CA741

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.

CE344

⚠ 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

CALIFORNIA

PROPOSITION 65 WARNING

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

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

Printed in U.S.A.

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!

CONSUMER AFFAIRS DEPARTMENT

CD748

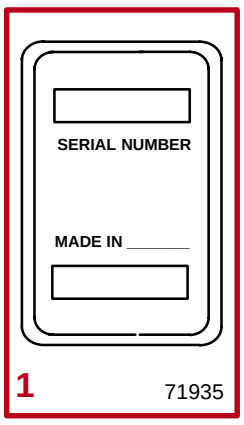
Identification Record

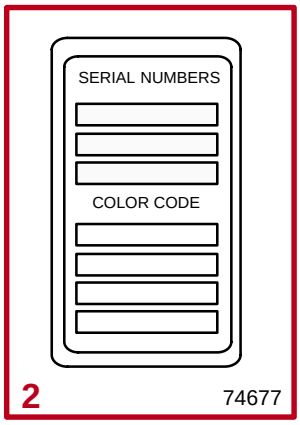
Please record the following information:

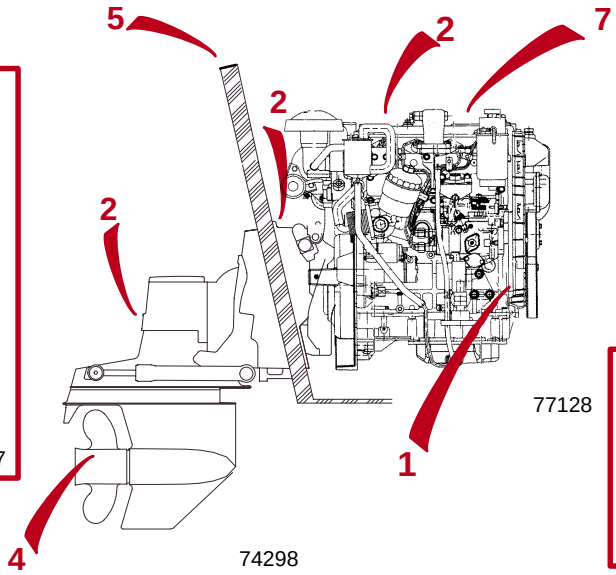
1			
	Engine Model and Horsepower		Engine Serial Number
2			
	Transom Assembly Serial Number (Sterndrive)	Gear Ratio	Sterndrive Unit Serial Number
3			
	Transmission Model (Inboard)	Gear Ratio	Transmission Serial Number
4			
	Propeller Number	Pitch	Diameter
5			
	Hull Identification Number (HIN)		Purchase Date
6			
	Boat Manufacturer	Boat Model	Length
7			
	Exhaust Gas Emissions Certificate Number (Europe Only)		

Serial Numbers

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







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Warranty Information

CD55

Owner Warranty Registration

UNITED STATES AND CANADA ONLY

- It is important that your selling dealer fills out the Warranty Registration Card completely and mails it to the factory immediately upon sale of the new product.
- It identifies 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.
- Upon receipt of the Warranty Registration Card at the factory, you will be issued a plastic Owner Warranty Registration Card which is your only valid registration identification. It must be presented to the servicing dealer should warranty service be required. Warranty claims will not be accepted without presentation of this card.
- A temporary Owner Warranty Registration Card will be presented to you when you purchase the product It is valid only for 30 days from date of sale while your plastic Owner Warranty Registration Card is being processed Should your product need service during this period, present the temporary registration card to the dealer. He will attach it to your warranty claim form.
- Because of your selling dealer's continuing personal interest in your satisfaction, the product should be returned to him for warranty service.
- If your plastic card is not received within 30 days from date of new product sale, please contact your selling dealer.
- The product warranty is not effective until the product is registered at the factory.
- NOTICE: Registration lists must be maintained by factory and dealer on marine products sold in the United States, should notification under the federal boat safety act be required.

CD56

International Owner Registration

OUTSIDE THE UNITED STATES AND CANADA

- It is important that your selling dealer fills out the Warranty Registration Card completely and mails it to the distributor or Marine Power Service Center responsible for administering the warranty registration/claim program for your area.
- The Warranty Registration Card identifies your name and address, product model and serial number(s), date of sale, type of use and the selling distributors/dealer's code number, name and address. The distributor/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/dealer. This card represents your factory registration identification, and should be retained by you for future use when required Should you ever require warranty service on this product, your dealer may ask you for the Warranty Registration Card to verify date of purchase and to use the information on the card to prepare the warranty claim form(s).
- In some countries, the Marine Power Service Center will issue you a permanent (plastic) Warranty Registration Card within 30 days after receiving the "Factory Copy" of the Warranty Registration Card from your distributor/dealer If you receive a plastic Warranty Registration Card, you may discard the "Purchaser's Copy" that you received from the distributor/dealer when you purchased the product. Ask your distributor/dealer if this plastic card program applies to you.
- For further information concerning the Warranty Registration Card and its relationship to Warranty Claim processing, refer to the "International Warranty." Refer to "Table of Contents."

IMPORTANT: Registration lists must be maintained by the factory and dealer in some countries by law. It is our desire to have ALL products registered at the factory should it ever be necessary to contact you. Make sure your dealer/distributor fills out the warranty registration card immediately and sends the factory copy to the Marine Power International Service Center for your area.

Recreational Use Diesel Limited Warranty

I. WHAT IS COVERED

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

II. DURATION OF COVERAGE

This Limited Warranty provides coverage for one (1) year from the date the product is first sold to a recreational use retail purchaser, or the date on which the product is first put into service, whichever occurs first. Commercial use of the product voids the warranty. Commercial use is defined as any work or employment related use of the product, or any use of the product which generates income, for any part of the warranty period, even if the product is only occasionally used for such purposes. The repair or replacement of parts, or the performance of service under this warranty, does not extend the life of this warranty beyond its original expiration date. Unexpired warranty coverage can be transferred to a subsequent purchaser upon proper re-registration of the product.

III. CONDITIONS THAT MUST BE MET IN ORDER TO OBTAIN WARRANTY COVERAGE

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

IV. WHAT MERCURY WILL DO

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

V. 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. The warranty registration card is the only valid registration identification and must be presented to the dealer at the time warranty service is requested in order to obtain coverage.

VI. WHAT IS NOT COVERED

This limited warranty does not cover routine maintenance items, tune ups, adjustments, normal wear and tear, damage caused by abuse, abnormal use, use of a propeller or gear ratio that does not allow the engine to run in its recommended rpm range (see the Operation, Maintenance and Warranty Manual), operation of the product in a manner inconsistent with the recommended operation/duty cycle section of the Operation, Maintenance and Warranty Manual, neglect, accident, submersion, improper installation (proper installation specifications and techniques are set forth in the installation instructions for the product), improper service, use of an accessory or part which damages the Mercury product and was not manufactured or sold by us, jet pump impellers and liners, operation with fuels, oils or lubricants which are not suitable for use with the product (see the Operation, Maintenance and Warranty Manual), alteration or removal of parts, or water entering the engine through the fuel intake, air intake or exhaust system. Use of the product for racing or other competitive activity, or operating with a racing type lower unit, at any point, even by a prior owner of the product, voids the warranty.

VII. 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.

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

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

X. 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.

CD622

Warranty Coverage and Exclusion

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

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

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

WARRANTY DOES NOT APPLY TO THE FOLLOWING:

- Minor adjustments or checks, including checking fuel injection pump timing, cleaning fuel injectors, filters, or adjusting belts, controls, and checking lubrication made in connection with normal services.
- Damage caused by neglect, lack of maintenance, accident, abnormal operation, improper installation or service, or freezing temperatures.
- Haul-out, launch, towing charges; removal and/or replacement of boat partitions or material because of boat design for necessary access to the product; all related transportation charges and/or travel time, etc. Reasonable access must be provided to the product for warranty service. Customer must deliver product to an Authorized Dealer.
- Additional service work requested by customer other than that necessary to satisfy the warranty obligation.
- Labor performed by other than an Authorized Dealer may be covered only under following circumstances: When performed on emergency basis (providing there are no Authorized Dealers in area who can perform the work required or have no facilities to haul out, etc., and prior factory approval has been given to have the work performed at this facility).
- All incidental and/or consequential damages (storage charges, telephone or rental charges of any type, inconvenience or loss of time or income) are the owner’s responsibility.
- Use of other than Quicksilver replacement parts when making warranty repairs.
- Oils, lubricants or fluids changed as a matter of normal maintenance is customer’s responsibility unless loss or contamination of same is caused by product failure that would be eligible for warranty consideration.
- Participating in or preparing for racing or other competitive activity.
- Engine noise does not necessarily indicate a serious engine problem. If diagnosis indicates a serious internal engine condition which could result in a failure, condition responsible for noise should be corrected under the warranty.
- Lower unit and/or propeller damage caused by striking a submerged object is considered a marine hazard.
- Water entering the engine via the air filter or exhaust system or submersion. Also, water in the starter motor.
- Starter motors and/or armatures or field coil assembly, which are burned, or where lead is thrown out of commutator because of excess cranking.
- Valve or valve seat grinding required because wear.
- Failure of any parts caused by lack of cooling water, which results from starting power package out of water, foreign material blocking inlets or power package being mounted too high.
- Use of fuels and lubricants which are not suitable for use with or on the product. Refer to your Operation and Maintenance Manual.
- Our limited warranty does not apply to any damage to our products caused by the installation or use of parts and accessories which are not manufactured or sold by us. Failures which are not related to the use of those parts or accessories, are covered under warranty, if they otherwise meet the terms of the limited warranty for that product.

Transferable Warranty

The product 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.

DIRECT SALE BY OWNER

- The second owner can be registered as the new owner and retain the unused portion of the limited warranty by sending the former owner's plastic Owner Warranty Registration Card and a copy of the bill of sale to show proof of ownership. In the United States and Canada, mail to:

  Attn: Warranty Registration Department
  Mercury Marine
  W6250 West Pioneer Road
  P.O. Box 1939
  Fond du Lac, WI 54936-1939

- A new Owner Warranty Registration Card will be issued with the new owner's name and address. Registration records will be changed on the factory computer registration file.
- There is no charge for this service.

Outside the United States and Canada, please contact the closest Mercury Marine Service Office, or the closest distributor in your country, for the transferable warranty procedure that would apply to you.

Read This Manual Thoroughly

IF YOU DON'T UNDERSTAND ANY PORTION, CONTACT YOUR DEALER FOR A DEMONSTRATION OF ACTUAL STARTING AND OPERATING PROCEDURES.

NOTICE

Throughout this publication, and on your power package **WARNINGS** and **CAUTIONS**, accompanied by the International HAZARD Symbol ⚠ , may be used to alert the installer/user to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. **Observe them carefully.**

These "Safety Alerts" alone cannot eliminate the hazards that they signal. Strict compliance with these special instructions while performing the service, plus "common sense" operation, are major accident prevention measures.

⚠ WARNING

Hazards or unsafe practices which could result in severe personal injury or death.

⚠ CAUTION

Hazards or unsafe practices which could result in minor personal injury or product or property damage.

IMPORTANT: Indicates information or instructions that are necessary for proper operation and/or maintenance.

General Information

⚠ 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.

We strongly recommend that other occupants be instructed on proper starting and operation procedures so they will be prepared should they be required to operate the power package and boat in an emergency.

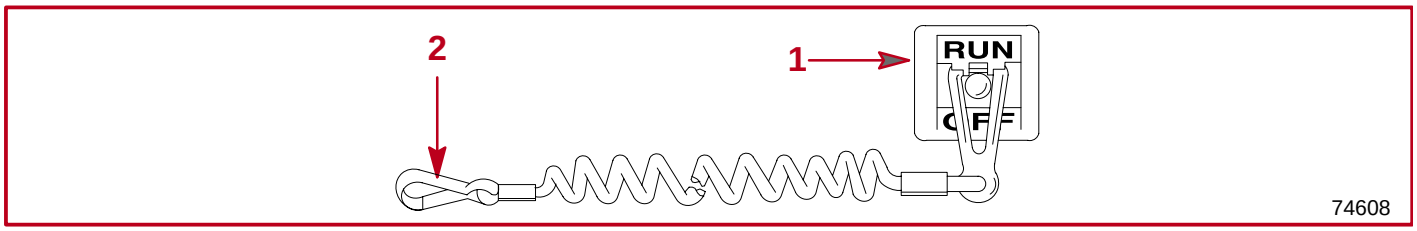
⚠ WARNING

The use of accessories not manufactured or sold by Mercury Marine is not recommended for use with your Mercury MerCruiser unit. If your Mercury MerCruiser unit is equipped with an accessory not manufactured by Mercury Marine, be sure to read the Operation and Maintenance Manual for the accessory before operation. If you haven't been supplied with such a manual, contact your dealer or the manufacturer of the accessory to secure the applicable manual.

⚠ WARNING

Electrical system components on this engine are not external ignition protected. DO NOT STORE OR UTILIZE GASOLINE ON BOATS EQUIPPED WITH THESE ENGINES, UNLESS PROVISIONS HAVE BEEN MADE TO EXCLUDE GASOLINE VAPORS FROM ENGINE COMPARTMENT (REF: 33 CFR). Failure to comply could result in fire, explosion and/or severe personal injury.

CA619
Lanyard Stop Switch



The purpose of a lanyard stop switch (1) is to turn off the engine when the operator moves far enough away from the operator's position (as in accidental ejection from the operator's position) to activate the switch. Some remote control units are equipped with a lanyard stop switch. A lanyard stop switch can be installed on the dashboard or side adjacent to the operator's position.

The lanyard is a cord usually between 4 and 5 feet (1220 and 1524 mm) in length when stretched out with an element on one end made to be inserted into the switch and a snap (2) on the other end for attaching to the operator. The lanyard is coiled to make its at-rest condition as short as possible so as to minimize the likelihood of lanyard entanglement with nearby objects. It is made as long as it is in its stretched condition 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.

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

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

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

⚠ WARNING

Should the operator fall out of the boat, the possibility of serious injury or death from being run over by the boat can be greatly reduced by stopping the engine immediately. Always properly connect both ends of the stop switch lanyard to the stop switch and the operator.

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

1 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 gear case or propeller.

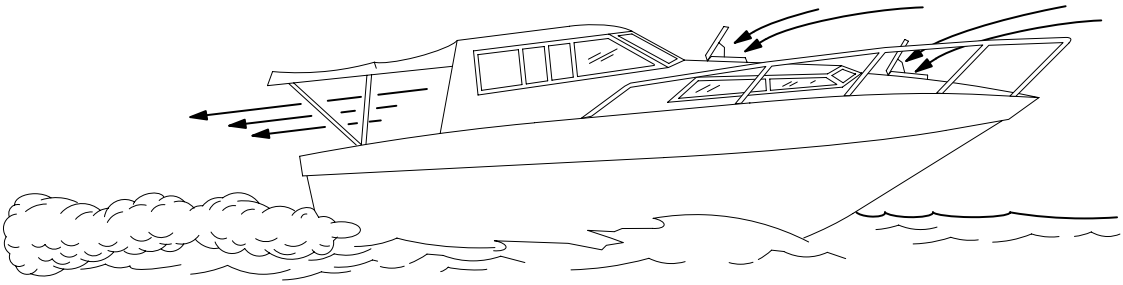
2 Loss of power and directional control in heavy seas, strong current or high winds.

3 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.

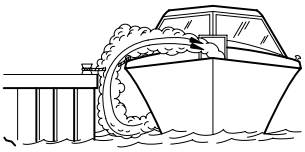
CA641



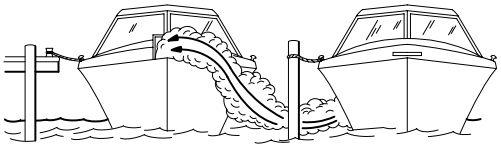
1

Courtesy of ABYC

CA642



2A



2B

3A

3B

Courtesy of ABYC

CA620
Exhaust Emissions

BE ALERT TO CARBON MONOXIDE POISONING

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

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

⚠ WARNING

Avoid the combination of a running engine and poor ventilation. Prolonged exposure to carbon monoxide in sufficient concentration can lead to unconsciousness, brain damage or death.

GOOD VENTILATION

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

1 Example of desired air flow through the boat.

CA643
POOR VENTILATION

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

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

2 Examples of poor ventilation while boat is stationary:

A Running the engine when the boat is moored in a confined space.

B Mooring close to another boat that has its engine running.

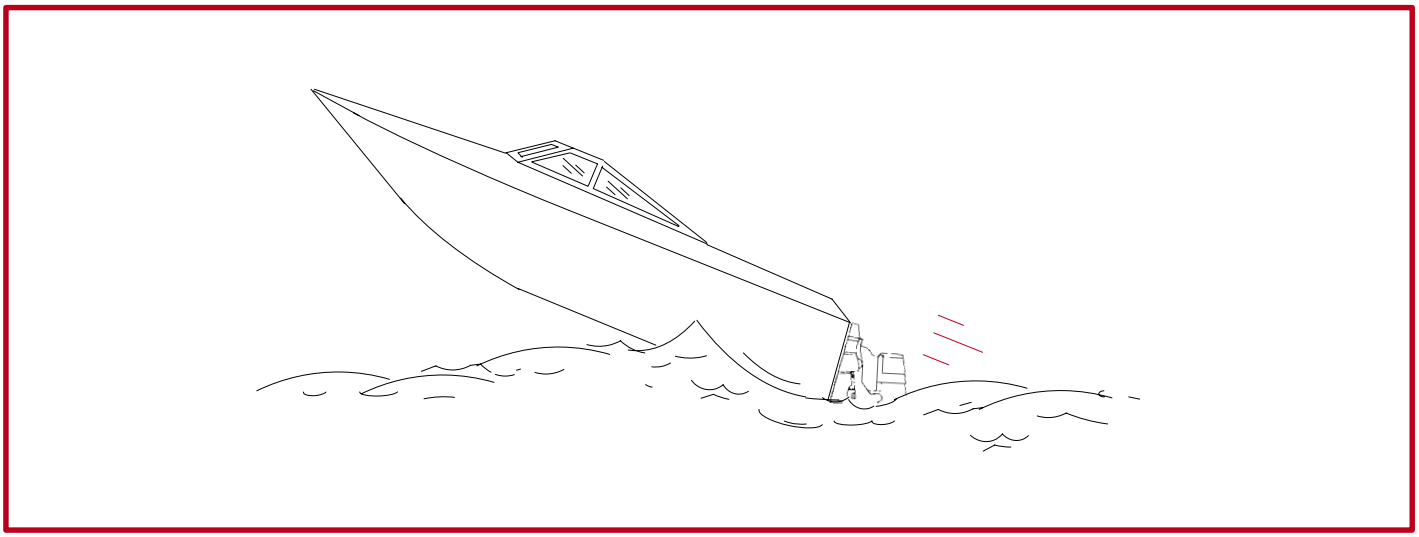
3 Examples of poor ventilation while boat is moving:

A Running the boat with the trim angle of the bow too high.

B Running the boat with no forward hatches open (station wagon effect).

CD747

Wave And Wake Jumping



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

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

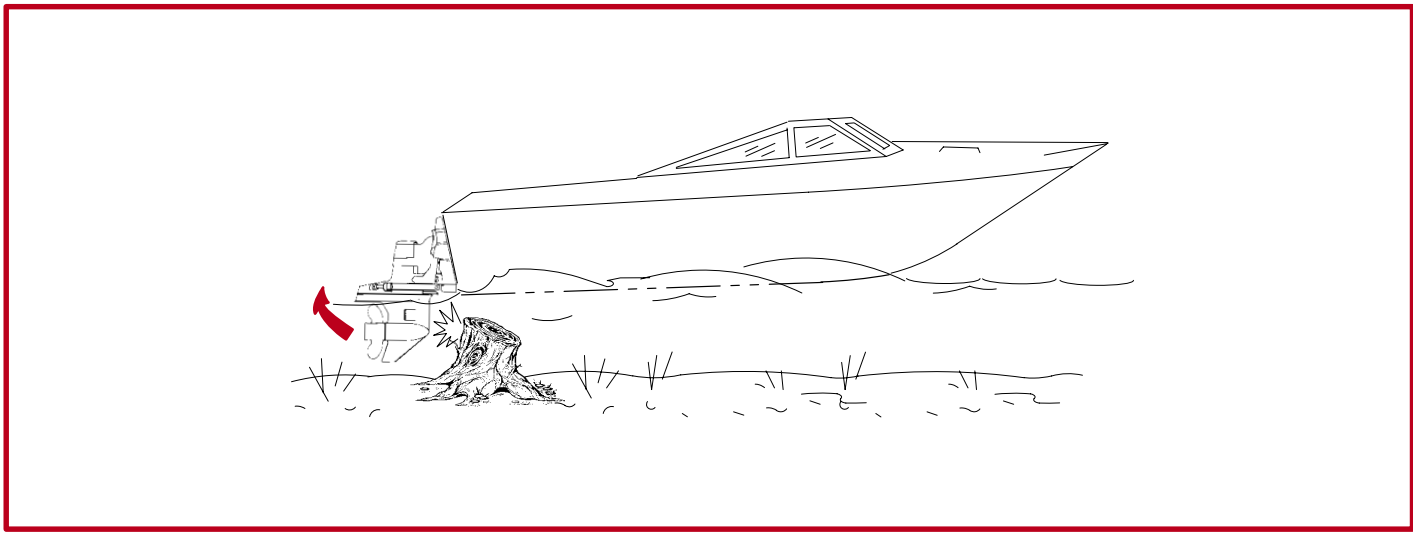
There is another less common hazardous result from allowing your boat to launch off a wave or wake. If the bow of your boat pitches down far enough while airborne, upon water contact it may penetrate under the water surface and “submarine” for an instant. This will bring the boat nearly to a stop in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

⚠ WARNING

Avoid serious injury or death from being thrown within or out of a boat when it lands after jumping a wave or wake. Avoid wave or wake jumping whenever possible. Instruct all occupants that if a wake or wave jump occurs, get low and hang on to any boat hand hold.

CD830

Impact With Underwater Hazards



Reduce speed and proceed with caution whenever you're driving a boat in shallow water areas or in areas where the waters are suspected of having underwater obstacles that could be struck by the sterndrive or the boat bottom. **The most important thing you can do to help reduce injury or impact damage from striking a floating or underwater object is control the boat speed. Under these conditions, boat speed should be kept to a minimum planing speed.**

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 sterndrive 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 engine as soon as possible and inspect the sterndrive unit for any broken or loose parts. If damage is present or suspected, the power package should be taken to an authorized dealer for a thorough inspection and necessary repair.

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

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

⚠ WARNING

Avoid serious injury or death from loss of boat control. Continued boating with major impact damage can result in sudden component failure with or without subsequent impacts. Have the power package thoroughly inspected and any necessary repairs made.

CA476
Safe Boating Suggestions

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

- **Know and obey all nautical rules and laws of the waterways.** Boat operators should complete a boating safety course. Courses are offered in the U.S.A. by (1) The U.S. Coast Guard Auxiliary, (2) The Power Squadron, (3) The Red Cross and (4) your state or provincial boating law enforcement agency. Inquiries may be made to the Boating Hotline, 1-800-368-5647 or the Boat U.S. Foundation information number 1-800-336-BOAT.

We strongly recommend that all powerboat operators attend one of these courses.

You should also review the NMMA Sources of Waterway Information booklet. It lists regional sources of safety, cruising and local navigation and is available at no charge by writing to:

Sources of Waterway Information
National Marine Manufacturers Association
410 N. Michigan Avenue
Chicago, IL 60611 U.S.A.

- **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 suggestions of the types of safety equipment to carry when boating:

(1) Approved fire extinguisher(s); paddle or oar.

(2) Signal devices: flashlight, rockets or flares, flag and whistle or horn.

(3) Spare propeller, thrust hubs and an appropriate wrench.

(4) Tools for necessary minor repairs; first aid kit and book.

(5) Anchor and extra anchor line; water-proof storage containers.

(6) Manual bilge pump and extra drain plugs; compass and map or chart of area.

(7) Spare operating equipment; batteries, bulbs, fuses, etc.

(8) Transistor radio

(9) Drinking water

- **Know 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. Just shifting the drive unit into neutral is not sufficient.
- **Use personal flotation devices.** Federal Law requires that there be a U.S. Coast Guard approved, wearable-type life jacket (personal flotation device), correctly sized and readily accessible for every person 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 one 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). When in doubt, contact your dealer or the boats manufacturer. Know your boat's operating and loading limitations.
- **Make sure everyone in the boat is properly seated.** Don't allow anyone to sit or ride on any part of the boat that was not intended for such use. This includes backs of seats, gunwales, transom, bow, decks, raised fishing seats, 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.

- **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 operating the boat above idle or planing transition speed. Watch “the other guy,” 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 25 miles per hour (40 km/hr) in 5 seconds will overtake a fallen skier who was 200 feet in front of you.
- **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 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.

CA282
Protecting People In The Water

WHILE YOU ARE CRUISING

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

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

Whenever a boat is moving (coasting) and the drive unit is in neutral position, 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

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

⚠ WARNING

Stop your engine immediately whenever anyone in the water is near your boat. Serious injury to the person in the water is likely if contacted by a rotating propeller, a moving boat, a moving gear case, or any solid device rigidly attached to a moving boat or gear case.

CC828
High-Speed And High-Performance Boat 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 familiarization demonstration ride with your dealer or an operator experienced with your boat. For additional information, obtain a copy of our “Hi-Performance Boat Operation” booklet (Part Number 90-849250--1) from your dealer, distributor, or Mercury Marine.

CA7

Conditions Affecting Operation

Weight Distribution

Positioning of weight (passengers and gear) inside the boat has the following effects:

A. Shifting weight to rear (stern) will:

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

B. Shifting weight to front (bow) will:

- Improve ease of planing on some boats.
- Improve rough water ride.
- At extremes, can cause boat to veer back and forth (bow steer).

CA8

Bottom Of Boat

To maintain maximum speed, the following conditions of the boat bottom should be observed.

A. Clean, free of barnacles and marine growth.

B. Free of distortion; nearly flat where it contacts the water.

C. Straight and smooth, fore and aft.

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

CA9

Cavitation

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

A. Weeds or other debris snagged on propeller or gear housing.

B. Bent propeller blade or damaged gear housing skew.

C. Raised burrs or sharp edges on propeller or gear housing.

CA10

Ventilation

Ventilation is caused by surface air or exhaust gases which are introduced around the propeller resulting in propeller speedup and a reduction in boat speed. Excessive ventilation is annoying and usually caused by:

A. Drive unit trimmed out too far.

B. A missing propeller diffuser ring.

C. A damaged propeller or gear housing, which allows exhaust gases to escape between propeller and gear housing.

D. Drive unit installed too high on transom.

Propeller Selection

IMPORTANT: Installed propeller must allow engine to run at the upper end of the specified throttle operating revolutions per minute (rpm) range, with a normal load aboard the boat. Use an accurate service tachometer to verify engine operating rpm.

It is the responsibility of the boat manufacturer and/or the selling dealer to equip the power package with the correct propeller(s). Specified engine wide-open-throttle (WOT) and operating rpm range are listed below and in Specifications.

IMPORTANT: The engines covered in this manual, depending upon the model, are equipped with either a governor or a device that limits engine rpm. Be sure that propeller being used does not allow engine to run against the governor or limiter, as a significant loss in performance will result.

Engine Rpm Limits		
MCM Model	**Engine Specified Operating Rpm Range**	**Rpm Governor or Limiter Setting (Begins At:)**
D1.7L DTI	4000 - 4400	4400

Select a propeller that will allow the engine power package to operate at or near the top end of the recommended wide-open-throttle operating rpm range with a normal load. High rpm, caused by an excessive trim angle, should not be used in determining correct propeller selection.

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

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

- Warmer weather and greater humidity cause an rpm loss.
- Operating in a higher elevation causes an rpm loss.
- Operating with a damaged propeller or dirty boat bottom causes an rpm loss.
- Operating with increased load (additional passengers, pulling skiers, etc.).

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

How Elevation And Climate Affect Performance

Elevation has a very noticeable effect on the wide-open-throttle power of an engine. Since air (containing oxygen) gets thinner as elevation increases, the engine begins to starve for air. Humidity, barometric pressure and temperature do have a noticeable effect on the density of air. Heat and humidity thin the air. This condition can become particularly annoying when the propeller testing was done on a cool, dry day. Then later; on a hot, sultry day, the boat doesn't seem to have the same performance.

Although some performance can be regained by dropping to a lower pitch propeller, the basic problem still exists. In some cases, a gear ratio change to more reduction is possible and very beneficial.

Summer conditions of high temperature, low barometric pressure and high humidity all combine to reduce the engine power. This, in turn, is reflected in decreased boat speeds, as much as 2 or 3 miles per hour in some cases. Nothing will regain this speed for the boater, but the coming of cool, dry weather.

In pointing out the practical consequences of weather effects, an engine running on a hot, humid, summer day, may encounter a loss of as much as 14% of the horsepower it would produce on a dry, brisk spring or fall day. With the drop in available horsepower, this propeller will, in effect, become too large. Consequently, the engine operates at less than its recommended rpm. This will result in further loss of horsepower at the propeller with another decrease in boat speed. This secondary loss, however, can be somewhat regained by switching to a lower-pitch propeller that allows the engine to again run at recommended rpm.

For boaters to realize optimum engine performance under changing weather conditions, it is essential that the engine be propped to allow it to operate at or near the top end of the recommended maximum rpm range at wide-open-throttle with a normal boat load.

Not only does this allow the engine to develop full power, but equally important is the fact that the engine also will be operating in an rpm range that discourages damaging detonation. This, of course, enhances overall reliability and durability of the engine.

Important Information

CD832
Operation and Maintenance

OPERATION / DUTY CYCLE

It is the operator’s responsibility to operate within the following specified operational capability, or duty cycle, as applicable to engine and installation:

PLEASURE DUTY RATING

- Engine Specified Operating Rpm Range

Model	Rpm
D1.7L DTI	4000 - 4400

- Wide-Open-Throttle operation is limited to short periods of time.

NOTE:
Pleasure duty rating applies to recreational planing craft used exclusively for pleasure and recreation.

IMPORTANT: Damage caused by improper application or failure to operate within the operational capability, or duty cycle, will not be covered by the Mercury MerCruiser Diesel Limited Warranty.

CE7
OWNER/OPERATOR RESPONSIBILITIES

It is the operator's responsibility to perform all safety checks, ensure that all lubrication and maintenance instructions are complied with for safe operation, and 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 assure optimum performance and dependability, and will keep your overall operating expenses at a minimum. See your Authorized Mercury MerCruiser Dealer for service aids.

⚠ CAUTION

The injection pump lever Wide-Open-Throttle (WOT) Stop Screw adjusts the engine speed governor, and is factory set and sealed. Readjusting the governed speed and operating above the specified RPM will cause extensive engine damage and/or failure. Removal of the seal and/or readjustment of the governed speed is considered misuse of engine, and resulting damages will not be covered by the limited warranty.

CA14
DEALER RESPONSIBILITIES

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

- Make sure 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.
- At the time of delivery, the dealer should 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 (branch or distributor) immediately upon sale of the new product.

CE8

Freezing Temperature And Cold Weather Operation

IMPORTANT: If boat is operated during periods of freezing temperature, precautions must be taken to prevent freezing damage to power package. Refer to the following and to "Cold Weather or Extended Storage" for related information and draining instructions.

⚠ CAUTION

Seawater (raw water) section of cooling system MUST BE COMPLETELY drained for winter storage or immediately after cold weather use, if the possibility of freezing temperatures exist. Failure to comply may result in trapped water causing freeze and/or corrosion damage to engine.

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

- At the end of each daily operation, COMPLETELY drain seawater section of cooling system to protect against damage by freezing.
- At the end of each daily operation, drain water from water separator, if equipped. Fill fuel tank at end of daily operation to prevent condensation.
- Use required permanent-type antifreeze solution to protect components against damage by freezing.
- Be sure to use proper cold weather lubrication oil, and be sure the crankcase contains a sufficient amount.
- Make certain that the battery is of sufficient size and is fully charged. Check that all other electrical equipment is in optimum condition.
- At temperatures of –4° F (–20° C) and below, it is recommended that you use a coolant heater to improve cold starting.
- If operating in arctic temperatures of –20° F (–29° C) or lower, consult your dealer for information about special cold weather equipment and precautions.

CA408

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 rise to come in 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.

CA17

Drive Unit Impact Protection

The Power Trim hydraulic system is designed to provide impact protection for drive unit. If a submerged object is struck while boat is moving forward, the hydraulic system will cushion kick-up of drive unit as it clears the object, reducing damage to unit. After drive unit has cleared object, the hydraulic system allows drive unit to return to original operating position, preventing loss of steering control and engine over speed.

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

If drive unit should strike a submerged object, stop engine as soon as possible and inspect drive unit for damage. If damage is present or suspected, boat should be taken to an Authorized Mercury MerCruiser Dealer for thorough inspection and necessary repair. Operating a damaged drive unit could cause additional damage to other parts of drive unit, or could affect control of boat. If continued running is necessary, do so at greatly reduced speeds.

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

CA20
Launching and Boat Operation Care

⚠ CAUTION

During launching from a trailer, if the unloading ramp is steep or the trailer bed must be tilted, the boat may enter the water rapidly and at a steep angle. This may force water through the exhaust system into the cylinders. The more weight on the transom, the more likely this is to occur.

Slowing down rapidly or stopping suddenly may cause a following wave to “swamp” the transom causing water to enter the cylinders through the exhaust system causing severe engine damage.

When backing up rapidly, the same situation may occur as stated in the preceding paragraph.

In any of these situations, water entering the engine could cause severe damage to internal parts. Refer to “Attention Required After Submersion”.

CA409
Attention Required After Submersion

- Before recovery, contact an Authorized Mercury MerCruiser Dealer.
- After recovery, immediate service by an Authorized Mercury MerCruiser Dealer is required to prevent serious damage to power package.

CA19
Trailering Boat

Boat can be trailered with drive unit in up or down position. Adequate road clearance is required between road and gear housing skew when trailering with drive unit in down position.

If adequate road clearance is a problem, place drive unit in full trailer position and support with an optional trailer kit which is available from your Authorized Mercury MerCruiser Dealer.

CA21
Stolen Power Package

If your power package is stolen, immediately advise the local authorities and Mercury Marine of the model and serial number(s) and to whom the recovery is to be reported. This “Stolen Motor” information is placed into a file at Mercury Marine to aid authorities and dealers in recovery of stolen motors.

CE9
Replacement Service Parts

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. Care should be exercised when replacing marine engine parts, as specifications are quite different from those of the standard automotive engine.

Since marine engines must be capable of running at or near maximum RPM much of the time, special pistons, camshafts and other heavy-duty moving parts are required for long life and peak performance.

These are but a few of the many special modifications that are required in Mercury MerCruiser marine engines to provide long life and dependable performance.

CA772
Do-It-Yourself Maintenance Suggestions

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

- 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.
- Do not attempt any repairs which are not covered in this manual unless you are aware of the precautions (“Cautions” and “Warnings”) and procedures required. Your safety is of 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 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.

CD753
Engine Break-In

INITIAL BREAK-IN PROCEDURE

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

IMPORTANT: It is recommended that the boat not be accelerated hard until this procedure has been completed.

IMPORTANT: Never operate the starter motor longer than 15 seconds at a time, to avoid overheating the starter motor. If engine does not start, wait 1 minute to allow the starter motor to cool; then, repeat starting procedure.

1. Refer to appropriate Starting, Shifting and Stopping section and start engine. Allow engine to idle until it has reached normal operating temperature.
2. Run engine in gear for 3 minutes at each of the following rpms: 1400 rpm, 2800 rpm and 3500 rpm.
3. Run engine in gear for 3 minutes at each of the following rpms: 1700 rpm, 3500 rpm and 4000 rpm.
4. Run engine in gear for 3 minutes at each of the following rpms: 2100 rpm, 3500 rpm and Maximum Rated Full Throttle rpm.

CD828
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 engine below 1500 RPM for extended periods during the first 10 hours. During this period, shift into gear as soon as possible after starting engine and advance throttle so that rpm is above 1500 (provided that conditions permit safe operation at this speed).
- DO NOT operate at any one constant speed for extended periods.
- DO NOT exceed 75% of full throttle during the first 10 hours except during engine Initial Break-In Procedure. During the next 10 hours, occasional operation at full throttle (5 minutes at a time maximum) is permissible.
- AVOID full throttle acceleration from stopped position.
- DO NOT operate at full throttle until engine reaches normal operating temperature.
- OBSERVE INSTRUMENTS, if an abnormal reading occurs, stop engine immediately and determine cause.
- FREQUENTLY CHECK crankcase oil and sterndrive unit fluid levels. Add if necessary. It is normal for oil consumption to be somewhat high during the break-in period.

CD608
Sterndrive Unit 10-Hour Break-In Period

It is especially important that the following procedure be used on new sterndrive units. This break-in procedure allows the proper seating of drive unit gears and related components, which greatly reduces the likelihood of problems.

1. Avoid full throttle starts.
2. DO NOT operate at any one constant speed for extended periods of time.
3. DO NOT exceed 75% of full throttle during the first 5 hours. During the next 5 hours, operate at intermittent full throttle.
4. Drive unit should be shifted into forward gear a minimum of 10 times during break-in, with run-in time at moderate rpm after each shift.

CA211
After Break-In Period

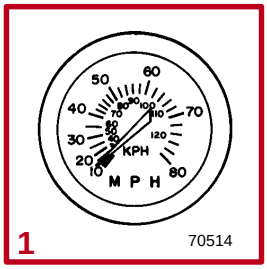
To help extend the life of your Mercury MerCruiser power package, the following recommendations should be considered;

- Use a propeller that allows the engine to operate at or near the top of the maximum rpm range (See “Specifications” section) when at full throttle with a normal boat load.
- Operation at 3/4 throttle setting or lower is recommended. Refrain from prolonged operation at maximum (full throttle) RPM.

CA414
End of First Season Checkup

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

Operation



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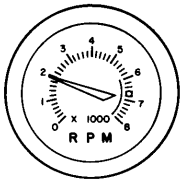

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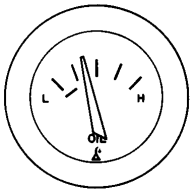

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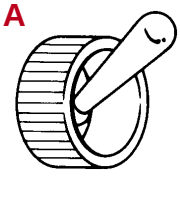

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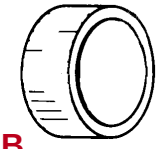

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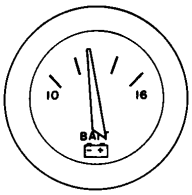

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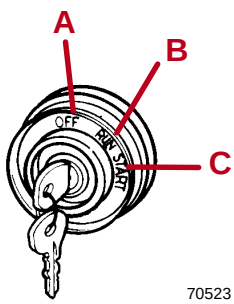

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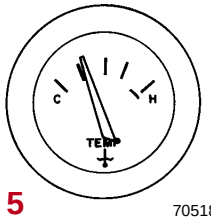

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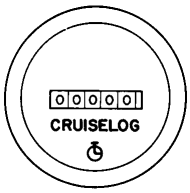

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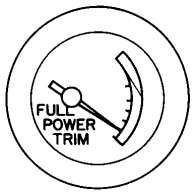

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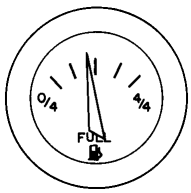

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Instrumentation

INSTRUMENTS

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

1 Speedometer: Indicates boat speed.

2 Tachometer: Indicates engine rpm.

3 Oil Pressure Gauge: Indicates engine oil pressure.

4 Battery Meter: Indicates battery voltage.

5 Coolant Temperature Gauge: Indicates engine operating temperature.

6 Fuel Gauge: Indicates quantity of fuel in tank.

7 Power Trim Gauge: Indicates drive unit angle (trim UP/OUT and DOWN/IN).

8 Hour Meter: Records engine running time.

SWITCHES

9 **Key Switch -** has three positions.

A OFF - In the OFF position, all electrical circuits are off and engine cannot be started. If the engine is operating the Key Switch CANNOT be used to stop the engine. The engine can only be stopped by using the engine Stop Switch, while the Key Switch is in the RUN position. No electrical circuit is operational when the Key Switch is turned to the OFF position.

B RUN - In the RUN position, all electrical circuits, indicator lamps, automatic preheating (if equipped) and all instruments are operational.

C START - In the START position the engine can be started.

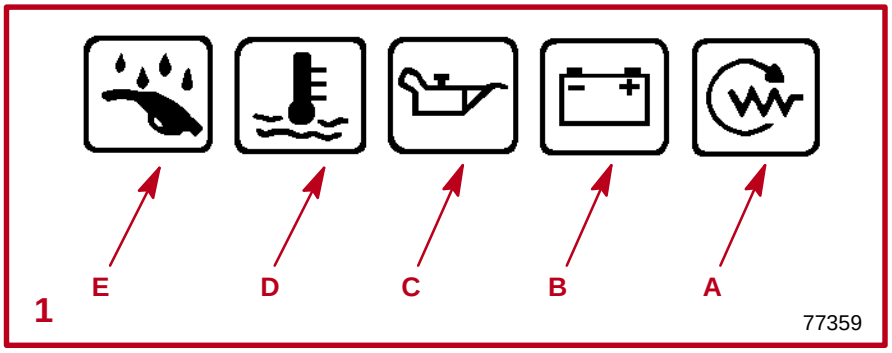
NOTE: *Key can only be removed in the OFF position.*

10 **Engine Stop Switch** - is used to stop the engine. This is done by electrically shutting off the fuel delivery system. The switch, toggle or push-button, is either toggled DOWN or pressed IN. Engage and hold the stop switch until the engine stops completely. Then, turn the key switch to the OFF position.

A Toggle Switch

B Push-Button Switch

CD756



CD757

ENGINE MONITORING FEATURES

1 The appropriate light functions as follows:

A Preheat Indicator Lamp - indicates when the glow plugs, if equipped, are preheating the combustion chambers. When the engine is cold the timed preheat period begins when the key switch is turned to RUN. The light stays on until the preheat period is complete. The engine can be started only after the light goes out.

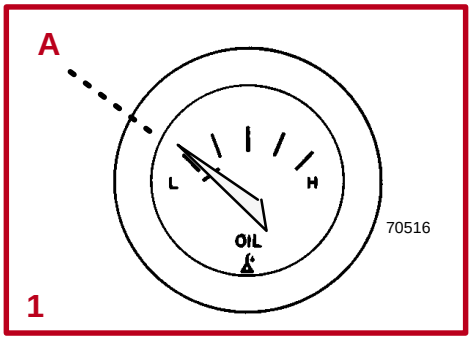
B Charge Indicator Lamp - indicates a problem with charging system if lamp illuminates while engine is operating. Lamp will be on when key switch is in RUN and engine is not operating. When engine starts, light should go off.

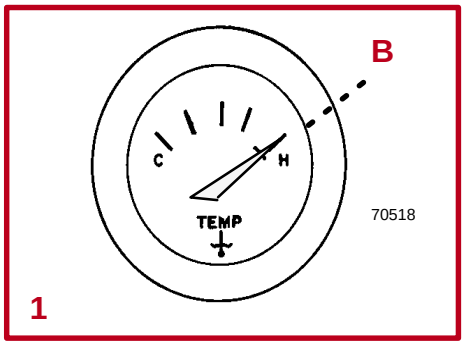
C Oil Pressure Warning Lamp - indicates low engine oil pressure if lamp illuminates while engine is operating.

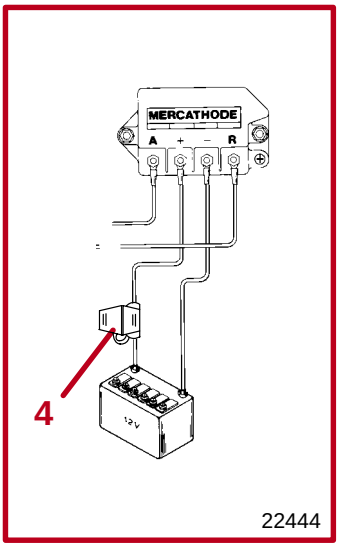
D Coolant Temperature Warning Lamp - indicates excessive engine coolant temperature if lamp illuminates while engine is operating.

E Water-In-Fuel Warning Lamp - indicates water is present in fuel filter and that fuel filter requires service.

CD758







CD759

Audio Warning System

Your Mercury MerCruiser power package may be equipped with an Audio Warning System.

1 The Audio Warning System horn will sound if any of the following occur:

A Engine oil pressure too low.

B Cooling system temperature too high.

2 If the Audio Warning System horn sounds while the engine is operating, stop the engine immediately. Investigate the cause and correct it, if possible. If the cause cannot be determined or corrected, consult your Authorized Mercury MerCruiser Dealer.

⚠ CAUTION

Avoid engine or sterndrive damage. Do not operate the engine once the Audio Warning System horn has sounded EXCEPT TO AVOID A HAZARDOUS SITUATION. The Audio Warning System will not protect the engine or sterndrive from damage. It is designed to warn the operator that a problem has occurred.

3 To test the Audio Warning System:

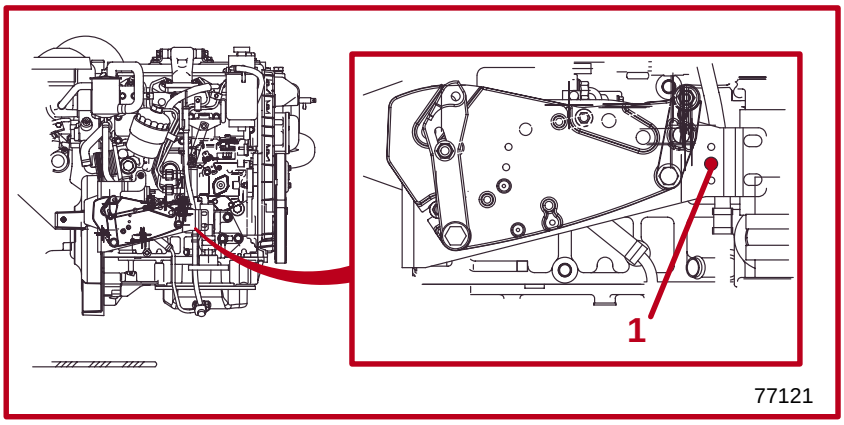
A Turn the ignition switch to the RUN position. Do not start the engine.

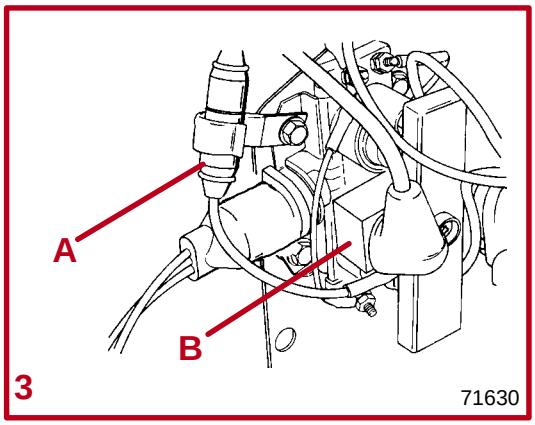
B The horn will sound if the system is working correctly. Once the engine is started, the horn should not sound except to warn the operator that a problem has occurred.

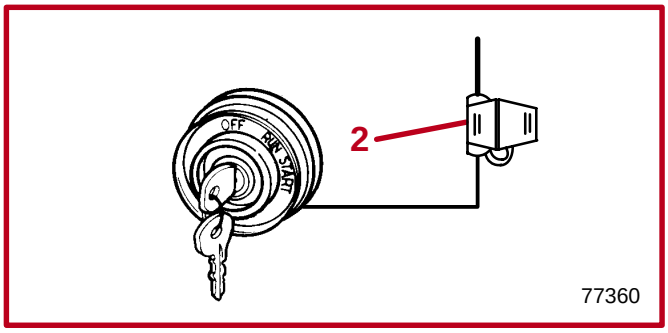
CA31

MerCathode System

4 A 20 amp in-line fuse is in the wire which connects to positive (+) terminal on controller. If fuse is “blown” (defective), the system will not operate.







CD761

Electrical System Overload Protection

If an electrical overload occurs, a fuse will blow or a circuit breaker will trip open.

IMPORTANT: The cause must be found and corrected before replacing fuse or resetting circuit breaker.

1 One 50 amp circuit breaker provide protection for engine wiring harness and instrumentation power lead. Reset by pushing RESET button IN.

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

2 When equipped with Quicksilver instrumentation and wiring, a 20 amp fuse and holder is located in-line on key switch power supply wire. The fuse protects the instrumentation and wiring should an electrical overload occur. If an overload occurs, the fuse will burn out. Check “blown” (defective) fuse if key is turned to RUN or START and instruments do not work and/or if switches do not function.

IMPORTANT: Cause for overload must be determined and corrected before attempting to install new fuse or fuse failure will occur again.

After cause is corrected, install new fuse and check system to function.

3 The Power Trim system is protected from overload by two fuses on the Power Trim pump.

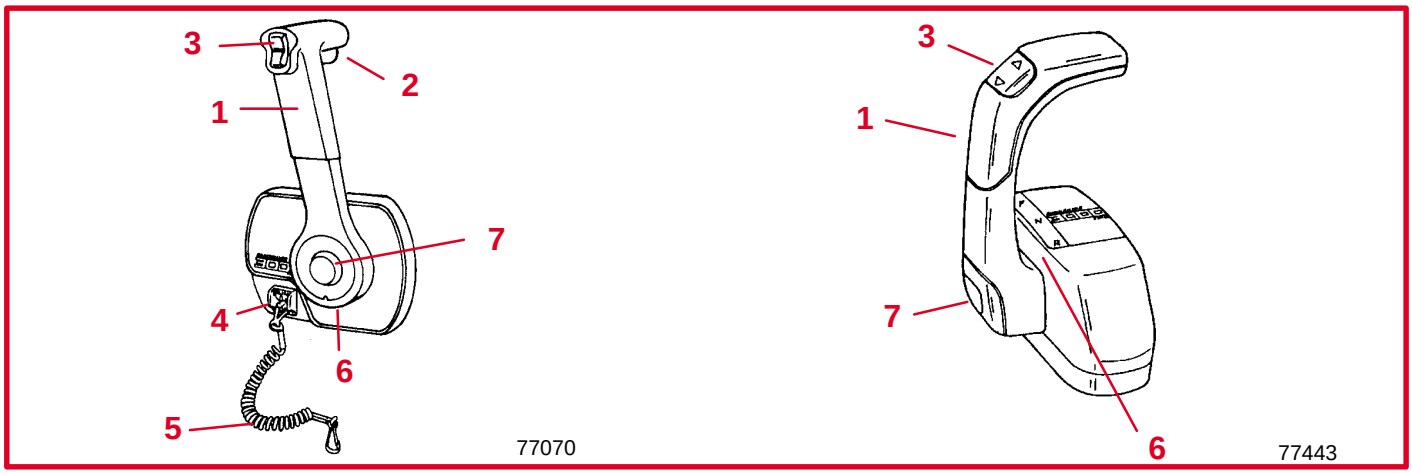
A 110 amp.

B 20 amp. in-line

CA933

Remote Controls

CD762



CD763

Remote Control Features

Your boat may be equipped with a Mercury Precision or Quicksilver remote control. All controls may not have all features shown. If boat is equipped with a remote control other than shown, consult your dealer for a description and/or demonstration of the control.

1 Operation of the shift and throttle are controlled by the movement of the control handle.

A **Single 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 and back to decrease speed. Pull the control handle back from NEUTRAL with a quick firm motion to the first detent for REVERSE gear. Continue pushing back to increase reverse speed.

B **Dual Control Handles -** Shift and throttle are controlled by separate handles. With throttle control at IDLE, push shift control forward for FORWARD gear or pull back for REVERSE gear. Then push the throttle control forward to increase speed.

2 **Neutral Release Lever -** Prevents accidental shift and throttle engagement. Neutral lock button must be pushed IN to move the control handle out of NEUTRAL.

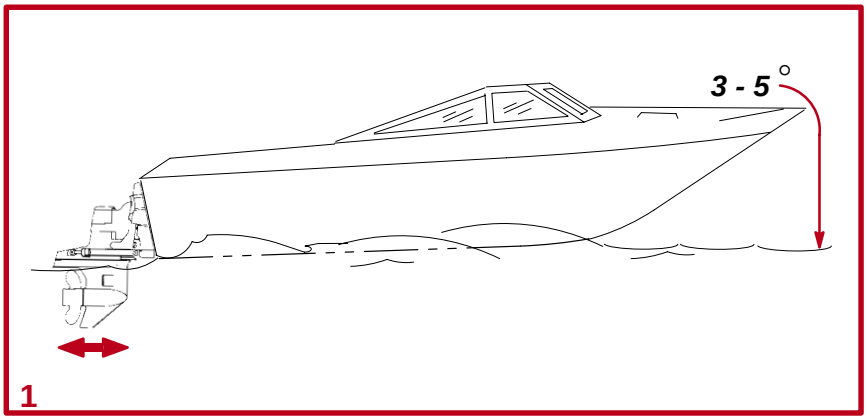
3 **Trim/Tilt Button(if Equipped) -** Refer to Power Trim Operation.

4 **Lanyard Stop Switch -** Turns 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 the Lanyard Stop Switch safety explanation and Warning in the General Information Section.

5 **Lanyard -** Refer to the lanyard stop switch safety explanation and warning in the General Information Section.

6 **Throttle Friction Adjustment -** Console controls require cover removal for adjustment.

7 **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.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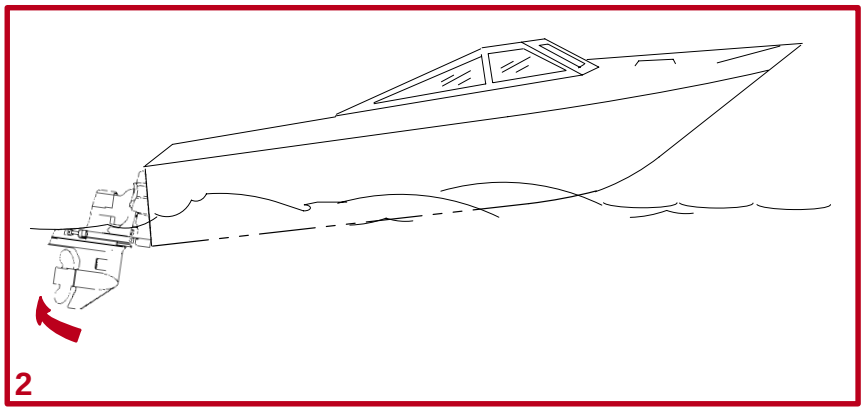
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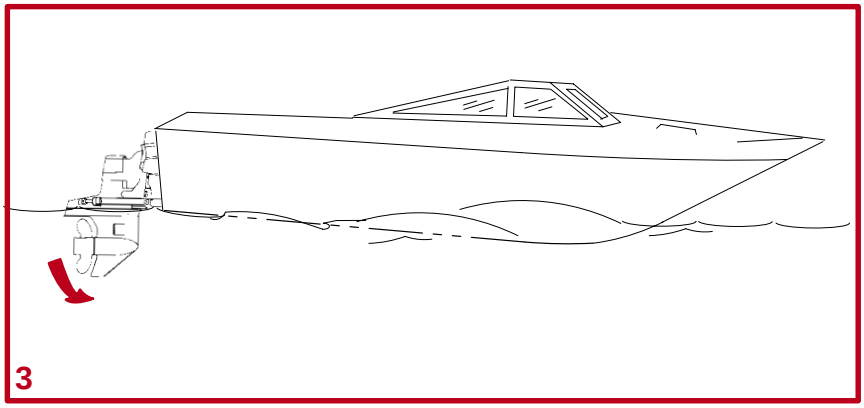

3

Power Trim

Power Trim allows the operator to adjust the drive angle, while underway, to provide the ideal boat angle for varying load and water conditions. Also, the Power Trim system “Trailering” feature allows the operator to raise and lower the drive unit for trailering, beaching, launching and low speed (below 1200 rpm engine speed), shallow water operation.

⚠ CAUTION

Never trim the drive unit UP/OUT using TRAILER switch while boat is underway at engine speeds above 1200 rpm. Use extreme caution when operating with drive unit raised. Severe damage to the drive unit may result if unit is raised beyond the gimbal ring support flanges at engine speeds above 1200 rpm.

1 In most cases, best overall performance is obtained with the drive unit adjusted so the boat bottom will run at a 3° to 5° angle to the water.

2 Trimming Drive 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.

3 Trimming Drive 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 drive unit up or down.

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

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

Dual Engine Trim / Trailer

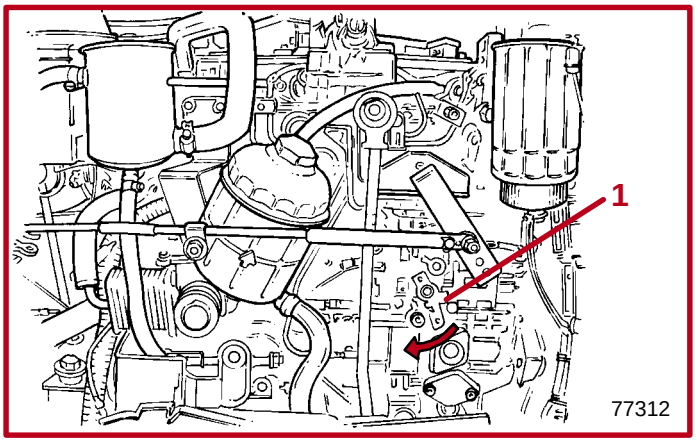
⚠ CAUTION

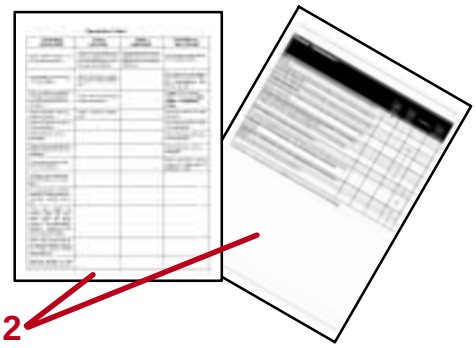
When lowering or raising sterndrives equipped with a dual engine tie bar kit, the sterndrives must be raised or lowered evenly to prevent the tie bar from becoming twisted. Failure to raise or lower sterndrives evenly may result in tie bar or sterndrive damage.

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

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

CD831





CD764

Starting, Shifting and Stopping

GENERAL INFORMATION

⚠ WARNING

Do not use volatile starting aids, such as Ether, Propane, or Gasoline in the engine air intake system. Explosion hazard resulting from ignition of vapors by glow plugs could cause severe personal injury and engine damage.

⚠ CAUTION

It is good practice to ventilate the engine compartment prior to servicing any engine components to remove any fuel vapors which may cause difficulty breathing or be an irritant.

1 A Mechanical Engine Stop Lever is located on the injection pump. It is used to manually shut off the engine by mechanically cutting off the fuel supply. It can be engaged by moving the lever in the direction shown by the arrow.

BEFORE STARTING THE ENGINE

⚠ CAUTION

DO NOT operate engine without water flowing thru seawater pickup pump, as pump impeller may be damaged and subsequent overheating damage to engine or drive unit may result.

IMPORTANT: As an added precaution, the following steps must be observed before starting:

- **Do not start engine without water being supplied to seawater pickup pump (to prevent pump or engine damage).**
- **Never operate the starter motor longer than 15 seconds at a time, to avoid overheating the starter motor. If engine does not start, wait 1 minute to allow the starter motor to cool; then, repeat starting procedure.**
- **Be sure engine crankcase is filled to correct level with the proper grade of oil for the prevailing temperature. Refer to Specifications - Crankcase Oil.**
- **Be sure that all electrical connections are secure.**

2 Check all items listed in the Maintenance Schedules and Operation Chart.

3 Perform any other necessary checks, as indicated by your dealer, or specified in your boat owner's manual.

STARTING COLD ENGINE

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

1 Turn on and run engine compartment bilge blower (if equipped) for five minutes. Or, open engine hatch to air out bilge before attempting to start engine(s).

2 Place drive unit in full DOWN/IN position.

3 Place control handle in NEUTRAL.

4 If engine has not been run for a period of time and will not readily start with the standard starting procedure, there is a hand pump/primer located on the engine to improve initial fuel supply. Refer to Maintenance - Fuel System, Priming Fuel System and follow instructions given.

NOTE: *The preheat devices (glow plugs) should operate at temperatures lower than –0°C (32°F). An engine coolant temperature sensor will automatically control activation and duration of preheat cycle.*

5 Turn key switch to RUN position to activate the glow plugs. Preheat cycle usually lasts 10 to 15 seconds. Observe preheat indicator (glow plug) lamp. Lamp should be illuminated when engine cylinder temperature is too low to sustain combustion. Engine can be started once preheat indicator lamp goes off.

NOTE: *The engine should be started only after the lamp goes off.*

IMPORTANT: After starting, the key switch should NOT be returned to the OFF position during engine operation. If the starter switch is in the OFF position and the engine is operating, the battery will not be charged, audio warning alarms will not be operational in the event of trouble and accessories may not operate.

6 Turn key switch to START position. Release key when the engine starts. Allow switch to return to RUN position. Do not operate the engine with the switch in the OFF position without first shutting down the engine, using the engine stop switch.

⚠ CAUTION

Do not attempt to engage the starter while the engine is running as this will lead to starter pinion and ring gear damage.

7 Ensure all instrumentation is functioning properly and indicating normal readings. Ensure charge indicator and oil pressure warning lamps go off. Check oil pressure gauge immediately after engine starts. If oil pressure is not within specified range (Refer to Specifications), stop the engine, locate and correct the problem, or see your Authorized Mercury MerCruiser Dealer if you are unable to determine the problem.

⚠ CAUTION

Do not increase the engine speed until the oil pressure gauge indicates normal. Shut the engine down if oil pressure does not register on the gauge within 20 to 30 seconds after start.

CD766
ENGINE WARM UP

⚠ CAUTION

Improper or no warm-up of engine can seriously impair the life of your diesel engine.

1 After starting, check to ensure all instrumentation is functioning properly. Run engine at 1,000 to 1,200 rpm until engine temperature is within normal operating range. It is very important that any engine be warmed up before applying full load. The warm-up period provides time for the lubricating oil to establish a film between moving parts.

NOTE: *Engine warm-up time during cold weather can be reduced by operating vessel at reduced engine speed. Commence normal vessel operation when systems reach operating temperatures.*

2 After the engine has reached operating temperature:

A Oil pressure should be within range listed in the engine specifications chart. Stop the engine if oil pressure is not within this range.

B Check the fuel system for leakage from the injection pump, fuel pipes, fuel filter and fuel lines.

C Check for oil leakage. Check the engine and sterndrive unit for oil leakage. Especially check the oil filter, oil lines, oil line connectors, and oil pan.

D Check for coolant leaks. Check coolant hoses and connection pipes of heat exchanger, fluid coolers, inter-cooler, water pump and drain fittings.

3 Locate and correct any problems, or see your Authorized Mercury MerCruiser Dealer if you are unable to determine the problem.

CD767
STARTING WARM ENGINE

1 Turn on and run engine compartment bilge blower for five minutes (if equipped). Or, open engine hatch to air out bilge before attempting to start engine(s).

2 Turn key switch to the RUN position.

3 Turn key switch to START position and release when engine starts. Ensure charge indicator and oil pressure warning lamps go off.

4 Check to ensure all instrumentation is functioning properly and indicating normal readings.

CE33
SHIFTING

⚠ CAUTION

Never attempt to shift unit unless engine is at idle RPM. Damage to drive unit could occur.

1 To shift unit, be sure remote control/throttle lever is in NEUTRAL. Move control/shift lever with a firm, quick motion forward to shift to FORWARD gear, or backward to shift to REVERSE. After shifting drive unit, advance throttle to desired setting.

2 Once underway, engine oil pressure should be within the range listed in the engine specifications chart at maximum rpm, or wide-open-throttle. Stop the engine if oil pressure is not within this range. Locate and correct the problem, or see your Authorized Mercury MerCruiser Dealer if you are unable to determine the problem.

CB575

IMPORTANT: Avoid stopping engine if the drive unit is in gear. If engine does stop with drive unit in gear, refer to the following procedure:

3 Push and pull repeatedly on remote control handle until handle returns to the neutral detent position. This may take several tries if the power package was operating above idle RPM when the engine stopped.

4 After handle returns to the neutral detent position,resume normal starting procedures.

CD341

ENGINE SHUT-DOWN (STOPPING)

1 Place remote control lever in NEUTRAL.

⚠ CAUTION

Avoid damaging the turbocharger and engine. Immediate engine shutdown (stopping) after high load operation may result in permanent turbocharger bearing damage. Operate the engine at IDLE for several minutes before shut-down.

2 Operate the engine at idle speed for several minutes to allow the turbocharger and engine to cool.

3 Toggle stop switch DOWN and hold, until engine stops completely.

4 Turn key switch to the OFF position.

Operation Chart - D1.7L DTI

STARTING PROCEDURE	AFTER STARTING	WHILE UNDERWAY	STOPPING & SHUT DOWN
Open engine hatch. Air out bilge completely.	Observe all gauges and warning lights to check condition of engine. If not normal, stop engine.	Frequently observe all gauges and indicator lights to monitor engine condition.	Shift remote control lever to neutral position.
Turn battery switch ON, if so equipped.	Check for fuel, oil, water, fluid, and exhaust leaks, etc.		Run engine at idle speed several minutes to allow the turbocharger and engine to cool.
Turn on and run engine compartment bilge blower, if so equipped, for five minutes.	Check shift and throttle control operation.		Toggle STOP switch “Down” and hold, **until engine completely stops.**
Check for leaks - fuel, oil, water, fluid, etc.	Check steering operation.		Turn key switch to OFF position.
Open fuel shut-off valve, if so equipped.			Turn battery switch OFF, if so equipped.
Open seacock, if so equipped.			Close fuel shut-off valve, if so equipped.
Check that mechanical engine-stop lever is *not* engaged.			Close seacock, if so equipped.
Prime fuel injection system, if necessary.			Flush seawater cooling circuit, if operating in saltwater area.
Pre-lubricate turbocharger and engine, if necessary.			
Turn key switch to “RUN” and check that lights and indicator lamps come on.			
Turn key switch to START, *after* the indicator lamp for glow plugs (if so equipped) ceases. Release key when engine starts.			
Check that charge indicator and oil pressure indicator lamps cease *after* engine starts.			
Warm-up engine at idle rpm for several minutes.			

Specifications

CD164

Fuel Requirements

⚠ WARNING

Electrical system components on this engine are not external ignition protected. DO NOT STORE OR UTILIZE GASOLINE ON BOATS EQUIPPED WITH THESE ENGINES, UNLESS PROVISIONS HAVE BEEN MADE TO EXCLUDE GASOLINE VAPORS FROM ENGINE COMPARTMENT (REF: 33 CFR). Failure to comply could result in fire, explosion and/or severe personal injury.

⚠ WARNING

FIRE HAZARD: Fuel leakage from any part of the fuel system can be a fire hazard which can cause serious bodily injury or death. Careful periodic inspection of entire fuel system is mandatory, particularly after storage. All fuel components including fuel tanks, whether plastic, metal or fiberglass, fuel lines, primers, fittings, and fuel filters should be inspected for leakage, soften, hardening, swelling or corrosion. Any sign of leakage or deterioration requires replacement before further engine operation.

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

⚠ WARNING

Under *no circumstances* should gasoline, gasohol and/or alcohol be mixed with diesel fuel for any reason. This mixture of gasoline, gasohol and/or alcohol with diesel fuel is highly flammable and produces a significant risk to the user.

Grade 2-D diesel fuel is required, meeting ASTM Standards D975 (or fuel rated Diesel DIN 51601), and having a minimum cetane rating of 45.

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

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

Sulphur content of the above fuel is rated at 0.50% by weight, maximum (ASTM). Limits may vary in countries outside of the United States.

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

- Corrosion on metal parts.
- Deterioration of elastomer and plastic parts.
- Corrosion and extensive damage, and excessive wear of internal engine parts, particularly bearings.
- Starting and operating difficulties.

CD769

Recommended Fuels

IMPORTANT: Mercury MerCruiser does not recommend to use “Heavy Oil” for your engine. Heavy oil fuels causes hard-starting and other various troubles such as premature wear of the injection pump plungers and injection nozzles resulting from the deposit of carbon residue and other contaminants.

Diesel Fuel/Applicable Standard	Recommendation
JIS (JAPANESE INDUSTRIAL STANDARD)	No.2
DIN (DEUTSCHE INDUSTRIE NORMEN)	DIN 51601
SAE (SOCIETY OF AUTOMOTIVE ENGINEERS) Based on SAE J-313C	No.2-D
BS (BRITISH STANDARD) Based on BSEN 590-1197	A-1

CE16

Diesel Fuel In Cold Weather

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

CD770

Crankcase Oil

To help obtain optimum engine performance and to provide maximum protection, the engine requires engine oil with a rating of HD-SAE-API CG-4, CH-4, SH and SJ.

We strongly recommend the use of:

MERCURY DIESEL ENGINE OIL

This oil is a specially blended 15W-40 oil with Marine Additives, for all temperature operation. It exceeds requirements for API CH-4, CF-4, CG-4,CF-2, SJ and SH oils.

Other recommended oils:

SHELL MYRINA	TEXACO URSA SUPER TD	VEEDOL TURBOSTAR
MOPAR	WINTERSHALL MULTI-REKORD	WINTERSHALL VIVA 1

These oils are approved by Mercury Marine and Marine Power Europe. For all temperature operation use 15W-40 oil.

Anti-Freeze/Coolant

⚠ CAUTION

Alcohol or Methanol base antifreeze or plain water are not recommended for use in closed cooling section of cooling system at any time.

Because diesel engines are high compression engines and related higher engine operating temperatures are created, the closed cooling system and engine, including related cooling passages must remain as clean as possible to provide adequate engine cooling. This can only be assured by using the proper anti-freeze, water, additives and inhibitors. It is recommended that the closed cooled section of the cooling system be filled with a low silicate formula of ethylene glycol antifreeze in solution with deionized water. A low silicate formula prevents antifreeze separation which causes a silicate gelatin to form. This gelatin will block engine and heat exchanger passages causing engine overheating.

The coolant, if not premixed, should be mixed before being added to the closed cooling system using a proper anti-freeze together with deionized water. Common tap water or softened water contains unwanted minerals which can leave large deposits in the system that restrict the cooling system efficiency. In addition, additives and inhibitors introduced into acceptable coolant solutions will form a protective film on internal passages and provide protection against internal cooling system erosion.

The closed cooling section should be kept filled year-round with an acceptable anti/freeze/coolant solution. Do not drain closed cooled section for storage, as this will promote rusting of internal surfaces. If engine will be exposed to freezing temperatures, make sure that closed cooled section is filled with a properly mixed antifreeze/coolant solution, to protect engine and closed cooling system to lowest temperature to which they will be exposed.

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

Some acceptable types of anti-freeze/coolants are listed in the following table. Refer to "Maintenance Schedules" for respective change intervals.

Description	Part Number
Quicksilver Premixed Marine Engine Coolant	92-813054A2
Fleetguard Compleat, Product Number 91-50663 with DCA4 additive	Obtain Locally

CD633
Engine Specifications
CD772

D1.7L DTI

Description		Specification - Sterndrive (MCM)
		D1.7L DTI
Crankshaft Kilowatts (Horsepower) [1]		89.5 (120)
Propeller Shaft Kilowatts (Horsepower) [1]		86.5 (116)
Engine Type		4 Stroke, 4 Cylinder, Vertical In-Line, 4 Valves Per Cylinder, Dual Overhead Camshaft, Direct Injection, Turbocharged, Intercooled
Displacement		1.686 cu. L (103 cid)
Engine Weight		225 kg (495 lb)
Firing Order		1 - 3 - 4 - 2
Bore		79 mm (3.11 in.)
Stroke		86 mm (3.39 in.)
Compression Ratio		17.2:1
Valve Clearance	Intake	0.40 mm (0.016 in.)
	Exhaust	0.50 mm (0.020 in.)
Maximum High Idle No Load rpm		4980
Governed rpm Setting (Begins At:)		4400
Rated rpm at Wide-Open-Throttle [2]		4000-4400
Idle rpm in Neutral [3]		725 - 750
Oil Pressure [3]	725 - 750 rpm	79 kPa (0.8 bar) (11.4 psi) Minimum
	4400 rpm	340-490 kPa (3.5-5.0 bar) (49-71 psi)
Oil Temperature (Peak)		140° C (284° F)
Thermostat		82-95° C (180-203° F)
Coolant Temperature (Peak)		90° - 104° C (194° - 219° F)
Electrical System		12-volt Negative (–) Ground
Alternator Rating		600 W,12 v, 50 A
Recommended Battery Rating		750 cca, 950 mca, or 180 Ah
Starter		12v, 1.4 kW

[1] Power rated in accordance with NMMA Procedure - ISO 3046 (Technically Identical to ICOMIA 28-83).

[2] Refer to “Conditions Affecting Operation - Propeller Selection” for additional information.

[3] Engine at normal operating temperature.

CD773
Fluid Capacities

ENGINE

NOTICE
Unit Of Measurement: Liters (U.S. Quarts) **All capacities are approximate fluid measures.**

Description	Specification
Total Oil Capacity [1]	6-1/2 (6-3/4)
Coolant (Anti-Freeze) Capacity	8-3/4 (9-1/4)

[1] Always use dipstick to determine exact quantity of oil required

CD774
DRIVE

NOTICE
Unit Of Measurement: Milliliters (U.S. Fluid Ounces). **All capacities are approximate fluid measures.**

Sterndrive Model	Alpha
Drive Unit Oil Capacity (With Gear Lube Monitor Bottle)	1892 (64)

CD775
Seacock, If Equipped

Internal Cross-Section (Equal to or greater than)	32 mm (1-1/4 in.)
Valve	Brass Ball or Gate Valve
Location	Should be easily accessible
Mounting	Adequate support to prevent hose fatigue

Seawater Strainer, If Equipped

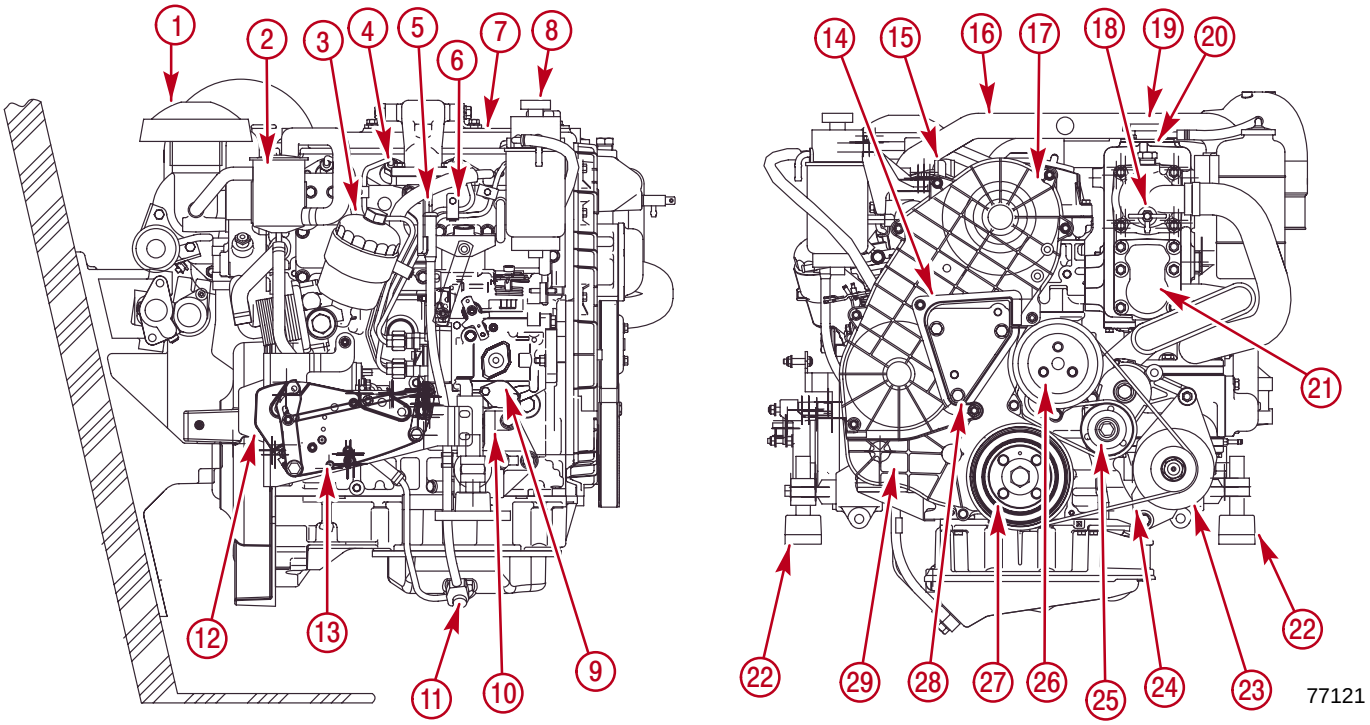
Flow Rate	80 L/min (21 US gal/min) Minimum
Location	Should be easily accessible; installed in water inlet hose after seacock, if equipped
Mounting	In a vibration-free location

Maintenance

CD776

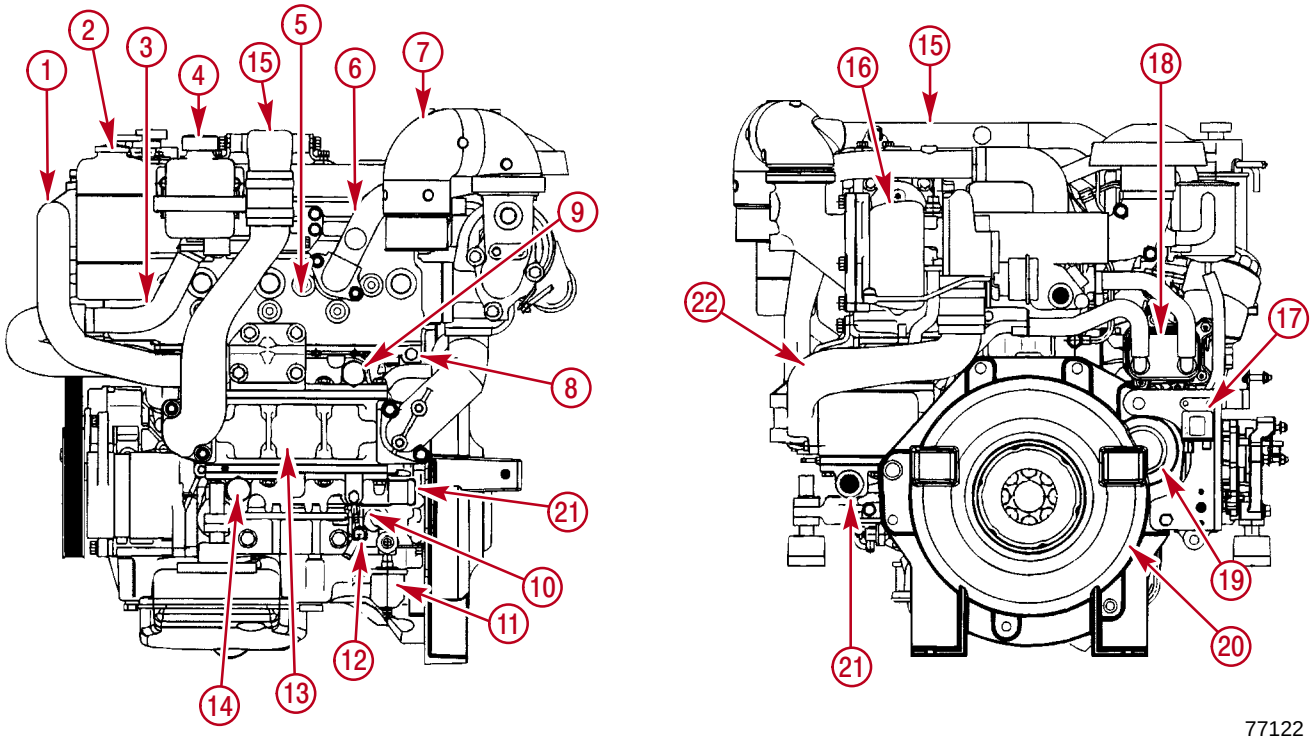
Power Package Views

FRONT AND STARBOARD SIDE VIEWS



1 - Air cleaner
2 - Oil Separator
3 - Oil Filter
4 - Nozzle Dust Cover
5 - Oil Dipstick
6 - Injection Pipe
7 - Camshaft Cover
8 - Primer Pump / Water Separating Fuel Filter
9 - Injection Pump
10 - Injection Pump Bracket
11 - Oil Drain Plug
12 - Starter Motor
13 - Shift Plate Assembly
14 - Engine Plate
15 - Engine Lifting Eye
16 - Intercooler To Intake Manifold Air Duct
17 - Timing Cover, Upper
18 - Seawater Drain Plug
19 - Pressure Cap
20 - Sacrificial Anode
21 - Thermostat Housing
22 - Engine Mount
23 - Alternator
24 - Serpentine Belt
25 - Automatic Tensioner Pulley
26 - Engine Water Circulating Pump Pulley
27 - Crankshaft Pulley
28 - Engine Plate Fixing bolt
29 - Timing Cover, Lower

PORT SIDE AND REAR VIEWS



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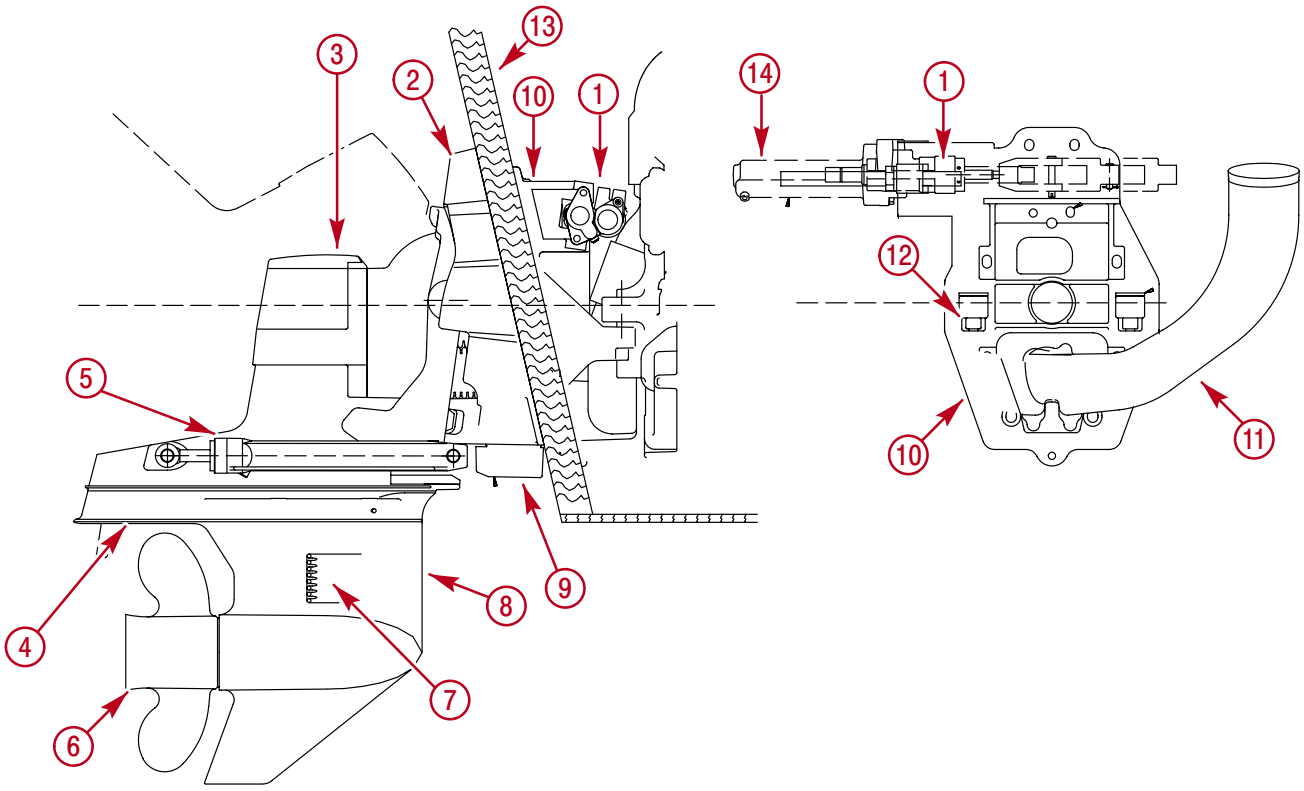
1 - Hose, Engine To Heat Exchanger
2 - Coolant Recovery Bottle
3 - Hose
4 - Gear Lube Monitor Bottle
5 - Heat Exchanger
6 - Heat Exchanger Coolant Pipe
7 - Exhaust Elbow
8 - Coolant Drain Plug
9 - Sacrificial Anode
10 - Seawater Drain Plug
11 - Oil Pressure Gauge Sending Unit
12 - Engine Coolant Drain Fitting
13 - Intercooler
14 - Sacrificial Anode
15 - Intercooler To Intake Manifold Air Duct
16 - Turbocharger
17 - Starter Relay
18 - Engine Oil Cooler
19 - Starter Motor
20 - Flywheel Housing
21 - Seawater Inlet Fitting
22 - Turbocharger To Intercooler Air Duct

CD778
STERNDRIVE AND TRANSOM VIEWS



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1 - Steering System
2 - Transom Assembly
3 - Sterndrive Unit
4 - Antiventilation Plate
5 - Power Trim Cylinder
6 - Propeller
7 - Seawater Intake Openings
8 - Speedometer Pitot Tube
9 - MerCathode Electrode (Optional)
10 - Inner Transom Plate
11 - Exhaust Pipe
12 - Rear Engine Mount
13 - Boat Transom / Hull
14 - Power Steering Cylinder (Optional)

General Information

⚠ WARNING

Always disconnect battery cables from battery BEFORE working around electrical system components to prevent injury to yourself or damage to electrical system should a wire be accidentally shorted.

⚠ WARNING

Always disconnect battery cables from battery BEFORE working on fuel system to prevent fire. This eliminates the engine wiring as a potential source of ignition.

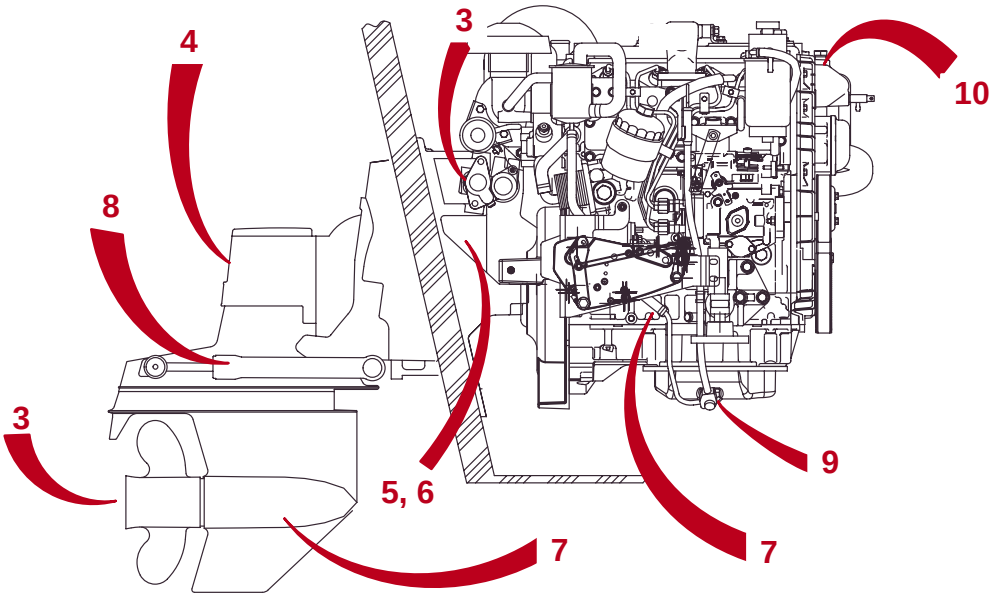
⚠ CAUTION

ENVIRONMENTAL HAZARD! **Discharge of oil or oil waste into the environment is restricted by law. Do not spill oil or oil waste into the environment when using or servicing your boat. Contain and dispose of oil or oil waste as defined by local authorities.**

IMPORTANT: Refer to Maintenance Schedules for complete listing of all routine and scheduled maintenance to be performed. Some listings can be done by owner/operator, while others should be performed by an Authorized Mercury MerCruiser Dealer. Before attempting maintenance or repair procedures not covered in this manual, it is recommended that a Mercury MerCruiser Service Manual(s) be purchased and read thoroughly.

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

CD780



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CD562

Maintenance Aids

1 Power Steering System - Quicksilver Power Trim and Steering Fluid, or Dexron II automatic transmission fluid (ATF).

2 All pivot points - SAE 30W motor oil.

3 Exposed Portion of Steering Cable and Propeller Shaft - Quicksilver Special Lubricant 101.

4 Sterndrive Unit - Quicksilver Hi-Performance Gear Lube.

5 All Grease Fittings - Quicksilver 2-4-C Marine Lubricant.

6 Engine Coupler and Universal Joint Shaft Splines - Quicksilver Engine Coupler Spline Grease (92-816391A4).

7 All Exterior Surfaces - Quicksilver Primer and Spray Paint, as needed, and Quicksilver Corrosion Guard.

8 Power Trim System - Quicksilver Power Trim and Steering Fluid, or SAE 10W-30 motor oil.

9 Crankcase Oil - - use ONLY specified engine oil. Refer to Specifications.

10 Closed Cooling System Coolant - use ONLY specified engine coolant. Refer to Specifications.

11 Universal Joints - Quicksilver U-Joint and Gimbal Bearing Grease (92-828052A3).

Maintenance Schedules

Routine Maintenance	Each Day Start	Each Day End	Weekly	Every Two Months
Check crankcase oil (interval can be extended based on experience).	●			
Check drive unit oil level, trim pump oil level, and power steering pump fluid level if equipped.	●			
Check water pickups for debris or marine growth. Check water strainer and clean, if equipped. Check coolant level.	●			
If operating in salt, brackish or polluted waters, flush cooling system after each use.		●		
Drain any water from fuel filter after each use (If operating in freezing temperatures).		●		
Inspect drive unit anodes and replace if 50 percent eroded.			●	
Check battery connections and fluid level.				●
Lubricate propeller shaft and the retorque nut (if operating in only freshwater, this maintenance may be extended to every four months).				●
Operating in Saltwater Only: treat engine surface with corrosion guard.				●

Maintenance Schedules (Continued)

Scheduled Maintenance	After first 50 hours	Every 100 hours or Annually ◆	Every 200 hours or Annually ◆	Every 200 hours or 2 years ◆	Every 300 hours or 3 years ◆	Every 500 hours or 5 years ◆	Every 1000 hours or 5 years ◆
Change crankcase oil and filter.	●		●				
Retorque exhaust riser clamp.	●		●				
Change drive unit oil and retorque connection of gimbal ring to steering shaft.		●					
Replace fuel filter(s).			●				
Check steering system and remote control for loose, missing or damaged parts. Lubricate cables and linkages.		●					
Inspect U-joints, splines, and bellows. Check clamps. Check engine alignment. Lubricate U-joints and splines.		●					
Lubricate hinge pins, gimbal bearing and engine coupler [8]		●					
Check continuity circuit for loose or damaged connections. Test MerCathode® unit output, if equipped.		●					
Drain condensation from intercooler.			●				
Lubricate driveshaft U-joints and tailstock input and output bearings.		●					
Touch-up paint power package and spray with corrosion guard.		●					

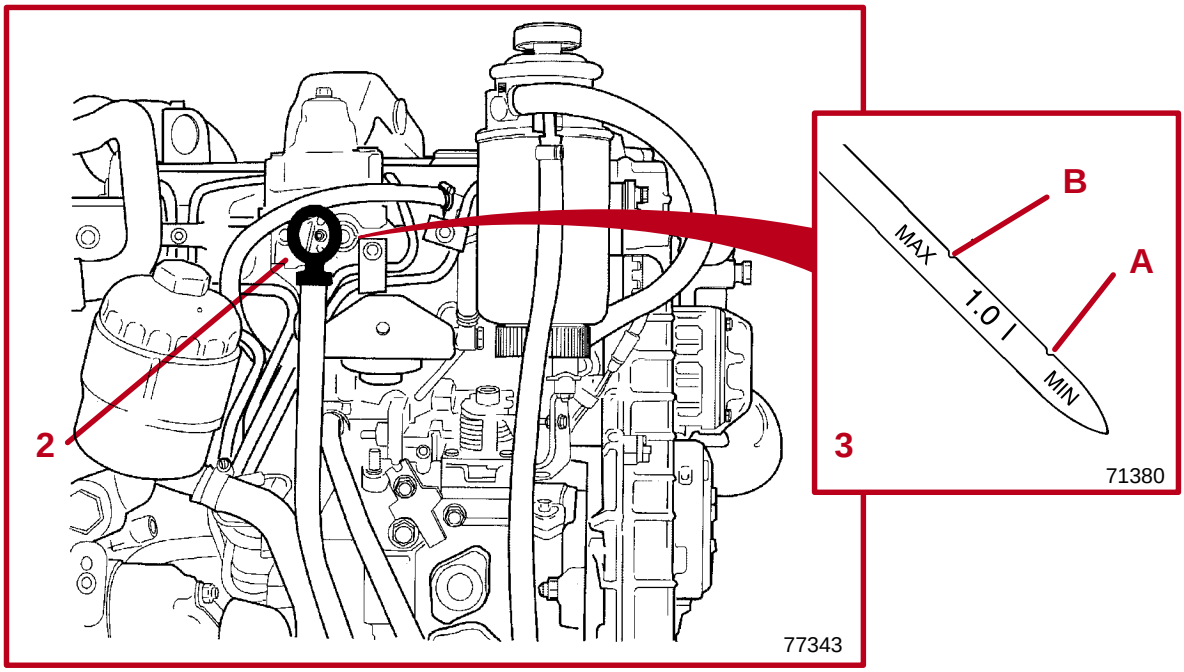
◆ Whichever Occurs First

[8] Lubricate engine coupler every 50 hours if operated at idle for prolonged periods of time.

Maintenance Schedules (Continued)

Scheduled Maintenance (Continued)	After First 50 hours	Every 100 hours or Annually ◆	Every 200 hours or Annually ◆	Every 200 hours or 2 years ◆	Every 300 hours or 3 years ◆	Every 500 hours or 5 years ◆	Every 1000 hours or 5 years ◆
Retorque engine mounts.					●		
Check electrical system for loose, damaged or corroded fasteners.					●		
Inspect condition and tension of belts.			●				
Check cooling system and exhaust system hose clamps for tightness Inspect both systems for damage or leaks.			●				
Disassemble and inspect seawater pump and replace worn components.					●		
Clean seawater section of closed cooling system. Clean, inspect and test pressure cap. Check anodes.			●				
Replace coolant.				●			
Clean intercooler core.						●	
Inspect timing belt and pulleys.					●		
Replace timing belt.							●
Check valve clearance.							●
Clean fuel tank.							●

◆ Whichever Occurs First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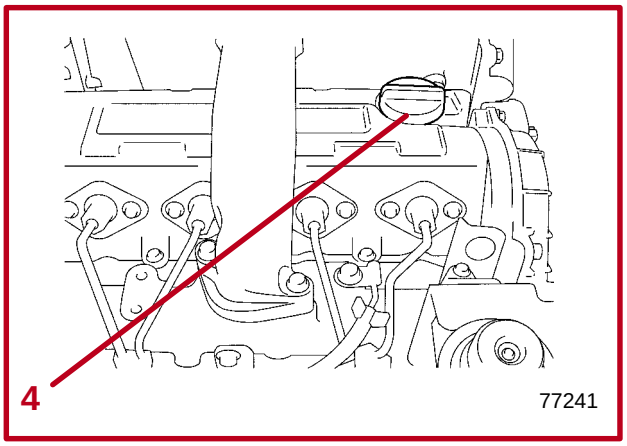
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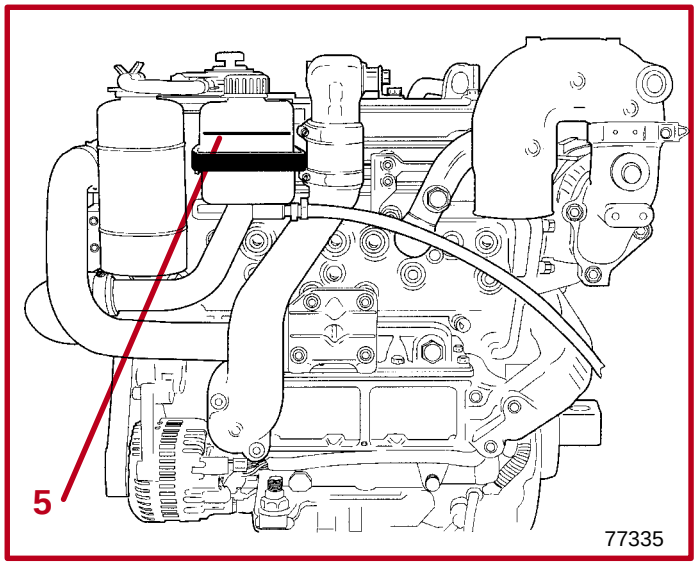
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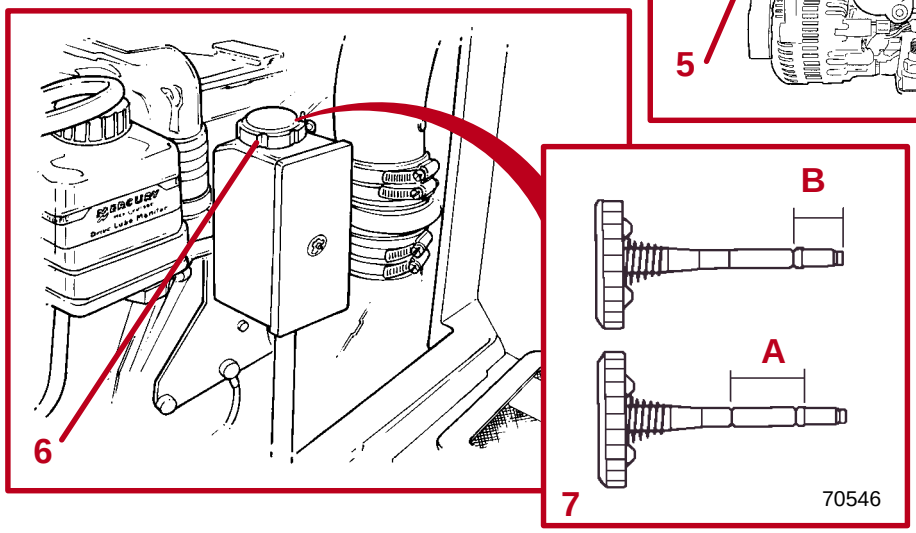
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CD783
Checking Fluid Levels

CRANKCASE OIL

1 Stop engine. Allow approximately ten minutes for oil to drain into oil pan. Boat must be at rest in water.

2 Remove dipstick. Wipe clean and reinstall fully into dipstick tube.

3 Remove dipstick and observe oil level. Oil must be between MIN and MAX marks on dipstick. If necessary, add oil as follows.

A MIN. - Minimum oil level mark

B MAX - Maximum oil level mark

NOTE: *Distance between marks is equivalent to approximately 1.0 liter (1 US quart).*

4 Remove oil filler cap. Add specified oil to bring level up to, but not over, maximum oil level mark - MAX - on dipstick. Reinstall oil filler cap.

NOTE: *It takes several minutes for the added oil to drain to the oil pan. Wait approximately 10 minutes and check the level again, after adding oil.*

IMPORTANT: Do not overfill crankcase oil.

CD482
DRIVE UNIT OIL

NOTE: *Oil level will fluctuate during operation. Oil level should be checked with cold engine before starting.*

5 Check gear lube monitor oil level. Keep oil level at or near FULL line. Check for water at bottom of monitor and/or if oil appears to be discolored, contact your Authorized Mercury MerCruiser Dealer immediately. Both conditions may indicate a water leak somewhere in the drive unit.

IMPORTANT: If more than 59 ml (2 fl. oz.) of Quicksilver Gear Lube are required to fill drive unit, a seal may be leaking. Contact your Authorized Mercury MerCruiser Dealer for service. Damage to unit may occur due to lack of lubrication.

CD270
POWER STEERING PUMP FLUID

IMPORTANT: If fluid is not visible in reservoir, contact your Authorized Mercury MerCruiser Dealer.

Power steering fluid must be checked with engine off and drive unit pointed straight back. Check with engine warm.

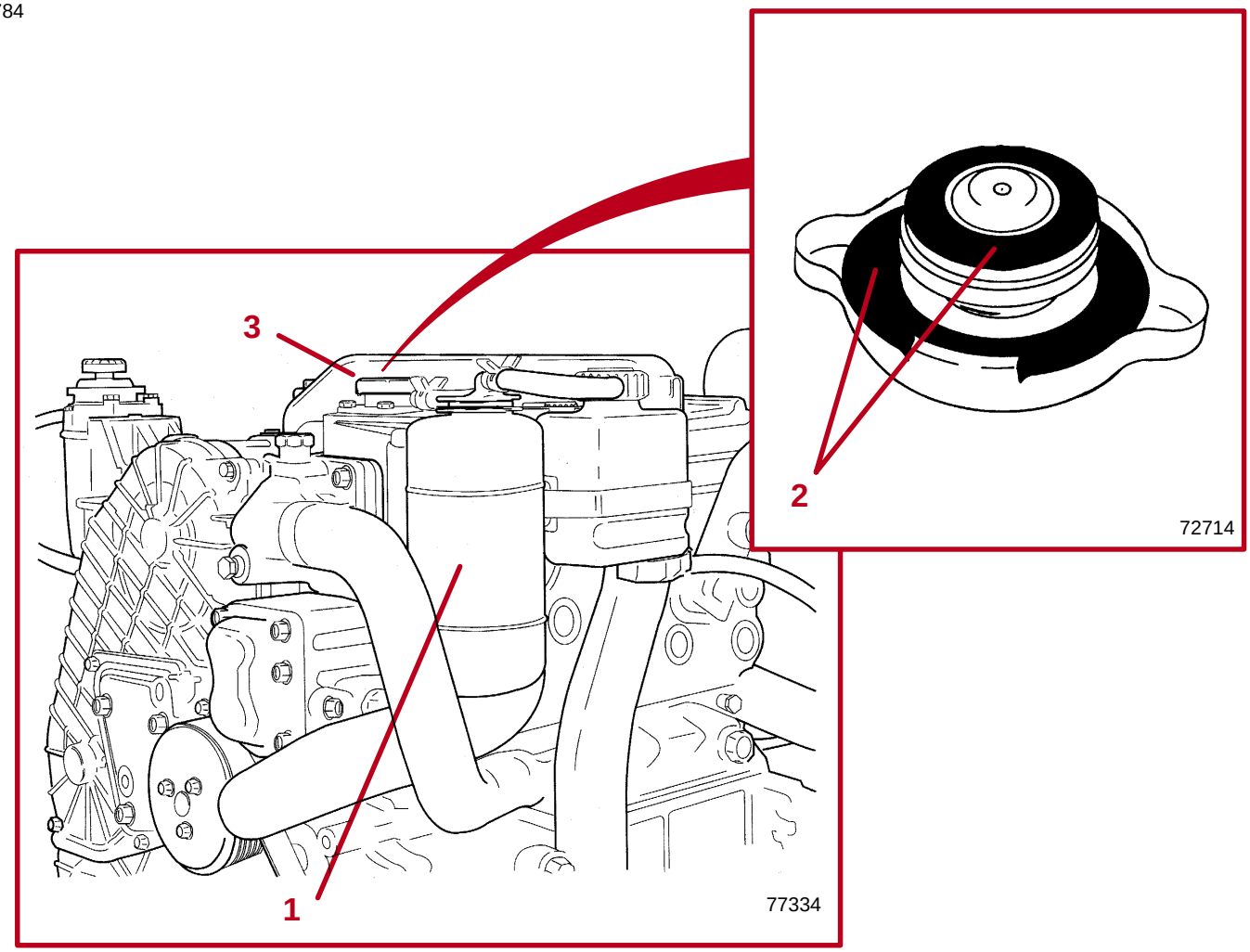
6 Remove fill cap/dipstick from reservoir. Wipe clean and reinstall into reservoir.

7 Remove fill cap/dipstick from reservoir and observe fluid level. Fluid must be between marks A and B on fill cap/dipstick.

A MAXIMUM - FULL HOT Fluid Level -top Line. Fill to this level when fluid is hot. *Do not overfill.*

B MINIMUM - FULL COLD Fluid Level - Fill to this level when fluid is cold. Do not allow fluid to drop below this level.

8 If necessary, add Quicksilver Power Trim and Steering Fluid or, if Quicksilver Power Trim and Steering Fluid is not available, use Dexron III, to bring fluid to proper level. Replace fill cap/dipstick.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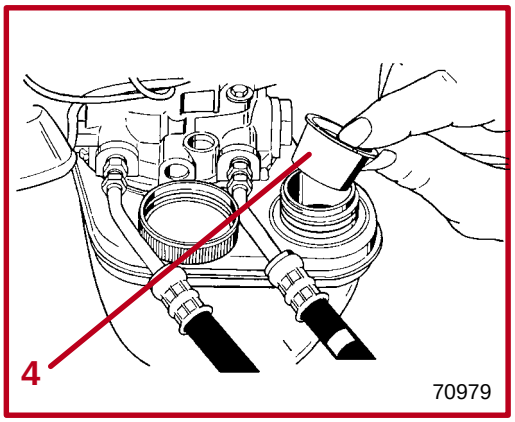
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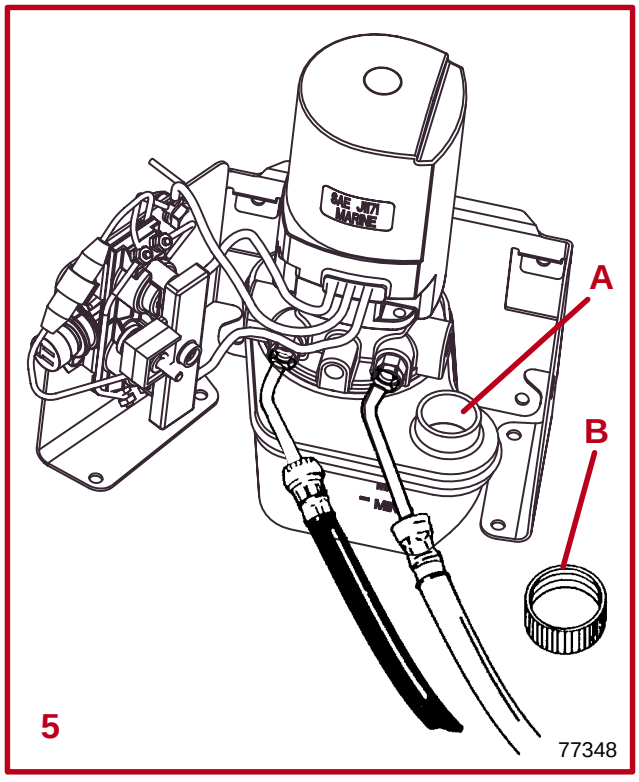
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CD785
ENGINE COOLANT

1 Before starting engine, check coolant level in coolant recovery bottle. Coolant level must be between the “MIN.” and “MAX” marks (on front of bottle). If level is low, remove fill cap from coolant recovery bottle and add specified coolant as required. Refer to Specifications for proper coolant.

⚠ WARNING

Do not remove coolant tank cap when engine is hot. Coolant may discharge violently, causing severe burns.

2 If coolant level *in coolant recovery bottle was* low:

- Inspect coolant recovery system for leaks.
- Inspect coolant tank cap gaskets for damage and replace if necessary.
- Also, the tank cap maintains pressure on the coolant tank. It may not be holding pressure properly. To have cap tested, contact your Authorized Mercury MerCruiser Dealer.

⚠ CAUTION

If the coolant should get extremely low and the engine very hot, let the engine cool for approximately 15 minutes before adding coolant; then, with the engine running, add coolant slowly. Adding cold coolant to a hot engine may crack the cylinder head or crankcase. Never use water alone.

3 Periodically, to ensure that coolant recovery system is functioning properly, you should allow engine to cool and then *slowly and carefully* remove coolant tank cap. Coolant level must be to the bottom edge of the tank filler neck. If coolant is low, add specified coolant as necessary to bring up to proper level. Refer to items **1** and **2** above.

CD620
POWER TRIM PUMP FLUID

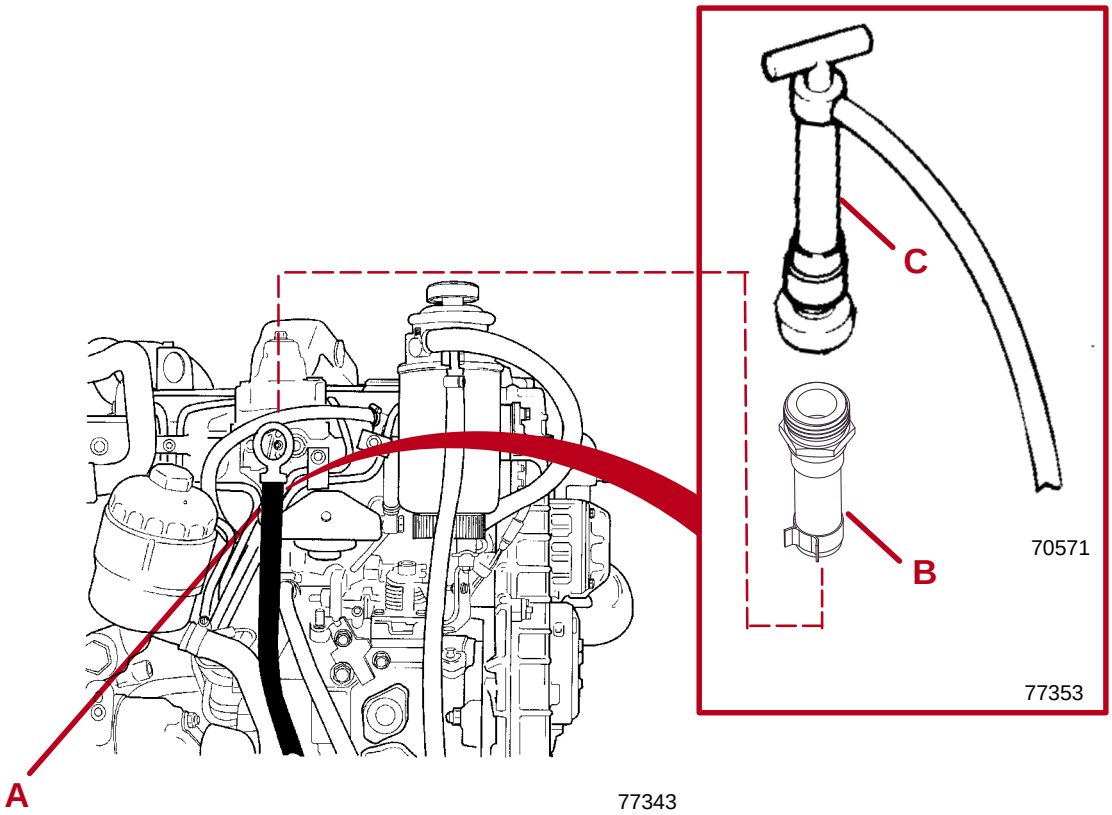
Power trim pump fluid level must be checked with the drive unit in the full DOWN/IN position.

4 New trim pumps have a shipping “cap plug” in the reservoir fill neck. Ensure that this “cap plug” has been removed. Remove and discard “cap plug” if present.

5 Remove reservoir cap and observe oil level. Level must be up to, but not over, the bottom edge of fill neck. Add Quicksilver Power Trim and Steering Fluid, or use SAE 10W-30 or 10W-40 motor oil if available, as necessary to bring oil to proper level. Replace reservoir cap.

A Reservoir Fill Neck

B Reservoir Cap



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CD835

Changing Lubricants and Fluids

See Maintenance Schedules for change interval. Lubricants should be changed before placing boat in storage.

Power Trim or Power Steering fluids do not require changing.

Coolant in closed cooling system should be changed at specified intervals by your Authorized Mercury MerCruiser Dealer.

CRANKCASE OIL AND FILTER

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

1 Start engine and allow it to warm up to normal operating temperature.

2 Stop engine and allow some time for oil to drain into oil pan (approximately 10 minutes).

3 Install crankcase oil pump. Push adapter onto dipstick tube and attach pump.

A Dipstick tube

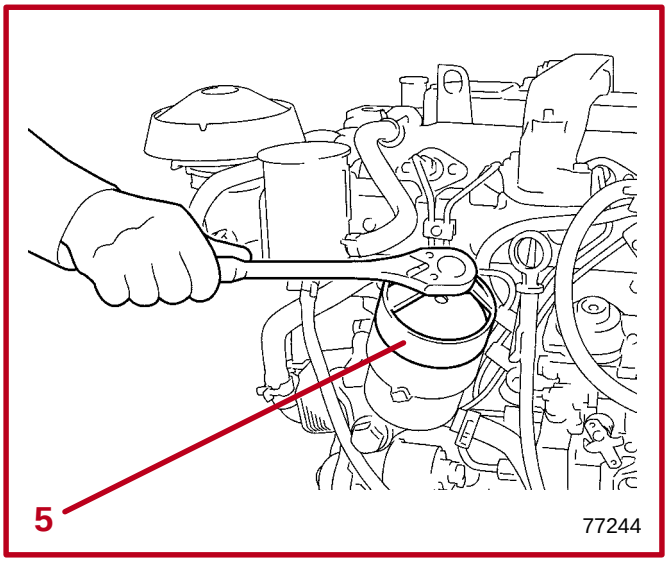
B Quicksilver Hose / Oil Pump Adapter (Quicksilver P/N 32-863642)

C Quicksilver Crankcase Oil Pump (Quicksilver P/N 802889A1)

4 Pump oil out of crankcase into drain pan. When crankcase is empty, remove pump and adapter. Install oil dipstick.

⚠ CAUTION

ENVIRONMENTAL HAZARD! **Discharge of oil or oil waste into the environment is restricted by law. Do not spill oil or oil waste into the environment when using or servicing your boat. Contain and dispose of oil or oil waste as defined by local authorities.**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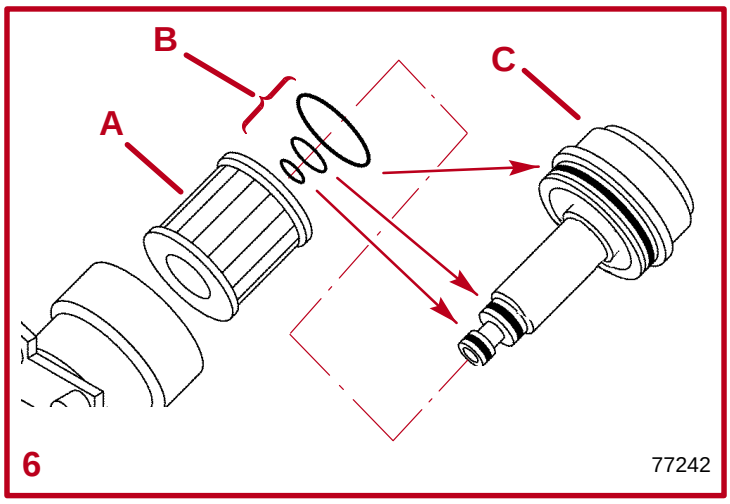
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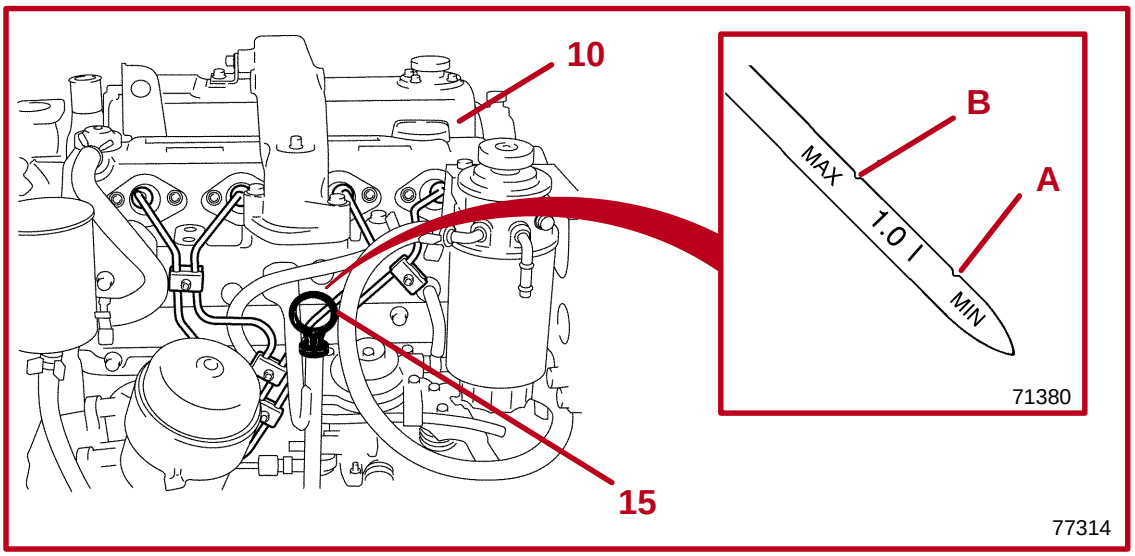
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CRANKCASE OIL AND FILTER (CONTINUED)

5 Use a filter wrench or appropriate socket to remove the cartridge type oil filter.

6 Discard the old filter element. Discard the old O-rings from the top piece.

A Filter Element

B O-Rings

C Top Piece

7 Install the three O-rings. Apply a coat of engine oil to the O-rings. Install the element on the top piece.

8 Install the top piece with the new element into the oil filter housing.

9 Turn the new cartridge until the sealing face is fitted against the gasket using the filter wrench or socket. Torque to 25 Nm (18 lb-ft).

NOTE: *Over tightening the cartridge will cause deformation of the cartridge and oil leakage.*

10 Remove oil fill cap and refill engine with new oil. Refer to specifications for quantity and grade of oil.

11 Add specified oil to bring level up to, but not over, maximum oil level mark - MAX - on dipstick.

12 Reinstall oil filler cap.

IMPORTANT: After oil change, pre-lubricate turbocharger and engine. To do this, hold the STOP switch engaged while you simultaneously turn the key switch to START position for 15 seconds. This will rotate the starter motor and engine / oil pump. During this process the engine will not run because no fuel is injected. Allow the starter motor to cool down for one minute and repeat the above described process. To avoid overheating the starter motor, do not engage the starter for more that 15 seconds.

13 Pre-lubricate the engine.

14 Start and operate the engine for a few minutes. Stop the engine and wait for about ten minutes.

15 Remove oil dipstick. Wipe clean and reinstall into dipstick tube.

16 Remove dipstick and observe oil level. If necessary, add oil to bring level up to, but not over, MAX mark or between MIN and MAX marks on dipstick.

A Minimum oil level mark

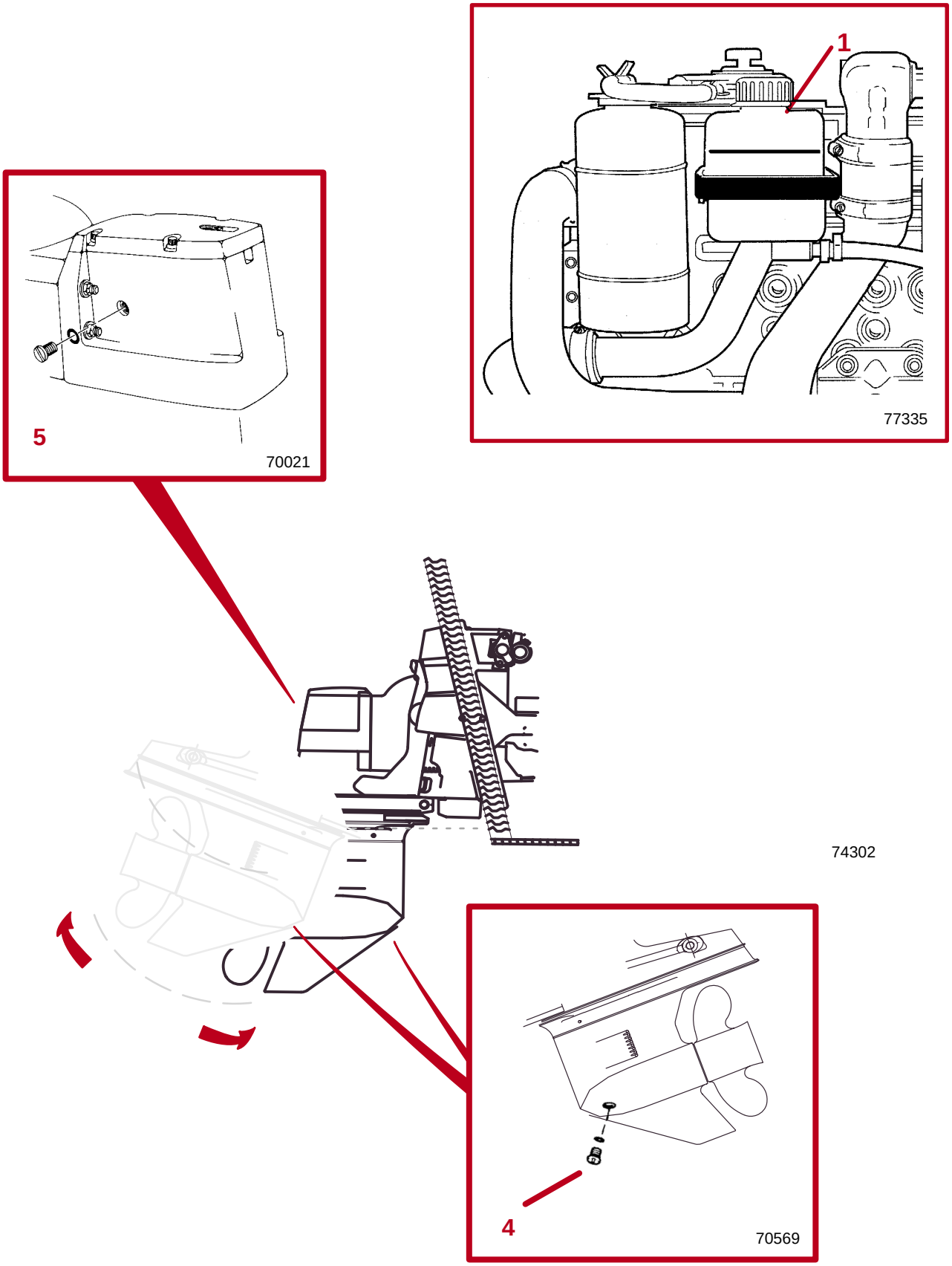
B Maximum oil level mark

IMPORTANT: When refilling engine with oil always use dipstick to determine how much oil is required.

⚠ CAUTION

Do not overfill the engine with oil. Too much engine oil will cause excessive oil consumption and higher oil temperature.

17 Start engine and check for leaks.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DRIVE UNIT OIL

1 Remove gear lube monitor from bracket.

2 Empty contents into suitable container.

3 Install monitor in bracket.

4 Place drive unit in full trim limit UP/OUT position, remove OIL FILL/DRAIN SCREW and sealing washer, and drain oil.

5 Remove OIL VENT screw and sealing washer. Allow oil to drain completely.

IMPORTANT: If any water drained from OIL FILL/DRAIN hole, or if oil appears discolored, drive unit is leaking and should be checked immediately by your Authorized Mercury MerCruiser Dealer.

6 Lower drive unit so propeller shaft is level. Fill drive unit, through OIL FILL/DRAIN hole, with specified gear lube until an air-free stream of lubricant flows from OIL VENT hole.

IMPORTANT: Use only Quicksilver High Performance Gear Lube in drive unit.

7 Install OIL VENT screw and sealing washer.

8 Continue to fill until gear lube appears in the gear lube monitor.

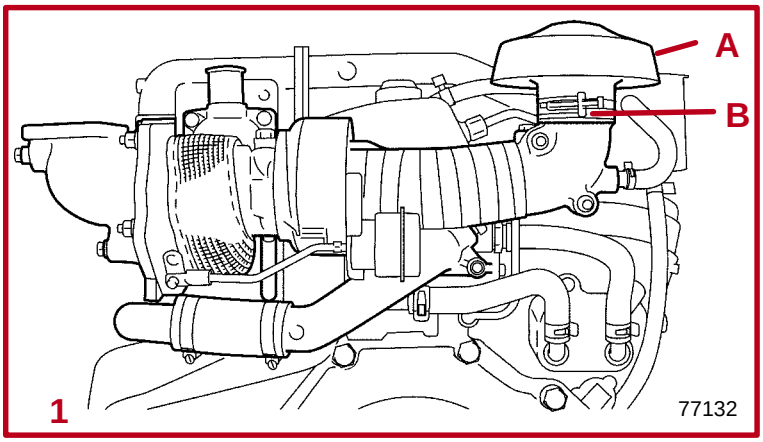
A Fill monitor to FULL mark. Lubricate O-ring on neck with sterndrive oil. Install cap; do not overtighten.

B Quickly install sealing washer and OIL FILL/DRAIN screw. Tighten securely.

9 Remove propeller and grease propeller shaft heavily, with specified lubricant (Refer to Propeller Installation if necessary). Reinstall propeller and torque nut to 75 Nm (55 lb-ft) MINIMUM.

10 Recheck oil level after first use.

IMPORTANT: Oil level in gear lube monitor will rise and fall during drive operation; always check oil level when drive is cool and engine is shut down.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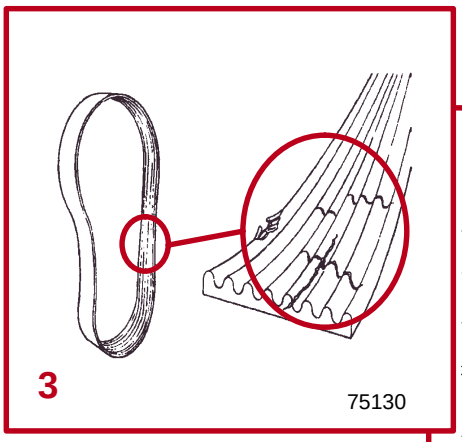
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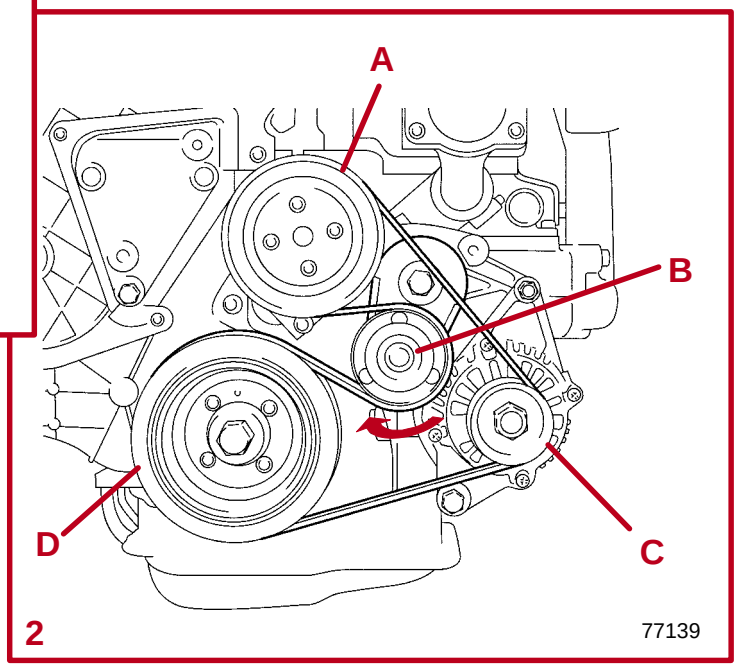
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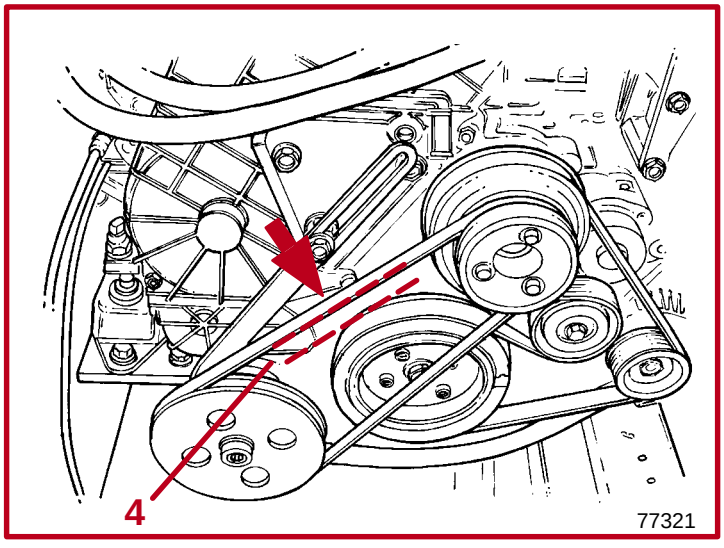
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CD793
Air Cleaner

The air cleaner is used to prevent the entry of rain water, seawater, and debris. No maintenance is required and there are no serviceable parts to the air cleaner.

1 Ensure that the air cleaner is mounted (clamped) securely at all times. Replace the assembly if is cracked or damaged.

A Air cleaner

B Clamp

CD794
Drive Belts

CHECKING SERPENTINE BELT

⚠ WARNING

Avoid possible serious injury. Make sure engine is shut off and ignition key is removed before inspecting belt.

2 The various components are:

A Water Circulating Pump Pulley

B Automatic Tensioner Pulley

C Alternator Pulley

D Crankshaft Pulley

3 Inspect drive belt for proper tension and for the following:

- Excessive wear
- Cracks

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

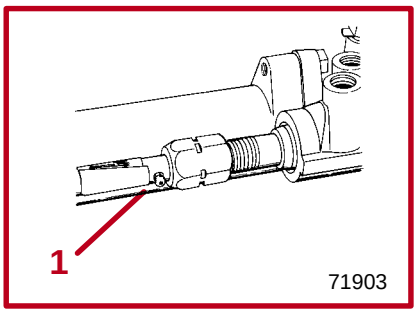
- Fraying
- Glazed surfaces
- Proper tension - Check operation of the automatic tensioner and associated components. Move tensioner pulley in direction of arrow (position a suitable tool on pulley fastener and rotate). Release and allow to glide back slowly. Tensioner must return to it's initial position.

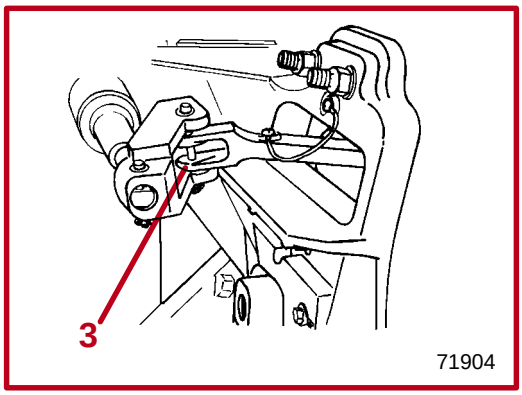
CHECKING POWER STEERING PUMP BELT

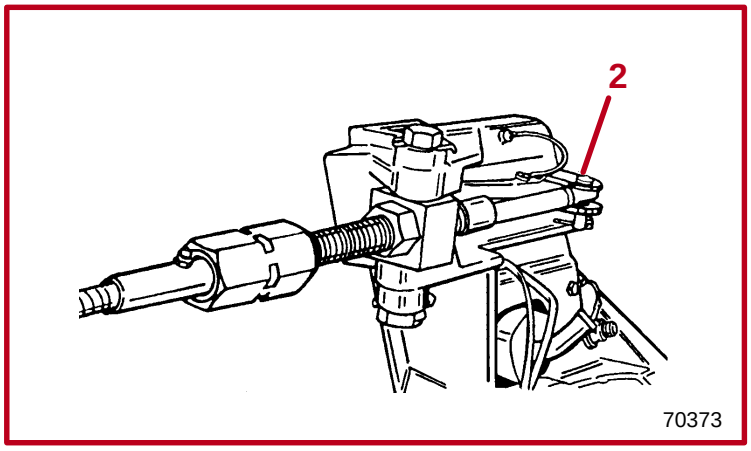
4 Inspect drive belt for proper tension and for the following:

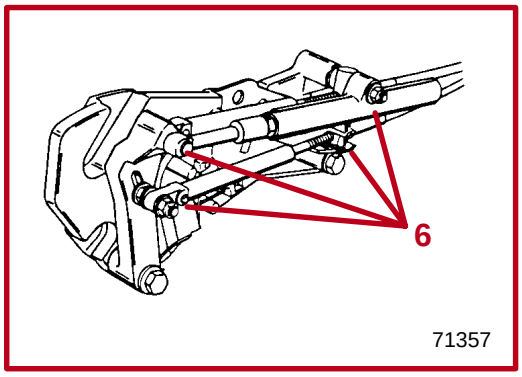
- Excessive wear
- Cracks
- Fraying
- Glazed surfaces
- Proper tension - Check tension by depressing upper strand of belt, with moderate hand pressure, at point shown. Belt should move no more than 5 mm (3/16 in.) either way.

CD795









CA524
Lubrication

STEERING SYSTEM

1 **If Steering Cable Has Grease Fittings:** Turn steering until steering cable is fully retracted into cable housing. Apply approximately 3 pumps of grease from a typical hand-operated grease gun. Lubricate at fitting with 2-4-C Marine Lubricant with Teflon.

⚠ WARNING

Do not grease steering cable while extended. Hydraulic lock could occur and cause loss of steering control.

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

2 Turn steering until steering cable fully extended. Lubricate by applying a thin coat of Special Lubricant 101 on exposed part of cable.

3 Lubricate steering system pivot points with SAE 30W motor oil.

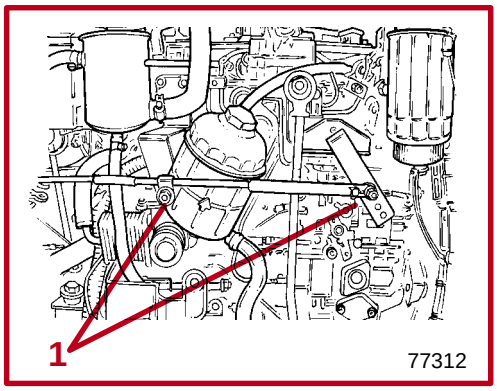
4 On dual engine boats: Lubricate all pivot points, including tie bar pivot points, with SAE 30W motor oil.

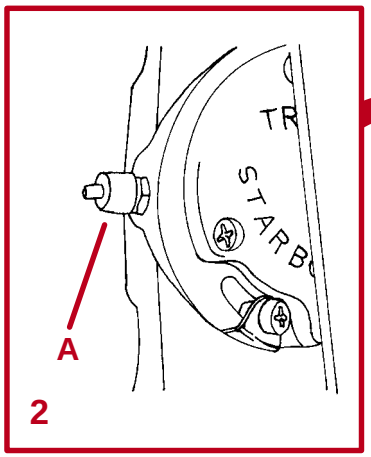
5 Upon first starting engine, turn steering wheel several times to starboard, and then port, to ensure that the steering system operates properly, before getting underway.

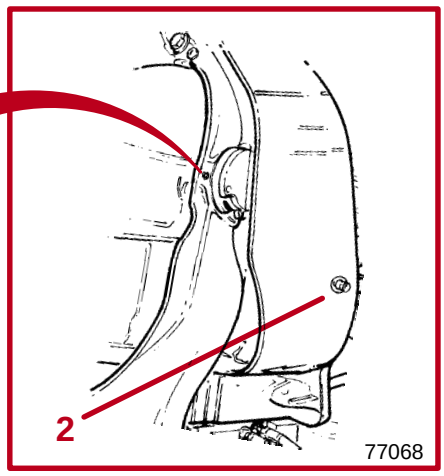
CA72
SHIFT CABLE

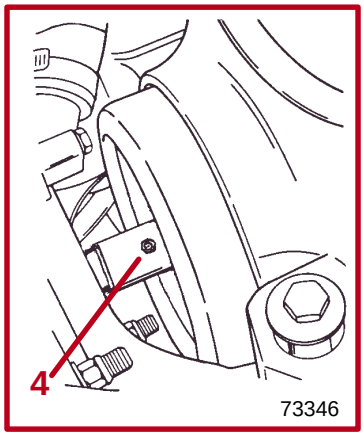
6 Lubricate pivot points with SAE 30W motor oil.

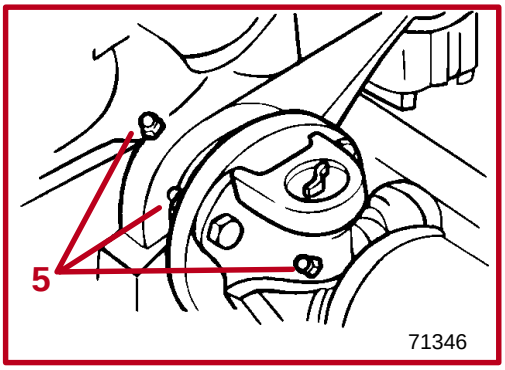
CD796

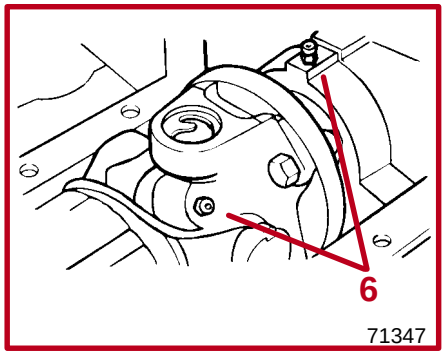












CA73
THROTTLE CABLE

1 Lubricate pivot points with SAE 30W motor oil.

CA938
DRIVE UNIT AND TRANSOM ASSEMBLY

2 Lubricate gimbal bearing by applying approximately 8-10 pumps of grease from a typical hand-operated grease gun using Quicksilver U-Joint and Gimbal Bearing Grease.

A **Alpha Models -** Lubricate hinge pins by applying a couple of pumps of grease from a typical hand-operated grease gun using Quicksilver 2-4-C Marine Lubricant with Teflon.

3 For propeller shaft lubrication, see PROPELLER.

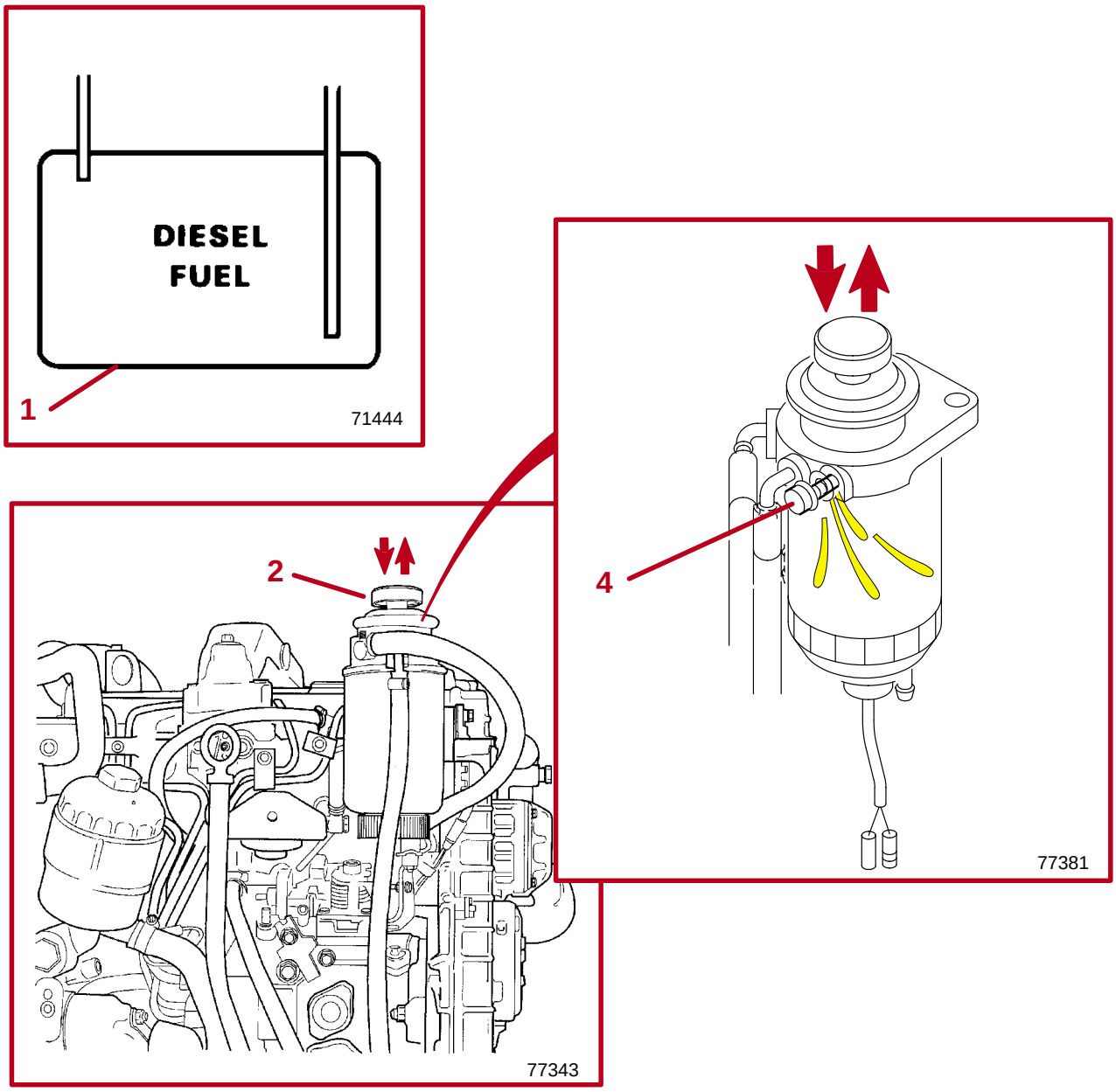
CB776
ENGINE COUPLER

4 Lubricate engine coupler splines through grease fitting on coupler by applying approximately 8-10 pumps of grease from a typical hand-operated grease gun using Quicksilver Engine Coupler Spline Grease. If boat is operated at idle for prolonged periods of time, coupler should be lubricated every 50 hours.

CB777
DRIVE SHAFT EXTENSION MODELS

5 Lubricate drive shaft grease fittings, at transom end, by applying approximately 3 - 4 pumps of grease from a typical hand-operated grease gun using Quicksilver U-joint and Gimbal Bearing Grease.

6 Lubricate drive shaft grease fittings, at engine end, by applying approximately 3 - 4 pumps of grease from a typical hand-operated grease gun using Quicksilver U-joint and Gimbal Bearing Grease.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CE406
Fuel System

⚠ CAUTION

Absolute cleanliness is required for work on the fuel system, fuel injection components have very close tolerances. Even minute particles of dirt or small amounts of water can impair the function of the fuel injection system.

FUEL TANK CLEANING AND FLUSHING

IMPORTANT: Diesel fuel should not be left in tank during winter storage, as an accumulation of rust, sludge and wax residue will form.

1 Refer to boat manufacturer's instructions and clean fuel tank at specified intervals. Unless specified otherwise, flush and clean diesel fuel tank every 1000 hours or 5 years, whichever occurs first.

CD654
HAND PUMP/PRIMER

2 A plunger-type of hand pump/primer is located on the fuel filter bracket and is used to: (1) refill fuel system if system was run dry; (2) refill fuel filter when changing filter; or (3) to prime the fuel system if engine has not been run for a while. To operate the hand pump/primer, move the plunger (upper portion) up and down as needed.

CD655
PRIMING FUEL SYSTEM

3 Prime engine if it has not been run for a while or if engine will not start. Move the hand pump/primer plunger up and down several times as previously outlined. Attempt to start engine.

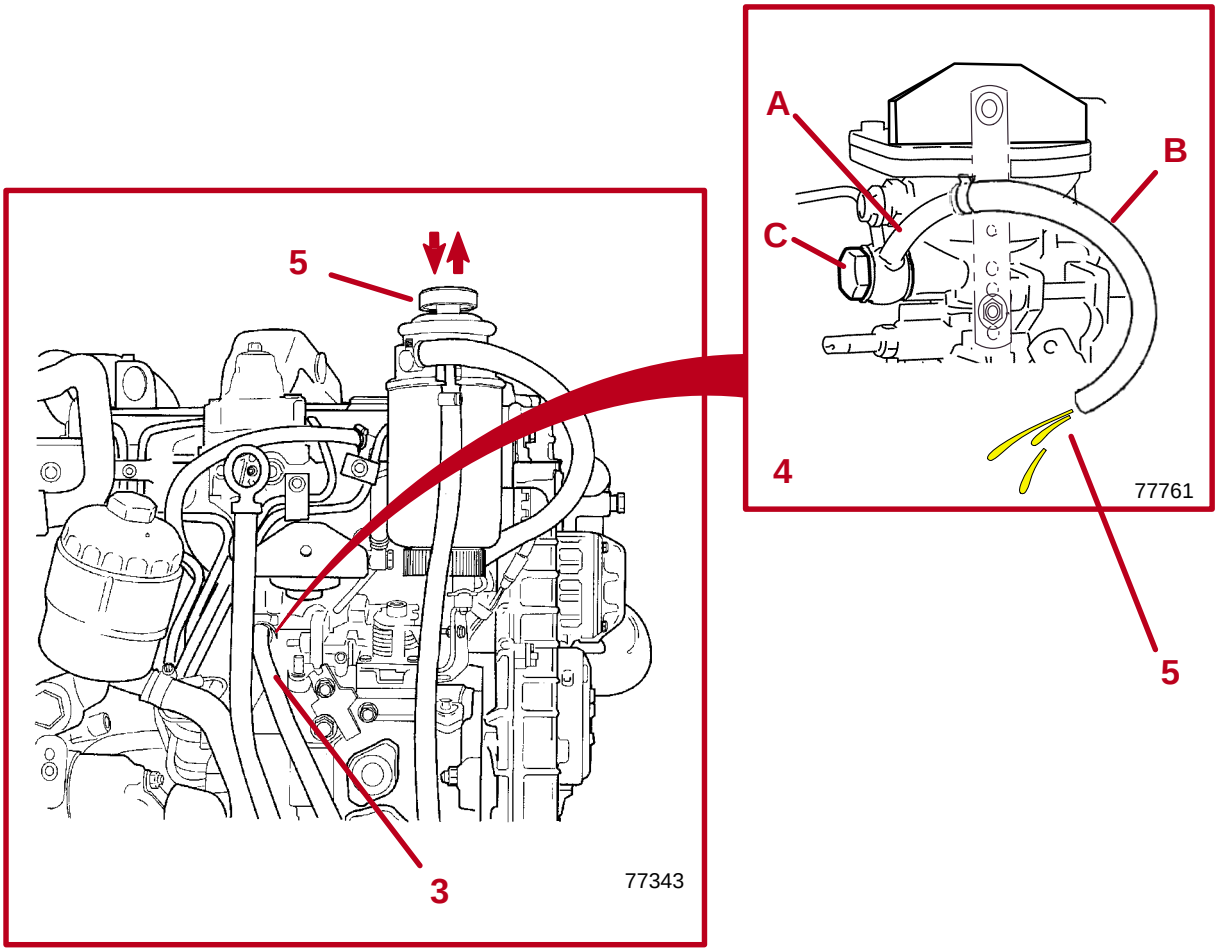
CD836
FILLING FUEL FILTER

NOTE: *Follow this procedure after installing new filter or if fuel has been drained from filter checking for water.*

4 Loosen bleed screw on fuel filter bracket. As previously outlined, move plunger on hand pump/primer up and down repeatedly, until an air free stream of fuel flows from bleed screw. Filter is full when this occurs.

5 Tighten bleed screw.

6 Operate the priming pump several times. Check for fuel leakage.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CD838

FILLING (BLEEDING) FUEL SYSTEM

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

1 Fill fuel filter as outlined previously.

2 Place a suitable container under fuel injection pump to catch fuel.

3 Remove and plug boat fuel return hose from injection pump return fuel fitting.

⚠ CAUTION

Avoid the risks of fuel leaking. The injection pump fuel return valve, a special hollow bolt, uses sealing washers to prevent fuel from leaking. Replace the sealing washers if leaking.

4 Temporarily install a length of fuel hose on return fuel fitting. Avoid disturbing special hollow bolt and sealing washers.

A Return Fuel Fitting

B Temporary Hose

C Hollow Bolt and Sealing Washers

5 Move plunger on hand pump/primer up and down repeatedly, until an air free stream of fuel flows from temporary hose.

6 Remove temporary hose. Unplug and install boat return fuel hose on fitting. Clamp hose.

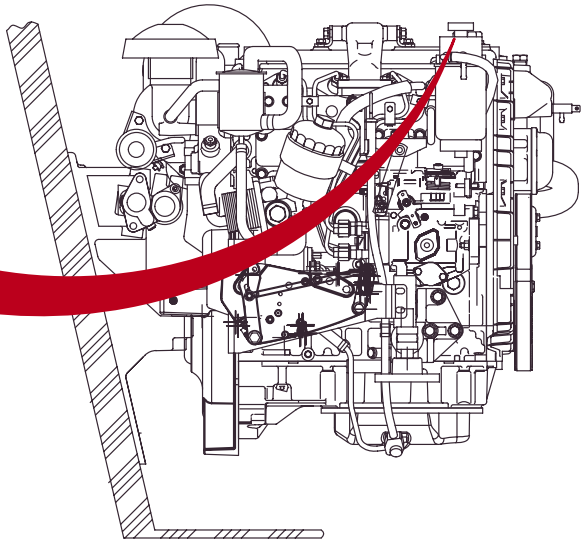
7 Move plunger knob up and down several times until some added resistance is noticed when knob is moved.

8 Check for fuel leaks.

9 Dispose of waste fuel as defined by local authorities.

10 Start engine, check for fuel leaks. If leaks exist stop engine immediately. Recheck installation.

NOTE: *In some circumstances, it may be necessary to bleed (purge air) from the injectors if the engine does not readily start. Refer to an Authorized Mercury MerCruiser Dealer.*



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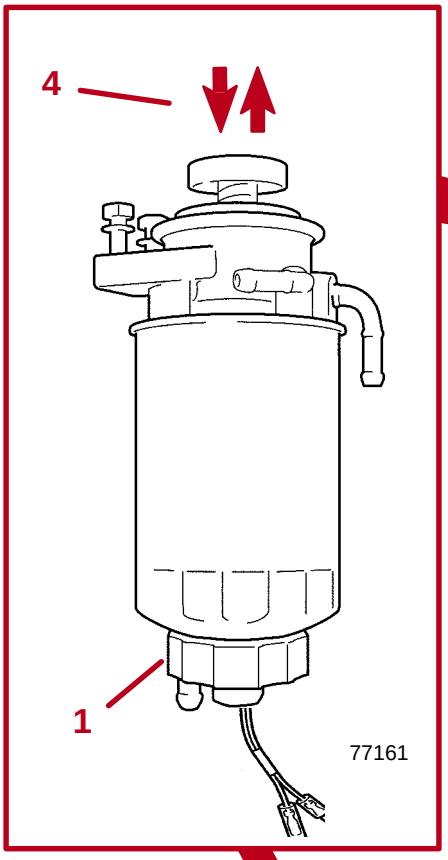

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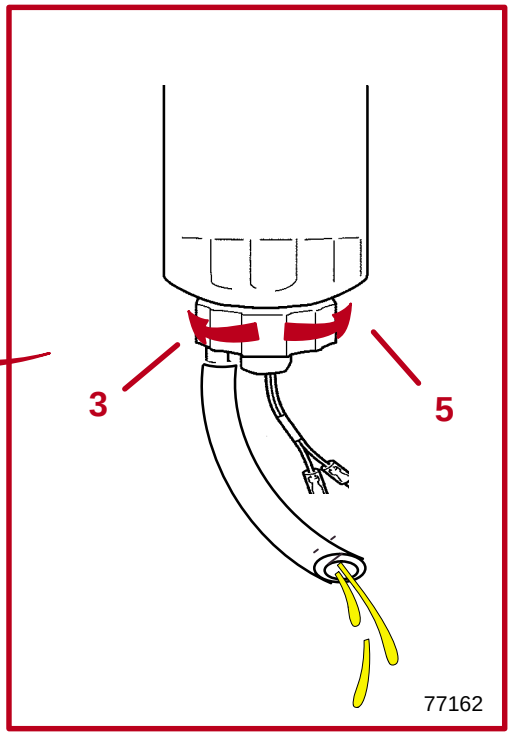


77162

DRAINING WATER SEPARATING FUEL FILTER

⚠ WARNING

Be careful when draining water separating fuel filter. Diesel fuel is flammable. Be sure ignition key is OFF. Do not allow fuel to contact any hot surfaces which may cause it to ignite. Do not allow sources of open flame in the area. Wipe up any spilled fuel immediately. Dispose of fuel soaked rags, paper, etc. in an appropriate air tight, fire retardant container. Fuel soaked items may spontaneously ignite and result in a fire hazard which could cause serious bodily injury or death.

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

1 The filter can be drained of water and small dirt particles by opening drain cap at bottom of filter.

2 Place a small container at the end of a drain hose beneath the drain cap on the filter.

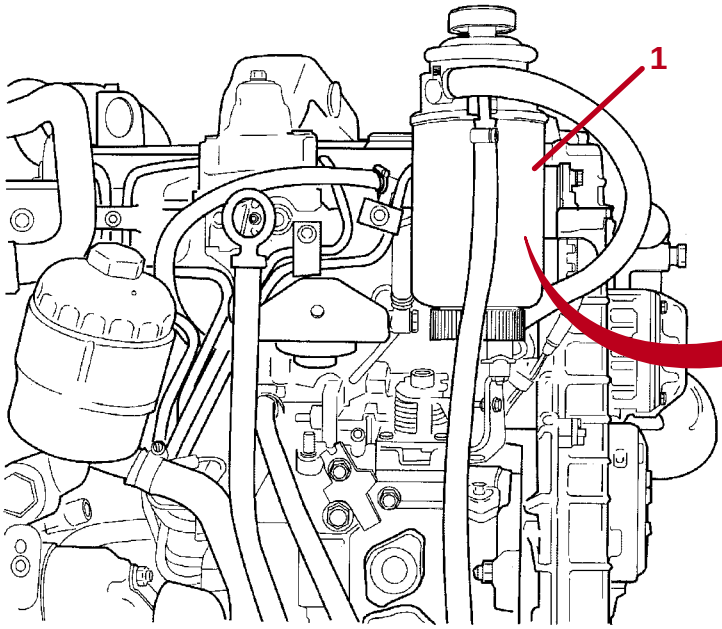
3 Open by turning the drain cap counterclockwise *(as viewed from the bottom of the filter)* approximately 5 turns.

4 Operate the priming pump up and down about 10 times until approximately 4 ml. (2 fl oz.) is drained. or until fuel is clear in appearance.

5 Close drain cap by turning clockwise. Tighten securely. Fill fuel filter as previously outlined.

6 After starting the engine, check to see that there is no fuel leak from the drain cap.

IMPORTANT: If fuel filter requires frequent draining, have the fuel tank drained to remove the water.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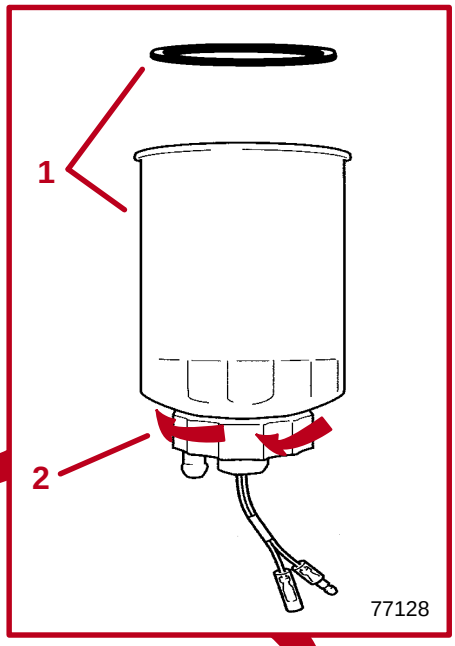
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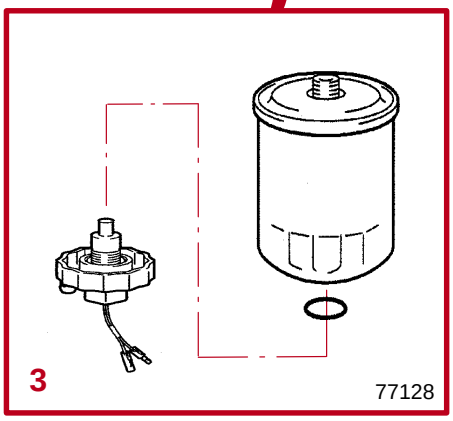
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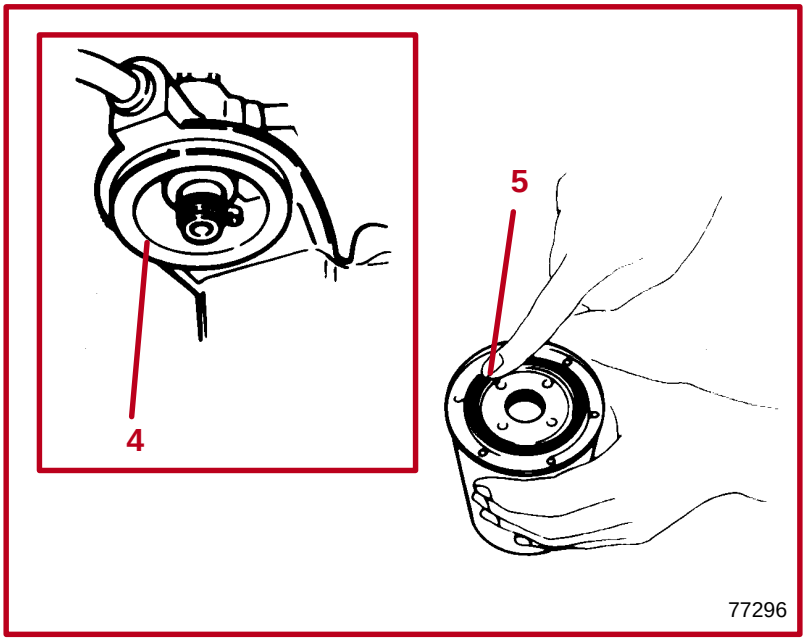
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CD803

REPLACING WATER SEPARATING FUEL FILTER

⚠ CAUTION

Any water entering the fuel injection system will disable the system. Check for water in water separating fuel filter before startup, daily.

⚠ CAUTION

If water should enter the fuel injection system, take unit to an Authorized Mercury MerCruiser Dealer IMMEDIATELY, so that corrosion and rusting of the injectors and other components can be avoided.

⚠ WARNING

Be careful when changing water separating fuel filter. Diesel fuel is flammable. Be sure ignition key is OFF. Do not allow fuel to contact any hot surfaces which may cause it to ignite. Do no tallow sources of open flame in the area. Wipe up any spilled fuel immediately. Dispose of fuel soaked rags, paper, etc. in an appropriate air tight, fire retardant container. Fuel soaked items may spontaneously ignite and result in a fire hazard which could cause serious bodily injury or death.

IMPORTANT: Element cannot be cleaned and reused. It must be replaced.

1 Remove water separating fuel filter and sealing ring from fuel filter bracket.

2 Remove the drain cap from the filter by turning it counterclockwise. Discard the used filter.

3 Install the O-ring and drain cap on the new fuel filter. Tighten drain cap.

4 Clean filter sealing surface on mounting bracket.

5 Coat sealing ring on new filter with clean motor oil.

6 Thread filter onto bracket until the sealing ring contacts bracket.

7 Tighten the fuel filter an additional 2/3 of a turn with a filter wrench.

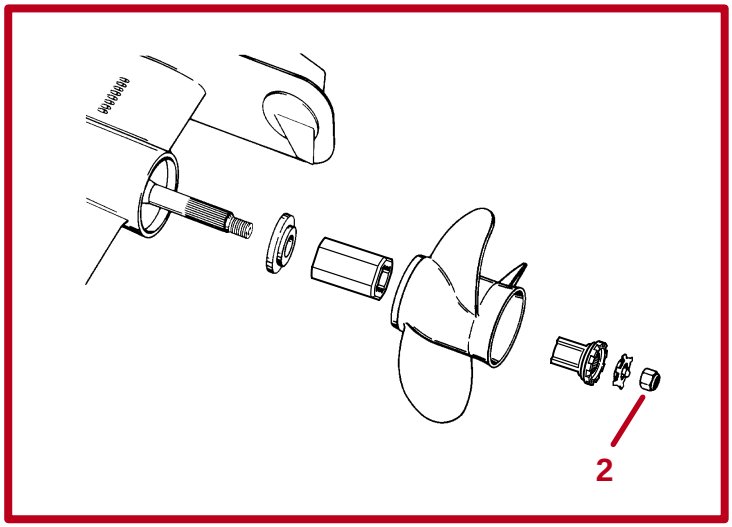
8 Ensure bottom drain cap is securely tightened. Fill fuel filter as explained previously. Check filter and drain cap for fuel leaks.

⚠ WARNING

Make sure no leaks exist before closing engine hatch.

9 Start and run engine. Check filter connection for fuel leaks. If leaks exist, recheck filter installation. If leaks continue, stop engine immediately and contact your Authorized Mercury MerCruiser Dealer.

CA634



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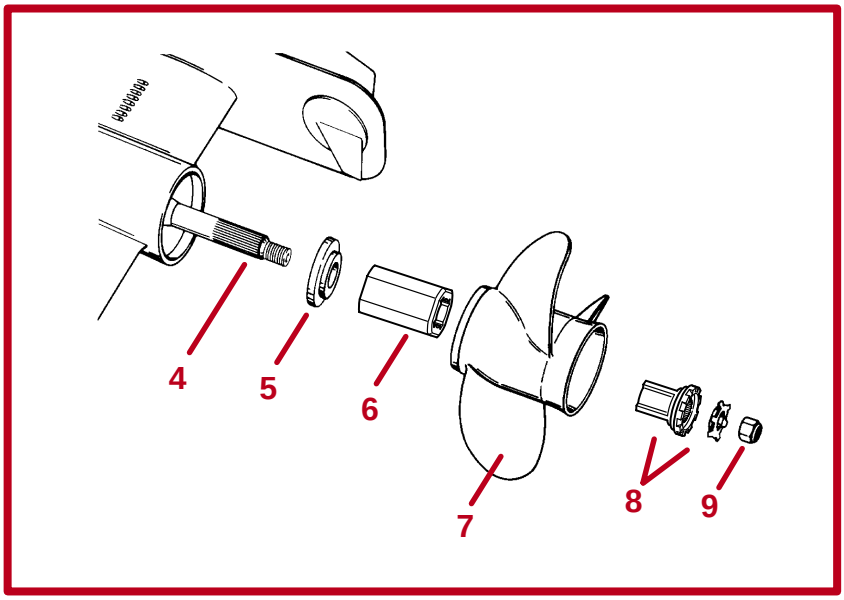

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CA816

Propeller

ALPHA

⚠ WARNING

Avoid Injury: Remote Control must be in NEUTRAL and ignition key removed from switch before removing and/or installing propeller.

⚠ WARNING

Avoid Injury: Place a block of wood between anti-ventilation plate and propeller to protect hands from propeller blades and to prevent propeller from rotating when removing propeller nut.

⚠ CAUTION

Avoid Injury: Periodically check propeller nut for tightness during boating season. A minimum of 55 lbs. ft. (75 N·m) torque is required.

CA746

REMOVAL

1 Place wood block between propeller blade and anti-ventilation plate to prevent rotation. Straighten bent tabs on tab washer.

2 Turn propeller shaft nut counterclockwise to remove nut.

3 Slide tab washer, drive sleeve, propeller and thrust hub off propeller shaft.

CA79

REPAIR

Some damaged propellers can be repaired. See your dealer.

CA774

INSTALLATION

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

4 Apply a liberal coat of one of the following Quicksilver lubricants to propeller shaft: Anti-Corrosion Grease, Special Lubricant 101, or 2-4-C Marine Lubricant with Teflon.

5 Slide thrust hub onto propeller shaft, with stepped side toward propeller hub.

6 Install Flo-Torque II Drive Hub into propeller.

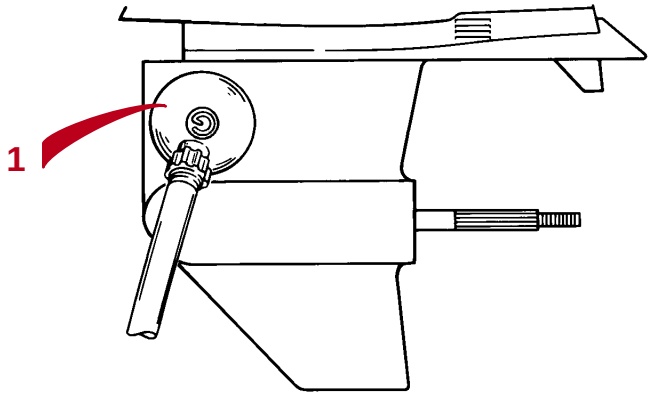
NOTE: *The drive sleeve is tapered and will slide fully into the propeller as the nut is tightened and properly torqued.*

7 Align splines and place propeller on propeller shaft.

8 Install drive sleeve and locking tab washer.

9 Install propeller nut. Tighten nut securely. A minimum of 55 lbs. ft. (75 N·m) torque is required. Bend three tabs on tab washer down into grooves in spline washer. After first use, bend the three tabs straight, retighten propeller nut to minimum 55 lbs. ft. torque (75 N·m). Bend tabs back down into spline washer. Check propeller at least after 20 hours of operation. Do not operate with loose propeller.

CA824



70564

CA825

Flushing Cooling System

CA827

To prevent silt and/or salt buildup in cooling system, flush with freshwater after each use and prior to storage.

If flushing cooling system with boat in water, raise drive unit to TRAILER position, install flushing attachment and lower drive unit to full DOWN/IN position.

If flushing cooling system with boat out of water, remove propeller before proceeding. If propeller is not removed observe the following precaution.

⚠ WARNING

When flushing, be certain the area around propeller is clear, and no person (or animal) is standing nearby. To avoid possible injury, remove propeller.

1. Install Quicksilver flushing attachment (or equivalent) over water intake openings in gear housing.
2. Connect hose between flushing attachment and water source valve.
3. With drive unit in normal operating position, partially open water source valve (about 1/2 maximum).
4. Place drive in NEUTRAL, idle speed position and start engine.

⚠ CAUTION

Avoid possible engine damage.

- **Do NOT run engine continuously at idle rpm.**
- **Do NOT run engine above 1500 rpm.**

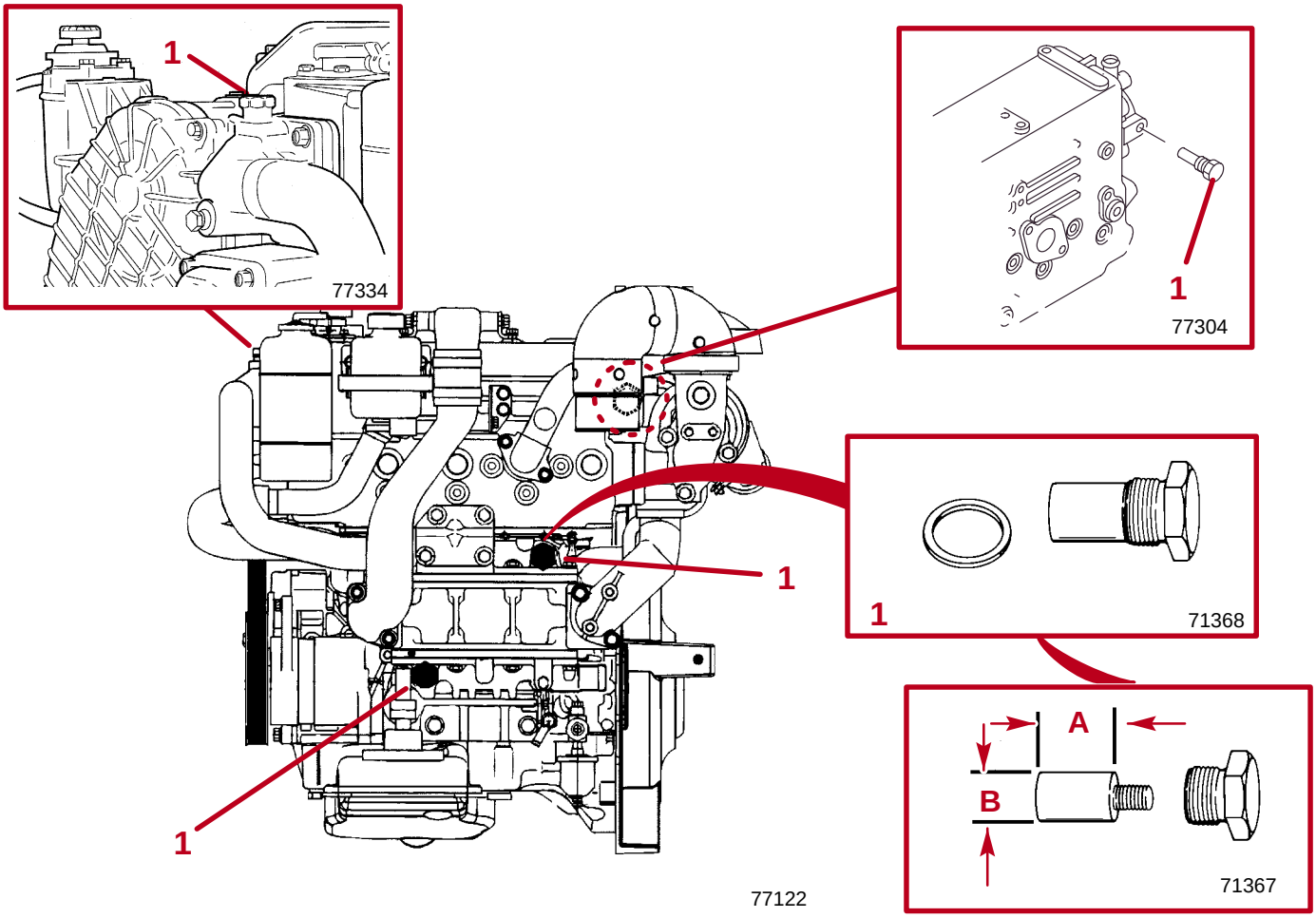
5. Slowly advance throttle until engine reaches 1300 rpm (+/– 100 rpm).

⚠ CAUTION

Watch temperature gauge on dash to ensure that engine does not overheat.

6. Operate engine with drive in NEUTRAL, for about 10 minutes or until discharge water is clear.
7. Slowly return throttle to idle speed position.
8. Stop engine
9. Shut off water and remove flushing attachment.

CD804



CD805

Corrosion And Corrosion Protection

INTERNAL COMPONENTS

1 There are anodes as part of the intercooler and heat exchanger systems, which serve as sacrificial anodes.

These sacrificial anodes are installed in the seawater circuit to help avoid electrolytic corrosion caused by seawater. There is one on the front and rear side of the heat exchanger and two on the intercooler.

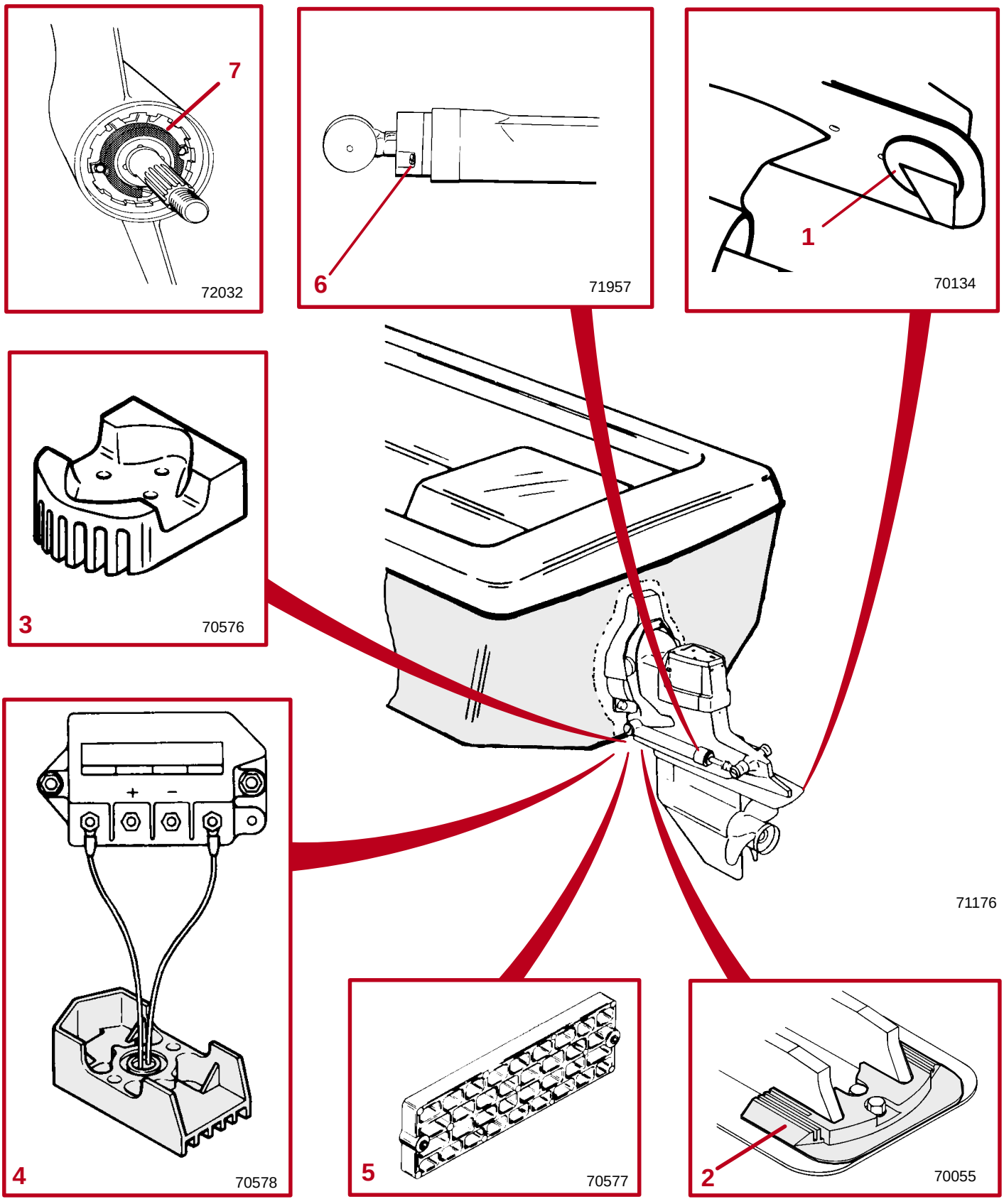
Inspection and replacement interval will vary depending on the condition of seawater and mode of engine operation.

2 Replace when eroded more than 50%. Check at least once yearly.

NOTE: *Remove deposits from surface of anode before trying to determine amount of erosion.*

A Length When New - 32 mm (1-1/4 in.)

B Diameter When New -15 mm (5/8 in.)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CD807

EXTERNAL COMPONENTS

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.

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

1 **Anodic Trim Tab -** serves as a sacrificial anode.

2 **Anodic Plate -** serves as a sacrificial anode.

3 **Block -** Is mounted to underside of gimbal housing and serves as a sacrificial anode.

4 **MerCathode System (if equipped) -** Electrode assembly replaces anodic block.

System should be tested to ensure adequate output.

Test should be made where boat is moored, using Quicksilver Reference Electrode and Test Meter. Contact your Authorized MerCruiser Dealer to arrange for this test.

5 **Anode Kit (if so equipped) -** Mounted to boat transom. Acts as a sacrificial anode.

CD679

6 **Trim Cylinder Anodes -** are mounted on each trim cylinder. To replace the trim cylinder anodes:

A Remove two screws from anode.

B Clean mounting surfaces down to bare metal for proper contact.

C Install new anode. Tighten screws securely.

CD808

7 **Bearing Carrier Anode (Alpha) -** is located in front of the propeller, between the front side of the propeller and the gear housing. Refer to Propeller section in this manual for propeller removal and installation. To replace the propeller anode:

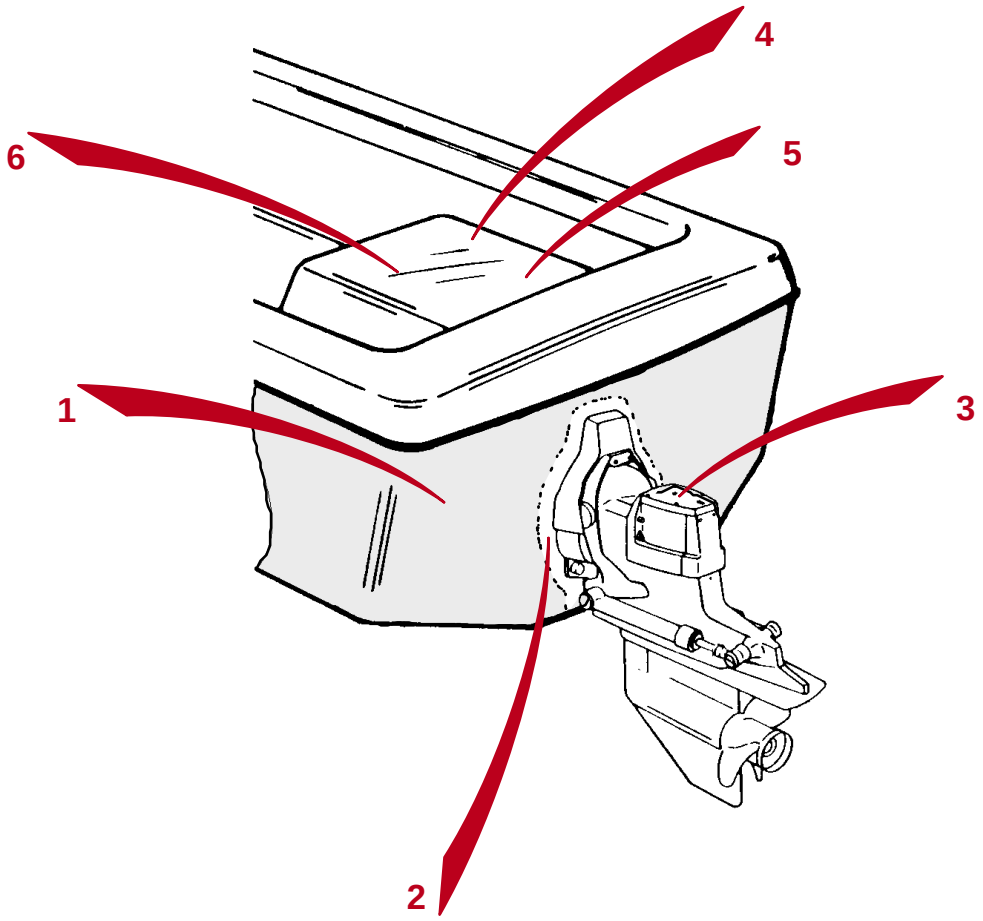
A Remove propeller.

B Remove two screws from anode.

C Clean mounting surfaces down to bare metal for proper contact.

D Install new anode. Tighten screws securely.

E Reinstall propeller. See Propeller Installation for proper tightening.



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CA168

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

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: Antifouling paint may be applied to boat hull and boat transom but you must observe the following precautions:

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:

2 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.

3 Painting Drive Unit or Transom Assembly: Drive 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.

4 Spray power package components on inside of boat every 2-3 weeks with Quicksilver Corrosion Guard to protect finish from dulling and corrosion. External power package components may also be sprayed.

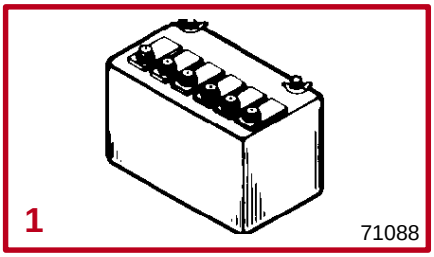
5 All lubrication points, especially steering system, shift and throttle linkages, should be kept well lubricated.

6 Flush cooling system periodically, preferably after each use.

CD15

Miscellaneous Maintenance

CD809



CA103

Battery

1 All lead acid batteries discharge when not in use. Recharge every 30 to 45 days. or when specific gravity drops below battery manufacturer's specifications.

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

⚠ WARNING

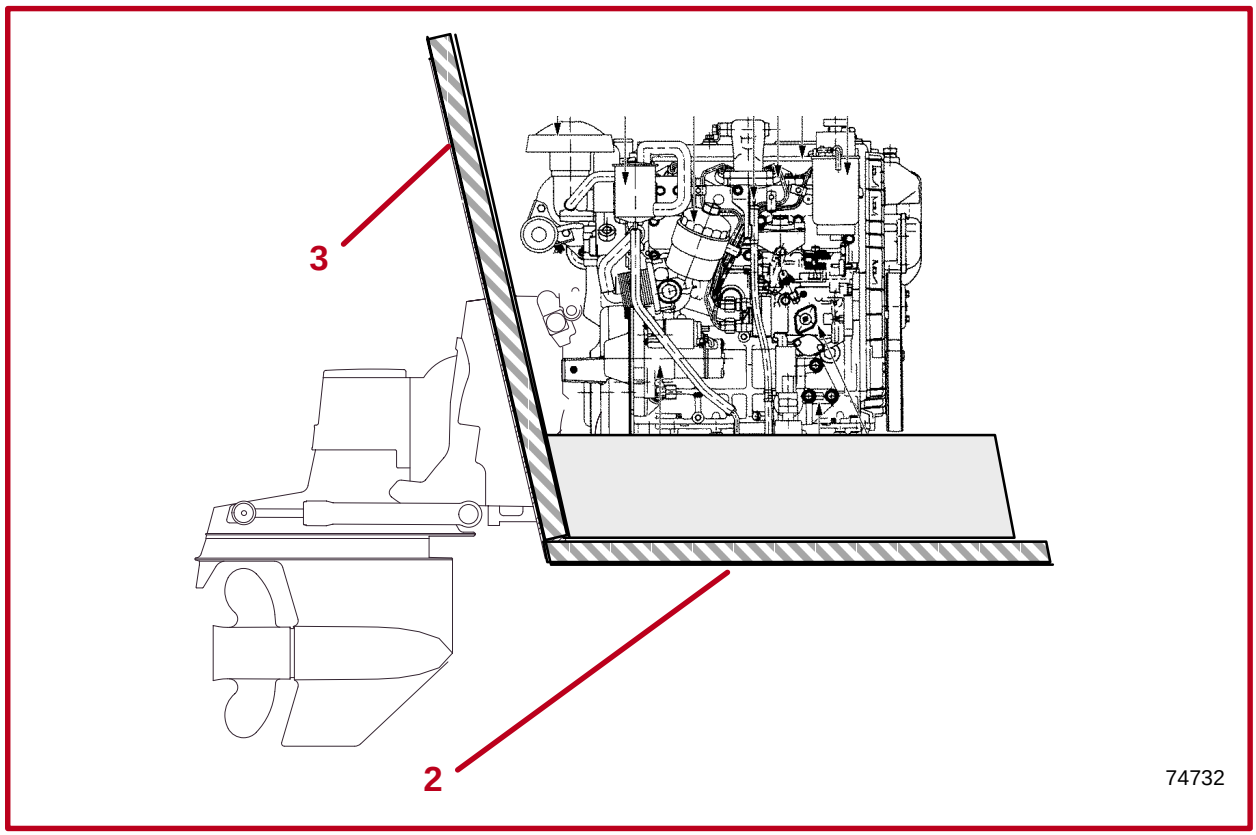
Do not use jumper cables and a booster battery to start engine. Do not recharge a weak battery in the boat. Remove battery and recharge in a ventilated area away from fuel vapors, sparks or flames.

⚠ WARNING

Batteries contain acid which can cause severe burns - Avoid contact with skin, eyes and clothing. Batteries also produce hydrogen and oxygen gasses when being charged. This explosive gas escapes fill/vent cell caps, and may form an explosive atmosphere around the battery for several hours after it has been charged; sparks or flames can ignite the gas and cause an explosion which may shatter the battery and could cause blindness or other serious injury.

Safety glasses and rubber gloves are recommended when handling batteries or filling with electrolyte. Hydrogen gases that escape from the battery during charging are explosive. When charging batteries, be sure area where batteries are located, is well-vented. Battery electrolyte is a corrosive acid and should be handled with care. If electrolyte is spilled or splashed on any part of the body, immediately flush the exposed area with liberal amounts of water and obtain medical aid as soon as possible.

CD810



CA104

Bottom Of Boat

2 To maintain maximum speed, the following conditions of the boat bottom should be observed:

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

ANTIFOULING PAINTS

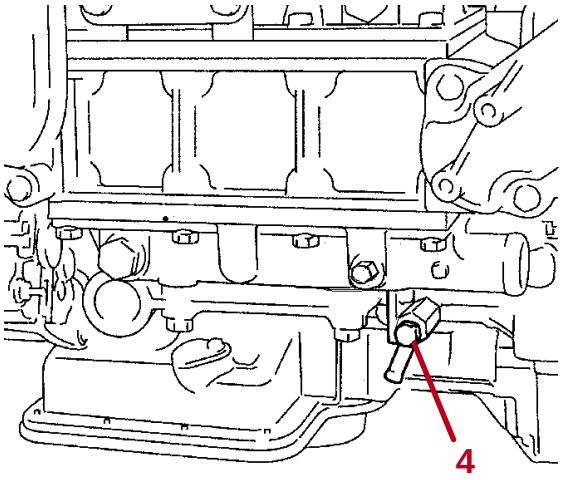
3 Refer to Antifouling Paint recommendations and related information on previous pages.

Refer to Corrosion And Corrosion Protection for additional information.

CD44

Cold Weather Or Extended Storage

CD811



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CD829

Power Package Layup

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

⚠ CAUTION

The engine must be prepared for long storage periods to prevent internal corrosion and severe damage.

⚠ CAUTION

DO NOT operate engine without water flowing thru seawater pickup pump, as pump impeller may be damaged and subsequent overheating damage to engine or drive unit may result.

IMPORTANT: If boat has already been removed from water, before starting engine a source of water must be supplied to water intake (inlet) openings. Follow all warnings and flushing attachment procedures stated in FLUSHING COOLING SYSTEM.

1 Supply cooling water to water intake (inlet openings) on sterndrive.

2 Start engine and run until it reaches normal operating temperature. Stop engine. Change oil and filter. Start engine and run for about 15 minutes. Check for oil leaks.

3 Flush cooling system. Refer to Flushing Cooling System procedure shown earlier in this manual.

⚠ WARNING

Do not remove coolant cap when engine is hot - coolant may discharge violently.

IMPORTANT: Closed cooling section must be kept filled year-round with the specified coolant.

IMPORTANT: Do not use Propylene Glycol Antifreeze in the closed cooling section of the engine.

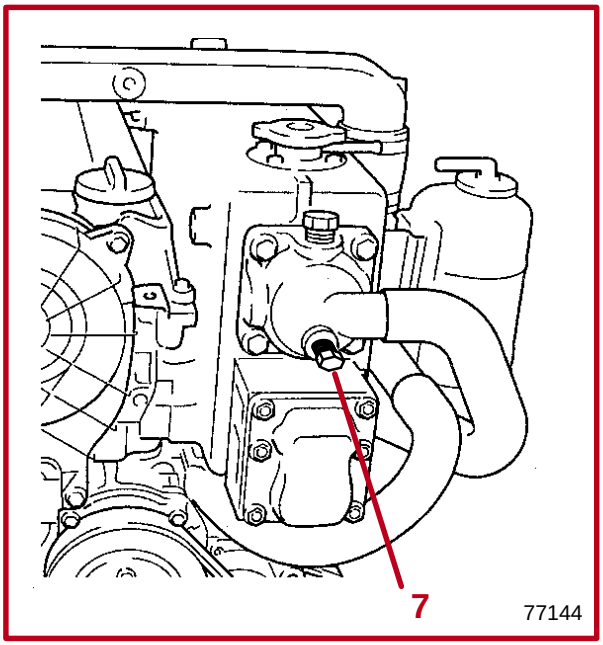
IMPORTANT: Drain seawater section of closed cooling system only.

4 Do not remove this drain plug. It is in the closed cooling circuit.

NOTE: *Refer to the following pages for continuation of specific draining instructions.*

CD812

Power Package Layup (Continued)



CD813

Drain seawater section of cooling system and prepare for cold weather or extended storage following these procedures:

DRAINING INSTRUCTIONS

⚠ CAUTION

If boat is to remain in the water, seacock, if so equipped, must remain closed until engine is to be restarted to prevent water from flowing back into seawater cooling system. If boat is not fitted with a seacock, water inlet hose must be disconnected and plugged to prevent water from flowing into cooling system and/or boat. As a precautionary measure, attach a tag to the ignition switch or steering wheel with the warning that the seacock must be opened or the water inlet hose reconnected prior to starting the engine.

IMPORTANT: Observe the following information to ensure complete draining of cooling system:

- **Engine must be as level as possible.**
- **A wire should be repeatedly inserted into all drain holes to ensure there are no obstructions in passages.**

5 Ensure engine is as level as possible to ensure complete draining of cooling system.

6 Close seacock, if so equipped, or disconnect and plug seawater inlet hose, if boat is to remain in the water.

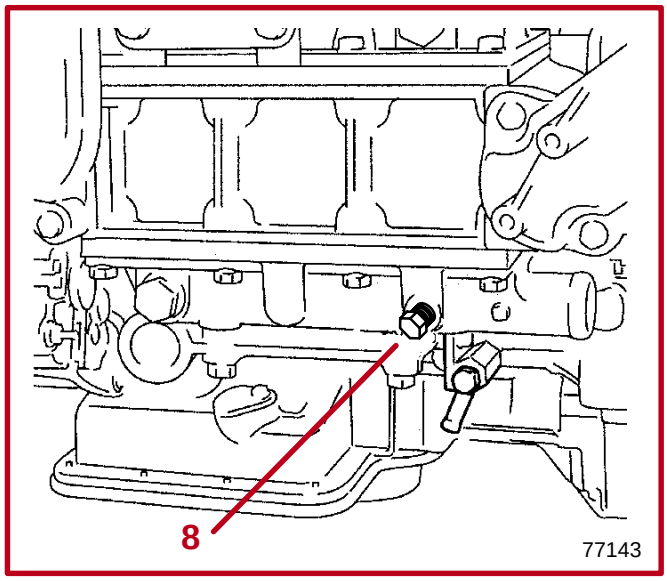
⚠ CAUTION

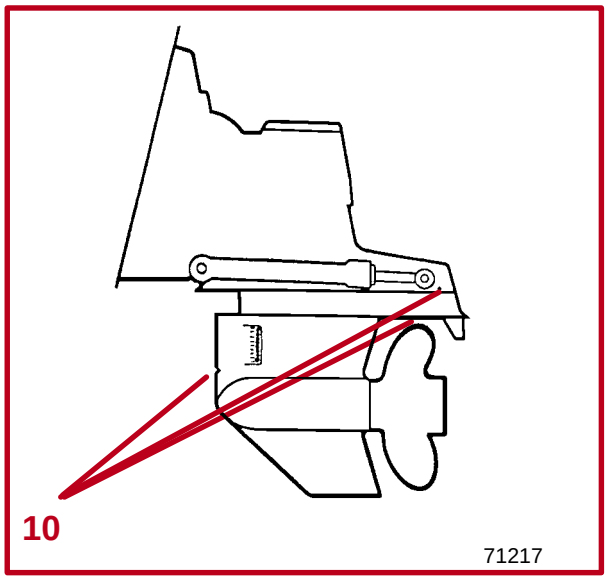
Avoid damage to heat exchanger and subsequent possible engine damage. Remove all water from heat exchanger sections. Failure to do so could cause corrosion or freeze damage to heat exchanger water passage tubes.

7 Remove drain plug from front cover of heat exchanger.

CD814

Power Package Layup (Continued)





CD815

8 Remove drain plug from lower part of intercooler.

9 Repeatedly clean out drain holes using a stiff piece of wire. Do this until entire system is drained.

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

⚠ CAUTION

Avoid water entering boat. Do not unplug seawater inlet hose unless a seacock is present and it is closed.

11 After seawater section of cooling system has been drained completely, coat threads of drain plugs with Perfect Seal and reinstall. Tighten securely.

CD816

Power Package Layup (Continued)

Dealer should perform the remaining tasks prior to layup:

12 After draining, perform all checks, inspections, lubrication and fluid changes outlined in Maintenance Schedules.

⚠ CAUTION

If boat is to remain in the water, seacock, if so equipped, must remain closed until engine is to be re-started to prevent water from flowing back into seawater cooling system. If boat is not fitted with a sea-cock, water inlet hose must be disconnected and plugged to prevent water from flowing into cooling system and/or boat.

13 Close seacock, if so equipped, or disconnect and plug seawater inlet hose, if boat is to remain in the water.

14 Clean seawater strainer, if equipped. Refer to Cleaning Quicksilver Seawater Strainer.

15 Clean engine and coat with Quicksilver Corrosion Guard.

16 Lubricate all cables and linkages.

17 Remove and store battery in a cool, dry place. Do not store on a concrete surface, or on the ground. Place on a dry, wood board or a thick plastic base (Refer to battery manufacturer's instructions.)

CD72

⚠ CAUTION

Stern drive unit should be stored in full "down" position. Universal Joint bellows may develop a "set" if unit is stored in raised position and may fail when unit is returned to service.

18 Place stern drive unit in the full DOWN / IN position.

Power Package Recommissioning

⚠ WARNING

To prevent possible injury or damage to equipment, do not install battery until all maintenance has been performed on engine.

1 Check that all cooling system hoses are in good condition, connected properly, and hose clamps are tight.

2 Replace fuel filter.

3 Bleed fuel system. Refer to Maintenance - Fuel System.

⚠ CAUTION

When installing battery, be sure to connect POSITIVE (+) battery cable to POSITIVE (+) battery terminal FIRST, and NEGATIVE (–) battery cable to NEGATIVE (–) battery terminal LAST. It battery cables are reversed, or connection order is reversed, electrical system damage will result.

4 Install fully-charged battery. Clean battery cable clamps and terminals and reconnect cables (see **CAUTION** listed above). Secure each cable clamp when connecting. Coat terminals with a battery terminal anti-corrosion spray to help retard corrosion.

5 Perform all checks on Operation Chart in the Starting Procedure column.

⚠ CAUTION

DO NOT operate engine without water flowing thru seawater pickup pump, as pump impeller may be damaged and subsequent overheating damage to engine or drive unit may result.

IMPORTANT: If boat has already been removed from water, before starting engine a source of water must be supplied to water intake (inlet) openings. Follow all warnings and flushing attachment procedures stated in FLUSHING COOLING SYSTEM.

6 Supply cooling water to water intake (inlet openings) on sterndrive.

IMPORTANT: After not having been operated for two months or longer, it is necessary to pre-lubricate the engine. To do this, hold the STOP switch engaged while you simultaneously turn the key switch to START position for 15 seconds. This will rotate the starter motor and engine/oil pump. During this process the engine will not run because no fuel is injected. Allow the starter motor to cool down for one minute and repeat the above described process. To avoid overheating the starter motor, do not engage starter motor for more than 15 seconds each time.

7 Pre-lubricate the engine if necessary. Refer to above Important information.

8 Start engine and closely observe instrumentation to make sure that all systems are functioning correctly.

9 Carefully inspect engine for fuel, oil, fluid, water and exhaust leaks.

10 Check steering system, shift and throttle control for proper operation.

CA442

Troubleshooting

Starter Motor Will Not Crank Engine, Or Cranks Slow

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

CD818

Engine Will Not Start, Or Is Hard To Start

Possible Cause	Remedy
Improper starting procedure	Read starting procedure.
Empty fuel tank or fuel shutoff valve closed	Fill tank or open valve.
Throttle not operating properly	Check throttle for freedom of movement.
Faulty electrical stop-circuit	Have Authorized Mercury MerCruiser Dealer service electric stop-circuit.
Clogged fuel filters	Replace filters.
Stale or contaminated fuel	If contaminated, drain 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.
Air in fuel injection system	Purge fuel injection system.
Glow-plugs or glow-plug system inoperative, if equipped	Test, and repair or replace components.
Injector / injector nozzle malfunction	Have inspected by an Authorized Mercury MerCruiser Dealer.
Incorrect injection timing	Have inspected by an Authorized Mercury MerCruiser Dealer.

CD819
Engine Runs Rough, Misses And/Or Backfires

Possible Cause	Remedy
Throttle not operating properly	Check throttle linkages for binding or an obstruction.
Idle speed too low	Check idle speed and adjust, if necessary.
Clogged fuel or air filters	Replace filters.
Stale or contaminated fuel	If contaminated, drain tank. Fill with fresh fuel.
Cracked, kinked or clogged fuel line or fuel tank vent line	Replace line, or remove line and blow out line with compressed air to remove obstruction.
Air in fuel injection system	Purge fuel injection system.
Injector / injector nozzle malfunction	Have inspected by an Authorized Mercury MerCruiser Dealer.
Injection pump governor malfunction	Have inspected by an Authorized Mercury MerCruiser Dealer.

CD820
Poor Performance

Possible Cause	Remedy
Throttle not fully open	Inspect throttle cable and linkages for operation.
Damaged or improper propeller	Replace.
Excessive bilge water	Drain and check for cause of entry.
Boat overloaded or load improperly distributed	Reduce load or redistribute load more evenly.
Boat bottom fouled or damaged	Clean or repair as necessary.
Air in fuel injection system	Purge fuel injection system.
Clogged fuel or air filters	Replace filters.
Fuel leakage from overflow valve	Have inspected by an Authorized Mercury MerCruiser Dealer.
Incorrect valve clearance adjustment.	Inspect and adjust valve clearance.
Deteriorated injection pump governor spring	Have inspected by an Authorized Mercury MerCruiser Dealer.
Uneven fuel injection amount between plungers.	Have inspected by an Authorized Mercury MerCruiser Dealer.
Cylinder compression pressure leakage	Have inspected by an Authorized Mercury MerCruiser Dealer.

CD821
Excessive Engine Temperature

Possible Cause	Remedy
Seacock closed or partially closed, if equipped	Fully open seacock.
Clogged or improperly installed seawater strainer	Clean or correct installation of seawater strainer
Drive belt loose or in poor condition	Replace and/or adjust belt.
Seawater pickups obstructed	Remove obstruction.
Faulty thermostat	Replace.
Coolant level low in closed cooling section	Check for cause of low coolant level and repair. Fill system with proper coolant solution.
Heat exchanger cores plugged with foreign material	Clean seawater side of water/water heat exchanger, and seawater strainer.
Loss of pressure in closed cooling section	Check for leaks. Clean, inspect and test pressure cap.
Closed cooling section dirty	Clean and flush.
Faulty seawater pickup pump	Repair.
Seawater discharge restricted or plugged	Clean exhaust elbow.
Seawater inlet hose kinked (restricted)	Position hose to prevent kinking (restriction).

CD822
Insufficient Engine Temperature

Possible Cause	Remedy
Faulty thermostat	Replace.

CD823
Turbocharger - Noisy Or Rough Operation

Possible Cause	Remedy
Poor lubrication / low oil pressure at turbocharger	Have inspected by an Authorized Mercury MerCruiser Dealer.
Entry of foreign materials from intake or exhaust side	
Rubbing of compressor or turbine impellers against housing	
Bearing failure	

CD824
Low Engine Oil Pressure

Possible Cause	Remedy
Faulty senders	Have system checked by an Authorized Mercury MerCruiser Dealer.
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, bad fuel pump, etc.).
Diluted or improper viscosity oil	Change oil and oil filter, using correct grade and viscosity oil. Determine cause for dilution (excessive idling, faulty fuel pump, etc.).

CD826
Battery Will Not Come Up On Charge

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

CD825
Remote Control Operates Hard, Binds, Has Excessive Free-play Or Makes Unusual Sounds

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

CA902

Steering Wheel Turns Hard Or Jerky

Possible Cause	Remedy
Low power steering pump fluid level.	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.	Drain and replace.

CA453

Power Trim Does Not Operate (Motor Doesn’t Run)

Possible Cause	Remedy
Blown fuse.	Replace fuse.
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.

CA454

Power Trim Does Not Operate (Motor Runs But Drive 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.

CA461

Owner Service Assistance

Local Repair Service

Always return your Mercury MerCruiser powered boat to your local Authorized Dealer, should the need for service arise. Only he has the factory trained mechanics, knowledge, special tools and equipment and the genuine Quicksilver parts and accessories* to properly service your engine should the need occur. He knows your engine best.

* Quicksilver parts and accessories are engineered and built by Mercury Marine, specifically for Mercury MerCruiser® stern drives 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.

Parts And Accessories Inquiries

All inquiries concerning Quicksilver replacement parts and accessories should be directed to your local Authorized Dealer. The dealer has the necessary information to order parts and accessories for you should he not have them 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 **motor model** and **serial number(s)** to order the correct parts.

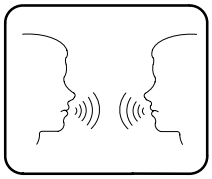
CB577

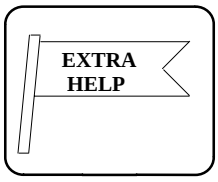
Resolving A Problem

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 additional assistance is required, take these steps.

1 *Talk with the dealership's sales manager or service manager. If this has already been done, then contact the owner of the dealership.*

2 *Should you have a question, concern or problem that cannot be resolved by your dealership, please contact Mercury Marine Service Office for assistance. Mercury Marine will work with you and your dealership to resolve all problems.*





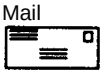
The following information will be needed by the service office:

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

Mercury Marine Service Offices are listed on the next page.

Mercury Marine Service Offices

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

Telephone 	Fax 	Mail 
United States		
(405) 743-6566	(405) 743-6570	Mercury MerCruiser 3003 N. Perkins Rd. Stillwater, OK 74075
Canada		
(905) 567-MERC (6372)	(905) 567-8515	Mercury Marine Ltd. 2395 Meadowpine Blvd. Mississauga, Ontario Canada L5N 7W6
Australia, Pacific		
(61) (3) 9791-5822	(61) (3) 9793-5880	Mercury Marine Australia 132-140 Frankston Road Dandenong,Victoria 3164 Australia
Europe, Middle East, Africa		
(32) (87) 32 • 32 • 11	(32) (87) 31 • 19 • 65	Marine Power - Europe, Inc. Parc Industriel de Petit-Rechain B-4800 Verviers Belgium
Mexico, Central America, South America, Caribbean		
(305) 385-9585	(305) 385-5507	Mercury Marine - Latin America & Caribbean 9010 S.W. 137th Ave. Suite 226 Miami, FL 33186 U.S.A.
Japan		
81-53-426-2500	81-53-423-2510	Mercury Marine - Japan 283-1 Anshin-cho Hamamatsu Shizuoka, 435-0005 Japan
Asia, Singapore		
5466160	5467789	Mercury Marine Singapore 72 Loyang Way Singapore 508762

CA463

Customer Service Literature

English Language

English language publications are available from:

Attn: Publications Department
Mercury Marine
W6250 West Pioneer Road
P.O. Box 1939
Fond du Lac, WI 54936-1939

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

When ordering be sure to:

1. List your product, model, year and serial number(s).
2. Check the literature and quantities you want.
3. Enclose full remittance in check or money order (NO C.O.D.'s).

CA781

Other Languages

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

caa781

Andre sprog

Kontakt det nærmeste Mercury Marine eller Marine Power International servicecenter for oplysninger om hvordan du kan anskaffe en Betjenings– og vedligeholdelsesmanual på et andet sprog. En liste med reservedelsnumre for andre sprog leveres sammen med din power–pakke.

cab781

Andere talen

Voor het verkrijgen van een Handleiding voor gebruik en onderhoud in andere talen dient u contact op te nemen met het dichtstbijzijnde internationale servicecentrum van Mercury Marine of Marine Power voor informatie hierover. Een lijst met onderdeelnummers voor andere talen wordt bij uw motorinstallatie geleverd.

cac781

Muut kielet

Saadaksesi Käyttö– ja huolto–ohjekirjoja muilla kielillä, ota yhteys lähimpään Mercury Marine tai Marine Power International huoltokeskukseen, josta saat lähempiä tietoja. Moottorisi mukana seuraa monikielinen varaosanumeroluettelo.

cad781

Autres langues

Pour obtenir un Manuel d’utilisation et d’entretien dans une autre langue, contactez le centre de service après–vente international Mercury Marine ou Marine Power le plus proche pour toute information. Une liste des numéros de pièces en d’autres langues accompagne votre bloc–moteur.

cae781

Andere Sprachen

Um eine Betriebs– und Wartungsanleitung in einer anderen Sprache zu erhalten, wenden Sie sich an das nächste Mercury Marine oder Marine Power International Service Center. Eine Liste mit Teilenummern für Fremdsprachen ist im Lieferumfang Ihres Motors enthalten.

caf781

Altre lingue

Per ottenere il manuale di funzionamento e manutenzione in altra lingua, contattate il centro assistenza internazionale Mercury Marine o Marine Power più vicino. In dotazione con il gruppo motore, viene fornito l’elenco dei codici prodotto dei componenti venduti all’estero.

cag781

Andre språk

Ytterligere informasjon om bruks– og vedlikeholdshåndbok på andre språk kan fås ved henvendelse til nærmeste internasjonale servicecenter for Mercury Marine eller Marine Power. En liste over delenumre for andre språk følger med aggregatet.

cah781

Outros Idiomas

Para obter um Manual de Operação e Manutenção em outro idioma, contate o Centro de Serviço Internacional de “Marine Power” (Potência Marinha) ou a Mercury Marine mais próxima para obter informações. Uma lista de números de referência para outros idiomas é fornecida com o seu pacote de propulsão.

caj781

Otros idiomas

Para obtener un Manual de operación y mantenimiento en otro idioma, póngase en contacto con el centro de servicio más cercano de Mercury Marine o Marine Power International para recibir información. Con su conjunto motriz se entrega una lista de los números de pieza para los otros idiomas.

cak781

Andra språk

För att få Instruktions– och underhållsböcker på andra språk, kontakta närmaste Mercury Marine eller Marine Power International servicecenter, som kan ge ytterligare information. En förteckning över artikelnummer på andra språk medföljer ditt kraftpaket.

CAm781

Αλλες γλώσσες

Για να αποκτήσετε ένα Εγχειρίδιο Λειτουργίας και Συντήρησης σε άλλη γλώσσα, επικοινωνήστε με το πλησιέστερο Διεθνές Κέντρο Σέρβις της Mercury Marine ή της Marine Power για πληροφορίες. Το πακέτο ισχύος σας συνοδεύεται από έναν κατάλογο αριθμών παραγγελίας για άλλες γλώσσες.

CA752
Ordering Literature

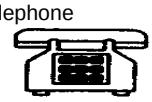
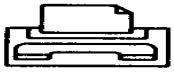
Before ordering literature, please have the following information about your power package available:

Model _____ **Horsepower**_____
Serial Number_____ **Year**_____

United States and Canada

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

Mercury Marine

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

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 MerCruiser power package and how to order that literature.

Owner’s Logbook

Date	Maintenance and Repair	Operating Hours

Owner’s Logbook

Date	Maintenance and Repair	Operating Hours

Owner’s Logbook

Date	Maintenance and Repair	Operating Hours