in.) clearance between the impeller edge and liner. Operating the jet drive in waters that contain sand and gravel can cause wear to the impeller blades, and the clearance will start to exceed 0.8 mm (0.03 in.).

MAINTENANCE

As the blades wear, shims located in the stack outside of the impeller can be transferred behind the impeller. This will move the impeller further down into the tapered liner to reduce the clearance.



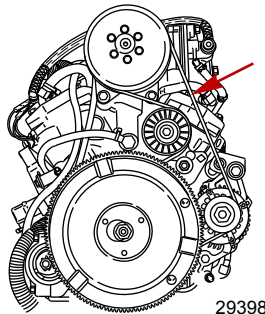
- a** - Shims
- b** - Clearance between impeller edge and liner

Check the impeller clearance by sliding a feeler gauge through the intake grate and measure the clearance between the impeller edge and liner.

Alternator Belt Inspection

Inspect the alternator belt and have it replaced by an authorized dealer if any of the following conditions are found:

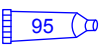
- Cracks or deterioration in the rubber portion of the belt.
- Belt surfaces rough or uneven.
- Signs of wear on edges or outer surfaces of belt.



MAINTENANCE

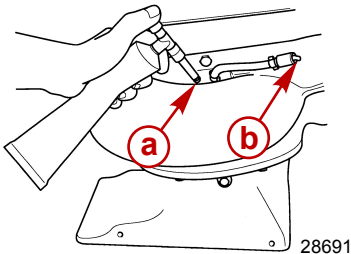
Lubrication Points

1. Lubricate the following with Quicksilver or Mercury Precision 2-4-C with PTFE.

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

IMPORTANT: It is important not to use a general all-purpose grease for this bearing. The lubricant recommended is a water-resistant grease of the proper consistency for this application. If a substitute is used, be sure that it is water-resistant.

- Driveshaft bearing
 - i. Pull vent hose off of the grease fitting.
 - ii. Pump in grease through the grease fitting until excess grease starts to exit the vent hose.
 - iii. Reconnect the vent hose onto the grease fitting after greasing.

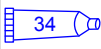


- a - Grease fitting
- b - Vent hose

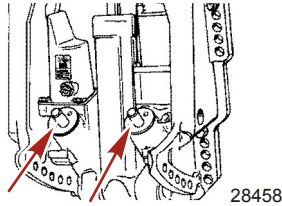
NOTE: After 30 hours of operation, pump in extra grease to purge out any moisture. Visually inspecting the purged grease at this time will give an indication of conditions inside the bearing housing. A gradual increase in moisture content indicates seal wear. If the grease begins to turn a dark, dirty gray color, the driveshaft bearing and seals should be inspected and replaced if necessary. Some discoloration of the grease is normal during the break-in period on a new set of seals.

2. Lubricate the following with Quicksilver or Mercury Precision Special Lubricant 101.

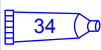
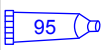
MAINTENANCE

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Trim rod ball ends	92-802865Q02

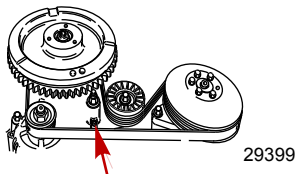
- Trim rod ball ends - Turn the ball ends to work the lubricant into the ball sockets.



3. Lubricate the following with Quicksilver or Mercury Precision Lubricants 2-4-C with PTFE or Special Lubricant 101.

Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Alternator belt tensioner pivot shaft, swivel bracket, tilt support lever, tilt tube, steering cable	92-802865Q02
 95	2-4-C with PTFE	Alternator belt tensioner pivot shaft, swivel bracket, tilt support lever, tilt tube, steering cable	92-802859A 1

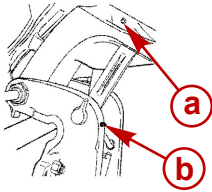
- Alternator belt tensioner pivot shaft - Lubricate through fitting.



- Swivel bracket - Lubricate through fitting.

MAINTENANCE

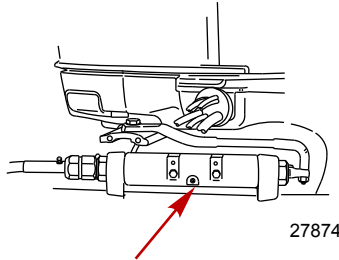
- Tilt support lever - Lubricate through fitting.



27873

- a** - Swivel bracket
- b** - Tilt support lever

- Tilt tube - Lubricate through fitting.

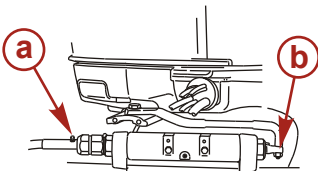


27874

⚠ 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.

- Steering cable - Rotate steering wheel to fully retract the steering cable end into the outboard tilt tube. Lubricate through fitting.



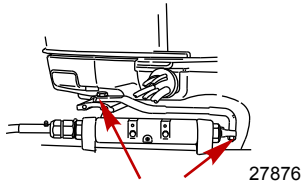
27875

- a** - Fitting
- b** - Cable end

4. Lubricate the following with lightweight oil.

MAINTENANCE

- Steering link rod pivot points - Lubricate pivot points.



Submerged Outboard

A submerged outboard will require service within a few hours by an authorized dealer once the outboard is recovered from the water. This immediate attention by a servicing dealer is necessary once the engine is exposed to the atmosphere to minimize internal corrosion damage to the engine.

STORAGE

Storage Preparation

The major consideration in preparing your outboard for storage is to protect it from rust, corrosion, and damage caused by freezing of trapped water.

The following storage procedures should be followed to prepare your outboard for out of season storage or prolonged storage (two months or longer).

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.

FUEL SYSTEM

IMPORTANT: Gasoline containing alcohol (ethanol or methanol) can cause a formation of acid during storage and can damage the fuel system. If the gasoline being used contains alcohol, it is advisable to drain as much of the remaining gasoline as possible from the fuel tank, remote fuel line, and engine fuel system.

The most effective method for storage preparation is to add the recommended amount of Mercury Precision fuel Stabilizer and Mercury Precision Quickleen products as described on their containers to the fuel tank before the last operation of the boat. Adding Fuel Stabilizer will help prevent the formation of varnish and gum in the gasoline. The Mercury Precision Quickleen product will help clean and lubricate the fuel injectors.

1. Portable fuel tank - Pour the required amount of gasoline stabilizer (follow instructions on container) into fuel tank. Tip fuel tank back and forth to mix the stabilizer with the fuel.
2. Permanently installed fuel tank - Pour the required amount of gasoline stabilizer (follow instructions on container) into a separate container and mix with approximately 1 liter (1 US quart) of gasoline. Pour this mixture into the fuel tank.
3. Remove the water separating fuel filter from the engine. Empty the fuel into a suitable container and discard the filter properly.

STORAGE

4. Premix the following in a container:
 - 8 cc (0.27 oz) or two teaspoons of Mercury Precision Quickleen lubricant.
 - 8 cc (0.27 oz) or two teaspoons of Mercury Precision Fuel Stabilizer.
5. Pour this mixture in a new water separating fuel filter. Reinstall the fuel filter.
6. Prime the fuel system as outlined in the **Operation - Starting the Engine**.
7. Place the outboard in water or connect a water hose to the flushing system for circulating cooling water. Start the engine and run at idle speed for 10 minutes to allow the treated fuel to fill the fuel system.

Protecting Internal Engine Components

***NOTE:** Make sure the fuel system has been prepared for storage. Refer to **Fuel System**, preceding.*

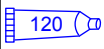
IMPORTANT: Refer to Spark Plug Inspection and Replacement for correct procedure for removing spark plug leads.

1. Remove the spark plugs. Add approximately 30 ml (1 oz) of engine oil or inject a five second spray of storage seal into each spark plug hole.
2. Rotate the flywheel manually several times to distribute the oil or storage seal in the cylinders.
3. Reinstall spark plugs.

Protecting External Outboard Components

- Lubricate all outboard components listed in **Maintenance - Inspection and Maintenance Schedule**.
- Touch up any paint nicks. See your dealer for touch-up paint.
- Spray Quicksilver or Mercury Precision Lubricants Corrosion Guard on external metal surfaces (except corrosion control anodes).

STORAGE

Tube Ref No.	Description	Where Used	Part No.
 120	Corrosion Guard	External metal surfaces	92-802878 55

Jet Drive

- Pump extra grease into the jet drive bearing to purge out moisture.

Positioning Outboard for Storage

Store outboard in an upright (vertical) position to allow water to drain out of the outboard.

NOTICE

Storing the outboard in a tilted position can damage the outboard. Water trapped in the cooling passages or rain water collected in the propeller exhaust outlet in the gearcase can freeze. Store the outboard in the full down position.

Battery Storage

- Follow the battery manufacturer's instructions for storage and recharging.
- Remove the battery from the boat and check water level. Recharge if necessary.
- Store the battery in a cool, dry place.
- Periodically check the water level and recharge the battery during storage.

TROUBLESHOOTING

Starter Motor Will Not Crank the Engine

POSSIBLE CAUSES

- Blown 20 amp fuse in the starting circuit. Refer to **Maintenance**.
- Outboard is not shifted to neutral position.
- Weak battery or battery connections are loose or corroded.
- Ignition key switch failure.
- Wiring or electrical connection faulty.
- Starter motor solenoid or slave solenoid failure.

Engine Will Not Start

POSSIBLE CAUSES

- Lanyard stop switch not in "RUN" position.
- Battery not fully charged.
- Incorrect starting procedure. Refer to **Operation** section.
- Old or contaminated fuel.
- Fuel is not reaching the engine.
 - Fuel tank is empty.
 - Fuel tank vent not open or restricted.
 - Fuel line is disconnected or kinked.
 - Primer bulb not squeezed.
 - Primer bulb check valve is faulty.
 - Fuel filter is obstructed. Refer to **Maintenance** section.
 - Fuel pump failure.
 - Fuel tank filter obstructed.
- Open 20 amp fuse. Check fuses, refer to **Maintenance** section.
- Threaded connection of an air hose is loose.
- Ignition system component failure.
- Spark plugs fouled or defective. Refer to **Maintenance** section.

TROUBLESHOOTING

Engine Runs Erratically

POSSIBLE CAUSES

- Spark plugs fouled or defective. Refer to **Maintenance** section.
- Incorrect setup and adjustments.
- Fuel is being restricted to the engine.
 - a. Engine fuel filter is obstructed. Refer to **Maintenance** section.
 - b. Fuel tank filter obstructed.
 - c. Stuck antisiphon valve on built-in fuel tank.
 - d. Fuel line is kinked or pinched.
 - e. Injector plugged.
- Threaded connection of an air hose is loose.
- Fuel pump failure.
- Ignition system component failure.

Performance Loss

POSSIBLE CAUSES

- Throttle not fully open.
- Damaged impeller.
- Boat overloaded or load improperly distributed.
- Excessive water in bilge.
- Boat bottom is dirty or damaged.

Engine Overspeed (Excessive RPM)

POSSIBLE CAUSES

- Outboard mounted too high on the transom.
- Worn jet pump impeller or liner.
- Incorrect jet pump impeller clearance adjustment.
- Tilting the outboard out beyond a vertical position.
- Cavitation of the impeller due to rough water or obstruction in the boat hull.
- Blockage of the water intake.

TROUBLESHOOTING

Battery Will Not Hold Charge

POSSIBLE CAUSES

- Battery connections are loose or corroded.
- Low electrolyte level in battery.
- Worn out or inefficient battery.
- Excessive use of electrical accessories.
- Defective rectifier, alternator, or voltage regulator.
- Open circuit in the alternator output wire (fused link).

OWNER SERVICE ASSISTANCE

Local Repair Service

Always return your outboard to your local authorized dealer should the need for service arise. Only he has the factory trained mechanics, knowledge, special tools, equipment, and genuine parts and accessories to properly service your engine should the need occur. He knows your engine best.

Service Away from Home

If you are away from your local dealer and the need arises for service, contact the nearest authorized dealer. Refer to the Yellow Pages of the telephone directory. If, for any reason, you cannot obtain service, contact the nearest Mercury Marine Service Office.

Parts and Accessories Inquiries

All inquiries concerning genuine replacement parts and accessories should be directed to your local authorized dealer. The dealer has the necessary information to order parts and accessories for you. When inquiring on parts and accessories, the dealer requires the model and serial number to order the correct parts.

Service Assistance

Your satisfaction with your outboard product is very important to your dealer and to us. If you ever have a problem, question or concern about your outboard product, contact your dealer or any authorized Mercury Marine dealership. If additional assistance is required, take these steps.

1. Talk with the dealership's sales manager or service manager. If this has already been done, then contact the owner of the dealership.
2. Should you have a question, concern, or problem that cannot be resolved by your dealership, please contact Mercury Marine Service Office for assistance. Mercury Marine will work with you and your dealership to resolve all problems.

The following information will be needed by the service office:

OWNER SERVICE ASSISTANCE

- Your name and address
- Daytime telephone number
- Model and serial number of your outboard
- The name and address of your dealership
- Nature of problem

Mercury Marine Service Offices

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

United States, Canada		
Telephone	English - (920) 929-5040 Français - (905) 636-4751	Mercury Marine W6250 W. Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
Fax	English - (920) 929-5893 Français - (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	(954) 744-3500	Mercury Marine 11650 Interchange Circle North Miramar, FL 33025 U.S.A.
Fax	(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	

OWNER SERVICE ASSISTANCE

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

OUTBOARD INSTALLATION

Important Information

BEFORE STARTING THE ENGINE

NOTICE

Lack of oil pressure in the system can cause severe internal engine damage during start-up. Prime the oil injection pump on new or rebuilt engines or after performing maintenance on the oiling system.

Refer to **Priming the Oil Injection Pump** for instructions.

FUEL REQUIREMENTS

Do not use premixed gas and oil in this engine. The engine automatically receives extra oil during engine break-in. Use a fresh supply of the recommended gasoline during engine break-in and after engine break-in.

OIL RECOMMENDATION

Recommended Oil	OptiMax Oil or Premium Plus 2-Cycle TC-W3 Outboard Oil
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OptiMax Oil or Premium Plus TC-W3 is a higher grade oil that provides increased lubrication and extra resistance to carbon buildup when used with good or varying grades of gasoline.

IMPORTANT: Oil must be NMMA certified TC-W3 2-Cycle oil.

Periodically consult with your dealer to get the latest gasoline and oil recommendations. If Mercury Precision or Quicksilver 2-Cycle Outboard Oil is not available, substitute another brand of 2-Cycle outboard oil that is NMMA Certified TC-W3. The use of an inferior 2-Cycle outboard oil can reduce engine durability. Damage from use of inferior oil may not be covered under the limited warranty.

OUTBOARD INSTALLATION

Boat Horsepower Capacity

WARNING

Exceeding the boat's maximum horsepower rating can cause serious injury or death. Overpowering the boat can affect boat control and flotation characteristics or break the transom. Do not install an engine that exceeds the boat's maximum power rating.

Do not overpower or overload your boat. Most boats will carry a required capacity plate indicating the maximum acceptable power and load as determined by the manufacturer following certain federal guidelines. If in doubt, contact your dealer or the boat manufacturer.

U.S. COAST GUARD CAPACITY	
MAXIMUM HORSEPOWER	XXX
MAXIMUM PERSON CAPACITY (POUNDS)	XXX
MAXIMUM WEIGHT CAPACITY	XXX

26777

Start in Gear Protection

WARNING

Starting the engine with the drive in gear can cause serious injury or death. Never operate a boat that does not have a neutral-safety-protection device.

The remote control connected to the outboard must be equipped with a start in neutral only protection device. This prevents the engine from starting in gear.

Selecting Accessories for Your Outboard

Genuine Mercury Precision or Quicksilver Accessories have been specifically designed and tested for this outboard.

OUTBOARD INSTALLATION

Some accessories not manufactured or sold by Mercury Marine are not designed to be safely used with this outboard or outboard operating system. Acquire and read the installation, operation, and maintenance manuals for all selected accessories.

Fuel System

AVOIDING FUEL FLOW RESTRICTION

IMPORTANT: Adding components to the fuel supply system (filters, valves, fittings, etc.) may restrict the fuel flow. This may cause engine stalling at low speed, and/or a lean fuel condition at high RPM that could cause engine damage.

ELECTRIC FUEL PUMP

The fuel pressure must not exceed 28 kPa (4 psi). If necessary, install a pressure regulator.

LOW PERMEATION FUEL HOSE REQUIREMENT

Required for outboards manufactured for sale, sold, or offered for sale in the United States.

- The Environmental Protection Agency (EPA) requires that any outboard manufactured after January 1, 2009 must use low permeation fuel hose for the primary fuel hose connecting the fuel tank to the outboard.
- Low permeation hose is USCG Type B1-15 or Type A1-15, defined as not exceeding $15/\text{gm}^2/24 \text{ h}$ with CE 10 fuel at $23 \text{ }^\circ\text{C}$ as specified in SAE J 1527 - marine fuel hose.

EPA PRESSURIZED PORTABLE FUEL TANK REQUIREMENTS

The Environmental Protection Agency (EPA) will require portable fuel systems that are produced after January 1, 2011 for use with outboard engines to remain fully sealed (pressurized) up to 34.4 kPa (5.0 psi). These tanks may contain the following:

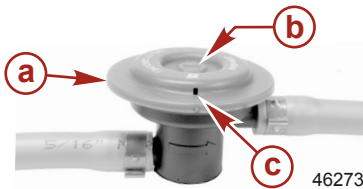
- An air inlet that opens to allow air to enter as the fuel is drawn out of the tank.
- An air outlet that opens (vents) to the atmosphere if pressure exceeds 34.4 kPa (5.0 psi).

OUTBOARD INSTALLATION

FUEL DEMAND VALVE (FDV) REQUIREMENT

Whenever a pressurized fuel tank is used, a fuel demand valve is required to be installed in the fuel hose between the fuel tank and primer bulb. The fuel demand valve prevents pressurized fuel from entering the engine and causing a fuel system overflow or possible fuel spillage.

The fuel demand valve has a manual release. The manual release can be used (pushed in) to open (bypass) the valve in case of a fuel blockage in the valve.



- a** - Fuel demand valve - installed in the fuel hose between the fuel tank and primer bulb
- b** - Manual release
- c** - Vent/water drain holes

FUEL TANKS

Portable Fuel Tank

Select a suitable location in the boat within the engine fuel line length limitations and secure the tank in place.

Permanent Fuel Tank

Permanent fuel tanks should be installed in accordance with industry and federal safety standards, which include recommendations applicable to grounding, anti-siphon protection, ventilation, etc.

FILLING THE FUEL SYSTEM

When starting an engine for the first time, or starting an engine that ran out of fuel or was drained of fuel, fill and prime the fuel system.

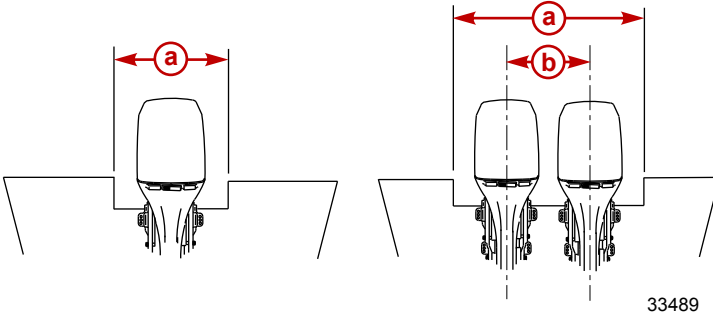
To fill and prime the fuel system:

1. Squeeze the fuel line primer bulb until it feels firm.
2. Turn the key switch to the "ON" position for three seconds. This operates the electric fuel pump.
3. Turn the key switch back to the "OFF" position and squeeze the primer bulb again until it feels firm.

OUTBOARD INSTALLATION

4. Turn the key switch to the "ON" position again for three seconds.
5. Continue this procedure until the fuel line primer bulb stays firm.

Installation Specifications



a - Minimum transom opening

b - Engine centerline for dual engine - 66.0 cm (26 in.)

Minimum Transom Opening	
Single engine	84.8 cm (33-3/8 in.)
Dual engine	151.8 cm (59-3/4 in.)

Lifting the Outboard

⚠ WARNING

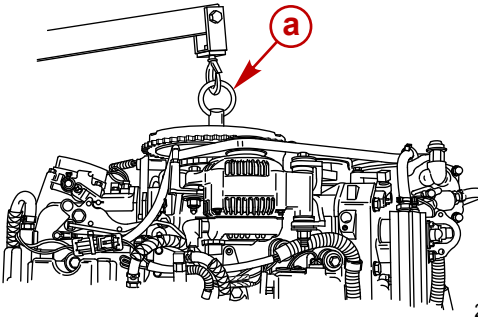
Improperly supporting an engine during lifting can result in the engine falling, causing serious injury or death. Before lifting the engine, verify that the lifting ring is threaded into the flywheel for a minimum of five turns and that the hoist has the correct lifting capacity for the engine weight.

To lift the outboard:

1. Remove the cowl from the outboard.


OUTBOARD INSTALLATION

- Thread the lifting eye into the flywheel hub for a minimum of five turns.



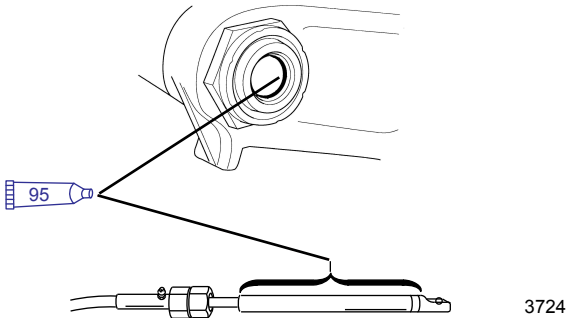
a - Lifting eye

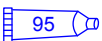
- Connect a hoist to the lifting eye.
- Lift the outboard and place it on the boat transom.

Lifting Eye	91-90455--1
	Threads into the flywheel to remove the powerhead assembly from the driveshaft housing, or to lift entire engine for removal/installation.

Steering Cable - Starboard Side Routed Cable

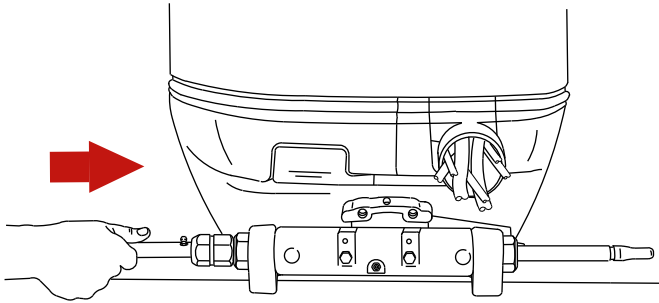
- Lubricate O-ring seal and entire cable end.



Tube Ref No.	Description	Where Used	Part No.
	2-4-C with PTFE	O-ring seal and entire cable end	92-802859A 1

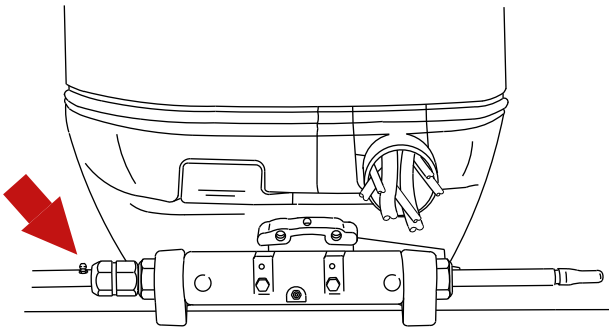
OUTBOARD INSTALLATION

2. Insert steering cable into tilt tube.



3725

3. Torque nut to specification.



3727

Description	Nm	lb-in.	lb-ft
Nut	47.5		35

Steering Link Rod Fasteners

IMPORTANT: The steering link rod that connects the steering cable to the engine must be fastened using a special washer head bolt (P/N 10-849838) and self-locking nylon insert locknuts (P/N 11-826709113). Never replace locknuts with common nuts (nonlocking) as they will work loose and vibrate off, freeing the link rod to disengage.

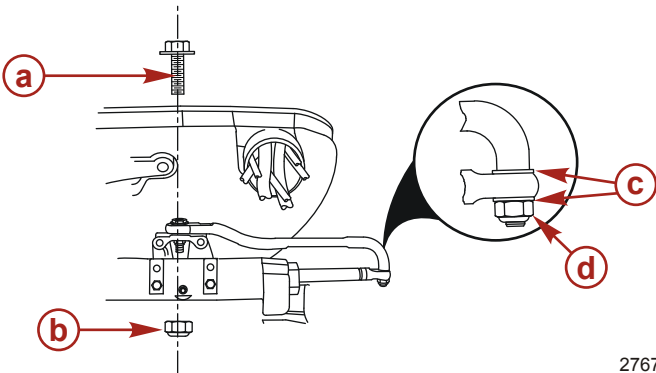
OUTBOARD INSTALLATION

⚠ WARNING

Improper fasteners or improper installation procedures can result in loosening or disengagement of the steering link rod. This can cause a sudden, unexpected loss of boat control, resulting in serious injury or death due to occupants being thrown within or out of the boat. Always use required components and follow instructions and torque procedures.

⚠ WARNING

Worn, loose, or seized steering components can lead to loss of boat control. Inspect all steering attachment components for wear, lubricate all attachment hardware, and check all fasteners for proper tightness in accordance with the inspection and maintenance schedule.



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- a** - Special washer head bolt (P/N 10-849838)
- b** - Nylon insert locknut (P/N 11-826709113) - used on head bolt
- c** - Flat washer (2)
- d** - Nylon insert locknut (P/N 11-826709113) - used on cable coupler

1. Assemble steering link rod to steering cable coupler with two flat washers "c" and a self-locking nylon insert locknut "d." Tighten the locknut until it seats, then loosen $\frac{1}{4}$ turn.

OUTBOARD INSTALLATION

2. Assemble the steering link rod to the engine with the special washer head bolt "a" and self-locking nylon insert locknut "b."
3. Torque the head bolt, then the locknut to specifications.

Description	Nm	lb-in.	lb-ft
Cable coupler nylon insert locknut "d"	Tighten locknut until it seats, then loosen ¼ turn.		
Head bolt nylon insert locknut "b"	27		20
Special washer head bolt	27		20

Determining the Mounting Height of the Outboard

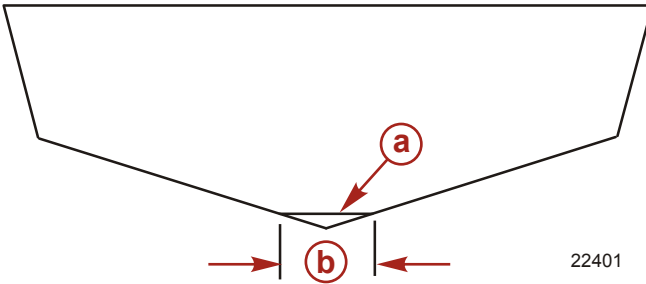
The following outboard mounting height settings will work good for most applications, however, because of different boat/hull designs, the setting should be rechecked by test running the boat. Refer to **Water Testing**.

- Installing the outboard too high on the transom will allow the water intake to suck in air and cause cavitation. (Cavitation will cause the engine to overspeed in spurts and reduce thrust.) This condition should be avoided by proper height setting.
- Installing the outboard too low on the transom will allow excessive drag.

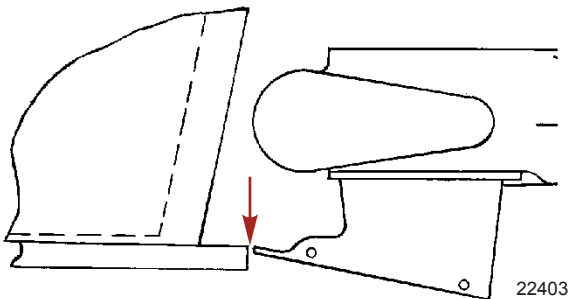
OUTBOARD INSTALLATION

BOATS WITH A "V" BOTTOM HULL

1. Measure the width of the leading edge on the water intake housing. Make a horizontal line on the transom up from the "V" bottom the same length as the width of the water intake housing.



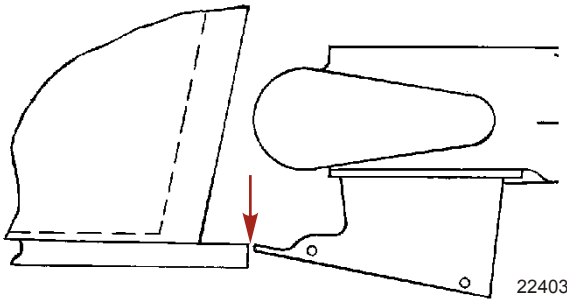
- a** - Horizontal line
b - Width of the leading edge on the water intake housing
2. Place (center) the outboard on the boat transom. Set the height of the outboard on the boat transom so that the front edge of the water intake housing is in line with the horizontal line made in step 1. Temporarily clamp the outboard to the transom at this position.
 3. Fasten the outboard to the transom at this height. Refer to **Fastening the Outboard**.



OUTBOARD INSTALLATION

BOATS WITH A FLAT BOTTOM HULL

1. Place (center) the outboard on the boat transom. Set the height of the outboard on the boat transom so that the front edge of the water intake housing is in line with the bottom of the boat as shown. Temporarily clamp the outboard to the transom at this position.
2. Fasten outboard to the transom at this height. Refer to **Fastening the Outboard**.

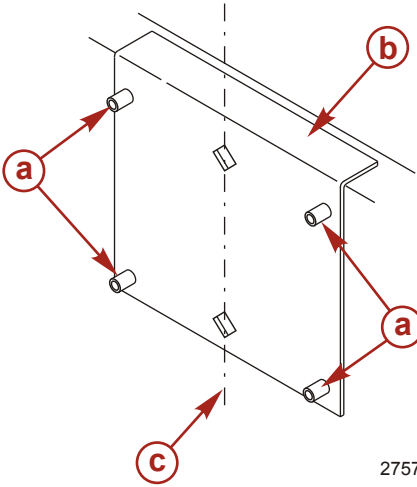


Drilling Outboard Mounting Holes

IMPORTANT: Before drilling any mounting holes, carefully read **Determining Recommended Outboard Mounting Height** and install outboard to the nearest recommended mounting height.

OUTBOARD INSTALLATION

1. Mark four mounting holes on the transom using the transom drilling fixture.

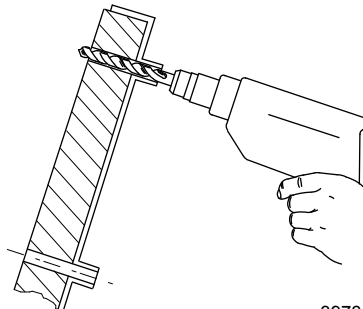


- a** - Drill guide holes
- b** - Transom drilling fixture
- c** - Transom centerline

2757

Transom Drilling Fixture	91-98234A2
<p>5489</p>	Aids in engine installation by acting as a template for engine mounting holes.

2. Drill four 13.5 mm (17/32 in.) mounting holes.



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OUTBOARD INSTALLATION

Fastening the Outboard to the Transom

MOUNTING BOLTS

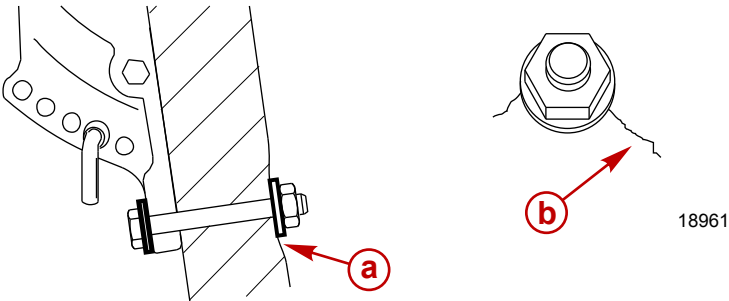
Outboard Transom Mounting Hardware - Supplied with Outboard		
Part Number	Part Name	Description
10-67755-1	Outboard mounting bolt	½-20 x 4.50 in. long (2.25 in. thread)
11-826711-17	Nylon insert locknut	½-20
12-28421	Flat washer	1-1/2 in. diameter
12-54012	Flat washer	7/8 in. diameter

Available Outboard Mounting Bolts	
Part Number	Description
10-67755005	½-20 x 2.50 in. long (1.25 in. thread)
10-67755006	½-20 x 3.50 in. long (1.25 in. thread)
10-814259	½-20 x 4.00 in. long (2.25 in. thread)
10-67755-1	½-20 x 4.50 in. long (2.25 in. thread)
10-8M0033366	½-20 x 5.00 in. long (3.25 in. thread)
10-67755-003	½-20 x 5.50 in. long (3.25 in. thread)
10-67755-2	½-20 x 6.50 in. long (2.75 in. thread)
10-8M0028080	½-20 x 7.50 in. long (2.75 in. thread)
10-8M0032860	½-20 x 8.00 in. long (2.75 in. thread)

OUTBOARD INSTALLATION

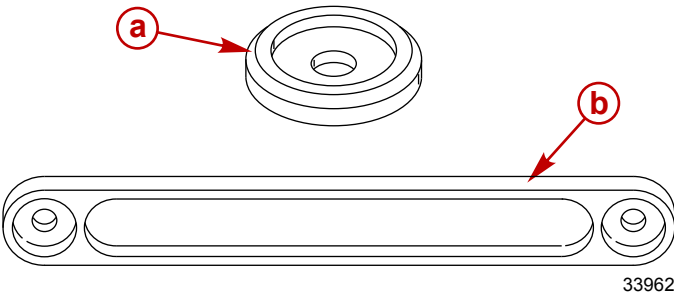
CHECKING BOAT TRANSOM CONSTRUCTION

IMPORTANT: Determine the strength of the boat transom. The outboard mounting locknuts and bolts should be able to hold 75 Nm (55 lb-ft) of torque without the boat transom yielding or cracking. If the boat transom yields or cracks under this torque, the construction of the transom may not be adequate. The boat transom must be strengthened or the load carrying area increased.



- a** - Transom yielding under bolt torque
- b** - Transom cracking under bolt torque

Use a dial torque wrench to determine transom strength. If the bolt or nut continues to turn without the torque reading on the dial increasing, it is an indication that the transom is yielding. The load area can be increased by using a larger washer or a transom reinforcement plate.



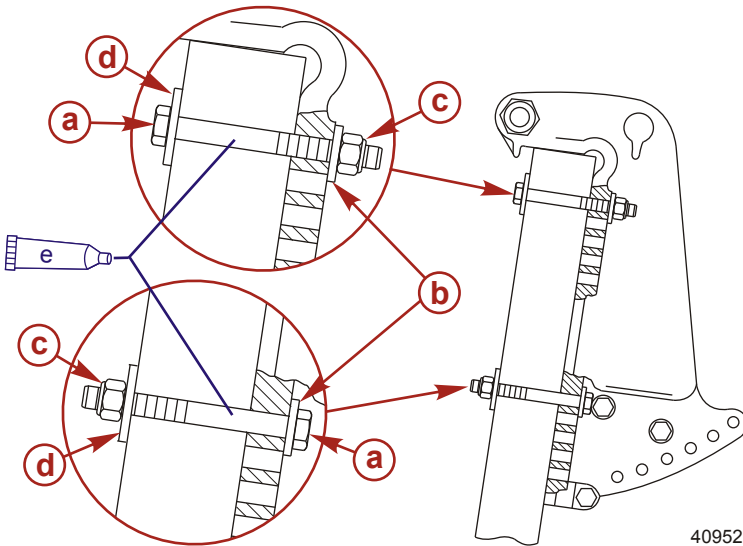
- a** - Large transom washer
- b** - Transom reinforcement plate

OUTBOARD INSTALLATION

1. Apply marine sealer to the shanks of the bolts, not to the threads.
2. Fasten the outboard with the correct mounting hardware.
Tighten the locknuts to the specified torque.

IMPORTANT: Ensure a minimum of two full threads of the mounting bolts extend beyond the locknut after tightening. The locknut must be drawn tight while still engaging the bolt threads and not contacting the shank of the bolt.

NOTE: For more accurate torque, tighten the mounting locknuts rather than the outboard mounting bolts.



- a - 1/2 in. diameter outboard mounting bolt (4)
- b - 7/8 in. flat washer (4)
- c - Nylon insert locknut (4)
- d - 1-1/2 in. flat washer (4)
- e - Marine sealer - apply to the shank of the bolts, not the threads

Description	Nm	lb-in.	lb-ft
Outboard mounting locknuts and bolts - standard boat transom	75		55

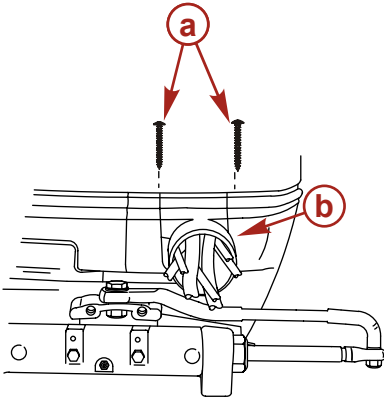
OUTBOARD INSTALLATION

Description	Nm	lb-in.	lb-ft
Outboard mounting locknuts and bolts - metal lift plates and setback brackets	122		90

Electrical, Hoses, and Control Cables

FRONT CLAMP DISASSEMBLY

Remove screws and open the front clamp assembly.



a - Screw (2)

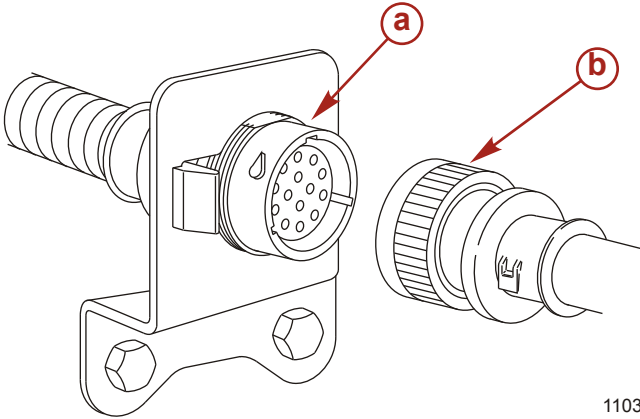
b - Front clamp

7644

OUTBOARD INSTALLATION

REMOTE WIRING HARNESS

Route the remote 14 pin boat harness through the front clamp. Connect remote harness to the 14 pin connector on the engine harness.



- a** - 14 pin connector
- b** - Remote 14 pin boat harness

BATTERY INFORMATION

WARNING

Failure to properly secure the battery leads can result in a loss of power to the Digital Throttle and Shift (DTS) system, leading to serious injury or death due to loss of boat control. Secure the battery leads to the battery posts with hex nuts to avoid loose connections.

- Do not use deep-cycle batteries. Engines must use a marine starting battery with 1000 MCA, 800 CCA, or 180 Ah.
- When connecting the engine battery, hex nuts must be used to secure battery leads to battery posts. Torque nuts to specification.

Description	Nm	lb-in.	lb-ft
Hex nuts	13.5	120	

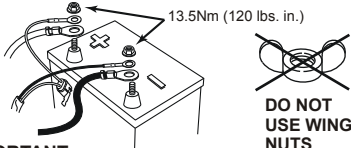
OUTBOARD INSTALLATION

IMPORTANT: Battery cable size and length is critical. Refer to engine installation manual for size requirements.

The decal needs to be placed on or near the battery box for future service reference. One 5/16 in. and one 3/8 in. hex nut is supplied per battery for wing nut replacement. Metric hex nuts are not supplied.

NOTICE - DTS & OptiMax Engines

DO NOT USE DEEP CYCLE BATTERIES!
DTS (Digital Throttle and Shift) applications and OptiMax engines must use a marine starting battery with 1000 MCA, 800 CCA, or 180 Ah. rating.



IMPORTANT:
Battery cable size and length is critical. Refer to engine installation manual for size requirements.

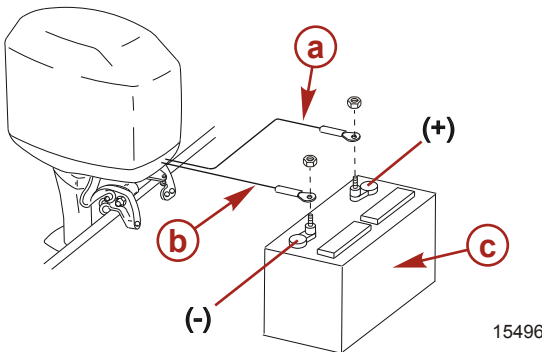
37-895387

Place decal on or near battery box for future service reference. 5/16" and 3/8" hex nuts supplied for wing nut replacement. Metric hex nuts not supplied.

3486

BATTERY CABLE CONNECTIONS

Single Outboard



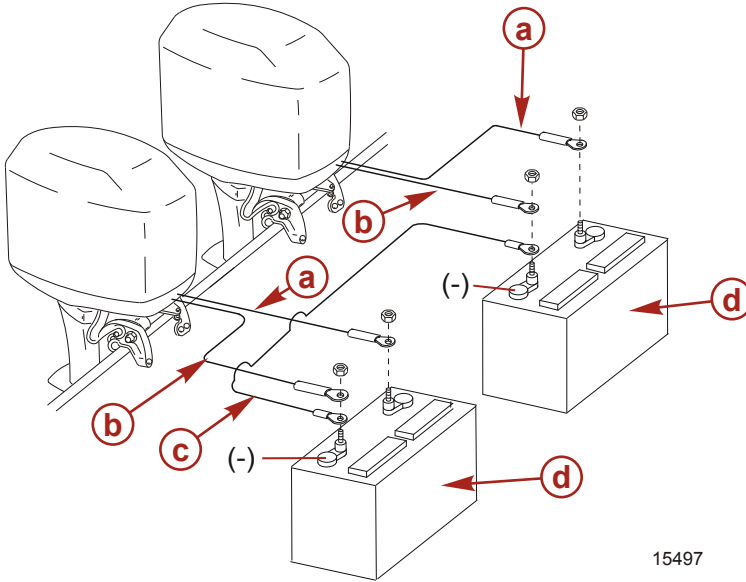
- a** - Red sleeve - Positive (+)
- b** - Black sleeve - Negative (-)
- c** - Cranking battery

15496

OUTBOARD INSTALLATION

Dual Outboards

Connect a common ground cable (wire size same as engine battery cables) between negative (-) terminals on starting batteries.



15497

- a** - Red sleeve - Positive (+)
- b** - Black sleeve - Negative (-)
- c** - Ground cable
- d** - Cranking battery

FUEL HOSE AND OIL HOSE CONNECTIONS

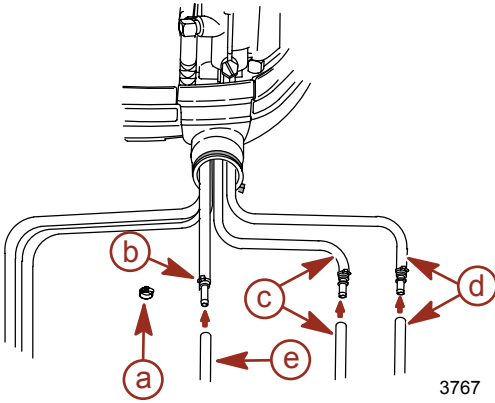
Fuel Hose Connection

Fuel hose size - Minimum fuel line inside diameter (I.D.) is 8 mm (5/16 in.), with a separate fuel line/fuel tank pickup for each engine.

1. Fasten the remote fuel hose to the fitting with a hose clamp.

OUTBOARD INSTALLATION

2. Connect the remote oil hoses to the engine hose connections. Fasten hose connections with cable ties.

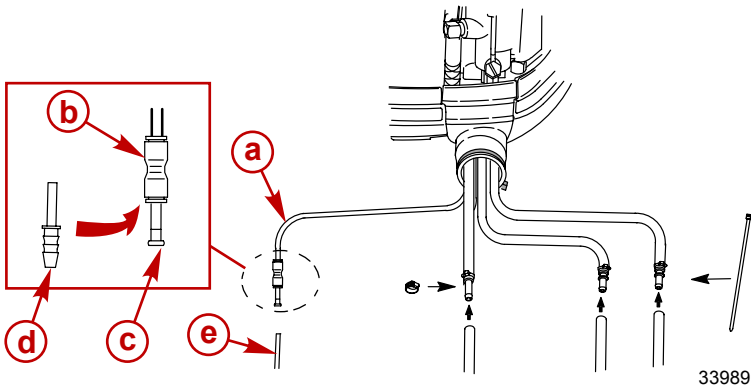


- a - Hose clamp
- b - Cable tie
- c - Oil hose without blue stripe
- d - Oil hose with blue stripe
- e - Remote fuel hose

ENGINE WATER PRESSURE TUBE CONNECTION

NOTE: This applies to models without SmartCraft gauges.

When making a water pressure gauge hose connection to the engine, make the connection to the water pressure tube, as shown.



- a - Water pressure tube
- b - Coupler
- c - Plug
- d - Barb hose fitting
- e - Water pressure tube or hose

OUTBOARD INSTALLATION

Shift and Throttle Cable

SHIFT CABLE INSTALLATION

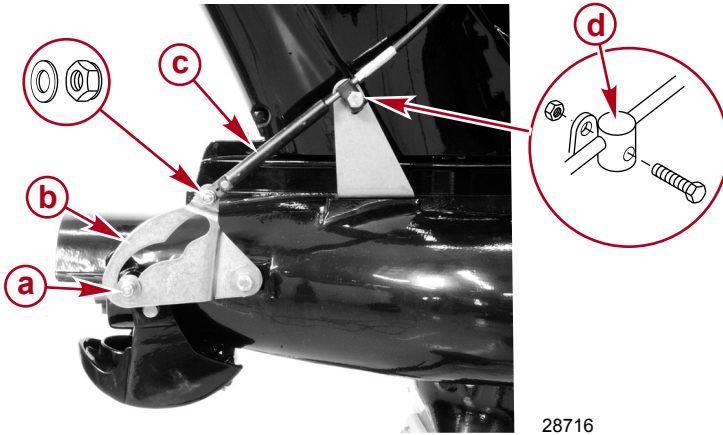
WARNING

If not properly installed, the reverse gate can interfere with water coming off the rudder, suddenly and unexpectedly slowing the boat. This can cause serious injury or death from occupants being thrown within or out of the boat. Adjust the shift cable to prevent the reverse gate from interfering with water flow off the rudder.

1. Attach the shift cable to the shift cam with a flat washer and a self-locking nylon insert locknut as shown. Tighten the locknut against the flatwasher, then back-off the locknut 1/4 turn.
2. Place the remote control handle into full forward position.
3. Adjust the shift cable adjustment barrel so that the roller is at the full end of travel (bottom) in the shift cam.

OUTBOARD INSTALLATION

4. Attach the shift cable adjustment barrel to the bracket with a bolt and locknut. Tighten the bolt until it seats against the adjustment barrel, then back-off the bolt 1/4 turn. Hold the bolt from turning, and tighten the locknut on the bolt. The adjustment barrel must be free to pivot.



- a** - Roller
- b** - Shift cam
- c** - Shift cable
- d** - Shift cable adjustment barrel

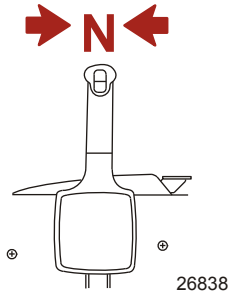
5. Recheck the shift cable adjustment in forward shift position. The correct shift adjustment will position the cam far enough on the roller to lock the reverse gate into forward position. Push on the reverse gate by hand to verify it is locked into position. The reverse gate should not move when pushed toward the neutral position.

IMPORTANT: The forward locking of the reverse gate must be met. If not, readjust the shift cable.

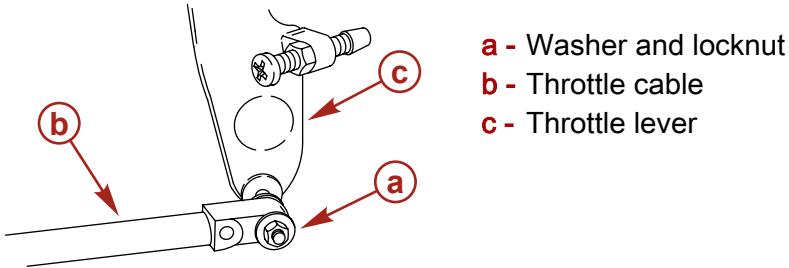
OUTBOARD INSTALLATION

THROTTLE CABLE INSTALLATION

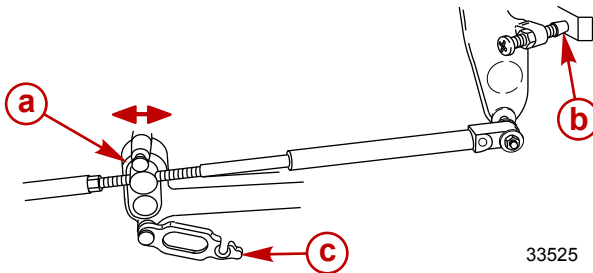
1. Position remote control into neutral.



2. Attach throttle cable to the throttle lever. Secure with washer and locknut.



3. Adjust the throttle cable barrel so that the installed throttle cable will hold the idle stop screw against the stop.



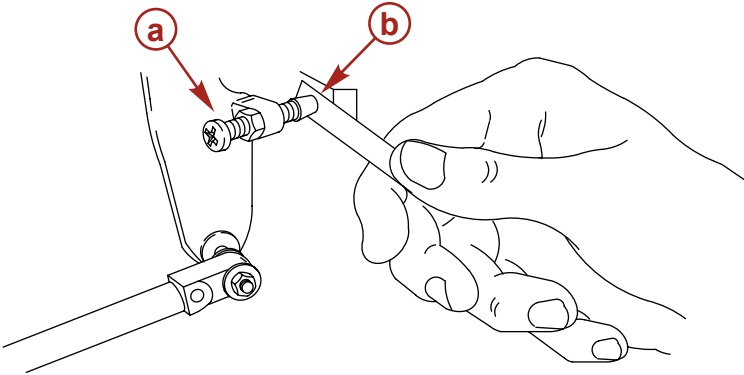
- a** - Throttle cable barrel
- b** - Idle stop screw
- c** - Cable latch

4. Check throttle cable adjustment as follows:

OUTBOARD INSTALLATION

- a. Shift outboard into gear a few times to activate the throttle linkage. Make sure to rotate the propeller shaft while shifting into reverse.
- b. Return remote control to neutral. Place a thin piece of paper between idle adjustment screw and idle stop. Adjustment is correct when the paper can be removed without tearing, but has some drag on it. Readjust cable barrel if necessary.

IMPORTANT: The idle stop screw must be touching the stop.



7740

- a** - Idle stop screw
- b** - Idle stop

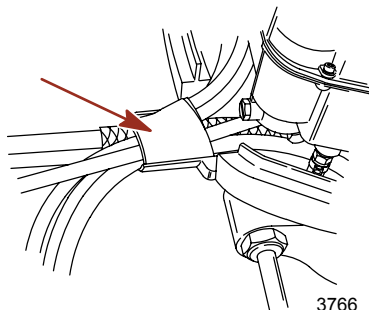
5. Lock the barrel holder in place with the cable latch.

Front Clamp Reassembly

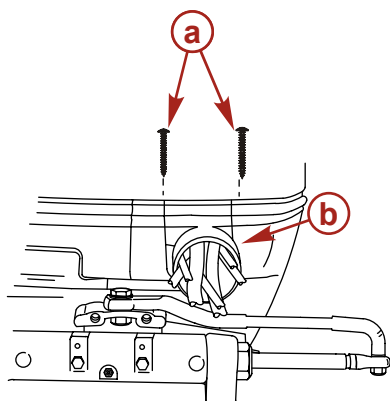
IMPORTANT: Sufficient slack must exist in engine wiring harness, battery cables, fuel hose, and oil hoses routed between clamp and engine attachment point, to relieve stress and prevent hoses from being kinked or pinched.

OUTBOARD INSTALLATION

1. Place the neoprene wrap over the wiring, hoses, and control cables.



2. Fasten clamp together with two screws.



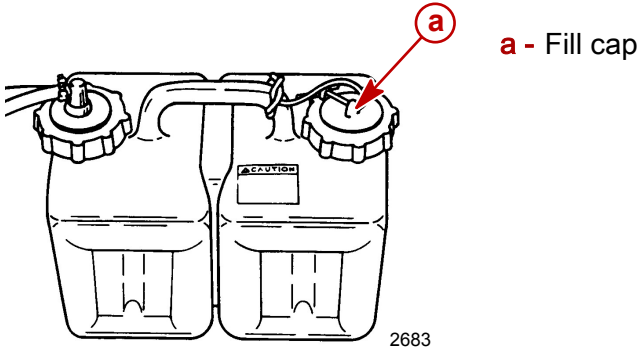
- a** - Screw (2)
- b** - Front clamp

OUTBOARD INSTALLATION

Oil Injection Set-Up

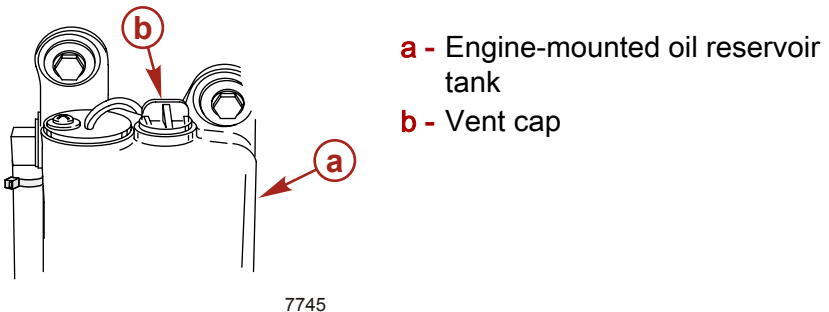
FILLING THE OIL TANKS

1. Remove the fill cap from the remote oil tank and fill the tank with the recommended oil. Install the fill cap and tighten securely.



IMPORTANT: Do not remove the vent cap from the engine-mounted oil reservoir tank when filling the tank. Removal of the vent cap may damage the threads in the oil reservoir tank. Damaged threads may result in future oil leakage.

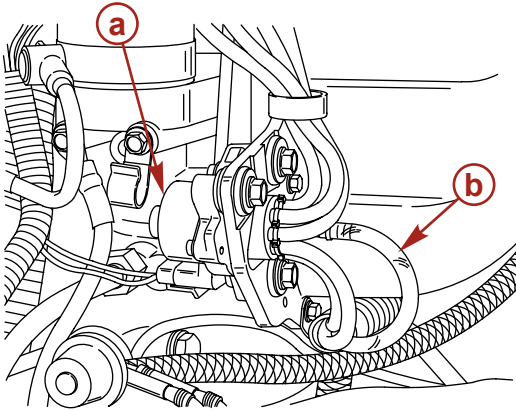
2. Check the oil level in the engine-mounted oil reservoir tank. The tank must contain at least 118 ml (4 oz) of oil prior to starting the engine.
3. If the oil level is less than 118 ml (4 oz), loosen the vent cap. Use a squirt can and fill the tank with at least 118 ml (4 oz) of the recommended oil. Tighten the vent cap.



OUTBOARD INSTALLATION

PRIMING THE OIL INJECTION PUMP

Before starting engine for the first time, prime the oil injection pump. Priming will remove any air that may be in the pump, oil supply hose, or internal passages.



7747

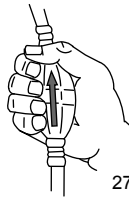
a - Oil injection pump

b - Oil supply hose

IMPORTANT: Fill the engine fuel system with fuel before priming the oil injection pump. Otherwise, the fuel pump will run without fuel during the priming process and may be damaged.

Prime the oil injection pump as follows:

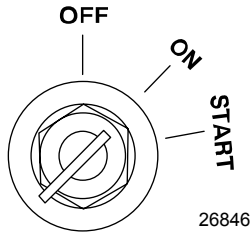
1. Fill the engine fuel tank with fuel.
2. Position the fuel primer bulb so the arrow on the side of the bulb is pointing up. Squeeze the fuel hose primer bulb until it feels firm.



27348

OUTBOARD INSTALLATION

3. Turn the ignition key switch to the "ON" position.



4. Within the first 10 seconds after the key switch has been turned on, move the remote control handle from neutral into forward gear 3 to 5 times. This will automatically start the priming process.

NOTE: *It may take a few minutes for the pump to complete the priming process.*

PURGING AIR FROM THE ENGINE MOUNTED OIL RESERVOIR TANK

1. Loosen the vent cap on the engine mounted oil reservoir tank.
2. Start the engine.
3. Operate the engine until all the air has vented out and oil starts to flow out of the tank.
4. Tighten vent cap.

OUTBOARD INSTALLATION

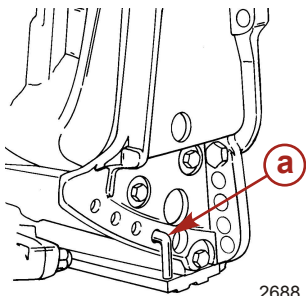
Trim In Pin

WARNING

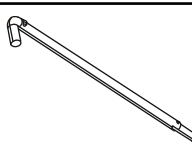
Operating the boat at high speeds with the outboard trimmed too far under can create excessive bow steer, resulting in the operator losing control of the boat. Install the trim limit pin in a position that prevents excessive trim under and operate the boat in a safe manner.

Some boats, particularly some bass boats, are built with a greater than normal transom angle, which will allow the outboard to be trimmed further in or under. This greater trim under capability is desirable to improve acceleration, reduce the angle and time spent in a bow high boat during planing off, and in some cases, may be necessary to plane off a boat with aft livewells, given the variety of available propellers and height range of engine installations.

However, once on plane, the engine should be trimmed to a more intermediate position to avoid a bow-down planing condition called plowing. Plowing can cause bow steering or oversteering and inefficiently consumes horsepower.



a - Tilt pin (not included with engine)

Stainless Steel Tilt Pin	17-49930A 1
 2749	Limits the down trim angle of the power trim equipped engines, or aids in determining the trim out angle on non-power trim engines.

OUTBOARD INSTALLATION

The owner may decide to limit the trim in. This can be accomplished by purchasing a stainless steel tilt pin from your dealer and insert it in whatever adjustment hole in the transom brackets is desired. A nonstainless steel shipping bolt should not be used in this application other than on a temporary basis.

MAINTENANCE LOG

Maintenance Log

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

Date	Maintenance Performed	Engine Hours