

NOTE: The following applies to CE-marked products only.

Declaration of Conformity—Mercury MerCruiser

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

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

Name of engine manufacturer: Mercury Marine MerCruiser		
Address: 3003 N. Perkins Road		
Town: Stillwater, OK	Post Code: 74075	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

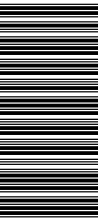
Conformity assessment module used for exhaust emissions:	<input type="checkbox"/> B+C	<input type="checkbox"/> B+D	<input type="checkbox"/> B+E	<input type="checkbox"/> B+F	<input type="checkbox"/> G	<input checked="" type="checkbox"/> H
or engine type approved according to:	<input type="checkbox"/> stage II of Directive 97/68/EC		<input type="checkbox"/> Directive 88/77/EC			
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: Electromagnetic Compatibility Directive 89/336/EC						

Description of Engines and Essential Requirements

Engine Type	Fuel Type	Combustion Cycle
<input checked="" type="checkbox"/> z or sterndrive with integral exhaust	<input type="checkbox"/> Diesel	<input type="checkbox"/> 2 stroke
<input type="checkbox"/> Inboard engine	<input checked="" type="checkbox"/> Petrol	<input checked="" type="checkbox"/> 4 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
Vazer 100 EC	1A035000	RCD-H-1
3.0 MPI (EC)	1A300000	RCD-H-1
5.0 MPI EC	1A300000	RCD-H-1
SeaCore 5.0 EC	1A300000	RCD-H-1
350 MAG EC	1A300000	RCD-H-1
377 MAG EC	1A343300	RCD-H-1
SeaCore 350 MAG EC	1A300000	RCD-H-1
8.2 MAG EC	1A350340	RCD-H-1
SeaCore 8.2 MAG EC	1A350340	RCD-H-1
8.2 MAG H.O. EC	1A350340	RCD-H-1
SeaCore 8.2 MAG H.O. EC	1A350340	RCD-H-1



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

Name / function:

Mark Schwabero, President, Mercury Marine

Signature and title:



Date and place of issue: July 30, 2010
Fond du Lac, Wisconsin, USA

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

Identification Record

Please record the following information:

Engine Model and Horsepower		Engine Serial Number
Transom Assembly Serial Number (Sterndrive)	Gear Ratio	Sterndrive Unit Serial Number
Transmission Model (Inboard)	Gear Ratio	Transmission Serial Number
Propeller Number	Pitch	Diameter
Hull Identification Number (HIN)		Purchase Date
Boat Manufacturer	Boat Model	Length

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

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

Mercury Marine, Fond du Lac, Wisconsin, USA. Printed in USA.

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

Welcome

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

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

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

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

Warranty Message

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


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

Read This Manual Thoroughly

IMPORTANT: If you don't understand any portion of this manual, contact your dealer for a demonstration of actual starting and operating procedures.

Notice

Throughout this publication, and on your power package, dangers, warnings, cautions, and notices, accompanied by the

International Hazard Symbol , may be used to alert the installer/user to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully.

These safety alerts alone cannot eliminate the hazards they warn of. Strict compliance with these special instructions while performing the service, plus common sense operation, are major accident prevention measures.

DANGER

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

WARNING

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

CAUTION

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

NOTICE

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

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

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

 **WARNING**

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

 **WARNING**

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

TABLE OF CONTENTS

Section 1 - Warranty

Warranty Registration: United States and Canada.....	2	Owner Responsibility.....	10
Warranty Registration: Outside the United States and Canada.....	2	California Emissions Limited Warranty.....	10
Transfer of Warranty.....	2	What Is Covered.....	11
Mercury Installation Quality Certification Program.....	3	Duration of Coverage.....	11
Mercury Product Protection Plan: United States and Canada... 4		How to Obtain Warranty Coverage.....	11
Mercury MerCruiser Limited Warranty (Gasoline-Fueled Products Only)	4	What Mercury Will Do.....	11
3-Year Limited Warranty Against Corrosion.....	6	What Is Not Covered.....	11
Global Application Warranty Charts.....	8	Disclaimers and Limitations.....	12
Warranty for Consumer Applications.....	8	California Emission Control Warranty Statement.....	12
Warranty for Commercial Applications.....	8	Your Warranty Rights and Obligations.....	12
Warranty for Government Applications.....	8	Manufacturer's Warranty Coverage.....	12
Emission Control Warranty Information.....	8	Owner's Warranty Responsibilities.....	12
Important Information.....	8	U.S. EPA Emissions Limited Warranty.....	13
Emission Control Information Label.....	9	Emission Control System Components.....	13
		Emission Certification Star Label.....	14
		Hang Tag.....	15

Section 2 - Getting to Know Your Power Package

Identification.....	18	Dual Engine Trim/Trailer.....	23
Alpha Sterndrive Decal Identification.....	18	Electrical System Overload Protection.....	23
Alpha Transom Serial Number.....	18	Audio and Visual Warning System.....	26
Engine Serial Number Decal.....	19	Warning Horn Signals.....	26
Lanyard Stop Switch.....	19	Caution.....	27
Instrumentation.....	20	Severe.....	27
Remote Controls.....	21	OBDM.....	27
Panel Mount Features.....	21	Testing the Audio Warning System.....	27
Console Mount Features.....	22	OBDM Malfunction Indicator Lamp (MIL) Kit.....	27
Power Trim.....	22	Testing the OBDM Malfunction Indicator Lamp (MIL)..	28
Single Engine Trim/Trailer.....	23	Guardian Strategy.....	28

Section 3 - On the Water

Safe Boating Suggestions.....	30	High-Speed and High-Performance Operation.....	35
Carbon Monoxide Exposure.....	31	Passenger Safety in Pontoon Boats and Deck Boats.....	35
Be Alert To Carbon Monoxide Poisoning.....	31	Boats Having an Open Front Deck.....	35
Stay Clear of Exhaust Areas.....	31	Boats With Front-Mounted, Raised Pedestal Fishing Seats	35
Good Ventilation	31	Wave and Wake Jumping.....	35
Poor Ventilation	32	Impact with Underwater Hazards.....	36
Basic Boat Operation.....	32	Drive Unit Impact Protection.....	36
Launching and Boat Operation.....	32	Conditions Affecting Operation.....	37
Operation Chart.....	32	Weight Distribution (Passengers and Gear) Inside the Boat.....	37
Starting and Stopping the Engine.....	33	The Bottom of the Boat.....	37
Starting the Engine.....	33	Cavitation.....	37
Stopping the Engine.....	33	Ventilation.....	37
Starting the Engine After Stopped While in Gear.....	34	Elevation and Climate.....	37
Throttle-Only Operation.....	34	Propeller Selection.....	37
Trailing the Boat.....	34	Getting Started.....	38
Freezing Temperature Operation.....	34	20-Hour Break-In Period.....	38
Drain Plug and Bilge Pump.....	34	After Break-In Period.....	38
Protecting People in the Water.....	34	End of First Season Checkup.....	38
While You Are Cruising.....	34		
While Boat Is Stationary.....	34		

Section 4 - Specifications

Fuel Requirements.....	40	Engine Specifications.....	41
Fuel Ratings.....	40	3.0 MPI.....	41
Using Reformulated (Oxygenated) Gasoline (USA Only).....	40	Fluid Specifications.....	42
Gasoline Containing Alcohol.....	40	Sterndrives.....	42
Engine Oil.....	40	Engine.....	42

Section 5 - Maintenance

Owner/Operator Responsibilities.....	44	Cleaning the IAC Muffler.....	55
Dealer Responsibilities.....	44	Changing the Water-Separating Fuel Filter.....	56
Maintenance.....	44	Inspecting the Fuel Pump Sight Tube.....	57
Do-It-Yourself Maintenance Suggestions.....	44	Lubrication.....	57
Inspection.....	45	Steering System.....	57
Maintenance Schedule—Sterndrive Models.....	45	Manual Steering System.....	58
Routine Maintenance.....	45	Throttle Cable.....	59
Scheduled Maintenance.....	46	Shift Cable - Typical.....	59
Maintenance Log.....	47	Sterndrive U-joint Shaft Splines and O-rings (Sterndrive Unit Removed).....	60
Engine Oil.....	48	Engine Coupler.....	60
Checking and Filling.....	48	Driveshaft Extension Models.....	60
Changing Oil and Filter.....	48	Propellers.....	61
Engine Oil Drain Pump.....	49	Propeller Repair.....	61
Changing the Oil Filter.....	49	Alpha Propeller Removal.....	61
Power-Assisted Steering Fluid.....	49	Alpha Propeller Installation.....	61
Checking.....	49	Drive Belts.....	62
Filling.....	50	Checking.....	63
Changing.....	50	Replacing Belts on Front Mount Models.....	63
Engine Coolant.....	50	Power Steering Pump Drive Belt.....	63
Checking.....	50	Alternator Belt.....	63
Filling.....	51	Replacing Belts on Side Mount Models.....	64
Changing.....	52	Power Steering Pump Drive Belt.....	64
Alpha Sterndrive Gear Lube.....	52	Alternator Belt.....	64
Checking.....	52	Flushing the Power Package.....	64
Filling.....	52	Flushing Attachments.....	64
Changing.....	53	Sterndrive Water Pickups.....	65
Power Trim Fluid.....	54	Battery.....	66
Checking.....	54	Corrosion Protection.....	66
Filling.....	54	Painting Your Power Package.....	70
Changing.....	55		
Cleaning the Flame Arrestor.....	55		

Section 6 - Storage

Cold Weather or Extended Storage.....	72	Clearing Clogged Blue Drain Hoses.....	76
Preparing Power Package for Storage.....	72	Draining the Sterndrive.....	77
Engine and Fuel System Preparation.....	72	Battery Storage.....	78
Draining the Seawater System.....	73	Recommissioning the Power Package.....	78
Single-Point Drain System.....	73		
Draining the Seawater Section of Models with Closed Cooling.....	74		

Section 7 - Troubleshooting

Diagnosing EFI Problems.....	80	Engine Guardian System.....	80
------------------------------	----	-----------------------------	----

Troubleshooting Charts.....	80	Battery Will Not Recharge.....	82
Starter Motor Will Not Crank Engine, or Cranks Slowly....	80	Remote Control Is Difficult to Move, Has Excessive Play, or	
Engine Will Not Start or Is Hard to Start.....	80	Makes Unusual Sounds.....	82
Engine Runs Rough, Misses, or Backfires.....	81	Steering Wheel Jerks or Is Difficult to Turn.....	82
Poor Performance.....	81	Power Trim Does Not Operate (Motor Does Not Operate)	82
Excessive Engine Temperature.....	81	Power Trim Does Not Operate (Motor Operates but	
Insufficient Engine Temperature.....	81	Sterndrive Unit Does Not Move).....	83
Low Engine Oil Pressure.....	82		

Section 8 - Customer Assistance Information

Owner Service Assistance.....	86	Resolving a Problem.....	86
Local Repair Service.....	86	Contact Information for Mercury Marine Customer Service	
Service Away From Home.....	86	87
Stolen Power Package.....	86	Ordering Literature.....	87
Attention Required After Submersion.....	86	United States and Canada.....	87
Replacement Service Parts.....	86	Outside the United States and Canada.....	88
Parts and Accessories Inquiries.....	86		

Section 9 - Checklists

Predelivery Inspection (PDI).....	90	Customer Delivery Inspection (CDI).....	91
-----------------------------------	----	---	----

Section 1 - Warranty

1

Table of Contents

Warranty Registration: United States and Canada.....	2	Owner Responsibility	10
Warranty Registration: Outside the United States and Canada	2	California Emissions Limited Warranty.....	10
Transfer of Warranty.....	2	What Is Covered	11
Mercury Installation Quality Certification Program.....	3	Duration of Coverage	11
Mercury Product Protection Plan: United States and Canada	4	How to Obtain Warranty Coverage	11
Mercury MerCruiser Limited Warranty (Gasoline-Fueled Products Only)	4	What Mercury Will Do	11
3-Year Limited Warranty Against Corrosion.....	6	What Is Not Covered	11
Global Application Warranty Charts.....	8	Disclaimers and Limitations	12
Warranty for Consumer Applications.....	8	California Emission Control Warranty Statement.....	12
Warranty for Commercial Applications.....	8	Your Warranty Rights and Obligations	12
Warranty for Government Applications.....	8	Manufacturer's Warranty Coverage	12
Emission Control Warranty Information.....	8	Owner's Warranty Responsibilities	12
Important Information.....	8	U.S. EPA Emissions Limited Warranty.....	13
Emission Control Information Label.....	9	Emission Control System Components.....	13
		Emission Certification Star Label.....	14
		Hang Tag.....	15

Warranty Registration: United States and Canada

To ensure that your warranty coverage begins promptly, your selling dealer should fill out the Warranty Registration Card completely and mail it to the factory immediately upon sale of the new product.

The Warranty Registration Card identifies the name and address of the original purchaser, product model and serial number(s), date of sale, type of use and selling dealer's code, name, and address. The dealer also certifies that you are the original purchaser and user of the product. A temporary Owner Warranty Registration Card will be presented to you when you purchase the product.

Upon receipt of the Warranty Registration Card at the factory, Mercury MerCruiser will send you an owner resource guide that includes your warranty registration confirmation. If you do not receive your owner resource guide within 60 days from date of new product sale, please contact your selling dealer.

Because of your selling dealer's ongoing interest in your satisfaction, the product should be returned to him for warranty service.

The product warranty is not effective until the product is registered at the factory.

NOTE: *Registration lists must be maintained by the factory and dealer on marine products sold in the United States in the event that a safety recall notification under the Federal Boat Safety Act is required.*

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

United States customers or dealers may contact:

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

Canadian customers or dealers may contact:

Mercury Marine Canada Limited
2395 Meadowpine Blvd.
Mississauga,
Canada, L5N 7W6
Fax 1-800-663-8334

Warranty Registration: Outside the United States and Canada

To ensure that your warranty coverage begins promptly, your selling dealer should fill out the warranty registration card completely and mail it to the distributor responsible for administering the warranty registration and claim program for your area.

The warranty registration card identifies your name and address, product model and serial numbers, date of sale, type of use, and the selling distributor's and dealer's code number, name, and address. The distributor or dealer also certifies that you are the original purchaser and user of the product. A copy of the warranty registration card, designated as the purchaser's copy, **MUST** be given to you immediately after the card has been completely filled out by the selling distributor or dealer. This card represents your factory registration identification. Keep the card; if you ever need warranty service on this product, your dealer may ask you for the warranty registration card to verify date of purchase and to use the information on the card to prepare the warranty claim forms.

In some countries, the distributor will issue a permanent (plastic) warranty registration card to you within 30 days after receiving the factory copy of the warranty registration card from your distributor or dealer. If you receive a plastic warranty registration card, you may discard the purchaser's copy that you received from the distributor or dealer when you purchased the product. Ask your distributor or dealer if this plastic card program applies to you. For further information concerning the warranty registration card and its relationship to warranty claim processing, refer to the International Warranty. See Table of Contents.

NOTE: *Registration lists must be maintained by the factory and dealer on marine products sold in the United States in the event of a safety recall notification under the Federal Boat Safety Act.*

Transfer of Warranty

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

To transfer the warranty to the subsequent owner, send or fax a copy of the bill of sale or purchase agreement, new owner's name, address and engine serial number to Mercury Marine's warranty registration department. In the United States 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 920-929-5893

In Canada mail to:
 Mercury Marine Canada Limited
 2395 Meadowpine Blvd.
 Mississauga,
 Canada, L5N 7W6
 Fax 1-800-663-8334

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

There is no charge for this service.

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

Mercury Installation Quality Certification Program



15502

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

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

The program has three goals:

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

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

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

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

Section 1 - Warranty

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

Mercury Product Protection Plan: United States and Canada

IMPORTANT: Certain performance products, triple engine installations, and commercial applications are excluded from the Mercury Product Protection Plan program.

The Mercury Product Protection Plan provides coverage against unexpected mechanical and electrical breakdowns that may occur beyond the standard limited warranty. The plan may be purchased up to twelve months after the original engine registration date and is available with terms ranging from one to five years.

The optional Mercury Product Protection Plan is the only factory authorized extended warranty plan available for your engine. See your participating Mercury MerCruiser dealer for complete program details.

Mercury MerCruiser Limited Warranty (Gasoline-Fueled Products Only)

Mercury MerCruiser Limited Warranty (Gasoline-Fueled Products Only)

What is Covered

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

Duration of Coverage

Warranty Period for Recreational Use

The warranty period begins on the date the product is first sold to a recreational-use retail purchaser or the date on which the product is first put into service, whichever occurs first. Products installed by an Installation Quality Certified Installer receive one (1) year of additional warranty coverage. 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. The warranty period is specific to the model covered; see your model for the base coverage period:

Coverage for Horizon Inboard Models, and Vazer 100 Sterndrive Models

The Limited Warranty for Horizon Inboard Models and Vazer 100 Models is four (4) years when installed by an Installation Quality Certified Installer or three (3) years for non-certified installations.

Coverage for SeaCore Sterndrive Models

The Limited Warranty for SeaCore Sterndrive Models is four (4) years when installed by an Installation Quality Certified Installer or three (3) years for non-certified installations.

Coverage for Tow Sports Inboard Models

The Limited Warranty for Tow Sports 5.7 TKS models is two (2) years when installed by an Installation Quality Certified Installer or one (1) year for non-certified installations.

The Limited Warranty for all other Tow Sports Inboard models is three (3) years when installed by an Installation Quality Certified Installer or two (2) years for non-certified installations.

Coverage for All Other Models

The Limited Warranty for all other Gasoline Sterndrive and Inboard models except those described above is two (2) years when installed by an Installation Quality Certified Installer or one (1) year for non-certified installations.

Warranty Period for Commercial Use

The warranty period begins on the date the product is first sold to a commercial-use retail purchaser or the date on which the product is first put into service, whichever occurs first. Commercial users of these products receive warranty coverage for either one (1) year from the date of first retail sale or the accumulation of 500 hours of operation, whichever occurs first. Commercial use is defined as any work-related or employment-related use of the product, or any use of the product that generates income for any part of the warranty period, even if the product is only occasionally used for such purposes. The repair or replacement of parts or the performance of service under this warranty does not extend the life of this warranty beyond its original expiration date.

Transfer of Coverage

Unexpired warranty coverage can be transferred 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.

Termination of Coverage

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

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

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 pre-delivery inspection process specified by Mercury Marine is completed and documented. Warranty coverage becomes available upon proper registration of the product by the authorized dealer. Inaccurate warranty registration information regarding recreational use or subsequent change of use from recreational to commercial (unless properly reregistered) may void the warranty at the sole discretion of Mercury Marine. Routine maintenance must be performed according to the maintenance schedule in the Operation, Maintenance & Warranty manual in order to obtain warranty coverage. Mercury Marine reserves the right to make any warranty coverage contingent upon proof of proper maintenance.

What Mercury Marine Will Do

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

How to Obtain Warranty Coverage

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

Section 1 - Warranty

What Is Not Covered

This limited warranty does not cover the following:

- Routine maintenance items
- Adjustments
- Normal wear and tear
- Damage caused by abuse
- Abnormal use
- Use of a propeller or gear ratio that does not allow the engine to run in its recommended RPM range (see the Operation, Maintenance & Warranty manual)
- Operation of the product in a manner inconsistent with the recommended operation and duty cycle section of the Operation, Maintenance & Warranty manual
- Neglect
- Accident
- Submersion
- Improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product)
- Improper service
- Use of an accessory or part that was not manufactured or sold by Mercury Marine and that damages the Mercury product
- Jet pump impellers and liners
- Operation with fuels, oils, or lubricants that are not suitable for use with the product (see the Operation, Maintenance & Warranty manual)
- Alteration or removal of parts
- Water entering the engine through the fuel intake, air intake, or exhaust system or damage to the product from insufficient cooling water caused by blockage of the cooling system by a foreign body
- Running the engine out of water
- Mounting the engine too high on the transom
- Operating the boat with the engine over trimmed

Use of the product for racing or other competitive activity, or operating with a racing-type lower unit at any point, even by a previous owner of the product, voids the warranty. Expenses related to haul-out, launch, towing, storage, telephone, rental, inconvenience, slip fees, insurance coverage, loan payments, loss of time, loss of income, or any other type of incidental or consequential damages are not covered by this warranty. Also, expenses associated with the removal or replacement of boat partitions or other material in order to gain access to the product are not covered by this warranty. No individual or entity, including Mercury Marine authorized dealers, has been given authority by Mercury Marine to make any affirmation, representation, or warranty regarding the product, other than those contained in this limited warranty. If such affirmation, representation, or warranty is made, it shall not be enforceable against Mercury Marine.

DISCLAIMERS AND LIMITATIONS

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

3-Year Limited Warranty Against Corrosion

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, MerCruiser Inboard or Sterndrive engine (Product) will not be rendered inoperative as a direct result of corrosion for the period of time described below.

Duration of Coverage

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

Condition That Must Be Met in Order to Obtain Warranty Coverage

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

What Mercury Will Do

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

How to Obtain Warranty Coverage

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

What Is Not Covered

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

Global Application Warranty Charts

Warranty for Consumer Applications

Engine Model	Region	Standard Factory Limited Warranty by Certification Status of Boat Manufacturer		Consumer Limited Corrosion Warranty
		Not Certified	Installation Quality Certified	
3.0 MPI (EC)	The Americas (excluding Brazil)	1 year	2 years	3 years
	Brazil	2 years	2 years	2 years
	Europe, Middle East, Africa	2 years	3 years	3 years
	Australia, New Zealand	2 years	2 years	3 years
	Japan	1 year	1 year	1 year
	South Pacific	2 years	2 years	2 years
	Other Asia	1 year	1 year	1 years

Warranty for Commercial Applications

Engine Model	Region	Standard Factory Limited Warranty by Certification Status of Boat Manufacturer		Commercial Limited Corrosion Warranty
		Not Certified	Installation Quality Certified	
3.0 MPI (EC)	The Americas (excluding Brazil)	1 year	1 year	1 year
	Brazil	2 years	2 years	2 years
	Europe, Middle East, Africa	1 year or 500 hours	1 year or 500 hours	1 year or 500 hours
	Australia, New Zealand			
	Japan			
	South Pacific			
	Other Asia			

Warranty for Government Applications

Engine Model	Region	Standard Factory Limited Warranty by Certification Status of Boat Manufacturer		Government Limited Corrosion Warranty
		Not Certified	Installation Quality Certified	
3.0 MPI (EC)	The Americas (excluding Brazil)	1 year	1 year	3 years
	Brazil	2 years	2 years	2 years
	Europe, Middle East, Africa	1 year or 500 hours	1 year or 500 hours	1 year or 500 hours
	Australia, New Zealand			
	Japan			
	South Pacific			
	Other Asia			

Emission Control Warranty Information

Important Information

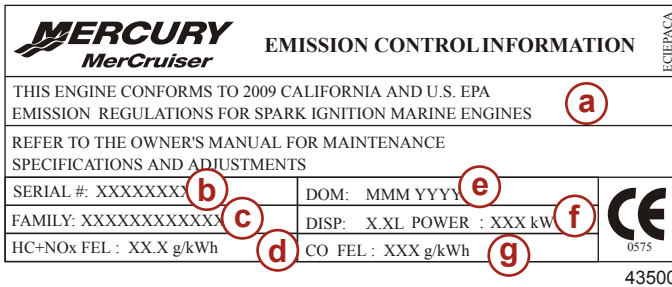
To identify the applicable emission control warranty coverage for a particular product, refer to the **Emission Control Information** label affixed to the engine.

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

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

Emission Control Information Label

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



- a - Applicable standard
- b - Engine serial number
- c - Engine family name
- d - Hydrocarbons plus oxides of nitrogen family emission limit
- e - Date of manufacture
- f - Engine displacement, engine power
- g - Carbon monoxide family emission limit

IMPORTANT: A CE mark in the lower right corner of the Emission Control Information label indicates that an EU Declaration of Compliance applies. Refer to the front page of this manual for further information.

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

ECI Label	Standard of Compliance
	<p>Indicates a marine engine compliant with United States EPA exhaust emission regulations for 2009. This marine engine is not for sale in California.</p>
	<p>Indicates a marine engine compliant with California CARB exhaust emission regulations for 2009</p>

Section 1 - Warranty

ECI Label	Standard of Compliance							
<p>MERCURY MerCruiser EMISSION CONTROL INFORMATION</p> <p>THIS ENGINE CONFORMS TO 2009 CALIFORNIA AND U.S. EPA EMISSION REGULATIONS FOR SPARK IGNITION MARINE ENGINES</p> <p>REFER TO THE OWNER'S MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS</p> <table border="1"> <tr> <td>SERIAL #: XXXXXXXX</td> <td>DOM: MMM YYYY</td> <td rowspan="3"></td> </tr> <tr> <td>FAMILY: XXXXXXXXXXXXX</td> <td>DISP: X.XL POWER : XXX kW</td> </tr> <tr> <td>HC+NOx FEL : XX.X g/kWh</td> <td>CO FEL : XXX g/kWh</td> </tr> </table> <p>43520</p>	SERIAL #: XXXXXXXX	DOM: MMM YYYY		FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW	HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh	<p>Indicates a marine engine compliant with California CARB and U.S. EPA regulations for 2009</p>
SERIAL #: XXXXXXXX	DOM: MMM YYYY							
FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW							
HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh							
<p>MERCURY MerCruiser EMISSION CONTROL INFORMATION NOT FOR SALE IN CALIFORNIA</p> <p>THIS ENGINE IS EXEMPT UNDER 40 CFR 1068.255 FROM EMISSION STANDARDS AND RELATED REQUIREMENTS</p> <p>REFER TO THE OWNER'S MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS</p> <table border="1"> <tr> <td>SERIAL #: XXXXXXXX</td> <td>DOM: MMM YYYY</td> <td rowspan="3"></td> </tr> <tr> <td>FAMILY: XXXXXXXXXXXXX</td> <td>DISP: X.XL POWER : XXX kW</td> </tr> <tr> <td>HC+NOx FEL : XX.X g/kWh</td> <td>CO FEL : XXX g/kWh</td> </tr> </table> <p>43521</p>	SERIAL #: XXXXXXXX	DOM: MMM YYYY		FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW	HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh	<p>Indicates a marine engine exempt under 40 CFR 1068.255 from United States EPA exhaust emission regulations for 2010. This marine engine is not for sale in California.</p>
SERIAL #: XXXXXXXX	DOM: MMM YYYY							
FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW							
HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh							
<p>MERCURY MerCruiser EMISSION CONTROL INFORMATION</p> <p>THIS ENGINE CONFORMS TO 2010 CALIFORNIA EMISSION REGULATIONS FOR SPARK IGNITION MARINE ENGINES. THIS ENGINE IS EXEMPT UNDER 40 CFR 1068.255 FROM EMISSION STANDARDS AND RELATED REQUIREMENTS. REFER TO THE OWNERS MANUAL FOR MAINTENANCE SPECIFICATIONS AND ADJUSTMENTS.</p> <table border="1"> <tr> <td>SERIAL #: XXXXXXXX</td> <td>DOM: MMM YYYY</td> <td rowspan="3"></td> </tr> <tr> <td>FAMILY: XXXXXXXXXXXXX</td> <td>DISP: X.XL POWER : XXX kW</td> </tr> <tr> <td>HC+NOx FEL : XX.X g/kWh</td> <td>CO FEL : XXX g/kWh</td> </tr> </table> <p>43522</p>	SERIAL #: XXXXXXXX	DOM: MMM YYYY		FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW	HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh	<p>Indicates a marine engine compliant with 2010 California emission regulations and exempt under 40 CFR 1068.255 from United States EPA exhaust emission regulations</p>
SERIAL #: XXXXXXXX	DOM: MMM YYYY							
FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW							
HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh							
<p>MERCURY MerCruiser EMISSION CONTROL INFORMATION</p> <p>THIS ENGINE DOES NOT COMPLY WITH U.S. EPA NONROAD EMISSION REQUIREMENTS. SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN TO REPLACE A NONROAD ENGINE BUILT BEFORE JANUARY 1, 2010 MAY BE A VIOLATION OF FEDERAL LAW SUBJECT TO CIVIL PENALTY.</p> <table border="1"> <tr> <td>SERIAL #: XXXXXXXX</td> <td>DOM: MMM YYYY</td> <td rowspan="3"></td> </tr> <tr> <td>FAMILY: XXXXXXXXXXXXX</td> <td>DISP: X.XL POWER : XXX kW</td> </tr> <tr> <td>HC+NOx FEL : XX.X g/kWh</td> <td>CO FEL : XXX g/kWh</td> </tr> </table> <p>43499</p>	SERIAL #: XXXXXXXX	DOM: MMM YYYY		FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW	HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh	<p>Indicates a service marine engine that can replace a marine engine built prior to January 1, 2010.</p>
SERIAL #: XXXXXXXX	DOM: MMM YYYY							
FAMILY: XXXXXXXXXXXXX	DISP: X.XL POWER : XXX kW							
HC+NOx FEL : XX.X g/kWh	CO FEL : XXX g/kWh							

Owner Responsibility

The operator must have routine engine maintenance performed to maintain emission levels within prescribed certification standards.

The operator may not modify the engine in any manner that alters the horsepower or allows emissions levels to exceed factory specifications.

California Emissions Limited Warranty

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

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

What Is Covered

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

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

Duration of Coverage

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

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

How to Obtain Warranty Coverage

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

What Mercury Will Do

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

What Is Not Covered

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

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

Section 1 - Warranty

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

Disclaimers and Limitations

DISCLAIMERS AND LIMITATIONS

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

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

California Emission Control Warranty Statement

Your Warranty Rights and Obligations

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

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

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

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

Manufacturer's Warranty Coverage

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

Owner's Warranty Responsibilities

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

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

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

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

U.S. EPA Emissions Limited Warranty

Consistent with the obligations created by 40 CFR Part 1045, Subpart B, Mercury Marine provides an emission warranty of three years or 480 hours of engine use whichever occurs first to the retail purchaser, that the engine is designed, built, and equipped so as to conform at the time of sale with applicable regulations under section 213 of the Clean Air Act, and that the engine is free from defects in materials and workmanship which cause the engine to fail to conform with applicable regulations.

Emission Control System Components

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

1. Fuel metering system
 - a. Carburetor and internal parts (or fuel pressure regulator or fuel injection system)
 - b. Air/fuel ratio feedback and control system
 - c. Cold start enrichment system
 - d. Intake valves
2. Air induction system
 - a. Controlled hot air intake system
 - b. Intake manifold
 - c. Air filter
 - d. Turbo charger systems
 - e. Heat riser valve and assembly
3. Ignition system
 - a. Spark plugs
 - b. Magneto or electronic ignition system
 - c. Spark control system
 - d. Ignition coil or control module
 - e. Ignition wires
4. Lubrication system
 - a. Oil pump and internal parts
 - b. Oil injectors
 - c. Oil meter
5. Positive crankcase ventilation (PCV) system
 - a. PCV valve
 - b. Oil filler cap
6. Exhaust system
 - a. Exhaust manifold
 - b. Exhaust elbow
 - c. Intermediate exhaust elbow
 - d. Lower exhaust pipe
 - e. Tailpipe
7. Catalysts or thermal reactor system
 - a. Catalytic converter
 - b. Thermal reactor
 - c. Exhaust manifold
 - d. Exhaust valves
8. 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

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

Emission Certification Star Label

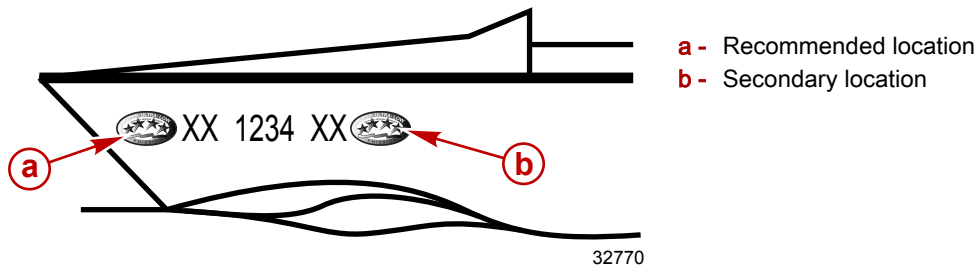
Your boat is labeled on the hull with one of the following star labels. The Symbol for Cleaner Marine Engines Means:





1. Cleaner Air and Water - for a healthier lifestyle and environment.
2. Better Fuel Economy - burns up to 30-40 percent less gas and oil than conventional carbureted two-stroke engines, saving money and resources.
3. Longer Emission Warranty - Protects consumer for worry free operation.

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

All Mercury MerCruiser engines (500 hp and below) will have a Three-Star Ultra Low Emission rating or Four-Star Super Ultra Low Emission rating. The Star label identifies that these engines meet the California Air Resources Board's Sterndrive and Inboard marine engine 2007 and later exhaust emission standards. Engines meeting these standards have 65-90% lower emissions than One-Star – Low Emissions engines.

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



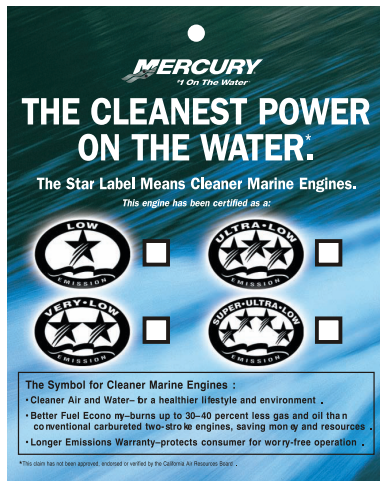
One Star - Low emission	
	<p>The one-star label identifies personal watercraft, outboard, sterndrive and inboard engines that meet the Air Resources Board's Personal Watercraft and Outboard marine engine 2001 exhaust emission standards. Engines meeting these standards have 75% lower emissions than conventional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

Hang Tag

The dealer must mark the appropriate box on one hang tag to match the Star label affixed to the boat. The dealer is responsible for displaying the hang tag in a visible location on the boat on display in California. Failure to properly display the hang tag could result in a citation and possible fine to the dealer from the California Air Resources Board.

Section 1 - Warranty

If in California, the dealer must place the hang tag in a visible location in the boat prior to displaying the boat.



Hang tag front side



Hang tag back side

43291

Section 2 - Getting to Know Your Power Package

Table of Contents

Identification.....	18	Electrical System Overload Protection.....	23
Alpha Sterndrive Decal Identification.....	18	Audio and Visual Warning System.....	26
Alpha Transom Serial Number.....	18	Warning Horn Signals.....	26
Engine Serial Number Decal.....	19	Caution	27
Lanyard Stop Switch.....	19	Severe	27
Instrumentation.....	20	OBDM	27
Remote Controls.....	21	Testing the Audio Warning System	27
Panel Mount Features	21	OBDM Malfunction Indicator Lamp (MIL) Kit.....	27
Console Mount Features	22	Testing the OBDM Malfunction Indicator Lamp (MIL)	28
Power Trim.....	22	28
Single Engine Trim/Trailer	23	Guardian Strategy.....	28
Dual Engine Trim/Trailer	23		

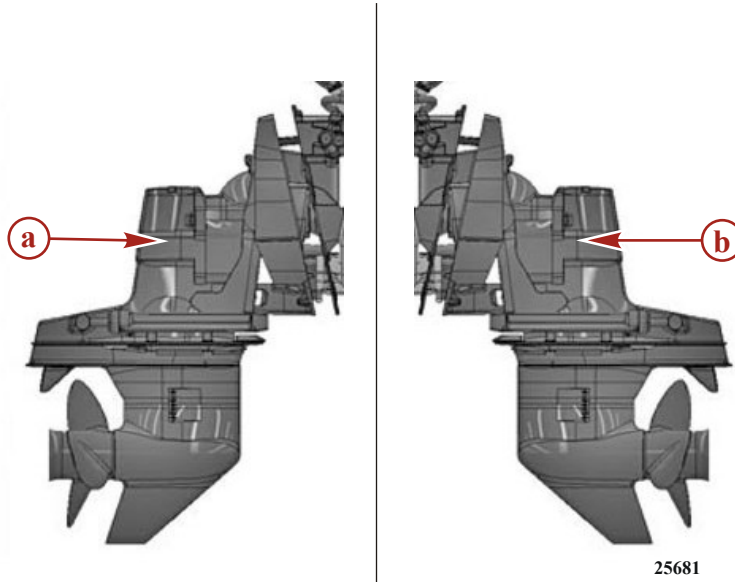
Identification

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

Alpha Sterndrive Decal Identification

The drive serial number is located on the port side of the Alpha sterndrive.

The drive ratio is located on the starboard side of the Alpha sterndrive.



Alpha sterndrive

- a** - Drive gear ratio decal (starboard)
- b** - Serial number decal (port)

Alpha Transom Serial Number

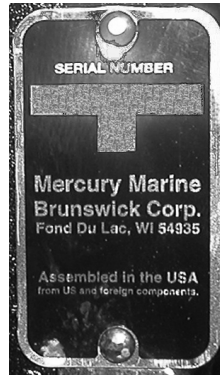
The transom serial number is located on the top of the transom assembly.



Alpha transom assembly serial number

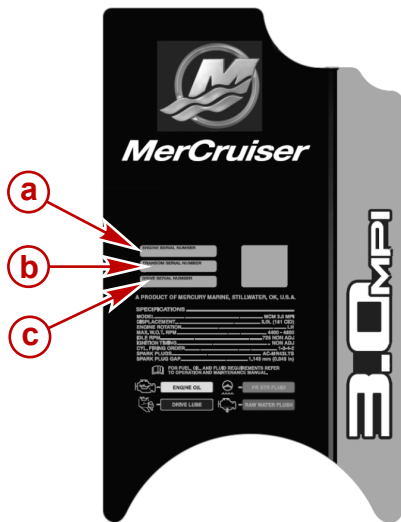
Engine Serial Number Decal

The serial number decal is located on the aft portion of the starboard side of the block, near the starter motor.



32121

The engine, transom, and drive serial numbers are also located on the engine identification plate.

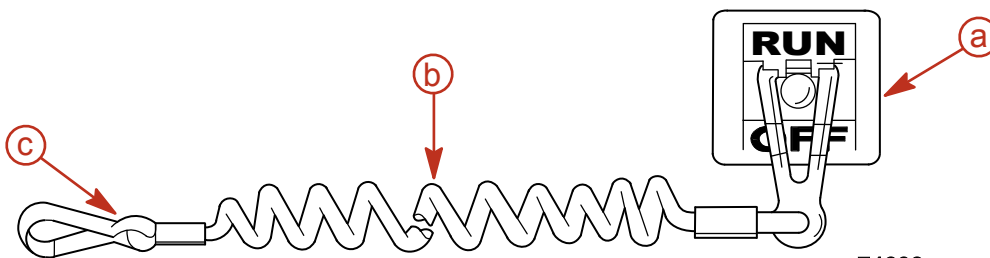


- a - Engine serial number
- b - Transom serial number
- c - Drive serial number

32636

Lanyard Stop Switch

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



- a - Stop switch
- b - Lanyard
- c - Clips to the operator

74608

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

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

Accidental ejections can also occur from:

- poor operating practices
- sitting on the seat or gunwale at planing speeds

Section 2 - Getting to Know Your Power Package

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

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

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

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

⚠ WARNING

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

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

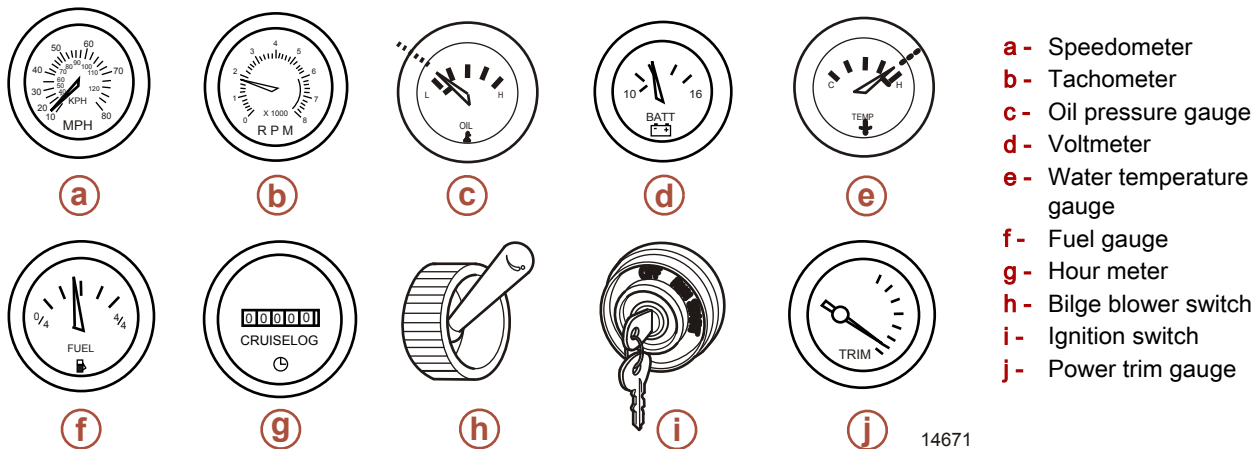
- Occupants could be thrown forward due to unexpected loss of forward motion, a particular concern for passengers in the front of the boat who could be ejected over the bow and possibly struck by the propulsion or steering components.
- Loss of power and directional control in heavy seas, strong current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

⚠ WARNING

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

Instrumentation

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



14671

Speedometer: Indicates boat speed.

Tachometer: Indicates engine RPM.

Oil Pressure Gauge: Indicates engine oil pressure.

Voltmeter: Indicates battery voltage.

Water Temperature Gauge: Indicates engine operating temperature.

Fuel Gauge: Indicates quantity of fuel in tank.

Hour meter: Records engine operating time.

Bilge Blower Switch: Operates bilge blower.

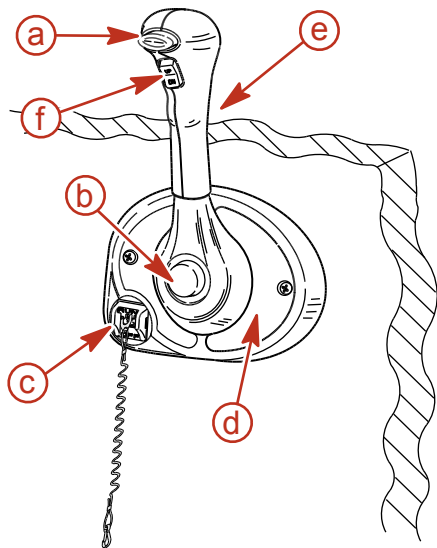
Ignition Switch: Allows operator to start and stop engine.

Power Trim Gauge: Indicates sterndrive unit angle (trim up/out and down/in).

Remote Controls

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

Panel Mount Features



- a - Neutral lock button
- b - Throttle only button
- c - Lanyard stop switch
- d - Control handle tension adjustment screw
- e - Control handle
- f - Trim/tilt button

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

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

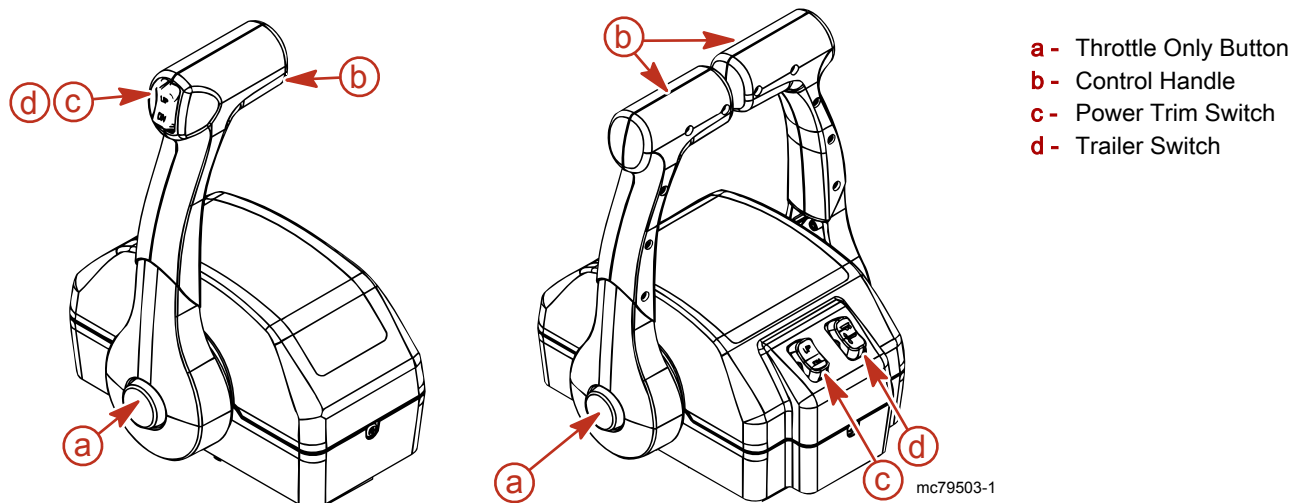
Lanyard Stop Switch - Turns the ignition off whenever the operator (when attached to the lanyard) moves far enough away from the operator's position to activate the switch. Refer to **Lanyard Stop Switch** for information on the use of this switch.

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

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

Trim/Tilt Button - Refer to **Power Trim**.

Console Mount Features



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

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

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

Power Trim Switch - See **Power Trim** section for detailed power trim operating procedures.

Trailer Switch - Used to raise drive unit for trailering, launching, beaching or shallow water operation. See **Power Trim** for detailed trailer switch operation.

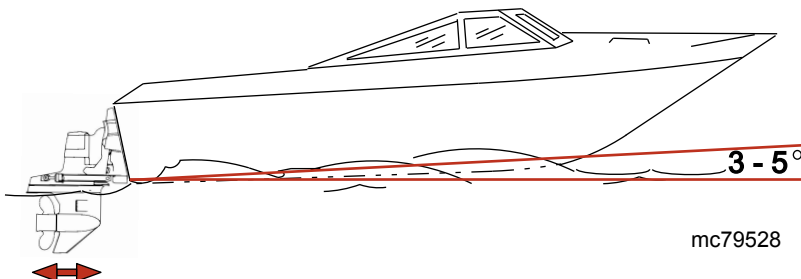
Power Trim

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

⚠ WARNING

Excessive trim can cause serious injury or death at high speeds. Use caution when trimming the sterndrive, and never trim out beyond the gimbal ring support flanges while the boat is underway or at engine speeds above 1200 RPM.

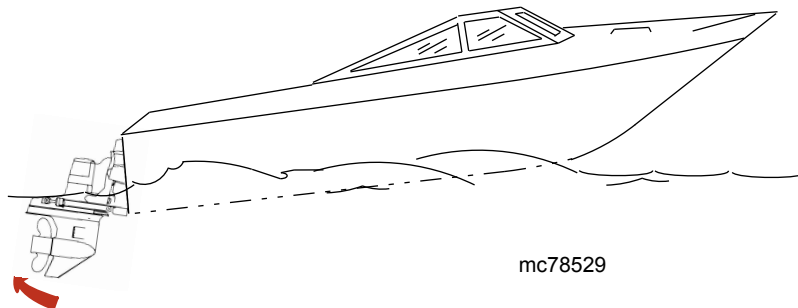
For best performance trim the sterndrive unit so that the boat bottom is at a 3-5° angle to the water.



Trimming sterndrive unit up/out can:

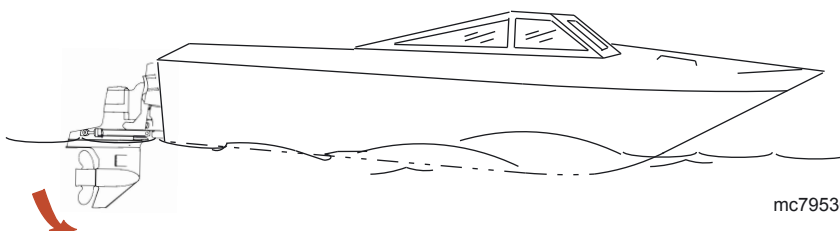
- Generally increase top speed
- Increase clearance over submerged objects or a shallow bottom
- Cause boat to accelerate and plane off slower

- In excess, cause boat porpoising (bouncing) or propeller ventilation
- Cause engine overheating if trimmed up/out to a point where any cooling water intake holes are above the water line



Trimming sterndrive unit down/in can:

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



Single Engine Trim/Trailer

Single engine applications will have a button that can be pressed to trim the sterndrive unit up or down.

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

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

Dual Engine Trim/Trailer

NOTICE

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

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

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

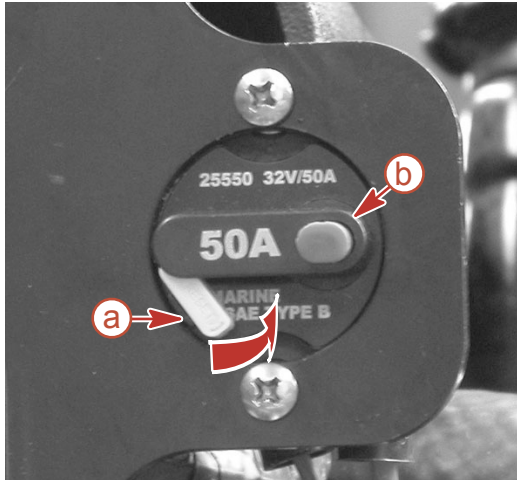
Electrical System Overload Protection

An electrical overload will either fail a fuse or trip a circuit breaker. You must find and repair the source of the overload before replacing the fuse or resetting the circuit breaker.

NOTE: *In an emergency, when you must operate the engine but cannot isolate the cause for the high current draw, turn off or disconnect all accessories connected to the engine and instrumentation wiring. Reset the circuit breaker. If the breaker remains open, you have not eliminated the electrical overload and the electrical system requires further checks. Contact your authorized Mercury MerCruiser dealer.*

Section 2 - Getting to Know Your Power Package

A circuit breaker protect the engine wiring harness and the instrumentation power lead. To test the circuit breaker, push the red button. If the circuit breaker is functioning properly, the yellow lever will appear. Reset the breaker by pushing the yellow lever back into the housing.

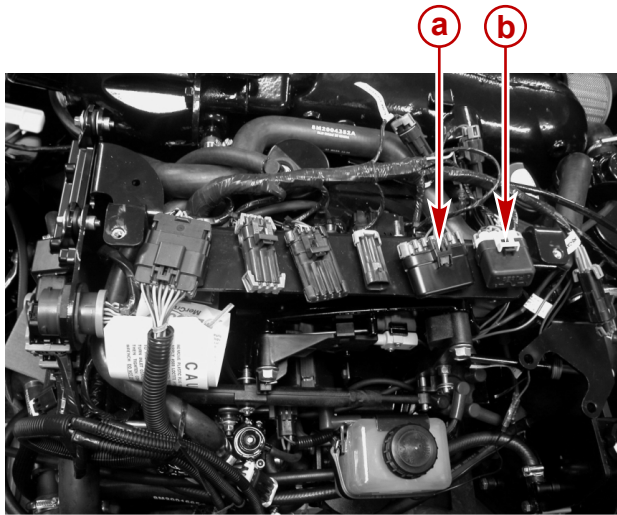


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Yellow lever style circuit breaker-typical

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

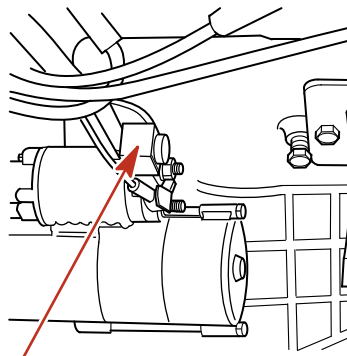
Four fuses protect the main power, fuel pump, ignition, and accessory circuits. Two 10 amp fuses protect the O₂ sensors. These are located on the top of the engine underneath the engine information plate.



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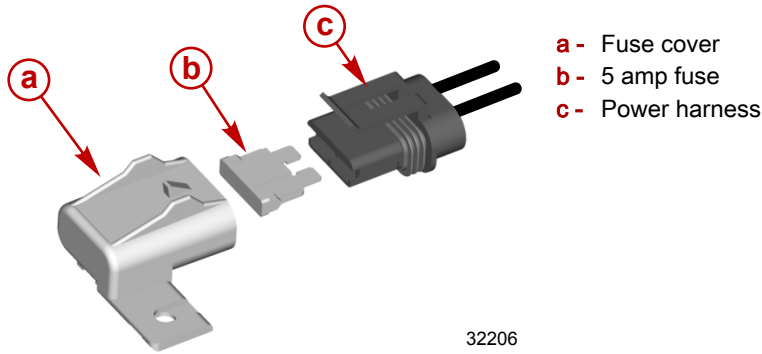
- a - O₂ sensor fuses
- b - Main power, fuel pump, ignition, and accessory fuses

A 90 amp fuse is located on the large post of the starter solenoid. This fuse protects the engine wiring harness.

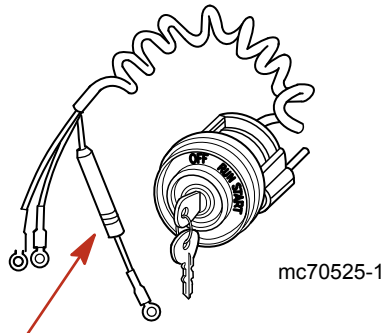


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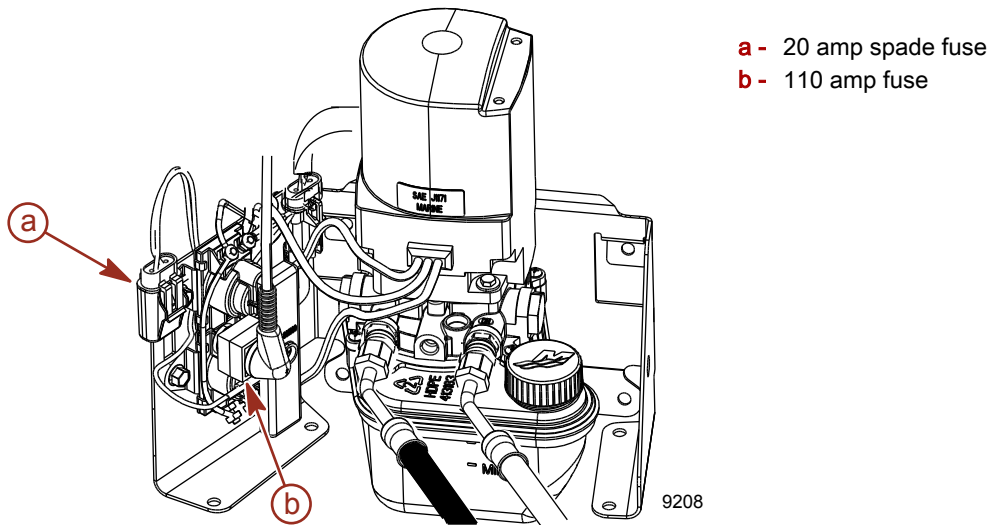
A 15 amp accessory fuse protects the accessory circuits. This fuse is located on the rear of the engine.



In the ignition switch "I" terminal lead, there may be a 20 amp fuse that protects the electrical system. Check for a failed fuse if you turn the ignition key to the "START" position and nothing happens, assuming the circuit breaker is not tripped.

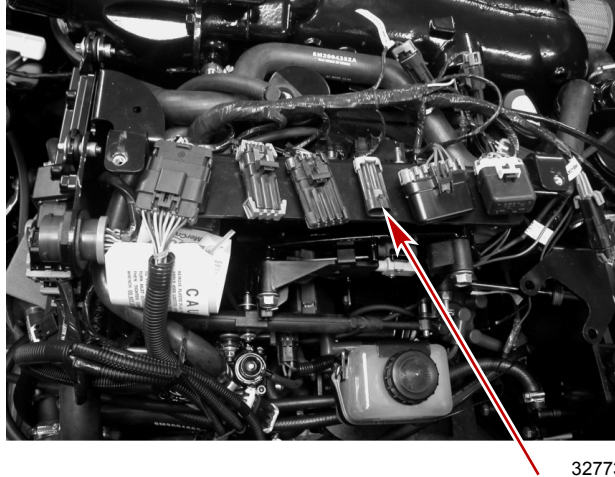


The power trim system is protected from overload by a 110 amp fuse and a 20 amp spade fuse on the power trim pump. The trim pump may also have an in-line circuit protection device in the power trim positive lead near the battery switch or battery connection.



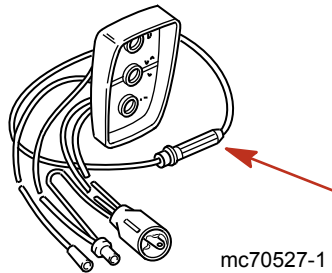
Section 2 - Getting to Know Your Power Package

A power harness, connected to the engine starting battery, minimizes voltage drop to the electrical system. This harness is protected by a 5 amp fuse.



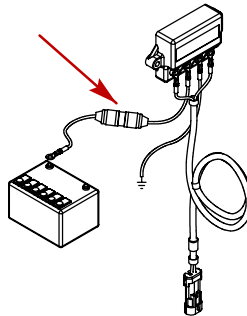
32773

The Quicksilver Three-Button Power Trim Control Panel is further protected by a 20 amp in-line fuse.



mc70527-1

A 20 amp in-line fuse protects the Quicksilver MerCathode System, if equipped. The fuse is located in the wire connecting the positive (+) terminal on the controller.



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Audio and Visual Warning System

Warning Horn Signals

IMPORTANT: The audio warning system alerts the operator that a problem has occurred. It does not protect the engine from damage.

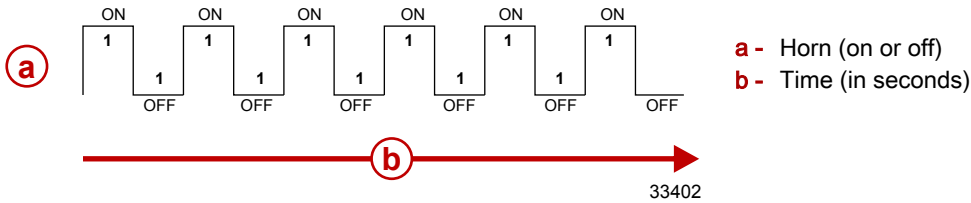
The Mercury MerCruiser power package may be equipped with an audio warning system. Most faults cause the warning horn circuit to activate. How the warning horn activates depends on the severity of the problem.

There are three warning horn states:

- Caution
- Severe
- Onboard Diagnostic Marine (OBDM) fault

Caution

If a caution is detected, the audio warning system will sound for six one-second intervals.



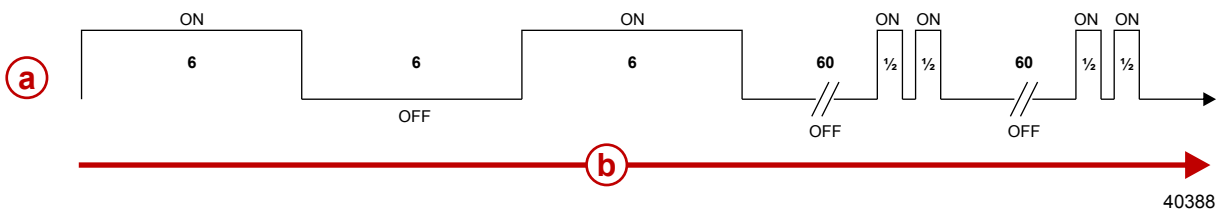
Below are some examples of a caution fault:

- Drive oil is low (sterndrive models only)
- Sensor failure

Severe

IMPORTANT: Operators are advised to contact an authorized Mercury MerCruiser dealer if a severe fault is activated.

If a severe fault is detected, the audio warning system sounds for six seconds, turns off for six seconds, and sounds for six more seconds. Then the audio warning system sounds for two half-second intervals every sixty seconds.



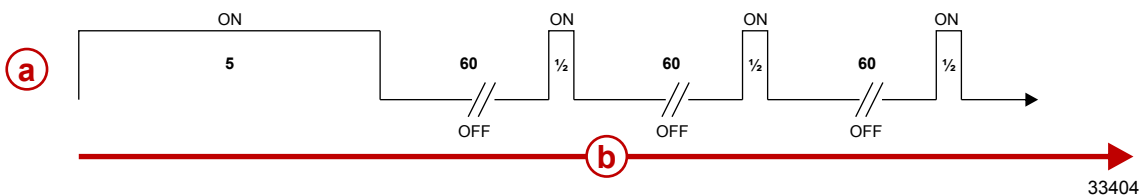
- a - Horn (on or off)
- b - Time (in seconds)

Below are some examples of a severe fault:

- Transmission fluid temperature is too hot
- Engine oil pressure is too low
- Engine temperature is too hot
- Seawater pressure is too low
- Transmission pressure is low

OBDM

If an OBDM fault is detected, the audio warning system sound with one five-second horn, then one short, 1/2-second horn every 60 seconds for certain faults related to the emissions or fuel system. Owners are advised to contact an authorized Mercury MerCruiser dealer for assistance.



- a - Horn (on or off)
- b - Time (in seconds)

Testing the Audio Warning System

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

OBDM Malfunction Indicator Lamp (MIL) Kit

Boats powered by Emissions Control (EC) catalyzed engines may use an OBDM MIL. The kit must be purchased separately. It contains the lamp and a special harness that connects to the engine harness.

Section 2 - Getting to Know Your Power Package

The MIL will provide a visual indication of a malfunction with the engine's Emission Control system.

- While an Onboard Diagnostic Marine (OBDM) fault is active the warning horn will sound for five seconds and repeat at one half second intervals for 60 seconds.
- When the MIL is connected, the engine's OBDM warning horn will be disabled.
- The MIL will remain illuminated while the OBDM fault is active.



43566

MIL (service engine light)

Testing the OBDM Malfunction Indicator Lamp (MIL)

1. Turn the ignition switch to the "ON" position without cranking the engine.
2. The MIL light will remain illuminated for four seconds if the system is functioning correctly.

Guardian Strategy

Engine Guardian reduces the potential for engine damage by restricting engine power when the PCM detects a potential problem. Below are some examples of what Engine Guardian monitors:

- Oil pressure
- Engine overspeed
- Exhaust manifold temperature

IMPORTANT: Guardian can reduce power anywhere from 100% to idle, depending on the severity of the problem. If forced to idle, boat speed might not respond to throttle operation.

The PCM stores the fault for diagnostics. For example, if the water inlet becomes partially blocked, Guardian reduces the available power level of the engine to help prevent damage from decreased water flow to the engine. If the debris passes through, and full water flow is restored, Guardian restores engine power to normal. To avoid recurrence of the problem, contact an authorized Mercury MerCruiser dealer.

As another example, Transmission Guardian is a MerCruiser DTS feature that protects transmissions from clutch damage. Transmission Guardian monitors the clutch pack pressure in forward and reverse gears. If the transmission fluid pressure drops below a predetermined level, Transmission Guardian lowers the engine torque and speed to prevent clutch slippage. To avoid possible recurrence of the problem, you should contact an authorized dealer. The ECM stores the fault and with this information the technician will be able to more rapidly diagnose problems.

Section 3 - On the Water

Table of Contents

Safe Boating Suggestions.....	30	High-Speed and High-Performance Operation.....	35
Carbon Monoxide Exposure.....	31	Passenger Safety in Pontoon Boats and Deck Boats.....	35
Be Alert To Carbon Monoxide Poisoning	31	Boats Having an Open Front Deck	35
Stay Clear of Exhaust Areas	31	Boats With Front-Mounted, Raised Pedestal Fishing	
Good Ventilation	31	Seats	35
Poor Ventilation	32	Wave and Wake Jumping.....	35
Basic Boat Operation.....	32	Impact with Underwater Hazards.....	36
Launching and Boat Operation.....	32	Drive Unit Impact Protection	36
Operation Chart	32	Conditions Affecting Operation.....	37
Starting and Stopping the Engine.....	33	Weight Distribution (Passengers and Gear) Inside the	
Starting the Engine	33	Boat.....	37
Stopping the Engine	33	The Bottom of the Boat.....	37
Starting the Engine After Stopped While in Gear.....	34	Cavitation.....	37
Throttle-Only Operation.....	34	Ventilation.....	37
Trailing the Boat.....	34	Elevation and Climate.....	37
Freezing Temperature Operation.....	34	Propeller Selection.....	37
Drain Plug and Bilge Pump.....	34	Getting Started.....	38
Protecting People in the Water.....	34	20-Hour Break-In Period.....	38
While You Are Cruising	34	After Break-In Period.....	38
While Boat Is Stationary	34	End of First Season Checkup.....	38

Safe Boating Suggestions

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

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

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

Perform safety checks and required maintenance.

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

Check safety equipment on board.

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

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

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

Passenger boarding.

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

Use personal flotation devices.

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

Prepare other boat operators.

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

Do not overload your boat.

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

Ensure that everyone in the boat is properly seated.

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

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

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

Know your boating area and avoid hazardous locations.

Be alert.

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

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

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

Watch fallen skiers.

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

Report accidents.

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

Carbon Monoxide Exposure

Be Alert To Carbon Monoxide Poisoning

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

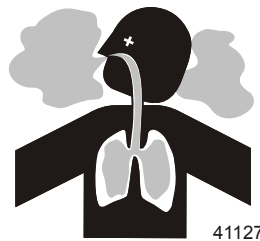
Early symptoms of carbon monoxide poisoning, which are similar to the symptoms of seasickness and intoxication, include headache, dizziness, drowsiness, and nausea.

WARNING

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

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

Stay Clear of Exhaust Areas

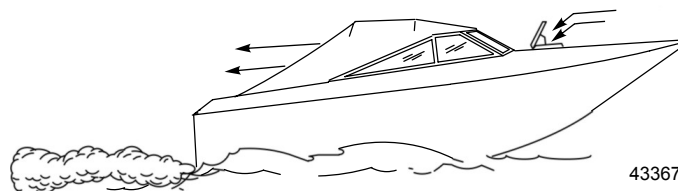


Engine exhaust gases contain harmful carbon monoxide. Avoid areas of concentrated engine exhaust gases. When engines are running, keep swimmers away from the boat, and do not sit, lie, or stand on swim platforms or boarding ladders. While underway, do not allow passengers to be positioned immediately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

Good Ventilation

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

Example of desired air flow through the boat:

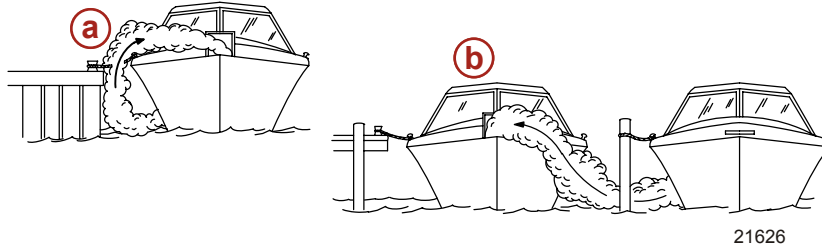


Poor Ventilation

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

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

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



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

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



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

Basic Boat Operation

Launching and Boat Operation

IMPORTANT: Install bilge drain plug prior to launching boat.

Operation Chart

Operation Chart			
BEFORE STARTING	AFTER STARTING	WHILE UNDERWAY	AFTER STOPPING
Install bilge drain plug.	Observe all gauges to check condition of engine. If not normal, stop engine.	Observe all gauges to check condition of engine. If not normal, stop engine.	Turn ignition key to the "OFF" position.
Open engine hatch.	Check for fuel, oil, water, fluid and exhaust leaks.	Listen for the audio alarm.	Turn battery switch to the "OFF" position.

Operation Chart			
BEFORE STARTING	AFTER STARTING	WHILE UNDERWAY	AFTER STOPPING
Turn battery switch on.	Check shift and throttle control operation.		Close fuel shut off valve.
Operate bilge blowers.	Check steering operation.		Close seacock, if equipped.
Open fuel shut off valve.			Flush cooling system if in saltwater.
Open seacock, if equipped.			Drain bilge.
Close the drain system.			
Place sterndrive unit in full down/in position.			
Check the engine oil.			
Perform all other checks specified by your dealer and/or boat builder.			
Listen for Audio Warning Alarm to sound when the ignition switch is in the "ON" position.			

Starting and Stopping the Engine

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

Starting the Engine

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

NOTICE

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

⚠ WARNING

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

3. Turn ignition key to "START". Release key when engine starts and allow switch to return to "ON" position. Allow engine to warm up (6-10 minutes on first start of the day).
4. If engine does not start after 3 attempts:
 - a. Push the **throttle only** button and position the remote control handle/throttle lever to the 1/4 throttle position.
 - b. Turn ignition key to "START". Release key when engine starts and allow switch to return to "ON" position.
5. If engine does not start after step 4:
 - a. Move the remote control handle/throttle lever to full throttle position, then return to 1/4 throttle.
 - b. Turn ignition key to "START". Release key when engine starts and allow switch to return to "ON" position.
6. Inspect the power package for fuel, oil, water and exhaust leaks.
7. Move control handle with a firm, quick motion forward to shift to forward gear, or backward to shift to reverse. After shifting, advance throttle to desired setting.

NOTICE

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

Stopping the Engine

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

2. Turn ignition key to the "OFF" position.

Starting the Engine After Stopped While in Gear

IMPORTANT: Avoid stopping the engine if the sterndrive is in gear.

If you stopped the engine while in gear, return the shift control to neutral and resume normal starting procedures.

Throttle-Only Operation

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

Trailing the Boat

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

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

Freezing Temperature Operation

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

Drain Plug and Bilge Pump

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

Protecting People in the Water

While You Are Cruising

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



Always slow down and exercise extreme caution any time you are boating in an area where there might be people in the water. Whenever a boat is moving (even coasting) and the gear shift is in neutral, there is sufficient force by the water on the propeller to cause the propeller to rotate. This neutral propeller rotation can cause serious injury.

While Boat Is Stationary

⚠ WARNING

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

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

High-Speed and High-Performance Operation

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

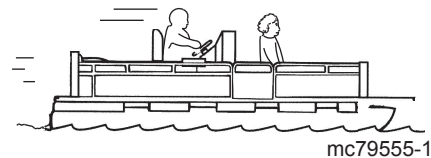
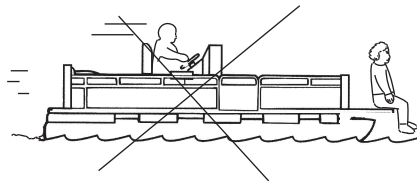
Passenger Safety in Pontoon Boats and Deck Boats

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

Boats Having an Open Front Deck

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

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



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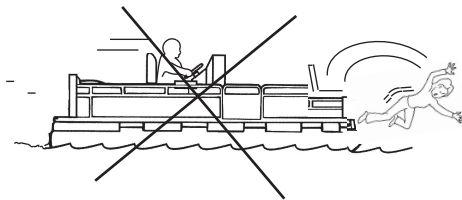
⚠ WARNING

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.

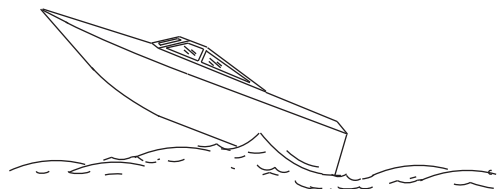


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Wave and Wake Jumping

⚠ WARNING

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



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Section 3 - On the Water

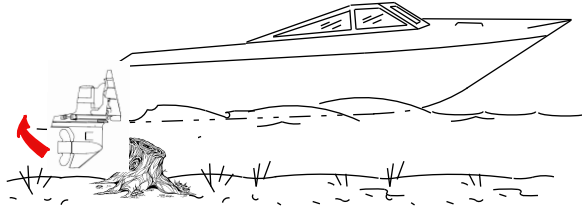
Operating recreational boats over waves and wakes is a natural part of boating. However, when this activity is done with enough speed to force the boat hull partially or completely out of the water, certain hazards arise, particularly when the boat re-enters the water.

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

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

Impact with Underwater Hazards

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



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

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

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

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

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

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

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

⚠ WARNING

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

Drive Unit Impact Protection

The power trim hydraulic system is designed to provide impact protection for the sterndrive unit. If a submerged object is struck while the boat is moving forward, the hydraulic system will cushion the kickup of the sterndrive unit as it clears the object, reducing damage to the unit. After the sterndrive unit has cleared the object, the hydraulic system allows the sterndrive unit to return to its original operating position, preventing loss of steering control and engine overspeed.

Use extreme caution when operating in shallow water or where underwater objects are known to be present. No impact protection is provided in reverse; use extreme care to prevent striking submerged objects while operating in reverse.

IMPORTANT: Impact protection system cannot be designed to ensure total protection from impact damage under all conditions.

Conditions Affecting Operation

Weight Distribution (Passengers and Gear) Inside the Boat

Shifting weight to rear (stern):

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

Shifting weight to front (bow):

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

The Bottom of the Boat

To maintain maximum speed, the boat bottom should be:

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

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

Cavitation

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

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

Ventilation

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

- Drive unit trimmed out too far
- A missing propeller diffuser ring
- A damaged propeller or gear housing, which allows exhaust gases to escape between propeller and gear housing
- Drive unit installed too high on transom

Elevation and Climate

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

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

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

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

Propeller Selection

IMPORTANT: The engines covered in this manual are equipped with an RPM rev-limiter that is set to an upper RPM limit. This limit, which is slightly above the normal operating range of the engine, helps prevent damage from excessive engine RPM. Once the RPM returns to the recommended operating RPM range, normal engine operation resumes.

Section 3 - On the Water

The boat manufacturer and the selling dealer are responsible for equipping the power package with the correct propeller. Refer to Mercury Marine's web page http://www.mercurymarine.com/everything_you_need_to_know_about_propellers6.

Select a propeller that will allow the engine power package to operate at or near the top end of the recommended WOT operating RPM range with a normal load.

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

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

- Warmer weather and greater humidity cause a loss of RPM.
- Operating in a higher elevation causes a loss of RPM.
- Operating with a dirty boat bottom causes a loss of RPM.
- Operating with increased load (additional passengers, pulling skiers) causes a loss of RPM.

For better acceleration, such as is needed for waterskiing, use the next lower pitch propeller. When not pulling skiers, do not operate at full throttle when using the lower pitch propeller.

Getting Started

20-Hour Break-In Period

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

- Do not operate below 1500 RPM for extended periods of time for the first 10 hours. Shift into gear as soon as possible after starting and advance the throttle above 1500 rpm **if conditions permit safe operation**.
- Do not operate at one speed consistently for extended periods.
- Do not exceed 3/4 throttle during the first 10 hours. During the next 10 hours, occasional operation at full throttle is permissible (5 minutes at a time maximum).
- Avoid full throttle acceleration from idle speed.
- Do not operate at full throttle until the engine reaches normal operating temperature.
- Frequently check engine oil level. Add oil as needed. It is normal for oil consumption to be high during the break-in period.

After Break-In Period

To help extend the life of your Mercury MerCruiser power package, the following recommendations should be considered;

- Ensure that propeller allows the engine to operate at or near the top of the specified WOT RPM range (Refer to **Specifications** and **Maintenance**) when at full throttle with a normal boat load.
- Operation at 3/4 throttle setting or lower is recommended. Refrain from prolonged operation at WOT RPM.
- Change the engine oil and oil filter. Refer to **Maintenance**.

End of First Season Checkup

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

Section 4 - Specifications

Table of Contents

Fuel Requirements.....	40	Engine Specifications.....	41
Fuel Ratings	40	3.0 MPI.....	41
Using Reformulated (Oxygenated) Gasoline (USA Only)	40	Fluid Specifications.....	42
.....	40	Sterndrives	42
Gasoline Containing Alcohol	40	Engine	42
Engine Oil.....	40		

Fuel Requirements

NOTICE

Running out of fuel can damage catalyst components. Do not allow the fuel tanks to become empty during operation.

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 will not be covered under the limited warranty.

Fuel Ratings

Mercury MerCruiser engines will operate satisfactorily with any major brand of unleaded gasoline that meets the following specifications:

USA and Canada - 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 - A posted pump Octane Rating of 91 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) Gasoline (USA Only)

Reformulated gasoline is required in certain areas of the USA and is acceptable for use in your Mercury MerCruiser engine.

The two types of oxygenates used in these fuels are alcohol (ethanol) and ether (MTBE or ETBE). If ethanol is the oxygenate that is used in the gasoline in your area, refer to **Gasoline Containing Alcohol**.

Gasoline Containing Alcohol

If the gasoline in your area contains either methanol (methyl alcohol) or ethanol (ethyl alcohol), be aware of possible adverse effects. These adverse effects are more severe with methanol and worsen according to the percentage of alcohol in the fuel.

Alcohol in gasoline can absorb moisture from the air, causing the water and the alcohol to separate from the gasoline in the fuel tank.

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

Be aware that gasoline containing alcohol may cause increased:

- Corrosion of metal parts
- Deterioration of rubber or plastic parts
- Fuel permeation through the 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.

IMPORTANT: If you use gasoline that contains or might contain alcohol, you must increase the frequency of inspection for leaks and abnormalities.

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

Engine Oil

For optimum engine performance and maximum protection, use the following oil:

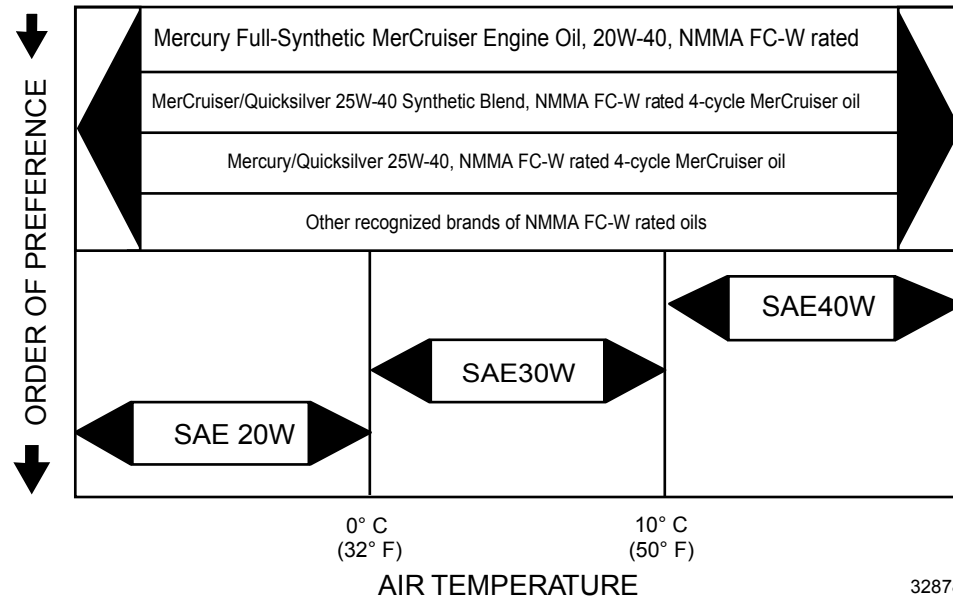
Application	Recommended Oil
All MerCruiser engines	Mercury MerCruiser Full-Synthetic Engine Oil, 20W-40, NMMA FC-W rated

IMPORTANT: Lubrication requirements for catalyzed engines differ from the requirements for noncatalyzed engines. Some marine-grade lubricants contain high levels of phosphorus, which can damage the catalyst system on MerCruiser engines. Although these high-phosphorus lubricants may allow acceptable engine performance, exposure over time will damage the catalyst. Catalysts damaged by lubricants containing high levels of phosphorus may not be covered by the MerCruiser Limited Warranty.

If Mercury MerCruiser Full-Synthetic Engine Oil, 20W-40 oil is unavailable, use the following lubricants, listed in order of recommendation. If you are servicing a catalyst engine, use these for short periods of time only.

1. Mercury/Quicksilver 25W-40 Synthetic Blend, NMMA FC-W-rated 4-cycle MerCruiser oil
2. MerCruiser/Quicksilver 25W-40, NMMA FC-W-rated 4-cycle MerCruiser oil
3. Other recognized brands of NMMA FC-W-rated 4-cycle oils
4. A good-grade, straight-weight detergent automotive oil according to the last row of the operating chart below

NOTE: We do not recommend nondetergent oils, multi-viscosity oils (other than as specified), non FC-W-rated synthetic oils, low-quality oils, or oils that contain solid additives.



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Engine Specifications

3.0 MPI

NOTE: Performance specifications are obtained and corrected in accordance with SAE J1228/ISO 8665 Crankshaft Power.

All measurements are taken with the engine at normal operating temperature.

RPM range is measured using an accurate service tachometer with the engine at normal operating temperatures.

Oil pressure must be checked with the engine at normal operating temperature.

NOTE: Oil pressure specifications are for reference and may vary.

Propshaft power		101 kW (135 hp)
Displacement		3.0 L (181 cid)
Alternator amperage	Hot	72 A
	Cold	65 A
RPM	WOT	4400–4800
	Rev limiter	4950
	Idle in neutral	700
Minimum oil pressure	At 2000 RPM	207 kPa (30 psi)
	At idle	28 kPa (4 psi)
Thermostat	Seawater-cooled models	71° C (160° F)
	Models with Closed Cooling	

Section 4 - Specifications

Timing at idle	Not Adjustable
Firing order	1-3-4-2
Minimum battery rating	375 CCA, 475 MCA, 90 Ah
Spark plug type	AC MR43LTS
	Champion RS12YC
	NGK BPR6EFS
Spark plug gap	0.9 mm (0.045 in.)
Emission control system	Electronic control (EC), heated oxygen sensor (HO2S), catalyst

Fluid Specifications

Sterndrives

NOTE: Oil capacity includes the drive lube monitor.

Model	Capacity	Fluid Type
Alpha One	1892 mL (64 oz)	High Performance Gear Lubricant

Engine

IMPORTANT: All capacities are approximate fluid measures.

3.0 MPI	Capacity	Fluid Type
Engine oil (with filter)	3.8 L (4 US qt)	Mercury Full-Synthetic MerCruiser 20W-40, NMMA FC-W rated oil.
Seawater cooling system	9 L (8.5 US qt)	Propylene glycol and purified water
Closed cooling system	9 L (8.5 US qt)	Mercury Extended Life Coolant Antifreeze or extended life ethylene glycol 5/100 antifreeze mixed 50/50 with purified water

Section 5 - Maintenance

Table of Contents

Owner/Operator Responsibilities.....	44	Cleaning the IAC Muffler.....	55
Dealer Responsibilities.....	44	Changing the Water-Separating Fuel Filter.....	56
Maintenance.....	44	Inspecting the Fuel Pump Sight Tube.....	57
Do-It-Yourself Maintenance Suggestions.....	44	Lubrication.....	57
Inspection.....	45	Steering System.....	57
Maintenance Schedule—Sterndrive Models.....	45	Manual Steering System.....	58
Routine Maintenance.....	45	Throttle Cable.....	59
Scheduled Maintenance.....	46	Shift Cable - Typical.....	59
Maintenance Log.....	47	Sterndrive U-joint Shaft Splines and O-rings (Sterndrive Unit Removed).....	60
Engine Oil.....	48	Engine Coupler.....	60
Checking and Filling.....	48	Driveshaft Extension Models.....	60
Changing Oil and Filter.....	48	Propellers.....	61
Engine Oil Drain Pump.....	49	Propeller Repair.....	61
Changing the Oil Filter.....	49	Alpha Propeller Removal.....	61
Power-Assisted Steering Fluid.....	49	Alpha Propeller Installation.....	61
Checking.....	49	Drive Belts.....	62
Filling.....	50	Checking.....	63
Changing.....	50	Replacing Belts on Front Mount Models.....	63
Engine Coolant.....	50	Power Steering Pump Drive Belt.....	63
Checking.....	50	Alternator Belt.....	63
Filling.....	51	Replacing Belts on Side Mount Models.....	64
Changing.....	52	Power Steering Pump Drive Belt.....	64
Alpha Sterndrive Gear Lube.....	52	Alternator Belt.....	64
Checking.....	52	Flushing the Power Package.....	64
Filling.....	52	Flushing Attachments.....	64
Changing.....	53	Sterndrive Water Pickups.....	65
Power Trim Fluid.....	54	Battery.....	66
Checking.....	54	Corrosion Protection.....	66
Filling.....	54	Painting Your Power Package.....	70
Changing.....	55		
Cleaning the Flame Arrestor.....	55		

Owner/Operator Responsibilities

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

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

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

Dealer Responsibilities

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

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

Maintenance

WARNING

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

WARNING

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

IMPORTANT: Refer to the maintenance schedule for the complete listing of all scheduled maintenance to be performed. A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. Certain other items should be performed only by an authorized Mercury MerCruiser dealer. Before attempting maintenance or repair procedures not covered in this manual, we recommend that you purchase a Mercury MerCruiser service manual and read it thoroughly.

NOTE: Maintenance points are color-coded for ease of identification.

Maintenance Point Color Codes	
Yellow	Engine oil
Black	Drive lube
Brown	Power steering fluid
Blue	Drain or flush

Do-It-Yourself Maintenance Suggestions

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

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

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

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

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

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

Inspection

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

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

Maintenance Schedule—Sterndrive Models

Routine Maintenance

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

New Bravo sterndrive installations may require as much as 470 mL (16 fl oz) of gear lube added to the monitor bottle during the break-in period (20 hours of running time). It is important to monitor and maintain the gear lube level during the break-in period. During the initial drive installation, air may be trapped in the top of the driveshaft housing. This void is filled from the gear lube monitor during the sterndrive break-in period. As the air is purged from the sterndrive through the monitor bottle, the lube level in the bottle will drop.

Task Interval	Maintenance to Be Performed
Each day start	<ul style="list-style-type: none"> • Check the engine oil level. (You can extend this interval based on experience with the product.) • Check the sterndrive gear lube level. • Check the trim pump oil level. • Check the power-assisted steering pump or the compact hydraulic steering fluid level, depending on the steering system of your model.
Each day end	<ul style="list-style-type: none"> • If operating in saltwater, brackish water, or polluted water, flush the seawater section of the cooling system after each use.
Weekly	<ul style="list-style-type: none"> • Check the water inlets for debris or marine growth. • Check and clean the seawater strainer, if equipped. • Check the coolant level. • Inspect the sterndrive anodes and replace if eroded 50% or more.

Section 5 - Maintenance

Task Interval	Maintenance to Be Performed
Every two months or 50 hours of operation	<ul style="list-style-type: none"> Remove the propeller and lubricate the propeller shaft and torque the nut. (If operating only in freshwater, you can extend the interval to every four months.) If operating in saltwater, brackish water, or polluted water, apply Corrosion Guard to the power package. Check the battery connections and the fluid level. Ensure that the gauges and the wiring connections are secure. Clean the gauges. (If operating in saltwater, reduce this interval to every 25 hours or 30 days, whichever occurs first.)

Scheduled Maintenance

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

Task Interval	Maintenance to Be Performed
After the initial 20-hour break-in period	Change the engine oil and filter.
Every 50 hours or 2 months (whichever occurs first)	All Bravo models: Lubricate the engine coupler (lubricate the engine coupler every 50 hours if operated at idle for prolonged periods of time).
Every 100 hours or annually (whichever occurs first)	<ul style="list-style-type: none"> Touch-up the paint on the power package. Change the engine oil and filter. Change the sterndrive gear lube. If the condition of the spark plugs, spark plug wires, and the distributor cap and rotor was satisfactory at the initial inspection (as listed in Every 300 hours or 3 years), inspect the condition of these components. Replace as necessary. On models with closed cooling, check the coolant level and antifreeze concentration for adequate freeze protection. Correct if necessary. Refer to the Specifications section. Tighten the connection of the gimbal ring to the steering shaft to specifications. Replace the water-separating fuel filter. Check the steering system and the remote control for loose, missing, or damaged parts. Lubricate the cables and the linkages. Check the continuity circuit for loose or damaged connections. Test the MerCathode unit output if equipped. Clean the flame arrestor, IAC muffler, and the crankcase ventilation hoses. Inspect the PCV valve, if equipped. Inspect the condition and the tension of the belts. Driveshaft extension models: Lubricate the driveshaft U-joints, and tailstock input and output bearings.
Every 150 hours or annually (whichever occurs first)	All Bravo models: Lubricate the engine coupler.

Engine Oil

Checking and Filling

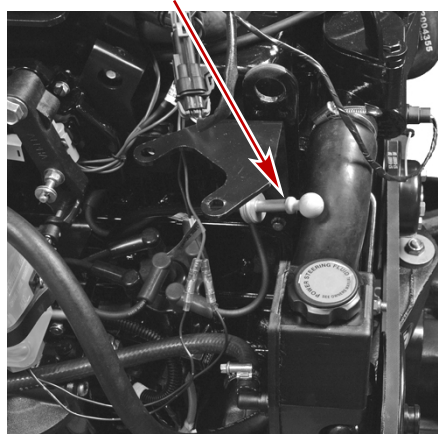
NOTICE

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

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

1. Stop the engine and allow the oil to drain into the oil pan for approximately five minutes with the boat at rest in the water.
2. Remove the dipstick, wipe clean, and install fully into the dipstick tube. Wait 60 seconds to allow trapped air to vent.

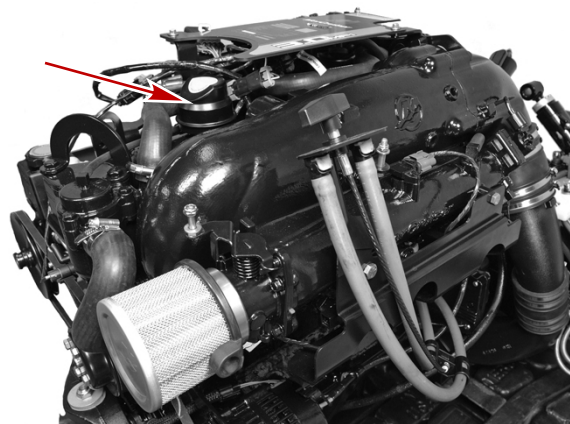
NOTE: Install the dipstick with the oil level indication marks facing the rear of the engine.



32550

3. Remove the dipstick and observe the oil level.
4. If the level is below the add mark, remove the oil fill cap and add the specified oil to bring the level up to the OK range on the dipstick. Recheck the oil level as you fill the system.

IMPORTANT: Do not overfill the engine with oil.



32610

Oil fill cap

Engine Model	Capacity	Fluid Type
3.0 MPI	3.8 L (4 US qt)	Mercury Full-Synthetic MerCruiser Oil 20W-40

5. Replace the fill cap.

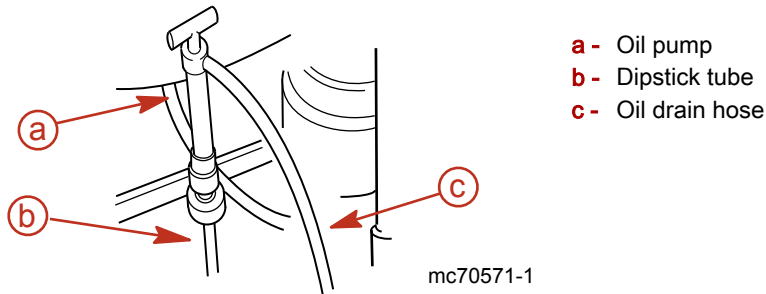
Changing Oil and Filter

See **Maintenance Schedule** for the change interval. Engine oil should be changed before placing the boat in storage.

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

Engine Oil Drain Pump

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



4. Insert the hose end of the crankcase oil pump onto an appropriate container and use the handle to pump until the crankcase is empty.
5. Remove the pump.
6. Install the dipstick.

Changing the Oil Filter

IMPORTANT: Always use dipstick to determine exactly how much oil is required.

1. Remove and discard the oil filter.
2. Coat the sealing ring on the new filter with engine oil.
3. Install the oil filter following the filter manufacturer's instructions. Do not overtighten.
4. With the boat at rest in the water, remove the oil fill cap and add the specified oil to bring the level up to the OK range on the dipstick. Recheck the oil level as you fill the system.

IMPORTANT: Do not overfill the engine with oil.

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

Engine Model	Capacity	Fluid Type
3.0 MPI	3.8 L (4 US qt)	Mercury Full-Synthetic MerCruiser Oil, 20W-40

5. Start and operate the engine for three minutes, checking for leaks.
6. Stop the engine and allow the oil to drain into the oil pan for approximately five minutes with the boat at rest in the water.
7. Check the oil level and add more if necessary.

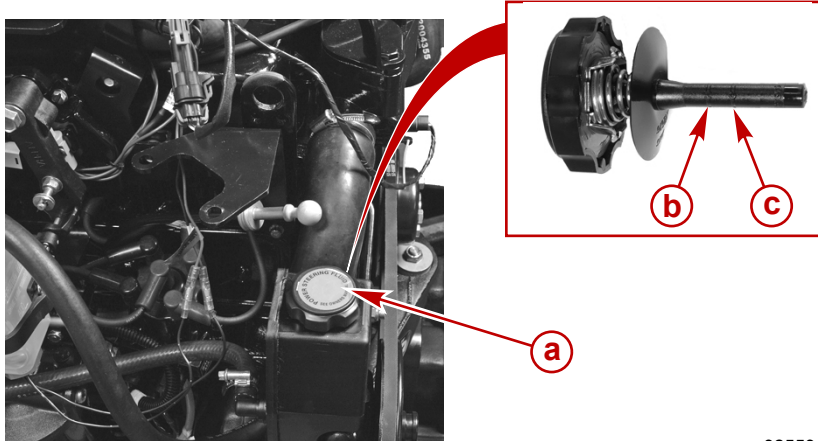
Power-Assisted Steering Fluid

Checking

1. Stop the engine and center the sterndrive unit.

Section 5 - Maintenance

2. Remove the fill cap from the power steering pump reservoir and observe the level. The oil level must be at the lower mark when the engine is cold and at the upper mark when the engine is warm.



- a - Power steering pump reservoir cap
- b - Warm full mark
- c - Cold full mark

32553

3. Add the specified fluid if required. Refer to **Filling**.
IMPORTANT: If fluid is not visible in pump, contact your authorized Mercury MerCruiser dealer.

Filling

1. Remove the fill cap and dipstick and observe the fluid level.
2. Add the specified fluid to bring the fluid level up to the proper level.

Tube Ref No.	Description	Where Used	Part No.
114	Power Trim and Steering Fluid	Power-assisted steering pump	92-858074K01
28	Dexron III Automatic Transmission Fluid	Power-assisted steering system	Obtain Locally

3. Install the fill cap and dipstick.

Changing

Power-assisted steering fluid does not require changing unless it becomes contaminated with water or debris. Contact your authorized Mercury MerCruiser dealer.

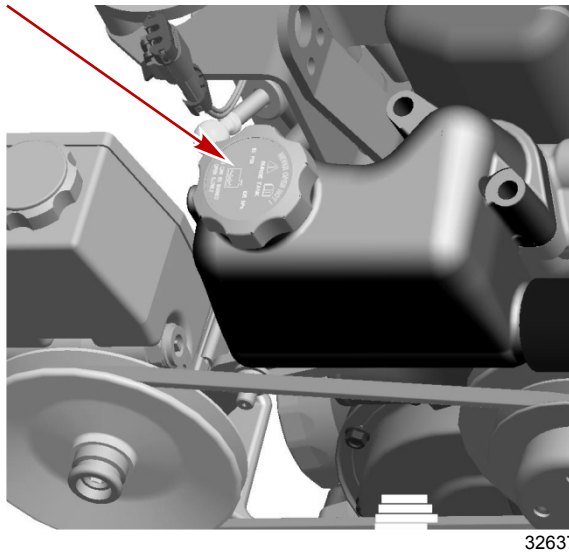
Engine Coolant

Checking

⚠ CAUTION

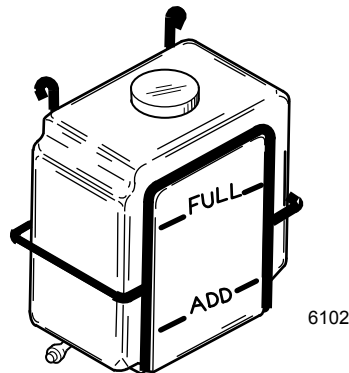
A sudden loss of pressure can cause hot coolant to boil and discharge violently resulting in serious injury from burns. Allow the engine to cool down before removing the coolant pressure cap.

1. Remove the cap from the thermostat housing and observe the fluid level.




32637

2. The coolant level in the thermostat housing should be at the bottom of the filler neck. If the coolant level is low, contact your authorized Mercury MerCruiser dealer.
3. Check the antifreeze concentration for adequate freeze protection and correct if necessary. Refer to the **Specifications** section.
4. Install the cap onto the thermostat housing.
IMPORTANT: Always tighten the pressure cap until it seats on the filler neck.
5. With the engine at normal operating temperature, check that the coolant level in the coolant recovery bottle is between the "ADD" and "FULL" marks.



6102

6. Add the specified fluid as necessary.

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

Filling

NOTICE

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

NOTICE


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

NOTICE

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

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

1. Remove the fill cap from the coolant recovery bottle. Inspect the gasket and replace if necessary.
IMPORTANT: Coolant flows at a high rate of speed in this closed cooling system. Higher idle speeds can trap air in the system and make purge procedures more difficult. Operate at idle when filling the system or purging air.
2. Fill to the full mark with the specified coolant.

Tube Ref No.	Description	Where Used	Part No.
	Extended Life Antifreeze/ Coolant	Closed cooling system	92-877770K1

3. Check the antifreeze concentration for adequate freeze protection and correct if necessary. Refer to the **Specifications** section.
4. Install the fill cap to the coolant recovery bottle.

Changing

Contact your authorized Mercury MerCruiser dealer.

Alpha Sterndrive Gear Lube

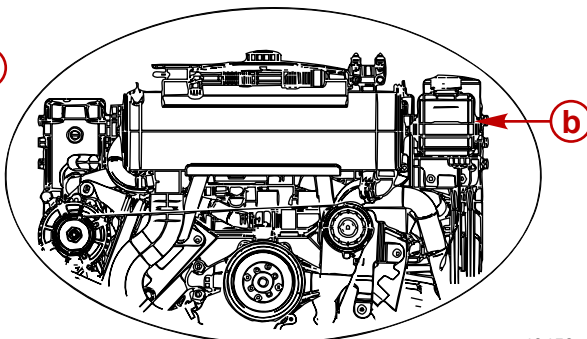
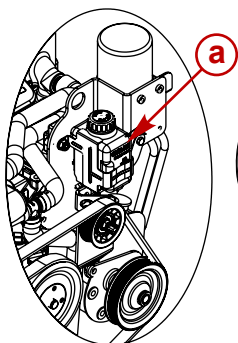
NOTICE

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

Checking

IMPORTANT: The gear lube level fluctuates during operation. Check before starting, when the engine is cold.

1. Check the gear lube level in the monitor bottle. Keep the gear lube level within the recommended operating range.



- a - Seawater cooled models
- b - Closed cooled models

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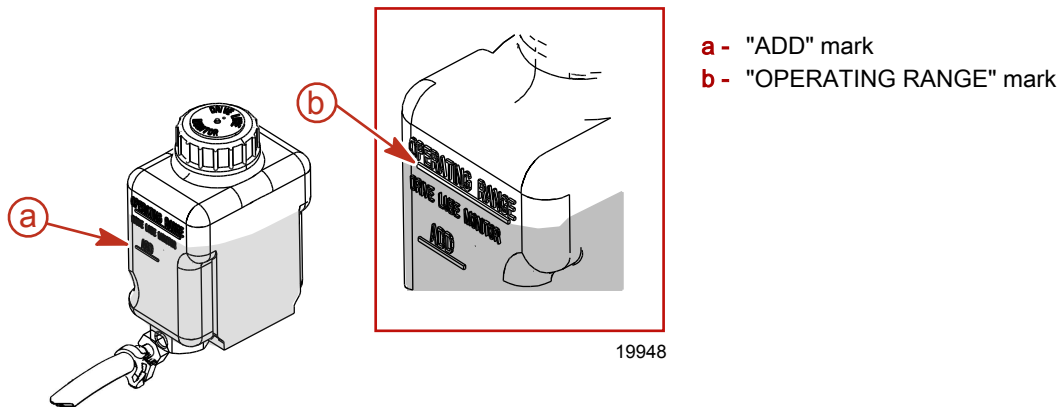
2. Inspect the gear lube condition. If any water is visible in the bottom of the gear lube monitor, if water appears at the fill and drain plug hole, or if the gear lube appears discolored, these conditions can indicate a water leak in the sterndrive.


Filling

IMPORTANT: If more than 59 ml (2 fl. oz.) of gear lubricant is required to fill the monitor, a seal may be leaking. Damage to the sterndrive unit may occur due to lack of lubrication. Contact your authorized Mercury MerCruiser dealer.

1. Remove the gear lube monitor cap.

- Fill the monitor with the specified fluid so that the gear lube level is in the operating range. Do not overfill.



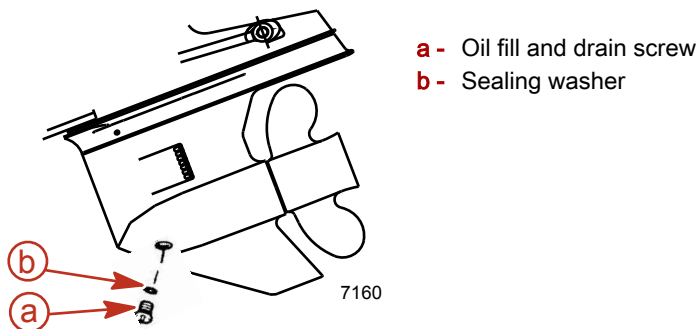
Tube Ref No.	Description	Where Used	Part No.
 87	High Performance Gear Lubricant	Gear lube monitor	92-858064K01

- Ensure that the rubber gasket is inside the cap and install. Do not over tighten.

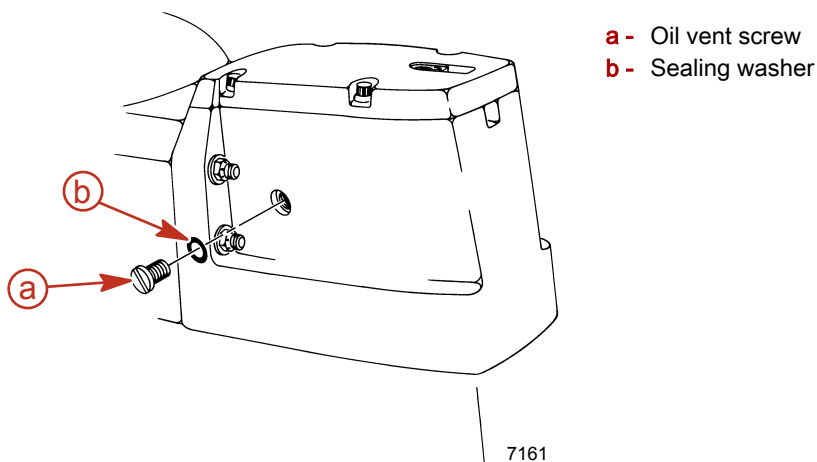
NOTE: When filling the entire sterndrive unit refer to **Changing**.

Changing

- Remove the gear lube monitor from the bracket.
- Remove the gear lube monitor cap and empty the contents into a suitable container.
- Install the gear lube monitor in the bracket.
- Place the sterndrive unit in full trim out position, remove the oil fill and drain screw and sealing washer and drain the oil.




- Remove the oil vent screw and sealing washer. Allow the oil to drain completely.



IMPORTANT: If any water drained from the oil fill/drain hole, or if the oil appears milky, the sterndrive unit is leaking and should be checked immediately by your authorized Mercury MerCruiser dealer.

Section 5 - Maintenance

- Lower the sterndrive unit so that the propeller shaft is level. Fill the sterndrive unit through the oil fill and drain hole with the specified gear lubricant until an air-free stream of lubricant flows from oil vent hole.

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

IMPORTANT: Use only Mercury/Quicksilver High Performance Gear Lubricant in sterndrive unit.

- Install the oil vent screw and sealing washer.
- Continue to pump gear lubricant into the drive through the oil fill and drain plug hole until gear lubricant appears in the gear lube monitor.
- Fill the monitor so that the gear lube level is in the operating range. Do not overfill. Ensure that the rubber gasket is inside the cap and install. Do not over tighten.

NOTE: Oil capacity includes the gear lube monitor.

Model	Capacity	Fluid Type
Alpha One	1892 ml (64 oz)	High Performance Gear Lubricant

- Remove the pump from the oil fill and drain hole. Quickly install the sealing washer and oil fill and drain screw. Tighten securely.
- Recheck the oil level after the first use.

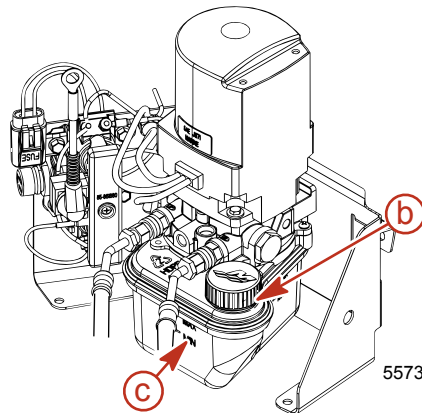
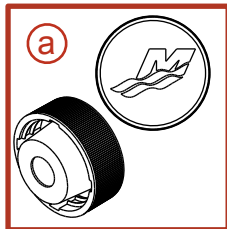
IMPORTANT: The gear lube level fluctuates during operation. Check when the engine is cold.

Power Trim Fluid

Checking

IMPORTANT: Check the oil level with the sterndrive unit in the full down/in position only.

- Place the sterndrive unit in full down/in position.
- Remove the fill cap from the reservoir.




- a - Fill cap
- b - Reservoir fill neck
- c - "MIN" and "MAX" lines

- Observe the oil level. Level must be between the "MIN" and "MAX" lines on the reservoir.

NOTE: Fill cap is vented.

- Fill as necessary with the specified fluid.

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

Filling

- Remove the fill cap from the reservoir.
- Add lubricant to bring level to the bottom of the filler neck.

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

3. Install the cap.

Changing

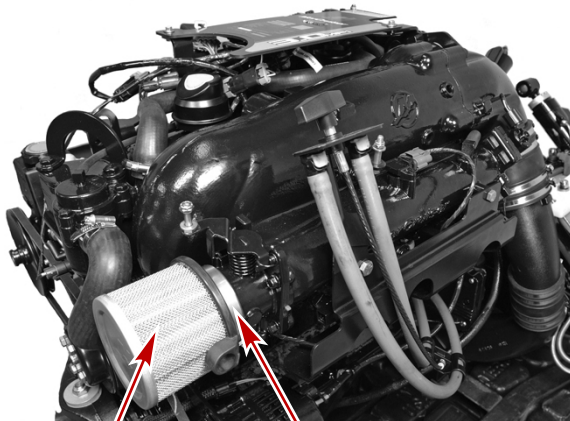
Power trim fluid does not require changing unless it becomes contaminated with water or debris. Contact your authorized Mercury MerCruiser dealer.

Cleaning the Flame Arrestor

⚠ WARNING

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

1. Loosen the flame arrestor clamp.
2. Remove the flame arrestor.



- a - Flame arrestor
- b - Clamp

32554

IMPORTANT: Do not use an acid-based cleaner as it can deteriorate portions of the flame arrestor.

3. Clean the flame arrestor with warm, soapy water.
4. Inspect the flame arrestor for holes, cracks, or deterioration. Replace if necessary.
5. Allow the flame arrestor to air dry completely before use.
6. Install the flame arrestor. Tighten the flame arrestor clamp to specifications.

Description	Nm	lb-in.	lb-ft
Flame arrestor clamp	3	26	–

Cleaning the IAC Muffler

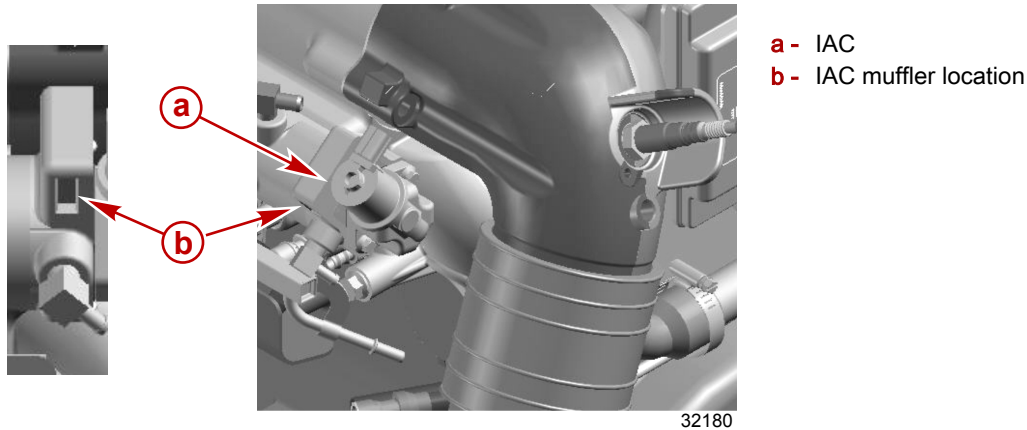
⚠ WARNING

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

1. Locate the idle air control valve (IAC) on the rear of the engine's port side.

Section 5 - Maintenance

2. Remove the IAC muffler from the slot in the air valve plate using needle-nosed pliers.



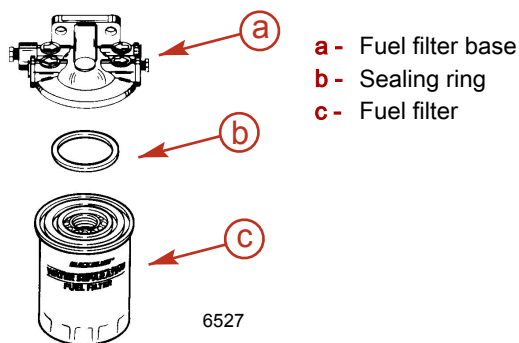
3. Inspect the muffler for holes, cracks, or deterioration. Replace if damaged.
IMPORTANT: Do not use a cleaner tains methyl ethyl ketone and do not use cleaner on electrical connections.
4. Clean the muffler with warm water and mild detergent. Replace if necessary.
5. Allow the IAC muffler to dry completely before use.
6. Install the IAC muffler.

Changing the Water-Separating Fuel Filter

⚠ WARNING

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

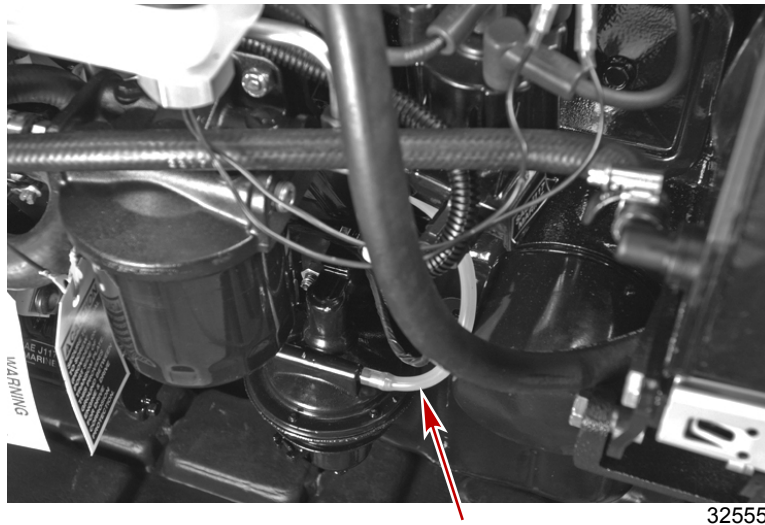
1. Shut off the engine and allow to cool for 12 hours.
2. Close the fuel supply valve, if equipped.
3. Wrap the water separating fuel filter with a cloth to help catch any fuel spills or spray.
4. Remove and discard the water separating fuel filter and sealing ring from the mounting bracket.
5. Coat the sealing ring on the new filter with engine oil.
6. Thread the filter onto the bracket and tighten securely by hand. Do not use a filter wrench.



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

Inspecting the Fuel Pump Sight Tube

The engine fuel pump sight tube gives you visual evidence of a fuel leak in the fuel pump diaphragm. If fuel is ever visible in the tube, see your authorized Mercury MerCruiser dealer to replace the fuel pump.



32555

Fuel pump sight tube

Lubrication

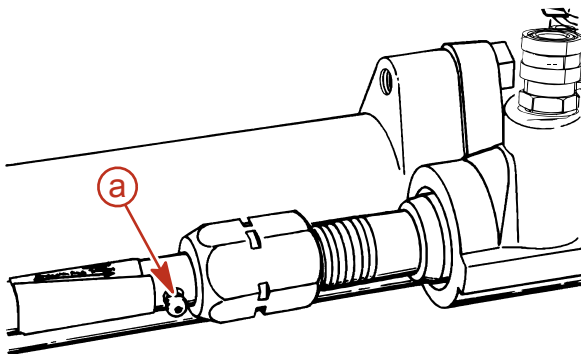
Steering System

⚠ WARNING

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


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

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



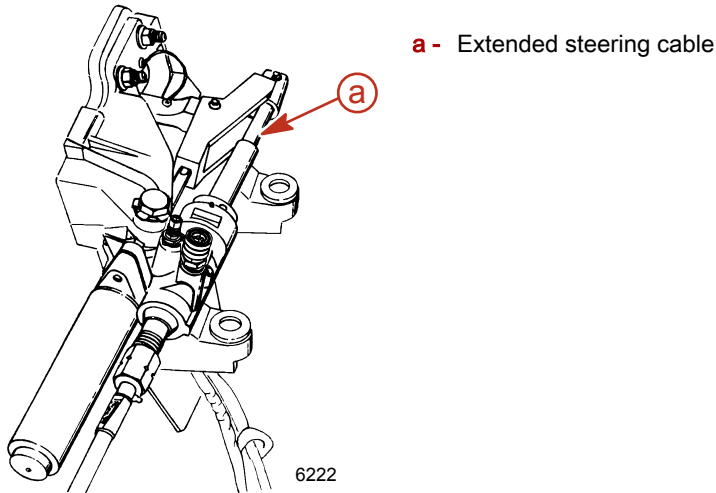
a - Steering cable grease fitting

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Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Steering cable grease fitting	92-802865Q02

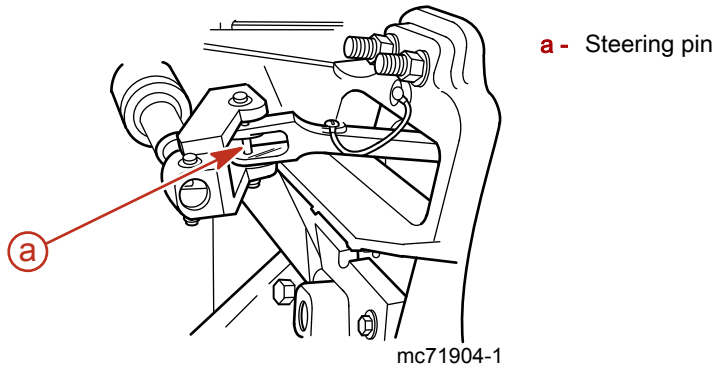
Section 5 - Maintenance

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



Tube Ref. No.	Description	Where Used	Part No.
34	Special Lubricant 101	Steering cable	92-802865Q02

- Lubricate the steering pin.



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

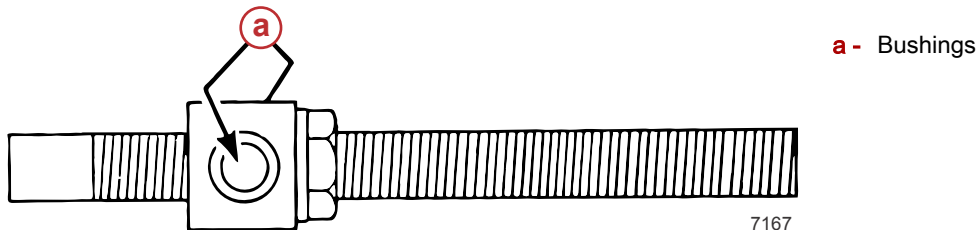
- On dual engine boats: Lubricate the tie bar pivot points.


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

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

Manual Steering System

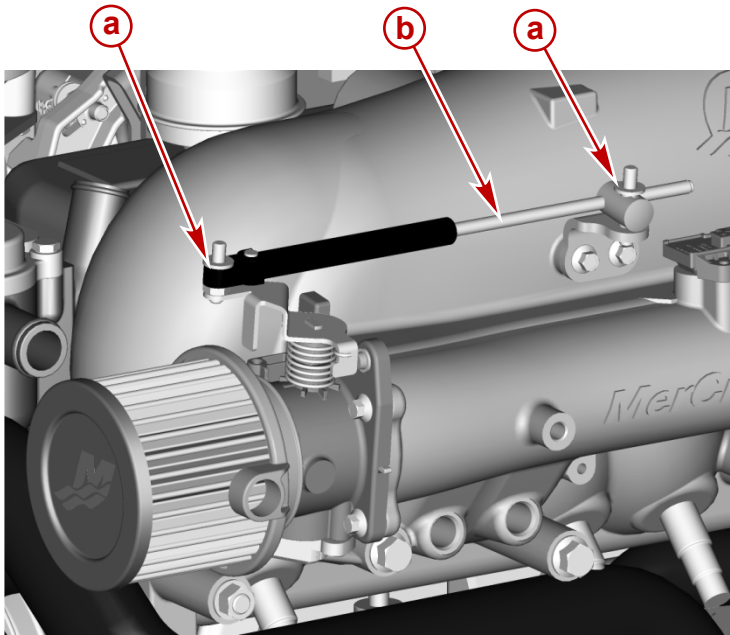
- Inspect the bushings for debris and lubricate the bushings.



Tube Ref No.	Description	Where Used	Part No.
 34	Special Lubricant 101	Steering cable end bushings	92-802865Q02

Throttle Cable

- Lubricate the pivot points and the guide contact surfaces with oil.

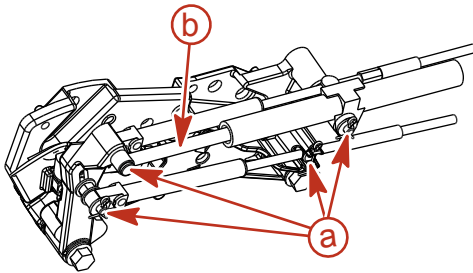


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- a** - Pivot points
- b** - Guide contact surfaces


Shift Cable - Typical

- Lubricate the pivot points and the guide contact surfaces.



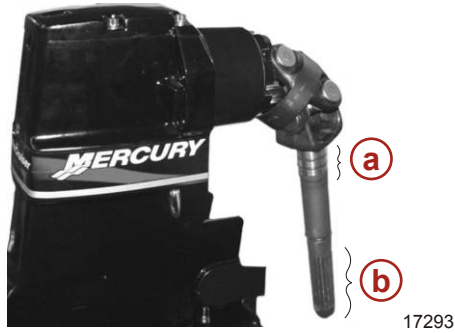
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- a** - Pivot points
- b** - Guide contact surfaces


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

Sterndrive U-joint Shaft Splines and O-rings (Sterndrive Unit Removed)

1. Coat sterndrive U-joint O-rings and driveshaft splines with grease.



- a - U-joint O-rings (3)
- b - Driveshaft splines

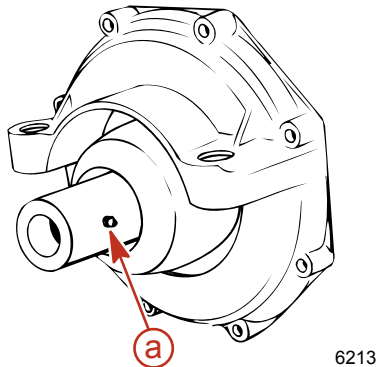
Tube Ref No.	Description	Where Used	Part No.
 91	Engine Coupler Spline Grease	Driveshaft splines and U-joint O-rings	92-802869A 1

2. For propeller shaft lubrication, refer to Propellers.


Engine Coupler

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

NOTE: If the boat is operated at idle for prolonged periods of time, coupler should be lubricated in the **Alpha Models** - every 150 hours.



- Alpha drive coupler**
- a - Engine coupler grease fitting

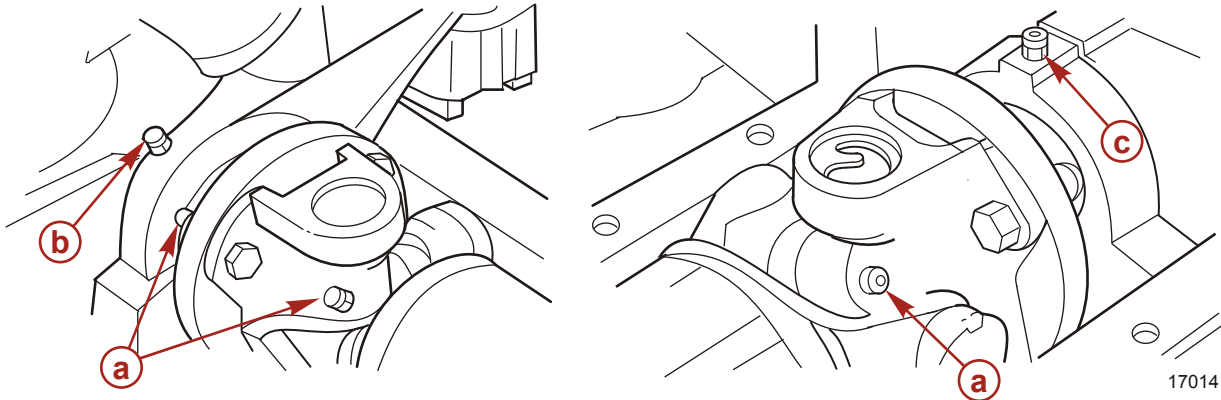
Tube Ref No.	Description	Where Used	Part No.
 91	Engine Coupler Spline Grease	Coupler	92-802869A 1

NOTE: Alpha Models - Your power package is equipped with a sealed engine coupler and Perm-a-Lube U-joints. The sealed coupler and shaft splines can be lubricated without removing the sterndrive unit. The Perm-a-Lube U-joints do not require lubrication.


Driveshaft Extension Models

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

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



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

Tube Ref No.	Description	Where Used	Part No.
 42	U-Joint and Gimbal Bearing Grease	Transom end grease fitting, engine end grease fitting, driveshaft grease fittings	92-802870A1

Propellers

Propeller Repair

Some damaged propellers can be repaired. Contact your authorized Mercury MerCruiser dealer.

Alpha Propeller Removal

⚠ WARNING

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

- Place wood block between propeller blade and anti-ventilation plate to prevent rotation. Straighten bent tabs on tab washer.
- Turn propeller shaft nut counterclockwise to remove nut.
- Slide tab washer, drive sleeve, propeller and thrust hub off propeller shaft.

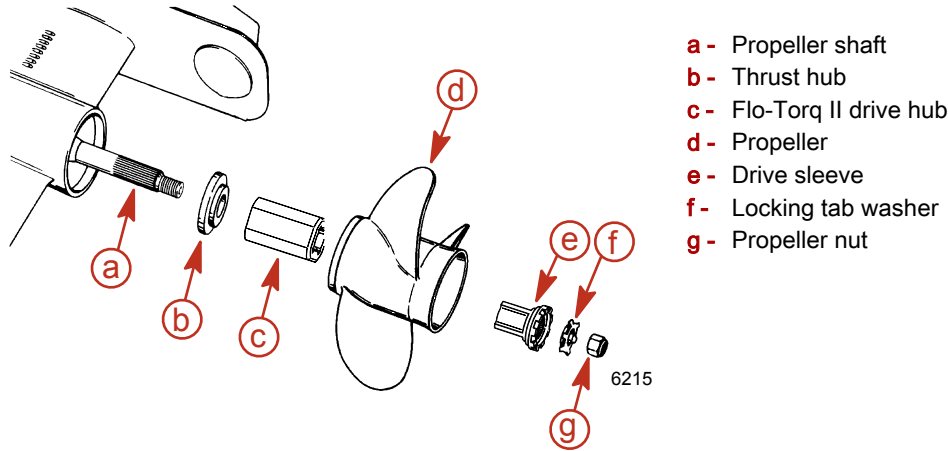
Alpha Propeller Installation

NOTICE

Operating the engine with a loose propeller can damage the propeller, the drive, or drive components. Always tighten the propeller nut or nuts to specification and check for tightness periodically and at the required maintenance interval.

Section 5 - Maintenance

IMPORTANT: If reusing tab washer, carefully inspect tabs for cracks or other damage. Replace tab washer if condition is questionable.



1. Apply a liberal coat of one of the following lubricants to the propeller shaft.

Tube Ref No.	Description	Where Used	Part No.
34	Special Lubricant 101	Propeller shaft	92-802865Q02
94	Anti-Corrosion Grease	Propeller shaft	92-802867Q 1
95	2-4-C Marine Lubricant with PTFE	Propeller shaft	92-802859A 1

2. Slide thrust hub onto propeller shaft, with stepped side toward propeller hub.
3. Install Flo-Torq II Drive Hub into propeller.
NOTE: The drive sleeve is tapered and will slide fully into the propeller as the nut is tightened and properly torqued.
4. Align splines and place propeller on propeller shaft.
5. Install drive sleeve and locking tab washer.
6. Install and torque the propeller nut.

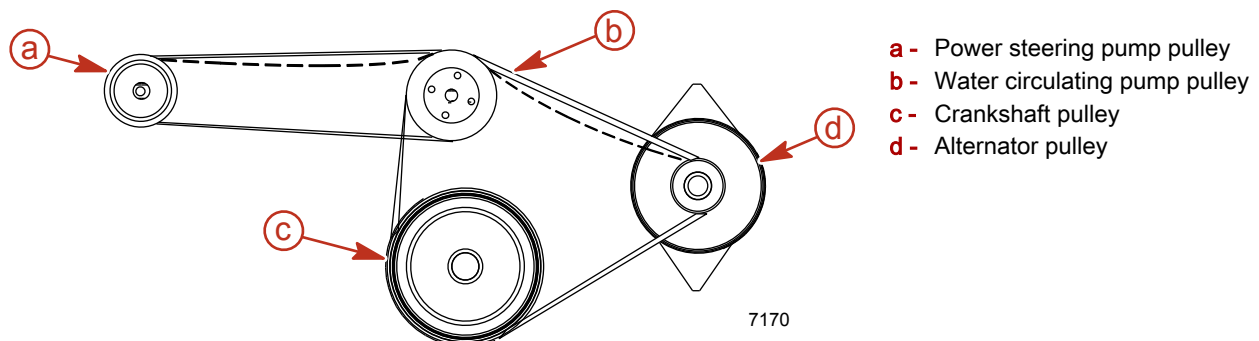
Description	Nm	lb-in.	lb-ft
Propeller nut (minimum)	75	–	55

7. Bend three tabs on the tab washer down into the grooves in spline washer. After the first use, bend the three tabs straight and retorque the propeller nut. Bend tabs back down into spline washer. Check propeller at least after 20 hours of operation. Do not operate with loose propeller.

Drive Belts

⚠ WARNING

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



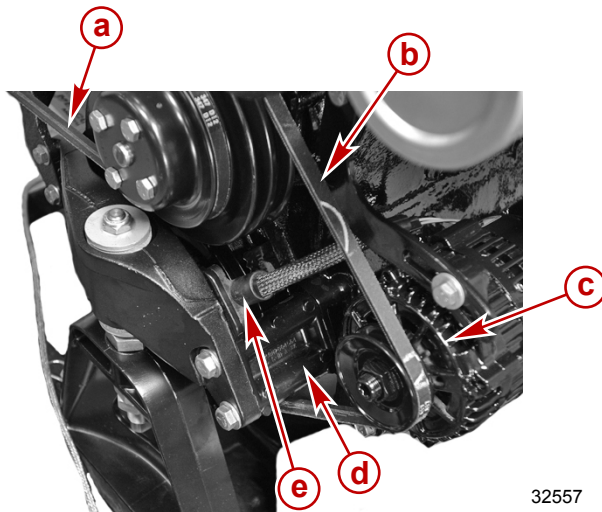
Checking

1. Check the drive belt for excessive wear, fraying, glazed surfaces, or cracks.

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

2. Inspect the drive belt for a proper tension of 6 mm (1/4 in.) deflection. Check the belt tension by applying moderate thumb pressure on the belt at the longest distance between the two pulleys.

Replacing Belts on Front Mount Models



- a - Power steering belt
- b - Alternator belt
- c - Alternator
- d - Spacer block
- e - Crank position sensor

32557

Power Steering Pump Drive Belt

1. Loosen power steering pump attaching bolts and mounting bolts.
2. Pivot power steering pump toward engine, as required, until belt can be removed.
3. Install new drive belt on pulleys. Adjust tension.

Alternator Belt

1. Remove the power steering belt, if equipped.
2. Remove the two screws and washers from the front engine mount bracket assembly on the port side.
3. Remove the spacer block between the bracket assembly and the engine block. You may need to tap gently on the spacer.
4. Loosen the alternator. Remove and replace the alternator belt.
5. Replace the spacer block between the bracket assembly and the engine block. Install the two screws using the washers removed previously.
6. Adjust the crank position sensor so the gap between the sensor and the flywheel meets the following specification.

Description	Specification
Crankshaft position sensor air gap	0.040 in.

7. Tighten the two spacer block bolts. If necessary, you can loosen the crankshaft position sensor bolts to move the sensor into position. Tighten all bolts to specification.

Description	Nm	lb-in.	lb-ft
Spacer block bolts	68	–	50
Crankshaft position sensor bolts	2	18	–

8. Install power steering belt, if equipped. Adjust the tension of both drive belts.

Description	
Deflection	6 mm (1/4 in.)

Replacing Belts on Side Mount Models

Power Steering Pump Drive Belt

1. Loosen power steering pump attaching bolts and mounting bolts.
2. Pivot power steering pump toward the engine until you can remove the belt.
3. Install the new drive belt. Adjust the tension to the following specification.

Description	
Deflection	6 mm (1/4 in.)

Alternator Belt

1. Remove power steering pump drive belt, if equipped.
2. Loosen the alternator.
3. Remove and replace the alternator belt.
4. Install the power steering belt, if equipped. Move the power steering brace to its original position and adjust tension of both drive belts.


Description	
Deflection	6 mm (1/4 in.)

Flushing the Power Package

Your boat comes equipped with through the sterndrive water pickups. See **Sterndrive Water Pickups** (following) for the flushing procedure. Consult your authorized Mercury MerCruiser dealer for further explanation.

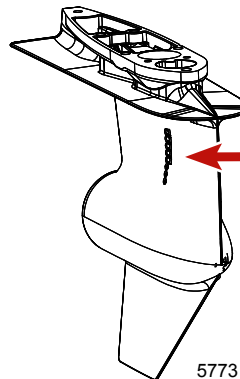
IMPORTANT: Alpha engines with the sterndrive water inlet blocked off at the gimbal housing, and using a through the hull water inlet, need a supply of cooling water available to both the sterndrive and to the engine during operation

Flushing Attachments

Flushing Device	91-44357Q 2
 <p>9192</p>	<p>Attaches to the water intakes; provides a fresh water connection when flushing the cooling system or operating the engine.</p>

Sterndrive Water Pickups

This Mercury MerCruiser sterndrive is equipped with side water pickups. Side pickups require the flushing attachment (44357Q 2).



Side Pickup

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

NOTICE

Flushing the engine with the boat in the water can cause seawater to flow into the engine, resulting in engine damage. Close the seacock before flushing the engine. Keep the seacock closed until starting the engine.

NOTE: Closed cooled models are equipped with a heat exchanger on the side of the engine.

1. If flushing the cooling system with the boat in the water:
 - a. Raise the sterndrive to trailer position.
 - b. Install the appropriate flushing attachment over the water inlet holes in the gear housing.
 - c. Lower sterndrive to full down/in position.
2. If flushing the cooling system with the boat out of the water:
 - a. Lower sterndrive to full down/in position.

⚠ WARNING

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

- b. Remove propeller.
 - c. Install the appropriate flushing attachment over the water inlet holes in the gear housing.
3. Connect hose between flushing attachment and water source.
4. With sterndrive in normal operating position, open the water source completely.
5. Place the remote control in the neutral idle speed position and start engine.

NOTICE

Operating the engine out of the water at high speeds creates suction, which can collapse the water supply hose and overheat the engine. Do not operate the engine above 1400 RPM out of the water and without sufficient cooling water supply.

6. Depress the throttle only button and slowly advance the throttle until the engine reaches 1300 RPM (\pm 100 RPM).
7. Observe the water temperature gauge to ensure that the engine is operating in the normal range.
8. Operate engine with sterndrive in neutral for about 10 minutes or until discharge water is clear.
9. Slowly return throttle to idle speed position.
10. Stop engine.

11. Shut off water and remove flushing attachment.
12. This step is only required if the boat is to be stored in the water. After the flush procedure is completed, remove the seawater inlet hose from the thermostat housing and plug the hose to prevent water from siphoning into the boat. This prevents seawater from contaminating the engine flush.
13. Tag the ignition switch with an appropriate tag requiring the seawater inlet hose to be reconnected prior to operating engine.

Battery

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

⚠ WARNING

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

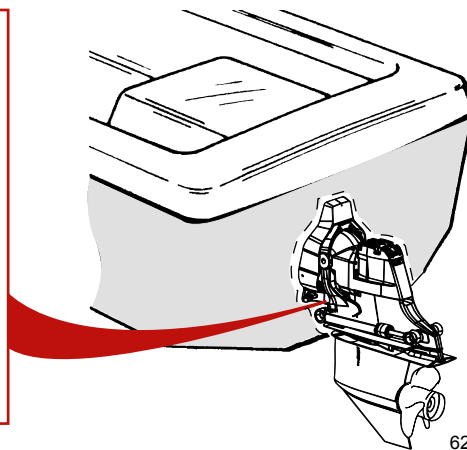
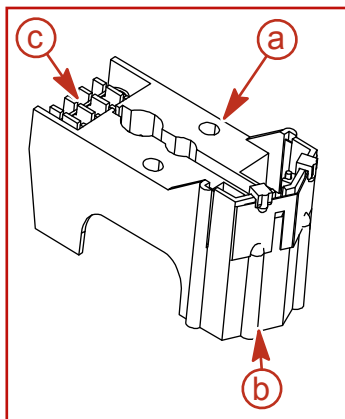
⚠ WARNING

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

Corrosion Protection

NOTICE

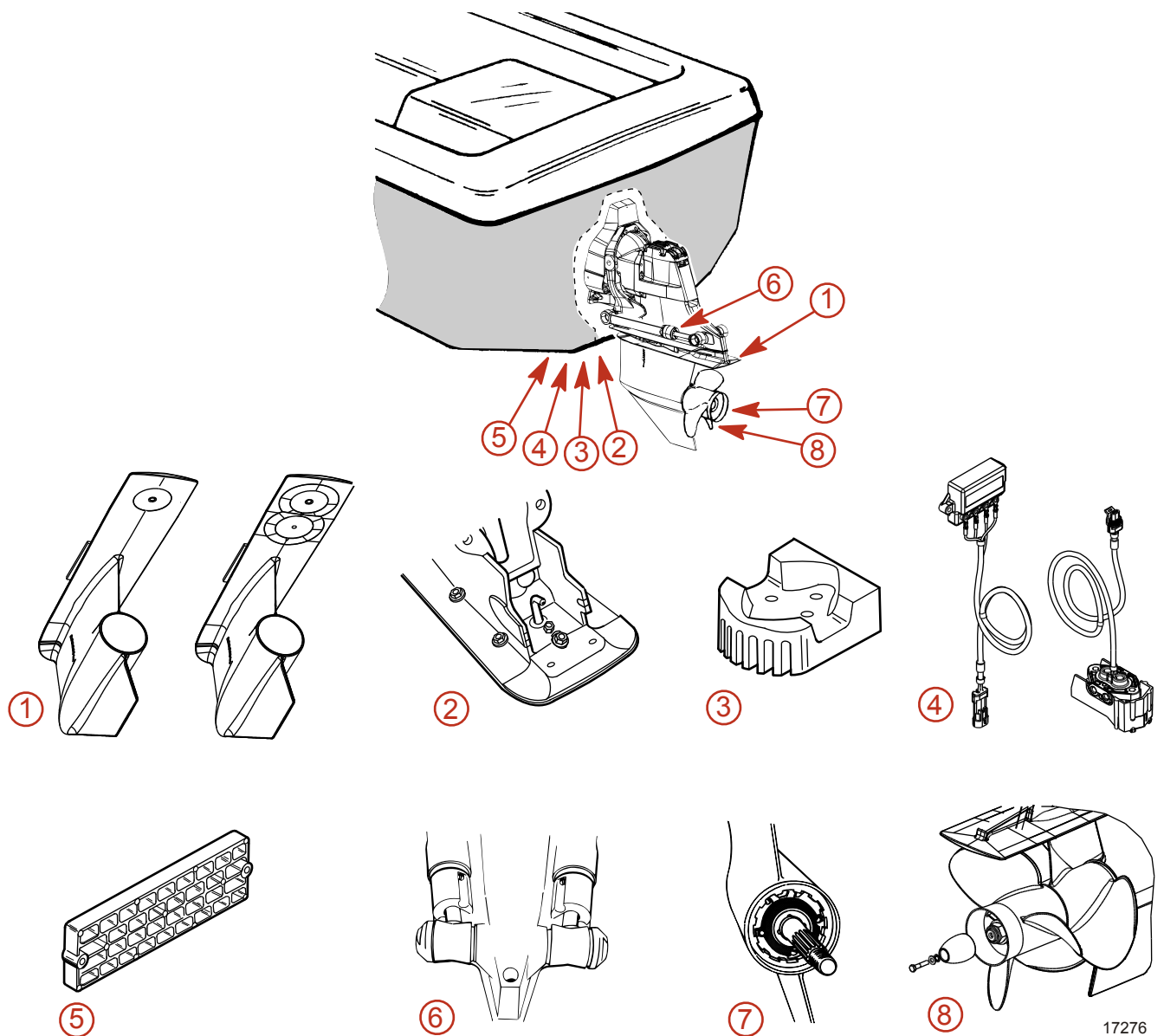
Washing the MerCathode assembly can damage components and lead to rapid corrosion. Do not use any cleaning equipment such as brushes or high-pressure washers to clean the MerCathode assembly.



- a - MerCathode reference electrode
- b - Do not paint
- c - Do not pressure wash

Whenever two or more dissimilar metals (like those found on the sterndrive) are submerged in a conductive solution, such as saltwater, polluted water or water with a high mineral content, a chemical reaction takes place causing electrical current to flow between metals. The electrical current flow causes the metal that is most chemically active, or anodic, to erode. This is known as galvanic corrosion and, if not controlled, it will in time cause the need for replacement of power package components exposed to water. Refer to the **Marine Corrosion Protection Guide** (90-88181301).

Mercury MerCruiser power packages are equipped with anodes to help protect them from galvanic corrosion under moderate conditions. However, for severe conditions (i.e. when using a stainless steel propeller, docking/mooring in areas with rapid water flow, etc.), it is recommended that a Quicksilver Anti-Corrosion Anode Kit and/or a MerCathode System be installed (some models have a MerCathode System as standard equipment).

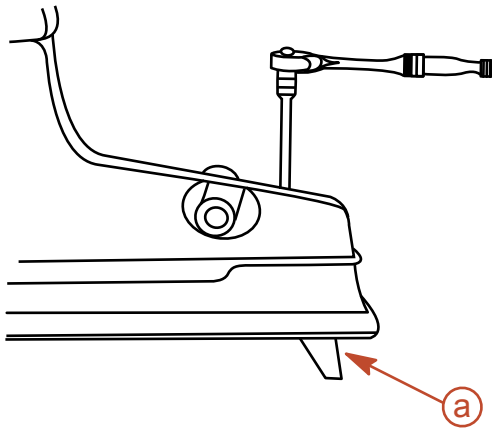


- 1 - Gearcase anodic plate
- 2 - Ventilation plate anode
- 3 - Gimbal mounted anodic block
- 4 - MerCathode System
- 5 - Anode kit
- 6 - Trim cylinder anodes
- 7 - Bearing carrier anodes (Alpha only)
- 8 - Propshaft Anode (Bravo III standard)

IMPORTANT: Replace sacrificial anodes if eroded 50 percent or more.

The following sacrificial anodes are installed at different locations on your power package. These anodes help protect against galvanic corrosion by sacrificing its metal to be slowly eroded instead of the metal components on the power package.

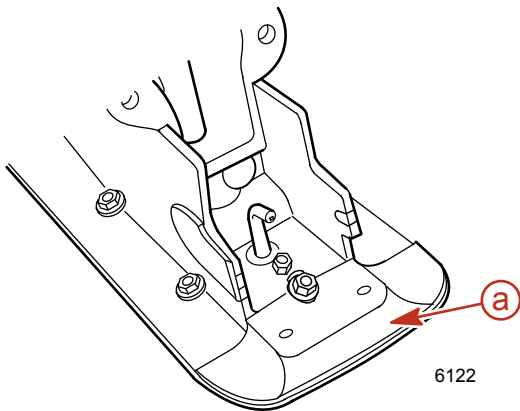
Gearcase Anodic Plate - Mounted on the underside of the lower gearcase.



a - Anode

10952

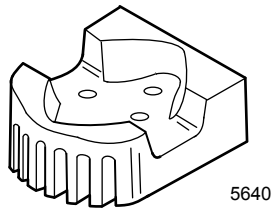
Ventilation Plate Anode - Mounted on the front of the gearcase.



a - Anode

6122

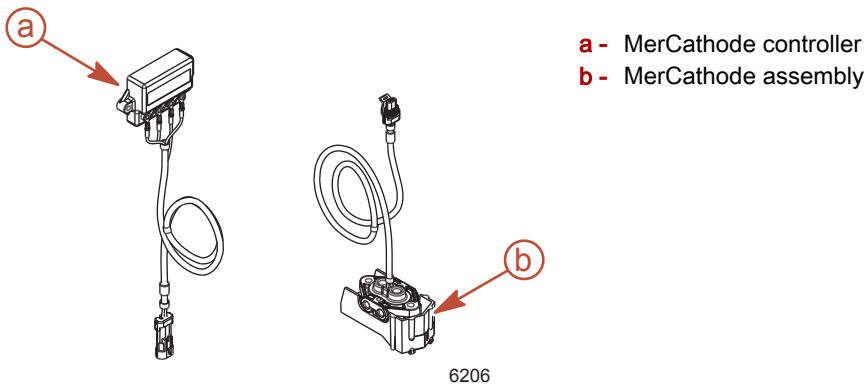
Drive Mounted Anodic Block (if equipped) - Mounted to underside of gimbal housing.



5640

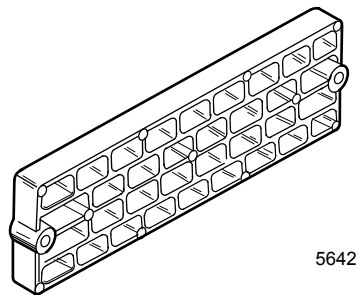
MerCathode System - Electrode assembly replaces Anodic block. System should be tested to ensure adequate output. The test should be performed where boat is moored, using Quicksilver Reference Electrode and Test Meter. Contact your authorized Mercury MerCruiser dealer.

IMPORTANT: To ensure that the MerCathode reference electrode is not damaged, do not paint or pressure wash.

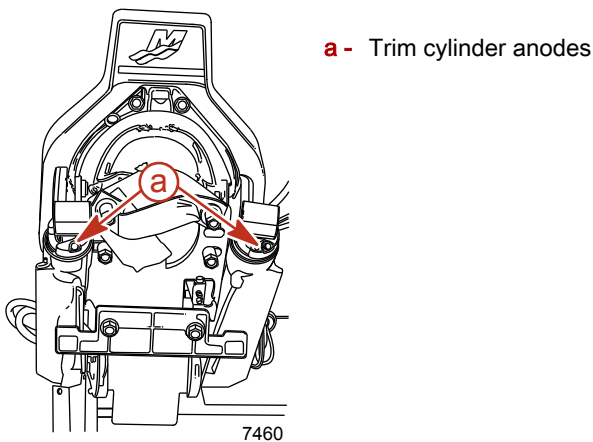


- a - MerCathode controller
- b - MerCathode assembly

Anode Kit (if equipped) - Mounted to the boat transom.

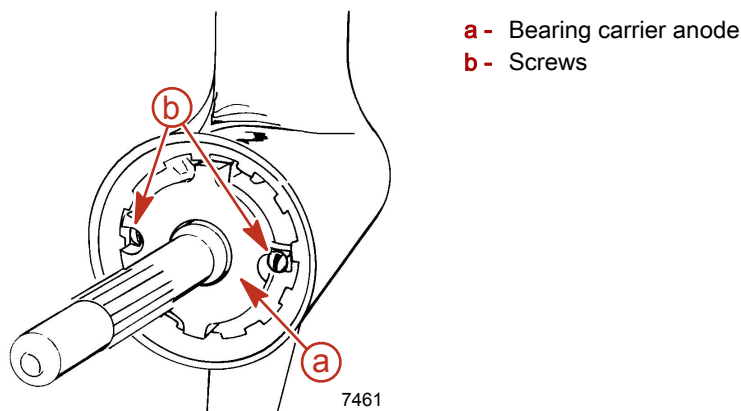


Trim Cylinder Anodes - Mounted on each trim cylinder.



- a - Trim cylinder anodes

Bearing Carrier Anode (Alpha) - Located in front of the propeller, between the front side of the propeller and the gear housing.



- a - Bearing carrier anode
- b - Screws

In addition to the corrosion protection devices, the following steps should be taken to inhibit corrosion:

1. Paint your power package, refer to **Painting Your Power Package**.
2. Spray power package components on inside of boat annually with Corrosion Guard to protect finish from dulling and corrosion. External power package components may also be sprayed.
3. All lubrication points, especially steering system, shift and throttle linkages, should be kept well lubricated.
4. Flush cooling system periodically, preferably after each use.

Painting Your Power Package

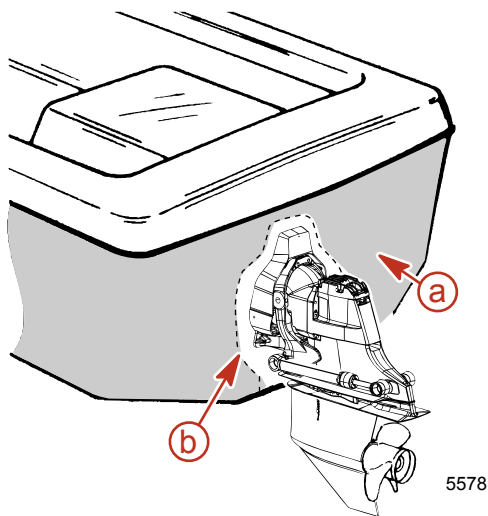
IMPORTANT: Corrosion damage that results from the improper application of anti-fouling paint will not be covered by the limited warranty.

1. **Painting Boat Hull or Boat Transom:** Anti-fouling paint may be applied to boat hull and boat transom but you must observe the following:

IMPORTANT: Do NOT paint anodes or MerCathode System reference electrode and anode, as this will render them ineffective as galvanic corrosion inhibitors.

IMPORTANT: If anti-fouling protection is required for boat hull or boat transom, copper or tin base paints, if not prohibited by law, can be used. If using copper or tin based anti-fouling paints, observe the following:

- Avoid any electrical interconnection between the Mercury MerCruiser Product, Anodic Blocks, or MerCathode System and the paint by allowing a minimum of 40 mm (1-1/2 in.) unpainted area on transom of the boat around these items.



- a - Painted boat transom
- b - Unpainted Area on Transom

2. **Painting Sterndrive Unit or Transom Assembly:** Sterndrive unit and transom assembly should be painted with a good quality marine paint or an anti-fouling paint that does not contain copper, tin, or any other material that could conduct electrical current. Do not paint drain holes, anodes, MerCathode system, and items specified by boat manufacturer.

Section 6 - Storage

Table of Contents

Cold Weather or Extended Storage.....	72	Clearing Clogged Blue Drain Hoses.....	76
Preparing Power Package for Storage.....	72	Draining the Sterndrive.....	77
Engine and Fuel System Preparation	72	Battery Storage.....	78
Draining the Seawater System.....	73	Recommissioning the Power Package.....	78
Single-Point Drain System.....	73		
Draining the Seawater Section of Models with Closed Cooling.....	74		

Cold Weather or Extended Storage

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

NOTICE

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

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

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

Preparing Power Package for Storage

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

NOTICE

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

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

Engine and Fuel System Preparation

⚠ WARNING

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

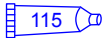

⚠ WARNING

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

NOTICE

Running out of fuel can damage catalyst components. Do not allow the fuel tanks to become empty during operation.

1. In a 23 Liter (6 US gal) remote fuel tank mix:
 - a. 19 Liter (5 US gal) regular unleaded 87 octane (90 RON) gasoline
 - b. 1.89 Liter (2 US qt) Premium Plus 2-Cycle TC-W3 Outboard Oil
 - c. 150 ml (5 oz) Fuel System Treatment and Stabilizer or 30 ml (1 oz) Fuel System Treatment and Stabilizer Concentrate

Tube Ref No.	Description	Where Used	Part No.
 115	Premium Plus 2-Cycle TC-W3 Outboard Oil	Fuel system	92-858026K01
 124	Fuel System Treatment and Stabilizer	Fuel system	92-8M0047932

2. Allow the engine to cool.
IMPORTANT: Immediately wipe up any fuel spills or sprays.
3. Close the fuel shut off valve, if equipped. Disconnect and plug the fuel inlet fitting if not equipped with a fuel shut off valve.
4. Connect the remote fuel tank (with the fogging mixture) to the fuel inlet fitting.
IMPORTANT: Supply cooling water to the engine.
5. Start and operate the engine at 1300 RPM for five minutes.
6. After the specified operating time is complete, slowly return the throttle to idle and shut the engine off.
IMPORTANT: Ensure that some fogging mixture remains in the engine. Do not allow the engine's fuel system to become completely dry.
7. Replace the water separating fuel filter element. Refer to **Section 5**.

Draining the Seawater System

CAUTION

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

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

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

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

Single-Point Drain System

CAUTION

Disconnecting the blue drain hoses can cause serious burns due to hot water. Check all hose connections before operating the engine and never disconnect the hoses until the engine has had sufficient time to cool.

NOTICE

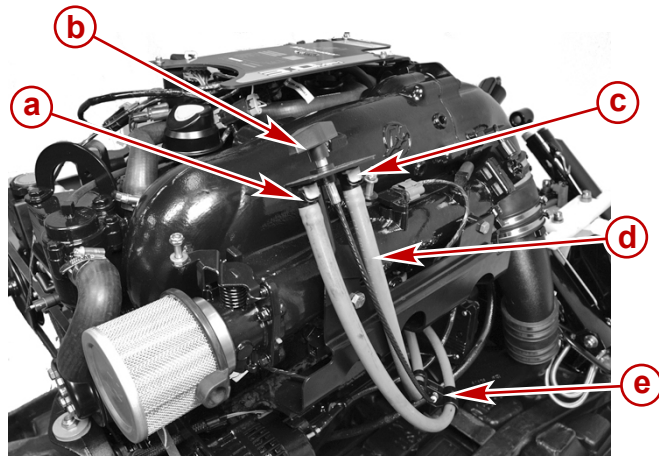
If the boat is at rest in the water with the engine off, an open seacock or water inlet hose could introduce water into the engine's cooling system or the boat. Keep the seacock or water inlet hose plugged until ready to start the engine. Attach a tag to the ignition switch or steering wheel to inform others of the water inlet connection.

IMPORTANT: Do not start or operate the engine at any point in this procedure.

1. If draining with the boat in the water, close the seacock (if equipped) or remove and plug the water inlet hose. If draining with the boat out of the water, place it on a level surface to drain completely.
2. Turn on the bilge pump.

Section 6 - Storage

3. Push the quick connect fitting release buttons and remove the blue drain hoses from the bracket.



- a - Release button (to engine block)
- b - T-handle
- c - Release button (to exhaust manifold)
- d - Blue drain hoses
- e - Hose guide

32559

4. Pull the T-handle until the hose guide is in contact with the quick connect fittings.
5. Push down on the T-handle to force the blue drain hoses below their connection points on the block.
6. If water does not drain from all blue drain hoses, refer to **Clearing Clogged Drain Hoses**.
7. Leave the blue drain hoses disconnected until all water drains from the engine.
8. Pull the T-handle until the quick connect fittings on the blue drain hoses are within reach.
9. Install the quick connect fittings on the bracket. Pull on the blue drain hoses to ensure they are firmly connected.
10. Push down on the T-handle until seated.
11. Turn off the bilge pump.
12. If the boat was drained in the water, open the seacock, if equipped, or unplug and reconnect the water inlet hose prior to operating the engine.

IMPORTANT: The next time you start the engine, check the blue drain hoses for leaks.

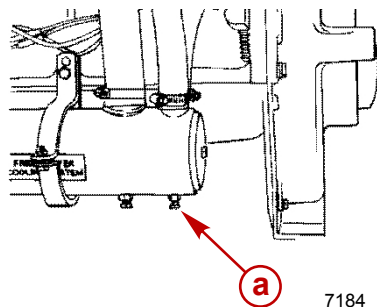
Draining the Seawater Section of Models with Closed Cooling

NOTICE

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

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

1. If draining with the boat in the water, close the seacock (if equipped) or remove and plug the water inlet hose. If draining with the boat out of the water, place the boat on a level surface to ensure complete draining of the system.
2. Remove the drain plug from the aft drain plug from the heat exchanger.



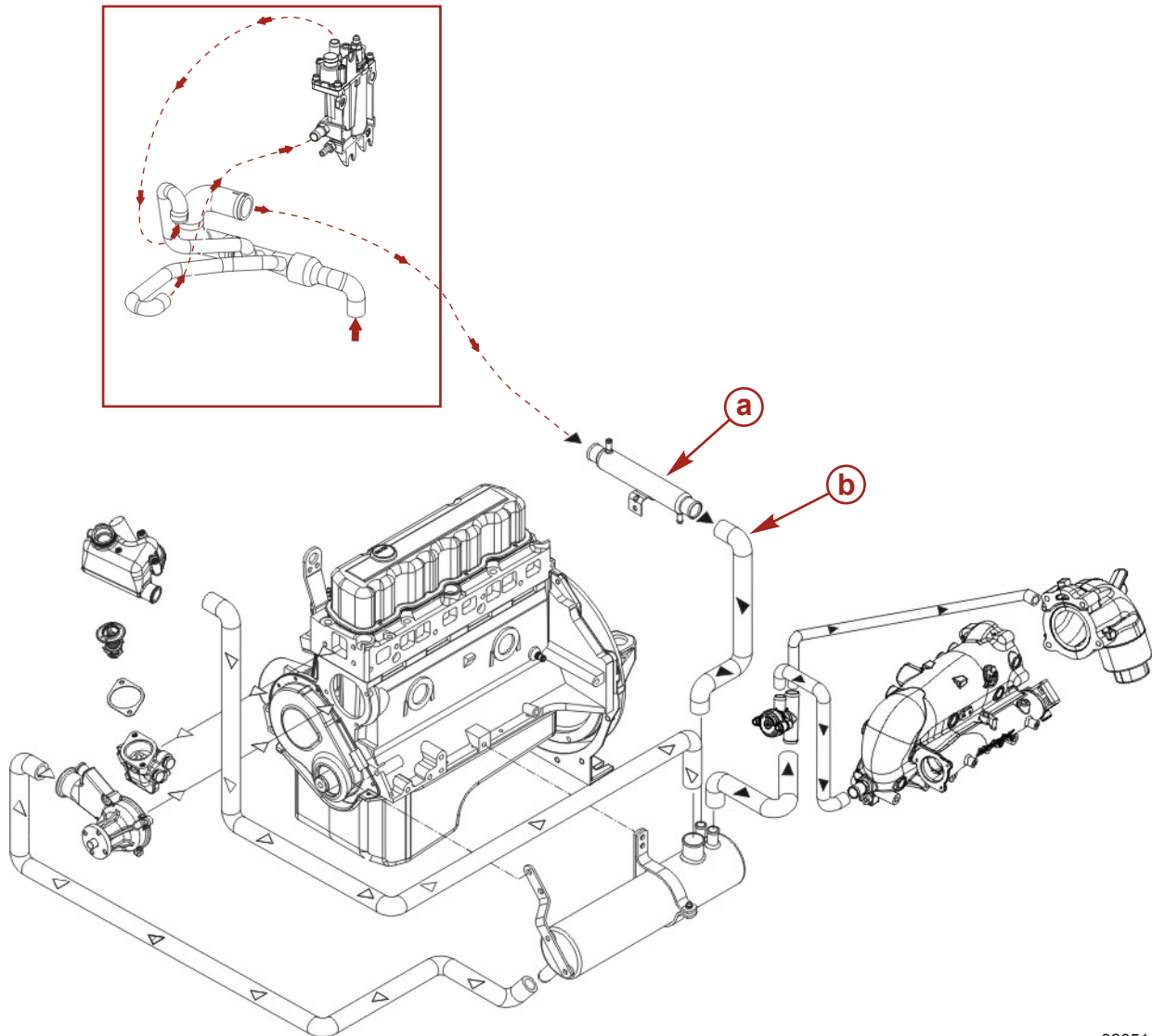
- a - Aft heat exchanger drain plug

7184

3. Clean out the drain hole with a stiff piece of wire until the entire system is drained.

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

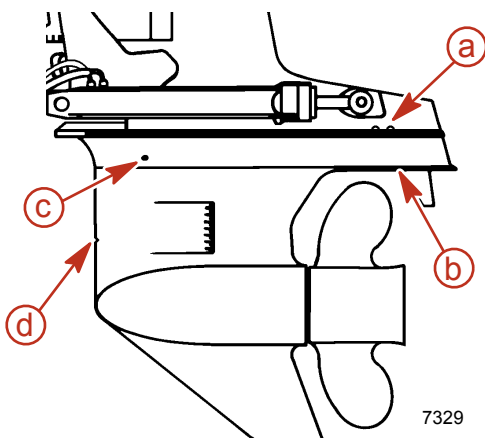
- Remove and lower the hose connecting the water inlet to the power steering cooler, or the water inlet to the heat exchanger.



32651

- a - Power steering cooler
- b - Water inlet to heat exchanger hose

- Ensure that the speedometer pitot hole, gear housing water vent and drain holes, and trim tab cavity vent and drain holes are open and unobstructed.

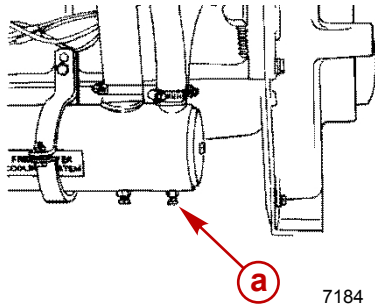


- a - Gear housing vent holes
- b - Trim tab cavity drain holes
- c - Gear housing drain hole
- d - Speedometer pitot hole

7329

Section 6 - Storage

6. Crank the engine over slightly with the starter motor to purge any water trapped in seawater pickup pump. Do not allow the engine to start.
7. After the cooling system has drained completely, apply sealant to the aft heat exchanger plug.



a - Aft heat exchanger drain plug

7184

Tube Ref No.	Description	Where Used	Part No.
19	Perfect Seal	Aft heat exchanger plug	92-34227Q02

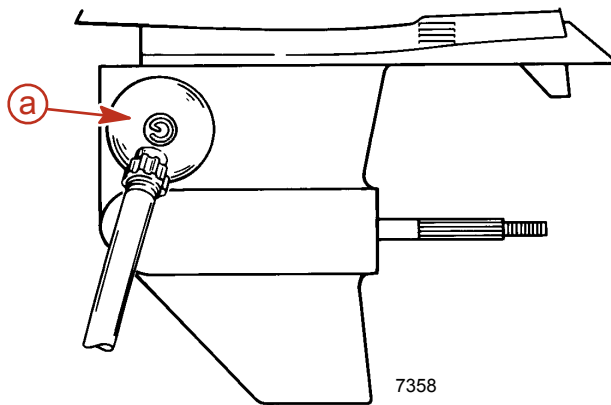
8. Prior to launching the boat or starting the engine, install the drain plug, reconnect the hoses, and tighten all hose clamps securely.
9. If the boat was drained in the water, open the seacock (if equipped) or unplug and reconnect the water inlet hose prior to operating the engine.

Clearing Clogged Blue Drain Hoses

⚠ CAUTION

Disconnecting the blue drain hoses can cause serious burns due to hot water. Check all hose connections before operating the engine and never disconnect the hoses until the engine has had sufficient time to cool.

1. If the engine can be started proceed to Step 2. If the engine cannot be started, proceed to Step 8.
2. If one hose is flowing freely, reconnect it to the bracket.
3. Ensure the clogged blue drain hose is in the correct position below its connection point on the block.
4. Turn on the bilge pump and supply water to the water inlets. If the boat is out of the water, install the flushing attachment and open the water source fully to provide maximum water flow.

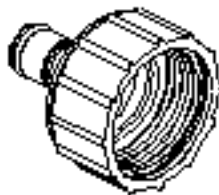


a - Flushing attachment

7358

Flushing Device	91-44357Q 2
<p>9192</p>	Attaches to the water intakes; provides a fresh water connection when flushing the cooling system or operating the engine.

5. Start the engine and allow it to operate at idle until the obstruction is cleared from the hose or for approximately 1 minute, whichever occurs first.
6. Check for water draining from the blue drain hose. If after 1 minute of idling, the blue drain hose is still clogged, proceed to Step 7. If water is draining, shut off the engine and continue with Step 3 of **Single Point Drain System**.
7. Shut off the engine. Disconnect the water source if connected to a flush device.
8. Attach the female end of the water hose adapter fitting to a water supply.



7252

Hose Adapter Fitting (22-863840)

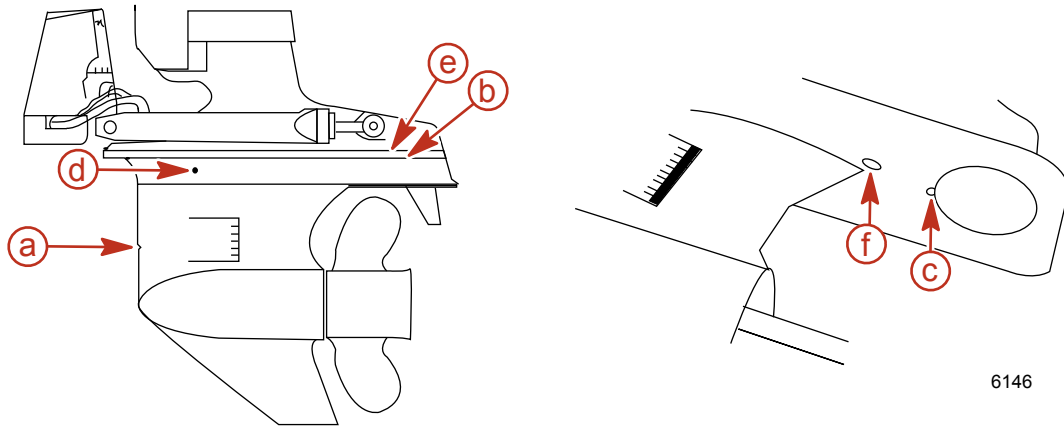
9. Attach the clogged blue drain hose to the male end of the water hose adapter fitting.
10. Fully open the water supply and allow it to run for 1 minute.
11. Turn off the water supply. Disconnect the water hose adapter from the blue drain hose and the water hose.
12. Push down on the T-handle to force the blue drain hoses down below their connection points on the block.
13. Check for water draining from the blue drain hose. If the blue drain hose is still clogged, shut off the bilge pump and reattach the blue drain hoses following the steps below. The unit will need to be serviced by an authorized Mercury MerCruiser dealer.
 - a. Pull the T-handle until the quick connect fittings on the blue drain hoses are within reach.
 - b. Install the quick connect fittings on the bracket. Pull on the blue drain hoses to ensure they are firmly connected.
 - c. Push down on the T-handle until seated.
14. If water is draining from the blue drain hose, continue with Step 4 of **Single Point Drain System**.

Draining the Sterndrive

NOTE: This procedure is needed only for salty, brackish, mineral laden, or polluted water applications; and for freezing temperatures or extended storage.

Section 6 - Storage

1. Insert a small wire repeatedly to make sure that vent holes, water drain holes, and passages are unobstructed and open.



Sterndrive Water Drain Holes

- a - Speedometer pitot tube
- b - Trim tab cavity vent hole
- c - Trim tab cavity drain passage
- d - Gear housing water drain hole (one each at port and starboard)
- e - Gear housing cavity vent hole
- f - Gear housing cavity drain hole

NOTICE

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

2. Lower the sterndrive to the full down/in position.
3. For additional assurance against freezing and rust, after draining, fill the cooling system with propylene glycol mixed to the manufacturer's recommendation to protect the engine to the lowest temperature to which it will be exposed during freezing temperatures or extended storage

Battery Storage

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

Recommissioning the Power Package

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

CAUTION

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

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

NOTICE

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

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

Section 7 - Troubleshooting

Table of Contents

Diagnosing EFI Problems.....	80	Low Engine Oil Pressure.....	82
Engine Guardian System.....	80	Battery Will Not Recharge.....	82
Troubleshooting Charts.....	80	Remote Control Is Difficult to Move, Has Excessive Play, or Makes Unusual Sounds.....	82
Starter Motor Will Not Crank Engine, or Cranks Slowly	80	Steering Wheel Jerks or Is Difficult to Turn.....	82
Engine Will Not Start or Is Hard to Start.....	80	Power Trim Does Not Operate (Motor Does Not Operate)	82
Engine Runs Rough, Misses, or Backfires.....	81	Power Trim Does Not Operate (Motor Operates but Sterndrive Unit Does Not Move).....	83
Poor Performance.....	81		
Excessive Engine Temperature.....	81		
Insufficient Engine Temperature.....	81		

Diagnosing EFI Problems

Your authorized Mercury MerCruiser dealer has the proper service tools for diagnosing problems on Electronic Fuel Injection (EFI) Systems. The Electronic Control Module (ECM) on these engines has the ability to detect some problems with the system when they occur, and store a Trouble Code in the ECM's memory. This code can then be read later by a service technician using a special diagnostic tool.

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.

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

Troubleshooting Charts

Starter Motor Will Not Crank Engine, or Cranks Slowly

Possible Cause	Remedy
Battery switch turned off.	Turn the switch on.
Remote control not in neutral position.	Position the control lever in neutral.
Open circuit breaker or fuse.	Check and reset the main power circuit breaker or replace the fuse. Check the 5 amp fuse on the power harness connected to the battery, and replace if necessary.
Loose or dirty electrical connections or damaged wiring.	Check all electrical connections and wires (especially battery cables). Clean and tighten all faulty connections.
Bad battery or low battery voltage.	Test the battery and charge if necessary; replace if bad.
Lanyard stop switch activated.	Check the lanyard stop switch.

Engine Will Not Start or Is Hard to Start

Possible Cause	Remedy
Lanyard stop switch activated.	Check the lanyard stop switch.
Improper starting procedure.	Read the starting procedure.
Insufficient fuel supply.	Fill fuel tank or open valve.
Faulty ignition system component.	Service the ignition system.
Clogged fuel filter.	Replace fuel filter.
Stale or contaminated fuel.	Drain fuel tank. Fill with fresh fuel.
Fuel line or tank vent line kinked or clogged.	Replace kinked lines or blow out lines with compressed air to remove obstruction.
Faulty wire connections.	Check wire connections.
EFI system fault.	Have EFI System checked by an authorized Mercury MerCruiser dealer.

Engine Runs Rough, Misses, or Backfires

Possible Cause	Remedy
Clogged fuel filter.	Replace filter.
Stale or contaminated fuel.	If contaminated, drain tank. Fill with fresh fuel.
Kinked or clogged fuel line or fuel tank vent line.	Replace kinked lines or blow out lines with compressed air to remove obstruction.
Flame Arrestor dirty.	Clean Flame Arrestor.
Faulty ignition system component.	Service ignition system.
Idle speed too low.	Have EFI system checked by an authorized Mercury MerCruiser dealer.
EFI System fault.	Have EFI System checked by an authorized Mercury MerCruiser dealer.

Poor Performance

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

Excessive Engine Temperature

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

Insufficient Engine Temperature

Possible Cause	Remedy
Faulty thermostat.	Replace.

Low Engine Oil Pressure

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

Battery Will Not Recharge

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

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

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

Steering Wheel Jerks or Is Difficult to Turn

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

Power Trim Does Not Operate (Motor Does Not Operate)

Possible Cause	Remedy
Blown fuse.	Replace fuse. Fuses may be located near the dash trim switch, at the trim pump, in the positive (red) power trim battery lead near the battery switch, or a combination of these.
Loose or dirty electrical connections or damaged wiring.	Check all associated electrical connections and wires (especially battery cables). Clean and tighten faulty connection. Repair or replace wiring.

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

Possible Cause	Remedy
Trim pump oil level low.	Fill pump with oil.
Drive unit binding in gimbal ring.	Check for obstruction.

Notes:

Section 8 - Customer Assistance Information

Table of Contents

Owner Service Assistance.....	86	Resolving a Problem	86
Local Repair Service	86	Contact Information for Mercury Marine Customer	
Service Away From Home	86	Service	87
Stolen Power Package	86	Ordering Literature.....	87
Attention Required After Submersion	86	United States and Canada	87
Replacement Service Parts	86	Outside the United States and Canada	88
Parts and Accessories Inquiries	86		

Owner Service Assistance

Local Repair Service

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

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

Service Away From Home

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

Stolen Power Package

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

Attention Required After Submersion

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

Replacement Service Parts

WARNING

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

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

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

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

Parts and Accessories Inquiries

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

Resolving a Problem

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

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

The following information will be needed by the Customer Service:

- Your name and address

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

Contact Information for Mercury Marine Customer Service

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

Telephone	Fax	Mail
+1 920 929 5040	+1 920 906 6033	Mercury Marine W6250 West Pioneer Road P.O. Box 1939 Fond du Lac, WI 54936-1939
+1 905 567 6372 (MERC)	+1 905 567 8515	Mercury Marine Ltd. 2395 Meadowpine Blvd. Mississauga, Ontario L5N 7W6 Canada
+61 3 9791 5822	+61 3 9793 5880	Mercury Marine – Australia 132-140 Frankston Road Dandenong, Victoria 3164 Australia
+ 32 87 32 32 11	+32 87 31 19 65	Marine Power – Europe, Inc. Parc Industriel de Petit-Rechain B-4800 Verviers, Belgium
+954 744 3500	+954 744 3535	Mercury Marine – Latin America & Caribbean 11650 Interchange Circle North, Miramar, FL 33025 U.S.A.
+81 53 423 2500	+81 53 423 2510	Mercury Marine – Japan 283-1 Anshin-cho Hamamatsu, Shizuoka 435-0005 Japan
+65 6546 6160	+65 6546 7789	Mercury Marine – Singapore 29, Loyang Drive Singapore, 508944

Ordering Literature

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

- Model
- Serial number
- Horsepower
- Year built

United States and Canada

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

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

Outside the United States and Canada

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

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

Mercury Marine

Attn: Publications Department

W6250 West Pioneer Road

P.O. Box 1939

Fond du Lac, WI 54936-1939

USA

Section 9 - Checklists

Table of Contents

Predelivery Inspection (PDI).....	90	Customer Delivery Inspection (CDI).....	91
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Predelivery Inspection (PDI)

IMPORTANT: This checklist is for packages that are not equipped with Axius. For engine packages equipped with Axius, use the Axius-specific checklist, which appears in Section 5 of the Axius Operation Manual.

Perform these tasks before the Customer Delivery Inspection (CDI).

N/A	Check/ Adjust	Item
<input type="checkbox"/>	<input type="checkbox"/>	Service bulletin updates or repairs completed
	<input type="checkbox"/>	Drain plug installed and drain valves closed
<input type="checkbox"/>	<input type="checkbox"/>	Seawater inlet valve open
	<input type="checkbox"/>	Engine mounts tight
<input type="checkbox"/>	<input type="checkbox"/>	Engine alignment
<input type="checkbox"/>	<input type="checkbox"/>	Drive unit fasteners tightened to specifications
<input type="checkbox"/>	<input type="checkbox"/>	Power trim cylinders fasteners tight
	<input type="checkbox"/>	Battery of proper rating, fully charged, secured, with protective covers in place
	<input type="checkbox"/>	All electrical connections tight
	<input type="checkbox"/>	Exhaust system hose clamps tight
	<input type="checkbox"/>	All fuel connections tight
	<input type="checkbox"/>	Correct propeller selected, installed, and tightened to specifications
	<input type="checkbox"/>	Throttle, shift and steering system fasteners tightened to specifications
<input type="checkbox"/>	<input type="checkbox"/>	Test OBDM warning system and MIL (light) operation (EC models only)
	<input type="checkbox"/>	Steering operation throughout range
	<input type="checkbox"/>	Throttle plates open and close completely
	<input type="checkbox"/>	Crankcase oil level
<input type="checkbox"/>	<input type="checkbox"/>	Power trim oil level
<input type="checkbox"/>	<input type="checkbox"/>	Stern drive unit oil level
<input type="checkbox"/>	<input type="checkbox"/>	Power steering fluid level
<input type="checkbox"/>	<input type="checkbox"/>	Closed Cooling fluid level
<input type="checkbox"/>	<input type="checkbox"/>	Transmission fluid level
<input type="checkbox"/>	<input type="checkbox"/>	V-engines: serpentine belt tension
<input type="checkbox"/>	<input type="checkbox"/>	Alternator belt tension (3.0L)
<input type="checkbox"/>	<input type="checkbox"/>	Power steering pump belt tension (3.0L)
<input type="checkbox"/>	<input type="checkbox"/>	SmartCraft gauges calibrated, if equipped
<input type="checkbox"/>	<input type="checkbox"/>	Warning system operation
<input type="checkbox"/>	<input type="checkbox"/>	Trim limit switch operation

Predelivery Inspection Checklist, Continued

N/A	Check/ Adjust	Item
		On-the-Water Test
<input type="checkbox"/>	<input type="checkbox"/>	Engine alignment (Inboard models only)
	<input type="checkbox"/>	Starter neutral safety switch operation
	<input type="checkbox"/>	E-stop switch/lanyard stop switch operation (all helms)
	<input type="checkbox"/>	Seawater pump operation
	<input type="checkbox"/>	Operation of instruments
	<input type="checkbox"/>	Fuel, oil, and water leaks
	<input type="checkbox"/>	Exhaust leaks
	<input type="checkbox"/>	Ignition timing
	<input type="checkbox"/>	Forward, neutral, and reverse gear operation
	<input type="checkbox"/>	Steering operation throughout range
	<input type="checkbox"/>	Acceleration from idle RPM is normal
	<input type="checkbox"/>	WOT_____ RPM within specification (in forward gear)
<input type="checkbox"/>	<input type="checkbox"/>	EC models: run two full operating cycles (key on/off) to WOT with engine at normal operating temperature while monitoring engine with G3 CDS to verify engine goes into closed-loop engine control.
<input type="checkbox"/>	<input type="checkbox"/>	Power trim operation
<input type="checkbox"/>	<input type="checkbox"/>	Boat handling
		After On-the-Water Test
	<input type="checkbox"/>	Propeller nut tightened to specification
	<input type="checkbox"/>	Fuel, oil, coolant, water and fluid leaks
	<input type="checkbox"/>	Oil and fluid levels
	<input type="checkbox"/>	Apply Quicksilver Corrosion Guard to engine package
	<input type="checkbox"/>	Operation, Maintenance & Warranty manual in boat
		If Boat Is Registered to a Resident of California
<input type="checkbox"/>	<input type="checkbox"/>	CARB hang tag in boat
<input type="checkbox"/>	<input type="checkbox"/>	CARB decal properly affixed to boat hull

Customer Delivery Inspection (CDI)

IMPORTANT: This checklist is for packages that are not equipped with Axius. For engine packages equipped with Axius, use the Axius-specific checklist, which appears in Section 5 of the Axius Operation Manual.

Perform these tasks after the Predelivery Inspection (PDI).

This inspection must take place in the presence of the customer.

N/A	Completed	Item
	<input type="checkbox"/>	Operation and maintenance manual—provide and review with customer. Emphasize the importance of safety warnings and Mercury engine testing procedures.
	<input type="checkbox"/>	Approve the external appearance of the product (paint, cowl, decals, etc.)
	<input type="checkbox"/>	Warranty—provide and explain the limited warranty to the customer. Explain dealer services.
<input type="checkbox"/>	<input type="checkbox"/>	Explain the optional Mercury Product Protection Plan (North America only)
		Operation of equipment—explain and demonstrate:
	<input type="checkbox"/>	E-stop switch / lanyard stop switch operation (all helms)
	<input type="checkbox"/>	Cause and effect of steering torque or pull; instruct on using a firm steering grip; explain boat spin-out and how to trim for neutral steering.
<input type="checkbox"/>	<input type="checkbox"/>	U.S. Coast Guard capacity plate
	<input type="checkbox"/>	Proper seating
	<input type="checkbox"/>	Importance of personal flotation devices (PFDs or life vests) and throwable PFDs (throw cushions)

Section 9 - Checklists

N/A	Completed	Item
<input type="checkbox"/>	<input type="checkbox"/>	Functions of SmartCraft accessories (if applicable)
	<input type="checkbox"/>	Off-season storage and maintenance schedule
	<input type="checkbox"/>	Engine (starting, stopping, shifting, using throttle)
	<input type="checkbox"/>	Boat (lights, battery switch location, fuses/breakers)
<input type="checkbox"/>	<input type="checkbox"/>	Trailer (if applicable)
		Registration:
	<input type="checkbox"/>	Complete and submit warranty registration—provide the customer with a copy.